Atlas-Campaspe Mineral Sands Project
Responses to the Department of the Environment Review Comments (dated 30 August 2013)

1.1.1 Commonwealth Government (30 August 2013) states:

Please provide further information and an assessment of the likely cumulative impacts of the proposed action in conjunction with the proposed Balranald Mineral Sands Project on matters of national environmental significance (MNES). This should include, but not be limited to, consideration of the Malleefowl, Corben's Long-eared Bat, Winged Peppercress, Cobar Greenhood and Mossgiel Daisy.

The potential cumulative impacts from the Atlas-Campaspe Project (the Project) and the Iluka Resources Limited Balranald Mineral Sands Project were assessed in Section 6.3 in Appendix A and Section 5.3 in Appendix B of the *Atlas-Campaspe Mineral Sands Project Environmental Impact Statement* (EIS). The threatened species recorded during the Balranald Mineral Sands Project surveys are identified as part of the threatened species assessments (Appendices C and D in Appendix B of the EIS).

An additional table is provided which includes the following for each relevant Matter of National Environmental Significance (MNES) (Table 1):

- potential impacts from the Project as documented in the EIS (Appendices A, B and C of the EIS);
- potential impacts from the Balranald Mineral Sands Project described by Iluka Resources Limited (2012a); and
- cumulative impacts of the Project and Balranald Mineral Sands Project.

The potential cumulative impacts have been assessed based on limited information from Iluka Resources Limited which has been made publically available (i.e. the Iluka Resources Limited Balranald Mineral Sands Project Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) Referral [Iluka Resources Limited, 2012b]). Since the Atlas-Campaspe Project EIS has been published before the Balranald Mineral Sands Project EIS, it is understood that Iluka Resources Ltd would be required to provide the Department of the Environment (DotE) with a more detailed assessment of the potential cumulative impacts because it is expected that more detailed information about the Balranald Mineral Sands Project will be available to them compared to that which is currently available to Cristal Mining.

1.1.2 Commonwealth Government (30 August 2013) states:

The area (in hectares) of each component of the action, including but not limited to, the proposed infrastructure at the mine site (identified in Figures 2-4 and 2-5 of the EIS) is still outstanding.

As described in the EIS, the Project would have a disturbance footprint of 4,463 hectares (ha), which includes approximately 4,158 ha of native vegetation and 305 ha of previously cleared land. Table 2 shows the approximate area to be disturbed by the Atlas-Campaspe Mine footprints, proposed Mineral Concentrate Transport Route and Ivanhoe Rail Facility.

Table 2
Approximate Area to be Disturbed by the Project

Project Component	Approximate Area (ha) (as shown on Figures 2-3 to 2-9 of the EIS)
Atlas- Campaspe Mine Footprints:	
• Mine Path	880
• Fixed Infrastructure	755
• Accommodation Camp	40
• Other (stockpiles, overburden emplacements, roads, etc).	2,650
Proposed Mineral Concentrate Transport Route widening	98
Ivanhoe Rail Facility (including access road)	40
Total	**4,463***

* includes 305 ha of previously cleared land

Table 1
Cumulative Impacts on Matters of National Environmental Significance

Species	Potential Impacts from the Atlas-Campaspe Project	Potential Impacts from the Balranald Mineral Sands Project described by Iluka Resources Limited (2012a)	Cumulative Impacts of the Atlas-Campaspe Project and Balranald Mineral Sands Project
Winged Peppercress	***Project area*** Fully described in the EIS.	***Project area*** This species was not recorded (Ecotone Ecological Consultants, 2012a and 2012b). Iluka Resources Limited (2012a) describes that there is a low possibility of this species occurring in the mine footprints and on the 'Ore Transport from Nepean to West Balranald'. Iluka Resources Limited (2012a) describes that there is a low likelihood of an adverse impact on the species. The area of potential habitat to be removed by Iluka Resources Limited (2012a) is not quantified.	The flora surveys by Australian Museum Business Services (Appendix A of the EIS) found (previously unknown) occurrences of the Winged Peppercress in the Project area and the proposed biodiversity offset area. Section 6.3 of Appendix A of the EIS considers the cumulative impacts from the Atlas-Campaspe Project and the Balranald Mineral Sands Project on flora and describes that no threatened flora species were recorded during the surveys of the Balranald Project area. Considering the available information on the proposed Balranald Project (Iluka Resources Limited, 2012a), there would be nil to low possibility of a cumulative impact on the species given the species has not been recorded in the Balranald Project area and Iluka Resources Limited (2012a) states that there is a low possibility that it occurs. Cristal Mining has fully described the adverse and beneficial impacts on the Winged Peppercress from the Atlas-Campaspe Project and this will enable Iluka Resources Limited to undertake a more comprehensive cumulative impact assessment as part of their (yet released) EIS which is to be prepared in accordance with the EPBC Act Guidelines for the Content of a Draft EIS - Balranald Mineral Sands Project (SEWPaC, 2013b).
	Offset area Fully described in the EIS.	***Offset area*** Iluka Resources Limited is required to provide an offset in accordance with *EPBC Act Environmental Offsets Policy* for the Balranald Mineral Sands Project EIS (Department of Sustainability, Environment, Water, Populations and Communities [SEWPaC], 2013a). Iluka Resources Limited (2012a) describes that an offset strategy would be prepared but no details are available.	
Cobar Greenhood	***Project area*** Fully described in the EIS.	***Project area*** This species was not recorded or considered to potentially occur.	The flora surveys by Australian Museum Business Services (Appendix A of the EIS) found (previously unknown) occurrences of the Cobar Greenhood Orchid in the Project area and the proposed biodiversity offset area. Section 6.3 of Appendix A of the EIS considers the cumulative impacts from the Atlas-Campaspe Project and the Balranald Mineral Sands Project on flora and describes that no threatened flora species were recorded during the surveys of the Balranald Project area. Cristal Mining has fully described the occurrence of the Cobar Greenhood Orchid recorded during surveys for the Atlas-Campaspe Project and this will enable Iluka Resources Limited to undertake a more comprehensive cumulative impact assessment as part of their (yet released) EIS which is to be prepared in accordance with the *EPBC Act Guidelines for the Content of a Draft EIS - Balranald Mineral Sands Project* (SEWPaC, 2013b).
	Offset area Fully described in the EIS.	***Offset area*** Iluka Resources Limited is required to provide an offset in accordance with *EPBC Act Environmental Offsets Policy* for the Balranald Mineral Sands Project EIS (SEWPaC, 2013a). Iluka Resources Limited (2012a) describes that an offset strategy would be prepared but no details are available.	

Table 1 (Continued)
Cumulative Impacts on Matters of National Environmental Significance

Species	Potential Impacts from the Atlas-Campaspe Project	Potential Impacts from the Balranald Mineral Sands Project described by Iluka Resources Limited (2012a)	Cumulative Impacts of the Atlas-Campaspe Project and Balranald Mineral Sands Project
Mossgiel Daisy	***Project area*** Fully described in the EIS.	***Project area*** This species was not recorded (Ecotone Ecological Consultants, 2012a and 2012b). Iluka Resources Limited (2012a) describes that there is a low possibility of this species occurring on the 'Ore Transport from Nepean to West Balranald'. Iluka Resources Limited (2012a) describes that there is a low likelihood of an adverse impact on the species. The area of potential habitat to be removed by Iluka Resources Limited (2012a) is not quantified.	The flora surveys by Australian Museum Business Services (Appendix A of the EIS) found (previously unknown) occurrences of the Mossgiel Daisy. Cristal Mining has reduced the potential for adverse impacts on the Mossgiel Daisy (specifically, avoiding clearance of the Mossgiel Daisy or its habitat). Section 6.3 of Appendix A of the EIS considers the cumulative impacts from the Atlas-Campaspe Project and the Balranald Mineral Sands Project on flora and describes that no threatened flora species were recorded during the surveys of the Balranald Project area. Considering the available information on the proposed Balranald Project (Iluka Resources Limited, 2012a), there would be nil to low possibility of a cumulative impact on the species given the species has not been recorded and that there is a low possibility that it occurs in the proposed Balranald Project area. Cristal Mining has fully described the occurrence of the Mossgiel Daisy recorded during surveys for the Atlas-Campaspe Project and this will enable Iluka Resources Limited to undertake a more comprehensive cumulative impact assessment as part of their (yet released) EIS which is to be prepared in accordance with the EPBC Act *Guidelines for the Content of a Draft EIS - Balranald Mineral Sands Project* (SEWPaC, 2013b).
	Offset area Fully described in the EIS.	***Offset area*** Iluka Resources Limited is required to provide an offset in accordance with *EPBC Act Environmental Offsets Policy* for the Balranald Mineral Sands Project EIS (SEWPaC, 2013a). Iluka Resources Limited (2012a) describes that an offset strategy would be prepared but no details are available.	
Malleefowl	***Project area*** Fully described in the EIS.	***Project area*** The Malleefowl was recorded within the 'West Balranald Deposit' (one mound) and within the 'Nepean Deposit' (two mounds) (Ecotone Ecological Consultants, 2012a and 2012b) (as described in Appendix C of Appendix B of the EIS). Iluka Resources Limited (2012a) describes the possibility of an adverse impact on the species. The Balranald Mineral Sands Project has an estimated maximum vegetation disturbance of 3,170 ha. However the disturbance footprint is not broken down to identify the amount of Malleefowl habitat to be impacted (Iluka Resources Limited, 2012b).	Section 5.3 of Appendix B of the EIS and Appendix D of Appendix B of the EIS considers the cumulative impacts from the Atlas-Campaspe Project and Balranald Mineral Sands Project on fauna and describes that the Malleefowl was recorded within the Balranald Project area. The regional distribution of the Malleefowl in relation to the Atlas-Campaspe Project and Balranald Mineral Sands Project is shown on Figure 1. Cristal Mining has fully described the potential impacts on the Malleefowl from the Atlas-Campaspe Project and this will enable Iluka Resources Limited to undertake a more comprehensive cumulative impact assessment as part of their (yet released) EIS which is to be prepared in accordance with the *EPBC Act Guidelines for the Content of a Draft EIS - Balranald Mineral Sands Project* (SEWPaC, 2013b).
	Offset area Fully described in the EIS.	***Offset area*** Iluka Resources Limited is required to provide an offset in accordance with *EPBC Act Environmental Offsets Policy* for the Balranald Mineral Sands Project EIS (SEWPaC, 2013a). Iluka Resources Limited (2012a) describes that an offset strategy would be prepared but no details are available.	

Table 1 (Continued)
Cumulative Impacts on Matters of National Environmental Significance

Species	Potential Impacts from the Atlas-Campaspe Project	Potential Impacts from the Balranald Mineral Sands Project described by Iluka Resources Limited (2012a)	Cumulative Impacts of the Atlas-Campaspe Project and Balranald Mineral Sands Project
South-eastern Long-eared Bat	***Project area*** Fully described in the EIS.	***Project area*** The South-eastern Long-eared Bat is considered to possibly occur across the proposed Balranald Project area (Iluka Resources Limited, 2012a). Iluka Resources Limited (2012a) describes the possibility of an adverse impact on the species. The area of potential habitat to be removed by Iluka Resources Limited (2012a) is not quantified.	The South-eastern Long-eared Bat is considered to possibly occur across the proposed Balranald Project area but no detailed information on its occurrence is provided in the *Balranald Mineral Sands Project Commonwealth EPBC Act Referral* (Iluka Resources Limited, 2012b). Section 5.3 of Appendix B of the EIS considers the cumulative impacts from the Atlas-Campaspe Project and Balranald Mineral Sands Project on fauna. Cristal Mining has fully described the potential impacts on the South-eastern Long-eared Bat from the Atlas-Campaspe Project and this will enable Iluka Resources Limited to undertake a more comprehensive cumulative impact assessment as part of their (yet released) EIS which is to be prepared in accordance with the *EPBC Act Guidelines for the Content of a Draft EIS - Balranald Mineral Sands Project* (SEWPaC, 2013b).
	Offset area Fully described in the EIS.	***Offset area*** Iluka Resources Limited is required to provide an offset in accordance with *EPBC* Act *Environmental Offsets Policy* for the Balranald Mineral Sands Project EIS (SEWPaC, 2013a). Iluka Resources Limited (2012a) describes that an offset strategy would be prepared but no details are available.	

1.1.3 Commonwealth Government (30 August 2013) states:

Further detailed information about the proposed staging of rehabilitation works and how these relate to the timing and location of the advancing void is still required. Although the Department notes that these are depicted in the figures, we request further information about the timing of commencement of rehabilitation at particular areas in regards to the stage of extraction, and the progression of rehabilitation works in relation to the progression of the mine void.

Rehabilitation would occur progressively over the 20 year life of the mine as shown on Figures 2-4 to 2-8 of the EIS. Mining areas (e.g. overburden emplacements and the backfilled mine path) would be rehabilitated as they are no longer required for mining operations and other mine infrastructure is rehabilitated as it is decommissioned.

Landform preparation (i.e. replacement of overburden, subsoil and topsoil) on mining areas would commence within three months of the area becoming available for rehabilitation (i.e. the area is no longer required for mining operations) (subject to favourable climatic conditions).

Revegetation of mining areas would commence within 12 months of the area becoming available for rehabilitation (i.e. the area is no longer required for mining operations) (subject to favourable climatic conditions). Revegetation activities would be conducted on an annual basis during late autumn/early winter (i.e. prior to the winter rains) to maximise the potential for successful revegetation.

Table 3 provides further detail regarding the timing of commencement of rehabilitation at particular areas in regards to the stage of extraction, and the progression of rehabilitation works in relation to the progression of the mine void.

Table 3
Rehabilitation Timing within the Project Footprint

Year	Approximate Area (ha) of Rehabilitation (as shown on Figures 2-4 to 2-8 of the EIS)	Location of the Active Mining Area (as shown on Figures 2-4 to 2-8 of the EIS)
2	0	Southern end of the Atlas Footprint
5	360	Northern end of the Atlas Footprint
6	610	Southern end of the Campaspe Footprint
16	2120	Mid-way along the Campaspe Footprint
20	2330 (+ 600 ha of Stage 1 rehabilitation)	Northern end of the Campaspe Footprint

1.1.4 Commonwealth Government (30 August 2013) states:

Based on the information provided in the EIS, uncertainty remains as to the adequacy of surveys in the proposed offset areas (including of potential habitat near the project footprint). Further information will be required to characterise the presence of MNES and habitat values within any proposed offset lands.

The survey effort by Australian Museum Business Services (Appendices A and B of the EIS) in the proposed biodiversity offset area is considered adequate and meets the survey requirements set out by the Commonwealth Government (SEWPaC, 2010a, 2010b). Table 4 shows the survey effort for each threatened species. The survey effort is also shown visually on Figure 2 (which has been created using the data presented clearly on Figure 5 of Appendix A of the EIS, as well as Figures 5 to 10 of Appendix B of the EIS).

Also of note, monitoring surveys would also be undertaken in the proposed biodiversity offset area once it is established. Section 4.6.4 of the EIS describes that a programme would be undertaken to monitor and report on the effectiveness of the management measures for the proposed biodiversity offset area. This monitoring programme would be detailed within the Biodiversity Management Plan that would be prepared by suitability qualified persons as described in Section 4.6.3 of the EIS.

Table 4
Survey Effort for Threatened Species Occurring within the Proposed Biodiversity Offset Area

Species	Survey Effort	Adequate (Yes/No)
Malleefowl	There is approximately 16,440 ha of potential habitat for the Malleefowl in the proposed biodiversity offset area. Malleefowl and their mounds were noted during all of the survey work undertaken in the proposed biodiversity offset area (Figure 1). The fauna field work in the proposed biodiversity offset area (including an area of land to the south) was undertaken across 31 days (Figure 2 in Appendix G of Appendix B of the EIS) and the flora surveys were undertaken across 34 days by Australian Museum Business Services and five days by FloraSearch. Specific survey methods for the Malleefowl included: • Malleefowl transects – Active searches (via transects) through Malleefowl habitat (Dune Mallee with some Sandplain Mallee). Four people, spaced 30 metres (m) apart, followed a 1 kilometre (km) transect searching for active mounds, tracks and sightings. This was performed across 19 different sites (Figure 2). • Scats and Tracks – Two people walked 1 km along sandy tracks nearby each of the 16 fauna trapping sites (Figure 2).	Yes*
South-eastern Long-eared Bat	There is approximately 15,830 ha of potential habitat for the South-eastern Long-eared Bat in the proposed biodiversity offset area. Harp traps were placed at 16 sites (Figure 2) (2 traps at each site) for 2 nights. A total of 64 trap nights. Although calls of the South-eastern Long-eared Bat cannot be distinguished based on Anabat detectors alone, Anabat detectors were useful because the species was trapped in the harp traps meaning that there was a high degree of confidence that the *Nyctophilus* sp. calls were the South-eastern Long-eared Bat. Anabats were placed at 16 sites (Figure 2) (2 detectors at each site) for 2 nights. Total of 64 trap nights.	Yes*
Winged Peppercress	Targeted searches for this species occurred within the proposed biodiversity offset area (Figure 2) in November and December 2011. During November a series of 100 x 20 m plots were located at random in vegetation identified as potential habitat. If the species was located a count was made of the number of individuals in the plot. During the December field surveys any potential habitat encountered for this species was searched and if an individual was located, a 20 x 100 m plot was placed down and all individuals within the plot were counted. This species was also recorded in the proposed biodiversity offset area by FloraSearch (Dr Colin Bower) in October 2012 during targeted searches for the Cobar Greenhood Orchid (Figure 2).	Yes^
Cobar Greenhood	Searches occurred at Rapid Data Point sites and full floristic sites (Figure 2) and during traverses to and from these locations (Appendix A of the EIS). Subsequent targeted searches for the Cobar Greenhood Orchid were undertaken by FloraSearch (Dr Colin Bower) in October 2012 (Figure 2).	Yes^

* Adequacy of survey effort is based on SEWPaC survey guidelines (2010a; 2010b).

^ Adequacy of survey effort is based on specialist advice from Dr Colin Bower.

1.1.5 Commonwealth Government (30 August 2013) states:

Please provide a map indicating likely suitable habitat within the region for the Malleefowl.

It is notable that a large amount of likely suitable habitat for the Malleefowl is present in the wider region surrounding the Project area. Potential habitat for the Malleefowl is mapped on Figure C-13 in Appendix C of Appendix B of the EIS. The regional distribution of the Malleefowl in relation to the Atlas-Campaspe Project and Balranald Mineral Sands Project is shown in Figure 1. A total of 16,440 ha of habitat for the Malleefowl has been mapped within the proposed biodiversity offset area (Figure C-13 in Appendix C of Appendix B of the EIS). Figure 3 shows Malleefowl records over the wider region surrounding the Atlas-Campaspe Mines area in order to identify likely suitable habitat. It can be seen that likely suitable habitat for the Malleefowl is abundant within the region surrounding the Project (Figure 3) Vegetation mapping surrounding the Atlas-Campaspe Mine was produced for the Project and can be seen on Figure 8 of Appendix A of the EIS.

1.1.6 Commonwealth Government (30 August 2013) states:

The Department notes the NSW Office of Environment and Heritage (OEH) comment regarding the assessment of the quality of habitat in different areas of the site. This is required to determine the level of avoidance of areas of higher quality, a more precise assessment of impacts, and provides information that is required under the EPBC Act offsets policy (and for the calculator guide). Without this information, it will be difficult to assess the adequacy of any offset proposed.

An assessment of vegetation condition is already provided in Section 5.3 in Appendix A of the EIS and a habitat assessment is provided in Section 4.4.13 in Appendix B of the EIS. Habitat condition data is provided in Appendix B of the EIS (see Appendix F and Appendix G). The data includes measurements of fire, clearing, logging, grazing, weeds, vehicle tracks, soil depth, ground layer, tree layer, tree height, age structure, shrub layer, shrub height, ground layer, crypto crust, cover vegetation, cover log, cover bare soil, cover litter, litter depth, large dead trees, trees with hollows, bark and hollows.

Visually, the Belah-Rosewood Woodland in the proposed biodiversity offset area and proposed accommodation camp location are similar but the Belah-Rosewood Woodland in the proposed biodiversity offset area has a much higher diversity of native flora species. Australian Museum Business Services (2013) note that the Belah-Rosewood Woodland in the proposed accommodation camp location was adversely affected by goats. The number of large dead trees within the Belah-Rosewood Woodland of the Project area makes it appear to contain a large number of hollow bearing trees. In fact the Belah-Rosewood Woodland contains a similar number of hollow bearing trees as the Linear Dune Mallee and less hollow bearing trees than the Sandplain Mallee. Figures 4-9 show the locations of hollow bearing trees within the Project and proposed biodiversity offset area.

A new series of figures have been produced to pictorially show this existing habitat condition data relevant to fire, clearing, logging, grazing, weeds and fauna tracks (Figures 10 to 15). The New South Wales (NSW) Office of Environment and Heritage (OEH) provided comments on the final version of the EIS on the 23 July 2013 and Cristal Mining met with OEH on 20 August 2013 to resolve outstanding biodiversity related issues. These figures were provided to OEH.

1.1.7 Commonwealth Government (30 August 2013) states:

Survey effort in the areas of impact must be matched by those in potential offset areas such that an adequate understanding of MNES in all areas is provided (so as to inform decisions on the adequacy of proposed avoidance mitigation and proposed offset measures). Further details should be provided here as necessary, in particular, for the Malleefowl, the Winged Peppercress, and the Cobar Greenhood.

Refer to Response 1.1.5. Based on guidelines and specialist advice, the survey effort to locate each relevant MNES is adequate. Refer to Table 4 and Figure 2.

1.1.8 Commonwealth Government (30 August 2013) states:

The following information in regards to the impacts to MNES of the action is still outstanding: -the area of impact (in hectares) for each component of the action;

Refer to Response 1.1.2.

1.1.9 Commonwealth Government (30 August 2013) states:

The quantification of indirect impacts likely to occur as a result of the action. The Department notes that some further information has been provided on potential indirect impacts (vehicle strike) on the Malleefowl. However, potential indirect impacts to the Malleefowl, Cobar Greenhood and Winged Peppercress need to be considered further. For example, the potential impacts of mining activities on use of habitat by Malleefowl in areas adjacent to the mine, including the potential for abandonment of nest mound/s and foraging habitat and; impacts on threatened plant species caused by runoff, erosion, sedimentation and/or accidental trampling. These impacts should be quantified.

It is not possible to meaningfully quantify indirect impacts.

Malleefowl

Potential indirect impacts on fauna have been assessed in Section 5.2 of Appendix B of the EIS (i.e. habitat fragmentation/loss of connectivity, edge effects, alteration of hydrology, use of saline water for dust control, groundwater dependant vegetation, competition and land degradation by rabbits and goats, predation by foxes, cats and other animals, introduction of pathogens, alteration of fire regimes, dust and pollution, noise, and lighting). A range of measures are also provided in the EIS to mitigate these potential indirect impacts.

Two Malleefowl mounds were found in the originally proposed surface disturbance area. Cristal Mining have committed to avoiding clearance of these mounds and have subsequently revised their proposed mine general arrangement to reflect this commitment.

Potential abandonment of habitat by Malleefowl in areas adjacent to the progressive active mine area could be caused by the above-listed potential indirect impacts which have already been assessed in the EIS. Malleefowl may or may not use habitat in areas adjacent to the active mine area due to the combination of potential indirect impacts. However, a range of measures are provided in the EIS to mitigate and offset the impacts from the Project such that the Australian Museum Business Services (Appendix B of the EIS) conclude that the local population of Malleefowl would be maintained.

If Malleefowl were to abandon a mound adjacent to the progressive active mine area, it is possible that the outcome would be non-consequential to the local population (e.g. they may build another mound in new location) or temporary (i.e. they may return to the mound once mining has passed). The proposed biodiversity offset area is suitably located and is known to provide habitat for the local population.

Also of note, as discussed with OEH, collection of monitoring data on Malleefowl as described in the *National Manual for the Malleefowl Monitoring System* (National heritage Trust, 2009) would also be undertaken in the proposed biodiversity offset area once it is established. Section 4.6.4 of the EIS describes that a programme would be undertaken to monitor and report on the effectiveness of the management measures for the proposed biodiversity offset area. This monitoring programme would be detailed within the Biodiversity Management Plan as described in Section 4.6.3 of the EIS.

Winged Peppercress

Potential indirect impacts on flora from alteration of surface water flow are assessed in Section 6.2.4 of Appendix A of the EIS. This assessment is relevant to the Winged Peppercress because Black Box Woodland is potential habitat for the species. Measures to manage the Black Box Woodland are provided in Section 4.6.3 of the EIS.

No Winged Peppercress have been identified immediately adjacent to the mine area, and given that many hundred Winged Peppercress were recorded in the proposed biodiversity offset area, potential adverse impacts from runoff, erosion, sedimentation are unlikely to significantly impact the species. Nevertheless, water management measures are provided in Section 2.9 of the EIS.

Accidental trampling of Winged Peppercress would be avoided by restricting entry to the proposed biodiversity offset area (refer Table 4-7 in Section 4.6.4 of the EIS, the land clearing strategies in Section 4.6.3 of the EIS, and the management of vehicles as outlined in Section 7.11.1 of Appendix A of the EIS.

Cobar Greenhood Orchid

The likelihood of potential indirect impacts on Cobar Greenhood Orchid recorded in the Mining Lease Application (MLA) area, but outside of the mine footprints (Areas 4 and 5), from runoff, erosion, sedimentation is considered low as a 25 m buffer would be maintained around the plants. There is a high likelihood of the Cobar Greenhood Orchid persisting in close proximity to the mine activity because the Cobar Greenhood Orchid only appears above ground in a short period during the year (spring). When it is not flowering the Cobar Greenhood Orchid remains below ground as a tuber. In addition to this, the proposed mine is progressive, and as such, mining activities would only be undertaken in close proximity to the Cobar Greenhood Orchid for approximately 5 years of the mine's life. After this time, the mining area surrounding the Cobar Greenhood Orchid would become inactive and rehabilitated.

During consultation with the DotE (15 October 2013), Cristal Mining agreed to relocate a section of stockpile (approximately 3.5 ha) in order to increase connectivity to potential habitat for the Cobar Greenhood Orchid.(Figures 16a and b).

Accidental trampling of Cobar Greenhood in locations where it has been recorded in the MLA, but outside of the mine footprints (Areas 4 and 5) is unlikely as these areas would be fenced as described in Section 4.6.3 of the EIS.

1.1.10 Commonwealth Government (30 August 2013) states:

The assessment of indirect impacts from the proposal to the adjacent proposed offset areas is also required.

The potential impact of edge effects on vegetation and habitat surrounding the Project (i.e. the proposed biodiversity offset area) is already discussed in Section 6.2.2 in Appendix A and Section 5.2.2 in Appendix B of the EIS. The potential edge effects would occur progressively due to the advancing extraction area and active mine area over 20 years and also progressively reduced due to progressive rehabilitation. Management and mitigation measures for edge effects (e.g. weed control and management of exotic animals) would be described in the proposed Biodiversity Management Plan. The proposed biodiversity offset area is suitably sized (16,540 ha) and unlikely to be notably affected by the Project.

1.1.11 Commonwealth Government (30 August 2013) states:

Furthermore, adequate baseline data to determine habitat use in the area is likely to be required to undertake the impact assessment, as well as the successful implementation of mitigation measures.

Refer to Response 1.1.5. Based on guidelines and advice from specialists, the survey effort to locate each relevant MNES is adequate. Refer to Table 4 and Figure 2.

1.1.12 Commonwealth Government (30 August 2013) states:

The Department considers that the Cobar Greenhood on-site is an important population under the EPBC Act as it is outside the known range of the species. The Department therefore recommends that, where possible, further avoidance to the Cobar Greenhood, as a result of mine infrastructure, stock piles and water management, is required.

As described in Section 4.6.3 of the EIS, additional mitigation measures would be put in place by Cristal Mining to minimise impacts on the Cobar Greenhood Orchid. These would include (as described in Section 4.6.3 of the EIS):

- erecting fencing and signage around a 25 m buffer from the fourth and fifth location of Cobar Greenhood Orchid to avoid incidental incursions;
- refinement of the final design/location of the stockpiles to avoid impacts on the fourth and fifth location of the Cobar Greenhood Orchid and minimise impacts on the orchid and its habitat where possible;
- the fifth location is within the proposed biodiversity offset area, however the mine plan would avoid the 25 m radius zone around this location (in which further individuals could occur);
- erecting fencing to protect the known occurrences of the Cobar Greenhood Orchid from grazing by goats and rabbits (locations 4 and 5); and
- inclusion of the Cobar Greenhood Orchid (collected from within the mining lease) into revegetation trials for rehabilitated mine landforms.

In addition to the above mitigation measures (previously outlined in Section 4.6.3 of the EIS) Cristal Mining have agreed to relocate a section of stockpile (approximately 3.5 ha) in order to increase connectivity to potential habitat for the Cobar Greenhood Orchid located within the Project (Figures 16a and b).

Three occurrences of the Cobar Greenhood Orchid would be removed by the Project. Avoidance of this impact is not possible as these sites are located within the mine path.

During September 2013, the Environmental Officer at Cristal Mining identified an additional Cobar Greenhood Orchid in the proposed biodiversity offset area (Location 6) (Figures 16a and b). The habitat in which it was recorded is shown in Plate 1 and the orchid is shown in Plate 2.

Plate 1 – Mallee habitat where the Cobar Greenhood Orchid was recorded

Plate 2 – Cobar Greenhood Orchid (Location 6, September 2013)

1.1.13 Commonwealth Government (30 August 2013) states:

The Department notes that the stockpile placement has been modified since the draft EIS to increase the avoidance to the species. However, likelihood of the species persisting in such close proximity, and surrounded by the mining operations, and the likelihood of restoring the habitat to an adequate level for the species, is also required.

There is a high likelihood of the Cobar Greenhood Orchid persisting in close proximity to the mine activity because the Cobar Greenhood Orchid only appears above ground in a short period during the year (spring). When it is not flowering the Cobar Greenhood Orchid remains below ground as a tuber. The likelihood of potential indirect impacts on Cobar Greenhood Orchid recorded in the MLA, but outside of the mine footprints (Areas 4 and 5), from runoff, erosion, sedimentation is considered low as a 25 m buffer would be maintained around the plants.

1.1.14 Commonwealth Government (30 August 2013) states:

The Department recommends that, where possible, further avoidance to habitat removal for the Corben's Long-eared Bat is required, as a result of mine infrastructure, stock piles and the accommodation facilities. The Department notes OEH's comment that the vegetation within the proposed footprint for the mine facility is likely to provide high quality habitat for Corben's Long-eared Bat. This requires further assessment and demonstration of avoidance. Demonstration of how the internal roads and accommodation facilities will be placed to avoid impacts is required.

The Belah-Rosewood Woodland in the proposed biodiversity offset area and proposed accommodation camp location are similar but the Belah-Rosewood Woodland in the proposed biodiversity offset area has a much higher diversity of native flora species. Australian Museum Business Services (2013) note that the Belah-Rosewood Woodland in the proposed accommodation camp location was adversely affected by goats. The number of large dead trees within the Belah-Rosewood Woodland of the Project area makes it appear to contain a large number of hollow bearing trees. In fact the Belah-Rosewood Woodland contains a similar number of hollow bearing trees as the Linear Dune Mallee and less hollow bearing trees than the Sandplain Mallee. Figures 4 to 9 show the locations of hollow bearing trees within the Project and proposed biodiversity offset area.

As described in Section 6.9.2 of the EIS:

Siting of the accommodation camp considered the following:

- *Proximity to both deposits and site access from Link Road – the accommodation camp is located between the ore deposits approximately 4 km from Link Road (Figure 2-3).*
- *Potential impacts to EEC and other vegetation – the location of the accommodation camp is not within any EEC, and no threatened species have been recorded within this area (Figures 13 to 19 of Appendix B of the EIS; Figures 8 and 9 of Appendix A of the EIS). The accommodation camp would disturb the Belah-Rosewood Woodland vegetation community, however, this is not a threatened community under the TSC Act or the EPBC Act (refer to Section 5.1.2 in Appendix A of the EIS). Despite this, 2,560 ha of the Belah-Rosewood Woodland is well represented within the proposed offset area (Section 8.3 in Appendix A of the EIS).*
- *Ability to maintain wet weather access – the accommodation camp and associated access road is located on a ridgeline and therefore is not expected to experience flooding.*
- *Minimisation of potentially unsafe interaction with mining fleet – the accommodation camp can be accessed without entering the mining areas (Figure 2-3).*

Approximately 3,963 ha of habitat for the South-eastern Long-eared Bat would be removed for the Project and approximately 15,830 ha of habitat for the South-eastern Long-eared Bat would be conserved within the proposed biodiversity offset area.

During the meeting (20 August 2013), OEH advised that they accept the proposed biodiversity offset area would sufficiently offset the biodiversity impacts from the Project, when considered in parallel with the Vegetation Management Area (Figure 17) which includes Belah-Rosewood Woodland in an area of the "Iona" property to be subdivided and managed such that stock are excluded, vegetation cover is retained and vegetation is mapped.

1.1.15 Commonwealth Government (30 August 2013) states:

The Department notes the inclusion of attachment D in the EPBC Report, however considers that this table does not address this requirement. The issue of predicted effectiveness needs to be based on the likely success of the mitigation measures achieving the desired outcomes rather than the list of desired outcomes that has provided. This assessment of effectiveness needs to be based on best available information for the relevant threatened species, or evidence of successful application of these measures to mitigate impacts for other species. For example, the Department requests the following information:

- ***an assessment of the likely success of proposed mitigation measures minimising indirect impacts to the Cobar Greenhood;***
- ***whether the collection of topsoil around the Cobar Greenhood has been found to be an effective method for the species;***
- ***what evidence is available to demonstrate that mitigation measures proposed for the Black Box/ephemeral wetland as habitat for MNES will be successful;***
- ***what evidence is available in relation to the use of nest boxes by the Corben's Long-eared Bat;***
- ***what is the likely success of the proposed rehabilitation and management in restoring habitat for MNES impacted by the proposal? For example, is the change in the physical and chemical properties to soil as a result of the mine likely to affect the success of mallee restoration?***
- ***how long is restoration expected to take before the vegetation is considered as providing habitat for the relevant MNES?***

The mitigation measures described in the EIS are proposed on the basis that there is a moderate to high likelihood that the measure would mitigate a potential impact from the Project. Table 5 provides further information on the assessment of predicted effectiveness of the mitigation measures. Specific questions are addressed below.

A Biodiversity Management Plan will be prepared by a suitability qualified persons as described in Section 4.6.3 of the EIS. The Biodiversity Monitoring Plan would include a program to monitor and report on the effectiveness of the measures in the Biodiversity Management Plan, with reporting to be carried out annually. For example, the reporting would include the following:

- monitoring the proposed biodiversity offset area (Figure 4-13 of the EIS) using BioMetric data collection methodology or other methodology in consultation with OEH and to the satisfaction of the Director-General;
- monitoring the threatened species in the proposed biodiversity offset area (Figure 4-13 of the EIS) (e.g. collection of monitoring data on Malleefowl as described in the *National Manual for the Malleefowl Monitoring System*);
- monitoring the condition and usage of all installed nest boxes in the mine revegetation area, including repair and replacement of boxes over the life of the mine; and
- a description of how monitoring data will be used to guide management actions within the proposed biodiversity offset area.

An assessment of the likely success of proposed mitigation measures minimising indirect impacts to the Cobar Greenhood?

There is a high likelihood of the Cobar Greenhood Orchid persisting in close proximity to the mine activity because the Cobar Greenhood Orchid only appears above ground in a short period during the year (spring). When it is not flowering, the Cobar Greenhood Orchid remains below ground as a tuber. The likelihood of potential indirect impacts on Cobar Greenhood Orchid recorded in the MLA, but outside of the mine footprints (Areas 4 and 5), from runoff, erosion, sedimentation is considered low as a 25 m buffer would be maintained around the plants.

Table 5
Mitigation Measures for Matters of National Environmental Significance

Relevant Matter of National Environmental Significance	Measure	Likely Success of the Mitigation Measures Achieving the Desired Outcomes.
Flora		
Cobar Greenhood Orchid	• Refinement of the final design/location of stockpiles to avoid impacts on the fourth and fifth location of the Cobar Greenhood Orchid (Figure 4-11 of the EIS) and fencing and signage of a 25 m radius zone to avoid incidental incursions. Locations 1, 2 and 3 are located above the mineral resource and within the proposed mine path. These locations, therefore, cannot be avoided.	There is a high likelihood that this measure would effectively avoid impacts on known Cobar Greenhood Orchid locations due to fencing and signage of a 25 m radius zone to avoid incidental incursions.
	• Fencing of the 25 m radius zone would be designed to protect the known occurrences of the Cobar Greenhood Orchid from grazing by goats and rabbits (Locations 4 and 5 shown on Figure 4-11 of the EIS).	There is a high likelihood that this measure would effectively mitigate current grazing impacts on known Cobar Greenhood Orchid locations as stock would not be able to access the 25 m radius zone.
	• Vegetation Clearance Protocol including pre-clearance targeted searches for the Cobar Greenhood Orchid (during mid-October) in the proposed disturbance area and salvage of orchids for use in revegetation trials and rehabilitation areas (Section 5.7.2 of the EIS), in accordance with appropriate licences.	There is a moderate likelihood that this measure would be effective for the Cobar Greenhood Orchid as it occurs as a tuber for most of the year and may or may not be recorded during pre-clearance targeted searches.
	• Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).	There is a high likelihood that this measure would effectively minimise the potential for accidental clearance outside proposed disturbance areas.
	• Protection of potential habitat (i.e. mallee woodland) outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA) by removing grazing by stock.	There is a high likelihood that this measure would effectively mitigate current grazing impacts on this species (were it to occur outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA).
	• The collection of topsoil around the Cobar Greenhood Orchid populations within the Atlas-Campaspe Mine for reuse on rehabilitation, where practicable.	There is a moderate likelihood that this measure would be effective for the Cobar Greenhood Orchid as it occurs as a tuber for most of the year.
	• Feral animal control (goats and rabbits) to reduce erosion and grazing pressure.	There is a high likelihood that this measure would effectively mitigate potential erosion and grazing impacts as a result of feral animals.
	• Weed management and monitoring to prevent weed invasion.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of weeds.
	• Fire prevention, control and management.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of fire since fire would be prevented, controlled and managed.

Table 5 (Continued)
Mitigation Measures for Matters of National Environmental Significance

Relevant Matter of National Environmental Significance	Measure	Likely Success of the Mitigation Measures Achieving the Desired Outcomes.
Mossgiel Daisy	• A section of the existing Magenta Road in the vicinity of the known Mossgiel Daisy population would not be widened (Figure 4-12 of the EIS). • This section of road would be sealed to minimise erosion and dust generation.	There is a high likelihood that this measure would effectively avoid impacts on the known population of Mossgiel Daisy.
	• Mineral Concentrate Transport Route (MCTR) mainly follows existing road realignments to reduce amount of vegetation clearance required.	There is a high likelihood that this measure would effectively avoid impacts on Mossgiel Daisy (were they to occur in an alternative road alignment).
	• Stockpiles and machinery associated with road-sealing would be located and stored outside of known habitat.	There is a high likelihood that this measure would effectively avoid impacts on the known population of Mossgiel Daisy.
	• Erection of temporary signage and fencing in the location of the Mossgiel Daisy population and habitat (Figure 4-12 of the EIS) during road sealing activities.	There is a high likelihood that this measure would effectively mitigate impacts on the known Mossgiel Daisy population.
	• Coverage of mineral concentrate transport truck loads to minimise dust during transport.	There is a high likelihood that this measure would effectively mitigate of potential impacts on the known Mossgiel Daisy population.
	• Mine staff and contractors would be made aware of the *Brachyscome papillosa* population along the proposed MCTR.	There is a high likelihood that this measure would effectively mitigate impacts on the known Mossgiel Daisy population.
	• Fire prevention, control and management.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of fire since fire would be prevented, controlled and managed.

Table 5 (Continued)
Mitigation Measures for Matters of National Environmental Significance

Relevant Matter of National Environmental Significance	Measure	Likely Success of the Mitigation Measures Achieving the Desired Outcomes.
Winged Peppercress	• Protection of Black Box Woodland and Grass/Herblands of Drainage Depressions outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA) by removing grazing by stock.	There is a high likelihood that this measure would effectively mitigate current grazing impacts on this species (were it to occur outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA).
	• The collection of seed bank and topsoil around the Winged Peppercress within the Atlas-Campaspe Mine for reuse on rehabilitation, where practicable.	There is a moderate likelihood that this measure would be effective for this species as it spreads via seed.
	• Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).	There is a high likelihood that this measure would effectively minimise the potential for accidental clearance outside proposed disturbance areas.
	• Feral animal control (goats and rabbits) to reduce erosion and grazing pressure.	There is a high likelihood that this measure would effectively mitigate potential erosion and grazing impacts as a result of feral animals.
	• Controlling and monitoring of weeds to improve the likelihood of recruitment of this species.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of weeds.
	• Selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands (e.g. *Eucalyptus largiflorens*) to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the Winged Peppercress.	Refer to the response above this table. There is a high likelihood that this measure would be effective at reinstating the water holding capacity of, and run-on to adjacent depressions.
	• Fire prevention, control and management.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of fire since fire would be prevented, controlled and managed.
	• Vegetation Clearance Protocol including pre-clearance targeted searches for the Winged Peppercress in the proposed disturbance area and salvage of seed for use in revegetation trials and rehabilitation areas (Section 5.7.2 of the EIS), in accordance with appropriate licences.	There is a high likelihood that the Vegetation Clearance Protocol would be a successful mitigation measure for the Winged Peppercress as it restricts vegetation clearance to approved disturbance areas, limiting the impact on the species beyond the approved disturbance area.

Table 5 (Continued)
Mitigation Measures for Matters of National Environmental Significance

Relevant Matter of National Environmental Significance	Measure	Likely Success of the Mitigation Measures Achieving the Desired Outcomes.
Malleefowl	• The two mounds in close proximity to the proposed surface development areas would be avoided through considerate mine planning.	There is a high likelihood that this measure would effectively avoid clearance of the known Malleefowl mounds.
	• Ivanhoe rail siding facility (retention of existing vegetation: Belah-Rosewood Woodland and Native Grassland).	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the Malleefowl may potentially use it).
	• MCTR mainly follows existing road realignments to reduce amount of vegetation clearance required.	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the Malleefowl may potentially use it).
	• Pre-clearance surveys would be undertaken for active Malleefowl mounds in advance of areas to be cleared. If active mounds are found, the eggs would be allowed to hatch and the chicks move away from the nest prior to habitat clearance (where practicable).	There is a moderate to high likelihood that this measure would effectively mitigate potential impacts as Malleefowl mounds would be disused if they need to be cleared.
	• A Threatened Species Management Protocol would be developed as a component of the Biodiversity Management Plan. This protocol would provide a procedure for minimising impacts on active Malleefowl mounds (e.g. timing habitat clearance to minimise impacts).	There is a moderate to high likelihood that this measure would effectively mitigate potential impacts. Clearing of trees and shrubs would, where practicable, be restricted to late summer or early autumn to avoid the period when Malleefowl mounds are most active and minimise impacts to fauna.
	• Livestock would be excluded from the MLA area during the period the Atlas-Campaspe Mine would be in operation.	There is a high likelihood that this measure would effectively mitigate current grazing impacts on this species (were it to occur outside of the disturbance areas for the Atlas-Campaspe Mine (but inside the MLA).
	• Management of exotic animals.	There is a moderate to high likelihood that this measure would effectively reduce the potential for impacts from predation to the Malleefowl.
	• Management of vehicles.	There is a moderate to high likelihood that this measure would effectively reduce the potential for impacts from vehicles on known Malleefowl and Malleefowl mounds.
	• Ivanhoe Rail Facility – vegetation selectively cleared.	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the species may potentially use it).
	• Fire prevention, control and management.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of fire since fire would be prevented, controlled and managed.
	• Timing of land clearance.	There is a high likelihood that this measure would effectively mitigate and/or avoid impacts on the Malleefowl by avoiding breeding season, where practicable.
	• Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).	There is a high likelihood that this measure would effectively minimise the potential for accidental clearance outside proposed disturbance areas.
	• Mine design and method, mine progressively over 20 years.	There is a high likelihood that this measure would effectively mitigate short-term impacts on the Malleefowl by progressively clearance and rehabilitation over 20 years.

Table 5 (Continued)
Mitigation Measures for Matters of National Environmental Significance

Relevant Matter of National Environmental Significance	Measure	Likely Success of the Mitigation Measures Achieving the Desired Outcomes.
Australian Painted Snipe	• Selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands (e.g. *Eucalyptus largiflorens*) to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the Australian Painted Snipe.	Refer to the response above this table. There is a high likelihood that this measure would be effective at reinstating the water holding capacity of, and run-on to adjacent depressions.
	• MCTR mainly follows existing road realignments to reduce amount of vegetation clearance required.	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the species may potentially use it).
	• Fire prevention, control and management.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of fire since fire would be prevented, controlled and managed.
	• Vegetation Clearance Protocol including staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).	There is a moderate to high likelihood that this measure would effectively minimise clearance of potential habitat for the Australian Painted Snipe.

Table 5 (Continued)
Mitigation Measures for Matters of National Environmental Significance

Relevant Matter of National Environmental Significance	Measure	Likely Success of the Mitigation Measures Achieving the Desired Outcomes.
South-eastern Long-eared Bat	• Ivanhoe rail siding facility (retention of existing vegetation: Belah-Rosewood Woodland and Native Grassland).	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the species may potentially use it).
	• MCTR mainly follows existing road realignments to reduce amount of vegetation clearance required.	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the species may potentially use it).
	• Ivanhoe Rail Facility – vegetation selectively cleared.	There is a high likelihood that this measure would effectively avoid clearance of potential habitat (assuming that the species may potentially use it).
	• Selectively place clay materials in low-lying portions of the re-profiled landform within the mine path to reinstate the water holding capacity of, and run-on to adjacent depressions. This would provide for the potential for species representative of Black Box Woodlands (e.g. *Eucalyptus largiflorens*) to establish. Following the re-establishment of the depression and run-on to it, and the establishment of these species, these depressions would provide potential habitat for the South-eastern Long-eared Bat.	Refer to the response above this table. There is a high likelihood that this measure would be effective at reinstating the water holding capacity of, and run-on to adjacent depressions.
	• Fire prevention, control and management.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of fire since fire would be prevented, controlled and managed.
	• Habitat supplementation.	Refer to the response above this table.
	• Staging of impacts and efficient, careful clearance (including clear delineation of disturbance, sign posts and staff awareness).	There is a high likelihood that this measure would effectively minimise the potential for accidental clearance outside proposed disturbance areas.
	• Management of exotic animals.	There is a high likelihood that this measure would effectively mitigate potential impacts as a result of feral animals.
	• Vehicles to remain on existing roads and tracks and inductions will include hazard of driving at dawn and dusk to increase driver awareness.	There is a high likelihood that this measure would effectively mitigate collision risk to the South-eastern Long-eared Bat.
	• Restriction of night-lighting to the minimum required for operational and safety requirements.	There is a high likelihood that this measure would effectively mitigate negative impact from artificial lights on the South-eastern Long-eared Bat.

Whether the collection of topsoil around the Cobar Greenhood has been found to be an effective method for the species?

When it is not flowering, the Cobar Greenhood Orchid remains below ground as a tuber. The collection of topsoil around the Cobar Greenhood Orchid could potentially help preserve tubers as assessed by the Australian Museum Business Services (Appendix A of the EIS). The relocation of topsoil to aid in the conservation of the Cobar Greenhood Orchid is a salvage measure. The Australian Museum Business Services (Appendix A of the EIS) conclude that the local population of Cobar Greenhood Orchid would be maintained regardless of whether the collection of topsoil around the Cobar Greenhood Orchid is successful.

What evidence is available to demonstrate that mitigation measures proposed for the Black Box/ephemeral wetland as habitat for MNES will be successful?

It is relevant to note that the Campaspe footprint has been refined to avoid some direct impacts on the Black Box Woodland (Figure 4-8 of the EIS). Notwithstanding, Cristal Mining would reinstate surface water flows from the backfilled mine path area to the Black Box Woodland south of the Campaspe deposit (shown on Figure 4-8 of the EIS). The hydrological design for the backfilled mine path would be provided in the Rehabilitation Management Plan prior to backfilling the relevant area of the mine path. Cristal Mining would prepare and implement a monitoring programme as part of the Rehabilitation Management Plan to confirm reinstatement of surface water flows to the Black Box Woodland south of the Campaspe deposit (shown on Figure 4-8 of the EIS).

Re-instatement of surface water flows via appropriate drainage works is a common practice across not only mining rehabilitation projects but any land development industry. In addition, the use of selective placement of materials during rehabilitation for surface water flow (i.e. clay material replacement) is also relatively common in the context of generation surface drainage works (e.g. drainage creek diversion works).

Cristal Mining would provide to the Director-General of the NSW Department of Planning and Infrastructure (DP&I) and OEH a report based on data collected in accordance with the monitoring programme which demonstrates the effectiveness of the surface flow reinstatement to the Black Box Woodland south of the Campaspe deposit (shown on Figure 4-8 of the EIS). Reinstatement of surface water flows to the Black Box Woodland shall be a performance criteria included in the Rehabilitation Management Plan.

What evidence is available in relation to the use of nest boxes by the Corben's Long-eared Bat?

Roost boxes are known to be used by long-eared bats (e.g. Lesser Long-eared Bat [*Nyctophilus geoffroyi*] and Gould's Long-eared Bats [*Nyctophilus gouldi*]) (Goldingay and Stevens, 2009; Smith and Agnew, 2002). Goldingay and Stevens (2009) undertook a review of the use of artificial tree hollows by Australian birds and bats and note that roost boxes could play an important role in the recovery of threatened bats. Existing studies on the use of roost boxes by the South-eastern Long-eared Bat are lacking; nonetheless this should not impede the proposed use of roost boxes for the species. The Australian Museum Business Services (Appendix B of the EIS) conclude that the local population of South-eastern Long-eared Bat would be maintained regardless of whether the roost boxes on the rehabilitation are successful.

What is the likely success of the proposed rehabilitation and management in restoring habitat for MNES impacted by the proposal? For example, is the change in the physical and chemical properties to soil as a result of the mine likely to affect the success of mallee restoration?

It is not a necessary objective for the rehabilitation to restore mallee on the backfilled mine path or waste emplacements because the offset compensates for the impact. Nevertheless, trials will be undertaken to establish mallee on the backfilled mine path and waste emplacements. The rehabilitation strategy will provide a wide range of benefits to biodiversity as outlined by the objectives of the Project rehabilitation strategy (Section 5.2 of the EIS):

The primary objectives of the Project rehabilitation strategy are:

- *the creation of safe, stable and non-polluting landforms;*
- *restoring self-sustaining ecosystems suitable for a final use determined in consultation with landholders and relevant government agencies; and*
- *progressive rehabilitation of the mine path scheduled to make best use of favourable climatic conditions.*

Other objectives of rehabilitation include:

- *preservation of existing vegetation and topography, where practicable;*
- *establishing permanent self-propagating vegetation cover including native species characteristic of vegetation communities cleared by Project development that could be used for a final land use involving either light intensity grazing or for nature conservation purposes;*
- *maintaining overland flow to local closed depressions to minimise disturbance to Black Box Woodlands (and potential threatened flora species) in the vicinity of the Project;*
- *exclusion of livestock from rehabilitation areas during operations and revegetation development;*
- *development of flexible rehabilitation concepts that facilitate trial-based improvements to the rehabilitation strategy; and*
- *conducting rehabilitation monitoring at select rehabilitation areas to assess rehabilitation performance on an annual basis against nominated performance standards and completion criteria.*

The rehabilitation strategy includes objectives relating to Black Box Woodlands (Sections 5.2 and 5.7.2 of the EIS) (considered potential habitat for a number of threatened species [Section 5.3.2 of the EIS]), however, the rehabilitation strategy management measures are not specific to habitat for MNES.

Cristal Mining has previous and ongoing rehabilitation experience at the Ginkgo, Snapper and Wemen Mines which provides a relevant indication of the key performance of the rehabilitation at the Project (Section 5.1 of the EIS). Cristal Mining has undertaken a number of rehabilitation trials and received a highly commended award at the 2012 NSW Minerals Council Excellence Awards for the rehabilitation planning and practices implemented at the Ginkgo Mine (Section 5 of the EIS).

The Rehabilitation Management Plan would be developed for rehabilitation planning and progressively refined where necessary (Section 5.6 of the EIS). It would be developed in consultation with relevant government agencies, and in accordance with the relevant NSW Trade and Investment – Division of Resources and Energy rehabilitation and mine closure guidelines (Section 7.3.9 of the EIS).

The rehabilitation monitoring proposed would be documented in the Rehabilitation Management Plan and would be conducted to assess (Section 5.7 of the EIS):

- *progress of rehabilitation areas;*
- *the effectiveness of the rehabilitation concepts and measures being used; and*
- *performance of rehabilitation and/or revegetation trials.*

The successful rehabilitation implemented at its other mines demonstrates that Cristal Mining will be able to achieve the objectives of the Project rehabilitation strategy.

How long is restoration expected to take before the vegetation is considered as providing habitat for the relevant MNES?

Refer to Response 1.1.3. Rehabilitation would occur progressively over the 20 year life of the mine as shown on Figures 2-4 to 2-8 of the EIS. Overburden emplacements and the backfilled mine path are rehabilitated on a campaign basis and other mine infrastructure is rehabilitated as it is decommissioned.

Cristal Mining has not committed to restoring habitat for MNES on the rehabilitated mine landform. As described in Section 4.6.3 of the EIS, the disturbance areas associated with the Project would be progressively rehabilitated and revegetated with species characteristic of the vegetation communities proposed to be cleared. An objective of the rehabilitation programme is to restore ecosystem function to land affected by the Project development including maintaining or establishing self-sustaining ecosystems.

1.1.16 Commonwealth Government (30 August 2013) states:

The Department considers that further, ongoing monitoring of the Malleefowl to determine its habitat use of the impact and offset area is required. This will be critical to confirm findings of the indirect impact assessment, when undertaken; to determine baseline data to assess the success of the proposed offset, and to implement adaptive management processes should a decline be noted.

Section 4.6.4 of the EIS already describes that a programme would be undertaken to monitor and report on the effectiveness of the management measures for the proposed biodiversity offset area, including targeted terrestrial fauna surveys to be undertaken every 3 years to monitor the use of the proposed biodiversity offset area by vertebrate fauna. This monitoring programme would be detailed within the Biodiversity Management Plan that would be prepared by suitability qualified persons as described in Section 4.6.3 of the EIS.

Also of note, as discussed with OEH, collection of monitoring data on Malleefowl as described in the *National Manual for the Malleefowl Monitoring System* would also be undertaken in the proposed biodiversity offset area once it is established.

1.1.17 Commonwealth Government (30 August 2013) states:

Please provide further information about the groundwater monitoring program, how this will be effective in ensuring that no impacts will occur to the World Heritage Area, and what corrective actions would be implemented if monitoring indicated impacts beyond what has been predicted.

The cumulative groundwater modelling results, which are considered to be conservative, show that drawdown (of the deep underlying saline groundwater aquifer) does not extend to the Willandra Lakes Region World Heritage Area or the Mungo National Park (Appendix F of the EIS). Notwithstanding, a Groundwater Monitoring Programme would be developed for the Project as part of the Groundwater Management Plan (in recognition of the importance of the Willandra Lakes Region World Heritage Area and the Mungo National Park). The Groundwater Monitoring Programme would be progressively implemented to detect changes in groundwater levels and quality as a result of groundwater extraction for water supply, dewatering during mining operations, deposition of process wastes behind the advancing ore extraction areas and disposal of excess waters if required.

The Groundwater Monitoring Programme will include monitoring bores surrounding the Atlas and Campaspe deposits, including sites that would be located between the deposits and World Heritage Area (Figure 4-4 of the EIS). In particular, Section 7.4.2 of the EIS states:

> *Existing site AM4 would be retained for the life of the Project to monitor the groundwater table west of the groundwater supply borefield (i.e. outside of the Willandra Lakes Region World Heritage Area and Mungo National Park) where groundwater drawdown extents are anticipated.*

The Groundwater Monitoring Programme would be used to confirm the groundwater model prediction made in the EIS. The Groundwater Management Plan would describe contingent mitigation, compensation, and/or offset options that would be enacted if, in the unlikely event, users of groundwater resources in the region are adversely affected by the Project and would describe procedures/reporting that would be implemented over the life of the Project (e.g. responses to complaints, progressive numerical model refinement and periodic reporting to inform the site water balance review).

1.1.18 Commonwealth Government (30 August 2013) states:

> ***While a high level, qualitative description of proposed mitigation is provided, detail is still required regarding the mitigation measures proposed. For example, including key objectives/targets, what, how, why, when, where, how often, by whom, allocated expenditure and resourcing, for how long, evidence of known/predicted effectiveness, baseline data/collection of baseline data, ongoing monitoring to ensure that the measures are effective, thresholds for corrective actions, corrective actions and the relevant impacts that will be reduced on individual MNES.***

A Biodiversity Management Plan will be prepared by a suitability qualified persons as described in Section 4.6.3 of the EIS. This management plan would include details regarding the mitigation measures proposed for the following:

- key objectives/targets;
- what, how, why, when, where, how often, by whom;
- for how long;
- evidence of known/predicted effectiveness;
- baseline data/collection of baseline data;
- ongoing monitoring to ensure that the measures are effective; and
- the relevant impacts that will be reduced on individual MNES.

As noted by the Commonwealth Government a high level, qualitative description of proposed mitigation is already provided in the EIS. The following details listed by the Commonwealth Government are either already provided in the EIS or not required as part of the EIS and would be provided as part of the Biodiversity Management Plan. Table 6 provides additional detail regarding the mitigation measures proposed, where required.

Table 6
Additional Detail

Aspect	Detail
Key objectives/targets	The key objectives/targets are already provided in the EIS.
What	The measures are already described in the EIS.
How	How the measures will be undertaken is described in the EIS and will be further described in the Biodiversity Management Plan.
Why	Why the measures are being applied is already described in the EIS.
When, where and how often	When, where and how often the measures will be undertaken is described in the EIS and will be further described in the Biodiversity Management Plan.
By whom	Cristal Mining is the proponent for the Project and will be responsible for undertaking the management measures.
Allocated expenditure and resourcing	This is not required as part of an EIS. Cristal Mining will be responsible for any expenditure and resourcing to undertake the management measures.
For how long	For how long the measures will be undertaken is described in the EIS and will be further described in the Biodiversity Management Plan.
Evidence of known/predicted effectiveness	The likely success of the mitigation measures achieving the desired outcomes is provided in Table 5.
Baseline data/collection of baseline data	Section 4.6.4 of the EIS already describes that a programme would be undertaken to monitor and report on the effectiveness of the management measures for the proposed biodiversity offset area.
Ongoing monitoring to ensure that the measures are effective	Section 4.6.4 of the EIS already describes that a programme would be undertaken to monitor and report on the effectiveness of the management measures for the proposed biodiversity offset area.
Thresholds for corrective actions	There are no proposed corrective actions.
Corrective actions and the relevant impacts	There are no proposed corrective actions.

1.1.19 Commonwealth Government (30 August 2013) states:

The Department notes the commitment to avoid clearing active Malleefowl mounds with eggs where practicable, and recommends that this commitment be strengthened to ensure that this does not occur. Mortality of young is considered a threat to the species which should be avoided.

OEH provided comments on the final version of the EIS on the 23 July 2013 and Cristal Mining met with OEH on 20 August 2013 to resolve outstanding biodiversity related issues. In particular situations, it may not be practicable to delay vegetation clearance until breeding has finalised. Clearing of trees and shrubs would, where practicable, be restricted to late summer or early autumn to avoid the period when Malleefowl mounds are most active and minimise impacts to fauna. Where it is no practicable to delay vegetation clearance activities until late summer and early autumn Cristal Mining will implement the following protocol:

1. Notify OEH of the required clearing, and provide justification as to why clearing cannot occur during late summer or early autumn where active Malleefowl mounds are known to be present.
2. Propose additional mitigation measures to minimise potential impacts on the Malleefowl. Additional mitigation measures may include clearing the area surrounding the mound in advance, encouraging the birds to move out of the clearance area.

The protocol and proposed additional mitigation measures will be described in the Biodiversity Management Plan.

1.1.20 Commonwealth Government (30 August 2013) states:

The Rehabilitation Plan does not include information specific to the revegetation of the mine void and how this will be implemented to ensure that habitat for MNES is restored to the site post mining.

Cristal Mining has not committed to restoring habitat for MNES on the rehabilitated mine landform. As described in Section 4.6.3 of the EIS, the disturbance areas associated with the Project would be progressively rehabilitated and revegetated with species characteristic of the vegetation communities proposed to be cleared. An objective of the rehabilitation programme is to restore ecosystem function to land affected by the Project development including maintaining or establishing self-sustaining ecosystems.

As described in Section 5.7 of the EIS, Landform Function Analysis (LFA) is a Commonwealth Scientific and Industrial Research Organisation developed method used to provide indicators of rehabilitation success and allows the assessment of landscape processes. LFA aims to measure the progression of rehabilitation towards a self-sustaining ecosystem through the assessment of landscape function.

1.1.21 Commonwealth Government (30 August 2013) states:

Key measures that are currently proposed in the EIS to be included in a Biodiversity Management plan at a later date, need to be included as part of the EIS. For example, the threatened species management protocols referred to in the EPBC controlling provisions index should be provided as part of the PPR, to ensure that these will be effective in minimising impacts to threatened species.

There is no Preferred Project Report relevant to the approval process under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). As noted by the Commonwealth Government, a qualitative description of proposed mitigation is already provided in the EIS (Response 1.1.18). Section 4.6.3 of the EIS already describes that a Biodiversity Management Plan would be prepared by suitability qualified persons. During a meeting with OEH (20 August 2013), they confirmed that Cristal Mining has provided sufficient information to develop relevant recommendations to DP&I.

1.1.22 Commonwealth Government (30 August 2013) states:

The Department acknowledges the close timing of the release of the EPBC Act Offsets Policy in relation to the preparation of the EIS. However, it is reiterated that this requirement must be addressed in the Preferred Project Report. The Department notes that Resources Strategies have requested further guidance in relation to meeting this requirement and look forward to receiving the offset assessment in due course. Once this information is received, the Department can undertake an assessment of the adequacy of the proposed offset in compensating for the impacts of the action. Refer also previous comments regarding information requirements for potential offset areas.

As stated in Response 1.1.21, there is no Preferred Project Report relevant to the approval process under Part 4 of the NSW EP&A Act.

Cristal Mining Australia acknowledges the *EPBC Act Environmental Offsets Policy*, however this was released in October 2012 and was therefore too late to incorporate into the EIS. See timeline below:

- **May 2011 – the proposed biodiversity offset area was selected.**
- November 2011 to May 2012 – Australian Museum Business Services undertook surveys of the proposed biodiversity offset area.
- **October 2012 - the *EPBC Act Environmental Offsets Policy* was released.**
- November 2012 – the EIS was submitted.

Australian Museum Business Services (Appendices A and B of the EIS) assessed the suitability of the proposed biodiversity offset area and concluded that it contained habitat that was suitable, and in some cases in better condition than in the Project area, for the Cobar Greenhood Orchid, Winged Peppercress, Malleefowl and South-eastern Long-eared Bat. The quantity of suitable habitat, or individual records, located within the proposed biodiversity offset area is also far greater than that located within the Project area for all four of these species.

Despite the above, necessary information in order to run the *EPBC Act Environmental Offsets Policy* calculator is provided below.

Cobar Greenhood Orchid

Table 7 provides the area of Cobar Greenhood Orchid habitat to be disturbed and offset. The 'area of habitat' protected matter attribute most effectively captures the nature of the residual impact on the Cobar Greenhood Orchid due to the conspicuous nature of the plant.

Table 7
Cobar Greenhood Orchid Habitat to be Disturbed and Offset

Vegetation Community	Area to be Disturbed (ha)	Area within the Proposed Biodiversity Offset Area (ha)
Sandplain Mallee	535	3,125
Linear Dune Mallee Woodland	1,040	9,640
Total	**1,575**	**12,765**

Table 8 provides the *EPBC Act Environmental Offsets Policy* calculator input for the Cobar Greenhood Orchid.

Table 8
Cobar Greenhood Orchid – EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Impact		
Area of Habitat to be Impacted	1,575 ha	Defined by Australian Museum Business Services (Appendix A of EIS)
Quality (0 to 10)	8	Some threats exist (exotic animals and grazing) so the quality of the habitat is less than 10. It is still quite high so 8 is deemed an appropriate rating for the quality of habitat for this species.
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the proposed biodiversity offset area within 12 months of grant of Development Consent.
Time until ecological benefit	2 years	Once livestock grazing is excluded from the proposed biodiversity offset area and exotic animals are reduced through management, it is reasonable to expect an ecological benefit within 2 years (i.e. the stock won't be present to graze on the plant).
Start area (ha) (Size of the offset)	12,765 ha	Defined by Australian Museum Business Services (Appendix A of EIS).

Table 8 (Continued)
Cobar Greenhood Orchid – EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Offset (Continued)		
Start Quality (0 to 10)	8	The habitat in the proposed biodiversity offset area is subject to the same threats as the Project area (exotic animals and grazing). A start quality of 8 is deemed an appropriate rating for the quality of habitat for this species.
Risk of loss (%) without offset	50%	A 50% risk of loss is considered appropriate since the area is a Western Lands Lease used for agriculture and there are no conservation protection measures in place.
Future quality without offset (scale of 0-10)	5	Without the proposed biodiversity offset area, the future quality of the habitat in the area is likely to decline due to the exotic animals and grazing on the Western Lands Lease. It is unlikely to decline past a moderate condition for this species without a substantial increase in grazing or other threats that are not currently operating.
Risk of loss (%) with offset	0%	With the proposed biodiversity offset area, there is unlikely to be any risk that the species would be lost in the area (i.e. loss would be prevented).
Future quality with offset (scale of 0-10)	9	The future quality of the habitat is likely to increase with the proposed biodiversity offset area since exotic animals would be reduced and grazing removed.
Confidence in the result	90%	There is a high level of confidence in the result.
% of impact offset	**394%**	**The proposed biodiversity offset area is more than suitable.**

Winged Peppercress

Table 9 provides the number of Winged Peppercress found in the disturbance area and proposed biodiversity offset area. The 'number of individuals' protected matter attribute most effectively captures the nature of the residual impact on the Winged Peppercress as the number of individuals were easily counted.

Table 9
Winged Peppercress to be Disturbed and Offset

	Number of Winged Peppercress Found in the Disturbance Area (ha)	Number of Winged Peppercress Found in the Proposed Biodiversity Offset Area (ha)
Total	3	200

Table 10 provides the *EPBC Act Environmental Offsets Policy* calculator input for the Winged Peppercress.

Table 10
Winged Peppercress – EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Impact		
Quantum of Impact	3	Two individual plants were recorded by Australian Museum Business Services and one was recorded by FloraSearch (2012) (Appendix A of EIS).
Offset		
Proposed Offset	200	195 individual plants were recorded by Australian Museum Business Services and five were recorded by FloraSearch (2012) (Appendix A of EIS).
Time horizon (years)	1	An arrangement would be made for the enduring protection and management of the proposed biodiversity offset area within 12 months of grant of Development Consent.
Future Value without Offset	0	There would be no benefit without the proposed biodiversity offset area.

Table 10 (Continued)
Winged Peppercress – EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Offset (Continued)		
Future Value with Offset	200	The Winged Peppercress in the proposed biodiversity offset area would be protected and the number of plants may increase since exotic animals would be reduced and grazing removed.
Confidence in the result	90%	High level of confidence.
% of impact offset	**5780%**	**The proposed biodiversity offset area is suitable.**

Malleefowl

Table 11 provides the area of Malleefowl habitat to be disturbed and offset. The 'area of habitat' protected matter attribute most effectively captures the nature of the residual impact on the Malleefowl.

Table 11
Malleefowl Habitat to be Disturbed and Offset

Vegetation Community	Area to be Disturbed (ha)	Area within Proposed Biodiversity Offset Area (ha)
Belah-Rosewood Woodland	2,035	2,560
Linear Dune Mallee Woodland	1,040	9,640
Sandplain Mallee	535	3,125
Shrubland	370	845
Cleared Land	300	270
Total	**4,280**	**16,440**

Table 12 provides the *EPBC Act Environmental Offsets Policy* calculator input for the Malleefowl.

Table 12
Malleefowl - EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Impact		
Area of Habitat to be Impacted	4,280 ha	Defined by Australian Museum Business Services (Appendix B of EIS)
Quality (0 to 10)	8	Some threats exist (exotic animals and grazing) so the quality of the habitat is less than 10. It is still quite high so 8 is deemed an appropriate rating for the quality of habitat for this species.
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the proposed biodiversity offset area within 12 months of grant of Development Consent.
Time until ecological benefit	2 years	Once livestock grazing is excluded from the proposed biodiversity offset area and exotic animals are reduced through management, it is reasonable to expect an ecological benefit within 2 years (i.e. the stock won't be present to trample the understorey vegetation).
Start area (ha) (Size of the offset)	16,440 ha	Defined by Australian Museum Business Services (Appendix B of EIS).
Start Quality (0 to 10)	8	The habitat in the proposed biodiversity offset area is subject to the same threats as the Project area (exotic animals and grazing). A start quality of 8 is deemed an appropriate rating for the quality of habitat for this species.
Risk of loss (%) without offset	50%	A 50% risk of loss is considered appropriate since the area is a Western Lands Lease used for agriculture and there are no conservation protection measures in place.

Table 12 (Continue)
Malleefowl - EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Offset (Continued)		
Future quality without offset (scale of 0-10)	5	Without the proposed biodiversity offset area, the future quality of the habitat in the area is likely to decline due to the exotic animals and grazing. It is unlikely to decline past a moderate condition for this species without a substantial increase in grazing or other threats that are not currently operating.
Risk of loss (%) with offset	0%	With the proposed biodiversity offset area, there is unlikely to be any risk that the species would be lost in the area (i.e. loss would be prevented).
Future quality with offset (scale of 0-10)	9	The future quality of the habitat is likely to increase with the proposed biodiversity offset area since exotic animals would be reduced and grazing removed.
Confidence in the result	90%	There is a high level of confidence in the result.
% of impact offset	**153%**	**The proposed biodiversity offset area is suitable.**

South-eastern Long-eared Bat

Table 13 provides the area of South-eastern Long-eared Bat habitat to be disturbed and offset. The 'area of habitat' protected matter attribute most effectively captures the nature of the residual impact on the South-eastern Long-eared Bat.

Table 13
South-eastern Long-eared Bat Habitat to be Disturbed and Offset

Vegetation Community	Area to be Disturbed (ha)	Area within Proposed Biodiversity Offset Area (ha)
Belah-Rosewood Woodland	2,035	2,560
Linear Dune Mallee Woodland	1,040	9,640
Sandplain Mallee	535	3,125
Ephemeral Wetland	0	11
Acacia Woodland Shrubland	200	415
Black Box Woodland	50	79
Total	**3,860**	**15,830**

Table 14 provides the *EPBC Act Environmental Offsets Policy* calculator input for the South-eastern Long-eared Bat.

Table 14
South-eastern Long-eared Bat - EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Impact		
Area of Habitat to be Impacted	3,860 ha	Defined by Australian Museum Business Services (Appendix B of EIS)
Quality (0 to 10)	8	Some threats exist (exotic animals and grazing) so the quality of the habitat is less than 10. It is still quite high so 8 is deemed an appropriate rating for the quality of habitat for this species.
Offset		
Time over which loss is averted (max. 20 years)	20 years	An arrangement would be made for the enduring protection and management of the proposed biodiversity offset area within 12 months of grant of Development Consent.
Time until ecological benefit	5 years	Once livestock grazing is excluded from the proposed biodiversity offset area and exotic animals are reduced through management, it is reasonable to expect an ecological benefit within 5 years.

Table 14 (Continued)
South-eastern Long-eared Bat - EPBC Act Environmental Offsets Policy Calculator Input

Aspect	Input	Justification
Offset (Continued)		
Start area (ha) (Size of the offset)	15,830 ha	Defined by Australian Museum Business Services (Appendix B of EIS)
Start Quality (0 to 10)	8	The habitat in the proposed biodiversity offset area is subject to the same threats as the Project area (exotic animals and grazing). The density of tree hollows could be greater. A start quality of 8 is deemed an appropriate rating for the quality of habitat for this species.
Risk of loss (%) without offset	50%	A 50% risk of loss is considered appropriate since the area is a Western Lands Lease used for agriculture and there are no conservation protection measures in place.
Future quality without offset (scale of 0-10)	5	Without the proposed biodiversity offset area, the future quality of the habitat in the area is likely to decline due to the exotic animals and grazing. It is unlikely to decline past a moderate condition for this species without a substantial increase in grazing or other threats that are not currently operating.
Risk of loss (%) with offset	0%	With the proposed biodiversity offset area, there is unlikely to be any risk that the species would be lost in the area (i.e. loss would be prevented).
Future quality with offset (scale of 0-10)	9	The future quality of the habitat is likely to increase with the proposed biodiversity offset area since exotic animals would be reduced and grazing removed.
Confidence in the result	90%	There is a high level of confidence in the result.
% of impact offset	**199%**	**The proposed biodiversity offset area is suitable.**

Table 15 provides further detail on how the proposed biodiversity offset area meets the EPBC Act Environmental Offsets Policy.

Table 15
EPBC Act Environmental Offsets Policy - Further Detail

Information Requirement	Response
The location and size, in hectares, of any offset site(s).	This information is already provided in the EIS.
Maps clearly showing for each offset site: • the relevant ecological features; • the landscape context; and • the cadastral boundary.	This information is already provided in the EIS.
The current tenure arrangements (including zoning and ownership) of any proposed offset sites.	This information is already provided in the EIS.
Confirmed records of presence (or otherwise) of relevant protected matter(s) on the offset site(s).	This information is already provided in the EIS.
Detailed information regarding the presence and quality of habitat for relevant protected matter(s) on the offset site. The quality of habitat should be assessed in a manner consistent with the approach outlined in the document titled *How to use the offset assessment guide* available at: http://www.environment.gov.au/epbc/publications/environmental-offsets-policy.html.	The quality of the habitat for relevant protected matters within the proposed biodiversity offset area is 8 out of 10. The habitat in the proposed biodiversity offset area is subject to the same threats as the Project area (exotic animals and grazing). The density of tree hollows could be greater. A start quality of 8 is deemed an appropriate rating for the quality of habitat.
Management actions that will be undertaken that improve or maintain the quality of the proposed offset site(s) for the relevant protected matter(s). Management actions must be clearly described, planned and resourced as to justify any proposed improvements in quality for the protected matter(s) over time.	Llivestock grazing will be excluded from the proposed biodiversity offset area and exotic animals will be reduced through management.
The time over which management actions will deliver any proposed improvement or maintenance of habitat quality for the relevant protected matter(s).	The proposed biodiversity offset area will be managed over a life of 20 years. An arrangement would be made for the enduring protection and management of the proposed biodiversity offset area within 12 months of grant of Development Consent.

Table 15 (Continued)
EPBC Act Environmental Offsets Policy - Further Detail

Information Requirement	Response
The risk of damage, degradation or destruction to any proposed offset site(s) in the absence of any formal protection and/or management over a foreseeable time period (20 years). Such risk assessments may be based on: • presence of pending development applications, mining leases or other activities on or near the proposed offset site(s) that indicate development intent; • average risk of loss for similar sites; and • presence and strength of formal protection mechanisms currently in place.	A 50% risk of loss (without the proposed biodiversity offset area) is considered appropriate since the area is a Western Lands Lease used for agriculture and there are no conservation protection measures in place.
The legal mechanism(s) that are proposed to protect offset site(s) into the future and avert any risk of damage, degradation or destruction.	This information is already provided in the EIS.
Provide information regarding how the proposed offsets package is additional to what is already required, as determined by law or planning regulations, agreed to under other schemes or programs or required under an existing duty-of-care.	This information is already provided in the EIS. The proposed biodiversity offset area is on a Western Lands Lease used for stock grazing.
The overall cost of the proposed offsets package; including costs associated with, but not limited to: • acquisition and transfer of lands/property; • implementation of all related management actions; and • monitoring, reporting and auditing of offset performance.	This is not required as part of an EIS. Cristal Mining will be responsible for any expenditure and resourcing to undertake the management measures.

1.1.23 Commonwealth Government (30 August 2013) states:

The Department considers that a Cultural Heritage Management Plan developed and implemented in accordance with the recommendations of Appendix E - Aboriginal and non-Aboriginal cultural heritage assessment (pp.81-82), and the Aboriginal heritage and cultural awareness program are likely to be sufficient to manage any potential impacts on the World and National Heritage cultural values.

The Department recommends that this Plan be submitted as a part of the assessment, or that the key commitments to be included in the Plan provided, in particular. the plan should:

- ***recognise the principles expressed in the Department's Ask First Guide that Indigenous people;***
- ***include and consider the World and National Heritage values of Willandra Lakes region, particularly criterion (iii) World Heritage value and criterion (g) National Heritage value which include the social and traditional value of the Willandra Lakes Region to the local Aboriginal community.***
- ***formalise protocols and policies for continued and regular consultation to identify, assess, protect and manage known and newly discovered Indigenous heritage. It should also identify any gender or age restrictions relating to access and activities at heritage sites.***

Cristal Mining agrees that the key commitments described in the Aboriginal and Non-Aboriginal Cultural Heritage Assessment (Appendix E of the EIS) should be included in the Cultural Heritage Management Plan. Cristal Mining also agrees that the recommendations made by SEWPaC (bullet points quoted above) be incorporated into the Cultural Heritage Management Plan.

Cristal Mining suggests that Cultural Heritage Management Plan be prepared in consultation with the registered Aboriginal parties and submitted for approval prior to commencement of activities that would impact Aboriginal cultural heritage sites.

1.1.24 Commonwealth Government (30 August 2013) states:

> ***The Department recommends that the cultural awareness program be conducted before the action is commenced and with direct input from the relevant Aboriginal people with rights or interests in the place. The Department also recommends that this training include an introduction to the World and National Heritage Lists, and specifically the listed values of the Willandra Lakes region.***

Section 16 of Appendix E of the EIS lists the recommendations that are proposed to be included and detailed in the Cultural Heritage Management Plan. These existing recommendations include:

> *…*
> *12. The inclusion of Aboriginal heritage and cultural awareness training as part of the induction programme. The cultural awareness training should have direct input from the registered Aboriginal parties.*

The induction programme would therefore include cultural awareness training (with direct input from registered Aboriginal parties) and each relevant employee would be required to complete the training prior to commencement of activities that would impact Aboriginal cultural heritage sites. Cristal Mining agrees that the cultural awareness training should include an introduction to the World and National Heritage Lists, and specifically the listed values of the Willandra Lakes region.

References

Australian Museum Business Services (2013) *Atlas-Campaspe Mineral Sands Project Flora Assessment*. Report *prepared for Cristal Mining Australia Limited.*

Bemax Resources Limited (2011) *Ginkgo Mineral Sands Mine Annual Environmental Management report.*

Department of Sustainability, Environment, Water, Population and Communities (2010a) *Survey guidelines for Australia's threatened bats*.

Department of Sustainability, Environment, Water, Population and Communities (2010b) *Survey guidelines for Australia's threatened birds.*

Department of Sustainability, Environment, Water, Populations and Communities (2013a) *EPBC Act Environmental Offsets Policy*.

Department of Sustainability, Environment, Water, Populations and Communities (2013b) *EPBC Act Guidelines for the Content of a Draft EIS - Balranald Mineral Sands Project*.

Ecotone Ecological Consultants (2012a) *Flora and Fauna Baseline Studies Balranald Mineral Sands Project – West Balranald Deposit, Balranald NSW*.

Ecotone Ecological Consultants (2012b) *Flora and Fauna Baseline Studies Balranald Mineral Sands Project – Nepean Deposit near Balranald, NSW.*

FloraSearch (2012) *Data from surveys for Pterostylis cobarensis Atlas-Campaspe Study Area and Surrounds*.

Goldingay, R.L., and Stevens, J.R. (2009) Use of artificial tree hollows by Australian birds and bats. *Wildlife Research* **36**, 81–97.

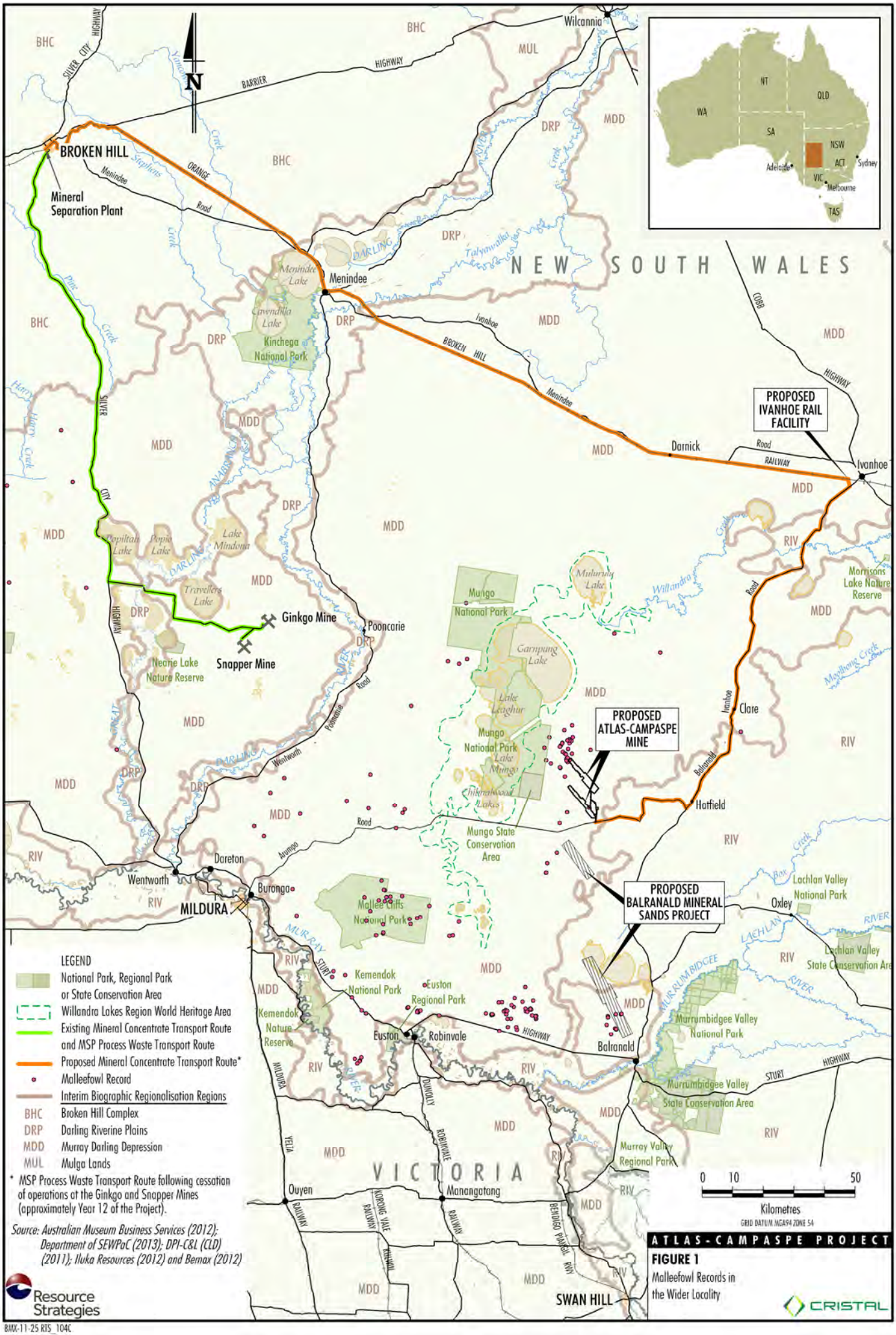
Iluka Resources Limited (2012a) *Balranald Mineral Sands Report – Project Scoping Report*.

Iluka Resources Limited (2012b) *Commonwealth Environmental Protection and Biodiversity Conservation Referral – Balranald Mineral Sands Project*.

National Heritage Trust (2009) *National Manual for the Malleefowl Monitoring System*.

Smith, G. C. and Agnew, G. (2002) The value of 'bat boxes' for attracting hollow-dependent fauna to farm forestry plantations in southeast Queensland. *Ecological Management & Restoration*, **3**: 37–46.

FIGURES



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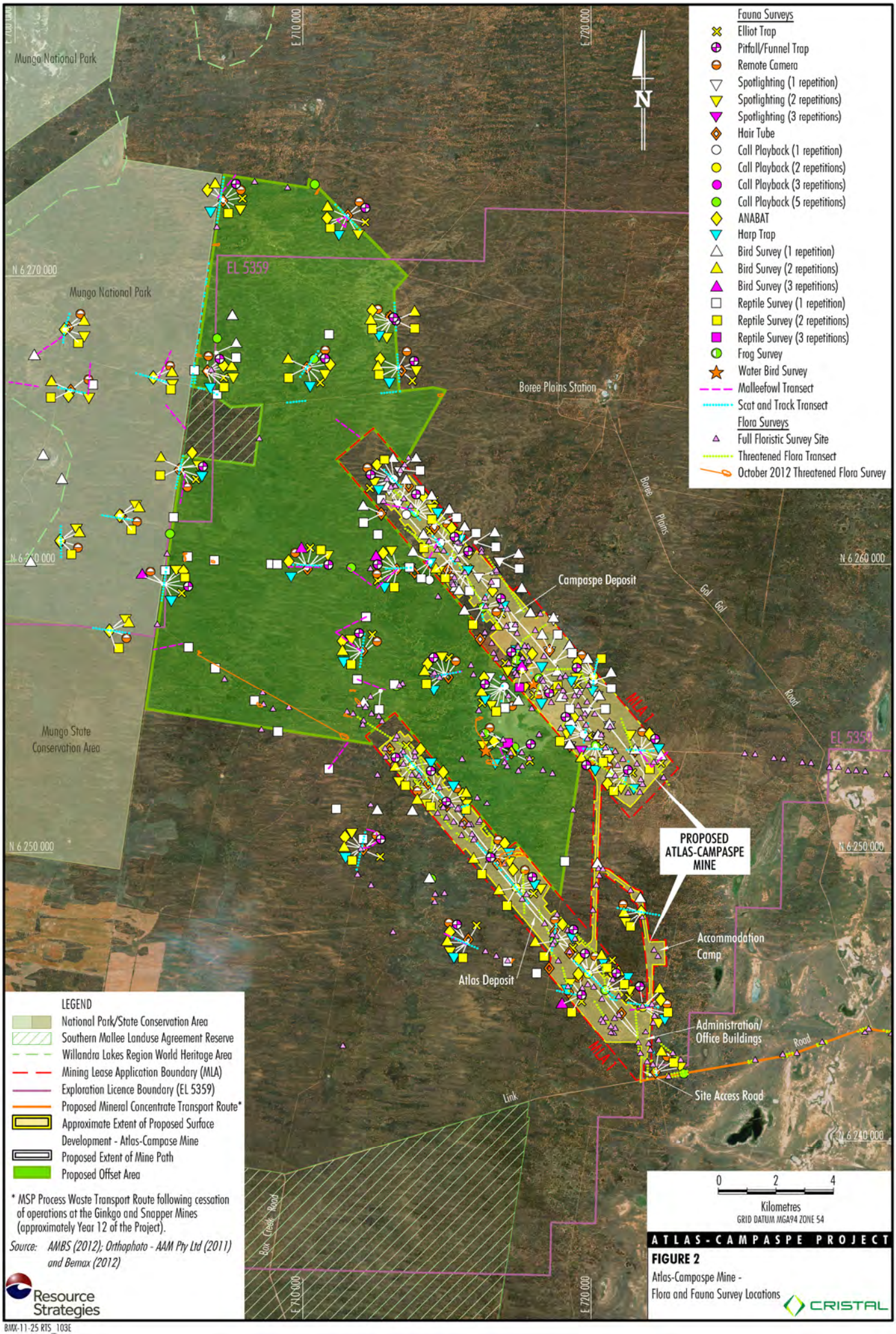

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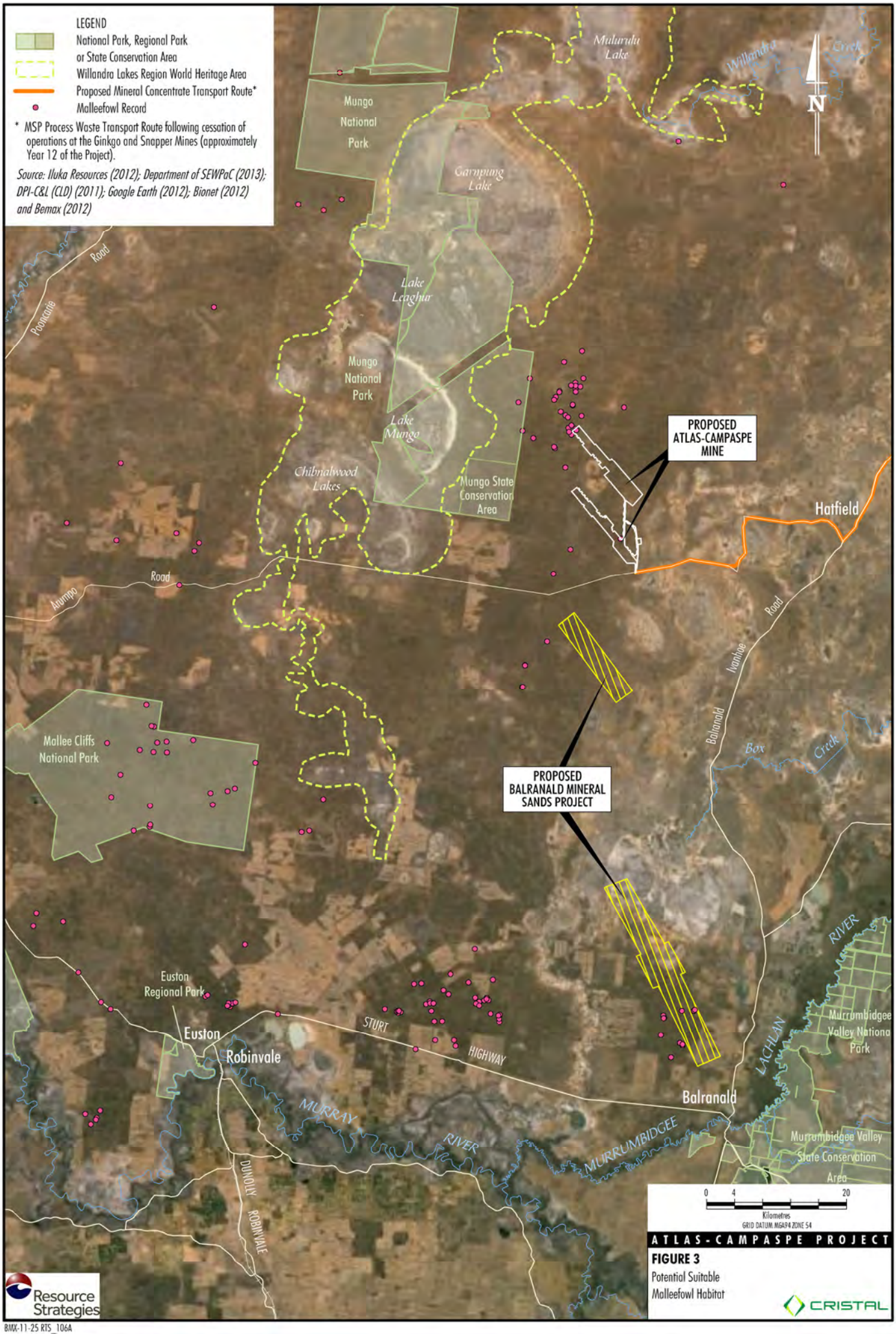

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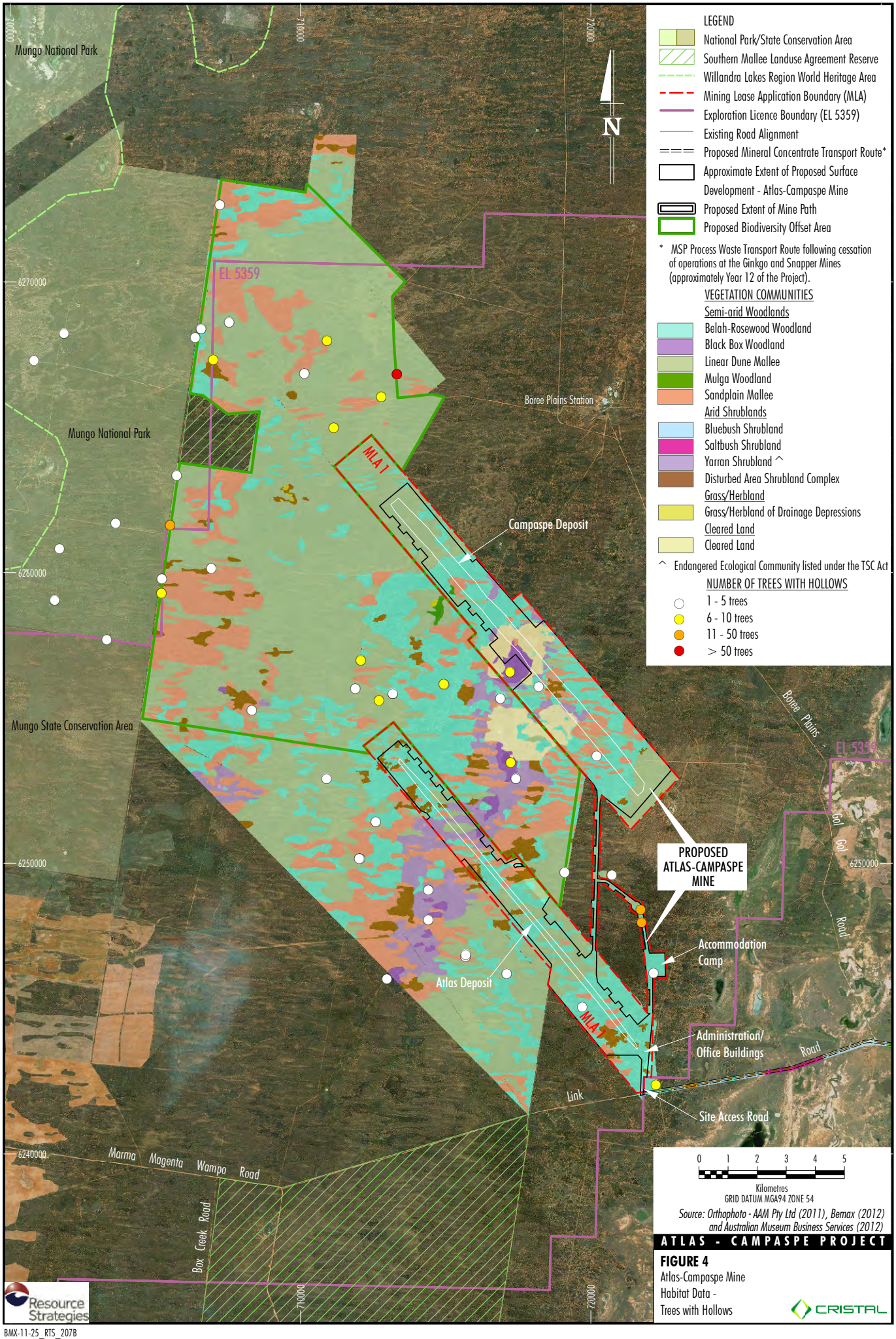

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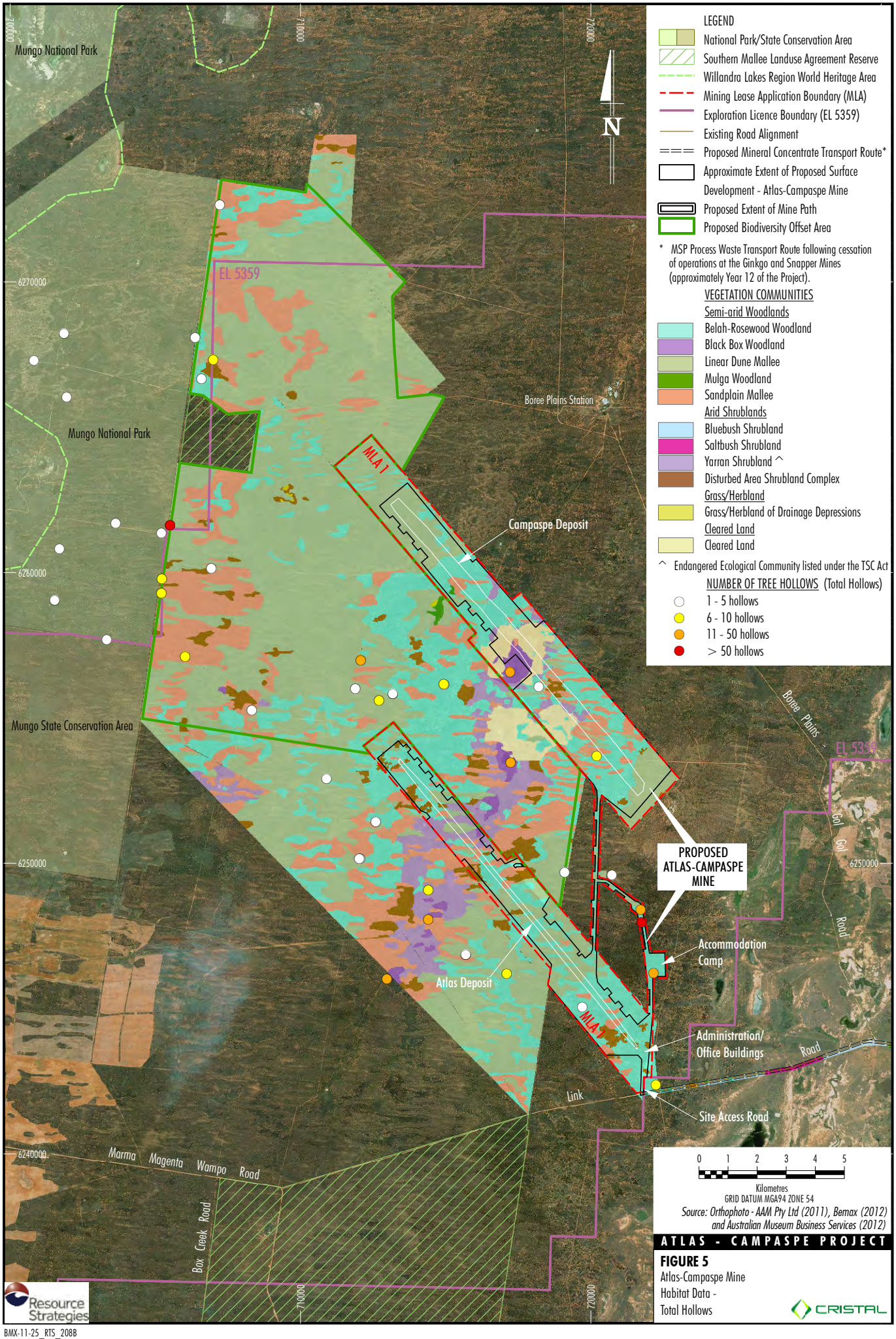

ATLAS - CAMPASPE PROJECT

FIGURE 5

Atlas-Campaspe Mine
Habitat Data -
Total Hollows

Resource Strategies

CRISTAL

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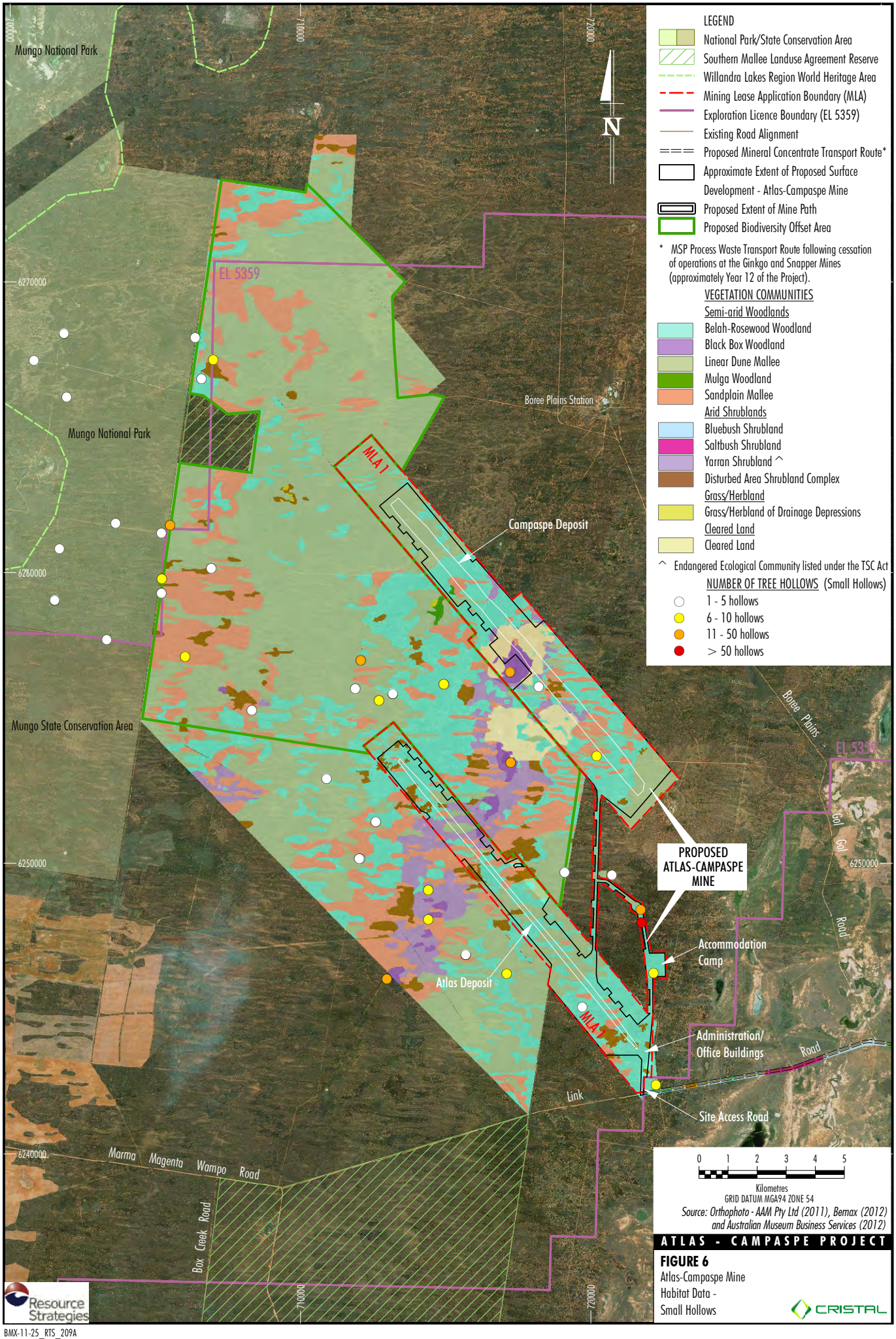

ATLAS - CAMPASPE PROJECT

FIGURE 6

Atlas-Campaspe Mine
Habitat Data -
Small Hollows

Resource Strategies

CRISTAL

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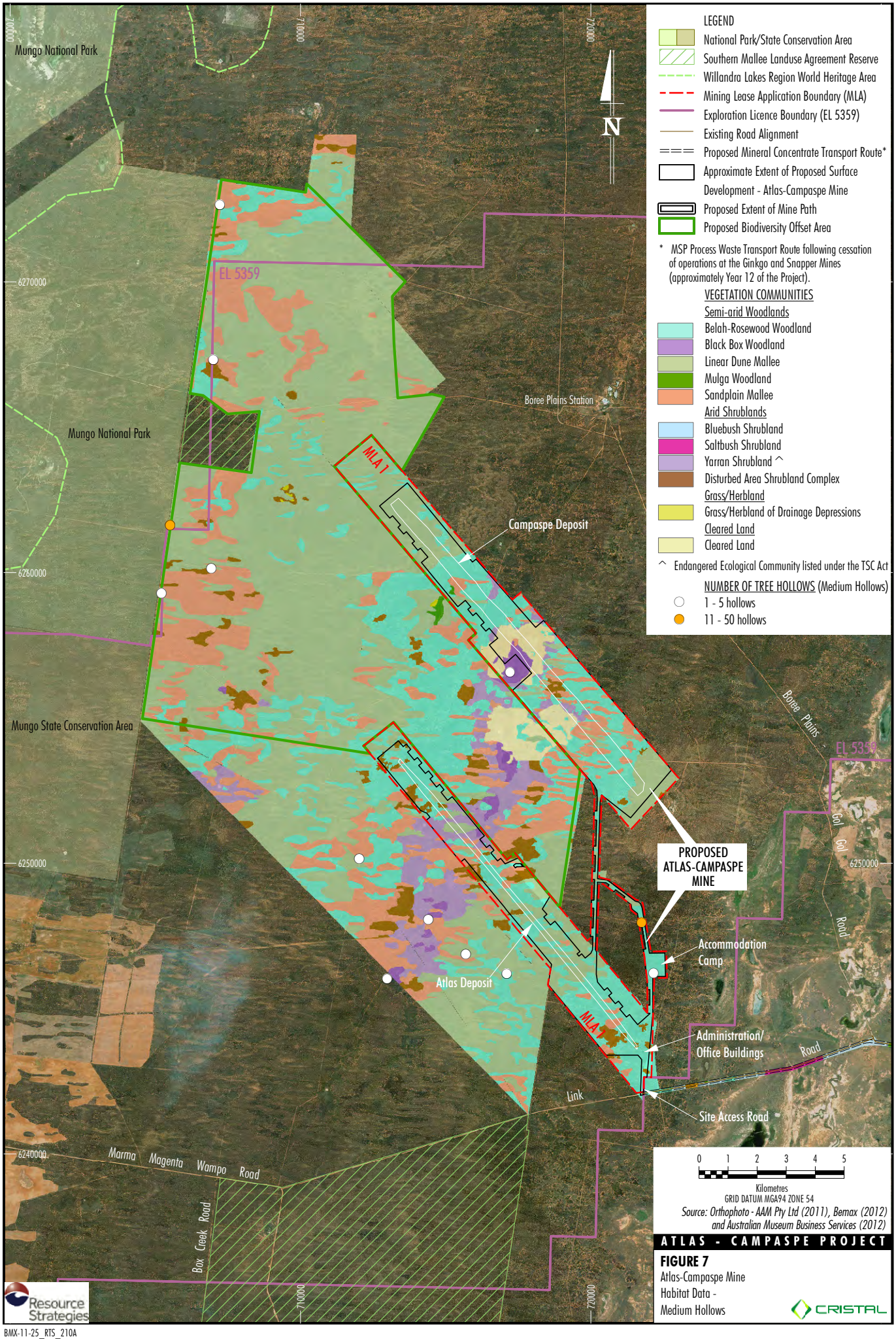

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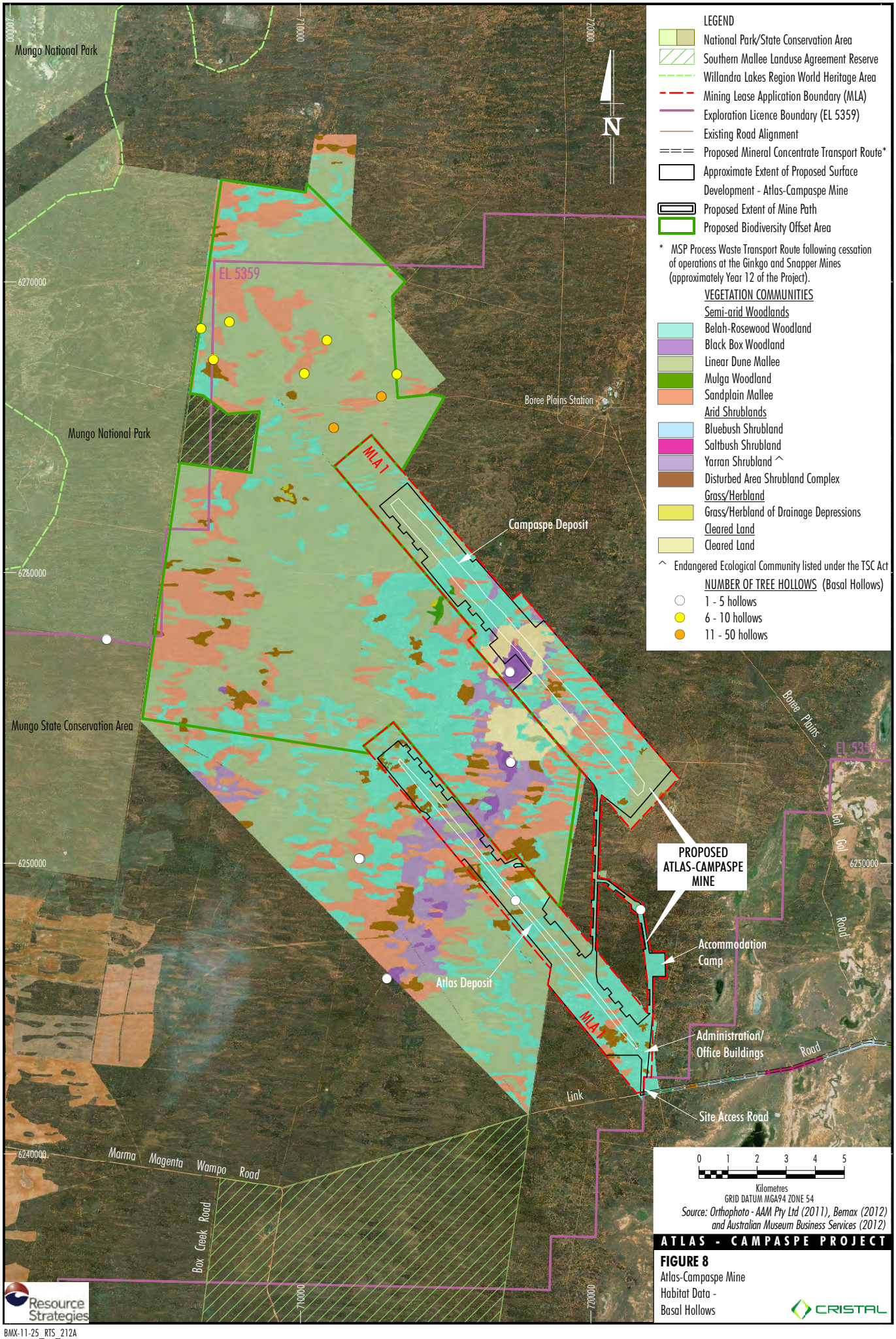

ATLAS - CAMPASPE PROJECT

FIGURE 8

Atlas-Campaspe Mine
Habitat Data -
Basal Hollows

Resource Strategies

CRISTAL

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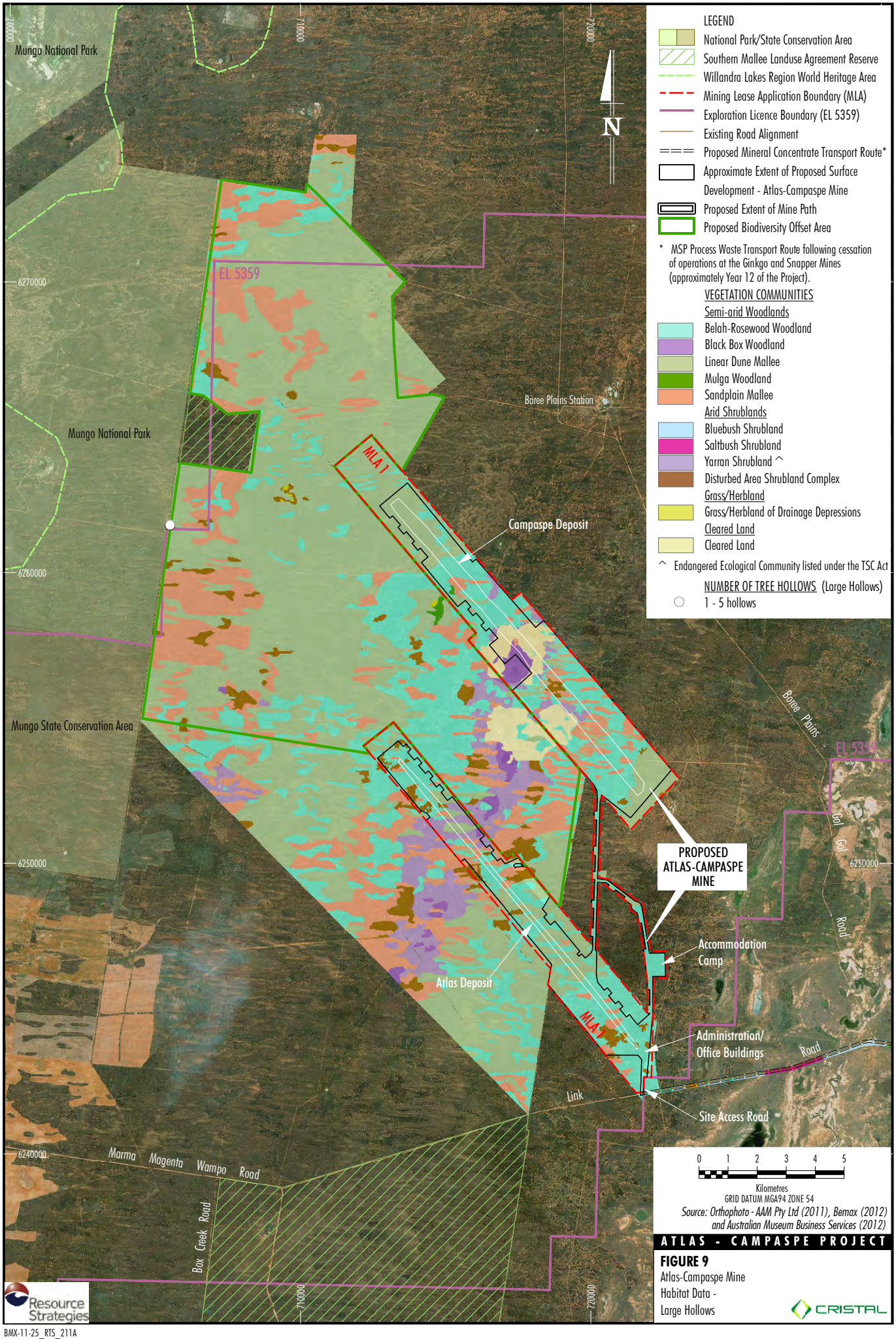

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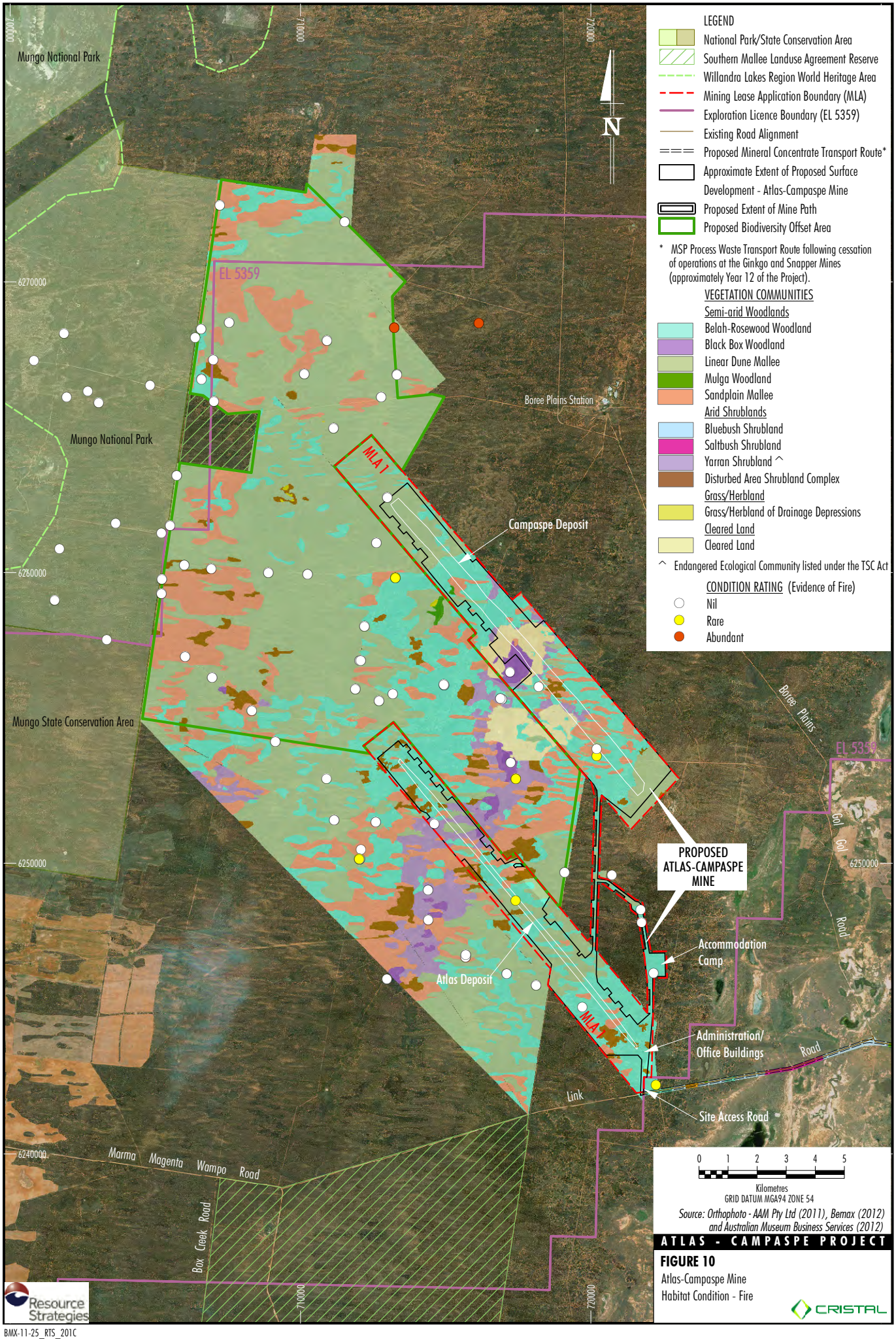

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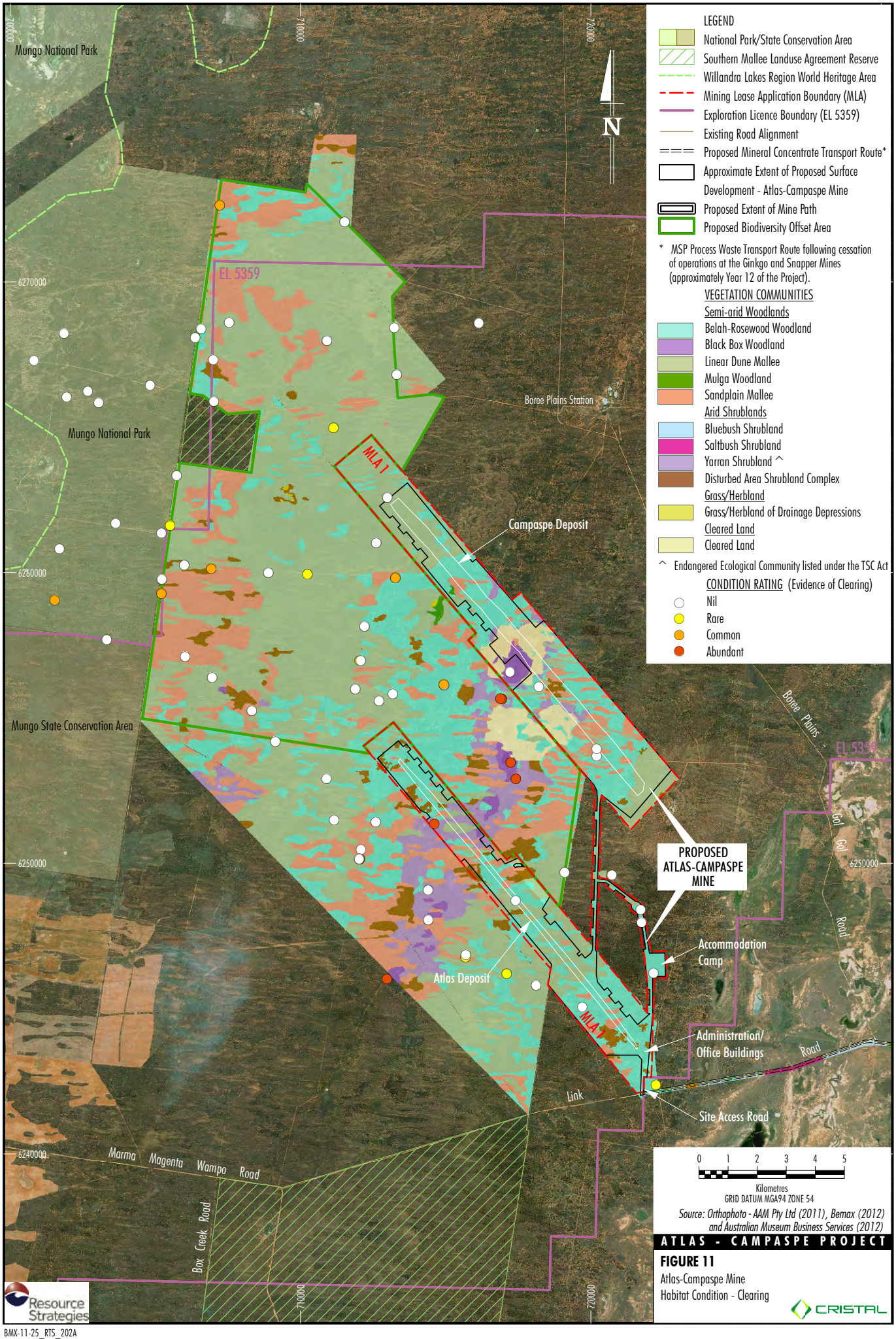

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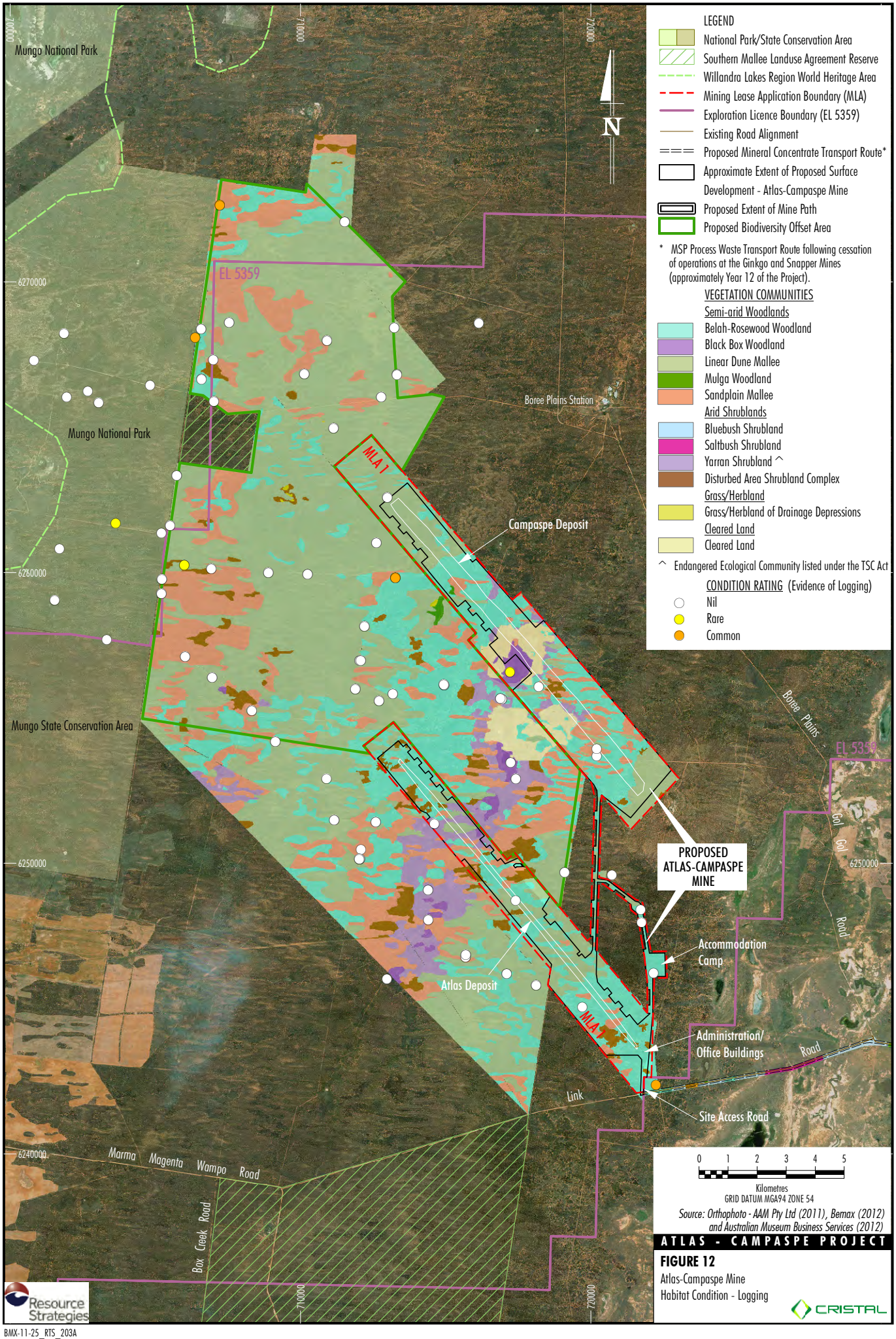

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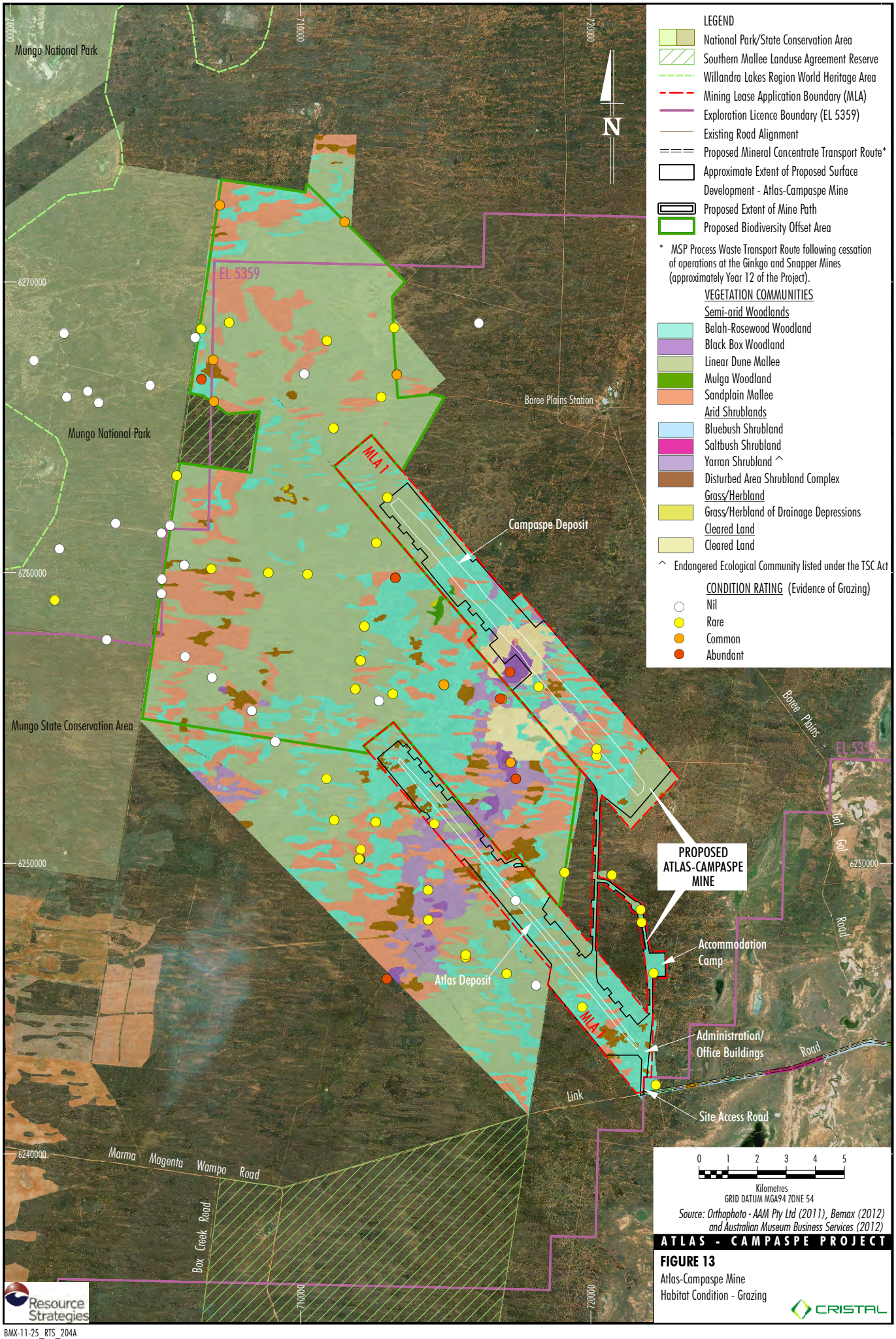

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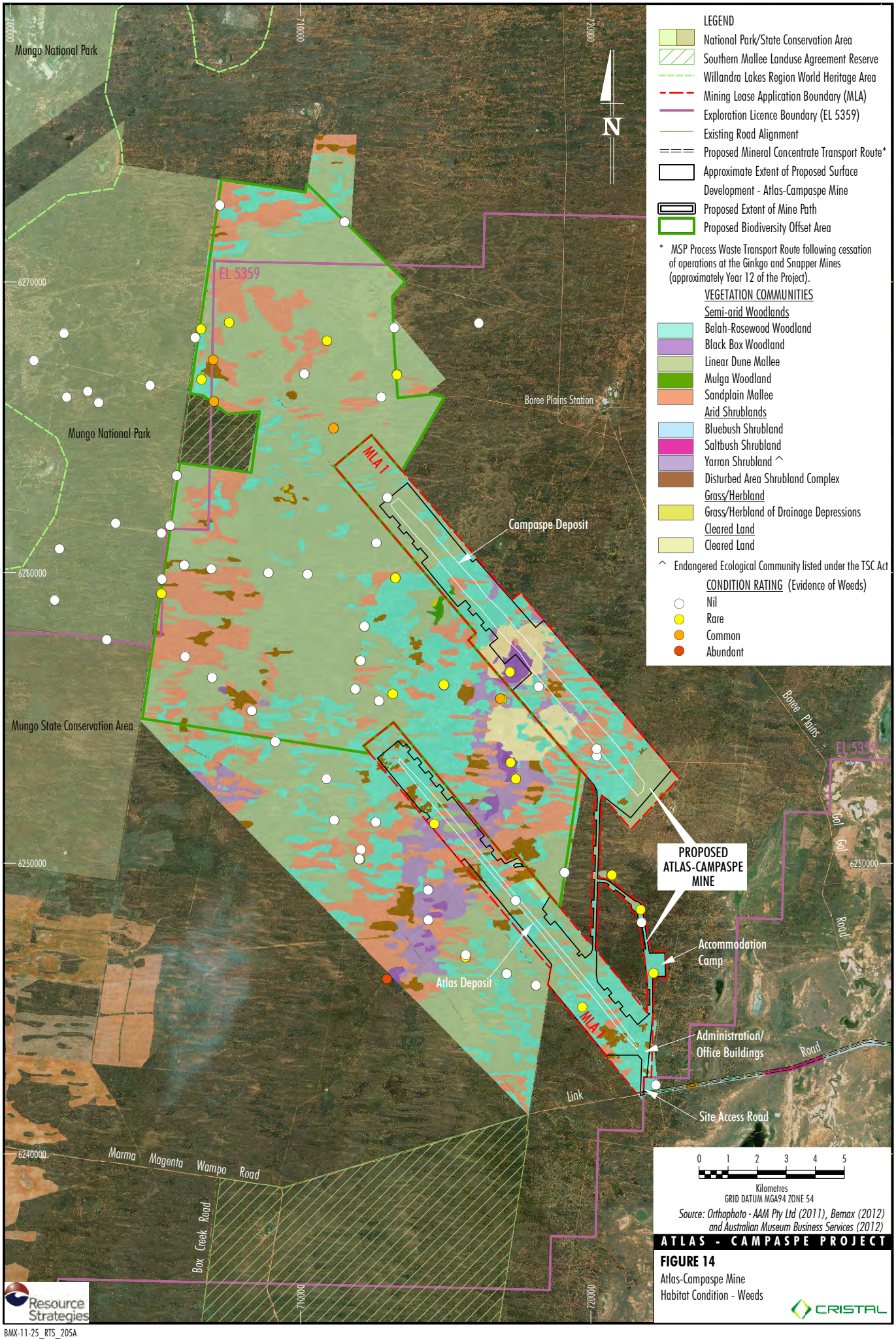

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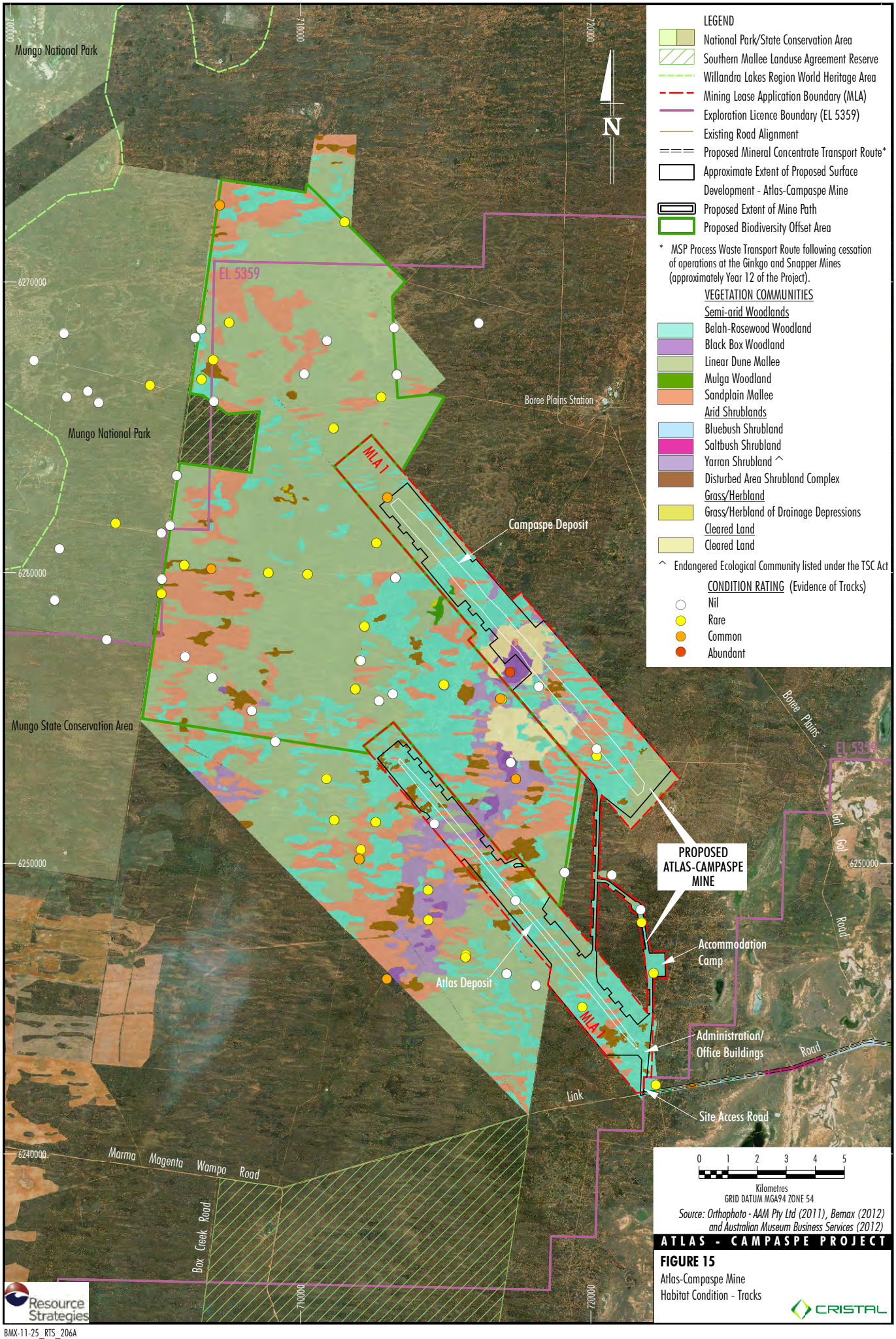

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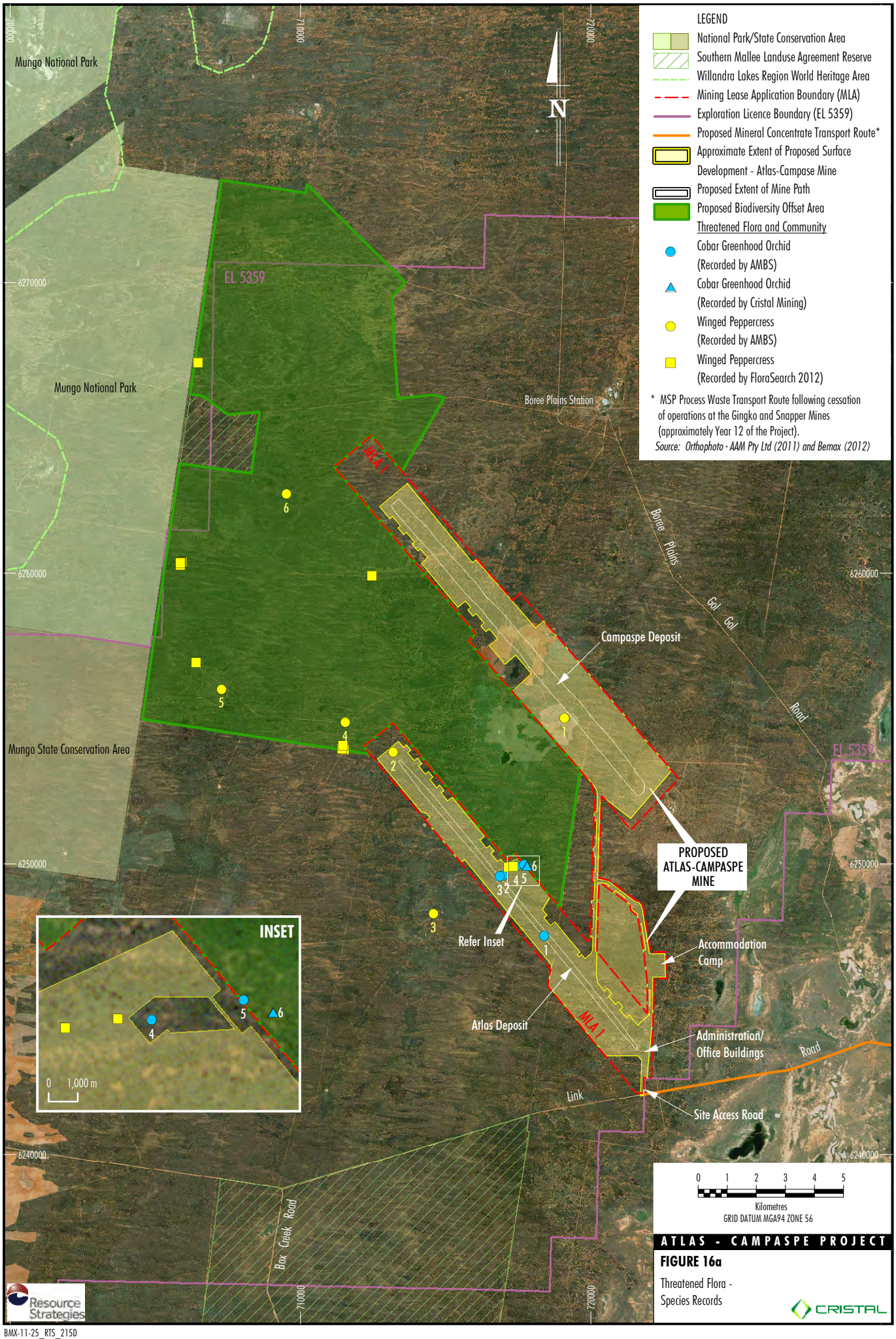
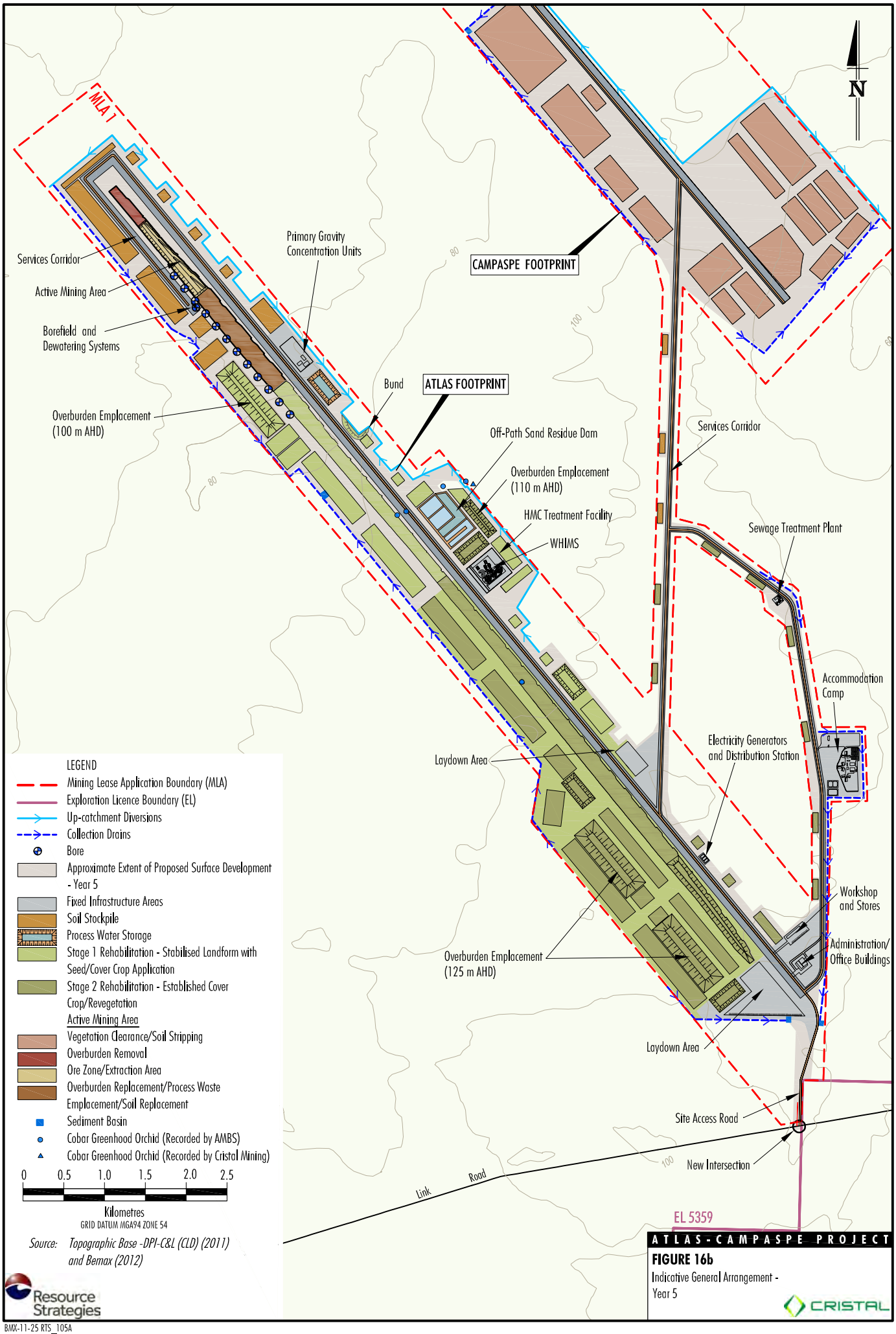

LEGEND
National Park/State Conservation Area
Southern Mallee Landuse Agreement Reserve
Willandra Lakes Region World Heritage Area
Mining Lease Application Boundary (MLA)
Exploration Licence Boundary (EL 5359)
Proposed Mineral Concentrate Transport Route*
Approximate Extent of Proposed Surface Development - Atlas-Campase Mine
Proposed Extent of Mine Path
Proposed Biodiversity Offset Area
Threatened Flora and Community
Cobar Greenhood Orchid (Recorded by AMBS)
Cobar Greenhood Orchid (Recorded by Cristal Mining)
Winged Peppercress (Recorded by AMBS)
Winged Peppercress (Recorded by FloraSearch 2012)
* MSP Process Waste Transport Route following cessation of operations at the Gingko and Snapper Mines (approximately Year 12 of the Project).
Source: Orthophoto - AAM Pty Ltd (2011) and Bemax (2012)
N
Mungo National Park
EL 5359
Boree Plains Station
MLA1
Campaspe Deposit
Boree Plains Road
Gol Gol Road
Mungo State Conservation Area
PROPOSED ATLAS-CAMPASPE MINE
Refer Inset
Accommodation Camp
Atlas Deposit
Administration/ Office Buildings
Road Link
Site Access Road
Box Creek Road
INSET
0 1,000 m
0 1 2 3 4 5
Kilometres
GRID DATUM MGA94 ZONE 56
ATLAS - CAMPASPE PROJECT
FIGURE 16a
Threatened Flora - Species Records
Resource Strategies
CRISTAL
BMX-11-25_RTS_215D



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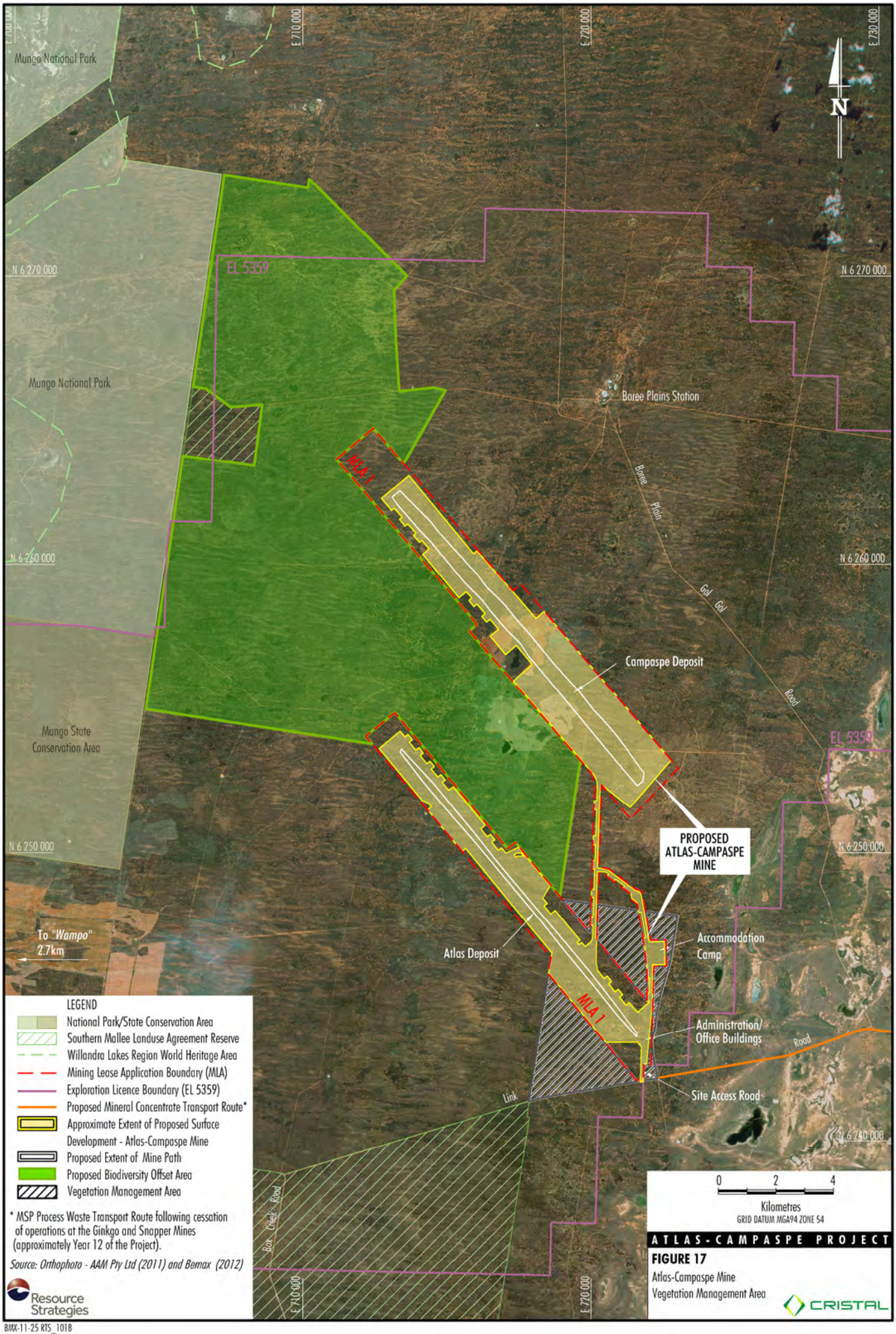

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