03 DEHP Submission with Responses

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Section 03 Department of Environment and Heritage Protection (DEHP) Comments and Responses

3.1 General EIS

Comment - 19.A

At various points the EIS document states that: 'No protected areas under the Nature Conservation Act 1992 are within or near the site'. Or 'No areas within or adjacent to the Project site have been proclaimed or are under consideration for proclamation as protected under the NC Act'.

Recommendation - 19.A

These statements are incorrect and need to be removed. An area comprising 1,673.5 ha of the north-western portion of MLA 70425 is located on Cudmore Resources Reserve and MLA 70425 adjoins Cudmore National Park.

National Parks and Resources Reserves are classes of protected area under the NC Act.

Response - 19.A

It is acknowledged these statements are incorrect. These inconsistencies, along with a number of others, have been reviewed to ensure they do not occur within the SEIS.

Section 6.3.4 – Special Interest Tenure (including protected estate) within the Kevin's Corner EIS provides a detailed description of the location of Cudmore Resources Reserve and Cudmore National Park. Furthermore, Section 6.8.2 of the Kevin's Corner EIS provided a detailed impact assessment and suggested mitigation methods for areas of High Ecological Significance including Cudmore Resources Reserve and Cudmore National Park.

Further impact assessment is presented in the SEIS regarding the potential impacts to the natural and conservation values of Cudmore Resources Reserve and Cudmore National Park (Volume 2, Appendix T3 of the SEIS).

3.2 Terrestrial Ecology

Comment - 19.B

The EIS contains little information on the potential impact of subsidence on terrestrial ecology, little information on remediation of cracks following subsidence and no habitat modelling for *Poephila cincta cincta* (Black Throated Finch).

Recommendation - 19.B

More information is required on how subsidence would impact terrestrial ecology. Habitat modelling must be conducted for *Poephila cincta cincta* (Black Throated Finch).

Response - 19.B

The Interim Subsidence Management Plan (ISMP) (SEIS, Volume 2, Appendix N) investigates potential impacts from subsidence and models areas likely to be affected. Potential impacts from subsidence include the loss of fauna habitat including trees, shrubs and groundcover. This may restrict the amount of available habitat for fauna species and reduce movement opportunities as well as facilitate the infiltration of weed species into these areas. In addition, dead standing trees that provide additional habitat for many reptile, mammal and bird species may be impacted. Potential impacts may stem from subsidence-related factors such as surface movement, tension cracking, changes in hydrology and gas release. Mitigation measures required to address impacts, such as channel restoration works and ripping of soil to address cracking, can also result in the loss of potential habitat.

The ISMP identifies general terrestrial ecology values and proposes appropriate mitigation measures. In addition, the ISMP details monitoring requirements and specifies progressive rehabilitation to ensure protection of the existing habitat. The Biodiversity Offset Strategy (SEIS, Volume 2, Appendix P) includes calculations of the residual subsidence impacts and discusses the provision of offsets to compensate for these residual impacts.

Modelling of the potential for occurrence for black-throated finch (southern) (*Poephila cincta cincta*) species has been undertaken in the Supplementary Survey and Assessment for Black-throated Finch which forms part of the Supplementary MNES Report (SEIS, Volume 2, Appendix Q, Attachment 2). This assessment incorporates the results of targeted field surveys and assessment of microhabitat features across the Project area. The assessment determined that there was limited potential for black-throated finch to occur within the Project area. Notwithstanding this, modelling of potential habitat was carried out which identified four areas that could offer high value habitat for this species if it was present. These areas are located around permanent water sources and are located in the south western corner, the central west and south eastern corner of the MLA. No high value habitat was identified in the off-lease section (off lease road and rail component) of the Project area.

Modelling of Project disturbance, including subsidence and related impacts, across potential habitat within the Project area indicates that 1002 ha of high value habitat for this species will be affected by direct and indirect impacts. Impacted areas are located primarily within the eastern portions of the underground mine areas however there are small areas in the higher reaches of minor watercourses in the south of the MLA where mitigation measures are required to address subsidence impacts (channel works, rehabilitation of cracking, etc.).

Although the Supplement Survey and Assessment of Black Throated Finch (*Poephila cincta cincta*) determined the species has limited potential to occur within the Project area, offsets to impacts to areas of potential high values habitat are proposed.

Comment - 19.C

The EIS does not fully address the Nature Conservation 1992 Act (NCA) wildlife requirements.

Recommendation - 19.C

The general requirements under provisions of the Nature Conservation Act 1992 in relation to clearing of native plants and impacts to native fauna are as follows:

- Clearing of least concern plants may occur without permit provided that impacts to animal breeding places are addressed through development of a peer reviewed species management program acceptable to DEHP.
- Clearing of plant species listed as endangered, vulnerable or near threatened is subject to permit and offsets will be required.
- A species management plan for affected endangered, vulnerable or near threatened listed species (both terrestrial and marine) must be prepared for the total project including, development, operation and decommissioning phases. The plan must satisfy the requirements under section 322 of the Nature Conservation (Wildlife Management) Regulation 2006 relating to tampering with animal breeding places.
- An authorised person must be employed where there is a risk to native fauna present within a proposed clearing site. An authorised person is a person permitted to tamper and interfere with a protected animal or a protected animal's breeding place. For example, a licensed spotter-catcher is someone who is specifically licensed as a spotter-catcher through a Rehabilitation Permit issued by DEHP.
- Rehabilitation of the areas of subsidence should allow for the maximum reestablishment of native vegetation including the shrubby understorey and ground cover, providing habitat for small ground dwelling fauna species and restoration of landscape connectivity.
- Data from all field activities, including surveys, operational development works and operational works of fauna identified and flora encountered in the project is to be provided to DEHP in a specified format (including metadata on accuracy, quality).

Response - 19.C

The Project area is likely to contain breeding sites for NC Act listed fauna species as identified in the Biodiversity and Offsets Strategy (SEIS, Volume 2, Appendix P). These fauna species all utilise breeding places within forested and woodland areas including riparian vegetation and could potentially be impacted by the development.

A Species Management Program for tampering with animal breeding places (for all relevant fauna species, including endangered, vulnerable or near threatened listed species (EVNTs)) will be prepared and submitted to DEHP for approval prior to any clearing being undertaken. This will satisfy the requirements under section 322 of the Nature Conservation (Wildlife Management) Regulation 2006 relating to tampering with animal breeding places.

A Species Management Plan (SMP) will be prepared for EVNT flora and fauna species and will address the potential for impacts relating to the total project including, development, operation and decommissioning phases. The development of Species Management Plans and the use of authorised fauna spotters for clearing activities will occur prior to construction activities.

Commonwealth and state offset requirements for the Project are presented in Volume 2 Appendix P of this SEIS. Additional information on the potential impacts and the rehabilitation methods and commitments for the

subsidence areas are presented in the Interim Subsidence Management Plan (SEIS, Volume 2, Appendix N). Commitments to the rehabilitation (including timeframes) that will occur on the site are presented as part of the Environmental Management Plans (Volume 2, Appendix T1 and Appendix T2) and will be subject to finalisation with the site Rehabilitation Management Plan (SEIS, Volume 2, Appendix T4.09) that is a proposed condition of the mine Environmental Authority. The Rehabilitation Management Plan (SEIS Volume 2, Appendix T4.09) has been developed in consideration of the DEHP Guideline 'Rehabilitation requirements for mining projects'.

The Species Management Program and SMP will include a requirement for all records of EVNT fauna or disturbance with any breeding place to be incorporated into an on-site database and to be forwarded to DEHP.

Comment - 19.D

Impacts from clearing include changes to species assemblages (composition and suite) within the development site. Existing native fauna will be displaced and opportunistic fauna (native and exotic) will become dominant. These species (crows, butcher birds, magpies, magpie larks etc) are aggressive and will impact on other native species in adjacent natural areas, thereby reducing the effectiveness of buffer zones.

Recommendation - 19.D

Two approvals that may be required depending on what is found at the site with relation to protected fauna and flora (discussed at the meeting on 18/11/2011):

- A generic species management program (SMP) can be applied for to allowing tampering with least concern animal breeding places (this excludes special least concern and colonial breeding fauna).
- If endangered, vulnerable, or near threatened (EVNT) fauna (or special least concern or colonial breeding fauna) is found on site, a specific SMP will need to be prepared and approved by DEHP before any breeding places are 'tampered' with.

Response - 19.D

The region in which the Project is situated has largely been cleared for grazing practices. This has facilitated the dominance of territorial, aggressive species across the region by reducing woodland structural complexity and decreasing the species diversity within the understory. Given that much of the habitat within the Project area is heavily disturbed from grazing practices and already supports species such as the noisy miner, it is considered that the Project will not significantly increase the risk of territorial species excluding other natives and ultimately driving a change in the faunal assemblage.

High levels of disturbance and habitat fragmentation may facilitate an increase in aggressive fauna species and ultimately result in a change in the faunal species assemblage. The conversion of structurally complex and floristically diverse grassy woodland habitats into highly simplified monocultures through clearing and fragmentation is ideal for species such as the noisy miner (Manorina melanocephala) (Grey et al., 2011[1];

[1] Grey, M., Clarke, M., Davidson, I., Maron, M., Ingwersen, D. and Tzaros,C. (2011). The Noisy Miner: Challenges in managing an overabundant species. LaTrobe University, Melbourne.

Ingwersen and Tzaros, 2011[2]), which is known to exclude a range of other native bird species from their suitable habitat.

The implementation of a staged rehabilitation plan that focuses on native species and restoring structurally complex habitat (to pre-mining equivalent) will ensure in the long-term that impacts from aggressive fauna species will be minimised.

Other potentially aggressive fauna species within the Project area include the Torresian crow (Corvus orru) and dingo/wild dog (Canis lupus dingo), species that are often at least partially reliant on Project waste. The application of waste management strategies such as correct storage and disposal procedures will reduce the opportunity for these species to proliferate.

If endangered, vulnerable, or near threatened (EVNT) fauna are found on site through further ground truthing a specific SMP will be prepared and will be submitted to DEHP for approval. In addition, a generic species management plan will be applied for allowing tampering with least concern animal breeding places.

Comment - 19.E

Clearing of protected plants.

Recommendation - 19.E

Two approvals that may be required depending on what is found at the site with relation to protected fauna and flora (discussed at the meeting on 18/11/2011:

- A class exemption for 'taking' least concern plants can be applied for and is recommended.
- If endangered, vulnerable or near threatened (EVNT) flora will be 'taken' then a clearing permit will be required (and an associated offset required).

Response - 19.E

Noted. A class exemption for 'taking' least concern plants may be required. As no EVNT flora was found during the surveys a clearing permit for EVNT species will not be required.

3.3 Project Description

Comment - 19.F

Within the EIS for Kevin's Corner there are several references to quarry material proposed to be sourced by Hancock Coal from on-site quarry pits, from selected borrow pits and from the Surbiton South Basalt Quarry, but no further details are provided.

[2] Ingwersen, D. and Tzaros, C. (2011). Woodland Birds: The next generation. Wingspan 21 (2) pp 22-25.

There are limited sources of suitable quarry material in the Alpha area, some of which, for example the Reserve for Gravel on Lot 1 on CP860083, are already committed to or required by other parties.

There is presently no hard rock quarry at Surbiton South on Surbiton Hill. This is currently a 'greenfield' resource. Surbiton South is a Pastoral Holding over Lot 3533 on PH56, which is held by Andrew Charles Robert Donaldson and Donna Lee Donaldson as joint tenants.

The known hard rock quarry resource on the southern side of Surbiton Hill is presently in the process of being allocated respectively to AC & DL Donaldson T/A ACR & DL Donaldson via proposed Sales Permit 20081313 and to Waratah Coal Pty Ltd via proposed Sales Permit 20091304. Both of these parties have separately commenced the Right to Negotiate process required under the Native Title Act 1993 (Cth) to address native title before the proposed sales permits can be issued.

The hard rock quarry resource on the southern side of Surbiton Hill was allocated in this manner as it was understood that Hancock Coal was apparently working with ACR & DL Donaldson for Hancock Coal to source their required quarry material at this location via ACR & DL Donaldson. It is now understood that there is no business relationship between Hancock Coal and ACR & DL Donaldson. ACR & DL Donaldson is still however continuing to acquire a sales permit for part of the Surbiton Hill resource. There is now no available hard rock quarry material to allocate to another party from the southern side of Surbiton Hill. Hancock Coal applied for a sales permit to get quarry material from the southern side of Surbiton Hill but this application was refused by DEHP Forest Products.

The known hard rock quarry resource on the northern side of Surbiton Hill cannot be allocated to any party at this stage given the close proximity of this resource to the homestead on Surbiton South and the various other infrastructure located on this part of the Pastoral Holding. This reluctance to allocate this northern side hard rock resource may change should the ownership of Surbiton South Pastoral Holding change i.e. should Mr and Mrs Donaldson decide to sell to a party interested in quarrying this resource.

Recommendation - 19.F

Proponent to specify:

- the actual locations of proposed gravel quarries / borrow pits on State-owned land and whether or not a third party has current rights to this quarry material;
- how they propose to access the State-owned hardrock quarry resource at Surbiton Hill (as Hancock Coal's application has been refused); and
- what actions they propose to implement to make sure that suitable quarry material:
  - is not contaminated or made unavailable or inaccessible by their mining activities; and
  - generated by their proposed open cut and underground coal mining activities is stockpiled, used and/or made available to third parties.

Response - 19.F

Quarry materials will mostly be sourced from areas within the mining lease (ML), where practical. Exact fill requirements will not be determined until the detailed design phase of the Project is complete. For fill and quarry

material that cannot be sourced in the ML, an investigation will be undertaken to identify potential sources of material in the local area, and any use of local borrow pits will be subject to approvals by the appropriate regulatory authority. If local supplies cannot meet required specifications then supplementary sources from more distant locations will be sourced. Any approvals that may be required for onsite and offsite processing will be captured as part of the Tier 2 approval process.

Comment - 19.G

Section 0.11.7

Statements that Cudmore National Park is 700 m west of the project boundary.

Recommendation - 19.G

This is incorrect and needs to be removed as the MLA falls within 100 metres of Cudmore National Park.

Response - 19.G

The Kevin's Corner EIS incorrectly included a statement of the distance between the closest corner of the mining tenement and the Cudmore National Park. The separation distance between the Cudmore National Park and boundary of ML 70425 is estimated to be 114 m. This change will be reflected in any further documentation.

3.4 Project Approvals

Comment - 19.H

Section 1.10.1

Table 1-5 – Other approvals to be obtained following Key approvals - lists approvals under the *Water Act 2000* that are required for the project. The item describes taking or interfering with the water – the relevant approval is listed as "taking and interfering with water". The relevant approval is a water licence to take or a water licence to interfere with water. The table should be updated to reflect the relevant approval.

Recommendation - 19.H

The following text should be removed from the table:

Taking or Interfering with water; *Water Act 2000;* Taking or interfering with water On-tenure, locations and details to be confirmed.

The following text should be added to the table:

Taking and Interfering with water; *Water Act 2000*; Water Licence to take water or Water Licence to interfere with the flow of water; On-tenure, locations and details to be confirmed.

Response - 19.H

Please refer to Table 0-2 (EIS, Volume 1, Section 00). The relevant approval type has been updated to reflect the recommendation.

Table 0-2 provides a summary of the statutory approvals required following receipt of the key Project approvals and replaces Table 1-5 – Other approvals to be obtained following key approvals and Table E2 – Future Approvals within the Kevin's Corner EIS.

Comment - 19.I

Section 1.10.1

Table 1-5 – Other approvals to be obtained following Key approvals lists approvals related to water that are required for the project. The table excludes the requirement for development permits for operational works that take or interfere with the flow of water. It is recommended that the table be updated to include the approvals that will be required.

Recommendation - 19.I

The following text should be added to the table:

- Construction of operational works that take or interfere with water; Sustainable Planning Act 2009; Development permit for operational works for taking or interfering with water (e.g. construction of a diversion channel or construction of groundwater bores); On-tenure, locations and details to be confirmed

Response - 19.I

Please refer Table 0-2 (as presented in Response 19.H). The relevant approval type has been updated to reflect the recommendation.

Table 0-2 provides a summary of the statutory approvals required following receipt of the key Project approvals and replaces Table 1-5 – Other approvals to be obtained following key approvals and Table E2 – Future Approvals within the Kevin's Corner EIS.

Comment - 19.J

Section 1.10.1, Table 1-5

This section refers to the proponent developing a management plan for Cudmore Resource Reserve.

Recommendation - 19.J

Clarification is required when using the terms 'operations plan', 'environmental management plan' and 'management plan'. It is not appropriate for a proponent to develop a Management Plan for Cudmore RR under the NCA 1992, in the sense that the term is used in the NCA (eg Section 34 and 111).

Further discussion between DEHP and DEEDI is required on this issue.

Response - 19.J

It is understood that there will be three "management plan" documents with differing levels of applicability to the Cudmore Resources Reserve. These are:

- A Management Plan - developed in accordance with Part 7 of the NC Act, to be prepared by DNPRSR and DNRM;
- An Operations Plan - specifically tailored for the proposed underground operations and associated surface impacts within Cudmore Resources Reserve; this Operations Plan is currently under development by HGPL. The scope of the Operations Plan is provided in Appendix T3 of the Kevin's Corner SEIS; and
- An Environmental Management Plan - for the whole of mine operations which will include reference to Cudmore Resources Reserve, the Management Plan for Cudmore Resources Reserve and the Operations Plan for activities within and below Cudmore Resources Reserve.

Application of Management Plan

The term "Management Plan" in this instance is used in accordance with Part 7 of the NC Act. That being, a plan developed by DNPRSR and DNRM (as joint custodians) to provide for the management principals and management outcomes of the Cudmore Resources Reserve.

Application of Operations Plan

The term "Operations Plan" in this instance is used to describe the plan of operations for the proposed underground mining activities and associated surface infrastructure and impacts within Cudmore Resources Reserve. This plan will detail:

- The environmental values of the area of Cudmore Resources Reserve subject to ML 70425;
- The mining and associated activities which are proposed to occur within the area of Cudmore Resources Reserve subject to ML 70425;
- The likely impacts which are envisaged to be caused by the proposed mining and associated activities within the area of Cudmore Resources Reserve subject to ML 70425;
- Environmental objectives and commitments for the area of Cudmore Resources Reserve subject to ML 70425; and
- Control strategies and indicators to measure and ensure environmental objectives and commitments are being achieved.

This Operations Plan will supplement the Environmental Management Plan developed for the whole of mine activities and specifically tailored for the area of the mine subject to Cudmore Resources Reserve.

Application of Environmental Management Plan

The term "Environmental Management Plan" in this instance is used in accordance with Part 6, Division 3 of the EP Act. That being, a plan developed to identify environmental protection commitments and control strategies to assist the administering authority in preparing the draft Environmental Authority.

Comment - 19.K

Section 1.10.3.4

This section states that all aspects of development of a mining activity for which an EA (mining activity) applies are exempt from the SP Act. Development Permits will be required for operational works for the taking of or interfering with flow. Section 11.1.7 of the EIS states that Development Permits will be required for the diversion of a watercourse (operational works for interfering with flow).

Recommendation - 19.K

Development permits under the Sustainable Planning Act 2009 will be required for operational works that take or interfere with water.

Response - 19.K

Please refer Table 0-2 (as presented in Response 19.H). The relevant approval type has been updated to reflect the recommendation.

Table 0-2 provides a summary of the statutory approvals required following receipt of the key Project approvals and replaces Table 1-5 – Other approvals to be obtained following key approvals and Table E2 – Future Approvals within the Kevin's Corner EIS.

3.5 Soils, Topography and Land Disturbance

Comment - 19.L

Section 5

The soils and land suitability assessment have been discussed at an acceptable standard. DEHP have no issues with the information and recommendations presented. The topsoil stripping assessment is acceptable.

Recommendation - 19.L

No further information required for the purposes of the EIS process.

Response - 19.L

Noted.

3.6 Land Use and Tenure

Comment - 19.M

Section 6.3.4

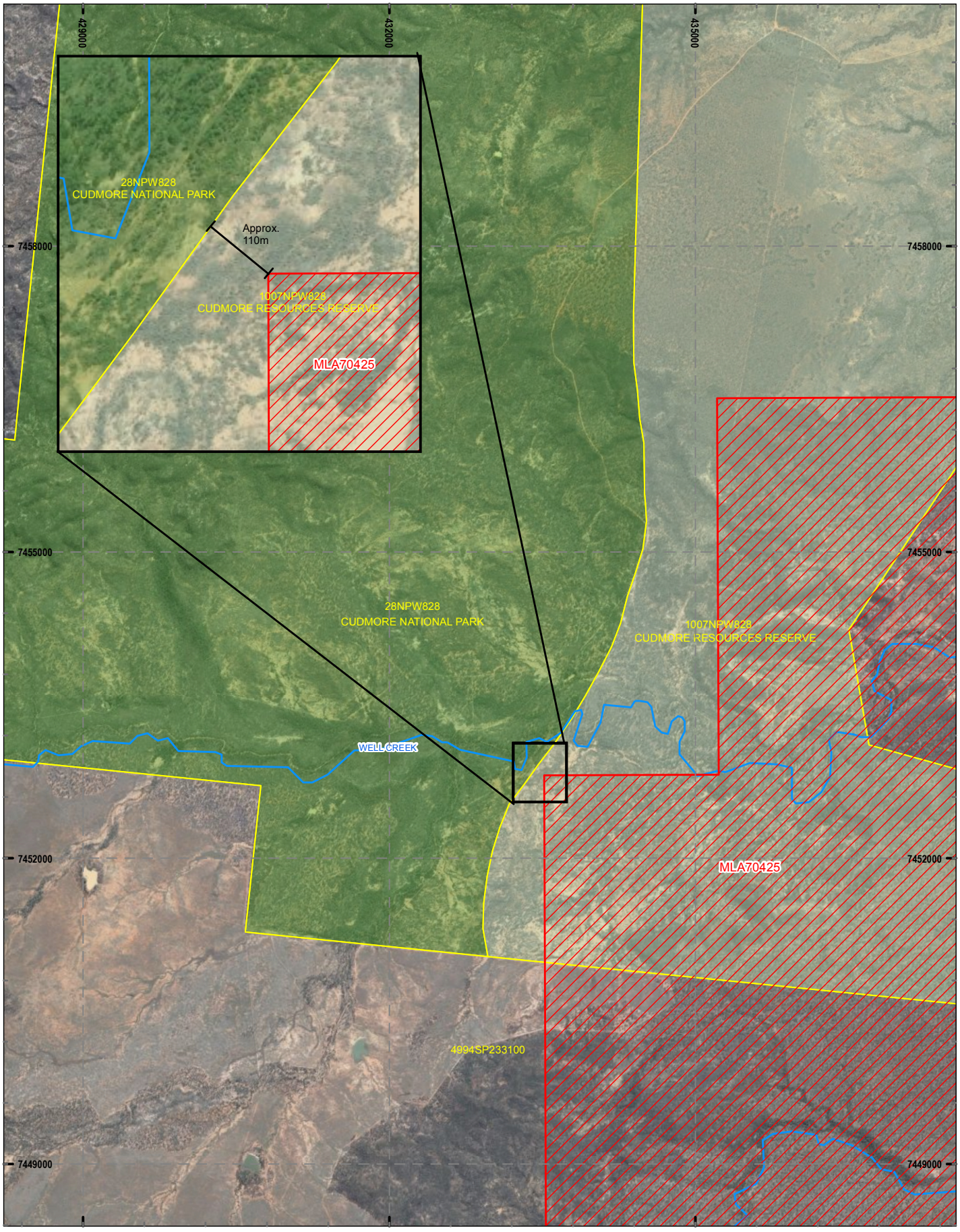
States that MLA 70425 is located 5 km east of Cudmore National Park.

Recommendation - 19.M

This statement is incorrect and needs to be removed as the MLA falls within 100 metres of Cudmore National Park.

Response - 19.M

The Kevin's Corner EIS incorrectly included a statement of the distance between the closest corner of the mining tenement and the Cudmore National Park. The separation distance between the Cudmore National Park and boundary of ML 70425 is estimated to be 114 m. The separation distance between Cudmore National Park, ML 70425 and the relationship to Cudmore Resources Reserve is shown on Figure 3-1.



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0 0.25 0.5 0.75 1 km

Scale: 1:50,000 (A4)

Datum: GDA 94, MGA Zone55

N W E S

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Kevin's Corner Project
Supplementary Environmental Impact Statement

CUDMORE NATIONAL PARK SEPARATION DISTANCE

Job Number	4262 6920
Revision	C
Date	14-06-2012

Figure: 3-1

File No: 42626920-g-1002.mxd

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Comment - 19.N

Section 6.5.4

Section 6.5.4.1 states "Discussions surrounding the proposed realignments are continuing with DEHP, HGPL and the proponents of adjoining mining operations. As such, final realignments have not yet been developed and negotiations with DEHP in this regard are continuing".

The stock route assessment needs to identify the cumulative impacts of the surrounding mining and infrastructure developments and provide mitigation measures to reduce the cumulative impacts on stock routes.

Recommendation - 19.N

Further negotiations will be required once the realignment proposal is developed.

Response - 19.N

The proposed realignments of the stock route network provided in the Kevin's Corner EIS are indicative only and were presented as realignments for discussion. Figure 3-2 depicts the stock route realignment options proposed within the Kevin's Corner EIS with pasture type, nearby watering points and other on-farm infrastructure shown to provide an indication of relevant considerations. Figure 3-3 depicts the vertical profile of the existing stock routes and proposed stock route realignment options.

No applications for the realignment of the stock routes have been made and the realignments proposed are stated as indicative only at this stage.

HGPL is currently in the process of developing a Stock Route Realignment Strategy which will assist in determining the most appropriate realignments for stock routes U291 and U301 (refer Volume 2, Appendix C, Section C.6 of the SEIS).

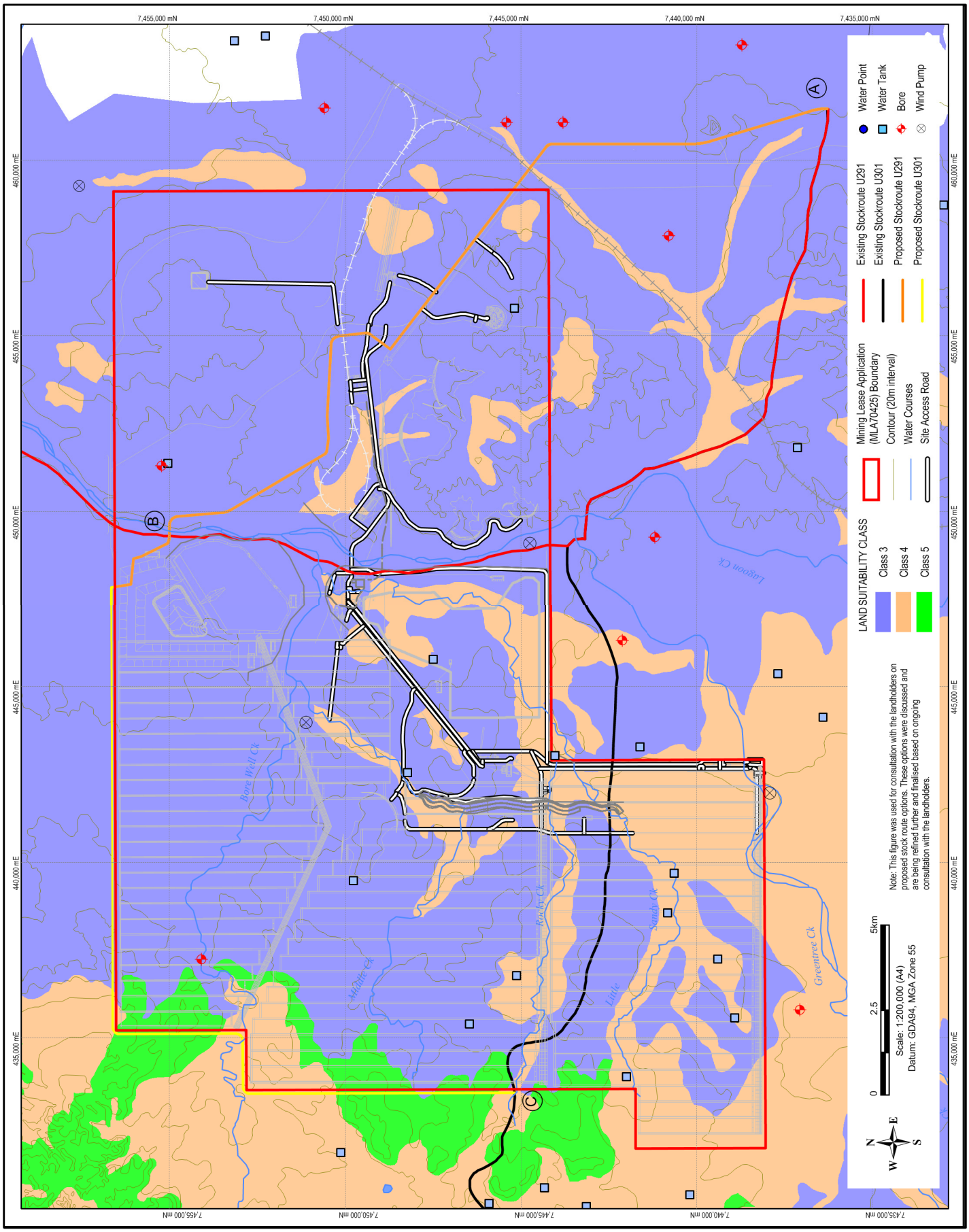
HGPL has met with the three impacted landholders in May 2012, to discuss the proposed stock route realignment. These discussions covered landholder requirements and took into account their extensive knowledge of their properties. This information is to be incorporated into the Stock Route Realignment Strategy and further discussed before realignments are finalised.

The Stock Route Realignment Strategy aims to address community and agency concerns regarding the proposed alternative alignments. To ensure the Stock Route Realignment Strategy develops alternative alignments that accord to landholder and agency requirements, the following principles will be employed:

- The quality of pasture along the proposed realignment is of no lesser quality the pasture along the current alignment;
- The topography of the proposed realignment is no less suitable than the topography along the current alignment and that stock can be travelled/agisted along the proposed realignment;
- Distances between water points and holding yards are of similar distances and suitable for travelling and agisting stock after the proposed realignment;

- Cumulative impacts on the Stock Route Network generated by the Alpha Coal and Kevin's Corner Coal Projects and other proposed mining projects are described, assessed and addressed; and
- Stakeholder (including land holders, industry bodies and agencies) concerns about the proposed realignments are adequately addressed and resolved.

As part of the EIS consultation process discussions have been held regarding an intended realignment agreeable to all affected parties. The next phase is to ground-check this prior to end of 2012 with a then draft set of plans provided for discussion with the regional council and stock route agency.



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Datum: GDA94, MGA Zone55

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Kevin's Corner Project
Supplementary Environmental Impact Statement

STOCK ROUTE OPTIONS PROPOSED FOR LANDHOLDER CONSULTATION

Job Number	4262 6920
Revision	C
Date	21-09-2012

Figure: 3-2

File No: 42626920-g-1005c.wor

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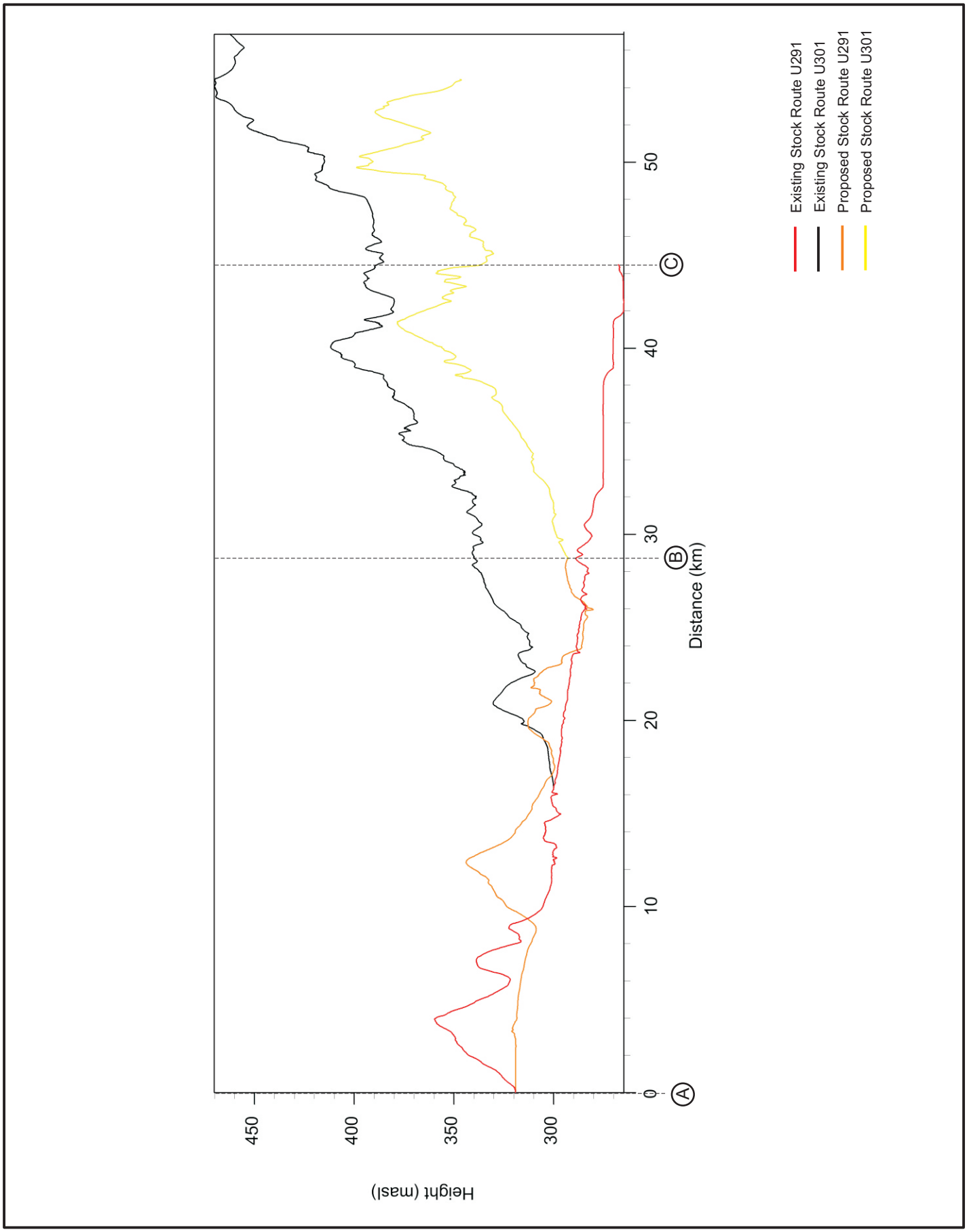

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Kevin's Corner Project
Supplementary Environmental Impact Statement

STOCKROUTE REALIGNMENT OPTIONS (PROFILES)

Job Number	4262 6920
Revision	B
Date	15-06-2012

Figure: 3-3

File No: 42626920-g-1006.cdr

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Comment - 19.O

Section 6.8.2.1

This section states that "Subsidence is expected to occur in areas of Cudmore Resources Reserve which are to be undermined. This subsidence is likely to have some impact upon the conservation value of the area due to the change in topography. However, no changes to land use or values are expected to result from this. The impacts this will have on the local topography is presented in Volume 2, Appendix J."

Recommendation - 19.O

Clarify the impacts of subsidence on conservation values - conservation is the predominant land use for Cudmore RR. Further one of the management principles for resources reserves (s21(c), NCA 1992) requires that the area is managed to ensure that the area is maintained predominantly in its natural condition.

Response - 19.O

It is acknowledged that one of the management principles (Section 21(1)(a) of the NC Act) for Resources Reserves is to 'ensure that the area is maintained predominantly in its natural condition.

However, it is also noted that Cudmore Resources Reserve is subject to the provisions of Schedule 2, Part 1, Column 1 of the NC (Protected Areas Management) Regulation, whereby Cudmore Resources Reserve is placed under the management of joint trustees. The trustees are the Chief Executive and Mining Chief Executive. It is also noted that, as prescribed by Schedule 2, Part 2 of the NC (Protected Areas Management) Regulation, the Mining Chief Executive is given the same powers as the Chief Executive, thereby implying that due recognition needs to be applied to both the environmental and economic resource values of Cudmore Resources Reserve.

Figure 3-4 depicts the extent of underground mining activities within Cudmore Resources Reserve.

The impacts and management measures for subsidence resulting from the proposed underground mining operations are detailed within the Interim Subsidence Management Plan within Appendix N of the Kevin's Corner SEIS.

The Interim Subsidence Management Plan details the proposed mining activity as a basis for calculating potential subsidence. Under this description, longwall panels are proposed for the underground workings beneath Cudmore Resources Reserve. Impacts generally associated with subsidence are:

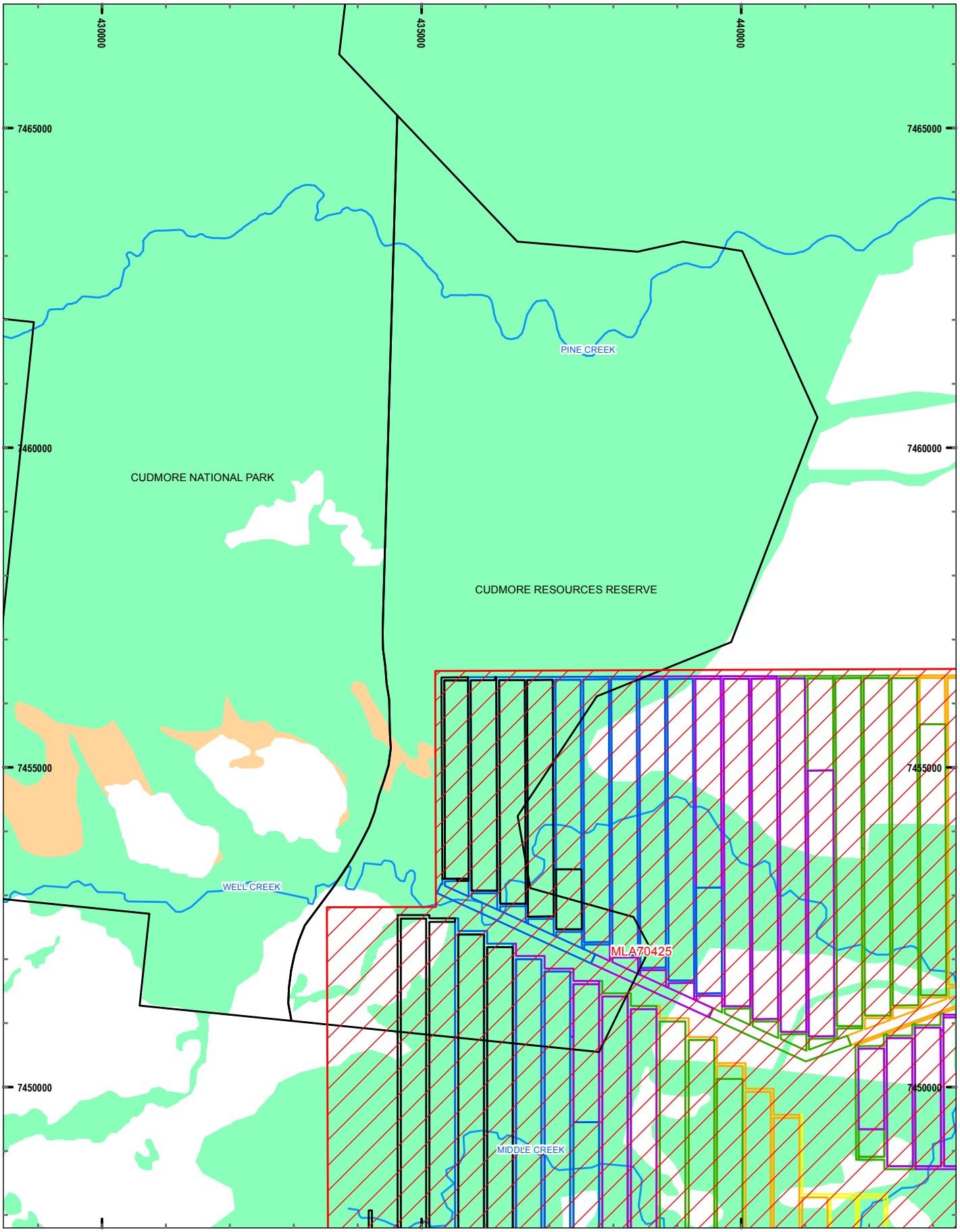
- Hydraulic impacts, including changes to water flow patterns and overland flow paths;
- Land surface cracking or compression;
- Water quality impacts such as:
    - → In-channel ponding;
    - → Ponding of overland flow;
    - → Increases in sediment load;
- Flora impacts such as:

  - → Root shearing;
  - → Changes to soil structure and moisture levels; and

- Fauna impacts such as:
  - → Loss of habitat through impacts on flora communities.

Further details surrounding the direct impacts of subsidence to underlying topography are contained within Appendix J of the Kevin's Corner EIS. An Interim Subsidence Management Plan detailing further impacts to the topography and drainage patterns of the undermined area is contained within Appendix N of the Kevin's Corner SEIS.

Impacts on the ecology of Cudmore Resources Reserve are contained within Volume 1, Sections 9 and 10 of the Kevin's Corner EIS. Further impact assessment on the ecology of the Project area, including Cudmore Resources Reserve, is contained within Appendix F of the Kevin's Corner SEIS.



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0 0.5 1 1.5 2 km

Scale: 1:80,000

Datum: GDA 94, MGA Zone55

N W E S

HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

DISTURBANCE CONTRAINTS

Job Number 4262 6920
Revision D
Date 15-06-2012

Figure: 3-4

File No: 42626920-g-1004.mxd

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Comment - 19.P

Section 6.8.2

The EIS points out that "the Proponent is applying for an "Interest in a Protected Area" beneath Section 34 of the Nature Conservation Act 1992 (NCA) in order to obtain approval to carry out the proposed activity beneath a protected area that will be required prior to the commencement of underground activities beneath the area. This matter is discussed further in Section 6.8.2 of the EIS."

The EIS then states that "Specifically HGPL will seek a Lease beneath the Land Act 1994 for the life of the mine for an interest in the Cudmore Resources Reserve. This lease will apply to lands subject to the extent of MLA 70425 that are identified to be within the boundaries of Cudmore Resources Reserve."

Recommendation - 19.P

Issues of how activities on the Resource Reserve are to be authorised are under discussion between DEHP, Hancock Coal and DEEDI (initial discussions were held on 18/11/11).

DEHP will propose a process to give consent for the ML in Cudmore Resources Reserve through an approval under Section 34 of the NCA. A Land Act lease is not an appropriate mechanism for land managed under the NCA.

Once developed, the proposed process will be circulated for comment and finalisation.

Note that consideration will need to be given to enabling conditions to be reviewed prior to the company entering the resources reserve as planned in 20 -30 years' time. DEHP must have an opportunity to review conditions on the basis of contemporary knowledge and consideration of works conducted in the adjacent lands. There is a need for an effective mechanism that triggers this review (eg the EA could be conditioned so that any authority for an interest in a protected area will be issued under provisions of Section 34 of the Nature Conservation Act 1992).

Note also that as resources reserves are a 'reserve' for the purposes of the Mineral Resources Act 1989 (MRA), the consent of the reserve owner (DEHP) is also required under s238 of the MRA.

Response - 19.P

HGPL has held discussions with DNPRSR and DNRM to identify and address issues in relation to the proposed underground workings and aboveground activities within a part of the Cudmore Resources Reserve. The most recent meeting between HGPL, DNPRSR and DNRM was held on 31 May 2012 to discuss the findings of the revised Interim Subsidence Management Plan, including the potential impacts of the mining operations and the management measures to be implemented to mitigate the potential impacts of the Project on the Cudmore Resources Reserve. The proposed compensation agreement for the impacts of the proposed mining operations on the Resources Reserve was also discussed and is currently in negotiation between HGPL and the relevant agencies. The particulars of this compensation agreement are private and confidential until the agreement is finalised.

It is understood that DNPRSR is currently considering the process beneath Section 34 of the NC Act to allow for the establishment of the Mining Lease over part of Cudmore Resources Reserve. It is acknowledged that the proposed underground mining activities in this area are not to occur as planned for another 20 to 30 years and that conditions placed on this aspect of the operation will likely be no longer applicable by the time the activity is to occur.

The proponent is fully supportive of allowing for the review and subsequent consideration of conditions relating to this aspect of the mining operations on the basis of contemporary knowledge at a time closer to when these activities are likely to occur. The proponent is also fully supportive of the introduction of a mechanism into the process that will catalyse the abovementioned review closer to the time when these activities are likely to occur, such as conditioning the Environmental Authority.

Further discussions in this regard are currently ongoing in order to satisfy any Coordinator-General requirements.

Comment - 19.Q

Section 6.8.2.2

Mitigation Methods states that an Operations Plan will be prepared for Cudmore Resources Reserve.

Recommendation - 19.Q

The title of the Operations Plan needs to be changed to an Environmental Management Plan.

The scope of the EMP also needs to be expanded to include:

- Specific information on the extent of impact due to subsidence and remediation obligations/proposals.
- Specific information on what the monitoring data will be collected for subsidence and the subsequent impacts on drainage and terrestrial ecology.
- Number and location of ventilation shafts and access tracks, remediation works, the extent of clearing around the shafts and remediation.
- Specific information on access arrangements.

DEHP will require access to numerous tracks through the Cudmore Resource Reserve to undertake day to day management, fire management and pest management activities. The internal roads also provide access to adjoining properties to the south. The EA should be conditioned to allow for ongoing DEHP/QPWS access to Cudmore Resources Reserve during the project life.

The real impacts on the Resources Reserve will only occur after mining has finished and the subsidence starts to occur. DEHP is unlikely to agree to conventional rehabilitation methods which include additional clearing of vegetation, deep ripping and re-profiling of the landscape. As the subsidence is expected to be approximately 2 to 3 metres, there will need to be a commitment to reinstate roads and firebreaks to a useable condition and to implement best environmental practice rehabilitation as required.

Response - 19.Q

Cudmore Resources Reserve is designated under the NC Act as a Resources Reserve and is to be managed in accordance with Section 21 of the same Act. The Reserve was gazetted as a Resources Reserve on 23 October 1998. The Reserve does not currently have an area specific management plan.

Cudmore Resources Reserve is identified beneath Schedule 2, Part 1 of the NC (Protected Areas Management) Regulation, as a resources reserve placed under the management of joint trustees. Specifically;

- Environment Chief Executive (DNPRSR); and
- Mining Chief Executive (DNRM).

In accordance with Schedule 2 part 2 of the NC (Protected Areas Management) Regulation, the joint trustee is given the powers of the Chief Executive (Environment), other than the power to:

1. Charge a fee for entry to the park; or
2. Grant any of the following—

a) A permit to take, use, keep or interfere with cultural or natural resources;
b) An apiary permit;
c) An aboriginal tradition authority or island custom authority;
d) A commercial activity permit or special activity permit;
e) A stock grazing permit, stock mustering permit or travelling stock permit; or

3. Enter into a commercial activity agreement; or
4. Approve the use of a herbicide or pesticide.

The issue of joint trustees implies that due recognition needs to be given to both the environmental and commercial resource values of the Reserve.

It is understood that there will be three "management plan" documents with differing levels of applicability to the Cudmore Resources Reserve. These are:

- A Management Plan - developed in accordance with Part 7 of the NC Act and to be prepared by DNPRSR;
- An Operations Plan - specifically tailored for the proposed underground operations and associated surface impacts within Cudmore Resources Reserve. This Operations Plan is currently under development by HGPL. The scope of the Operations Plan is provided in Appendix T3 of the Kevin's Corner SEIS; and
- An Environmental Management Plan - for the whole of mine operations which will include reference to Cudmore Resources Reserve, the Management Plan for Cudmore Resources Reserve and the Operations Plan, for activities within and below Cudmore Resources Reserve.

The Operations Plan will be prepared by the Proponent and will deal specifically with those activities proposed to occur within and beneath Cudmore Resources Reserve. This Operations Plan will include:

- Specific information on the extent of impact due to subsidence and remediation obligations/proposals;

→ Avoiding those conventional methods of rehabilitation which DNPRSR have indicated they are unlikely to support and developing/providing alternatives to these rehabilitation methods;

- Specific information on what monitoring data will be collected for subsidence and the subsequent impacts on drainage and terrestrial ecology;

→ Details surrounding monitoring 'indicators' which will be utilised in identifying and addressing subsequent impacts on drainage and terrestrial ecology;

- Number and location of ventilation shafts and access tracks, remediation works, the extent of clearing around the shafts and remediation;

→ Detailed mine planning for the area subject to Cudmore Resources Reserve has yet to occur, due to the long horizon on these activities specific details surrounding the underground mining technique and associated surface activities will be revised at a time closer to when these activities are likely to occur; and

- Specific information on access arrangements;

→ As it will be an active mine site for part of the life of the Kevin's Corner Mine, there will be induction and safety requirements on anyone who works on or traverses the area of the Mining Lease; this will be of relevance to any DNPRSR staff who wish to undertake day to day management, fire management and pest management activities within that part of Cudmore Resources Reserve within the Mining Lease.

The Proponent is supportive of the Environmental Authority being conditioned to allow for ongoing DNPRSR access to Cudmore Resources Reserve during the Project life.

3.7 Terrestrial Ecology

Comment - 19.R

Section 9.5

The statement "No NC Act protected areas were identified within or adjacent to the site" is not correct. The project area overlaps Cudmore Resources Reserve and is within 700m of Cudmore National Park. Clarification of the exact distance of the project area to the boundary of Cudmore National Park is required.

Recommendation - 19.R

It is recommended that the proponent correctly address the likely environmental impacts to these NCA list protected areas and provide clarification on the distance to Cudmore National Park boundary.

Response - 19.R

As part of the SEIS a Scope for the Cudmore Resources Reserve Operations Plan has been completed and is included as Appendix T3. The Scope for the Cudmore Resources Reserve Operations Plan outlines the proposed establishment and operation of the mine, identification of potential environmental impacts to the ecological and cultural values present within the Reserve and outlines the proposed mitigation and management measures currently proposed. The Operations Plan will assist the joint trustees in the drafting of a Management Plan for the Cudmore Resources Reserve as required by the provisions of the NC Act and associated Regulations.

The Operations Plan will be prepared by the Proponent and will deal specifically with those activities proposed to occur within and beneath Cudmore Resources Reserve. This plan will detail:

- The ecological and cultural values of the area of Cudmore Resources Reserve subject to ML 70425;
- The mining and associated activities which are proposed to occur within the area of Cudmore Resources Reserve subject to ML 70425;
- The likely impacts to the identified ecological and cultural values which may be caused by the proposed mining and associated activities within the area of Cudmore Resources Reserve subject to ML 70425;
- Environmental objectives and commitments for the area of Cudmore Resources Reserve subject to ML 70425; and
- Control strategies and indicators to measure and ensure environmental objectives and commitments are being achieved.

The Kevin's Corner EIS incorrectly included a statement of the distance between the closest corner of the mining tenement and the Cudmore National Park. The separation distance between the Cudmore National Park and boundary of ML 70425 is estimated to be 114 m. This change will be reflected in any further documentation.

3.8 Surface Water

Comment - 19.S

Section 11.1.4.2

The EIS states "Part 3 Section 12 (g) of the Burdekin WRP has provisions to make water available in the Belyando-Suttor sub-catchment to support growth in irrigated agriculture." It is unclear how this statement relates to the proposed Kevin's Corner project.

Recommendation - 19.S

The proponent should expand on the statement to demonstrate the relevance to the proposed project.

Response - 19.S

The only relevance to the Kevin's Corner Project is that potential future irrigated agriculture should be considered in identifying the Environmental Values applicable to downstream waterways.

Comment - 19.T

Section 11.2.5

Baseline Water Quality Objectives (WQOs) have not yet been developed.

Queensland Water Quality Guidelines (QWQG 2009) requires data be collected over 12-24 months to develop local WQOs and trigger levels for reference sites. The surface water technical report (V2 M4 p16) states samples were taken between October 2010 and February 2011 during periods of flow following significant rain events; no other data is provided or reported.

Although the proponent has committed to collecting further samples for the development of local WQOs and trigger levels, these are not yet available. Before any useful local guidelines and objectives can be developed, this data needs to be finalized and reported for proper assessment.

Recommendation - 19.T

The proponent needs to collect sufficient water quality data (for at least 12 months and covering the natural seasonal variations in waterway conditions) to meet the QWQG requirements for baseline WQO development and report the WQO and trigger level values that are to be used for the mine. This must be completed before any EMP is developed.

Response - 19.T

The current baseline monitoring program is design to collect at least 12 sampling events which will coincide with wet weather events of sufficient magnitude to generate flows in the watercourses on site. It should be noted that the watercourses on the site are ephemeral and consequently generally do not flow outside of the wet season.

The Proponent has to date collected 185 baseline water quality samples from across the Kevin's Corner and Alpha Coal mine sites. This is considered to represent a sufficient dataset to represent baseline water quality and has been used to propose modified limits for water quality parameters in Table T-14 (SEIS, Volume 2, Appendix T1) where appropriate as already discussed with the responsible DEHP representative. It is proposed that the baseline monitoring program will be continued to supplement the existing data and to continue to revise 20th and 80th percentiles for the purpose of establishing local water quality objectives. ANZECC/QWQG default values would apply in the interim.

Comment - 19.U

Section 11.3.10

The proposed diversion of Little Sandy and Rocky Creeks may not be approved by the Department in its current form. Concerns in relation to the proposed diversion are detailed throughout the Attachment Watercourse Diversions – Central Queensland Mining Industry Guideline version 5.0.

The proposed diversion will significantly reduce the existing length of Little Sandy and Rocky Creeks. The Department's experience supported by research undertaken in ACARP projects relating to stream diversions within the Bowen Basin show that one of the greatest impacts to the long-term stability and performance of stream diversions is the reduction in total length of the replaced watercourse.

Recommendation - 19.U

The proponent has not provided details regarding the decrease in watercourse length for Little Sandy and Rocky Creeks as a result of the proposed diversion. The proponent has also not recognised that the reduction in watercourse length is an issue to the long-term performance of the diversion and the impact to the existing watercourses. The proponent should provide alternative diversion alignments that exhibit similar watercourse lengths to Little Sandy and Rocky Creeks.

Response - 19.U

If a stream is diverted from a waterway and back into the same waterway further downstream, change in length can indicate risks particularly if the stream gets shorter because it indicates the diversion may be too steep.

However for Kevin's Corner Project with the diversion of Little Sandy Creek and Rocky Creek into Middle Creek, the change in watercourse length has no significant meaning. What is more important is the longitudinal gradient, and in the case of the proposed constructed diversion, the gradient is mild; less than the original watercourse and erosion is not expected to occur. Conversely it is actually expected that the constructed diversion will likely experience sedimentation and it is recommended that this should be allowed to occur naturally. The diversion will be constructed as a single thread channel within a defined and constructed floodplain corridor. It is possible that the diversion channel with sedimentation may evolve into an anastomosing channel (multiple threads) and these type of channel systems do naturally occur in the Project area. This subject has been discussed at a number of meetings with DEHP (formerly DERM; 7/3/12, 26/3/12, 28/3/12, 4/4/12, 10/4/12, 19/4/12, 16/8/12) and accepted.

The diversion design is discussed in Section 11.3.10 of the EIS. A longitudinal profile is presented in Figure 11-20. Further detail on the diversion design and hydraulic performance is provided in Appendix M2.2 of the EIS

Comment - 19.V

Section 11.3.10

The proponent and DEHP both acknowledge that further investigation needs to be undertaken as part of the detailed design of the diversion structures.

Recommendation - 19.V

The proponent to note that a more comprehensive assessment of the diversions will need to be undertaken as part of the water licence process under the Water Act 2000.

Response - 19.V

The Proponent acknowledges and is planning for the requirement that a more comprehensive assessment of the diversions will need to be undertaken as part of the water licence process under the *Water Act 2000*. This will include more comprehensive geotechnical/geological investigations to inform design, rehabilitation and potential risks that will be mitigated in the final design.

Comment - 19.W

Section 11.3.10

The use of rock chutes within watercourses for bed grade control should be considered as a temporary structure. The proponent has proposed that a rock chute will be constructed at the confluence with Middle Creek and the proposed diversion.

Recommendation - 19.W

The proponent should investigate alternative diversion design options to reduce the need for the installation of a rock chute on Middle Creek as a long-term solution for bed grade control.

Response - 19.W

The need for a grade control to manage the drop of Middle Creek into the constructed diversion cannot be reasonably eliminated with alternative diversion options. This is because the diversion concept presented in the EIS already has a very mild gradient already and cannot be reasonably designed to reduce this gradient further. Nonetheless options will be investigated as part of detailed planning, investigation and design for *Water Act* approvals. Options may include:

- Use of bedrock as the necessary grade control structure should geotechnical investigations show bedrock is shallow (this is likely and expected).
- Temporary erosion protection design during the mining phase.
- Permanent chute/ drop / erosion protection design for the post mining phase using conservative design and durable materials that will not require on-going maintenance.

Comment - 19.X

Section 11.3.10.2

The proponent indicates that an isolated area upstream of the mine pit and flood levee will require captured water to be discharged through the clean water system or pumped to the diversion.

Recommendation - 19.X

The proponent must acknowledge that the transfer of water to the proposed diversion via pumping is a short-term option and should not be considered post mine life.

Response - 19.X

The EM Plan for the Project has been revised as part of the SEIS to allow for the provision of water releases from site. This water release provision is captured in both the EM Plan and the proposed EA conditions (SEIS, Volume 2, Appendix T1). The post mine scenario will allow for free draining clean water systems.

Comment - 19.Y

Section 11.3.10.2

The diversion cross-section design includes a bottom width of 3m. The geomorphic assessment of Little Sandy and Rocky Creeks highlights that the existing minimum bed width of 5m. The proposed diversion design should where possible include features of the watercourses it is replacing.

Recommendation - 19.Y

The proponent should examine the changes in hydraulic performance with a minimum bed width of Little Sandy and Rocky Creeks and the increase in bed width due to contributing catchment areas. The proponent should investigate options to include the existing features of the watercourses it is replacing.

Response - 19.Y

The 3 m width of the diversion channel in the EIS was assumed as an initial concept to demonstrate that the diversion is feasible. Further comprehensive geo-morphological investigations will be undertaken and more detailed survey will be used in the final design for *Water Act* approval. This will ensure that the bed width is appropriate to match existing streams and provides adequate control of stream power. The proponent will consult with the relevant agency administering *Water Act* approval during the detailed design phase.

Comment - 19.Z

Section 11.4.10.3

Contingency measures are outlined for the mitigation of subsidence impacts on Sandy Creek. Elsewhere in the EIS, such as in the Project Description (Figure 2-2 Overall site layout on p2-7), underground mining is not shown to be located under Sandy Creek.

Recommendation - 19.Z

The proponent should update the relevant sections of text so that the mitigation measures are appropriate for the predicted impacts.

Response - 19.Z

An Interim Subsidence Management Plan has been developed as part of the SEIS (Volume 2, Appendix N). This plan provides details of the site catchments and watercourses that are impacted by subsidence. Sandy creek is not one of the watercourses that will be impacted by subsidence.

Comment - 19.AA

Section 11.4.12

The proponent and DEHP both acknowledge that further investigation needs to be undertaken as to the Cumulative Impacts in respect to the Kevin's Corner and Alpha Coal Project as outlined in Volume 11 Surface Waters Section 11.4.12 Cumulative Impacts page 103.

Recommendation - 19.AA

The Department requests that a review of mining impact on the reduction of floodplain width within Sandy Creek be undertaken in light of potential off site impacts (afflux) and the long-term stability and performance of this watercourse.

Response - 19.AA

A cumulative surface water impact assessment has been prepared which considers the cumulative impacts of the Alpha and Kevin's Corner Coal mines on flood levels within the Kevin's Corner lease. This is provided as Appendix S of the SEIS and demonstrates that the proposed levee designs are appropriate. Further the Alpha mine will not cause an increase in flood extent within the Kevin's Corner lease.

Comment - 19.AB

Section 11.5.11

The EIS proposes to conduct ongoing water monitoring via a gauging station upstream from potential discharge locations at Site 14 (as per S11.5.1.1 p105, ref table 11-33; also as repeated in the EMP, V2 W p51 table W-11). Site 14 has not been included in the water quality monitoring reference sites (table 11-33) (though its proposed location is mapped in V2 M4 p18). It is not clear whether site 14 is intended as a reference site due to its exclusion from this table.

Detailed information including the location and intended use of this site should be included to accurately assess the suitability of this monitoring site.

Recommendation - 19.AB

The proponent should give complete details on monitoring site 14 similar to the details given in table 11-13 and W-11 (and any other locations this information is repeated). The proponent should also provide sufficient water quality data for the site as per the data in V2 M4 p21 table 5-3 to provide an adequate baseline of information.

Response - 19.AB

Site 14 is identified as a stream gauging site which is proposed to be installed during the operational phase of the mine. The primary purpose of the stream gauging station will be to measure in-stream flows to determine flow conditions for any proposed releases. The gauging station will also be equipped with probes to monitor pH and EC.

The site was not selected as a baseline monitoring location for the purpose of the EIS which is why it was not previously listed. Accordingly no data is currently available for site 14.

Table T-12 from the EM Plan (SEIS, Volume 2, Appendix T1) has been updated to include further detail. Please refer below to the updated table.

Table 3-1 Water quality monitoring reference sites

Site ID	Site Description	Coordinates			
		Longitude	Latitude	Easting	Northing
Native	Offsite - Native Companion Creek at Highway	146.70713	-23.64900	470,132	7,384,603
1	Lagoon Creek Upstream	146.50753	-23.11128	449,572	7,444,077
2	Lagoon Creek	146.50587	-23.03964	449375	7,452,007
3	Sandy Creek Downstream	146.51162	-22.99849	449,949	7,456,564
5	Well Creek Downstream of Little Sandy	146.50264	-23.04005	449,044	7,451,960
6	Middle Creek Upstream	146.38845	-23.06756	437,358	7,448,870
7	Middle Creek	146.42681	-23.08567	441,295	7,446,882
8	Middle Creek	146.43266	-23.07765	441,891	7,447,772

Site ID	Site Description	Coordinates			
		Longitude	Latitude	Easting	Northing
9	Middle Creek Downstream	146.46482	-23.04502	445,172	7,451,396
10	Rocky Creek Upstream	146.35139	-23.10048	433,578	7,445,210
11	Rocky Creek Downstream	146.41766	-23.11379	440,370	7,443,765
12	Little Sandy Creek Upstream	146.34739	-23.13476	433,185	7,441,413
13	Little Sandy Creek Downstream	146.41697	-23.13110	440,307	7,441,848
14	Proposed Stream Gauging Station	146.49856	23.070781	448,639	7,448,028
A1	Lagoon Creek Upstream	146.48551	-23.33321	447,404	7,419,500
A4	Lagoon Creek Upstream	146.52091	-23.14202	450,953	7,440,678
A5	Greentree Creek	146.41934	-23.16079	440,563	7,438,562
A7	Rocky Creek	146.46379	-23.10169	445,089	7,445,122
A8	Little Sandy Creek Downstream	146.42358	-23.29371	441,055	7,423,849
A9	Spring Creek Upstream	146.40339	-23.28915	438,989	7,424,345
120309A	DEHP Gauge - Mistake Creek at Twin Hills	146.95000	-21.95000	494,837	7,572,706
120306A	DEHP Gauge - Mistake Creek at Charlton	147.10000	-22.50000	510,285	7,511,825
120301B	DEHP Gauge - Belyando River at Gregory Development Road	146.86667	-21.53334	486,193	7,618,819
120305A	DEHP Gauge - Native Companion Creek at the Violet Grove	146.66667	-23.56667	465,984	7,393,708

Comment - 19.AC

11.5.1.2

The monitoring program (V2 W p54 table W-13) states event sampling for water quality will be undertaken weekly (dependent on rain and flow conditions) and "at the commencement of any managed release".

The specific details of timing, frequency and duration of water quality monitoring in relation to a managed release is not provided and not clear.

Water quality should be monitored more frequently than the "regular" monitoring regime (currently weekly, as per table W-13) before/during off-site discharge (Leading Practice Sustainable Development Program for the Mining Industry – Managing Acid and Metalliferous Drainage 2007).

Recommendation - 19.AC

The proponent needs to clarify timing (i.e. before and/or after managed release reaches the receiving waterways), frequency and duration of water quality sampling in relation to a managed release.

The proponent should also commit to more frequent water quality monitoring before and during managed releases in line with leading practice recommendations.

Response - 19.AC

The monitoring program has been revised on the basis of the Final Model Conditions for Coal Mines in the Fitzroy Basin July 2011 as presented in the EM Plan (Volume 2, Appendix T1 of this SEIS).

3.9 Groundwater

Comment - 19.AD

Section 12.3.1

The section currently states that; Section 19(6) states that a person may take or interfere with subartesian water unless a moratorium notice, or water resource plan declaration, limits or alters the water that may be taken or interfered with; or, a regulation under section 1046 of the Act regulates the taking or interfering with water. Section 1046 of the Water Act is concerned with the regulation of declared subartesian areas.

This is an error in that the section quoted should be 20(6).

Recommendation - 19.AD

This section should read; Section 20(6) states that a person may take or interfere with subartesian water unless…

Response - 19.AD

Noted and agreed.

Comment - 19.AE

Figure 12-3

Figure 12 – 3 provides surface geological mapping of the area and while there are some formation names written on the map, there is no legend showing the names of the various geological formations.

This map is critical to understanding regional geology, and a legend should be attached.

Recommendation - 19.AE

The proponent should provide a legend on Figure 12 – 3.

Response - 19.AE

SEIS Volume 2 Appendix L Section 4.7 includes Figure 4-26, which indicates the mapped surface geology.

Table 3-2 below provides a list of geological descriptions. Cross-sections indicating geology with depth, based on exploration bore logs, have also been constructed to assist in providing additional geological information.

Table 3-2 Geological descriptions

Carboniferous	
Ch	Mount Hall Formation - Quartzose to feldspathic sublabile sandstone, quartz-pebble conglomerate, mudstone and red siltstone
Cr	Raymond Group - Flaggy quartzose sandstone, siltstone and minor limestone
Cs	Star of Hope Formation - Lithic conglomerate, feldspatholithic sandstone, rhyolitic to dacitic ignimbrite and flows, tuffaceous siltstone and rare sinter
Cu	Ducabrook Formation - Feldspatholithic sandstone, mudstone, siltstone (commonly tuffaceous), minor algal and oolitic limestone
Cainozoic	
Czb, Czb-NER	Olivine basalt lava flows
Jurassic	
Jh	Hutton Sandstone - Pale brown to pale grey, poorly sorted, medium-grained, feldspathic sublabile sandstone (at base) and fine-grained, well-sorted quartzose sandstone (at top); minor dark grey carbonaceous siltstone, mudstone and rare pebble conglomerate
JKr	Ronlow Beds - Quartzose to sublabile sandstone, minor siltstone, mudstone and coal
Cretaceous	
Kud	Doncaster
Early Permian-Late Permian	
Po	Colinlea Sandstone - Quartz sandstone, pebbly quartz sandstone, minor conglomerate and siltstone
Quaternary	
Q – Q-NER	Alluvium of older flood plains, sand, gravel, soil
Q>Ka – QNER	Allaru Mudstone - Alluvium of older flood plains, sand, gravel, soil
Q>Ku – Q-NER	Wallumbilla Formation - Alluvium of older flood plains, sand, gravel, soil
Q>T – Q-NER>T-NER	Alluvium of older flood plains, sand, gravel, soil
Triassic	
Re	Clematis Sandstone - Medium to coarse-grained quartzose to sublabile, micaceous sandstone, siltstone, mudstone and granule to pebble conglomerate
Rm	Moolayember Formation - Micaceous lithic sandstone, micaceous siltstone
Rd	Dunda Beds - Lithic to quartzose sandstone, siltstone, mudstone
Rw	Warang Sandstone - Kaolinitic quartz sandstone, conglomerate, variegated mudstone and siltstone
Tertiary	
T – T-NER	Quartzose sandstone, conglomerate, siltstone
TQw	Woondoola Beds - Silt, clay, sandy clay; minor sand and gravel; fluvial

Comment - 19.AF

Section 12.8.1.3

In Volume 1 section 12 Groundwater 12.8.1.2 it is stated that; The VWP readings show diurnal variations in water level. Water level plots shown in Figures 12-7, 12-8 and 12-9 indicate that this variation can be as much as 5 metres. Figure 12-11 shows contours for the potentiometric surface of the DE sands. Section 12.8.1.3 discussed this issue. However it is not indicated how the apparent diurnal water level variations are dealt with when selecting water levels to produce the contours.

Recommendation - 19.AF

Section 12.8.1.3 should include an explanation of how the diurnal variation in water levels was dealt with when selecting water levels to produce the potentiometric surface contours in Figure 12-11.

Response - 19.AF

Data provided in the VWPs is pressure data, the marked variations are as a result of confining pressures, more marked in deeper / high pressure confined units. These data are utilised for trend evaluation rather than specific level values.

The harmonic mean of the data was used to provide input into the steady-state groundwater flow pattern assessment.

Steady state groundwater level data has been compiled based on a range of data compiled during the predictive groundwater study. These data were considered when assessing groundwater flow patterns. The steady-state data and calibration is provided in SEIS, Volume 2, Appendix L, Section 4.5.2, Section 4.6.1, Section 9.1, Section 9.3.1, and Appendix D detailing the predictive modelling.

Comment - 19.AG

Section 12.8.3.2

A bore survey was carried out to determine the existing bores and their use in an area within approximately 10 kilometres from the mine.

In Volume 1 Section 12 Groundwater Section 12.8.10 the following information is provided; Based on the hydrochemistry data, the bore survey bores are recognised to intersect the sandstone units within the Colinlea Sandstone. Compared to the composite groundwater quality data (presented in Section 12.8.8) it is considered that the coal seams contain poor quality groundwater, leading to the large difference in groundwater quality between the composite samples (Section 12.8.8.2) and the data compiled in Table 12-18.

This appears to be the only attempt to determine which aquifer/s the neighbouring bores intersect.

While drilling logs are not available for a number of these bores, it is critical that an assessment is made, bore by bore, to determine the likely aquifer/s they are intersecting. It may be necessary to drill additional investigation bores in these areas to determine likely aquifers being utilised.

This assessment is necessary in order to make predictions of the impacts of mining and the dewatering of various aquifers.

For instance it is noted that the model does not include a layer to simulate the Tertiary sediments. Is the proponent confident that there are no bores in the area taking water from the Tertiary sediments? If there are, how will the impacts on this aquifer be determined?

Recommendation - 19.AG

The proponent should make an assessment of the likely aquifer/s being accessed by each of the bores identified in the bore survey.

Response - 19.AG

Predictive groundwater modelling allows for the identification of at-risk bores within the largest predicted drawdown cone (the D seam). These bores will then be revisited in the field to obtain groundwater data for inclusion in the make good agreements.

Bore depths, screen details, etc. will be used with the geological data to evaluated which sandstone layer(s) has been intersected.

Due to limited groundwater data (screen depths and supply aquifers) a precautionary approach has been adopted whereby all identified bores within the largest predicted drawdown cone (1 m) will be reassessed prior to mining.

SEIS, Volume 2, Appendix L, Section 11 details the predictive model revisions conducted to include the Tertiary layers, model layer refinements, recalibration and model layer parameters. This was done to allow for better representation of the Tertiary units, potential impacts on the perched water table(s) within the unconfined units, and to assess potential risk to vegetation communities.

No shallow groundwater production has been recorded (bore survey and DNRM database) and no usable groundwater has been intersected during any drilling (hydrogeological, geotechnical, or exploration) within the Tertiary units across MLA70425 and MLA70426. However, areas predicted to contain at-risk bores will be assessed, which will include any possible shallow bores.

Comment - 19.AH

Section 12.8.3.2

In Volume 1 Section 12 Groundwater, Section 12.8.3.2 Bore Survey it states in part that;

The survey area selected was based on the following: Properties that are wholly west of the Rewan Formation outcrop (aquitard) are excluded based on the interpretation that drawdown impacts will not extend through the aquitard.

Hence the survey has not extended to the west and northwest of the proposed mining area. However the model is predicting impacts in these areas.

How will it be validated that there is no impact in these areas if bore surveys, collection of baseline data, and ongoing monitoring is not carried out there.

Recommendation - 19.AH

The bore survey should be extended to the west and northwest of the proposed mine area.

Response - 19.AH

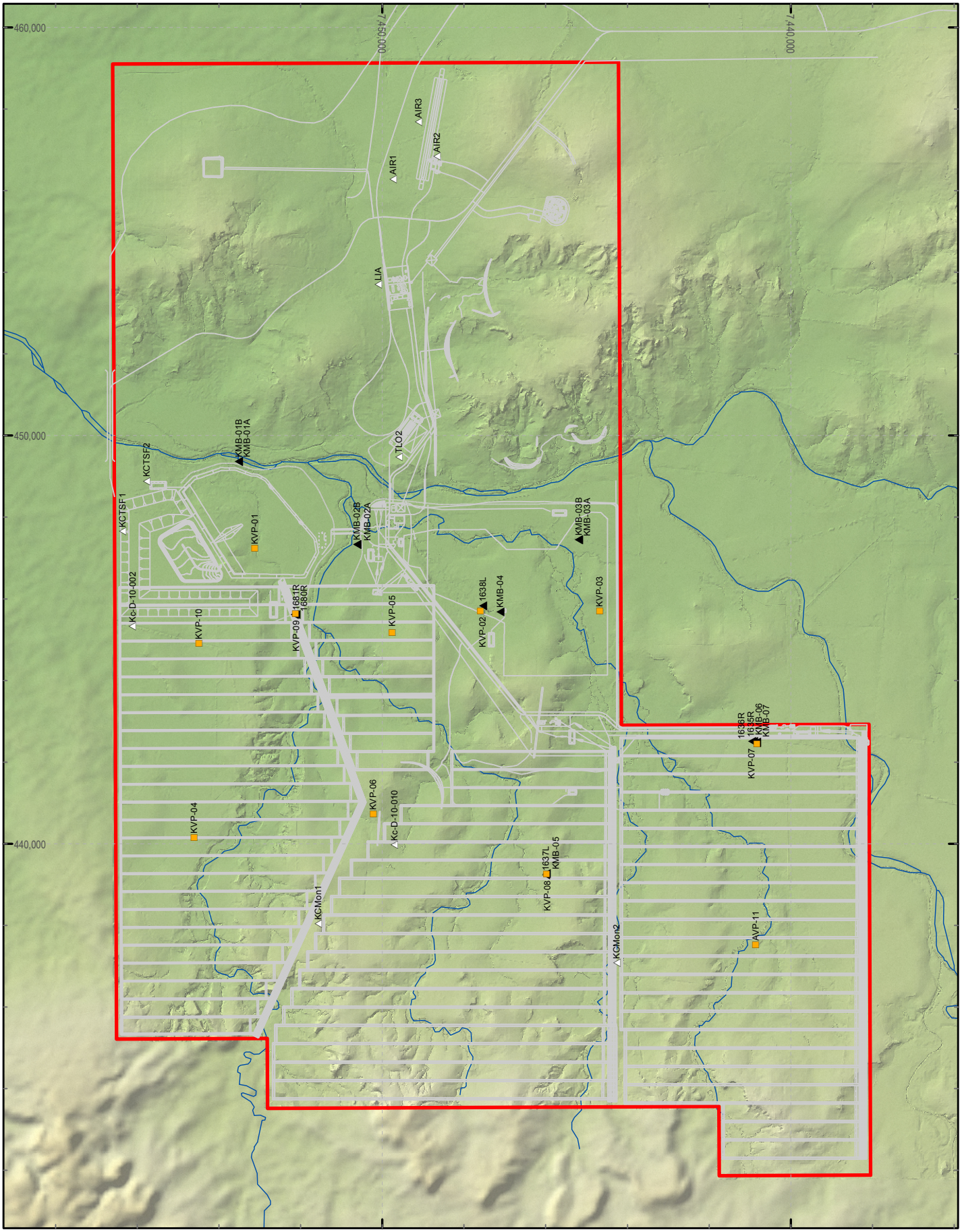
Predictive groundwater modelling has allowed for the determination of potential drawdown within model layers for the mine dewatering at Kevin's Corner. All at-risk bores within the largest predicted drawdown cone (D seam) will be revisited to compile groundwater data for make good agreements prior to mining (SEIS, Volume 2, Appendix T1, Section T.3.4.8, Groundwater Commitments).

Additional monitoring points will be selected and included over time as drawdown in the west and northwest would only occur after several years of mining. These proposed bore locations are presented on Figure 3-5 below.

It is considered, based on the limited data within the GAB units directly west of Kevin's Corner and the predicted changes in potentiometric pressures below the GAB outcrops, that vibrating wire piezometers be installed to assess potential changes in the groundwater levels over time.

It is considered that multiple VWPs sensors can be installed within monitoring bores constructed within the Rewan Formation and Clematis Sandstone, allowing for an assessment of possible induced flow impacts.

Four GAB monitoring points are proposed to the north and west outside of MLA70425 (as shown in Figure 3-5).



Source: See Copyright Details below and for full disclosure Please Refer to the EIS ***Volume 4 - References***

0 0.5 1 2 3 Km

Scale 1:125,000 (A4)

Datum: GDA 94, MGA Zone55

N E S W

HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

GROUNDWATER MONITORING LOCATIONS

Job Number	4262 6920
Revision	B
Date	24-09-2012

Figure: 3-5

File No: 42626920-g-1010.mxd

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Comment - 19.AI

Figure 12-11

It appears that this figure was produced primarily using data from vibrating wire piezometer bores located south of MLA 70425. Only one of the bores which appears to have been utilised (AVP_11) is located within MLA 70425.

This assumption is based on the locations of the bores provided on Figure 12 – 11.

An additional 5 holes with VWP's (1228C, 1234C, 1238C, 1313C and 1356R) have been drilled within MLA 70425. Data from those bores accessing the relevant aquifers should be utilised in updating this figure.

Additionally any water levels obtained from the bore survey where confidence can be placed in the details of the aquifer being accessed, should be utilised in this update.

Figure 12-10 was produced using data from many more bores but given that these investigation bores were all accessing water from multiple aquifers, there can be little confidence placed in the results.

In relation to Figure 12 – 11 it is difficult to have confidence in data on groundwater flow direction from the mine when contours have been developed based on data primarily from bores south of the mine site. In particular there remain questions over groundwater flow direction from the mine to the north.

Additionally, potentiometric surface and water level contour maps should be developed for all aquifers individually to provide and understanding of groundwater flow patterns in all aquifers.

Recommendation - 19.AI

The proponent should update Figure 12-11 by utilising all additional water level data now available, including the newly constructed VWP holes within MLA 70425.

Similar figures should be produced for all aquifers.

Response - 19.AI

Additional groundwater level data has been assessed allowing for the identification of steady state groundwater flow, which was used in the groundwater modelling. The data used included data from additional bores constructed across Kevin's Corner since the EIS compilation, DEHP data, bore survey data, and exploration bores. Appendix D in the groundwater modelling report (SEIS, Volume 2, Appendix L) includes the water level data used for calibration and the associated aquifer, the modelled results are included for comparison.

Groundwater flow contours have been produced. Predictive modelling allowed for an assessment long term groundwater levels and flows which are compared to steady-state flow patterns.

Comment - 19.AJ

Figure 12-13

The figure provides a boundary of MLA 70426 (Alpha) but not Kevin's Corner. The 20 km limit from MLA boundary marked relates to Alpha and not Kevin's Corner. This is a misleading figure.

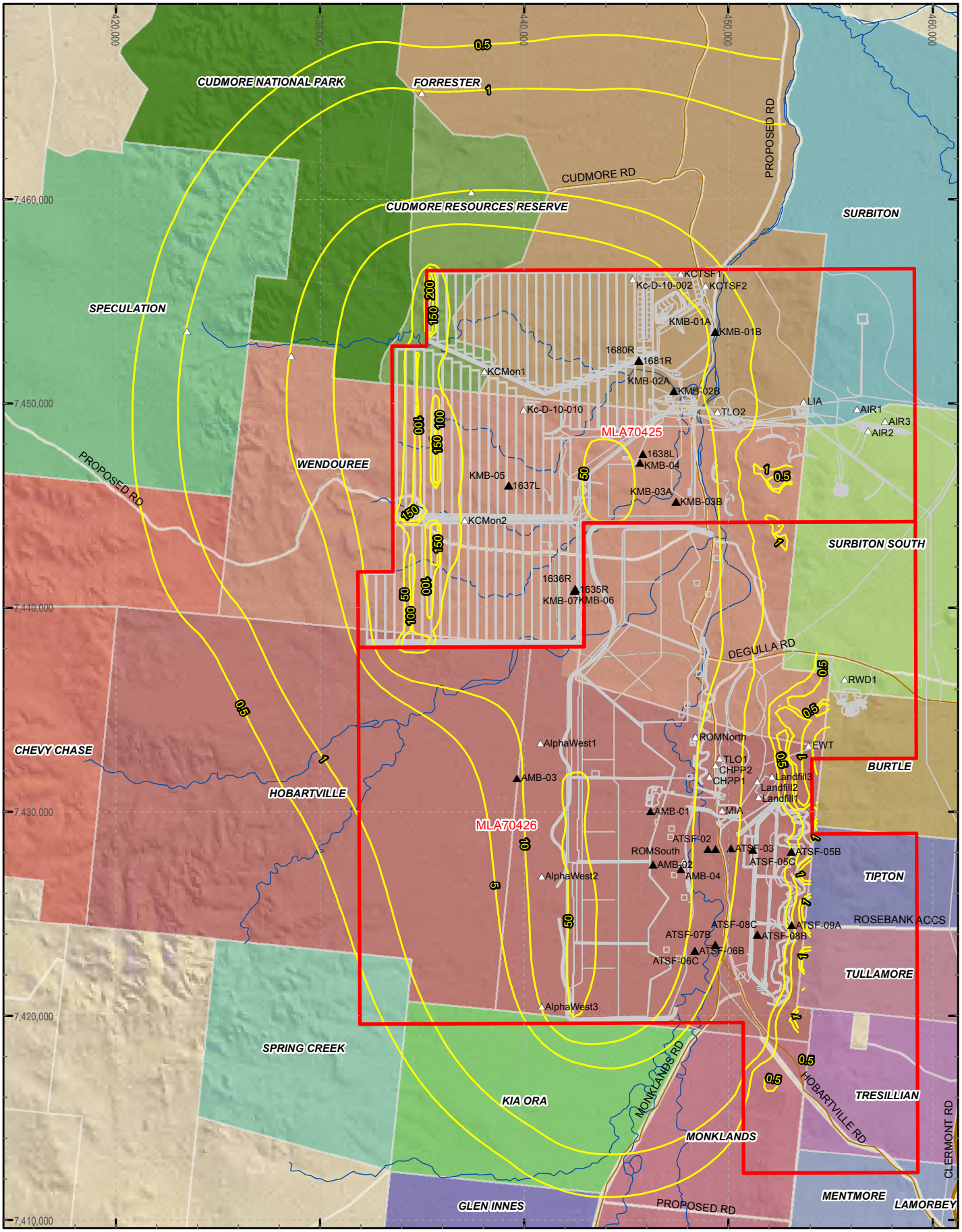
Recommendation - 19.AJ

The proponent should amend Figure 12 – 13 to include the boundary of MLA 70425 with an appropriately amended 20 km limit boundary.

Response - 19.AJ

Figures generated in the groundwater modelling report provide locations of all bores recorded during post EIS, these records were used when determining at-risk bores for both Kevin's Corner alone and Alpha Coal and Kevin's Corner together. The drawdown cones are within the area surveyed (bore survey), see Figure 3-6.

It is noted that not all bores may have been captured during the EIS bore survey; therefore, the proponent will be undertaking a detailed survey during the compilation of make-good agreements within the predicted 1 m drawdown, which was used to identify at-risk bores.



▲ URS Existing Monitoring Bores

△ URS Proposed Monitoring Bore

Kevins Corner and Alpha Cumulative Groundwater Drawdown Contour

Drainage

Mining Lease Application Boundary

Source: See Copyright Details below and for full disclosure Please Refer to the EIS ***Volume 4 - References***

0 1.5 3 6 Km

Scale 1:250,000 (A4)

Datum: GDA 94, MGA Zone55

N W E S

I HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

KEVINS CORNER AND ALPHA CUMULATIVE GROUNDWATER DRAWDOWN: LAYER 7

Job Number	4262 6920
Revision	B
Date	24-09-2012

Figure: 3-6

File No: 42626920-g-1008.mxd

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Comment - 19.AK

Section 12.8.10

The section currently states that;

All of the groundwater samples have electrical conductivity values that exceed the ADWG guideline of 100 µs/cm.

This is incorrect. It is likely that the guideline may be 1000 µs/cm but the guideline generally seems to quote limits in mg/l.

Recommendation - 19.AK

This reference should be removed. If it is to be replaced it should be with accurate data from the guideline quoted.

Response - 19.AK

It is noted Section 12.8.10 Bore Survey Hydrochemistry and Table 12-18 include an EC guideline for ADWG, 2004 health of 100 µS/cm. This is incorrect.

Table 12-11 provides the water quality standards utilised during the EIS. It is noted that the Australian Drinking Water Guidelines (ADWG, 2004) was used for drinking water guidelines, which does not have a guideline value for electrical conductivity. The guideline value for Total Dissolved Solids (TDS) is 500 mg/L, which equates to ~ 750 µS/cm, using:

TDS (mg/L) = EC (µS/cm) x 0.67

The results tabled in Table 12-18 for the bore survey samples indicate that Spring Creek Old Yard Bore and Hobartville Bullock Bore are within the equivalent EC guideline value. The remaining samples all exceed 750 µS/cm.

Comment - 19.AL

Section 12.11.3

In this section it is stated;

The cone of depressurisation, at its maximum extent at the end of mining, does not extend to the registered springs in the area (Figure 12-4), thus any potential induced flow (that could potentially propagate to surface over time) will not impact on these springs.

This appears to be the only statement in relation to the time to maximum drawdown extent. It may be inferred from this that the maximum extent of drawdown will occur at the end of mining after 31 years but it needs to be clearer.

Recommendation - 19.AL

This section should include a clear statement as to the time to maximum predicted extent of drawdown.

Response - 19.AL

Predictive groundwater drawdown was conducted for LOM and 300 years post mining. The hydrographs and assessment of risk to the registered springs was included in the SEIS, Volume 2, Appendix L model report. Section 13 discusses long term hydrographs, which project groundwater level and potentiometric pressure (within confined aquifers) changes based on the proposed mining activities.

No projected impacts, in any of the model layers, below the northern registered springs have been predicted during or post mining.

Comment - 19.AM

Section 12.13.5.2

In Table 11, proposed monitoring bores are identified but target aquifers are not identified.

Recommendation - 19.AM

Table 12-32 should identify which aquifers are to be targeted by the proposed monitoring bores.

Response - 19.AM

Section 14.2 of the groundwater model report (SEIS, Volume 2, Appendix L) includes all monitoring commitments, Table 14-1 provides the monitoring points and target unit details.

3.10 Noise and Vibration

Comment - 19.AN

Appendix P, Table 5.2

The second paragraph states that Table 5.2 (Volume 2 Appendix P Section 5.3 Table 5.2) provides a summary of data presented in Appendix B. Data on temperature and relative humidity could not be found in Appendix B.

Recommendation - 19.AN

Include data on temperature and humidity in Appendix B.

Response - 19.AN

The second paragraph of Volume 2 Appendix P, Section 5.3, Page 24, states:

"Table 5.2 provides a summary of the meteorological scenarios considered which are based on the meteorological data presented in Appendix B".

The meteorological effects that would have the most influence on received noise levels at sensitive receptors are wind speed and direction and atmospheric stability.

The prevailing meteorological conditions for the site have been assessed using data extracted from the meteorological model, CALMET, for the year 2009. Post-processed CALMET results of this analysis are presented graphically in the form of windroses and wind class frequency distributions in Appendix B.

A standard temperature of 10 °C and relative humidity of 50% has been applied in the noise modelling predictions, as indicated in Table 5.2.

Further details of the meteorological analysis including temperature and relative humidity data and the CALMET modelling are provided in the Air Quality Impact Assessment (Volume 1, Section 13 of the EIS).

Section 4.4 of the Revised Noise and Vibration Assessment Report (Volume 2, Appendix H) presents a discussion and clarification regarding the response for this submission.

Comment - 19.AO

Appendix P, Table 5.2

The calculation relating the overpressure of 115dB criteria and both the charge of 1,300kg and distance to the sensitive receiver is unclear. Assuming blasting of 1,330kg could be occurring on the Northern underground border of the site, this would lead to an overpressure of 123dBL (see Volume 2 Appendix P Section 5.3 Table 5.2).

Recommendation - 19.AO

Clarification is required on where the blasting areas are and a distance table from the closest blasting area to each receiver and the relating calculated overpressure.

Response - 19.AO

Setback distances from the open-cut areas have been considered in the overpressure calculations. It is anticipated that coal would be extracted from the underground mines by long-wall methods and blasting would not be carried out in these areas.

Notwithstanding this, the EIS notes that that overpressure calculations should only be used as a guide and it was recommended that calculations and predictions be refined on the availability of the site specific constants, once exact locations for blasting are known.

Section 4.3 of the Revised Noise and Vibration Assessment Report (Volume 2, Appendix H) presents a discussion and clarification regarding the response for this submission.

3.11 Decommissioning and Rehabilitation

Comment - 19.AP

Section 26.4.7.2

The proponent states that introduced, stoloniferous grass species (e.g. Rhodes Grass, Indian Couch) will be sown on the steeper slopes as their growth habit provides more extensive coverage in a shorter time. These are exotic species and native species to the Desert Upland should be used to prevent wider invasion to this bioregion.

Recommendation - 19.AP

It is recommended that the proponent uses a combination of gradual slope, local native perennial pasture and annual forbs species to rapidly establish ground cover and prevent erosion. Seed should be planted out early in the wet season to maximise establishment.

Response - 19.AP

Exotic pasture species will not be used during standard rehabilitation (native grass species only). Native stoloniferous species will be used for rehabilitating areas with slope or potential erosion issues as they are able to expedite ground coverage and minimise the potential for erosion.

The SEIS EM Plan (Volume 2, Appendix T1) has been updated to include the following text.

Native pasture species (warm season perennial, cool season perennial, yearlong green perennial and annual) will be sown on pasture areas requiring rehabilitation. If steep slopes are present and it is not practicable to re-shape the area and/or there is a high risk if erosion, native stoloniferous grass species (e.g. *Brachyachne convergens* (native couch/spider grass), *Chloris pectinata* (comb chloris) and *Iseilema vaginiflorum* (red flinders grass)) will be sown as their growth provides more extensive coverage in a shorter time. If rehabilitation using native species are unsuccessful, discussions will be held with DEHP regarding implementation of conditions for the use of introduced species, including buffer zones, as outlined in Volume 1, Section 26 of the EIS and in the Environmental Management Plan, Appendix T1 of this SEIS.

3.12 Project Approvals

Comment - 19.AQ

Appendix E, Section E2

Table E2 – Future Approvals lists approvals under the Water Act 2000 that are required for the project. The item describes taking or interfering with the water – the relevant approval is listed as "taking and interfering with water". The relevant approval is a water licence to take or a water licence to interfere with water. The table should be updated to reflect the relevant approval.

Recommendation - 19.AQ

The following text to be removed from the table:

Taking or Interfering with water; Water Act 2000; Taking or interfering with water; On-tenure, locations and details to be confirmed.

The following text to be added to the table:

Taking or Interfering with water; Water Act 2000; Water Licence to take water or water licence to interfere with the flow of water; On-tenure, locations and details to be confirmed.

Response - 19.AQ

Please refer to Table 0-2. The relevant approval type has been updated to reflect the recommendation.

Table 0-2 provides a summary of the statutory approvals required following receipt of the key Project approvals and replaces Table 1-5 – Other approvals to be obtained following key approvals and Table E2 – Future Approvals within the Kevin's Corner EIS.

Comment - 19.AR

Appendix E, Section E2

Table E2 – Future Approvals lists approvals related to water that are required for the project. The table excludes the requirement for development permits for operational works that take or interfere with the flow of water. It is recommended that the table be updated to include the approvals that will be required.

Recommendation - 19.AR

The following text be added to the table:

Construction of operational works that take or interfere with water; Sustainable Planning Act 2009; Development permit for operational works for taking or interfering with water (e.g. construction of a diversion channel or construction of groundwater bores); On-tenure, locations and details to be confirmed

Response - 19.AR

Please refer Table 0-2 (presented in the Response 19.AQ). The relevant approval type has been updated to reflect the recommendation.

Table 0-2 provides a summary of the statutory approvals required following receipt of the key Project approvals and replaces Table 1-5 – Other approvals to be obtained following key approvals and Table E2 – Future Approvals within the Kevin's Corner EIS.

3.13 Subsidence Report

Comment - 19.AS

Appendix J

The impacts of subsidence on watercourses and surrounding landscapes have been documented within separate sections of the EIS. The Department has developed a draft guideline titled "Watercourse Subsidence – Central Queensland Mining Industry" that contains the minimum requirements for developing a Subsidence Management Plan in relation to the impact of watercourses.

Recommendation - 19.AS

The proponent will need to develop a Subsidence Management Plan that addresses the impacts on all watercourses and surrounding landscape in accordance with the draft Departmental guideline titled "Watercourse Subsidence – Central Queensland Mining Industry". The plan should also include all applicable information relating to the impact of subsidence on floodplains and other landscape features.

Response - 19.AS

An Interim Subsidence Management Plan has been developed as part of the SEIS (Volume 2, Appendix N) in accordance with the adopted Departmental (DERM) guideline titled "Watercourse Subsidence – Central Queensland Mining Industry" (Draft Version 7.0, July 2011).

3.14 Flora and Fauna Assessment

Comment - 19.AT

Appendix L1

This section is incorrectly referenced.

Recommendation - 19.AT

Migratory species (birds) under JAMBA, CAMBA, ROKAMBA are classified as "Special Least Concern Species" under the Nature Conservation (Wildlife) Regulation 2006.

Response - 19.AT

Section 4.2.1

Updated Text

The migratory bird species which have been identified during the database search are listed under by the following international agreements / conventions:

- Convention on the Conservation of Migratory Species of Wild Animals (The Bonn Convention);
- Japan – Australia Migratory Bird Agreement (JAMBA);
- China – Australia Migratory Bird Agreement (CAMBA); and
- Republic of Korea – Australia Migratory Bird Agreement (ROKAMBA).

Migratory birds listed under the above international agreements / conventions are also listed as Special Least Concern as per the Nature Conservation (Wildlife) Regulation 2006.

Changes have also been made to Appendix A: Flora and Fauna Species List (shown at comment 19.BL). The revised table now shows migratory birds as special least concern under the Nature Conservation Act 1992 in the status column.

Comment - 19.AU

Appendix L1

This section does not highlight the potential change to species assemblages as a result of the project.

Recommendation - 19.AU

The proponent must address potential change to species assemblages from the development. Particularly with respect to small bird species and ground dwelling animals. The proponent must address the impact of aggressive native fauna on other wildlife species.

Response - 19.AU

Given that much of the habitat within the Project area is heavily disturbed from grazing practices and already supports species such as the noisy miner, it is considered that the Project will not significantly increase the risk of territorial species excluding other natives and ultimately driving a change in the faunal assemblage. High levels of disturbance and habitat fragmentation may facilitate an increase in aggressive fauna species and ultimately result in a change in the faunal species assemblage. The conversion of structurally complex and floristically diverse grassy woodland habitats into highly simplified monocultures through clearing and fragmentation is ideal for species such as the noisy miner (Manorina melanocephala) (Grey et al., 2011; Ingwersen and Tzaros, 2011), which is known to exclude a range of other native bird species from their suitable habitat. The region in which the Project is situated has largely been cleared for grazing practices. This has facilitated the dominance of territorial, aggressive species across the region by reducing woodland structural complexity and decreasing the species diversity within the understory.

The implementation of a staged rehabilitation plan that focuses on native species and restoring structurally complex habitat (to pre-mining equivalent) will ensure in the long-term that impacts from aggressive fauna species will be minimised (SEIS, Volume 2, Appendix T4.09).

Other potentially aggressive fauna species within the Project area include the Torresian crow (*Corvus orru*) and dingo/wild dog (*Canis lupus dingo*), species that are often at least partially reliant on Project waste. The application of waste management strategies such as correct storage and disposal procedures (SEIS, Volume 2, Appendix T4.01, Interim Waste Management Plan) will reduce the opportunity for these species to proliferate.

Comment - 19.AV

Appendix L1

This section does not adequately address the management recommendations for species listed under the Nature Conservation Act 1992.

Recommendation - 19.AV

More detailed information is required in this section to outline measures to avoid, mitigate and then offset the impact associated with the development, particularly to species listed as extinct in the wild, endangered, vulnerable and near threatened, (EVNT).

Response - 19.AV

The EIS commits to the development of species management plans for species of conservational significance (EIS, Volume 1, Section 9.4.3.5). Further, management measures for MNES are detailed in Volume 2, Appendix Q, Supplementary MNES of this SEIS and Commonwealth and State offset requirements for the Project (including NC Act listed species) are presented in Volume 2, Appendix P Biodiversity Offset Strategy of this SEIS.

Comment - 19.AW

Appendix L1

This section does not mention the Biodiversity Offset Policies required to address the impacts of the project on state significant biodiversity values.

Recommendation - 19.AW

The proponent must apply the requirements of the Queensland Biodiversity Offset Policy to address the impacts of the project on native EVNT plants and animals. (Extinct in the wild, endangered, vulnerable and near threatened species).

Response - 19.AW

Noted. The BOP does not apply to state significant projects declared under section 26(1) (a) of the SDPWO Act. Nevertheless, the Kevin's Corner Project Offset Strategy (SEIS, Volume 2, Appendix P) includes consideration of the Queensland Biodiversity Offset Policy requirements.

Comment - 19.AX

Appendix L1

This section outlines brief methodologies for the revegetation of sites.

Recommendation - 19.AX

Provide more detail in relation to the revegetation methodology and include that seed from native vegetation used for the revegetation must be sourced from species endemic to the region to ensure genetic variations are maintained.

Response - 19.AX

Plant selection for areas to be rehabilitated to pre-existing conditions will focus on those native species that will successfully establish on the available growth medium, bind the soil and will result in a variety of structure and food/habitat resources. Native species will be established through direct seeding or planting of tube stock/nursery-raised stock from local propagules. Seed will be collected locally where possible to ensure it is adapted to environmental conditions in the area.

Native tree and shrub establishment on site will be dominated by the direct seeding method, currently being used at the majority of coal mines located to the east of the Galilee Basin. Revegetation will be achieved by using species from the local plant communities that were identified during the flora assessment undertaken in 2010 (see Volume 1, Section 9). Table 3-3 (see below) provides an indication of the species likely to be used for revegetation of the disturbance areas at within the Project area.

Table 3-3 Species to be used for rehabilitation throughout the life of the Kevin's Corner Coal Project (Mine)

Scientific Name	Common Name
Woodlands	
Acacia cambagei	gidgee
Acacia coriacea subsp sericophylla	desert oak
Acacia excels	ironwood
Acacia harpophylla	brigalow
Acacia holosericea	soap bush
Acacia lazaridis	Lazarides wattle
Acacia oswaldii	milijee
Acacia salicina	sally wattle
Acacia shirleyi	lancewood
Aeschynomene indica	budda pea
Alphitonia excels	red ash
Aristida bigandulosa	dark wiregrass
Aristida sp.	wiregrass
Atalaya hemiglauca	whitewood
Bothriochloa ewartiana	desert bluegrass
Brachychiton populneus	kurrajong
Chloris divaricate	slender chloris
Chrysopogon fallax	golden beard grass
Corymbia dallachiana	Dallachy's gum
Corymbia setosa	rough-leaved bloodwood
Dactyloctenium radulans	button grass
Dichanthium sericeum subsp sericeum	bluegrass
Digitaria brownii	cotton panic grass
Dodonaea lanceolata var. lanceolata	hopbush
Enchylaena tomentose	ruby saltbush
Eragrostis sp.	lovegrass
Eremophila latrobei	crimson turkey bush
Eremophila mitchellii	false sandalwood
Erythrina vespertilio	bat's wing coral tree
Eucalyptus brownii	Reid river box
Eucalyptus camaldulensis	river red gum
Eucalyptus cambageana	Dawson gum
Eucalyptus coolabah coolabah	coolabah
Eucalyptus melanophloia	silver-leaved ironbark

Scientific Name	Common Name
Eucalyptus populnea poplar box	poplar box
Eucalyptus tessellaris Moreton Bay ash	Moreton Bay ash
Eucalyptus thozetiana	Thozet's box
Lysiphyllum carronii	red bauhinia
Melaleuca tamariscina	weeping bottlebrush
Panicum decompsitum	native millet
Paspalidium caespitosum	brigalow grass
Setaria surgens	annual pigeon grass
Themeda triandra	kangaroo grass
Grasslands	
Astrebla elymoides	hoop mitchell grass
Astrebla pectinata	barley mitchell grass
Astrebla squarrosa	bull mitchell grass
Dichanthium sericeum subsp sericeum	bluegrass
Panicum decompositum	native millet
Sporobolus caroli	fairy grass
Themeda triandra	kangaroo grass
Riparian Zones	
Aristida inaequiglumis	feathertop three-awn
Aristida latifolia	feather top wiregrass
Atalaya hemiglauca	whitewood
Brachychiton populneus	kurrajong
Chloris divaricate	slender chloris
Corymbia dallachiana	Dallachy's gum
Enchylaena tomentose	ruby saltbush
Eragrostis elongate	clustered lovegrass
Eragrostis lacunaria	purple lovegrass
Eragrostis parviflora	weeping lovegrass
Eucalyptus camaldulensis	river red gum
Eucalyptus cambageana	Dawson gum
Eucalyptus coolabah	coolabah
Eucalyptus melanophloia	silver-leaved ironbark
Eucalyptus tessellaris	Moreton Bay ash
Heteropogon contortus	black speargrass
Lysiphyllum carronii	red bauhinia
Paspalidium caespitosum	brigalow grass

Scientific Name	Common Name
Sporobolus caroli	fairy grass
Themeda triandra	kangaroo grass
Steep Slopes / High Erosion	
Brachyachne convergens	native couch/spider grass
Chloris pectinata	comb chloris
Iseilema vaginiflorum	red flinders grass

A combination of native pasture species and non-invasive cover crop (e.g. millet, oats or barley) may be used on the disturbance areas to ensure the quick establishment of a continuous groundcover, thereby reducing the risk of erosion. Legumes may also be selected to assist in the supply of bio-available nitrogen to the soil. If the use of native grasses and/or legumes is deemed necessary for erosion control in the bushland areas, native pasture seed and fertiliser will be applied at a lower rate than for pasture outcomes to reduce competition with tree seed and/or seedlings.

Native pasture species (warm season perennial, cool season perennial, yearlong green perennial and annual) will be sown on pasture areas requiring rehabilitation. If steep slopes are present and it is not practicable to re-shape the area and/or there is a high risk if erosion, native stoloniferous grass species (e.g. *Brachyachne convergens* (native couch/spider grass), *Chloris pectinata* (comb chloris) and *Iseilema vaginiflorum* (red flinders grass)) will be sown as their growth provides more extensive coverage in a shorter time. If native species are unsuccessful, discussions will be held with DEHP regarding implementation of conditions for the use of introduced species, including buffer zones, as outlined in Volume 1, Section 26 of the EIS and in the Environmental Management Plan, Appendix T1, of this SEIS.

Aerial sowing and ground broadcasting will be conducted for both tree and pasture seed as the preferred sowing methods and grazing will be restricted whilst the vegetation is establishing.

All revegetated areas will be monitored to ensure long-term groundcover establishment and success. Revegetation techniques will be continually developed and refined over the life of mine through an ongoing process of monitoring at the site and recognition of other industry experiences.

Comment - 19.AY

Appendix L1

This section mentions pest species.

Recommendation - 19.AY

The proponent should make a contribution to the local authority to manage invasive species in the region, thereby contributing to healthy environments and maintaining biodiversity and productivity yields.

Response - 19.AY

The Project will monitor and control potential pests and weeds on site as outlined in the Pest and Weed Management Plan presented in Volume 2, Appendix T4.02 of this SEIS. It has been produced in accordance with the *Land Protection (Pest and Stock Route Management) Act 2002* and aligned with Local Government feral animal control programs as set out in the Local Government Area Pest Management Plans. This Pest and Weed Management Plan covers the impacted Mining Lease as well as off lease (road and rail) areas. HGPL will consult with relevant local government officers and state government regional officers on the plan as required.

If required, further private consultation with potentially affected landholders or council will be undertaken and will address such impacts from weeds and pests. These negotiations will be confidential between HGPL and each key stakeholder.

Comment - 19.AZ

Appendix L1; Section 1.1

This section does not provide detail outlining the survey methodology used to conduct the survey.

Recommendation - 19.AZ

Describe in detail what the 'standard methodology' referred to in this section is and how this approach is adequate to identify the suite of species likely to be affected by the development and associated infrastructure.

Response - 19.AZ

The text referred to in the submission is from the Executive Summary of the Report. This section is not designed to relay all the technical information, merely summarise what is in the report. The full description of the methodology used can be found in EIS Volume 2, Appendix L1, Section 5.

Comment - 19.BA

Appendix L1; Section 3.3

The Biodiversity Offset Policy is now approved and no longer draft.

Recommendation - 19.BA

This section requires updating.

Response - 19.BA

Comments noted. The current offset policy is the Biodiversity Offset Policy (version 1) 3 October 2011 and will be used in the assessment and development of subsequent documentation and offset plans/strategies.

The Biodiversity Offset Policy (version 1) 3 October 2011 is referenced as follows:

Department of Environment and Resource Management (2011), Biodiversity Offset Policy (version 1) 3 October 2011. Queensland Government.

Comment - 19.BB

Appendix L1; Section 3.6

This list is incomplete.

Recommendation - 19.BB

The listing should be updated to include special least concern animals. Note that special least concern animals include the following: koala; echidna; platypus; a least concern bird to which may be subject to the following agreements JAMBA, CAMBA, ROKAMBA.

Response - 19.BB

The Biodiversity Offsets Strategy (Appendix P) identifies those State listed flora and fauna species that are known to occur, or are considered likely to occur, within the Project area. This includes EVNT and special least concern species. The status of all species is identified in the strategy.

Appendix L1 S3.6

Updated Text.

The most relevant portions of the Nature Conservation Act 1992 (NC Act) to the Project site are the sections which pertain to Wildlife and Habitat Conservation. The class of wildlife to which the NC Act applies includes protected wildlife, which is defined as:

- Wildlife which is extinct in the wild;
- Endangered wildlife;
- Vulnerable wildlife;
- Near threatened wildlife;
- Special least concern wildlife; and
- Least concern wildlife.

Comment - 19.BC

Appendix L1; Section 4.1

The project is located within range of species of conservation significance.

Recommendation - 19.BC

The project is located within the Desert Uplands Bioregion, it is likely there will be impacts on species of conservation significance within the project area footprint. This should be identified in this section.

Response - 19.BC

Potential impacts on conservation significant species was described and addressed in EIS Volume 2, Appendix L1, Section 8. Additional field assessment of broad vegetation groups and fauna habitat across the Project area has been undertaken in addition to targeted searches for individual species and is detailed in the Supplementary MNES Report (SEIS, Volume 2, Appendix Q). Four MNES species were recorded within the Desert Uplands Bioregion and a further six MNES species are considered likely to occur. Seven state listed species were recorded within the Project area (including some dual listed MNES species) and eight species are considered likely to occur (also including dual listed species). Full details of all MNES and state listed species occurring within the Project, estimated impacts to fauna habitats as a result of the Project, and proposed extent of offsets are provided in the Biodiversity Offset Strategy (SEIS, Volume 2, Appendix P).

Comment - 19.BD

Appendix L1; Section 4.1

There are errors in Table 5. Species that are described as not listed under the NCA are listed. (Refer to the Nature Conservation (Wildlife) Regulation 2006).

Recommendation - 19.BD

The following corrections are required in Table 5:

- Acacia ramiflora – NCA – least concern
- Cadellia pentastylis – NCA – vulnerable
- Dichanthium queenslandicum NCA – vulnerable
- Eriocaulon carsonii – NCA - endangered

Response - 19.BD

The status of all species has been confirmed and is presented in Table 3-4.

Table 3-4 Flora of Conservation Significance Potentially on the Project Site

Botanical Name	Common Name	Conservation Status	
		EPBC Act	NC Act
Acacia ramiflora		Vulnerable	Least Concern
Acacia spania		Not Listed	Near Threatened
Bertya pedicellata		Not Listed	Near Threatened
Cadellia pentastylis	Ooline	Vulnerable	Vulnerable
Cerbera dumicola		Not Listed	Near Threatened
Corymbia clandestina		Vulnerable	Vulnerable
Desmodium macrocarpum		Not Listed	Near Threatened
Dichanthium queenslandicum	King Blue-grass	Vulnerable	Vulnerable
Eriocaulon carsonii	Salt Pipewort, Button Grass	Endangered	Endangered
Micromyrtus rotundifolia		Not Listed	Vulnerable
Sporobolus partimpatens		Not Listed	Near Threatened

Comment - 19.BE

Appendix L1; Section 4.2

There are errors in Table 6. Species that are described as not listed under the NCA are listed. (Refer to the Nature Conservation (Wildlife) Regulation 2006).

Recommendation - 19.BE

The following corrections are required in Table 6:

- Neochmia ruficauda ruficauda – NCA – endangered
- Poephila cincta cincta – NCA – endangered
- Rostratula australis – NCA – vulnerable
- Lasiorhinus krefftii – NCA – endangered
- Nyctophilus timoriensis – NCA – vulnerable
- *Sminthopsis douglasi* – NCA – endangered
- *Denisonia maculata* – NCA – vulnerable
- *Furina dunmalli* - NCA – vulnerable
- *Lerista allanae* – NCA – endangered
- Paradelma orientalis – NCA – vulnerable
- *Rheodytes leukops* – NCA - vulnerable

Response - 19.BE

Appendix L1 S4.2

The status of all listed species has been confirmed and updated details presented in Table 3-5.

Table 3-5 Fauna of Conservation Significance Potentially on the Project Site

Scientific Name	Common Name	Conservation Status	
		EPBC Act	NC Act
Birds			
Geophaps scripta scripta	Squatter pigeon (southern subspecies)	Vulnerable	Vulnerable
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	Endangered
Lophoictinia isura	Square-tailed Kite	Not Listed	Near Threatened
Melithreptus gularis	Black-chinned Honeyeater	Not Listed	Near Threatened
Neochima ruficauda ruficauda	Star Finch (eastern and southern)	Endangered	Endangered
Poephila cincta cincta	Black Throated Finch	Endangered	Endangered
Rostratula australis	Australian Painted Snipe	Vulnerable	Vulnerable
Mammals			
Dasyurus hallucatus	Northern Quoll	Endangered	Not Listed
Lasiorhinus krefftii	Northern Hairy-nosed Wombat	Endangered	Endangered
Nyctophilus timoriensis	Greater Long Eared Bat, Southern Long Eared bat	Vulnerable	Vulnerable
Sminthopsis douglasi	Julia Creek Dunnart	Endangered	Endangered
Reptiles			
Ctenotus capricorni	Capricorn ctenotus	Not Listed	Near Threatened
Denisonia maculata	Ornamental Snake	Vulnerable	Vulnerable
Egernia rugosa	Yakka skink	Vulnerable	Vulnerable
Furina dunmalli	Dunmall's Snake	Vulnerable	Vulnerable
Lerista allanae	Allan's Lerista	Endangered	Endangered
Paradelma orientalis	Brigalow Scaly Foot	Vulnerable	Vulnerable
Rheodytes leukops	Fitzroy River Turtle	Vulnerable	Vulnerable

Note: that the Fitzroy River Turtle and the Hairy-nosed Wombat have very limited ranges and therefore, these species probably do not exist on the Project site.

Comment - 19.BF

Appendix L1; Section 4.2.1

There is an error in Table 7.

Recommendation - 19.BF

The table needs to be updated to correct *Rostratula benghlensis s. lat* (painted snipe). This species is also listed as vulnerable.

Response - 19.BF

Appendix L1 S4.2.1

Table 7 refers only to migratory and/or marine species. The painted snipe is also referred to in Table 3-6 (see below) as vulnerable. The Australian painted snipe (*Rostratula australis)* is treated as conspecific with the painted snipe (*Rostratula benghalensis* s. lat*).*

Table 3-6 Fauna of Conservation Significance Potentially on the Project Site

Scientific Name	Common Name	Conservation Status	
		EPBC Act	NC Act
Birds			
Geophaps scripta scripta	Squatter pigeon (southern subspecies)	Vulnerable	Vulnerable
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	Endangered
Lophoictinia isura	Square-tailed Kite	Not Listed	Near Threatened
Melithreptus gularis	Black-chinned Honeyeater	Not Listed	Near Threatened
Neochima ruficauda ruficauda	Star Finch (eastern and southern)	Endangered	Endangered
Poephila cincta cincta	Black Throated Finch	Endangered	Endangered
Rostratula australis	Australian Painted Snipe	Vulnerable	Vulnerable
Mammals			
Dasyurus hallucatus	Northern Quoll	Endangered	Not Listed
Lasiorhinus krefftii	Northern Hairy-nosed Wombat	Endangered	Endangered
Nyctophilus timoriensis	Greater Long Eared Bat, Southern Long Eared bat	Vulnerable	Vulnerable
Sminthopsis douglasi	Julia Creek Dunnart	Endangered	Endangered
Reptiles			
Ctenotus capricorni	Capricorn ctenotus	Not Listed	Near Threatened
Denisonia maculata	Ornamental Snake	Vulnerable	Vulnerable
Egernia rugosa	Yakka skink	Vulnerable	Vulnerable
Furina dunmalli	Dunmall's Snake	Vulnerable	Vulnerable
Lerista allanae	Allan's Lerista	Endangered	Endangered
Paradelma orientalis	Brigalow Scaly Foot	Vulnerable	Vulnerable
Rheodytes leukops	Fitzroy River Turtle	Vulnerable	Vulnerable

Comment - 19.BG

Appendix L1; Section 5.3.3

Only 14 fauna transects were carried out in the project area, of which 10 are on the edge of the remnant vegetation and their location would inadequately survey the fauna values of the remnant vegetation within the project area. All 36 fauna transects reported on and depicted do not occur within the project area.

Recommendation - 19.BG

It is recommended that further fauna surveys are conducted with the new sites located within the core areas of the remnant vegetation, away from artificial waters, in order to adequately sample the fauna values within the project area.

Response - 19.BG

36 fauna transects were established over the Alpha and Kevin's Corner MLAs. The transects sampled all habitat types over wet and dry seasons. The survey methodology is considered well and above what would be standard practice. The placement of the transects is consistent with the methodology to sample fauna habitat in central Queensland. Taken in context with habitat sampled on the Alpha Coal MLA, it is proposed that the core habitat has been adequately sampled and that no further surveys are required.

DEHP and SEWPaC have been consulted in relation to field survey requirements and additional fauna surveys were undertaken by AMEC in August 2012 across the mine lease and off-lease rail and road corridors. The surveys focused on MNES fauna species and habitat assessments in accordance with SEWPaC guidelines. The rail and road survey was a full ecological flora and fauna survey to identify State and MNES matters.

In particular, additional survey effort was undertaken for black-throated finch (*Poephila cincta cincta*) and red goshawk (*Erythrotriorchis radiatus*) in compliance with the SEWPaC guidelines issued for these species. Targeted survey for the retro slider (*Lerista allanae*) was also carried out. The Supplementary MNES Report (SEIS, Volume 2, Appendix Q) and Biodiversity Offsets Strategy (SEIS, Volume 2, Appendix P) have been updated to include a description of the additional survey work undertaken and results.

Comment - 19.BH

Appendix L1; Section 6

The list of ground flora species is not comprehensive for each ecological community due the timing of the data collection in June and November.

Recommendation - 19.BH

It is recommended that further flora surveys are conducted at the end of the wet season from March to May in order to adequately survey summer flowering plants. Carrying out flora survey work in June and November minimises the likelihood of recording species such as *Desmodium macrocarpum.*

Response - 19.BH

Terrestrial ecology field surveys, including both flora and fauna studies, were carried out between June 2008 and November 2010 and extended across the Kevin's Corner MLA and the adjoining Alpha MLA to the south. This included surveys during March (2009 and 2010), April (2010) and June (2008 and 2010). Additional surveys were undertaken in August 2012 across the entire Project area to expand upon the results of the original survey, to undertake broad vegetation analysis and habitat criteria assessment, as well as targeted searched for individual species. A gap analysis was undertaken as part of the MNES assessment process and it was determined that the combined level of survey was sufficient to support the conclusions presented in the Supplementary MNES Report (SEIS, Volume 2, Appendix Q) and the Biodiversity Offset Strategy (SEIS, Volume 2, Appendix P).

In particular, additional survey effort was undertaken for State and federally listed threatened flora species recorded or likely to occur in the locality and Threatened Ecological Communities potentially occurring within the Project area including the Brigalow TEC and the Native Grasslands of the Queensland Central Highlands and the Northern Fitzroy Basin TEC. Fauna species such as *Poephila cincta cincta* (black-throated finch) and *Erythrotriorchis radiatus* (red goshawk) were also targeted. The Supplementary MNES Report (SEIS, Volume 2, Appendix Q) and Biodiversity Offsets Strategy (SEIS, Volume 2, Appendix P) have been updated to include a description of the additional survey work undertaken and results.

Additional field survey work is proposed for March 2013 to establish ecological conditions across high value habitats that are likely to be impacted within the Project area and proposed to be offset in line with recommendations of the Biodiversity Offset Strategy (Appendix P). It is proposed that additional survey for grass species be carried out at that time to further clarify the presence or absence of the listed king blue-grass (*Dichanthium queenslandicum)*.

Comment - 19.BI

Appendix L1; Section 7.3.2

This section outlines that elimination of grazing from the project site will improve the suitability of the site for squatter pigeons.

Recommendation - 19.BI

More detail is required to outline how removal of grazing will achieve the stated objective of conserving habitat for the species. State rational for the comment and specific management actions that would achieve a conservation benefit for the species. Squatter pigeons should be included in a Species Management Program (see following comment). The issue is overgrazing, managed grazing may be beneficial.

Response - 19.BI

The intent of this comment is not to identify the removal of grazing as a management option but notes that when mining activities commence, grazing will be excluded from areas of the MLA which may benefit the squatter pigeon. Species-specific management plans will be developed for conservation significant fauna identified on the

site prior to construction activities. Measures being taken to mitigate impacts to the southern squatter pigeon (*Geophaps scripta scripta*) are provided in the SEIS (Volume 2, Appendix T1, Control Strategies for Fauna).

Comment - 19.BJ

Appendix L1; Section 8.3.2

This section is incomplete and more detail is required.

Recommendation - 19.BJ

In addition submit a threatened and special least concern fauna species management plan for approval by the Department of Environment and Resource Management prior to the commencement of any works that:

- ensures the impacts to these species and communities are minimised;
- contributes to the survival of these species in the wild; and
- achieves conservation benefits for these species and communities.

The requirements of Section 332 (4) (Tampering with animal breeding place) of the Nature Conservation (Wildlife Management) Regulation 2006 must be addressed.

Response - 19.BJ

If endangered, vulnerable, or near threatened (EVNT) fauna are found on site through further ground truthing a specific SMP will be prepared and will be submitted to DEHP. The Supplementary MNES Report (SEIS, Volume 2, Appendix Q) includes a requirement for the preparation of species management programs for each MNES species impacted by the Project. Species management plans for EVNT or special least concern species will also be required in support of a species management program required for tampering with breeding places.

Comment - 19.BK

Appendix L1; Appendix A

This table contains errors.

Recommendation - 19.BK

The following corrections are required:

- Goat, dingo, cat, rabbit, house mouse, pig, are not listed under the NCA. Therefore LC should be removed from the Status column in the table and changed to Introduced.
- Echidna and koala are listed as special least concern animals.

Response - 19.BK

Appendix L1 Appendix A

Changes to Appendix A fauna species list have been made. These changes can be found in the below table used to respond to 19.BL.

Comment - 19.BL

Appendix L1; Appendix A

The list of fauna species observed on and adjacent to the project site is inadequately presented to be informative.

Recommendation - 19.BL

The list of fauna species observed on and adjacent to the project site should be presented in a matrix where by species are linked to transects/sites where observed/and community in which they were located. The flora and fauna data should be presented in a format that is readily transferable to the Wildnet database.

Response - 19.BL

Appendix L1 Appendix A

The table in the EIS, Appendix A has been updated as presented in Table 3-7.

Table 3-7 Flora and Fauna Species List

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Capra hircus*	Feral Goat		*													x	
Canis lupus	Dingo / Wild Dog		*						x								
Sminthopsis macroura	Stripe-faced Dunnart		LC			x											
Felis catus	Feral Cat		*	x				x									
Oryctolagus cuniculus*	European Rabbit		*		x		x	x		x				x			
Trichosurus vulpecula	Common Brushtail Possum		LC	x													
Lagorchestes conspicillatus	Spectacled Hare Wallaby		LC				x			x							
Macropus giganteus	Eastern Grey Kangaroo		LC	x	x	x				x							
Macropus robustus robustus	Euro		LC		x			x						x			
Macropus rufogriseus	Red-necked Wallaby		LC			x											
Macropus rufus	Red Kangaroo		LC			x				x							
Wallabia bicolor	Swamp Wallaby		LC		x												
Mus musculus*	House Mouse		*		x	x		x		x							
Pseudomys delicalutus	Delicate Mouse		LC			x											
Petaurus breviceps	Sugar Glider		LC	x													
Phascolarctos cinereus	Koala		SLC	x													
Aepyprymnus rufescens	Rufous Bettong		LC					x	x								

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Sus scrofa*	Feral Pig		LC					x				x					
Tachyglossus aculeatus	Short-beaked Echidna		SLC			x		x		x							
Pteropus scapulatus	Little Red Flying Fox		LC	x													
Saccolaimus flaviventris	Yellow-bellied Sheath-tailed Bat		LC		x			x					x				
Taphozous troughtoni	Troughton's Sheath-tailed Bat		LC	x	(x)	(x)			(x)	(x)			x		(x)		
Chaerephon jobensis	Northern Free-tailed Bat		LC	x	x	x	x	x	x	x		x	x		x		
Mormopterus beccarii	Beccari's Free-tailed Bat		LC	x	x	x		x	x	x			x		x		
Mormopterus eleryi	Bristle-faced Free-tailed Bat		LC	(x)		(x)							(x)				
Mormopterus ridei / sp.3	Inland Free-tailed Bat		LC	x	(x)	x		(x)		x			x		(x)		
Austronomus australis	White-striped Free-tailed Bat		LC	x		x											
Chalinolobus gouldii	Gould's Wattled Bat		LC	x	x	x	x	x	x	x	x	x	x		x		
Chalinolobus morio	Chocolate Wattled Bat		LC	x	x	x	x	x		x					x		
Nyctophilus species[3]	Unknown Long-eared Bat		LC	x		x	x	x									
Scotorepens balstoni	Inland Broad-nosed Bat		LC					x									
Scotorepens greyii	Little Broad-nosed Bat		LC			x		x		x							
Vespadelus baverstocki	Inland Forest Bat		LC					x									
Vespadelus finlaysoni	Inland Cave Bat		LC					(x)									
Vespadelus troughtoni	Eastern Cave Bat		LC					(x)									

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Amphibians																	
Rhinella marina*	Cane Toad		*	x		x		x								x	
Litoria alboguttata	Striped Burrowing frog		LC					x								x	
Litoria caerulea	Green Tree Frog		LC	x		x				x						x	
Litoria fallax	Dwarf Tree Frog		LC													x	
Litoria inermis	Floodplain Frog		LC													x	
Litoria latopalmata	Broad-palmed Frog		LC													x	
Litoria rubella	Desert Tree Frog		LC	x													
Platyplectrum ornatus	Ornate Burrowing Frog		LC	x		x		x			x	x				x	
Limnodynastes tasmaniensis	Spotted Marsh Frog		LC					x									
Uperoleia rugosa	Eastern Burrowing Toadlet		LC	x													
Reptiles																	
Chlamydosaurus kingii	Frilled Neck Lizard		LC	x													
Ctenophorus nuchalis	Central Netted Dragon		LC			x			x								
Pogogna barbata	Common Bearded Dragon		LC									x					
Diporiphora australis	Tommy Roundhead Dragon		LC	x	x	x			x			x					
Amphibolurus nobbi	Nobbi Dragon		LC	x		x											
Cryptophis boschmai	Carpentaria Whip Snake		LC													x	

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Demansia psammophis	Yellow-faced Whipsnake		LC			x											
Holocephalus bitorquatus	Pale-headed Snake		LC			x										x	
Pseudonaja textilis	Eastern Brown Snake		LC							x							
Diplodactylus steindachneri	Box Pattern Gecko		LC	x		x											
Diplodactylus tessellatus	Tessellated Gecko		LC													x	
Gehyra dubia			LC	x				x									
Gehyra variegata			LC	x													
Hemidactylus frenatus	Asian House Gecko		LC													x	
Heteronotia binoei	Bynoe's Gecko		LC	x		x	x										
Lialis burtonis	Burton's Snake-lizard		LC													x	
Antaresia maculosa	Spotted Python		LC													x	
Aspidites melanocephalus	Black-headed Python		LC													x	
Carlia munda			LC	x	x	x		x									
Carlia pectoralis pectoralis	Rainbow Skink		LC	x		x					x						
Cryptoblepharus sp.	Skink		LC	x								x					
Ctenotus herbetior			LC	x		x					x						
Ctenotus pantherinus	Leopard Skink		LC													x	
Ctenotus robustus			LC	x		x		x	x	x							

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Menetia greyii			LC			x		x		x							
Morethia taeniopleura	Fire-tailed Skink		LC			x											
Tiliqua scincoides	Eastern Blue-tongue		LC													x	
Varanus gouldii	Sand Goanna		LC						x								
Birds																	
Smicrornis brevirostris	Weebill		LC					x									
Aquila audax	Wedge-tailed Eagle		LC	x		x				x							
Elanus axillaris	Black Shouldered Kite		LC	x						x							
Haliastur sphenurus	Whistling Kite	M	LC	x		x		x									
Alcedo azurea	Azure Kingfisher		LC	x											x		
Anas gracilis	Grey Teal		LC												x		
Anas supeciliosa	Pacific Black Duck		LC												x		
Chenonetta jubata	Australian Wood Duck		LC		x	x				x					x		
Anhinga melanogaster	Darter		LC												x		
Ardea alba	Great Egret	M, Mi	SL C												x		
Ardea intermedia	Intermediate Egret	M													x		
Ardea novaehollandiae	White-faced Heron		LC	x													
Ardea pacifica	White Necked Heron		LC			x											

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Nycticorax caledonicus	Nankeen Night Heron	M						x									
Artamus cinereus	Black-faced Woodswallow		LC	x						x							
Artamus cyanopterus	Dusky Woodswallow		LC	x						x							
Artamus leucorynchus	White-breasted Woodswallow		LC		x					x							
Cracticus nigrogularis	Pied Butcherbird		LC		x	x								x			
Cracticus torquatus	Grey Butcherbird		LC		x									x			
Gymnorhina tibicen	Australian Magpie		LC	x	x	x	x	x	x	x	x			x	x		
Burhinus grallarius	Bush Stone-curlew		LC	x										x			
Cacatua galerita	Sulphur-crested Cockatoo		LC	x		x				x				x			
Calyptorhynchus banksii	Red-tailed Black Cockatoo		LC									x					
Eolophus roseicapilla	Galah		LC			x		x		x				x			
Nymphicus hollandicus	Cockatiel		LC	x		x											
Coracina novaehollandiae	Black-faced Cuckoo-shrike	M			x			x									
Lalage tricolor	White-winged Triller		LC	x													
Eurostopodus argus	Spotted Nightjar	M														x	
Dromaius novaehollandiae	Emu		LC	x	x	x	x	x	x	x				x			
Elseyornis melanops	Black-fronted Dotterel		LC												x		
Vanellus tricolor	Banded Lapwing		LC												x		

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Vanellus miles	Masked Lapwing		LC												x		
Climacteris affinis	White -browed Treecreeper		LC			x											
Climacteris picumnus	Brown Treecreeper		LC			x										x	
Geopelia cuneata	Diamond Dove		LC							x							
Geopelia striata	Peaceful Dove		LC		x	x				x							
Geophaps scripta scripta	Southern Squatter Pigeon	V	V							x		x					
Ocyphaps lophotes	Crested Pigeon		LC	x	x			x		x				x			
Phaps chalcoptera	Common Bronzewing		LC		x												
Corcorax melanorhamphos	White-winged Chough		LC					x									
Struthidae cinerea	Apostlebird		LC	x	x	x	x	x	x	x	x			x			
Eurystomus orientalis	Dollarbird	M		x													
Corvus coronoides	Australian Raven		LC		x												
Corvus orru	Toreesian Crow		LC	x	x									x			
Centropus phasianinus	Pheasant Coucal		LC	x										x			
Neochmia modesta	Plum-headed Finch		LC							x							
Taeniopygia bichenovii	Double-barred Finch		LC	x				x		x	x						
Taeniopygia guttata	Zebra Finch		LC							x							
Falco berigora	Brown Falcon		LC			x											

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Falco cenchroides	Nankeen Kestrel	M				x				x							
Falco longipennis	Australian Hobby		LC	x													
Grus rubicunda	Brolga		LC							x							
Dacelo novaeguineae	Laughing Kookaburra		LC	x		x						x					
Todiramphus macleayii	Forest Kingfisher	M			x												
Todiramphus sanctus	Sacred Kingfisher	M		x													
Petrochelidon nigricans	Tree Martin		LC					x									
Malurus cyaneus	Superb Fairy Wren		LC		x												
Malurus lamberti	Variegated Fairy Wren		LC		x	x											
Malurus melanocephalus	Red-backed Fairy Wren		LC			x				x							
Entomyzon cyanotis	Blue-faced Honeyeater		LC	x		x											
Lichenostomus penicillatus	White-plumed Honeyeater		LC		x					x							
Lichenostomus virescens	Singing Honeyeater		LC	x													
Manorina melanocephala	Noisy Miner		LC		x												
Melithreptus albogularis	White-throated Honeyeater		LC			x											
Philemon corniculatus	Noisy Friarbird		LC	x	x	x	x	x	x	x				x			
Merops ornatus	Rainbow Bee Eater	M, Mi	SL C	x		x				x							
Grallina cyanoleuca	Peewee		LC	x	x	x	x	x	x	x	x			x	x		

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Myiagra rubecula	Leaden Flycatcher		LC	x													
Anthus novaeseelandiae	Australian Pipit	M	LC							x					x		
Daphoenositta chrysoptera	Varied Sittella		LC					x									
Ardeotis australis	Australian Bustard		LC							x							
Pachycephala rufiventris	Rufous Whistler		LC		x												
Pachycephala pectoralis	Golden Whistler		LC	x													
Pardalotus striatus	Striated Pardalote		LC			x											
Acanthiza chrysorrhea	Yellow-rumped Thornbill		LC		x												
Pelecanus conspicillatus	Australian Pelican	M	LC												x		
Melanodryas cucullata	Hooded Robin		LC							x							
Microeca fascinan	Jacky Winter		LC		x					x							
Petroica goodenovii	Red-capped Robin		LC								x						
Phalacrocorax sulcirostris	Little Black Cormorant		LC												x		
Coturnix ypsilophora	Brown Quail		LC		x												
Podargus strigoides	Tawny Frogmouth		LC	x	x												
Pomatostomus temporalis	Grey Crowned Babbler		LC					x									
Aprosmictus erythropterus	Red-winged Parrot		LC		x			x									
Melopsittacus undulatus	Budgerigar		LC							x							

Common Name	Species Name	Status[1]		Habitat Type[2]													
		EPBC Act	NC Act	River Red Gum Riparian	Poplar	Ironbark	Thozets Box	Brigalow	Lancewood	Non-remnant Grassland	White Cypress Pine	Bloodwood	woodland	Melaleuca Heathland	Roadside Verge	Waterhole / Dam	Other
Platycerus adscitus	Pale-headed Rosella		LC	x	x	x		x									
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet		LC			x											
Trichoglossus haematodus	Rainbow Lorikeet		LC	x						x							
Ptilonorhynchus maculatus	Spotted Bowerbird		LC	x													
Rhipidura fuliginosa	Grey Fantail		LC	x													
Rhipidura leucophrys	Willy Wagtail		LC			x		x		x							
Ninox novaeseelandiae	Southern Boobook		LC						x								
Platalea flavipes	Yellow-billed Spoonbill		LC	x													
Threskiornis molucca	Australian White Ibis	M	LC												x		
Threskiornis spinicollis	Straw-necked Ibis	M	LC												x		

1. **EPBC Act**: V – Vulnerable Mi – Migratory M – Marine **NC Act:** V – Vulnerable LC – Least Concern SLC – Special Least Concern * Introduced species
2. x – denotes the habitat(s) in which the species was observed. (x) – denotes a possible presence, however could not be confirmed due to an overlap between microbat species calls
3. The *Nyctophilus* genus bats could not be identified via Anabat to species level, these potential species include: *Nyctophilus corbeni, Nyctophilus howensis, Nyctophilus timoriensis* and *Nyctophilus walkeri*. The conservation status of these species in terms of the EPBC and NC Acts are as follows: EPBC Act; *Nyctophilus corbeni* (Vulnerable), *Nyctophilus howensis* (Extinct), *Nyctophilus timoriensis* (Vulnerable) and *Nyctophilus walk*eri (not listed under this Act), NC Act; *Nyctophilus timoriensis* (Vulnerable), *Nyctophilus walkeri* (Near Threatened) and *Nyctophilus corbeni* and *Nyctophilus howensis* (not listed under this Act).

Comment - 19.BM

Appendix L1; Appendix F

This list of threatened species is not meaningful.

Recommendation - 19.BM

The list of threatened species could be made more meaningful if it included a column describing the threatened species habitat requirements in detail and whether or not these habitat requirements were found within the project area.

Response - 19.BM

Appendix F provides broad habitat requirements for each of the threatened species predicted to occur on site by the EPBC protected matters and wildlife online databases, but not seen during the survey. Notes on the likelihood of presence based on these habitat requirements and/or distribution is also provided in Appendix L1, Appendix F: Threatened Species Not Observed on the Project site as presented in Table 3-8.

Table 3 of the Biodiversity Offset Strategy (SEIS, Volume 2, Appendix P) lists those documents used when determining offset requirements and includes the original terrestrial ecology appendix. Appendix A of the Biodiversity Offsets Strategy includes a revised assessment of habitat requirements for each species considered and justification for the inclusion, or omission, of each. This assessment is based on a new desktop assessment, consideration of known records and revised habitat assessment and mapping carried out following the August 2012 field survey.

Table 3-8 Threatened Species Not Observed on the Project site

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
Zamiaceae	*Macrozamia platyrhachis*	-	Endangered	Endangered	Restricted to the Blackdown Tableland / Planet Downs area of the Dawson Range in central Queensland, in eucalypt woodland or open forest on sandy soil. Seeds become ripe in March to April (Department of the Environment, 2009)	Unlikely
Blenchnaceae	*Blechnum ambiguum*	-	Not Listed	Near Threatened	Common on wet rocks, usually found in open forest, especially common in sandstone areas (PlantNet, 2009)	Unlikely
Apocynaceae	*Marsdenia brevifolia*	-	Vulnerable	Vulnerable	Occurs on serpentine rock outcrops or crumbly black soils derived from serpentine in eucalypt woodland. Flowering occurs from November to February, fruiting from February to June (Department of the Environment, 2009)	Low Potential
Apocynaceae	*Cerbera dumicola*	-	Not Listed	Near Threatened	Found near Howard Point, Middle Percy Island, 55 km NE of Arthur Point, Shoalwater Bay (APNI, 2009).	Unlikely
Asteraceae	*Rutidosis glandulosa*	-	Not Listed	Near Threatened	Leichhardt District, Blackdown Tableland, 32 km SE of Blackwater, along a sandy creek (APNI, 2009)	Low Potential
Asteraceae	*Trioncinia retroflexa*	-	Not Listed	Endangered	Occurs in soils are moderately shallow to deep cracking clay soils, dark brown to reddish brown in colour, often self mulching, and with gravel, stone or linear gilgai sometimes present (Department of the Environment, 2009)	High Potential
Brassicaceae	*Lepidium hyssopifolium*	Basalt Peppercress	Endangered	Not Listed	Basalt Peppercress can be found on a variety of soils, growing in association with many vegetation types, including eucalypt woodland with grassy ground cover, low open casuarina woodland with a grassy ground cover and tussock grass, flowering in summer (APNI, 2009)	Unlikely
Campanulaceae	*Wahlenbergia islensis*	-	Not Listed	Near Threatened	Leichhardt region; near Isla George (APNI, 2009)	Low Potential
Celastraceae	*Apatophyllum flavovirens*	-	Not Listed	Endangered	Leichhardt District: Bull Creek Gorge, 15 km W of 'Castlevale', W of Springsure (APNI, 2009)	Low Potential

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
Celastraceae	*Apatophyllum teretifolium*	-	Not Listed	Near Threatened	Leichhardt District: Lonesome National Park, NNE of Injune (APNI, 2009)	Low Potential
Ericaceae	*Leucopogon cuspidatus*	Beard Heath	Vulnerable	Not Listed	Leucopogon cuspidatus collections have been made from open forest, woodland and heath on rocky slopes with granitic or serpentinite substrates, flowering from July to October (Department of the Environment, 2009)	Low Potential
Ericaceae	*Leucopogon grandiflorus*	Whorl-leaved Heath	Not Listed	Near Threatened	Found at Leichhardt District - Carnarvon Creek (APNI, 2009)	Low Potential
Eriocaulaceae	*Eriocaulon carsonii*	Salt Pipewort	Endangered	Endangered	The salt pipewort is found in aquatic environments, on permanent spring-fed wetlands with a groundwater source from the GAB. All populations occur in relatively flat landscapes except for one which is found in a spring-fed area on the side of a gentle range (DEHP, 2007)	Unlikely
Euphorbiaceae	*Bertya opponens*	-	Vulnerable	Not listed	Flowering is generally believed to occur between July and August, although timing is more dependent on the individual site characteristics. The two coastal populations, because of their different climatic and seasonal variations, normally flower in October-November, but can flower as late as February (Department of the Environment, 2009)	Unlikely
Euphorbiaceae	*Shonia carinata*	-	Not Listed	Vulnerable	Located within the Maranoa District: Summit of Junction Ridge, N of Marlong Arch, Mt Moffatt National Park (APNI, 2009)	Low Potential
Euphorbiaceae	*Bertya pedicellata*	-	Not Listed	Near Threatened	Grows in heath or open eucalypt forest with heath understorey on skeletal sandy loam soils derived from rhyolite on steep rocky slopes, rock pavements and in mountain gorges; located near Rockhampton (Department of the Environment, 2009)	Low Potential
Fabaceae	*Daviesia discolor*	-	Vulnerable	Vulnerable	Occurs on sandy soil derived from sandstone and on lateric clay, at altitudes of 600 to 900 m, in open eucalypt forest	Unlikely

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
					dominated by Eucalytpus shaerocarpa and Eucalytpus nigra. Flowering occurs from August to October (Department of the Environment, 2009)	
Fabaceae	*Daviesia quoquoversus*	-	Not Listed	Vulnerable	Located in the Leichhardt district, Blackdown Tableland, 25 km from Mimosa Creek (APNI, 2009)	Low Potential
Fabaceae	*Desmodium macrocarpum*	Large-podded Trefoil	Not Listed	Near Threatened	Located in clay soils and skeletal soils (ANRA, 2009)	Moderate Potential
Fabaceae	*Zornia pallida*	-	Not Listed	Near Threatened	Rare in Queensland, no information about this species (APNI, 2009; North Australian Land Manager, 2009)	Potential
Haloragaceae	*Haloragis exalata subsp. velutina*	Tall Velvet Sea-berry	Vulnerable	Vulnerable	Often occurs in damp places near watercourses and in woodland on steep, rocky slopes. Flowering from January to April (Department of the Environment, 2009)	Low Potential
Lamiaceae	*Plectranthus blakei*	-	Not Listed	Near Threatened	Located in the Leichhardt district, in the Blackdown Tableland Park APNI, 2009)	Low Potential
Longaniaceae	*Logania diffusa*	-	Vulnerable	Vulnerable	This species occurs on the top of the plateau escarpment in heathland in the Blackdown Tableland and in open forest with shallow, sandy, often stony soil overlying sandstone. Flowering occurs in March to September, fruiting in January (Department of the Environment, 2009)	Low Potential
Loranthaceae	*Lysiana filifolia*	-	Not Listed	Near Threatened	Only known to parasitise she-oaks growing in open woodland communities, recorded flowering and fruiting from June to August (Lokkers et al., 2005)	Unlikely
Mimosaceae	*Acacia grandifolia*	-	Vulnerable	Not Listed	Known only from 2 localities in the Burnett District, Qld, occuring as open stands among sandstone outcrops in sand or in shallow, stony soils derived from basalt. Flowers in September (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia tenuinervis*	-	Not Listed	Near Threatened	Grows in Brigalow scrub or eucalypt woodland, in ironstone gravel. Flowers August to September (Wattle, 2001)	Low Potential

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
Mimosaceae	*Acacia arbiana*	-	Not Listed	Near Threatened	Confined to the summits of Ropers and Scotts Peak and perhaps other peaks of the Peak Range, E of Clermont, Qld. Recorded from trachyte outcrops in heath-like vegetation. Flowers July to August (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia spania*	Western Rosewood	Not Listed	Near Threatened	Known only from two localities near Emerald, Qld, where it occurs as relatively pure stands in shallow red soil surrounded by open eucalypt woodland. Flowers in August (Wattle, 2001)	Low Potential
Mimosaceae	*Acacia hockingsii*	-	Not Listed	Vulnerable	Restricted to the Isla Gorge area, Qld. Grows in shallow soil over sandstone in eucalypt woodland (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia islana*	-	Not Listed	Vulnerable	Restricted to the Isla Gorge area (50 km SSW of Theodore), Qld. Grows in Eucalyptus woodland on shallow, stony soil over sandstone (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia storyi*	-	Not Listed	Near Threatened	Occurs on the Blackdown Tableland and adjacent, lower land on W side, Qld. Grows on sandstone plateaux, in open forest. Flowers April to August and fruits August , September and December (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia pubicosta*	-	Not Listed	Near Threatened	Restricted to the Biggenden area, south-eastern Qld. Confined to rocky slopes (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia gittinsii*	-	Not Listed	Near Threatened	Confined to the Blackdown Tableland S of Blackwater, Qld. Grows on sandstone in Eucalyptus woodland; it is common in places in wetter areas (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia tingoorensis*	Tingoora Wattle	Not Listed	Vulnerable	Restricted to a small area near Kingaroy in the Burnett District, south-eastern Qld; grows in deep red loam or shallow loamy and sandy soils, in eucalypt woodland or forest; forms dense stands on roadsides. Flowers August to September (Wattle, 2001)	Unlikely
Mimosaceae	*Acacia pubifolia*	Wyberba Wattle	Vulnerable	Vulnerable	Grows on rocky granite hillsides, in sandy, stony or loam	Unlikely

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
					soil in eucalypt-scrub woodland or Eucalyptus - Callitris forest. Flowers September to November (Wattle, 2001)	
Mimosaceae	*Acacia ramiflora*	-	Vulnerable	Not Listed	Poorly known and inadequately collected species in the Torrens Creek- Pentland area; also near headwaters of Gilbert R., Qld. Grows on sandstone hills (Wattle, 2001). This species occurs within the Burdekin, Desert Channels, Northern Gulf and Wet Tropics (Queensland) Natural Resource Management Regions (EPBC, 2008)	Low Potential
Myrtaceae	*Baeckea trapeza*	-	Not Listed	Vulnerable	Located along Two Mile Creek in the Blackdown Tableland (APNI, 2009)	Unlikely
Myrtaceae	*Corymbia clandestina*	-	Vulnerable	Vulnerable	This species is known from two localities, north-west and south-west of Clermont, Queensland. It grows on hillsides as a minor component of woodland dominated by Eucalyptus crebra, with skeletal brown clay-loam or red gravels (EPBC, 2008)	Low Potential
Myrtaceae	*Ochrosperma obovatum*	-	Not Listed	Vulnerable	Inhabits the Burnett District, 6 km ESE of Brovinia (APNI, 2009)	Unlikely
Myrtaceae	*Melaleuca pearsonii*	-	Not Listed	Near Threatened	On exposed plateaus in closed heath to open shrubland (APNI, 2009)	Low Potential
Myrtaceae	*Sannantha brachypoda*	-	Not Listed	Near Threatened	Grows in a wide range of habitats, including Melaleuca dominated open forest and Eucalypt forest (PlantNet, 2009)	Low Potential
Myrtaceae	*Homoranthus zeteticorum*	-	Not Listed	Near Threatened	Located in Salvator Rosa National Park in Queensland (APNI, 2009)	Unlikely
Myrtaceae	*Eucalyptus pachycalyx subsp. waajensis*	Pumpkin Gum	Not Listed	Endangered	Common in hills west of Herberton and north of Mount Garnet and at Mt Mulligan in N Qld, a small occurance near Waaje in the Barakula area. Flowering period February (Brooker and Kleinig, 2004)	Unlikely
Myrtaceae	*Eucalyptus sicilifolia*	-	Not Listed	Vulnerable	Very restricted, known only from Little St Peter Mountain	Unlikely

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
					and Mt Zamia Environmental Park, near Springsure, Flowering period from July to September (Brooker and Kleinig, 2004)	
Myrtaceae	*Eucalyptus decolor*	-	Not Listed	Near Threatened	Known only from the Many Peaks Range S of Gladstone and ranges south of Biggenden; flowering from December to March (Brooker and Kleinig, 2004)	Unlikely
Myrtaceae	*Melaleuca groveana*	Grove's Paperbark	Not Listed	Near Threatened	Grows in heath, often in exposed sites	Unlikely
Myrtaceae	*Homoranthus decumbens*	-	Vulnerable	Vulnerable	This species grows in shrub land on shallow sandy soils containing lateritic pebbles and on sandstone cliff edges in the Blackdown National Park (Department of the Environment, 2009)	Unlikely
Myrtaceae	*Homoranthus decasetus*	-	Not Listed	Near Threatened	Inhabits the Isla Gorge in the Leichhardt district (APNI, 2009)	Low Potential
Myrtaceae	*Eucalyptus raveretiana*	Black Ironbox	Vulnerable	Vulnerable	Occurs in riparian woodlands on alluvial flats along riverbanks on sandy and / or alluvial soils, between Rockhampton, Charters Towers and the lower Burdekin. Recorded flowering from December to January, fruiting February to April (Brooker and Kleinig, 2004)	Unlikely
Myrtaceae	*Corymbia scabrida*	Rough-leaved Yellowjacket	Not Listed	Near Threatened	Restricted distribution to the west of Springsure in central Qld, flowering period October (Brooker and Kleinig, 2004).	Unlikely
Picrodendraceae	*Pseudanthus pauciflora subsp. arenicola*	-	Not Listed	Near Threatened	Grows in health land, accompanied by Banksia spp. and Leptospermum spp. and in Eucalypt woodlands (personal communication with Queensland Herbarium, June 2009)	Moderate Potential
Rhamnaceae	*Polianthion minutiflorum*	-	Vulnerable	Vulnerable	Grows in forest and woodland on sandstone slopes and gullies with skeletal soil. It is known from five areas in east Queensland, from Redcliffe Vale, about 110 km west of Mackay, south to Kingaroy	Low Potential
Rutaceae	*Boronia eriantha*	Round-leaflet Sandstone	Not Listed	Near Threatened	Located in soils which are shallow with low water-holding	Low Potential

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
		Boronia			capacity and low fertility, shrub layers and ground cover tend to be sparse (APNI, 2009)	
Santalaceae	*Thesium australe*	Austral Toadflax	Vulnerable	Vulnerable	Occurs in grassland or grassy woodland and is often found in damp sites in association with Themeda triandra (DEC, 2009)	Low Potential
Solanaceae	*Solanum adenophorum*	-	Not Listed	Endangered	A relatively rare species recorded from scattered localities in Qld in the Dingo-Nebo-Clermont area near Rockhampton (APNI, 2009)	Moderate Potential
Surianaceae	*Cadellia pentastylis*	Ooline	Vulnerable	Vulnerable	Occurs on the western edge of the NSW north-west slopes, from Mt Black Jack near Gunnadah to west of Tenterfield, and extends into Queensland to Carnarvon Range and Callide Valley, south-west of Rockhampton. The distribution of this species overlaps with the following EPBC Act-listed threatened ecological communities of Brigalow (Department of the Environment, 2009)	Unlikely
Arecaceae	*Livinstona fulva*	-	Not Listed	Near Threatened	Blackdown Tableland in open Eucalypt forest (PASCOA, 2009)	Unlikely
Arecaceae	*Livinstona nitida*	-	Not Listed	Near Threatened	Open eucalypt forest, stream banks and on rocky escarpments in the Carnarvon and Isla Gorge area of central Queensland (PASCOA, 2009)	Low Potential
Cyperaceae	*Cyperus clarus*	-	Not Listed	Vulnerable	Grows in grassland or open woodland, on heavy soils derived from basalt (PlantNet, 2009)	Unlikely
Cyperaceae	*Eleocharis blakeana*	-	Not Listed	Near Threatened	Grows in ephemerally wet situations, such as gilgais, often associated with Acacia harpophylla and Casuarina cristata woodland and on clayey soil (PlantNet, 2009)	Moderate Potential
Juncaginaceae	*Maundia triglochinoides*	-	Not Listed	Vulnerable	Flowering occurs during warmer months. Grows in swamps, creeks or shallow freshwater 30 - 60 cm deep on heavy clay, low nutrients (DEC, 2009)	Unlikely

Family	Scientific Name	Common Name	Conservation Status		Habitat	Likelihood of Presence on the Project site
			EPBC	NC Act		
Orchidaceae	*Gastrodia crebriflora*	-	Not Listed	Vulnerable	A ground orchid inhabiting the Blackdown Tableland (APNI, 2009)	Unlikely
Orchidaceae	*Pterostylis woollsii*	Long Tail Greenhood	Not Listed	Near Threatened	Grows in dry open granite forests (PlantNet, 2009)	Unlikely
Orchidaceae	*Diuris parvipetala*	Slender Purple Donkey Orchid	Not Listed	Vulnerable	Found in near Carnarvon Gorge in central Queensland and in south-eastern Queensland, from Brigooda near Murgon, south to the New South Wales border. It grows in shallow, brown, basalt loam soils (DEHP, 2009)	Unlikely
Orchidaceae	*Phaius australis*	Lesser Swamp-orchid	Endangered	Endangered	Inhabits swampy grassland or swampy forest including rainforest, eucalypt or paperbark forest, mostly in coastal areas (Department of the Environment, 2009)	Unlikely
Orchidaceae	*Genoplesium validum*	-	Not Listed	Near Threatened	Located within creeks along the Blackdown Tableland (APNI, 2009)	Low Potential
Poaceae	*Arthraxon hispidus*	Hairy-joint Grass	Vulnerable	Vulnerable	Found along the edges of rainforests, creeks and swamps. Flowering between March to July and summer to autumn (Department of the Environment, 2009)	Low Potential
Poaceae	*Digitaria porrecta*	Finger Panic Grass	Endangered	Near Threatened	Occurs in grasslands on extensive basaltic plains, and in undulating woodlands and open forests with an underlying basaltic geology. Seeding period from March to April (Department of the Environment, 2009)	Unlikely
Poaceae	*Dichanthium queenslandicum*	King Blue-grass	Vulnerable	Vulnerable	Endemic to Queensland where it occurs mostly on black clay soils around Emerald and more rarely on the Darling Downs. Flowers November to January (Department if the Environment, 2009)	Low Potential
Poaceae	*Dichanthium setosum*	Bluegrass	Vulnerable	Near Threatened	Dichanthium setosum is associated with heavy basaltic black soils and stony red-brown hard setting loam with clay subsoil and is found in moderately disturbed areas. Flowering period November to June (Ausgrass, 2002)	Unlikely

Comment - 19.BN

Appendix L1; Appendix F

Given the loss of habitat and future potential loss of habitat for these species in the region, together with climate change and ongoing impact from invasive species, these projects have potential to significantly impact on the long term viability of these species.

Recommendation - 19.BN

Contribution to the ongoing management and maintenance of these species in these environments will be essential to ensure the survival of these species.

Response - 19.BN

If endangered, vulnerable, or near threatened (EVNT) fauna are found on site through further ground truthing, specific SMP will be prepared that will include management and mitigation measures.

High levels of disturbance and habitat fragmentation has occurred in the region in which the Project is situated. Given that much of the habitat within the Project area is heavily disturbed from grazing practices, it is considered that the Project will not significantly increase the risk of territorial species excluding other natives and ultimately driving a change in the faunal assemblage.

The implementation of a staged rehabilitation plan that focuses on restoring structurally complex habitat (to pre-mining equivalent) will ensure in the long-term that impacts will be minimised.

3.15 Geomorphology Technical Report

Comment - 19.BO

Appendix M1; Section 6.3

The proposed diversion of Little Sandy and Rocky Creek will significantly increase flows to the existing Middle and Well Creeks above those currently experienced. The proponent indicates that as a result, channel bed widening and more frequent bankfull flows will be experienced, particularly within Middle Creek. The proposed diversion should have little to no impact to existing watercourses upstream and downstream of the diversion.

Recommendation - 19.BO

The proponent will need to undertake further review of the impacts of the diversion to existing watercourses and demonstrate that there is no impact on the structural integrity and performance of Middle and Well Creeks downstream of the diversion. The proponent will need to consider the impacts from subsidence on Middle and Well Creeks and propose remediation activities to further limit instabilities of the bed and banks that may cause increased erosion from additional flows from the proposed diversion.

Response - 19.BO

Included in Response 19.BP below.

Comment - 19.BP

Appendix M1; Section 5.6 and 6.3

The baseline fluvial geomorphology assessment of Middle Creek indicates that it is located within a confined valley that is typically unstable in the long-term as relatively thin alluvium deposits outside of the channel can be stripped by large infrequent events. The HEC-RAS modelled outputs shows that increases in stream power from 30 to 48.8 Watts/m^2 for channel forming events (ARI 10 years) and stream powers for the ARI 50 year events from 61.6 to 105.1 Watts/m^2. The proponent has indicated that the increase in stream power will not cause significant changes to Middle Creek.

Recommendation - 19.BP

The proponent has provided conflicting advice on the expected changes to the stability and performance of Middle Creek with respect to the additional flows from the proposed diversion. The proponent will need to confirm the anticipated impact to Middle Creek from the proposed diversion given the increase in stream powers of approximately 60% for channel forming events and 65% for larger flows that intercept the floodplain.

Response - 19.BP

This response covers material relevant to Comments 19.BO and 19.BP. It expands on material covered in the EIS Geomorphology Technical Report Sections 5.5, 5.6, 6.1, and 6.2. It provides an updated assessment of the effects of the Rocky Creek – Little Sandy Creek Diversion on the geomorphology of the Middle Creek and Well Creek watercourses. It will outline the baseline conditions in Middle Creek and Well Creek, identify the potential impacts of increased flow and channel subsidence, and suggest potential mitigation measures to address these impacts.

Middle Creek

The lower 7.2 km of Middle Creek will be affected by the increased flow delivered by the Rocky/Little Sandy Creek Diversion. This channel bed slopes at 0.0024 m/m, and is the steepest watercourse in the MLA. It is a small stream typically less than 10 m across with ~1 m banks. The banks are generally well vegetated and not obviously eroding except in a few sites on the outside of bends and where accelerated land degradation is occurring adjacent to the channel. The channel occupies most of the valley floor as the adjacent hill slopes descend to the edge of the channel and there is no continuous floodplain in the valley floor. The bedrock through which the watercourse is cut comprises Tertiary consolidated alluvium, with some deep weathering profiles and duricrust development. Although it is the steepest watercourse in the MLA and hence potentially an aggressive system, it is in fact the least geomorphic developed as it has been unable to form a floodplain across its valley floor. Its form is consistent with the Erskine *et al* (2005) *bedrock confined* stream type. These valleys are typically unstable in the long term as the relatively thin deposits of alluvial fill adjacent to the channel can be stripped by large infrequent floods, and then re-formed during smaller events. However, there is no obvious environmental

evidence that such stripping processes have occurred in geologically recent times and it is likely that these events occur very infrequently (less than once in several thousand years).

The hydrological assessment estimates that Middle Creek carries 2-yr ARI flows of 2 m^3/s increasing downstream to 4 m^3/s, and 50-yr ARI flows of 75 m^3/s increasing to 115 m^3/s. Consistent with these modest lows, stream power is also generally low, averaging 7 – 8 W/m2 in the 2-yr ARI event (Figure 3-7 and Table 3-9) and 65 – 70 m3/s in the 50-yr ARI event (Figure 3-7 and Table 3-9). The 50-yr ARI stream power values show some spikes of over 200 W/m^2 (at ch6996, ch5565 in Table 3-7), but there is no evidence for channel erosion instability at these locations and it considered likely these are artefacts of the modelling. The 2-yr ARI flows are contained within the channel, and substantial out of channel flow does not occur until events >10-yr ARI floods.

The Kevin's Corner mine Project will result in two key impacts on Middle Creek:

1. Increased flow due to addition of the Rocky Creek and Little Sandy Creek flow; and
2. Channel subsidence resulting from underground long-wall mining.

The hydrological assessment estimates that Middle Creek in the diverted/subsided case will carry 2-yr ARI flows of 6 m^3/s increasing downstream to 7 m^3/s, and 50-yr ARI flows of 170 m^3/s increasing to 187 m^3/s. While the 2-yr ARI flow increase is effectively quite small, at the 50-yr ARI the flow increase is 63-126% and there is therefore potential for adverse effects such as channel bed and bank erosion, floodplain stripping, and increased sediment transport and delivery downstream.

The HEC-RAS model outputs in Table 3-9 show what may be regarded as a worst case increase under the Diverted Case scenario. While the mean stream power values remain below the ACARP Guidelines for vegetated channels, the percentage increases are 70 – 80% at all listed ARI events. Figure 3-7 shows that the Diverted Case model outputs have stream power increases uniformly along the channel, with increases at the baseline case spike locations.

The full effect of the Kevin's Corner Mine will also result in subsidence of the stream bed, and as can be seen in Table 3-9, this greatly reduces modelled stream power along the reach probably largely due to the reduced stream gradient (Table 3-9). The downstream 4.5 km of Middle Creek will be affected by subsidence of 6 underground longwall panels and the creek bed will be lowered by about 1.5 m. Pillar zones between the panels will subside only a few centimetres if at all. The overall effect on stream power will be to greatly reduce the mean reach values (Table 3-9), but there will be spikes of very high stream power over several of the pillar zones (at ch4504, ch3739, ch2705, and ch305 in Figure 3-7).

The subsidence voids in the channel will be partly or fully filled with sediment during subsequent floods, returning the overall stream gradient towards its original baseline condition. From experience in the Bowen Basin along the Isaac River, void filling could occur within one or two moderate floods. The long-term effects on stream power will therefore likely be somewhere between the Diverted and Subsided cases.

The combined effects on channel geomorphology from the diversion of increased flows to Middle Creek, and the subsidence of the channel may include the following:

- Increased channel bed and bank erosion, particularly in the upstream ~3 km of the reach where little subsidence is likely;

- Increased channel bed and bank erosion over the short pillar sections in the lower 4.5 km of the reach;
- Increased erosion at the outside of channel bends;
- Increased transport of sand through the reach;
- Deposition of sand in the subsidence voids in the channel; and
- Increased out of bank storage on the low hill slopes adjacent to the channel.

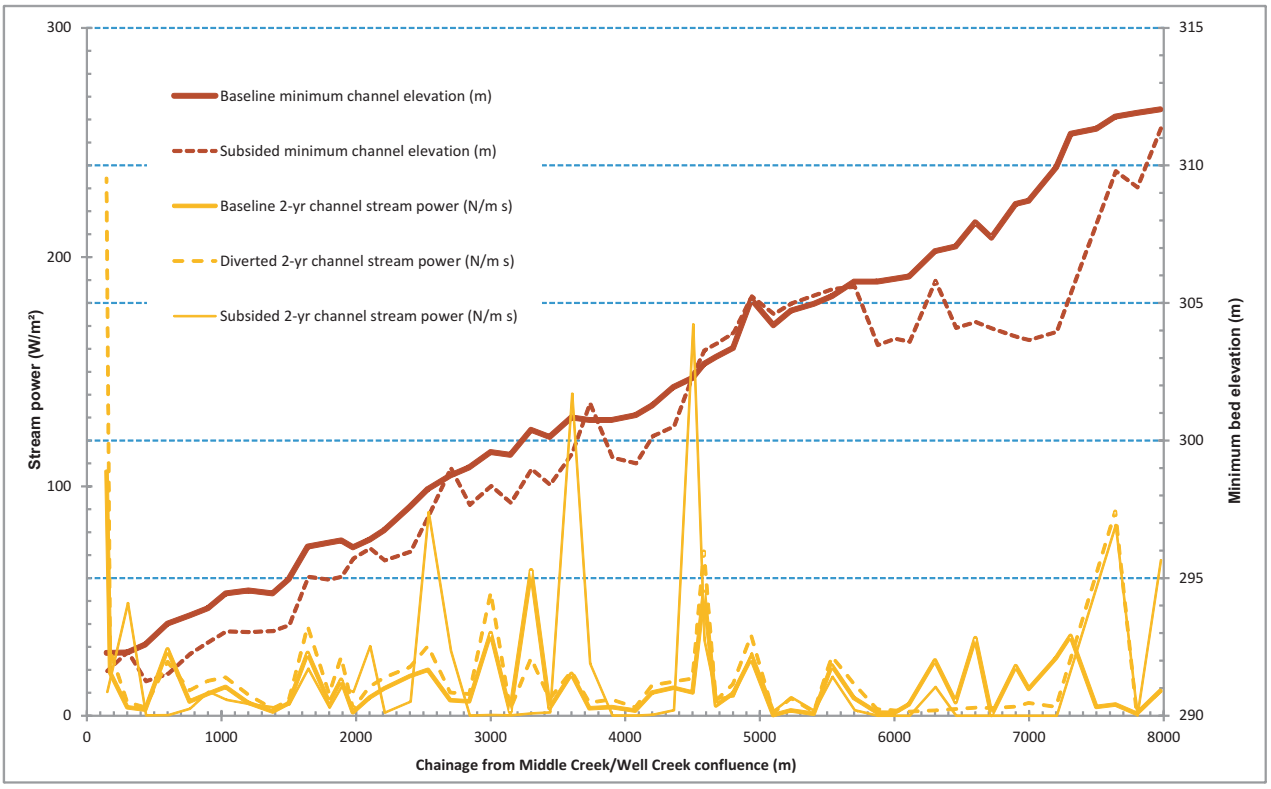
Given the small size of this fluvial system and its channel landforms, the fact that no channel or out of channel vegetation cover will be removed, even under the increased flow of the diversion it is unlikely that channel geomorphic changes will occur rapidly, and it would be appropriate to undertake adaptive mitigation as the need arises. However, it would be appropriate as part of the subsidence management plan monitoring to undertake more detailed assessment of the Middle Creek channel geomorphology to closely identify the expected types and locations of geomorphic changes, and to detail appropriate monitoring to detect these changes, and mitigation measures to ensure the system evolves in a stable manner during and after the mine life.

The following stages of work are proposed and will be included in the either the diversion monitoring program or the subsidence management monitoring plan:

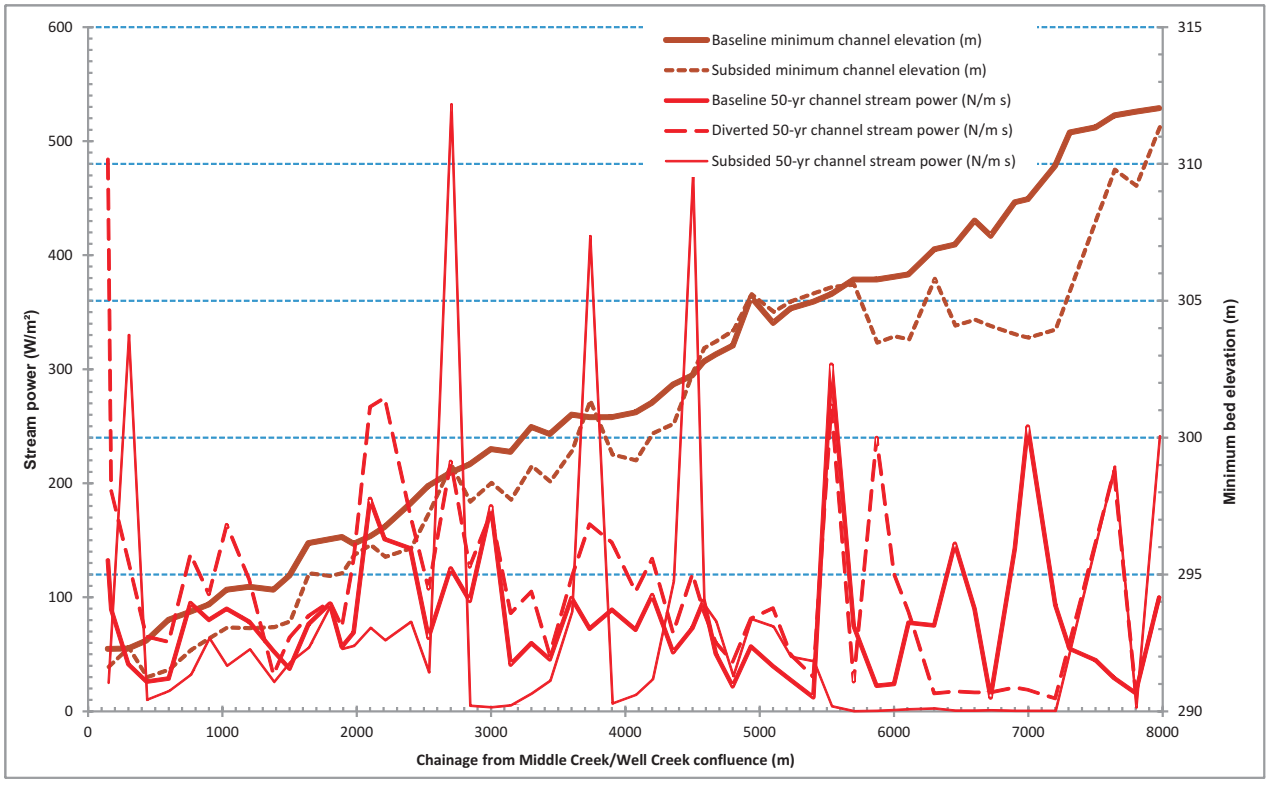
1. Detailed assessment of Middle Creek channel geomorphology to identify bed and bank characteristics, focussing on changes in bed slope, bank height and erosion potential, existing bend erosion, and sediment characteristics. As part of this work the HEC-RAS and TUFLOW modelling could be field verified.
2. Based on the above baseline study, a detailed monitoring programme will be developed to determine the dynamics of the pre-mine sediment transport and watercourse geomorphic system, in particular identifying the parts of the channel that required most monitoring effort. Stages 1 and 2 should be completed prior to the commencement of the diversion works and mining. Monitoring will be carried out at regular intervals throughout the mine life. Annual site inspection surveys, and more detailed assessments every five years or after a 5-yr ARI flood event will be carried out as per the requirements of the site monitoring programs.
3. During the mine life, adaptive management responses would be instigated to address mining-related channel geomorphic instability as may be identified by the monitoring program. Examples of possible mitigation are: zones of accelerated bed and bank erosion could be mitigated with timber pile fields that have been successfully used in the Bowen Basin; if sediment build-up occurred it could be mechanically removed to avoid downstream transfer of increased sand load; where bank erosion was causing stream widening to occur the channel could be mechanically widened, a floodplain formed, and the sediment disposed of within the mine area and away from the watercourse.
4. Towards the end of the mine life (within 5 years of closure) it would be appropriate to undertake a detailed watercourse geomorphology status survey to determine what channel and out of channel/floodplain geomorphic responses to increased flow and channel subsidence had occurred in Middle Creek. At that stage, with geomorphic system responses underway, it should be possible to more robustly predict how the system is likely to evolve in the future and to develop final mitigation measures to put in place that would provide for sustainable post-mine watercourse geomorphic development.

These commitments are reflected in Section 7 of the Interim Subsidence Management Plan which is provided as Appendix N of the SEIS and SEIS Volume 2, Appendix C.

Middle Creek Minimum Bed Level and Stream Power (2-yr ARI)



Middle Creek Minimum Bed Level and Stream Power (50-yr ARI)



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HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

MIDDLE CREEK MINIMUM BED LEVEL AND STREAM POWER: 2-YEAR AND 50-YEAR ARI

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Revision	A
Date	15-06-2012

Figure: 3-7

File No: 42626920-g-1026.cdr

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Table 3-9 Middle Creek HEC-RAS model outputs (geometric means for the reach ch7200 – ch152).

	Baseline	Diverted	Subsided	Baseline	Diverted	Subsided
	Q Total (m3/s)			Top Width (m)		
50-Year	93	181	181	109	188	199
20-Year	49	96	96	57	100	142
10-Year	27	54	54	30	54	96
5-Year	14	27	27	18	25	59
2-Year	3	6	6	9	8	30
	Flow Depth (m^2)			Flow Area (m^2)		
50-Year	3.0	3.6	3.3	85	188	234
20-Year	2.5	3.1	2.9	43	100	137
10-Year	2.1	2.6	2.5	24	54	86
5-Year	1.7	2.1	2.0	13	25	49
2-Year	1.0	1.3	1.3	5	8	18
	Channel velocity (m/s)			Channel power (W/m^2)		
50-Year	1.75	1.91	1.10	68.4	81.6	16.7
20-Year	1.49	1.65	0.90	45.9	56.1	9.9
10-Year	1.27	1.44	0.73	31.0	40.2	5.7
5-Year	1.03	1.20	0.57	18.3	25.8	3.0
2-Year	0.72	0.80	0.36	7.4	9.2	0.9
	Channel shear (W/m^2)			E.G. Slope (m/m)		
50-Year	15.2	42.6	15.2	0.0021	0.0018	0.0008
20-Year	11.0	34.0	11.0	0.0022	0.0018	0.0007
10-Year	7.7	28.0	7.7	0.0022	0.0018	0.0006
5-Year	5.2	21.5	5.2	0.0022	0.0019	0.0006
2-Year	2.4	11.5	2.4	0.0022	0.0018	0.0004

Well Creek

Well Creek is a significant tributary of Sandy Creek, which is the master stream flowing through the Kevin's Corner MLA. Middle Creek joins Well Creek about 5.8 km upstream of the Well Creek/Sandy Creek junction. In the present baseline conditions, Well Creek is joined by Little Sandy Creek at ~ch1600 m in the Well Creek HEC-RAS model. The increased flow in Middle Creek, arising from the Rock Creek/Little Sandy Creek diversion will affect the 4.2 km reach of Well Creek from the Middle Creek Junction to the Little Sandy Creek junction.

The affected reach of Well Creek has a bed slope of ~0.0017 m/m, and the channel is about 20 m wide and 1 – 2 m below its adjacent floodplain. It has a sandy bed and the banks are well vegetated and stable.

The hydrological model estimates 2-yr flow of 11 m^3/s increasing downstream to 14 m^3/s just before the Little Sandy Creek junction. Events greater than ~ 5-yr ARI leave the channel, and there is a substantial loss of flow to

the northern (true left) floodplain between ch4000 m and ch2400 m. In the 10-yr ARI event, some 60% of the flow leaves Well Creek here and flows to Sandy Creek. In the 50-yr ARI event Well Creek flow at Middle Creek is 296 m^3/s increasing to 347 m^3/s at ch4000 m. It then drops to 184 m^3/s by ch2400 m, rising again to 495 m^3/s downstream of Little Sandy Creek.

Outputs of the HEC-RAS model of lower Well Creek are shown in Figure 3-8. In the baseline case stream power is generally well below 30 W/m^2, and the drop-off in discharge between ch4000 and ch2400 is clearly evident in the very low stream powers through this sub-reach. There are three small stream power spikes at ch4200 m, ch 2400 m, and ch 2153 m that are associated with abrupt changes in bed slope. In the 50-yr ARI case there are numerous very large stream power spikes in the upstream ~2 km of the affected reach. As with Middle Creek, there is no evidence for channel instability at these points and it is considered likely the spikes are artefacts of the modelling.

The Kevin's Corner mine Project will result in three key impacts on Well Creek:

1. Increased flow due to addition of Middle Creek carrying the Rocky Creek and Little Sandy Creek flow;
2. Reduced inflows and no losses to floodplain flow downstream of Middle Creek due to floodplain levee banks, and
3. Channel subsidence resulting from underground long-wall mining.

The hydrological assessment estimates that Well Creek in the diverted/subsided case will carry 2-yr ARI flows of ~12 m^3/s increasing downstream to ~13 m^3/s, and 50-yr ARI flows of ~345 m^3/s. While the 2-yr ARI flow increase is effectively quite small, at the overall 50-yr ARI flow increase is 26% (see Table 3-10). There is thus some limited potential for effects such as channel bed and bank erosion, and increased sediment transport and delivery downstream.

The HEC-RAS model outputs in Table 3-10 show what may be regarded as a worst case increase under the Diverted Case scenario. In the 2-yr ARI case there is a modelled decrease in stream power, while in the 50-yr ARI cases there is a 43% increase. The overall reach mean stream power values are well below ACARP guidelines for vegetated channels.

The full effect of the Kevin's Corner Mine causes subsidence of the stream bed, and as can be seen in Table 3-10, this greatly reduces modelled stream power along the reach probably largely due to the reduced stream gradient (Table 3-10). The upstream 1.7 km of the affected reach of Well Creek will have three subsided sections that lower the channel bed and adjacent floodplains by 1.5 m to 2 m. Two pillar zones between the panels will subside only a few centimetres if at all. The overall effect on stream power will be to greatly reduce the mean reach values (see Table 3-10), but there will be spikes of very high stream power over the pillar zones (at ch5315, ch4775, and ch4255 in Figure 3-7).

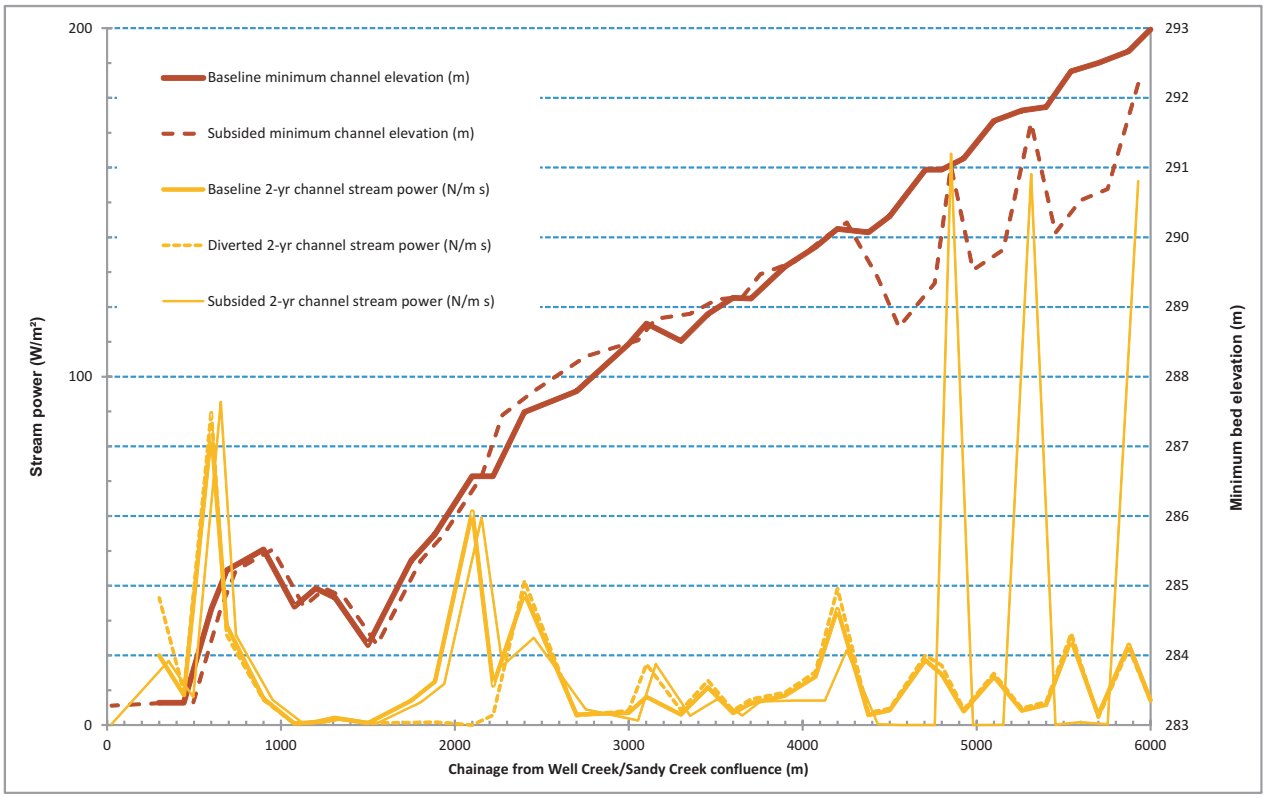
The subsidence voids in the channel will be partly or fully filled with sediment during subsequent floods, returning the overall stream gradient towards its original baseline condition, and this could occur within one or two moderate floods. The long-term effects on stream power will therefore likely be somewhere between the Diverted and Subsided cases.

The combined effects on channel geomorphology from the increased input of Middle Creek flows to Well Creek, and the subsidence of the channel may include the following:

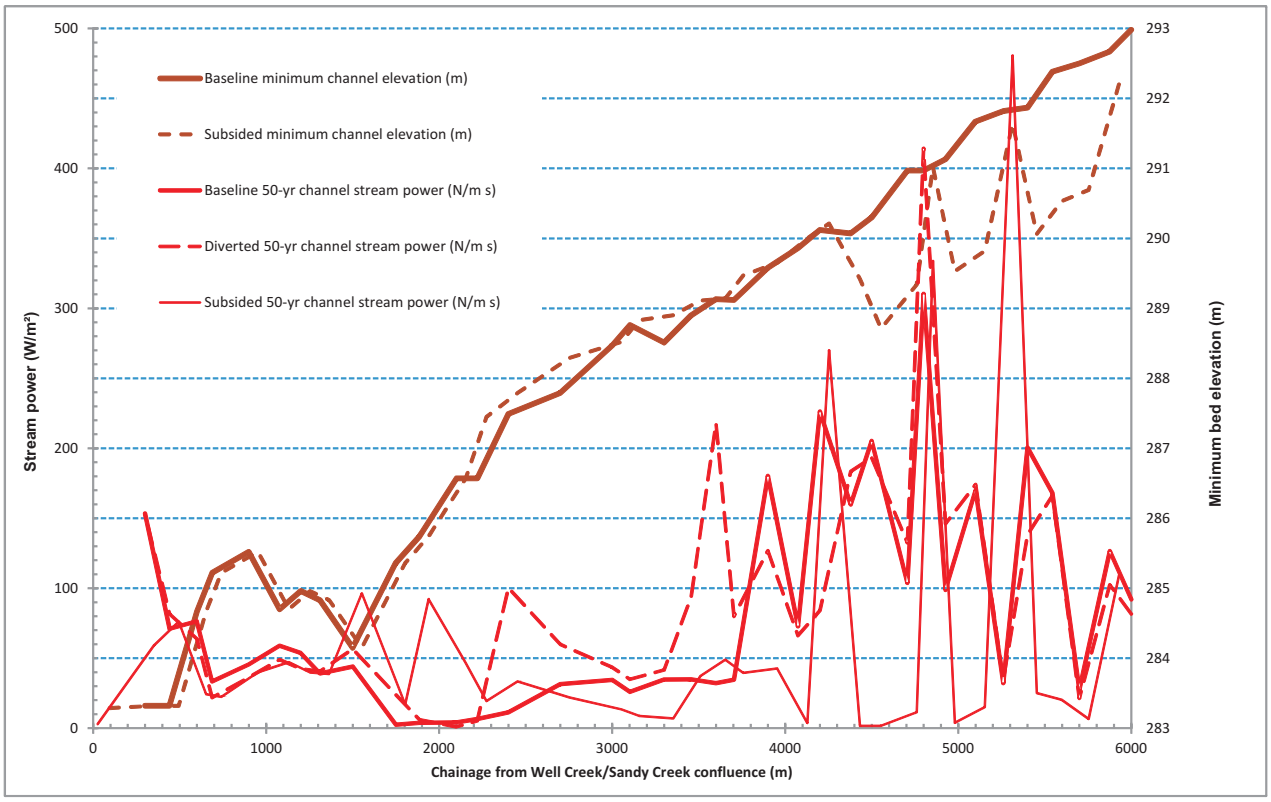
- Increased channel bed and bank erosion, particularly in the downstream ~2.5 km of the affected reach where little subsidence is likely;
- Increased channel bed and bank erosion over the short pillar sections in the upper ~1.7 km of the reach;
- Increased transport of sand through the reach;
- Deposition of sand in the subsidence voids in the channel; and
- Increased out of bank storage on the floodplain adjacent to the channel.

Given the moderate size of this fluvial system and its channel/floodplain landforms, the modest increases in overall stream power, and the fact that no channel or out of channel vegetation cover will be removed, even under the increased flow from Middle Creek it is unlikely that channel geomorphic changes will occur rapidly, and it would be appropriate to undertake adaptive mitigation as the need arises. However, it would be appropriate to undertake more detailed assessment of the Well Creek channel geomorphology to closely identify the expected types and locations of geomorphic changes, and to detail appropriate monitoring to detect these changes, and mitigation measures to ensure the system evolves in a stable manner during and after the mine life. This assessment could be carried out in conjunction with the work proposed for Middle Creek above.

Lower Well Creek Minimum Bed Level and Stream Power (2-yr ARI).
Middle Creek joins at ch 5800 m, and Little Sandy Creek joins at ch 1600 m



Lower Well Creek Minimum Bed Level and Stream Power (50-yr ARI)
Middle Creek joins at ch 5800 m, and Little Sandy Creek joins at ch 1600 m



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HANCOCK GALILEE PTY LTD
Kevin's Corner Project
Supplementary Environmental Impact Statement

LOWER WELL CREEK MINIMUM BED LEVEL AND STREAM POWER: 2-YEAR AND 50-YEAR ARI

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Figure: 3-8

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Table 3-10 Well Creek HEC-RAS model outputs (geometric means for the reach ch5785 m - ch1600 m).

	Baseline	Diverted	Subsided	Baseline	Diverted	Subsided
	Q Total (m3/s)			Top Width (m)		
50-Year	275	346	347	910	459	488
20-Year	130	184	184	418	248	324
10-Year	74	104	104	95	124	192
5-Year	42	51	51	48	60	118
2-Year	11	12	12	20	18	33
	Flow Depth (m^2)			Flow Area (m^2)		
50-Year	3.2	3.5	3.5	478	459	487
20-Year	2.9	3.0	3.1	199	248	277
10-Year	2.6	2.6	2.8	75	124	156
5-Year	2.1	2.1	2.3	41	60	79
2-Year	1.2	1.1	1.4	14	18	23
	Channel velocity (m/s)			Channel power (W/m^2)		
50-Year	1.57	1.79	1.23	45.6	65.3	23.0
20-Year	1.46	1.54	1.00	38.9	44.2	13.1
10-Year	1.36	1.33	0.87	32.6	30.1	9.3
5-Year	1.18	1.05	0.75	23.2	16.2	6.5
2-Year	0.80	0.68	0.54	8.9	5.4	2.8
	Channel shear (W/m^2)			E.G. Slope (m/m)		
50-Year	18.7	36.5	18.7	0.0013	0.0014	0.0010
20-Year	13.1	28.7	13.1	0.0014	0.0014	0.0008
10-Year	10.6	22.7	10.6	0.0014	0.0013	0.0008
5-Year	8.7	15.5	8.7	0.0015	0.0012	0.0008
2-Year	5.3	8.2	5.3	0.0015	0.0012	0.0008

Summary

This assessment of the affected reaches of Middle Creek and Well Creek has taken the updated HEC-RAS modelling of the baseline, diverted, and subsided (including the diversion) cases and in conjunction with existing knowledge of the geomorphic and sediment transport systems in these creeks provided a more detailed review of potential water course geomorphology effects that could arise from the Kevin's Corner Mine Project.

It is considered likely that geomorphic effects will be modest, given the small scale of the potentially affected channels, floodplains, and hill slopes, stream power increases will overall fall below ACARP guideline values, and the existing vegetation cover will not be affected by the mine. There are however some geomorphic knowledge gaps particularly related to detailed channel, bank and overbank characteristics, and in relation to the sediment transport through the channel system. Given the potential adverse effects are unlikely to be large, it is considered appropriate to propose that these knowledge gaps be addressed as part of a wider study of

cumulative geomorphic impacts of mining proposals in the Sandy Creek catchment over the next 2-3 years, and prior to the commencement of mining in the Kevin's Corner MLA. The results of these investigations would then be used to inform a detailed monitoring and mitigation plan to be followed during the mine life. Towards the end of the mining activities, and before the mine license is relinquished, a detailed water course geomorphology status report will be prepared, and this would be required to develop any further mitigation measures needed to ensure that there is no impact on the long-term post-mine structural integrity and performance of Middle and Well Creeks downstream of the diversion.

3.16 Hydrology Technical Report

Comment - 19.BQ

Appendix M2.2; Section 10.2.1 - 10.2.5

The proponent has indicated that all watercourses within an indicative period of 20 years will reach similar bed grades post subsidence when compared to the baseline conditions. Sediment generation rates from contributing catchment areas or re-entrainment of sediment within each watercourse has not been evaluated to give merit to this proposed timeframe.

Recommendation - 19.BQ

The proponent should provide sediment generation rates from the contributing catchment areas or re-entrainment of sediment within each watercourse to verify the proposed timeline of 20 years to re-establish the baseline bed profiles within each watercourse. The proponent should provide mitigation measures to reduce erosion generated from subsidence within each watercourse to reflect the potential time lag before the watercourse reaches the existing bed level.

Response - 19.BQ

The sediment generation rate for the greater Sandy Creek catchment is estimated to be 240 kg/ha/yr (refer EIS, Volume 2, Appendix M1 Geomorphology Report, Section 4.4).

It is not possible to make accurate predictions or verify estimates of timeframes to re-establish the baseline bed profiles within each watercourse. The reasons are:

- It is not possible to predict the specific magnitude of flow events, event sequences, and frequency / duration of dry spells for the stream hydrology that will actually occur in future decades.
- Some of the factors that could affect the timeline such as upstream sediment supply (from outside the mine lease) and upstream catchment hydrology (also from outside the mine lease) are not within the proponents control.

Nonetheless, it is clear from first principles of geomorphological science, and the precedence of other longwall mining in Queensland that the processes required for stream bed longitudinal profile readjustment do occur naturally. Sometimes it may only require one large flood for the stream bed profile to readjust. The timeframe

cannot be accurately predicted and does not particularly matter as it is essential that adaptive management principles be applied for mitigation of potential adverse geomorphological impacts.

Comment - 19.BR

Appendix M2.2; Section 9

The proposed diversion of Little Sandy and Rocky Creeks may not be approved by the Department in its current form. The hydraulic analysis of all watercourses impacted by subsidence should be documented separately to the watercourses additionally impacted by the proposed diversion. The proponent has not included shear stress as a key hydraulic parameter within either the summary tables or supporting graphs.

Recommendation - 19.BR

The proponent should provide a more detailed hydraulic analysis on the current baseline conditions for each watercourse; a comparative analysis for subsidence impacts and the combined impact of subsidence and the proposed diversion. These results should be represented in table and graphical form and include shear stress values

Response - 19.BR

This submission comment was discussed with DEHP on 5 April 2012. A case to separate subsidence only impacts (without the diversion) has no meaningful value because this will not occur. The Project schedule will require construction of the diversion before subsidence, so the developed cases presented in the EIS with (1) diversion only and (2) diversion + subsidence was appropriate to reflect the impacts and sequence of impacts that may occur.

The EIS Hydraulics report (EIS, Volume 2, Appendix M2.2) has been revised for this SEIS (SEIS, Volume 2, Appendix K) to also present the shear stress results.

Comment - 19.BS

Appendix M2.2; Section 9

The hydraulic analysis summary table values on page 28 do not reflect the graphically depicted values on pages 29 and 30. The summary values and graphical representation of steam powers should be limited to a minimum of 1 Watt/m^2 and not be represented in log format on the y-axis.

Recommendation - 19.BS

The proponent should provide updated summary tables or graphs to represent the actual modelled hydraulic parameter values. The graphical representation of stream powers should not be in log format and depict stream powers above 1 Watt/m^2.

Response - 19.BS

The revised Hydraulics report (refer SEIS, Volume 2, Appendix K) presents revised graphs on a linear scale.

Further review of the hydraulic modelling results was undertaken to remove spikes of extreme highs and lows of stream power values that were attributable to modelling anomalies rather than reflecting real values. Such anomalies are typically associated with the conveyance-ratio change between cross-sections being outside the tolerance limits specified within the HEC-RAS model. The reason for removing results, where the conveyance-ratio change was outside the recommended tolerance, is because these results would be in contradiction to the HEC-RAS assumption of gradually-varied flow. Extremely detailed survey would be required and streams would need to be quite uniform to fully meet the assumption of gradually varied flow, however from experience it is known that many natural streams do not have gradually-varied flow at all locations. This key assumption does not appear to have been considered in the ACARP studies that have informed the limits specified in the ACARP or DEHP guidelines.

The results presented in the revised tables show reach values using a geometric mean of the individual cross-section values. This method is considered more realistic than considering the individual model cross-section values which when complicated by potentially unreal spikes would not represent stable or unstable stream power conditions. The reach assessment approach is considered a more reliable method to assess risks of channel instability.

The revised charts in the revised hydraulics report also now show the reach values.

Comment - 19.BT

Appendix M2.2; Appendix B to E

The graphical representations of stream hydraulic parameters are difficult to interpret in their present form. The graphs should depict baseline and proposed scenario results where appropriate to demonstrate the impact of mining activities on each watercourse. It was also noted that no 5-year ARI values were included within Appendix D.

Recommendation - 19.BT

The proponent should review the present graphical representation of stream hydraulic parameters to make them more legible and depict baseline and proposed scenarios from the impact of mining on the same graphs were applicable.

Response - 19.BT

The revised Hydraulics report (refer SEIS, Volume 2, Appendix K) presents revised graphs showing baseline and proposed scenarios on the same charts.

3.17 Site Water Management System and Water Balance Technical Report

Comment - 19.BU

Appendix M3; Section 2.2

The first paragraph of this section includes the sentence "Subordinate to the Water Act is the Environmental Protection (Water) Policy 2009 (EPP Water) which provides a framework for the identification of environmental values (EVs) associated with Queensland waters and provision of water quality guidelines and objectives aimed at enhancing or protecting the EVs". This is incorrect.

Recommendation - 19.BU

Replace existing text with "Subordinate to the Environmental Protection Act 1994 is the Environmental Protection Policy 2009 (EPP Water) which provides a framework for the identification of environmental values (EVs) associated with Queensland waters and provision of water quality guidelines and objectives aimed at enhancing or protecting the EVs"

Response - 19.BU

Noted. Correction recommendation is agreed.

Comment - 19.BV

Appendix M3; Section 5.4.1

Tables 5-5 Concept Mine WMS Storages identifies the preliminary proposed minimum capacity of the mine water dams and the raw water dams. In addition, Table 5-6 Summary of Storage Catchment Areas identifies the catchment area for the mine water dams and the raw water dam. These storages appear to capture runoff from undisturbed catchments. The capture of overland flow water would need to be in accordance with the provisions of the Water Resource (Burdekin Basin) Plan 2007 (WRP).

Recommendation - 19.BV

The proponent needs to address the capture of overland flow by these storages and how this will be in accordance with the provisions of the Burdekin WRP.

Response - 19.BV

The purpose of the proposed storages is to manage mine water. The catchment areas upstream of each storage will be minimised to the extent necessary to provide sufficient storage for mine water generated from the Project through the construction of diversion drains. The diversion drains will divert upstream clean water flows around

each storage and in so doing minimise the potential of each of the storages to capture overland flow water. This is understood to be consistent with clause 79 (1d) of the Burdekin WRP.

3.18 Surface Water Quality Technical Report

Comment - 19.BW

Appendix M4; page 3-6

The information presented in the report on all environmental values downstream of the proposed activity could be expanded to include specific locations and more detail about each environmental value. This should include a map.

Recommendation - 19.BW

The proponent provide a map describing the specific locations of environmental values of waterways downstream of the proposed mine site in addition to the relevant Water Quality Objective (WQO) for those environmental values.

Response - 19.BW

As stated in the EIS Water Quality Report (EIS, Volume 2, Appendix M4) environmental values for the study area have not been defined with Schedule 1 of EPP Water. Environmental Values were identified through a desktop assessment of site specific attributes. The desktop assessment showed that the environmental values within the study area are fairly uniform being primarily aquatic ecosystem protection and suitability for stock water and farm use.

Comment - 19.BX

Appendix M4; page 16

Water quality monitoring activities were undertaken by the proponent between October 2010 and February 2011 (wet season). In addition, on page 16 of the "Surface Water Quality Technical Report", the proponent has clearly stated that the annual rainfall at the Project site is highly variable (Fig. 4-2). Therefore, the monitoring period is probably not representative of the water quality conditions of the locations for the whole year (although this is generally the time when streams flow). One season of monitoring data is a limitation for deriving site specific guidelines.

Recommendation - 19.BX

The Queensland Water Quality Guidelines (QWQGs 2009) are followed when designing monitoring programs and deriving local water quality guidelines. This should ideally include the collection of water quality data over 12-24 months (see criteria under Section 4.4.3). Considering that all of the streams within the Project site are

ephemeral, surface water quality monitoring should continue during the upcoming wet seasons, preferably over a number of flow events.

Response - 19.BX

Figure 3-9 from the EIS water Quality report (EIS, Volume 2, Appendix M4) as presented below reports yearly rainfall totals and the statement that rainfall is highly variable refers to variability between years and not within years. Figure 3-10 (below) which shows average monthly rainfall for the area shows that monthly rainfall totals outside the wet season months are below 40 mm. Experience on site has shown that events greater than 50 mm in 24 hours are necessary to generate flows in watercourses within the study area. The water quality monitoring program as discussed with a DEHP Representative has been designed in accordance with the QWQG with water quality sampling to be undertaken following rainfall events of sufficient magnitude to generate flow within the watercourses and not specifically focused on the wet season. It is understood that DEHP does not consider water quality sampling during periods of no flow as being valid and hence such sampling has been excluded from the monitoring program.

The monitoring program is ongoing and will include the collection of water quality data over a minimum of two years. The baseline water quality monitoring will be completed prior to the commencement of construction on the mine.

Figure 3-9 Annual Rainfall for Kevin's Corner - SILO Data Drill (1889 to 2010)

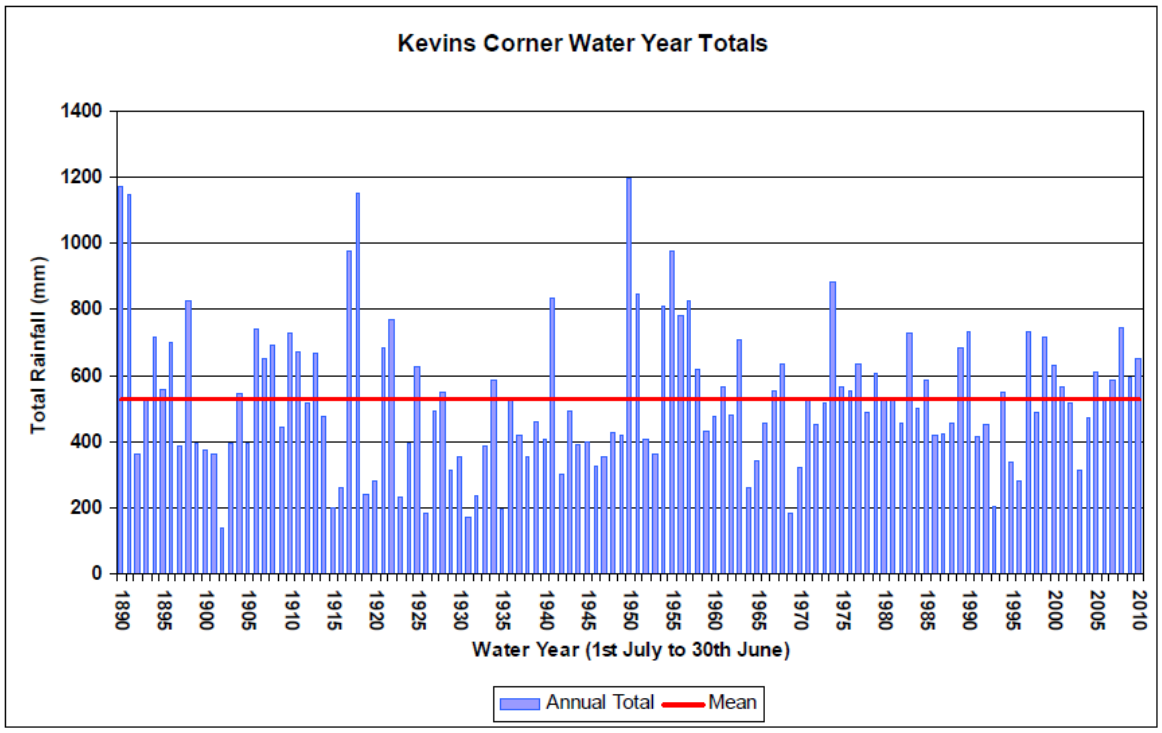
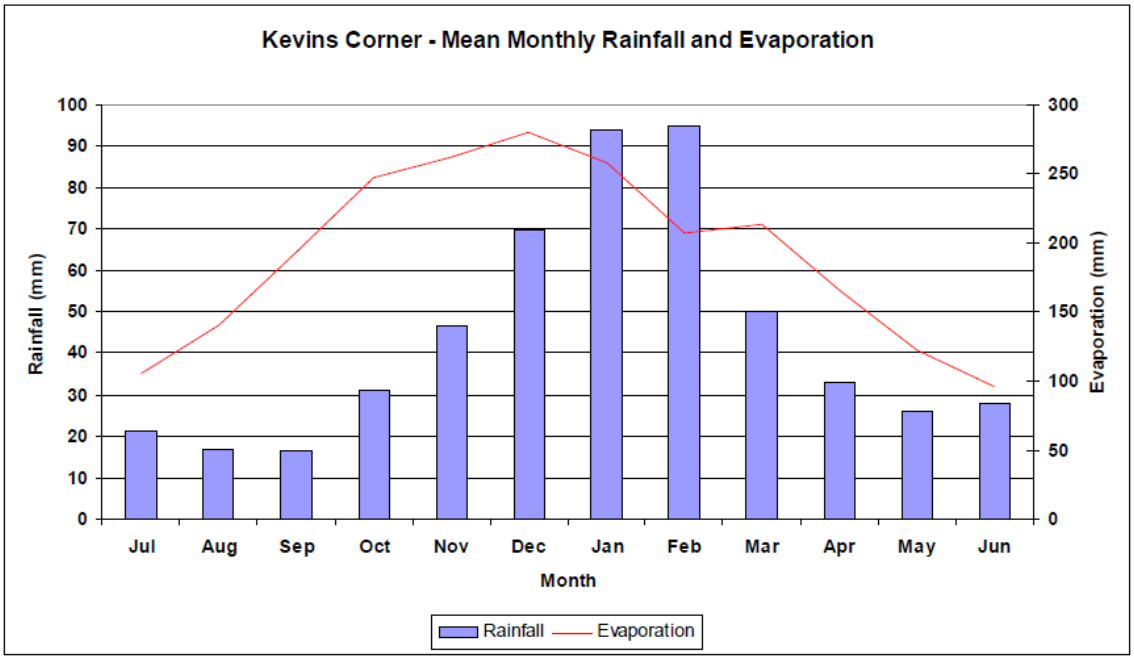


Figure 3-10 Mean Monthly Rainfall and Evaporation for Kevin's Corner (1889 to 2009)



Comment - 19.BY

Appendix M4; page 16

The locations of the monitoring sites as shown on Table 5-2 are expected to be followed by their actual location details (coordinates in decimal degree of longitude and latitude). This includes the positions of stream gauging station site/s.

Recommendation - 19.BY

The positions of the water quality monitoring sites and gauging stations should be provided in decimal degree of longitude and latitude (GDA94). This information is needed to ensure than consistent/identical locations will be used as monitoring sites for future samplings (on-going water quality monitoring programs). This will permit direct comparison of water quality of pre-mine and during operations as part of the approval.

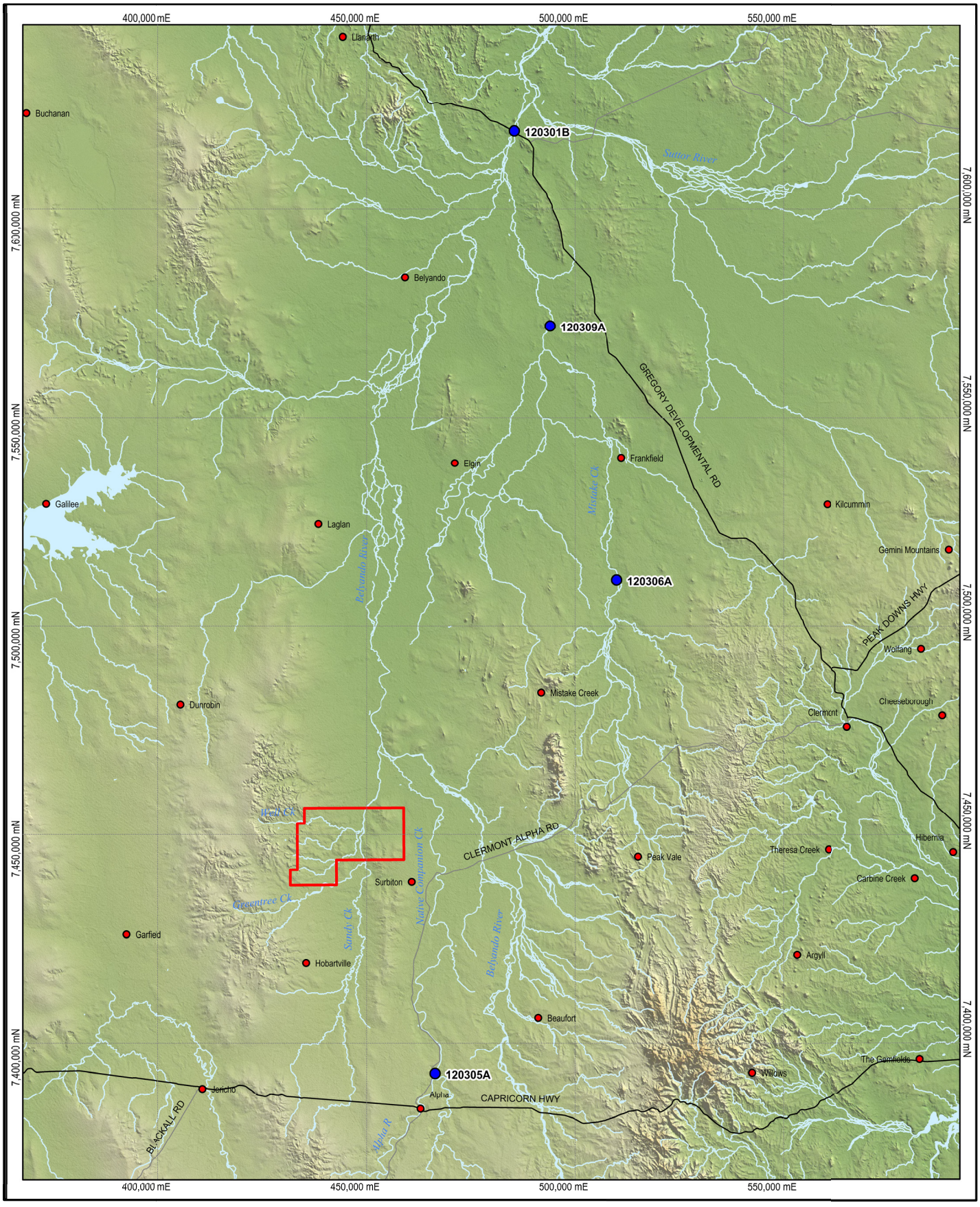
Response - 19.BY

The locations of the water quality sampling locations have been reprojected to lat/long (GDA94)

Table 3-11 from the EIS Water Quality Report (EIS, Volume 2, Appendix M4) has been updated to include the longitudes and latitudes of monitoring sites.

Table 3-11 Monitoring Site IDs and Description

Site ID	Description	Longitude	Latitude
Native	Native Companion Creek at Highway	146.70713	-23.64900
1	Lagoon Creek Upstream	146.50753	-23.11128
2	Lagoon Creek	146.50587	-23.03964
3	Sandy Creek Downstream	146.51162	-22.99849
5	Well Creek Downstream Little Sandy Creek	146.50264	-23.04005
6	Middle Creek Upstream	146.38845	-23.06756
7	Middle Creek	146.42681	-23.08567
8	Middle Creek	146.43266	-23.07765
9	Middle Creek Downstream	146.46482	-23.04502
10	Rocky Creek Upstream	146.35139	-23.10048
11	Rocky Creek Downstream	146.41766	-23.11379
12	Little Sandy Creek Upstream	146.34739	-23.13476
13	Little Sandy Creek Downstream	146.41697	-23.13110
14	Proposed Stream Gauging Location	146.49856	23.070781
A1	Lagoon Creek Upstream	146.48551	-23.33321
A4	Lagoon Creek Upstream	146.52091	-23.14202
A5	Greentree Creek	146.41934	-23.16079
A7	Rocky Creek	146.46379	-23.10169
A8	Little Sandy Creek Downstream	146.42358	-23.29371
A9	Spring Creek Upstream	146.40339	-23.28915



Mining Lease Application (MLA70425) Boundary

DERM Gauging Station

Drainage

Major Highway

Major Road

Source: See Copyright Details below and for full disclosure Please Refer to the EIS *Volume 4 - References*

0 12.5 25km

Scale: 1:1,250,000 (A4)

Datum: GDA94, MGA Zone55

N W E S

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Kevin's Corner Project
Supplementary Environmental Impact Statement

LOCATIONS OF DERM GAUGING STATIONS

Job Number | 4262 6920
Revision | A
Date | 15-06-2012

Figure: 3-11

File No: 42626920-g-1036.wor

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Comment - 19.BZ

Appendix M4; page 34

The monitoring program parameters presented in Table 7-2 are supported. Additional parameters should be considered as outlined in the Final Model Water Conditions for Coal Mines in the Fitzroy Basin (July 2011) unless demonstrated that these are not of potential concern.

Recommendation - 19.BZ

Additional parameters should be included in the surface water quality monitoring program, including but not limited to:

- Molybdenum (dissolved (field-filtered) and total (unfiltered))
- Selenium (dissolved (field-filtered) and total (unfiltered))
- Silver (dissolved (field-filtered) and total (unfiltered))
- Fluoride (total (unfiltered)).
- Sodium

Table W-11, page 52, Environmental Management Plan should also be revised. It is important to note that based on the Model Conditions, all metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.

Response - 19.BZ

The monitoring program has been revised to include the following:

- Molybdenum (dissolved (field-filtered) and total (unfiltered));
- Selenium (dissolved (field-filtered) and total (unfiltered));
- Silver (dissolved (field-filtered) and total (unfiltered));
- Fluoride (total (unfiltered)); and
- Sodium.

The Environmental Management Plan and draft EA Conditions (SEIS, Volume 2, Appendix T1) have been revised based on the Final Model Water Conditions for Coal Mines in the Fitzroy Basin (July 2011).

The updated SEIS table is provided below.

Table 3-12 Parameters for Baseline Monitoring Program

Analyte Group	Parameter	Rationale
Physico-chemical	Alkalinity	Generic parameters for data analysis to indicate general stream condition
	Acidity	
	Electrical Conductivity (field & lab)	
	pH (field & lab)	

Analyte Group	Parameter	Rationale
	Suspended Solids	
	Turbidity (field)	
	Flow rate	
	Dissolved Oxygen (field)	
	Temperature (field)	
	Fluoride	
	Sodium	
	Sulphate	
Metals (total & dissolved)	Aluminium	Indicators of naturally occurring metal contents in the region. During mine activities elevated metal concentrations could indicate uncontrolled mine drainage.
	Arsenic	
	Boron	
	Cadmium	
	Chromium	
	Cobalt	
	Copper	
	Iron	
	Lead	
	Manganese	
	Mercury	
	Molybdenum	
	Nickel	
	Selenium	
	Silver	
	Uranium	
	Vanadium	
	Zinc	
Total Petroleum Hydrocarbons	C6 – C9	Indicators of fuels spills from vehicles and equipment
	C10 – C36	
Nutrients	Ammonia	May vary as a result of contamination from mine activities
	NItrate	

Comment - 19.CA

Appendix M4; pages 35 and 37

There is an error on page 35 and 37 (Table 7-3 and 7-4) where Site A7 is written twice at the same column.

Recommendation - 19.CA

Revise the document by removing one of the A7 from the table. This also applies to page 53 and 54 (Table W-12 and W-13) of the Environmental Management Plan document.

Response - 19.CA

These duplications are noted and have been removed from the EM Plan document. See below for the updated SEIS EM Plan tables.

Table 3-13 Baseline Water Quality Monitoring Schedule (updated for SEIS)

Monitoring Type	Sites	Frequency
Event Sampling	1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, A1, A4, A5, A7, A8, A9, Native	Fortnightly during and after major rainfall events where flow is sufficient and access is available.

Table 3-14 On-going Water Quality Monitoring Schedule (updated for SEIS)

Monitoring Type	Sites	Frequency
Stream Gauging Stations	8, 14	Continuous
Event Sampling	1, 2, 3,4, 5, 8, 9, 10, 12, , 14, A4, A5	Fortnightly during and after major rainfall events where flow is sufficient and access is available

3.19 Environmental Management Plan

Comment - 19.CB

Appendix W; EM Plan

One of the points that the proponent has committed is: "All potential uncontrolled release points from the project will be identified and regulated as release points into the receiving environment."

In the worst scenario, there is a possibility that uncontrolled releases into the environment with insufficient dilution with receiving water and the potential to cause environmental harm.

Recommendation - 19.CB

The release regime has been revised in consultation with DEHP (P Curley) to be consistent with the requirements of the Model Water Conditions for Coal Mine in the Fitzroy Basin and now incorporates release points from which controlled releases will be made on the basis of instream flow and the quality of the release.

Response - 19.CB

The release regime has been revised in consultation with DEHP (P Curley) to be consistent with the requirements of the Model Water Conditions for Coal Mine in the Fitzroy Basin and now incorporates release points from which controlled releases will be made on the basis of instream flow and the quality of the release.

3.20 Surface Water Quality Technical Report

Comment - 19.CC

Appendix W; EM Plan

It is recommended that proponent reformat Section W.3.4.9 and follows the suggested format of the Final Model Water Conditions for Coal Mines in the Fitzroy Basin.

Recommendation - 19.CC

It is recommended that the proponent re-format Section W.3.4.9 as follows:

1. Re-arrange Table W-20 (page 65) to follow the format of Table 5 (page 9) of Fitzroy Model Conditions, with coordinates in decimal degree (Latitude and Longitude).
2. Expand parameters on Table W-21 (page 65) as shown in Table 6 (Page 9) of the Fitzroy Model Conditions. It is recommended that the contaminant limits are set up following the Model Conditions rather than using TBA label. This comment also applies to Table W-22 (page 65).
3. Convert the coordinates of water quality monitoring sites on Table W-23 (page 67, EIS, Volume 2, Appendix W) from Easing/Northing to decimal degree of Longitude and Latitude.

It is recommended that the proposed Environmental Authority Conditions: Schedule C – Water, incorporating recent changes made in the Model Conditions, for review by DEHP. It is also recommended that a surface water quality Receiving Environmental Monitoring Program (REMP) be developed with input from DEHP with implemented as soon as practicable to continue the collection of background and baseline data.

Response - 19.CC

The requested section of the EM Plan has been revised in consultation with the DEHP representative to reflect the Final Model Water Conditions for Coal Mines in the Fitzroy Basin (July 2011).

See below for the updated SEIS tables.

Table 3-15 Mine Affected Water Release Points, Sources & Receiving Waters

Name	Release point Latitude	Release point Longitude	Contaminant source and location	Monitoring point	Receiving water description
RP1	-23.0703	146.4299	MWD1	Outlet works direct into Middle Creek	Middle Creek

Name	Release point Latitude	Release point Longitude	Contaminant source and location	Monitoring point	Receiving water description
				– from release point	
RP2	-23.0658	146.4994	MWD2	Outlet works direct into Sandy Creek – from release point	Sandy Creek
RP3	-23.0900	146.4991	MWD3	Outlet works direct into Sandy Creek – from release point	Sandy Creek
RP4	-23.1038	146.5046	MWD4	Outlet works direct into Sandy Creek – from release point	Sandy Creek
RP5	-23.0547	146.4194	MWD1	Spillway	Well Creek
RP6	-23.0736	146.5263	MWD2	Spillway	Sandy Creek
RP7	-23.0897	146.5048	MWD3	Spillway	Sandy Creek
RP8	-23.1031	146.5113	MWD4	Spillway	Sandy Creek
RP9	-23.0996	146.4270	Borefield Dam 1	Spillway	Little Sandy/Rocky Creek Diversion
RP10	-23.1200	146.4269	Borefield Dam 2	Spillway	Little Sandy/Rocky Creek Diversion
RP11	-23.1516	146.4404	Adit/ROM dam south	Spillway	Sandy Creek

[1] Latitude and longitude values to be confirmed with final placement of discharge points during detailed design.

Table 3-16 Mine Affected Water Release Limits (updated for SEIS)

Quality Characteristic	Release Limits	Monitoring frequency	Comment
Electrical conductivity (uS/cm)	Release limits specified in W-23 for variable flow criteria.	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	
Turbidity (NTU)	Limit derived from suspended solids limit and demonstrated correlation between turbidity to suspended solids historical monitoring data for dam water*	Daily during release* (first sample within 2 hours of commencement of release)	Turbidity is required to assess ecosystems impacts and can provide instantaneous results.
Suspended Solids (mg/L)	Limit to be determined based on receiving water reference data and achievable best practice sedimentation control and treatment*	Daily during release* (first sample within 2 hours of commencement of release)	Suspended solids are required to measure the performance of sediment and erosion control measures.
Sulphate (SO_4^{2-}) (mg/L)	Release limits specified in Table W-23 for variable flow criteria.	Daily during release* (first sample within 2 hours of commencement of release)	Drinking water environmental values from NHMRC 2006 guidelines OR ANZECC.

Note: *Limit for suspended solids can be omitted if turbidity limit is included. Limit for turbidity not required if suspended solids limit included. Both indicators should be measured in all cases.

Table 3-17 Release Contaminant Trigger Investigation Levels (updated for SEIS)

Quality Characteristic	Trigger Levels (µg/L)	Comment on Trigger Value	Monitoring Frequency
Aluminium	1172	80th percentile of reference data	Monitoring to be commenced within 2 hours of commencement of the release, and then 24 hours thereafter.
Arsenic	13	For aquatic ecosystem protection, based on SMD guideline	
Cadmium	0.2	For aquatic ecosystem protection, based on SMD guideline	
Chromium	3	80th percentile of reference data	
Copper	4	80th percentile of reference data	
Iron	2234	80th percentile of reference data	
Lead	4	For aquatic ecosystem protection, based on SMD guideline	
Mercury	0.2	For aquatic ecosystem protection, based on SMD guideline	
Nickel	11	For aquatic ecosystem protection, based on SMD guideline	
Zinc	16	80th percentile of reference data	
Boron	370	For aquatic ecosystem protection, based on SMD guideline	
Cobalt	90	For aquatic ecosystem protection, based on SMD guideline	
Manganese	1900	For aquatic ecosystem protection, based on SMD guideline	
Molybdenum	34	For aquatic ecosystem protection, based on SMD guideline	
Selenium	10	For aquatic ecosystem protection, based on SMD guideline	
Silver	1	For aquatic ecosystem protection, based on SMD guideline	
Uranium	1	For aquatic ecosystem protection, based on SMD guideline	
Vanadium	10	For aquatic ecosystem protection, based on SMD guideline	
Ammonia	900	For aquatic ecosystem protection, based on SMD guideline	
Nitrate	1100	For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	Protection of livestock and short term irrigation guideline	
Sodium (ug/L)	18000	For aquatic ecosystem protection, based on SMD guideline	

Note:
1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.
2. The quality characteristics required to be monitored as per Table W-3 (SEIS, Volume 2, Appendix T1) can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from Table 3 by amendment.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

Table 3-18 Mine Affected Water Release during Flow Events (updated for SEIS)

Receiving waters/ stream	Release Point (RP)	Gauging station	Gauging Station Latitude (decimal degree, GDA94)	Gauging Station Longitude (decimal degree, GDA94)	Receiving Water Flow Recording Frequency	Receiving Water Flow Criteria for discharge (m^3/s)	Maximum release rate (for all combined RP flows)	Electrical Conductivity and Sulphate Release Limits
Sandy Creek	RP2, RP3, RP4	Sandy Creek Gauging Station	23.075557	146.49855	Continuous (minimum daily)	Low Flow <3.5 m3/s for a period of 28 after natural flow events that exceed 3.5 m3/s	< 0.2 m^3/s	Electrical conductivity (µS/cm): 168 Sulphate ($SO4^{2-}$): 250 mg/L
						Medium Flow > 3.5 m^3/s	< 5.8 m^3/s	Electrical conductivity (µS/cm): <1500 Sulphate (SO42-) (mg/L) <2125 mg/L
							< 1.1 m^3/s	Electrical conductivity (µS/cm): <3500 Sulphate ($SO4^{2-}$) (mg/L) <5000
						High Flow > 10 m^3/s	< 2 m^3/s	Electrical conductivity (µS/cm): <5000 Sulphate ($SO4^{2-}$) (mg/L) <5000 mg/L
Middle Creek	RP1	Middle Creek Gauging Station	-23.07765	146.43266	Continuous (minimum daily)	Low Flow <0.5 m3/s for a period of 28 after natural flow events that exceed 1 m3/s	<0.2 m^3/s	Electrical conductivity (µS/cm): 168 Sulphate ($SO4^{2-}$): 250 mg/L
						Medium Flow > 1 m^3/s	< 1.7 m^3/s	Electrical conductivity (µS/cm): <1500 Sulphate (SO42-) (mg/L) <2125 mg/L
							< 0.34 m^3/s	Electrical conductivity (µS/cm): <3500 Sulphate ($SO4^{2-}$) (mg/L) <5000
						High Flow >4.5 m^3/s	< 0.9 m^3/s	Electrical conductivity (µS/cm): <5000 Sulphate ($SO4^{2-}$) (mg/L) <5000 mg/L

3.21 Site Water Management System and Water Balance Technical Report

Comment - 19.CD

Appendix M3; Page 13, 17-20

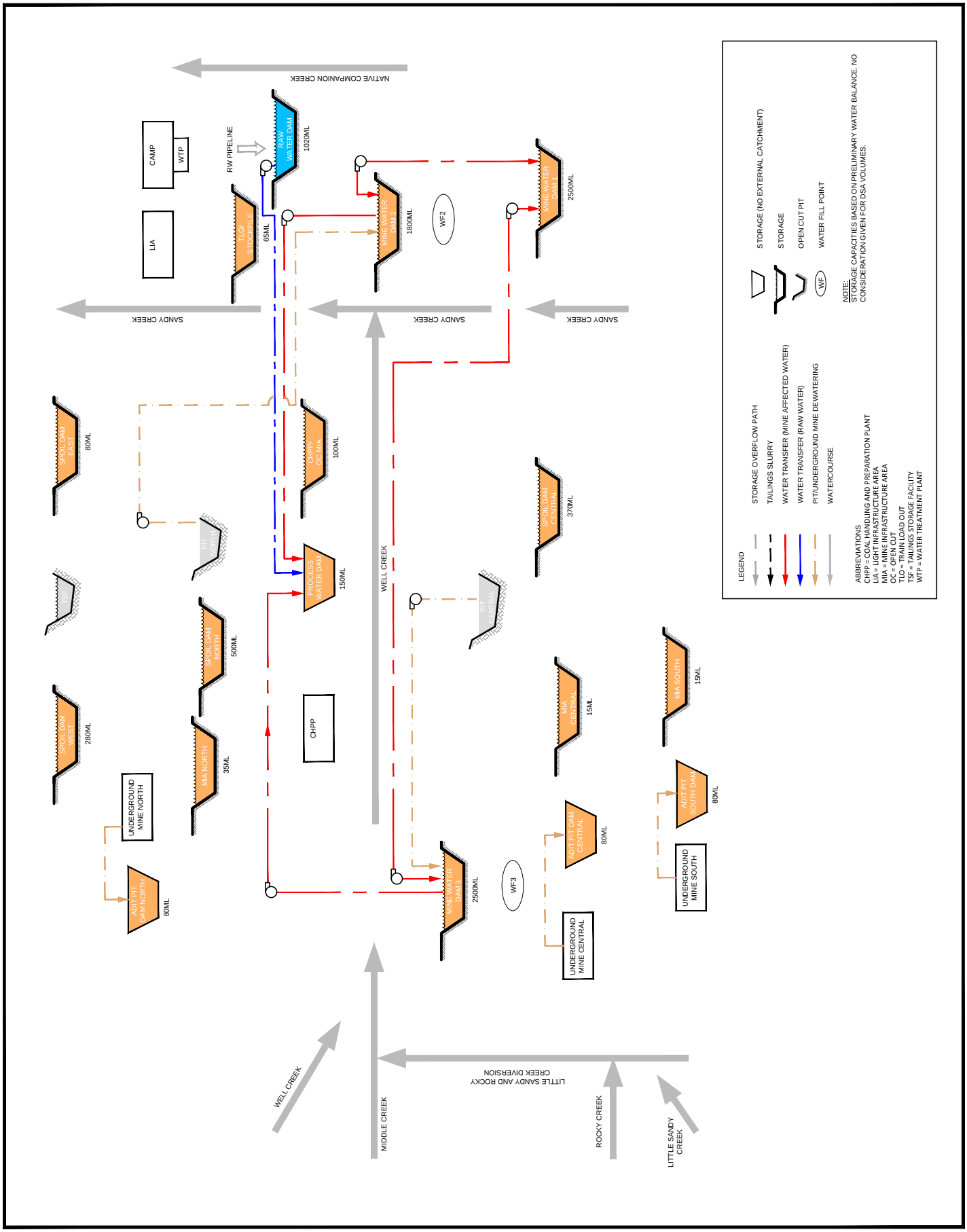
Some abbreviations did not appear to have any description, such as: RWD and MWD. Also legends on Fig. 4-5, 4-6, 4-7, and 4-8 should be expanded as some characters were not included, such as the description of grey dashed, red, brown, and blue arrows.

Recommendation - 19.CD

Describe the acronyms such as RWD and MWD on the list of Abbreviations. Expand the legend of all figures to provide a better understanding for the reader/audience.

Response - 19.CD

The comments on the Appendix M3 document are noted. The addition of abbreviations and acronyms has been added to the EM Plan (SEIS, Volume 2, Appendix T1) as the live document going forward. Additionally the EM Plan figures have been checked to confirm the characters are adequately represented. The figures mentioned above have been reproduced and are presented below.



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Kevin's Corner Project
Supplementary Environmental Impact Statement

CONCEPT WMS SCHEMATIC - WATER DISTRIBUTION AND PIT DEWATERING FLOW PATHS

Job Number	4262 6920
Revision	A
Date	15-06-2012

Figure: 3-15

File No: 42626920-g-1040.dwg

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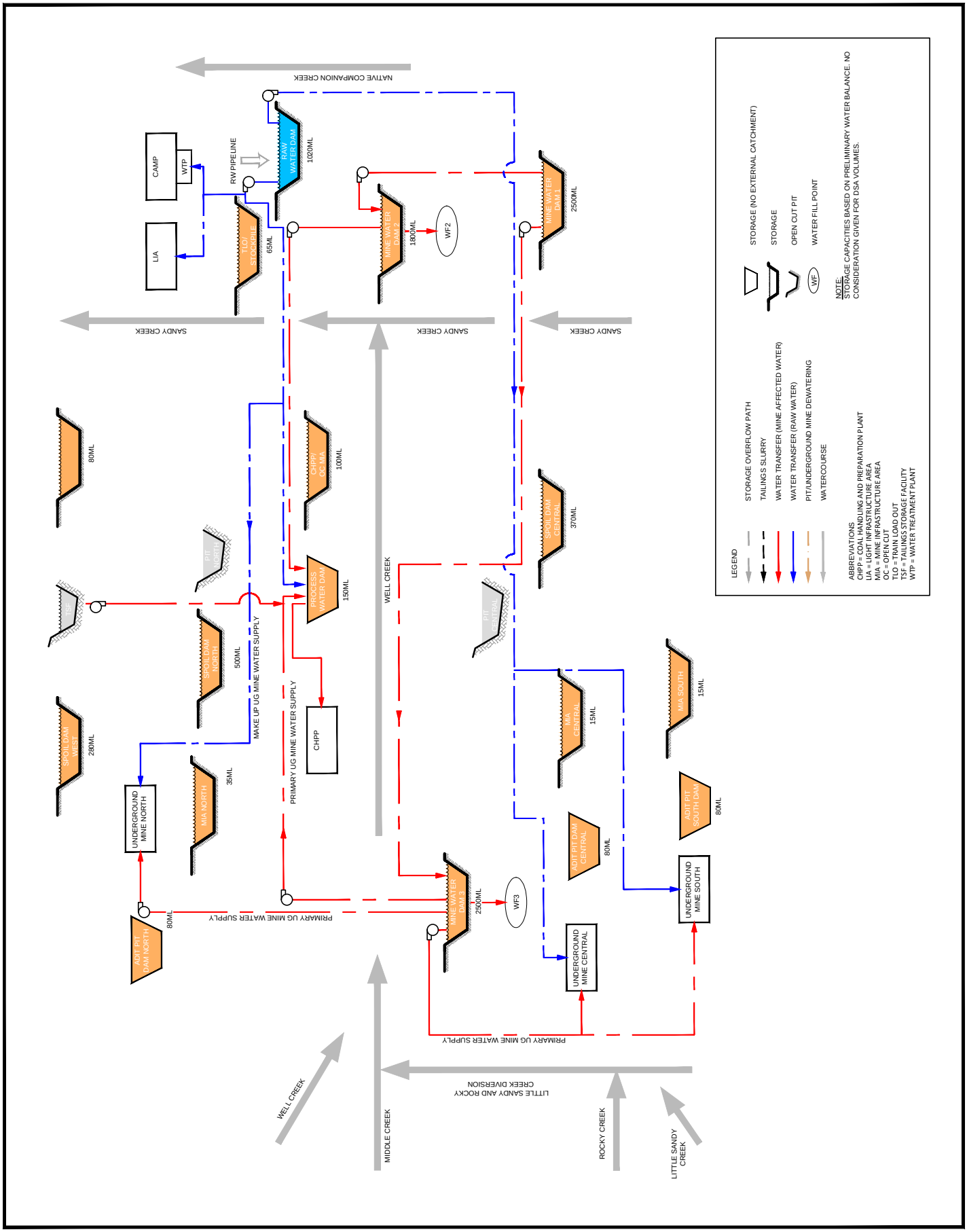

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Supplementary Environmental Impact Statement

CONCEPT WMS SCHEMATIC - WATER DEMAND FLOW PATHS

Job Number	4262 6920
Revision	A
Date	15-06-2012

Figure: 3-14

File No: 42626920-g-1039.dwg

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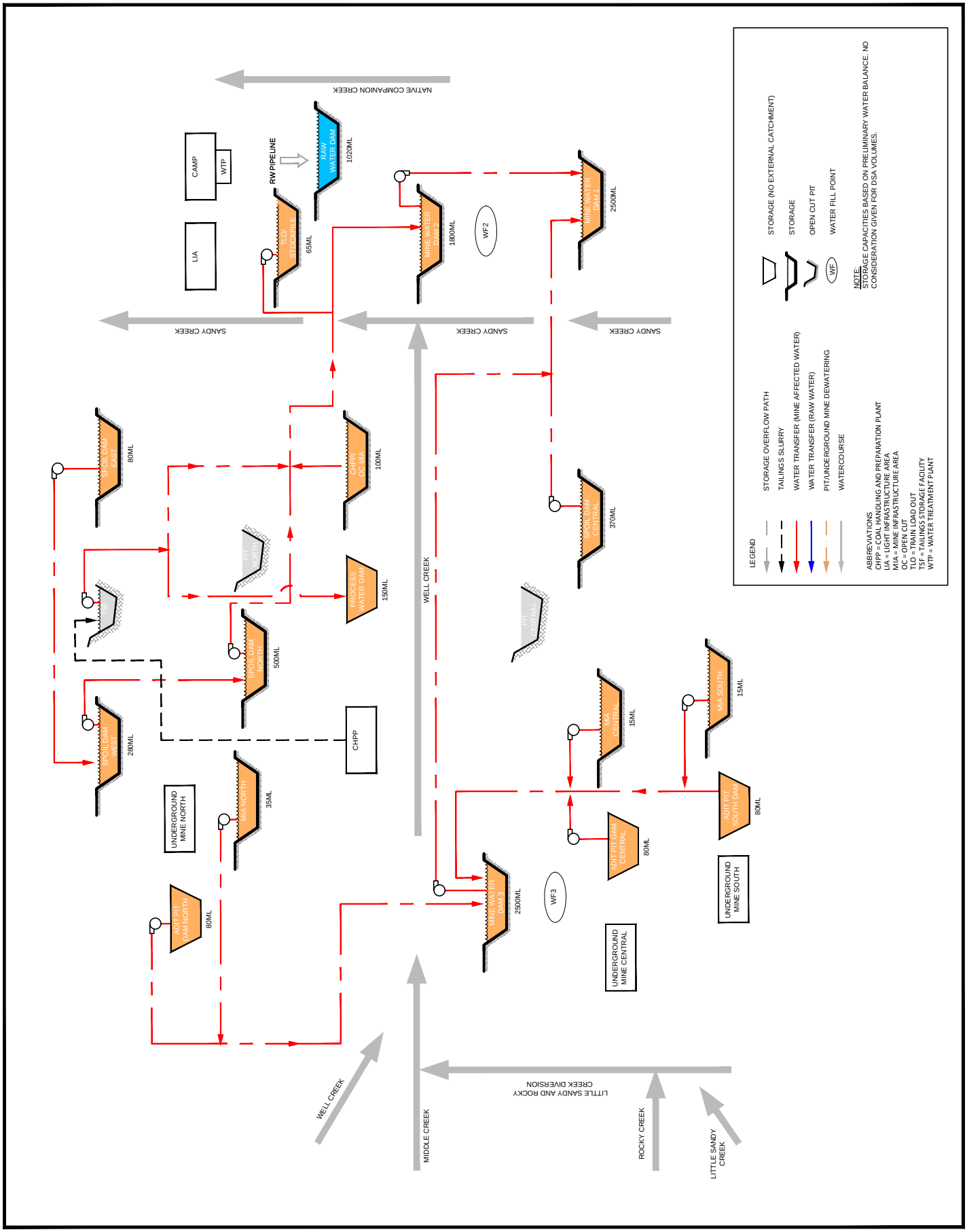

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Kevin's Corner Project
Supplementary Environmental Impact Statement

CONCEPT WMS SCHEMATIC - WATER RECOVER FLOW PATHS

Job Number	4262 6920
Revision	A
Date	15-06-2012

Figure: 3-13

File No: 42626920-g-1038.dwg

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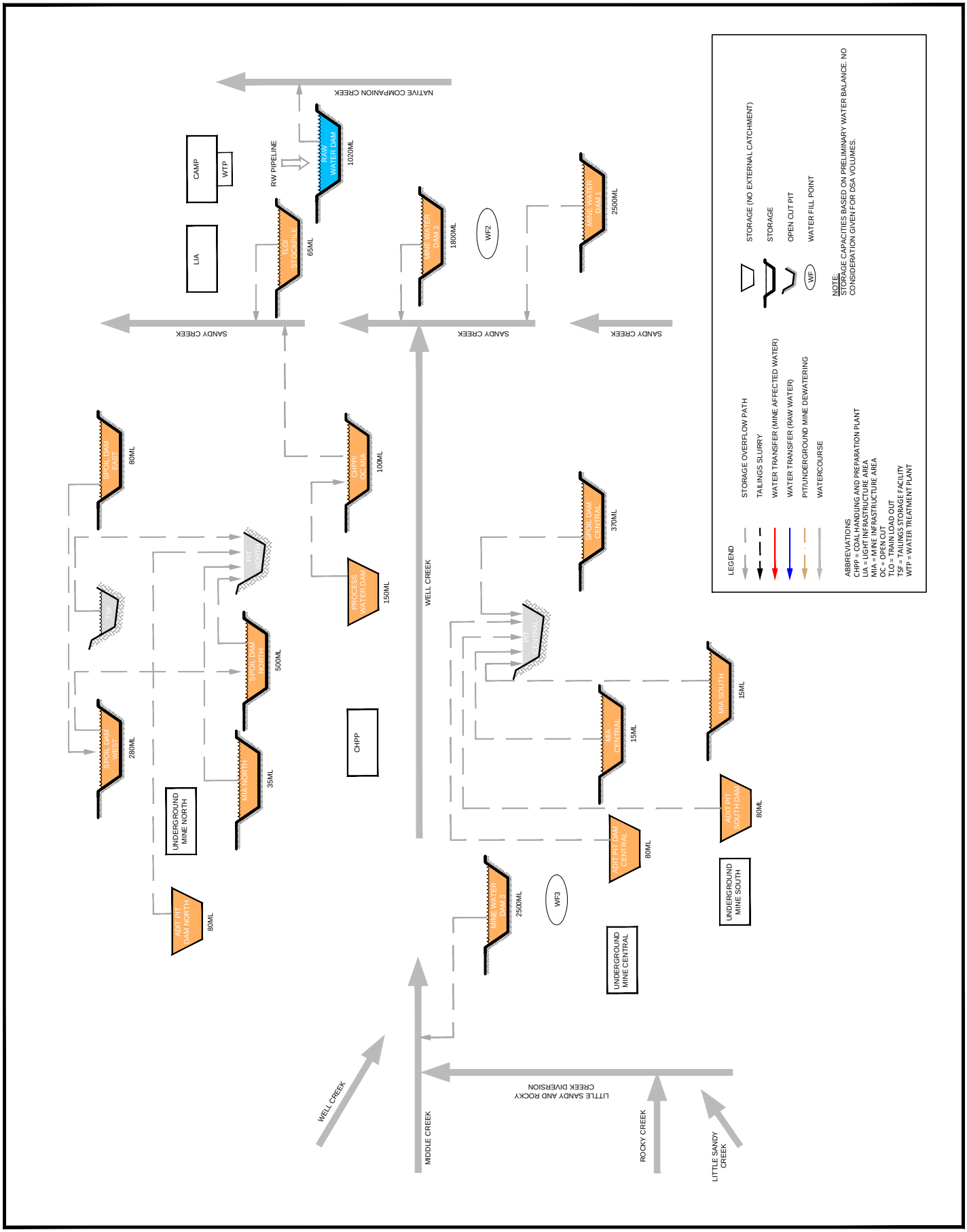

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Kevin's Corner Project
Supplementary Environmental Impact Statement

CONCEPT WMS SCHEMATIC - STORAGE OVERFLOW PATHS

Job Number	4262 6920
Revision	A
Date	15-06-2012

Figure: 3-12

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3.22 Air Quality

Comment - 19.CE

Appendix O; Section 3.2

There is uncertainty about the adopted background concentrations. The adopted background TSP, PM_{10} and $PM_{2.5}$ concentrations are reported in Table 3-4. These are based on the Ensham Coal Mine Project measured data. It is not clear that the adopted background levels represent the 70th percentile or 95th percentile of the measured data.

Recommendation - 19.CE

Please clarify that the adopted background levels represent the 70th percentile or 95th percentile of the measured data. The adopted background concentrations must be the most representative of the site.

Response – 19.CE

The background concentration applied in the assessment are from the Ensham Coal mine project and are the 70th percentile of 24-hour average concentrations recorded for PM_{10}. The analysis of seven months of background monitoring data from the Monklands TEOM indicates that the background concentrations applied may be an over-estimate for the site which means that all predicted concentrations in the assessment could be an over-estimate. The interim results are shown in Table a) and a description of the background monitoring program is provided in Volume 2, Appendix G, Section 2-2 of the SEIS.

Please refer to section 2-2 of the SEIS for a full description of the background monitoring program for the site.

Table 3-19 Interim background monitoring concentrations

Site	Start date	End date	PM_{10} (70th percentile) (µg/m^3)	% completion
Forrester Homestead	01/07/2011	29/02/2012	16.5	64.5
Monklands Homestead	01/07/2011	29/02/2012	23.1	99.9
Alpha Accommodation Village	01/07/2011	29/02/2012	22.4	94.5
EIS and SEIS background	01/01/2009	31/12/2009	27.0	>90

Comment - 19.CF

Appendix O; Section 4.1

$PM_{2.5}$ emissions from diesel powered equipment and vehicles are not sufficiently considered. Fine fugitive dust such as $PM_{2.5}$ is expected to be released from the mining activities. In the EIS $PM_{2.5}$ concentrations are estimated assuming a $PM_{2.5}$ to PM_{10} ratio of 20%. According to the data published by Australian NPI, diesel combustion is a major source of $PM_{2.5}$ emissions in the coal mining industries. It is reported as the second highest source of $PM_{2.5}$ emissions in the industrial sector. See reference below:

http://www.DEHP.qld.gov.au/environmental_management/pdf/emission-reportcard-09.pdf.

Recommendation - 19.CF

The EIS must include $PM_{2.5}$ emissions from the combustion of diesel powered mining equipment's and vehicles and estimate the impact on the receiving environment.

Response - 19.CF

An assessment of emissions from diesel powered non-mobile and mobile equipment has been made and is presented in Volume 2, Appendix G, Section 4-1-2-2 of the SEIS.

Comment - 19.CG

Appendix O; Section 4.1

It is not clear if there will be any diesel power generating facility proposed for the site. If a power generation facility will be installed, then the emissions from this facility must be provided in the EIS.

Recommendation - 19.CG

The EIS must clarify the emissions of power generation facility if proposed for the site.

Response - 19.CG

The Kevin's Corner coal mine has entered into a supply of infrastructure and services agreement with Powerlink Queensland for permanent electricity supply. This is contracted for 30 months after financial closure for the Alpha Coal Mine project. Therefore, there will not be an on-site power generation facility. There will be temporary diesel generators used during the construction phase and emergency diesel generators available for use during power outages for critical mine safety equipment, airport etc. An assessment of $PM_{2.5}$ emissions from these sources has been made and is presented on Volume 2, Appendix G, Section 4-1-2-2 of the SEIS.

Comment - 19.CH

Appendix O; Section 4.2

It is not clear how the dust control target of 75% can be achieved. It is mentioned in the above sections that by watering the haul roads dust emissions will be controlled by 75%. This will be achieved by Level 2 watering of haul roads. According to Section 12.4.1 of "NSW Coal Mining Benchmarking Study, 2011", the Level 2 requires greater than 2 L/m^2/hour watering to achieve 75% control of dust emissions. Level 1 requires 2 L/m^2/hour watering and it can achieve 50% control of dust emissions. See NSW document: http://www.environment.nsw.gov.au/air/coalminingNSW.htm.

It is not clear the amount of water required for level 2 watering to achieve 75% dust control will be available at the site.

Recommendation - 19.CH

The EIS to clarify how the 75% control of dust from the unpaved haul road can be achieved and the amount of water required for watering will be available at the site. Also clarify that the most cost-effective and best practice control measures are considered in selecting the vehicles fleet and designing the mining activities.

Response - 19.CH

HGPL has undertaken a supply and demand assessment of the water required on an annual basis for the Project which is described in the Off-Lease Assessment Report (SEIS, Volume 2 Appendix I). The assessment shows that for the first five years of the Project, an off-site source of water for mine construction and operations, including dust mitigation, will not be required.

HGPL is investigating a number of options for the supply of water to the Project after five years which include:

- A new pipeline to the Project site sourcing water from the Connors River Dam (CRD) under a SunWater contract lease, supply and transport agreement. The CRD and pipeline project would involve the construction and operation of the dam and associated water distribution infrastructure in Central Queensland;
- The secure of water from the Emerald Fairburn Dam in association with a dedicated water pipeline. The Emerald water pipeline would be sized to allow for the conveyance of however much water supply allocation can be secured in the near future;
- Use of existing farm dams which exist on the Kevin's Corner Project tenement;
- Flood water harvesting from the Belyando River in combination with a proposed off-stream dam storage;
- Surface evaporation protection for site water storages;
- Soils engineering compaction technology to provide earthworks stabilisation to reduce the use of water for soil;
- Dewatering of mining pits and underground mining areas to off-set the water needed for import to the site; and
- Use of Belt press filters in the CHPP which would reduce water demand in the CHPP by 50%.

Comment - 19.CI

Appendix O; Section 4.2

It is not clear why graders are the major source of dust emissions. According to Table 4-1 of Section 4.2, graders were found to be the major source of air emissions. Wheel generated dust from the unpaved roads and truck dumping overburden are usually the major dust emission sources at coal mining sites. It is not clear why graders were found to be the major source of air emissions at this site.

Recommendation - 19.CI

The EIS should clarify why graders were found to be the major source of air emissions at this site.

Response - 19.CI

The assessment of emissions from graders was overestimated in the EIS because the average speed applied to the graders was too high. The background to the reason for this over-estimation is described in Volume 2, Appendix G, Section 3-2 of the SEIS. Table 3-20 shows the impact of the correction to the calculation of grader emissions:

Table 3-20 Estimation of grader emissions

Calculation	Year 1 PM_{10}	Year 5 PM_{10}	Year 15 PM_{10}	Year 25 PM_{10}
Graders (EIS)	243,236	243,236	145,942	194,589
Graders (SEIS)	7,756	7,756	4,654	6,205
Graders (difference)	-235,480 (-19.3%)	-235,480 (-15.4%)	-141,288 (-11.0%)	-188,384 (-9.9%)

Comment - 19.CJ

Appendix O; Section 4.2

It is not clear that the worst case emissions and their impact are estimated. The worst case emissions can be generated by considering the maximum daily production rate, the maximum daily haulage of the material and the worst case meteorological conditions. The worst case scenarios are not discussed in the report.

Recommendation - 19.CJ

Please calculate the worst case emission rates based on (a) the maximum daily production rate, (b) the maximum daily haulage of material and (c) the worst case meteorological conditions. If these emissions are significantly higher than those for normal operations, it is necessary to evaluate the worst-case dust impact, as a separate exercise to determine the impact on the neighbouring sensitive receptors.

Response - 19.CJ

Project emissions have been calculated for each year of the life of the mine and sensitivity analyses have been undertaken on the input parameters drag-line drop height, overburden moisture content and coal moisture content to show that underestimation of these parameters are unlikely to significantly impact on emissions generation (Volume 2, Appendix G, Section 3-3 of the SEIS). Furthermore, predictions reported in the assessment represent those modelled with the most conservative dispersion conditions which are likely to be experienced at the Project site over the course of one year.

During the operation of the mine, the requirement for a consistent production of product coal from the mine to rail load out is such that significant variations in source activity during the course of the day are not anticipated and

are therefore not possible to estimate. An attempt to estimate daily variations would be arbitrary and therefore would not add any value to the assessment.

Comment - 19.CK

Appendix O; Section 5.2.4

Averaging period of dust deposition is not provided. The estimated dust deposition impacts from the operation of the project are presented in Table 5-5 of Section 5.2.4. It is not clear that these represent the monthly or the annual average values. Please note that the DEHP criterion and the standard license condition for dust is 120 $mg/m^2/day$ and it is based on monthly (30-days) averaging period.

Recommendation - 19.CK

The EIS to provide the maximum monthly or 30-days average dust deposition values and compare these values against the DEHP criterion of 120 $mg/m^2/day$.

Response - 19.CK

The predicted dust deposition rate values are reported in Volume 2, Appendix G, Section 4-1-4, Table 4-6 of the SEIS. The units are $mg/m^2/day$ and are compared against the DEHP guideline value of 120 $mg/m^2/day$.

Comment - 19.CL

Appendix W; Section W.3.3.7

Insufficient detail is provided on the industry best practise dust controls. The Environmental Management Plan (Section W.3.3.7) of the EIS provides a general description of the air emission control strategies proposed for the site. The EIS does not compare these mitigation measures against the industry best practice. Best practice environmental management is a benchmarking of performance against the industry and is assessed against the measures currently used nationally and internationally within the industry.

The information provided in the NSW Coal Mining Benchmarking Study, 2011, (see: http://www.environment.nsw.gov.au/air/coalminingNSW.htm) may be considered for assessing the mitigation measured proposed for the site against the mining industry best practice environmental management.

According to the above NSW document the most cost-effective control measure is the utilization of larger-capacity vehicles, which can produce a significant cost saving due to the reduction in the number of vehicles required as well as the reduction in operating costs. The utilization of large trucks can minimize the number of trips. It is not clear that the best practice control measures are considered in selecting the vehicle fleet and designing mining activities.

Recommendation - 19.CL

The EIS to demonstrate that the mitigation measures proposed for the site represent the best available control technologies for controlling particulates from the air emission sources and provide a summary table showing the expected removal efficiency of these control technologies.

Response - 19.CL

The draft EM Plan (Volume 2, Appendix T1), Table 3 is a summary of the measures proposed for the control of emissions from the site are compared to those described in the NSW Coal Mining Benchmarking Study (2011), which represent best practice for the industry.

3.23 Environmental Management Plan

Comment - 19.CM

Appendix W; Section W.3.4.3

The Department has not fully assessed the impacts of subsidence on watercourses and the surrounding landscape as the information presented was located within numerous volumes and sections of the EIS documentation. The proponent will need to provide a Subsidence Management Plan.

Recommendation - 19.CM

The proponent will need to provide a Subsidence Management Plan that includes all the relevant documentation and is in accordance with the draft Departmental guideline titled Watercourse subsidence - Central Queensland Mining Industry, Draft Version 7.0, 12 July 2011.

Response - 19.CM

An Interim Subsidence Management Plan as discussed with DEHP officers has been developed as part of the SEIS. The Interim Subsidence Management Plan is presented in Volume 2, Appendix N. The plan has been developed in accordance with the Watercourse subsidence - Central Queensland Mining Industry guideline.

3.24 Groundwater

Comment - 19.CN

Appendix N1; Section 4

Table 4-2 provides detail of the layers in the Regional scale FEFLOW model. It is noted that the Tertiary sediments are not included as a layer in this model.

In section 3.3 of the groundwater technical report it is stated; Groundwater will flow into the pit through the pit wall from the tertiary sediments (where water occurs). A similar statement is made in this section in relation to water from the tertiary sediments flowing into the long wall mine.

Whilst it is also stated that the tertiary aquifer is not considered to have regional significance there needs to be some indication of what limitations this will provide in relation to the ability to predict impacts of mine dewatering on the tertiary aquifer.

Recommendation - 19.CN

The proponent should provide a clear statement as to why the tertiary sediments were not included as a layer in the model and what limitations, if any, may result.

Response - 19.CN

The predictive groundwater model (SEIS, Volume 2, Appendix L) has been refined to include Tertiary units.

Potential mine dewatering and depressurisation indirect impacts (induced flow) on the Tertiary units was evaluated. These data are presented in the modelling report, SEIS, Volume 2, Appendix L,Section 11 and Section 13.

Comment - 19.CO

Appendix N1; Section 4

Based on Volume 1 section 12 figure 12-11 it seems possible that there is a difference in heads in the D-E sands of some 60 metres from the southern boundary of the model to the northern boundary. Similarly there is a gradient from west to east which according to the groundwater report, provides recharge to the area.

The pre-mining groundwater flow direction has been stated to be south-south-west to north-north-east. It has also been stated that following mining this will have a radical change to become a north – south flow.

However the initial heads for the model have been fixed at 300 metres AHD right across the model area. This seems to severely restrict the models ability to take into account pre-existing groundwater flow conditions and to accurately identify impacts which will include a dramatic change in flow direction.

Furthermore the model has been set up with 300 metre AHD fixed head boundary conditions along all sides of the model. This would appear to impede the models ability to supply water from the west, the identified primary recharge process for the area. In view of these concerns and the previously stated concerns about the permeabilities to be used for the Rewan formation and the lack of a tertiary sediments layer in the model, it would be best if the model could be peer reviewed to look at these and other issues which would affect the models ability to predict impacts from the mine dewatering.

Recommendation - 19.CO

The proponent should engage a third party consultant to peer review the Regional Groundwater model with a particular emphasis on its ability to predict impacts of both Kevin's Corner and Alpha mines on existing users of groundwater in the area.

Response - 19.CO

A refined groundwater model has been conducted since EIS submission. The refined groundwater model report is presented in the SEIS Groundwater Report (Volume 2, Appendix L).

Section 7 of the Groundwater Report (SEIS, Volume 2, Appendix L) details the model refinement, including model boundary changes (Section 7.4) which were based on steady-state groundwater level data, flow patterns, and gradients. The steady-state conditions were used during model calibration (point-to-point). Section 8 details the model construction and initial head conditions.

Section 9 provides the calibration and sensitivity data. Appendix D (of the Groundwater Report) includes the field measured groundwater levels (and corresponding unit) and the model simulated water levels. The relation between the simulated and observed groundwater levels was the preferred indicator of model error. Root-mean-square error (RMSE) was selected to evaluate the performance of model calibration based on groundwater levels. Good agreements between calibrated results and field measurements usually have RMSE less than 10 % of the difference between the maximum and minimum potentiometric heads across the model area. The RMSE for the steady-state calibration was 3.4 m, which was 3.7% of the approximate 90 m range of groundwater levels.

The refined model was subject to third party / peer review by independent reviewers. This report forms part of Appendix L - Revised Kevin's Corner SEIS Groundwater Report. The third party / peer review report was completed by Parsons Brinckerhoff Australia Pty Limited (PB) and is included in Appendix D of the revised groundwater report (SEIS, Volume 2, Appendix L).

Comment - 19.CP

Appendix N1; Section 4.3

The FEFLOW Regional Scale model has been developed with 13 layers. Layer 1 represents the GAB (presumably the Clematis) and layers 2 and 3 the Rewan formation. It is not clear if layers 2 and 3 have been assigned different hydraulic properties. It seems that they may not have. In Volume 2 Appendix N1 section 6.1.2 it is stated that; Figure 15 shows drawdown in the uppermost (GAB) aquifer. This Figure is constructed by showing drawdown in layer 1 of the model, in an area where layer 1 has finite thickness and represents the GAB aquifer. Drawdown in the GAB is not predicted to be zero, but it is localised. The peak drawdown just reaches 15 m.

Sections 12.11 and 12.12 of Volume 1 Section 12 Groundwater, indicate that the Clematis will be unaffected. Much information on varying horizontal and vertical permeabilities at varying depths in different bores is presented in Table 12-30. Based on the data in this table the following comments are made; these results indicate heterogeneity within the Rewan Group, which contains layers of very low permeability. These zones

provide the confining pressures required for artesian and sub-artesian conditions recorded in the GAB and reduce the potential for vertical induced flow. The results match the conceptualisation of the Rewan Group acting as a regional aquitard, which prevents inter-aquifer and inter-basin flow.

There does appear to be some conflict between modelling predictions in the groundwater technical report and information presented in the groundwater report.

The model should reflect the heterogeneity in the Rewan demonstrated in table 12-30. Accurate predictions on the potential impacts of mining on the GAB aquifers are required. If GAB aquifers are not impacted does this mean additional impacts will occur in other aquifers in other areas?

Recommendation - 19.CP

The regional model should reflect the permeability variation in the Rewan Formation as presented in Volume 1 Section 12 Table 12-30.

Response - 19.CP

Refined groundwater modelling has been conducted for the Project, which allowed for a revised assessment of potential impacts on the GAB. Section 10 of the SEIS, Volume 2, Appendix L includes an assessment of groundwater level and potentiometric pressure changes as a result of mining. The predictive model was used to predict groundwater level drawdown within different aquifers and corresponding model layers, over time and spatially across the model domain. Projected groundwater levels below the Great Artesian Basin (GAB) Rewan Formation and Clematis Sandstone do not indicate any drawdown effects as a result of mine dewatering over the life of mine.

The predictive model was refined to allow for additional impact assessment (Section 11), including the registered springs, sub-E sandstone, older units to the east, and Tertiary units. Long term impacts, assessed through the use of observation points within the model domain, were assessed spatially and over time. Resultant hydrographs were projected (300 years post mining) and included in Appendix E. These data were used to assess potential impacts (including cumulative impacts) on aquifers and geological units within and adjacent to MLA70426.

Comment - 19.CQ

Appendix N1; Section 6.1.1

The predicted inflow volumes to the mines of 265 GL to the Alpha open cut and 125 GL to the Kevin's Corner underground do not match the figures on Figure 13. It is assumed that some varying parameters have been used but the difference needs to be explained.

Similarly there are two outcomes provided in Figure 13, an (a) and a (b) case but no discussion about what these cases are.

Recommendation - 19.CQ

The variations in volumes provided in section 6.1.1 and the graphs in Figure 13 should be explained.

Response - 19.CQ

New predictive groundwater estimates have been compiled on a year-on-year basis. SEIS, Volume 2, Appendix L, Section 10.2 provides the range of groundwater ingress estimates. These were estimated for Kevin's Corner alone and Alpha Coal and Kevin's Corner Projects.

Predictive inflows for Alpha Coal and Kevin's Corner were estimated through zone budget in the model simulation. Scenario Case 7 (increasing storage in various model layers) provided the highest estimates of groundwater volumes during the life of mine and the lowest groundwater volume estimate resulted from scenario Case 21. Case 21 reduces vertical hydraulic conductivity in Bandana Formation and Joe Joe Formation. Case 21 results in a marked reduction in groundwater ingress volumes estimates as it reduces the potential impacts of longwall mining (goaf) interconnectivity within the underground mining operations. Based on documented goaf impacts, resulting in increased fracturing, it is considered that Case 21 has a low probability. A range of high, low, and expected groundwater ingress estimates were compiled using the three matching scenarios (Case 7, Case 21, and Base Case). The total volumes of groundwater ingress for both Kevin's Corner and Alpha coal projects at LOM were 241 GL (Case 7), 176 GL (Base Case), and 104 GL (Case 21).

An estimate of groundwater ingress volumes into Kevin's Corner Project alone was undertaken. Three scenarios (high (Case 7), base, and low (Case 21)) were modelled using only the Kevin's Corner mine schedule and plan. The total volumes of groundwater ingress for Kevin's Corner mine only at LOM were 141 GL (Case 7), 117 GL (Base Case), and 43 GL (Case 21).

3.25 General EIS

Comment - 19.CR

The draft Environmental Management Plan does not adequately address issues relating to the impact of activities on Cudmore Resources Reserve (a Category C ESA).

It also does not address the potential impacts on the adjoining Cudmore NP (a Category A ESA).

Current siting of infrastructure and works on the resources reserve are based on desktop assessment (discussed at meeting of 18/11 between DEEDI/DEHP/Hancocks). For the mining requirements, condition 14 of the Code of Environmental Compliance for Mining Lease Projects prohibits Level 2 Code Compliant EA activities from occurring within 2km of a category A environmentally sensitive area or within 1km of a category B environmentally sensitive area.

Cudmore National Park is a Category A environmentally sensitive area. QPWS manage Category A areas to maintain the natural integrity, cultural values and natural landscapes and seascapes across time as the highest priority of protected area management. QPWS has a legislative obligation to ensure the cardinal principles of national park management are followed. The cardinal principle of national park management is to 'provide, to the

greatest possible extent, for the permanent preservation of the area's natural condition and the protection of the area's cultural resources and values (Nature Conservation Act 1992).

The EIS proposes that activities be allowed to occur within 100 metres of the National Park boundary. The full impacts of subsidence at this stage are unknown and will potentially impact on areas away from the area directly above the mining activity.

Cudmore RR is also a Category C Environmentally Sensitive Area under the DEHP framework for managing mining activities.

Cudmore RR sits on a largely flat area, but has a vein of slightly higher land along the spine – there needs to be some consideration of how subsidence will influence the drainage into the edges of the National Park and surrounding landscape.

Most of the RR is remnant vegetation, and it provides a significant buffer area for the NP. 3 of the 7 (approx.) regional ecosystems on the RR are of concern, and these all have low representation in the protected area estate. Cudmore RR is also in the Jericho subregion, which has about 2.5% in protected area. This is quite low, so Cudmore RR is important in this respect. The block does not sit directly on an identified conservation corridor, but with Cudmore NP it makes up a significant node on the Great Artesian Basin Rim Corridor

Recommendation - 19.CR

Mining interests cannot be granted over national park (s27 of the NCA). QPWS is responsible for authorising the activity on the Resources Reserve under the Nature Conservation Act 1992 and any authority needs to ensure that it has no impact on the primary values of Cudmore National Park.

QPWS recommends that all mining activity comply with the Code of Environmental Compliance for Mining Lease Projects and that no mining activity be permitted within 2km of Cudmore National Park.

Response - 19.CR

Figure 3-16 depicts the relationship between the topography of Cudmore National Park, Cudmore Resources Reserve and the north-western corner of ML 70425.

As shown on Figure 3-16, there is an elevated section (described as a 'spine' in submission 19.CR) which traverses Cudmore National Park and Cudmore Resources Reserve in a north-west to south-east alignment. Part of this elevated land is within the mining lease area that is within the Resources Reserve and will be subject to underground mining and may therefore be impacted by associated subsidence.

Figure 3-17 depicts the extent of proposed mining activities within the bounds of Cudmore Resources Reserve.

Cudmore Resources Reserve overlies the western portion of the northern and central mine areas. The extent of subsidence impacts has been estimated and is detailed within the Subsidence Management Plan contained within Appendix J of the Kevin's Corner EIS. The amount of subsidence expressed at the surface is largely dependent on strata, depth below surface of mining and thickness of seam mined.

The impacts to the ecological values of these areas have been detailed within Section 9 and Section 10 of the Kevin's Corner EIS. Subsidence impacts from underground mining activities have been detailed within Appendix J of the Kevin's Corner EIS and will be further detailed within Appendix N of the Kevin's Corner SEIS.

Surface water impacts and changes to topography are detailed within Appendix N and Appendix Q of the Kevin's Corner SEIS.

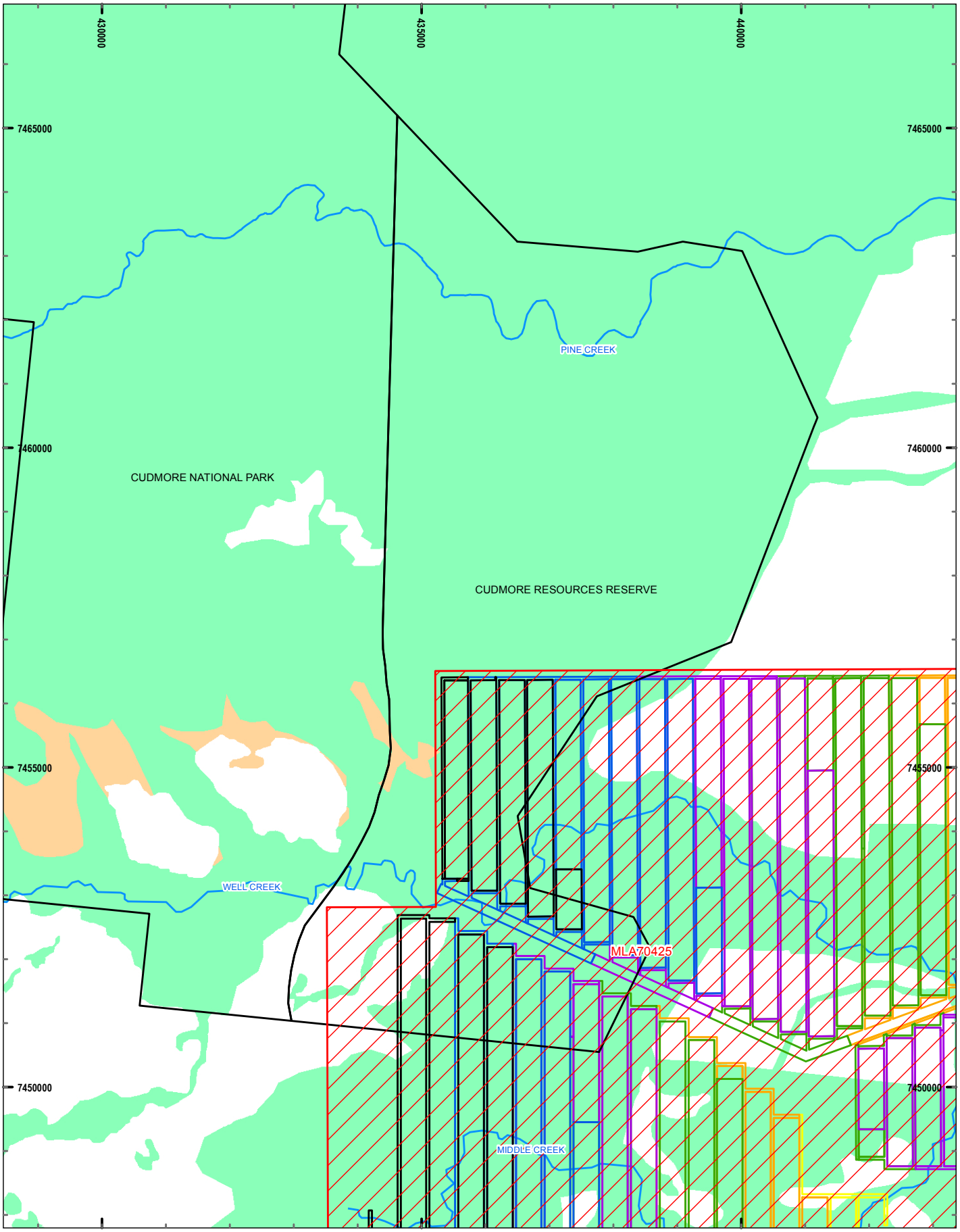
Careful management will be required to minimise potential impacts on the ecological and surface water values of the Resources Reserve and the National Park and the potential effects of subsidence.

Part of any mining lease approval is that impacts from any land disturbance cannot occur outside of the mining lease boundary. Therefore, the planned longwall panels will be designed to ensure that this is the case.

Further potential impacts will be minimised through the development of three "management plan" type documents with differing levels of applicability to the Cudmore Resources Reserve. These are:

- A Management Plan - developed in accordance with Part 7 of the Nature Conservation Act 1992, to be prepared by DNPRSR;
- An Operations Plan - specifically tailored for the proposed underground operations and associated surface impacts within Cudmore Resources Reserve; this Operations Plan is currently under development by HGPL/GVK; and
- An Environmental Management Plan - for the whole of mine operations which will include reference to Cudmore Resources Reserve, the Management Plan for Cudmore Resources Reserve and the Operations Plan for activities within and below Cudmore Resources Reserve.

While these management plans are currently being prepared, it should be noted that mining within the area of the Resources Reserve is not proposed until the later stages of the mine life; currently proposed for Years 25 to 30. Conditions may be considered appropriate to allow the review of the management plan closer to the time of the proposed mining activity within the Resources Reserve.



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Scale: 1:80,000

Datum: GDA 94, MGA Zone55

N W E S

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Kevin's Corner Project
Supplementary Environmental Impact Statement

DISTURBANCE CONTRAINTS

Job Number	4262 6920
Revision	D
Date	15-06-2012

Figure: 3-17

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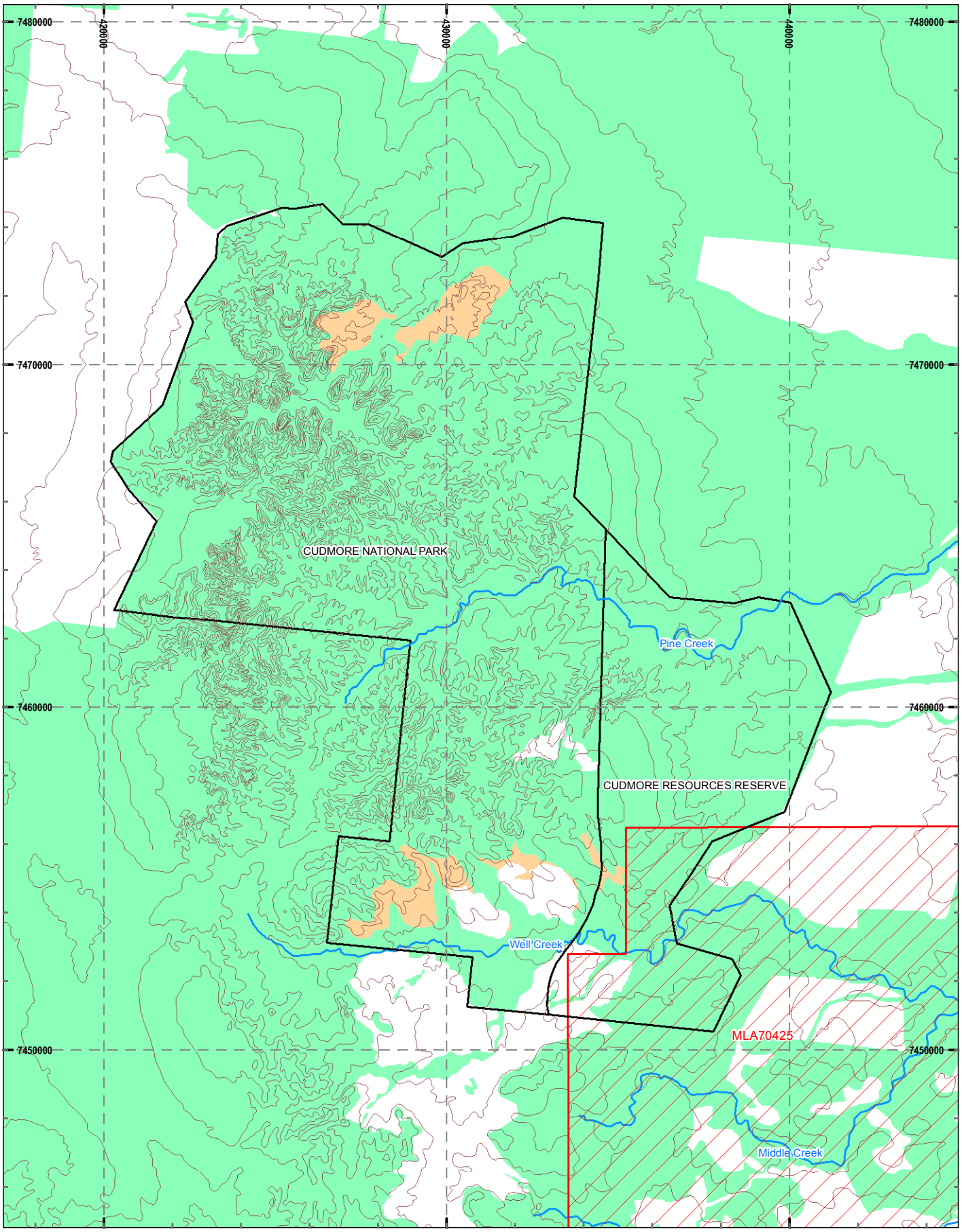

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0 1 2 3 4 km

Scale: 1:150,000

Datum: GDA 94, MGA Zone55

N W E S

HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

BIOPHYSICAL CONTRAINTS

Job Number	4262 6920
Revision	B
Date	15-06-2012

Figure: 3-16

File No: 42626920-g-1004.mxd

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3.26 Environmental Management Plan

Comment - 19.CS

Appendix W; Figure W-5

Figure W-5 only identifies the project disturbance area as the open cut and infrastructure areas, however subsidence from underground mining is considered significant disturbance under the legislation.

Recommendation - 19.CS

The EM Plan accurately identifies all significant disturbance as the project disturbance area.

Response - 19.CS

Noted. The impacts of subsidence are being assessed as part of the Subsidence Management Plan. An Interim Subsidence Management Plan can be found in Volume 2, Appendix N of the SEIS.

Comment - 19.CT

Appendix W; Section W.2

Required to identify all mining activities – including all Environmentally Relevant Activities under schedule 2 and 6 of the Environmental Protection Regulation 2008, and all notifiable activities under schedule 2 of the Environmental Protection Act 1994.

The EM Plan should identify and describe all the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Kevin's Corner Coal Mine and define the critical environmental values. For each of the environmental values to be protected, commitments must be proposed and identify the environmental protection objective(s), standard(s), measurable indicator(s) and control strategy(ies) to demonstrate how the objective(s) will be achieved.

Recommendation - 19.CT

The EM Plan should include all relevant mining activities proposed to be undertaken as part of the Kevin's Corner Coal Mine.

The EM Plan should include an identification of all the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Kevin's Corner Coal Mine.

Response - 19.CT

A revised Environmental Management Plan (EMP) for the Project has been developed to support the SEIS. The revised EMP includes further details on environmental values within the Mining Lease area and the potential

environmental impacts that are likely to occur as a result of the proposed mining and ancillary activities. The revised EMP also includes control strategies and commitments to demonstrate how the identified impacts are to be mitigated and prevented.

All Environmentally Relevant Activities (ERAs) known at the time of preparing the Kevin's Corner EIS were identified and contained within the Kevin's Corner EIS.

Comment - 19.CU

Appendix W; Section W.3.3.7

Section W.3.3.4 identifies that greenhouse gases will be sourced from fugitive emissions of coal seam gas. The EM Plan does not include environmental protection commitments or control strategies for fugitive emissions of coal seam gas.

Section 51 of the Environmental Protection Regulation 2008 'Matters to be considered for environmental management decisions' states that:

(1) The administering authority must, for making an environmental management decision relating to an activity, consider the following matters—

(h) The quantity and type of greenhouse gases released, and the measures proposed to demonstrate the release is minimised using best practice methods that include strategies for continuous improvement.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that may release greenhouse gas and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Recommendation - 19.CU

Abatement measures for the fugitive emissions of coal seam gas should be proposed and assessed. It should include a description of the proposed measures to avoid and/or minimise greenhouse gas emissions directly resulting from activities of the Kevin's Corner Coal Mine. Where abatement measures are not feasible, these options should be discussed.

The EM Plan should identify and describe all the environmental values and potential environmental impacts that will be caused by all the activities proposed to be undertaken as part of the Kevin's Corner Coal Mine with regards to greenhouse gas. For each of the environmental values to be protected, commitments must be proposed and identify the environmental protection objective(s), standard(s), measurable indicator(s) and control strategy(ies) to demonstrate how the objective(s) will be achieved.

Response - 19.CU

HGPL included an assessment of fugitive emissions of greenhouse gases (GHG) in the EIS. The total estimate of GHG emissions across the mine has been updated in the SEIS (Volume 2, Appendix G, Section 5.3) to include the contribution from land clearance. The total GHG inventory is shown below:

Table 3-21 Total GHG inventory

Scope	Source	Minimum Emissions (t CO2-e / yr)	Maximum Emissions (t CO2-e / yr)	Average Emissions (t CO2-e / yr)	Life of Mine Emissions (t CO2-e)
1	Fugitive emissions	75,360	320,468	270,032	7,830,936
1	Diesel combustion (transport)	19,804	55,238	33,506	971,679
1	Diesel combustion (stationary)	1,660	15,888	13,111	380,222
1	Explosives- Ammonium Nitrate Fuel Oil (ANFO)	0	57,030	3,824	110,891
1	Land clearance	-	-	17,907	519,316
1	Total Annual Scope 1	96,824	448,624	338,380	9,813,004
2	Purchased Electricity	525,399	2,024,881	1,699,164	49,275,743
Annual Scope 1 and 2		637,074	2,392,332	2,037,544	59,088,787

Fugitive emissions occur at both underground and open-cut mines with actual emission levels varying based on the gas content of the coal, local geology and the depth of the coal seam below ground level. Depending on the quality and quantity of the fugitive gas it can be captured and flared or used for power generation. While the volume of fugitive emissions presented for the Kevin's Corner site in the Table above appears to be large it is effectively over an open-cut and three underground mines which make the capture and utilisation of this gas not feasible.

HGPL have developed a draft Environmental Management Plan (EM Plan) (Volume 2, Appendix T1) which includes measures for the minimisation and mitigation of greenhouse gas emissions from the Project. The EM Plan will be approved by DEHP before implementation.

Comment - 19.CV

Appendix W; Section W.3.4.3

The EM Plan does not outline the water containment structures to be utilised for the Kevin's Corner Coal Project.

Recommendation - 19.CV

This section of the EM Plan should include a determination if any water storages onsite will be classified as a regulated dam following a hazard analysis. For any identified regulated dams, the following information is required to be submitted:

1. Adequate design plans or conceptual design plans for the dams, together with certification (for final design plans) or endorsement (for conceptual design plans) of a suitably qualified and experienced person that the submitted final or conceptual design plan of the regulated dam will provide the performance stated in that submitted design plan.
2. The design of the regulated dam should take into account:

- That the dam is designed and located to have the smallest practical catchment;
- That the dam is designed to accept waste inputs for the operation year and inputs from the critical wet season;
- The spillway is designed and maintained to withstand the peak flow from the critical design storm (the critical design storm has a duration that produces the peak discharge for the catchment);
- That the gradients of earth embankment batters should be stable;
- That the dam should prevent any erosion of the downstream face of the dam and spillway to avoid surface scour which may lead to failure of the wall; and
- The Department of Mines and Energy, Technical Guidelines of Environmental Management of Exploration and Mining in Queensland, January 1995.

For a final design plan, the documents must include all investigations and design reports, plans and specifications sufficient to hand to a contractor for construction, and planned decommissioning and rehabilitation outcomes, so as to address all hazard scenarios that would be identified by a properly conducted hazard assessment of the structures.

For a conceptual design plan, the documents must be accompanied by a commitment that the final design plan will not be substantially different from the concept and will therefore inspire sufficient confidence to allow the administering authority to endorse the conceptual design plan for the regulated dam within the EM Plan.

Response - 19.CV

All of the DEHP requirements suggested for Regulated Dams and Levees will be considered and incorporated into the further conceptual design planning and final detailed design.

All levees (as shown in the EIS) will be Regulated Structures.

All mine water dams as shown in the EIS will be Regulated Structures. The preliminary hazard category of the Regulated Dam is Significant Hazard, based on expectations that mine water will only be mildly contaminated with salinity. These are included in the EM Plan (Volume 2, Appendix T1).

A Site Water Management (Basis of Design) Report has been provided as Appendix M of this SEIS. This presents the concept design details for regulated structures proposed for the Kevins' Corner coal mine including the diversion, levees and dams associated with mine water management system

The concept locations presented in the EIS were sufficient to demonstrate that space is available and has been planned for the works and to adequate detail to inform holistic impacts assessment (e.g. soils and vegetation clearing, groundwater impacts of dams etc.).

The requirement that final design plan will not be substantially different from the concept is considered to be premature given that the detailed design requirements requested are part of the approval process for regulated structures which is conducted post EIS.

Comment - 19.CW

Appendix W; Section W.3.4

The EM Plan does not provide information regarding the management of stormwater on the proposed Kevin's Corner Coal Mine.

Section 57 of the Environmental Protection Regulation 2008 'Release of stormwater' states:

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of stormwater to the receiving environment.

(2) The administering authority must consider the following matters—

(a) the topography of, and climatic conditions affecting, the receiving environment;

(b) if the activity involves exposing or disturbing soil—the soil type, its characteristics and the way it is managed;

(c) if the activity involves the storage of materials or wastes that are exposed to rainfall or stormwater run-off—the characteristics and containment of the material or waste.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of stormwater and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Recommendation - 19.CW

The EM Plan should provide descriptions of the proposed stormwater drainage system and the proposed disposal arrangements, including any off-site services. Maps (A3) should be provided in latitudes and longitudes in the GDA94, and include contours at a scale suitable to allow contributing catchments for rainfall runoff to be determined. Maps should include a contour plan with superimposed site layout showing all relevant facilities and infrastructure. Watercourses, drainage lines and contributing catchments must be identified and marked on the map.

Response - 19.CW

The stormwater generated from facilities within the mine area to the west of Sandy Creek will be contained within the mine water management system and is not proposed to be separately released to the environment. Stormwater generated within the Light Industrial Area (LIA) and the accommodation village which are located outside of the mining area will be managed through dedicated stormwater management systems. Stormwater

generated within the LIA will be treated and reused on site wherever possible. Excess stormwater will be discharged to Sandy Creek. Stormwater generated within the Accommodation Village will be managed using best practice water sensitive urban design principles. Excess stormwater will be discharged to the environment following an appropriate level of treatment in accordance with accepted practice. These figures will be developed and incorporated into the further conceptual design planning and final detailed design. Once this has occurred a revision of the EM Plan will occur incorporating these updates and changes. This will then allow for predictions to be made with respect to rainfall runoff contributing to surrounding catchments.

Comment - 19.CX

Appendix W; Section W.3.4.2

The EM Plan does not provide statements clearly identifying each environmental value with the potential to be affected by the project. The EM Plan does not provide sufficient detail regarding ecosystem values. The EM Plan does not include background receiving water and sediment monitoring data as appropriate to enable the administering authority to establish release limits.

Recommendation - 19.CX

The EM Plan should include a description of all environmental values – including ecosystem values. These values should be clearly linked to water quality data.

Descriptions must include background receiving water and sediment monitoring data as appropriate to enable the administering authority to establish release limits.

Response - 19.CX

The text provided in Section W.3.4.2 of the EIS EM Plan (EIS, Volume 2, Appendix W) and retained in the SEIS EM Plan (SEIS, Volume 2, Appendix T1) is consistent with the information provided in the EIS surface water quality technical report (EIS, Volume 2, Appendix M4). The environmental values applying to the study area are identified as:

- Protection of slightly to moderately disturbed aquatic habitat
- Suitable for visual recreation
- Protection of cultural and spiritual values
- Suitable for crop irrigation, stock water and farm use

The proponent has to date collected 185 baseline water quality samples from across the Kevin's Corner and Alpha Coal mine sites. This is considered to represent a sufficient dataset to represent baseline water quality and has been used to propose modified limits for water quality parameters in (SEIS, Volume 2, Appendix T1) where appropriate as discussed with DEHP . It is proposed that the baseline monitoring program will be continued to supplement the existing data and to continue to revise 20th and 80th percentiles for the purpose of establishing local water quality objectives. ANZECC/QWQG default values would apply in the interim.

See below for the updated SEIS table.

Table 3-22 Release Contaminant Trigger Investigation Levels - Potential Contaminants (updated for SEIS)

Quality Characteristic	Trigger Levels (µg/L)	Comment on trigger value	Monitoring Frequency
EC	700	*For aquatic ecosystem protection, based on SMD guideline*	Monitoring to be commenced within 2 hours of commencement of the release, and then 24 hours thereafter.
pH	6 – 8.5	*For aquatic ecosystem protection, based on SMD guideline*	
Turbidity	460	*99th percentile of reference data*	
Aluminium	7490	*99th percentile of reference data*	
Arsenic	13	*For aquatic ecosystem protection, based on SMD guideline*	
Cadmium	0.2	*For aquatic ecosystem protection, based on SMD guideline*	
Chromium	16	*99th percentile of reference data*	
Copper	40	*99th percentile of reference data*	
Iron	9700	*99th percentile of reference data*	
Lead	12	*99th percentile of reference data*	
Mercury	0.5	*99th percentile of reference data*	
Nickel	11	*For aquatic ecosystem protection, based on SMD guideline*	
Zinc	167	*99th percentile of reference data*	
Boron	370	*For aquatic ecosystem protection, based on SMD guideline*	
Cobalt	90	*For aquatic ecosystem protection, based on SMD guideline*	
Manganese	1900	*For aquatic ecosystem protection, based on SMD guideline*	
Molybdenum	34	*For aquatic ecosystem protection, based on SMD guideline*	
Selenium	10	*For aquatic ecosystem protection, based on SMD guideline*	
Silver	1	*For aquatic ecosystem protection, based on SMD guideline*	
Uranium	1	*For aquatic ecosystem protection, based on SMD guideline*	
Vanadium	20	*99th percentile of reference data*	
Ammonia	900	*For aquatic ecosystem protection, based on SMD guideline*	
Nitrate	1100	*For aquatic ecosystem protection, based on ambient Qld WQ Guidelines (2006) for TN*	
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Fluoride (total)	2000	*Protection of livestock and short term irrigation guideline*	
Sodium (ug/L)	23000	*99th percentile of reference data*	

Note:

1. All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered). Trigger levels for metal/metalloids apply if dissolved results exceed trigger.

2. The quality characteristics required to be monitored as per Table W-3 (SEIS, Volume 2, Appendix T1) can be reviewed once the results of two years monitoring data is available, or if sufficient data is available to adequately demonstrate negligible environmental risk, and it

may be determined that a reduced monitoring frequency is appropriate or that certain quality characteristics can be removed from Table 3 by amendment.
3. SMD – slightly moderately disturbed level of protection, guideline refers ANZECC & ARMCANZ (2000).
4. LOR – typical reporting for method stated. ICPMS/CV FIMS – analytical method required to achieve LOR.

Comment - 19.CY

Appendix W; Section W.3.4.4

At varying points through the EIS documents there is discussion about the use of groundwater by private landowners for domestic purposes and or drinking water.

In Volume 1 Section 12 Groundwater section 12.8.10 Bore Survey Hydrochemistry it is stated that;

Groundwater from the sandstone units is thus considered to be suitable, albeit brackish, for domestic and stock watering purposes.

In section 12.10 Environmental Values it is stated that;

The groundwater chemistry data indicates that, although brackish in areas, the groundwater is suitable for domestic purposes from the sandstone units.

The main groundwater EVs for groundwater in the MLA 70425 is, therefore, domestic use and stock watering.

There is some discussion that factors which include elevated metal levels may result in samples from some bores not being suitable as a source of drinking water. There appears to be little or no discussion about those domestic purposes, other than drinking water, eg septic systems, laundry purposes etc.

Then in the EMP the following two statements are noted.

Volume 2 Appendix W Section 3.4.2 Environmental Values states;

While groundwater in the area is used for domestic purposes and based solely on total dissolved solids (TDS) values may be potable, groundwater can be above drinking water guideline values for metals and metalloids, and generally is not suitable for drinking water consumption without treatment.

Again there is no discussion about domestic purposes other than drinking.

Then section 3.4.4 Groundwater Objectives states;

Ensure the Project does not detrimentally impact on the suitability of groundwater for agricultural use (stock watering).

There is no mention of domestic purposes.

Recommendation - 19.CY

The proponent must clearly address all existing domestic use of water (not just drinking water) and provide reasoning as to why the impacts to domestic supplies should not be included in 3.4.4.

Response - 19.CY

Section W3.4.2 and W3.4.4 of the EM Plan (Volume 2, Appendix T1) have been updated to include consideration of domestic use.

Comment - 19.CZ

Appendix W; Section W.3.4.6

The EM Plan does not outline the water management practices or water management system to be utilised for the Kevin's Corner Coal Project.

This section of the EM Plan is required to outline the water management practices of the site – i.e. the water management plan. This section of the EM Plan should examine and address all issues relevant to the importation, generation, use, and management of water on a mining project in order to minimise the quantity of water that is contaminated and released by and from the project.

A mining project water management plan systematically identifies the actual and potential risks of harm to natural water flows posed by mining activities; the actual and potential risk of environmental harm posed by water contaminated by the mining activities; and defines management actions that will effectively minimise these risks.

A mining project water management plan should be based on a comprehensive process that assesses the likelihood and consequence of risks to water quality values within and around the mining project. Effective management actions (controls) should then be identified to reduce these risks to acceptable levels.

Recommendation - 19.CZ

This section of the EM Plan should detail the sites water management system following the departmental guideline 'Preparation of water management plans for mining activities'. The guideline identifies that a water management plan should form an integral part of the EM Plan.

The EM Plan should:

Determine the adequacy of the system to prevent unauthorised discharges during Average Recurrence Interval (ARI) 1 in 25, 1 in 50, 1 in 100 and 1 in 1000 year rainfall events considering both an operational water balance and the ability to deal with rainfall events that may occur on site at any time.

Provide an overview of the application of 'time of concentration' design rainfall events for catchments contributing to individual relevant dams or storages or to groups of dams or storages, under conditions arising from water balance modelling or more conservative alternatives; so as to determine the failure outcomes for worst case contaminant release including overtopping and likely collapse of structures and the Annual Exceedence Probability (AEP) levels at which such outcomes occur.

Develop control measures for routine operations to minimise the likelihood of environmental harm.

- Develop control measures to manage seepage and drainage for all regulated structures.

- Develop contingency plans and emergency procedures for non-routine situations.
- Develop a system for emergency spills or discharges.

Response - 19.CZ

The standard conditions specified in the Model Water Conditions for Coal Mines in the Fitzroy Basin in relation to Water Management Plans have been incorporated in the revised EM Plan.

Comment - 19.DA

Appendix W; Section W.3.4.7

There is inconsistency in the proposed baseline water quality monitoring period.

In the EM Plan (V2 W p50), the proponent states local trigger values will be developed around the continuing baseline monitoring program, which will continue until the mine is operational. On p53, it states baseline data collection would "continue until construction activities commence".

Collecting data for baseline water quality during construction could bias the resulting WQOs and trigger levels.

Recommendation - 19.DA

The proponent needs to state when baseline water quality collected will be completed and when associated trigger levels will be developed; these must be developed and reported before construction commences.

Response - 19.DA

The baseline monitoring has commenced and will be completed prior to the commencement of construction. The baseline monitoring program will be undertaken for a period of at least two years prior to the commencement of construction. It is noted that collecting data for baseline water quality during construction would bias the resulting WQOs and trigger levels and this would not form part of the baseline monitoring program. The inconsistency in the EM Plan has been corrected within the SEIS Volume 2, Appendix T1 document to read "The baseline monitoring program has commenced as part of this EIS and is proposed to continue until construction commences".

Comment - 19.DB

Appendix W; Subsidence Section Page W-57

A subsidence monitoring program has been proposed within the EM Plan, the program does not include all aspects that should be in a subsidence monitoring program for impacts on watercourses. The proponent should refer to the draft DEHP guideline (Watercourse subsidence - Central Queensland Mining Industry, Draft Version 7.0, 12 July 2011) for the development of a monitoring program for subsidence of watercourse.

Recommendation - 19.DB

The proponent needs to address requirements of a subsidence monitoring program as outlined in the draft DEHP guideline (Watercourse subsidence - Central Queensland Mining Industry, Draft Version 7.0, 12 July 2011) for the impacts of subsidence on watercourses.

Response - 19.DB

An Interim Subsidence Management Plan has been developed as part of the SEIS (Volume 2, Appendix N). This plan includes a monitoring program which is consistent with the draft DEHP guideline (Watercourse subsidence - Central Queensland Mining Industry, Draft Version 7.0, 12 July 2011).

Comment - 19.DC

Appendix W; Subsidence Section Page W-57

It is stated in section W 3.4.3 that; the groundwater monitoring network, installed for the EIS, will be enhanced to monitor the potential impacts of the mine infrastructure on the groundwater resources to the east of Sandy Creek. The proposed monitoring points are included in Figure W – 9.

However it is not clear on Figure W – 9 which bores are existing and which bores are proposed. It seems from information in other parts of the report that all bores on W-9 are existing.

Table W-25 identifies another 17 proposed monitoring sites which do not appear on W-9.

Recommendation - 19.DC

Figure W – 9 should be amended to indicate which bores are existing and which bores are proposed and updated to include all proposed bores.

Response - 19.DC

Figure T-9 of the SEIS EM Plan (SEIS, Volume 2, Appendix T1) (refer to Figure 3-5 of this report) has been updated since the EIS and includes both proposed and existing monitoring points on site and proposed monitoring points off lease. These off lease monitoring points are discussed in the SEIS groundwater modelling report (SEIS, Volume 2, Appendix L, Section 14.2.2.1).

Comment - 19.DD

Appendix W; Section 3.4.8

Section 11.4.12 – Cumulative Impacts for surface water outlines possible impacts on other projects as a result of mining and changes to the catchment for the Kevin's Corner Project. This section also outlines some potential outcomes such as the adjustments to levees within both leases and a hydraulic model that would cover both project sites. Due to the fact that the infrastructure within the Kevin's Corner project needs to be considered in

conjunction with the adjoining project, the proponent should make a commitment within the EM Plan to undertake these joint studies to assess these impacts.

Recommendation - 19.DD

The proponent should make commitments within the EMP to address the impacts of this project on adjoining projects and where appropriate modify designs of infrastructure.

Response - 19.DD

A Cumulative Surface Water Impact Assessment Report has been included as Appendix S of this SEIS. In addition, the proponent has made commitments within the revised EM Plan (SEIS, Volume 2, Appendix T1, Section T.3.4.8) to address the impacts of this Project on adjoining projects and, where appropriate, modify designs of infrastructure.

Comment - 19.DE

Appendix W; Section 3.4.8

In this section the following commitment is given;

…a commitment that trigger levels will be determined by the proponent before the commencement of mine operations.

In section 3.4.6 it is stated that;

The Project will develop alternate water supply agreements with landholders who will potentially be impacted by mine dewatering. Landholders who have groundwater supplies that are materially impacted by the operation, to a degree where groundwater is not able to be used for its pre-mining beneficial use (in terms of quality and/or quantity) will be provided with an alternate water supply of comparable yield and quality.

However there is no commitment to enter into agreements with those landowners, predicted to be impacted by mining, prior to mining starting

Recommendation - 19.DE

The proponent should provide a commitment to enter into agreements with landowners, prior to mining commencing, where it is predicted that mining will impact on the farm bores belonging to those landowners.

Response - 19.DE

The EM Plan Section T.3.4.8, Groundwater Commitments (SEIS, Volume 2, Appendix T1) has been revised to include the make-good agreement commitment prior to mining commencing.

At-risk bores, due to Kevin's Corner mine dewatering, are predicted and commitments discussed in the revised Groundwater Report; Section 10.6.4. of SEIS, Volume 2, Appendix L.

Comment - 19.DF

Appendix W; Section 3.4.9

In the EM Plan, the proponent does not specifically commit to implementing appropriate management/mitigation actions for water quality guideline exceedances requiring an investigation or a REMP (throughout the Proposed environmental authority conditions for surface waters; V2 W 3.4.9 p64-72).

It is not clear what actions may be taken in such circumstances.

Recommendation - 19.DF

The EM Plan should include commitments to implementing appropriate management/mitigation actions for any incident (for example contaminated water overtopping mine water dams during a large rain event) requiring a REMP as soon as practicable following each incident. Management actions need to be clearly stated in the EIS and EM Plan in order to adequately assess their suitability.

Response - 19.DF

The SEIS EM Plan and draft EA conditions (Volume 2, Appendix T1) have been amended to be consistent with the requirements of the Final Model Conditions for Coal Mines in the Fitzroy Basin July 2011. Conditions W22 – W 25 of the draft EA conditions outline the requirements of the site to have a REMP and the actions to be taken in the event of a water quality guideline exceedance during any incident. These conditions are reproduced below.

Receiving Environment Monitoring Program (REMP)

W22 The environmental authority holder must develop and implement a Receiving Environment Monitoring Program (REMP) to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised mining activity. This must include monitoring the effects of the mine on the receiving environment periodically (under natural flow conditions) and while mine affected water is being discharged from the site.

For the purposes of the REMP, the receiving environment is the waters of the Sandy Creek and connected or surrounding waterways within 5 km downstream of the release. The REMP should encompass any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be directly affected by an authorised release of mine affected water.

W23 The REMP must:

a) Assess the condition or state of receiving waters, including upstream conditions, spatially within the REMP area, considering background water quality characteristics based on accurate and reliable monitoring data that takes into consideration temporal variation (e.g. seasonality); and

b) Be designed to facilitate assessment against water quality objectives for the relevant environmental values that need to be protected; and
c) Include monitoring from background reference sites (e.g. upstream or background) and downstream sites from the release (as a minimum, the locations specified in Table 8); and
d) Specify the frequency and timing of sampling required in order to reliably assess ambient conditions and to provide sufficient data to derive site specific background reference values in accordance with the *Queensland Water Quality Guidelines* 2006. This should include monitoring during periods of natural flow irrespective of mine or other discharges; and
e) Include monitoring and assessment of dissolved oxygen saturation, temperature and all water quality parameters listed in Table 2 and 3); and
f) Include, where appropriate, monitoring of metals/metalloids in sediments (in accordance with ANZECC & ARMCANZ 2000, BATLEY and/or the most recent version of AS5667.*1 Guidance on Sampling of Bottom Sediments*); and
g) Include, where appropriate, monitoring of macro-invertebrates in accordance with the AusRivas methodology, and
h) Apply procedures and/or guidelines from ANZECC & ARMCANZ 2000 and other relevant guideline documents; and
i) Describe sampling and analysis methods and quality assurance and control; and
j) Incorporate stream flow and hydrological information in the interpretations of water quality and biological data.

W24 A REMP Design Document that addresses each criterion presented in Conditions W22 and W23 must be prepared and submitted to the administering authority no later than 3 months after the date of issue of this environmental authority. Due consideration must be given to any comments made by the administering authority on the REMP Design Document and subsequent implementation of the program.

W25 A report outlining the findings of the REMP, including all monitoring results and interpretations in accordance with conditions W22 and W23 must be prepared annually and made available on request to the administrating authority. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.

Comment - 19.DG

Appendix W; Section 3.4.9

This section of the EM Plan is required to outline the management of any proposed releases of mine effected water to the environment. Section W.3.4.8 of the EM Plan identifies that no 'controlled' discharges of contaminated water will occur, however there will be potential 'uncontrolled' discharges of contaminated water to the environment.

The EM Plan 'proposes' conditions for an Environmental Authority that do not include contaminant release limits. The proposed release conditions only refer to regulated structures meeting the spillway critical design storm AEP's that are yet to be identified.

Section 51 of the Environmental Protection Regulation 2008 'Matters to be considered for environmental management decisions' states that:

(1) The administering authority must, for making an environmental management decision relating to an activity, consider the following matters—

(b) the characteristics of the contaminants or materials released from carrying out the activity;

(d) the impact of the release of contaminants or materials from carrying out the activity on the receiving environment, including the cumulative impact of the release with other known releases of contaminants, materials or wastes.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision regarding the release of contaminants and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Section 52 of the Environmental Protection Regulation 2008 'Conditions to be considered for environmental management decisions' states that the administering authority must consider whether to impose conditions about:

- Ensuring an adequate distance between any sensitive receptors and the relevant site for the activity to which the decision relates;
- Limiting or reducing the size of the initial mixing zone or attenuation zone, if any, that may be affected by the release of contaminants;
- Treating contaminants before they are released;
- Restricting the type, quality, quantity, concentration or characteristics of contaminants that can be released;
- The way in which contaminants may be released; and
- Ensuring a minimum degree of dispersion happens when a contaminant is released.

The EM Plan should provide sufficient information regarding the operation of the activities with regards to how the release of mine effected water will be undertaken to allow the administering authority to set appropriate conditions within the environmental authority.

The Standard Criteria, defined in Schedule 4 of the Environmental Protection Act 1994, must be considered and includes:

- Any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and
- The character, resilience and values of the receiving environment.

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000, Section 3.2.4.2 provides some direction to make judgements about an acceptable level of change for the protection of various ecosystems. In the absence of clear information from which to set decision criteria, the guidelines recommend for sites of high conservation value, a default target for the size of the effect to be 10% of, or one standard deviation from a baseline mean, whichever is smaller.

To negotiate a value for uncontrolled releases EC limits, it will be necessary to have sufficient background water quality data from historical flow events, ideally above each discharge point. This data should be used to demonstrate that there is sufficient 'assimilative capacity' in receiving waters to receive mine discharges.

Further, section 56 of the Environmental Protection Regulation 2008 'Release of water, other than stormwater, to surface water' states:

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water, other than stormwater, to surface water.

(2) The administering authority must consider each of the following matters—

(a) any available toxicity data relevant to the release and the receiving environment;

(b) if there is an initial mixing zone—

(i) whether there is any practicable alternative that would reduce or eliminate the initial mixing zone; and

(ii) whether the size of the initial mixing zone is likely to adversely affect an environmental value or the ecological condition of the receiving environment, including, for example, a watercourse or wetland; and

(iii) whether concentrations of contaminants in the initial mixing zone are acutely toxic to the biota.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of water, other than stormwater, to surface water and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994.

Recommendation - 19.DG

The EM Plan be redrafted to include the management of discharges, including justification for the release of specific contaminants to the environment and the management of the release to the environment.

Response - 19.DG

A Site Water Management (Basis of Design) Report has been included as Appendix M of this SEIS, which details the management of discharges, including justification for the release of specific contaminants to the environment and the management of the release to the environment. The EM Plan (SEIS, Volume 2, Appendix T1, Section T.3.4.9) has been redrafted to be consistent with the requirements of the Final Model Conditions for Coal Mines in the Fitzroy Basin July 2011 with regard to the management of discharges, including justification for the release of specific contaminants to the environment and the management of the release to the environment.

Comment - 19.DH

Appendix W; Section 3.4.9

There appears to be an omission/ error in the following sentence;

The bore locations, included in Table W-25, are indicated on Table W-25 the proposed groundwater monitoring program, currently forms the basis for the 'approved monitoring report'.

It seems likely that it should read;

The bore locations, included in Table W-25, are indicated on Figure W-9. Table W-25, the proposed groundwater monitoring program, currently forms the basis for the 'approved monitoring report'.

Recommendation - 19.DH

W42 should be reworded to include figure W-9.

Response - 19.DH

In the revised EM Plan for the Project (SEIS, Volume 2, Appendix T1) the figure reference in W57 text has been amended to Figure T-9 (formerly Figure W-9).

Comment - 19.DI

Appendix W; Section 3.4.9

The executive summary of Volume 2 Appendix N1 states;

Drawdown will be greatest to the north west of the proposed Kevins Corner underground mine. In Volume 2 Appendix W EMP section W 3.3.7 it is stated that; Monitoring groundwater will be undertaken to; Assess the extent of groundwater level drawdown attributable to the operation of the project.

However in Volume 2 Appendix W EMP, Figure W-9, which shows the location of existing and proposed monitoring bores, shows no bore sites to the north or the west of the proposed mine.

How will these drawdowns be monitored? The proposed environmental authority condition W42 needs to be amended to include monitoring bores (that will be drilled prior to mining commencing) to the north and west of the proposed mine.

The added concern is that it is generally stated in the EIS that groundwater flow direction, which is now mostly south to north, will change to a north to south flow direction, towards Alpha mine. This confirms potential impact for groundwater north of the mine.

Recommendation - 19.DI

Proposed environmental authority condition W42 should be amended to include the location of those monitoring bores which will be drilled prior to mining commencing to the north and west of the proposed mine.

Response - 19.DI

Figure T-9 (formerly Figure W-9) of the revised EM Plan (SEIS, Volume 2, Appendix T1) has been updated and now includes four possible monitoring points, which will be confirmed once site access and land access agreements (off lease) are complete. Table W-15 of the Proposed EA Conditions in the revised EM Plan (SEIS, Volume 2, Appendix T1) includes commitment to construct four additional VWPs to the north and west of Kevin's Corner to assist in validating model predictions and assessing potentiometric pressure changes in the underlying units.

These proposed VWPS are discussed in SEIS groundwater modelling report (SEIS, Volume 2, Appendix L, Section 14.2.2).

Comment - 19.DJ

Appendix W; Section 3.6.3

This section identifies that there is the potential for an onsite landfill to be developed.

Section 55 of the Environmental Protection Regulation 2008 'Release of water or waste to land' states:

(1) This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to land (the relevant land).

(2) The administering authority must consider the following matters—

(a) the topography, including the flooding potential of the relevant land;

(b) the climatic conditions affecting the relevant land;

(c) the available land on which the water or waste can be released;

(d) the storage of the water or waste in wet weather;

Example—

storage of water or waste in ponds or tanks

(e) the way in which the water or waste will be released to the relevant land;

(f) the need to protect soil and plants on the relevant land from damage;

(g) the potential for infiltration of the water or waste to groundwater;

(h) the potential for generation of aerosols or odours from the water or waste;

(i) the impact of any transfer or run-off of contaminants from the relevant land to surface waters;

(j) the ongoing availability of the land for the release of the water or waste.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of waste to land and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994 with regards to the undertaking of ERA 60 as part of the Kevin's Corner Coal Mine.

Recommendation - 19.DJ

The EM Plan should detail the operation of the waste disposal facility considering the departmental guideline 'Waste Disposal – Landfill siting, design, operation and rehabilitation'.

Response - 19.DJ

HGPL understands that the administering authority must make an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to land (the relevant land). A comprehensive Landfill Operations Plan and a Landfill Environmental Management Plan in accordance with DNRM's Landfill siting, design, operation and rehabilitation guideline document (revision 17 September 2010) will be developed (SEIS, Volume 2, Appendix T1,). In response to comments regarding 301- Appendix W; Section 3.6.3, URS offers the following:

a) *The topography, including the flooding potential of the relevant land*
   The parcel of land on the Kevin's Corner mining lease that is designated for use as a general waste landfill disposal facility is near grid markers E 450000 and N 7447500. This parcel sets on the end of a ridge with a gently sloping profile of about 3% from the ridge line toward the north, west and south. Elevations on the parcel range from about RL 325 to about RL 310. This parcel, being along a ridge line, has very low potential of flooding from inflow of upstream waters. The topography easily accommodates development of up-gradient drainage features that will divert up-gradient inflow around the perimeter of the landfill facility. The designated landfill parcel lies approximately 1.25 kilometres east of Sandy Creek, which has a creek bed elevation near RL 290 at its nearest point to the landfill. This places the lower extremities of the landfill parcel some twenty metres above Sandy Creek; thus, yielding very low potential for flooding of the landfill during flood stages of Sandy Creek. The parcel has no other permanent or significant drainage features that might pose a flood risk on or near the parcel.
b) *The climatic conditions affecting the relevant land*
   Historically, the area experiences a deficit of precipitation on an annual basis, with a wet season typically starting in mid-spring and running through the summer months and a dry season typically through the winter months. As with most landfill, well-designed engineering features help to manage facility operation during typical inclement weather / climatic conditions. The Kevin's Corner Landfill would include engineering features such as robust access tracks and drainage structures, waste compacting and covering procedures and a rehabilitation plan to ensure stability of non-operational areas of the waste disposal facility.
c) *The available land on which the water or waste can be released*
   Preliminary estimates indicate that the land necessary for development of the Kevin's Corner Landfill is approximately 9 hectares for the waste disposal cells. For the support infrastructure (e.g. – drainage features, leachate management, access roads, environmental monitoring, perimeter buffer, etc.) the total land area estimate is between 15 hectares and 18 hectares. Comparatively, this is a very small parcel

within the mining lease, and the lease has more than adequate land area to accommodate a general waste disposal facility.

d) *The storage of the water or waste in wet weather; Example— storage of water or waste in ponds or tanks*
The Kevin's Corner Landfill does not anticipate permanent landfill infrastructure for storage of liquid wastes; however will have a designated hardstand area for set-down of waste transport containers, in the event of unforseen weather conditions limiting waste movement. Hardstand capacity should be sufficient to store waste materials for at least 1 month prior to disposal. Delivery of waste should not occur until such time that the landfill is ready to receive such wastes for immediate disposal. Waste, which the landfill receives for disposal, should be immediately (i.e. the same day) compacted and covered to reduce the potential for adverse impact from inclement weather. Waste collection and transport containers (e.g. – roll-on/roll-off containers, front-lift bins, etc.) should be covered containers, so in unforeseen instances when disposal does not occur on the day of delivery and transport containers remain on the landfill site, the covered waste containers will offer a satisfactory level of protection from the potential for adverse impact from inclement weather. Detailed design, as part of the tier two approvals, will determine if landfill and road designs can be optimised to increase onsite access during adverse weather conditions.
Stormwater and surface flows on the site would typically take three forms:

- Water not affected by site operations
- Water affected by site operations, but not contaminated by waste, and
- Water affected by waste handling operations

Water not affected by site operations (bypass waters): Bypass waters would be deemed as clean and acceptable for direct discharge to the environment. Such waters would not receive treatment before release from the site.
Water affected by site operations: Water affected by site operations, but not necessarily by waste handling operations, would typically be sediment-laden waters. The on-site engineered drainage system would direct such water to a sedimentation dam, which would allow time for sediment to drop from the water, and if necessary, for further treatment. Release of water from the sediment dam would not occur until the quality of water meets licensed limits. Conceptual plans for the Kevin's Corner Landfill, previously submitted, include a sedimentation dam.
Water affected by waste handling operations: Water affected by waste handling operations would be classified as leachate, and managed as such. The following paragraphs provide an explanation of leachate management.
General waste disposal facilities, particularly landfills, typically generate quantities of leachate that require management, often in the form of on-site treatment. Leachate results when decomposing waste releases water-based liquid or when rain water or surface water directly contacts waste materials and the water is released from the waste after such contact. Water that falls directly onto exposed waste and liquids that leachate from disposed waste would be collected in the leachate management system of the landfill. The landfill design will incorporate a leachate collection and drainage system within the waste disposal unit, and that system will convey collected leachate to an on-site holding tank. The design will also incorporate perimeter drains around active disposal areas to collect and convey water, which has a high potential for contact with waste, to the leachate holding tank. From the tank, leachate will slowly drain to an on-site wetland reed bed of Monto vetiver grass. The grass will treat the leachate during its flow-through time, and discharge into a small holding pond at the effluent end of the wetland. Leachate in the pond will

require testing prior to discharge. If leachate quality does not meet discharge guidelines, the primary choices for action would be:

- Return (pump) the leachate to the holding tank from which the leachate would recirculate through the wetland reed bed.
- Recirculate (pump) the leachate into the operational disposal face of the landfill to aid in waste compaction and decomposition. In such a scenario, some of the leachate would be permanently "locked" in the waste within the landfill and a portion of the leachate would reach the collection system and circulate again through the leachate treatment system.
- Use the leachate for dust suppression in operational areas of controlled drainage that would contain the leachate within the leachate management system.

When the leachate treatment system yields an effluent that meets discharge criteria, the treated leachate would be put to a beneficial use (e.g. dust control or irrigation anywhere on the landfill) or allowed to discharge freely to the environment.

e) *The way in which the water or waste will be released to the relevant land*

The Kevin's Corner Landfill would prohibit the intentional receipt and / or disposal of liquid wastes at the landfill. The intent of the facility and conceptual design are strictly for the disposal of general waste materials. As previously described, the current landfill concept anticipates delivery of waste for disposal to the landfill in waste containers and skips. The contents of those collection and storage units would be tipped at the active disposal area (the active face) within the overall landfill disposal unit. From thence, waste compaction and daily covering (with soil or synthetic cover) occurs before the end of that operational day. For a description of releases of water to the relevant land, please see the response to the section regarding the storage of the water or waste in wet weather. That response gives a summary of water and leachate management on the landfill site.

f) *The need to protect soil and plants on the relevant land from damage*

Detailed soil and flora assessments were conducted as part of the EIS (HGPL, 2011) to determine particulars about soil mechanics and chemistry on the site and the presence of sensitive plant species on, and immediately around, the Kevin's Corner Landfill site. Detailed design of the landfill will reflect the limitations of soil characteristics (such as permeability, strength, cohesiveness and erodibility, pH, acid potential), ensuring the design is fit for purpose and supports the stability of the landfill and the stability and sustainability of the local environment. The landfill design will aim to minimise the amount of land disturbance to only that area absolutely necessary for constructing and operating the landfill facility. The site-specific landfill operations plan and environmental management plan will adopt relevant management strategies for plant species that have particular social, cultural or environmental significance (refer to EIS, Volume 1, Section 9), as well as weeds and pests (refer to SEIS, Volume 2, Appendix T4.02). The facility's operational and environmental monitoring programs would also aim to protect native flora to the extent practical, and rehabilitate disturbed areas to a pre-disturbance (or environmentally better) condition.

g) *The potential for infiltration of the water or waste to groundwater*

The onsite landfill will accept general solid waste only. The proponent does not anticipate storage or generation of any other liquid wastes that would pose a risk of infiltration to groundwater. The nature of general solid waste materials, comprising mixed waste such as food, paper, plastic, etc., combined with the modern engineered design of general waste disposal facilities, mean that the potential for general waste to infiltrate to groundwater is negligible. The intent is that recyclable and regulated wastes are

diverted from landfill, with provision made for source segregation of these materials for collection and processing offsite. An on-site package sewage treatment plant would process sewage to Class A effluent quality suitable for irrigation on-site and dewater sludge for composting.

The more significant risk is that of infiltration of waste-contaminated water (namely, leachate) into groundwater. Design features of the Kevin's Corner Landfill would mitigate the potential for infiltration of leachate to groundwater at the facility. The design of the landfill will include a low-permeability lining system comprising layer of synthetic lining material; or alternatively, low-permeability clayey soil liner should the soils in situ be suitable. Above the lining and within the waste disposal unit, the landfill design will include a leachate drainage and collection system to intercept and remove storm water that falls directly into the active disposal area and liquids that leach from the deposited waste and flow down to the floor (the top surface of the lining system) of the disposal unit. A pumping system will pump leachate from the base of the landfill into a leachate treatment system that comprises an above-ground leachate holding tank, a wetland reed bed, and an effluent holding pond situated outside, but near to, the disposal unit. After pumping leachate to the holding tank, leachate will flow from the tank into the wetland reed bed. The leachate treatment system, will be underlain by a lining system similar to that of the landfill; and thus, reduce the potential for infiltration of leachate to groundwater. Treated effluent would be subject to water quality monitoring to determine suitability for irrigation during landfilling (either for dust control or waste compaction), release to the environment or recycling back in the leachate treatment system.

h) *Containers used to transport waste to the landfill should be sealed containers that do not leak liquids that might leach from waste during transport. The potential for generation of aerosols or odours from the water or waste*

General wastes, especially food and other organic wastes have a significant potential to generate nuisance odours. To mitigate the risk of emission of nuisance odours from general waste, the Kevin's Corner Landfill would incorporate the following features:

- Closed containers and skips for delivery of all wastes to the landfill
- Same-day tipping, compaction and covering of waste deliveries
- Application of intermediate or final cover on disposal areas that will remain inactive for more than 6 months (use of intermediate cover) and for areas in which waste fill profile achieves the maximum design profile (final cover)

i) *Monitoring of landfill gas emissions as part of the site's environmental monitoring plan*

The potential to incorporate a passive landfill gas extraction system, if deemed necessary to control nuisance odour emissions due to landfill gas

Typical landfill leachate does have a low to medium potential for emission of nuisance odours, and the use of a wetland reed bed will help to mitigate that potential. The drainage, collection and storage components of the leachate management system are concealed / closed components, and once leachate discharges from the holding tank into the wetland reed bed, the bio-treatment capacity of that component will immediately begin working to remove contaminants and reduce the potential for emission of nuisance odours from the leachate. Once cycled through the system, the effluent in the holding pond should have insignificant potential for nuisance odour emission. It should be noted that odours once generated are dependent on the distance to the sensitive receptors from the landfill as well as the prevailing wind conditions. The proposed location of the site landfill has considered the nature of the landfilling activity and its proximity to any sensitive receptors.

j) *The impact of any transfer or run-off of contaminants from the relevant land to surface waters*

On-site surface water drainage structures and the leachate management system will significantly reduce the potential for run-off of contaminants to surface waters. Those features aim to control surface water and leachate flows and only allow releases to the environment after treatment and in a controlled manner. Releases to the environment would be treated as surface flow already deemed suitable for release to the environment; reducing potential for unauthorised release of contaminants. The distance from the landfill site to Sandy Creek (in excess of a kilometre) would also aid in mitigating the potential for release of contaminants to surface waters by means of bio-remediation of remnant organic contaminants, natural attenuation (bonding of contaminants to fixed soil particles) and dilution with natural surface runoff.

k) The ongoing availability of the land for the release of the water or waste

The proposed site of the Kevin's Corner Landfill is on the Kevin's Corner mine lease; and thus, would be available for the duration of the lease. An intent of the landfill design is that the disposal facility will service the mine lease for the duration of mining operations through to decommissioning of the mine operation. Unless other contractual arrangements are agreed, the Proponent would likely maintain liability for post-closure care and maintenance of the facility until such time that the facility is deemed environmentally stable (i.e. – the facility is no longer seen as a potential environmental hazard). Post-closure care and maintenance periods for general waste landfills might typically range from 10 to 30 years after final closure of the disposal facility.

Comment - 19.DK

Appendix W; Section 3.6.3

The commitments within the Water section of the EM Plan identifies that a sewage treatment plant is to be constructed as part of the mining activities. The EM Plan does not provide any information regarding the undertaking of ERA 63 Sewage Treatment as part of the Kevin's Corner Coal Mine.

Section 55 of the Environmental Protection Regulation 2008 'Release of water or waste to land' states:

1. This section applies to the administering authority for making an environmental management decision relating to an activity that involves, or may involve, the release of water or waste to land (the relevant land).
2. The administering authority must consider the following matters—

a) the topography, including the flooding potential of the relevant land;
b) the climatic conditions affecting the relevant land;
c) the available land on which the water or waste can be released;
d) the storage of the water or waste in wet weather;
e) Example—storage of water or waste in ponds or tanks
f) the way in which the water or waste will be released to the relevant land;
g) the need to protect soil and plants on the relevant land from damage;
h) the potential for infiltration of the water or waste to groundwater;
i) the potential for generation of aerosols or odours from the water or waste;
j) the impact of any transfer or run-off of contaminants from the relevant land to surface waters;
k) the ongoing availability of the land for the release of the water or waste.

The EM Plan does not provide the necessary information the administering authority is required to consider when making a decision relating to an activity that involves the release of waste or water to land and as such does not provide sufficient information for the administering authority to make a decision under section 203 of the Environmental Protection Act 1994 with regards to the undertaking of ERA 63 as part of the Kevin's Corner Coal Mine.

Recommendation - 19.DK

The EM Plan should detail the operation of the sewage treatment facility considering departmental and recycled water guidelines. The EM Plan should include details of the process of disposal of sewage sludge and waste waters.

Response - 19.DK

Sewage will be generated from the accommodation village, Kevin's Corner airport, light industrial area (LIA), mine infrastructure area (MIA), coal handling and preparation plant (CHPP), northern underground mine, central underground mine and southern underground mine. This sewage will need to be collected, stored and transported to a sewage treatment plant (STP) for treatment and reuse.

The sewage management strategy is based on a number of assumptions including the following:

- all sewage will be treated at a single package sewage treatment plant (STP) on site, with solid waste products such as sludge and fine screenings to be pelletised for fertilisation in mine site rehabilitation and smaller scale landscaping around the infrastructure operations;
- Gas from the digestion process may be captured and used in a local COGEN or Bio-Gas WTE (Waste to Energy) system;
- the STP will be located on the eastern side to the LIA, between it and the airport;
- the STP will treat all sewage to a Class A effluent;
- the class A effluent will be pumped to the mine water management system for use as process water;
- sewage generated at the central and southern underground mines will be collected in buried concrete tanks, emptied by tanker service on a regular basis, and transported to the STP for treatment;
- all components of the sewerage reticulation network will accommodate worst case scenarios driven by staffing levels during the construction and operation phases. Downward fluctuations in these numbers will result in spare capacity in the system; and
- all grey water generated at each of the underground mine areas will be treated by package grey water treatment plants and disposed to a grey water irrigation area.

Design has been based on relevant codes and guidelines including the following:

- Department of Natural Resources and Mines – Planning Guidelines for Water Supply & Sewerage;
- Queensland Water Recycling Guidelines – EPA, 2005;
- Code AS.2200:2006 – Design Charts for Water Supply and Sewerage;
- Code AS.2566.2:2002 – Buried Flexible Pipelines Part 2 : Installation;
- Code AS.3500.1:2003 – Plumbing & Drainage Part 1 : Water Services; and

- WSAA TN4 (Water Services Association of Australia): Guideline Note on De-rating
- Specific design criteria include the following:
- the STP will be a packaged treatment plant with inlet works incorporating inlet screening, screenings compactor and 2 buffer tanks sized for 24hrs storage;
- submersible pumps will pump sewage from the buffer tanks to the treatment works;
- pump stations will be submersible below ground installations, comprising precast concrete packaged Flygt ITT stations (or similar) fitted with duty and standby pumps with an elevated motor control centre in a weather-proof kiosk;
- all pumps will be controlled by a simple level transducer that will switch pumps off and on;
- 4 hours of emergency storage will be provided at each pump station in the event of power failures;
- pump stations will be fitted with in-line macerators to avoid having to screen influent sewage at the pump stations, while fine screening will be undertaken at the STP;
- rising mains will be designed to operate in an acceptable velocity envelope with minimum and maximum velocities of 0.75 to 1.5 m/s respectively;
- the STP facility will incorporate a treated effluent storage dam with sufficient capacity for 10 days of wet weather storage (10ML); and
- where specific EP or demand is unknown the Queensland Department for Planning and Resource Management (DEHP) - Planning Guideline - Water Supply and Sewerage (April 2010), Chapter 5, Table A (Demands Flow and projection) was applied.

The EM Plan (SEIS, Volume 2, Appendix T1, Section 3.4.9, Sewage & Wastewater Treatment) has been updated to provide proposed EA conditions for the management of sewage effluent.

Comment - 19.DL

Appendix W; Section 3.6.3

The EM Plan is required to detail the finalised plans for the tailings waste. The environmental authority is a 'life of mine' approval and must be issued to authorise adequate tailings disposal for the proposed mine life. The finalised management of tailings needs to be identified within the EM Plan. The environmental authority is able to be amended should another viable alternative for tailings disposal be identified. The EM Plan identifies that there is the potential for tailings to contain Potentially Acid Forming (PAF) material. No detail of the management of PAF tailings is provided in the EM Plan.

Recommendation - 19.DL

The EM Plan should detail the finalised management of tailings at the Kevin's Corner Coal Mine, including (if required):

- Undertaking the chemical analysis of tailings material.
- The availability or leachability of metals from the tailings.
- The placement strategies of tailings material within a Tailings Storage Facility, 'in pit' or within other mine waste emplacement areas to enable successful rehabilitation outcomes.

Response - 19.DL

The updated EM Plan (Volume 2, Appendix T1) describes the finalised management of tailings to a level that is commensurate with the EIS approvals stage of a coal mine in Queensland. The EM Plan (Volume 2, Appendix T1) details a range of measures for managing coal and mining waste materials including tailings. These include the development of an Overburden and CHPP Rejects Management Plan prior to construction, infill drilling, sampling and geochemical testing programs, monitoring of surface runoff and seepage and refinement of management strategies as the project progresses.

Chemical Analysis

The geochemical characteristics of the tailings materials are reported in some detail in Volume 2 of the EIS at Appendix Q1 (Geochemical Addendum Report which has been updated in the Geochemical SEIS report (Volume 2 Appendix D)). The results of both static and kinetic geochemical tests demonstrate that the tailings have a relatively low oxidisable sulphur content and low acid generating capacity. If there is an increase in acid generating capacity of the tailings due to tailings being less benign than predicted, and pH levels deviate below the predicted pH range of 5-6, consideration will be given to additional risk management methods such as lime amendment.

Leachability of Metals

Leachate from tailings materials will initially be pH-neutral and over time should remain in the range pH 5-6. Total metal and metalloid concentrations in tailings materials are low and are sparingly soluble with leachate containing soluble concentrations below the applied surface water and groundwater guideline investigation criteria. Tailings will initially report to the TSF in a slurry form containing approximately 30% solids and excess water will be recycled from the TSF using a decant system for reuse at the CHPP.

Placement Strategies

Tailings will be sub-aerially deposited in a conventional surface tailings storage facility for the first 5-7 years of operation whilst investigations into the feasibility of future 'in-pit' tailings storage at the Northern Pit are completed. The surface tailings storage facility will be rehabilitated using a conventional spoil and topsoil cover system similar to that used and planned to be used at numerous coal mines in the Bowen Basin.

Given the arid climate of the region, the tailings surface is expected to dry out relatively quickly and form a dense compact solid material, which will facilitate placement of a spoil cover and rehabilitation of the TSF at the end of mine life. A progressive closure strategy will be adopted for TSF rehabilitation. A cover system will be utilised for TSF closure and topsoil will be placed onto the re-profiled final landform slopes. After approximately 5-7 years, an in-pit storage system will be implemented in the Northern Open-Cut. A cover system will also be implemented over tailings stored at the Northern Open-Cut. A final cover will be constructed on the tailings surface for closure. Runoff water from the TSFs after closure will be collected in surface water collection ponds to reduce suspended solids before release to the environment.

Closure works for the out-of-pit TSF can be completed within the mine life. It is envisaged that the closure of the in-pit TSF may take months or years before a cover can be constructed on the tailings surface depending on the

geotechnical properties of the tailings. The excessive space of the North Open Pit TSF may be filled with overburden materials to provide foundation support for construction of the cover.

Comment - 19.DM

Appendix W; Section 3.6.9

The EM Plan proposes Environmental Authority conditions to authorise the disposal of waste tyres within spoil emplacements. The content of the EM Plan does not detail the management of waste tyres as a notifiable activity under schedule 2 of the Environmental Protection Act 1994.

The departments Operational Policy 'Disposal and storage of scrap tyres at mine sites' identifies that best practice environmental management for scrap tyres generated by mining activities follows a waste management strategy according to the following hierarchy in decreasing order of preference and desirability: avoidance, recycling, waste-to-energy, and disposal. Adoption and implementation of this hierarchy reflects the economic cost of handling and transporting large mine tyres in Queensland and the considerable energy and material resource embedded in the tyres.

Recommendation - 19.DM

The EM Plan include further information regarding the management of waste tyres.

Response - 19.DM

As far as possible, practical measures will be adopted to prolong the life of the tyres and minimise the number and volume of waste tyres generated from the Kevin's Corner Project, including (but not limited to): inspection and maintenance programs, seasonal tyre rotation, tyre pressure management and driver training.

For waste tyres generated during construction and operation, the Kevin's Corner Project will adopt and implement best practice management for the treatment of waste tyres, i.e. in accordance with the waste management hierarchy and the operational policy for the Disposal and storage of scrap tyres at mine sites (DEHP, 2010).

Where possible, waste tyres will be reused onsite for practical purposes (such as markers, barriers or erosion control).

HGPL has investigated options for processing waste tyres off site; however supplier agreements are unlikely to be feasible due to the large volumes and distance involved in transporting the tyres. Options for onsite reprocessing (either recycling or energy production) is not considered to be a feasible activity at this stage.

Where no other options are practical, waste tyres will be appropriately stored and disposed of once mining operations commence by burying in the mine overburden in a designated location. Tyre storage and disposal will be in accordance with the DEHP (2012) Operational Policy for the Disposal and Storage of Scrap Tyres at Mine Sites (SEIS, Volume 2, Appendix T1), e.g.

- Tyres stored awaiting disposal — or transport for take-back and, recycling, or waste-to-energy options – should be stockpiled in volumes less than 3 m in height and 200 m2 in area. Additional fire precautions should be taken, including removal of grass and other materials within a 10 m radius of the scrap tyre store. Tyres should be stored in a manner that prevents water retention and minimises mosquito breeding events. Options may include holing side-walls, covering with tarpaulins, spraying with a non-persistent insecticide, or reducing the stockpile during rain events.
- Disposing of scrap tyres in underground stopes is acceptable provided this practice does not cause an unacceptable fire risk or compromise mine safety.
- Disposing of scrap tyres in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as possible but not directly on the pit floor. Placement should ensure scrap tyres do not impede saturated aquifers and do not compromise the stability of the consolidated landform.

Under the Environmental Protection Act 1994 (Qld), disposal of tyres to landfill is a notifiable activity. Locations of disposal must be recorded on the Environmental Management Register (EMR) managed by the Queensland Department of Environment and Heritage Protection (DEHP).

Comment - 19.DN

Appendix W; Section 3.8.4

The first objective dot point states:

- Achievement of acceptable post-disturbance land use suitability – mining and rehabilitation will aim to create a stable landform with land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed. This will be achieved by setting clear rehabilitation success criteria and outlining the monitoring requirements that assess whether or not these criteria are being accomplished;
- The departmental guideline 'Rehabilitation requirements for mining projects' states that indicating that the land will achieve a specific land capability class (DME 1995) is not a sufficient description of the proposed land use.

Recommendation - 19.DN

The EM Plan be developed considering the departmental guideline 'Rehabilitation requirements for mining projects'.

The proposed post mining land use must be clearly specified using terms such as grazing (up to a particular intensity), cropping (including type of crop), forestry plantation (for a specified type of wood), habitat (for a nominated species), or return to native vegetation.

When establishing native vegetation as one of the rehabilitation objectives for the mine site, the EM Plan must specify the ecosystem(s) or habitats that are intended to be developed on the rehabilitated domains. The EM Plan may also nominate reference/analogue sites that will be used for comparison.

Response - 19.DN

The EM Plan (SEIS, Volume 2, Appendix T1) has been developed in consideration of the DEHP Guideline 'Rehabilitation requirements for mining projects'. The EM Plan and the proposed draft Environmental Authority Conditions (Section T.3.8.9 of the SEIS EM Plan) require the development of a site Rehabilitation Management Plan which will address the guideline requirements in more detail.

As part of the update to the EM Plan the following text has been added,

"Post-mining, rehabilitation of the Project site will return a stable landform capable of uses similar to those prior to disturbance. To achieve this, the nominated post-mine land use for the site is a mix of bushland and low density cattle grazing land. This will link remnant native vegetation where possible and will aim to return some conservation values."

Additionally a revised conceptual final landform and rehabilitation plan is shown in the EM Plan (SEIS, Volume 2, Appendix T1).

HGPL in consultation with DEHP has developed a draft site Rehabilitation Management Plan (SEIS, Volume 2, Appendix T4.09). This Plan will be a live document allowing for continuous improvement that will benefit from the implementation of rehabilitation monitoring and trials once the site has commenced mining operations.

The objectives of rehabilitating disturbed land include:

- progressively undertake rehabilitation on areas that cease to be used for mining or mine-related activities within two years of becoming available;
- achievement of acceptable post-disturbance land use suitability – mining and rehabilitation will aim to create a stable landform with land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed. That is the land will be rehabilitated to a condition that will sustain low density grazing land and native bushland, unless otherwise agreed with relevant stakeholders. This will be achieved by setting clear rehabilitation success criteria and outlining the monitoring requirements that assess whether or not these criteria are being accomplished;
- post-disturbance grazing land will be rehabilitated to a land suitability Class 3, which has moderate limitations, and Good Quality Agricultural Land Class C2 and C3 Pasture Land. The objective of the post-disturbance grazing land is to accomplish and remain as sustainable low density cattle grazing;
- native vegetation will be revegetated using existing vegetation communities where appropriate, for example Brigalow Open Woodland, Silver-leaved Ironbark Open Woodland, Poplar Box Open Woodland, Gidgee Open Woodland or other appropriate vegetation communities identified at the Project Site during the pre-mining assessment. The objective of the rehabilitation for the post-disturbance land use of native vegetation is to accomplish and remain a sustainable native bushland;
- creation of stable post-disturbance landform - mine wastes and disturbed land will be rehabilitated to a condition that is self-sustaining, or to a condition where maintenance requirements are consistent with an agreed post-mining land use; and

- preservation of downstream water quality – surface and ground waters that leave the mining leases should not be degraded to a significant extent. Current and future water quality will be maintained at levels that are acceptable for users downstream of the site.

Comment - 19.DO

Appendix W; Section 3.8.4

The rehabilitation objectives do not provide a clear description of proposed rehabilitation outcomes within the individual domains of the mine site.

The EM Plan is required to describe the proposed rehabilitation of the mining disturbance and how it will control future environmental harm to an acceptable level.

Recommendation - 19.DO

The rehabilitation outcomes for the Kevin's Corner Coal Mine should be developed considering the departmental guideline 'Rehabilitation requirements for mining projects'.

Response - 19.DO

The EM Plan (SEIS, Volume 2, Appendix T1) has been developed in consideration of the DEHP Guideline 'Rehabilitation requirements for mining projects'. The EM Plan and the draft environmental Authority Conditions ((SEIS, Volume 2, Appendix T1) of the SEIS, EM Plan) require the development of a site Rehabilitation Management Plan which will address the guideline requirements in more detail (SEIS, Volume 2, Appendix T4.09).. As part of the SEIS EM Plan revision a domain plan in accordance with DEHP guideline requirements has been produced. The domain plan outlines areas with similar rehabilitation requirements.

Preliminary performance criteria have been provided (SEIS, Volume 2, Appendix T1) and replicated below.

Providing detailed performance criteria or rehabilitation methodologies at this stage of the Project, may result in superseded and less successful rehabilitation strategies being implemented in the future. Detailed performance criteria or rehabilitation methodologies are to be developed prior to rehabilitation commencing. As per current industry practice, success criteria and rehabilitation methods will be regularly assessed and updated based on a "continuous loop of improvement" with respect to future rehabilitation strategies and relinquishment. During operations rehabilitation works will be designed specifically to optimise the potential for rapid ecosystem re-establishment. (SEIS, Appendix C, Section C.26, SEIS, Volume 2, Appendix T4.09)

The SEIS EM Plan (SEIS, Volume 2, Appendix T1), states that the mine area has been divided into six domains and preliminary performance criteria are provided for each domain. The rehabilitation domains are shown on Figure T-16 and include:

- Domain 1: Infrastructure;
- Domain 2: Pits, voids and overburden emplacements;
- Domain 3: Tailings storage facilities;

- Domain 4: Dams and surface water infrastructure;
- Domain 5: Subsidence affected areas; and
- Domain 6: Other lands.

Preliminary performance (or closure) criteria for the rehabilitation domains are provided in Table 3-23 below. The success criteria are performance objectives or standards against which rehabilitation success in achieving a sustainable system for the proposed post-mine land use is demonstrated.

The success criteria will be reviewed every 3 to 5 years with stakeholder participation to ensure the criteria remain realistic and achievable.

Table 3-23 Rehabilitation success criteria

Rehabilitation Element	Indicator	Criteria
1. Infrastructure		
Landform stability	Slope gradient	Area has gradient of <2°.
Landform stability	Erosion control	Erosion mitigation measures have been applied.
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Ensure receiving waters affected by surface water runoff have contaminant limits of electrical conductivity maximum of 2,000 µS/cm and pH range of 5.5 to 9.5, or as determined to be sustainable through ongoing investigations. This will then enable the setting of water quality objectives.
Water Storages, Creek Diversions		Clean water storages and diversions to be stabilised and left as required.****Dirty water storages to be cleaned out and rehabilitated to a stable non-polluting condition.
Topsoil	Physical and chemical soil parameters	Soil salinity content is <0.6 dS/m. Soil pH is between 5.5 and 8.5. Soil Exchange Sodium Percentage (ESP) is <15%. Future soils testing will be undertaken to determine if the above soil quality objectives are achievable, though confirming current soil properties. Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts. Adequate macro and micro-nutrients are present.
Vegetation	Land use	Buildings, water storage, roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management activities. Predicted economics and /or benefits have been defined and agreed by the stakeholders.
Vegetation	Surface cover	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m2 in area or >10 m in length down slope.
Vegetation	Species composition	Palatable, nutritious pasture native grass species are present.
Vegetation	Community structure	Desirable native grass species comprise at least 60% of total grass cover. Tree density and height of >25 stems per 5 ha each being >2 m in height.
Vegetation	Resilience to	Established species survive and/or regenerate after disturbance. Weeds do not dominate native species after disturbance or after rain. Pests do not occur in

Rehabilitation Element	Indicator	Criteria
	disturbance	substantial numbers or visibly affect the development of native plant species.
Vegetation	Sustainability	Nitrogen fixing grass species present. More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead.
Fauna	Vertebrate species	Representation of a range of species characteristics (e.g. activity pattern, habitat usage, diet, dispersal character etc. (WBM, 2003; Kimber et. al., 1999)) from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the grassland ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine closure or by more than 40% over the two successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different pastoral ecological processes (including termites for soil structure, Collembola for decomposition, Hemiptera for herbivory and predatory groups such as arachnids, centipedes, earwigs, cockroaches and ants as indicators of a range of other processes (Bisevac and Majer, 1998).
Fauna	Habitat structure	Typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of pastoral ecosystem type are present, including: a variety of food plants and signs of natural generation of shelter sources including leaf litter.
Safety		Risk assessment has been undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders. Closure documentation includes the contaminated sites register which identifies contaminated sites and the treatment applied.
2. Pits, Voids and Overburden Emplacement		
Overburden Emplacement		
Landform stability	Slope gradient	No less than 75% of the area has slopes <10° and up to 25% of the area has slopes >10°. Where reject layers are present and exposed, the landform is capped.
Landform stability	Erosion control	Erosion control structures are installed commensurate with the slope of the landform.
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Ensure receiving waters affected by surface water runoff have contaminant limits of electrical conductivity maximum of 2,000 µS/cm and pH range of 5.5 to 9.5, or as determined to be sustainable through ongoing investigations. This will then enable the setting of water quality objectives.
Water Storages, Creek Diversions		Clean water storages and diversions to be stabilised and left as required. Dirty water storages to be cleaned out and rehabilitated to a stable non-polluting condition.
Topsoil	Salinity (electrical conductivity)	Soil salinity content is <0.6 dS/m. Future soils testing will be undertaken to determine if the above soil quality objective is achievable, though confirming current soil properties.
Topsoil	pH	Soil pH is between 5.5 and 8.5. Future soils testing will be undertaken to determine if the above soil quality objective is achievable, though confirming current soil properties.
Topsoil	Sodium content	Soil Exchange Sodium Percentage (ESP) is <15%. Future soils testing will be undertaken to determine if the above soil quality objective is achievable, though confirming current soil properties.

Rehabilitation Element	Indicator	Criteria
Topsoil	Nutrient cycling	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts. Adequate macro and micro-nutrients are present.
Vegetation	Land use	Area accomplishes and remains as a healthy working bushland ecosystem.
Vegetation	Surface cover	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m2 in area or >10 m in length down slope.
Vegetation	Species composition	Comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland to open forest where possible.
Vegetation	Community structure	Groundcover, understorey and overstorey structure similar to that of appropriate reference site(s)*.
Vegetation	Resilience to disturbance	Established species survive and/or regenerate after disturbance. Weeds do not dominate native species after disturbance or after rain. Pests do not occur in substantial numbers or visibly affect the development of native plant species.
Vegetation	Sustainability	Species are capable of setting viable seed, flowering or otherwise reproducing. Evidence of second generation of tree/shrub species. Vegetation develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons. More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead.
Fauna	Vertebrate species	Representation of a range of species characteristics (e.g. activity pattern, habitat usage, diet, dispersal character etc (WMB, 2003; Kimber et. al., 1999)) from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. Sighting of species of conservation significance or indicators of the presence of species of conservation significance (e.g. tracks) likely to be present in the established ecosystem type within the three-year period preceding mine closure (assuming non-mine related disturbance has not eliminated local populations thereby removing the colonising source). The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine lease relinquishment or by more than 40% over the two successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different ecological processes (including termites for soil structure, Collembola for decomposition, Hemiptera for herbivory and predatory groups such as arachnids, centipedes, earwigs, cockroaches and ants as indicators of a range of other processes (Bisevac and Majer, 1998).
Fauna	Habitat structure	Typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of that ecosystem type are present, including: a variety of food plants; evidence of active use of habitat provided during rehabilitation such as nest boxes, stags and logs and signs of natural generation of shelter sources including leaf litter.
Safety		Risk assessment has been undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders.
Final Voids (including ramps)		
Landform stability	Slope gradient	Highwall faces exhibit long-term geotechnical stability and a geotechnical report has been completed. Competent rock highwall to have slope of <65°. Incompetent rock highwall to have slope of <17°. Low wall to have slope of <17°.

Rehabilitation Element	Indicator	Criteria
		Ramp walls not backfilled exhibit long-term geotechnical stability and a geotechnical report has been completed. In-pit rejects and spoil slope gradients can exceed 15%.
Landform stability	Erosion control	Erosion mitigation measures have been applied to ensure slope stability
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Electrical conductivity of any void water may exceed 2,000 µS/cm if an ecological assessment shows the long-term ecological stability and groundwater quality is not adversely affected.
Water Storages, Creek Diversions		As for 1.
Topsoil		As for 1.
Vegetation	Land use	Where ramps and in-pit spoil design allow, area accomplishes and remains as a healthy working bushland ecosystem ().
Vegetation	Surface cover	As for 1.
Vegetation	Species composition	Comprise a mixture native grasses, shrubs and trees (where possible) suitable for establishment on steeper slopes.
Vegetation	Community structure	Groundcover and understorey structure to that of appropriate reference site(s)*.
Vegetation	Resilience to disturbance	As for 1.
Vegetation	Sustainability	More than 75% of individual grasses and shrubs are healthy when ranked healthy, sick or dead.
Safety		Risk assessment has been completed and risk mitigation measures have been implemented. Where risk mitigation measures include bunds, safety fences and warning signs, these have been erected generally in accordance with relevant guidelines and Australian Standards.
3. Tailings Storage Facility		
Landform stability	Erosion control	Tailings are capped to a depth to be defined in field trials, which includes a minimum topsoil depth of 200mm on the cap. Erosion mitigation measures have been applied. Average soil loss per annum per domain unit is <40 tonnes/ha/yr (sheet erosion).
Landform stability	Surface Water Drainage	Drainage control measures are installed. No water is observed leaching from the facility.
Water quality		As for 1. Area accomplishes and remains as native vegetation.
Topsoil		As for 1.
Vegetation	Land use	Area accomplishes and remains as sustainable grazing.
Vegetation	Surface cover	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m2 in area or >10 m in length down slope.
Vegetation	Species composition	Grasses, shrubs and trees representative of regionally occurring vegetation communities where possible.
Vegetation	Resilience to	Established species survive and/or regenerate after disturbance. Weeds do not

Rehabilitation Element	Indicator	Criteria
	disturbance	dominate native species after disturbance or after rain. Pests do not occur in substantial numbers or visibly affect the development of native plant species.
Vegetation	Sustainability	Species are capable of setting viable seed, flowering or otherwise reproducing.
Fauna	Vertebrate species	Representation of a range of species characteristics from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. The number of vertebrate species does not show a decrease over a number of successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different ecological processes.
Safety		As for 1.
4. Dams and Surface Water Infrastructure		
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Ensure receiving waters affected by surface water runoff have contaminant limits of electrical conductivity maximum of 2,000 µS/cm and pH range of 5.5 to 9.5, or as determined to be sustainable through ongoing investigations. This will then enable the setting of water quality objectives.
Water Storages, Creek Diversions		Clean water storages and diversions to be stabilised and left as required. Dirty water storages to be cleaned out and rehabilitated to a stable non-polluting condition.
5. Subsidence Areas		
Landform stability	Erosion control	Erosion mitigation measures have been applied.
Landform stability	Subsidence Impacts	Subsidence impacts will be managed in accordance with the Subsidence Management Plan. The Kevin's Corner Interim Subsidence Management Plan has been attached as SEIS Volume 2, Appendix N. In summary, the Kevin's Corner Interim Subsidence Management Plan includes the following mitigation measures: Perform regular inspections over subsidence areas to identify any surface cracks and/or sinkholes. Undertake minimal clearing, if required, of areas around cracks and/or sinkholes to allow for ripping and seeding. Ripping and seeding of areas where required. Following initial ripping and seeding, if trees are to be planted, they will not be planted until enough rain has fallen. Seed and/or plant appropriate species of vegetation to achieve a post-subsidence land use the same as that pre-subsidence (i.e. low intensity cattle grazing). Regrade subsidence areas and where necessary backfill with mine spoil to control surface water flow and minimise erosion and sedimentation. Undertake drainage works, such as graded banks and diversion drains, to partially drain larger subsidence voids and direct water into stable areas or sediment control areas. If ripping is not feasible due to the width of the cracks, topsoil will be stripped and stockpiled. Clay material will be imported to fill and seal cracks and the topsoil will be respread once the cracks have sealed. The area will then be reseeded with appropriate plant species.
Landform stability	Surface Water Drainage	Design local drainage works to prevent the uncontrolled flow of runoff from the subsided floodplain area over the channel banks. Small diversion bunds directing

Rehabilitation Element	Indicator	Criteria
		floodplain runoff to properly engineered rock chute structures will be installed to minimise bank erosion.
Water quality		As for 1.
Water Storages, Creek Diversions		As for 1.
Water Storages, Creek Diversions		Provide a cover of topsoil in a weathered rock matrix to create a stable substrate for revegetation of channel banks. Weathered rock provides temporary erosion protection by covering erodible soils and minimising topsoil loss. Replace sand across the channel bed, including higher sand deposits suitable for re-creation of in-channel benches. Install timber groynes/pile field retards at the base of the channel banks (extending into the channel) to mitigate erosion undercutting the channel banks and to facilitate creation of in-channel benches. The structures will be built between each of the subsided panels affecting the river before subsidence occurs. In areas where less active bank erosion develops, large woody debris will be placed in-stream to encourage the deposition of sediment and revegetation over time. Local drainage works will be designed to prevent the uncontrolled flow of runoff from the subsided floodplain area over the channel banks. Small diversion bunds directing floodplain runoff to properly engineered rock chute structures will be installed to minimise bank erosion. Topsoil will be placed on banks and banks will be revegetate. Stock will be excluded to a width of at least 30 metres from the top of bank and subsided floodplain areas in order to minimise further impacts on vegetation cover and land condition. A targeted revegetation will be undertaken in areas where surface water patterns have been affected
Topsoil		As for 1.
Vegetation	Land use	Roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management activities. Stock will be excluded to a width of at least 30 metres from the top of bank and subsided floodplain areas in order to minimise further impacts on vegetation cover and land condition.
Vegetation	Surface cover	As for 1.
Vegetation	Species composition	Palatable, nutritious pasture native grass species are present. Suitable species will be used for the revegetation of riparian zones.
Vegetation	Community structure	Desirable native grass species comprise at least 60% of total grass cover. Tree density and height of >25 stems per 5 ha each being >2 m in height.
Vegetation	Resilience to disturbance	As for 1.
Vegetation	Sustainability	Nitrogen fixing grass species present. More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead.
Fauna	Vertebrate species	Representation of a range of species characteristics (e.g. activity pattern, habitat usage, diet, dispersal character etc. (WBM, 2003; Kimber et. al., 1999)) from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the grassland ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine closure or by more than 40% over the two

Rehabilitation Element	Indicator	Criteria
		successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different pastoral ecological processes (including termites for soil structure, Collembola for decomposition, Hemiptera for herbivory and predatory groups such as arachnids, centipedes, earwigs, cockroaches and ants as indicators of a range of other processes (Bisevac and Majer, 1998).
Fauna	Habitat structure	Typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of pastoral ecosystem type are present, including: a variety of food plants and signs of natural generation of shelter sources including leaf litter.
Safety		Risk assessment has been undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders.
6. Other Lands		
Vegetation	Land use	Roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management activities. Predicted economics and /or benefits have been defined and agreed by the stakeholders. Minor dozer reshaping work will be undertaken to ensure surface level consistency with the surrounding areas. Any creek crossings (i.e. culverts, etc.) will be removed and the pre-existing drainage line re-instated where applicable. If required the area will be deep ripped to loosen compacted material. A light vehicle access road is to be maintained to enable inspections of the site following closure of the mine. Fertiliser and pasture/tree seed will be applied to assist establish pasture post-mine land use.
Water Quality	Physical and chemical parameters	A ground and surface water monitoring program will remain in place to closely monitor any changes to water chemistry within the site boundary.
Safety	State and federal OH&S requirements	Risk assessment has been completed and risk mitigation measures have been implemented. Where risk mitigation measures include safety fences and warning signs, these have been erected generally in accordance with relevant guidelines and Australian Standards.

Comment - 19.DP

Appendix W; Section 3.8.4

The EM Plan does not sufficiently detail the management of overburden for the project to ensure rehabilitation requirements are met. Waste characterisation is not sufficient as the number of samples may be deficient.

Recommendation - 19.DP

The EM Plan should detail the management of overburden to ensure rehabilitation requirements are met.

The EM Plan should describe and show the location, design and methods for constructing dumps of waste rock and subsoil. The location of the dumps should be shown on map relative to topography and other natural features of the area. The following should be detailed and discussed:

- Management of the waste rock dumps to ensure material is not deposited or otherwise moves off the lease boundary;
- An estimated tonnage and/or volume of waste rock and subsoil to be produced annually;
- Waste rock characterisation and how material types will be identified and handled
- Measure to ensure stability of the waste rock dumps, particularly the management of drainage;
- Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance; and
- The proposed distance from the waste rock dumps to the mining lease boundary.

Response - 19.DP

The Proponent held several meeting with DEHP personnel on both the Alpha Coal and Kevin's Corner projects where the number of samples and geochemical characteristics of the coal and mine waste materials were presented and discussed. In the Kevin's Corner EIS, information was presented (including geostatistical modelling), which demonstrated that mining waste characterisation was sufficient in the area proposed to be mined in the first five to ten years. Since the EIS, an infill drilling, sampling and geochemical testing program has been implemented at Kevin's Corner and is continuing to further supplement this information. As of 31 March 2012, a total of 446 representative samples of coal and mining waste materials from 47 drill holes have been subjected to static geochemical tests. In addition, a total of 27 kinetic leach column (KLC) tests have, or are being, completed on selected representative coal and mining waste samples. The results from this sampling and analysis program have been interpreted and reported by RGS Environmental Pty Ltd in a revised geochemical assessment report (SEIS, Volume 2 Appendix E).

The drilling, sampling and geochemical testing at Kevin's Corner is extremely detailed and in excess of, programs completed for similar proposed and approved coal mining projects in the Bowen Basin. The Kevin's Corner program includes kinetic leach column testing which has rarely been completed at the EIS stage or even during the operational phase of coal mining projects in Queensland.

The location of the out of pit spoil (waste rock) emplacement areas was documented in the Volume 1 Section 16 (Figures 16.9 and 16.10) and Volume 2, Appendix Q1 (Figures 4 to 7) of the EIS, this information has been reproduced in the Volume 2, Appendix E of this SEIS, Revised Geochemical Assessment Report, at Figures 2, 6 and 7.

Each of the 6 dot points are listed and addressed below:

1. **Management of the waste rock dumps to ensure material is not deposited or otherwise moves off the lease boundary;**

Management of the spoil (waste rock) emplacement areas is described in the SEIS EM Plan. Control of movement of sediment from these areas is documented in the EM Plan at Section W3.4.6 along with a commitment to prepare a Sediment and Erosion Control Plan prior to operations. . Waste dumps have been designed with sufficient buffer area which will contain sediment and erosion within the mining lease boundary.

2. **An estimated tonnage and/or volume of waste rock and subsoil to be produced annually;**

An estimated tonnage and/or volume of waste rock and subsoil (overburden) to be produced annually has been provided in the EIS at Volume 1 Section 2.6.3.3 and in the SEIS EM Plan as follows:

Mine Overburden

The Kevin's Corner mine has weathered overburden material in the upper measures. The weathered material that does not require drilling and blasting will be removed by high volume efficient mining equipment, as indicated in Table 3-24. This material is regarded as waste rock as it has no marketable value.

Table 3-24 (From the EIS): Indicative total mine overburden 2014 - 2020

Year	2014	2015	2016	2017	2018	2019	2020
Total Overburden (Mbcm)	115	115	115	115	115	115	110

NB – the volumes may change with the final selection of equipment and subsequent schedule.

3. Waste rock characterisation and how material types will be identified and handled

Waste rock (overburden) characterisation and how material types will be identified and handled has been documented in the EIS at Volume 1 Section 16 and Volume 2 Appendix Q1. This information is further supplemented in the Geochemical SEIS Report (Volume 2, Appendix E) at Section 5 and Section 7.5. The overwhelming majority of waste rock will have negligible sulfide content and be Non-Acid Forming (NAF). A small proportion (1%) of waste rock materials located close to coal seams may have some potential to generate acid and these will either be managed in the open pit being covered with NAF spoil where they occur, or report to coarse reject storage locations for compaction, possible lime amendment and encapsulation within a thick layer of NAF overburden. Visual identification of these materials through open-pit mining geological control coupled with pre-mining and ongoing geochemical sampling and testing of coal seam and near coal seam materials will be used to delineate the extent of any PAF overburden materials and ensure that these are selectively handled and managed in an appropriate manner.

4. Measure to ensure stability of the waste rock dumps, particularly the management of drainage

Landform stability measures for both the in-pit and out-of pit overburden emplacement areas, including the management of surface water, are provided in the EM Plan (SEIS, Volume 2, Appendix T1 and T4.09).

Table 3-25 (From the EM Plan): Rehabilitation success criteria

Rehabilitation Element	Indicator	Criteria
1. Infrastructure		
Landform stability	Slope gradient	Area has gradient of <2°.
Landform stability	Erosion control	Erosion mitigation measures have been applied.
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Ensure receiving waters affected by surface water runoff have contaminant limits of

Rehabilitation Element	Indicator	Criteria
		electrical conductivity maximum of 2,000 µS/cm and pH range of 5.5 to 9.5, or as determined to be sustainable subject to future investigations and setting water quality objectives.
Water Storages, Creek Diversions		Clean water storages and diversions to be stabilised and left as required. Dirty water storages to be cleaned out and rehabilitated to a stable non-polluting condition.
Topsoil	Physical and chemical soil parameters	Soil salinity content is <0.6 dS/m. Soil pH is between 5.5 and 8.5. Soil Exchange Sodium Percentage (ESP) is <15%. Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts. Adequate macro and micro-nutrients are present
Vegetation	Land use	Buildings, water storage, roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management activities. Predicted economics and /or benefits have been defined and agreed by the stakeholders.
Vegetation	Surface cover	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m^2 in area or >10 m in length down slope.
Vegetation	Species composition	Palatable, nutritious pasture grass species are present.
Vegetation	Community structure	Desirable grass species comprise at least 60% of total grass cover. Tree density and height of >25 stems per 5 ha each being >2 m in height.
Vegetation	Resilience to disturbance	Established species survive and/or regenerate after disturbance. Weeds do not dominate native species after disturbance or after rain. Pests do not occur in substantial numbers or visibly affect the development of native plant species.
Vegetation	Sustainability	Nitrogen fixing grass species present. More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead.
Fauna	Vertebrate species	Representation of a range of species characteristics (e.g. activity pattern, habitat usage, diet, dispersal character etc (WBM, 2003; Kimber et. al., 1999)) from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the grassland ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine closure or by more than 40% over the two successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different pastoral ecological processes (including termites for soil structure, Collembola for decomposition, Hemiptera for herbivory and predatory groups such as arachnids, centipedes, earwigs, cockroaches and ants as indicators of a range of other processes (Bisevac and Majer, 1999).
Fauna	Habitat structure	Typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of pastoral ecosystem type are present, including: a variety of food plants and signs of natural generation of shelter sources including leaf litter.
Safety		Risk assessment has been undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders. Closure documentation includes the contaminated sites register which identifies contaminated sites and the treatment applied.

Rehabilitation Element	Indicator	Criteria
2. Pits, Voids and Overburden Emplacement		
Overburden Emplacement		
Landform stability	Slope gradient	No less than 75% of the area has slopes <10° and up to 25% of the area has slopes >10°. Where reject layers are present and exposed, the landform is capped.
Landform stability	Erosion control	Erosion control structures are installed commensurate with the slope of the landform.
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Ensure receiving waters affected by surface water runoff have contaminant limits of electrical conductivity maximum of 2,000 µS/cm and pH range of 5.5 to 9.5, or as determined to be sustainable subject to future investigations and setting water quality objectives.
Water Storages, Creek Diversions		Clean water storages and diversions to be stabilised and left as required. Dirty water storages to be cleaned out and rehabilitated to a stable non-polluting condition.
Topsoil	Salinity (electrical conductivity)	Soil salinity content is <0.6 dS/m.
Topsoil	pH	Soil pH is between 5.5 and 8.5.
Topsoil	Sodium content	Soil Exchange Sodium Percentage (ESP) is <15%.
Topsoil	Nutrient cycling	Nutrient accumulation and recycling processes are occurring as evidenced by the presence of a litter layer, mycorrhizae and/or other microsymbionts. Adequate macro and micro-nutrients are present.
Vegetation	Land use	Area accomplishes and remains as a healthy working bushland ecosystem.
Vegetation	Surface cover	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m^2 in area or >10 m in length down slope.
Vegetation	Species composition	Comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland to open forest where possible.
Vegetation	Community structure	Groundcover, understorey and overstorey structure similar to that of appropriate reference site(s)*.
Vegetation	Resilience to disturbance	Established species survive and/or regenerate after disturbance. Weeds do not dominate native species after disturbance or after rain. Pests do not occur in substantial numbers or visibly affect the development of native plant species.
Vegetation	Sustainability	Species are capable of setting viable seed, flowering or otherwise reproducing. Evidence of second generation of tree/shrub species. Vegetation develops and maintains a litter layer evidenced by a consistent mass and depth of litter over subsequent seasons. More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead.
Fauna	Vertebrate species	Representation of a range of species characteristics (e.g. activity pattern, habitat usage, diet, dispersal character etc (WMB, 2003; Kimber et. al., 1999)) from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. Sighting of species of conservation significance or indicators of the presence of species of conservation significance (e.g. tracks) likely to be present in the established ecosystem type within the three-year period preceding mine closure (assuming non-mine related disturbance has not eliminated local populations thereby removing the colonising source). The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine lease relinquishment or by more than 40% over the two successive

Rehabilitation Element	Indicator	Criteria
		seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different ecological processes (including termites for soil structure, Collembola for decomposition, Hemiptera for herbivory and predatory groups such as arachnids, centipedes, earwigs, cockroaches and ants as indicators of a range of other processes (Bisevac and Majer, 1998).
Fauna	Habitat structure	Typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of that ecosystem type are present, including: a variety of food plants; evidence of active use of habitat provided during rehabilitation such as nest boxes, stags and logs and signs of natural generation of shelter sources including leaf litter.
Safety		Risk assessment has been undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders.
Final Voids (including ramps)		
Landform stability	Slope gradient	Final void batter slopes will be designed and excavated to exhibit permanent geotechnical stability. Prior to closure, further investigations will be undertaken to specify design criteria and appropriate action will be taken to ensure effective long term safety, stability and management of the void.
Landform stability	Erosion control	Erosion mitigation measures have been applied to ensure slope stability
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Electrical conductivity of any void water may exceed 2,000 µS/cm if an ecological assessment shows the long-term ecological stability and groundwater quality is not adversely affected.
Water Storages, Creek Diversions		As for 1.
Topsoil		As for 1.
Vegetation	Land use	Where ramps and in-pit spoil design allow, area accomplishes and remains as a healthy working bushland ecosystem (although naturalised grasses may be used).
Vegetation	Surface cover	As for 1.
Vegetation	Species composition	Comprise a mixture grasses, shrubs and trees (where possible) suitable for establishment on steeper slopes.
Vegetation	Community structure	Groundcover and understorey structure to that of appropriate reference site(s)*.
Vegetation	Resilience to disturbance	As for 1.
Vegetation	Sustainability	More than 75% of individual grasses and shrubs are healthy when ranked healthy, sick or dead.
Safety		Risk assessment has been completed and risk mitigation measures have been implemented. Where risk mitigation measures include bunds, safety fences and warning signs, these have been erected generally in accordance with relevant guidelines and Australian Standards.
3. Tailings Storage Facility		
Landform stability	Erosion control	Tailings are capped to a depth to be defined in field trials, which includes a minimum topsoil depth of 200mm on the cap.

Rehabilitation Element	Indicator	Criteria
		Erosion mitigation measures have been applied. Average soil loss per annum per domain unit is <40 tonnes/ha/yr (sheet erosion).
Landform stability	Surface Water Drainage	Drainage control measures are installed. No water is observed leaching from the facility.
Water quality		As for 1. Area accomplishes and remains as native vegetation.
Topsoil		As for 1.
Vegetation	Land use	Area accomplishes and remains as sustainable grazing.
Vegetation	Surface cover	Minimum of 70% vegetative cover is present (or 50% if rocks, logs or other features of cover are present). No bare surfaces >20 m2 in area or >10 m in length down slope.
Vegetation	Species composition	Grasses, shrubs and trees representative of regionally occurring vegetation communities where possible .
Vegetation	Resilience to disturbance	Established species survive and/or regenerate after disturbance. Weeds do not dominate native species after disturbance or after rain. Pests do not occur in substantial numbers or visibly affect the development of native plant species.
Vegetation	Sustainability	Species are capable of setting viable seed, flowering or otherwise reproducing.
Fauna	Vertebrate species	Representation of a range of species characteristics from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. The number of vertebrate species does not show a decrease over a number of successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different ecological processes.
Safety		As for 1.
4. Dams and Surface Water Infrastructure		
Landform stability	Surface Water Drainage	Use of contour banks and diversion drains to direct water into stable areas or sediment control basins.
Water quality		Ensure receiving waters affected by surface water runoff have contaminant limits of electrical conductivity maximum of 2,000 µS/cm and pH range of 5.5 to 9.5, or as determined to be sustainable subject to future investigations and setting water quality objectives.
Water Storages, Creek Diversions		Clean water storages and diversions to be stabilised and left as required. Dirty water storages to be cleaned out and rehabilitated to a stable non-polluting condition.
5. Subsidence Areas		
Landform stability	Erosion control	Erosion mitigation measures have been applied.
Landform stability	Subsidence Impacts	Perform regular inspections over subsidenec areas to identify any surface cracks and/or sinkholes. Undertake minimal clearing, if required, of areas around cracks and/or sinkholes to allow for ripping and seeding. Ripping and seeding of areas where required. Following initial ripping and seeding, if trees are to be planted, they will not be planted until enough rain has fallen. Seed and/or plant appropriate species of vegetation to achieve a post-subsidence land use the same as that pre-subsidence (i.e. low intensity cattle grazing). Regrade subsidence areas and where necessary backfill with mine spoil to control surface water flow and minimise erosion and sedimentation. Undertake drainage works, such as graded banks and diversion drains, to partially drain

Rehabilitation Element	Indicator	Criteria
		larger subsidence voids and direct water into stable areas or sediment control areas. If ripping is not feasible due to the width of the cracks, topsoil will be stripped and stockpiled. Clay material will be imported to fill and seal cracks and the topsoil will be respread once the cracks have sealed. The area will then be reseeded with appropraite plant species.
Landform stability	Surface Water Drainage	Design local drainage works to prevent the uncontrolled flow of runoff from the subsided floodplain area over the channel banks. Small diversion bunds directing floodplain runoff to properly engineered rock chute structures will be installed to minimise bank erosion.
Water quality		As for 1.
Water Storages, Creek Diversions		As for 1.
Water Storages, Creek Diversions		Provide a cover of topsoil in a weathered rock matrix to create a stable substrate for revegetation of channel banks. Weathered rock provides temporary erosion protection by covering erodible soils and minimising topsoil loss. Replace sand across the channel bed, including higher sand deposits suitable for re-creation of in-channel benches. Install timber groynes/pile field retards at the base of the channel banks (extending into the channel) to mitigate erosion undercutting the channel banks and to facilitate creation of in-channel benches. The structures will be built between each of the subsided panels affecting the river before subsidence occurs. In areas where less active bank erosion develops, large woody debris will be placed in-stream to encourage the deposition of sediment and revegetation over time. Local drainage works will be designed to prevent the uncontrolled flow of runoff from the subsided floodplain area over the channel banks. Small diversion bunds directing floodplain runoff to properly engineered rock chute structures will be installed to minimise bank erosion. Topsoil will be placed on banks and and banks will be revegetate. Stock will be excluded to a width of at least 30 metres from the top of bank and subsided floodplain areas in order to minimise further impacts on vegetation cover and land condition. A targeted revegetation will be undertaken in areas where surface water patterns have been affected
Topsoil		As for 1.
Vegetation	Land use	Roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management activities. Stock will be excluded to a width of at least 30 metres from the top of bank and subsided floodplain areas in order to minimise further impacts on vegetation cover and land condition.
Vegetation	Surface cover	As for 1.
Vegetation	Species composition	Palatable, nutritious pasture grass species are present. Suitable species will be used for the revegetation of riparian zones.
Vegetation	Community structure	Desirable grass species comprise at least 60% of total grass cover. Tree density and height of >25 stems per 5 ha each being >2 m in height.
Vegetation	Resilience to disturbance	As for 1.
Vegetation	Sustainability	Nitrogen fixing grass species present. More than 75% of shrubs and/or trees are healthy when ranked healthy, sick or dead.
Fauna	Vertebrate species	Representation of a range of species characteristics (e.g. activity pattern, habitat usage,

Rehabilitation Element	Indicator	Criteria
		diet, dispersal character etc (WBM, 2003; Kimber et. al., 1999)) from each faunal assemblage group (e.g. reptiles, birds, mammals), present in the grassland ecosystem type, based on pre-mine fauna lists and sighted within the three-year period preceding mine lease relinquishment. The number of vertebrate species does not decrease by more than 25% in the successive seasons prior to mine closure or by more than 40% over the two successive seasons prior to mine lease relinquishment.
Fauna	Invertebrate species	Presence of representatives of a broad range of functional indicator groups involved in different pastoral ecological processes (including termites for soil structure, Collembola for decomposition, Hemiptera for herbivory and predatory groups such as arachnids, centipedes, earwigs, cockroaches and ants as indicators of a range of other processes (Bisevac and Majer, 1998).
Fauna	Habitat structure	Typical food, shelter and water sources required by the majority of vertebrate and invertebrate inhabitants of pastoral ecosystem type are present, including: a variety of food plants and signs of natural generation of shelter sources including leaf litter.
Safety		Risk assessment has been undertaken in accordance with relevant guidelines and Australian Standards and risks reduced to levels agreed with the stakeholders.
6. Other Lands		
Vegetation	Land use	Roads (except those used by the public) and other infrastructure have been removed unless stakeholders have entered into formal written agreements for their retention. Areas are readily accessible and conducive to safe cattle management activities. Predicted economics and /or benefits have been defined and agreed by the stakeholders. Minor dozer reshaping work will be undertaken to ensure surface level consistency with the surrounding areas. Any creek crossings (i.e. culverts, etc) will be removed and the pre-existing drainage line re-instated where applicable. If required the area will be deep ripped to loosen compacted material. A light vehicle access road is to be maintained to enable inspections of the site following closure of the mine. Fertiliser and pasture/tree seed will be applied to assist establish pasture post-mine land use.
Water Quality	Physical and chemical parameters	A ground and surface water monitoring program will remain in place to closely monitor any changes to water chemistry within the site boundary.
Safety	State and federal OH&S requirements	Risk assessment has been completed and risk mitigation measures have been implemented. Where risk mitigation measures include safety fences and warning signs, these have been erected generally in accordance with relevant guidelines and Australian Standards.

5. Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance; and

Slope profiles that are consistent with intended land use and acceptable post-mining land management and maintenance are documented the SEIS EM Plan as follows:

Table 3-26 (From the EM Plan): Rehabilitation success criteria

Rehabilitation Element	Indicator	Criteria

Rehabilitation Element	Indicator	Criteria
2. Pits, Voids and Overburden Emplacement		
Overburden Emplacement		
Landform stability	Slope gradient	No less than 75% of the area has slopes <10° and up to 25% of the area has slopes >10°. Where reject layers are present and exposed, the landform is capped.

6. **The proposed distance from the waste rock dumps to the mining lease boundary.**

The location of the out of pit spoil (waste rock) emplacement areas was documented in Volume 1 Section 16 (Figures 16.9 and 16.10) and Volume 2, Appendix Q1 (Figures 4 to 7) of the EIS. This information was reproduced in the Volume 2, Appendix E of this SEIS, Revised Geochemical Assessment Report, at Figures 2, 6 and 7. Overburden materials generated in the first two years of mining will be stored at out-of-pit emplacement areas located to the northeast and northwest of the Northern open pit. The actual distance of the northern extent of the waste rock dumps is approximately 1 km from the mining lease boundary, as shown in Volume 1 Section 16 (Figures 16.9 and 16.10) and Volume 2, Appendix Q1 (Figures 4 to 7) of the EIS, this information has been reproduced in the Volume 2, Appendix E of this SEIS, Revised Geochemical Assessment Report, at Figures 2, 6 and 7.

Comment - 19.DQ

Appendix W; Table W-38

Not all rehabilitation success criteria and indicators are measurable or definitive, i.e. one statement is 'Comprise a mixture of native trees, shrubs and grasses representative of regionally occurring woodland to open forest where possible'.

Recommendation - 19.DQ

Ensure all rehabilitation success criteria and indicators are able to be measured to identify when rehabilitation is complete. Targeted vegetation communities should be identified, including the species compositions aimed for or the re-establishment of target fauna species.

Response - 19.DQ

The information provided in the revised EM Plan (Volume 2, Appendix T1) relating to rehabilitation criteria is considered appropriate for this stage of the Project. As per current industry practice, success criteria will be regularly assessed and updated based on a "continuous loop of improvement" with respect to future rehabilitation strategies and relinquishment. During operations rehabilitation works will be designed specifically to optimise the potential for rapid ecosystem re-establishment. It is in the Proponents interest to successfully rehabilitate the available areas of the mine to reduce their financial assurance exposure. As part of the continued development of the site's rehabilitation criteria measurable and/or definitive goals will be set (SEIS, Volume 2, Appendix T4.09).

3.27 Cumulative Impacts

Comment - 19.DR

Appendix X; Section X.1

This review of the cumulative impacts of mining in the Galilee Basin on Nature Conservation is inadequate. Table X-1 lists the cumulative impact on Nature Conservation as a low impact.

Recommendation - 19.DR

It is recommended that the review of the cumulative impacts of all mining proposals in the Galilee Basin on Biodiversity describe in full the extent of clearing of regional ecosystems, species habitat, special features values and the loss of connectivity and integrity to the Desert Uplands bioregion that is likely to occur.

Response - 19.DR

The level of detail the cumulative impact assessment can present is dependent on the availability of the information in the public arena at the time of the EIS release. A more detailed Cumulative Impact Assessment Report for the Project has been committed to and the scope of this report can be found in Section 4.6 of Appendix O (Volume 2 of this SEIS). Results of field surveys, vegetation mapping and habitat modelling undertaken for both the Alpha Coal and Kevin's Corner Projects will form the basis of the assessment. The assessment will identify where biodiversity corridors have been mapped by DEHP in the vicinity of the Alpha Coal and Kevin's Corner Projects. This interim cumulative impacts study scope has been developed in consultation with DEHP, OCG and DSEWPaC. The data will be provided to these agencies, available for use by other proponents. The report is expected to be completed in March 2013 (SEIS, Volume 2, Appendix O, Table O-11).

The impacts on terrestrial ecology biodiversity as a result of the Project are discussed in the EIS Volume 1 Section 9. The development and implementation of an offsets strategy is one way to mitigate any negative potential impacts of the Project. This strategy is presented in the Biodiversity Offset Strategy (State and Federal) State Offsets Report (Volume 2, Appendix P of this SEIS). The strategy will continue to be developed in close consultation with DEHP and DSEWPaC in consideration of the appropriate guidelines and the cumulative effects of other projects.

Comment - 19.DS

Appendix X; Section X.6.4

The proponent has acknowledged that from the assessment methodology in Section X.3, the overall cumulative impact on surface water is high. The proposed mitigation and control strategies to manage the cumulative impacts would seem to reflect only the impact from this project on surface waters. The proponent has acknowledged that there could be an increase in afflux off lease which will impact the proposed stream diversions and levees of Alpha Coal Project (Volume 11, Section 11.4.12, page 103). The hydraulic model used in this assessment was generated to assess the baseline conditions (Volume 11, Section 11.4.3.1, page 89).

Recommendation - 19.DS

The proponent should provide a detailed cumulative impacts report reviewing the impact on surface waters from this project and the proposed Alpha Coal Project. The proponent should provide detailed information as to the extent of afflux off lease and the impact on the adjoining Alpha Coal Project through the development of an applicable hydrological model for developed conditions. The proponent should review the proposed impact to the reduction in floodplain area of Sandy Creek and examine potential modifications to the impact from mining that will limit and reduce off lease impacts.

Response - 19.DS

An assessment of the cumulative impacts of the Alpha Coal and Kevin's Corner coal mines on afflux has been undertaken as part of the Cumulative Surface Water Impact Assessment which is provided as Appendix S of the SEIS. This assessment has shown that cumulative impact of both mines increases afflux at the Alpha Coal/Kevin's Corner mine lease boundary by up to 90 mm for the 1:1000 AEP event compared to the level predicted for the Kevin's Corner mine alone. Since the Kevin's Corner levees have been designed with a freeboard of 1 m above the 1:1000 AEP event this increase in flood levels does not impact on the flood immunity for the mine. Further the increase in flood levels does not increase the flood extent due to the natural topography on the eastern bank of Sandy Creek. The Cumulative Surface Water Impact Assessment also assessed the cumulative impacts of the Alpha Coal and Kevin's Corner Projects on stream hydraulic parameters including the potential for changes to erosion and sedimentation within the Kevin's Corner lease. The report found that the proposed levee and dam designs within the Kevin's Corner lease were suitable when the cumulative impacts of the Alpha Coal and Kevin's Corner mines are taken into account. Cumulative impacts will not affect the diversion as the Alpha Coal Project is not located upstream of the diverted watercourses.

3.28 Offsets Strategy

Comment - 19.DT

Appendix Z; Section Z.2.4.2

The statement - "Offsets under the policy for biodiversity Offsets will not be required" is not correct.

Recommendation - 19.DT

The proponent is planning to directly and indirectly disturb 38,365.7ha and the proponent needs to assess the impacts of these areas within the framework of the Queensland Biodiversity Offsets Policy 2011 (BOP) and consider how to address the loss of connectivity and integrity to the Desert Uplands bioregion. The area and significance of the impacts need to be addressed in detail. The proponent needs to also address the BOP offset requirements in line with the forthcoming Galilee Offset Strategy for all proposed mining projects within the Basin and detail how to secure these offsets within the "Desert Uplands Ecological Footprint Area".

Response - 19.DT

A more detailed Biodiversity Offset Strategy has been prepared for the Kevin's Corner Project that has regard to the BOP. The Offset Strategy (SEIS, Volume 2, Appendix P) addresses both state and commonwealth offset requirements.

The BOP does not formally apply to state significant projects. The Coordinator-General may have regard to this policy when assessing projects.

HGPL propose to assess and identify the potential impacts to state significant biodiversity values that are listed in the BOP. The extent of these impacts has been discussed and mapped in the Offset Strategy.

HGPL will have regard to the DEHP Galilee Offset Strategy when it is released. In the interim, HGPL will proceed with identifying potential offset areas that meet both the state and commonwealth offset requirements. It is HGPL's understanding that there is currently no requirement to secure offsets within the "Desert Upland Ecological Footprint Area".

Comment - 19.DU

Appendix X

The EIS considers cumulative impacts for groundwater depression in conjunction with Alpha. Chapter 27 Cumulative Impacts does not fully address the Terms of Reference (ToR).

The Executive Summary (& Chapter 11 Surface Water) states that certain aspects of flood interactions with Alpha are not considered.

There is a degree of the uncertainty associated with the current flood hydrology (fluvial hydrology and flood afflux) associated with the proposed diversion and a lack of detail regarding levee feasibility (stability relative to watercourses/pits, and erosion protection).

These uncertainties are addressed in separate comments.

Recommendation - 19.DU

The EIS must address cumulative impacts for flood hydrology particularly across nearby upstream sites. Related aspects drawn to attention in following recommendations are to be considered as part of that cumulative impacts study.

Response - 19.DU

The Kevin's Corner Project and the Alpha Coal Project will have minimal impact on flood hydrology, because the creeks are allowed to pass through the sites. It is presumed that the comment refers more to cumulative impacts on flood hydraulics, physical features in streams that affects floods, sediment generation and overall net effect on waterway geomorphology. This SEIS makes commitments to detailed cumulative impacts studies and also presents the scoping suggested for a cumulative impact assessment and adaptive management of potential impacts on stream geomorphology. The cumulative impacts of multiple projects on sediment transport and geomorphology will need to be further and regularly reviewed as currently too few details are available about other project details and importantly timing of the approval and subsequent commencement of other projects.

An initial high level review has been undertaken and the possible cumulative effect on geomorphology is presented in the Interim Cumulative Impacts Assessment (Volume 2, Appendix O), as well as additional studies in the Cumulative Surface Water Impact Assessment (Volume 2, Appendix S) of this SEIS.

3.29 Subsidence Report

Comment - 19.DV

Appendix J

Appendix J divides the longwall mining panels into three groups: Northern, Central and Southern. Estimates of subsidence across the groups range up to 3 metres. At page 21, it is recommended that a 'numerical caving model' be adopted to improve predictions. It is not clear if this recommendation has been actioned or how predictions would be affected.

The shallowest seams subject to subsidence are in the north east at 70 metres which would be under Middle Creek after the diversion, and under Upper Wells Creek. At this depth connection by subsidence between the surface and the mine front is regarded as a real possibility. Potential impacts are not effectively addressed.

Surface cracking is addressed by claims in documentation that any cracks are likely to be 'self-sealing' due to the clayey nature of overburden. Clear criteria are not stated for when more active intervention for subsidence cracking should be applied. Whether the options of clay or bentonite are best practice fill for larger cracks is open to question.

The Central subsidence area is under the diversion which runs parallel to, and within two, of the north/south panels immediately adjacent to the zone containing the open cut pits. Consequent issues of stability of the diversion are not adequately addressed.

The upper parts of tributaries Little Sandy Creek, Rocky Creek, Middle Creek and Well Creek have banks that regularly run at right angles across panel edges. As identified in Appendix M1 Fluvial Hydrology, banks crossing panel edges present zones of high potential for creating erosion and instability. Active short term and long term intervention to restore watercourse function in these circumstances is not addressed in the EIS.

The current proposed mitigation for both subsidence and erosion consist of comprehensive monitoring and reactive treatment of unspecified problems as they arise. The EIS should better define potential impacts and specify methods to mitigate those potential impacts.

Recommendation - 19.DV

Methods to actively mitigate potential impacts of subsidence - in general and under watercourses, short and long term - need to be proposed.

Response - 19.DV

An Interim Subsidence Management Plan (Volume 2, Appendix N) has been developed as part of the SEIS. This Interim Subsidence Management Plan has been prepared in accordance with the draft DEHP guideline (Watercourse subsidence - Central Queensland Mining Industry). This plan will supplement the information that is contained within the revised Project EM Plan (Volume 2, Appendix T1).

The subsidence management plan has been informed through the preparation of a Subsidence Impact Assessment report (Volume 2, Appendix N, Appendix C) which has applied the numerical model developed by Whittaker and Reddish 1989 to the prediction of subsidence calculated using empirical methods to estimate the maximum strain over the subsided area.

As part of the interim subsidence management plan modelling predictions relating to the potential connectivity between the surface and the underground mine workings are made. These assumptions are conservative in nature as modelling does not take into account the sealing role that the alluvial and lateritic profiles across the site will have on limiting the potential for this hydraulic connection.

The methodology for remediating cracking and other potentially negative impacts caused by subsidence of the surface by underground mining are proposed within the Interim Subsidence Management Plan and will be determined through an active monitoring program. The Plan currently indicates that the cracks will be remediated following three storm events if they are not self-sealed by this time. It is acknowledged that bentonite is not the only method of sealing cracks but sand is another option that will be considered.

The diversion alignment was determined by the constraints provided by the local topography, the existing channel geometry from each creek, the orientation of the proposed longwall panels for the Central Underground Mine, and the location of the flood protection levee. The diversion was conceptually designed with consideration to the guidelines developed by the Australian Coal Association Research Program (ACARP). The diversion alignment was designed to contain the excavated channel within a single longwall panel to reduce the potential for wide scale re-construction or maintenance of the diversion which would be necessary if it crossed multiple panels. The gradient of the proposed constructed diversion is less than the original watercourse and erosion is not expected to occur. Indeed it is actually expected that the constructed diversion will likely experience sedimentation and it is recommended that this should be allowed to occur naturally.

Hydraulic modelling was undertaken to assess the impacts of subsidence on the proposed diversion channel. The modelling results indicate that there would only be very marginal differences in hydraulic performance of the diversion following subsidence as the diversion channel is generally contained with the two longwall panels and

would generally subside similarly. In addition the downstream section of the diversion will be subsided prior to the upstream section which will maintain flow within the diversion. It is therefore unlikely that stability issues within the diversion would arise.

As part of the Interim Subsidence Management Plan the baseline and subsided case stream power and resultant erosion risks were examined for the Project area. This information and a range of potential mitigation measures discussed are presented in SEIS, Volume 2, Appendix N.

3.30 Surface Water

Comment - 19.DW

A significant amount of work has been undertaken to produce the current hydrology and hydraulics documentation. However, neither the hydrology nor the hydraulics are currently reliably calibrated or verified.

In regard to hydrology, flood frequency analyses (FFA) for flows at gauging stations in watercourses (regarded as similar) have been transposed using empirical relationships. Comparisons were made of these results to empirical methods for ungauged catchments by ACARP and a method proposed for the revised AR&R, and to RORB modelling using parameters also based on regional-empirical methods.

The transposed FFA results are preferred for AEP up to 1 in 50, but RORB is preferred for events less frequent than 1 in 100. It is reasoned that the RORB estimates (which are more conservative) are less likely to be representative of the range of losses and spatial and temporal variation of more frequent real events.

However, RORB can be run in a stochastic mode that simulates variation in predefined rainfall patterns and losses. It is not clear whether this was done. It is also not clear the RORB estimate is conservative for the interim AEP 1 in 1,000 adopted for the levee – even allowing for a freeboard of 1 metre.

Use of local knowledge of flood levels in previous significant flooding events is not clear. Any such information would be valuable for verification in respect of larger events.

It is acknowledged that flood afflux will affect (at least) Alpha immediately upstream, and therefore these matters should be considered in conjunction with concepts being proposed there to determine any afflux issues for infrastructure or assets upstream.

Recommendation - 19.DW

Information should be provided to assist in verifying hydrological and hydraulic modelling conducted to estimate design floods and levels.

It is important that realistic impacts be assessed and mitigation be provided for all modified natural and man-made 'watercourses'. Conservative estimates of larger flood flows and levels in particular are critical to guiding adequate concepts and detailed designs.

Feasible locations for levee and diversion concept designs need to be determined more in tandem and more precisely.

Response - 19.DW

This submission comment was discussed at the meeting with DEHP on 10 April 2012. It was agreed that the submission is commenting on the level of detail rather than raising specific questions or concerns. It was agreed that the EIS flood hydrology study was adequate. No further action is required.

3.31 Geomorphology Technical Report

Comment - 19.DX

Suggestions in Appendix M1 Fluvial Hydrology (and elsewhere) that only events in the range ARI 2 to 10 will control stability of a diversion on top of land to be subsided with flood plain limited by a proposed levee are not accepted. The levee close to Sandy Creek also amounts to a diversion - in that the flood plain on the western side is substantially reduced.

Figure E-7 in M2 Hydrology Technical Report indicates that the current flood estimate at AEP 1 in 2,000 apparently results in around 4 metres per second average velocity along that levee, and significant portions of Middle and Wells Creeks which are subject to increased flows and shallow subsidence.

Part of the consideration of hydraulic adequacy of diversions is whether the man-made confining structures such as levees can survive the erosive forces to deliver their design performance. For the above proposed diversion, stability (of location) of the low flow channel in an area of known disruption of the natural channel is likely at risk.

Feasibility during operations in situations of unnatural and confined watercourses, is likely to be controlled by rare events – less than AEP 1 in 1,000. For the diversion this will likely require more details of the underlying strata and concepts for confinement of the diversion and dissipation of energy temporarily and long term.

On decommissioning the ability to deal with extreme events without high maintenance requirements is important. The EIS does not address this issue.

Recommendation - 19.DX

Diversions and levees designs should be revised to address the above issues.

Response - 19.DX

The statement that "the levee close to Sandy Creek also amounts to a diversion - in that the flood plain on the western side is substantially reduced" is not correct. It is a levee not a diversion and the levee must be (and has been) assessed for its impact on reduction of floodplain corridor width and changes in levels, velocities, and stream power of Sandy Creek. This assessment was undertaken for the EIS.

Whilst Figure E-7 in M2 Hydrology Technical Report indicates velocities of around 4 metres per second average velocity within Sandy Creek at AEP 1 in 2,000 the velocities within the diversion and along the levee adjacent to

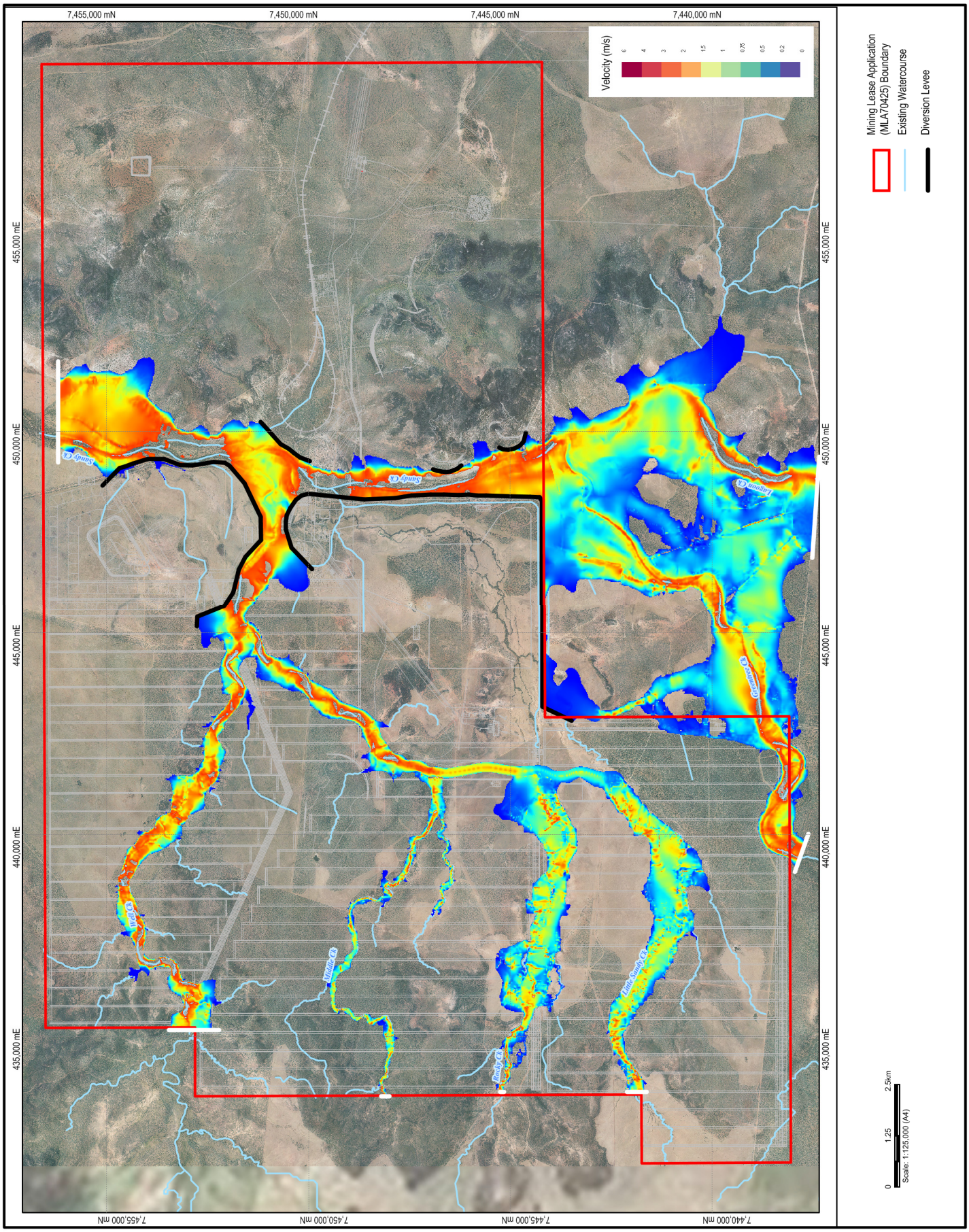
the diversion are substantially less than this. Figure 7-2 and Figure E-7 show the following in relation to the diversion:

- The diversion levee only extends from chainage 0 to chainage 3500 along the diversion (refer Figure 7-2);
- Along this section of the diversion, the velocities are less than 1.5 m/s (refer Figure E-7).

Hydraulic modelling was undertaken to assess the impacts of subsidence on the proposed diversion channel. The modelling results indicate that there would only be very marginal differences in hydraulic performance of the diversion following subsidence as the diversion channel is generally contained with the two longwall panels and would generally subside similarly. The gradient of the proposed constructed diversion is less than the original watercourse and erosion is not expected to occur. Indeed it is actually expected that the constructed diversion will likely experience sedimentation and it is recommended that this should be allowed to occur naturally. This is consistent with the EIS geomorphology technical report (EIS, Volume 2, Appendix M) which shows that eventual natural stream adjustment occurs (silting of panels subsidence and eroding down of pillar zones) to reform a uniform longitudinal profile. In an extreme event this effect would occur within one entire flood.

For the detailed diversion design, more details of the underlying strata and concepts for confinement of the diversion and dissipation of energy temporarily and long term will be assessed.

The mine closure planning will consider the ability to deal with extreme events without high maintenance requirements following decommissioning at the end of the mine life.



Draft

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Datum: GDA94, MGA Zone55

HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

SUMMARY OF 1:2000 AEP EVENT VELOCITY RESULTS - DIVERTED

Job Number	4262 6920
Revision	B
Date	21-09-2012

Figure: 3-19

File No: 42626920-g-1020b.wor

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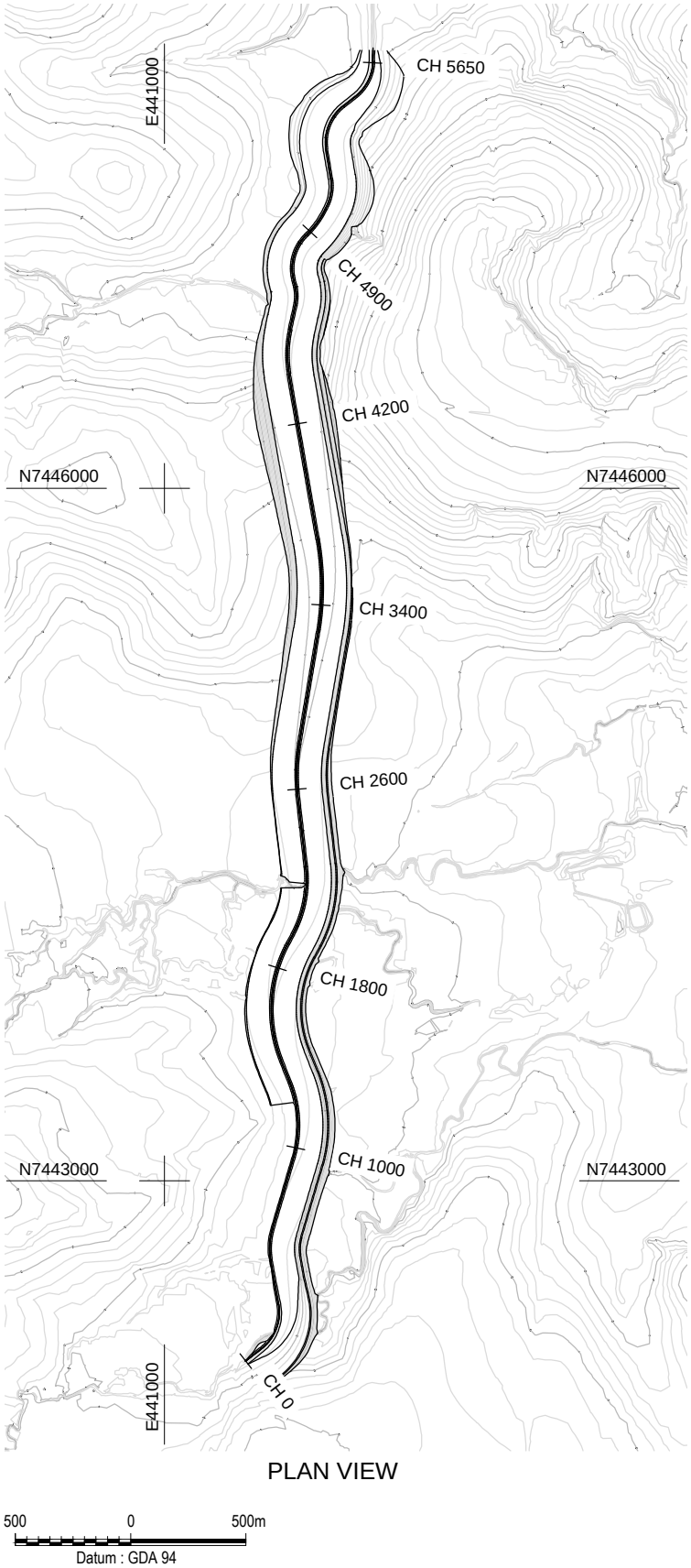

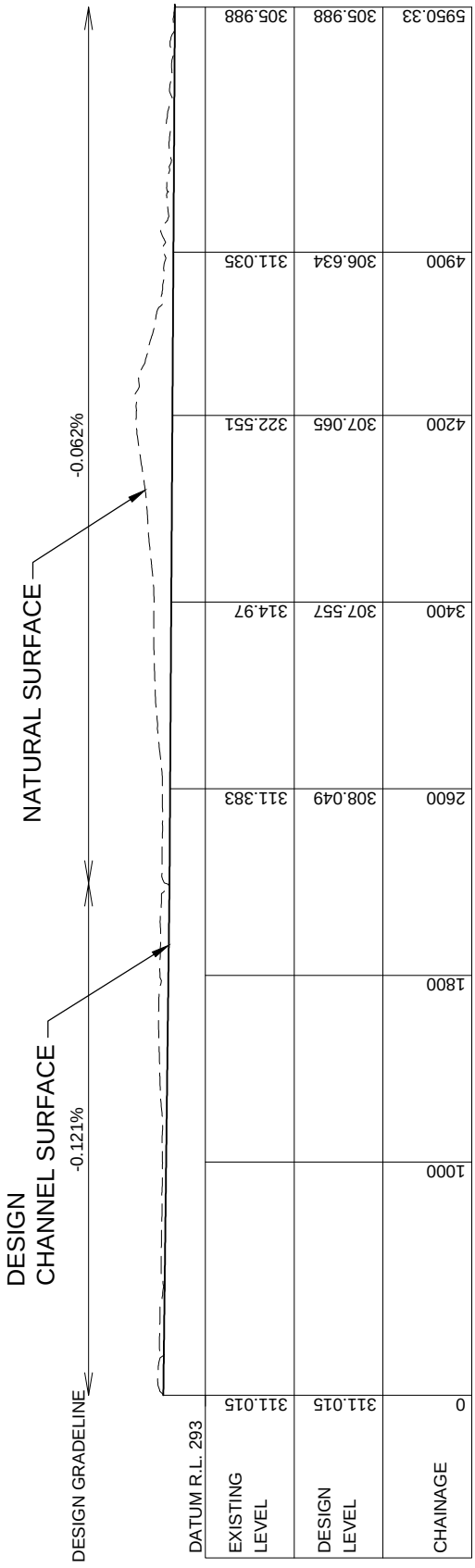

CHAINAGE	DESIGN LEVEL	EXISTING LEVEL
0	311.015	311.015
1000		
1800		
2600	308.049	311.383
3400	307.557	314.97
4200	307.065	322.551
4900	306.634	311.035
5950.33	305.988	305.988

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HANCOCK GALILEE PTY LTD

Kevin's Corner Project
Supplementary Environmental Impact Statement

LITTLE SANDY CREEK DIVERSION CHANNEL AND PROFILE

Job Number 4262 6920
Revision A
Date 15-06-2012

Figure: 3-18

File No: 42626920-g-1019.dwg

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Comment - 19.DY

The levees associated with Sandy Creek do not appear to be located so as to provide adequate geotechnical factors of safety for the pit walls, and adequate protection against erosion failure to an acceptable probability over the operational life and beyond.

This issue applies to both the Kevin's Corner and Alpha parts of the levees.

Recommendation - 19.DY

That relevant geology, geotechnical, hydrology and hydraulics be applied to sufficiently progress concept designs for levees to demonstrate the feasibility of their location.

Response - 19.DY

The Proponent agrees with the recommendations provided and is already planning the Project with these considerations. The Proponent commits to adjustment of pit wall locations with a sufficient set back from the levees to provide the appropriate factor of safety as it is not considered feasible to move the levees closer to the creeks without potentially introducing more stream instability risk and afflux impact to the upstream Alpha Coal project.

Detailed geology, geotechnical, hydrology and hydraulics will be applied to sufficiently progress concept designs for levees to demonstrate the feasibility of their location. As this work progresses, the Proponent will discuss progressive findings of investigations and detailed design analyses with the DEHP that is responsible for levees licensed as regulated structures under the EP Act.

A Site Water Management (Basis of Design) Report has been provided as Appendix M of this SEIS. This document provides concept design details for the KC flood levees to support the draft EA conditions. The adequacy of the flood levees to provide the required flood immunity when the cumulative impacts of the Alpha and Kevin's Corner coal mines are taken into account has also been assessed as part of the Cumulative Surface Water Impact Assessment report which is provided as Appendix S of this SEIS.

3.32 Site Water Management System and Water Balance Technical Report

Comment - 19.DZ

The water balance model submitted without nominated volumes to adequately contain mine-affected water on site. Operational rules and pump capacities are not well defined.

In particular, it is not clear whether there is capacity to accommodate on site what might prove to be the final required storage capacities for various dams. At this stage, it is not clear how pumping capacity and necessary monitoring and control will be provided – including provision for contingencies of site access and wet weather.

Recommendation - 19.DZ

Site water management planning and modelling to be progressed to an acceptable stage including:

- estimates of likely storage requirements can be made;
- provision for necessary pumping capacity, and commitments to monitoring and manual/automatic control better defined; and
- contingencies to deal with site access and wet weather.

Response - 19.DZ

A Site Water Management (Basis of Design) Report has been provided as Appendix M of the SEIS which provides concept details for the mine water management system including:

- estimates of storage requirements for each mine water storage;
- operating rules including pumping capacity
- hydraulic performance
- contingency storage

Light vehicle access has been designed to provide site access during wet weather for events up to 1:1000 AEP.

3.33 Surface Water

Comment - 19.EA

No final void water balance modelling has been provided to confirm the worst case equilibrium level of waters in final voids.

This work is required to establish whether the voids will act as sinks on decommissioning, and to determine acceptable levels for location of tailings in pit.

Recommendation - 19.EA

Final void water balances to be completed using worst case equilibrium water levels to confirm if final voids act as sinks and to inform waste in pit concepts.

Response - 19.EA

Integrated groundwater modelling was utilised to assess long term groundwater conditions post-closure of both Alpha Coal and Kevin's Corner mines (cumulative impacts) and assess pseudo steady state final void levels (SEIS, Volume 2, Appendix L, Section 12 Integrated Model).

The integrated modelling predicts that the final void water level (for Kevin's Corner alone) reaches a pseudo steady-state after ~ 100 years, at around 208 m AHD, which is some 100 m below surface. An uncertainty

assessment, allowing for varying climate conditions (long term climate change) indicates that the variation in in / out flux components in the integrated model do not markedly alter predictions, ~ 1 m. The lowest elevation around the Southern open pit final void, where decant could potentially occur, is along the western pit wall, at an elevation of 320 m AHD. As the remaining void space (between pseudo steady-state final void water level and decant level) is ~ 315 million m^3, even considering the highest recorded rainfall volumes at the site, the risk of decant is considered negligible.

3.34 Mine Waste

Comment - 19.EB

Initial investigation, siting and some alternative sites have been presented for the external TSF. Concepts have not be presented regarding how the placement and decant of water will be operated.

No concepts have been provided on how the in spoil/in pit tailings cells will be filled and operated.

The tailings capacity that is required by the project has not been clearly demonstrated.

Recommendation - 19.EB

Options and contingencies to deliver required tailings storage to be more clearly documented including operational concepts and options to demonstrate a low risk feasible operational pathway towards a final decommissioned land form, which should address geotechnical stability, seepage management and promoting drying and consolidation for capping as required.

Response - 19.EB

Tailings Storage Facilities

The updated EM Plan (SEIS, Volume 2, Appendix T1, Section T.3.6) describes the finalised management of tailings to a level that is commensurate with the EIS approvals stage of a coal mine in Queensland. Tailings will initially report to the TSF in a slurry form containing approximately 20% solids and excess water will be recycled from the TSF using a decant system for reuse at the CHPP. If there is an increase in acid generating capacity of the tailings due to tailings being less benign than predicted, and pH levels deviate below the predicted pH range of 5-6, consideration will be given to additional risk management methods such as selective placement, early encapsulation or lime amendment. Given the arid climate of the region, the tailings surface is expected to dry out relatively quickly and form a dense compact solid material, which will facilitate placement of a spoil cover and rehabilitation of the TSF at the end of mine life. A cover system will be utilised for TSF closure and topsoil will be placed onto the re-profiled final landform slopes. The EM Plan (Section T.3.6, Table T-29) details a range of commitments made for managing coal and mining waste materials including tailings. These include the development of a Mining Waste Management Plan (MWMP) prior to construction, infill drilling, sampling and geochemical testing programs, monitoring of surface runoff and seepage and refinement of management strategies as the project progresses.

Tailings (i.e. fine reject) slurry from the coal handling and preparation plant (CHPP) will be thickened to a solids content of approximately 20% by weight using two high rate thickeners prior to disposal in the tailings storage facilities (TSFs). Thickeners will be located at the CHPP and the thickener underflow will be pumped to TSFs using centrifugal pumps for deposition. The overflow of water will be pumped back to the coal preparation plant (CPP) for reuse.

The TSFs will consist of an out-of-pit facility and the North Open Pit facility for the life of mine (LOM). Tailings will be deposited in the out-of-pit tailings facility during the first 5 year. In Year 6, the North Open Pit will become available for tailings storage. The out-of-pit TSF will be constructed on the north side of the North Open Pit between two proposed overburden stockpiles.

Tailings Deposition and Water Recirculation

The main design driver for the proposed TSFs is to maximize water reuse during operation and to improve trafficability of the tailings surface for closure works. Tailings deposition planning and operation of the TSFs will be the key aspects to achieve the design objective. Thin layer deposition will be used to facility consolidation and strength gain of the deposited tailings.

Out-of-pit TSF

The out-of-pit (external) TSF will consist of 1 tailings cell and one decant pond. The perimeter embankment will be constructed in one stage. Concept design details and a conceptual drawing for the out of pit TSF are provided in Appendix M of the SEIS

Tailings will be discharged from the perimeter embankments using multiple spigots to develop uniform tailings beaches. Supernatant water will report to the decant pond for sedimentation of suspended solids prior to water recirculation.

In-pit Disposal

From Year 6 to the end of mine life, tailings will be deposited in the North Open Pit. The maximum depth of the open pit is approximately 70 m. The storage capacity of the open pit will provide sufficient storage volume for the tailings to be produced for the remaining of the mine life. A decant pond will initially be located toward the north-east corner of the pit. Tailings discharge spigots will be located along the top of the pit walls and managed to migrate the decant pond toward a south-central position by Year 30 of the mine life. The concept design details and a conceptual drawing for the in-pit tailings facility are provided in the Site Water Management (Basis of Design) Report (SEIS, Volume 2, Appendix M).

Tailings discharge pipeline will be installed along the top of the pit walls. Tailings will be discharged using multiple spigots for tailings beach development. The supernatant water will be pumped back to the CPP for reuse through pumping barges to be located at the deepest part of the decant pond.

Closure and Rehabilitation

The EM Plan (SEIS, Volume 2, Appendix T1, Section T.3.6, Table T-29) details a range of commitments made for managing coal and mining waste materials including tailings. These include the development of a Mining

Waste Management Plan (MWMP) prior to construction, infill drilling, sampling and geochemical testing programs, monitoring of surface runoff and seepage and refinement of management strategies