

Blewett Richard

From: Johnson James
Sent: Friday, 10 May 2019 4:13 PM
To: Blewett Richard
Cc: Minchin Stuart
Subject: FW: QLD DES Request CSIRO/GA Clarification [SEC=UNCLASSIFIED]
Attachments: Letter GA_CSIRO clarification 10 May 2019.pdf; Source Aquifer to Doongmabulla Springs_final_20181129.pdf

Richard,

As discussed this afternoon. Let's consider further next week.

Regards,
James

From: §22 @des.qld.gov.au>
Sent: Friday, 10 May 2019 9:36 AM
To: §22 @csiro.au; Johnson James §22
Subject: QLD DES Request CSIRO/GA Clarification

Good morning James and §22

James as discussed. §22 apologies I was unable to reach you to discuss prior to sending the attached correspondence. Please feel free to give me a call to discuss when convenient.

Kind regards,
§22



Queensland
Government

§22
§22
Coal and Central Qld Compliance
Department of Environment and Science

§22
99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

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Department of
Environment and Science

10 May 2019

Dr James Johnson
Chief Executive Officer
Geoscience Australia
Cnr Jerroomberra Avenue and Hindmarsh Drive
SYMONSTON ACT 2609

By email: s22 [REDACTED]

s22 [REDACTED]

CSIRO Land and Water
Black Mountain Science and Innovation Park
Clunies Ross Street
ACTON ACT 2601

By email: s22 [REDACTED]

Dear Dr Johnson and s22 [REDACTED]

Thank you for meeting with the Department of Environment and Science (the department) on 16 April 2019 to discuss the CSIRO and Geoscience Australia Report '*Advice on Groundwater Management and Monitoring and Groundwater Dependent Ecosystem Management plans to the Department of the Environment and Energy (CSIRO and Geoscience Australia, February 2019)*' (the 2019 Report).

Following the department's review of the 2019 Report, the department wishes to seek your advice about the type of investigation and research that may provide greater certainty regarding the department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex (DSC).

The environmental authority (EA) for the Carmichael Coal Mine requires Adani to develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP). The term GDEMP is defined in the EA and states, among other things, that a GDEMP must include '*detailed baseline research to establish the source aquifer(s) for groundwater supply to each groundwater dependent ecosystem [potentially or indirectly impacted by mining activities]*'.

Your 2019 Report states that:

'It is plausible and reasonable that the Clematis Sandstone is a major source aquifer for the DSC... It is not plausible and reasonable to state unequivocally that the Clematis Sandstone is the sole source aquifer for the DSC...' (p2); and

'Available evidence supports the conceptualisation that the Clematis Sandstone is a likely source aquifer for the DSC. However, the proposed monitoring and management approaches do not sufficiently address the uncertainty regarding the potential alternative or additional source aquifers (refer Section 3.2 and 3.3).' (p9); and

'To constrain the source aquifer(s) of the DSC, a more sophisticated statistical analysis of hydrochemistry data is required. This includes assessing a wider variety of groundwater and surface water analytes, as well as appropriate use of isotope hydrochemistry analysis. Further information on potential techniques is provided (CSIRO and Geoscience Australia, 2018) and other readily available references.' (p10)

Further, in advice given to the Commonwealth Department of the Environment and Energy, 'Advice on draft research plans to the Department of the Environment and Energy', dated November 2018, you state:

'An integrated analysis of existing and newly acquired geological, hydrodynamic and hydrochemical data would improve the conceptual understanding of the groundwater sources of the DSC.' (at page 5); and

'Further information on the specific methods and techniques to be applied to chemically assess the springs source and groundwater flow processes is required for a more detailed assessment to be made. This includes the need to define the analytical suite, quality assurance and quality control methods, and use of a broader range of isotopic and environmental traces...' (at page 13).

Having regard to the 2019 Report, the 2018 advice, and our meeting of 16 April 2019, the department has the understanding that the following further research (steps) would improve the certainty about the source aquifer(s) of the DSC and other groundwater dependent ecosystems:

1. hydrogeochemical analysis of water samples for comparison within and across relevant aquifers (Clematis Sandstone, Dunda Beds and Rewan Formation);
2. incorporation of the use of isotope and ageing tracers in the above hydrogeochemical analysis;
3. a comprehensive review of groundwater level and quality data from relevant aquifers including data from new proposed nested bores in the vicinity of DSC;
4. detailed geological mapping including cores from bores drilled in the vicinity of DSC and facies modelling to better inform hydraulic connectivity within and across all aquifers;
5. incorporation of the airborne electro-magnetic modelling recently completed by Geoscience Australia (and available to Adani by June 2020); and

6. revision of the conceptual understanding of the source aquifer(s) for DSC and groundwater system based on information collected from the above for incorporation into the groundwater model review (re-run).

Is this understanding correct? Does the above summary accurately reflect the CSIRO and GA advice with respect to further work required to increase certainty of the source aquifer(s) for the DSC?

In addition, the department seeks your advice on the following questions:

1. What is the level of confidence that the Clematis Sandstone aquifer is the main source for the DSC?
2. If there is a high level of uncertainty, what work should be undertaken to address and reduce the level of uncertainty regarding the potential alternative or additional source aquifers for the DSC?
3. For any additional work recommended for question 2, what is a realistic timeframe for the completion of each element of the additional work?
4. Are the groundwater drawdown trigger thresholds proposed in the new GDEMP appropriate and suitable to ensure the long-term protection of the DSC in light of your advice that the conceptual model is not fit for purpose?
5. Based on GDEMP version 11b, are there any other matters or recommendations that CSIRO and GA would highlight in order to ensure the effectiveness of the management plan in relation to environmental authority conditions?

This advice will assist the department's review and assessment of the GDEMP.

Given that the department wishes to progress the assessment of the GDEMP in a timely manner, there is some urgency to your advice. Could you please advise when you anticipate to be in a position to provide your advice.

By way of background, please refer to the GDEMP (version 11b) that was submitted to the department on 9 April 2019 (available at <https://www.adaniaustralia.com/-/media/Project/Australia/Our-Projects--Businesses/mine-environment-reporting/GDEMP-Final-V11b-19March2019.pdf?la=en&hash=C4988A8485428FD234C4A09023D08B34>), and the enclosed document '*Research Study Report – Source Aquifer to Doongmabulla Springs*' that was provided to the department by Adani in November 2018.

Please do not hesitate to contact me on s47F or at s22 @des.qld.gov.au should you require further information about this request.

Yours sincerely

s22

Coal and Central Queensland Compliance

Enc.

Research Study Report – Source Aquifer to Doongmabulla Springs (revision 03, Adani, November 2018)

Key Decisions

Project Name	QLD DES Advice request for GDEMP
Project Manager	§22

Key Decisions							
ID	Priority	Decision Location/Meeting	Description	Made By	Date Decided	Comments/Resolution	Additional Action Required
1	Urgent	GA	Proceed with quotation for 4 weeks review of GDEMPv11b and GMMPv7 (3 weeks effort 1 week clearance)	James Johnson	16/05/2019	Concerns/risks raised regarding impartiality (excessive review of proponent - breach of code of conduct), lack of familiarity of state advice processes and EA, questions focused regulatory decisions not technical science outcomes, and specificity of questions	Clarification from Qld to be sought on concerns and risks - Action RB §22
2	Urgent	GA	Costing for GA contribution to QLD estimate	Richard Blewett	17/05/2019	RB considered estimate to be reasonable for 3 weeks effort	§22 Track effort across GA team
3	Urgent	CSIRO	CSIRO to send response on behalf of joint response team D2019-54357	§22	17/05/2019	22/05/19 - QDES responds with revised request.	Provide a requote by 24/05/19
4	Urgent	CSIRO	CSIRO to send response to revised request (D2019-60929) on behalf of joint response team	§22	24/05/2019	Awaiting response	
5	High	CSIRO/GA	Proceeding assuming proposal to be accepted	R Blewett §22	28/05/2019	Meeting with CSIRO to discuss broad scope of response 1500 29/03/19 delivery to CSIRO by 05/06/19	
6	High	CSIRO/GA	Finalised and cleared QDES advice docu	CEC §22	7/06/2019	Finalised and cleared	
7							
8							
9							
10							

Project Name	QLD DES Advice request for GDEMP
Project Manager	§22

Risk Register																	
Summary					Risk Analysis					Risk Control Action Plan & Status							
ID	Risk Category	Risk Identified Date	Identified by	Risk Description	Risk Impact	Likelihood Rating	Consequence Rating	Risk Level	Priority Rating	Risk Action Plan	Control Strategy	Effectiveness	Target/Residual Risk Level	Action Owner	Current Status	Action Due Date	Status Update
1																	
2																	
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Daily Log

Project Name	QLD DES Advice request for GDEMP
Project Manager	§22

Daily Log				
Date	Person Responsible	Problem/Action/Event/Comment	Target Date	Results
29/05/2019	§22	Start assessment - phone call with CSIRO @ 1500 - submission	5/06/2019	

From: §22 [REDACTED]@csiro.au>
Sent: Friday, 17 May 2019 10:15 AM
To: Blewett Richard; §22 [REDACTED]
Cc: §22 [REDACTED]
Subject: Proposal for advice request
Attachments: Advice request and costing response_CSIRO_GA_17May2019_for_Clearance.docx

Hi All

Please find attached a final version of our joint proposal for clearance through our respective channels.

We recommend that CSIRO respond to QDES on behalf of the joint GA-CSIRO team, with this action being in the CSIRO Land and Water Director's hands.

Regards

§22 [REDACTED]
§22 [REDACTED] | Water Resource Management
CSIRO Land and Water

§22 [REDACTED]@csiro.au
www.csiro.au

CSIRO Land and Water, GPO Box 1700, Canberra ACT 2601

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Advice request | Queensland Department of Environment and Science request on Carmichael Coal Mine Project management plans

This proposal for effort and cost stems from the Queensland Department of Environment and Science request on the 10 May 2019 for advice on the Carmichael Coal Mine Project.

Questions

The following are excerpts from the request letter sent to Geoscience Australia (GA) and the CSIRO

Having regard to the 2019 Report, the 2018 advice, and our meeting of 16 April 2019, the department has the understanding that the following further research (steps) would improve the certainty about the source aquifer(s) of the DSC and other groundwater dependent ecosystems:

- 1. Hydrogeochemical analysis of water samples for comparison within and across relevant aquifers (Clematis Sandstone, Dunda Beds and Rewan Formation);*
- 2. Incorporation of the use of isotope and ageing tracers in the above hydrogeochemical analysis;*
- 3. A comprehensive review of groundwater level and quality data from relevant aquifers including data from new proposed nested bores in the vicinity of DSC;*
- 4. Detailed geological mapping including cores from bores drilled in the vicinity of DSC and facies modelling to better inform hydraulic connectivity within and across all aquifers;*
- 5. Incorporation of the airborne electro-magnetic modelling recently completed by Geoscience Australia (and available to Adani by June 2020); and*
- 6. Revision of the conceptual understanding of the source aquifer(s) for DSC and groundwater system based on information collected from the above for incorporation into the groundwater model review (re-run).*

Is this understanding correct? Does the above summary accurately reflect the CSIRO and GA advice with respect to further work required to increase certainty of the source aquifer(s) for the DSC?

In addition, the department seeks your advice on the following questions:

- 1. What is the level of confidence that the Clematis Sandstone aquifer is the main source for the DSC?*
- 2. If there is a high level of uncertainty, what work should be undertaken to address and reduce the level of uncertainty regarding the potential alternative or additional source aquifers for the DSC?*
- 3. For any additional work recommended for question 2, what is a realistic timeframe for the completion of each element of the additional work?*
- 4. Are the groundwater drawdown trigger thresholds proposed in the new GDEMP appropriate and suitable to ensure the long-term protection of the DSC in light of your advice that the conceptual model is not fit for purpose?*
- 5. Based on GDEMP version 11 b, are there any other matters or recommendations that CSIRO and GA would highlight in order to ensure the effectiveness of the management plan in relation to environmental authority conditions?*

This advice will assist the department's review and assessment of the GDEMP.

Considerations and clarifications required

Clarification required – The request solely mentions the GDEMP. It is of note that the State EA only mentions the GDEMP. However, as the GDEMP is intrinsically tied to the GMMP via monitoring and management triggers, it is implicit that a review of the GDEMP would require a review of the GMMP. For transparency, DES should clarify it is of the same understanding.

Clarification required – Question 1 – the issue is not whether the Clematis is the main source aquifer for the DSC. It is whether it is the *only* source aquifer for the DSC.

Clarification required - Question 2 - uncertainty - this requires additional clarity as to what constitutes a "high level of uncertainty". This will involve advice as to what is an acceptable level of uncertainty for the Qld EA. From the context, it is assumed that this question relates to "conceptual uncertainty" and not the "predictive uncertainty" of the numerical model. GA/CSIRO will not be providing a definitive answer on this matter but will provide commentary towards the question.

To note: Question 3 - this question has a multitude of variables including what resources are available, and what level of reduction in uncertainty is desired. Without knowing these, GA/CSIRO is only able to provide indicative timeframes. GA/CSIRO will not be providing a decision on this matter but will provide commentary towards the question.

Clarification required - Question 4 - It is incorrect that previous GA/CSIRO advice to the Department of Environment and Energy (DoEE) was "that the conceptual model is not fit for purpose". For context, the GA/CSIRO advice in February 2019 is worded the "best choice of available [numerical] model runs does not mean that this [numerical] model run is considered to be fit-for-purpose". This question required reframing if GA/CSIRO are to proceed.

The joint response from GA and CSIRO will:

- Build upon existing advice to DoEE but incorporate changes to recent documents, specifically changes in GDEMPv11b and related matters in GMMPv7
- Require QDES to supply the following documents GMMPv5, GMMPv7, GDEMPv10 and GDEMPv11b . In addition, and if available, 'tracked changes' version of the GMMP and/or GDEMP that contain all changes made between document versions mentioned above.

Cost estimates

GA Cost: \$79,569 includes technical assessment, peer review and agency clearance.

CSIRO Cost – \$23,503 includes technical assessment, peer review and agency clearance.

Estimated total cost: \$103,072 GST exclusive

GA Staff and effort

Role	Days
Response Coordinator	17
Hydrodynamics – Senior	12
Hydrochemistry – Senior	12
Geology/Hydrogeology - Senior	12

GA Cost – \$79,569 inc technical and agency clearance.

CSIRO Staff and effort

Role	Days
CSIRO coordinator and reviewer	2
GDE Ecologist	5
Numerical Modeller	5

CSIRO Cost – \$23,503 inc technical and agency clearance.

Total cost: \$103,072

Role descriptions

GA and CSIRO Response coordinator 1) technical hydrogeological lead to direct response 2) uphold scientific impartiality and integrity, 3) coordinate a cohesive response across agencies and disciplines, and 4) support and facilitate response through cross

GA Geology/Hydrogeology - Senior 1) consider the strategic implications of proponent's preferred hydrogeological (including structure) conceptualisation and plausible/reasonable alternatives, 2) Provide strategic technical advice under broad direction, 4) evaluate and communicate risks, in the technical context.

GA Hydrodynamic - Senior 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including hydraulic parameterisation and water flow, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

GA Hydrochemistry - Senior 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including bulk chemistry and water quality, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

CSIRO Numerical Modeller 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including numerical methods, model parameterisation and conceptual implementation, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

CSIRO Ecologist 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including ecosystem monitoring and mitigation measures, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

From: s22 [redacted]@csiro.au>
Sent: Wednesday, 22 May 2019 4:56 PM
To: s22 [redacted]
Cc: s22 [redacted]
Subject: FW: Proposal for advice request from DHES around the Adani Carmichael mine
Attachments: DES CSIRO_GA Request REVISED.docx

Importance: High

Hi s22 [redacted]

Today, we received a revised advice request from QDES. Please note that James Johnson received the email below and (hopefully) the tracked change document attachments (not included in this email as they appear to exceed your firewall limit).

Could you please review the request by QDES and revise our joint proposal accordingly?

s22 [redacted] – once we have an agreed and revised proposal, could you please provide GA clearance so that CSIRO can revert to QDES.

Cheers

s22 [redacted]
[redacted] | Water Resource Management
CSIRO Land and Water

s22 [redacted]@csiro.au

From: s22 [redacted]
Date: Wednesday, 22 May 2019 at 4:32 pm
To: s22 [redacted]
Subject: FW: Proposal for advice request from DHES around the Adani Carmichael mine

Dear s22 [redacted]

As discussed, for your action.

With thanks, s22 [redacted]

From: s22 [redacted]@des.qld.gov.au]
Sent: Wednesday, 22 May 2019 12:07 PM
To: s22 [redacted]
Cc: Johnson James
Subject: RE: Proposal for advice request from DHES around the Adani Carmichael mine
Importance: High

Dear s22 [redacted] (cc James),

Thank you for your proposal. In light of the feedback and information that CSIRO/GA have sought clarification on, DES has significantly reviewed the initial scope of the request to provide more clarity and direction in relation to DES's interests.

The revised scope provides clarity and focusses on the track changed versions of the GDEMP. The scope provides confirmation that the review does *not* include the updated GMMP and includes a refined list of questions. Accordingly, please find attached a narrowed and refined scope for the review and the 'track changed' GDEMPs (for ease of reference). Again, given the urgency around timeliness, if you could please review and provide an update proposal (costings/timeframes) at your earliest convenience.

If you would like to discuss or seek clarification I would be happy to arrange a meeting as soon as possible.

Kind regards,

s22



s22

Coal and Central Qld Compliance
Department of Environment and Science

s22

99 Hospital Road, Emerald QLD 4720
PO Box 3028, Emerald QLD 4720

From: s22 <[redacted]@csiro.au>

Sent: Monday, 20 May 2019 3:31 PM

To: s22

Cc: Johnson James

Subject: Proposal for advice request from DHES around the Adani Carmichael mine

Dear s22 (cc James),

Thank you for your request on Friday May 10th for GA and CSIRO to provide advice about the type of investigation and research that may provide greater certainty regarding your Department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex.

GA and CSIRO would be happy to undertake the work detailed in your email.

Please find attached our joint proposal, noting we are seeking clarification on aspects of the advice you are seeking. In summary, we have estimated the cost at \$103,072 (GST exclusive) and the advice delivered to you within 20 working days following contract execution.

Please engage with s22 as the primary contact in relation to contractual issues (E:

s22

With regards, s22

s22

CSIRO Land and Water

s22

s22 [REDACTED]

<https://www.csiro.au/en/Research/LWF>

CSIRO acknowledges the Traditional Owners of the lands that we live and work on across Australia and pays its respect to Elders past and present.

GPO Box 1700
CSIRO Black Mountain Site
Clunies Ross St, Canberra ACT 2601

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DES CSIRO/GA GDEMP 11b Advice request – REVISED based on CSIRO/GA feedback and clarification provided 20 May 2019

Review documents (*for clarification please note DES does not require a review of the GMMP*):

1. GDEMP v11b (track change versions v10 – v11 and v11a-11b attached);

Following the department's review of the CSIRO/GA 2019 Report, the department seeks your advice about the type of investigation and research that may provide greater certainty regarding the department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex (DSC).

The environmental authority (EA) for the Carmichael Coal Mine requires Adani to develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP). The term GDEMP is defined in the EA and states, among other things, that a GDEMP must include '*detailed baseline research to establish the source aquifer(s) for groundwater supply to each groundwater dependent ecosystem [potentially or indirectly impacted by mining activities]*'.

Your 2019 Report states that:

'It is plausible and reasonable that the Clematis Sandstone is a major source aquifer for the DSC... It is not plausible and reasonable to state unequivocally that the Clematis Sandstone is the sole source aquifer for the DSC...' (p2); and

'Available evidence supports the conceptualisation that the Clematis Sandstone is a likely source aquifer for the DSC. However, the proposed monitoring and management approaches do not sufficiently address the uncertainty regarding the potential alternative or additional source aquifers (refer Section 3.2 and 3.3).'' (p9); and

'To constrain the source aquifer(s) of the DSC, a more sophisticated statistical analysis of hydrochemistry data is required. This includes assessing a wider variety of groundwater and surface water analytes, as well as appropriate use of isotope hydrochemistry analysis. Further information on potential techniques is provided (CSIRO and Geoscience Australia, 2018) and other readily available references.' (p10)

Further, in advice given to the Commonwealth Department of the Environment and Energy, '*Advice on draft research plans to the Department of the Environment and Energy*', dated November 2018, you state:

'An integrated analysis of existing and newly acquired geological, hydrodynamic and hydrochemical data would improve the conceptual understanding of the groundwater sources of the DSC.' (at page 5); and

'Further information on the specific methods and techniques to be applied to chemically assess the springs source and groundwater flow processes is required for a more detailed assessment to be made. This includes the need to define the

analytical suite, quality assurance and quality control methods, and use of a broader range of isotopic and environmental traces...' (at page 13).

Having regard to **the 2019 Report, the 2018 advice, and our meeting of 16 April 2019**, the department has the understanding that the following further research (steps) would improve the certainty about the source aquifer(s) of the DSC and other groundwater dependent ecosystems:

- a) hydrogeochemical analysis of water samples for comparison within and across relevant aquifers (Clematis Sandstone, Dunda Beds and Rewan Formation);
 - b) incorporation of the use of isotope and ageing tracers in the above hydrogeochemical analysis;
 - c) a comprehensive review of groundwater level and quality data from relevant aquifers including data from new proposed nested bores in the vicinity of DSC;
 - d) detailed geological mapping including cores from bores drilled in the vicinity of DSC and facies modelling to better inform hydraulic connectivity within and across all aquifers;
 - e) incorporation of the airborne electro-magnetic modelling recently completed by Geoscience Australia (and available to Adani by June 2020); and
 - f) revision of the conceptual understanding of the source aquifer(s) for DSC and groundwater system based on information collected from the above for incorporation into the groundwater model review (re-run).
1. Does the above summary accurately reflect the CSIRO/GA advice with respect to further work that could increase certainty of the source aquifer(s) for the DSC?
 2. Would CSIRO/GA recommend any additional measures?
 3. Would it be appropriate from an adaptive management framework for all the above matters to be undertaken over a set period i.e. prior to the model review (re-run)?

Based on GDEMP 11b (track change version/s) and the CSIRO/GA advice dated November 2018 and February 2019, the department seeks your additional advice on the following questions:

4. Generally, in respect to groundwater research and modelling, is it acceptable and/or common from a scientific basis to have some level of uncertainty? i.e. can source aquifer(s) ever be categorically determined or definitively identified? Can you have absolute certainty? Is there always some level of uncertainty?
5. Are the groundwater drawdown trigger thresholds proposed in the updated GDEMP 11b appropriate and suitable to ensure the long-term protection of the DSC in light of your advice that the numerical model is not fit for purpose?
6. For question 5, are the adaptive management measures and commitments in the updated GDEMP appropriate? If not, please provide suggestions to address this?

This advice will assist the department's review and assessment of the latest version of the GDEMP 11b.

Please note there is a high level of urgency to your advice given the department wishes to progress the assessment of the GDEMP and work with Adani to finalise the plan.

From: s22 [redacted]@csiro.au>
Sent: Friday, 24 May 2019 3:59 PM
To: s22 [redacted]
Cc: s22 [redacted]
Subject: Advice to QDES
Attachments: Advice request and costing response_CSIRO_GA_24May2019_for_submission.docx

Dear s22 [redacted]

Please find attached a draft proposal to provide advice to Queensland DES by 7 June 2019.
This document was prepared following a number of follow up conversations between CSIRO and GA staff.
We are prepared to delay other projects as this project is a high priority.
Kind regards

s22 [redacted]

GA-CSIRO RESPONSE TO REQUEST FOR ADVICE BY QUEENSLAND DES**Advice request | Queensland Department of Environment and Science (QDES) request on Carmichael Coal Mine Project Groundwater Dependent Ecosystem Management Plan (GDEMP)**

This proposal responds to a request for advice from the Queensland Department of Environment and Science on 20 May 2019 with regard to the Carmichael Coal Mine Project. This proposal sets out the advice sought, our understanding of the request, provides a costing estimate, delivery timeframe, and personnel roles and responsibilities.

Review documents (for clarification please note DES does not require a review of the GMMP): GDEMP v11b (track change versions v10 – v11 and v11a-11b attached);

1 Advice regarding the source aquifer(s) of the Doongmabulla Springs Complex (DSC)

The following are excerpts from the request letter sent to Geoscience Australia (GA) and the CSIRO.

Following the department's review of the CSIRO/GA 2019 Report, the department seeks your advice about the type of investigation and research that may provide greater certainty regarding the department's interest in relation to the identification of the source aquifer(s) to the Doongmabulla Springs Complex (DSC).

The environmental authority (EA) for the Carmichael Coal Mine requires Adani to develop and implement a Groundwater Dependent Ecosystems Management Plan (GDEMP). The term GDEMP is defined in the EA and states, among other things, that a GDEMP must include 'detailed baseline research to establish the source aquifer(s) for groundwater supply to each groundwater dependent ecosystem [potentially or indirectly impacted by mining activities].

Having regard for **the 2019 Report, the 2018 advice, and the meeting on 16 April 2019**, the department asks three questions to clarify their understanding about further research (steps) to improve the certainty about the source aquifer(s) of the DSC and other groundwater dependent ecosystems.

- 1. Does the above summary accurately reflect the CSIRO/GA advice with respect to further work that could increase certainty of the source aquifer(s) for the DSC?*
- 2. Would CSIRO/GA recommend any additional measures?*
- 3. Would it be appropriate from an adaptive management framework for all the above matters to be undertaken over a set period i.e. prior to the model review (re-run)?*

2. Advice regarding acceptable levels of uncertainty for groundwater research and modelling, groundwater drawdown trigger thresholds and adaptive management measures in the updated GDEMP.

Based on GDEMP 11b (track change version/s) and the CSIRO/GA advice dated November 2018 and February 2019, the department seeks your additional advice on the following questions:

- 4. Generally, in respect to groundwater research and modelling, is it acceptable and/or common from a scientific basis to have some level of uncertainty? i.e. can source aquifer(s) ever be categorically determined or definitively identified? Can you have absolute certainty? Is there always some level of uncertainty?*

GA-CSIRO RESPONSE TO REQUEST FOR ADVICE BY QUEENSLAND DES

5. *Are the groundwater drawdown trigger thresholds proposed in the updated GDEMP 11b appropriate and suitable to ensure the long-term protection of the DSC in light of your advice that the numerical model is not fit for purpose?*
6. *For question 5, are the adaptive management measures and commitments in the updated GDEMP appropriate? If not, please provide suggestions to address this?*

Scope of advice to be provided by GA-CSIRO

The joint response from GA and CSIRO will:

- Build upon existing advice to DoEE but incorporate changes to recent documents, specifically changes in GDEMPv11b
- Rely on documents supplied by QDES, in particular the 'tracked changes' versions of the GDEMP that contain all changes made between document versions 'v10 to v11' and 'v11a to v11b'
- Seek a single point of contact in QDES for CSIRO and GA staff to clarify technical matters

Cost estimates

GA Cost: \$24,907 includes technical assessment, peer review and agency clearance.

CSIRO Cost – \$23,503 includes technical assessment, peer review and agency clearance.

Estimated total cost: \$48,410 GST exclusive

Delivery of services

From date of contract execution the advice would be delivered to QDES by no later than **COB Friday 7 June 2019** in the form of a short report. This timeline assumes the scope of work remains unchanged from that set out above.

GA-CSIRO RESPONSE TO REQUEST FOR ADVICE BY QUEENSLAND DES**Resourcing**

GA Staff and effort

Role	Days
GA Response coordinator	2
Hydrodynamics – Senior	2
Hydrochemistry – Senior	5
Geology/Hydrogeology - Senior	5

GA Cost – \$24,907 includes technical assessment, peer review and agency clearance.

CSIRO Staff and effort

Role	Days
CSIRO coordinator and reviewer	2
GDE Ecologist	5
Groundwater hydrologist	5

CSIRO Cost – \$23,503 includes technical assessment, peer review and agency clearance.

Role descriptions

GA and CSIRO Response coordinator 1) technical hydrogeological lead to direct response 2) uphold scientific impartiality and integrity, 3) coordinate a cohesive response across agencies and disciplines, and 4) support and facilitate response through cross-disciplinary collaboration

GA Geology/Hydrogeology - Senior 1) consider the strategic implications of proponent's preferred hydrogeological (including structure) conceptualisation and plausible/reasonable alternatives, 2) Provide strategic technical advice under broad direction, 3) evaluate and communicate risks, in the technical context.

GA Hydrodynamic - Senior 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including hydraulic parameterisation and water flow, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

GA Hydrochemistry - Senior 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including bulk chemistry and water quality, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

CSIRO Groundwater hydrologist 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including numerical methods, model parameterisation and conceptual implementation, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.

CSIRO Ecologist 1) to assess and evaluate the adequacy and feasibility of proponent technical methodology and approaches including ecosystem monitoring and mitigation measures, 2) Provide high level specialist technical advice under broad direction, 3) Evaluate, prioritise and communicate identified technical risks in the context of a multi-disciplinary science advice response, and 4) contribute to a concise and timely cohesive advice response to support decision making.



For Official Use Only

From: s22 [redacted]@environment.gov.au
Sent: Tuesday, 28 May 2019 11:35 AM
To: s22 [redacted]
Cc: s22 [redacted]
Subject: RE: Any updates to Carmichael project management plans? [DLM=For-Official-Use-Only]

Hi s22 [redacted]

There are no updates on the plans highlighted in yellow at this stage. I expect we'll be able to give an update once new Ministers are briefed this week. A couple of things to note:

- Adani has all Commonwealth approvals to allow the commencement of mining
- Queensland's recent announcement on a timeframe for approval of the BTF MP and the GDEMP are unlikely to affect the timing of Commonwealth approvals of the plans highlighted in yellow, but may complicate them – noting there are interrelations between:
 - o Qld's approval of the BTFMP and the Morey Downs West OAMP; and
 - o Advice sought by Qld from CSIRO/GA may have implications for the two Cth research plans.

Happy to discuss.

Cheers
 s22 [redacted]

From: s22 [redacted]@industry.gov.au
Sent: Tuesday, 28 May 2019 10:26 AM
To: s22 [redacted]
Cc: s22 [redacted]
Subject: Any updates to Carmichael project management plans? [DLM=For-Official-Use-Only]

Hi s22 [redacted]

We're updating the Adani QTB for the office. Has there been any progress on any of the other Carmichael project management plans highlighted below?

Table 1: Status of outstanding plans required for the Carmichael Coal Mine and Rail Project.

Plan	When required	Commonwealth approval required?	Queensland government approval required?
Black-throated Finch Management Plan	Required before mining operations (constructing accommodation and roads, dewatering, clearing overburden)	Yes Status: Approved December 2018	Yes Status: Pending.
Groundwater Dependent Ecosystems Management Plan	Required before mining operations (constructing accommodation and	Yes Status: Approved April 2019	Yes Status: Pending.

	roads, dewatering, clearing overburden)		
Groundwater Management and Monitoring Plan	Required before first box cut (first coal extraction)	Yes Status: Approved April 2019	Yes Status: Pending.
Great Artesian Basin Springs Research Plan	Required before first box cut (first coal extraction)	Yes Status: Pending. 1st draft submitted 25 July 2018	No
Rewan Formation Connectivity Research Plan	Required before first box cut (first coal extraction)	Yes Status: Pending. 2nd draft submitted 4 December 2018	No
Subsidence Management Plan	Required before commencing underground mining	No	Yes Status: Pending.
Groundwater Model Review	Required within 2 years of the first box cut (first coal extraction)	No	Yes Status: Pending.
Offset Area Management Plan Moray Downs West – Offset Delivery Stage 1 – Carmichael Coal Mine and Rail Project	None i.e. can be provided at any stage	Yes Status: Pending. 5th version submitted 11 January 2019	No
Seismic Survey Management Plan	Required before seismic survey activities (not currently required)	Yes Status: Not required as there is currently no intention to undertake seismic surveys.	No

Thanks

§22 [Redacted]

Coal and Tax

§22 [Redacted]

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From: Media <Media@ga.gov.au>
Sent: Friday, 31 May 2019 12:05 PM
To: Johnson, James; stuart minchin; Blewett Richard; §22
Cc: Media
Subject: email, 31 May 2019, Media re Guardian Media story Adani plans [SEC=UNCLASSIFIED]

Hello all,

Just letting you know the Guardian journalist published her story this morning (as reported in the press clips):

<https://www.theguardian.com/environment/2019/may/31/adani-still-needs-further-federal-approval-despite-pre-election-green-light>

She used the DoEE response and has not followed up with us for any further details.

Thanks for your help with this yesterday.

Kind regards,

§22

§22 | Media Adviser | Public Relations
Communications | Enabling Services

§22 **Media Hotline** 1800 882 035 www.ga.gov.au



Geoscience Australia acknowledges the Traditional Custodians of Country throughout Australia and recognises the continuing connection to lands, waters and communities. We pay our respects to Aboriginal and Torres Strait Islanders Cultures: and to elders past, present and emerging.



From: Media
Sent: Thursday, 30 May 2019 5:20 PM
To: Johnson James ; Minchin Stuart ; Blewett Richard ; Media ; §22
Subject: Fwd: Adani plans [SEC=UNCLASSIFIED]

Hi all,

FYI - below is the department's proposed response to the Guardian.

I've asked them if they would prefer us to provide our response separately in the morning. The journalist has not followed up.

Thanks,

s22

Get [Outlook for iOS](#)

From: Media <Media@environment.gov.au>
Sent: Thursday, May 30, 2019 4:46:11 PM
To: Media
Cc: Media; s22
Subject: RE: Adani plans [SEC=UNCLASSIFIED]

Many thanks s22 much appreciated.

We're proposing to answer s22 questions with the below:

//

Were these concerns that CSIRO identified in the groundwater plan that will now need to be addressed in the research plans? Or are they concerns that they identified in the research plans that will need to be rectified in subsequent drafts of those research plans? Or is it both?
It's both.

Can we have a lay description of what these concerns are? Do they relate to water?
The concerns raised by CSIRO and Geoscience Australia relevant to the research plans relate to water and are set out in their advice and the summary of their advice available on the Department's website [here](#).

Is it correct that the groundwater plans and the research plans were all given to CSIRO and Geoscience Australia for assessment at the end of 2018? Based on what is written in the statement of reasons, and in CSIRO and GA's published assessment, this appears to be the case, I simply want to confirm I am reading this correctly.
Yes.

In your responses to my questions yesterday, you said that Adani submitted the research plans in 2018. But if there are concerns that need to be addressed through those plans, does this mean they are required to submit new drafts of those plans that take in these concerns? If yes, has that been done or when will this be done?
The research plans were first submitted to the Department in 2018. The Department is currently reviewing GA and CSIRO's advice as it pertains to the research plans and considering what further feedback may need to be provided to the company.

Will it be the new minister Sussan Ley who is responsible for approving the research plans? Are those plans currently with her for a decision?
Under the conditions of approval, the plans must be approved by the Minister or her delegate.
//

Feel free to pass on your statement to s22 if she follows up with you.

Kind regards

Media Team

Communications and Engagement Branch
Department of the Environment and Energy
GPO Box 787, CANBERRA ACT 2601



From: Media [<mailto:Media@ga.gov.au>]
Sent: Thursday, 30 May 2019 4:06 PM
To: Media <Media@environment.gov.au>
Cc: Media <Media@ga.gov.au>
Subject: RE: Adani plans [SEC=UNCLASSIFIED]

Hi [REDACTED]

As discussed with [REDACTED] please see below our approved statement.

It would be much appreciated if you could share your approved response with us, and let us know if you choose to incorporate any of our statement.

Approved statement

As part of a process overseen by the Department of the Environment and Energy, Geoscience Australia together with the CSIRO was asked to review Adani's groundwater management plans and research plans for the Carmichael Coal Mine and Rail Infrastructure project.

Specifically, the Department of the Environment and Energy sought technical advice relating to the Groundwater Dependent Ecosystem Management Plan, the Groundwater Management and Monitoring Plan, the Rewan Formation Connectivity Research Plan and Great Artesian Springs Research Plan. All finalised technical advice for the request was provided to the Department on Friday, 22 Feb 2019.

The Department of the Environment and Energy is the regulator in this matter and is responsible for the process to approve management and research plans under the Environmental Protection and Biodiversity Conversation Act 1999. It is not the role of Geoscience Australia to make or suggest regulatory decisions to the Department of the Environment and Energy. Our role in this process is to provide independent advice based on science in answer to questions asked by the regulator to inform its decisions.

The timeline and advice documentation is available at the below web page under "Carmichael Coal Mine and Rail Project":

<https://www.environment.gov.au/protection/assessments/key-assessments>

Specifically, see the below technical report for the concerns raised by Geoscience Australia and the CSIRO:

<https://www.environment.gov.au/system/files/pages/cb8a9e41-eba5-47a4-8b72-154d0a5a6956/files/csiro-geoscience-australia-final-advice.pdf>

For questions relating to the remaining approvals and concerns still to be addressed, please refer to the Department of the Environment and Energy.

Kind regards,

[REDACTED]

[REDACTED] | Media Adviser | Public Relations
Communications | Enabling Services

[REDACTED] **Media Hotline** 1800 882 035 www.ga.gov.au



GEOSCIENCE AUSTRALIA
APPLYING GEOSCIENCE TO AUSTRALIA'S MOST IMPORTANT CHALLENGES

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From: Media <Media@environment.gov.au>
Sent: Thursday, 30 May 2019 1:35 PM
To: Media <Media@ga.gov.au>; Media <Media@environment.gov.au>
Subject: RE: Adani plans [SEC=UNCLASSIFIED]

Thanks s22 our response is currently sitting with our SES for approval, will share with you when we can.

Cheers

s22

From: Media [<mailto:Media@ga.gov.au>]
Sent: Thursday, 30 May 2019 1:29 PM
To: Media <Media@environment.gov.au>; Media <Media@ga.gov.au>
Subject: RE: Adani plans [SEC=UNCLASSIFIED]

Great, thanks s22

We are working on a high level statement now which we will send to you once approved.

Kind regards,

s22

s22 | Media Adviser | Public Relations
Communications | Enabling Services

s22 **Media Hotline** 1800 882 035 www.ga.gov.au



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From: Media <Media@environment.gov.au>
Sent: Thursday, 30 May 2019 12:49 PM
To: Media <Media@ga.gov.au>
Cc: Media <Media@environment.gov.au>
Subject: RE: Adani plans [SEC=UNCLASSIFIED]

Hi [REDACTED]

Thanks for getting in touch – we're happy to coordinate this response if that works best, and would so happy for you to send through some lines for us to include (attributable to GA).

Just flagging that at this stage we're unlikely to meet the 2pm deadline.

Please let me know if you have any concerns.

Many thanks

[REDACTED]

Media Team

Communications and Engagement Branch
Department of the Environment and Energy
GPO Box 787, CANBERRA ACT 2601



From: Media [<mailto:Media@ga.gov.au>]
Sent: Thursday, 30 May 2019 12:03 PM
To: Media <Media@environment.gov.au>
Cc: Media <Media@ga.gov.au>
Subject: FW: Adani plans [SEC=UNCLASSIFIED]

Hi team,

As discussed with [REDACTED] we received the below questions from [REDACTED] at the Guardian.

We can work on a statement from GA (using material we drafted a few weeks ago), but I wanted to check if the Department would prefer to address some of her questions around the process?

Kind regards,

[REDACTED]

[REDACTED] | Media Adviser | Public Relations
Communications | Enabling Services

[REDACTED] **Media Hotline** 1800 882 035 www.ga.gov.au



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From: s22 [redacted] <s22@theguardian.com>
Sent: Thursday, 30 May 2019 11:46 AM
To: Media <Media@ga.gov.au>
Subject: Adani plans

Hi,

Further to my conversation with s22 [redacted] just now, here are some questions I was hoping to get some responses to. I'm looking for some assistance in understanding what scientific requirements still remain for Adani and what concerns have been identified in what documents assessed by CSIRO and Geoscience Australia. I'm currently a little unclear on some elements.

Specifically, the statement of reasons for the approval of the groundwater plans says that some of the concerns identified in the CSIRO/GA assessment will need to be addressed through the approval of the research plans (the GAB springs research plan and the rewan formation connectivity plan).

Were these concerns that were identified in the groundwater plan that will now need to be addressed in the research plans? Or are they concerns that were identified in the research plans that will need to be rectified in subsequent drafts of those research plans? Or is it both?

Can we have a lay description of what these concerns are? Do they relate to water?

Is it correct that the groundwater plans and the research plans were all given to CSIRO and Geoscience Australia for assessment at the end of 2018? Based on what is written in the statement of reasons, and in CSIRO and GA's published assessment, this appears to be the case, I simply want to confirm I am reading this correctly.

If there are concerns that need to be addressed through those research plans, does this mean Adani is required to submit new drafts of those plans that take in these concerns? If yes, has that been done or when will this be done?

Thank you for taking these questions. As discussed on the phone, I'm happy to take on record statements in writing but if someone wants to step me through this over the phone on background I would be very happy to do that. Please let me know if anything is unclear.

I have a hard stop today because I need to leave the office at 3pm for a flight. Do you think you could get me some responses by 2pm?

Please let me know what is possible and we can discuss from there.

Thank you again

s22

s22

Environment Reporter
The Guardian | Australia

s47F

s22 [@theguardian.com](mailto:s22@theguardian.com)

twitter: s22



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Geoscience Australia Costing Model - Cost Calculator

Version : 15 August 2018

Manager: [Redacted]
Name: [Redacted]
Description: [Redacted]
Duration: [Redacted] to [Redacted]

Name	Resource	Costing/Travel Basis	Period			CY	Period			NY	Period			FY1	Period			FY2	TOTAL
			FY Year ending		Annual indexation factor		FY Year ending		Annual index factor		FY Year ending		Annual index factor		FY Year ending		Annual index factor		
		30-Jun-19		29-Jun-20		30-Jun-21		30-Jun-22											
		N/A		2%		1.9%		1.8%											
		Type	Duration	FTE	Total	Duration	FTE	Total	Duration	FTE	Total	Duration	FTE	Total	Duration	FTE	Total		
Staffing																			
Response Coordinator	EL 2 (Ave)	Full cost	Day		\$0.00	17	1	\$23,514.25			\$0.00			\$0.00			\$0.00	\$23,514.25	
Hydrodynamics	EL 1.5	Full cost	Day		\$0.00	12	1	\$14,964.50			\$0.00			\$0.00			\$0.00	\$14,964.50	
Hydrochemistry	EL 1.5	Full cost	Day		\$0.00	12	1	\$14,964.50			\$0.00			\$0.00			\$0.00	\$14,964.50	
Geology/Hydrogeology	EL 1.5	Full cost	Day		\$0.00	12	1	\$14,964.50			\$0.00			\$0.00			\$0.00	\$14,964.50	
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Branch Head	SES	Full cost	Day		\$0.00	1	1	\$2,160.50			\$0.00			\$0.00			\$0.00	\$2,160.50	
CoD EGD	SES	Full cost	Day		\$0.00	1	1	\$2,160.50			\$0.00			\$0.00			\$0.00	\$2,160.50	
CEO	SES	Full cost	Day		\$0.00	1	1	\$2,160.50			\$0.00			\$0.00			\$0.00	\$2,160.50	
Senior scientist	APS 2 (Ave)	Full cost	Day		\$0.00	1	1	\$890.32			\$0.00			\$0.00			\$0.00	\$890.32	
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	Make selection...	Full cost	Day		\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
<i>Services (Note: all extensive service requirements should be negotiated and Directly Priced)</i>																			
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<i>Domestic travel - accommodation</i>																			
	Make selection...	Make selection...	Day		\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
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<i>Domestic travel - Vehicle, note this should only be used for short distances, flights and leased vehicle are more cost effective over long distances</i>																			
	Personal Vehicle use allowance		Day		\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
<i>Domestic travel - meals & incidentals</i>																			
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	Make selection...	Make selection...	Day		\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
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<i>International travel - total meals & incidentals</i>																			
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	Make selection...	Make selection...	Day		\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
<i>Direct costs / Disbursements</i>																			
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
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	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
	Category...	Comment...		enter cost directly ->	\$0.00			\$0.00			\$0.00			\$0.00			\$0.00	\$0.00	
TOTAL					\$0.00				\$75,779.58				\$0.00				\$0.00	\$75,779.58	

SUMMARY					
Salary and oncosts		\$0.00	\$42,246.76	\$0.00	\$42,246.76
Overheads		\$0.00	\$33,532.83	\$0.00	\$33,532.83
Services		\$0.00	\$0.00	\$0.00	\$0.00
Travel		\$0.00	\$0.00	\$0.00	\$0.00
Direct costs / Disbursements		\$0.00	\$0.00	\$0.00	\$0.00
TOTAL COST		\$0.00	\$75,779.58	\$0.00	\$75,779.58

MINIMUM PRICE					
Cost		\$0.00	\$75,779.58	\$0.00	\$75,779.58
Contingency	5%	\$0.00	\$3,788.98	\$0.00	\$3,788.98
MINIMUM PRICE		\$0.00	\$79,568.56	\$0.00	\$79,568.56