Department of Planning and Environment

Our ref: DOC22/1002286

Your ref: SSI-10035

Mr Keith Ng
Planning Group
Department of Planning and Environment
4 Parramatta Square
12 Darcy Street
PARRAMATTA NSW 2150

14 December 2022

Subject: EHG comments on Environment Impact Statement for Parramatta Light Rail – Stage 2- SSI-10035

Dear Mr Ng

Thank you for the email of 8 November 2022 requesting comments on the Environmental Impact Statement (EIS) for this State significant infrastructure proposal - SSI-10035.

The Environment and Heritage Group (EHG) appreciates the Department giving it an extension in which to provide its submission. The EHG comments and recommendations on the EIS are at Attachment A.

If you have any queries regarding this matter, please email rog.gsrplanning@environment.nsw.gov.au.

Yours sincerely,

S. Harrison

Susan Harrison

Senior Team Leader Planning
Greater Sydney Branch
Biodiversity and Conservation

Attachment A

Subject: EHG comments on the Environment Impact Assessment for Parramatta Light Rail Stage 2 - SSI-10035

The Environment and Heritage Group (EHG) has reviewed the following:

- Executive Summary
- Introduction
- Chapter 6 – Project description operation
- Chapter 7 – Project description construction
- Chapter 13 – Land Use and Property
- Chapter 16 of EIS – Biodiversity
- Chapter 17 of EIS - Water
- Appendix K – consolidated mitigation measures
- Technical Paper 9 - Biodiversity Development Assessment Report
- Technical Paper 10 – Hydrology, Flooding and Water Quality

and provides the following comments.

Flood

Flood impacts

Further design development should continue to aim to reduce the level of flood impacts to below significant levels, which is generally defined as 10mm increase in flood levels in the 1% AEP flood event. No rationale has been provided for allowing impacts of up to 20mm for commercial/industrial properties.

The EIS shows severe flood impacts at the eastern end of Grand Avenue, Camellia of up to 270mm. It is strongly recommended that the response to submissions (RtS) provides proof of concept that these impacts can be reduced through revised flood modelling including mitigation measures. This is to ensure a feasible measure exists prior to planning approval. There may be other areas of significant impacts where this additional work is needed. However, the information on which to assess this is not available, because the impacts are shown on figures at too coarse a scale and there are locations where the impacts in mm are not stated in the report.

Where flood modelling still predicts the project will have significant flood impacts even after further design work, consultation should be undertaken with landowners and, where relevant, tenants.

The cumulative flood impact assessment has adopted assumptions for developments and other projects that are far too conservative to enable any useful consideration of cumulative impacts. Namely, it appears that large areas have been blocked out of the flood model, which is an unrealistic assumption, not reflective of the approval requirements for these developments and projects. A cumulative impact assessment should use realistic assumptions or a proposed design. The RtS should refine the assumptions for the cumulative impact assessment. Areas where impacts are predicted due to the project such as the Camellia Waste Facility should be given due consideration. Areas that show no hydraulic interaction with the project such as the Viva Energy site do not need further consideration.

Table 5-2 Stormwater design categories. Under category S1, it is suggested that the project will rely on the upgrade of downstream stormwater systems by others to mitigate project impacts. This would only be acceptable where others already have a plan in place to upgrade that stormwater

infrastructure e.g., in a Floodplain Risk Management Plan or capital works plan of the City of Parramatta Council. Otherwise, the project must include provision for mitigating downstream impacts using onsite storage/detention of stormwater e.g., through underground tanks or above ground detention. This should be listed as an environmental mitigation measure. To clarify, this would be in addition to any on-site stormwater detention requirements associated with the project's own site area.

Flood risk and immunity
Table 5-1 Flood immunity standards. The critical infrastructure components that form part of the project should be stated in the table or elsewhere in the documents for accountability and transparency. These components should include critical communications equipment and a definition of why particular equipment would be critical.

Climate Change
The technical report (10) notes that climate change projections would be subject to review and update during design development using the latest rainfall intensity and sea level rise projections. In addition to using the latest data, the project should commit to using the latest version of the Floodplain Development Manual and associated guides. It is recommended that consideration be given to the 95th percentile projections for 2100 or mid-range projections for 2150.

Coastal Hazards
Although there is no coastal vulnerability area mapping for the Parramatta River, the project must still comply with the *Coastal Management Act 2016* and the *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP). Available information suggests most of the project area in Wentworth Point may be subject to estuarine inundation under future sea level rise. The risks associated with estuarine inundation have not been adequately considered per clause 2.12 of the SEPP. The project should map relevant estuarine inundation for the project, including under climate change conditions. These maps should then be used to assess the risks of estuarine inundation and respond with appropriate management measures, in accordance with the SEPP. The mapping should be undertaken for estuarine inundation plus sea level rise to 2100. As a minimum, mid-range and 95th percentile projections for SSPs 4.5 and 8.5 should be considered.

Development consent should not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land.

Open Space / Reserve land

Appendix K includes a mitigation measure (LV11) for the rehabilitation of public open space from temporary impacts. EHG supports the measure and recommends impacted open space is rehabilitated to improve local biodiversity.

Section 13.4.1 of the EIS states, “the project would provide new and improved open space and recreation facilities and repurpose some residual land. This would offset some of the areas of open space directly impacted by the project”. It would appear not all open space areas that are permanently impacted by the project will be offset.

For example, the EIS indicates for:

- Ken Newman Park - the project’s operational infrastructure would occupy about 17% of the total area of the reserve (Table 13.2)

- Koonadan Reserve (northern bank of the Parramatta River) - approximately 50% of the reserve would be restored and returned to public use while the other 50% would form part of the project's operational footprint.

Table 13.4 in the EIS estimates the permanent impacts on RE1 zoned land is 1.3ha, on C2 – Environmental Conservation is 1.2ha and C3 – Environmental Management zoned land is 1.8ha. Beneath this table under the heading 'recreation zoned land' it states, "it is estimated that about 2.7 ha of land currently zoned for public recreation uses (RE1) would be permanently required as part of the project's operational footprint." The RtS should clarify the total area of RE1 land that will be permanently impacted.

The EIS states "it is noted that the project would provide new active transport infrastructure, new and improved open spaces and recreation facilities, and would repurpose some residual land. This would offset the areas of open space directly impacted by the project's land requirements". The project should provide additional open space and conservation zoned land to offset the permanent loss of open space, public reserve and/or conservation zoned land. Existing reserve/open space areas provide opportunities for improve local biodiversity and amenity.

The RtS should clarify what is being lost and what is being offset.

Biodiversity

To adequately assess this SSI and mitigate impacts, the footprint and extent of works associated within ecological areas needs to be clearly defined in the EIS and not deferred to detailed design stage.

Several biodiversity mitigation measures are not being committed to and instead will only be implemented 'where reasonable and feasible' and 'as far as practicable'. This is the case for impacts from overhead wiring, light spill and the timing of works. EHG recommends that:

- where threatened fauna on Sydney Olympic Park Authority (SOPA) land are likely to be impacted, then the Biodiversity Management Plan that deals with these impacts be prepared in consultation with SOPA
- management measures for works adjacent to Newington Nature Reserve be developed in consultation with NPWS
- works which affect fauna habitat should be scheduled to avoid and minimise impacts during breeding periods on threatened and non-threatened native fauna including vegetation clearance, night works, the siting of lighting and noisy works that may disturb breeding populations and migratory shorebirds. This should be addressed in the Biodiversity Management Plan. A condition of consent should be included to this effect.

<u>Buildings and Microbats</u>

If any buildings are to be demolished because of the project, these structures should be surveyed for microbats, as microbats also occasionally roost in buildings. According to Section 7.2 of the EIS the site establishment works include removing redundant buildings and structures (as required), but no further details are provided in Chapter 7, nor is this addressed in Chapter 16 of the EIS.

Section 11.1.1 of the BDAR notes the project would result in direct impacts to 56.14ha of buildings, infrastructure, and hardstand while Section 12.3 states the project would result in direct impacts to 40.19ha of buildings, infrastructure, and hardstand but no further details are provided in the BDAR on these buildings or if surveys been undertaken. The RtS should address this and confirm the hectares of impact.

Parramatta River and Haslams Creek crossings

The project includes two new bridge crossings over the Parramatta River, between Camellia and Rydalmere and between Melrose Park and Wentworth Point. The alignment also crosses Haslams Creek via the existing bridge at Holker Busway, which is also part of the project.

The BDAR indicates construction of the bridges across the Parramatta River would reduce riparian connectivity through the removal of mangroves and may temporarily prevent the movement of terrestrial fauna along riverbanks. It states, "clearing of vegetation for bridge construction would result in the creation of a gap in riparian vegetation" (Table 9.10 of the BDAR) but notes there is likely to be some regrowth of mangroves following construction and it is unlikely that fauna movement would be permanently affected (section 9.2.4).

The BDAR indicates the project would remove a total 2.55ha of native riparian or floodplain vegetation, including mangroves (0.91ha), saltmarsh (0.05ha), Swamp Oak Forest (0.47ha) and Freshwater Wetlands (0.07ha) (Table 9.13). Table 9.14 also refers to the clearing of planted Sydney Turpentine Ironbark Forest.

The bridge design and construction of the bridge crossings should avoid and minimise impacts on existing native vegetation and riparian land. EHG supports the SSI project avoiding impacts by using existing cleared areas/ natural gaps in the vegetation and elevated work areas to limit disturbance and notes the inclusion of mitigation measures BD12 and BD15 in the EIS (see Table 16.13, pages 16.32 and 16.33):

BD12 Impacts on estuarine mangrove vegetation at Haslams Creek would to be avoided or minimised as far as practicable.
Works on the Holker Busway bridge would be undertaken via scaffolding attached to the bridge where practicable, rather than from the ground, to minimise impacts on estuarine mangrove vegetation.

BD15 …. The revegetation plan would include active revegetation of mangroves at the proposed bridges over the Parramatta River……

Whether or not the riparian corridor is currently vegetated with native vegetation, the EIS should assess the potential impact of the proposed bridge crossings on riparian land and the potential to rehabilitate and improve riparian connectivity. Mitigation measures need to be included to address this. Where riparian land is permanently impacted by the project it should be offset and details provided on this (see comments below).

EHG recommends that when the construction compounds at the Camellia -Rydalmere crossing (compound 2 and compound 3, see figure 7.8 – map 1) and Archer Park / Melrose Park/ Koonadan Reserve - Wentworth Point bridge (compound 8 and compound 9, see Figure 7.9 – map 2) are removed, any impacted riparian land (i.e., within 40m of the Parramatta River (measured from top of highest bank)) are replanted with local native species.

The EIS refers to the impact of shading from the bridge structures on native vegetation. In terms of operational impacts, Table 9.5 in the BDAR notes the proposed new bridges over the Parramatta River would create shade in areas adjacent to the project site that are not currently subject to shade. It indicates shading may have a greater impact on overall structure and function of mangroves and saltmarsh than the initial construction of the bridges, as shading by structures may adversely affect vegetation and overall net primary production (Struck et al 2004). It is assumed that any areas of vegetation that receive more shading once the bridges are built than they do now, are likely to die off or undergo substantial floristic or structural changes, rendering them in a poorer ecological state than they are now.

Chapter 23 of the EIS states "the bridge designs would continue to be refined during design development. The final bridge designs would be developed in accordance with the urban design requirements and in consultation with the project-specific Design Review Panel and key project stakeholders." The RtS should clarify whether the bridge design requirements will include features to allow vegetation to grow underneath the bridge structures. To assist mitigate the impact on riparian connectivity and vegetation, EHG recommends:

- the bridge design:
  - minimises shading impacts by considering the bridge height and width
  - is elevated to allow local native trees to grow under the structures
  - allows sufficient natural light and moisture to penetrate beneath the structures for plants to grow (see photo example below)
- advice is obtained from experienced habitat restoration professionals
- long term monitoring is undertaken to assess the impact of shading on the rehabilitation of riparian vegetation.

An example of a bridge at Lakes Environs (Waterside Green), Lakeview Drive Cranebrook with grates incorporated into the structure to assist in allowing light and moisture penetration for plant growth under the bridge

View under the bridge at Lakes Environs (Waterside Green) looking up at a grate incorporated into the structure

It is noted the proposed works include provision for bus access to the proposed bridge between Melrose Park and Wentworth Point (Table 6.1 of EIS), but the project would operate in a shared corridor across the proposed bridge between Melrose Park and Wentworth Point and along the Holker Busway, sharing the lane with buses (section 6.2.2). EHG supports a shared corridor across this bridge as this will reduce the required bridge width and will thereby assist in allowing moisture to penetrate beneath the bridge and decrease shading impacts.

Rehabilitation of disturbed riparian land

The EIS indicates the project crosses high biodiversity value land as identified on the Biodiversity Values Map (BV Map) under the *Biodiversity Conservation Act 2016* (BC Act) at the Parramatta River and Haslams Creek (Table 16.7) and that the main habitat corridors within the project site are the Parramatta River, Haslams Creek, and their associated riparian zones The BV Map identifies land with high biodiversity value that is sensitive to impacts from development and clearing.

Rehabilitation of riparian vegetation, fauna habitat, and connectivity along the river should be consistent with the Central City District Plan and the City of Parramatta Environmental Sustainability Strategy 2017 which both aim to protect and enhance the health of waterways including Parramatta's unique natural ecosystem. In addition, the EIS refers to the *Parramatta River Estuary Coastal Zone Management Plan* (Cardno, 2013) and a new coastal management plan for the Greater Sydney Harbour, including the Parramatta River, which is currently being developed in accordance with the requirements of the Coastal Management Act (see section 17.2.6). It indicates key relevant risk mitigation strategies identified in the plans include protection and reinstatement of riparian vegetation. In terms of improving local biodiversity, the SSI should reinstate riparian vegetation in accordance with these plans.

The RtS should provide details on the total area of riparian land which would be temporarily and permanently impacted. Riparian land temporarily disturbed by the project should be rehabilitated with locally occurring native provenance plant species. Where riparian land is permanently impacted, EHG recommended the total area of riparian land is offset by rehabilitating an equivalent riparian area with locally occurring native species either in the vicinity of the works site or elsewhere along the Parramatta River and Haslams Creek. The EIS has not addressed this.

The BDAR includes a mitigation measure involving active revegetation of mangroves at the two Parramatta River bridges following construction, considering future shading impacts (page 174). The rehabilitation should extend 40m from the top of the highest bank on either side of the Parramatta River and 20m from the top of the highest bank on either side for Haslams Creek. using plants from the native vegetation community that once occurred landward of the mangroves.

EHG recommends the RtS provides details on the following including a scaled map which locates:

- the project site boundary
- development footprint
- the top of highest bank along the watercourses
- the riparian corridor widths along the watercourses (measured from the top of the highest bank) in accordance with Natural Resource Access Regulator (NRAR) (2018) guidelines
- the proposed riparian widths to be provided
- the riparian land/area to be rehabilitated
- existing native vegetation
- the area of impact that the bridge crossings will have
- the vegetation communities that adjoin or once adjoined the mangroves at the bridge crossing locations.

The EIS includes a mitigation measure (LP10) that "land subject to temporary use will be rehabilitated as soon as practicable to the pre-construction condition (or as agreed with the landowner/landholder), taking into consideration the existing condition, location and land use characteristics". For riparian land/ reserve and open space areas that are not currently vegetated with local native species it is important the Rehabilitation Strategy improves and enhances local biodiversity by planting local native species and not just keeping the status quo of the pre-construction condition. The Rehabilitation Strategy that is to guide rehabilitation (see Mitigation Measure LP9) should address this.

Vegetation Management Plan

EHG recommends the following condition is included as a condition of consent to ensure riparian land is rehabilitated:

A Vegetation Management Plan shall be prepared and implemented by a suitably qualified ecologist/bush regenerator to protect, restore, maintain and manage riparian land along the Parramatta River and Haslams Creek. The plan should include:

- *a scaled plan which shows the location of:*
  - *the Parramatta River and Haslams Creek*
  - *top of highest bank*
  - *the riparian corridor widths (measured from the top of the highest bank)*
  - *existing native vegetation along the watercourses to be removed and retained*
  - *the site boundary and development footprint*
- *details on riparian land temporarily and permanently impacted*
- *details on offset areas to offset riparian land permanently impacted*
- *details on the native vegetation communities and plant species that occur or once occurred along these watercourses*
- *details of the project timelines for any vegetation clearing and vegetation reinstatement*
- *a list of plant species to be removed and details on whether the plants are exotic, non-local native species, or local natives*
- *procedures to demonstrate how plants and seed of local provenance are to be obtained and used – the plant species should be from the relevant native plant communities that occur or once occurred in this area*
- *the plan should demonstrate the plant species are of local provenance and specify that plants are to be propagated from locally sourced seeds to ensure genetic integrity*
- *details on the local native provenance plant species (trees, shrubs and groundcovers) to be planted – note a diversity of local species should be planted - a list of species should be provided and the plant community in which they occur*
- *details on revegetation works, including the location and number of trees and other plants to be planted, planting densities and species mix for replanting and demonstrate this is representative of the vegetation communities in its natural state/unmodified condition in this locality*
- *vegetation and tree protection measures to be employed.*

Maintenance Phase:

i. *Details on specific timeframes, performance monitoring (including the timing, number and frequency of visits); maintenance post completion of primary restoration works (including details on what the maintenance will entail, the duration, frequency and number of visits) and ongoing maintenance in perpetuity, performance measures, expected outcomes and responses.*
ii. *details on plant loss replacement – any plant loss should be replaced by the same plant species*
iii. *specific management responsibilities*
iv. *other necessary habitat management or improvement measures.*

Green and Golden Bell Frog

The BDAR notes several constructed ponds are present at Sydney Olympic Park which were created to form additional breeding habitat for the Green and Golden Bell Frog (GGBF) (Section 4.3.2). The EIS indicates Narawang Wetland includes constructed habitats designed for the GGBF, which were developed in the 1990s to offset impacts associated with development within Sydney Olympic Park (Table 16.7). As the alignment for the light rail project runs alongside Narawang Wetland and ponds

adjacent to Holker Busway, the BDAR states "Impacts on these wetlands constructed to provide habitat for the Green and Golden Bell Frog have been avoided as far as far as practical (Table 9.14 of the BDAR)" and that "there would be no temporary or permanent removal of ponds".

If lands that were protected as an offset for the Sydney Olympics are to be impacted by this project, then the values to be lost should also be offset.

Table 9.15 in the BDAR states "construction of the project will remove 0.72 hectares of habitat for this species, comprising areas of *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands, located immediately adjacent to Hill Road and Holker Street, as well as areas of saltmarsh, mangroves and Swamp Oak Forest. These would provide foraging habitat for this species. Breeding in these patches is unlikely given the high levels of disturbance from vehicles and pedestrians. The species may breed further in Narawang Wetland. It is unclear if these areas have been included in the species polygon.

Section 9.2.4 of the BDAR indicates excavation for the light rail tracks may impact GGBF underpass between Kronos Hill and Wentworth Common at Holker Busway, and the culvert between Narawang Wetland and Nuwi Wetland. It notes this may impact movement of GGBF for a 'short period', but no permanent impacts are likely. It is unclear what duration of time defines this short period and what exactly is to occur with the underpasses and whether the proposed works on the underpasses would disturb and impact the frog breeding ponds on either side of the underpasses.

Appendix K includes a mitigation measure (BD9) which states:

> BD9 Habitat connectivity and quality for the Green and Golden Bell Frog will be maintained during construction. This will include replacing any Green and Golden Bell Frog underpasses with the potential to be affected during construction with an equivalent structure, in consultation with Sydney Olympic Park Authority

The EIS states that the bridge works will result in no temporary or permanent removal of ponds. However, the EIS indicates the project works include duplication of the Hill Road Bridge. This would require removal of Narawang Wetlands Ponds N22 and N17, as well as indirect impacts on connected ponds. The RtS should confirm if the bridge works will result in any temporary or permanent impacts to the ponds.

Details are required on the duration of the proposed construction works (including any proposed temporary /short period works) which have the potential to impact GGBF habitat, as the temporary nature of some works may be long enough to be permanent in a frog's life cycle.

The BDAR also indicates the project would:

- remove linear strips of potential foraging and movement habitat for the Green and Golden Bell Frog from adjacent to Newington Nature Reserve at the southern landing of the bridge between Melrose Park and Wentworth Point, along Hill Road (including areas adjacent to the Narawang Wetland), alongside the Holker Busway (e.g., Kronos Hill), and adjacent to Australia Avenue (the area near the Brickpit) (Table 9.15). It notes these tend to be disturbed areas adjacent to roads and footpaths.
- the bridge crossing at Wentworth Point will shade Green and Golden Bell Frog habitat (Figure 11.1b in the BDAR). It is noted the BDAR recommends a credit requirement for shading impacts, which EHG supports
- the project has the potential to spread the noxious fish *Gambusia holbrooki* into currently fish-free breeding ponds because of changes to flooding regimes (Table 9.13). The BDAR states "a flood management strategy would be prepared to build on the flood assessment in

Technical Paper 10 (Hydrology, Flooding and Water Quality) and inform design development by minimising flooding impacts to flood sensitive areas and infrastructure within Sydney Olympic Park, including the Narawang Wetland, the Brick Pit and the existing leachate management system. This would help to limit the potential for movement of *Gambusia holbrooki* into breeding ponds where it does not currently occur".

EHG notes the requirement to prepare a Flood Management Study has been included as a mitigation measure in Table 10.1 of the BDAR. EHG recommends a condition of consent is also included which requires this flood management strategy to be prepared to ensure the potential for movement of *Gambusia holbrooki* into breeding ponds is prevented and adequately addressed.

The BDAR states that given the fidelity of local populations to suitable wetland habitat, impacts from vehicle strike and fragmentation are likely to be low. However, EHG considers this assessment has not considered the impacts of these factors on migration and dispersal of individuals.

Table 9.4 (indirect impacts) and Table 9.5 (operational impacts) of the BDAR does not include any specific consideration of the impacts of noise and light on the GGBF. For example, it does not consider that noise can alter the calling pattern of male frogs. It also fails to consider that the removal of trees along Hill Road will increase the light and disturbance to Narawang Wetland. This needs to be assessed.

The BDAR recommends that a Biodiversity Management Plan is prepared, including relevant subplans such as threatened species management plans. EHG considers the management plan for the GGBF should be prepared by a suitably qualified and experienced herpetologist.

The RtS should provide details on what works will potentially impact GGBF ponds, underpasses, and foraging habitat and the mitigation measures to be used to ensure the success of maintaining a population of GGBF at the site The mitigation measures should be developed in consultation with suitably qualified ecologist with demonstrated experience with GGBF and their habitat requirements.

If impacts to existing GGBF habitat can't be avoided and minimised and the existing habitat protected, it is recommended alternative and additional habitat needs to be created at Sydney Olympic Park to maintain the viability of the Parramatta Key Population. The creation of the additional habitat should be provided before any clearing and construction works commence for this SSI. A suitably qualified and experienced ecologist and SOPA should be involved with identifying suitable locations and the design of this additional habitat. Monitoring of this additional habitat should be undertaken in accordance with the ecologists and SOPA's advice. A condition of consent should be included to this effect.

Tree removal

The SEARs for this SSI require the proposal to achieve a net increase in tree numbers and canopy. Mitigation Measure (LV3) indicates a tree register will be prepared by a qualified arborist to identify all trees with the potential to be impacted (see Appendix K). In addition to identifying the number of trees impacted, EHG recommends that prior to any tree clearing an inventory of trees and tree hollows to be removed needs to be undertaken including details on the:

- the total number of trees to be removed
- the type and size of trees
- the tree species and whether the trees are native to the local area/ non-local natives/ exotic/ and invasive
- size, type, number, and location of tree hollows to be removed.

The EIS states "the trees within/close the project site consist of a mix of locally indigenous species, Australian native species, and exotic ornamental or invasive specimens" (section 15.2.4). EHG recommends the project:

- aims to avoid and minimise the removal of existing locally indigenous species
- removes invasive trees and replaced with local natives.

Loss of hollow bearing trees

The EIS states the "removal of mangroves would result in the loss of many small hollows suitable for microbats and other smaller fauna" (Table 16.9 of EIS - also see Section 12.2 of the BDAR). It is unclear how many hollows in total are to be removed by the project. It indicates alternative resources would be available in mangroves present in adjacent areas, including along the Parramatta River, Haslams Creek, and the Badu Mangroves (table 16.9). It is unlikely that tree hollows in adjacent areas would provide alternative habitat for fauna impacted by the loss of trees hollows, as the hollows in adjacent areas are likely to already be used by other native fauna.

Table 9.13 of the BDAR notes "the project would result in the removal of hollow-bearing trees, predominantly from mangroves. No large hollows suitable for owls or cockatoos would be removed. The implementation of fauna management measures would minimise potential impacts on fauna as a result of the removal of hollow-bearing trees (see Section 10.2)". The management measures in Table 10.1 of the BDAR however do not provide certainty that replacement nest boxes will be provided as it states "the use of nest boxes appropriate for use by microbats may also be investigated as an option, however, needs to take into account durability of nest boxes and appropriate location of installation", although Table 10.1 then states the need for additional nest boxes in the Millennium Parklands to replace lost habitat along Hill Road and Holker Busway would be determined in consultation with SOPA ecologists (page 173).

EHG agrees the need for nest boxes to replace lost habitat should be determined in consultation with SOPA ecologists but to undertake consultation on replacement nest boxes details need to be provided on the number, size, type and location of existing tree hollows that are proposed to be removed (see below).

Replacement nest boxes and/or artificial hollows using a HollowHog tool (https://www.hollowhog.com.au/) should be installed prior to removal of any existing tree hollows and the release of any hollow dependent fauna.

Mitigation Measure BD8 in Table 16.13 of the EIS should be amended so the nest boxes installed are appropriate for use by microbats and small fauna (see Table 16.13) as Section 16.2.2 of the EIS indicates the tree hollows observed are suitable for microbats and small fauna (page 16.11).

The proposed removal of trees is also likely to remove the potential supply of future hollows that would be expected to form in time. Table 9.14 in the BDAR acknowledges that the removal of vegetation reduces the area for creation of future habitat features such as hollows which are a critical resource for many fauna species, but it does not address how this issue is to be mitigated (page 162). It is recommended the RtS address this issue.

Pre-clearance fauna surveys and relocation of native fauna

EHG recommends the following conditions of consent are included:

- ***Prior to the removal trees, pre-clearance surveys need to be undertaken by a suitably qualified and experience ecologist** to delineate, map, and mark habitat-bearing trees and shrubs to be*

retained/removed and other fauna habitat features and determine the presence of any native fauna using nests, dreys, hollow-bearing trees etc

- *Where tree hollows are to be removed, and/or hollow dependent native fauna are found using the hollows compensatory nest boxes and/or artificial hollows using a HollowHog tool (https://www.hollowhog.com.au/) should be provided prior to removing the tree hollows and the release of the hollow dependent fauna unless the removed tree hollows can be relocated and installed on the same day they are removed.*
- *A suitably qualified ecologist should:*
  - *provide details on the size, type, number, and location of replacement nest boxes and/or artificial hollows required – this would be based on the results of the pre-clearing survey*
  - *to provide alternate habitat for hollow-dependent fauna displaced during clearing install replacement nest boxes and/or artificial hollows in trees being retained nearby prior to any vegetation removal (preferably one month prior)*
  - *salvage and relocate the tree hollows approved for removal to appropriate locations on the same day the tree hollows are removed and prior to the release of any native fauna found using the tree hollows*
  - *safely remove native fauna found to be occupying trees prior to clearing of trees and relocate fauna to appropriate nearby suitable habitat*
  - *install other habitat features such as logs on the ground.*

The clearing of trees and shrubs should be avoided in late winter/spring during breeding/nesting period for birds.

Evidence *of the pre-clearing surveys and inspections for fauna and any relocation of fauna must be provided to the satisfaction of the Secretary of Planning.*

Reuse of removed trees

To enhance habitat, native trees approved for clearing can be placed in the riparian corridors and other appropriate areas. EHG recommends the inclusion of the following condition of consent:

- *Any native trees required to be removed from the site shall be salvaged including tree hollows, tree trunks (greater than approximately 25-30cm in diameter and 2-3m in length) and root balls and placed in the local reserves and riparian corridors to enhance habitat.*

  If removed native trees are not able to be entirely re-used by the project, the proponent should consult with local community restoration/rehabilitation groups, Landcare groups, and relevant public authorities including SOPA, NPWS, local councils, and Greater Sydney Local Land Services prior to removing any native trees to determine if the removed trees can be reused in habitat enhancement and rehabilitation work. This detail including consultation with the community groups and their responses must be documented

Net increase tree numbers and canopy

Mitigation Measure (LV5) indicates a tree offset strategy will be developed to offset the loss of trees and achieve a net increase in tree canopy. It should be noted the SEARs requires the proposal to achieve a net increase in both tree numbers and canopy and it is recommended Mitigation Measure LV5 is amended to be consistent with the SEARs and that the tree offset strategy addresses this.

EHG recommends the replacement trees comprise a diversity of local native provenance species from the relevant vegetation community that once occurred in this locality.

Tree replacement ratio
EHG recommends that the trees removed (which are not covered by a biodiversity offset strategy) are replaced at a ratio of greater than 1:1 as the removal of existing trees and the benefits that they provide, will take decades for a juvenile tree to grow and replace. This will assist to mitigate impacts on local biodiversity, urban tree canopy and heat island effect.

A replacement ratio of greater than 1:1 is also consistent with the SEARs which requires the proposal to achieve a net increase in both tree numbers and canopy. EHG recommends a condition of consent is included to this effect.

Operational Impacts

Light and Noise
EHG is concerned about the long-term operational impacts of light and noise on native fauna within the Sydney Olympic Park environs, river crossings and the Newington Nature Reserve. EHG recommends adequate mitigation measures are implemented to lessen long term impacts on native fauna including the White-bellied Sea-eagle, Powerful Owl, migratory waders, and the Grey-headed Flying-fox. It is recommended a condition of consent is included to this effect as the mitigation measures included in Table 10.1 of the BDAR do not include a specific measure for 'noise impacts' although it does refer to the use of noise barriers under the 'timing impact' etc

The mitigation measures included for lighting in Table 10.1 of the BDAR do not provide certainty that these measures will be implemented as it only states "Opportunities to minimise light spill to ecologically sensitive areas along Hill Road, the Holker Busway and adjacent to the Newington Nature Reserve would be investigated and implemented where reasonable and feasible, with regard to the *National Light Pollution Guidelines for Wildlife* (Department of the Environment and Energy 2020), SOPA environmental guidelines, the Parklands Plan of Management, and Biodiversity Management Plan. Any new lighting should use adaptive light controls where possible to manage timing, intensity and colour of light."

Overhead wiring
Table 6.1 in the EIS indicates overhead wiring is proposed along most of the alignment. The EIS indicates investigations would be conducted during design development to assess the potential to incorporate wire-free design at visually sensitive environments, or areas where existing above-ground infrastructure and significant trees need to be retained (section 6.7.4).

EHG recommends overhead wiring is removed or minimised where native fauna such as birds and bats could be impacted, and the project should not just consider removing overhead wiring from residential areas to mitigate visual impacts.

The BDAR includes a key mitigation measure for "minimising of overhead wiring adjacent to Newington Nature Reserve, along Holker Busway and Hill Road to limit impacts on the Grey-headed Flying-fox, White-bellied Sea-eagle and migratory waders". EHG notes the relevant sections in the BDAR where this measure is included does not list removing wiring from the two new Parramatta River bridge crossings to mitigate potential impacts on native fauna (see Executive Summary on page vi and Section 9.1, 12.4 of BDAR).

EHG notes Section 10.2 of the BDAR includes the following mitigation measure:

> The need for over-head wiring would be carefully considered at each stage, and where possible, alternative power options would be implemented in areas adjoining Grey-headed Flying-fox foraging habitat, or flight paths of the White-bellied Sea-eagle and migratory waders. Opportunities to minimise overhead wiring through ecologically sensitive areas would be investigated and implemented where reasonable and feasible.

The Biodiversity Mitigation Measures (BDM) in the EIS includes the following measure (BD4) which implies that as far as practicable the use of overhead wiring would be minimised on the bridges over the Parramatta River (see Table 16.13):

> BD4 The use of overhead wiring would be minimised as far as practicable in areas adjoining Grey-headed Flying-fox foraging habitat and the flight paths of the White-bellied Sea-eagle and migratory waders, particularly on the bridges over the Parramatta River, adjacent to Newington Nature Reserve, and around Hill Road and the Holker Busway.

EHG recommends the mitigation measures in the BDAR are amended to include the requirement to remove/minimise the use of over-head wiring from the new bridges, particularly as BD8 in the EIS (see Table 16.13) includes:

> BD8 The design of the proposed bridges over the Parramatta River, and works to bridges in Sydney Olympic Park, would include provision for bat-friendly roost features.

EHG is concerned that encouraging bats to roost on the Parramatta River bridges has the potential to increase the potential for collision with the overhead wires if they are there. The BDAR proposes the preparation of a microbat management plan which would include installation of next boxes or inclusion of bat-friendly roosts in the design of bridge structures to mitigate the loss of hollows because of mangrove clearing (page 136). EHG does not consider the BDAR has adequately addressed this issue.

While Section 9.4 in the BDAR states “further investigations would be conducted during design development in consultation with key stakeholders to assess the potential to incorporate wire-free power in other locations, such as along Hill Road and on bridges over the Parramatta River” (see Table 9.5), the inclusion of this statement provides no certainty that wire-free power will be incorporated along Hill Road and on the bridges over the Parramatta River. This is despite Table 9.5 acknowledging there is a risk of collision with wires where White-bellied Sea-eagles are travelling between roosting and foraging locations, and when foraging along the Parramatta River, where the new bridges and associated wires would pose a new obstacle. Powerline spans may pose a higher collision risk if located directly along flight paths between the nest and foraging areas (Rollan et al, 2010).

The EIS states that “Fauna species at risk of collision or electrocution from powerlines, or in the case of the project, catenary overhead wiring, could include raptors (birds of prey), migratory species (if wires cross their natural migration pathways), Grey-headed flying-foxes, and the White-bellied Sea-eagle. However, there would be a relatively minor increase in risk of injury and mortality for these species given the presence of existing overhead wiring and/or other built structures throughout the project site” (see Section 16.4.4). EHG disagrees with this statement about the relatively minor increase in risk of injury and mortality for these species. The cumulative impact of this SSI installing additional wiring with existing overhead wiring and/or other built structures throughout the project site needs to be addressed.

EHG has been advised by NPWS and SOPA that the White-bellied Sea-eagles at the Newington Nature Reserve are under threat because their eaglet fledglings while learning to fly are flying into the buildings at Wentworth Point and are breaking their wings and limbs. EHG is concerned that the new bridges with overhead wiring place migratory waders and other birds including the White-bellied Sea-eagle fledglings, microbats and flying foxes at risk of collision and electrocution from the wiring.

EHG recommends a condition of consent is included which requires:

> ***The use of overhead wiring along the PLR alignment must be excluded from areas adjoining patches of vegetation that constitute Grey-headed Flying-fox foraging habitat and the flight paths of the White-bellied Sea-eagle, migratory waders, and other flying fauna, particularly on the bridges over the Parramatta River, adjacent to Newington Nature Reserve, and around Hill Road, Narawang Busway and the Holker Busway.***

Monitoring of the White-bellied Sea-eagle

Table 10.1 in the BDAR includes a mitigation measure that ongoing monitoring of the White-bellied Sea-eagle would occur during the first two years of operation to assess this species' behavioural response to the new infrastructure. EHG notes Appendix K includes:

- mitigation measure BD16 which requires a fauna monitoring program to be developed and implemented during construction and includes monitoring of the White-bellied Sea-eagle to construction noise
- mitigation measure BD18 which will monitor the behavioural response of the White-bellied Sea-eagle to operation and it indicates the monitoring will be in consultation with Sydney Olympic Park Authority ecologists and Birdlife Australia.

EHG requests that it is also consulted regarding this monitoring program.

Based on the findings of the first 2 years of operational monitoring it is recommended this monitoring continues for a minimum of 5 years. The monitoring data should be made publicly available in annual reports and made available online and published in scientific literature. It is important that TfNSW makes its monitoring data available for other projects to benefit.

EES recommends the mitigation measure (BD18) is amended to reflect this and the condition of consent include this requirement

Grey-headed Flying-fox

Table 16.13 in the EIS includes the following mitigation measure:

> BD5 The planting of feed trees for the Grey-headed Flying-fox will be considered to improve habitat values at Wentworth Point and Sydney Olympic Park, with a particular focus on locally indigenous winter-flowering species, such as Forest Red Gum (*Eucalyptus tereticornis*), Spotted Gum (*Corymbia maculata*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*).

It should be noted, the planting of feed trees and roosting habitat for Grey-headed Flying fox is not recommended near residences at Wentworth Point. The OEH Living with grey-headed flying foxes fact sheet advises to plant food trees preferred by flying-foxes away from houses.

Wilsonia backhousei and Coastal saltmarsh

The EIS states "Newington Nature Reserve contains the largest remaining stand of Coastal Saltmarsh on the Parramatta River" (section 16.2.5). It indicates the known locations of the Narrow-leafed Wilsonia are outside the project site and would not be directly impacted but may be at risk of indirect impacts during construction (section 16.3.1).

Table 9.11 in the BDAR states "changes to hydrology have the potential to impact on the persistence of Saltmarsh vegetation, and in particular, an increase in flooding frequency, duration or flood height has the potential to result in reductions to the extent of *Wilsonia backhousei* within Saltmarsh vegetation at the northern end of Newington Nature Reserve". It notes "Flood modelling indicates that there would likely be a slight increase in the height of flooding in Newington Nature Reserve as a result of the project … which over time may influence the extent of Saltmarsh and

Wilsonia backhousei." EHG recommends long term hydrological monitoring is undertaken by the applicant to use as a to guide for any future rehabilitation works.

The BDAR includes a mitigation measure that monitoring of indirect impacts on mangroves, saltmarsh and the *Wilsonia backhousei* population would be undertaken during and following construction. If an incident occurs which directly or indirectly impacts *Wilsonia backhousei* habitat areas during construction, monitoring by a suitably qualified expert is required to determine the severity and potential need for additional offsets under the (page 174). EHG notes this measure is included as a mitigation measure (BD17) in Table 16.13 in the EIS, but this Table needs to be amended under 'timing' to list that the monitoring is to be undertaken both during construction and post construction.

Site landscaping and use of native provenance species

EHG recommends vegetation that is approved for removal is replaced by a diversity of local provenance native trees, shrubs and groundcover species from the relevant native vegetation community (or communities) that occur or once occurred along the project site and the plants are of local provenance to ensure genetic integrity s and the Landscape plans /plant species lists are prepared in consultation with SOPA.

The BDAR (Section 5.2) refers to modified soil structures in the parkland which may not be appropriate to plant species indigenous to the Homebush Bay area. It is recommended the RtS provides further details on the suitability of using local provenance species along the PLR2 alignment route including the rehabilitation of the riparian corridors and details on any locations where using local natives may not be possible due to modified soils. If it is appropriate to use local provenance EHG recommends mitigation measure BD6 is amended to reflect this. It is recommended the Landscape Plans for the project are prepared and implemented by an appropriately qualified bush regenerator/ecologist.

The EIS should demonstrate that enough space is available to accommodate existing trees that are to be retained and any trees to be planted so trees can grow to maturity without the need for lopping /trimming. Lopping trees removes the potential for tree hollows to form.

EHG recommends any trees to be planted are advanced or established local native species where they are commercially available to increase urban tree canopy cover. Other local native tree species which are not commercially available may be sourced as juvenile sized trees or pre-grown from provenance seed. EHG recommends the non-commercially available species of trees are propagated as soon as possible.

Mitigation Measure BD15 proposes active revegetation of mangroves at the proposed bridge crossings over the Parramatta River. As noted above the rehabilitation and revegetation of riparian land should also plant the native vegetation community that once occurred landward of the mangroves. Details should be provided on the vegetation communities that adjoin the mangroves at these crossing locations.

It is suggested the following conditions of consent are included:

- ***Where soil structures are appropriate to do so any planting, landscaping or rehabilitation shall use a diversity of local provenance native trees, shrubs and groundcover species from the relevant native vegetation community (or communities) that occur or once occurred in this locality rather than use exotic species or non-local native species.***

- *Tree planting shall use advanced and established local native trees species which are commercially available. Other local native tree species which are not commercially available may be sourced as juvenile sized trees or pre-grown from provenance seed.*
- *Enough area/space is provided to allow the trees to grow to maturity.*
- *A Landscape Plan is to be prepared and implemented by an appropriately qualified bush regenerator/ecologist and include details on:*
  a. *the suitability of using local provenance species for planting along the PLR2 alignment route where it is appropriate to use (i.e., there are no modified soils)*
  b. *native vegetation community (or communities) that once occurred along the project site and the plan demonstrates that the proposed plant species are from the relevant vegetation community. Local provenance tree, shrub and groundcover species are to be used*
  c. *the locations where using local natives are not appropriate due to modified soils*
  d. *seed collection – the location of all native seed sources should be identified*
  e. *the type, species, size, quantity, and location of replacement trees*
  f. *the species, quantity and location of shrubs and groundcover plantings*
  g. *the area/space required to allow the planted trees to grow to maturity*
  h. *trees removed from the site that are not covered by a biodiversity offset strategy must be replaced at a ratio greater than 1:1*
  i. *plant maintenance regime. The planted vegetation must be regularly maintained and watered for 12 months following planting. Should any plant loss occur during the maintenance period the plants should be replaced by the same plant species.*

End of Submission