ASHTON LONGWALL 7A – END OF PANEL SUMMARY REPORT

1 INTRODUCTION

This report has been prepared in conjunction with the SCT Operations Pty Ltd (SCT) Longwall 7A – End of Panel Subsidence Report and the Aquaterra "Ashton Coal Mine 2010-2011 AEMR Groundwater Management Report".
The combination of these reports were prepared to satisfy the requirements of the *Subsidence Management Plan Approval, Ashton Coal Mine Extraction "Longwalls 7A Only", Clause 17* and the *Ashton Coal Project (ACP) Development Consent No. 309-11-2001.*

End of Panel Report

SMP Clause 17: Within 4 months of the completion of each longwall panel, an end of panel report must be submitted to the Director-General. The end of panel report must:

a) include a summary of the subsidence and environmental monitoring results for the applicable longwall panel;
b) include an analysis of these monitoring results against the relevant;
   - impact assessment criteria;
   - monitoring results from previous panels; and
   - predictions in the SMP;
c) identify any trends in the monitoring results over the life of the activity; and
d) describe what actions were taken to ensure adequate management of any potential subsidence impacts due to longwall mining.

Development Consent (DC) (MOD7) Clause 3.3: Subsidence will be monitored and managed in accordance with approved Extraction Plans (or equivalent), the development of which will be informed by:

- An End of Panel Report for each longwall panel with a focus on subsidence.

2 BACKGROUND

Longwall 7A began extraction on the 22 March 2011 and completed longwall mining on 5 August 2011. Longwall 7A was 793m long, 187m wide and was mined without any unexpected impact to the surface environment or infrastructure above it. The longwall panel length was reduced so that ACOL complied with Development Consent condition 1.18: "*The Applicant shall design underground workings to ensure that longwall voids do not result closer than 40 metres from any point vertically beneath the high bank of Bowmans Creek (except those sections of channel made redundant by the diversion)"* as the Bowmans Creek Diversion was not constructed due to delays in subordinate approvals.

The effects of Longwall 7A subsidence were monitored in accordance with the document "Subsidence Management Plan - Longwall 6B-8"; this included both regular survey monitoring and visual inspection of both land features and infrastructure.

3 MINE SUBSIDENCE

The Pikes Gully Seam section has been mined along the length of Longwalls 1 to 8 at Ashton Underground Mine. Mining height is nominally in the 2.5m to 2.6m range. The seam dips to the southwest at a grade of up to 1 in 10. Overburden ranges in thickness from 179m at the start of the longwall panel to 160m at the take off end. The final extraction void is nominally 198m. This includes the 5.5m width of development drivage either side of the longwall block. Maingate chain pillars are at a centre to centre width and length of 40m and 150m respectively. Tailgate chain pillars are at a centre to centre width and length of 35m and 150m respectively.

Ashton's longwall mining operation commenced in February 2007. Since then 8 panels have been completed with the 9th (Longwall 8 which is located adjacent to Longwall 7B 'short') currently being mined. The progress of longwall extraction is shown in **Figure 1**.

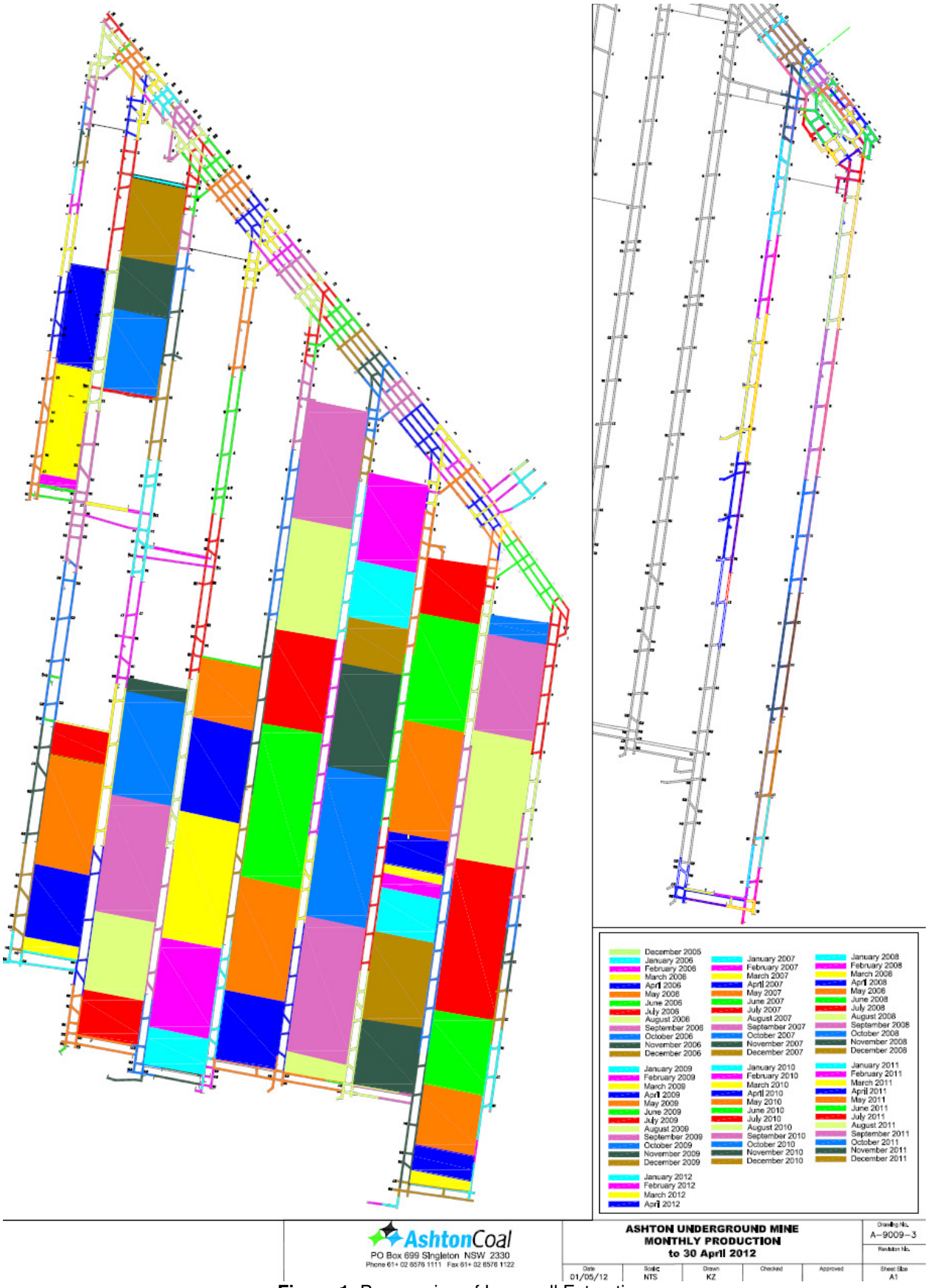

Figure 1: Progression of Longwall Extraction

4 MONITORING

Ashton Coal has monitored the subsidence movement on the surface during the extraction of Longwall's 1-8 using longitudinal subsidence lines. These are located over the start and finish lines of each panel and a main cross line extending over all seven panels. All panels have monitoring data for each start and end lines and various cross lines relevant to the panel, surface features or strata features. Several other subsidence lines have been used to monitor the slope leading down to Glennies Creek, closure across the New England Highway, and subsidence across a dyke. These locations can be seen in **Figure 2.**

The following table (**Table 1)** outlines the maximum subsidence parameters predicted and recorded during regular survey of subsidence lines as the longwall passed each location.

Subsidence monitoring over Longwall 7A consisted of regular survey of centreline 1 (CL1), centreline 2 (CL2) and cross line 5 (XL5). The frequency and results of this have been maintained per monitoring document *Ashton Mine Subsidence Monitoring Programme Longwall 6B-8.* Monitoring information was supplied to the Principal Subsidence Engineer.

Visual and survey monitoring of two existing 2 pole 132kV power structures and an 11kV line over Longwall 7A was undertaken regularly. The 132kV pole sets have been referenced as Set 11 (located towards the Tailgate of LW7A) and Set 12 (located near the Maingate of LW7A). The 11kV powerline was surveyed prior to undermining and visually inspected during/post undermining to ensure adequate clearance and safety. **Appendix 1**, **Figure 4 and 5** shows the 11kV powerline post rollers being fitted and post undermining respectively whilst **Figure 6** shows the 132kV line post subsidence. Survey data from the 132kV powerline set was recorded and supplied to the Principal Subsidence Engineer as per the *Ashton Mine Subsidence Monitoring Programme Longwall 6B-8.* The effects of subsidence on both 132kV structures can be seen in **Appendix 2**. A maximum of 0.09m and 0.03m of subsidence has been recorded to date on pole Set 11 and Set 12 respectively.

Over Longwall 7B 'short' and Longwall 8, the existing 66kV power structures will be monitored by survey methods. The results of the successful monitoring to date will be discussed further in the LW7B(s) and LW8 End of Panel Reports.

During mining of LW7A, monthly survey was required on Narama Dam. Narama Dam is a prescribed dam under the Dam Safety Act 1978 and is located a minimum of 486m from the goaf edge of LW7A. Monthly survey of the dam indicated negligible movement of the dam wall during LW7A extraction. Survey results were distributed in accordance with the *Ashton Mine Subsidence Monitoring Program of Narama Dam* and submitted to relevant stakeholders.

Table 1: Subsidence of Mined Longwall Panels - Predicted vs. Actual (SCT End of Panel Subsidence Report, 2012)

	Maximum Predicted EIS	Maximum Predicted SMP	Maximum Measured	
North End of LW1			**CL2**	**XL8**
Subsidence (mm)	1430	1800	1528	1500
Tilt (mm/m)	122	244	100	103
Horizontal Movement (mm)	-	>500	476	500
Tensile Strain (mm/m)	16	73	40	15
Compressive Strain (mm/m)	25	98	28	27

	Maximum Predicted EIS	Maximum Predicted SMP	Maximum Measured			
Remainder of LW1			**CL1**	**XL5**		
Subsidence (mm)	1690	1700	1318	1436		
Tilt (mm/m)	60	141	60	75		
Horizontal Movement (mm)	-	300-500	480	503		
Tensile Strain (mm/m)	8	42	49	17		
Compressive Strain (mm/m)	12	56	23	24		
Longwall 2			**CL1**	**CL2**	**XL5**	
Subsidence (mm)	1690	1600	1296	1513	1266	
Tilt (mm/m)	91	102	40	82	78	
Horizontal Movement (mm)	-	300-500	440	298	390	
Tensile Strain (mm/m)	12	30	17	16	11	
Compressive Strain (mm/m)	18	41	16	32	28	
Longwall 3			**CL1**	**CL2**	**XL5**	
Subsidence (mm)	1500	1600	1420	1354	1429	
Tilt (mm/m)	65	78	41	48	97	
Horizontal Movement (mm)	-	300-500	463	345	394	
Tensile Strain (mm/m)	9	23	10	17	22	
Compressive Strain (mm/m)	13	31	7	18	24	
Longwall 4			**CL1**	**CL2**	**XL5**	**XL10**
Subsidence (mm)	1430	1600	1397	1194	1546	1263
Tilt (mm/m)	46	78	36	40	53	33
Horizontal Movement (mm)	-	300-500	230	560	360	258[1]
Tensile Strain (mm/m)	6	23	10	18	9	6
Compressive Strain (mm/m)	9	31	9	67	9	10
Longwall 5			**CL1**	**CL2**	**XL5**	
Subsidence (mm)	1430	1600	1266	1326	1376	
Tilt (mm/m)	29	78	23	29	35	
Horizontal Movement (mm)	-	300-500	399	339[2]	360	
Tensile Strain (mm/m)	4	23	21	6	5	
Compressive Strain (mm/m)	5	31	9	8	17	
Longwall 6A			**CL1**	**CL2**	**XL5**	
Subsidence (mm)	1430	1600	1415	1546	1263	
Tilt (mm/m)	29	57	24	53	33	
Horizontal Movement (mm)	-	300-500	338	360	258	
Tensile Strain (mm/m)	4	17	7.6	9	6	
Compressive Strain (mm/m)	5	23	9.6	9	10	
Longwall 7A			**CL1**	**CL2**	**XL5**	
Subsidence (mm)	1430	1600	1415	>860	1391	
Tilt (mm/m)	29	57	24	13	23	
Horizontal Movement (mm)	-	300-500	338	118	365	
Tensile Strain (mm/m)	4	17	7.6	2.4	10	
Compressive Strain (mm/m)	5	23	9.6	>3.8	12.1	

[1] XL10 was installed after some horizontal movement associated with the previous longwall may have occurred so not all horizontal movements were measured.
[2] Maximum measured at end line so actual maximum expected to be greater.

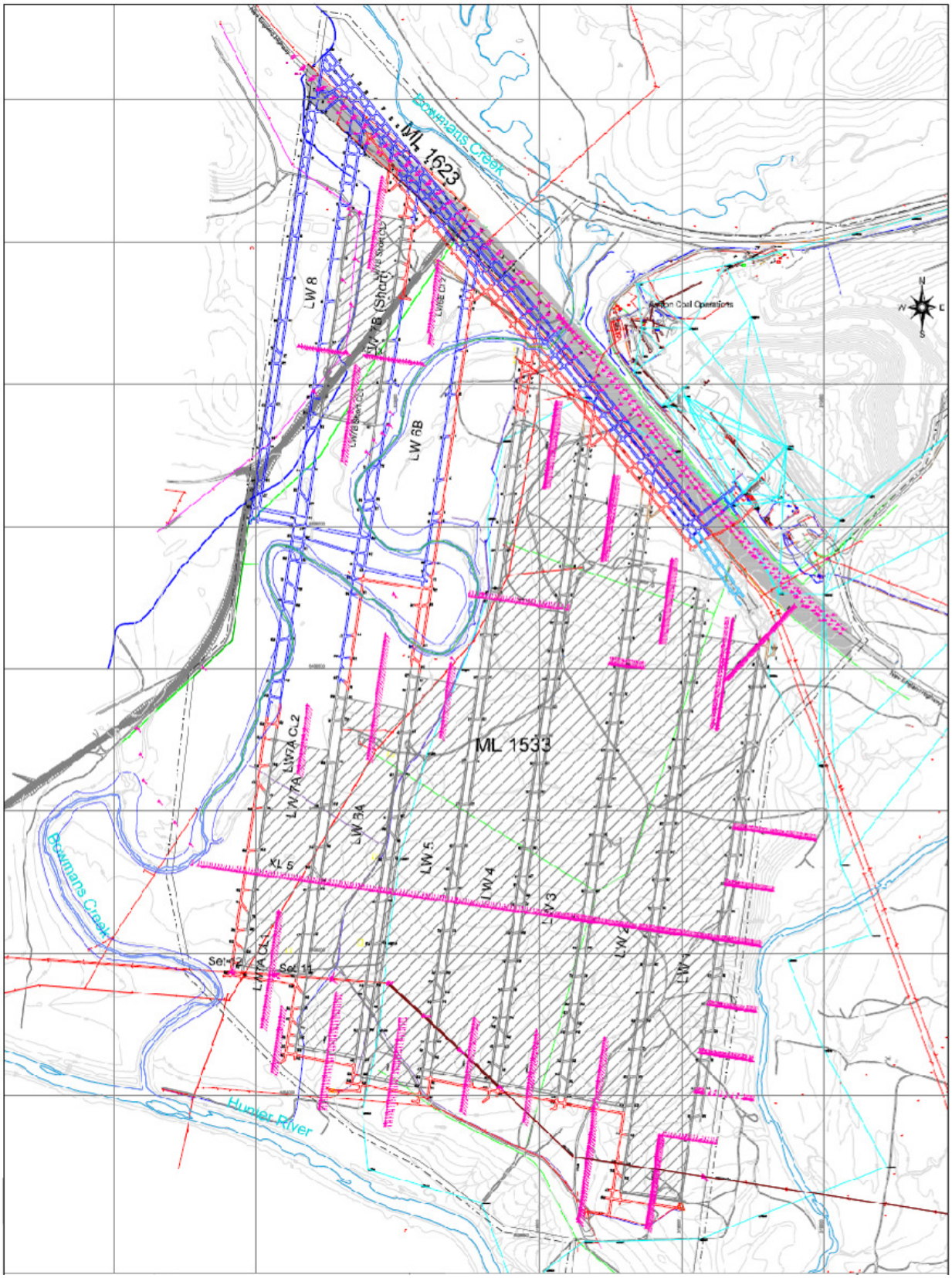

Figure 2: Plan location of Monitoring Cross Lines. Also shown is the 132kV power line monitoring points (pole sets 11 and 12).

5 ABORIGINAL HERITAGE

Aboriginal Cultural Heritage Management Plan (ACHMP) was implemented for the period. It is noted that there were no previously recorded AHIMS sites undermined during LW7A extraction. No ripping works were undertaken above Longwall 7A during the period for subsidence remediation.

The implementation of the ACHMP is considered to have been effective to date. The process of assessing the potential impacts on artefact sites based on predictions of crack locations has been positive. Ongoing visual monitoring of crack positions has shown no impact to known objects.

While preservation is the ongoing aim of ACOL, due to the nature of subsidence impacts and the potential for emergency remediation works being required due to safety related issues a Aboriginal Heritage Impact Permits (AHIP) have been applied for and received. These permits cover the surface area above all longwall panels (Longwalls 1 to 8) at Ashton.

A permit to disturb system operates onsite to take into account a range of issues, including Archaeology, flora and fauna, survey location of boreholes and other surface infrastructure (either buried or otherwise). This has proved successful as it requires systematic investigation of a range of potential issues prior to land disturbance activities. During surface works of LW7A, no remediation occurred in the immediate vicinity of any archaeological site. Prior to active surface disturbance work, known archaeological sites which have the potential to be impacted on by such works were demarcated with pegs and 'caution tape'. This aimed to make operators aware of sites within the working area. Each operator was required to undergo an induction reassessment in the ACHMP and shown the locations of sites within the work area prior to commencing work. This level of education and communication proved invaluable in the non disturbance of any archaeological site.

6 SUBSIDENCE IMPACTS

Surface subsidence cracks have developed along each gate edge of the Longwall panels. These generally run parallel to the gate road within the longwall block. Cracks are particularly evident on the up-hill side of each panel. Note: Photos of subsidence impacts are documented in **Appendix 1: Photos** (Figures 4-11).

Remediation of cracking over Longwall 7A was undertaken by filling the cracks with loam (sand and clay mixture). This was pushed into the cracks by hand using a shovel with a small 'dingo' loader used to deliver material to the crack. The loader was used to compact the soil into the void where possible. Post initial filling of the crack, secondary filling occurred once the loam had settled into the crack. Secondary filling was minimal for most cracks if the loader was able to be used during primary crack filling. Where this wasn't the case, the soil took time to settle resulting in some minor depressions.

Previous remediation works undertaken on subsidence cracks at Ashton through the Voluntary Conservation Area above Longwall 1 were rehabilitated using a small excavator and skid steer loader. Cracked areas in open fields above Longwalls 1 to 6A were remediated using a D6 dozer with ripping tines. Once the area was ripped, the ground was flattened using the blade. During remediation of cracking above Longwall 6A, the bladed off ground was compacted using a pad-foot roller and harrowed to encourage grass regrowth. The results of this extra work was beneficial for grass re-growth, ease of travelling across the paddock/worked area and due to the ground being flat/compact identifying secondary cracking was made significantly easier.

The extent of subsidence remediation at the goaf edge for all longwall's is outlined in **Figure 3.** A specific, defined example of gateroad cracking which developed over Longwall 7A is shown

in **Figure 9.** This was more defined due to the hard, compact surface of the gas drainage well pad. Remediation of the area after filling with loam is shown in **Figure 10**. Other remediation works were completed using a motor grader. This was primarily tasked with access road repairs. During the Longwall 7A extraction period no road works occurred to remediate subsidence damage as the road was not undermined. Previously, where subsidence effects were more than small surface cracks, the road was ripped by the grader prior to smoothing with the blade. This also occurred where large pot-holes had developed.

Initial caving over the start of Longwall 7A was typical of the caving behaviour observed elsewhere at ACOL and consistent with predicted subsidence behaviour. No crack was observed over the LW7A start line however a shallow depression formed. This resulted in localised ponding and is discussed further below.

Ponding over Longwall 3 (at chainage 530m) has been left as a water storage area. Because of its size and tendency to fill after rain events repair will not occur at this stage. Other areas where ponding has become evident is three zones over Longwall 5 (at Chainage 1,090m, 400m and 80m) and Longwall 6A (at Chainage 2,360m and adjoining Dam 10). Ponding above LW6A adjoining Dam 10 is shown in **Figure 7** (foreground). Ponding has developed adjacent to gas drainage plant 4 (~65m outbye the LW7A start point) during Longwall 7A extraction. This is the only site of ponding over the Longwall 7A panel and is shown in **Figure 7** (background). All areas of ponding currently pose no safety or environmental issues however they may need to be pumped out or have natural drains re-established to prevent continual filling and holding post lower seam extraction. This is planned as future remediation. Works were undertaken independent of, but during the Longwall 7A mining period, to install culverts under the dirt access road to allow suitable drainage of the Longwall 3 ponding. This is shown in **Figure 8**.

No farm dams were undermined by LW7A. The previously undermined Dam 10 and 11 show no visible evidence of water loss and continued to fill with ongoing rainfall post Longwall 6A undermining them.

No overhead power lines were negatively impacted by undermining or repair work of Longwall 7A subsidence cracks. This infrastructure included an overhead 11kV and 132kV power line. No buried power/phone cables were disturbed by Longwall 7A undermining or remediation. One cable exists over the gate-edge of LW7A and feeds a neighbouring mine sites dust monitor. Remediation occurred around this site with no ill effects. The powerline infrastructure undermined had rollers installed to prevent any subsidence induced tension on the lines. Powerlines remained visually stable and relatively straight during and post undermining.

The maximum subsidence movements detected over Longwall 7A were less than those predicted in the SMP. This occurred for all survey monitoring lines. Horizontal and vertical movement was within predictions for XL5, CL1 and CL2. Horizontal movement has occurred in the upslope direction above each of the Longwall panels. This movement has predominantly occurred within the longwall panels with limited displacement detected outside the panel. This result is consistent with previously mined panels. Quantitatively horizontal movement, tilt and strains are less than those predicted in the SMP. The results compared to other panels vary slightly due to depth, strata and surface conditions. Following LW1 mining there has been no indication of any significant lateral movement of the steep slope adjacent Glennies Creek or of the New England Highway cutting.

During Longwall 7A subsidence remediation, some previously remediated cracks areas which required secondary remediation had loam spread into depressions and eroded areas. This was the case for the Longwall 4 and 5 start lines. The depressions and holes which had formed were the result of the ripped soil settling into the crack with rainfall and compaction. The loam was used to re-level the surface and was fine enough to flow down any un-filled sub surface cracks. **Figure 11** shows the result of re-levelling the LW5 start line depressions.

7 GROUNDWATER

Groundwater for the End of Panel report is reported fully in the Ashton Coal Mine 2010-2011 Annual Environmental Management Report. The Groundwater Management Report prepared by RPS Aquaterra was submitted attached to the AEMR. A summary of the groundwater impacts as discussed in the AEMR is included below.

All groundwater-related impacts from underground mining during the review period were below the levels predicted in the groundwater impact reports for the 2001 EIS, 2009 EA and 2010 SMP for LW7A. As such, the monitoring results have shown that the LW extractions have been completed in full compliance with Development Consent Condition 3.9.

Over the 2010-11 reporting period:

- The groundwater monitoring network was expanded which included 3 nested monitoring sites, installed in the Bowmans Creek Alluvium and the Permian overburden units (this was undertaken in accordance with the Bowmans Creek EA Section 13 Commitments). An additional 6 standpipe piezometers were also installed to verify the hydraulic properties of the Bowmans Creek Alluvium and monitor any effects of the Bowmans Creek Diversion and mining beyond LW6A.
- Groundwater monitoring frequency was increased in key monitoring bores during the early and final stages of LW6A and LW7A panel extraction, to monitor the impacts of subsidence on the Bowmans Creek Alluvium. This was undertaken in accordance with Consent Condition 3.9, which requires confirmation that the subsidence impacts or environmental consequences are less than those predicted in the Ashton Coal Bowmans Creek Diversion EA.
- Apart from the initial drawdown observed in the Glennies Creek Alluvium during the mining of LW1, no mining impacts have been observed in the Glennies Creek, Bowmans Creek or Hunter River Alluvium as a result of underground mining.
- There were no additional baseflow impacts to Glennies Creek. Actual seepage inflow rates from the Glennies Creek Alluvium were about 0.66L/s (0.06ML/d), and therefore continued to be below the EIS and EA predictions of 3.2L/s (0.28ML/d) and 2.6L/s (0.21ML/d), respectively.
- Mining of LW6A and LW7A occurred beneath parts of the Bowmans Creek Alluvium and no reduction in Alluvium storage was evident, hence no baseflow impacts on Bowmans Creek have been observed to date. The actual seepage rates have therefore continued to be less than the rates contained in the EIS (4.5L/s / 0.38ML/d), EA and SMP (0.34L/s / 0.03ML/d) predictions.
- There were no baseflow impacts to the Hunter River and therefore no impacts to the small stands of River Red Gums near the Hunter River, which is consistent with the EA and SMP predictions, and lower than the EIS prediction of 3L/s (0.27ML/d) for this stage of mining.

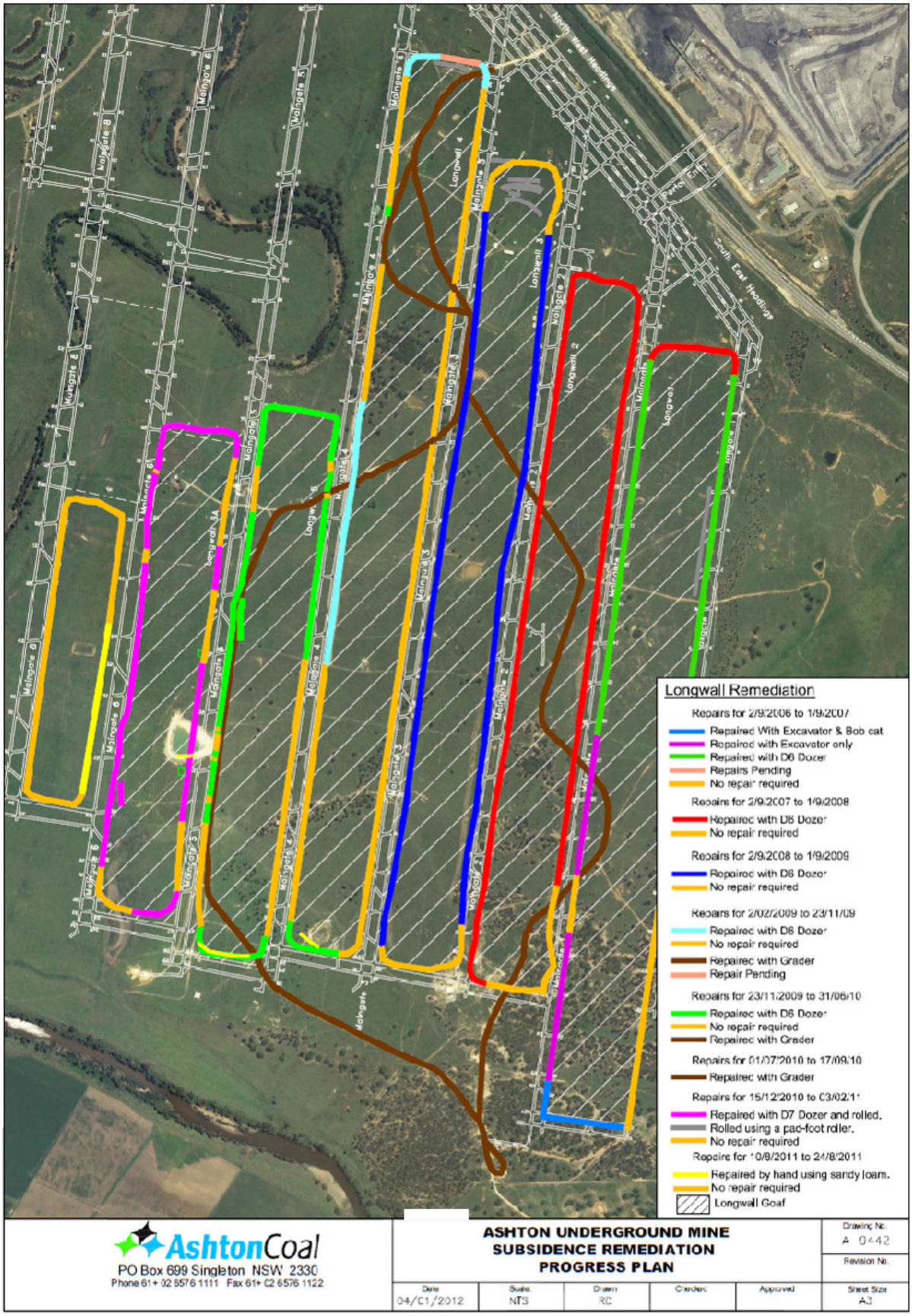

Figure 3: Subsidence remediation progress.

APPENDIX 1: PHOTO'S

Figure 4: 11kV power line located mid panel in LW7A looking north pre-undermining (05/04/2011). Rollers have been fitted to this line in preparation for undermining.

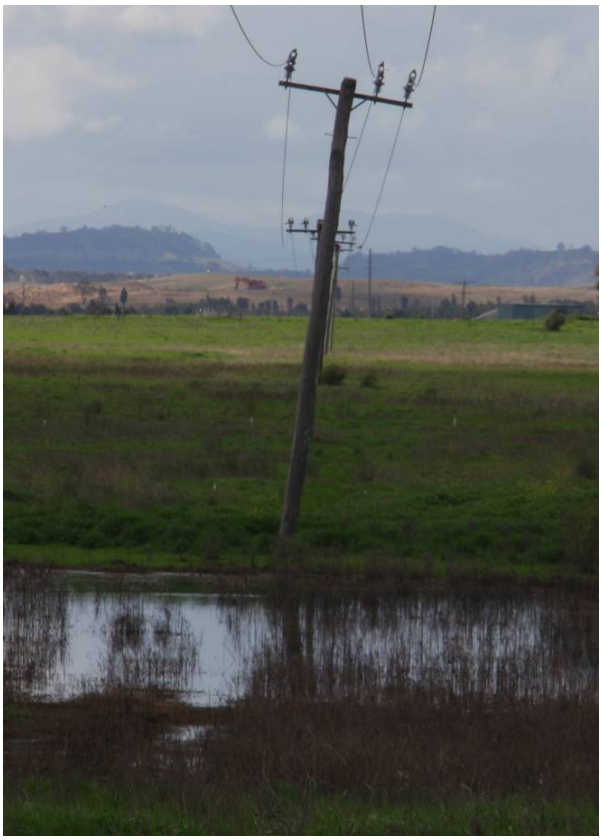

Figure 5: 11kV power line located mid panel in LW7A looking north post-undermining (02/09/2011).

Figure 6: Pole set 11 (foreground) and Pole set 12 (Background) post subsidence.

Figure 7: LW7A ponding in the background behind Gas Drainage Plant 4 (16/06/2011). The ponding in the foreground is dam 10 which includes the ponding caused by subsidence during Longwall 6A.

Figure 8: Roadworks completed on the dirt access road to install suitable drainage for the Longwall 3 ponding.

Figure 9: LW7A Gateroad cracking through the compacted pad area at Gas Drainage Plant 5 pre-remediation (16/06/2011).

Figure 10: LW7A Gas drainage plant 5 following remediation (10/08/2011).

Figure 11: Longwall 5 secondary remediation (10/08/2011). Loam was used to re-level the ground following settling of the ripped soil.

8 APPENDIX 2: SURVEY MONITORING RESULTS

Table 2: Ashton Coal Underground Survey Monitoring of 2 pole 132kV Power line.

AshtonCoal — Ashton Underground - 132kV LW7 SET11 & 12 Power Pole Monitoring

Point	Original East	1:00:00 PM 21/3/2011 North	R.L.
SET11BASE1	317563.079	6404421.798	60.706
SET11BASE2	317563.654	6404426.202	60.661
SET11TOP1	317563.356	6404421.672	75.466
SET11TOP2	317563.870	6404425.997	75.405
SET12BASE1	317411.771	6404431.729	61.879
SET12BASE2	317412.038	6404436.016	61.836
SET12TOP1	317411.779	6404431.395	76.684
SET12TOP2	317412.213	6404436.377	76.622

LW7 Ch of Poles 1310

Direction of Longwall Extraction 8.04 16 (hms)

Test-01 2:00:00 PM 31/3/2011 — 62m — LW7 Ch= 1248

Incremental δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.084	6404421.797	60.689	0.005	-0.001	-0.017	#	101.18 36	0.005
SET11BASE2	317563.659	6404426.201	60.645	0.005	-0.001	-0.016	#	101.18 36	0.005
SET11TOP1	317563.362	6404421.678	75.453	0.006	0.006	-0.013	#	44.59 60	0.008
SET11TOP2	317563.869	6404426.005	75.390	-0.001	0.008	-0.015	#	352.52 30	0.008
SET12BASE1	317411.783	6404431.713	61.874	0.012	-0.016	-0.005	#	143.07 48	0.020
SET12BASE2	317412.047	6404436.008	61.828	0.009	-0.008	-0.008	#	131.38 01	0.012
SET12TOP1	317411.794	6404431.404	76.672	0.015	0.009	-0.012	#	59.02 10	0.017
SET12TOP2	317412.224	6404436.383	76.610	0.011	0.006	-0.012	#	61.23 22	0.013

Total δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.084	6404421.797	60.689	0.005	-0.001	-0.017	#	101.18 36	0.005
SET11BASE2	317563.659	6404426.201	60.645	0.005	-0.001	-0.016	#	101.18 36	0.005
SET11TOP1	317563.362	6404421.678	75.453	0.006	0.006	-0.013	#	44.59 60	0.008
SET11TOP2	317563.869	6404426.005	75.390	-0.001	0.008	-0.015	#	352.52 30	0.008
SET12BASE1	317411.783	6404431.713	61.874	0.012	-0.016	-0.005	#	143.07 48	0.020
SET12BASE2	317412.047	6404436.008	61.828	0.009	-0.008	-0.008	#	131.38 01	0.012
SET12TOP1	317411.794	6404431.404	76.672	0.015	0.009	-0.012	#	59.02 10	0.017
SET12TOP2	317412.224	6404436.383	76.610	0.011	0.006	-0.012	#	61.23 22	0.013

Test-02 11:00:00 AM 7/4/2011 — 116m — LW7 Ch= 1194

Incremental δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.082	6404421.817	60.649	-0.002	0.020	-0.040	#	354.17 22	0.020
SET11BASE2	317563.656	6404426.223	60.599	-0.003	0.022	-0.046	#	352.14 05	0.022
SET11TOP1	317563.363	6404421.713	75.411	0.001	0.035	-0.042	#	1.38 12	0.035
SET11TOP2	317563.864	6404426.041	75.346	-0.005	0.036	-0.044	#	352.05 34	0.036
SET12BASE1	317411.784	6404431.726	61.858	0.001	0.013	-0.016	#	4.23 55	0.013
SET12BASE2	317412.049	6404436.013	61.814	0.002	0.005	-0.014	#	21.48 05	0.005
SET12TOP1	317411.795	6404431.402	76.660	0.001	-0.002	-0.012	#	153.26 06	0.002
SET12TOP2	317412.225	6404436.384	76.599	0.001	0.001	-0.011	#	45.00 00	0.001

Total δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.082	6404421.817	60.649	-0.002	0.020	-0.040	#	354.17 22	0.020
SET11BASE2	317563.656	6404426.223	60.599	-0.003	0.022	-0.046	#	352.14 05	0.022
SET11TOP1	317563.363	6404421.713	75.411	0.001	0.035	-0.042	#	1.38 12	0.035
SET11TOP2	317563.864	6404426.041	75.346	-0.005	0.036	-0.044	#	352.05 34	0.036
SET12BASE1	317411.784	6404431.726	61.858	0.001	0.013	-0.016	#	4.23 55	0.013
SET12BASE2	317412.049	6404436.013	61.814	0.002	0.005	-0.014	#	21.48 05	0.005
SET12TOP1	317411.795	6404431.402	76.660	0.001	-0.002	-0.012	#	153.26 06	0.002
SET12TOP2	317412.225	6404436.384	76.599	0.001	0.001	-0.011	#	45.00 00	0.001

Test-03 3:00:00 PM 13/4/2011 — 181m — LW7 Ch= 1129

Incremental δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.080	6404421.831	60.636	-0.002	0.014	-0.013	#	351.52 12	0.014
SET11BASE2	317563.656	6404426.238	60.585	0.000	0.015	-0.014	#	0.00 00	0.015
SET11TOP1									
SET11TOP2									
SET12BASE1	317411.785	6404431.727	61.858	0.001	0.001	0.000	#	44.59 60	0.001
SET12BASE2	317412.050	6404436.014	61.815	0.001	0.001	0.001	#	44.59 60	0.001
SET12TOP1	317411.813	6404431.387	76.657	0.018	-0.015	-0.003	#	129.48 20	0.023
SET12TOP2	317412.232	6404436.371	76.597	0.007	-0.013	-0.002	#	151.41 57	0.015

Total δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.080	6404421.831	60.636	-0.002	0.014	-0.013	#	351.52 12	0.014
SET11BASE2	317563.656	6404426.238	60.585	0.000	0.015	-0.014	#	0.00 00	0.015
SET11TOP1									
SET11TOP2									
SET12BASE1	317411.785	6404431.727	61.858	0.001	0.001	0.000	#	44.59 60	0.001
SET12BASE2	317412.050	6404436.014	61.815	0.001	0.001	0.001	#	44.59 60	0.001
SET12TOP1	317411.813	6404431.387	76.657	0.018	-0.015	-0.003	#	129.48 20	0.023
SET12TOP2	317412.232	6404436.371	76.597	0.007	-0.013	-0.002	#	151.41 57	0.015

Test-04 12:00:00 PM 15/4/2011 — 216m — LW7 Ch= 1094

Incremental δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.080	6404421.837	60.635	0.000	0.006	-0.001	#	0.00 00	0.006
SET11BASE2	317563.657	6404426.242	60.584	0.001	0.004	-0.001	#	14.02 10	0.004
SET11TOP1	317563.367	6404421.717	75.397						
SET11TOP2	317563.870	6404426.043	75.330						
SET12BASE1	317411.785	6404431.731	61.856	0.000	0.004	-0.002	#	0.00 00	0.004
SET12BASE2	317412.051	6404436.019	61.812	0.001	0.005	-0.003	#	11.18 36	0.005
SET12TOP1	317411.796	6404431.402	76.658	-0.017	0.015	0.001	#	311.25 25	0.023
SET12TOP2	317412.216	6404436.386	76.596	-0.016	0.015	-0.001	#	313.09 09	0.022

Total δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.080	6404421.837	60.635	0.000	0.006	-0.001	#	0.00 00	0.006
SET11BASE2	317563.657	6404426.242	60.584	0.001	0.004	-0.001	#	14.02 10	0.004
SET11TOP1	317563.367	6404421.717	75.397						
SET11TOP2	317563.870	6404426.043	75.330						
SET12BASE1	317411.785	6404431.731	61.856	0.000	0.004	-0.002	#	0.00 00	0.004
SET12BASE2	317412.051	6404436.019	61.812	0.001	0.005	-0.003	#	11.18 36	0.005
SET12TOP1	317411.796	6404431.402	76.658	-0.017	0.015	0.001	#	311.25 25	0.023
SET12TOP2	317412.216	6404436.386	76.596	-0.016	0.015	-0.001	#	313.09 09	0.022

Test-05 11:00:00 AM 5/5/2011 — 404m — LW7 Ch= 906

Incremental δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.088	6404421.854	60.630	0.008	0.017	-0.005	#	25.12 04	0.019
SET11BASE2	317563.664	6404426.263	60.578	0.007	0.021	-0.006	#	18.26 06	0.022
SET11TOP1	317563.354	6404421.763	75.392	-0.013	0.046	-0.005	#	344.13 09	0.048
SET11TOP2	317563.870	6404426.089	75.324	0.000	0.046	-0.006	#	0.00 00	0.046
SET12BASE1	317411.793	6404431.736	61.852	0.008	0.005	-0.004	#	57.59 41	0.009
SET12BASE2	317412.059	6404436.020	61.809	0.008	0.001	-0.003	#	82.52 30	0.008
SET12TOP1	317411.786	6404431.440	76.653	-0.010	0.038	-0.005	#	345.15 23	0.039
SET12TOP2	317412.225	6404436.422	76.593	0.009	0.036	-0.003	#	14.02 10	0.037

Total δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.088	6404421.854	60.630	0.008	0.017	-0.005	#	25.12 04	0.019
SET11BASE2	317563.664	6404426.263	60.578	0.007	0.021	-0.006	#	18.26 06	0.022
SET11TOP1	317563.354	6404421.763	75.392	-0.013	0.046	-0.005	#	344.13 09	0.048
SET11TOP2	317563.870	6404426.089	75.324	0.000	0.046	-0.006	#	0.00 00	0.046
SET12BASE1	317411.793	6404431.736	61.852	0.008	0.005	-0.004	#	57.59 41	0.009
SET12BASE2	317412.059	6404436.020	61.809	0.008	0.001	-0.003	#	82.52 30	0.008
SET12TOP1	317411.786	6404431.440	76.653	-0.010	0.038	-0.005	#	345.15 23	0.039
SET12TOP2	317412.225	6404436.422	76.593	0.009	0.036	-0.003	#	14.02 10	0.037

Test-06 11:00:00 AM 9/8/2011 — 1304m — LW7 Ch= 6

Incremental δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.093	6404421.866	60.629	0.005	0.012	-0.001	#	22.37 12	0.013
SET11BASE2	317563.666	6404426.270	60.575	0.002	0.007	-0.003	#	15.56 43	0.007
SET11TOP1	317563.372	6404421.774	75.393	0.018	0.011	0.001	#	58.34 14	0.021
SET11TOP2	317563.883	6404426.102	75.325	0.013	0.013	0.001	#	44.59 60	0.018
SET12BASE1	317411.796	6404431.747	61.855	0.003	0.011	0.003	#	15.15 18	0.011
SET12BASE2	317412.062	6404436.033	61.813	0.003	0.013	0.004	#	12.59 41	0.013
SET12TOP1	317411.823	6404431.435	76.657	0.037	-0.005	0.004	#	97.41 46	0.037
SET12TOP2	317412.244	6404436.414	76.599	0.019	-0.008	0.006	#	112.50 01	0.021

Total δ

	East	North	R.L.	δEast	δNorth	δR.L.	Hr	Bearing	Distance
SET11BASE1	317563.093	6404421.866	60.629	0.005	0.012	-0.001	#	22.37 12	0.013
SET11BASE2	317563.666	6404426.270	60.575	0.002	0.007	-0.003	#	15.56 43	0.007
SET11TOP1	317563.372	6404421.774	75.393	0.018	0.011	0.001	#	58.34 14	0.021
SET11TOP2	317563.883	6404426.102	75.325	0.013	0.013	0.001	#	44.59 60	0.018
SET12BASE1	317411.796	6404431.747	61.855	0.003	0.011	0.003	#	15.15 18	0.011
SET12BASE2	317412.062	6404436.033	61.813	0.003	0.013	0.004	#	12.59 41	0.013
SET12TOP1	317411.823	6404431.435	76.657	0.037	-0.005	0.004	#	97.41 46	0.037
SET12TOP2	317412.244	6404436.414	76.599	0.019	-0.008	0.006	#	112.50 01	0.021