

TASMANIAN ADVANCED MINERALS PTY LTD
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EL15/2009 Hawkes Creek
ML 27M/2009 Hawkes Creek
Combined report November, 2011-March, 2012

Volume 1 of 1

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1 Summary

- A resource of pale coloured silica flour and pale coloured lump silica along the Northwest Track in EL15/2009 was investigated by means of 42 test pits.
- In ML 27M/2009 similar material was investigated at Third Hill Southeast and Fourth Hill Southeast by means of 24 and 12 test pits respectively.
- Speculative resource assessments were made for two parts of the Northwest Track. On the Third and Fourth Hills Northwest there is a mass of 64,400 tonnes of pale coloured silica flour and lump while on Second Hill Northwest there is a mass of 34,125 tonnes.
- A speculative figure of 63,640 tonnes was returned for Third Hill Southeast.
- No resource figure was determined for the part of Fourth Hill Southeast that was investigated. However, it is strongly recommended that ML 27M/2009 be extended to take in the entire hill so that the whole of the resource can be explored.
- The resource figures given here are not JORC compliant. The proportion of waste is unknown and bulk sampling will be essential to better estimate the yield of commercial silica flour.

2 Introduction

Tasmanian Advanced Minerals Pty Ltd is actively mining high purity, residual, quartz sand and quartz silt, known locally as silica flour, from two areas near the Arthur River in northwest Tasmania. The Blackwater area is on the south side of the river two to four kilometres west of Kanunnah Bridge and the Hawkes Creek area is a further five kilometres to the west, but on the north side of the river (Figure 1).

During November-December, 2011, and February-March, 2012, exploration work was carried out in the Hawkes Creek area with the aim of delineating further resources along strike to the northwest and southeast of the current mining operation (Figure 2). This report summarises the new work at Hawkes Creek.

The resource delineated by the new work consists predominantly of pale coloured silica flour and pale coloured, hard, lump silica. The tonnage estimates given in this report for the resource are not JORC compliant measures. Instead, they are speculative values that include an unspecified amount of waste consisting mainly of the hard lump silica, but also including patches of clay, limonite and black organics as well as material that may be pale coloured, but is chemically inferior due, in some instances, to the presence of intermixed sedimentary sand and fine gravel.

Further work involving the screening of bulk samples combined with chemical and grain size analyses of the screened product will be necessary to estimate the commercial yield from the delineated resource.

3 Work in EL15/2009

3.1 Northwest Track

Work along the Northwest Track extended a previous (2010) test pitting program and generated enough data for some speculative resource estimates. Some 42 new test pits (Figure 3) were dug in November-December, 2011, with a 12 tonne Caterpillar excavator, a substantially larger and more capable machine than the 7.5 tonne Takeuchi that was previously used. Pits were dug along the crest of the ridge and on short side lines.

At each test pit site the upper layers consisting of humus and soil were cleared and stockpiled separately from the underlying materials. Sample depths and other depths were measured relative to the cleared surface. Sampling of pit faces was found to be generally difficult due to the abundance of lump and the hardness/toughness of the silica flour. Consequently, almost all of the samples from the Northwest Track were taken from the bucket of the excavator since the action of digging caused much disaggregation of the *in situ* material. This introduced the risk of metal contamination in the samples.

4 Work in ML 27M/2009

4.1 Third Hill Southeast

At Third Hill Southeast a total of 24 test pits were dug on side tracks laid out from the pre-existing Forestry track (Figure 4), which was considerably overgrown and required reopening. Test pits were dug in the same fashion as those at the Northwest Track, but a particular effort was made to collect as many samples as possible from the pits rather than the excavator bucket. Pit samples were collected using wooden or plastic tools.

4.2 Fourth Hill Southeast

Twelve test pits were dug and sampled along the crest of Fourth Hill Southeast (Figure 5) in the same fashion as at Third Hill Southeast. The hill could only be tested up to the boundary of ML 27M/2009 though the ridge crest extends for another 150 m beyond the boundary. The eastern flank of the ridge also extends outside ML 27M/2009.

5 Results and conclusions

5.1 Northwest Track

Four hills make up the ridge that is followed by the Northwest Track. They are designated First Hill Northwest at the southern end of the track through to Fourth Hill Northwest at the northern end of the track (Figure 2). Pale coloured silica flour is present on all of the four hills, but on the Third and Fourth Hills Northwest the occurrence is up to 50 m wide (Figure 3) whereas on Second Hill Northwest the occurrence may be only 15 m wide. The occurrence on the First Hill Northwest is small though it is of easy access.

Descriptive logs of the Northwest Track test pits are given in Appendix 1 and the results of sample analyses are given in Appendix 2. Figure 3 shows the thickness of pale coloured silica flour and lump silica that was encountered in the various test pits. In most pits the silica flour was pale brown or very pale brown in colour and along most of the Northwest Track it contains abundant lump silica. This lump silica is generally very fine grained, grey or white, sometimes crudely banded, cherty quartz though there is common colloform banding of cherty and crystalline quartz, often around crystal lined vughs ('lacy agate' texture).

On Third and Fourth Hills Northwest a 3m thickness line or isopach has been interpolated from the test pit data. The combined area enclosed by the 3m isopach at Third and Fourth Hills NW is substantial and 16 test pits with an average thickness of silica flour of 4.9 m fall inside the isopach. Of these test pits only five reached the bottom of the pale coloured silica flour. Assuming an overall average thickness of 4m of silica flour within the 3m isopach allows the following speculative resource estimate to be made:

Combined area within the 3m isopach	8,050 m ²
Assumed average thickness	4 m
Volume of resource	32,200 m ³
Density of silica flour	2 tonnes/m ³
Mass of resource in Third & Fourth Hills NW	64,400 tonnes

This estimate is speculative albeit possibly conservative. It has been assumed that 3 m would be about the lateral thickness limit for mining so additional test pits to better define the 3 m isopach would be useful. Also, the maximum thickness of the deposit remains unknown. It must be emphasised that the proportion of waste within the resource is also unknown and further work involving screening of bulk samples is necessary in order to assess the yield of commercial silica flour.

The silica flour deposit on Second Hill NW is thin and narrow and thus, may not be mineable. Assuming a width of 15 m and an average depth of 3.5 m a very speculative resource estimate for the deposit between ATP11.05 and ATP11.11 (325 m) on the Second Hill Northwest is as follows:

Area of interest	4875 m ²
Assumed average thickness	3.5 m

Volume of resource	17,062.5 m ³
Density of silica flour	2 tonnes/m ³
Mass of resource in Second Hill Northwest	34,125 tonnes

A better measure of the dimensions of the deposit on the Second Hill NW would be provided by costeans dug transversely across the ridge at the same spacing as the existing test pits.

The chemistry of the Northwest Track samples is varied, but there appears to be a band of silica flour with very low iron and relatively low chrome on all three of the Second, Third and Fourth Hills Northwest. Included are the following test pits (from the NW) 11.17, 14, 31, 32, 02, 03, 04, 05, 06, 07 and 08.

5.2 Third Hill Southeast

Test pit logs and sample analyses for the Third Hill Southeast are given in Appendix 1 and Appendix 2 respectively. Figure 4 shows the thickness of pale coloured silica flour and lump silica in the various test pits.

The new work has delineated an area of resource that is elongated NW-SE parallel to the general strike of the underlying bedrock. On the eastern side of this area there is a rounded sedimentary component in what otherwise appears to be silica flour consisting of the usual very angular grains. On the western side there is also a rounded sedimentary component as well as angular, brecciated fragments of a fine grained, siliceous rock that may be after fine grained carbonate.

The sedimentary component in each case comprises extra-well rounded and polished granules and small pebbles of milky quartz together with more angular dark minerals. The very high degree of rounding along with the polishing suggests aeolian (wind) transport, which further suggests that the grains were derived from the Precambrian bedrock rather than from Tertiary deposits.

There are nine test pits inside the delineated area, four of which reached the bottom of the silica resource. One of the other pits was still in pale coloured silica flour and lump silica at a depth of 6.5 m. Assuming an average thickness of 3.7 m for the silica flour and lump silica on Third Hill Southeast allows the following speculative resource estimate to be made:

Area of interest	8,600 m ²
Assumed average thickness	3.7 m
Volume of resource	31,820 m ³
Density of silica flour	2 tonnes/m ³
Mass of resource in Third Hill Southeast	63,640 tonnes

The chemistry of the material within the delineated area is very varied. Particularly low values of iron and relatively low values of chrome were recorded in the southern part of the area in test pits 11.44, 45, 46 and 12.01.

5.3 Fourth Hill Southeast

Exploration at Fourth Hill Southeast (Figure 5, Appendix 1, Appendix 2) identified an area of some 5000 m² underlain by pale coloured silica flour and lump silica along part of the crest of the elongate hill or ridge. However, a component of extra-well rounded and polished, vein quartz pebbles was recognised in two pits (11.20, 24) while another two pits (11.21, 22) were abandoned at shallow depth because of very slow digging caused by hard lump silica. The results from these four pits created too much uncertainty for even a speculative resource estimate to be made.

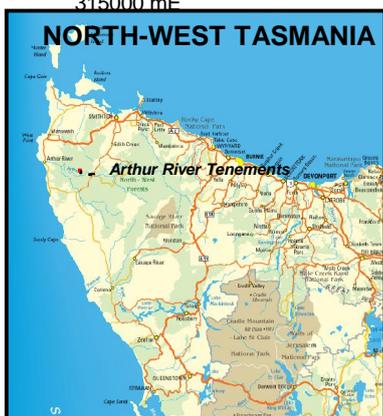
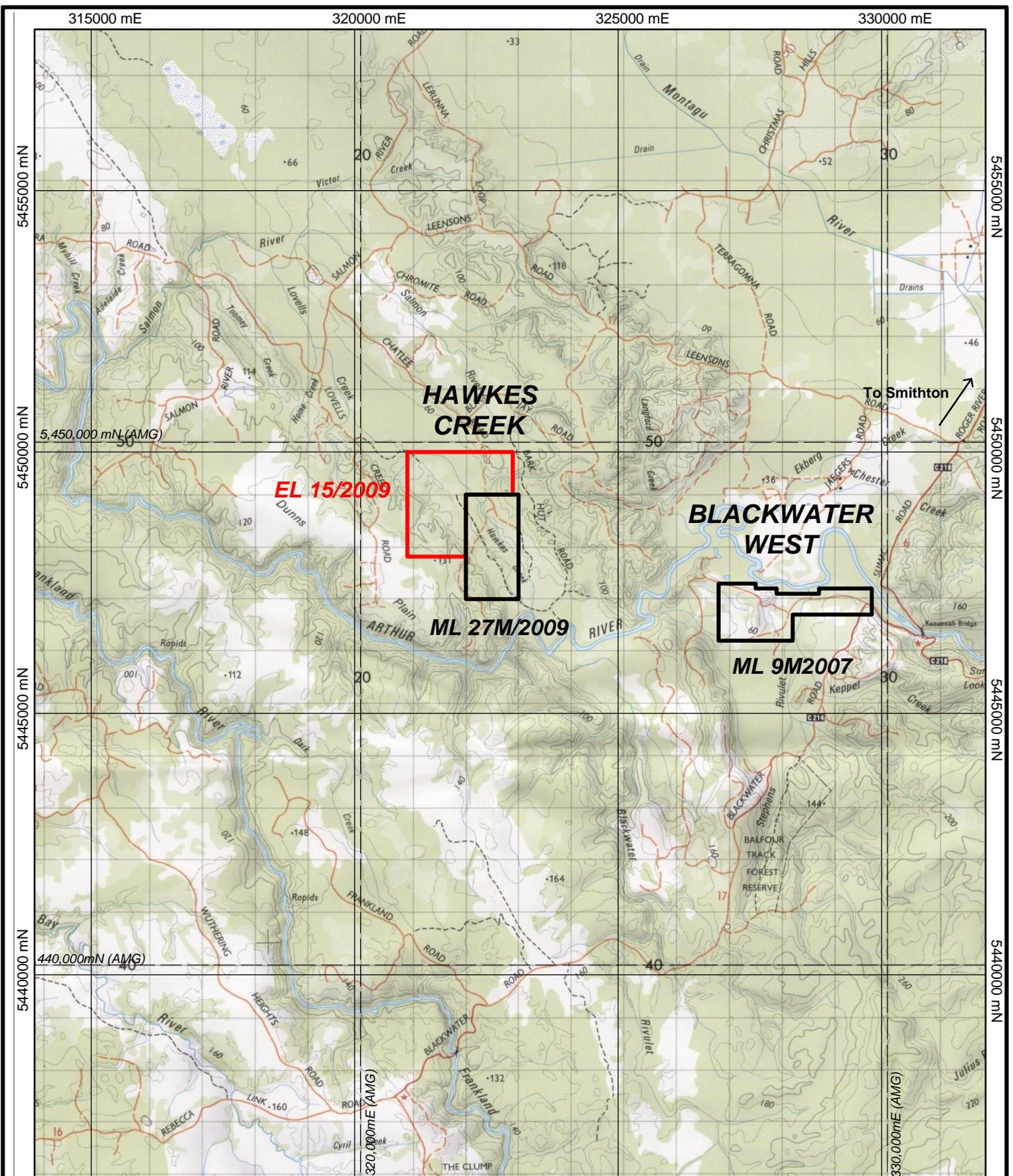
Results from the other pits demonstrate the potential for a substantial mass of resource to be present at Fourth Hill Southeast in view of the likely extensions of the known material onto the flanks of the ridge as well as along the crest of the ridge to the southeast. Exploration to the southeast is encouraged by the very low iron and relatively low chrome values returned from test pits 11.13, 14 and 19, which are at the current edge of the mining lease. An enlargement of ML 27M/2009 would be required to enable the further exploration.

6 Environmental matters

All tracks remain open pending further work. The test pits have been made safe for workers and for wildlife, but they have not been fully rehabilitated.

7 References

Turner, N. J. 2010. EL15/2009 Hawkes Creek; EL35/2003 Stephens Rivulet and Hawkes Creek; ML 9M2007 Blackwater. Combined interim report on work in February-March, 2010.



TASMANIAN ADVANCED MINERALS P/L
ARTHUR RIVER TENEMENTS AT 18.03.12

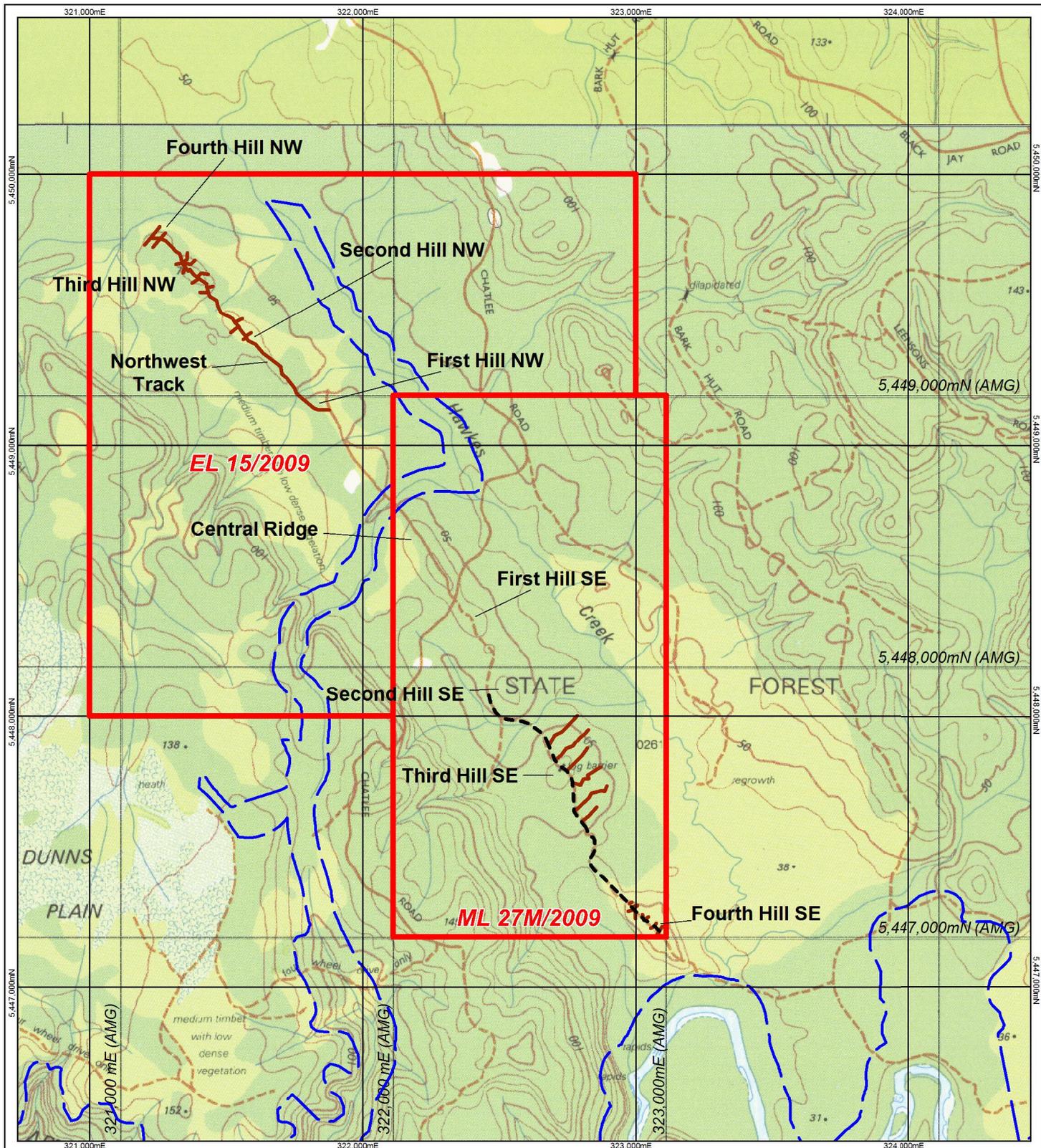
ML 27M/2009 and EL 15/2009 - HAWKES CREEK
ML 9M2007 - BLACKWATER

LOCATION PLAN

Compiled : Nic Turner	Drawn : Gillian Bennett	Date : 24/03/2012	File : AR-Tenements 100k.wor
Scale: 1:100,000		Projection: MGA Zone 33 (GDA94)	
0		1.25 2.5 5 km	
			Figure No 1

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Base image by TASMAP, © State of Tasmania



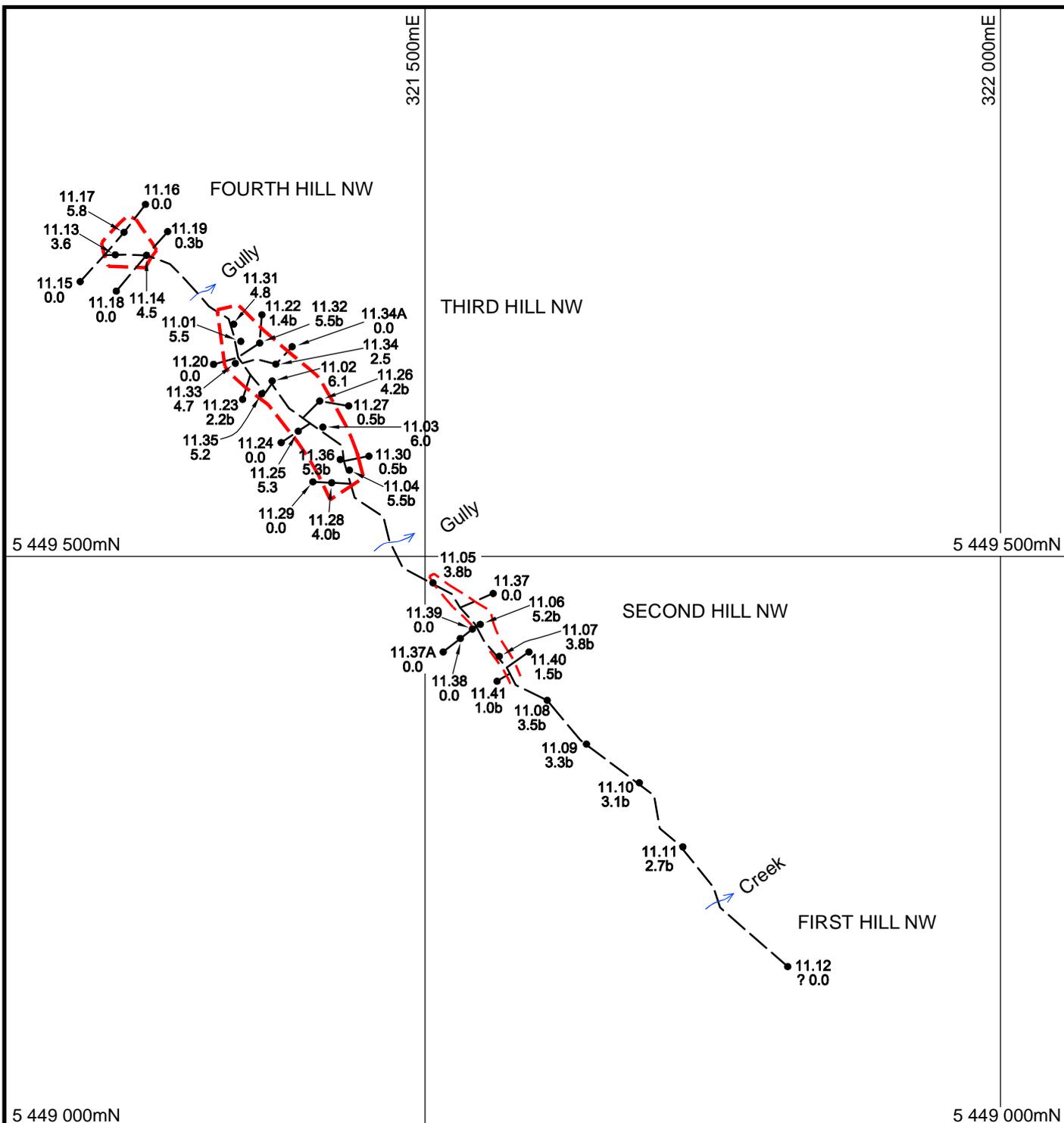
-  Tasmanian Reserve Estate: Informal reserve on other public land.
-  Tracks for test pit access
-  New
-  Reopened

Mining proceeding on Central Ridge, First Hill SE and Second Hill SE



Base image by TASMALP. © State of Tasmania

TASMANIAN ADVANCED MINERALS P/L			
ML 27M/2009 and EL 15/2009 HAWKES CREEK TENEMENTS WORK CARRIED OUT NOV-DEC, 2011 and FEB-MAR, 2012			
Compiled : Nic Turner.	Drawn : G. Bennett	Date : 02/04/2012	File : HC-Feb-Mar 2012-20k.wor
Scale: 1:20000		Projection MGA Zone 55 (GDA 94)	
		Figure No	2
N. J. Turner Geological Services Pty Ltd			



LEGEND

- Rough Track
- 11.33 4.7 Test pit with the number (11.33) and thickness (4.7m) of pale silica flour and lump silica.
- - - Interpolated 3m thickness line or isopach.
- b Indicates that the bottom of the pale silica was reached.

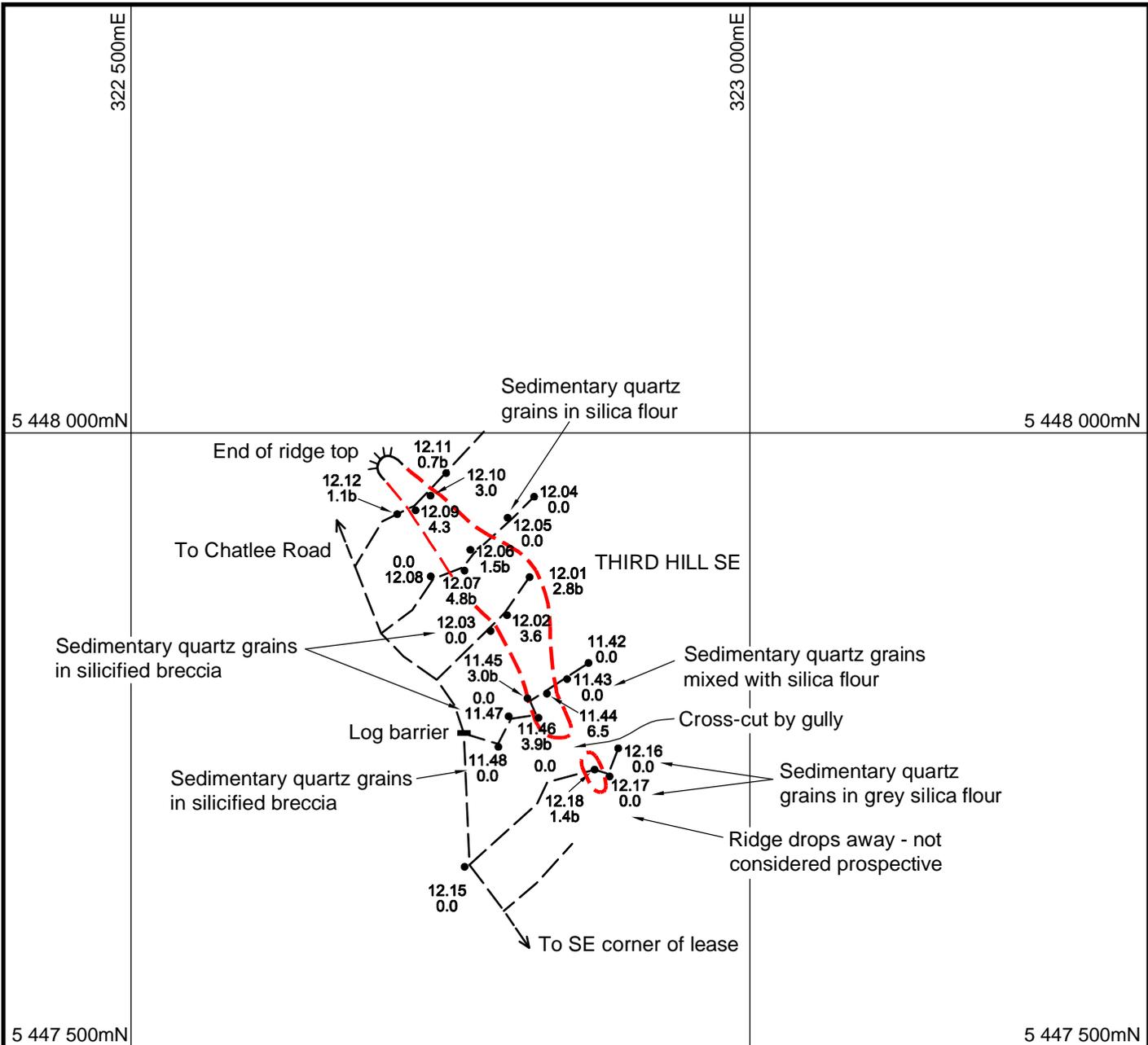


TASMANIAN ADVANCED MINERALS P/L
EL 15/2009 - HAWKES CREEK

**TEST PITS ALONG THE
NORTHWEST TRACK**

Compiled : Nic Turner	Drawn : Gillian Bennett	Date : 23/03/12	Scale : 1:5000
Survey : Hand held GPS, Tape and Compass		File : HC-TP-NWTrack.dwg	Figure No 3

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LEGEND

- Rough Track
- 12.09 4.3 Test pit with the number (12.09) and thickness (4.3m) of pale silica flour and lump silica.
- - - - - Approximate boundary of silica flour
- b Indicates that the bottom of the pale silica was reached.



TASMANIAN ADVANCED MINERALS P/L			
ML 27M/2009 - HAWKES CREEK			
TEST PITS AT THE			
THIRD HILL SOUTH EAST			
Compiled : Nic Turner	Drawn : Gillian Bennett	Date : 23/03/12	Scale : 1:5000
Survey : Hand held GPS, Tape and Compass		File : HC-TP-THSE.dwg	Figure No 4
N. J. Turner Geological Services Pty Ltd			

ML 27M/2009

5 447 500mN

5 447 500mN

323 000mE

Hawkes Creek

To Chatlee Road

Sedimentary quartz grains at surface

FOURTH HILL SE

Large blocks of lump. Very hard digging

Rare sedimentary quartz grains

End of ridge top

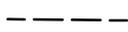
5 447 000mN

5 447 000mN

RIVER

ARTHUR

LEGEND

-  Rough Track
-  12.26 5.2 Test pit with the number (12.26) and thickness (5.2m) of pale silica flour and lump silica.
-  Boundary of minimum area of silica flour.
-  Indicates that the bottom of the pale silica was reached.
-  Tasmanian Reserve Estate: Informal reserve on other public land.



**TASMANIAN ADVANCED MINERALS P/L
ML 27M/2009 - HAWKES CREEK**

**TEST PITS AT THE
FOURTH HILL SOUTH EAST**

Compiled : Nic Turner	Drawn : Gillian Bennett	Date : 23/03/12	Scale : 1:5000
Survey : Hand held GPS, Tape and Compass		File : HC-TP-FHSE.dwg	Figure No 5

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TASMANIAN ADVANCED MINERALS PTY LTD

EL15/2009 & ML27M/2009, Hawkes Creek
Exploration 21.11.11 to 5.3.12

Appendix 1: Logs of test pits on the Northwest Track in EL15/2009 and at Third Hill Southeast and Fourth Hill Southeast in ML27M/2009.

Excavators: Caterpillar 12 tonne (2011) and 11 tonne (2012). Maximum reach of the machines was 5.8 m and about 5 m respectively.

Each test pit site was first cleared of humus and soil and the thickness of this layer is given in the following table. Depths given for the underlying materials were measured from the cleared surface.

Samples were sourced either from the bucket of the excavator or were collected directly from the pit using a wooden or plastic tool. Sample source is listed along with analytical data in Appendix 2.

Following sampling and logging the test pits were made safe but were not rehabilitated.

The test pits were surveyed by tape and compass with hand held GPS measurements as control at selected points.

Northwest Track test pits

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
ATP11.01	321342	5449688	A 1.7 m B 3.0 m C 4.5 m D 5.5 m	Humus & soil 0.5 m. Silica breaks out as a mixture of flour and abundant lump up to 0.35 m across of cream and pale grey, very fine grained quartz showing planer banding also concentric interbanding with relatively coarse, crystalline quartz, commonly around crystal lined vughs ('lacy agate' texture). Flour is very pale brown becoming white around 5.5 m.
ATP11.02	321368	5449652	A 1.8 m B 3.7 m C 5.0 m D 6.1 m	Humus & soil 0.5 m. Silica similar ATP11.01.
ATP11.03	321413	5449612	A 1.8 m B 3.4 m C 5.0 m D 6.0 m	Humus & soil 0.5 m. Silica similar ATP11.01, but even lumpier. Lower part of pit in coherent, jointed lump silica with crude planar character. Pale brown at 1.8 m passing to very pale brown.
ATP11.04	321436	5449575	A 1.8 m B 3.5 m C 5.0 m D 5.5 m	Humus & soil 0.4 m. Easier digging, but still very lumpy. A, B, D very pale brown; C cream. Patch of orange-brown clay at 5.5 m probably indicates bottom of resource.
ATP11.05	321508	5449477	A 1.8 m B 3.1 m	Humus & soil 0.5 m. Silica breaks out as mainly small, relatively soft fragments of grey and white, vuggy lump. Flour is very pale brown to 3.8 m. Continued in very dark brown, iron and organic rich material to 5.3 m.
ATP11.06	321548	5449441	A 1.8 m B 3.3 m C 4.5 m	Humus & soil 0.5 m. Digging OK to 3.3 m then harder in part of pit. Lumpy silica, but with substantial very pale brown

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				flour. Flour changes to pale brown at 5.2 m. Black organics 5.6-5.8 m.
ATP11.07	321565	5449412	A 1.8 m B 3.2 m	Humus & soil 0.4 m. Easy digging in very pale brown, gritty flour with minor lump, but encountered some large blocks of hard lump localised to part of pit. Into dark brown material 3.8-5 m
ATP11.08	321607	5449375	A 1.7 m B 3.2 m	Humus & soil 0.3 m. Cream, gritty flour with minor, small lump to 1.7 m then harder digging in tough though easily crushed lump to 3.4 m. Black bottom 3.5-3.9 m.
ATP11.09	321642	5449335	A 1.4 m B 3.0 m	Humus & soil 0.6 m. Hard digging in tough silica that breaks out as very pale brown flour with minor lump of white and grey, very fine grained quartz that ranges from hard to easily crushed in the hand. Black bottom at 3.3 m.
ATP11.10	321688	5449300	A 1.5 m B 3.0 m	Humus & soil 0.5 m. Hard digging, but breaks out as very pale brown, gritty flour with minor lump. Black bottom at 3.1 m.
ATP11.11	321726	5449245	A 2.1 m	Humus & soil 0.6 m. Scattered blocks of hard lump at surface, but the excavated material broke out as pale brown flour with minor, mostly crushable lump. Black bottom 2.7-3.0 m.
ATP11.12	321815	5449140	No sample	Humus & soil was cleaned off, but orange-brown patches in the exposed silica discouraged further excavation.
ATP11.13	321230	5449763	A 1.8 m B 3.1 m C 3.6 m	Humus & soil 0.3 m. Very rocky. Silica breaks out as big, hard blocks with abundant small fragments ('gravel') and

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				very pale brown, gritty flour. Too hard to continue below 3.6 m.
ATP11.14	321257	5449762	A 1.7 m B 3.5 m C 4.5 m	Humus & soil 0.8 m. Easy digging. Silica breaks out as very pale brown flour and 'gravel' with minor blocky lump. Jointing evident in <i>in situ</i> silica at bottom of hole.
ATP11.15	321200	5449740	A 1.2 m	Different geological unit beneath the humus & soil. Breccia texture with small, angular, very fine grained, soft fragments in matrix of clayey flour. Minor very well rounded quartz granules present. Initially grey, but rapidly becomes orange-brown.
ATP11.16	321257	5449808	No sample	Similar ATP11.15 with rounded quartz granules. Rapidly becomes orange-brown.
ATP11.17	321236	5449783	A 1.4 m B 3.3 m C 4.7 m D 5.8 m	Humus & soil 0.6 m. Very good pit with gritty, cream flour and minor lump throughout. Still good at bottom.
ATP11.18	321232	5449733	A 1.2 m B 2.2 m	Humus & soil 0.5 m. Hard digging that produced very pale grey flour though the <i>in situ</i> material resembles ATP11.15. Black bottom at 2.2 m.
ATP11.19	321277	5449733	No sample	Humus & soil 0.6 m. Into brown clay at 0.3 m. Rounded milky quartz and black quartz pebbles and granules present.
ATP11.20	321316	5449667	A 0.4 m	Humus & soil 0.8 m. Pale brown, clayey flour with breccia texture and orange-brown patches. Clay and black organics at 1.6 m.
ATP11.21	321310	5449669	A 1.2 m	Humus & soil 0.6 m. Extremely hard digging, but silica breaks out as gritty, very pale brown flour with very little lump. Black

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				organics 1.3-1.8 m.
ATP11.22	321359	5449710	A 1 m	Humus & soil 0.6 m. Hard digging in silica that breaks out as gritty, very pale brown flour with minor lump. Black organics 1.4-1.8 m.
ATP11.23	321341	5449638	A 1.4 m B 2.8 m	Humus & soil 0.6 m. Silica breaks out as gritty, very pale brown flour with minor lump. Patch of orange-brown clay in one side of pit 2.2-3.0 m. Grey flour and grey, silicified, oolitic carbonate in part of pit with steep contact against other flour. Orange-brown clay in floor of pit at 4.4 m.
ATP11.24	321376	5449600	No sample	Orange-brown clay and lump silica just below humus.
ATP11.25	321392	5449610	A 1.5 m B 3.5 m C 4.3 m D 5.2 m	Humus & soil 0.6 m. Pale brown then very pale brown flour with abundant lump of white and grey, very fine grained, vuggy quartz. Patch of orange-brown clay at 3.1 in one wall of pit. Very blocky 4.5-5.3 m with very pale brown, gritty flour.
ATP11.26	321411	5449635	A 1.1 m B 2.3 m C 3.3 m	Humus & soil 0.8 m. Hard silica that breaks out as very pale brown flour with abundant gravel and small blocks. Touched black bottom at 4.2 m.
ATP11.27	321438	5449631	No sample	Humus & soil 0.5 m. 0.5 m of flour over black bottom. Flour is clayey with a few well rounded pebbles.
ATP11.28	321420	5449563	A 1.3 m B 2.5 m C 3.5 m	Humus & soil 0.7 m. Hard silica that breaks out as gravel with very pale brown flour and minor blocks of easily crushed, vuggy lump. Black bottom at 4 m.
ATP11.29	321404	5449565	No sample	Humus & soil 0.7 m. Grey flour with small quartz crystals.

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
ATP11.30	321453	5449587	No sample	Humus & soil 0.8 m. 0.5 m of flour over black bottom.
ATP11.31	321335	5449704	A 1.2 m B 2.4 m C 3.8 m	Humus & soil 0.8 m. Easy digging in very pale brown, gritty flour with a little lump. Black bottom 4.8-4.9 m.
ATP 11.32	321356	5449686	A 1.4 m B 3.2 m C 4.7 m	Humus & soil 0.5 m. Easy digging in very pale brown flour with abundant lump. Black bottom at 5.5 m.
ATP11.33	321337	5449669	A 1.2 m B 2.8 m C 4.0 m	Humus & soil 0.6 m. Very hard digging in silica that breaks out as very pale brown, gritty flour with gravel and minor blocks. Same to 4.7 m with 1*1 m patch of brown flour in south wall of pit.
ATP11.34	321372	5449669	A 1.4 m	Humus & soil 0.5 m. Silica breaks out as gritty, very pale brown flour with minor lump. Patches of orange-brown clay at 2.5 m become dominant by 3.8 m.
ATP11.35	321360	5449643	A 1.4 m B 3.0 m C 4.5 m D 5.2 m	Humus & soil 0.8 m. Easy digging. Very pale brown flour that becomes very gritty and lumpy below 3.5 m. Lump consists of bleached , grey and white, very fine grained, vuggy quartz.
ATP11.36	321428	5449585	A 2.1 m B 3.5 m C 5.0 m	Humus & soil 0.6 m. Hard silica that breaks out as gritty, very pale brown flour with minor lump. Grittier below 3.5 m. Into black bottom at 5.3 m.
ATP11.37	321560	5449468	No sample	Clayey flour with seams of black organics below humus & soil. Scattered very well rounded quartz grains also black, relatively angular grains.
ATP11.38	321532	5449428	No sample	Similar ATP11.37. Black bottom at 1 m.
ATP11.39	321542	5449436	No sample	Similar ATP11.37. Black clayey

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				bottom at 1 m.
ATP11.40	321591	5449417	No sample	Humus & soil 0.8 m. Pale flour with easily crushed lump. Black bottom 1.5-2.1 m.
ATP11.41	321563	5449390	No sample	Humus & soil 0.8 m. Pale flour with easily crushed lump to 1 m. Black bottom 1-1.4 m.
Third Hill Southeast test pits				
ATP11.42	322869	5447812	No sample	Humus & soil 0.5 m. Pale to medium brown clay to 1.2 m with 0.15 m band of silica flour dipping steeply through the clay.
ATP11.43	322852	5447800	A 1.5 m	Humus & soil 1 m. Very pale brown. Consists of very angular quartz grains (silica flour), very rounded and polished quartz grains (?aeolian), and minor dark mineral grains. Negligible lump. Black bottom at 2.5 m.
ATP11.44	322835	5447787	A 1.4 m B 3.0 m C 4.5 m D 6.0 m	Humus & soil 0.8 m. Easy digging in very pale brown flour with massive, friable lump and minor lump of white and grey, very fine grained quartz. Bottom of hole at 6.5 m in same material.
ATP11.45	322820	5447783	A 2.0 m B 3.0 m	Humus & soil 0.8 m. Easy digging in very pale brown flour with a little lump. Encountered grey-brown clay from 3 m.
ATP11.46	322830	5447768	A 1.2 m B 2.5 m	Humus & soil 0.7 m. Thin veneer with rounded pebbles below humus. Easy digging in mottled very pale brown and white flour with very little lump. Black bottom at 3.9 m.
ATP11.47	322805	5447769	A 1.4 m	Humus & soil 0.8 m. Breccia texture of small (10-20 mm), angular, fine grained fragments in matrix of flour. Well rounded

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				quartz grains present. Orange-brown clay bottom at 1.8 m.
ATP11.48	322798	5447745		Humus & soil 0.8 m. Tough digging in pale grey breccia similar to ATP11.47.
ATP12.01	322822	5447882	A 1.4 m	Humus and soil 1.1 m. Very lumpy and gritty, medium grey, silica flour. Much of the lump is easily crushed. Some lump contains small vughs lined with quartz crystals. Bottom at 2.8 in cream clay. Strong water flow at bottom.
ATP12.02	322803	5447852	A 0.8 m B 3.0 m	Humus and soil 0.9 m. Pale brown, gritty, silica flour. Common lumps of grey, cherty silica. Boulder size from 2 m. Stopped hole in same material at 3.6 m.
ATP12.03	322790	5447839	No sample	Humus and soil 0.8 m. Material below humus is coarse grained with very angular fragments, but also very well rounded grains. Small poorly formed quartz crystals in finer matrix.
ATP12.04	322826	5447947	No sample	Humus and soil 0.6 m. Clay rich silica flour and sand overlying orange-brown clay to bottom of hole at 1.5 m.
ATP12.05	322804	5447928	A 0.8 m	Humus and soil 0.6 m. Pale grey, gritty silica flour with minor very rounded and polished quartz grains. Black organics, brown iron-rich material and grey clay below 0.9 m.
ATP12.06	322774	5447904	A 1.5 m	Humus and soil approx. 1.0 m. Pale material underlain by black organics and brown clay at 1.7 m. Bottom of hole at 2.3 m.
ATP12.07	322769	5447889	A 1.5 m B 3.3 m	Easy digging in very pale brown, gritty, silica flour. Lump

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
			C 4.7 m	increases with depth and consists of vuggy, cream to pale brown, very fine grained, hard silica. Black bottom at 4.8 m.
ATP12.08	322742	5447882		Shallow scrape below humus and soil in grey, brown and pink, clay rich material.
ATP12.09	322728	5447936	A 2.0 m B 3.7 m	Humus and soil 0.7 m. Pale brown, gritty silica flour with abundant lump of white and cream silica. Small porous patches in lump coated with pale brown clay. Bottom of hole at 4.3 m, still in similar material.
ATP12.10	322740	5447950	A 1.7 m B 3.0 m	Humus and soil 0.8 m. Very hard digging in material that breaks out as very pale brown silica flour with both crushable and very hard lump. Hole abandoned at 3 m due to slow digging.
ATP12.11	322753	5447967	No sample	Humus and soil 0.8 m. Pale grey, lumpy silica flour to black bottom at 0.7 m. Bottom of hole 1.5 m.
ATP12.12	322714	5447933	No sample	Humus and soil 0.9 m. Pale grey, lumpy silica flour to black bottom at 1.1 m. Bottom of hole 1.4 m.
Fourth Hill Southeast Test Pits				
ATP12.13	323077	5447192	A 1.6 m B 3.0 m	Humus and soil 0.4 m. Very pale brown, gritty, silica flour with boulder lump that causes hard digging. Lump consists of white cherty silica with crude pale grey banding. Bottom at 4 m in similar material.
ATP12.14	323097	5447222	A 1.5 m B 3.0 m C 4.5 m	Humus and soil 0.4 m. Very pale brown, gritty silica flour with common small, cherty

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				lump. Lump may display crude white and pale grey banding. Lacy agate texture also present. Bottom at 4.5 m with no change.
Third Hill Southeast Test Pits				
ATP12.15	322870	5447647	No sample	Humus and soil about 1 m. Very siliceous sand. Mainly coarse grained with common very well rounded and polished quartz granules and pebbles. Black bottom at 1.0 m.
ATP12.16	322893	5447742	No sample	Humus and soil 0.7 m. Pale grey, soft sand with silica flour matrix. Big patch of black organics and orange-brown clay. Bottom 1.1 m.
ATP12.17	322887	5447720	No sample	Humus and soil approx. 1 m. Similar ATP12.16. Rounded quartz pebbles present also cherty lump silica. Bottom of black organics and brown clay at approx. 1 m.
ATP12.18	322875	5447725	No sample	Humus and soil 0.8 m. Very hard digging in material that breaks out as pale brown silica flour and subordinate lump silica. Lump may contain crystal lined vughs. A few very well rounded quartz granules present. Bottom of black organics and dark grey clay at 1.4 m.
Fourth Hill Southeast Test Pits				
ATP12.19	323055	5447215	A 1.6 m B 3.3 m C 4.2 m	Humus and soil 0.8 m. Very pale brown, sandy, gritty silica flour with common lump. Lump mainly cherty and may display crude, cream and pale grey

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
				banding or lacy agate texture. Mostly grit and lump below 3.3 m. Stopped hole at 4.2 m.
ATP12.20	323075	5447234	A 1.5 m B 3.2 m C 4.1 m	Humus and soil 0.4 m. Easy digging in very pale brown, sandy, gritty silica flour with very little lump. Rare very well rounded quartz pebbles present. Stopped hole at 4.1 m.
ATP12.21	323030	5447245	A 1.5 m	Humus and soil 0.3 m. Hard digging in mainly hard lump silica. Breaks out with a substantial proportion of pale brown, sandy, gritty silica flour. Hole abandoned at 2.1 m due to slow digging.
ATP12.22	323047	5447258	A 1.0 m	Humus and soil 0.5 m. Hard digging in pale brown, fine grained, massive, lump silica with seams of quartz crystals. Hole abandoned at 1 m due to slow digging.
ATP12.23	323025	5447267	A 1.0 m B 3.0 m	Humus and soil 0.5 m. Very hard digging in close jointed, planar jointed lump silica. Material breaks out with plenty of very pale brown, sandy, gritty silica flour. Bottom of hole in same material at 3 m.
ATP12.24	322973	5447279	A 2.1 m	Humus and soil 0.7 m. Rounded pebbles in material under the humus then brown, sandy, gritty silica flour with abundant lump of white and pale grey, cherty silica with seams of quartz crystals. Abandoned hole at 2.1 m due to slow digging.
ATP12.25	323004	5447297	A 1.4 m B 2.7 m	Humus and soil 0.5 m. Pale brown, sandy, gritty silica flour with common lump similar to ATP12.24. Hole abandoned at 2.7 m due to slow digging.

Test Pit Number	MGA Easting (m)	MGA Northing (m)	Sample Depth (m)	Comment
ATP12.26	323000	5447252	A 1.9 m B 3.2 m C 5.2 m	Humus and soil 0.5 m. Jointed material that breaks out as very pale brown, sandy, gritty silica flour with abundant lump. Lump increases with depth and consists of hard, white, very fine grained silica with patches of crystalline quartz. No change at bottom of hole at 5.2 m.
ATP12.27	322983	5447311	A 1.7 m	Humus and soil 0.6 m. Cream, sandy, gritty silica flour with lump of very fine grained, cream silica containing seams of crystalline quartz. Orange-brown clay from 2.7 m to bottom of hole at 3.0 m.
ATP12.28	322961	5447325	A 1.5 m B 3.0 m	Humus and soil 0.5 m. Cream, sandy, gritty silica flour with relatively little lump to bottom on black organics and black clay at 3.6 m. End of hole at 3.6 m.

TASMANIAN ADVANCED MINERALS PTY LTD

EL15/2009 & ML27M/2009, Hawkes Creek
Exploration 21.11.11 to 5.3.12

Appendix 2: Analytical data for samples from excavator test pits on the Northwest Track in EL15/2009 and at Third Hill Southeast and Fourth Hill Southeast in ML27M/2009.

Each test pit site was first cleared of humus and soil. Sample depths were measured from the cleared surface.

Samples were sourced either from the bucket of the excavator or were collected directly from the pit using a wooden or plastic tool. Sample source is listed in the following table.

Laboratory: Tasmanian Advanced Minerals Pty Ltd, Wynyard.

Analyst: Mari Rademeyer.

Method of analysis: ICPMS

Humus	Sample No	Depth	Source	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Cu	Cr	Mn	Ni	425	300.0	250.0	212	150.0	106.0	75.0	45	PAN
Northwest Track																					
0.5	ATP 11/01 A	1.7	11/01 to 36	221	93	372	254	40	0.4	56.6	0.9	0.3	46.6	3.2	1.5	1.2	3.4	3.4	5.7	15.8	17.8
	ATP 11/01 B	3.0	Almost	165	60	320	302	27	0.4	25.6	0.6	0.2	55.3	3.4	1.6	1.2	3.8	5.2	5.4	10.8	11.5
	ATP 11/01 C	4.5	all from	78	27	84	356	19	0.2	0.8	0.4	0.1	22.0	4.6	2.7	2.3	6.5	7.0	9.2	25.0	19.2
	ATP 11/01 D	5.5	bucket	58	12	42	310	11	0.1	0.2	0.1	0.0	26.0	6.2	3.8	3.1	10.4	9.9	10.7	16.2	11.8
0.5	ATP 11/02 A	1.8		96	18	69	319	13	0.2	6.1	0.2	0.1	36.4	2.4	1.2	1.0	2.6	4.8	7.7	18.0	24.0
	ATP 11/02 B	3.7		95	18	52	351	16	0.3	3.1	0.2	0.1	66.6	3.0	1.5	1.1	3.0	2.6	3.4	6.8	10.5
	ATP 11/02 C	5.0		111	30	60	432	17	0.3	4.5	0.3	0.1	64.6	2.6	1.2	1.0	2.6	2.6	4.2	10.2	9.6
	ATP 11/02 D	6.1		126	27	54	468	16	0.2	1.9	0.1	0.0	58.9	2.8	1.2	1.0	3.4	4.0	5.2	13.8	8.0
0.5	ATP 11/03 A	1.8		104	15	51	253	17	0.1	0.5	0.1	0.1	67.8	3.4	1.5	1.1	3.2	2.9	2.8	7.3	8.5
	ATP 11/03 B	3.4		98	23	42	217	14	0.2	4.1	0.2	0.1	55.6	3.8	1.8	1.4	3.4	3.9	5.3	10.6	12.6
	ATP 11/03 C	5.0		96	18	26	302	18	0.2	1.7	0.2	0.1	69.2	13.2	1.4	1.0	3.1	2.0	1.9	4.2	1.2
	ATP 11/03 D	6.0		95	30	19	204	16	0.1	1.2	0.2	0.1	64.6	4.4	2.0	1.4	3.8	3.4	3.5	6.7	8.3
0.4	ATP 11/04 A	1.8		76	10	19	209	11	0.2	0.8	0.1	0.0	58.2	5.5	2.5	1.9	5.0	3.8	4.5	9.2	7.2
	ATP 11/04 B	3.5		84	6	15	211	16	0.2	0.3	0.1	0.0	61.6	6.0	2.8	2.0	4.8	4.2	3.4	6.6	6.4
	ATP 11/04 C	5.0		101	10	16	294	19	0.2	0.1	0.1	0.0	56.9	6.4	3.3	2.7	7.6	4.6	5.8	7.6	3.8
	ATP 11/04 D	5.5		162	15	17	290	18	0.2	0.5	0.1	0.0	67.9	4.7	2.1	1.6	3.8	3.2	3.2	6.7	5.5
0.5	ATP 11/05 A	1.8		127	17	53	226	15	0.2	2.6	0.1	0.0	48.8	5.3	2.7	2.2	5.6	5.8	6.0	11.6	10.8
	ATP 11/05 B	3.1		243	33	66	319	19	0.3	1.1	0.3	0.1	49.0	5.6	2.7	2.3	4.9	4.4	5.1	9.4	15.1
0.5	ATP 11/06 A	1.8		135	11	86	127	14	0.1	0.9	0.1	0.0	31.2	7.3	4.0	2.4	6.8	6.8	8.0	13.6	18.0
	ATP 11/06 B	3.3		171	16	117	245	23	0.2	6.5	0.2	0.1	46.6	4.4	2.4	1.7	4.0	4.3	5.4	14.5	14.8
	ATP 11/06 C	4.5		211	22	162	346	29	0.4	10.1	0.3	0.1	39.8	4.0	2.2	1.8	4.8	5.2	5.5	17.9	18.0
0.4	ATP 11/07 A	1.8		118	7	58	267	11	0.2	0.2	0.1	0.0	22.8	7.0	3.6	2.6	7.0	6.6	7.6	16.7	24.2
	ATP 11/07 B	3.2		150	30	57	308	14	0.2	1.4	0.2	0.0	38.6	5.4	2.6	1.4	4.8	4.1	5.4	13.4	21.6
0.3	ATP 11/08 A	1.7		96	18	5	280	8	0.1	0.1	0.1	0.0	34.0	5.5	2.6	1.9	5.4	5.6	6.4	14.5	24.0
	ATP 11/08 B	3.2		89	11	4	305	7	0.1	0.1	0.1	0.0	26.9	3.7	2.1	1.6	4.9	6.1	9.4	17.6	25.8
0.6	ATP 11/09 A	1.4		106	28	16	375	8	0.1	0.2	0.2	0.1	27.8	4.0	2.0	1.8	4.9	7.2	10.0	17.4	23.4
	ATP 11/09 B	3.0		192	53	24	534	13	0.2	0.4	0.4	0.0	37.8	3.0	1.8	1.3	4.5	5.2	12.8	22.6	8.9
0.5	ATP 11/10 A	1.5		121	56	58	304	12	0.2	10.9	0.4	0.1	31.4	5.4	3.2	2.1	6.0	5.5	8.3	13.0	22.8
	ATP 11/10 B	3.0		90	10	8	238	7	0.1	0.1	0.1	0.0	31.0	10.0	4.5	3.5	8.6	7.0	6.2	12.8	13.9
0.6	ATP 11/11 A	2.1		134	29	116	430	21	0.2	18.5	0.3	0.1	15.4	5.2	3.2	2.2	6.6	8.2	12.2	22.2	22.6
0.3	ATP 11/13 A	1.8		124	27	56	230	25	0.2	7.6	0.2	0.1	50.4	4.0	2.0	1.4	4.0	3.8	6.0	14.3	12.4
	ATP 11/13 B	3.1		99	27	29	262	15	0.1	2.7	0.1	0.1	51.6	4.2	1.8	1.4	4.4	4.6	6.2	18.0	6.2
0.3	ATP 11/13 C	3.6		106	41	15	281	21	0.1	1.2	0.2	0.1	59.0	3.7	1.5	1.1	3.1	3.3	4.2	10.8	12.8
0.8	ATP 11/14 A	1.7		100	14	39	182	16	0.2	1.3	0.1	0.1	50.0	4.6	2.1	1.8	4.5	5.0	4.8	10.2	14.8
	ATP 11/14 B	3.5		115	49	76	226	20	0.1	9.8	0.3	2.0	39.4	4.6	2.3	1.8	5.9	5.9	6.2	19.2	13.0

Humus	Sample No	Depth	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Cu	Cr	Mn	Ni	425	300.0	250.0	212	150.0	106.0	75.0	45	PAN
	ATP 11/14 C	4.5	92	17	90	127	19	0.2	0.7	0.1	0.0	55.8	5.9	2.4	1.8	4.2	3.2	3.6	7.0	13.9
	ATP 11/14 D	75.5	108	21	54	212	16	0.2	2.0	0.2	0.0	50.8	5.3	2.2	1.7	4.6	3.8	5.0	10.4	14.5
?	ATP 11/15 A	1.2	790	260	757	231	146	1.3	216.0	2.2	0.7	43.6	5.2	2.7	3.6	16.6	12.3	5.4	6.5	3.2
0.6	ATP 11/17 A	1.4	122	10	60	171	12	0.2	0.5	0.1	0.1	23.6	4.1	2.2	1.7	4.8	5.6	8.9	18.9	27.8
	ATP 11/17 B	3.3	125	12	54	184	14	0.1	2.4	0.1	0.0	41.0	6.8	3.0	2.4	6.6	5.6	6.8	15.9	10.3
	ATP 11/17 C	4.7	131	16	71	261	15	0.2	2.2	0.1	0.0	28.2	6.8	3.3	2.4	7.0	5.6	8.0	16.5	20.4
	ATP 11/17 D	5.8	146	18	62	227	16	0.2	2.0	0.2	0.1	25.7	5.3	2.5	2.0	6.0	5.0	7.7	18.9	25.4
0.5	ATP 11/18 A	1.2	694	401	1043	242	174	1.1	335.8	4.4	1.0	45.4	3.8	1.9	1.6	7.4	8.5	5.2	10.8	14.0
	ATP 11/18 B	2.2	637	434	1005	188	124	1.1	205.0	4.9	0.8	44.0	3.6	1.8	1.8	14.5	8.6	10.6	10.1	3.8
0.8	ATP 11/20 A	0.4	276	45	174	615	44	0.8	32.3	0.4	0.2	26.4	2.6	1.6	1.2	3.6	4.8	7.0	19.2	32.3
0.6	ATP 11/21 A	1.2	300	151	406	201	73	0.7	153.5	1.3	0.5	25.6	4.0	2.6	2.8	9.1	6.4	8.6	16.4	23.4
0.6	ATP 11/22 A	1.0	423	159	527	193	71	0.8	105.9	1.5	0.4	34.0	3.9	2.2	2.0	12.4	6.1	5.7	11.0	21.0
0.6	ATP 11/23 A	1.4	228	68	472	410	38	0.5	50.9	0.6	0.1	25.8	4.8	2.3	2.2	6.1	5.7	7.8	16.8	26.2
	ATP 11/23 B	2.8	710	39	367	776	131	1.3	3.8	0.3	0.1	69.6	8.6	2.8	1.6	8.2	2.8	2.2	2.0	0.2
0.6	ATP 11/25 A	1.5	204	82	318	294	41	0.4	61.8	0.9	0.2	51.0	3.0	1.7	1.1	3.6	4.2	6.4	13.0	14.6
	ATP 11/25 B	3.1	312	127	538	340	66	0.6	73.5	1.3	0.3	45.6	3.0	1.6	1.5	6.6	4.9	9.4	19.6	5.4
	ATP 11/25 C	3.5	103	45	138	255	21	0.1	6.9	0.5	1.5	25.6	4.8	2.7	2.1	6.8	7.2	9.8	18.1	20.7
	ATP 11/25 D	4.3	295	109	449	269	51	0.8	69.7	1.0	0.3	45.4	2.9	1.4	1.1	3.4	4.0	8.0	14.5	17.8
0.8	ATP 11/26 A	1.1	145	29	128	302	24	0.4	15.2	0.2	0.0	43.6	4.3	2.1	1.5	4.3	4.8	7.2	12.1	18.1
	ATP 11/26 B	2.3	184	61	200	347	41	0.4	27.5	0.5	0.1	42.0	3.2	1.6	1.4	4.2	4.6	8.7	19.2	13.4
	ATP 11/26 C	3.3	135	26	94	401	37	0.3	3.7	0.2	0.1	44.6	3.0	1.5	1.2	3.6	4.2	5.4	12.8	22.4
0.7	ATP 11/28 A	1.3	163	65	123	191	27	0.4	32.7	0.5	0.1	64.6	5.6	2.6	1.8	4.6	3.3	3.0	4.8	7.8
	ATP 11/28 B	2.5	193	45	159	323	35	0.5	28.6	0.5	0.4	49.0	4.2	2.0	1.6	4.6	4.1	5.4	11.9	15.4
	ATP 11/28 C	3.5	244	84	281	339	45	0.6	60.4	0.7	0.2	43.8	5.7	2.9	2.2	5.9	4.9	4.9	9.6	19.8
0.8	ATP 11/31 A	1.2	76	11	40	152	8	0.1	0.7	0.0	0.0	33.8	9.6	4.6	3.8	9.3	6.6	6.0	11.0	12.3
	ATP 11/31 B	2.4	81	22	56	180	8	0.2	0.7	0.1	0.1	27.6	8.0	4.3	3.6	9.4	7.5	7.6	13.8	16.2
	ATP 11/31 C	3.8	76	10	34	233	9	0.2	0.3	0.1	0.1	29.3	6.1	3.3	2.7	8.0	7.6	8.8	16.4	17.4
0.5	ATP 11/32 A	1.4	124	23	120	461	22	0.3	6.3	0.2	0.0	42.6	2.4	1.1	1.0	2.7	5.4	6.4	19.6	16.4
	ATP 11/32 B	3.2	89	19	57	302	18	0.2	1.7	0.1	0.0	57.2	4.3	1.9	1.4	4.0	4.0	5.5	13.7	5.9
	ATP 11/32 C	4.7	102	16	86	380	30	0.2	1.4	0.1	0.1	54.3	2.5	0.8	1.0	2.5	2.6	3.0	14.8	16.0
0.6	ATP 11/33 A	1.2	434	197	563	222	84	1.2	149.8	1.7	0.5	30.3	3.8	2.7	1.8	7.0	11.8	8.2	16.3	17.0
	ATP 11/33 B	2.8	382	173	676	458	77	1.0	114.5	1.8	0.4	29.0	3.6	5.6	1.8	6.0	3.5	10.3	24.8	13.6
	ATP 11/33 C	4.0	270	114	432	552	54	0.7	92.2	1.6	0.3	32.6	4.6	2.2	1.6	4.7	4.9	5.7	15.0	26.9
0.5	ATP 11/34 A	1.4	143	98	197	278	27	0.4	12.1	0.7	0.1	32.6	4.0	2.2	1.8	5.4	5.6	7.4	19.2	19.6

Humus	Sample No	Depth		Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Cu	Cr	Mn	Ni	425	300.0	250.0	212	150.0	106.0	75.0	45	PAN
0.8	ATP 11/35 A	1.4		481	247	669	262	109	1.1	205.0	2.3	0.7	33.0	3.6	2.8	1.9	7.6	10.2	7.6	22.0	9.4
	ATP 11/35 B	3.0		126	22	87	263	12	0.3	5.9	0.2	0.1	62.5	3.1	1.5	0.8	2.5	3.4	3.2	9.5	13.4
	ATP 11/35 C	4.5		146	36	151	218	18	0.5	8.2	0.3	0.1	55.4	3.2	1.4	1.0	2.8	2.5	3.2	9.2	19.8
	ATP 11/35 D	5.2		153	33	128	213	18	0.4	15.9	0.3	0.1	61.2	3.6	1.6	1.1	3.2	2.8	2.8	7.9	13.9
0.6	ATP 11/36 A	2.1		281	121	399	199	52	0.8	76.5	1.1	0.4	41.2	6.0	2.9	2.4	10.6	15.6	10.3	7.6	1.3
	ATP 11/36 B	3.5		150	21	126	209	19	0.3	10.4	0.2	0.1	60.9	8.0	3.1	2.1	4.8	3.7	4.0	5.6	7.2
	ATP 11/36 C	5.0		224	60	267	263	31	0.4	33.3	0.5	0.1	38.0	8.6	3.8	2.8	7.6	5.0	5.0	11.2	15.2
Third Hill Southeast																					
1.0	ATP 11/43 A	1.5	Pit	669	208	1052	35	58	0.6	35.8	2.0	0.3	9.0	7.6	3.6	3.8	58.6	11.6	1.4	1.6	1.6
0.8	ATP 11/44 A	1.4	Pit	46	4	22	266	57	0.0	0.5	0.0	0.1	25.8	2.3	1.2	1.1	3.0	8.9	13.3	23.8	16.7
	ATP 11/44 B	3.0	Bucket	43	8	20	284	61	0.1	0.3	0.1	0.1	36.7	2.2	1.2	1.0	4.2	9.0	14.4	20.0	9.9
	ATP 11/44 C	4.5	Bucket	44	5	23	447	82	0.1	0.1	0.0	0.0	35.8	2.2	1.0	0.8	3.4	6.0	10.2	22.4	17.8
	ATP 11/44 D	6.0	Bucket	61	19	30	592	138	0.1	20.9	0.1	0.1	40.6	3.4	1.3	1.0	3.0	3.8	6.2	16.6	23.8
0.8	ATP 11/45 A	2.0	Pit	62	11	43	471	38	0.1	4.0	0.1	0.1	5.2	1.6	1.2	1.1	6.4	12.6	22.4	27.8	19.8
	ATP 11/45 B	3.0	Bucket	59	14	36	592	1001	0.1	1.7	0.1	0.2	13.2	2.7	1.6	1.6	7.0	11.2	17.4	26.3	17.6
0.7	ATP 11/46 A	1.2	Pit	39	5	20	670	47	0.0	0.6	0.0	0.0	8.0	3.8	2.4	2.2	9.6	15.0	21.0	25.8	11.2
	ATP 11/46 B	2.5	Pit	73	10	59	699	42	0.0	1.9	0.1	0.1	11.0	2.8	1.7	1.4	3.2	9.6	16.9	28.4	20.7
0.6	ATP 11/47 A	1.4	Pit	629	298	979	108	92	0.7	142.6	3.2	0.5	19.2	9.6	4.4	3.2	34.4	9.0	6.6	6.6	4.1
1.1	ATP 12/01 A	1.4	Pit	313	6	46	85	23	0.2	0.4	0.0	0.0	58.1	6.0	2.7	2.1	7.5	6.0	4.4	6.7	6.5
0.9	ATP 12/02 A	0.8	Pit	90	28	128	553	70	0.2	6.0	0.3	0.0	25.3	2.5	1.6	1.6	6.8	10.1	12.4	24.9	14.8
	ATP 12/02 B	3.0	Pit	90	24	155	542	79	0.1	5.2	0.2	0.0	18.3	2.7	1.6	1.4	6.9	9.8	12.6	25.4	21.3
0.6	ATP 12/05 A	0.8	Pit	339	126	452	210	79	0.3	14.4	1.8	0.1	34.1	9.6	4.7	4.0	19.6	8.1	6.3	8.2	5.4
1.0	ATP 12/06 A	1.5	Pit	533	292	910	348	160	0.8	265.3	2.8	0.8	22.8	4.0	2.4	2.0	11.4	9.0	11.8	21.3	15.3
1.0	ATP 12/07 A	1.5	Pit	128	47	176	617	121	0.2	17.9	0.4	0.1	23.8	2.6	1.3	1.0	3.8	6.2	9.8	29.2	22.3
	ATP 12/07 B	3.3	Pit	178	103	333	484	111	0.4	45.0	0.9	0.2	19.5	2.2	1.2	1.2	4.3	5.5	11.4	27.6	27.1
	ATP 12/07 C	4.7	Bucket	154	65	376	524	108	0.3	24.0	0.7	0.2	37.8	2.6	1.2	1.0	4.1	5.1	8.0	19.8	20.4
0.7	ATP 12/09 A	2.0	Pit	191	64	270	780	126	0.3	25.3	0.6	0.1	32.0	3.4	1.8	1.4	6.1	9.5	9.9	20.5	15.4
	ATP 12/09 B	3.7	Bucket	107	27	122	685	132	0.2	7.4	0.2	0.1	46.6	3.7	1.8	1.2	4.1	5.1	7.7	15.1	14.7
0.8	ATP 12/10 A	1.7	Bucket	212	73	280	409	70	0.4	29.8	0.7	0.3	8.9	2.9	1.8	1.7	11.4	15.8	14.7	24.0	18.8
	ATP 12/10 B	3	Bucket	187	59	261	390	70	0.3	22.9	0.5	0.1	26.2	3.2	1.8	1.4	8.1	11.2	12.9	20.4	14.8
Fourth Hill Southeast																					
0.4	ATP 12/13 A	1.6	Pit	74	12	68	326	19	0.1	4.0	0.1	0.0	23.8	3.2	1.7	1.5	4.7	7.5	13.1	25.4	19.1
	ATP 12/13 B	3.0	?Bucket	81	9	39	359	26	0.1	0.9	0.1	0.0	45.5	3.6	1.6	1.5	4.7	5.7	7.7	15.6	14.1
0.4	ATP 12/14 A	1.5	Pit	89	12	44	193	21	0.0	0.3	0.1	0.0	32.6	5.7	2.5	1.9	5.2	5.7	9.1	17.1	20.2
	ATP 12/14 B	3.0	Pit	65	7	32	431	31	0.1	0.3	0.1	0.0	25.9	3.9	2.0	1.7	4.6	6.7	8.9	24.0	22.3
	ATP 12/14 C	4.5	Bucket	89	12	41	235	22	0.1	0.5	0.1	0.0	52.9	3.7	1.5	1.3	6.0	8.1	8.6	14.4	3.5

Humus	Sample No	Depth		Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	Cu	Cr	Mn	Ni	425	300.0	250.0	212	150.0	106.0	75.0	45	PAN
0.8	ATP 12/19 A	1.6	Pit	139	38	197	365	77	0.1	1.1	0.3	0.0	39.7	5.3	2.7	2.1	8.4	7.3	9.1	18.6	6.8
	ATP 12/19 B	3.3	Bucket	104	18	54	325	46	0.1	0.9	0.1	0.0	61.8	5.6	2.3	1.7	4.9		2.8	9.3	3.5
	ATP 12/19 C	4.2	Bucket	111	9	24	186	36	0.1	1.0	0.1	0.0	68.6	6.8	3.0	2.1	5.4	4.9	4.1	3.8	1.3
0.4	ATP 12/20 A	1.5	Pit	333	192	742	194	66	0.5	22.6	1.9	0.2	44.5	5.0	2.4	2.0	7.1	7.2	5.1	12.5	14.2
	ATP 12/20 B	3.2	Bucket	213	116	405	168	40	0.3	22.5	1.0	0.1	30.3	5.3	3.0	2.6	8.9	9.7	9.3	22.3	8.6
	ATP 12/20 C	4.1	Bucket	153	71	202	124	25	0.1	13.3	0.4	0.1	26.4	5.3	2.7	2.7	9.9	10.8	9.9	17.2	15.1
0.3	ATP 12/21 A	1.5	Pit	103	61	224	245	20	0.2	7.8	0.5	0.3	8.8	3.7	2.1	2.1	7.1	10.5	11.8	27.5	26.4
0.5	ATP 12/22 A	1.0	Bucket	263	167	636	290	64	0.4	32.9	1.5	0.2	36.5	3.5	1.7	1.4	6.3	5.7	7.2	17.3	20.4
0.5	ATP 12/23 A	1.0	Pit	51	7	42	594	47	0.0	0.1	0.0	0.0	5.9	1.4	1.1	1.1	4.9	10.6	17.1	36.3	21.6
	ATP 12/23 B	3.0	Bucket	68	12	34	399	23	0.1	0.5	0.1	0.0	47.4	3.0	1.5	1.3	4.8	9.3	7.1	17.4	8.2
0.7	ATP 12/24 A	2.1	Bucket	452	189	586	186	95	0.9	93.2	1.5	0.3	42.4	5.4	3.2	2.7	12.1	12.2	7.5	10.4	4.1
0.5	ATP 12/25 A	1.4	Pit	798	521	1627	204	213	1.3	264.4	5.5	0.9	36.4	4.9	2.5	2.4	14.7	18.0	7.8	10.8	2.5
	ATP 12/25 B	2.7	Bucket	596	373	1235	259	171	1.1	122.6	3.7	0.6	38.9	5.5	5.1	5.2	28.0	9.9	3.7	3.1	0.6
0.5	ATP 12/26 A	1.9	Pit	104	35	91	204	17	0.1	1.0	0.2	0.0	46.7	4.7	2.0	1.9	6.1	6.6	7.5	12.4	12.1
	ATP 12/26 B	3.2	Pit	112	34	60	208	19	0.1	2.3	0.1	0.0	64.8	4.1	1.8	1.4	3.4	3.6	4.1	9.6	7.2
	ATP 12/26 C	5.2	Bucket	136	51	141	263	45	0.1	7.6	0.3	0.0	64.1	4.0	1.7	1.5	4.1	5.1	5.0	9.9	4.6
0.6	ATP 12/27 A	1.7	Pit	254	22	185	365	106	0.2	1.8	0.2	0.0	34.3	6.3	3.5	2.7	8.9	10.6	9.4	17.3	7.0
0.5	ATO 12/28 A	1.5	Pit	253	65	403	378	61	0.4	19.7	0.6	0.1	32.9	5.9	3.4	2.1	13.6	12.2	8.7	16.9	4.3
	ATP 12/28 B	3.0	Bucket	406	132	699	252	86	0.6	50.9	1.4	0.2	26.1	5.6	2.8	2.0	10.2	9.4	9.3	21.4	13.2