Appendix F

Assessments of Significance
Assessments of Significance

TSC Act

The Threatened Species Conservation Act 1995 (TSC Act) specifies a set of seven factors which must be considered by decision makers in assessing the effect of a proposed development or activity on threatened species, populations or ecological communities, or their habitats. These factors are collectively referred to as the ‘seven part test’.

The seven factors are addressed below to determine whether there will be a significant impact on any of the TSC-listed threatened species and vegetation communities found in the study area, including:

- Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion (ILGW) (EEC)
- Freshwater Wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (FW) (EEC)
- Eastern Flame Pea (Chorizema parviflorum Benth.) in the Wollongong and Shellharbour Local Government Areas (E Population)
- Green and Golden Bell Frog Litoria aurea (V)

For the purposes of these assessments, the following definitions apply:

- The **study area** is the area surveyed for the purposes of the Albion Park Rail bypass EIS. In the initial surveys, the study area included the proposal site and approximately 20 metres to either side of the proposed alignment for the whole upgrade length. Further surveys were undertaken and the study area consisted of this area as well as all areas of contiguous and adjacent vegetation (i.e. the **local occurrence**), and all patches of vegetation in the study locality that were considered important to consider in the assessment of the potential impact of the proposal on threatened fauna species and ecological communities.
- The **study locality** (in relation to database search area) is defined as the area within a 10 kilometre radius of the proposal site. Note that this is different to the definition of locality provided within the Threatened Species Assessment Guidelines: the assessment of significance (DECC 2007a) (see below).
- The **locality** (as defined within DECC 2007a) is the same meaning as ascribed to a local population of a species or local occurrence of an ecological community.
- The **local occurrence** (as defined within DECC 2007a) is the ecological community that occurs within the study area. However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area of that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated. This may include similar vegetation communities with similar species composition. For the current study area it is considered that a gap of up to 30 metres (30 metre threshold gap) is sufficient for all species within the ecological communities to move between communities and exchange genetic material.
- The **local population** is the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions:

  - The local population of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat
adjoining and contiguous with the study area that could reasonably be expected to be
cross-pollinating with those in the study area.

- The local population of resident fauna species comprises those individuals known or
likely to occur in the study area, as well as any individuals occurring in adjoining
areas (contiguous or otherwise) that are known or likely to utilise habitats in the study
area.

The local population of migratory or nomadic fauna species comprises those individuals that
are likely to occur in the study area from time to time.

**Ecological Communities**

**a) In the case of a threatened species, whether the action proposed is likely to have an
adverse effect on the life cycle of the species such that a viable local population of the
species is likely to be placed at risk of extinction.**

**Illawarra Lowlands Grassy Woodland**

N/A

**Freshwater Wetlands**

N/A

**b) In the case of an endangered population, whether the action proposed is likely to
have an adverse effect on the life cycle of the species that constitutes the
endangered population such that a viable local population of the species is likely to
be placed at risk of extinction.**

**ILGW**

N/A

**FW**

N/A

**c) In the case of an endangered ecological community or critically endangered ecological
community, whether the action proposed:**

1. is likely to have an adverse effect on the extent of the ecological community
such that its local occurrence is likely to be placed at risk of extinction, or
2. is likely to substantially and adversely modify the composition of the ecological
community such that its local occurrence is likely to be placed at risk of
extinction.

**Illawarra Lowlands Grassy Woodland**

Illawarra Lowlands Grassy Woodland occurs in the TransGrid site, Old Golf Course site, Croom
Reserve and the road reserve within the proposal site. This amounts to approximately 2.47 ha.

i) A maximum of 2.47 ha of this community would be removed due to the proposal. This
represents approximately 2.4% of the 103.85 ha of this community still occurring in
the locality. Therefore, the proposal is unlikely to have an adverse affect on this
community such that it is placed at risk of extinction within the local area..

ii) A maximum of 2.47 ha of this vegetation would be removed by the proposal
representing approximately 2.4% of the 103.85 ha of this community still occurring in
the locality. The proposal is unlikely to modify the composition of the community,

**Freshwater Wetlands**
### d) In relation to the habitat of a threatened species, population or ecological community:

i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

#### Illawarra Lowlands Grassy Woodland

i) Approximately 2.47 ha of this community would be removed from the proposal site. This represents approximately 2.4% of the 103.85 ha of this community still occurring in the locality.

ii) The areas of ILGW that will be cleared as a result of the proposal are generally confined to the edges of remnant patches and hence the removal of these areas will not cause any further fragmentation or isolation.

iii) The condition of ILGW within the proposal site is variable. The Transgrid site and Croom Reserve have the best quality ILGW in the proposal area and so these areas represent the most important vegetation to be removed. These areas of ILGW are also of the highest quality in the locality, however only small areas of each would be cleared due to the proposal. Less than 0.1 ha of this community would be removed in these areas and maximum 2.47 ha in total for the whole proposal area. This vegetation occurs in fragmented patches and its removal would only contribute to a minor loss in connectivity for ILGW in the locality.

#### Freshwater Wetlands

i) Approximately 0.59 ha of this community would be directly removed and impacted due to the proposal. These direct impacts have the potential to cause indirect impacts to adjacent and connected wetland areas.

ii) The proposal is unlikely to cause fragmentation of wetland bird habitat due to the construction or decommissioning of utilities running through the wetland habitat. Isolation is unlikely to occur as the wetlands creeks and tributaries will all maintain flow. Water flow would be maintained during and post-proposal.

iii) The Frazer's Creek wetlands forms the largest wetland complex in the proposal area and includes a SEPP 14 wetland (outside the proposal area). The wetlands contain a variety of habitat types with varying vegetation structure and composition, providing habitat for wetland birds, amphibians and other aquatic flora and fauna. This wetland complex is the largest within the locality and provides the best habitat for wetland fauna. Approximately 785 metres squared (including access) of this wetland would be disturbed due to the proposal. The other wetlands within the proposal site provide less valuable habitat as they are more degraded from farming and livestock disturbance. Only small areas of these wetlands would be impacted due to the proposal. The disturbance of these wetland areas within the proposal would cause a loss of approximately 0.5% of the current extant community on the Illawarra Plain (approximately 100 ha) (NPWS 2002). Following the proposal, it is expected that the
majority of wetlands will remain largely intact.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

No areas of critical habitat for any of the communities is present within the proposal site, study area, or nearby landscape.

f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan.

<table>
<thead>
<tr>
<th>Illawarra Lowlands Grassy Woodland</th>
<th>A Recovery Plan for this EEC has not been prepared.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater Wetland</td>
<td>A Recovery Plan for this EEC has not been prepared.</td>
</tr>
</tbody>
</table>

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

<table>
<thead>
<tr>
<th>Illawarra Lowlands Grassy Woodland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key threatening processes relevant to ILGW on-site include the following:</td>
</tr>
<tr>
<td>i) Clearing of native vegetation</td>
</tr>
<tr>
<td>More than 60% of the native vegetation of NSW has been cleared. The removal of maximum 2.47 hectares of native vegetation can be seen as contributing to this key threatening process, however minor or negligible the impact may be at a local, regional or state level.</td>
</tr>
<tr>
<td>ii) Invasion and establishment of exotic vines and scramblers</td>
</tr>
<tr>
<td>A number of exotic vines or scramblers were observed in the proposal site. The proposal has the potential to contribute to the spread of exotic species in the proposal site through the transfer and introduction of plant material and soil on machinery. Mitigation measures would be followed to prevent the spread of weeds on site, and so the proposal is not considered likely to contribute greatly to this key threatening process.</td>
</tr>
<tr>
<td>iii) Invasion and establishment and spread of Lantana camara</td>
</tr>
<tr>
<td><em>Lantana camara</em> was recorded in most of the ILGW plots, indicating it is well established within this woodland in the locality. The proposal has the potential to contribute to the spread of exotic species in the proposal area through the transfer and introduction of plant material and soil on machinery. The invasion of <em>Lantana camara</em> would also prevent threatened species such as the EFP from establishing. Mitigation measures would be followed to prevent the spread of weeds on site, and so the proposal is not considered likely to contribute greatly to this key threatening process.</td>
</tr>
<tr>
<td>iv) Loss of hollow-bearing trees</td>
</tr>
<tr>
<td>Although only three hollow-bearing trees would be removed due to the proposal, this key threatening process is still being triggered.</td>
</tr>
<tr>
<td>iv) Removal of dead wood and trees</td>
</tr>
<tr>
<td>The ILGW within the proposal site contains fallen logs that can be used by native fauna for refuge and foraging purposes. The removal of these logs would contribute to this key threatening process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Freshwater Wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key threatening processes relevant to FW on-site include the following:</td>
</tr>
</tbody>
</table>
i) Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands
Creeks would be underbored which would avoid impacts to flows.

ii) Clearing of native vegetation
More than 60% of the native vegetation of NSW has been cleared. The removal of approximately 0.59 hectares of native vegetation can be seen as contributing to this key threatening process, however minor or negligible the impact may be at a local, regional or state level.

iii) Invasion and establishment of exotic vines and scramblers
No exotic vines or scramblers were observed within FW in the proposal site. The proposal has the potential to contribute to the spread of exotic species in the proposal site through the transfer and introduction of plant material and soil on machinery. Mitigation measures would be followed to prevent the spread of weeds on site, and so the proposal is not considered likely to contribute greatly to this key threatening process.

**Conclusion**

**Illawarra Lowlands Grassy Woodland**
The proposal is unlikely to have a significant impact on the EEC as it would only remove a small area of this vegetation community from the locality and is unlikely to modify the structure of the community. A species Impact Statement is not required.

**Freshwater Wetlands**
The proposal is unlikely to have a significant impact on the EEC as it would only remove a small area of this vegetation community from the locality and is unlikely to modify the structure of the community. A species Impact Statement is not required.

---

**Flora**

<table>
<thead>
<tr>
<th>a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eastern Flame Pea (Chorizema parviflorum) Benth. population, Wollongong and Shellharbour local government areas</strong></td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Eastern Flame Pea (Chorizema parviflorum) Benth. population, Wollongong and Shellharbour local government areas</strong></td>
</tr>
<tr>
<td>The Eastern Flame Pea population in the Wollongong and Shellharbour LGAs is found in forest and woodland dominated by Forest Red Gum (E. tereticornis) and/or Woollybutt (E. longifolia). It is also strongly associated with White Feather Honeymyrtle (M. decora). In the proposal site it occurs in the TransGrid site, Old Golf Course site, northern road reserve and Croom Reserve, with the highest abundance occurring in the TransGrid and Old Golf Course sites. This species is tolerant of disturbance as is demonstrated by its occurrence in open grassy land in the Old Golf Course and along easements in TransGrid, in the road reserve, and on the edges of tracks. Approximately 110 individuals were recorded within the proposal area out of approximately 518 individuals found within the local area. However, only 31 individuals would be impacted by the proposal. This represents approximately 6% of the local population. Approximately 83 person</td>
</tr>
</tbody>
</table>
hours were spent searching for the Eastern Flame Pea within and outside the proposal site during the 2013 and 2014 flowering periods and the total population is now considered to be accounted for in the locality. The loss of approximately 6% of the local population would only have a minor impact on the life cycle of this population.

c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
   i. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
   ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

<table>
<thead>
<tr>
<th>Eastern Flame Pea (Chorizema parviflorum) Benth. population, Wollongong and Shellharbour local government areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

d) In relation to the habitat of a threatened species, population or ecological community:
   i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
   ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
   iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

<table>
<thead>
<tr>
<th>Eastern Flame Pea (Chorizema parviflorum) Benth. population, Wollongong and Shellharbour local government areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Approximately 2.47 ha of habitat for the Eastern Flame Pea would be removed as a result of the proposed works, including ILGW and adjacent easements. This excludes areas that are too heavily grazed or consist of predominantly exotic understory species in which the Eastern Flame Pea does not usually occur. The Eastern Flame Pea can, however, occur in disturbed sites which are regularly stripped such as the powerline easements in the Transgrid site.</td>
</tr>
<tr>
<td>ii) The habitat to be removed occurs in the Old Golf Course, within the road reserve, on the edge of the TransGrid site and the edge of Croom Reserve. These areas of habitat are generally isolated as the areas of ILGW occur patchily.</td>
</tr>
<tr>
<td>iii) The habitat to be removed is important as it contains approximately 31 Eastern Flame Pea individuals. This represents approximately 6% of the local population and would unlikely affect the long term survival prospects for the local population. The species is also tolerant of disturbed areas and has the potential to re-establish following the completion of the works.</td>
</tr>
</tbody>
</table>

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

<table>
<thead>
<tr>
<th>Eastern Flame Pea (Chorizema parviflorum) Benth. population, Wollongong and Shellharbour local government areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>No areas of critical habitat for the Eastern Flame Pea is present within the proposal site, local area, or nearby landscape.</td>
</tr>
</tbody>
</table>

f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan.
Eastern Flame Pea (*Chorizema parviflorum*) Benth. population, Wollongong and Shellharbour local government areas

A Recovery Plan has not been prepared for this population of Eastern Flame Pea.

**g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

**Eastern Flame Pea (*Chorizema parviflorum*) Benth. population, Wollongong and Shellharbour local government areas**

Key threatening processes relevant to this species and proposal may include:

i) Clearing of native vegetation;

The clearing of native vegetation is considered a major contributor to the loss of biodiversity. This includes the Eastern Flame Pea individuals that would be removed as a result of the proposal.

**Conclusion**

The proposal is unlikely to have a significant impact on this threatened species as it would only remove a small number of individuals from the locality. The species is also tolerant of disturbed areas and has potential to re-establish following the completion of the works. A species Impact Statement is not required.

**FAUNA**

**a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.**

**Green and Golden Bell Frog (*Litoria aurea*)**

The Green and Golden Bell Frog inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. The closest known population to the proposal site occurs at Port Kembla at the eastern end of Foreshore Road, approximately 12 km from the proposal site. This species has not been recorded in or within two kilometres of the proposal site. Following targeted searches, the Green and Golden Bell Frog was not detected in any wetlands within the proposal site even though suitable habitat occurs in all wetlands in the proposal site. Approximately 0.59 ha of suitable wetland habitat would be impacted or disturbed due to the proposal (including the dams in the old golf course and Frazer’s Creek). A number of aquatic areas suitable for this species occur outside the proposal site in the local area including the wetlands in the True Energy land, other areas of the Macquarie Rivulet and Frazer’s Creek, the wetland in the Illawarra Regional Airport, the dams and wetland within the Boral quarry, and the wetlands within Shell Cove Golf Course. As no individuals were detected in the proposal site and suitable habitat occurs outside the proposal area in the local area, the proposal is unlikely to place the local population of Green and Golden Bell Frog at risk of extinction. Mitigation measures include continual monitoring for this species throughout the life of the project.

**b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction.**

**Green and Golden Bell Frog (*Litoria aurea*)**
i. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:
   ii. is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or
   iii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

iv. Green and Golden Bell Frog (Litoria aurea)

v. N/A

c) In relation to the habitat of a threatened species, population or ecological community:
   i. the extent to which habitat is likely to be removed or modified as a result of the action proposed, and
   ii. whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and
   iii. the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.

Green and Golden Bell Frog (Litoria aurea)

i) Up to 0.59 ha of potential habitat for the Green and Golden Bell Frog would be impacted as a result of the proposed works. The potential habitat to be impacted occurs in aquatic areas, in particular wetland areas with a diversity of habitat features including nearby open grassy areas, diurnal sheltering sites, bulrushes or spikerushes, as well as being free of plague minnow. These areas are limited to the Frazer's Creek wetland complex, the larger dam north of the Macquarie Rivulet, and the unnamed waterway1 wetland.

ii) The proposal is likely to cause some minor fragmentation of aquatic habitat in the proposal site due to the construction of utilities. Isolation is unlikely to occur as the wetlands, creeks and tributaries will all maintain flow. This is relevant to all wetland areas within the proposal area.

iii) The Frazer’s Creek wetlands form the largest wetland complex in the proposal site and includes a SEPP 14 wetland (outside the proposal area). This wetland area is the most important for the Green and Golden Bell Frog as it contains all of this species habitat requirements. The loss or disturbance of 0.59 ha of aquatic habitat would not affect the long-term survival of the Green and Golden Bell Frog in the locality due to there being an abundance of other suitable aquatic areas in the local area and the unlikelihood of this species occurring in the proposal site, as surveys were conducted in optimal conditions.

d) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly).

Green and Golden Bell Frog (Litoria aurea)

No areas of critical habitat for the Green and Golden Bell Frog is present within the proposal site, study area, or nearby landscape.

e) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan.
Green and Golden Bell Frog (*Litoria aurea*)

A draft NSW Recovery Plan for the Green and Golden Bell Frog has been prepared. The recovery objectives relevant to the proposal within this recovery plan include:

- liaising with public authorities and private landholders
- implementing strategic planning instruments
- implementing environmental impact assessment guidelines
- identifying and assessing threats
- preparing guidelines for the construction, improvement and maintenance of Green and Golden Bell Frog habitat
- undertaking habitat improvement activities
- preparing Green and Golden Bell Frog plans of management for key populations
- implementing a frog disease management strategy
- integrating the recovery plan with relevant threat abatement plans and other threat reduction initiatives
- creating a database of population localities
- implementing a systematic monitoring program on public lands
- promoting and coordinating research programs for the Green and Golden Bell Frog.

The proposal is consistent with these objectives.

Conclusion

The proposal is unlikely to have a significant impact on this threatened species as it would only disturb a small area of potential habitat. Furthermore, the species has not been recorded in the proposal area despite targeted surveys. A species Impact Statement is not required.

EPBC Assessments of Significance

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects the environment, particularly Matters of National Environmental Significance (Protected matters). It streamlines the national environmental assessment and approvals process, protects Australian biodiversity and integrates management of important natural and cultural places. The Matters of National Environmental Significance are:

- Listed threatened species and ecological communities including:
  - Green and Golden Bell Frog (*Litoria aurea*) (V)
- Migratory species protected under international agreements including:
- Ramsar wetlands of international importance;
- The Commonwealth marine environment;
- World Heritage properties;
- National Heritage places; and
- Nuclear actions.

An action will require approval if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- Extinct in the wild;
- Critically endangered;
- Endangered; or
Vulnerable.

An action will also require approval if the action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories:

1. Critically endangered: or
2. Endangered.

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

<table>
<thead>
<tr>
<th>a) Lead to a long-term decrease in the size of an important population of a species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green and Golden Bell Frog (Litoria aurea)</strong></td>
</tr>
<tr>
<td>The Green and Golden Bell Frog inhabits marshes, dams and stream-sides, particularly those containing bullrushes (Typha spp.) or spikerushes (Eleocharis spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (Gambusia holbrooki), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas. The closest known population to the proposal site occurs at Port Kembla at the eastern end of Foreshore Road, approximately 12 km from the proposal site. This species has not been recorded in or within two kilometres of the proposal site. Following targeted searches, the Green and Golden Bell Frog was not detected in any wetlands within the proposal site even though suitable habitat occurs in all wetlands in the proposal site. However, this habitat is not optimal as Plague Minnow was present in most wetlands. Approximately 0.59 ha of suitable wetland habitat would be impacted due to the proposal. A number of aquatic areas suitable for this species occur outside the proposal site in the local area including the wetlands in the True Energy land, other areas of the Macquarie Rivulet and Frazer’s Creek, the wetland in the Illawarra Regional Airport, the dams and wetland within the Boral quarry, and the wetlands within Shell Cove Golf Course. As no individuals were detected in or adjacent to the proposal site and enough suitable habitat occurs outside the proposal site in the local area, the proposal is unlikely to lead to a long-term decrease in the size of the local population of this species. There would be no impacts on an important population of the species.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b) Reduce the area of occupancy of an important population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green and Golden Bell Frog (Litoria aurea)</strong></td>
</tr>
<tr>
<td>Approximately 0.59 ha of potential habitat for the Green and Golden Bell Frog would be impacted as a result of the proposal. The potential habitat to be impacted occurs in aquatic areas, in particular wetland areas with a diversity of habitat features including nearby open grassy areas, diurnal sheltering sites, bulrushes or spikerushes vegetation. These areas are limited to the Frazer’s Creek wetland complex, the larger dam north of the Macquarie Rivulet, and the unnamed waterway1 wetland. As the Green and Golden Bell Frog was not detected during targeted surveys and is unlikely to occur due to a lack of previous recordings in the proposal site, the area of occupancy of the local population of Green and Golden Bell Frog is unlikely to be reduced. Furthermore, an important population is not known from the proposal site.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>c) Fragment an existing important population into two or more populations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green and Golden Bell Frog (Litoria aurea)</strong></td>
</tr>
<tr>
<td>The Green and Golden Bell Frog was not recorded during extensive targeted surveys nor has this species been recorded within two kilometres of the development site. Therefore, the proposal site does not provide habitat for an important population of the species.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>d) Adversely affect habitat critical to the survival of a species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green and Golden Bell Frog (Litoria aurea)</strong></td>
</tr>
<tr>
<td>No critical habitat has been described for this species.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>e) Disrupt the breeding cycle of an important population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green and Golden Bell Frog (Litoria aurea)</strong></td>
</tr>
</tbody>
</table>


A Key Population for the Green and Golden Bell Frog in the local area occurs at Port Kembla. It consists of four sub-populations at or around North Port Kembla, Boiler’s Point Coomaditchy Lagoon and Korrongulla Wetland. None of these sites occur in or near the proposal site, nor have previous recordings in the Illawarra region occurred in or within 2 km of the proposal site. Furthermore, targeted surveys did not detect this species at the proposal site. Therefore, it is considered that an important population will not be affected by the proposal.

**f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline**

**Green and Golden Bell Frog (Litoria aurea)**

Approximately 0.59 ha of potential habitat for the Green and Golden Bell Frog would be impacted as a result of the proposal. The potential habitat to be impacted occurs in aquatic areas, in particular wetland areas with a diversity of habitat features including nearby open grassy areas, diurnal sheltering sites, bulrushes or spikerushes. These areas are limited to the Frazer’s Creek wetland complex, the larger dam north of the Macquarie Rivulet, the dams in the old golf course and the unnamed waterway1 wetland. The proposal is likely to cause minor fragmentation of aquatic habitat in the proposal site due to the construction of utilities, however this would only be temporary. Isolation is unlikely to occur as the wetlands, creeks and tributaries would all maintain flow.

Considering the Green and Golden Bell Frog was not identified during optimal survey periods, has not been recorded within two kilometres of the proposal site and the proposal site is twelve kilometres away from the nearest Key Population in Port Kembla, the removal of potential habitat due to the proposal is unlikely to cause a decline in a local Green and Golden Bell Frog population.

**g) Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species’ habitat**

**Green and Golden Bell Frog (Litoria aurea)**

Plague minnow (Gambusia holbrooki) is an invasive species that preys on tadpoles of the Green and Golden Bell Frog. ‘Predation by the plague minnow’ is listed as a Key Threatening Process under the TSC Act and ‘Novel biota and their impact on biodiversity’ is listed as a Key Threatening Process under the EPBC Act. Plague minnow was detected within the majority of the aquatic areas within the proposal area. The proposal could facilitate further invasion of the plague minnow into areas where it has not established, however the Green and Golden Bell Frog was not detected in the proposal site and is not considered likely to occur due to a lack of previous records in or within two kilometres of the proposal site and the nearest Key Population being approximately twelve kilometres away.

**h) Introduce disease that may cause the species to decline**

**Green and Golden Bell Frog (Litoria aurea)**

‘Chytridiomycosis due to the amphibian chytrid fungus’ is a Key Threatening Process under the EPBC Act and is a known threat to the Green and Golden Bell Frog and other amphibian species. There will only be minor changes to water flow as a result of the proposal, therefore the proposal is unlikely to facilitate the introduction or spread of this infectious disease. Mitigation measures ensuring spread of Chytrid Fungus does not occur have been recommended.

**i) Interfere substantially with the recovery of the species**

**Green and Golden Bell Frog (Litoria aurea)**

A draft NSW Recovery Plan for the Green and Golden Bell Frog has been prepared. The overall objectives of the recovery plan are to:
- increase the security of key Green and Golden Bell Frog populations by way of preventing the further loss of Green and Golden Bell Frog habitat at key populations across the species range and where possible secure opportunities for increasing protection of habitat areas;
- ensure extant Green and Golden Bell Frog populations are managed to eliminate or attenuate the operation of factors that are known or discovered to be detrimentally affecting the species;
- implement habitat management initiatives that are informed by data obtained through investigations into the general biology and ecology of the Green and Golden Bell Frog through a systematic and coordinated monitoring program;
- establish, within more than one institution, self-sustaining and representative captive populations (particularly ‘at risk’ populations) of the Green and Golden Bell Frog for the primary purpose of maintaining ‘insurance’ colonies for re-establishment and supplementation of populations of the species; and
- increase the level of regional and local awareness of the conservation status of the Green and Golden Bell Frog and provide greater opportunity for community involvement in the implementation of this recovery plan.

The proposal does not interfere with any of these objectives.

**Conclusion**

The proposal is unlikely to have a significant impact on this threatened species as it would only disturb a small area of potential habitat. Furthermore, the species has not been recorded in the proposal area despite targeted surveys. A referral is not required.