

1st Fauna Experts Joint Report Black-throated Finch (southern) Land Court of Queensland

Land Court of Queensland Registry: Brisbane

Numbers: MRA428-14, EPA429-14, MRA430-14, EPA431-14, MRA432-14, & EPA433-14.

Applicant: Adani Mining Pty Ltd

First Respondent: Land Services of Coast and Country Inc.

Statutory Party: Department of Environment and Heritage Protection

Experts and Areas of Expertise:

- Lindsay Agnew (**LA**), biologist – area of expertise relevant to the current matter – Black-throated Finch southern subspecies (*Poephila cincta cincta*).
- Adrian Caneris (**AC**), biologist – area of expertise relevant to the current matter - Black-throated Finch southern subspecies (*Poephila cincta cincta*).
- Mike Olsen (**MO**), botanist - area of expertise relevant to the current matter – floristic and vegetation characteristics of habitat for Black-throated Finch southern subspecies (*Poephila cincta cincta*).
- Bruce Wilson (**BW**), botanist - area of expertise relevant to the current matter – floristic and vegetation characteristics of habitat in areas where Black-throated Finch southern subspecies (*Poephila cincta cincta*) occurs.

Meeting Dates: 15 December 2014 (AC & LA), 6 January 2015 (all experts) and various telephone and email communications in November 2014 to January 2015.

Expert's Statement

We acknowledge that we have been instructed to assist the Land Court of Queensland by investigating and reporting on issues relevant to the Black-throated Finch southern subspecies (*Poephila cincta cincta*). We assert that we are qualified to give opinion evidence as an expert witness in relation to this issue in dispute in the current proceeding.

We verify that our instructions have included the Land Court Rules 2000 (current as at 13 December 2013) and the Uniform Civil Procedure Rules 1999, which we have read and understand, and that no instructions were given or accepted to adopt or reject any particular opinion in preparing this Joint Report. We confirm that each expert understands the expert's duty to the court and has complied with that duty in preparing this Joint Report.

Important Note

In this Joint Report, **matters of agreement are unattributed**. Comments made by individual experts and/or matters of disagreement are prefixed by the relevant expert(s) initials.

Introduction

This joint report has been prepared by **AC and BW** on behalf of the Applicant, Adani Mining Pty Ltd and **LA and MO** on behalf of the First Respondent, Land Services of Coast and Country Inc (together, **the Experts**), in accordance with the **Order** made by the Land Court of Queensland on 20 October 2014.

Prior to the preparation of the joint report, on 28 November 2014, the First Respondent delivered a notice containing a list of the specific issues in respect of which it is proposed to seek agreement. An amended notice of issues was delivered on 2 December 2014 (**Preliminary Issues**).

This joint report sets out the areas of agreement and disagreement of the experts in relation to the issues in respect of the Black-throated Finch southern subspecies (*Poephila cincta cincta*) (**BTF**).

Abbreviations used in this report

Adani - Adani Mining Pty Ltd

BOS - Biodiversity Offset Strategy

DERM Queensland Department of Environment and Resource Management

EA Environmental Authority

EEM Ecological Equivalence Methodology Guideline Version 1

EIS Environmental Impact Statement

ELA Eco Logical Australia

GAB Great Artesian Basin

ML Mining Lease

MNES - Matters of national environmental significance

MSES - Matters of state environmental significance

NC Act - Nature Conservation Act 1992 (Old)

OAMP - Offset Area Management Plans

SEIS - Supplementary EIS

SSBV State significant biodiversity values

Project - Carmichael Coal Mine and Rail Project

UG - Underground Mine

VM Act - Vegetation Management Act 1999 (Old)

1. Background

- 1.1 Adani is proposing to develop a 60 million tonne per annum (product) coal mine in the north Galilee Basin approximately 160 kilometers north-west of the Town of Clermont in Central Queensland. All coal will be railed via a privately owned rail line connecting to existing rail infrastructure, and shipped through coal terminal facilities at the Port of Abbot Point. The Project will have an operating life of approximately 90 years.
- 1.2 The Project is comprised of three major components:
- (a) the Project (Mine) – a greenfield coal mine over Exploration Permit for Coal (**EPC**) 1690 and the eastern portion of EPC 1080, which includes both open cut and underground mining, on mine infrastructure and associated mine processing facilities;
 - (b) the Project (Rail) – a greenfield rail line connecting the Project (Mine) to the existing Goonyella and Newlands rail systems to provide for the export of coal via the Port of Abbot Point; and
 - (c) the Project (Offsite Infrastructure) – largely proposed to be developed under the yet to be finalised Galilee Basin State Development Area (**SDA**), including:
 - (i) a workers' accommodation village and associated facilities;
 - (ii) permanent airport site; and
 - (iii) water supply infrastructure.
- 1.3 The Project is a significant project for which an EIS was required under the State Development and Public Works Organisation Act 1971 (Qld) (SDPWO Act). The Project is also a controlled action requiring assessment and approval under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act).
- 1.4 Approval process to date
- (a) On 22 October 2010, an initial advice statement (IAS) for the Project was submitted by Adani.
 - (b) On 26 November 2010, the Project was gazetted as a coordinated project (as they were then known) under the SDPWO Act.
 - (c) From 12 February 2011 to 28 March 2011, the terms of reference (TOR) for the EIS for the Project underwent public notification.
 - (d) On 25 May 2011, the TOR for the EIS were finalised.
 - (e) In November 2012, Adani submitted the EIS for the Project. Public notification of the EIS was carried out from 15 December 2012 until 11 February 2013. During this time, a total of 68 original submissions were received about the EIS, together with some 14,396 online facilitated submissions.
 - (f) After analysing the number and range of issues raised in the submissions, Adani proposed to respond to the submissions by way of an Supplementary Environmental Impact Statement (SEIS) in order to provide additional supporting information to the assessment of the Project's impacts.

1st Experts Joint Report - Black-throated Finch (southern)

- 1.5 On 26 March 2013, the Coordinator-General formally requested additional information to the EIS be provided. Adani prepared the Subsequent EIS (SEIS) which underwent public notification from 25 November 2013 to 20 December 2013
- 1.6 On 7 May 2014, the Coordinator-General's report evaluating the EIS was released. The Coordinator-General's report recommended approvals for the Project and contained a number of conditions and recommendations.
- 1.7 On 14 August 2014 the Coordinator-General approved the Adani rail line.
- 1.8 Concurrently, an approvals process had also been running under the EPBC Act. Adani obtained approval from the Minister for the Department of Environment under the EPBC Act on 24 July 2014, subject to conditions.
- 1.9 Adani applied for MLA 70441 on 8 November 2010. On 9 July 2013, Adani also applied for MLA 70505 and MLA 70506. It is proposed that all three MLs (if and once granted) will operate as part of a single mining project. Public notification of the ML applications was carried out together with the associated EA application.
- 1.10 On or around 9 July 2013, Adani submitted an application for a site-specific EA for the Project. A previous application had been submitted, however, it did not relate to any tenements other than MLA 70441. The EA application form as submitted at that time did not fully answer all of the questions set out in the prescribed form. A revised application form was submitted to DEHP as changed application documents on 14 April 2014. DEHP wrote to Adani confirming that it agreed to the change to the application documents on 15 April 2014. Combined public notification of the ML and EA applications was carried out, and the objection period closed on Tuesday, 17 June 2014.
- 1.11 The decision stage for the EA application commenced on Monday, 23 June 2014. Adani:
 - (a) lodged statutory declarations detailing compliance with public notification of the applications on 20 June 2014; and
 - (b) provided completed Land Court Form 9 to the Department of Natural Resources and Mines and ML Objectors on 20 June 2014.
- 1.12 At close of public notification on 17 June 2014, only two properly made submissions had been made about the EA application and one objection to the ML lodged. The relevant third parties are:
 - (a) Land Services of Coast and Country Inc. (LSCCI); and
 - (b) the Conservation Action Trust (CAT), a not-for-profit organisation based in Mumbai, India.
- 1.13 On 28 October 2014, a draft EA was provided to Adani and the submitters.
- 1.14 LSCCI is the primary objector in the Land Court proceedings and CAT has since elected to be a Level 1 objector, not taking an active role in the hearing.
- 1.15 LSCCI have raised objections to the applications in the following areas:
 - (a) groundwater;
 - (b) groundwater dependent ecosystems;
 - (c) surface water;
 - (d) biodiversity (primarily focused on impacts to the Black-throated Finch (BTF);
 - (e) climate change; and

1st Experts Joint Report - Black-throated Finch (southern)

(f) economic and social matters.

1.16 In terms of the biodiversity and the impacts to the BTF, LSCCI has specifically raised the following matters:

- (a) if the mine proceeds, it will cause severe adverse environmental impacts to biodiversity and ecosystems on, and associated with, the area of the mine (paragraph 18 of the LSCCI Objection);
- (b) the species that will be severely impacted by the mine include, but are not limited to, the BTF (paragraph 19 of the LSCCI Objection);
- (c) a nationally significant population of BTF is located within the mine lease area and will be severely and permanently adversely impacted by the mine through impacts such as the direct clearing of habitat and diminution of surface water and groundwater dependent ecosystems (paragraph 20 of the LSCCI Objection);
- (d) the exact extent of the impacts cannot be known as the application, EIS and SEIS did not adequately assess the presence of BTF or its habitat requirements (paragraph 21 of the LSCCI Objection);
- (e) no confidence can be placed in proposed offsets for the BTF as its requirements are insufficiently known to select any offset areas (paragraph 22 of the LSCCI Objection);
- (f) the full extent of the adverse environmental impacts to biodiversity and ecosystems cannot be particularised by the objector due to the inadequate information provided by the Applicant in the applications, EIS and SEIS (paragraph 23 of the LSCCI Objection);
- (g) it has not been adequately demonstrated that the mine will not have unacceptable adverse impacts on biodiversity, including threatened species, and ecosystems. In particular, the:
 - (i) mine will have adverse impacts on the environment by adversely impacting on biodiversity and ecosystems considering s 269(4)(j) of the MRA;
 - (ii) absence of adequate scientific information about potentially severe and long-term adverse impacts on biodiversity is good reason to refuse the mining lease applications considering s 269(4)(l) of the MRA; and
 - (iii) adverse environmental impacts and potentially severe adverse environmental impacts caused by these proposed mining operations on biodiversity and ecosystems is an inappropriate use of the land when current use does not pose a similar threat considering s 269(4)(m) of the MRA. (paragraph 24 of the LSCCI Objection)

1.17 The CAT submission raises issues not in relation to the Project locality or Queensland, but focusses on impacts overseas. Specifically, the submission is focused on the impacts of Adani's existing and in development power stations in India on the local environments and communities. These issues are not viewed as relevant to this JER or our areas of expertise.

2. Relevant EA conditions

- 2.1 The draft EA issued by DEHP which is the subject of these proceedings replicates the conditions contained in Appendix 1 to the Coordinator-General's report.
- 2.2 The conditions imposed by the Coordinator-General of primary relevance to our field of expertise are contained in Appendix 1 I2-I7 of the Coordinator-General's Report and the EPBC.
- 2.3 These conditions require Adani to:
- (a) Prepare a Black Throated Finch Species Management Plan within 10 business days of receiving the administering authority's approval in writing. The BTF SMP must include:
 - (i) a baseline research program on the specific nesting and feeding requirements of the species that will be undertaken prior to and during project stage 1;
 - (ii) a baseline research program to establish whether the BTF at the project site are sedentary, locally migratory or regionally migratory;
 - (iii) a description of how the results of baseline research are to be used to determine any changes of classification of and/or impact on BTF habitat;
 - (iv) details of proposed impacts to BTF habitat from each project stage including impacts from clearing, subsidence, ecological function changes, hydrological changes and weed and pest infestation changes; and
 - (v) mitigation measures to be undertaken to avoid, mitigate and manage impacts resulting from each stage of the project, including rehabilitation of habitat.
 - (b) The BTF SMP must be reviewed by an appropriately qualified person annually and a report prepared on 1 July each year. The report must assess the plan against the requirements under condition I6 and:
 - (i) include recommended actions to ensure actual and potential environmental impacts are effectively managed for the coming year; and
 - (ii) identify any amendments made to the BTF SMP following the review.

3. Summary of Residual Project Impacts on BTF

- 3.1 A summary of the project's residual impacts on BTF, as provided by the Environmental Offset Package for the Carmichael Coal Mine and Rail Project (Revision 9 - 21 March 2014), with the extent of the impacts [represented by area (ha)] are presented in Table 1.

Table 1. Summary of Project (Mine and Rail) Impacts on BTF

ENVIRONMENTAL VALUE	EPBC ACT STATUS	NC ACT STATUS	PROPOSED IMPACT AREA (ha)			
			MINE		RAIL	TOTAL
			ON SITE AND SUBSIDENCE	OFF SITE		
Black-throated finch (southern)	E	E	9,770.99	2.53	16.24	*9,789.75

* This may be subject to change if the northern portion of the site is converted to underground mining.

1st Experts Joint Report - Black-throated Finch (southern)

- 3.2 **AC:** notes that immediately prior to the JER commencement there was consideration of a change in the mine design and that the northern portion of the lease may have a reduced footprint size and an increased area of underground mining where previously open cut mining was intended. This change would alter the potential direct and indirect impacts on the BTF habitats and given the northern portion is recognised as the area holding the higher value habitats this change, if undertaken, is viewed as a reduction in potential impacts on the finch habitats and habitat connectivity in the local landscape.
- 3.3 **AC:** Despite the potential reduction in impacts, given the high value of the habitats within the northern portion of the mining lease, and significance of the extant BTF population that proposed offsets for BTF as a result of stage 1&2 should remain to provide an increase in potential net benefit.
- 3.4 **LA:** I am unable to assess the implications of **AC's** notation above as I do not have any details nor has such a change to the proposed action been notified formally.

4. OFFSET REQUIREMENTS

- 4.1 The Coordinator-General's Report and the EPBC Act approval include the requirement for Adani to prepare and implement a Biodiversity Offset Strategy that outlines how the project proposes to address offset requirements for significant residual impacts on matters of national environmental significance (MNES) and matters of state environmental significance (MSES).
- 4.2 Condition 8 of the project's EPBC Act approval requires that Adani must legally secure the minimum offset areas detailed in **Table 2** within two years of commencement of each component of the project.
- 4.3 The required minimum offset areas are for impacts on BTF resulting from; the open-cut mine, off-lease infrastructure, and the rail components.
- 4.4 As per the requirements of the EPBC Act approval there is also an initial offset contribution of 2,000 ha for subsidence impacts associated with the underground mine. This initial contribution of 2,000 ha was conditioned by the Commonwealth Government with regards to the modelling of the cumulative impacts of subsidence, cracking and ponding as per the Draft Subsidence Management Plan (Adani 2013).
- 4.5 The project's has impacts on MSES that require offsets. However, we note the Queensland Coordinator-General's decision to not require any additional offsets for impacts to MSES if the Commonwealth Government also requires an offset for the same value, which is the case for BTF.

Table 2 Minimum Offset Area Required for BTF (ha)

Mining Operations North of the Carmichael River	Mining Operations South of the Carmichael River	Underground Mining	Off-lease Infrastructure	Rail East	Rail West
18,204.06	10,739.39	2,000.00	7.62	2.44	46.48

5. Assessments Relevant to the MLA and Surrounds

- 5.1 The Applicant's reporting relevant to BTF which we have reviewed for this Joint Report comprise the following:
- GHD (2012a). Report on Carmichael Coal Mine and Rail Project Mine Technical Report: Terrestrial Ecology 16 November 2012. Appendix N1 of EIS.
 - GHD (2012b). Moray Downs Black-throated Finch Surveys. Carmichael Coal Mine Project 22 October 2012.
 - GHD (2013a). Report for Black-throated Finch On-site Monitoring Survey 1. Carmichael Coal Mine and Rail SEIS. 17 October 2013.
 - GHD (2013b). BioCondition Assessment Report. Report for Offsite Infrastructure Project. Carmichael Coal Mine and Rail Report SEIS. 31 October 2013.
 - GHD (2014a). Report for Black-throated Finch On-site Monitoring Survey 2. Carmichael Coal Mine and Rail SEIS. February 2014.
 - GHD (2014b). Black-throated Finch Management Plan. Carmichael Coal Mine and Rail Project. 11 February 2014.
 - CO2 (2014). Biodiversity Offset Strategy. Carmichael Coal Mine and Rail Project. 29 October 2014.
 - Eco Logical Australia (2014a). Carmichael Coal Mine Ecological Equivalence Assessment Stage 2. 30 January 2014.
 - Eco Logical Australia (2014b). Moray Downs West Ecological Equivalence Assessment Stage 2. 9 October 2014.
- 5.2 The experts note that a "3rd round" of BTF monitoring has been completed. No reporting or interim findings in regard to that monitoring event have been provided to us at the time of preparing this Joint Report. The experts have requested the data from that monitoring event to assist in the preparation of this Joint Report, though unfortunately it was not available (as at 15 January 2015).
- 5.3 **AC** visited the subject site over 7 days, noting that 1 full day was spent undertaking onsite inductions and 2.5 hours on an additional day. The assessment was primarily a broad site familiarisation targeting the key BTF watering holes, known record locations and broader habitat values of the disturbance area and nominated offset habitats within the Moray Downs property and surrounding lands. AC was assisted in the field by Dr Lindsay Popple.
- 5.4 **LA** has undertaken BTF surveys and habitat assessments on and/or around the Moray Downs property since 2011. **LA** implemented a wide-ranging inspection of the MLA and adjacent land over a two-day period in late-November 2014. Following that site inspection, a further two days were spent investigating habitat values and surveying for BTF on land to the west/south-west/north-west of the Moray Downs property¹. **LA** has also implemented BTF surveys and habitat assessments within the surrounds of the Moray Downs property over a four day period in late October 2011², and a

¹ including in part, Moonoomoo, Carmichael and Dongmabulla Stations.

² including in part, Yarrowmere, Moonoomoo, Carmichael and Dongmabulla Stations.

1st Experts Joint Report - Black-throated Finch (southern)

further day of survey in April 2012³. In early 2013, properties were surveyed to the near south and east of the MLA⁴. During each period I was assisted in the field by a fellow biologist with appropriate experience in BTF surveys and habitat assessments.

5.5 A summary of BTF records derived from field investigations by **AC** and **LA** is presented in **Attachments 1 and 2**.

5.6 Notable aspects of that data include the following:

- 15 records of BTF.
- Two BTF nesting records.
- One record of a very large flock of 120 BTF. Other records include larger flocks of 36, 25, and 22 BTF.
- Four locations where BTF were recorded, where previous Applicant surveys have been implemented though no BTF recorded. Some of these locations have been subjected to repeated surveys by the Applicant.

³ including in part, Dongmabulla Station.

⁴ including in part, Laglan, Waltham, Lestree Downs, Degulla, and Disney Stations

6. Grounds and Issues

- 6.1 The relevant grounds and issues as identified by the Appellant and provided on amended notice of issues as delivered on 2 December 2014 are individually provided (numbered as listed on the amended notice) below with specific responses by the experts.
- 6.2 **Issue No. 15** “On the available evidence the area of the proposed mining lease supports habitat for a significant number of Black-throated finches (BTF) which may contribute to a core component of one of only three nationally (thus internationally) significant subpopulations of the endangered BTF”.
- 6.2.1 **AC & LA agree** that the proposed mining lease supports habitat for a significant number of BTF which represents a significant population of the endangered BTF.
- 6.2.2 **AC & LA:** Whilst an accurate estimate of the number of BTF is unavailable at the time of writing, based on existing data and our own site investigations, it is our view that the proposed mining lease and near surrounds supports a significant population which may be, at least, one of the largest known sub-populations of the southern subspecies of BTF.
- 6.2.3 **LA:** Reviews of the Applicant’s reports identifies significant numbers of BTF⁵, e.g. surveys in May 2013 provided a cumulative total of 276 BTF, whilst surveys in May 2011 provided a cumulative total of 195 BTF. The Coordinator-General’s report⁶ noted that “The sub-population of BTF in the landscape that encompasses the mine area and adjacent properties to the north and west is seemingly large and significant in the context of existing known populations (i.e. Townsville)” (pg. 61).
- 6.2.4 **LA:** Over a two-day survey period in September 2013, researcher Stanley Tang⁷ estimated that between 400-500 BTF were present at, and in the near surrounds of, 10 Mile Bore in the northern part of the MLA. I have reviewed a photograph taken during that survey which provides a record of at least 124 BTF. Discussions with a variety of biologists with experience of the BTF (including members of the BTF Recovery Team) indicate that there is no known record comparable to this aggregation of BTF. The Coordinator-General’s report noted that the sighting of a single flock of at least 400 BTF on the mine site is “... the largest number of BTF ever recorded at a single location.” (pg 63). The Applicant’s reporting provides only cursory acknowledgement of this highly significant record.
- 6.2.5 **LA:** Reviews of the Applicant’s reports identifies a variety of records of larger flocks (6 records of 20-29 BTF and 7 records of 30-41 BTF; from five surveys). I have reviewed records of BTF available to me for the area surrounding, but excluding the MLA and the Moray Downs property. Of those records, the median flock size was 5 BTF, and a flock of 16 BTF was the largest recorded (*pers. obs.* October 2011)⁸.
- 6.2.6 **AC:** There is no disputing that the MLA, Moray Downs and wider landscape hold a significant number of Black-throated finches and constitute habitat which is critical for the species survival. During my site investigations I observed significant numbers of BTF within the lease and offset

⁵ The Applicant’s reporting makes repeated reference to (though provides little detail of) the surveys undertaken by Ecology and Heritage Partners Pty Ltd during June/July 2012, which provided a total of 155 BTF from 12 sites within “the Mine Study Area and broader Moray Downs property”.

⁶ Carmichael Coal Mine and Rail project: Coordinator-General’s evaluation report on the environmental impact statement May 2014.

⁷ PhD Candidate, James Cook University.

⁸ That observation was made to the near west of the MLA.

1st Experts Joint Report - Black-throated Finch (southern)

area. My site investigations and review of the prior results clearly show that the northern most portions of the MLA are holding the higher value habitats and larger bird numbers. Of particular note was the largest flock record which I estimated as being a minimum of 120 BTF which was recorded in habitats immediately north of the 10 Mile tank within the proposed offset area (**see Attachment 1**).

- 6.2.7 **AC and LA** acknowledge that the 10 Mile Bore and surrounds may maintain an important function in sustaining the BTF population, though the extent of this needs further investigation.
- 6.2.8 AC:** Whilst there are significant numbers of birds known from the proposed disturbance area, there is also relatively high numbers utilising proposed offset areas. It is not unreasonable to also suggest that with increased survey effort there is likely to be BTF and similar habitat values present within areas outside of the MLA and proposed offset (Moray Downs West).
- 6.3 **Issue No. 16** “Since the early 1980s the extent of occurrence of BTF has declined by approximately 80%. It is already extinct south of the Burdekin River”.
- 6.3.1 **AC & LA agree**, the BTF has had a significant reduction in its known range.
- 6.3.2 **AC:** though the decline would have commenced well prior to the 1980’s.
- 6.4 **Issue No. 17** “The Townsville subpopulation of BTF is thought to be the largest surviving subpopulation with no more than 600 mature individuals”.
- 6.4.1 **AC & LA agree**, though based on the increased information obtained by the subject application and investigations within the local landscape it is highly likely that the subject site and surrounds supports a larger, more viable population than previously thought.
- 6.5 **Issue No. 18** “BTF present on the proposed mining lease area form part of a regional subpopulation previously thought to have no more than 400 mature individuals”.
- 6.5.1 **AC & LA agree**, however, based on increased observations and more recent data it is highly likely that the regional subpopulation previously thought to have no more than 400 mature individuals is a notable underestimate given the significant numbers of BTF recorded on the MLA and Moray Downs property.
- 6.6 **Issue No. 19** “The baseline information provided within the EIS document and subsequent supplementary reporting is not sufficient to adequately understand the existing values of the site commensurate with the potential significance of the site’s BTF population. This includes information on site habitat preferences for foraging and breeding, distribution and abundance, movement patterns, and population dynamics”.
- 6.6.1 **AC & LA agree**, and recommend further more detailed and targeted studies are required to fully understand the existing values of the site and specific values, particularly in regard to BTF population size, foraging and breeding habitats.
- 6.6.2 **AC & LA:** The 20-minute bird surveys have been implemented during three survey events at a total of 96 2ha survey locations⁹. Whilst these “rapid assessment” surveys have the capacity to provide a useful overview of the avifauna assemblage using a particular habitat area, they do not represent a suitable method to investigate BTF site usage. Other notable inadequacies in this

⁹ i.e. 29 sites (May 2012), 52 sites (May 2013), and 67 sites (October 2013).

1st Experts Joint Report - Black-throated Finch (southern)

survey approach are as follows:

- 6.6.2.1 A review of the spatial layout of the 2ha survey sites identifies that the majority (92%; 88 sites) are within very close proximity to the existing track system (adjacent to or <100m). Only eight 2ha survey sites are located at distance to the track system¹⁰. The bias towards survey site locations adjacent to the existing track system has resulted in a notable absence of survey coverage across extensive areas of potential BTF habitat throughout the MLA. This issue represents a significant weakness in the Applicant's assessment of BTF habitat values across the MLA and adjacent areas of the Moray Downs property.
- 6.6.2.2 Whilst the description of this survey methodology acknowledges the importance of early-morning surveys and standardised survey protocols, it is apparent that this has not been adhered to in the implementation of this survey program approach¹¹.
- 6.6.2.3 Whilst the Applicant's reporting consistently claims that the 20-minute bird survey is a method "based on" the Commonwealth Government's BTF assessment guideline (DEWHA 2009), that method is not referred to in the national guideline (or any nationally threatened bird species; DEWHA 2010)¹².
- 6.6.3 **AC & LA:** A review of the water body survey data shows 104 surveys have been implemented, with average survey duration (i.e. presence at a water body) of approximately 55 minutes. In regard to survey effort (survey person hours), the average water body survey effort was approximately 1.8 survey person hours. Neither measure is consistent with the Commonwealth Government's BTF assessment guideline (DEWHA 2009). There is also no evidence of any standardised protocol in regard to survey timing or survey duration. Notably, there appears to be little attention being given to implementing water body surveys during an optimum period which follows dawn.
- 6.6.4 **AC & LA:** It is our shared view that water body counts need to be conducted from dawn and for a period of at least 6 hours. These counts should incorporate a methodology which ensures that water bodies in close proximity (up to 5km) are all simultaneously counted to provide more accurate capture of BTF populations within an area, i.e. a "nearest neighbor" survey design.
- 6.6.5 **LA:** A review of the Applicant's reporting indicates that approximately 272 survey person days have been expended in BTF surveys (November 2010 to October 2013), though there has been no dedicated search effort for BTF nests. Whilst two potential nest trees were detected, these appear to have been located incidental to the 2ha 20-minute surveys. During my comparatively brief 2-day site assessment, it was possible to record two BTF nests (new locations), incidental to the primary objective of site familiarisation. The lack of any apparent effort to detect nest sites, and resultant lack of any appreciation for breeding habitat values for this significant population of BTF represents a major failure of the Applicant's assessment of site values for BTF. Ultimately, the lack of survey effort to assess breeding habitat values significantly constrains and undermines the Applicant's assessment of the relative importance of the habitat to the BTF across the MLA and adjacent parts of the Moray Downs property (and stated impact significance

¹⁰ CHAB67 (app. 250m from track; October 2013); C1S07 (May 2012); C1S09 (May 2012); CHAB04 (May & October 2013); CHAB22 (May & October 2013); CHAB02 (May & October 2013), CHAB50 (October 2013), and CHAB34 (October 2013).

¹¹ e.g. "The two bird surveys at each site were undertaken throughout the day; however, efforts were made to survey each site at least once in the premium survey period, between dawn and 3 hours after dawn". GHD (2014a). Carmichael Coal Mine and Rail SEIS Report for Black-throated Finch On-site Monitoring Survey 2. Report produced by GHD for Adani Mining Pty Ltd.

¹² DEWHA (2010). Survey guidelines for Australia's threatened birds. Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999. Department of the Environment, Water, Heritage and the Arts, Canberra.

1st Experts Joint Report - Black-throated Finch (southern)

and proposed offsets).

- 6.6.6 **AC:** whilst I agree that there needs to be a better more refined assessment of breeding habitat values and accurate estimation of breeding present within the disturbance areas, the lack of such information does not preclude a successful offsetting of lost values. What is important is to have a measure of breeding success in order to demonstrate that similar levels of breeding are being maintained. It is likely that with a more refined and targeted monitoring program information collected will provide suitable benchmarks by which the offsets can be assessed.
- 6.6.7 **LA:** The BTF Recovery Team provided a submission to the Coordinator-General (8 February 2013) which was highly critical of all aspects of the Applicant's BTF survey program, concluding that as a result of the identified deficiencies, the abundance of BTF had been grossly understated and the description of BTF habitat was incorrect. As I understand, that review applied to the Applicant's reporting up to mid-December 2012. Having reviewed the Applicant's subsequent reporting, it is my view that concerns raised in the BTF Recovery Team critique remain relevant to the post-December 2012 survey approaches to assess BTF population characteristics and habitat values.
- 6.6.8 **AC,** whilst I agree that there could be substantial improvements in the information collection from site assessment, the ongoing monitoring is contributing to a significant increase in knowledge of BTF in this area. Further, with refinement the monitoring program and specifically the type and location of data collected could provide a systematic improvement of knowledge and specific quantification of the extant habitats and habitat values. The adaptive management intent as detailed within the BTF Management Plan provides for such changes.
- 6.6.9 **LA:** The current monitoring program is based on a previous survey design which has been identified as deficient. The deficiencies could only result in a significant constraint to understanding BTF site usage. The Coordinator-General's report was highly critical of all aspects of that BTF survey program, concluding that as a result of the identified deficiencies, the abundance of BTF had been grossly understated and the description of BTF habitat was incorrect. If those survey design deficiencies are to be perpetuated through the on-going monitoring program, it follows that such a program could not be relied upon to adequately detect impacts to BTF.
- 6.6.10 **LA:** The following example highlights the abovementioned concerns. Over a 9-day survey in October 2013, GHD (2013) implemented the 2nd monitoring event, which included surveys at 67 2ha sites, 16 water bodies, and 17 camera trap sites (36 survey-person days). That survey effort yielded only 12 BTF sightings (cumulative total of 84 BTF which may include double-counts). A few weeks earlier, an over a two-day period, researcher Stanley Tang mist-netted approximately 140 BTF (banding 45 individuals) on the mine site. It was during this survey that Stanley Tang recorded the significant aggregation of in excess of 400 BTF. It is difficult to reconcile such low results from the Applicant's substantive monitoring survey program (36 survey-person days) in contrast to the substantive results recorded by the independent researcher Stanley Tang (two survey-person days). I note that the GHD (2013) report, whilst referring to the Stanley Tang records, does not attempt any meaningful discussion in regard to the disparity in survey results. Furthermore, it is now apparent that the report reference only provides a partial account of the significance of the Stanley Tang survey records (e.g. see Coordinator Generals report).
- 6.7 **Issue No. 20** "The existing information review of the EIS documents does not adequately describe the characteristics of the regional population or known/potentially suitable habitat within the region in order to contextualise site values for the BTF".

1st Experts Joint Report - Black-throated Finch (southern)

- 6.7.1 **AC & LA agree** that none of the Applicant's reporting provides a detailed assessment of the site's BTF population or BTF habitat values in a regional context.
- 6.7.2 **AC**, The Biodiversity Offset Strategy prepared by CO2 Australia (29/10/14) provides a broad measure and context of the extant habitat values primarily based on remnant vegetation and whilst BTF habitat values are not restricted to remnant vegetation it provides a broad context of where habitat values are located.
- 6.7.3 **AC**, it is my view that the work to date although generally broad in nature provides reasonably sufficient context to demonstrate that the required offset values can be met. In addition, as the project progresses there is a requirement to undertake more detailed and specific assessment of the habitat values and to have these assessments reviewed (See: Coordinator Generals report conditions 12 to 17) within the disturbance area. The proposed establishment of a BTF Bioregional Management Plan will further describe the characteristics of the regional population and identify known/potentially suitable habitat and where information is required. It should be noted that there has been a considerably higher level of assessment within the subject area and that there is a lack of such information in other areas across the region to allow accurate comparative assessment on a regional basis.
- 6.7.4 **LA**: None of the Applicant's reporting provides a suitably detailed assessment of the site's BTF population or BTF habitat values within a regional context. There has been no apparent attempt to draw on the various publicly available recourses (databases, recent survey reports, etc) or consult with researchers in order to review BTF records or other relevant data for the region. The reliance on extrapolating habitat values from publicly available remnant vegetation mapping and the Commonwealth's 2009 mapping of important habitat areas (based on BTF records between 1995 to 2009), whilst generally useful, does not provide in itself, a context assessment commensurate with the significance of the findings on the site.
- 6.7.5 **MO**: With respect to the grasses (Poaceae) that **MO** understands is a critical component of the feeding habitat for BTF, the existing information does not provide data that enables an adequate assessment of the spatial patterning of Poaceae across either the proposed mine site or the proposed offset areas. The use of Broad Vegetation Groups (BVGs) (ELA, 2014a & 2014b) and Regional Ecosystems (Res) (GHD, 2014b) is considered by **MO** to be a poor surrogate for the evaluation of the occurrence and relative abundance of the species of Poaceae known to be of significance to BTF as a critical food resource (refer to **LA**'s list provided in response to Issue No. 31 - paragraph 6.18.5). The existing information only refers to a limited sub-set of Poaceae where such information can be gleaned from the supplied reports (e.g. GHD, 2014b where different reference sources (page 23 (DEWHA, 2009a – 7 genera, 8 species) vs. page 29 (BTF Recovery Team, 2007 - 6 genera) have resulted in different Poaceae being discussed therein). It may be that other raw data lies beneath the reporting of various indices such as Bio-Condition (GHD, 2013b), but such data is not readily apparent in the reports or other data made available to date. Given the current lack of a detailed understanding of the patterning of these Poaceae and the relationship to BTF across the study area, the Precautionary Principle must be invoked given the global significance of the BTF population across the study area (See discussion under paragraphs 6.2 to 6.6 above by the nominated fauna experts).
- 6.7.6 **BW**: The grasses surveyed for in ELA 2014a and 2014b included the 8 species listed in the significant impact guidelines for the BTF (DEWHA, 2009a). The Broad Vegetation Groups and Regional Ecosystems are considered useful as broad surrogates for the distribution of grass species. I agree that more intensive survey of grass species would provide more detailed information on the occurrence and abundance of these grass species. However, given that **LA**

1st Experts Joint Report - Black-throated Finch (southern)

and **AC** agree that “little is known about dietary preferences or the comparative values to BTF of the variety of grass species within the region.” (issue 31) I consider a more intensive survey of Poaceae species may not provide a lot more additional guidance about BTF habitat at this time.

6.7.7 **LA:** Whilst acknowledging that there is comparatively less known about BTF dietary patterns within the broader area surrounding the site, there is a larger body of information available in regard to BTF foraging habits in other parts of its distribution (see LA advice in response to Issue 31). That useful information is not considered in preparing a suitable response to assessing BTF habitat values in both the ELA reports (2014a & b).

6.8 **Issue No. 21** “The design and application of the field survey program for the EIS documents was inadequate to properly understand site usage and site values for BTF, especially in regards to breeding”.

6.8.1 **AC & LA agree**, and especially in regard to investigating and assessing breeding habitat values.

6.8.2 **LA:** The BTF Recovery Team provided a submission to the Coordinator-General (8 February 2013) in regard to the EIS. That submission was decidedly critical of the EIS in regard to BTF survey program, noting that:

6.8.2.1 In regard to the water body surveys - “... the Proponent's surveys do not provide an accurate record of the BTFs on the site nor will they have identified the important water holes for this sub-species”.

6.8.2.2 In regard to terrestrial surveys, the methodology was “not appropriate” and that “The RT believes the Proponent has failed to conduct adequate surveys for the BTF and as a result will have understated the BTF presence on the site.”

6.8.2.3 In regard to surveys for nests and breeding activity – “The fact that the Proponent has failed to locate BTF nests during his surveys is of great concern to the RT. We maintain this demonstrates a lack of survey effort on the part of the Proponent and completely undermines his assessment of the importance of the habitat to the BTF.”

6.8.2.4 In regard to the survey program generally – “...the survey effort provided by the Proponent for the EIS documents is totally inadequate for a project of this importance to the BTF population. We maintain that significant additional survey works are required before the Proponent can fully assess the impacts of proposed works and provide mitigating actions to offset long term damage to the BTF population.”

6.8.3 **LA:** Whilst the Coordinator-General's report (page 61) notes that “DEHP considers that adequate survey effort was undertaken in these off-lease areas”, in reference to the rail and off-lease infrastructure, there is no similar reference as to whether DEHP regards the survey on the MLA as “adequate”. On this, it would be useful to review a copy of the relevant State Government Department's submission in regard to the assessment of the Applicant's BTF survey program for the MLA and relevant adjacent parts of Moray Downs property.

6.8.4 **LA:** The Coordinator-General's report (Synopsis, page -x-) acknowledges that “Further baseline information and research is required to fully understand the habitat preferences of the species in the project area; to quantify distribution and abundance, movement patterns and population dynamics, ..”

1st Experts Joint Report - Black-throated Finch (southern)

- 6.8.5 **AC:** I agree that there is a need for the field assessment to provide the information required to fully understand the habitat preferences of the species in the project area (and region) to quantify distribution and abundance, movement patterns and population dynamics. It is only through the undertaking of detailed monitoring, as required by approval conditions that this information is or will be reliably obtained. With relatively simple improvements to the existing monitoring protocols/approach the current level of field assessment could be far better targeted to provide the required information on BTF and their habitats.
- 6.8.6 **LA:** It is my firm view that the existing monitoring design replicates the suite of fundamental flaws evident in the preceding survey program. As suggested by **AC**, any “relatively simple improvements” to the existing monitoring program would in my view not be sufficient. It is also my view that the monitoring program should be completely redesigned by a biologist with a suitable experience in BTF ecology, that the survey design be peer reviewed, and only implemented by field investigators with suitable experience in surveys for BTF.
- 6.8.7 **LA:** In regard to the latter point, none of the Applicant’s reports provide any information in regard to who implemented the BTF surveys and habitat assessments, and importantly, what previous experience of BTF they might have had.
- 6.9 **Issue No. 22** “The EIS and subsequent supplementary reporting does not provide an adequate assessment of the cumulative impacts of the proposed activities to BTF subpopulation within the Galilee Basin”.
- 6.9.1 **AC,** whilst I agree there is insufficient data and knowledge to accurately and specifically quantify the cumulative impacts of the project. However this is due to the size and extent of the project, the timeframe over which actions will be undertaken and the relatively poor understanding of the BTF habitat partitioning in the local landscape and as such this is not unreasonable. There have been relatively significant levels of work conducted to gain base line understanding and the relevant approval conditions specify and require substantially more extensive detailed assessments to ensure accurate measurement of cumulative impacts and quantification of offset measures. The BTF monitoring and habitat assessments will continue to provide increased data and understanding over the projects development on temporal and spatial variation of habitat use in the disturbance area. With a refined monitoring program to better capture actual comparable data on the BTF numbers and breeding habitats this knowledge will increase. The increased understanding will add significant data on the local landscape which will be incorporated into the Black-throated Finch Species Management Plan for the Mine Area. This information will also be provided and contribute to the development of a bioregional management plan, which will further assist in refinement of species recovery actions. The onsite disturbance areas and offsite (offset areas) habitat management and monitoring program, as described above, will be developed, implemented and regularly reviewed in consultation with relevant stakeholders (i.e. Black-throated Finch Recovery Team, Commonwealth and State governments, key stakeholders). The EPBC approval condition 17 includes the approval holder must contribute \$100 000 (GST exclusive) per annum for 10 consecutive years to the pool of funds beginning from commencement of mining activities. The approval holder must provide notice of the establishment of and/or contribution to a pool of funds established for the better protection and long term conservation of EPBC Act listed threatened species.
- 6.9.2 **LA:** I agree with **AC’s** view that there is insufficient data and knowledge to accurately and specifically quantify the cumulative impacts of the project. I agree with **AC** that a relatively significant level of work has been undertaken. I also note that we have both previously agreed

1st Experts Joint Report - Black-throated Finch (southern)

that there are fundamental deficiencies in the design and implementation of that “relatively significant level of work”, and that the reporting is not sufficient to adequately understand the existing values of the site commensurate with the potential significance of the site’s BTF population.

6.9.3 **LA:** I consider that a significant level of additional survey work is required before the Applicant can fully appreciate the site values for BTF, then assess the impact of works proposed, then design a suitable mitigation strategy, to then provide an suitably informed assessment of the residual and cumulative impacts of the proposed activities to the BTF subpopulation within the Galilee Basin. Given the likely importance of the site for BTF, the potential significance of the impact arising from proposed action to BTF, and concerns regarding declines thought to be occurring elsewhere within the current distribution of BTF, it seems not unreasonable to require the Applicant to assess cumulative impacts in the context of the subspecies population.

6.9.4 **AC:** I agree that the significance of the site for BTF and the potential for a significant impact arising from residual and cumulative impacts warrants an appropriate mitigation strategy and measures by which the actions can be proven to have offset lost values. However, it is my view that with a more refined monitoring program the Black-throated finch surveys will continue over time to provide data on temporal and spatial variation of habitat use within the disturbance and offset areas which will contribute significant data for incorporation into the Black-throated Finch Species Management Plan and ultimately the refinement of mitigation and species recovery actions on and offsite.

6.10 **Issue No. 23** “In the absence of an adequate assessment and understanding of the existing values of the site for the BTF, the information provided in the EIS documents cannot be relied upon to confidently assess the significance of the potential impacts to the BTF, the suitability of proposed mitigation measures, or the appropriateness of any offsets”.

6.10.1 **AC:** Whilst the above statement has some validity, it does not reflect the inherent approach to the project and relevant approval conditions. Given the project size and length of time over which the actions are taken, the approval conditions require ongoing assessment of the sites habitat values and significance of the potential impacts to BTF to provide the data required to demonstrate the suitability of mitigation measures and that commensurate offsets have been secured and appropriately managed.

6.10.2 **LA:** As I appreciate, project approvals have been granted on the understanding that the accepted deficiencies in the BTF survey and habitat assessments¹³, the assessment of impact significance, and utility of proposed offsets can all be improved post-approval, as a result of implementing the relevant approval conditions, to the extent that both project impacts and impact mitigation strategies can be ultimately deemed suitable/acceptable. There appears to be no impact thresholds nominated by the relevant approval conditions, thus the only likely primary response to new knowledge which describes an increase in impact significance is by way of providing additional offsets. It is my view that the outcomes likely to arise from the process as summarised by **AC**, are as follows:

6.10.2.1 A suitably-designed BTF monitoring survey and habitat assessment program is implemented and results will provide data which demonstrates wider site usage by BTF and greater clarity on comparative values and extent of BTF foraging and breeding habitat. The Coordinator-

¹³ The Coordinator-General’s report was highly critical of all aspects of that BTF survey program, concluding that as a result of the identified deficiencies, the abundance of BTF had been grossly understated and the description of BTF habitat was incorrect.

1st Experts Joint Report - Black-throated Finch (southern)

General report was highly critical of all aspects of that BTF survey program, concluding that as a result of the identified deficiencies, the abundance of BTF had been grossly understated and the description of BTF habitat was incorrect.

- 6.10.2.2 Data derived from the above will predictably necessitate revision of the BTF habitat values mapping - revision of comparative habitat values and an overall expansion of the area of habitat value to BTF.
- 6.10.2.3 The revision of the BTF habitat values assessment will in turn demonstrate that the previous impact calculations (gross measure in current use is habitat loss) underestimates the actual offset liability.
- 6.10.2.4 Revision of the offset proposal will be required – the current primary response is providing an extent of potentially suitable habitat in accordance with ratio calculation and based on “like for like” approach.
- 6.10.3 **LA:** It is possible that an outcome of the abovementioned process may indeed provide a greater future understanding of the significance of the site’s population in the context of the overall BTF population, such that a potential offset may not be commensurate with the significance of the impact to the Black-throated Finch southern subspecies, i.e. “Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the aspect of the environment [being *Poephila cincta cincta*] that is protected by national environment law and affected by the proposed action” (Commonwealth of Australia 2012)¹⁴.
- 6.10.4 **LA:** In regard to assessing the suitability of the current proposed offsets, the three key documents reviewed were CO2 (2014) and Eco Logical Australia (ELA 2014a and 2014b). The CO2 (2014) report provides an overall summary of the Biodiversity Offset Strategy, which is based on the results of implementing the Queensland Government’s Ecological Equivalence Methodology (EEM) for the mine site ELA (2014a) and for the proposed offset sites ELA (2014b). ELA (2014b) notes that in addition to implementing the EEM, “... collection of additional data, such as the presence of micro-habitats” would be undertaken in regard to MNES, which includes BTF. My review indicates that whilst both reports provide references to a sub-set of BTF habitat characteristics as “additional survey considerations’ (e.g. “key grass species”), it is not apparent how the application of the standard EEM might have been augmented to provide specific attention to the assessment of BTF requirements.
- 6.10.5 **BW:** The EE assessments followed the standard method in DERM (2011) and included measurements of tree, shrub, grass and weed cover and species richness by life-form and the number of large trees. Additional attributes were collected to indicate BTF habitat including the presence/absence of all target grass species that were listed as a food source in the BTF recovery plan and the distance from permanent water. The target grass species were collected at all sites in the Carmichael Coal Mine Site and for high value finch habitat sites on Moray Downs West. This information was used to provide an ecological condition assessment of all communities as well as an additional indication of BTF habitat value for the entire mine footprint on the mine site. The ELA (2014b) study collected similar information on the Moray Downs offset site and calculated the same ecological condition assessment but used a different method to calculate BTF habitat value. The target grass species information was used to confirm that all assessment units classified as BTF habitat contained on average 2 target grass species per site,

¹⁴ Offset Principle 1 as stated in the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy* (October 2012).

1st Experts Joint Report - Black-throated Finch (southern)

and was not used further in the subsequent analysis. The BTF habitat value on Moray Downs was incorporated into the proposed offset area in the latest version of the BOS (CO2, 2014). My understanding is the analysis of this information for defining BTF habitat on the Mine and proposed offset sites is still ongoing.

- 6.10.6 **LA:** To date, BW has not been able to provide the data which substantiates his claim in regard to the “target grass species” or demonstrate how such data, as an additional attribute, has informed the assessment of BTF habitat values on the mine site or proposed offsets. Furthermore, it is evident from the information **BW** provides above, that the additional attribute “target grass species” may have only been used to assess part of the proposed offset.
- 6.10.7 **MO:** **MO** agrees with **LA** with respect to the sampling protocols developed (particularly for the proposed offset areas where sampling appears to be of a low intensity spatially and temporally), but also with the concern that the current process will not provide the required level of confidence in adequately accounting for the increasing level of knowledge the process may input into management actions and the impacts from the proposed mine. **MO** reiterates his concerns expressed in 6.7.5 above that the “target grass species” utilised in the EE assessments and the BVGs used as habitat surrogates do not provide adequate data on the spatial patterning of preferred Poaceae species eaten by BTF across either the proposed mine site or offset areas. **MO** is unable to advise the court on the species specific data for Poaceae relevant to BTF referred to by **BW** above as it is not apparent in the provided material (as discussed in 7.7.5 above).
- 6.10.8 **BW:** The sampling intensity used in the EE assessments in the ELA 2014a and 2014b meet or exceed the specifications in the DERM (2011) method and I consider it to be adequate for the assessing potential offsets. I agree that any new knowledge should be incorporated into the assessment and my understanding is that this can occur through the Biodiversity Offset Strategy process.
- 6.10.9 **LA:** It is my view that the application of the EEM has the capacity to provide a generally useful tool to provide a replicable assessment fauna habitat characteristics over a variety of sites and by way of a systematic approach, provide a basis to compare broad fauna habitat attributes across multiple sites. It is my view that the application of the standard EEM does not provide the scope for the level of assessment that is required in order to assess and compare habitat values for a particular threatened species, such as BTF. Furthermore, the application of the standard EEM is certainly not commensurate with the type of habitat assessment which is warranted given the significance of BTF population and the potential requirements to determine suitable offset habitat.
- 6.10.10 **MO:** **MO** agrees with **LA** that the EEM does not provide the species specific data required for assessment of Poaceae spatial patterning across the study area.
- 6.10.11 **LA:** There appears to be inequities in the application EEM across the suite of Assessment Units (AU) and between the mine site and the offset sites which have the potential to undermine the assessment conclusions. For example, AU 4 is 8,811 ha in area, representing approximately 90% of the area made up of six Assessment Units¹⁵ considered to provide BTF habitat on the mine site. Nine EE sites were established to assess AU 4. In contrast, 10 EE sites were established to provide assessment coverage of the 50ha Assessment Unit 2 (not 10). There is no explanation in the report for this apparent disparity or for other apparent survey effort

¹⁵ ELA (2014a) describes the Assessment Units relevant to BTF as AU1 (BVG 12a), AU2 (BBVG 16a), AU3 (BVG 34d), AU4 (BVG 17a/17b), AU5 (BVG 17c), and AU6 (BVG 18a).

1st Experts Joint Report - Black-throated Finch (southern)

inequities. In regard to a comparison of survey effort (number of EE sites) between the mine site and offset areas, it is apparent that there was a five-fold difference in survey effort, i.e. a survey effort of 1 EE Site/293ha on the mine site in contrast to 1 EE Site/1,473ha for the proposed offset¹⁶. It is my view that these apparent inequities would have the effect of distorting any basis for a suitable comparison between Assessment Units and in comparisons of the habitat values to be cleared and those to be offset.

- 6.10.12 **BW:** I agree that there is no explanation given for the inequalities of sampling effort in the ELA documents. However, the sampling intensity does conform to the guidelines in the DERM (2011) method, which includes the requirement for “2-5 sampling sites per assessment unit”. I consider that sampling intensity should also be based on an assessment of variability within the assessment units. The AU2 is made up of riparian vegetation communities which, from my observations, are more variable in composition and condition compared to AU4 which is made up of eucalypt woodlands of more uniform condition. Therefore it is reasonable for a greater sampling intensity in AU2 to ensure the full range of variability in this unit is assessed. As per the guideline, the “scores are to be (were) averaged to determine a score for the overall assessment unit “ and therefore the unequal sampling effort does not distort the final EE score for each unit.
- 6.10.13 **LA:** In regard to the survey effort applied to the proposed offset areas, it is apparent that the majority of that effort was expended on the northern offset site, the largest of the four proposed offset areas. It is also apparent that there was a comparatively negligible survey effort for the remaining offset areas. My review of the ELA (2014b) report reveals the following:
- 6.10.14 2 EE Sites for the second offset area of approximately 4,000 ha (to the near north of the Moray Carmichael Boundary Road; Stage 2 offset).
- 6.10.15 5 EE Sites for the third offset area of approximately 4,000 ha (to the near south of the Carmichael River; Stage 1 offset).
- 6.10.16 3 EE Sites for the fourth offset area of approximately 7,000 ha (offset area adjacent and to the south of the aforementioned, Stage 2 offset).
- 6.10.17 In my view, the above does not represent any meaningful survey effort and cannot be relied upon to assist in any meaningful appreciation of BTF habitat values of the proposed offsets.
- 6.10.18 **BW:** The sampling intensity on the offset area was less than that of the mine site although it still meets the minimum specifications. I believe the additional sampling effort in the northern area is justified on the basis this area contains greater areas of finch habitat (as indicated by the distribution of AU1, 2, 9 & 12 on Figure 5). I consider the current level of sampling adequate to indicate potential habitat values, although I agree that more intensive sampling would provide more detailed assessment of habitat values.
- 6.10.19 **LA:** Both ELA reports note a sub-set of Regional Ecosystems were used to provide focus for the assessment of BTF habitat values and that for these areas, the presence of BTF records in combination with known water points were used to determine whether the entirety of the assessment unit provided habitat for BTF. There are a number of concerns with this approach, For example, there is ample evidence to demonstrate that BTF use habitats other than those mapped as Regional Ecosystems (i.e. non-remnant vegetation communities) and that some of these habitats may actually provide comparatively high habitat values for a BTF population.

¹⁶ Source data provided in Table 2 of both ELA reports (2014a & b).

1st Experts Joint Report - Black-throated Finch (southern)

Notable areas non-remnant vegetation in which BTF are known to occur, or have the potential to occur have not been included in the assessment approach. For the project site, it is my view that limiting the assessment of BTF habitat values to the footprint of regional ecosystem mapping would result in an underestimate of the extent and values of habitat used by BTF. The fundamental flaws of BTF survey program have been highlighted previously in the Joint Report. The reliance of the ELA reports on the data derived from a deficient BTF survey program, as one of the key determinants in assessing the value of an assessment, notably constrains the capacity of the ELA assessments of BTF habitat values on the mine site. Furthermore, given the lack of, and for some areas, the absence of target BTF survey work on the proposed offset sites, there is little opportunity to include this as key determinant of habitat values in the same way on those proposed offset areas.

- 6.10.20 **BW:** Non-remnant areas of regrowth vegetation often have substantial biodiversity value. Non-remnant regrowth areas were not mapped in the updated regional ecosystem mapping used for the EE assessment on the Carmichael Mine in the ELA (2014a) study. Areas of incorrectly mapped non-remnant vegetation on the certified (under the Vegetation Management Act 1999) regional ecosystem mapping were included. From my field observations of the mine site, much of the non-remnant regrowth areas on the site are not advanced regrowth with relatively open/short woody layers and a ground layer dominated by the exotic grass *Cenchrus ciliaris*.
- 6.10.21 **MO:** **MO** agrees with **BW** regarding the areas of regrowth vegetation regarding biodiversity value, but is unable to assess the veracity of the statement regarding the spatial patterning of *Cenchrus ciliaris* on the basis of the available data and reports, although field observations during the recent site inspection did reveal substantive areas of *Cenchrus ciliaris* in some areas of cleared land with improved pasture.
- 6.10.22 **LA:** Both ELA reports provide summary of each Assessment Unit's characteristics and values to particular threatened fauna, including BTF. It is not clear how the reported interpretations of habitat values relate to the survey data that may have been collected. Furthermore, it is not clear what background information is relied upon to form the basis for a variety of conclusions in regard to particular resources and/or conditions which BTF may or may not favour.
- 6.10.23 **BW:** The ELA survey has relied primarily on the EE method to give an indication of habitat value. AUs that were considered to contain "areas of grassy woodland containing key seedling grass species" (ELA 2014b, page 31, para 2) and distance from water were added to the EE assessment to define areas of very high, high medium and low BTF habitat. I believe this current information is adequate to indicate the potential habitat of the site. Further work is required to define specific areas of actual habitat and the improvement in BTF habitat that would result from additional (compared to what would happen if it wasn't an offset site) management actions at the offset site.
- 6.10.24 **LA:** It is unclear to me how some of the ecological condition indicators can be considered to be of value in the process of assessing BTF habitat and in turn, support conclusions in regard to habitat values and comparative values. For example, there has been no targeted surveys to investigate BTF breeding habitat values.
- 6.10.25 **AC:** Whilst I agree that information provided in the EIS documents cannot be relied upon to confidently assess the significance of the potential impacts to the BTF, the suitability of proposed mitigation measures, or the appropriateness of any offsets it is my view that the reporting to date only seeks to establish that there is potential to meet the offset requirements. The EE assessments followed the standard methodology as is required by DERM (2011) and included

1st Experts Joint Report - Black-throated Finch (southern)

measurements of additional attributes to provide preliminary indication of the presence of suitable BTF habitat including the presence/absence of key grass species and the distance from permanent water. The use of EEM to identify offset values is the standard contemporary approach. I agree that to obtain a more accurate measure of specific BTF habitat values within the disturbance areas and proposed offsets is required and I note is a condition of existing approval/s.

6.11 **Issue No. 24** “It can be said with certainty that there will be a complete loss of any potential BTF habitat: **(A)** within the Open Cut Pit Area; **(B)** in areas taken up by related infrastructure such as soil storage areas, dams, roads and accommodation”.

6.11.1 **AC & LA agree.**

6.11.2 **MO and BW** agree with respect to native Poaceae that are known food resources for BTF (refer to **LA's** list provided in response to Issue No. 31 – paragraph 6.18.5).

6.12 **Issue No. 25** “Above the underground mine any potential BTF habitat may be disturbed by subsidence, the extent to which is unknown”.

6.12.1 **AC & LA agree.**

6.12.2 **AC**, although the extent to which underground mining will impact on BTF habitat is unquantifiable at this time, it should be noted that impacts will take considerable time to eventuate and these will be measured as part of the monitoring program. Further the offset conditions include a requirement for estimated/predicted subsidence impacts and these are required as an upfront offset which removes and time lag. If ongoing monitoring identifies an increase in subsidence impacts these are to be further offset. Further, although an area/s is subjected to subsidence this does not necessarily remove all BTF habitat values, and it is reasonable to assume that there is likely to be ongoing habitat values retained or replaced through natural revegetation.

6.12.3 **LA:** The current monitoring program is based on a previous survey design which has been identified as deficient. The deficiencies could only result in a significant constraint to understanding BTF site usage. The Coordinator-General's report was highly critical of all aspects of that BTF survey program, concluding that as a result of the identified deficiencies, the abundance of BTF had been grossly understated and the description of BTF habitat was incorrect. If those deficiencies are to be perpetuated through the on-going monitoring program, it follows that such a program could not be relied upon to adequately detect impacts to BTF.

6.13 **Issue No. 26** “As well as direct loss of habitat, the mining and associated activities will cause further fragmentation of habitat and disturbance to existing feeding and breeding patterns.”

6.13.1 **AC & LA agree.**

6.13.2 **AC**, although the open cut and operational areas will result in fragmentation of habitat, to varying degrees, and disturbance to existing feeding and breeding patterns the provision of the offset and improvement to existing habitat values within (cattle removal, pest and feral predator control; provision of drinking sites) will provide alternative habitats and connectivity between areas which are currently of no, lower and/or high value habitats.

6.14 **Issue No. 27** “In response to habitat clearing and disturbance, BTF are likely to disperse to surrounding areas where they will experience one of the following potential outcomes: **(A)** Not find suitable habitat and die; **(B)** Find suitable habitat already occupied by other BTF which cannot support an increased carrying capacity, resulting in further dispersal or death; **(C)** Find suitable habitat that is already occupied by BTF and displace the original BTF; **(D)** Find suitable habitat not currently occupied by other BTF or occupied by a resident population in habitat which could support a further increase in the local population.”

6.14.1 **AC & LA agree.**

6.15 **Issue No. 28** “The first three scenarios represent higher probability outcomes for BTF displaced by the project.”

6.15.1 **AC**, The above statement is substantially correct under a no nearby offset scenario. Further as suggested throughout the objection grounds there is limited understanding of the actual BTF population and resource partitioning within the wider landscape. The level and extent of available habitat and resources is unknown and would change seasonally as a result of natural events such as fire, drought and high rainfall as well as anthropogenic changes and particularly farmers modifying landscapes. Further with habitat improvements as proposed to the adjoining offset areas it is not unreasonable to consider a likelihood of increased available habitat and greater carrying capacity within some areas currently occupied by BTF and currently unused areas becoming suitable to contribute to increased utilisation, if not ultimately occupation.

6.15.2 **LA**: I agree that the first three scenarios represent higher probability outcomes for BTF displaced by the project. As AC suggests, there may be potential to increase the carrying capacity of habitats within parts of the proposed offsets though improved land management, though there has been no analysis or assessment of what in reality, could be achieved. It is quite possible that whilst AC’s proposition is valid, in practical terms, any improvement in carrying capacity may only result in a relatively minor positive outcome in mitigating the impacts of habitat loss on such a large scale.

6.16 **Issue No. 29** “Reduction of habitat for a significant number of BTF is likely to have a corresponding significant impact on the regional population which is of international significance.”

6.16.1 **AC & LA agree.**

6.16.2 **AC**, Whilst I agree a reduction of habitat for a significant number of BTF is likely to have a corresponding significant impact on the regional population, the above statement implies or seems to assume there is no commensurate offset and thus a net loss of habitat and no management or mitigation actions to improve overall habitat values and reduction of recognised threats. For clarity, whilst I agree with the statement, I do not agree it has any relevance to the proposed actions. It is my view the offset and mitigation actions could provide an overall net benefit.

6.17 **Issue No. 30** “The EIS documents do not provide sufficient details of the proposed offset locations or the characteristics of those locations to assess their current or potential suitability as viable BTF habitat.”

6.17.1 **AC**, There has been a Biodiversity Offset Strategy prepared by CO2 Australia (29/10/14) which details how the initial offset requirements will be undertaken. The Coordinator-General’s Report and the EPBC Act approval include specific requirement to prepare and implement a

1st Experts Joint Report - Black-throated Finch (southern)

Biodiversity Offset Strategy that outlines how the project will meet the offset requirements for significant residual impacts on and matters of national environmental significance and matters of state environmental significance. The Biodiversity Offset Strategy provides a substantive documentation of how the offset requirements can be fulfilled and prescribes ongoing offset delivery actions and outcomes. Whilst the scope and extent of the Biodiversity Offset Strategy covers the proposed offsets to fulfil the offset delivery requirements for stage 1 and 2 of the project. In December 2013 and September 2014, ecological equivalence assessments were conducted of the mine and off-lease infrastructure areas in order to determine baseline condition of impact areas and inform the suitability of offsets (Eco Logical Australia 2014a&b). As required by Queensland Government offset policies, the surveys were undertaken in accordance with the DERM Ecological Equivalence Methodology Guideline Version 1. The Ecological Equivalence Assessment results are presented in **Appendix C** of the 2014 Biodiversity Offset Strategy. The Biodiversity Offset Strategy includes an implementation and review plan including details for compliance reporting and updating of the document if and as required.

6.17.2 **LA:** The abovementioned ground of the Appeal was based on a review of documents which preceded the submission of the CO2 Biodiversity Offset Strategy (BOS) cited by **AC**. The 315-page BOS report does provide sufficient detail of the extent and location of the areas proposed offset impact to BTF (*cf.* the previously redacted offset reports). As I have outlined in my response to Issue No. 23, I have reservations in regard to the capacity of the EEM as a suitable means to assess BTF habitat values and why I have concluded that neither of the assessment reports by ELA provide a suitable basis to describe and compare BTF habitat values on the mine site and proposed offset areas.

6.17.3 **MO: MO** reiterates his concerns regarding the EEM discussed above in 6.7.5, 6.10.6 and 6.10.9 regarding constraints of the EEM to provide species specific data on the relevant Poaceae for BTF.

6.18 **Issue No. 31** “BTF are dependent on the seed of native grasses, although little is known about dietary preferences or the comparative values to BTF of the variety of grass species within the region.”

6.18.1 **AC & LA** agree.

6.18.2 **AC:** Although there is a recognised need for improved knowledge of specific grasses and dietary preferences to fully understand the comparative values; it is known that there are BTF utilising the proposed offset areas, that a similar suite of dominant vegetation communities occur within and it is not unreasonable to suggest that there is feeding resources present. Further the prescriptions within the BTF Management Plan, monitoring protocols and proposed development of a bioregional Management plan will all contribute to an improved understanding of the species utilisation of native grasses. In addition, the proposed management actions within the offset area/s will result in an overall increase in native grass cover.

6.18.3 **LA:** **AC** is correct in that there are BTF records for the northernmost of the four offset areas (part of the Stage 1 offset), albeit poorly surveyed. My review of the survey program (baseline and monitoring) indicates there has been negligible effort given BTF surveys within the remaining three offset areas. There is one BTF record for one of those areas. The total BTF survey effort for these three proposed BTF offset areas, of over 15,000 ha, is limited to 80

1st Experts Joint Report - Black-throated Finch (southern)

minutes of foot survey, a one-hour of water body survey, and deployment of one camera trap¹⁷. This does not represent any meaningful survey effort and cannot be relied upon to assist in any meaningful appreciation of BTF habitat values of the proposed offsets.

- 6.18.4 **LA:** Whilst it holds true that a greater understanding of the BTF diet is required, it is apparent that the Applicant's reporting only considers a subset of the suite of grass species known to be used by BTF (eight species from seven genera)¹⁸. The BTF Management Plan (GHD 2014b) references 8 species from 7 genera. The ELA (2014a & b) reports refer to "key grass species" though these are not listed in the report. Later in both ELA reports, there is reference to several grass species associated with preferential habitat (5 species from 5 genera). The source of the information relied upon by the ELA reports is not provided.
- 6.18.5 **LA:** In contrast to the seven genera cited within the Applicant's reporting, I am aware of 22 grass genera which provide known feeding resources for BTF. These are: *Alloteropsis* spp., *Bothriochloa* spp., *Chloris* spp. (native and introduced sp.), *Dactyloctenium* spp., *Dicanthium* spp., *Digitaria* spp. (native and introduced sp.), *Echinochloa* spp., *Echinopogon* sp., *Eleusine* sp., *Enteropogon* sp., *Eragrostis* spp., *Eremochloa* sp., *Eriachne* sp., *Melinis* sp., *Panicum* spp., *Paspalidium* sp., *Paspalum* sp., *Schizachyrium* spp., *Setaria* spp., *Sporobolus* spp., *Themeda* sp., and *Urochloa* sp. Other genera for which there are no positive feeding records, though suspected of being used by BTF include, *Eulalia* spp., *Aristida* spp., and *Triodia* spp.
- 6.19 **Issue No. 32** "Grass species richness and/or condition of grass cover are variable and Regional Ecosystem (RE) mapping cannot be confidently relied upon to identify the extent or value of suitable habitat for BTF."
- 6.19.1 **AC & LA** agree.
- 6.19.2 **AC:** there is a need for and it is requirement of approval conditions to more accurately measure the extant values of both disturbance and offset area habitat values. My site visit identified that there are areas which the large scale mapping methodology has incorrectly allocated values. However, it should be taken into account that these inaccuracies are converse and both understate and overstate extant values in various locations. Although my site visit was relatively short and only provided for rapid assessment of mapped values, it is my view that the actual overall estimated values present is substantially correct for the purpose of which it is being applied. Further, with ongoing more refined assessment of the disturbance site and offsets areas will provide added detail to current mapping of BTF habitats lost and gained.
- 6.19.3 **BW:** grass species richness and/or condition of grass cover are variable, but there is generally a relationship between these attributes and the mapped extent of regional ecosystems. Regional ecosystem mapping is the most readily available and appropriate tool to allow rapid mapping of these values over the large areas required for the Carmichael Mine project. More detailed site assessments of these values would provide more detailed and accurate information.

¹⁷ Survey effort for the 2nd offset area (near north of the Moray Carmichael Boundary Road; Stage 2 offset) was limited to a 2ha survey site (CHAB08, surveyed May and October 2013) and one camera trap site (CCAM07, surveyed once in May 2013). There is one BTF record for the 2ha survey site (May 2013). This does not represent any meaningful survey effort for an area of approximately 4,000 ha. BTF survey effort on the 3rd offset area (near south of the Carmichael River; Stage 1 offset) was limited to one water body watch survey at Rocky Dam (October 2013). There are no BTF records for this offset area and one water body watch does not represent any meaningful survey effort for an area of over 4,000 ha. For the remaining Stage 2 offset area (adjacent to the aforementioned), there are no BTF records and no evidence of any BTF survey for this offset of over 7,000 ha.

¹⁸ The BTF Management Plan (GHD 2014b) references 8 species from 7 genera. The ELA (2014a & b) reports refer to "key grass species" though these are not listed in the report. Later in both ELA reports, there is reference to several grass species associated with preferential habitat (5 species from 5 genera). The source of the information relied upon by the ELA reports is not provided.

1st Experts Joint Report - Black-throated Finch (southern)

- 6.19.4 **MO: MO** agrees with **BW** with respect to broad scale mapping, but, given the global significance of the BTF population from the study area (see discussion between paragraphs 6.2 to 6.6 above), **MO** considers that a less “broad-brush” approach is required in this instance regardless of regional based policies or methodologies. **MO** has not been presented with any data that indicates the relationship between regional ecosystems and the preferred species of Poaceae (see **LA** comments in paragraph 6.18.5) (or mapping thereof other than related to BVGs or Res) for the study area.
- 6.19.5 **LA: I** agree with **MO**. I also disagree with **AC**’s conclusion that “the actual overall estimated values present is substantially correct”.
- 6.20 **Issue No. 33** “Creation or modification of understory species is not currently feasible.”
- 6.20.1 **AC**, The primary management Actions proposed for offset areas will be the removal and/or reduction of cattle, provision of additional water sources and the implementation of a weed control program targeting *Cenchrus ciliaris*. This is to ensure that seeding grass species diversity is optimised. Other management actions include the development of a fire management plan or prescriptions to minimise fuel loads where appropriate towards maintaining appropriate fire regimes and to provide a mosaic of grass species and diversity.
- 6.20.2 **BW**, the composition and abundance of understory species varies with management particularly of grazing and fire. Some useful and relevant management guidelines are available for the region and its ecosystems although there is likely to be a need for the development of more detailed knowledge and/or quantification of the regimes required to meet specific habitat requirements.
- 6.20.3 **MO: MO** considers that the pasture management discussed above by **BW** remains unknown for the study area, but concurs that such information is required to provide a level of confidence in the proposed offset strategy.
- 6.21 **Issue No. 34** “It follows that not enough is known about the BTF floral habitat to confidently identify or create offset sites.”
- 6.21.1 **AC, Disagree**,
- 6.21.2 **AC**, Although it is currently impossible to specifically quantify the offset values and how they meet the stated requirements, the Biodiversity Offset Strategy prepared by CO2 Australia (29/10/14) has followed contemporary methodology and specifically the assessment of values was undertaken in accordance with the Ecological Equivalence Methodology Guideline Version 1 (DERM 2011; EEM). There is no prescribed BTF specific methodology. I do agree that there are additional actions and/or modifications which can be incorporated into the existing BTF Management and Monitoring Plans which would provide improved results and understanding of the BTF habitats within offset sites overtime.
- 6.21.3 **MO and LA agree**. Refer to information provided in our previous responses.
- 6.22 **Issue No. 35** “Offset sites that do not provide appropriate native understorey grasses are of no use in mitigating the risk of population decline.”
- 6.22.1 **AC, Disagree**,

1st Experts Joint Report - Black-throated Finch (southern)

6.22.2 **AC:** I am unaware of any proposed offset site that does not provide appropriate native understorey grasses. If a portion of an offset site does not provide appropriate or suitable native grasses it does not inevitably imply they are of no use in mitigating the risk of population decline. It is more correct to state they have little direct value. However these areas can contribute through provision of habitat linkages, watering points and even potentially breeding habitats. Further the areas identified as holding little or no grasses are predominately ranked as being of no value to BTF by the EEM and subsequent habitat mapping, although there is likely to be areas missed or under mapped due to the large scale of mapping there is also areas mapped as low or no value which hold suitable native grasses. To be clear, I do not believe there are any large notable areas that do not provide appropriate native understory grasses that will be relied upon to offset the loss of areas which provide such values.

6.22.3 **LA:** I accept the statement of this issue. I disagree with **AC's** comments on the basis of the Applicant's reports I have reviewed, though I unable to fully assess the veracity of the statement without the opportunity to inspect some of the proposed offset sites.

7. Closing Comments and Recommendations

7.1 We understand that a 3rd round of BTF monitoring has been completed and believe there is value in having opportunity to jointly review the methodology and results.

7.2 **AC** and **LA** have concern about the timing of the 3rd monitoring event in that it was a "dry-season" monitoring event and the site work was undertaken in December 2014 following rainfall and with ongoing rainfall events. **AC** was onsite during this time and observed numerous pools of surface water along tracks and elsewhere which provided a significant increase in drinking sites at the time. **AC** observed BTF drinking from several water sources which are not included in the monitoring program.

7.3 **AC** and **LA** agree that, in order to fully complete our joint assessment, and to further clarify the issues in agreement and/or dispute, would require the following information:

7.3.1 The results of the 3rd round of BTF monitoring and associated reporting.

7.3.2 Any further botanical or site specific (disturbance area and proposed offset area) assessment of extant habitat values;

7.3.3 Confirmation and details of, if any, proposed changes to the mine layout, and specifically if the north-eastern portion of the mine is being converted from open cut to underground.

7.3.4 In regards to the BTF surveys and monitoring events, confirmation of personnel and experience in relation to BTF and target surveys for BTF.

7.4 **LA** and **AC** agree that there would be value in receiving;

7.4.1 For each survey event:

a) Details of the most senior ecologist actively participating in BTF surveys or monitoring events and a list of all field workers for each survey event, including their experience in surveys for BTF;

b) Any anecdotal evidence of BTF that have been observed at and around the mine site or camp;

1st Experts Joint Report - Black-throated Finch (southern)

- c) Confirmation that there is a process in place to inform relevant Adani staff (environment officer) of such sightings and provision of any anecdotal records currently held. **AC**, notes that the site induction included specific mention of the species and requirement to report any sightings;
 - d) Various reports refer to BTF records derived from field work undertaken by Ecology and Heritage Partners Pty Ltd. This work has not been described in any detail. Provide details of the surveys and records associated with various references to the same, e.g. "Within the Mine Study Area and broader Moray Downs property during June/July 2012 surveys (by Ecology and Heritage Partners Pty Ltd (unpublished data, 2012) - approximately 155 black-throated finches (southern) were observed at 12 sites." (page 111 of GHD (2013). Report for Carmichael Coal Mine and Rail Project SEIS - Matters of National Environmental Significance).
- 7.5 **AC** and **LA** agree that, in order to fully complete our joint assessment, LA should be afforded the opportunity to inspect/assess the suite of proposed offset sites.
- 7.6 Once the above information has been adequately provided, and **LA** has had the opportunity to inspect/assess the suite of proposed offset sites, further analysis and assessment of site ecological values could be undertaken/completed.
- 7.7 **AC** and **LA** defer to the court and relevant parties if such assessments are to be the subject of a 2nd Joint experts report or any further findings included and addressed within individually authored court reports.
- 7.8 **AC** and **LA**, agree and recommend that the monitoring program should be revised and targeted more specifically on BTF and their habitats. These changes should include as a minimum:
- 7.8.1 The monitoring of water bodies should be conducted over at least a 6 hour period and commencing from dawn in order to accurately capture utilisation of the watering points. These counts should incorporate a methodology which ensures that all water bodies in close proximity (up to 5km) are all simultaneously counted to provide more accurate capture of BTF populations within an area;
 - 7.8.2 Detailed botanical assessment should be focused on all BTF sighting locations to record habitat values present within habitats being utilised (with particular emphasis given to the assessment of grass species richness and cover structure);
 - 7.8.3 The 2-Ha survey plots should be ceased as they have little relevance to BTF and more effort should be placed into actively locating BTF and collection of information on their movements across the project and offset areas;
 - 7.8.4 Call playback should be used when BTF are encountered to assist in gaining a more complete identification of birds present in the local area (other than at water hole monitoring);
 - 7.8.5 Specific surveys targeting breeding should be undertaken to provide details on locations and habitat values present in locations in which the birds are breeding;
 - 7.8.6 Persons undertaking the surveys/monitoring should be experienced ecologists with sound understanding of the BTF and its habitats; and
 - 7.8.7 That any future revision of the current survey and monitoring programs should be developed in consultation with researchers from the BTF Recovery Team and independently peer-reviewed.

1st Experts Joint Report - Black-throated Finch (southern)



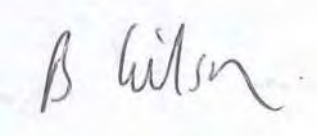
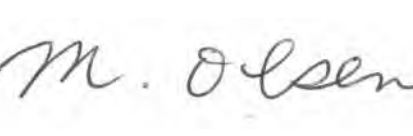
- 7.9 Whilst **AC** and **LA** are in a position to offer our recommendations in regard to improving the BTF survey and monitoring program, we rely on further information to assist in preparing recommendations in regards to the assessment of BTF habitat values and habitat suitability assessments in regard to determining offset suitability. This includes further consideration of the potentially important role that the 10 Mile Bore and surrounds may support in sustaining the BTF population.
- 7.10 **MO: MO** recommends that more spatially relevant survey of the target species of Poaceae (see LA comments in paragraph 6.18.5) be completed in order for an adequate evaluation of the impact of the proposed mine on this globally significant population of BTF and thence an assessment of the efficacy of the proposed offset areas with respect to these target species. A sampling strategy that allows assessment of not only species presence/absence but also relative abundance will be the most suitable to be relevant to habitat mapping of such parameters relevant to BTF.

Attachments

Attachment 1: Map showing **AC** and **LA** BTF Records

Attachment 2: Spreadsheet detailing **AC** and **LA** BTF Records

Date of Agreement: 15 January 2015

	
Adrian Caneris	Lindsay Agnew
	
Bruce Wilson	Mike Olsen

Attachment 1 - Experts' BTF Records

White numbered dots - Experts' BTF Records

Pink dots - Applicant's BTF Records
Yellow outline - Moray Downs property
Red outline - extent of mining leases

Google earth

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Image Landsat



Attachment 2: Summary of BTF Observations by Adrian Caneris and Lindsay Agnew for the Moray Downs Property and Proposed Carmichael Mine

Record Site	Observer	Date	BTF Record	Previously surveyed by Applicant	Previous Survey Result	Comments
1	AC	03/12/2014	3	No	n/a	GHD 2ha survey site app. 300m to south (2 surveys in May & October 2013; 1 record of 8 BTF).
2	AC	03/12/2014	3	No	n/a	GHD 2ha survey site app. 1km to north-west (2 surveys in May & October 2013; no BTF records).
3	AC	04/12/2014	3	Yes	No BTF	GHD water body survey site (April 2011 and May 2011). Also a 2ha survey site app. 300m south (2 surveys in May & October 2013; no BTF records) and one water body survey site app. 900m to south-east (Sept 2011; no BTF records)
4	AC	04/12/2014	13	No	n/a	GHD 2ha surveys sites within 900m to north and south (four surveys; 1 record of 1 BTF).
5	AC	04/12/2014	17	No	n/a	GHD water body survey site app. 500m to north (2 surveys, April & May 2011; 1 record of 10 BTF). Also, a 2ha survey site app. 600m south (2 surveys in May & October 2013; 1 record of 10 BTF).
3	AC	05/12/2014	36	Yes	No BTF	GHD water body survey site surveyed in April 2011 and May 2011 (2 surveys for each event).
2	AC	05/12/2014	22	No	n/a	GHD 2ha survey site app. 1km to north-west (2 surveys in May & October 2013; no BTF records).
6	AC	06/12/2014	120	No	n/a	GHD water body survey site app. 700m south (6 surveys; 1 record of 1 BTF). Also, a 2ha survey site app. 600m to north (2 surveys in 2013; no BTF records).
7	AC	07/12/2014	3	Yes	1 record of 11 BTF	GHD camera trap survey site (May 2013 & October 2013) and water body survey site (May & October 2013).
7	AC	08/12/2014	8	Yes	1 record of 11 BTF	GHD camera trap survey site (May 2013 & October 2013) and water body survey site (May & October 2013).
8	LA	17/04/2012	9	No	n/a	GHD 2ha survey sites - one app. 1km to south-east (surveyed October 2013; no BTF records) and one app.1.1km to north (surveyed May 2013 & October 2013; no BTF records).
9	LA	17/04/2012	2	No	n/a	GHD survey site app. 900 to south-west (adjacent to road). 6 water body surveys (November 2010, April 2011, May 2011, & October 2013) and 2 camera trap surveys (May 2013 & October 2013). No BTF records.
10	LA	24/11/2014	2	Yes	1 record of 1 BTF	Numerous GHD surveys at this site - 4 camera trap surveys (May 2012, May 2013, & October 2013); 7 water body surveys (November 2011; May 2013, October 2013); and two 2ha surveys (May 2012).

Record Site	Observer	Date	BTF Record	Previously surveyed by Applicant	Previous Survey Result	Comments
11	LA	24/11/2014	25	Yes	1 record of 3 BTF	GHD water body survey site - 3 surveys (November 2011 & May 2013).
12	LA	24/11/2014	6	Yes	No BTF	GHD water body survey site (November 2011).
13	LA	24/11/2014	1	No	n/a	GHD 2ha survey site app. 300m to south. Surveyed in May 2013 and October 2013. No BTF records.
14	LA	24/11/2014	2 BTF nests	No	n/a	GHD 2ha survey site app. 100m to north-west. Surveyed May 2012, No BTF record. Incidental GHD survey record of 19 BTF app. 200m to north-west (May 2013).
15	LA	25/11/2014	9	Yes	No BTF	GHD water body survey site surveyed twice in April 2011 and in May 2011. Also a 2ha survey site app. 300m south (2 surveys in May & October 2013; no BTF records) and one water body survey site app. 900m to south-east (Sept 2011; no BTF records).
16	LA	25/11/2014	2	No	n/a	GHD water body survey site - 2 surveys in November 2011.