MEETING MINUTES

11 June, 2014

Minutes: Santos Community Committee - Narrabri Shire
Wednesday, 11 June 2014
Narrabri Golf Club, Narrabri

Attendance: David Ross (Chair), Tahnee Laycock (Secretary), Tony Pickard, Ian Duffy, Terry Hynch, Annie Moody (Santos), Doug Main (Santos), Vesna Rendulic (Santos), Ron Campey, Victoria Hamilton, John Tough.

Apologies: Jon Maree Baker, Brendan Warnock, Ken Flower.

	Discussion	**Action/By Whom**
1. Welcome, apologies and introductions	The chair opened the meeting at 5:38pm. Chair welcomed committee. Introduced Santos Representative: Doug Main. Chair informed the committee that Michael Guest has resigned from the CCC committee. Chair thanked him for his time, effort and contribution to the CCC.	
2. Previous meeting minutes	– Action for Santos to provide committee with full soil analysis including analysis of bacteria of the Leewood site next year when it is available, as well as providing regular soil checks to ensure no contamination is occurring is now completed. The 12 pages that were missing were the soil tests from Wilga Park which is why they weren't included. *Comment:* Committee member won't enter Santos shop as they have been informed it is classed as a consultation.	

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	Discussion	Action/By Whom
	– Action for Santos to explore the option of formalising the committee. The Office of Coal Seam Gas and other government departments including the Division of Resources and Energy and The Land and Water Commission are framing a potential terms of reference and framework for a formal consultative committee group in Narrabri. They have been talking with the council but they cannot give any formal outcome information of the discussions at this stage. They have advised Santos that they will have more information to them by the end of June. Once the framework has been set up, the formalising of the committee will happen quite quickly. Santos is happy to continue on with the informal committee in the interim and believe it serves a purpose. Q. Committee member: Do committee members get any input in how the CCC will be run? A. Santos: No and Santos won't either. It will be the Minister that signs off on it. – In regards to setting up a proxy for Jon Maree Baker, Santos is happy for committee members to have proxies. So, Santos is very happy for somebody from Namoi Water to replace Jon Maree Baker. – Santos to provide further details on the erosion management plan for the flow line project. This has been partially completed. Committee member requested that a further explanation be provided in general terms how Santos is ensuring, in the forest and other areas, that erosion doesn't happen down the disturbed earth corridor where Santos put in the gas lines including slopes, creeks and gullies. – Santos to respond to questions raised regarding recent aquifer contamination and associated questions within 10 days. Responses have been completed, however, Santos is	Santos to provide further details on the erosion management plan for the flow line project including slopes, creeks and gullies.

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	Discussion	Action/By Whom
	waiting on them to be signed off on, and at this stage they will be distributed through the chair. – Santos to respond to questions raised in Appendix 1 and 2 regarding the Produced Water Management Plan Document and & also Tintsfield Water Management Plan. Ongoing. – Santos to respond to whether they can provide a copy of the Bibblewindi Hydrological Assessment. Ongoing. – Action on Chairman to work out correct figure of Tourism expenditure and rectify with Santos and Social Impact Assessment firm GHD. Completed. – Santos to provide the most recent data on water quality concentrations across Narrabri Gas Development. All current water information is on the water portal. Santos will provide a copy of the information and presentation and email it to the chair to distribute. *Comment:* A lot of the original answers from what was said in May's meeting were completely changed in the minutes. Thus, not a true reflection of the meeting. Member voiced a complaint. *Comment:* The minutes were reviewed and changes were submitted and accepted by the chair. Chair requested that comments on the minutes need to be made within 5 days of receiving the draft. No leeway will be provided in the future for any committee member.	Santos will email to the chair to distribute a copy of the water information and the presentation. Chair and Secretary to look over previous meeting and respond accordingly.

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	Discussion	Action/By Whom
3. Update in rehabilitation activities - Presented by Doug Main (Santos)	Doug Main introduced himself as a project manager in the operations team. Doug looks after a range of projects, including most recently the new Leewood ponds. Legacy Rehabilitation Project – Progress Update <u>Background</u> When Santos bought ESG, we found some environmental issues that did not uphold the Santos values: • "Cares – by taking the long-term view to build a sustainable future for our company, our people and the environments and communities in which we operate" • We will lighten the footprint of our activities" *Legacy Issues* Bibblewindi Dieback (2011 spill) – Santos discovered an earlier spill that had been unreported and voluntarily disclosed it to the regulator. Site over clearing – Initial indications suggested that some sites had been cleared in excess of approvals. *Opportunities for improvement* Unwanted ponds – Numerous ponds exists that are surplus to requirements, or do not meet Santos standards. Well site partial and full rehab – Some well sites need tidying up and reduction of cleared area. Some sites can be returned to land holders. Supplemental Rehab – Ongoing monitoring of previously rehabilitated areas identified the need for supplemental work. <u>Progress Summary</u>	

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	Discussion	Action/By Whom
	Issues originally identified: Bibblewindi dieback (2011 spill) – 95% completed – All civil works completed in March 2013. Irrigation of soil has been completed and assisted revegetation is in progress. Site over clearing – 100% completed – All identified over-clearing reduction has been completed. Additional items identified: Unwanted ponds – 100% completed – All nominated excess ponds have been decommissioned and sites have commenced natural revegetation. Pond 3 is currently being emptied, Pond 2 remains and Pond 1 has been removed and area rehabilitated. Well site partial and full rehabilitation – 100% completed – Rehab of all legacy sites completed. Bohena dieback soil treatment – 95% completed – All civil works completed in March 2013. Irrigation of soil has been completed and assisted revegetation is in progress. Supplemental rehabilitation – 100% completed – All works completed and natural revegetation is in progress. Completed: Bohena 6 Pond rehabilitation – 100% completed – All work complete. Bohena 2, 2D, 4, 4l well rehabilitation – 100% completed – All work complete. Private landholder's yard rehabilitation – 100% completed – All work complete. Scope has grown over time, but some quick wins have been achieved and significant progress made on planning and procurement. All civil works have been completed.	

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	Discussion	Action/By Whom
	In the last eighteen months: • More than 40 hectares of land has undergone some kind of rehabilitation • Emptying, backfill and soil treatment of five ponds, ten sumps and nine flare pits (24 in total) has been completed • 42 individual sites/leases have undergone/commenced some form of rehabilitation (eight x full rehabilitation, 28 partial, six x dieback) • Approximately 3,000 tonnes of solid waste disposed of to licenced landfill Rehabilitation close-out approach has been agreed with DRE and FCNSW. Close-out will occur when revegetation has become self-sustaining. <u>Rehabilitation Process</u> ✓ It takes considerable time and has various stages. ✓ Detailed studies of the existing site and historical practices ✓ Development of rehabilitation plans and analytical testing ✓ Regulatory review of the scope of work for each site ✓ Procurement of contractors ✓ Execution of work ✓ Validation of work conducted ✓ Close-out Bohena 3 See Appendix 1 Rehabilitation began at Bohena 3 in October 2012. Civil work completed 23 November 2012.	

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	Discussion	Action/By Whom
	Bohena 6 See Appendix 2 Initial rehabilitation was conducted at Bohena 6 in Q2 2012. Civil work completed in January 2013. Bohena South See Appendix 3 Dewhurst 8 Pond See Appendix 4 The Dewhurst ponds and sumps were located on private land and have been decommissioned according to landholder requests. Civil works completed on 1 February 2013. Lease Site Rehabilitation – Bohena 5 See Appendix 5 Well head decommissioning was completed in August 2012. Site rehabilitation works completed in December 2012. Lease Site Partial Rehabilitation Dewhurst 13 See Appendix 6 Work commenced 7 November 2012. Work completed 1 February 2013. Lease Site Partial Rehabilitation Dewhurst 16 See Appendix 7 Work commenced 28 November 2012.	

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	Work completed 13 March 2013. Lease Site Partial Rehabilitation Bibblewindi 13 See Appendix 8 Rehabilitation activities began at Bibblewindi 13 on 8 October 2012. Work concluded on 8 November 2012. Dieback Area Remediation #1 See Appendix 9 Dieback Area Remediation #2 See Appendix 10 <u>Dieback Area Remediation</u> ✓ Using the results of extensive trials and testing, dieback areas are treated as follows: ✓ Removal of dead vegetation (safety concerns) – used later for soil stabilisation and to create habitat ✓ Removal of heavily impacted soil ✓ Earthworks to improve drainage and site contours ✓ In-situ chemical treatment of impacted and affected soils (gypsum and sulphur) ✓ Respread retained topsoil ✓ Addition of organics to soil ✓ Respread retained timber ✓ Irrigation of soil to assist chemical processes ✓ Assisted revegetation ✓ Ongoing monitoring	

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	Discussion	Action/By Whom
	Future Plans • Ongoing monitoring of revegetation • Partial rehabilitation of new sites • Transfer of stored water out of the Pilliga • Continuous improvement – upgrade of sediment and erosion control measures on all remaining sites Q. Committee member: Why did Santos not re-seed in Bohena 3? A. Santos: There was a lot of consultation with forestry and they insisted it be natural and not assisted vegetation. We only did assisted vegetation in dieback areas. Everywhere else is natural vegetation. Q. Committee member: What about the pad sides? A. Santos: No, because they were a supplementary rehab. Q. Committee member: At Bohena 2 Bore, the dieback is about a kilometre long. Why is that? A. Committee member: First Source Energy 1999 had an unlined dam at the site that burst in a thunderstorm. It was a complete spill however it didn't go all the way through from the burst itself; rain has assisted its spread. Eastern Star Gas in 2004 started its rehabilitation and treated the back end with gypsum but nothing is growing. Q. Committee member: What would cause it to not grow back for 15 years? A. Santos: Salt. The only way to treat it is to remove it. Q. Committee member: At Bohena 6, the dam on the right hand side there is an earth dam. How did the revegetation go there?	

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	A. Santos: At Bohena 6 we did an early rehab. The ponds at Bohena 6 were filled in before my time so I never actually got to see them. Q. Committee member: Is the revegetation only growing on the mulch or into the earth that is there? A. Santos: It's going through. Depending on the site we have a couple of different methodologies for mulch. Some of them we mix in lime and gypsum and other sites we spread varying amounts of mulch and use deep grit. Revegetation is not only on the top 50 mL but 300 mL deep. Q. Committee member: Who grows the seeds? A. Santos: Yes we have contractors and our civil works contractors have got sub-contractors. Q. Committee member: Do you compact the pipelines? A. Santos: I'll have to take that question on notice. *Comment:* I have noticed out there in the last couple of weeks you have hand planted a lot of little seedlings. Some areas they have come through quite well with around 80% levying but other areas extremely poor less than 10% levy. *Comment:* That is part of the assisted revegetation program. They were grown from seedlings that were collected in the spring. Q. Committee member: You were talking earlier on about irrigation to flush the salts. Where do the salts go?	Santos to respond to whether the pipelines are compacted. Santos to respond to why

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	A. Santos: Part of the agreed rehabilitation plan was that they would get diluted and flushed with storm water. Q. Committee member: Why was that particular method used and approved? A. Santos: That is a question for our scientists. I will take this on notice. Q. Committee member: Bibblewindi had a leak from the dam. There was uranium collected together in a large area with an amount over and above what is permissible for drinking water. The collection was caused by bicarbonates. This produced water that spilt out there at these spill sites is full of bicarbonates. So have you done a check out there for the uranium level by natural and unnatural? A. Santos: Taken on notice. *Comment:* Please take on notice and find out why and what soils two people out on Moore's Rd were testing last Wednesday at 9am. Q. Committee member: With the 3,000 tonnes of solid waste, what was in that? A. Santos: It's classified as general soil waste. Sludge sediment including dust, dirt, sand. Q. Committee member: It had to be taken to Newcastle. Why? A. Santos: The local landfill had insufficient capacity to cope with it. Q. Committee member: How did you transport it? Was it liquid or solid? A. Santos: It was a challenge for us. We had to convert it to a solid. So we pumped out the water that we could using suck trucks. Then we mixed in this super absorbent polymer. Similar to what is used in nappies that absorbs moisture. As soon as it got to a spadable	the irrigation method to flush the salts was used and approved. Santos to provide a copy of the natural and unnatural uranium levels from the produced water spill at Bohena. Santos to provide why and what soils two people out on Moore's Rd were testing.

	Discussion	Action/By Whom
	state we used excavators to transfer it to lined trucks and down the road it went. Q. Committee member: Can the committee get an analysis of that? A. Santos: Taken on notice. Q. Committee member: You have had lots of fines. Have any of the fines been because rehabilitation related? A. Santos: There was a $1500 penalty infringement notice from the Bibblewindi ponds leak. There was also a fine that was handed down from the spill that we inherited from Eastern Star Gas. When you acquire a company you take over their assets and liabilities. Q. Committee member: We were told that the soil that was removed from Bibblewindi treatment facility was contaminated. That soil is now being used as the bund around the 5 mg tank. Can we have a soil analysis of that as near where that is, is where you found the uranium? So did the leak come from the pond or the soil that was removed from the spill site? A. Santos: We cannot take a sample of the bund as that bund is lined. I'll take that on notice. *Comment:* While we are on the subject of ponds and soil I would like to hand out a copy of the Tintsfield Pond EPA factsheet that states it was reported by Santos over 12 months ago. Q. Committee member: Are there aquifers under Leewood? A. Santos: Yes. They are under every bit of soil in this area. Q. Committee member: How many wells do you have down now and how many more are you going to put down?	Santos to provide an analysis of how the 3,000 tonnes of solid waste was transported to Newcastle. Santos to determine whether it is feasible to provide a soil analysis of the soil that was contaminated at the Bibblewindi treatment facility.

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4. General Business **Feedback on chairing**	A. Santos: At the moment we have maybe 40 active wells. Active meaning they could produce if we had a pump down there. Under our exploration and appraisal licence we have approval for 15 of which we have done 7 with 5 to go or 5 with 7 to go. In the broader Narrabri Project we intend to drill up to 850 wells. Committee to email the Chair any improvements they wish to express. Overall consensus, committee was happy with how the meetings are being run.	

Next Meeting Topics: **Santos Website**

Date of next meeting: **23rd July 2014**

Meeting Closed: **7:17pm**

Appendix 1: Bohena 3
Appendix 2: Bohena 6
Appendix 3: Bohena South
Appendix 4: Dewhurst 8 Pond
Appendix 5: Lease Site Rehabilitation – Bohena 5
Appendix 6: Lease Site Partial Rehabilitation Dewhurst 13
Appendix 7: Lease Site Partial Rehabilitation Dewhurst 16
Appendix 8: Lease Site Partial Rehabilitation Bibblewindi 13
Appendix 9: Dieback Area Remediation #1
Appendix 10: Dieback Area Remediation #2

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Attachment 1: Actions

Action Raised	Date Raised	Progress Made
Action for Santos to explore the option of formalising the committee.	18th June 2013	Ongoing waiting on response from Government
Santos to respond to questions raised regarding recent aquifer contamination and associated questions within 10 days.	12th April 2014	Ongoing
Santos to respond to question raised regarding CCC chance to comment on the transportation of water from the exploration phase to production phase.	14th May 2014	
Santos to respond to questions raised in Appendix 1 and 2 regarding the Produced Water Management Plan Document and & also Tintsfield Water Management Plan.	14th May 2014	Ongoing
Santos to respond to whether they can provide a copy of the Bibblewindi Hydrological Assessment.	14th May 2014	Ongoing
Santos to provide the most recent data on water quality concentrations across Narrabri Gas Development.	14th May 2014	Ongoing
Santos to provide explanation as to how they are going to ensure, in the forest and other areas, that erosion doesn't happen down the disturbed earth corridor, where the gas lines are put including slopes, creeks and gullies.	11th June 2014	
In relation to the tampering of minutes the Chair and Secretary will look over previous meeting and respond accordingly.	11th June 2014	
Santos to respond to whether the pipelines are compacted.	11th June 2014	
Santos to respond to why the irrigation method to flush the salts was used and approved.	11th June 2014	
Santos to provide a copy of the natural and unnatural uranium levels from the produced water spill at Bohena.	11th June 2014	

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Santos to provide why and what soils two people out on Moore's Rd were testing.	11th June 2014	
Santos to provide an analysis of how the 3,000 tonnes of solid waste was transported to Newcastle.	11th June 2014	
Santos to determine whether it is feasible to provide a soil analysis of the soil that was contaminated at the Bibblewindi treatment facility.	11th June 2014	

Santos Activities Update – June 2014

SANTOS UPDATE – June 2014

Proposed upcoming work program – Narrabri Area

Time frames are indicative as schedules are dependent on factors such as approval times, weather and rig availability.

Decommissioning of wells:

- There are no plug and abandon activities planned for June

Workovers:

- The workover program is continuing with work being undertaken at the Bibblewindi East and Bibblewindi West pilot wells during June
- The workover rig is used to install and/or maintain pumps on existing wells

Drilling of exploration core holes:

- There are no core hole activities planned for June

Pilot wells:

- Drilling has been completed on the Dewhurst 26 – 29 well sets
- The drill rig has been released until pilot drilling resumes, pending approvals, later this year
- Tintsfield pilot is on-line with the Bibblewindi East and West pilot off-line for workover program

Leewood:

- The transfer of water from the pond at Bibblewindi to Leewood will be ongoing throughout June
- Installation of the liner of the second and third pond cells at Leewood is continuing
- Completion of the remaining pond cell is expected later in the year
- The Review of Environmental Factors (REF) for Leewood Phase 2 is being prepared
- The proposed activity involves the construction of treatment facilities for produced water and brine at Leewood
- Community consultation activities for Leewood Phase 2 will be undertaken when the scope of the project is finalised

Other work:

- Wilga Park Power Station has been re-commissioned but is presently off-line as there is no gas flowing from the Bibblewindi West pilot as work being undertaken as part of the workover program

Site visits:

- The next scheduled community site visit will take place on Thursday 19 June. If you are interested in attending or would like more information, please call Vesna Rendulic on 6792 9033 or email EnergyNSW@santos.com

Community:

- On Friday May 23, Santos held a site tour for a number of journalists from local, state and national media outlets
- On Tuesday June 3 Santos will make a presentation on the Narrabri Gas Project to the Narrabri Shire Council
- The next meeting of the Santos Community Committee on CSG for the Narrabri Shire will be held on Wednesday 11 June

Other:

- This year is the 60th Anniversary of Santos and in recognition of this major milestone a book on the history of the company, *Blue Flames, Black Gold* was launched recently by Santos CEO David Knox in Adelaide.
- The Planning Assessment Commission is holding public hearings in Narrabri on June 19 as part of the assessment process for Santos' Bibblewindi and Dewhurst Gas Exploration Pilot Expansion. The hearings provide a chance for public comment on the assessment. All speakers must register by June 13. For more information visit www.pac.nsw.gov.au

Questions to June 2014 Narrabri Santos CCC

These questions stem from the Santos Statement on the Tints field Ponds dated 5th June 2014 and in view of the findings released by the EPA on the Prime News on 10th June 2014

Q: If the leak was detected around the same time as the Bibblewindi leak, why is it not mentioned in the EPA Investigation Report?

Q: What was the naturally occurring level of Salinity in both the soils and water at the effected site and what are the elevated level?

Q: What are the heavy metals as mentioned and what were the naturally occurring levels and the elevated levels in both the effected soils and water?

Q: Has Santos done a full Bacterial analysis been done on the effected water and moist soils? If so will Santos supply the members of the present Committee with these results?

Q: Where is the monitoring bore located and at what depth were these elevated levels of naturally occurring salts and heavy metals?

Q: If no water was put into Tintsfield Pond 2 since mid-2012, then where was the water from the Tintsfield Pilot going? Which Tintsfield Pond was used to hold the transferred water from the Bibblewindi No.3 Pond?
How much water was transferred to the Tintsfield Ponds from Bibblewindi, when the transfer had finished what was the remaining safe capacity of the Tintsfield Dams, percentage wise?

Q: We now have a copy of the soil analysis at Wilga Park. These sample points do not mention Uranium and other Heavy metals, would it be possible to obtain a full soil and water analysis of the area around the located leak both before and after the leak was detected?

Q; Would it also be possible to obtain a copy of the EPA Investigation Report, as well as any Santos Reports and studies in relation to the leak? The CCC is still waiting the report on the Bibblewindi leak from CH2MHILL titled "Hydrological Definition Study"; I suppose that Santos has asked CH2MHILL to do one on the Tintsfield leak?

Q: How does Santos know that the leak was about 2 litres per day? Does Santos know how long the leak was occurring?

Q: Does Santos know what caused the liner to fail, and if so what was the cause?

Q: Is Santos or any part of their operation in PEL 238 under continuing Investigations by either the EPA or the OCSG?

Q: When Santos decommissioned the previous operators drill and other ponds located on the well pads and other locations in PEL 238, were any liners or ponds leaking into the surrounding area. If there were leaks, can Santos inform the present Committee where the leaks occurred and what are the elevated levels of "naturally occurring" heavy metals and Salts? Will Santos have these made available to the members of the present Committee?

Q: In NSW, has Santos now or in the past engaged any outside security firm that could have joined the ranks of the so called "activists"? If so, was any information passed on to Santos or others about people or activities? Could these activities have been influenced by these outside people?

Tony Pickard

Narrabri CCC

Meeting Action Item Response

Reference:	140509_NCCC
Subject:	Meeting Action Items – May 2014 Meeting Narrabri CCC
Requested by:	David Ross Chair Narrabri CCC
Response:	**Item 3 -** *Further to the distribution of the Leewood Soil Analysis report to the CCC, a member has asked if the results for Leewood include analysis for uranium?* • Santos undertook uranium analysis of soil at Leewood and Bibblewindi as part of baseline monitoring activities. • A copy of the results is provided below.
Briefing Officer:	Glenn Toogood Team Leader, Water
Date:	11 June 2014

HEAVY METAL CONCENTRATIONS IN SOIL CORES

Location	Depth (mbGL)	Barium (mg/kg)	Strontium (mg/kg)	Uranium (mg/kg)
Bibblewindi	7	<10	2	0.3
Bibblewindi	11	<10	<2	0.5
Bibblewindi	16	<10	<2	0.7
Bibblewindi	28	20	<2	0.6
Leewood (Background)	8	60	<2	0.2
Leewood (Background)	10	10	<2	0.5
Leewood (Background)	15	20	<2	0.5
Leewood (Background)	33	70	6	0.3

Narrabri CCC

Meeting Action Item Response

Reference:	140611_NCCC
Subject:	Meeting Action Items – June 2014 Meeting Narrabri CCC
Requested by:	David Ross Chair Narrabri CCC
Response:	**Item 1 -** *Santos to provide explanation as to how they are going to ensure, in the forest and other areas, that erosion doesn't happen down the disturbed earth corridor, where the gas lines are put including slopes, creeks and gullies.* • Information on erosion and sediment control was provided to the Committee prior to the June 2014 meeting as Item 2 in the Minute Action Item Response. • Further information on standards that Santos applies to construction activities in relation to erosion and sediment control can be sourced through the 'Blue Book'. • 'Blue Book' reference: Landcom. March 2004. *Managing Urban Stormwater: Soils and Construction* (4th Edition). NSW Government. Available from: http://www.environment.nsw.gov.au/stormwater/publications.htm • This document is large (555 pages in length, 22MB) and is too large to email.
	Item 2 – *Santos to provide a copy of the natural and unnatural uranium levels from the produced water spill at Bohena.* • The Bohena pond has been decommissioned and the site rehabilitated. • As Uranium was not a potential contaminant of concern, soil tests for this element were not undertaken. • Uranium is a naturally occurring trace element in the soil across the Project Area, as is evidenced by a number of soil sampling activities that have been undertaken. (Results of a number of these tests have been previously provided to the Committee). • Uranium is not an unnaturally occurring trace element and there are a number of reports from Government agencies which have detailed the extent of Uranium within the soil weathering profile.

	Item 3 – *Santos to provide why and what soils two people out on Moore's Road were testing.* • There is no road within the Narrabri Shire Council area with the name Moore's Road that we have been able to locate. Please refer to map of Narrabri Shire roads available at http://www.narrabri.nsw.gov.au/files/uploaded/file/RoadsA1.pdf • Santos was undertaking a number of soil sampling activities (with appropriate landholder approval) during May and June 2014. • Soil sampling is one of a suite of baseline studies being undertaken for the preparation of an Environmental Impact Statement (EIS) for the Narrabri Gas Project. • On lodgement of the EIS, the information gathered from these surveys will be provided to the NSW State Government and will be entered to the Soils and Land Information System (SALIS) database.
Briefing Officer:	Annie Moody Team Leader, Community and Land
Date:	7 August 2014

Narrabri CCC

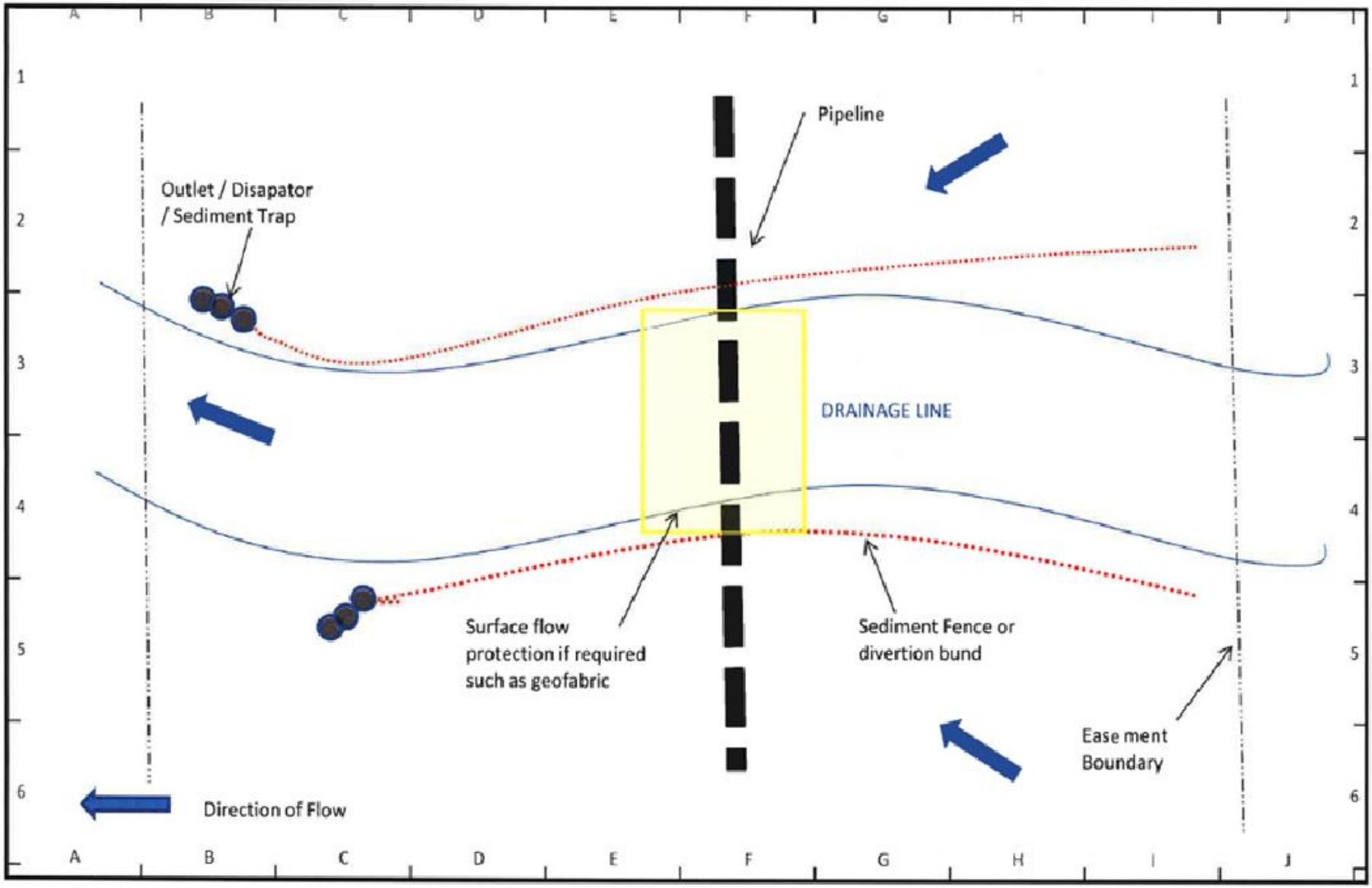
Meeting Action Item Response

Reference:	140509_NCCC
Subject:	Meeting Action Items – May 2014 Meeting Narrabri CCC
Requested by:	David Ross Chair Narrabri CCC
Response:	**Item 1** - *Santos to provide full soil analysis of Leewood* • Pages 1 to 13 of the report were provided to the Committee at the May 2014 meeting • Pages 14 to 21 of the report had been omitted as they were unrelated to the Leewood property. Those samples related to soil analysis of the Wilga Park Power Station property owned by Santos. • The full soil analysis report for both properties is provided at Attachment One
	Item 2- *Santos to provide further details on the erosion management plan for the flow line project in response to committee member asking how Santos will stop and manage erosion on the banks of creeks that the flow line passes through after construction?* • Construction activities are undertaken so as to minimise the amount of disturbed area, reduce length and steepness of slopes, implement erosion control measures and stabilise disturbed areas as soon as possible. • Erosion control is a proactive strategy that minimises the degree of sedimentation from the site. • A 10 metre wide corridor was cleared to accommodate the pipeline and the vegetation within the corridor was mulched. • After installation of the pipe, the mulch and topsoil was spread to encourage revegetation which will cover and bind the soil. • The bulk of pipe installation was undertaken using the ploughing method which reduces the amount of disturbance generated by these works. • This method also allows the ground to close in naturally after the installation of the pipe. • When crossing a drainage line, elements of construction include – Separation of clean water flow from site activities;

	– Diversion of site runoff away from the main creek to sediment controls and stable, well vegetated areas; – Isolation of the construction site from the adjacent waterway; – Use of erosion and sediment controls (rock socks, sediment fence); – Installation of stable vehicular crossings if required. • A plan of a standard drainage crossing is included at Attachment Two.
Briefing Officer:	Annie Moody Team Leader, Community and Land
Date:	5 June 2014

Attachment Two

Dewhurst Flowlines and Gathering System - Standard Drainage Crossing Plan



EAST WEST enviroag
ABN 87 135 440 317
82 Plain Street
Tamworth NSW 2340
Ph 02 6762 1733
Fx 02 6765 9109
admin@ewenviroag.com.au
www.ewenviroag.com.au

ANALYSIS REPORT SOIL

Project No:	**EW120674**	**Date of Issue:**	**19/12/2012**
Customer:		Report No:	1
Address:		Date Received:	12/10/2012
		Matrix:	SOIL
Phone:		Location:	Leewood/Wilga Park
Fax:		Sampler ID:	Client Supplied
email:		Date of Sampling:	12/10/2012
		Sample Condition:	acceptable

Comments:

Results apply to the samples as submitted. All pages of this report have been checked and approved for release.

Signed: Stephanie Cameron
Laboratory Manager

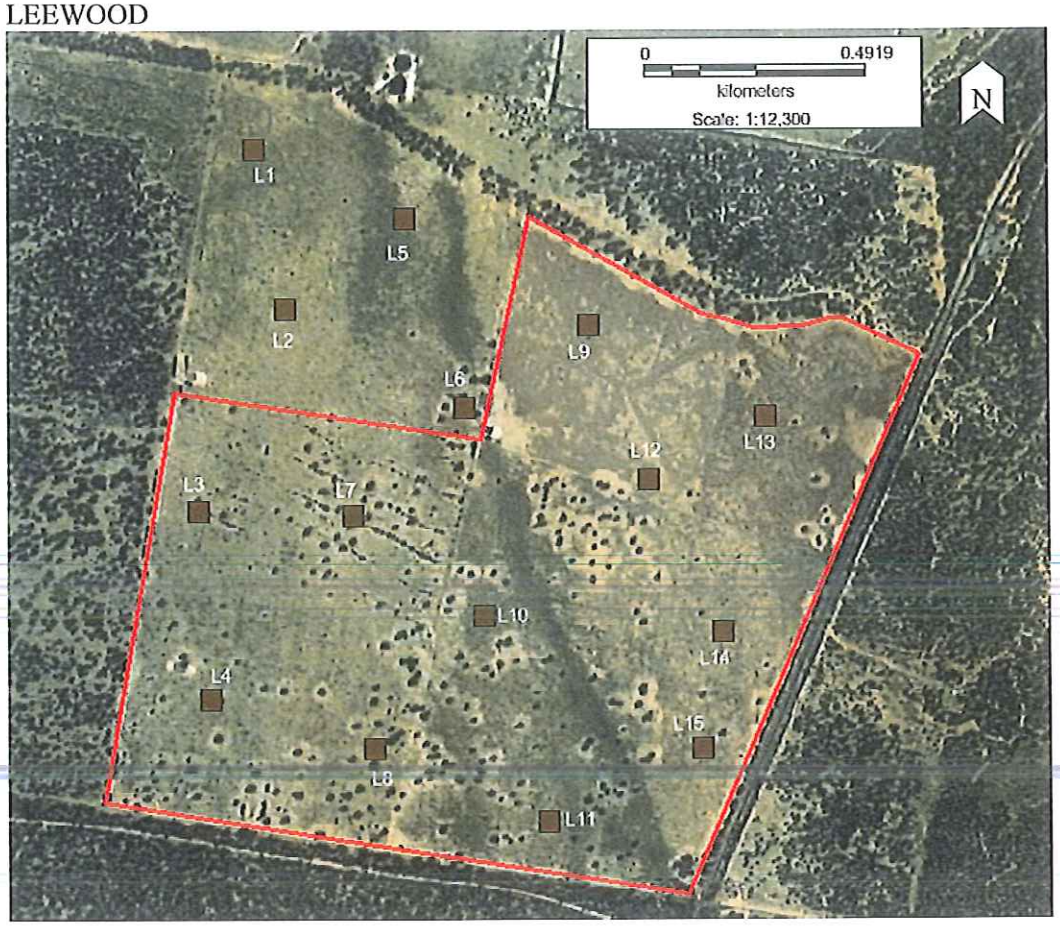
NATA Accredited Laboratory 15708

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

This analysis relates to the sample submitted and it is the client's responsibility to make certain the sample is representative of the matrix to be tested.
Samples will be discarded one month after the date of this report. Please advise if you wish to have your sample/s returned.

LEEWOOD



Leewood

Pit Point	X	Y
L1	149.619611	-30.492679
L2	149.620305	-30.495764
L3	149.618323	-30.499676
L4	149.618587	-30.503364
L5	149.623045	-30.494047
L6	149.624427	-30.497722
L7	149.621901	-30.499799
L8	149.622375	-30.504347
L9	149.627284	-30.496134
L10	149.624872	-30.501775
L11	149.626358	-30.505810
L12	149.628633	-30.499140
L13	149.631326	-30.497950
L14	149.630354	-30.502125
L15	149.629871	-30.504405

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L2	L2	L4	L4
			Depth	0-15cm	15-30cm	0-15cm	15-30cm
			Units	120674-1	120674-2	120674-3	120674-4
Chlorides	Probe	R&L 5A1	*mg/kg*	36.8	170	24.5	175
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.07	0.24	0.04	0.21
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	5.34	5.54	5.02	5.14
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	3.96	3.63	2.37	3.13
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	12.8	19.2	14.7	11.8
Phosphorus Buffer Index	PBI $_{(Col)}$	R&L 9I2a	*mg/kg*	81.9	76.8	80.3	70.1
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	10.4	19.5	2.17	12.4
Organic Carbon	LECO	R&L 6B2	*%*	0.80	0.57	0.78	0.41
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.57	0.63	0.45	0.40
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.28	0.21	0.39	0.23
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	29.3	1.64	18.8	1.51
Iron Ex	DTPA	R&L 12A1	*mg/kg*	122	74.2	232	96.7
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.44	0.38	0.44	0.50
Sol Calcium	SAR	In House	mg/kg	15.5	11.0	6.76	16.8
Sol Magnesium	SAR	In House	mg/kg	49.1	33.9	14.8	160
Sol Sodium	SAR	In House	mg/kg	88.2	260	45.8	314
SAR	calculation	-	meq/100g	3.76	11.1	1.95	13.4
Potassium Ex	Colwell	R&L 9B1	mg/kg	147	93.4	209	124
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.38	0.24	0.54	0.32

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	109	0.28	78	0.20	197	0.51	124	0.32
Calcium Ex	NH_4Cl	R&L 15A1	-	421	2.11	320	1.60	243	1.22	145	0.73
Magnesium Ex	NH_4Cl	R&L 15A1	-	638	5.32	1026	8.55	527	4.39	984	8.20
Sodium Ex	NH_4Cl	R&L 15A1	-	254	1.10	572	2.49	107	0.47	494	2.15
Ex Potassium %	Calc	Calc	%	3.17		1.55		7.68		2.79	
Ex Calcium %	Calc	Calc	%	23.9		12.5		18.5		6.36	
Ex Magnesium %	Calc	Calc	%	60.4		66.6		66.8		72.0	
Ex Sodium %	Calc	Calc	%	12.5		19.4		7.07		18.9	
ECEC	Calc	Calc	*meq/100g*	8.81		12.8		6.58		11.4	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	0.40		0.19		0.28		0.09	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L2	L2	L4	L4
			Depth	0-15cm	15-30cm	0-15cm	15-30cm
			Units	120674-1	120674-2	120674-3	120674-4
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	29.5	28.9	27.3	29.3
Silt	Hydrometer	ASTM D422-63	%	1.4	1.0	1.8	2.2
Fine Sand	Hydrometer	ASTM D422-63	%	27.4	31.0	28.9	35.1
Coarse Sand	Hydrometer	ASTM D422-63	%	41.7	39.0	41.8	33.3
Gravel	Hydrometer	ASTM D422-63	%	0.1	0.1	0.2	0.1
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.004	0.003	0.002	0.0001
EAT	In water	In House	*Class*	1	1	3a	1
EAT	In SAR 6	In House	*Class*	6	6	6	6
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.51	1.41	1.48	1.51
Total Porosity	BD and PD	ASTMF1815	% v/v	47.6	46.3	39.8	42.1
Capillary Porosity	Calc	ASTMF1815	% v/v	22.4	22.9	25.4	28.3
Air Filled Porosity	Calc	ASTMF1815	% v/v	25.1	23.4	14.4	13.8
Water Retention	30cm tension	ASTMF1815	% v/v	14.9	16.2	17.1	18.8
Moisture	oven dry	ASTMF1815	% v/v	4.50	7.32	3.81	10.8
Texture	McDonald *et al*	In House	*Class*			FSCL	FSCL

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L4	L4	L4	L4
			Depth	30-50cm	50-70cm	70-90cm	90-110cm
			Units	120674-5	120674-6	120674-7	120674-8
Chlorides	Probe	R&L 5A1	*mg/kg*	275	700	800	700
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.29	0.63	0.72	0.60
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	5.19	5.31	5.41	5.49
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	2.99	3.81	3.22	3.63
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	12.7	11.9	21.2	11.8
Phosphorus Buffer Index	PBI $_{(Col)}$	R&L 9I2a	*mg/kg*	68.4	72.6	78.8	72.6
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	20.9	74.2	86.0	56.5
Organic Carbon	LECO	R&L 6B2	*%*	0.39	0.31	0.23	0.25
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.35	0.47	0.59	0.62
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.20	0.16	0.30	0.31
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	2.86	1.53	<0.25	1.81
Iron Ex	DTPA	R&L 12A1	*mg/kg*	67.7	33.6	36.4	32.6
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.48	0.37	0.40	0.27
Sol Calcium	SAR	In House	mg/kg	14.3	10.7	5.87	11.3
Sol Magnesium	SAR	In House	mg/kg	158	206	114	208
Sol Sodium	SAR	In House	mg/kg	404	795	753	744
SAR	calculation	-	meq/100g	17.2	33.9	32.1	31.7
Potassium Ex	Colwell	R&L 9B1	mg/kg	150	102	146	166
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.38	0.26	0.37	0.43

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	118	0.30	107	0.27	144	0.37	144	0.37
Calcium Ex	NH_4Cl	R&L 15A1	-	125	0.63	89	0.45	75.7	0.38	73.8	0.37
Magnesium Ex	NH_4Cl	R&L 15A1	-	1057	8.81	1592	13.3	1702	14.2	1771	14.8
Sodium Ex	NH_4Cl	R&L 15A1	-	643	2.80	102	0.44	1319	5.73	1343	5.84
Ex Potassium %	Calc	Calc	%	2.41		1.90		1.79		1.73	
Ex Calcium %	Calc	Calc	%	4.99		3.10		1.83		1.73	
Ex Magnesium %	Calc	Calc	%	70.3		91.9		68.6		69.2	
Ex Sodium %	Calc	Calc	%	22.3		3.07		27.8		27.4	
ECEC	Calc	Calc	*meq/100g*	12.5		14.4		20.7		21.3	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	0.07		0.03		0.03		0.03	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L4	L4	L4	L4
			Depth	30-50cm	50-70cm	70-90cm	90-110cm
			Units	120674-5	120674-6	120674-7	120674-8
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	29.2	31.2	28.8	33.4
Silt	Hydrometer	ASTM D422-63	%	2.7	2.6	4.4	5.5
Fine Sand	Hydrometer	ASTM D422-63	%	34.6	31.7	36.3	40.0
Coarse Sand	Hydrometer	ASTM D422-63	%	33.4	34.4	30.4	21.1
Gravel	Hydrometer	ASTM D422-63	%	0.1	0.1	0.1	0.0
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.001	0.03	0.02	0.004
EAT	In water	In House	*Class*	1	2	2	2
EAT	In SAR 6	In House	*Class*	6	6	6	6
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.48	1.36	1.37	1.32
Total Porosity	BD and PD	ASTMF1815	% v/v	42.1	48.4	47.3	49.4
Capillary Porosity	Calc	ASTMF1815	% v/v	28.4	27.6	34.4	27.4
Air Filled Porosity	Calc	ASTMF1815	% v/v	13.7	20.9	12.9	22.0
Water Retention	30cm tension	ASTMF1815	% v/v	18.8	20.3	25.0	20.8
Moisture	oven dry	ASTMF1815	% v/v	11.3	13.1	13.6	15.3
Texture	McDonald *et al*	In House	*Class*	FSCL	CL	MC	MC

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L4	L6	L6	L10
			Depth	110-130cm	0-15cm	15-30cm	0-15cm
			Units	120674-9	120674-10	120674-11	120674-12
Chlorides	Probe	R&L 5A1	*mg/kg*	650	17.0	115	10.5
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.56	0.03	0.19	0.02
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	5.51	4.45	6.30	4.45
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	4.34	3.75	3.55	2.78
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	11.2	14.5	12.2	15.8
Phosphorus Buffer Index	PBI $_{(Col)}$	R&L 9I2a	*mg/kg*	75.8	82.7	70.5	83.0
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	50.8	2.68	10.4	2.73
Organic Carbon	LECO	R&L 6B2	*%*	0.23	0.89	0.42	0.63
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.63	0.33	0.38	0.44
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.32	0.27	0.34	0.30
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	0.73	8.87	1.84	12.9
Iron Ex	DTPA	R&L 12A1	*mg/kg*	27.9	189	60.8	228
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.18	0.28	0.56	0.38
Sol Calcium	SAR	In House	mg/kg	14.5	2.39	11.7	1.59
Sol Magnesium	SAR	In House	mg/kg	203	4.11	81.0	2.87
Sol Sodium	SAR	In House	mg/kg	725	23.8	231	13.9
SAR	calculation	-	meq/100g	30.9	1.01	9.84	0.59
Potassium Ex	Colwell	R&L 9B1	mg/kg	156	71.9	58.9	166
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.40	0.18	0.15	0.43

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	158	0.41	37.7	0.10	45.0	0.12	61.4	0.16
Calcium Ex	NH_4Cl	R&L 15A1	-	68.0	0.34	181	0.91	113	0.57	242	1.21
Magnesium Ex	NH_4Cl	R&L 15A1	-	1770	14.8	162	1.35	905	7.54	179	1.49
Sodium Ex	NH_4Cl	R&L 15A1	-	1343	5.84	58.7	0.26	554	2.41	37.6	0.16
Ex Potassium %	Calc	Calc	%	1.90		3.71		1.09		5.21	
Ex Calcium %	Calc	Calc	%	1.59		34.7		5.31		40.0	
Ex Magnesium %	Calc	Calc	%	69.1		51.8		70.9		49.4	
Ex Sodium %	Calc	Calc	%	27.4		9.79		22.7		5.41	
ECEC	Calc	Calc	*meq/100g*	21.3		2.61		10.6		3.02	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	0.02		0.67		0.07		0.81	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L4	L6	L6	L10
			Depth	110-130cm	0-15cm	15-30cm	0-15cm
			Units	120674-9	120674-10	120674-11	120674-12
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	32.3	21.8	25.2	20.1
Silt	Hydrometer	ASTM D422-63	%	7.3	0.7	1.2	0.6
Fine Sand	Hydrometer	ASTM D422-63	%	41.3	29.0	31.6	27.0
Coarse Sand	Hydrometer	ASTM D422-63	%	19.0	48.5	42.0	52.2
Gravel	Hydrometer	ASTM D422-63	%	0.0	0.0	0.0	0.1
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.02	0.02	0.01	0.04
EAT	In water	In House	*Class*	2	8	1	8
EAT	In SAR 6	In House	*Class*	6	8	6	8
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.32	1.65	1.51	1.55
Total Porosity	BD and PD	ASTMF1815	% v/v	48.9	38.9	43.1	44.0
Capillary Porosity	Calc	ASTMF1815	% v/v	27.4	21.0	20.3	21.2
Air Filled Porosity	Calc	ASTMF1815	% v/v	22.0	17.9	22.8	22.8
Water Retention	30cm tension	ASTMF1815	% v/v	20.8	12.7	13.5	13.6
Moisture	oven dry	ASTMF1815	% v/v	13.3	2.52	7.26	2.87
Texture	McDonald *et al*	In House	*Class*	MC	*	*	*

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L10	L12	L12	L12
			Depth	15-30cm	0-15cm	15-30cm	30-50cm
			Units	120674-13	120674-14	120674-15	120674-16
Chlorides	Probe	R&L 5A1	mg/kg	8.50	26.0	95.0	183
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	dS/m	0.09	0.05	0.15	0.24
pH ($CaCl_2$)	Electrode	R&L 4B1	pH units	4.60	4.53	5.01	5.27
NO_3-Nitrogen Ex	Aqueous	In House	mg/kg	2.37	2.63	3.72	4.43
Phosphorus Ex	Colwell	R&L 9B1	mg/kg	13.0	15.8	12.7	12.8
Phosphorus Buffer Index	PBI $_{(Cal)}$	R&L 9I2a	mg/kg	70.5	80.0	76.1	68.4
Sulphur Ex	KCl-40	R&L 10D1	mg/kg	1.59	6.84	7.94	17.0
Organic Carbon	LECO	R&L 6B2	%	0.54	0.81	0.70	0.49
Copper Ex	DTPA	R&L 12A1	mg/kg	0.22	0.26	0.38	0.43
Zinc Ex	DTPA	R&L 12A1	mg/kg	0.15	0.35	0.17	0.18
Manganese Ex	DTPA	R&L 12A1	mg/kg	4.46	13.5	3.82	1.23
Iron Ex	DTPA	R&L 12A1	mg/kg	135	125	107	61.9
Boron Ex	CaCl2	R&L 12C2	mg/kg	0.19	0.32	0.53	0.51
Sol Calcium	SAR	In House	mg/kg	2.47	8.12	16.7	10.2
Sol Magnesium	SAR	In House	mg/kg	4.78	24.4	208	125
Sol Sodium	SAR	In House	mg/kg	15.6	56.5	274	334
SAR	calculation	-	meq/100g	0.66	2.41	11.7	14.2
Potassium Ex	Colwell	R&L 9B1	mg/kg	52.4	96.4	69.4	71.0
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.13	0.25	0.18	0.18

				mg/kg	meq/100g	mg/kg	meq/100g	mg/kg	meq/100g	mg/kg	meq/100g
Potassium Ex	NH_4Cl	R&L 15A1	-	18.7	0.05	79.1	0.20	59.3	0.15	66.2	0.17
Calcium Ex	NH_4Cl	R&L 15A1	-	125	0.63	265	1.33	141	0.71	111	0.56
Magnesium Ex	NH_4Cl	R&L 15A1	-	140	1.17	293	2.44	1120	9.33	1324	11.0
Sodium Ex	NH_4Cl	R&L 15A1	-	34.4	0.15	109	0.47	529	2.30	758	3.30
Ex Potassium %	Calc	Calc	%	2.41		4.56		1.22		1.13	
Ex Calcium %	Calc	Calc	%	31.4		29.8		5.64		3.69	
Ex Magnesium %	Calc	Calc	%	58.7		55.0		74.7		73.3	
Ex Sodium %	Calc	Calc	%	7.52		10.7		18.4		21.9	
ECEC	Calc	Calc	meq/100g	1.99		4.44		12.5		15.1	
Ca/Mg Ratio	Calc	Calc	meq/100g	0.54		0.54		0.08		0.05	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L10	L12	L12	L12
			Depth	15-30cm	0-15cm	15-30cm	30-50cm
			Units	120674-13	120674-14	120674-15	120674-16
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	20.1	24.0	27.8	25.3
Silt	Hydrometer	ASTM D422-63	%	0.8	1.9	1.4	2.1
Fine Sand	Hydrometer	ASTM D422-63	%	27.3	30.0	33.1	31.9
Coarse Sand	Hydrometer	ASTM D422-63	%	51.7	44.0	37.7	40.3
Gravel	Hydrometer	ASTM D422-63	%	0.1	0.1	0.1	0.3
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.01	0.003	0.01	0.01
EAT	In water	In House	*Class*	8	2	1	2
EAT	In SAR 6	In House	*Class*	6	6	6	6
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.66	1.62	1.44	1.42
Total Porosity	BD and PD	ASTMF1815	% v/v	37.5	39.6	43.9	42.0
Capillary Porosity	Calc	ASTMF1815	% v/v	19.6	18.1	18.1	18.8
Air Filled Porosity	Calc	ASTMF1815	% v/v	17.9	21.5	25.7	23.2
Water Retention	30cm tension	ASTMF1815	% v/v	11.8	11.2	12.6	13.2
Moisture	oven dry	ASTMF1815	% v/v	2.38	4.56	8.75	10.5
Texture	McDonald *et al*	In House	*Class*	*	FSCL	FSCL	FSCL

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L12	L12	L12	L12
			Depth	50-70cm	70-90cm	90-110cm	110-130cm
			Units	120674-17	120674-18	120674-19	120674-20
Chlorides	Probe	R&L 5A1	*mg/kg*	315	355	345	200
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.35	0.34	0.35	0.24
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	6.24	6.38	6.83	6.63
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	8.84	4.81	3.31	3.43
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	12.2	14.3	17.3	13.7
Phosphorus Buffer Index	PBI $_{(Col)}$	R&L 9I2a	*mg/kg*	67.0	67.4	67.9	61.3
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	29.0	32.4	35.8	22.3
Organic Carbon	LECO	R&L 6B2	*%*	0.27	0.20	0.14	0.14
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.44	0.57	0.63	0.63
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.16	0.44	0.23	0.28
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	1.85	0.71	1.43	1.65
Iron Ex	DTPA	R&L 12A1	*mg/kg*	23.6	24.0	30.0	44.2
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.43	0.33	0.32	0.32
Sol Calcium	SAR	In House	mg/kg	4.77	8.57	4.16	6.17
Sol Magnesium	SAR	In House	mg/kg	13.5	270	11.3	166
Sol Sodium	SAR	In House	mg/kg	339	521	338	313
SAR	calculation	-	meq/100g	14.4	22.2	14.4	13.3
Potassium Ex	Colwell	R&L 9B1	mg/kg	146	125	110	162
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.37	0.32	0.28	0.42

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	103	0.26	94.7	0.24	107	0.27	123	0.32
Calcium Ex	NH_4Cl	R&L 15A1	-	95.8	0.48	79.5	0.40	96.4	0.48	76.0	0.38
Magnesium Ex	NH_4Cl	R&L 15A1	-	1779	14.8	1888	15.7	1871	15.6	1711	14.3
Sodium Ex	NH_4Cl	R&L 15A1	-	1111	4.83	1159	5.04	1156	5.03	1046	4.55
Ex Potassium %	Calc	Calc	*%*	1.29		1.13		1.28		1.62	
Ex Calcium %	Calc	Calc	*%*	2.35		1.86		2.26		1.95	
Ex Magnesium %	Calc	Calc	*%*	72.7		73.5		72.9		73.1	
Ex Sodium %	Calc	Calc	*%*	23.7		23.5		23.5		23.3	
ECEC	Calc	Calc	*meq/100g*	20.4		21.4		21.4		19.5	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	0.03		0.03		0.03		0.03	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L12	L12	L12	L12
			Depth	50-70cm	70-90cm	90-110cm	110-130cm
			Units	120674-17	120674-18	120674-19	120674-20
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	24.0	26.9	23.9	23.7
Silt	Hydrometer	ASTM D422-63	%	3.0	2.1	1.9	2.0
Fine Sand	Hydrometer	ASTM D422-63	%	32.7	32.7	32.2	32.2
Coarse Sand	Hydrometer	ASTM D422-63	%	40.3	38.3	42.0	42.1
Gravel	Hydrometer	ASTM D422-63	%	0.0	0.0	0.0	0.0
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.01	0.01	0.01	0.01
EAT	In water	In House	*Class*	1	3a	3a	3a
EAT	In SAR 6	In House	*Class*	6	6	6	6
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.39	1.41	1.44	1.51
Total Porosity	BD and PD	ASTMF1815	% v/v	42.4	43.1	43.2	38.5
Capillary Porosity	Calc	ASTMF1815	% v/v	19.6	20.5	21.2	23.0
Air Filled Porosity	Calc	ASTMF1815	% v/v	22.8	22.6	22.0	15.5
Water Retention	30cm tension	ASTMF1815	% v/v	14.1	14.5	14.8	15.2
Moisture	oven dry	ASTMF1815	% v/v	13.7	15.1	14.1	15.6
Texture	McDonald *et al*	In House	*Class*	SC	SC	SC	SC

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L13	L13	L15	L15
			Depth	0-15cm	15-30cm	0-15cm	15-30cm
			Units	120674-21	120674-22	120674-25	120674-26
Chlorides	Probe	R&L 5A1	*mg/kg*	30.0	100	21.5	39.0
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.05	0.18	0.04	0.07
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	5.20	6.07	4.37	4.59
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	2.22	2.94	4.49	2.72
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	15.6	13.0	14.1	16.7
Phosphorus Buffer Index	PBI $_{(Col)}$	R&L 9I2a	*mg/kg*	76.1	76.1	96.7	84.1
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	3.36	6.58	10.5	2.94
Organic Carbon	LECO	R&L 6B2	*%*	0.68	0.48	1.11	0.68
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.55	0.48	0.34	0.34
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.42	0.24	0.25	0.32
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	20.6	2.68	11.9	3.82
Iron Ex	DTPA	R&L 12A1	*mg/kg*	89.6	69.0	163	153
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.35	0.41	0.35	0.62
Sol Calcium	SAR	In House	mg/kg	15.3	11.6	6.54	40.7
Sol Magnesium	SAR	In House	mg/kg	59.8	43.6	21.8	7.9
Sol Sodium	SAR	In House	mg/kg	72.9	199	32.7	21.4
SAR	calculation	-	meq/100g	3.11	8.48	1.39	0.91
Potassium Ex	Colwell	R&L 9B1	mg/kg	74.7	69.4	116	518
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.19	0.18	0.30	1.33

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	45.6	0.12	61.8	0.16	91.5	0.23	68.6	0.18
Calcium Ex	NH_4Cl	R&L 15A1	-	329	1.65	309	1.55	253	1.27	155	0.8
Magnesium Ex	NH_4Cl	R&L 15A1	-	461	3.84	1115	9.29	324	2.70	842	7.02
Sodium Ex	NH_4Cl	R&L 15A1	-	128	0.56	484	2.10	83.6	0.36	307	1.33
Ex Potassium %	Calc	Calc	*%*	1.90		1.21		5.14		1.89	
Ex Calcium %	Calc	Calc	*%*	26.70		11.8		27.7		8.33	
Ex Magnesium %	Calc	Calc	*%*	62.4		70.9		59.2		75.4	
Ex Sodium %	Calc	Calc	*%*	9.03		16.1		7.97		14.3	
ECEC	Calc	Calc	*meq/100g*	6.16		13.1		4.56		9.3	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	0.43		0.17		0.47		0.11	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674 Location: Leewood

Test Parameter	Method Description	Method Reference	Sample ID	L13	L13	L15	L15
			Depth	0-15cm	15-30cm	0-15cm	15-30cm
			Units	120674-21	120674-22	120674-25	120674-26
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	26.0	28.9	24.9	23.2
Silt	Hydrometer	ASTM D422-63	%	1.9	1.9	2.6	2.7
Fine Sand	Hydrometer	ASTM D422-63	%	30.8	33.2	35.6	36.6
Coarse Sand	Hydrometer	ASTM D422-63	%	41.3	35.9	36.8	37.4
Gravel	Hydrometer	ASTM D422-63	%	0.0	0.1	0.1	0.1
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.001	0.002	0.002	0.003
EAT	In water	In House	*Class*	3a	1	3a	1
EAT	In SAR 6	In House	*Class*	6	6	8	6
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.55	1.43	1.56	1.57
Total Porosity	BD and PD	ASTMF1815	% v/v	41.4	45.5	39.1	33.8
Capillary Porosity	Calc	ASTMF1815	% v/v	20.8	19.8	22.0	22.5
Air Filled Porosity	Calc	ASTMF1815	% v/v	20.5	25.6	17.1	11.3
Water Retention	30cm tension	ASTMF1815	% v/v	13.5	13.90	14.1	14.4
Moisture	oven dry	ASTMF1815	% v/v	3.76	8.66	3.95	9.23
Texture	McDonald *et al*	In House	*Class*	*	*	*	*

EAST WEST enviroag

Report Date: 19/12/2012

WILGA PARK

Wilga Park

Pit Point	X	Y
W1	149.650134	-30.360460
W2	149.650321	-30.364071
W3	149.651206	-30.367161
W4	149.653259	-30.362408
W5	149.653741	-30.365310
W6	149.656909	-30.364068
W7	149.656694	-30.366921
W8	149.660992	-30.365447
W9	149.662528	-30.368768

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W1	W1	W4	W4
			Depth	0-15cm	15-30cm	0-15cm	15-30cm
			Units	120674-27	120674-28	120674-29	120674-30
Chlorides	Probe	R&L 5A1	*mg/kg*	14.5	13.5	13.5	15.5
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.13	0.15	0.13	0.18
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	7.74	7.95	7.34	7.95
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	6.23	2.69	4.16	2.66
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	16.2	11.9	15.6	15.2
Phosphorus Buffer Index	PBI $_{(Col)}$	R&L 9I2a	*mg/kg*	104	118	95.9	119
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	12.0	5.3	10.3	3.81
Organic Carbon	LECO	R&L 6B2	*%*	1.11	0.44	1.17	1.21
Copper Ex	DTPA	R&L 12A1	*mg/kg*	1.17	0.97	0.91	0.97
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.53	0.41	0.28	0.81
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	37.3	15.0	54.6	27.7
Iron Ex	DTPA	R&L 12A1	*mg/kg*	37.9	30.9	53.2	50.0
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.62	0.91	0.62	0.49
Sol Calcium	SAR	In House	mg/kg	40.7	19.4	101	181
Sol Magnesium	SAR	In House	mg/kg	7.90	6.36	76.3	98.1
Sol Sodium	SAR	In House	mg/kg	21.4	89.0	114	237
SAR	calculation	-	meq/100g	0.91	3.79	4.86	10.1
Potassium Ex	Colwell	R&L 9B1	mg/kg	518	292	180	223
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	1.33	0.75	0.46	0.57

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	498	1.28	288	0.74	175	0.45	211	0.54
Calcium Ex	NH_4Cl	R&L 15A1	-	7909	39.5	7649	38.2	4235	21.2	7674	38.4
Magnesium Ex	NH_4Cl	R&L 15A1	-	607	5.06	925	7.71	545	4.54	761	6.34
Sodium Ex	NH_4Cl	R&L 15A1	-	52.4	0.23	194	0.84	173	0.75	417	1.81
Ex Potassium %	Calc	Calc	*%*	2.77		1.55		1.67		1.15	
Ex Calcium %	Calc	Calc	*%*	85.8		80.5		78.7		81.5	
Ex Magnesium %	Calc	Calc	*%*	11.0		16.2		16.9		13.5	
Ex Sodium %	Calc	Calc	*%*	0.49		1.77		2.79		3.85	
ECEC	Calc	Calc	*meq/100g*	46.1		47.5		26.9		47.1	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	7.82		4.96		4.66		6.05	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W1	W1	W4	W4
			Depth	0-15cm	15-30cm	0-15cm	15-30cm
			Units	120674-27	120674-28	120674-29	120674-30
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	33.2	31.1	34.4	31.6
Silt	Hydrometer	ASTM D422-63	%	1.8	2.3	1.3	2.6
Fine Sand	Hydrometer	ASTM D422-63	%	33.1	33.4	35.9	37.7
Coarse Sand	Hydrometer	ASTM D422-63	%	31.8	32.4	28.3	28.0
Gravel	Hydrometer	ASTM D422-63	%	0.1	0.7	0.1	0.1
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.01	0.01	0.04	0.04
EAT	In water	In House	*Class*	4	4	5	4
EAT	In SAR 6	In House	*Class*	4	4	6	4
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.38	1.43	1.38	1.45
Total Porosity	BD and PD	ASTMF1815	% v/v	42.8	37.5	43.5	34.0
Capillary Porosity	Calc	ASTMF1815	% v/v	28.1	27.2	29.4	27.0
Air Filled Porosity	Calc	ASTMF1815	% v/v	14.7	10.2	14.1	9.9
Water Retention	30cm tension	ASTMF1815	% v/v	20.3	19.0	21.3	18.7
Moisture	oven dry	ASTMF1815	% v/v	22.3	21.9	17.3	20.2
Texture	McDonald *et al*	In House	*Class*				

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W5	W5	W5	W5
			Depth	0-15cm	15-30cm	30-50cm	50-70cm
			Units	120674-31	120674-32	120674-33	120674-34
Chlorides	Probe	R&L 5A1	*mg/kg*	12.0	13.5	17.0	140
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.12	0.16	0.19	0.42
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	7.74	7.98	8.06	8.42
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	4.49	2.72	2.49	1.90
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	14.1	12.9	14.5	11.5
Phosphorus Buffer Index	PBI (Col)	R&L 9I2a	*mg/kg*	116	125	96.8	87.4
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	2.78	3.87	2.94	23.2
Organic Carbon	LECO	R&L 6B2	*%*	0.68	0.93	0.47	0.24
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.98	0.71	0.68	0.58
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.30	0.19	0.85	0.31
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	31.5	17.5	21.8	22.4
Iron Ex	DTPA	R&L 12A1	*mg/kg*	38.3	39.3	45.9	54.2
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.63	0.56	0.56	1.33
Sol Calcium	SAR	In House	mg/kg	230	16.0	12.8	5.98
Sol Magnesium	SAR	In House	mg/kg	154	8.23	9.57	8.85
Sol Sodium	SAR	In House	mg/kg	55.1	140	164	371
SAR	calculation	-	meq/100g	2.35	5.96	6.99	15.8
Potassium Ex	Colwell	R&L 9B1	mg/kg	224	172	154	113
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.57	0.44	0.39	0.29

				mg/kg	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*	*mg/kg*	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	233	0.60	126	0.32	133	0.34	106	0.27
Calcium Ex	NH_4Cl	R&L 15A1	-	6398	32.0	8375	41.9	7539	37.7	5550	27.8
Magnesium Ex	NH_4Cl	R&L 15A1	-	520	4.33	897	7.48	909	7.58	1158	9.65
Sodium Ex	NH_4Cl	R&L 15A1	-	56.8	0.25	338	1.47	412	1.79	1037	4.51
Ex Potassium %	Calc	Calc	%	1.61		0.63		0.72		0.64	
Ex Calcium %	Calc	Calc	%	86.1		81.9		79.5		65.8	
Ex Magnesium %	Calc	Calc	%	11.7		14.6		16.0		22.9	
Ex Sodium %	Calc	Calc	%	0.66		2.87		3.78		10.7	
ECEC	Calc	Calc	*meq/100g*	37.2		51.1		47.4		42.2	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	7.38		5.60		4.98		2.88	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W5	W5	W5	W5
			Depth	0-15cm	15-30cm	30-50cm	50-70cm
			Units	120674-31	120674-32	120674-33	120674-34
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	32.5	29.9	32.4	29.8
Silt	Hydrometer	ASTM D422-63	%	2.4	2.5	2.4	1.7
Fine Sand	Hydrometer	ASTM D422-63	%	34.3	38.3	33.2	33.2
Coarse Sand	Hydrometer	ASTM D422-63	%	30.7	29.2	28.9	33.7
Gravel	Hydrometer	ASTM D422-63	%	0.1	0.2	3.1	1.5
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	1.9	1.0	0.6	0.5
EAT	In water	In House	*Class*	5	4	4	3a
EAT	In SAR 6	In House	*Class*	6	4	4	4
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.46	1.45	1.38	1.43
Total Porosity	BD and PD	ASTMF1815	% v/v	38.3	34.0	42.8	37.5
Capillary Porosity	Calc	ASTMF1815	% v/v	28.4	24.7	27.1	26.0
Air Filled Porosity	Calc	ASTMF1815	% v/v	10.0	12.2	15.6	14.2
Water Retention	30cm tension	ASTMF1815	% v/v	19.5	17.1	19.6	18.1
Moisture	oven dry	ASTMF1815	% v/v	18.9	19.6	16.9	16.2
Texture	McDonald *et al*	In House	*Class*	CL	CL	CL	CL

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W5	W5	W5	W7
			Depth	70-90cm	90-110cm	110-130cm	0-15cm
			Units	120674-35	120674-36	120674-37	120674-38
Chlorides	Probe	R&L 5A1	mg/kg	275	400	385	10.0
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	dS/m	0.54	0.33	0.16	0.07
pH ($CaCl_2$)	Electrode	R&L 4B1	pH units	8.47	8.37	6.53	6.89
NO_3-Nitrogen Ex	Aqueous	In House	mg/kg	2.34	2.84	3.57	3.34
Phosphorus Ex	Colwell	R&L 9B1	mg/kg	11.4	12.8	13.0	16.9
Phosphorus Buffer Index	PBI (Col)	R&L 9I2a	mg/kg	77.0	76.1	84.2	93.5
Sulphur Ex	KCl-40	R&L 10D1	mg/kg	85.6	189	251	3.2
Organic Carbon	LECO	R&L 6B2	%	0.15	0.16	0.13	0.96
Copper Ex	DTPA	R&L 12A1	mg/kg	0.52	0.59	0.61	1.11
Zinc Ex	DTPA	R&L 12A1	mg/kg	0.17	0.17	0.15	0.20
Manganese Ex	DTPA	R&L 12A1	mg/kg	14.8	13.9	22.2	50.2
Iron Ex	DTPA	R&L 12A1	mg/kg	43.4	37.8	56.8	42.1
Boron Ex	CaCl2	R&L 12C2	mg/kg	1.26	1.32	1.10	0.43
Sol Calcium	SAR	In House	mg/kg	2.55	14.7	5.04	149
Sol Magnesium	SAR	In House	mg/kg	2.27	33.2	7.93	119
Sol Sodium	SAR	In House	mg/kg	470	703	669	97.6
SAR	calculation	-	meq/100g	20.0	29.9	28.5	4.16
Potassium Ex	Colwell	R&L 9B1	mg/kg	121	127	112	147
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.31	0.33	0.29	0.38

				mg/kg	meq/100g	mg/kg	meq/100g	mg/kg	meq/100g	mg/kg	meq/100g
Potassium Ex	NH_4Cl	R&L 15A1	-	114	0.29	91.6	0.23	95.1	0.24	134	0.34
Calcium Ex	NH_4Cl	R&L 15A1	-	3979	19.9	1785	8.93	1262	6.31	3578	17.9
Magnesium Ex	NH_4Cl	R&L 15A1	-	1100	9.17	1148	9.57	1051	8.76	422	3.52
Sodium Ex	NH_4Cl	R&L 15A1	-	1160	5.04	1421	6.18	1422	6.18	167	0.73
Ex Potassium %	Calc	Calc	%	0.85		0.94		1.13		1.53	
Ex Calcium %	Calc	Calc	%	57.8		35.8		29.4		79.6	
Ex Magnesium %	Calc	Calc	%	26.6		38.4		40.7		15.6	
Ex Sodium %	Calc	Calc	%	14.7		24.8		28.8		3.23	
ECEC	Calc	Calc	meq/100g	34.4		24.9		21.5		22.5	
Ca/Mg Ratio	Calc	Calc	meq/100g	2.17		0.93		0.72		5.09	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W5	W5	W5	W7
			Depth	70-90cm	90-110cm	110-130cm	0-15cm
			Units	120674-35	120674-36	120674-37	120674-38
Particle Size Analysis (Hydrometer)							
Clay	Hydrometer	ASTM D422-63	%	26.7	29.9	22.1	25.5
Silt	Hydrometer	ASTM D422-63	%	2.2	0.6	4.3	4.0
Fine Sand	Hydrometer	ASTM D422-63	%	34.6	35.3	43.2	36.3
Coarse Sand	Hydrometer	ASTM D422-63	%	36.4	34.1	30.5	34.2
Gravel	Hydrometer	ASTM D422-63	%	0.1	0.1	0.0	0.1
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.5	0.5	0.5	0.004
EAT	In water	In House	*Class*	3b	3a	1	3a
EAT	In SAR 6	In House	*Class*	4	4	6	6
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.38	1.45	1.46	1.45
Total Porosity	BD and PD	ASTMF1815	% v/v	43.5	34.0	38.3	34.0
Capillary Porosity	Calc	ASTMF1815	% v/v	29.8	28.5	32.3	31.7
Air Filled Porosity	Calc	ASTMF1815	% v/v	13.7	11.0	6.1	7.8
Water Retention	30cm tension	ASTMF1815	% v/v	21.60	19.70	22.2	21.9
Moisture	oven dry	ASTMF1815	% v/v	12.0	11.8	11.5	9.09
Texture	McDonald *et al*	In House	*Class*	FSCL	FSCL	FSCL	*

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID	W7
			Depth	15-30cm
			Units	120674-39
Chlorides	Probe	R&L 5A1	*mg/kg*	16.0
Electrical Conductivity	Soil:Water (1:5)	R&L 3A1	*dS/m*	0.21
pH ($CaCl_2$)	Electrode	R&L 4B1	*pH units*	7.97
NO_3-Nitrogen Ex	Aqueous	In House	*mg/kg*	2.37
Phosphorus Ex	Colwell	R&L 9B1	*mg/kg*	15.7
Phosphorus Buffer Index	PBI (Col)	R&L 9I2a	*mg/kg*	91.1
Sulphur Ex	KCl-40	R&L 10D1	*mg/kg*	11.1
Organic Carbon	LECO	R&L 6B2	*%*	0.51
Copper Ex	DTPA	R&L 12A1	*mg/kg*	0.85
Zinc Ex	DTPA	R&L 12A1	*mg/kg*	0.17
Manganese Ex	DTPA	R&L 12A1	*mg/kg*	25.2
Iron Ex	DTPA	R&L 12A1	*mg/kg*	37.7
Boron Ex	CaCl2	R&L 12C2	*mg/kg*	0.43
Sol Calcium	SAR	In House	mg/kg	296
Sol Magnesium	SAR	In House	mg/kg	208
Sol Sodium	SAR	In House	mg/kg	305
SAR	calculation	-	meq/100g	13.0
Potassium Ex	Colwell	R&L 9B1	mg/kg	113
Potassium Ex	Colwell	R&L 9B1/AAS	meq/100g	0.29

				mg/kg	*meq/100g*
Potassium Ex	NH_4Cl	R&L 15A1	-	123	0.32
Calcium Ex	NH_4Cl	R&L 15A1	-	6534	32.7
Magnesium Ex	NH_4Cl	R&L 15A1	-	588	4.90
Sodium Ex	NH_4Cl	R&L 15A1	-	434	1.89
Ex Potassium %	Calc	Calc	*%*	0.79	
Ex Calcium %	Calc	Calc	*%*	82.1	
Ex Magnesium %	Calc	Calc	*%*	12.3	
Ex Sodium %	Calc	Calc	*%*	4.74	
ECEC	Calc	Calc	*meq/100g*	39.8	
Ca/Mg Ratio	Calc	Calc	*meq/100g*	6.67	

EAST WEST enviroag

Report Date: 19/12/2012

ANALYSIS REPORT

Project No: EW120674

Location: Wilga Park

Test Parameter	Method Description	Method Reference	Sample ID / Depth / Units	W7 / 15-30cm / 120674-39
Particle Size Analysis (Hydrometer)				
Clay	Hydrometer	ASTM D422-63	%	27.0
Silt	Hydrometer	ASTM D422-63	%	2.2
Fine Sand	Hydrometer	ASTM D422-63	%	34.6
Coarse Sand	Hydrometer	ASTM D422-63	%	36.2
Gravel	Hydrometer	ASTM D422-63	%	0.0
Saturated Hydraulic Cond.	30cm tension	ASTM F1815-97	*mm/hr*	0.003
EAT	In water	In House	*Class*	4
EAT	In SAR 6	In House	*Class*	4
Bulk Density	Clod/compaction	ASTMF1815	g/cm^3	1.31
Total Porosity	BD and PD	ASTMF1815	% v/v	50.5
Capillary Porosity	Calc	ASTMF1815	% v/v	29.3
Air Filled Porosity	Calc	ASTMF1815	% v/v	21.2
Water Retention	30cm tension	ASTMF1815	% v/v	22.5
Moisture	oven dry	ASTMF1815	% v/v	10.5
Texture	McDonald *et al*	In House	*Class*	*

DOCUMENT END

EAST WEST enviroag

Report Date: 19/12/2012

Narrabri CCC

Meeting Action Item Response

Reference:	140611_NCCC
Subject:	Meeting Action Items [Item 1] – June Meeting Narrabri CCC
Request date:	11 June 2014
Requested by:	David Ross Chair Narrabri CCC
Background Request:	• Questions tabled at meeting by member
Response:	**Question 1 -** *If the leak was detected around the same time as the Bibblewindi leak, why is it not mentioned in the EPA Investigation Report?* • The EPA investigation of Bibblewindi and Tintsfield were done separately as part of two separate EPA requests for information.
	Question 2 - *What was the naturally occurring level of salinity in both the soils and water at the effected site and what are the elevated levels?* • The TDS results from monitoring bores immediately adjacent to the Tintsfield ponds range from 1130 – 5520 mg/L (perched water) and 688 – 2140 mg/L (deeper groundwater) systems. • Background TDS results from up-gradient piezometers at Tintsfield were 1010 mg/L in the perched water and 1550 mg/L in the deeper groundwater system. • The salinity of soils both adjacent to the ponds and in a background location at Tintsfield were not assessed. • The TDS of water in the ponds at Tintsfield is 34,320 mg/L.
	Question 3 - *What are the heavy metals as mentioned and what were the naturally occurring levels and the elevated levels in both the effected soils and water?* • It's unclear what 'as mentioned' is referring too, however the below table lists the heavy metals that reported elevated results in relation to adopted criteria along with corresponding background concentrations for water and soil at Tintsfield, where available. • The soil concentrations are from cores collected at Leewood. The elevated water concentrations presented are the maximum results and not indicative of concentrations from all piezometers adjacent to the

ponds.

Analyte	Elevated Water Conc. (mg/L)	Background Water Conc. (mg/L)	Background Soil Conc. (mg/kg)
Aluminium	1.41	0.44	4660
Boron	0.59	0.24	<50
Copper	0.009	0.002	5
Uranium	35 µg/L	<1 µg/L	0.5
Zinc	0.03	0.007	9

Question 4 - *Has Santos done a full bacterial analysis on the effected water and moist soils? If so will Santos supply the members of the present Committee with these results?*

- A bacterium which is naturally occurring in the environment is not considered a contaminant of potential concern in the Tintsfield Ponds. There was no regulatory requirement to undertake bacterial testing.
- More broadly, Santos undertakes regional testing of bacteria, such as SRBs. These results have previously been presented at the Narrabri CCC.

Question 5 - *Where is the monitoring bore located and at what depth were these elevated levels of naturally occurring salts and heavy metals?*

- Monitoring bores are located immediately around the periphery of both Tintsfield Ponds, in a background location approximately 300 m to the east and in a down-gradient location approximately 200 m to the west.
- Slightly elevated results salt and select heavy metals were identified between approximately 15 – 25 mbgl and 31 – 34 mbgl in the shallow perched zones.

Question 6 – *If no water was put into Tintsfield Pond 2 since mid-2012, then where was the water from the Tintsfield Pilot going?*

- As previously presented to the Narrabri CCC, the Tintsfield Pilot recommenced operation in February 2014. There is no water produced when the pilot is shut in.

Question 7 – *Which Tintsfield Pond was used to hold the transferred water from the Bibblewindi No.3 Pond?*

- Water from Bibblewindi Pond 3 was transferred to Tintsfield Pond 2.

Question 8 - *We now have a copy of the soil analysis at Wilga Park. These sample points do not mention Uranium and other Heavy metals, would it be possible to obtain a full soil and water analysis of the area around the located leak both before and after the leak was detected?*

- Results for analysis of core samples at three varying depths representing

	the shallow perched zones are provided at **Attachment One**.
	Question 9 - *Would it also be possible to obtain a copy of the EPA Investigation Report, as well as any Santos Reports and studies in relation to the leak? The CCC is still waiting the report on the Bibblewindi leak from CH2MHILL titled "Hydrological Definition Study"; I suppose that Santos has asked CH2MHILL to do one on the Tintsfield leak?* • A request for a copy of the EPA investigation reports should be referred to that organization. • Santos has provided all reports in relation to the ponds to the EPA as part of their investigation.
	Question 10 - *How does Santos know that the leak was about 2 litres per day? Does Santos know how long the leak was occurring?* • The water abstraction rates achieved during the recent pilot trial were between 2 – 5 L/day. • This relates to water abstracted from two shallow piezometers using a submersible pump. • The actual leakage rate would likely be significantly less based on the hydraulic conductivity of silty clays.
	Question 11 - *Does Santos know what caused the liner to fail, and if so what was the cause?* • At this stage, it is still unclear whether the elevated salinity underlying Tintsfield Ponds is derived from a failure of the lining of the pond or from natural elevated salinity in the area.
	Question 12 - *Is Santos or any part of their operation in PEL 238 under continuing Investigations by either the EPA or the OCSG?* • NSW State Government has an extensive audit and compliance program associated with permits and authorities that the individual departments administer. • Authority holders may not be aware of all investigations being undertaken so this question is best referred to EPA and/or OCSG. • There is one current matter to which Santos is responding: – The EPA advised Santos by notice on 24 July 2014 that they were seeking further information in relation to the storage of water at the Tintsfield ponds. – On 30 July, EPA provided Santos with a notice to transfer water from Tintsfield Pond 2 to the Bibblewindi water facility by the 14 September 2014. – Santos has commenced the transfer of water contained in Tintsfield Pond 2 to Bibblewindi and subsequently to our water facility at Leewood.

	– Santos was able to commence the work after approval from the PAC – which was sought in November last year – was granted in July 2014. – As was detailed in our statement on June 5, the removal of water from the pond is part of finalising extensive work on decommissioning and upgrading water storage facilities constructed by a previous operator in and around the Pilliga in north west NSW.
	Question 13 - *When Santos decommissioned the previous operators drill and other ponds located on the well pads and other locations in PEL 238, were any liners or ponds leaking into the surrounding area. If there were leaks, can Santos inform the present Committee where the leaks occurred and what are the elevated levels of "naturally occurring" heavy metals and Salts? Will Santos have these made available to the members of the present Committee?* • This has been discussed at previous CCC meetings. Please refer to presentations and minutes from November 2012 and February 2013 meetings associated with rehabilitation works.
	Question 14 - *In NSW, has Santos now or in the past engaged any outside security firm that could have joined the ranks of the so called "activists"? If so, was any information passed on to Santos or others about people or activities? Could these activities have been influenced by these outside people?* • No.
Briefing Officer:	Glenn Toogood Team Leader, Water
Date:	4 August 2014

Attachment One

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB**	Page	: 1 of 6
Client	: **SANTOS LTD**	Laboratory	: Environmental Division Brisbane
Contact	:	Contact	:
Address	:	Address	:
E-mail	:	E-mail	:
Telephone	:	Telephone	:
Facsimile	:	Facsimile	:
Project	:	QC Level	:
Order number	:		
C-O-C number	: .	Date Samples Received	: 26-MAR-2014
Sampler	: .	Issue Date	: 09-APR-2014
Site	: NARRABRI		
		No. of samples received	: 3
Quote number	:	No. of samples analysed	: 3

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Andrew Epps	Metals Production Chemist	Brisbane Acid Sulphate Soils
		Brisbane Inorganics
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics
Ryan Story	2IC Organic Instrument Chemist	Brisbane Organics

Analytical Results

Sub-Matrix: DRILL CUTTINGS (Matrix: SOIL)

Compound	CAS Number	LOR	Unit	Client sample ID: WPKMW1D_SDCUT_14_201211151200	WPKMW1D_SDCUT_22_201211151200	WPKMW1D_SDCUT_36_201211151200	----	----
				Client sampling date / time: 15-NOV-2012 12:00	15-NOV-2012 12:00	15-NOV-2012 12:00	----	----
				EB1407245-001	EB1407245-002	EB1407245-003	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	9.7	8.6	8.6	----	----
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	238	79	136	----	----
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	<1.0	<1.0	1.2	----	----
ED008: Exchangeable Cations								
Exchangeable Calcium	----	0.1	meq/100g	0.8	4.2	7.4	----	----
Exchangeable Magnesium	----	0.1	meq/100g	0.5	1.9	1.2	----	----
Exchangeable Potassium	----	0.1	meq/100g	0.2	0.6	1.3	----	----
Exchangeable Sodium	----	0.1	meq/100g	2.7	2.7	2.8	----	----
Exchangeable Aluminium	----	0.1	meq/100g	<0.1	<0.1	<0.1	----	----
Exchangeable Sodium Percent	----	0.1	%	63.5	29.2	22.1	----	----
Cation Exchange Capacity	----	0.1	meq/100g	4.3	9.4	12.8	----	----
ED021: Bicarbonate Extractable Potassium (Colwell)								
Bicarbonate Extractable K (Colwell)	----	10	mg/kg	230	290	720	----	----
ED092: DTPA Extractable Metals								
Copper	7440-50-8	1.00	mg/kg	<1.00	<1.00	2.72	----	----
Iron	7439-89-6	1.00	mg/kg	7.08	7.16	167	----	----
Manganese	7439-96-5	1.00	mg/kg	<1.00	60.2	22.6	----	----
Zinc	7440-66-6	1.00	mg/kg	22.0	<1.00	1.52	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	4670	9350	9230	----	----
Arsenic	7440-38-2	5	mg/kg	<5	<5	6	----	----
Barium	7440-39-3	10	mg/kg	50	180	150	----	----
Beryllium	7440-41-7	1	mg/kg	<1	<1	<1	----	----
Boron	7440-42-8	50	mg/kg	<50	<50	<50	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	10	24	10	----	----
Cobalt	7440-48-4	2	mg/kg	3	6	7	----	----
Copper	7440-50-8	5	mg/kg	<5	8	15	----	----
Iron	7439-89-6	50	mg/kg	11200	29600	38800	----	----
Lead	7439-92-1	5	mg/kg	<5	8	6	----	----
Manganese	7439-96-5	5	mg/kg	30	790	637	----	----

Analytical Results

Sub-Matrix: DRILL CUTTINGS (Matrix: SOIL)				Client sample ID	WPKMW1D_SDCUT_14_201211151200	WPKMW1D_SDCUT_22_201211151200	WPKMW1D_SDCUT_36_201211151200	----	----
				Client sampling date / time	15-NOV-2012 12:00	15-NOV-2012 12:00	15-NOV-2012 12:00	----	----
Compound	CAS Number	LOR	Unit		EB1407245-001	EB1407245-002	EB1407245-003	----	----
EG005T: Total Metals by ICP-AES - Continued									
Molybdenum	7439-98-7	2	mg/kg		<2	<2	<2	----	----
Nickel	7440-02-0	2	mg/kg		4	9	14	----	----
Selenium	7782-49-2	5	mg/kg		<5	<5	<5	----	----
Strontium	7440-24-6	2	mg/kg		8	15	21	----	----
Tin	7440-31-5	5	mg/kg		<5	<5	<5	----	----
Vanadium	7440-62-2	5	mg/kg		21	49	22	----	----
Zinc	7440-66-6	5	mg/kg		43	13	20	----	----
EG020T: Total Metals by ICP-MS									
Uranium	7440-61-1	0.1	mg/kg		<0.1	0.1	<0.1	----	----
Lithium	7439-93-2	0.1	mg/kg		2.8	5.7	5.8	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		<0.1	<0.1	<0.1	----	----
EK040S: Fluoride Soluble									
Fluoride	16984-48-8	1	mg/kg		2	1	<1	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg		0.2	0.3	0.4	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	20	mg/kg		20	70	90	----	----
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	20	mg/kg		20	70	90	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	2	mg/kg		87	195	243	----	----
EK080: Bicarbonate Extractable Phosphorus (Colwell)									
Bicarbonate Ext. P (Colwell)	----	2	mg/kg		<2	<2	<2	----	----
EP003: Total Organic Carbon (TOC) in Soil									
Total Organic Carbon	----	0.02	%		0.02	0.05	0.06	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 - Silica gel cleanup									
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----

Analytical Results

Sub-Matrix: DRILL CUTTINGS (Matrix: SOIL)				Client sample ID	WPKMW1D_SDCUT_14_201211151200	WPKMW1D_SDCUT_22_201211151200	WPKMW1D_SDCUT_36_201211151200	----	----
				Client sampling date / time	15-NOV-2012 12:00	15-NOV-2012 12:00	15-NOV-2012 12:00	----	----
Compound	CAS Number	LOR	Unit		EB1407245-001	EB1407245-002	EB1407245-003	----	----
EP071 SG-S: Total Petroleum Hydrocarbons in Soil - Silica gel cleanup									
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	10	mg/kg		<10	<10	<10	----	----
C10 - C14 Fraction	----	50	mg/kg		<50	<50	<50	----	----
C15 - C28 Fraction	----	100	mg/kg		<100	<100	<100	----	----
C29 - C36 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ C10 - C36 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013									
C6 - C10 Fraction	C6_C10	10	mg/kg		<10	<10	<10	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	10	mg/kg		<10	<10	<10	----	----
>C10 - C16 Fraction	>C10_C16	50	mg/kg		<50	<50	<50	----	----
>C16 - C34 Fraction	----	100	mg/kg		<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	mg/kg		<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	50	mg/kg		<50	<50	<50	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	50	mg/kg		<50	<50	<50	----	----
EP080: BTEXN									
Benzene	71-43-2	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
Toluene	108-88-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Ethylbenzene	100-41-4	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
ortho-Xylene	95-47-6	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
^ Sum of BTEX	----	0.2	mg/kg		<0.2	<0.2	<0.2	----	----
^ Total Xylenes	1330-20-7	0.5	mg/kg		<0.5	<0.5	<0.5	----	----
Naphthalene	91-20-3	1	mg/kg		<1	<1	<1	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	0.1	%		97.3	108	102	----	----
Toluene-D8	2037-26-5	0.1	%		98.2	110	104	----	----
4-Bromofluorobenzene	460-00-4	0.1	%		102	114	108	----	----

Surrogate Control Limits

Sub-Matrix: DRILL CUTTINGS		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	52.7	133.7
Toluene-D8	2037-26-5	60.3	131.1
4-Bromofluorobenzene	460-00-4	59.2	126.6

PHOENIX
STRATEGIC MANAGEMENT

PO BOX 943
INGLEBURN NSW 1890
TELEPHONE: 0402 060 649
PHOENIXSTRATEGIC.COM.AU

PHOENIX STRATEGIC MANAGEMENT
ABN 89 422 045 729

Santos Community Consultative Committee – Narrabri Shire Meeting

Wednesday 23rd July – 5:30 pm to 7:30 pm

Narrabri Golf Club

1.	Welcome, apologies and introductions	5:30 – 5:35	All
2.	Previous meeting minutes	5:35 – 5:55	David Ross
3.	Navigating the Santos website	5:50 – 6.30	Leesa Selke/Annie Moody
4.	Leewood Phase 2 Review of Environmental Factors	6.30 – 7.10	Simon Griffiths
5.	General Business • Other business • Dates for upcoming meetings • Next meeting and issue to discuss	7:10 – 7:30	All