



Terrestrial Ecology HBT Clearing – Ecological Monitoring

QCLNG Facility
Curtis Island
Queensland
Australia
2010 - 2011

EGC Pty Ltd

Environmental Ground, Water and Air Consultants Pty Ltd



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1.0 QCLNG PROJECT

1.1 PROJECT BACKGROUND

QGC Pty Ltd, a wholly-owned subsidiary of BG Group PLC, received development approval from the Queensland Government (29/06/2010) and the Federal Government (22/10/2010) for the development of an integrated liquefied natural gas project in Queensland, referred to as the QCLNG Project, including a construction of an LNG facility on Curtis Island. The QCLNG Project consists of the following components:

- ⇒ Coal Seam Gas (CSG) field development and supporting infrastructure in the Surat Basin (Gas Field Component) including the management of associated water produced,
- ⇒ A network of underground pipelines, including gas and water collection pipelines in the gas field component, and a 340 km underground gas transmission pipeline from the gas field to the LNG Facility (Pipeline Component),
- ⇒ A gas liquefaction facility on Curtis Island (*Figure 1, ref. Figures*), north of Gladstone, initially comprising two processing units, or “trains”, to possibly be followed by a third train. This component also includes an export jetty and other supporting infrastructure (LNG Component),
- ⇒ Access channels for shipping vessels (Swing Basin and Channel), and
- ⇒ LNG shipping operations to load the LNG and export it to global markets (Shipping Operations).

QGC's Contractor Bechtel was responsible for earthworks including site clearance and levelling at the Curtis Island site. Earthworks commenced in 2010, with the first LNG delivery expected in 2014. When completed the project will be one of Australia's largest capital projects supplying up to 12 million tonnes of LNG per annum.

This summary report relates to the pre-clearance surveys and monitoring of vegetation clearing at the Curtis Island LNG site between July 2010 and May 2011.

2.0 QCLNG ECOLOGICAL SURVEYS

QGC obligations under the *Nature Conservation Act 1992* and the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 included a pre-clearing ecological survey of Hollow Bearing Trees (HBT) followed by monitoring during HBT/remnant vegetation clearing at the QCLNG Curtis Island site. The ecological surveys and monitoring were commissioned by QGC and were carried out by Environmental Ground, Water and Air Consultants Pty Ltd (EGC).

This report provides a summary of all terrestrial ecology reports issued by EGC during the clearance of the QCLNG facility (Appendix A, B and C) as well as the description of the final monitoring stage and clearing of remaining vegetation.

2.1 HBT ECOLOGICAL SURVEYS (EGC REPORT 1 AND 2, APPENDIX A AND B)

The HBT assessments were undertaken in two (2) stages between the 13th and 14th of July 2010 (Stage 1) and between the 29th of September and the 21st of October 2010 (Stage 2).

A report including the results of the HBT Surveys (Stage 1) was issued on the 8th September 2010 (*Terrestrial Ecology, LNG Facility Site Clearance, B1302QGC-Rep1-Rev0 – ref. Report 1, Appendix A*) and was followed by the Stage 2 report issued on 28th of October 2010 (*Terrestrial Ecology Pre-clearance Survey, B1302QGC-Rep2-Rev0 – ref. Report 2, Appendix B*).

The surveys resulted in identification of six hundred and sixty-seven (667) HB trees (*Figure 2, ref. Figures*).

2.2 WEED SURVEY (EGC REPORT 3, NOT INCLUDED)

Weed survey carried out by EGC during October 2010 within the QCLNG site at Curtis Island was an additional task to the contract (ref. B1302QGC-Rep3-Rev0), and on the QGC request it has not been included, as not relevant to the scope of this report.

2.3 ECOLOGICAL MONITORING – HBT CLEARING (EGC REPORT 4, APPENDIX C)

EGC carried out ecological monitoring between October 2010 and December 2010 during the felling of all of the HBTs.

The Scope of Works for ecological monitoring was in accordance with the requirements outlined in the QGC Ecological Management Plan (EMP) and in the QGC Invitation to Tender (*Invitation to Tender 109662TN*, summarized in the report issued on the 31st March 2011 (*Terrestrial Ecology, HBT Clearing – Ecological Monitoring, QCLNG facility, B1302QGC-Rep4-Rev1 ref. Report 4, Appendix C*), and provided a summary of ecological monitoring during HBT clearing. Report includes details of the number and types of species relocated, number of fatalities, location of HBT and areas of habitat description (GPS), issues identified, and where applicable, recommendations for future clearing works.

2.4 ECOLOGICAL MONITORING – REMNANT VEGETATION CLEARING

Following the clearing of HBTs, monitoring of remnant vegetation clearing continued between January 2011 and May 2011 with the description of works and the summary included in Section 3.4.

3.0 SURVEY SUMMARY

3.1 HBT ECOLOGICAL SURVEYS (EGC REPORT 1 AND 2, APPENDIX A AND B)

This section summarises Stage 1 and 2 of the pre-clearing ecological surveys (*Reports 1 & 2 in Appendices A & B*). The clearing footprint of the QCLNG project site on Curtis Island was surveyed by a team of EGC ecologists between the 13th and 14th of July 2010 (Stage 1) and between the 29th of September and the 21st October 2010 (Stage 2). EGC ecologists identified and mapped HBTs and conducted surveys to identify the presence or absence of listed State and Commonwealth fauna species.

3.1.1 Methodology

The methodology employed for determination of HBTs was based on the study: *The Status of Hollow Bearing Trees Required for the Conservation of Aboresal Marsupials in the Dry Sclerophyll Forests of South-East Queensland, Australia* by Kevin Wormington et al, (2005). For a tree to be classified during ground surveys as hollow bearing it was to be >20cm DBH (DBH = diameter at breast height 1.3m from the ground) and have at least one entrance >2cm diameter that appeared to extend internally to a hollow space. Hollow entrances <6 cm diameter which are on long thin branches, only marginally larger than the entrance or greater than at tertiary level

(where the branch meets the trunk) were not identified as a hollow. Burrow cameras were used when practical to confirm the identification of hollows.

3.1.2 Results

The survey found HBTs evenly distributed across the site at a density of approximately four (4) HBTs per hectare. Night spotlighting was carried out to identify the species of fauna occupying the tree hollows. The survey identified six hundred and sixty seven (667) HBTs which provided potential habitat for gliders, possums or other arboreal fauna. No fauna species listed as rare or threatened under State or Commonwealth legislation were observed during the survey.

Each HBT tree was marked conspicuously and their positions recorded by GPS to manage the felling of the trees and ensure that mortality of fauna caused by tree felling was minimised.

3.2 WEED SURVEY (EGC REPORT 3, NOT INCLUDED)

Not Applicable.

3.3 ECOLOGICAL MONITORING – HBT CLEARING (EGC REPORT 4, APPENDIX C)

3.3.1 Methodology

Bechtel's Contractor were responsible for the clearing of HBTs across the site in all clearing areas under the supervision of Bechtel and with EGC monitoring. All clearing activities of individual HBTs undertaken by Golding sub-contractors were performed in the presence of EGC ecologists and in accordance with the EGC HBT clearing procedures (*Appendix B of Report 4 in Appendix C*). These procedures include procedures for the safe handling of fauna expected to be encountered during felling activities.

The Scope of Works for ecological monitoring included the following requirements as outlined in the QGC Ecological Management Plan (EMP) and in the QGC Invitation to Tender (*Invitation to Tender 109662TND*):

- ⇒ Ensure that HBTs are felled as responsibly as possible and in-line with the QGC EMP,
- ⇒ Inspect each tree and hollows to remove any fauna by hand,

- ⇒ Relocate fauna in good condition to an area of the island where no clearing activities would proceed,
- ⇒ Transport injured fauna (after administration of 1st aid) to a wildlife carer or veterinarian or, if required, euthanize on site in accordance with an Animal Ethics Committee Approval,
- ⇒ Provide a clearing report outlining any fatalities and number and species of animals relocated, (ref. Report 4 in Appendix C), and
- ⇒ Provide a summary report/s for all clearance supervision works. Reports should include details of the number and types of species relocated, number of fatalities, location of HBT and habitat description (GPS), issues identified, and where necessary, recommendations for future clearance works (ref. Report 4 in Appendix C).

3.3.2 Results

HBT removal was carried out between the 11th of November and the 16th of December, 2010, with five hundred and eighty (580) HBTs of the total six hundred and sixty-seven (667) HBTs felled. The remaining eighty-seven (87) HBTs were identified as being outside the clearing boundaries demarcated by QGC surveyors. All fauna encountered during this period was documented. The complete records including fauna encountered during all HBT clearing activities are included in *Appendix C of Report 4 - Appendix C*. A map of the clearing area is presented in *Figure 4* while a summary of the fauna encountered throughout HBT felling is included in Table 1.

**Table 1: Fauna Encountered During HBT Felling in QGLNG Area
 (November - December 2010)**

Fauna	Scientific Name	Amount	Healthy - Released	Injured - Carer	Deceased – Buried
Squirrel Glider	<i>Petaurus norfolcensis</i>	60	55	1	4
Yellow-bellied Glider	<i>Petaurus australis</i>	3	3	0	0
Brush-tail Possum	<i>Trichosurus vulpecula</i>	13	11	0	2
Boobook Owl	<i>Ninox novaeseelandiae</i>	3	0	1	2
Azure Kingfisher	<i>Alcedo azurea</i>	4	0	3	1
Flying Fox	<i>Pteropus spp.</i>	3	3	0	0
Owlet Nightjar	<i>Aegotheles spp.</i>	1	1	0	0
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	4	0	4	0
Frill-neck Dragon	<i>Chlamydosaurus kingii</i>	1	1	0	0
Green Tree Frog	<i>Litoria Caerulea</i>	4	4	0	0
Pink-tongue Skink	<i>Scincidae spp.</i>	1	1	0	0
TOTAL		97	79	9	9

3.4 REMNANT VEGETATION CLEARING

3.4.1 Methodology

EGC supervised all bulk remnant vegetation clearing between the 5th of January and 30th of March 2011 followed by clearing of a portion of the Material Offloading facility (MOF) area on the 8th of April 2011. Bechtel's Contractors - were responsible for the clearing of remnant vegetation across the entire site in all clearing areas under the supervision of Bechtel. EGC ecologists monitored all areas subject to clearing.

3.4.2 Results

The records documenting fauna encountered during all remnant clearing activities are enclosed in Appendix D. Table 2 presents a summary of the fauna encountered within all areas subject to clearing of remnant vegetation.

**Table 2: Fauna Encountered During Clearing of Remnant Vegetation
 (January - April 2011)**

Fauna	Scientific Name	Amount	Healthy - Released	Injured - Carer	Deceased – Buried
Squirrel Glider	<i>Petaurus norfolcensis</i>	8	3	5	0
Brush-tail Possum	<i>Trichosurus vulpecula</i>	1	0	0	1
Sugar Glider	<i>Petaurus breviceps</i>	3	0	3	0
Green Tree Snake	<i>Dendrelaphis punctulata</i>	2	0	0	2
Azure Kingfisher	<i>Alcedo azurea</i>	1	0	1	0
Kookaburra	<i>Dacelo novaeguineae</i>	4	0	2	2
Green Tree Frog	<i>Litoria caerulea</i>	17	10	3	4
Frill-neck Dragon	<i>Chlamydosaurus kingii</i>	1	1	0	0
Black Headed Monitor	<i>Varanus tristis</i>	1	0	1	0
Carpet Python	<i>Morelia spilota</i>	1	0	0	1
Giant White-Tailed Rat	<i>Uromys caudimaculatus</i>	1	0	0	1
Eastern Brown Snake	<i>Pseudonaja textilis</i>	1	0	0	1
Black Whip Snake	<i>Demansia vestigiata</i>	1	0	0	1
TOTALS		42	14	15	13

Table 3: Total Fauna Encountered During Clearing Activities

Fauna	Scientific Name	Amount	Healthy - Released	Injured - Carer	Deceased – Buried
Squirrel Glider	<i>Petaurus norfolcensis</i>	68	58	6	4
Yellow-bellied Glider	<i>Petaurus australis</i>	3	3	0	0
Brush-tail Possum	<i>Trichosurus vulpecula</i>	14	11	0	3
Boobook Owl	<i>Ninox novaeseelandiae</i>	3	0	1	2
Azure Kingfisher	<i>Alcedo azurea</i>	5	0	4	1
Flying Fox	<i>Pteropus spp.</i>	3	3	0	0
Owlet Nightjar	<i>Aegotheles spp.</i>	1	1	0	0
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	4	0	4	0
Frill-neck Dragon	<i>Chlamydosaurus kingii</i>	2	2	0	0
Green Tree Frog	<i>Litoria Caerulea</i>	21	14	3	4
Pink-tongue Skink	<i>Scincidae spp.</i>	1	1	0	0
Sugar Glider	<i>Petaurus breviceps</i>	3	0	3	0
Green Tree Snake	<i>Dendrelaphis punctulata</i>	2	0	0	2
Kookaburra	<i>Dacelo novaeguineae</i>	4	0	2	2
Black Headed Monitor	<i>Varanus tristis</i>	1	0	1	0
Carpet Python	<i>Morelia spilota</i>	1	0	0	1
Black Whip Snake	<i>Demansia vestigiata</i>	1	0	0	1
Eastern Brown Snake	<i>Pseudonaja textilis</i>	1	0	0	1
Black Whip Snake	<i>Demansia vestigiata</i>	1	0	0	1
TOTAL		139	93	24	22

4.0 NEST BOX OFFSET PROGRAM

The QGC's obligations to mitigate the effects of clearing on the fauna populations on the QCLNG site included installation of nest boxes. The fifty (50) hollow log home boxes were installed on-site to provide temporary replacement habitat. The boxes were installed across Curtis Island at various locations pre-determined by EGC ecologists (*Figure 5*).

4.1 INSTALLATION

The locations of nest box installation were determined by EGC in fifty (50) trees determined as suitable habitat. Trees were chosen to provide a wide array of variable tree species for different fauna. The locations identified for installation were selected in areas that were outside the broad clearing boundary of the QCLNG site in an area previously identified by EGC (*Figure 5*). Nest box installation took place over three days, between the 28th and 30th of March, 2011. All nest boxes were installed approximately 3.5 – 4m from ground level. Nest boxes were installed on the southern side of the tree to provide for adequate shade and maximum comfort for fauna species.

5.0 LIMITATIONS OF REPORT

EGC have prepared this report for the use of QGC in accordance with generally accepted consulting practice. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has not been prepared for the use by parties other than the client, the owner and their respective consulting advisors. It may not contain sufficient information for the purposes of other parties or for other uses. It is recommended that any works planned by others and relating specifically to the content of this report be reviewed by EGC to verify that the intent of our recommendations is properly reflected in the other's designs.

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Brisbane, 9th August 2011

6.0 REFERENCES

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