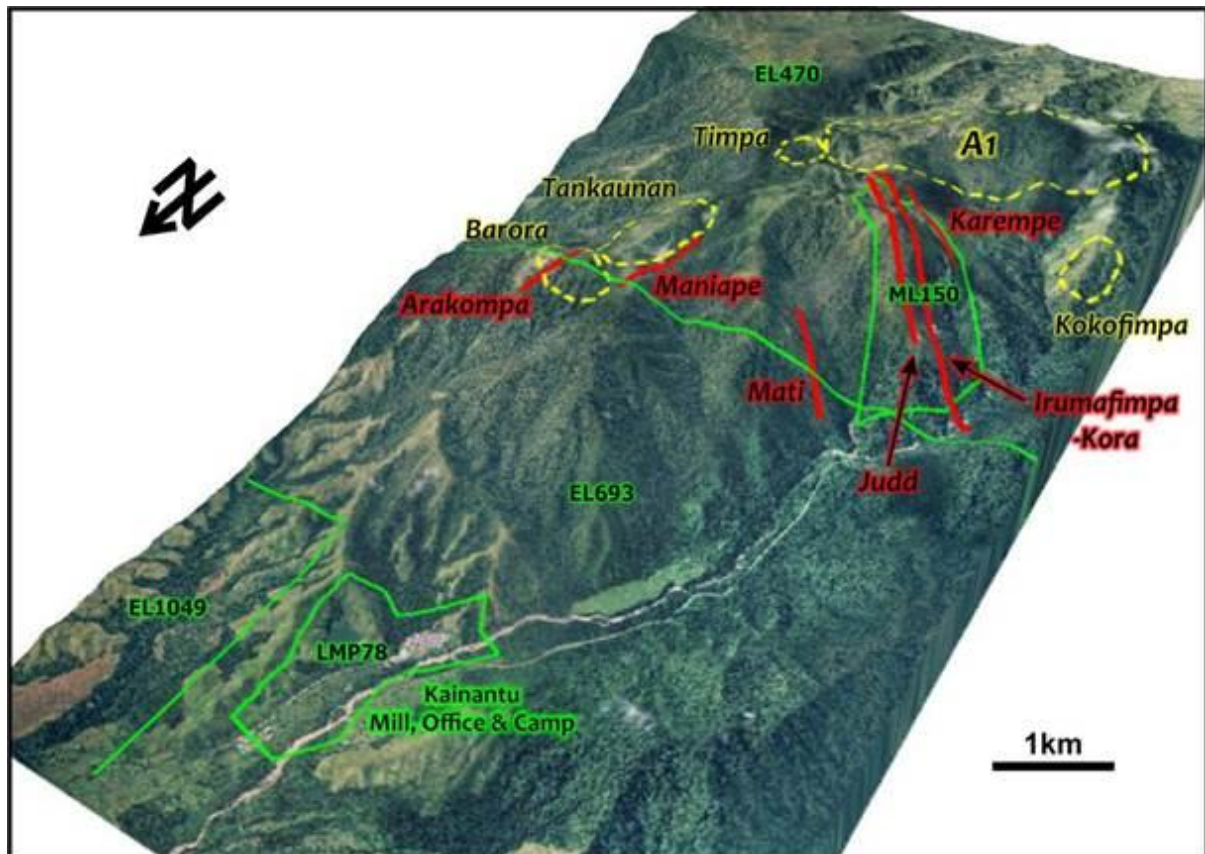


**INDEPENDENT TECHNICAL REPORT, RESOURCE ESTIMATE  
AND SUMMARY OF MINING FACILITIES,  
KAINANTU PROJECT, PAPUA NEW GUINEA**



Prepared by Nolidan Mineral Consultants

for

Otterburn Resources Corp.

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## 1 SUMMARY

### 1.1 INTRODUCTION

At the request of Mr Brian Lueck, Director of Otterburn Resources Corp, ("Otterburn"), Nolidan Mineral Consultants ("Nolidan") was commissioned in November 2014 to prepare a Technical Report on the Kainantu project ("the Project") in accordance with National Instrument 43-101 – Standards of Disclosure for Mineral Projects ("NI 43-101") including a mineral resource estimate of the Irumafimpa-Kora gold copper deposit. In April 2015 Mr. Lueck requested Nolidan to amend the 06 March 2015 report to include descriptions of the mining and milling infrastructure and recommendations to refurbish the mine and mill at Kainantu. In March 2016 Mr. Lueck requested Nolidan to update the report dated 01 May 2015 to reflect changes since that date.

The Kainantu property covers a total area of 405 sq.km and is located in the Eastern Highlands Province of Papua New Guinea, approximately 180 km west-northwest of Lae.

The Project as described herein is 100% owned by K92 Mining Limited ("K92ML") (formerly Barrick (Kainantu) Limited); a company incorporated in Papua New Guinea, which is 100% owned by K92 Holdings (PNG) Limited ("K92PNG"), a 100% owned subsidiary of K92 Holdings International Limited ("K92 Holdings").

K92PNG acquired K92ML from Barrick (Niugini) Limited ("Barrick") pursuant to an agreement dated June 11, 2014 (the "K92ML Purchase Agreement") (which closed March 6, 2015), for the sum of US\$2,000,000. Under the terms of that agreement K92PNG is obligated to make additional payments of up to US\$60,000,000 as follows:

- (i) US\$20,000,000 upon K92PNG determining 1,000,000 ounces of gold equivalent (based on in-situ and mined product classified as measured mineral resource, indicated mineral resource, probable ore reserve or proven ore reserve); and
- (ii) US\$5,000,000 upon upon K92PNG determining each additional 250,000 ounces of gold equivalent (on the same bases as stated above) up to an aggregate of 3,000,000 ounces.

The obligation to pay additional payments will cease on March 6, 2025.

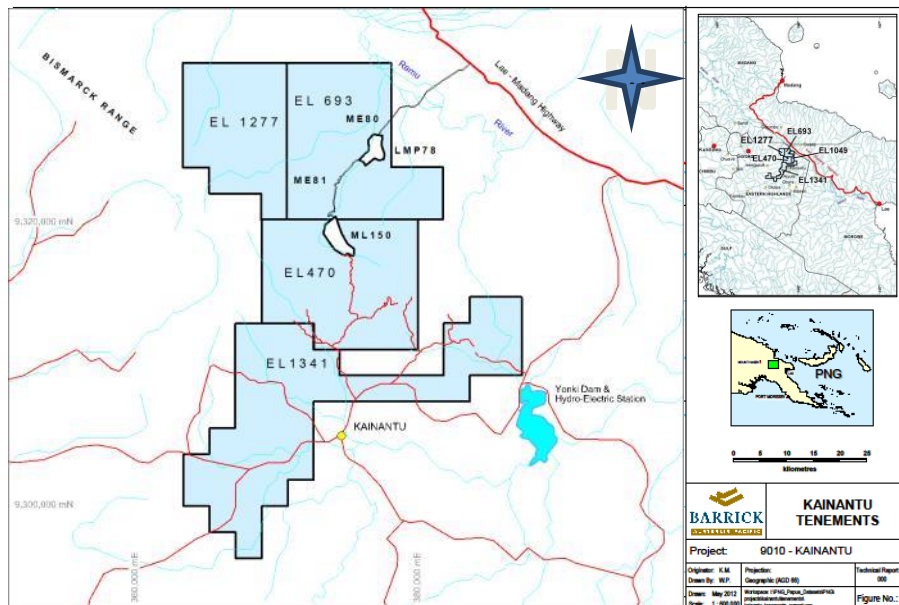
On August 21, 2014, Otterburn, K92 Holdings and the shareholders of K92 Holdings entered into a Share Exchange Agreement, pursuant to which Otterburn agreed to acquire all of the issued and outstanding shares of K92 Holdings, from the shareholders of K92 Holdings on the basis of one common share of Otterburn for each outstanding common share of K92 Holdings, for an aggregate of 49,126,666 Otterburn common shares. Subsequently the transaction was restructured, and Otterburn and Cada International Ltd. (a wholly owned subsidiary of Otterburn) entered into a merger agreement with K92 Holdings on April 15, 2016, pursuant to which K92 Holdings agreed to merge with Cada International Ltd. to form an amalgamated subsidiary of Otterburn, and whereby Otterburn agreed to acquire all of the outstanding shares of K92 Holdings, in exchange for common shares of Otterburn on the basis of one post-consolidation common share of Otterburn for each common share of K92 Holdings, for an aggregate of 49,126,666 Otterburn common shares.

Otterburn is a company incorporated under the laws of British Columbia, Canada; the common shares of which are publicly listed on the TSX Venture Exchange.

K92ML is the registered holder of the following tenements in PNG, as issued by the applicable government authorities in accordance with the PNG Mining Act 1992 (the "Mining Act"):

1. Mining Lease 150 ("ML150"), effective until June 14, 2024;
2. Mining Easements 80 and 81 ("ME80" and "ME81"), each effective until June 14, 2024;
3. Licence for Mining Purposes 78 ("LMP 78"), effective until June 14, 2024;
4. Exploration Licence 470 ("EL470"), effective until February 05, 2017;

5. Exploration Licence 693 ("EL693"), effective until February 05, 2017
6. Exploration Licence 1341 ("EL1341"), effective until June 20, 2016; and
7. Exploration Licence 1277 ("EL1277") which expired on May 20, 2009. The PNG Minister for Mining rejected K92ML's application for renewal on December 5, 2011. K92ML initiated legal action to compel the Minister for Mining to overturn the decision, but the court instructed the parties to instead try to reach an out-of-court settlement. Negotiations in that regard have to date been unsuccessful; and if not settled will revert to the courts for a decision.



**Kainantu Project Location.**

Source: Barrick 2014

## 1.2 GEOLOGY AND MINERALIZATION,

The Kainantu property is located within the New Guinea Thrust Belt, close to its northern contact with the Finisterre Terrane. The property area is underlain by metamorphosed sedimentary rocks of the Early Miocene Bena Bena Formation, unconformably overlain by Miocene age sedimentary and intermediate volcanic rocks of the Omaura and Yaveufa Formations. These formations were intruded in the mid-Miocene by the Akuna Intrusive Complex, which comprised multiple phases of mafic to felsic magma. Late Miocene age Elandora Porphyry dykes formed small high level crowded feldspar porphyry dykes and diatreme breccias.

Mineralization on the property includes gold, silver and copper occurring in epithermal Au telluride veins and Au Cu Ag sulphide veins of Intrusion Related Gold Copper ("IRGC") affinity and also less explored porphyry Cu Au systems; and alluvial gold. The Irumafimpa-Kora vein deposit is the most advanced project at Kainantu with current defined resources and past modern mining activity in the Irumafimpa area. The deposit occurs in the centre of a large mineralized system approximately 5 km x 5 km in area that has been partly delineated by drilling and comprises several individual zones of IRGC and porphyry style mineralization. The current resources occupy a broad northwest trending mineralized zone more than 2.5 km long and up to 60m wide in which individual veins vary from less than one metre wide that pinch and swell over short distances (Au telluride lodes) to more continuous veins up to several metres wide (Au Cu Ag sulphide lodes).

The Kora veins average 3.1m true width; which is the entire extent of the known veins before cut-off grades are applied. The Mill veins at Irumafimpa average 1.2m true width, which is the entire extent of the known veins before cut-off grades are applied, and also the minimum width used during resource estimation.



Other less advanced prospects on the property include epithermal Au veins similar to Irumafimpa, IRGC veins similar to Kora, porphyry Cu Au systems, skarn Cu, Pb and Zn mineralization and alluvial gold.

### 1.3 PROJECT HISTORY

Gold was discovered in the area in 1928 in the Kainantu alluvial gold areas on current EL1341, however modern exploration did not commence until the early 1980's. After the discovery of Irumafimpa, Highlands Pacific Limited ("HPL") focused on the high grade Au telluride mineralization with little work conducted on the porphyry Cu Au targets. HPL commenced mining operations on the Irumafimpa deposit in 2005. Barrick (Niugini) Limited ("Barrick") purchased the tenement package from HPL in late 2007 and concentrated on increasing the resource at ML150 and discovering economic porphyry Cu Au mineralization. There has been a significant amount of exploration on the property by various owners. The operations history of the Kainantu ML150 Gold Mine is summarised in the table below. The operation has been on care and maintenance since January 2009.

Kainantu Project Recent History		
From	To	Irumafimpa Operations History (ML150)
January 2004		Highlands Pacific DFS approved by Mineral Resources Authority
2005	October 2007	Kainantu Gold Mine operated as Highlands Kainantu Limited (HKL)
November 2007		Barrick purchased the Kainantu project.
January 2008	June 2008	Barrick suspended mining operations from January to June 2008 in order to improve safety in line with Barrick standards. Technical aspects of operation also reviewed and implementation of some changes commenced
July 2008	January 2009	Mining restarted in July 2008 and suspended in January 2009.
January 2009	December 2009	Exploration of epithermal and sulphide veins continued on ML150 until June 2009, and then halted due to Corporate review of exploration priorities.
January 2010	March 2015	Project on Care and Maintenance, limited exploration on EL's
March 2015	Current	K92PNG purchases project from Barrick, continues care and maintenance and commences planning work.

### 1.4 RESOURCE ESTIMATE

After a review of previous resource estimates Nolidan recommended to Otterburn that the current resource estimate should be quoted:

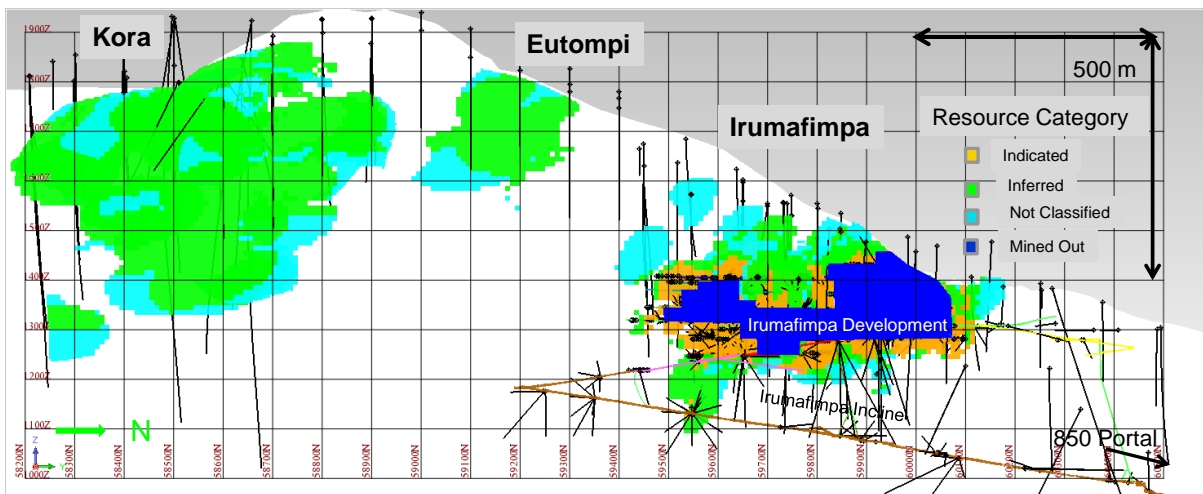
- a) Using a standard Ordinary Kriging estimation approach. Grade caps should be selected to restrict the influence of outliers where drilling was sparse.
- b) Cut-offs should be based on a combination of thickness and grade reflecting potential mining methods. Lower cut-off grades of 5g/t AuEq for wide veins (> 3m width) and 6g/t AuEq for veins between 1.2m and 3m width were suggested.
- c) Resources should not be reported at confidence levels above Indicated due to the drill spacing at Kora and limited confidence in underground sampling information from Irumafimpa

A resource estimate was completed for the Irumafimpa-Kora vein systems based on the historical surface and underground drilling conducted by previous owners, Barrick and HPL. Face channel and

grade control samples collected during previous mining operations were also used but have only a local influence.

Comparison of grade control face sampling and drilling in the same mineralized zones shows a significant bias towards lower average grades in drilling compared with the average grade of the face samples. For all veins the highest recorded values for gold (outliers) occurred in drillhole samples and grade capping was therefore used. Face samples are however concentrated in the higher grade mining areas, so were included in resource estimation.

Estimation was conducted using industry standard methods in unfolded space for grade and thickness across narrow veins with allowance for minimum mining width. Vein thickness and grades for Au, Ag, and Cu were estimated in unfolded 2D space using Ordinary Kriging on grade capped composites before being translated back into a true 3D block model. Results were validated against informing samples, and nearest neighbour and inverse distance squared estimates. Results are presented in the table below and should be read in conjunction with the notes following.



ML150 long section with blocks coloured by resource category.

Mineral Resource by Deposit, Category and Mining Method											
Deposit	Resource	Mining	Tonnes	Gold		Silver		Copper	Gold Equivalent		
	Category	Method	Mt	g/t	MOz	g/t	MOz	%	Mlb	g/t	MOz
Kora/Eutompi	Inferred	Mechanical	3.36	7.1	0.77	32.9	3.55	2.2	161	11.5	1.24
		Hand	1.06	7.2	0.25	40.0	1.37	2.3	55	12.0	0.41
Irumafimpa	Indicated	Mechanical	0.01	11.5	0.00	2.2	0.00	0.3	0	12.1	0.00
		Hand	0.56	12.6	0.23	8.9	0.16	0.3	3	13.3	0.24
	Inferred	Mechanical	0.07	7.2	0.02	7.4	0.02	0.2	0	7.7	0.02
		Hand	0.45	11.3	0.16	9.6	0.14	0.3	3	12.0	0.17
Total All Deposits	Indicated		0.56	12.6	0.23	9	0.2	0.3	3	13.3	0.24
	Inferred		4.94	7.5	1.20	32	5.1	2.0	219	11.6	1.84

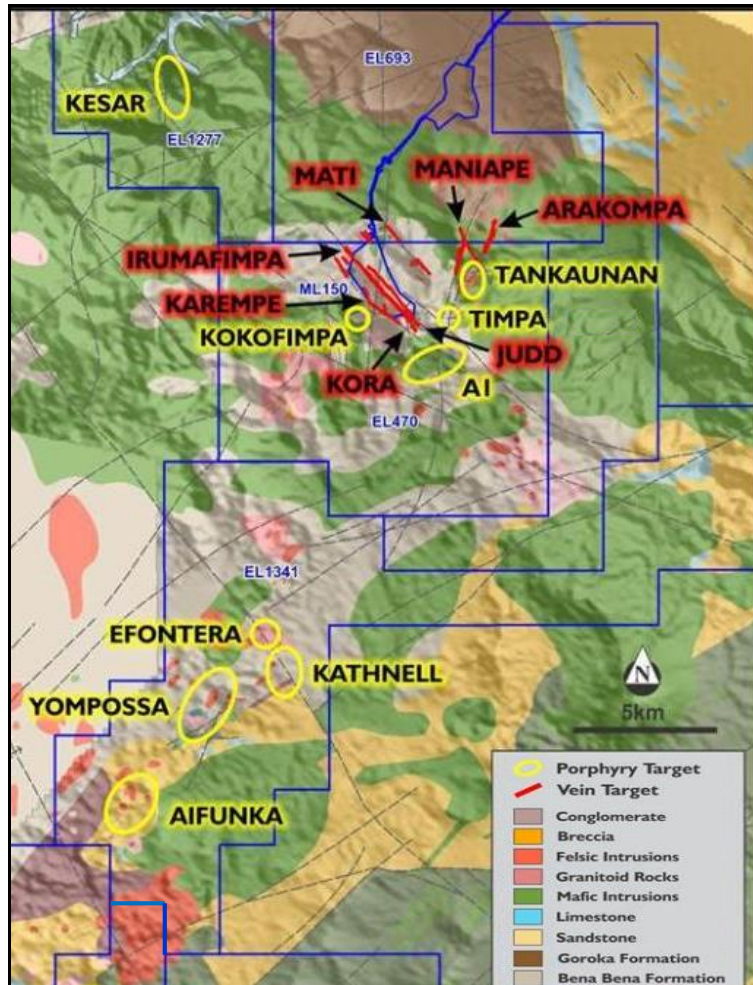
M in Table is millions. Reported tonnage and grade figures are rounded from raw estimates to reflect the order of accuracy of the estimate. Minor variations may occur during the addition of rounded numbers. Gold equivalents are calculated as  $AuEq = Au\ g/t + Cu\% * 1.7308 + Ag\ g/t * 0.0185$ .

1. The current sample exploration database was supplied by Barrick in MS Access format.
2. Estimation undertaken in Surpac™, using ordinary kriging (“OK”) in unfolded space.
3. The estimation block size was 10m in Y and 10m in Z with width estimated in unfolded space as a variable. Grade was interpolated by domain using OK estimation with parameters based on directional variography by domain. Thickness of the vein was also estimated by OK estimation.

4. Results validated against drill data and Inverse Distance Squared, Nearest Neighbour, Gram M Accumulation estimates and Ordinary Krige uncapped estimates.
5. Minimum mining width of 1.2 m horizontal. Grade was diluted to account for minimum width.
6. This mineral resource estimate is based on 78,935 metres of drilling from 767 holes, and 18,312 metres of assayed intervals across all lodes. A single vein composite was used for each drill intercept on each lode – cut-off for selection was 3 m-gms Au Equivalent. There are a total of 2,003 vein composites across 19 veins, including 349 face composites.
7. A mined out area representing the extent of current mining projected across all lodes were removed from the final model as the exact location of individual stopes is not clear.
8. Top caps were applied to the composites for each vein. Grade caps were selected to restrict the influence of outliers where drilling was sparse, and varied by vein.
9. A minimum of 2 samples and maximum of 12 samples were used for each block. Search distances varied by lode and reflect the variogram ranges of 100-200 m, maximum projection beyond last drill-hole is 50 m.
10. The volume for each vein was defined by a wireframe in 3D space and is used to constrain the resource blocks.
11. Lower cut-off grades for reporting were a combination of thickness and grade reflecting mining methods, metallurgical recovery, and royalties:
  - a. Narrow Vein - Shrink Stopes - 1.2 m – 3 m thick and  $\geq 6\text{g/t AuEq}$
  - b. Wide Vein – Mechanised Stopes -  $>3$  m thick and  $\geq 5\text{g/t AuEq}$
12. Resource categories are based on estimation confidence and number of informing samples as a guide. Blocks shown in the Long Section have been coloured by resource category. Turquoise blocks are unclassified blocks with only one sample supporting them and are not included in the resource estimate.
13. Density of  $2.75 \text{ t/m}^3$  was used for every vein block.

## 1.5 EXPLORATION TARGETS

The Kainantu project is located in a world class Cu-Au province as evidenced by the underlying geology and presence of nearby major projects operated by global majors Barrick, Newcrest and Harmony. Nolidan concludes that based on a review of historical exploration and the identified mineralization within the Kainantu Project package there remain a significant number of major untested and early stage targets. Within ML150 this includes the Kora lodes which are strongly mineralized at the limit of drilling and open in all directions, as well as the Judd, Karempa and other unnamed mineralized lodes parallel to defined resources which have potentially economic grade surface and/or drill values from very limited work to date.



**Kainantu geology and known vein and porphyry deposits and prospects.**

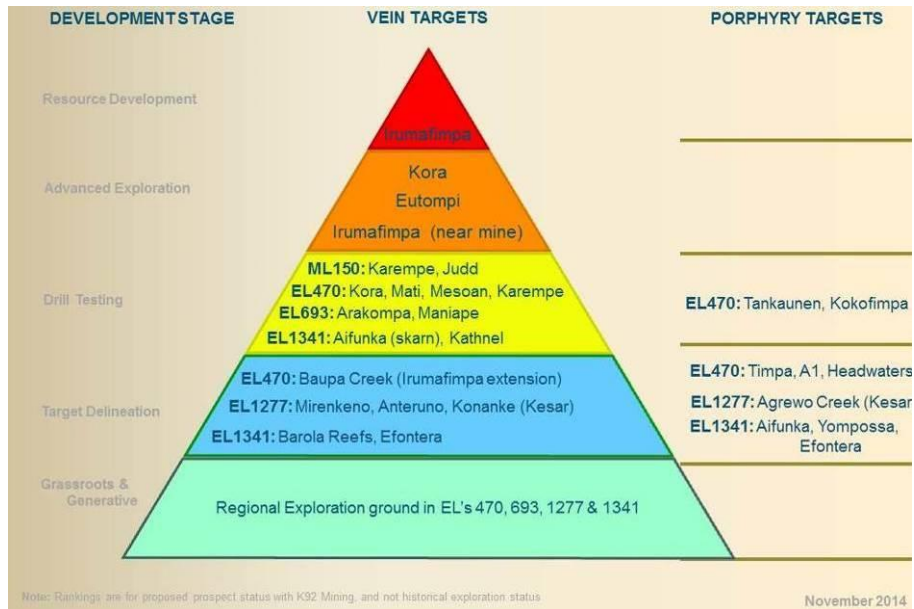
*(Source: Barrick, 2014)*

Outside the ML there are continuations of the lodes listed above, as well as the strongly mineralized Mati-Mesoan, Arakompa and Maniape lodes proximal to the mining lease. A porphyry Cu-Au target is evident at shallow depth in the A1/Tempe/Tankuanan area to the southeast of ML150. Further away there is substantial mineralization at the Aifunka and Kathnel deposits on EL1341 in a separate mineralization centre.

Nolidan notes that Barrick originally purchased the Kainantu Project for the porphyry Cu-Au potential and internal reports rank the project very highly on a global scale. The decision to divest the project was made for corporate rationalisation reasons based on global competition for exploration expenditure rather than geological prospectivity reasons. This combined with the challenging land access meant that field work and drilling was not optimally conducted (e.g. at the A1 area). Within the four EL's surrounding the mine area there are numerous high quality epithermal Cu-Au and porphyry prospects which were not available for land access until late in Barrick's tenure. It is the view of Nolidan that all exploration targets in the Project remain untested or under-tested by modern exploration.

Nolidan recommends a complete review and prioritisation of exploration activities early in the operational phase. Exploration philosophy and expenditure should be based on a risk-reward approach (aligned with company strategy and timeframes). In particular, time to project realisation should be considered with opportunities for resource additions on the current ML150 given priority, and aspects including target size, likelihood of success and proximity to mining infrastructure and metallurgical compatibility being key ranking factors off the current mining lease. Prospect prioritisation for expenditure could be improved by a combination of:

- a) District scale targeting over the whole Kainantu project tenement package facilitated by 3D integration of available topographic, geological, structural, geochemical, geophysical and geochronological data.
- b) Benchmarking of the above against similar projects either in the same area or of similar geological setting.
- c) Economic target considerations of size, grade, mining concept and development costs vs expected exploration expenditure requirements.



**Kainantu Current Exploration Targets**

*(Source: Barrick, 2014)*

## 1.6 PREVIOUS MINING AND PROCESSING

During the mining operation at Irumafimpa between 2006 and 2009, mining was predominantly shrink stoping with some bench stoping (longhole). The method applied was based on the geological structure and varying vein widths. Multiple independent reviews have shown that previous operators had considerable difficulty with dilution issues during mining which has been mainly attributed to the geological complexity of the veins and a poor understanding of grade distribution within the veins.

The processing plant built to treat the Irumafimpa lodes was demonstrated in the previous operating phase between 2006 and 2008 (HPL and Barrick) to be generally well suited to the mineralization in that deposit.

The underground mining operation and process facility have not operated since January 2009.

## 1.7 DISCUSSION

It is Nolidan's opinion that further investigation is required to understand the geological complexity of the veins at Kainantu and the controls on high grade shoots. This will require better resource definition.

The ML150 resource documented in this report is mostly in the Inferred category, and this itself is dominated by the Kora area, which also shows higher copper and silver values than Irumafimpa. No mining dilution or loss has been taken into account with these resource numbers (other than using a minimum width of 1.2m). Mining dilution or loss will be higher in the narrow lodes at Irumafimpa than the wider sulphide lodes at Kora. Figures previously used by Barrick for conversion of resources

to reserves of 92% for tonnage and 65% for ounces seem appropriate and should be kept in mind when reviewing resource numbers.

Significant opportunity remains for resource extension within the immediate mine environment, including:

- a) The Irumafimpa-Kora vein system is open at depth, in the central areas beneath the top of the mountain (Eutompi) and to the South (Kora) beyond the ML150 boundary.
- b) Drillhole BKDD0023 below Kora is well mineralized with a significant intercept at depth (30.6m from 920.8m @ 2.0 g/t Au, 4.8 g/t Ag and 1.3%Cu or 4.3 g/t AuEq). It represents a potential extension to the resource of at least 300m.
- c) Blocks shown in the Long Section in the resource section of this summary have been coloured by resource category. Turquoise blocks are unclassified blocks with only one sample supporting them and are not included in the resource estimate. These areas are extensive and represent obvious targets for immediate drillhole targeting.
- d) The area between Kora and Irumafimpa (Eutompi) is untested at depth.
- e) The parallel lodes on ML150, the Judd and Karempe in particular, have been outlined at surface showing similar widths and grades to Irumafimpa but have had little drill testing.

The Kainantu project tenure is comprised of about 405 km<sup>2</sup> of exploration tenure in a recognized copper-gold mineralized province, with the majority of exploration at a reconnaissance stage. There remains significant exploration upside and opportunity for major discoveries of further vein deposits and Cu-Au porphyries to facilitate project growth and sustainability.

Nolidan notes that although all of the Resource is in the Indicated or Inferred category, dominantly the latter, this is not unusual for a vein style deposit situated well below the surface. Exploration and upgrading to measured and indicated categories will require close spaced drilling and development along the veins. The general sequence of work suggested by Nolidan is as follows:

- a) Exploration at surface using drilling and geophysics to identify the mineralized structures.
- b) Drilling to Inferred category from surface and underground at nominal 100m spacing (vertical and horizontal) sufficient to quantify the likely resource for geological continuity, general mining methods and metallurgical performance.
- c) Drilling to Indicated category at nominal 25m spacing (vertical and horizontal)
- d) Drilling to Measured category at a nominal 10m spacing (vertical and horizontal).

The Work Program proposed by Otterburn for 2016 is summarized in Section 1.9 Work Program and Budget. Expenditure is concentrated on exploration within ML150 and EL470 (75% of total proposed expenditure for 2016). Close spaced drilling is proposed from existing underground workings to confirm indicated resources at Irumafimpa.

## 1.8 RECOMMENDATIONS

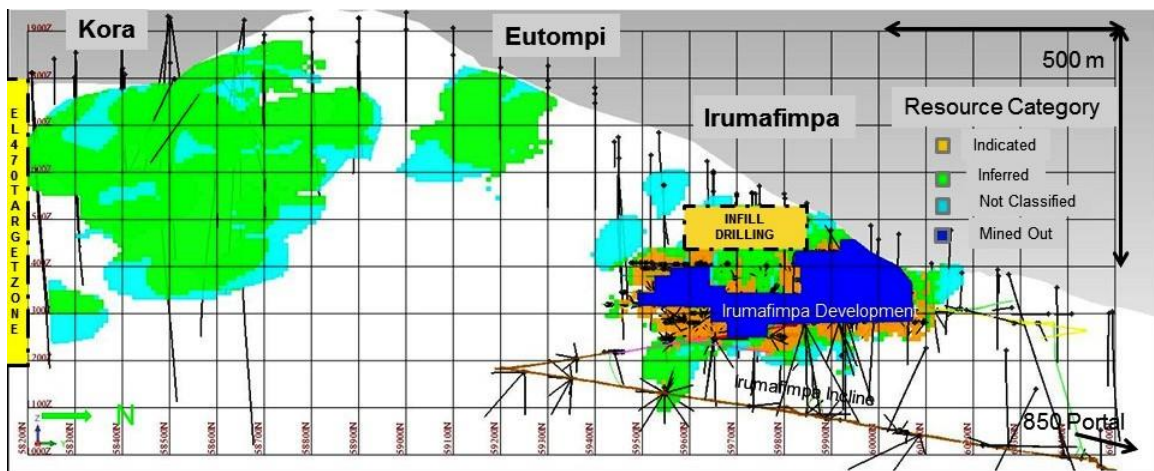
Nolidan recommends that:

The current resource should be reviewed and a strategy to convert inferred resource to indicated or measured resources be instigated to facilitate geology/resource model interpretation and to improve resource confidence (reducing project risk). Not all current inferred resources will be able to be converted to a higher resource category.

- Drilling should concentrate on infill drilling of current resources and extensions to veins within ML 150.
- Nolidan agrees with the budget proposal for infill drilling to commence from existing underground workings at Irumafimpa.

Exploration activities on the exploration licences should commence as soon as practical so that expenditure commitments can be satisfied. Drilling on EL470 and EL693 is prioritized below.

- Priorities for drilling on EL470 should include the Karempe and Mati/Mesoan prospects and extensions to the Kora lodes to the south east.
- Priorities for drilling on EL693 should include follow-up drilling of the Arakompa and Maniape deposits where historic resources have previously been identified.
- Further review and compilation of existing exploration data to generate new drilling targets.
- District scale targeting over the Kainantu project could be facilitated by 3d integration of available geological, structural and geochemical data.



**Kainantu Targets of 2016 Work Program and Budget**

**1.9 WORK PROGRAM AND BUDGET**

**1.9.1 Exploration**

Minimum expenditures and work programs for the 2016 Anniversary year as committed to the Mineral Resources Authority (“MRA”) in application for renewal of exploration tenements are presented in the table below. The expenditure commitments are a minimum commitment to the MRA and actual expenditure commitments are anticipated to be significantly higher to meet the proposed minimum work programs. The MRA will expect additional work to be completed by K92ML in the 2016 Anniversary year to compensate for K92ML’s lower expenditure in the 2015 anniversary year which did not meet the minimum requirement. As K92ML must meet both expenditure and work program commitments to maintain the tenements in good standing, the expenditure planned for the 2016 anniversary year has been increased beyond that required for the year to include expenditure not made in 2015. K92ML has expended K154,967 (EL470), K62,154 (EL693), and K73,343 (EL1341) on exploration work in 2015.

Tenement No.	Expiry Date	Commitment 2016 PGK	Period Ending	Minimum Expenditure Commitment 2015/2016	Proposed Work Program Budget		Proposed 2016 Work Program
					Unit	Amount	
EL470	4/02/2017	1,000,000	4/02/2017	PGK 2,000,000	PGK	1,845,000	30 wks access negotiations, 2 wks Library search & data review, 10 wks Reconnaissance & Detailed geological mapping, significant sampling of soil + rock + wacker, samples for petrology & whole rock analysis, ground magnetic surveying, significant trenching & channel sampling, two cored drillholes testing extensions to Kora veins.
					USD	590,000	
					CAD	785,000	
					% Total	60%	

EL693	4/02/2017	400,000	4/02/2017	PGK 600,000	PGK	540,000	10 wks access negotiations, 2 wks Library search & data review, 9 wks Reconnaissance & Detailed geological mapping, significant sampling of float + BCL streams + soil + rock + channel + wacker, samples for petrology & whole rock analysis, two cored drillholes testing vein targets
					USD	175,000	
					CAD	230,000	
					% Total	18%	
EL1277	29/5/2009*	400,000	29/05/2016	PGK 400,000*	PGK		
					USD		
					CAD		
					% Total	0%	
EL1341	20/06/2016	150,000	20/06/2016	PGK 290,000	PGK	220,000	6 wks review, 4 wks reconnaissance, 12 wks mapping & data interp, significant sampling of float + stream + soil + rock + wacker holes, samples for petrology
					USD	70,000	
					CAD	95,000	
					% Total	7%	
ML150	3/06/2024	N/A	N/A	N/A	PGK	450,000	Close spaced underground drilling to confirm indicated resources at Irumafimpa. Estimated 8,000m – 100 holes
					USD	150,000	
					CAD	200,000	
					% Total	15%	
Total					PGK	3,055,000	
					USD	985,000	
					CAD	1,300,000	
					Total	100%	

Notes - \*Renewal date and expenditure commitment for EL1277 yet to be agreed with Minister for Mining and the Mining Advisory Council.

### 1.9.2 Mine and Mill Refurbishment and Associated Studies

In order to comply with the terms of ML150, whereby K92ML is required to refurbish the mine and mill by December 31, 2016, it is recommended that K92ML undertake the following:

1. Development of a detailed mine plan with costing for refurbishment of the underground workings.
2. Rehabilitation of the mine and mill as defined by the above studies and as required by the terms of ML150

In addition to these requirements, K92ML has budgeted to undertake the following works:

1. Metallurgical studies to determine the optimum processing system for mined material from the ore at Irumafimpa including flotation test work designed to produce an Au-Te concentrate and separate copper concentrate and gravity recovery test work
2. Studies to optimize the milling circuit including costing
3. Once the underground is rehabilitated, undertake close 10 x 10 meter spaced drilling in order to increase the confidence in parts of the indicated resource at Irumafimpa

In the near term, the ML150 renewal terms do not require the existing mine to restart production, only that the mine and mill are returned to the condition they were in prior to suspension of mining operations. It is K92ML's objective to use the results of the recommended drilling to update the mineral resource estimates which can then be used to support a new mine plan to support a re-start of the mine.



Item	Amount ,000's CAD	Description
Studies -Metallurgical Testwork	\$0	No work planned
Studies -Mill optimization and crushing circuit redesign and costing studies	\$0	No work planned
Studies - Mine rehabilitation and design	\$100	Geotechnical and Ventilation surveys
Office, Camp and Security Refurbishment	\$0	Office currently in working order.
Mine refurbishment	\$700	For Main incline and access to working levels, make safe and compliant with Mines Safety regulations, including: re-install transformers, compressors and ventilation systems, test electrical cables and replace connections where necessary, re-install pumps and water supply network, dewater control and systems, replace or improve ground support where necessary to make many access drives safe, emergency systems, communication systems
Bulk Sampling of Underground Mineralization	\$878	Mine bulk sample from 21 Level of the mine and treat at refurbished Mill
Mine and Mill Refurbishment	\$2,000	Initial costs for capital items required under the Refurbishment phase, including drum scrubber. Crushing and screening, Reclaim, Ball Mill, Flotation, TSF, Concentrates, Reagents, Water, Air, Power, Control Systems, Engineering Design, First Fill and Provisions
<b>Total</b>	<b>\$3,678</b>	

Nolidan notes that these are direct costs, and do not include general and administration costs.

## 2 INTRODUCTION AND TERMS OF REFERENCE

### 2.1 ISSUER

This report is an independent technical review of the geology, exploration, current mineral resource estimates, and existing mining facilities at the Kainantu project.

At the request of Mr Brian Lueck, Director of Otterburn Resources Corp., (“Otterburn”), Nolidan Mineral Consultants (“Nolidan”) was commissioned in November 2014 to prepare a Technical Report on the Kainantu project (“the Project”) in accordance with National Instrument 43-101 – *Standards of Disclosure for Mineral Projects* (“NI43-101”), including an updated mineral resource estimate of the Irumafimpa-Kora gold - copper deposit. In April 2015 Mr. Lueck requested Nolidan to amend the 06 March 2015 report to include descriptions of the mining and milling infrastructure and recommendations to refurbish the mine and mill at Kainantu. In March 2016 Mr. Lueck requested Nolidan to update the report dated 01 May 2015 to reflect changes since that date.

### 2.2 TERMS OF REFERENCE AND PURPOSE

Otterburn intends that this report be used as an Independent Technical Report as required under Part 4 “Obligation to File a Technical Report” of NI 43-101 to support publicly disclosed information and the filing of an information circular.

At Otterburn’s request, the scope of Nolidan’s inquiries and of the report included the following:

1. Preparation of a new mineral resource estimate reported in accordance with NI 43-101.
2. Site verification and review of project.
3. Preparation of an Independent Technical Report prepared in accordance with NI 43-101.
4. Description of mining and milling facilities at Kainantu.
5. Summarize recommendations to refurbish the mine and treatment plant at Kainantu.

### 2.3 INFORMATION USED

This report is based on technical data provided by Otterburn to Nolidan. Otterburn provided open access to all the records necessary, in the opinion of Nolidan, to enable a proper assessment of the project and resource estimates. Otterburn has warranted in writing to Nolidan that full disclosure has been made of all material information and that, to the best of the Otterburn’s knowledge and understanding, such information is complete, accurate and true.

Additional relevant material was acquired independently by Nolidan from a variety of sources. This material was used to expand on the information provided by Otterburn and, where appropriate, confirm or provide alternative assumptions to those made by Otterburn.

With respect to Items 6, and 9 through 13 of this report, the authors have relied in part on historical information including exploration reports, technical papers, sample descriptions, assay results, computer data, maps and drill logs generated by previous operators and associated third party consultants. Historical documents and data sources used during the preparation of this report are cited in Item 27.

Throughout this Report, measurements are in metric units and currency is in Canadian Dollars or PNG Kina unless otherwise stated. Appendix 1 lists key technical terms and abbreviations used throughout this Report.

Four weeks were spent on data collection and analysis and preparation of this report.

Investors should note that the statements and diagrams in this report are based on the best information available at the time, but may not necessarily be absolutely correct. Such statements and diagrams are subject to change or refinement as new exploration makes new data available, or

new research alters prevailing geological concepts. Appraisal of all the information mentioned above forms the basis for this report. The views and conclusions expressed are solely those of Nolidan.

#### **2.4 SITE VISIT BY QUALIFIED PERSONS**

Mr Anthony Woodward of Nolidan visited the Kainantu Gold Mine from 12th November to 13th November 2014. The project was on care and maintenance. The two day visit included a review of drill core and exploration data from the Kainantu project. Landslides following heavy overnight rain had temporarily blocked road access from the mine camp to the mine workings at the time of Mr Woodward's visit. Discussions were held with Barrick's Exploration Manager and Mine Manager while on site.

In the course of the site visit Mr Woodward viewed drill core including sections of the Kora and Judd mineralized vein systems. He also examined the drill core processing and storage facilities. Drill sections through the mineralized systems were viewed at the exploration office. Mapping and sampling data from the underground workings including stopes at Irumafimpa and photographs of the underground development at Irumafimpa was inspected. As drillcore from Irumafimpa was badly degraded photographs of Irumafimpa drillcore were viewed at the exploration office. He located and viewed drill logs from surface drilling and original laboratory assay reports were located at the exploration office.

The review of geology and resource estimates was conducted by Mr Woodward who accepts full responsibility for the resource estimates quoted in this report. Mr Woodward has sufficient experience which is relevant to the Kainantu style of mineralization and deposits under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves' (Australia) and is a Qualified Person as defined in NI 43-101 (Canada). He is a member of the Australian Institute of Geoscientists (Member #2668). Mr Anthony Woodward is employed by Nolidan Mineral Consultants of Brisbane.

### **3 RELIANCE ON OTHER EXPERTS**

During the preparation of this document, Nolidan has relied on the opinions and documentation prepared by other experts in both external (consultant) and internal (company) capacity only in respect of legal political, plant refurbishment and environmental matters relevant to the technical report. These include O'Briens Lawyers (mineral title, surface rights, and legal agreement information), the Fraser Institute (political risk), AMC Consultants (mine refurbishment) and Kramer Ausenco and Mincore (plant refurbishment).

O'Briens Lawyers are based in Port Moresby and have extensive experience advising participants in the mineral industry. A number of operating mining companies and exploration companies are clients of the firm. The firm was founded in 2002 by Senior Partner Steven O'Brien who holds admissions in Papua New Guinea and the High Court of Australia, Queensland. Kramer Ausenco is also based in Port Moresby. The firm was established by PNG engineer, Frank Kramer, in 1978. Then under the name Cameron McNamara Kramer, it was PNG's first home-grown engineering and project management practice. It is now PNG's largest engineering services business. The Fraser Institute is a research and educational organization based in Canada that publishes peer-reviewed research into international economic and public policy issues.

### **4 PROPERTY DESCRIPTION AND LOCATION**

The Kainantu property covers a total area of 405 sq.km and is located in the Eastern Highlands Province of Papua New Guinea, approximately 180 km west-northwest of Lae (Figure 1). The project is located at the approximate centre of the Project, at 6°06'25" S Latitude and 145°53'27" E Longitude.

The property comprises four exploration licences, EL470, EL693, EL1277 and EL1341, one mining licence, ML150, two mining easements, ME80 and ME81, and one licence for mining purposes, LMP78. Tenements are owned 100% by K92ML but there is an understanding in-place for a 5% share to be divested to the local landowners. Further information on this understanding is detailed in Section 4.3.1. Memorandum of Understanding (MOU). To the extent known by Nolidan, there are no option agreements or joint venture terms in place for the property. A tenement map is shown in [Figure 1](#) and tenement details are summarised in [Table 1](#).

The Project as described herein is 100% owned by K92 Mining Limited ("K92ML"); a company incorporated in Papua New Guinea, which is 100% owned by K92 Holdings (PNG) Limited ("K92PNG"), a 100% owned subsidiary of K92 Holdings International Limited ("K92 Holdings").

On August 21, 2014, Otterburn, K92 Holdings and the K92 Holdings shareholders entered into a Share Exchange Agreement, pursuant to which Otterburn agreed to acquire all of the issued and outstanding shares of K92 Holdings, from K92 Holdings shareholders, in consideration for issuing shares in the capital of Otterburn. However, after further consideration by the parties, it was determined that effecting a tri-party merger under BVI law was more appropriate in order to effect Otterburn's acquisition of K92 Holdings. Accordingly, Otterburn entered into an agreement with K92 Holdings, pursuant to which K92 Holdings will merge with a newly created British Virgin Islands subsidiary of Otterburn, and whereby the Otterburn will acquire all of the outstanding shares of K92 Holdings, in exchange for shares of Otterburn.

Otterburn is a company incorporated under the laws of British Columbia, Canada; the common shares of which are publicly listed on the TSX Venture Exchange.

Nolidan has not undertaken any title search or due diligence on the tenement titles or tenement conditions and the tenement's status has not been independently verified by Nolidan.

K92ML is the registered holder of the following tenements in PNG (MRA, 2016), as issued by the applicable government authorities in accordance with the PNG Mining Act 1992 (the "Mining Act"):

1. Mining Lease 150 ("ML150"), effective until June 14, 2024;
2. Mining Easements 80 and 81 ("ME80" and "ME81"), each effective until June 14, 2024;
3. Licence for Mining Purposes 78 ("LMP 78"), effective until June 14, 2024;
4. Exploration Licence 470 ("EL470"), effective until February 05, 2017;
5. Exploration Licence 693 ("EL693"), effective until February 05, 2017;
6. Exploration Licence 1341 ("EL1341") effective until June 20, 2016.; and
7. Exploration Licence 1277 ("EL1277") which expired on May 20, 2009. The PNG Minister for Mining rejected K92ML's application for renewal on December 5, 2011. K92ML initiated legal action to compel the Minister for Mining to overturn the decision, but the court instructed the parties to instead try to reach an out-of-court settlement. Negotiations in that regard have to date been unsuccessful; and if not settled will revert to the courts for a decision.

The renewal of ML150, ME80, ME81, and LMP78 occurred immediately prior to the acquisition of K92ML by K92PNG.

K92PNG acquired K92ML from Barrick (Niugini) Limited ("Barrick") pursuant to an agreement dated June 11, 2014 (the "K92ML Purchase Agreement") (which closed March 6, 2015), for the sum of US\$2,000,000. Under the terms of that agreement K92PNG is obligated to make additional payments of up to US\$60,000,000 as follows:

- (i) US\$20,000,000 upon K92PNG determining 1,000,000 ounces of gold equivalent (based on in-situ and mined product classified as measured mineral resource, indicated mineral resource, probable ore reserve or proven ore reserve); and

(ii) US\$5,000,000 upon upon K92PNG determining each additional 250,000 ounces of gold equivalent (on the same bases as stated above) up to an aggregate of 3,000,000 ounces.

The obligation to pay additional payments will cease on March 6, 2025.

The PNG National Government has expressed its desire to recommence mining on ML150 as soon as possible to deliver benefits to the local community, Provincial Government and Nation (Barrick 2014).

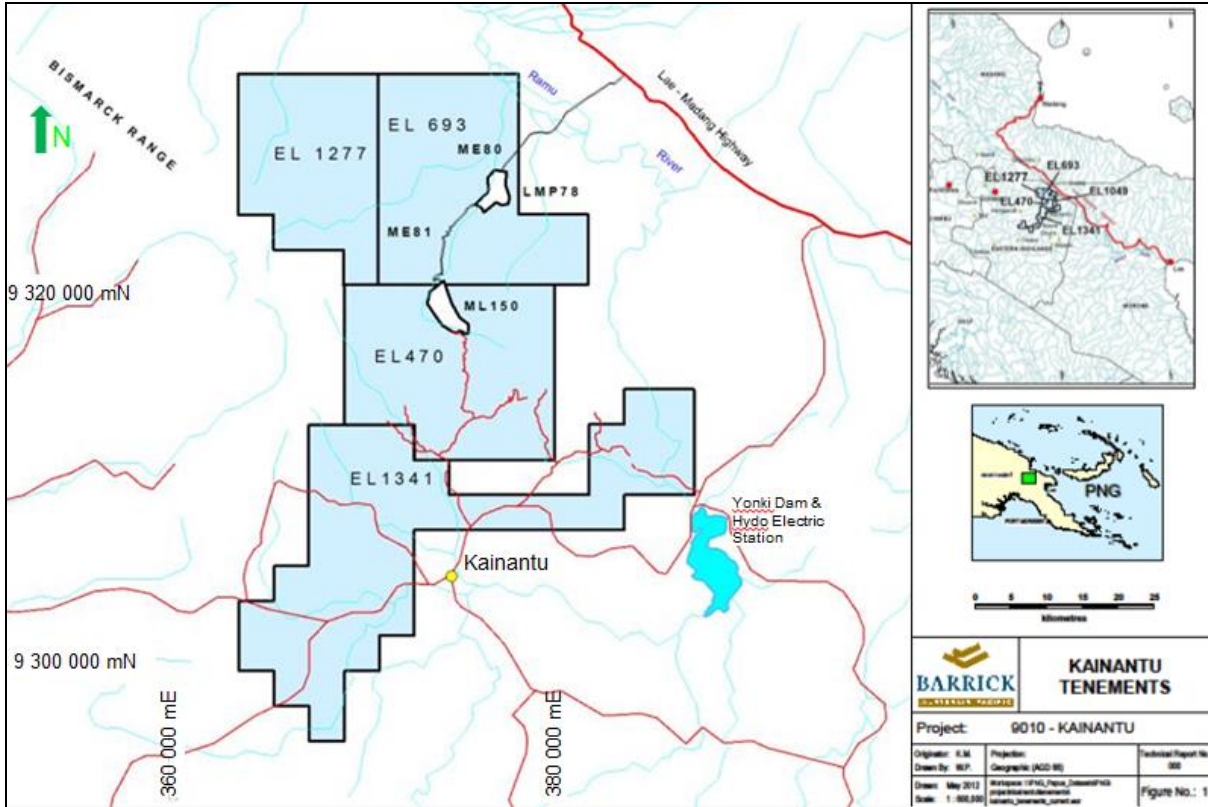


Figure 1. Kainantu Project Location and Tenements.

Source: Barrick 2014

Table 1. Project Tenure Details.

Tenement No.	Grant Date	Expiry Date	Renewal or Appln. Date	Area (km <sup>2</sup> )	Rent (2016) Kina	Owners <sup>#</sup>
EL470	5/2/1982	4/2/2017	Current	95.0	13,160	K92ML
EL693	5/2/1986	4/2/2017	Current	95.0	13,160	K92ML
EL1277	30/5/2001	29/5/2009*	TBA*	68.3	9,400	K92ML
EL1341	21/6/2004	20/6/2016	Current	146.8	20,210	K92ML
ML150	4/6/2002	14/6/2024	Current	2.9	3,456	K92ML– 95% Landowners – 5%**
ME80***	14/6/2002	14/6/2024	Current	0.29	N/A	K92ML
ME81***	14/6/2002	14/6/2024	Current	0.35	N/A	K92ML
LMP78***	14/6/2002	14/6/2024	Current	2.1	2,512	K92ML

\* Last approved renewal was to 29/05/2009. Application for renewal of tenure to 29/05/2011 was rejected by the Minister for Mining on 05/11/2011. K92ML undertook legal action to compel the Minister to overturn the decision and renew the lease. This was not successful and K92ML continues to negotiate settlement terms and the date for renewal.

\*\* Ownership of ML150 currently 100% K92ML. 5% pledged under commercial terms to Landowners in the 2003 Memorandum of Understanding, and ratified by the 2014 K92ML Purchase Agreement.

\*\*\* ME80, ME81 and LMP78 are linked to the current ML150.

## 4.1 TENURE

### 4.1.1 Exploration Licence

An exploration licence may be granted for a term not exceeding two years, which may be extended under Section 28 of the Mining Act 1992 and Regulation. An exploration licence includes all land in the State, within the bounds of the exploration licence, including all water lying over that land.

An exploration licence authorizes the holder, in accordance with any conditions to which it may be subject, to:

- a) Enter and occupy the land which comprises the exploration licence for the purpose of carrying out exploration for minerals on that land; and
- b) Subject to Section 162, extract, remove and dispose of such quantity of rock and earth, soil or minerals as may be permitted by the approved programme; and
- c) Take and divert water situated on or flowing through such land and use it for any purpose necessary for his exploration activities subject to and in accordance with the provisions of the Water Resources Act (Chapter 205); and
- d) Do all other things necessary or expedient for the undertaking of exploration on the land.

The holder of an exploration licence is entitled to the exclusive occupancy for exploration purposes of the land in respect of which the exploration licence was granted.

Subject to Subsection (2), the Minister shall, on the application under Section 24 of the holder of an exploration licence, extend the term of the exploration licence for periods each of up to two years, where the Board advises the Minister that the holder has:

- a) Complied with the conditions of the exploration licence during the previous term of the exploration licence; and
- b) Paid compensation as required by this Act; and
- c) Submitted a programme for the proposed extended term which the Board recommends for approval under Section 26.

Where he considers that it is in the best interests of the State to do so, the Minister may refuse to extend the term of an exploration licence.

Where the Board is unable to give the advice required under Subsection (1) to the Minister, the Minister may, after receiving a recommendation from the Board, extend the term of the exploration licence for such period or periods of up to two years as he may determine, and include such further conditions of the exploration licence as he may consider necessary.

In considering whether the holder of an exploration licence has paid compensation as required by this Act, the Board shall rely on the advice of the Chief Warden

### 4.1.2 Mining Lease

A mining lease (ML) may be granted for a term not exceeding 20 years, which may be extended under Section 46 of the Mining Act 1992 and Regulation. A mining lease must be not more than 60 km<sup>2</sup> in area, and be in a rectangular or polygonal shape.

A mining lease authorizes the holder, in accordance with the Mining (Safety) Act (Chapter 195A) and any conditions to which the mining lease is subject, to; -

- a) enter and occupy the land over which the mining lease was granted for the purpose of mining the minerals on that land and carry on such operations and undertake such works as may be necessary or expedient for that purpose; and

- b) construct a treatment plant on that land and treat any mineral derived from mining operations, whether on that land or elsewhere, and construct any other facilities required for treatment including waste dumps and tailings dams; and
- c) take and remove rock, earth, soil and minerals from the land, with or without treatment; and
- d) take and divert water situated on or flowing through such land and use it for any purpose necessary for his mining or treatment operations subject to and in accordance with the Water Resources Act (Chapter 205); and
- e) do all other things necessary or expedient for the undertaking of mining or treatment operations on that land.

Subject to the Act, the holder of a mining lease -

- a) is entitled to the exclusive occupancy for mining and mining purposes of the land in respect of which the mining lease was granted; and
- b) owns all minerals lawfully mined from that land.

#### **4.1.3 Mining Lease No 150 Renewal Conditions**

Mining Lease No. 150 was renewed on 23 January 2015 for a period of 10 years to 13 June 2024. Conditions of the lease renewal are summarised below:

1. The lessee must comply with the Kainantu Mine Project Proposals for Development Tenure Extension Application 2014 dated 10 June 2014.
2. The mine must comply with the Mining Safety Act.
3. The Lessee must comply with all relevant legislation.
4. The change in control of K92ML must occur within 3 months of ML renewal.
5. The mine and mill must be completely refurbished by 31 December 2016 (this variation to the original condition 5 of the lease renewal was approved by the Mining Minister on December 07, 2015).
6. Operations and production from the Kora deposit must commence on or before 30 June 2018.
7. Develop a detailed rehabilitation and Mine Closure Plan at least 5 years prior to the planned closure of the mine or the expiration of the Mine lease or any extended Mining Lease, whichever occurs first.
8. Any public statement in relation to the Mining Lease and Kainantu Gold Project must also disclose any relevant conditions that form part of the extension of the Mining Lease.

#### **4.1.4 Expenditure Commitments**

The tenement package has current annual rents of PGK 85,868 and annual minimum expenditure commitments of PGK 1,435,000 under approved work programs for the granted tenements. Exploration expenditure on the Kainantu tenements by Barrick up to September 2012 is summarised in [Table 2](#).

**Table 2. Exploration expenditure on Kainantu tenements 2008–2012. Source Barrick 2012**

Tenement No.	2008 (\$)	2009 (\$)	2010 (\$)	2011 (\$)	2012* (\$)	Total (\$)
ML150	7,550,567	5,677,662	1,190,921	35,018	106,090	14,560,258
EL470	656,258	2,740,803	1,659,744	4,554,996	2,966,867	12,578,668
EL693	-82,011	347,468	100,037	38,896	8,937	413,327
EL1049	47,684	145,783	42,077	60,583	17,926	314,053
EL1277	18,387	174,440	40,594	34,980	1,781	270,182
EL1341	182,903	215,168	1,305,213	1,848,981	253,788	3,806,053
Project Costs	3,490,130	315,720	1,130,781	2,102,274	2,291,614	9,330,519
<b>Total</b>	<b>11,863,918</b>	<b>9,617,044</b>	<b>5,469,367</b>	<b>8,675,728</b>	<b>5,647,003</b>	<b>41,273,060</b>

#### 4.1.5 Reporting Requirements

Pursuant to the Mining Act (1992), license holders are required to provide reports to the Mineral Resources Authority (“MRA”) as follows:

##### Mining Licenses

- Monthly Mineral Return – Submitted every calendar month from date of grant of lease, detailing production of minerals (if any), including quantity and value of ore mined/treated and the quantity and value of minerals recovered.
- Monthly Royalty Return - Submitted every calendar month from date of grant of lease, detailing minerals won that are shipped/exported, prices and exchange rates at time of sale, expenditure, and net revenue from which royalty is calculated and paid to landowner groups.
- Annual report – as for Exploration License.

##### Exploration Licenses

- Bi-annual prospecting report – submitted every 6 months from date of expiry, on cancellation and on surrendering EL. Summarises all works undertaken on or in connection with EL since the previous report.
- Bi-annual expenditure report - submitted every 6 months from date of expiry, on cancellation and on surrendering EL. Summarises all expenditure connected with acquisition and interpretation of exploration data on the lease.
- Annual report – submitted every 12 months from date of grant of lease. Provides detailed information on all work on, or in connection with the license. Includes aims of works, procedures applied and conclusions reached. All relevant data must be included.

#### 4.2 ROYALTIES

The Mining Act 1992 (Act) provides that all minerals at or below the surface of any land (i.e. gold, silver, copper and other minerals) are the property of the State. K92ML, pursuant to the Mining Lease from the State, owns what is mined from the orebody.

The tenements are subject to royalties and interests in favour of the Government of Papua New Guinea in accordance with the Mining Act 1992 (Act). The holder of a mining lease or a special mining lease under the Act is required to pay a royalty to the State equal to 2% of either:

- the Free on Board (FOB) value of the minerals, if they are exported without smelting or refining in Papua New Guinea; or
- the Net Smelter Return from the minerals, if they are smelted or refined in Papua New Guinea.

No other royalty agreements exist over the tenement package.



While not strictly a royalty cost, the PNG government imposes a second cost on mining projects, that of the MRA Levy. This levy is 0.25% of mine revenue (there are no deductions allowed for concentrate transport, smelting and refining).

#### **4.2.1 States Right to Acquire 30% Interest In Mining Projects**

Under the laws and upon grant of a mining licence (ML) or a special mining licence (SML) the State may elect at its discretion to take, at sunk cost, up to a 30% participating interest in any major mineral development in PNG. Upon exercise of that option, the State will fund its share of capital and ongoing costs and the mine developer will be repaid its share of sunk costs.

In respect of ML150, the State waived its right to acquire a 30% interest in the existing mining licence when they were first granted and has no similar rights under the ML renewal process. However, the State retains the option in respect of the Exploration Licences should any be converted into a Mining Licence or Special Mining Licence.

### **4.3 MEMORANDUM OF AGREEMENT (MOA)**

The original tenement holder, Highlands Pacific Limited ("HPL") signed a Memorandum of Agreement (MOA) with the State, the Eastern Highlands Province ("EHP") Government, the Kainantu LLG, the Billimoian Landowners Association ("BLA"), and Associated Landowners on 11<sup>th</sup> November 2003. This MOA provides for the allocation and use of the royalties derived from the project for the benefit of all stakeholders.

The agreement was to be reviewed five years after consummation, i.e. in 2008, and bi-annually thereafter. There have been no reviews of the MOA due initially to delays in completion of an investigation into Landholding at the Project by the Land Titles Commission ("LTC"), and subsequently due to further delays from appeals to the determination by the LTC in 2009.

The MOA would normally have expired with ML150 on 13<sup>th</sup> June 2014. However, in line with the continuance of the mining lease under Section 112 of the Mining Act 1992, the MOA will continue in force unless the Minister for Mining decides not to extend the term of the mining lease.

K92ML has discussed and agreed with the MRA that the review of the MOA and Compensation Agreement (see 5.4 below) will be delayed until the LTC has finalised review of all appellants to the 2009 LTC determination, and the primary Landholders for the Project have been declared. In the interim, K92ML will comply with the tenets of the MOA and will resurrect aspects of the MOA which have been closed while the project has been in care and maintenance.

#### **4.3.1 Memorandum of Understanding (MOU)**

HPL signed a Memorandum of Understanding (MOU) on 21<sup>st</sup> August 2003 with the Billimoian Landowners Association (BLA). The MOU was presented to the MRA as an attachment to the MOA. The document provides the framework and understanding for the Landowners to receive a 5% interest in the Project.

The agreement to provide to the Landowners a 5% carried equity in the Project was established by the Chief Warden Mr Timothy Kota through mediation after a breakdown in negotiations between the parties over the draft Compensation Agreement.

The MOU provides for Landowners to be issued a 5% carried equity in the Project through the issuing of shares in Highlands Kainantu Limited ("HKL"). The 5% interest was not issued due to uncertainty in relation to the parties who constitute Landowners which is being determined through the Land Title Commission ("LTC") Appeals Review. The obligation in relation to the MOU now resides with K92 Holdings to issue a 5% carried equity interest in K92 Mining Limited once the LTC has issued its determination.

The MOU also provides that 65% of the dividends from the 5% equity will be used to repay capital costs to the parent company and 35% will be paid to the Landholders until the capital has been fully repaid.

This MOU has no legal or binding effect, however K92PNG agreed with Barrick Niugini under the K92ML Purchase Agreement to pursue in good faith negotiations to implement the terms of the MOU and convey a 5% equity interest in K92ML to the BLA.

#### **4.3.2 Local Business Development Policy (LBDP)**

This document, dated August 2003, was prepared as Annexure A to the MOA. The policy sets out the principles by which direct assistance will be given to the Landowners and local Community. K92ML will continue to operate under the tenets of this Policy.

#### **4.3.3 Community Sustainable Development Plan (CSDP)**

This document, dated August 2003, was presented to the MRA as Annexure B to the MOA.

The Plan provides for coordinated management of the benefit streams arising from the mining operation, to ensure that community development was delivered in a sustainable manner.

Key obligations to the Developer under the Plan are:

- Royalties. Distribution of royalties to be to the Public Infrastructure Trust Fund for management under the CSDP.
- Community Facilities Grant (CFG). K600,000 allocated by HPL for high priority community development projects.
- Structural Support Grant (SSG). A grant provided between the commencement of commercial production and commencement of payment of company tax.
- Tax Credit Scheme (TCS). The TCS of applicable tax credits to fund local infrastructure projects.

#### **4.4 COMPENSATION AGREEMENT**

HPL signed a Lands and Environment Compensation Agreement with identified impact communities in June 2003. The agreement was to be reviewed three years from commencing commercial production, and every three years thereafter. There have been no reviews of the agreement due initially to delays in completion of an investigation into Landholding at the Project by the Land Titles Commission (LTC), and subsequently due to further delays from appeals to the determination by the LTC in 2009.

K92ML has discussed and agreed with the MRA that the review of the MOA and Compensation Agreement will be delayed until the LTC has finalised review of all appellants to the 2009 LTC determination, and the primary Landholders for the Project have been declared.

Upon re-commencement of the Project, K92ML will convene a forum for discussion to determine and ratify a method for implementation of the Compensation Agreement in an operational phase now that the LTC has made its 2009 determination. These forums will involve the signatories to the Compensation Agreement (which includes all beneficiaries of the 2009 LTC determination), the LTC, the Provincial Administration, and the Development Coordination Division arm of the MRA.

#### **4.5 CARE AND MAINTENANCE**

In January 2008, Barrick sought to place the mine into care and maintenance. The basis of the care and maintenance application was that the mining operation was not economic at the market conditions existing at that time. Barrick submitted that it would undertake significant exploration on ML150 and surrounding tenements to prove up sufficient resources to enable mining operations to resume.

Barrick received approval to have the mine in care and maintenance via the Variation to the Approved Purposes for Mining Lease No. 150 dated 13 February 2009.

Barrick received an extension to its care and maintenance until February 2013, when the Mining Advisory Council determined that extension of care and maintenance was appropriate provided a Mine Closure Plan was submitted.

Mining Lease No. 150 was renewed on 23 January 2015 for a period of 10 years to 13 June 2024.

Conditions of the lease renewal are discussed in section 4.1.3

Since 01 May 2015 various consultants have been engaged by Otterburn to review aspects of the mine and mill refurbishment. Otterburn has informed Nolidan that the mine is still on care and maintenance at the date of this report.

#### **4.6 ENVIRONMENTAL LIABILITIES AND MINE CLOSURE**

To the extent known by Nolidan, there are no known environmental liabilities on the property which were not fully disclosed in the Mine Closure Plan by Barrick dated November 2010, a summary of which is given below:

The estimated closure costs are reported in two ways, namely as the Asset Retirement Obligation (ARO) and Life-of-Mine (LOM) costs. The ARO reflects expected costs as of the end of a calendar year (the ARO Year) as defined by the Financial Standards Board (FASB) Statement 143. Both the ARO and LOM costs calculated are undiscounted and based on third party cost rates.

The mine closure costs have been calculated in accordance with the Barrick Mine Closure Planning and Cost Estimation Guideline which outlines the approach to estimating costs associated with mine site reclamation, closure and decommissioning. The Barrick Reclamation Cost Estimator (BRCE) model has been used to determine the 2010 costs.

The un-discounted ARO closure cost as at 31 December 2009 was determined as \$5.94m. This estimate has been reviewed based on operational changes and closure review. The un-discounted ARO closure cost estimate for 31 December 2010 is \$ 6.86m.

The un-discounted LOM closure cost as at 31 December 2009 was determined as \$5.97m. This estimate has been reviewed based on operational changes and the closure review. The LOM closure cost estimate for 31 December 2010 is \$6.89m.

It should be noted that in 2010 the 'Direct Total' cost includes a 16% contractor profit and administration fee within the labour rate, whereas in previous years a 20% P&G fees was applied to the overall total cost.

**Table 3 Mine Closure Costs - Barrick 2010**

KAINANTU	Description	2009 ARO (from BRCE)	2010 ARO (from BRCE)
<b>Waste rock Dumps</b>	Waste Rock Dumps	\$32,186	\$37,179
<b>Tailings impoundments</b>	Tailings Impoundments	\$236,238	\$263,413
<b>Pits</b>	Pits	\$0	\$0
<b>Roads</b>	Roads	\$2,494	\$0
<b>Processing areas</b>	Heap Leach Facilities	\$0	\$2,885
	Landfills	\$3,645	\$4,107
	Buildings	\$194,330	\$306,034
	Other Demo & Equip Removal	\$680,000	\$708,800
	Yards	\$29,436	\$33,577
	Process Ponds	\$6,089	\$6,285
<b>Backfilling, Adits, Shafts</b>	General rock Hauling/backfilling	\$0	\$0
	Adits & Declines	\$38,651	\$41,166
	Shafts	\$878	\$1,015
<b>Drainage and Sediment Control</b>	Drainage & Sediment Control	\$8,075	\$12,097
<b>Wells and Bores</b>	Wells & Bores	\$3,816	\$4,537
<b>Exploration rehabilitation</b>	Exploration Holes	\$0	\$0
	Exploration Roads & Pads	\$0	\$0
	Trenches	\$0	\$0
<b>Waste, Decontamination and Effluent Disposal</b>	Waste Disposal	\$48,309	\$50,643
	Solution/water pumping	\$0	\$0
	Solution/water Evaporation	\$0	\$0
	Solution/water Management	\$0	\$0
	Decontamination	\$0	\$0
<b>Other Costs including Closure Management, Admin etc</b>	Other user costs	\$1,891,640	\$2,081,982
	Miscellaneous costs	\$849,534	\$942,814
	Closure Plan Management	\$20,000	\$120,750
	Construction Management	\$256,656	\$300,558
	Monitoring & Maintenance	\$220,993	\$458,207
	General & Administration	\$0	\$1,060,000
	Human Resources	\$430,000	\$424,000
	Direct Totals	\$4,952,970	\$6,860,049
	Contractor P&G (including profit)	\$990,594	\$0
	<b>Total</b>	<b>\$5,943,563</b>	<b>\$6,860,049</b>

#### 4.7 TAILINGS STORAGE FACILITY

A tailing storage facility (TSF) is located downstream of the process plant adjacent to the Kumian Creek, which flows into the Baupa River (~~Figure 6~~~~Figure 6~~~~Figure 6~~). Tailings are reject from the flotation circuit.

The tailings storage facility is classified as a high hazard dam and contains tailings material. Runoff from within the dam is captured in catchment ponds behind the dam wall and is intermittently decanted into the tailings treatment ponds prior to discharge to Kumian Creek. The tailings material remains saturated as meteoric waters have been allowed to pond in the TSF. Water quality of the discharge from the ponds indicates that the water quality does not pose a risk to the receiving environment.

##### 4.7.1 Tailings Disposal

It is reported that nominally 285,000 tonnes of tailings were produced by the plant during the years of production. The waste stream generated from the processing of ore comprises of sand tailings from the flotation circuit. The flotation tailings were relatively inert, composed primarily of quartz and waste rock sand and only very minor sulphur bearing minerals. However inspections of the tailings material indicate it does possess acid producing potential. A water cover is maintained over the material within the TSF which has prevented oxidation. No detailed studies have been completed on tails characterisation.

The only water discharge from the plant was contained in the flotation tailings, and pumped to the tailings dam. Any over-accumulation of decant water in the TSF was discharged to the overflow wetland system. Overflow and decant from the TSF flows through a wetland system prior to discharge to Kumian Creek. Barrick verbally confirmed that the amount of AMD water currently being discharged into the creek is within acceptable levels as governed by the Department of Environment.

##### 4.7.2 Future Tailings Capacity

It is reported that approximately 307,000t of ore was fed to the plant over the life of the mine, with 93% reporting to the tailings for 285,000t.

Assuming a total capacity of 545,000t, and utilisation of 285,000t to date, the remaining capacity of the TSF would be around 238,000t dry or 170,000m<sup>3</sup>. In 2013 Golders estimated nominally 280,000m<sup>3</sup> capacity remaining based on the observation of 2m remaining freeboard on the TSF wall.

No detailed survey reconciliation has been completed on the current capacity of the TSF. The two estimation methods presented here have a variance of 110,000m<sup>3</sup>. A detailed survey reconciliation will be completed as a high priority during the process of refurbishment of the Plant.

#### 4.8 REQUIRED PERMITS

The following permits are required for mining operations:

- License to keep, store or possess explosives;
  - Application will be made by the Registered Mine Manager prior to recommencement of underground refurbishment operations.
- Permit for Persons using Explosives;
  - Competent Persons will be employed for using explosives, and K92ML will ensure those Competent Persons have this appropriate permitting.
- Conveyance of Explosives & Dangerous Goods;
  - Application for this permit will be made by the Registered Mine Manager prior to commencement of shipping of explosives or dangerous goods to the site.
- License to keep, or Register premises to store inflammable liquids;
  - This license will be checked and if it is not current then the license will be renewed immediately after Completion of the sale agreement.
- Approval to recruit non-citizens;
  - License is currently held by previous operators. Approval will be sought by K92ML immediately after completion of the sale agreement.
- Gold Export License;
  - K92ML will apply for this license prior to recommencement of production operations.
- Export Consignment Form;
  - K92ML will pursue this form with the MRA upon receipt of the Gold Export License.
- Exchange Control for Establishing Foreign Bank Accounts;
  - Approved, but will be amended by K92ML upon completion of the sale arrangements.
- Tax Clearance Certificates for Transfer of Funds out of PNG;
  - K92ML will apply for this clearance from the Commissioner of Taxation after Completion of the sale arrangements.
- Liquor License;
  - This application will be made upon Completion of the sale arrangements.
- Certificate to Conduct Business as a Foreign Enterprise;
  - Not required as K92ML will be operating through a PNG company.
- Registration of an Overseas Company under the Companies Act;
  - Not required as K92ML will be operating through a PNG company.
- Date Transmission VSAT;
  - Not required at this time.
- Radio Licenses;
  - Granted to previous operator.

#### 4.9 ENVIRONMENTAL PERMITS

Environmental Permits for the Property are for Water Extraction and Waste Discharge. Environmental permits for the site are current until 31<sup>st</sup> December 2053. The various iterations of the Permits are described here:

- 14/06/2002; Grant of permits - Water Extraction WE-L3(9), Waste Discharge WD-L3(32)
- 30/08/2004; Amendment for Water Extraction WE-L3(13), Waste Discharge WD-L3(34).
- 12/09/2005; Amendment for Water Extraction WE-L3(13), Waste Discharge WD-L3(34).
- 11/12/2007; Transfer for Water Extraction WE-L3(13), Waste Discharge WD-L3(34). Transferred from Highlands Kainantu Ltd to Barrick Kainantu Ltd.

#### 4.10 OTHER SIGNIFICANT FACTORS AND RISKS

Barrick conducted an extensive investigation into the matter of the all outstanding sales royalties and compensations payable by K92ML since the commencement of the project. Some of these monies remain outstanding due to internal disputes over land ownership, the resolution of which is beyond K92ML's control. Barrick, in conjunction with the K92ML Purchase Agreement, set up bank accounts under K92ML to hold these monies in trust. Considerable effort was expended to ensure that Barrick had determined the entire value of the amounts outstanding. Where there are discrepancies, Barrick has erred on the side of caution with respect to determining amounts payable. However, any discrepancies discovered after closing of the K92ML Purchase Agreement are the responsibility of the new management. Barrick considers that once the bank accounts are in place and the populated with the relevant monies, they have concluded their obligation to fully investigate and hand over the outstanding monies for the new administration's future management and dispersal.

Access to areas with existing surface miners is challenging, although well under control at the present time. K92ML maintains a security presence at the main artisanal mining areas (Kora and Irumafimpa). The Security teams are supervised by K92ML personnel, but are comprised of local Billimoian security contractors who source their personnel from the nearby Billimoian villages. There have been no significant artisanal mining issues since this approach was employed (Barrick, 2014).

Land Ownership and access issues result from inter-clan fighting. This results in delays in assessment and advancement of exploration properties. The risk to property is minimal and is mitigated by ongoing and proactive Community Relations ("CR") engagement.

Strong community relations are imperative to exploring in PNG with community agreement required before any exploration activities can take place. The Kainantu area has been beset with CR issues since modern exploration commenced, resulting in many prospective areas not being explored and very limited drilling. The K92ML CR team have worked to gain the trust of the local landowners and this has resulted in access being granted in many areas which have not previously undergone detailed exploration.

As part of Barrick's commitment to deal equitably with local communities, Community Engagement Agreements between Barrick and local landowners were put in place prior to any exploration activities commencing. These set out what the community could expect from Barrick, including incentive payments, rental payments and dispute resolution procedures. The Exploration CR team includes up to four community relations officers and six village liaison officers supported by a community relations coordinator and Community Relations Manager.

Community relations personnel deal with all access negotiations prior to any exploration activities being undertaken, calculate, resolve and payout compensation payments and attend all Warden's Hearings. (Barrick 2014)

K92ML has undertaken to continue this pro-active CR engagement with affected landowners.

As to political risk, Nolidan notes that on the Fraser Institute's Investment Attractiveness Index for 2014 Papua New Guinea ranks higher than Indonesia and the Philippines but below Australia and New Zealand (Jackson, T., and K.P.Green, 2015). Its score was 48.5 compared with 56.2 in 2013.

## 5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

### 5.1 PHYSIOGRAPHY

The Property lies within an area of mostly rugged topography, with transecting rivers forming lower lying areas. Elevations range from 400m to 1600m above sea level. Vegetation is mostly primary rainforest with areas of shifting agriculture in valley floors.

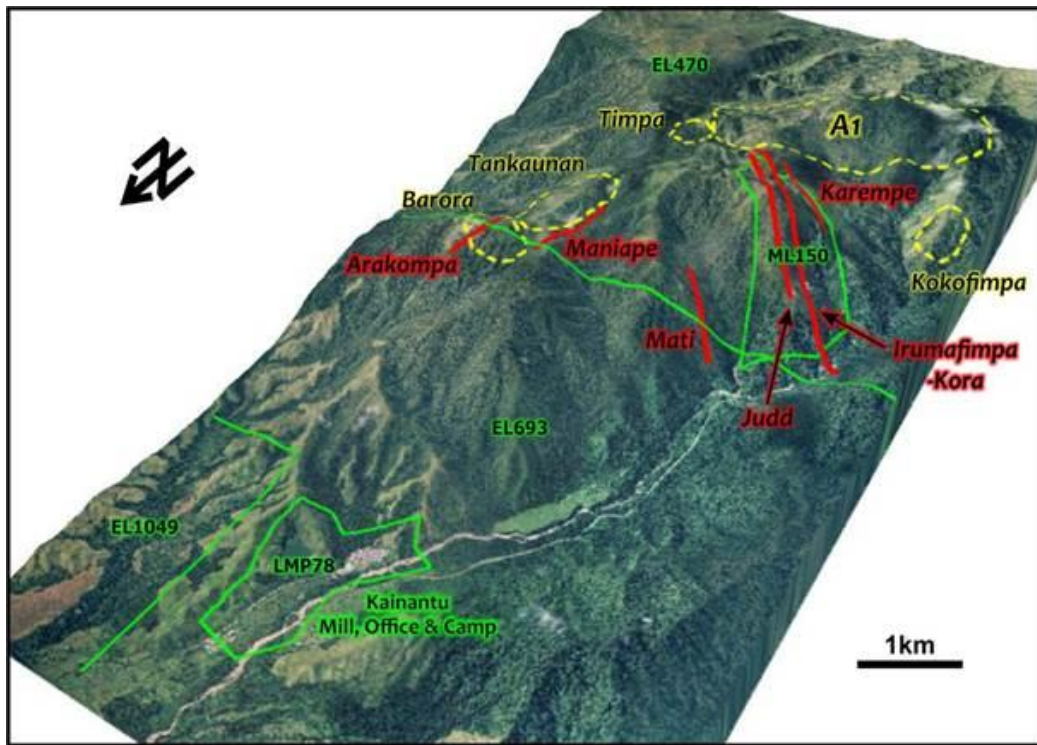


Figure 2. Oblique View of Northern Part of Property, Showing Relief and Location of Main Infrastructure.

Source: Barrick 2012

## 5.2 ACCESS

The property area is accessed by a two hour drive along the sealed Lae-Madang Highway from Lae. Lae is the capital city of the Morobe Province and second largest city in PNG. It is serviced by daily flights from Port Moresby and other PNG centres and also hosts the largest cargo port in PNG.

The property is serviced by a 10 km long formed access road from the Lae-Madang Highway, commencing at Gusap Airstrip to the Kumian Process Plant and Office facility. The access road crosses one single lane bridge at the Ramu River. From the process plant site, a formed haul road travels 6.5 km to the 800 Lower Portal of the mine. The haul road crosses three major single lane bridges.

Access and haul roads span 6m width and are constructed within two Mining Easements (ME's 80 and 81) commencing at the Ramu Bridge. The haul road rises 391m in elevation over its total length. These roads are graded and reformed generally twice a year in low traffic conditions, and have not deteriorated significantly in high rainfall seasons.

## 5.3 CLIMATE

The climate across the Property is variable due to topography. Hot temperatures and wet conditions characterize the climate at Kainantu. Daytime temperatures reach 30°C dropping to night time lows of 20°C. A pronounced wet season occurs between November and April, although rainfall is common throughout the year. Rainfall averages 235 mm/month during the November to April wet season, and 137 mm/month during the dry season. Annual rainfall averages approximately 2000 mm. Project operation/exploration is subject to the weather; reduced visibility when cloudy prevents operation of helicopters and heavy rainfall or earthquakes can trigger landslides.

## 5.4 LOCAL RESOURCES

The Property site offices are located 140 km from Lae, 21 km from Kainantu township and 56 km from Goroka (Table 4). Goroka is the Capital of Eastern Highlands Province and contains Local and Provincial Level Government Offices.

**Table 4. Local Resources to Property**

Local Resources	Lau (Morobe Province)	Goroka	Kainantu
Population:	~100,700	~18,500	~6,700
Elevation:	10m	1600m	1570m
Distance from Lae:	-	285km	170km
Distance to Property Site Offices	140	56	21
Airport:	Runway Length 2440m. 1 Runway;	Runway max 1646m. 2 x runways.	Disused
Commercial air travel:	+ 11 flights daily	3 flights daily. 1 hr flight from Port Moresby.	no
Facilities:	Many	Schools, hospital, police station, district and provincial court, tertiary education, fuel stations, banks	School, hospital, police station, district court, fuel stations, banks. Local Level Government Offices.

#### 5.4.1 Yonki Dam and Ramu Hydro Electric Power Station

Yonki Dam provides water for the Ramu Hydro Power Station and the Yonki Toe of Dam Power Station operated by PNG Power Ltd. The Dam commissioned in 1991 on the upper Ramu River, has a 335 Mm<sup>3</sup> capacity, a 60 m high earth fill dam wall with 680 m long crest

Mining Projects including Hidden Valley created a need for additional power output. The Yonki Toe of Dam Project was commissioned in 2013 to help meet that need.

Currently the Ramu 1 Hydro Power station is supplying 54 MW from three generators on to the Ramu Grid while the Yonki Toe of Dam supplies 14MW. They are supplemented by 4MW from the Pauanda Hydro Power station, 10MW from the Baiune Hydro Power station at Bulolo in Morobe Province and a combined thermal generation capacity of 20MW from the diesel power stations in Lae, Madang and the Highlands centres, giving a total generation capacity of 102MW into the Ramu Grid (PNG Power website, 2014).

The grid serves Lae, Madang & Gusap in the Mamose Region, and Wabag, Mendi, Mt Hagen, Kundiawa, Goroka, Kainantu & Yonki in the Highlands.

#### 5.4.2 Gusap Airstrip

The Gusap Airstrip is a fully licenced, international grass strip located in the Ramu Valley and maintained jointly by the project and Ramu Agricultural Industries mainly for use in emergencies.

### 5.5 INFRASTRUCTURE

The Kainantu mine is located within ML150 and the main Kainantu exploration camp and processing plant are located within LMP78 which is located within EL693. The Property includes all mine infrastructure, exploration camps, exploration data and diamond drill core.

The property is well supported by regional infrastructure, and contains nearly all the necessary site infrastructure to recommence mining operations. Elements of the infrastructure will require upgrade or servicing.

The following descriptions are summarised from Barrick (2014).

#### 5.5.1 Power

Power is supplied to the Property from two sources. The primary source is the PNG Power national grid from the Ramu sub-station, located 20 km from the processing plant site. The electrical energy



for Kainantu operations is delivered by PNG Power from the nearby Yonki Dam Hydroelectric Plant. In early 2010, back-up power capacity was reduced to one 530 kVa containerised 415V generator at the plant site. Power from the national grid services both the plant area and is available up to the lower portal of the underground mine. Power reticulation is 11kV.

### 5.5.2 Water

Water for potable use is drawn from two bore wells and treated at an on-site treatment plant. Raw water for use in the process plant is provided primarily from diverted discharge from the underground mine, backed up by additional capacity from bore wells and the option to draw water from Baupa Creek. Make-up water can also be supplemented by decant water from the TSF.

## 5.6 MINE

Underground mining at Kainantu operated from 2004 to 2008. The majority of the mining infrastructure remains in place and is summarised below.

### 5.6.1 Lower 800 Portal And Workshop

The Lower 800 Portal area encompasses infrastructure for utilisation and security of the Irumafimpa Mine. Key elements of the infrastructure are:

- Power generation platform; This raised concrete platform formerly housed and sheltered five generator units and power regulation infrastructure providing underground back-up power
- Workshop and secure store rooms; a facility comprising four containers stacked two high and roofed with sheeting iron. The facility provides secure storage for cap lamp recharging station, re-breather units, small equipment and general consumables. A covered work deck provides shelter from weather during maintenance and servicing of underground plant. The underground tag-board and mine entry log is also housed here.
- Reinforced underground portal including security gates.
- Washdown bay, ablutions hut, laydown area.

The lower portal facility is located less than three hundred meters from a local settlement named Kokomo, comprised of Pomasi residents and Billimoian settlers. There have been no security issues for the portal from the settlement.

### 5.6.2 Underground Mine

The Irumafimpa Underground Mine comprises:

- Lower 800 Portal, Upper 1300 Portal, Puma manway Portal, and various escape ways.
- 6 km incline to working levels. The incline is 5m x 5m, from the 840 portal to the switchback at the Kora turnoff, where breakthrough of the decline from the working levels occurred. The upper section of the incline from the switchback is 4m x 4m.
- Working levels 16 to 23, each developed with footwall drive, ore development drives, and ancillary crosscuts and stoping development. The working levels are constructed at 3m x 3.5m.
- Two ore passes dropping from the upper levels to the lower section of the incline.

#### 5.6.2.1 Upper 1300 Portal

Most of the infrastructure at the Upper 1300 Portal which had been used during mine operations has been removed from the site. The site is currently not accessible from the underground mine due to a collapse along the internal access route.

### 5.6.3 1400 Level Camp

Following closure of the underground mine in 2009, the majority of the 250 man 1400 Level Camp was decommissioned and removed from the site. One building remains which facilitates security services for the upper mine openings and prevention of illegal mining.

### 5.7 PROCESSING PLANT AND INVENTORY

The Kainantu processing plant ([Figure 3](#)~~Figure 3~~~~Figure 3~~) is located approximately 7 km from the opening of the 800 portal which accesses the Irumafimpa Mine. The plant has been on care and maintenance since December 2008. Simple processing technology was used and following crushing, screening and grinding, sulphide bearing material was separated from non-mineralized host rock by flotation and a gold -rich flotation concentrate sold. Further details of the processing plant are in Section 13 Mineral Processing and Metallurgical Testing.

A verification of inventory for the site was conducted by Genric Holdings, an international security specialist company, in September 2014. The inventory included the accommodation camp, operations fixed assets, vehicles, exploration, communications, and warehouse

An itemized database exists of all mining and milling equipment, buildings, vehicle fleet, heavy equipment fleet (including loaders, grader, scooptrams, forklifts.), power infrastructure (including power lines, transformers, generators, cable, etc.), parts and spares warehouse, underground mining consumables, communication and IT equipment, computers, exploration equipment and any other equipment or assets retained by the company (Genric, 2014).

The current value of these assets has not been determined.



Figure 3. Oblique view of Process Plant and office infrastructure area (circa 2012)

Source: Barrick 2012

### 5.8 OFFICE

Additional infrastructure at the property includes an accommodation camp at Kunian, administration offices, warehouses, equipment workshops, exploration area and an assay laboratory ([Figure 3](#)~~Figure 3~~~~Figure 3~~).

## 5.9 EXPLORATION AREA

An office facility measuring 16m x 11m provides facility for an exploration team to operate at the site. The office is accompanied by a 23m x 21m core processing shed with extensive roller-racking for core logging. A warehouse facility of 7m x 22m provides secure locked storage for all exploration equipment and consumables, and a container laydown provides further storage for equipment and sulfidic core which would otherwise be susceptible to weather. A palletised core farm contains all available core from the history of the Project. A separate ablutions building is also located at the site.



Figure 4. Profile view of Exploration Coreshed (left foreground), warehouse (left background) and offices (right foreground) (circa 2014)

## 5.10 ACCOMMODATION CAMP

Accommodation at Kumian Camp consists of a series of single person/shared ablution type facilities, as well as fully ensuited rooms for senior personnel. The current optimum capacity of the camp is 365 personnel. This can be expanded by refurbishment of existing (closed) accommodation in the camp to accommodate a further 203 personnel (568 personnel in total). The primary security post and gate house is located in a 6m x 4½m building at the entrance to the site on the access road.



Figure 5 Aerial and Ground view of Kumian Accommodation Camp (circa 2009)

Mess/catering facilities for 116 persons provide three meals a day for site personnel in accordance with required health standards. These facilities are officially inspected monthly and are randomly monitored by site OH&S staff on a weekly basis. Grounds and surrounds will be maintained by a contract company, but Mess buildings and infrastructure will be maintained by K92.

The camp also contains a health / first aid clinic for the benefit of K92's employees. The clinic is sufficiently furnished to stabilise injured personnel prior to transport. It contains a paramedic's office, treatment couch, emergency treatment room, bathroom, dispensary, records storage and a waiting area. The clinic is supported by a mobile ambulance for paramedics and clinic staff.



**Figure 6. Aerial view of Process Plant, Tailings Storage Facility and Accommodation Camp (circa 2009)**  
*Source: Barrick 2012*

At the exploration area the office is accompanied by a core processing shed with extensive roller-racking for core logging. A warehouse facility provides secure locked storage for all exploration equipment and consumables, and a container laydown provides further storage for equipment and sulfidic core which would otherwise be susceptible to weather. A palletised core farm contains all available core from the history of the Project.

## 6 HISTORY

Gold was discovered in the area in 1928 in the Kainantu alluvial gold areas, however modern exploration did not commence until the early 1980's. After the discovery of Irumafimpa, Highlands

Pacific Limited (“HPL”) focused on high grade Au telluride mineralization with little to minor work conducted on the porphyry Cu Au targets. HPL commenced mining operations on the Irumafimpa deposit in 2005.

Barrick purchased the tenement package from HPL in late 2007 and concentrated on increasing resources at Irumafimpa-Kora and discovering economic porphyry Cu-Au mineralization. There has been a significant amount of exploration on the property by various owners, which is summarised in [Table 5](#). The operation has been on care and maintenance since January 2009.

**Table 5. Kainantu exploration statistics, Barrick and historical.**

Tenement	Drillholes	Drill Metres	Drill Samples	Stream Sediments	Rock Chips/Trench	Soils Samples	Pan Concentrate	Unknown
<b>Barrick</b>								
ML150	30	11497	10522		4/-	8		
EL470	11	6072	6039		2077/12	926		
EL693	0	0			26/65			
EL1277	0	0			141/-			
EL1341	1	530	491	2	939/-	404		
<b>Historical</b>								
ML150	641	43110	26456	25	185/719	549	12	4
EL470	19	3084	1216	947	903/111	1196	486	5
EL693	46	11694	887	294	340/452	470	201	
EL1277	0	0		367	159/211	624	178	
EL1341	39	3365	2113	1026	2627/168	2802	62	890

### 6.1 PREVIOUS OWNERSHIP

EL470 was granted to Renison Goldfield Consolidated (PNG) (“RGC”) on 5th July 1982 as PA470. The area of EL693 was granted to RGC as PA462 and held in joint venture between RGC and Kafenu Mining until 1986, when a renewal application was rejected. The area was granted to RGC on 29 December 1986 as EL693.

RGC entered a Joint Venture over the EL’s 470 & 693 with Highlands Gold Resources Limited (“HGL”) in 1989, with HGL as the Operator. In 1994 RGC withdrew from the joint venture and the tenures became the sole property of HGL. When HGL was restructured in 1996, the new company Highlands Pacific Resources Limited (“HPL”) inherited the properties.

The properties were joint ventured between HPL and Greater Pacific Gold NL (“GPG”) from 1996 to 1998 with GPG as the Operator. This agreement was succeeded by a joint venture between HPL and Nippon Metals and Mining Company (“Nippon”) commencing in 1999, with HPL as the Operator and Nippon as the Funder. Nippon withdrew from the joint venture in late 2000.

In the following years, HPL systematically increased the size of its tenement package with applications granted for tenements in 2001 (EL11277), 2002 (ML150, LMP78, ME80, and ME81), 2004 (EL1341), 2005 (EL1399) and 2006 (EL1400). Barrick purchased the Kainantu tenement package from HPL in December 2007 through its 100% owned subsidiary Placer Dome Oceania Limited. This entity’s name was subsequently changed to Barrick Kainantu Limited (now “K92 Mining Limited”) which was the most recent holder of the Kainantu package tenements.

At the time of the purchase by Barrick, the package included seven exploration licences; EL470, EL693, EL1049, EL1277, EL1341, EL1399 and EL1400; one mining licence, ML150; two mining easements, ME80 and ME81; and one licence for mining purposes, LMP78. During its term of

operations, Barrick surrendered the EL's 1399, 1400 and 1049; and added two exploration license applications; ELA1898 and ELA1899. These two applications were later dropped in late 2013.

In November 2011, an application for renewal of EL1277 was rejected by the PNG Minister for Mining. Barrick commenced Court action to dispute this decision in Court. No settlement has been reached out of Court, and the status of EL1277 remains subject to negotiation.

The current total area of the tenement package is approximately 405 km<sup>2</sup>.

## 6.2 HISTORICAL EXPLORATION 1928-2012

The Historical Exploration up to 2007 described in this section is summarised from Smith (2008).

Ned Rowlands, an Australian prospector, first discovered gold in the Kainantu area in 1928 on a small creek draining into Abinakenu Creek. From 1928 to 1940, approximately 102 kg of gold was reportedly won as alluvial gold. Production ceased during WWII and did not resume in the Kainantu area until 1947. Between 1947 and 1972 alluvial gold production from the Kainantu area totalled 772.8 kg fine gold and 58.9 kg of silver.

Between 1948 and 1952, copper was discovered at Yonki Creek. In 1955, prospectors worked this small lode, which contained the secondary copper minerals malachite and covellite. Approximately 8 tonnes of handpicked ore grading 8% copper was shipped to Australia for processing.

The southern end of the Irumafimpa lodes was discovered some time prior to 1967. In 1967, Ken Reihder and Ray Frazer started working Prospect Claim 6 for copper and gold. The workings, known as the Kora mine, produced about 1,000 tonnes of gold and copper ore between 1967 and 1970. The ore processed through a five-head stamp mill is recorded as averaging three ounces recovered gold to the tonne.

Between 1969 and 1972, most reconnaissance work concentrated on the Yonki copper gold lode, which lies south of Abinakenu Creek. Two samples were collected near Yar Tree Hill from auriferous vein quartz reef.

In early 1982, general reconnaissance was carried out in the area by stream sediment and rock chip sampling. The work confirmed the presence of gold in alluvium and rocks over a wide area. Further work was recommended.

In 1984, further reconnaissance revealed that alluvial gold is present in virtually all of the creeks draining a NNW trending ridge between Abinakenu and Asupuia village. Later in 1984 and 1985, various programs were carried out to sample the ridge south and east of the Asupuia – Abinakenu ridge. Later, in 1989, Highlands Gold carried out further sampling east of Mt Kanuna. One party attempted to walk up the main ridge between Asupuia and Abinakenu, only to be turned back by hostile landowners.

Prospecting Authority (PA) 693 was initially granted to RGC (PNG) Pty Ltd on 24th December 1986 and renewed for a further two-year period on 29th December 1988. In July 1989, Highlands Gold Resources N.L. (HGL) entered into a joint venture agreement with RGC to earn a 50% interest in EL693. Expenditure commitments were fulfilled and HGL assumed its share of the ownership in 1994.

Highlands Gold actively explored the Kainantu properties from 1989 to 1994. Their initial work consisted of mapping, sampling and trenching. The work delineated several high grade gold targets including Irumafimpa, Maniape and Arakompa. Exploration was focused on Irumafimpa where six diamond drillholes were drilled (for a total of 1,402m) during the last quarter of 1992. These drillholes returned some very encouraging gold results. To follow up on these, further extensive trenching, mapping and sampling was conducted. During the last half of 1993 a geophysics program

comprising magnetics, CSAMT and IP was implemented, and a further 15 diamond drillholes (for a total of 3597.3m) were completed.

In 1996, Highlands Gold was taken over by Placer. In June of that year, Placer floated the exploration assets of Highlands Gold off into a new company called Highlands Pacific. The Kainantu tenements became part of the core assets of Highlands Pacific. That same year Highlands Pacific joint ventured the property to a junior exploration company, Greater Pacific Ltd. and this company became operator and manager of the project. Greater Pacific however struggled to make any exploration progress on the property, due to landowner difficulties and funding shortfalls. By the end of 1998 it became obvious that Greater Pacific would be unable to meet their joint venture obligations. At that time Highlands Pacific staff reviewed all of the previous exploration conducted within the Kainantu district. This review indicated a very high potential for discovery of a significant tonnage of high-grade gold mineralization within the Irumafimpa, Maniape and Arakompa vein systems. A follow up work program, to be managed by HPL, was proposed.

The joint venture with Greater Pacific was terminated early in 1999, and subsequently a joint venture with Nippon Metals and Mining Company was ratified. Under the terms of this agreement, Nippon was to sole fund the initial stages of exploration whilst HPL manage the exploration programs. In 1999 the Nippon-Highlands joint venture drilled 14 holes in the Irumafimpa area with reasonable success. The following year the venture drilled another 12 holes to further define the Irumafimpa resource. Nippon withdrew from the joint venture in late 2000 and Highlands Pacific subsequently regained 100% of the project.

Local people started mining zones of the Irumafimpa zone in 1992 after the discovery of the outcrop by Highlands Gold. Surface mining at all of the three mineralized structures continues today, and provides a major source of income for the local people.

Modern development of the Irumafimpa deposit commenced in 2004, and the mine has struggled to achieve planned mined grades, through a combination of complexity of geology and unplanned dilution. The net effect of not achieving planned head grades was a shortfall in metal production resulting of purchases of spot gold to enable the company to meet its hedging requirements. Continued shortfalls in metal production pushed Highlands Pacific to consider a sale of the assets, which was acquired by Barrick Gold in December 2007.

Barrick conducted Exploration from 2008 to August 2012. In addition to resource evaluation of the Kora deposit their priority was discovery of a large porphyry system. Land access issues were the main challenge to implementing exploration activities. Access to the high priority A1 project was only available for the 6 months before Exploration was halted by the decision to divest the project.

### 6.2.1 Geophysical Surveys

Geophysical surveys conducted on the property are summarised below:

**Table 6. Summary of Geophysical surveys conducted by Barrick and previous owners.**

Survey	Year	Operator	Specifications	License
<b>Pre-Barrick Geophysical Surveys</b>				
Aeromagnetic	1982	Geoterrex	500m Line spacing, 000° Line orientation, 100m terrain clearance	Kainantu Region
Aeromagnetic	1982	Geoterrex	125m Line spacing, 135° Line orientation, 100m terrain clearance	PA443
Aeromagnetic	1982	Geoterrex	125m Line spacing, 000° Line orientation, 100m terrain clearance	PA444
Ground mag IP/Resistivity	1993	Elliott Geophysics	Ground magnetics: 22Lkm IP/Resistivity: 16Lkm DDIP over 36 IP spreads	EL470 (ML150 Irumafimpa)
<b>Barrick Initiated Geophysical Surveys</b>				
Mag/Rad/DTM	2008	UTS	Helicopter survey, stinger magnetic sensor, 32L crystal	Kainantu Package

Survey	Year	Operator	Specifications	License
		Geophysics	pack, GPS, Radar and laser altimeter. 200m line spacing and 50m terrain clearance.	
Petrophysics	2008	Emmerson, D.	Petrophysics analysis of three host rocks and mineralization from Arakompa & Irumafimpa.	EL693, 470, ML150
AEM	2008	UTS Geophysics	Towed bird helicopter electromagnetics survey (AeroTEM IV). 090° line direction. 150m line spacing, 100m helicopter height, 50m EM Loop height. Total of 290km2 for 1660 Lkm.	EL693, 470, 1341 + Wamum Project
Aerial Photos	2009	Fugro	1:20,000. Total area 49.8km2	Kainantu region
Magnetic	2011	Barrick	Inversion model created from existing data	EL470 (Tankanen)

### 6.2.2 Drilling, targets and results

Drilling conducted on the property is summarized in Table 7 which was derived from the master database compiled by Barrick. At this stage drilling procedures have not been sighted by Nolidan. However, Barrick is an established publicly traded Canadian mining company with multiple international mining, development and exploration operations. As such, it is reasonable to assume that Barrick abided by industry standard drilling procedures at the Kainantu project as per the drilling procedures they employ at their other projects.

**Table 7. Property drilling statistics by prospect (Barrick and others).**

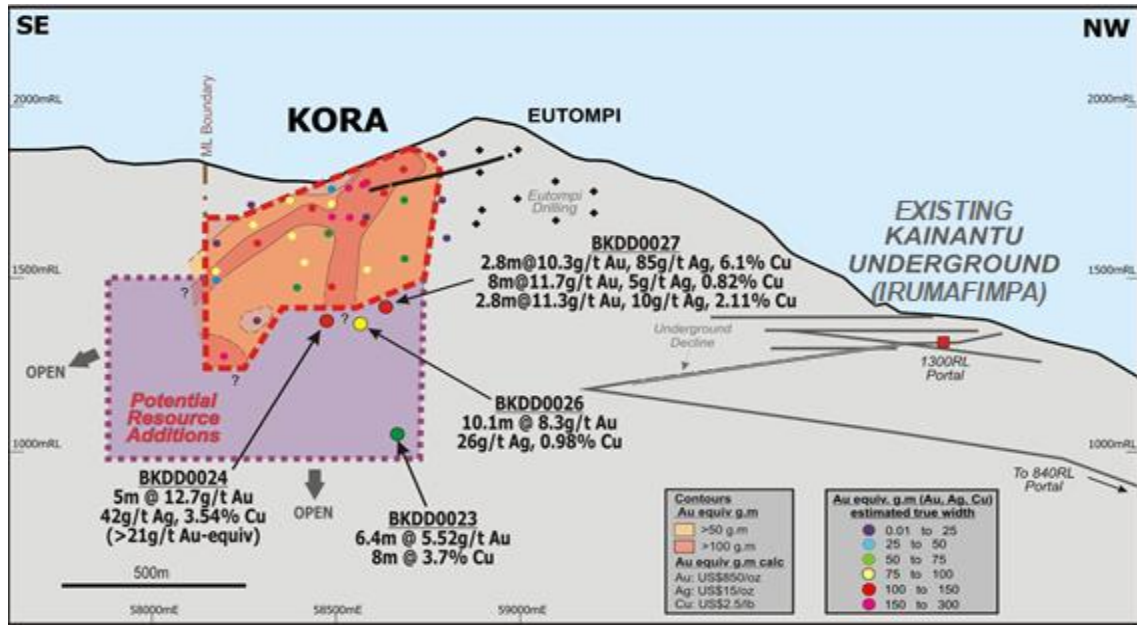
Prospect/area	Surface DD		Underground DD		RC	
	Holes	metres	Holes	metres	Holes	metres
<b>Historical</b>						
Irumafimpa/Kora and other ML150	79	16596	562	26514		
Aifunka Hill	5	902			22	717
Arakompa	46	11694				
Baupa Creek	3	297				
Kathnel	7	667				
Maniape	16	2787				
Yompossa	2	521				
Ontenu	3	557				
<b>Barrick</b>						
Irumafimpa/Kora and other ML150	24	10690	6	808		
Kokofimpa	3	2023				
Ontenu	1	530				
Tankuanan	8	4049				

Irumafimpa-Kora is an advanced property and updated Resources are described in Section 14. A description of the most recent drilling conducted by Barrick at Kora (and Karempa and Judd) follows below. The historical drilling by HPL at Irumafimpa was extensive. Project drill collar plans, representative sections and descriptions of results for the other prospects were obtained from Barrick (2014) unless referenced otherwise. Figure 15 shows the location of the prospects described below in relation to property boundaries.

#### 6.2.2.1 ML150 (Irumafimpa, Kora, and Karempa)

A representative long section is shown in Figure 7. A total of 24 diamond holes (BKDD0001–BKDD0019 and BKDD0023–BKDD0027) were drilled by Barrick at Kora for a total of 2022.9m (Table 8), including a single hole at the nearby Karempa vein system (Figure 8). Drilling confirmed the continuity of the Kora Lode and confirmed that the overall system has a vertical extent to >800m. Significant intercepts are summarised in Table 9 and Figure 9 shows the consistency of grade intersected at Kora.





**Table 8. Diamond drillhole information at Kora.**

Hole ID	Collar Location			Collar Orientation		Depth (m)	
	Northing	Easting	RL	Azimuth	Dip		
BKDD0001	9317626	375484	375484	1855	220	-60	374.3
BKDD0002	9317766	375485	375485	1914	215	-60	525.3
BKDD0003	9317626	375484	375484	1855	220	-70	530
BKDD0004	9317559	375423	375423	1802	220	-60	246.3
BKDD0005	9317559	375423	375423	1802	220	-70	387.7
BKDD0006	9317578	375569	375569	1811	225	-70	685
BKDD0007	9317851	375426	375426	1928	220	-60	607.9
BKDD0008	9317696	375258	375258	1799	220	-65	166.2
BKDD0009	9317703	375145	375145	1813	45	-75	279.5
BKDD0010	9317696	375261	375261	1799	170	-60	300.9
BKDD0011	9317703	375145	375145	1813	40	-45	129
BKDD0012	9317702	375145	375145	1813	85	-45	271.5
BKDD0013	9317851	375427	375427	1928	205	-55	267.1
BKDD0014	9317578	375568	375568	1811	225	-60	608.8
BKDD0015	9317706	375141	375141	1813	0	-45	235.1
BKDD0016	9317766	375482	375482	1914	220	-70	235.1
BKDD0017	9317578	375568	375568	1811	220	-50	262
BKDD0018	9317703	375145	375145	1813	105	-75	150.1
BKDD0019	9317851	375426	375426	1928	240	-60	191.7
BKDD0023	9317946	375301	375301	1924	220	-75	951.4
BKDD0024	9317880	375462	375462	1933	215	-60	971.9
BKDD0025	9317625	375007	375007	1846	245	-60	698.7
BKDD0026	9317946	375301	375301	1824	195	-65	758.7
BKDD0027	9317625	375007	375007	1846	45	-65	555.2

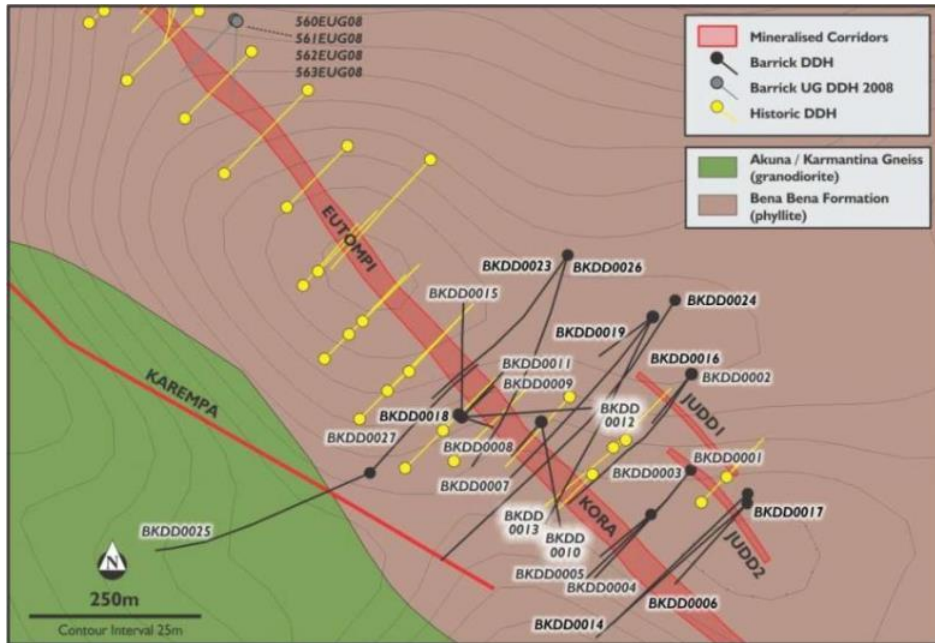


Figure 8. Local geology and Barrick drillholes location plan at Kora and Karempe.

(Source Barrick 2014)

Prospect location in relation to property boundaries is shown in Figure 16

Table 9. Significant intercepts, Barrick drilling (> 1 g/t Au) at Kora.

Hole ID	From (m)	To (m)	Length (m)	Au (g/t)	Cu (%)	Metal Accumulation. Factor (gm)
BKDD0001	279	282	3	5.16	8.37	15.48
BKDD0001	299	303	4	6.3	8.04	25.20
BKDD0002	113.3	116.3	3	347.73	0.21	1043.19
BKDD0005	138.1	146	7.9	20.14	6.74	159.11
BKDD0005	156	159	3	8.33	7.96	24.99
BKDD0005	173	182.7	9.7	4.64	0.53	45.01
BKDD0006	575.2	581	5.8	6.76	7.94	39.21
BKDD0007	515.15	522.51	7.36	22.78	2.22	167.66
BKDD0008	87.5	89.5	2	53.36	4.8	106.72
BKDD0008	123.38	130	6.62	9.57	0.44	63.35
BKDD0009	218.87	221.36	2.49	207.09	3.04	515.65
BKDD0009	225.6	231.4	5.8	25.05	2.25	145.29
BKDD0010	104.8	107	2.2	101.7	15.07	223.74
BKDD0011	38	47	9	19.17	1.08	172.53
BKDD0013	488	492	4	228.91	0.45	915.64
BKDD0015	62.4	73	10.6	184.78	1.85	1958.67
BKDD0023	945	951.4	6.4	5.55	0.46	35.52
BKDD0024	619	624	5	12.94	3.54	64.70
BKDD0026	582.9	593	10.1	8.21	0.97	82.92
BKDD0027	472	480	8	11.97	0.82	95.76

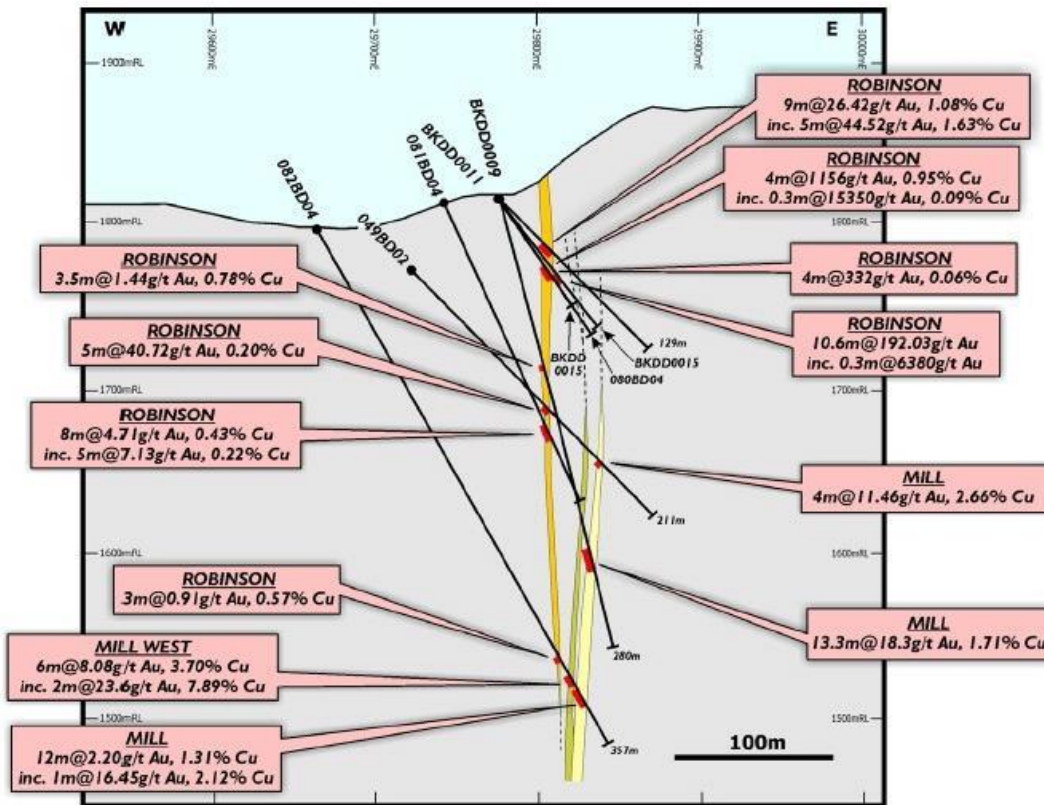


Figure 9. Cross section 58600mN at Irumafimpa showing consistency of high grade, particularly within the Robinson lode.

Yellow colouring indicates the Mill lode and orange colouring the Robinson lode Prospect location in relation to property boundaries is shown in [Figure 16](#)

(Source Barrick 2014)

6.2.2.1.1 Discussion of results

A review of >100g/t Au and >10% Cu intersections showed greater continuity of high grade at Kora when compared to Irumafimpa (Figure 10).

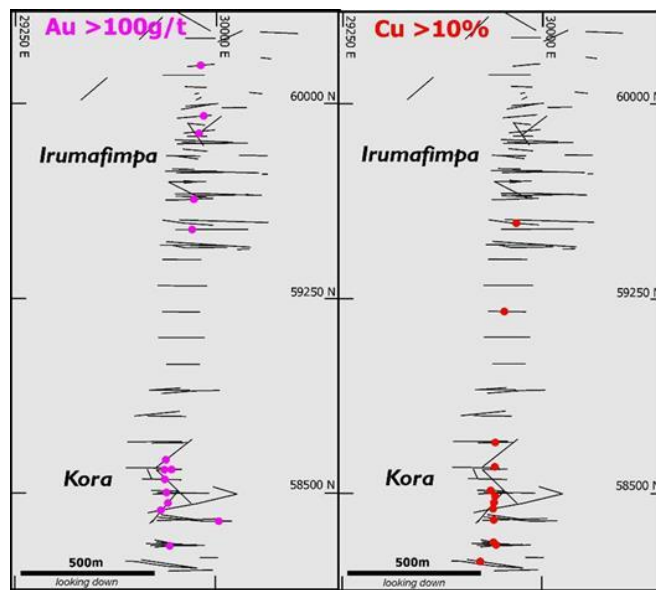


Figure 10. Surface drilling traces showing surface projections of >100g/t Au and >10% Cu.

(Source Barrick 2014)

Prospect location in relation to property boundaries is shown in [Figure 16](#)

In addition, veins are wider and likely more continuous than those at Irumafimpa. Mineralization is open in all directions. There is also strong potential below the Eutampi area and high grade mineralization to the southeast where structures hosting Kora lodes were identified by Barrick 800m beyond the ML boundary in mapping.

Potential also exists to define additional vein hosted resources within the ML at Judd and Karempé.

6.2.2.2 Judd

Judd, a narrow intermediate vein system located 200m east of and parallel to Kora was partially tested by Barrick holes designed to test the Kora lode at depth. This drilling on the Judd lode returned several highly encouraging intersections of the Judd lode including 1m @ 4.1 g/t Au, 9m @ 8.8 g/t Au and 1.1% Cu and 3m @ 278 g/t Au (Figure 11). Barrick considered that holes designed to specifically target the Judd lode would have the potential to yield high grade resources within close proximity to the immediate mine environment.

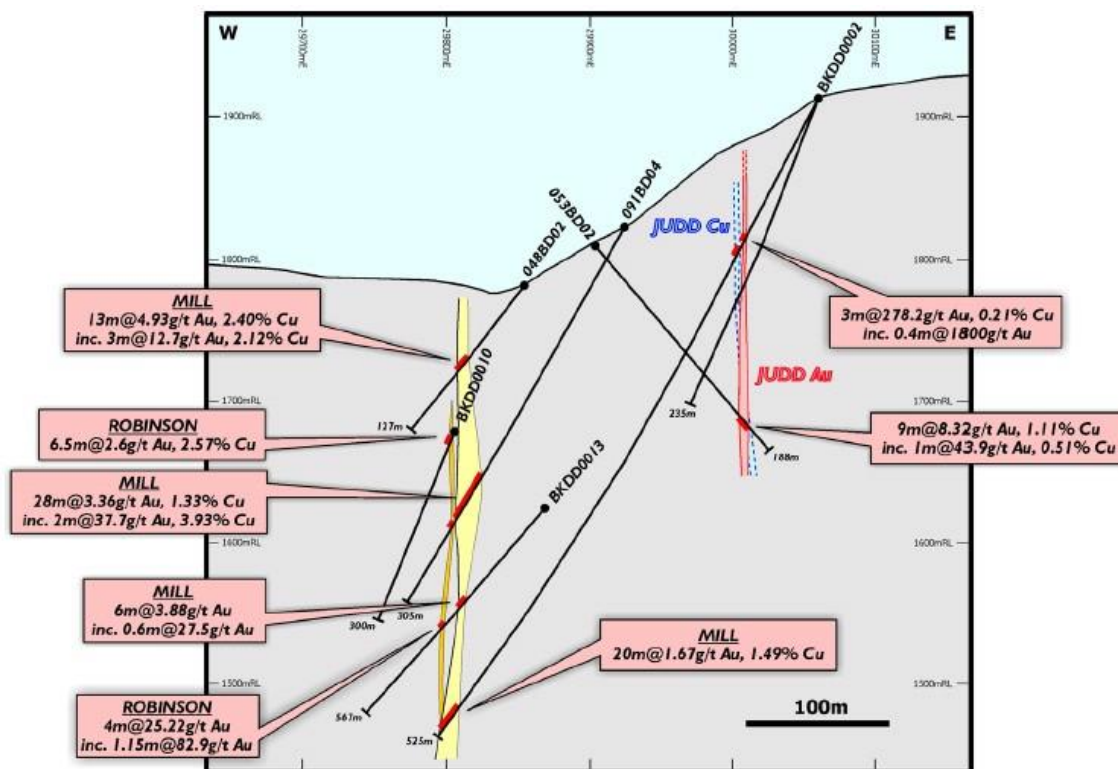


Figure 11. Cross section showing narrow mineralization intersected at Judd lode.

Pink colouring shows the Judd lode, yellow colouring the Mill lode and orange colouring the Robinson lode.

(Source Barrick 2014)

Prospect location in relation to property boundaries is shown in [Figure 16](#)

6.2.2.3 Arakompa

Eighteen holes drilled in the early 1990's (Figure 12) returned average intersections from the Arakompa lode of 3.2m @ 13.3g/t Au. An unclassified historic resource is reported in Section 6.4.2.

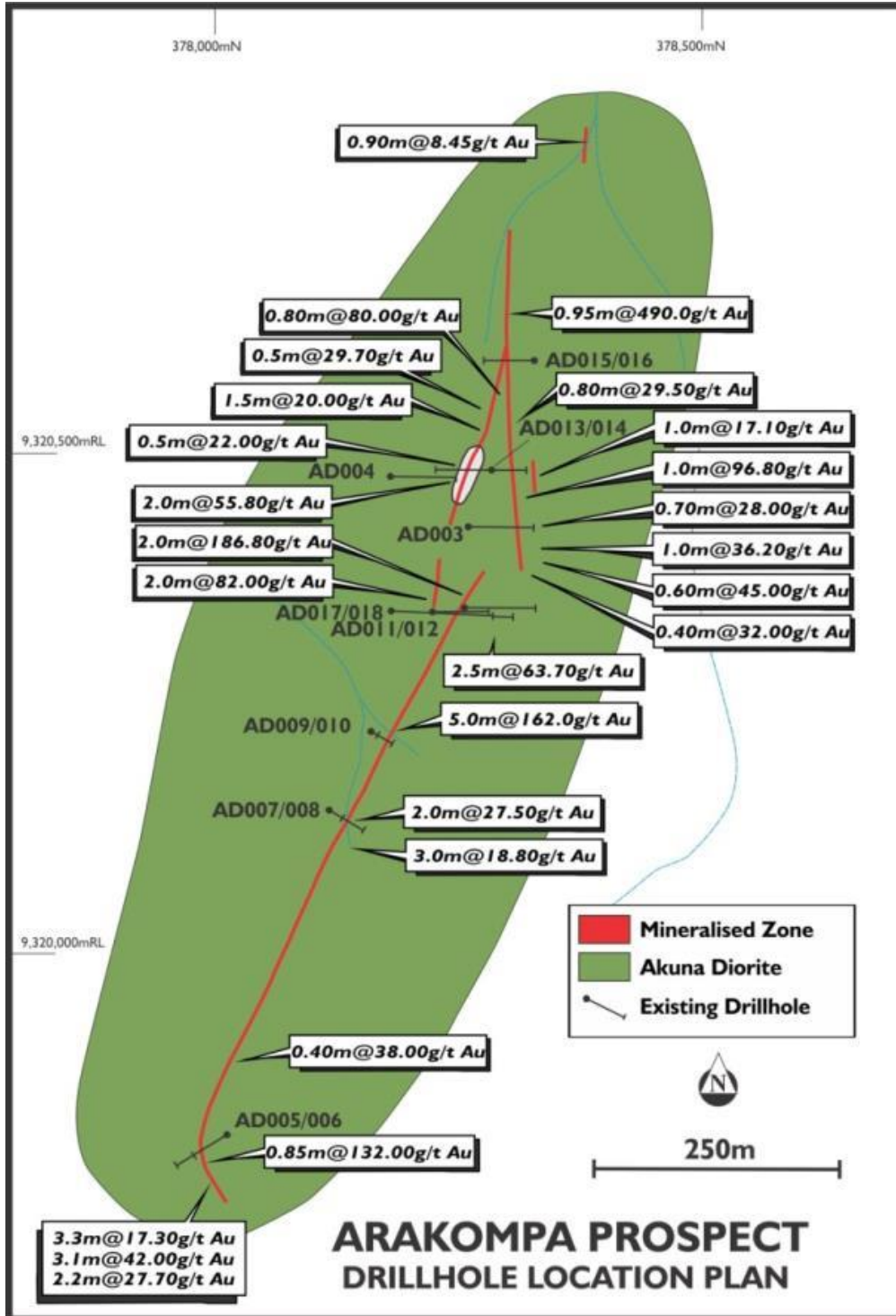


Figure 12. Arakompa plan view showing drillhole locations, high grade intersections and strike continuity of mineralization.

(Source Barrick 2014)

Prospect location in relation to property boundaries is shown in Figure 16

6.2.2.4 Maniape

According to Gauthier (2008), the prospect was discovered by RGC in 1987 by a soil grid survey, following up on anomalous soil in ridge and spur. The prospect was drill tested by Highlands Gold in 1994 (13 DDH, 1730m) following extensive trenching and 1999 (3 DDH, 903m). Sixteen holes, drilled in the early 1990's returned an average intersection from the Maniape lode of 3.2m @ 17.2g/t within broad zones of anomalous gold geochemistry. The drill plan, representative cross section and table of intersections are shown below (Figure 12 and Table 10). An unclassified historic resource is reported in Section 6.4.2.

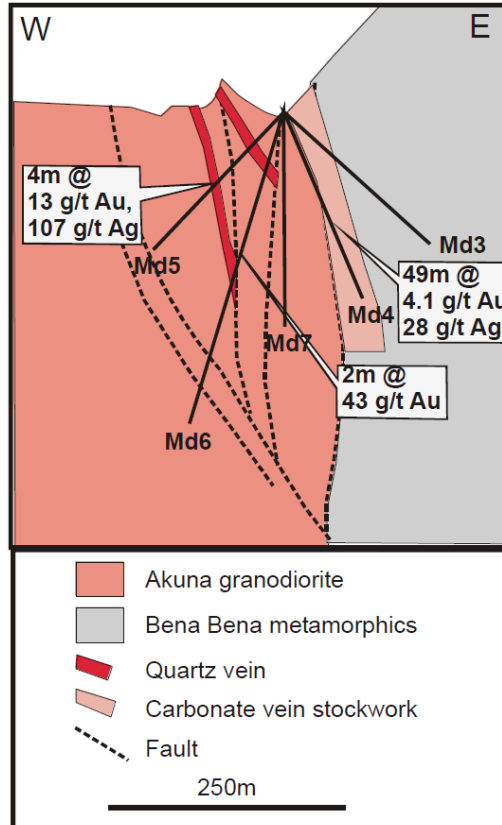


Figure 13. Section of Maniape lode system.

(Gauthier, 2008).

Location of section on [Figure 20](#)~~Figure 20~~~~Figure 20~~.

Prospect location in relation to property boundaries is shown in [Figure 16](#)~~Figure 16~~~~Figure 16~~

**Table 10. Maniape drill intersections (Gauthier, 2008)**

Table 1. Maniape intersections

Hole	section	From	To	Interval	True W.	Au	Ag	Cu	Zn	Au
	AGD 66	(m)	(m)	(m)	(m)	(g/t)	(g/t)	%	%	g x m
004MD92	9319900	0	106.2	106.2	20	2.80	20.00			297.36
004MD92	9319900	20.6	22.8	2.2		37.40	170.00	0.96	0.96	82.28
004MD92	9319900	45.15	94.75	49.6		4.05	27.80	0.14	0.19	200.88
004MD92	9319900	62.2	77.8	15.6		7.85	88.70	0.43	0.60	122.46
005MD92	9319900	0	55	55	28	1.73	15.80			95.15
005MD92	9319900	51	55	4		13.83	107.40	0.82	1.76	55.32
006MD92	9319900	0	100.7	100.7	28	1.63	7.35			164.14
006MD92	9319900	51.1	51.7	0.6		42.20	37.00	0.07	1.60	25.32
006MD92	9319900	61	63	2		34.50	18.00	0.03	0.32	69.00
008MD92	9319700	0	59.6	59.6	38	0.96	16.02			57.22
008MD92	9319700	54	57.5	3.5		9.76	55.00	0.11	0.17	34.16
009MD92	9319700	0	78	78	38	4.17	40.60			325.26
009MD92	9319700	9.5	12.5	3		48.35	59.20	0.02	0.01	145.05
009MD92	9319700	69	76.1	7.1		21.90	227.80	0.03	0.55	155.49
010MD92	9319700	104.5	139.5	35	24	1.66	62.02			58.10
010MD92	9319700	127.9	132.22	4.32		9.40	412.55	0.11	0.84	40.61
011MD92	9319700	122.4	123.4	1		80.00	310.00	0.05	1.35	80.00
012MD92	9319400	66	82.4	16.4		2.72	55.40			44.61
012MD92	9319400	69.1	72	2.9		11.75	54.90	0.86	0.69	34.08
014MD99	9319500	288.2	304.7	16.5		1.78	71.33	0.30		29.37
015MD99	59872mN	80.7	85	4.3		1.09	459.00	0.32	0.47	4.69
016MD99	59893mN	193.7	252.8	59.1		0.93	13.06	0.13	0.15	54.96

### 6.3 HISTORICAL EXPLORATION REVIEWS

Barrick engaged independent consultants Tosdale (2012) and Corbett (2009) to carry out exploration targeting reviews for the Kainantu project. Their findings are included below as they represent independent assessment of the potential of the Kainantu property. Barrick also conducted several internal reviews of the exploration prospectivity. Key findings are summarised below.

#### 6.3.1 Gauthier (2008b)

Gauthier (2008b) produced a detailed assessment of the prospectivity of the Kainantu property identifying multiple high grade epithermal vein prospects and high priority porphyry Cu-Au prospects. The report provides a summary of the Priority, Prospect name, Deposit Type, Host rock, Alteration Geochemistry, Previous work summary and Reference.

The high priority vein targets are:

1. Irumafimpa, Judd and Kora (ML150)
2. Mesoan-Mati, Maniape, Arakompa

The high priority porphyry Cu-Au targets are (ranked):

1. Kora, Timpa, Kesar
2. Yompossa, Aifunka
3. Tankauan – Kompene diatrema, A1 - Headwaters (includes Kokofimpa – Blue Lake – Breccia Hill).

Some are fairly well defined targets that are either at drill testing stage or very close (Kora, Timpa, and Yompossa). The others are fairly large systems and will require more work to define individual drill targets (Kesar, Aifunka, Tankauan, A1).

#### 6.3.2 Maniape Exploration potential (Gauthier, 2008)

From Gauthier (2008)

“The western structure is open to the south where it has been defined by trenches for at least 300m. Assays from these trenches returned very high Ag (up to 290 g/t) and up to 39.5g/t Au. High Ag suggests that this may be the upper part of this structure and that 100- 150m vertical of gold-rich veining might occur below. The western structure may have a gold-rich shoot occurring at a different level compared to the eastern structure.....

A porphyry system may underlie the Maniape intermediate sulphidation epithermal system. This is suggested by the presence of porphyry style mineralization and alteration at the Headwaters of the Tankauan creek, which is east and at lower elevation. In addition, deeper drillholes at Maniape

have intersected relatively wide zones of moderate-high copper grades. The potential for porphyry style mineralization in this area will be further defined as part of the regional exploration effort. The northern extension of the Maniape structure is considered to have low potential because the ridge drops sharply in elevation below the favourable 1350m RL level.”

### 6.3.3 Corbett (2009)

Corbett provided review and recommendations for existing exploration targets and highlighted that the early stage potential and that many areas of interest had received little follow up:

**Irumafimpa-Kora** - The Irumafimpa structure hosts low sulphidation quartz-sulphide Au + Cu mineralization typical of that which might form marginal to porphyry Cu-Au intrusions. Continued data analysis should seek to identify any link structures, which may form steep plunging shoots under conditions of strike-slip deformation. A possible porphyry Cu-Au at the fluid upflow is also recognised as a target, below.

**Kesar** - While it is stressed exploration at Kesar Creek remains in the very early stage, the project is rated with a low priority. The current programme of geological mapping and sampling should continue to map out the Kesar Creek prospect which might be accessed at the end of this program.

**Kokofimpa** - Although in the early stages of investigation, Kokofimpa displays many aspects of hydrothermal alteration and mineralization commonly associated with porphyry Cu-Au systems and so warrants continued investigation. Further work recommended.

Other targets listed in order of declining merit:

- The Bilimoia target lies SW of the original Timpa Cu-Au breccia in the vicinity of a Barrick Mo in soil anomaly and represents the SE strike extension of the Kora vein. It is targeted as a possible intrusion-related upflow for the Kora-Irumafimpa low sulphidation deep epithermal Cu-Au vein mineralization.
- Kora Deep occurs as the deeper portion of the Kora-Irumafimpa
- Barora, which represents an intense magnetic high and site of mixed anomalous geochemistry, has long been targeted for possible blind porphyry Cu-Au mineralization
- The Mesoan vein system, which is parallel to and NE of Irumafimpa, is evidenced at the surface by artisan workings and so warrants follow up geological mapping and sampling when access has been gained.
- The Kompene diatreme is rimmed by anomalous Au, Cu, Ag, Zn, Pb and Mo geochemistry as a theoretical site for carbonate-base metal style Au mineralization
- The ridge NNE of Maniape which contains anomalous Au, Cu, Pb and As geochemistry has probably not been prospected and warrants follow up.
- There are strong As anomalies in the Mainape-Arapompa-Kampene area which require verification, as much of this area was prospected in the 1989 program. If these soil anomalies are valid, further follow up is required.

### 6.3.4 Tosdale (2012)

The summary and recommendations were offered by Tosdale (2012) regarding future exploration programs are included below:

Different levels of separate magmatic-hydrothermal systems underlie the Tankuanan, Timpa, A1 (Moly Hill), and Breccia Hill prospects. Significant exploration on Tankuanan has failed to identify a potentially economic porphyry Cu system, and further exploration expenditure does not appear warranted. The only exception would be a program to test for higher grade that might be accessible



under the potentially inclined late mineral pebble breccia and late mineral sericitically altered porphyry that outcrops on the west side of the Tankuanan property.

In contrast, the lack of systematic exploration on the Breccia Hill and A1 (Moly Hill) prospect coupled with geologic evidence suggest that these prospects could contain mineralized systems. What is also unknown is the deposit types or the potential depth beneath the current surface. At least at the Timpa prospect, the presence of a hydrothermal system is evident, as the geologic and geochemical data confirms that it represents a separate system from the nearby Tankuanan porphyry prospect. However, at the current outcrop levels, the mineralized breccia may represent a level of a porphyry Cu system that lies above the level of significant Cu and Au mineralization.

#### 6.4 HISTORICAL ESTIMATES

All mineral resources reported in this section are provided for informational purposes only.

##### 6.4.1 Historical Estimates Irumafimpa-Kora

Historical estimates for the Irumafimpa and Kora deposits have previously been prepared before the Otterburn entered into an agreement to acquire an interest in the property that contains the deposit.

Early HPL resources reported in accordance with JORC 2004 were prepared by independent consultants Hackchester Pty Ltd (2005) and Mining Associates Pty Ltd (2006). Numerous historical estimates and financial models were prepared by Barrick for Irumafimpa-Kora. Otterburn is not treating the historical estimates as current mineral resources or mineral reserves. These historic resources are not reported here as they are superseded by the current Mineral Resource estimate contained in Section 14 of this report.

The current resource statement presented in Section 14 in this document supersedes all previous resource figures.

##### 6.4.2 Historical Estimates – Arakompa and Maniape

Historical estimates have also been reported for the Arakompa and Maniape deposits and are shown in Table 11.

**Table 11 Historical estimates reported for the Arakompa, Maniape and Aifunka deposits**

Deposit	Category	Historical Resource *			
		cut-off g/tAu	t	Au g/t	Au Oz
Maniape <sup>(1)</sup>	Unclassified	1	7,990,000	2.2	557,000
Arakompa <sup>(2)</sup>	Unclassified	5	2,753,000	9.0	798,000
Aifunka North <sup>(3)</sup>	Unclassified	-	851,000	3.7	102,000
Aifunka South <sup>(3)</sup>	Unclassified	-	214,000	1.8	12,000
<b>Total</b>			<b>11,808,000</b>	<b>5.6</b>	<b>1470,000</b>

(1) Barrick (2008). Method unclear. Little Ag, no Cu. Based on 16 drillholes.

(2) HPL (2002). Method: Polygonal narrow vein model. Little Ag, no Cu. Based on 18 drillholes. No work since.

(3) HGL (1992). Method. Polygonal model. Highlands Gold Annual Report 1992 (number 964).

\* A qualified person has not done sufficient work to classify the historical estimates as current mineral resources or mineral reserves. There was no classification assigned so no comparison can be made to resource categories under JORC Code 2012 or CIM Definition Standards. Nolidan has quoted the historical estimates for information and targeting purposes only.

Otterburn is not treating these historical estimates as current mineral resources or mineral reserves. Before these historical estimates can be determined if all or any can be classified as current, a Qualified Person for Otterburn must review of the existing database, QAQC, with appropriate data

verification procedures, and the geological model. Because the historical estimates were unclassified, it is likely that additional confirmatory and infill drilling would be required. No exploration is planned on these prospects in the current 12 month plan as the Company will be focusing its efforts on the mine and mill refurbishment, close spaced drilling at Irumafimpa and drilling of the Kora extension.

## 6.5 HISTORIC PRODUCTION

Historic production is not an indication of future production and is provided for informational purposes only.

### 6.5.1 Irumafimpa-Kora

Smith and Thomas (2008) visited the Irumafimpa Mine site to analyse the causes of the poor reconciliation from mineral reserve to grade control and again from grade control to final mill reconciled production. Due to the difficulty of obtaining comprehensive data from site Smith and Thomas (2008) report that it was not possible to produce a full mine reconciliation to the Barrick standard, however they note; site staff did make available a number of comparative tables that provide an adequate proxy for mine reconciliation. ~~Table 12~~~~Table 12~~~~Table 12~~ presents a stope by stope comparison of mineral reserve estimates against grade control estimates for stopes being mined or planned in November 2008. It is evident that grade control (GC) has identified significantly less tonnes, grade and metal than was reported in the ore reserve (OR), as shown by the GC:OR ratios.

**Table 12. Irumafimpa - Stope by stope comparison of Reserve estimate against Grade Control estimate (November 2008)**

A	COMPLETED STOPES	RESERVE*						GRADE CONTROL - STOPE ENVELOPE					
		Vein		Block Model - Sept 2006				Vein		RECOVERABLE STOPE ORE			
		Width	Grade	Block Width	Grade	Tonnes	Ounces	Width	Grade	Designed Mining Width	Grade	Tonnes	Ounces
1	17L-17ShrM5	1.1	34.3	1.3	26.3	3,236	2,736	0.6	19.2	1.0	12.2	1,940	763
2	19L-13ShrM4	1.5	18.2	1.7	16.1	4,499	2,332	0.6	13.3	1.0	8.0	1,653	423
<b>B</b>	<b>ACTIVE STOPES</b>												
1	17L-14ShrM5	1.3	11.5	1.5	10.0	3,983	1,284	1.2	10.1	1.4	8.7	1,726	481
2	17L-15/16ShrM4	1.4	26.4	1.6	13.2	4,381	1,859	1.4	13.2	1.6	6.6	4,381	930
3	19L-14/15/16ShrPu	1.5	17.0	1.7	15.0	13,124	6,312	1.5	8.2	1.7	7.2	8,663	2,003
5	19L-11CAFM4	4.7	19.6	5.2	17.7	13,324	7,575	1.1	17.2	1.1	16.4	1,137	599
6	19L-26/27LHM6	1.1	15.1	1.3	12.7	6,529	2,672	1.5	10.0	2.4	6.2	7,748	1,554
7	20L-17/19ShrM1	1.1	20.3	1.3	17.1	9,980	5,483	1.0	10.5	1.2	8.7	6,749	1,882
	<b>Sub-Total</b>	<b>2.2</b>	<b>18.4</b>	<b>2.5</b>	<b>15.3</b>	<b>51,321</b>	<b>25,186</b>	<b>1.3</b>	<b>10.3</b>	<b>1.7</b>	<b>7.6</b>	<b>30,404</b>	<b>7,448</b>
<b>C</b>	<b>TO BE COMMENCED</b>												
1	22L-20/21ShrM5	0.7	8.9	1.0	6.2	5,164	1,032	1.5	9.9	1.7	8.7	7,646	2,131
2	22L-22ShrM5	1.7	26.7	1.9	23.9	4,966	3,822	1.4	8.8	1.6	7.6	2,441	600
3	21L-17/18ShrM3	1.1	8.1	1.3	6.8	3,251	710	1.3	7.0	1.5	6.0	5,309	1,028
4	19L-12CAFM4	1.9	25.0	2.1	22.5	5,303	3,842	1.1	17.2	1.3	13.2	1,791	761
5	19L-18/19ShrM1	1.1	20.7	1.3	17.4	6,522	3,658	1.3	9.1	1.5	7.9	5,369	1,356
6	18L-12CAFPu	0.5	35.0	1.0	17.8	2,582	1,479	1.4	11.1	1.6	9.7	1,263	393
7	18L-14/15ShrPu	1.4	23.1	1.6	20.3	8,474	5,530	1.4	10.3	1.6	9.0	5,080	1,475
8	18L-16ShrPu	1.5	22.2	1.7	19.6	4,506	2,845	1.5	7.6	1.7	6.7	4,835	1,041
9	19L-24/25LHM6	1.0	52.4	1.5	34.7	7,648	8,531	2.1	12.8	2.3	11.7	9,049	3,390
	<b>Sub-Total</b>	<b>1.2</b>	<b>26.0</b>	<b>1.5</b>	<b>20.2</b>	<b>48,414</b>	<b>31,450</b>	<b>1.5</b>	<b>10.1</b>	<b>1.7</b>	<b>8.9</b>	<b>42,783</b>	<b>12,176</b>

\*RESERVE based on September 2006 Block model

GC : OR	tonnes	grade	ounces
active and completed stopes	59%	50%	30%
upcoming stopes	88%	44%	39%

~~Table 13~~~~Table 13~~~~Table 13~~ presents mill production for the life of the Irumafimpa mine. On a qualitative basis a negative reconciliation on grade from grade control to mill production is evident. The grade control grades in ~~Table 12~~~~Table 12~~~~Table 12~~ are of the order of 8 to 9 g/t whereas the back calculated mill head grade for 2008 was 5 g/t.

**Table 13. Historic mill production for Irumafimpa**

Year	Mill tonnes	Head grade Au g/t	Contained Oz Au
2006*	104,272	8.00	26,819
2007*	141,452	7.00	31,835
2008** ( 6 months)	61,532	5.02	9,939
<b>LOM Total</b>	<b>307,256</b>	<b>6.94</b>	<b>68,593</b>
* From Highlands Pacific annual reports			
** Barrick Ownership (mining and processing ceased in January 2009)			

### 6.5.2 Other sites

Illegal mining is an important activity for the provision of local income. It is understood the illegal mining is restricted to the oxidised upper portions of mineralized prospects where gold is easily obtainable in its native form. The sites and extent of illegal mining have not been examined in this report.

## 6.6 HISTORICAL PERFORMANCE AND RECONCILIATION REVIEWS

The operations at Irumafimpa-Kora were suspended in January 2009. A general timeline of the operations is shown in Table 22. Nolidan notes that there were several historical reviews into the poor performance of operations with recommendations for improvements including:

- A full technical review by SRK in 2006.
- Mining Associates (2006)
- Clark (2007) conducted a Technical Review of Mine Geological Systems in July 2007.
- A review by Gauthier and Pridmore (2007) of Barrick which included review of geology and resource issues in October 2007
- A mine reconciliation review by Smith and Thomas (2008) of Barrick.

**Table 14. Summary operations timeline for the Project**

From	To	Irumafimpa Operations History (ML150)
January 2004		Highlands Pacific DFS approved by Mineral Resources Authority
2005	October 2007	Kainantu Gold Mine operated as Highlands Kainantu Limited (HKL)
November 2007		Barrick purchased the Kainantu project.
January 2008	June 2008	Barrick suspended mining operations from January to June 2008 in order to improve safety in line with Barrick standards. Technical aspects of operation also reviewed and implementation of some changes commenced
July 2008	January 2009	Mining restarted in July 2008 and was halted permanently in January 2009.
January 2009	December 2009	Exploration of epithermal and sulphide veins continued on the ML until June 2009, and then halted due to review of exploration priorities.
January 2010	current	Project on Care and Maintenance, limited exploration on EL's

### 6.6.1 SRK (2006)

Key findings from SRK with regards to Reserves, Cut Off Grade, Dilution and Ore Loss include:

- The actual measured stope widths are generally slightly greater than the widths used in reserve calculations. In future mining, the control on overbreak will have to be tightened up, or, alternately, reserves will need to be re-estimated applying a higher planned dilution factor. If reserves are re-estimated applying additional dilution material, the actual grade of this material should be applied in

calculations, as it generally carries a grade of around 3 to 4 g/t. The net result will be reserves with slightly higher tonnage, slightly lower average grade but containing slightly more ounces.

- Difficulty has been experience with diamond drilling recoveries of the clays and broken material in the shear zones, which often carry very high gold grades. With loss of this material the gold goes undetected or greatly underestimated, which in turn influences reserve estimation. However, when crosscuts are driven across the veins and channel sampling is carried out the various veins and gold bearing structures can be clearly identified and the channel sampling in crosscuts captures both the higher grade veins as well as the lower grade gold values in the rock either side of the veins. More reliance on results from crosscutting will help in future identification of the high grade veins/structures. This will help eliminate the problem experienced in the past, where stopes in numerous cases were following minor splays rather than the main veins/structures. If the major gold bearing veins/structures can be clearly delineated in crosscuts prior to development of stope raises, the stopes can be correctly located and then there should be closer correlation between planned versus actual gold recovered from stopes. It will also enable the actual grade of the “dilution” to be applied and accounted for in reserve estimation.
- The 6g/t cut-off grade used in determining the mining and recoverable reserves was established at the Feasibility Study stage. During the brief production history of the mine, the production levels and mining costs anticipated in the Feasibility Study have not yet been achieved. However, with the recent improvements in understanding of the geology of the mine, the disparities between predicted (reserves) and actual (mined) grades obtained in the past should be minimised, production rates should increase and mining unit costs should reduce making a cut-off grade of 6g/t realistic.
- There is no reliable data upon which to determine the actual ore recoveries or losses. Up until quite recently there has been a poor understanding of the geology, which has, in many instances, caused stope mining to follow minor splays rather than the main gold bearing veins/structures. In these circumstances, the veins mined were not always the veins planned to be mined and grade/tonnage reconciliation has been very difficult. No cavity monitoring system (CMS) surveys have been carried out to determine actual stope void dimensions and therefore it is not possible to accurately determine ore recoveries/losses. As the mine staff report that the stopes dirt flows freely during draw down, and that stopes are drawn empty prior to filling with waste, it can be assumed that ore recovery is likely to be high. With the recently improved understanding of the geology, stopes located correctly and CMS survey data for mined stopes, the more accurate determination of ore recoveries/losses should be possible.
- It is not easy to visually identify which of the veins/structures carry gold and due to the complexity of the geology all stope development is strictly controlled by geologists and their sampling and assay results. The geologists are responsible to mark up faces to indicate the gold vein channel limits and mining limits. The location of stope drives, crosscuts and raises are controlled by sampling and surveying.

#### 6.6.2 Mining Associates (2006)

Key observations and issues identified by MA (2006) included vein continuity, dilution, data collection, delineation drilling, mining issues, grade variability, and resource estimates. MA noted that:

- The Kainantu gold mine is experiencing initial start-up problems with achieving planned gold recovery from its first group of underground stopes primarily located on the 19 and 20 levels.
- The main problem appears to be related to unforeseen geological complexity surrounding the vein mineralization and in particular the high grade Mill Vein. The geology and mining departments are frequently finding it difficult to identify continuous mineralized structures due to splaying of the veins which in some cases results in wide (5m to 10m) zones of mineralization.
- The splay structures are causing confusion in that it is unclear from limited information obtained from the 30m cross-cuts which vein is to be used for raise development. In addition to this, the splay structures themselves may not be continuous at the scale of the stope development (30m by 30m) with veins dying out within the stope outlines.

### 6.6.3 Clark (2007)

Clark (2007) comprehensively documented observations and recommendations concerning mineral resources, grade control and reconciliation, operational mining issues and dilution control, mining method, geological standard and systems, corporate knowledge and concentrator and assay laboratory. Some of her observations are summarised below.

- The original Feasibility Study model produced an inflated resource tonnes and grade due to a lack of understanding about the detailed structural geology, grade variability, continuity and distribution between and within the mineralized lodes. Improved understanding is the result of information gained from underground exposure of the mineralized system. Future resource modelling methodology will need to be continually adjusted to reflect updated geological understanding where it affects Mineral Resource estimation accuracy.
- She recommended that a reputable geostatistical expert, with experience in similar types of high grade/high nugget deposits is sourced to conduct an external review of the geological model, data inputs and the geostatistical process used to estimate tonnes and grade. The aim of the review should also be to confirm the current methodology (ID2) as acceptable for the deposit style or recommend a more appropriate method.
- Geologists, mining engineers and the mill operations personnel were not reconciling tonnage and grade data that could be tracked back to scheduled production tonnages and grade, in turn tracked back to the Mineral Reserve or Mineral Resource estimate.
- Sampling protocols have not been consistently followed by underground samplers.
- The drillhole spacing should be reviewed to test whether it is too wide for the current requirement for stope by stope grade prediction given the orebody's inherent grade variability.
- Geologists need to investigate, quantify and document the influence of core loss and relate these findings to the Mineral Resource estimate and classification of resources and reserves. On site geologists stated that a significant number of diamond drillholes should not be relied upon in resource estimation due to core loss in the drilling process. There does not seem to be any documentation discussing this issue. Nor is there evidence that a comparative analysis of drillhole data against channel samples in nearby cross cuts. It was unclear if these holes had been identified in the current Mineral Resource estimate. Grade estimations that rely on sample information from drill core that was subjected to significant loss of sample should be identified in the model.
- A review of diamond drilling practices is recommended. The review should address core recovery and production rates. The core drilling is considered to be a vital part of the reserve and resource estimation process and long term development planning.

### 6.6.4 Gauthier, and Pridmore (2007)

Gauthier and Pridmore noted that the grade continuity within the veins is not consistent over a length greater than 10m and until a greater geological input and understanding of the structural controls is obtained the operation will continue to underperform. Key issues outlined in their review include:

- Enhance geological procedures to improve control on variable gold mineralization at the scale of the stope development (30 m by 30 m).
- Require an underground resource delineation drilling program to delineate stope tonnes and grade on a scale of 10 m by 10 m.
- Maintain and optimise the mapping and grade information from cross-cut developments.
- Replace sludge sampling in the muck drives with horizontal diamond drilling (LM30?) to improve grade continuity issues between cross-cut drives.
- Capture cross-cut drive information in the digital geological model for short term planning tonnage and grade estimates.
- Develop 6 monthly reconciliation system to reconcile resource estimates with mill head grades.
- Maintain focus on longer term exploration resource drilling programs to develop additional resources/reserves required to extend mine life.

- Photographing of the well exposed cross-cuts should be initiated as a matter of urgency.

#### 6.6.5 Smith and Thomas (2008)

Key findings by Smith and Thomas (2008) regarding contributions to monthly mine grade overall of the mill by 70% to 100% include:

- Sampling and mapping: sample contamination, sampling bias and inaccurate vein measurement.
- Unplanned dilution: sidewalls in stopes and overbreak in drives.
- Ore movement: waste mucked into ore stream
- Mathematical and logic errors in grade estimation: application of length weighting and sample support as well as inaccurate data storage and application.

Smith and Thomas (2008) of Barrick conclude a minor component of the negative reconciliation between grade control and the mill was found to be the result of either incorrect procedure or simple mathematical errors. The reconciliation of greatest concern was the severe reduction in grade from the Mineral Reserve to mill production.

At Irumafimpa, the abundant essentially barren mineralization (quartz and sulphide) is highly visible and voluminous whereas gold mineralization is more cryptic and occupies a minor volume within the earlier mineralization stages (Figure 14).

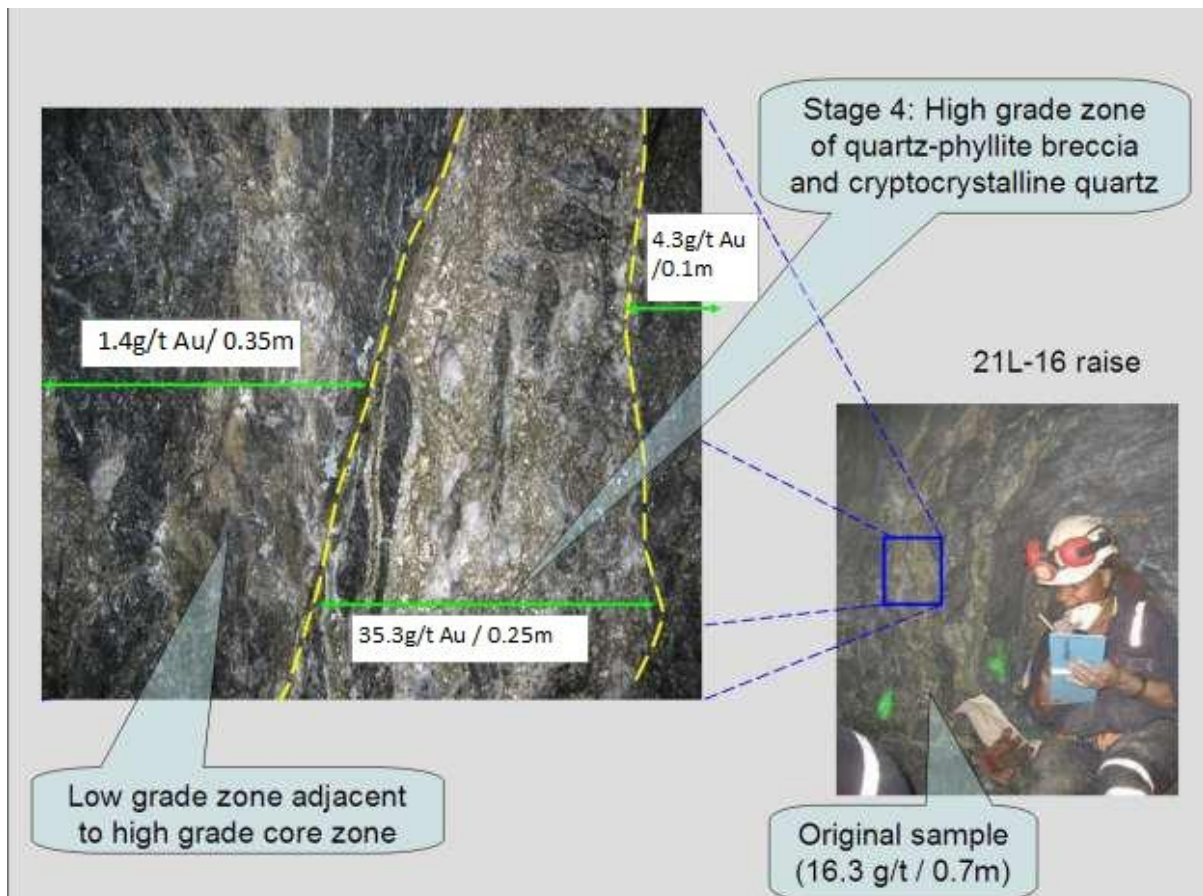


Figure 14. Diagram illustrating grade distribution within an original 0.7m sample.

(Source: Smith and Thomas, 2008)

#### 6.6.6 Discussion

Nolidan notes that the Kainantu operations experienced significant problems with reconciling resource estimates with head grades, as noted in the independent reports discussed above.

Mine geologists found it difficult to identify continuous mineralized structures and consequently stope development between levels was frequently on splays off the main veins resulting in mining of waste when the vein splays died out. Stope mapping and sampling plans viewed by Nolidan show significant grade variability along strike in the shrink stopes and skilled geological support will need to be maintained. Nolidan suggests that future mine planning delineation will require underground diamond drilling at 10m by 10m to confirm vein continuity and delineate stope tonnes and grade.

Selection of treatment plant feed from development headings will require more assay control and less reliance on visual assessment as it appears that development did not always mine to the limits of the mineralized structures.

A thorough understanding of the controls on gold mineralization and the gold distribution within the mineralized structures will help control mine dilution. Attention to detail in grade control sampling will be a necessity.

## 7 GEOLOGICAL SETTING AND MINERALIZATION

### 7.1 REGIONAL GEOLOGY

The Kainantu property is located within the New Guinea Thrust Belt, close to its northern contact with the Finisterre Terrane (Figure 15). The contact is marked by the northwest trending Ramu-Markham fault, a major suture zone that marks the northern margin of the Australian Craton. The New Guinea Thrust Belt records an early Miocene or older ductile, tight folding event that was followed by middle Miocene intrusions. Late Miocene regional scale low-angle thrust faulting followed, associated with the collision of the Finisterre Terrane. The belt is characterised by a number of north-northeast trending fault zones that commonly host major ore deposits (Hill et al., 2002).

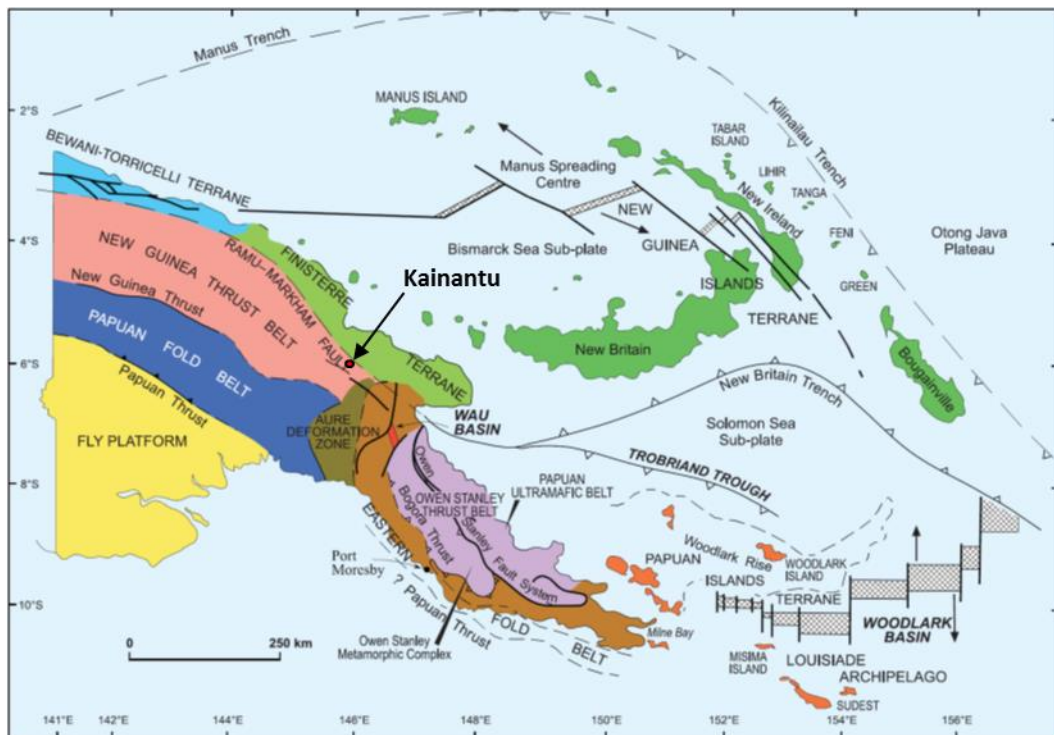


Figure 15. Tectonic Framework of Papua New Guinea, Showing Location of Kainantu Property.

Source: Williamson & Hancock (2005).

### 7.2 PROPERTY GEOLOGY

The Kainantu area is underlain by rocks of the Early Miocene Bena Bena Formation, comprising pelite, psammite, conglomerate and marl beds metamorphosed to greenschist to amphibolite grade.

These are unconformably overlain by Miocene age Omaura Formation consisting of volcano-lithic sandstones and siltstones and numerous fossiliferous limestone lenses. The overlying Yaveufa Formation consists of basaltic and andesitic flows, agglomerates, volcanoclastic sandstone and limestone (Tingey and Grainger, 1976). The mid-Miocene Akuna Intrusive Complex consists of multiple phases ranging from olivine gabbros, dolerites, hornblende gabbros and biotite diorites to granodiorites. Late Miocene age Elandora Porphyry dykes form small high level crowded feldspar porphyry dykes and diatreme breccias associated with mineralization (Table 15). A north-northeast trending transfer structure transects the area, with associated mineralization, alteration and porphyry complexes aligned along it. Local deformation history as documented in the Irumafimpa-Kora mine area is shown in Table 16.

**Table 15. Summary of main regional rock units identified within Kainantu area.**

Age	Rock Units
Recent Quaternary	Kainantu Formation – basal fluvial conglomerate, sandstone and mudstone overlain by well bedded tephra.
~~~Unconformity~~~	
Late Miocene	Elandora Porphyry – intermediate dykes sills and stocks.
Early Miocene	Akuna Intrusive Complex – range in composition from olivine gabbros through to granodiorites.
Early Miocene – Mid Miocene	Yaveufa Formation - basaltic and andesitic agglomerates, lithic tuffs, volcanoclastic sandstone and limestone.
Late Oligocene – Late Miocene	Omaura Formation – thin bedded to laminated calcareous siltstone and mudstone.
~~~Unconformity~~~	
Early Mesozoic	Bena Bena Formation - pelite, psammite, conglomerate and marl metamorphosed to schist and phyllite.

**Table 16. Local deformation history for the Kainantu area.**

*Source (Blenkinsop, 2005)*



## Deformation history

Event	Structures	Interpretations
D4	Chinook	Joint: open due to in situ stress orientation
D3	Faults with gouge	N-S shortening: faults along S1
	Mill lode style mineralization	Extension on Mill Lode: Reactivation of S1
D2	Crenulations: $L_1^2$ lineation, S2	NNE shortening
D1b	Shear zone network	Localisation into zones of intense deformation
D1aq	Main cleavage - S1 L1 lineation = $L_0^1$	N-NE shortening

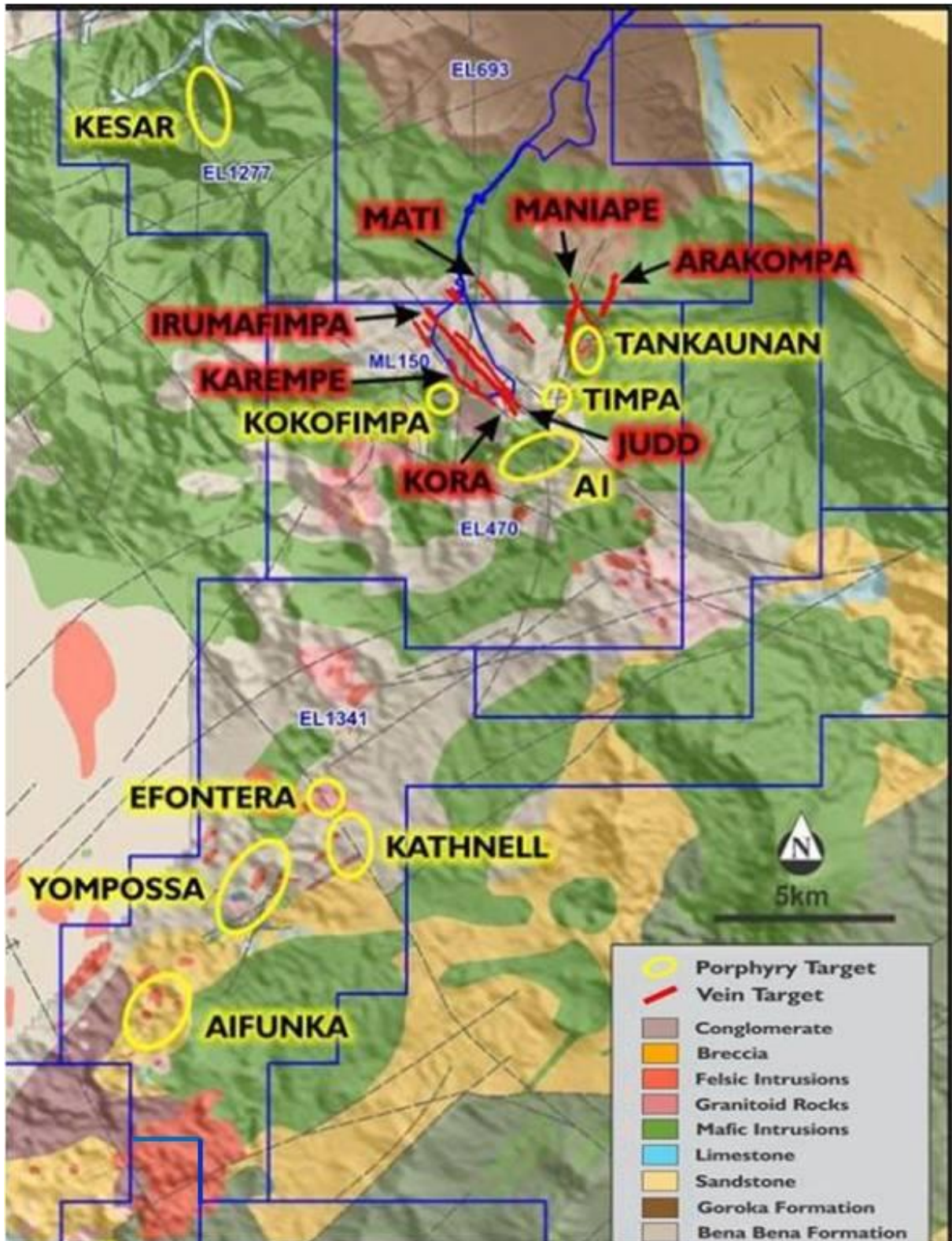


Figure 16. Kainantu property geology and known vein and porphyry deposits and prospects.

*The prospects are summarized in Table 21. (Source: Barrick, 2014)*

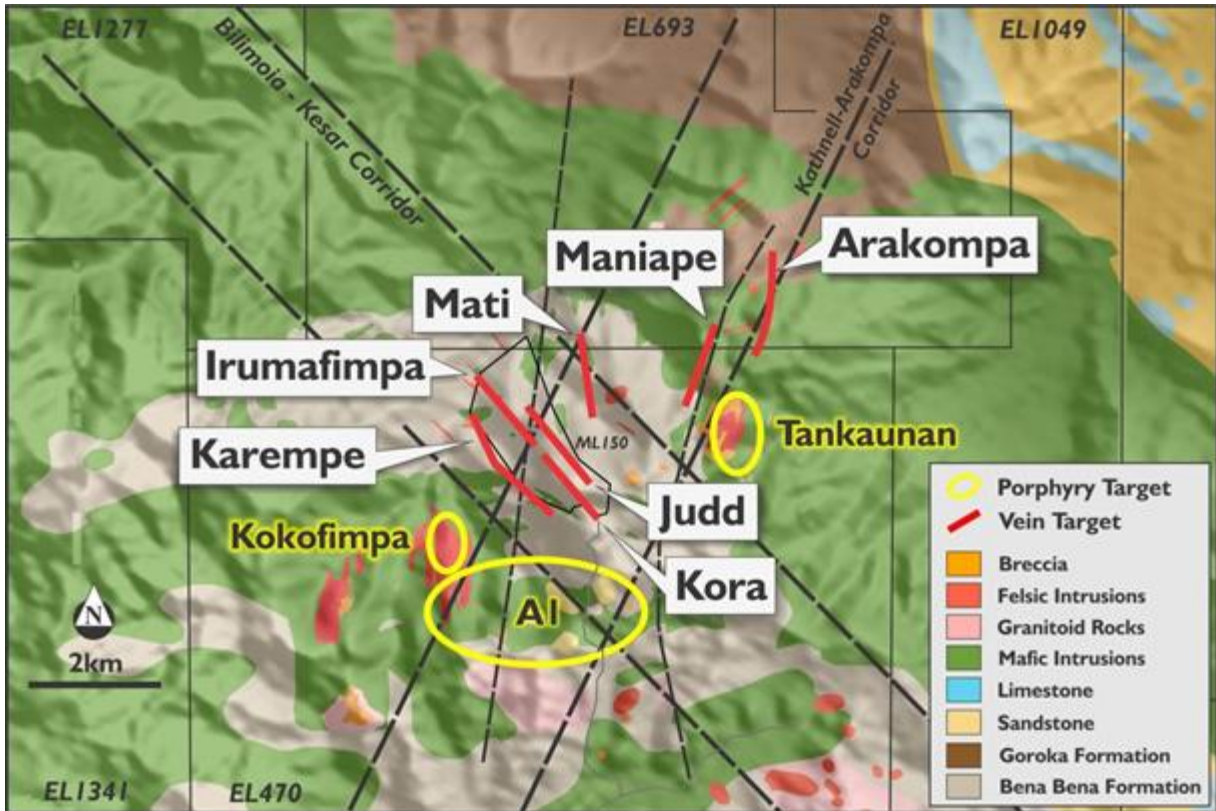


Figure 17. Local geology with location of known vein and porphyry deposits and prospects in the Kora-Irumafimpa area showing relationship to property boundaries.

The prospects are summarized in Table 21. (Source: Barrick, 2014)

### 7.3 MINERALIZATION OVERVIEW

The descriptions in this section have been sourced from the summary provided in Barrick (2014). It is understood more detailed information is available for each of the deposits and prospects in historical reports and exploration documentation. However this was not available for detailed review.

Mineralization on the property includes gold, silver and copper occurring in epithermal Au telluride veins and Au Cu Ag sulphide veins of Intrusion Related Gold Copper (“IRGC”) affinity and also less explored porphyry Cu Au systems; and alluvial gold.

The Irumafimpa-Kora vein deposit is the most advanced project at Kainantu with current defined resources and past modern mining activity in the Irumafimpa area. The deposit occurs in the centre of a large mineralized system approximately 5 km x 5 km in area that has been partly delineated by drilling and comprises several individual zones of IRGC and porphyry style mineralization. (Figure 17). Peripherally, exploration activities have identified further areas of vein and porphyry-style mineralization (Figure 16).

Other less advanced prospects on the property include epithermal Au veins similar to Irumafimpa, IRGC veins similar to Kora, porphyry Cu Au systems, skarn Cu, Pb and Zn mineralization and alluvial gold. A summary of the mineralization style, host rocks and dimensions and continuity for the Irumafimpa-Kora vein deposit and the other vein and porphyry prospects in the Kainantu Project shown in Figure 17 and described further below.

The location of the deposits and prospects in relation to the property boundaries is shown in Figure 16.

**Table 17. Summary of mineralization, host rocks, dimensions and continuity for main Kainantu deposits and prospects**

Deposit Prospect	Mineralization	Host Rocks	Dimensions	Continuity
Irumafimpa-Kora (including Eutompi)	Vein Low sulphidation Au-Cu (described in Section <del>7.47-47.4</del> ) (Resources reported in Section 14)	Quartz veins in chlorite-sericite schist.	>2.5 km strike x 60 m wide System is open along strike and at depth	Drilling shows strike and depth continuity at a gross scale. Gold mineralization is discontinuous.
Judd	Vein Low sulphidation Au-Cu (Barrick drilling returned 3m @ 278g/t Au)	Quartz veins in chlorite-sericite schist.	2.5km strike x 1-4m wide Vein system as defined by surface mapping and sampling and sporadic drilling. Mineralization open along strike and to depth	Surface continuity along strike unknown due to poor outcrop exposure
Karempe	Vein Epithermal Au (rock chip average grades of 6.7 g/t Au, 16.8 g/t Au, 45.2 g/t Au and 50.8 g/t Au; )	Quartz veins in granodiorite and chlorite-sericite schist.	3km strike and 1-2m wide vein as defined by surface mapping and sampling. Mineralization open along strike and to depth	Discontinuous vein outcrops and no drilling
Arakompa	Vein Epithermal Au Historical Resource (Section 6)	Quartz veins in Akuna Diorite	3km strike and 1-2m wide vein system NNE trending No deep drilling.	Surface continuity along strike unknown due to poor outcrop exposure
Maniape	Vein Epithermal Au Historical Resource (Section 6)	Bena Bena Metamorphics, Akuna Diorite,	Strike length 1km Near surface zone of mineralization of 700m strike x 34m wide x 125m depth defined by surface sampling and diamond drilling	Continuity of near surface mineralization confirmed by drilling
Mati / Mesoan	Vein Epithermal Au (Rock chips average of 28g/t Au and a maximum of 131g/t Au)	Bena Bena Metamorphics, Akuna Diorite,	1 km strike mineralized zone defined No drilling	Surface continuity along strike unknown due to poor outcrop exposure No drilling
Kesar (reconnaissance stage)	Vein and Porphyry Au and Cu Vein rock chip grades up to 30g/t Au. Porphyry copper grades up to 0.5% Cu. Quartz-sulphide veins with pyrite ± chalcopyrite ± galena ± sphalerite ± molybdenite ± covellite also identified	Quartz veins. Dacitic porphyry dykes with potassic alteration contain Cu mineralization.	Undefined	Undefined
A1 (reconnaissance stage)	High-sulphidation and porphyry Cu-Au Brecciated vuggy silica-pyrite-enargite mineralization and anomalous molybdenum in soils Historic float sample of massive enargite-pyrite returned 16.6% Cu and 12g/t Au.	Bena Bena Metamorphics, Akuna Diorite, Feldspar porphyry and breccias	Undefined	Undefined
Kokofimpa	Porphyry Cu-Au	Akuna Intrusive Complex and Elandora porphyry intrusions within the Bena Bena Metamorphics	3 km x 3 km Defined porphyry system with multiple magmatic phases with minimal drilling in center of prospect.	Undefined

Deposit Prospect /	Mineralization	Host Rocks	Dimensions	Continuity
Tankaunan	Porphyry Cu-Au	Akuna Intrusive Complex and mid-late Miocene Elandora Porphyry intrusions within Bena Bena Metamorphics	Extent of systems needs to be defined by first pass 400x400m drilling.	Undefined
Timpa	Porphyry potential postulated Cu-Au-As in Soils Advanced argillic alteration Quartz Breccia (monomict, quartz cemented, with shallow quartz infill textures; soil sampling shows the breccia is anomalous in Au, As, Bi, Sb, W)	Bena Bena Metamorphics and breccia	Quartz breccia is 500 m by 100 m. Other mineralization Undefined	Undefined
Aifunka	Skarn (Porphyry-related) Cu and Au Au (Barda reefs) Historical Resource (Section 6)	Mineralization is hosted in calc-silicate bands spatially associated with the brecciated porphyry dyke contacts. Underlain by the Omaura Sediments and Akuna Intrusive Complex with Elandora Porphyry.	Undefined	Undefined
Yompossa	Porphyry Cu-Au (60m @ 0.3% Cu and 0.1g/t Au from 105m in BHP01)	Underlain by Bena Bena Formation and Omaura Formation. Contains feldspar porphyry intrusions interpreted to be associated with Elandora Porphyry	Anomaly is 500m x 600m and is open to the NE. Potential for mineralization below historic drilling.	Undefined
Kathnel	Base metal epithermal veins (Pb-Zn-Cu-Au)	-	Undefined	Undefined
Efontera	Porphyry Cu-Au	-	Undefined	Undefined

#### 7.4 IRUMAFIMPA-KORA VEIN SYSTEM

The Irumafimpa-Kora vein system (comprising the Kora, Eutompi and Irumafimpa prospects) is interpreted to contain two stages of mineralization (Corbett, 2009). The earliest is a sulphide-rich Cu-dominant stage. This is overprinted by a quartz-rich Au-dominant crustiform quartz vein to breccia system with high grade gold associated with tellurides (e.g. Calaverite AuTe). The alteration and mineralization paragenesis recognised in the Irumafimpa-Kora vein system is summarised below in Table 18.

**Table 18. Mineralization and alteration paragenesis in the Irumafimpa-Kora vein system.**

Stage	Name	Description
Stage 1.	Silicification and fuchsite alteration	silica, fuchsite
Stage 2.	Sulphide-rich Cu-dominant	quartz, pyrite, chalcopyrite, bornite
Stage 3.	Quartz-rich Au-dominant	quartz, gold tellurides (calaverite and kostivite), native gold
Stage 4.	Quartz Cu	quartz, pyrite, chalcopyrite, bornite

Stage 1 is the earliest period of alteration and is characterised by silicification and fuchsite alteration of phyllitic wall rock.

Stage 2 mineralization comprises coarse-grained idiomorphic quartz and pyrite (typically euhedral) veins with base metals. Volumetrically this early mineralization appears to be the most abundant mineralization. At Kora the mineralization comprises massive pyrite veins to pyritic breccias, grading

to pyrite-chalcopyrite-bornite veins characterised by elevated Zn, Pb, Sn, W, Bi, and Sb. High copper grades (average 2.2 % Cu) occur at Kora. There appears to be a lateral zonation northward to lower copper grades at Irumafimpa.

Stage 3 mineralization is the dominant gold-bearing stage and is characterised by crustiform, vughy and colloform quartz veins, quartz breccias, and xenomorphic pyrite. Most of the gold occurs as the gold tellurides calaverite and kostivite, which are concentrated at vein margins. Significant native gold has been locally observed and is probably a result of oxidation of tellurides at Irumafimpa, and as primary native gold at Kora.

Stage 4 is manifested as local brecciation and deposition of low temperature quartz along with minor copper mineralization.

#### 7.4.1 Host rocks

Dominant host rock is highly sheared and deformed Bena Bena Formation low grade metamorphics intruded by Elandora porphyry at the Northern end of the Vein system.

#### 7.4.2 Controls

The structural history of the Irumafimpa-Kora area has been documented by Blenkinsop (2006) (Table 16). The Irumafimpa-Kora vein system follows the main NW shear zones of the contiguous Irumafimpa and Kora structures. Veins are breccia veins with abundant clasts of both altered wall rock and earlier stages of vein mineralization. Vein formation was multistage, with at least four identifiable episodes of alteration and mineralization (Table 18).

At Kora both the sulphide-rich Cu-dominant and quartz-rich Au-dominant mineralization occur along the same NW trending sub-vertical structure. This is likely a long lived structure, which was reactivated at several different stages. The quartz-rich Au-dominant mineralization shows variations in dip (from sub-vertical to locally -60 dip) and strike, which define larger high grade shoots.

Late stage faults with gouge postdate the mineralization (Table 16). These usually occur on the vein margins but can cause local disruption of the veins.

#### 7.4.3 Dimensions and Continuity

The current resources occupy a broad northwest trending mineralized zone more than 2.5 km long and up to 60m wide in which individual veins vary from less than one metre wide that pinch and swell over short distances (Au telluride lodes) to more continuous veins up to several metres wide (Au Cu Ag sulphide lodes).

Historical exploration has identified and subdivided several shoots within the lodes, defining the Kora, Eutompi and Irumafimpa Prospects. The vertical extent in outcrop is also significant, with Kora identified for at least 200m vertical extent (1750-1950m RL) and Irumafimpa outcropping at 1300m RL.

At Kora, drilling has confirmed that the overall system has a vertical extent greater than 800m. Mineralization is open in all directions. Wider mineralized zones (up to 6m) contain multiple high grade veins which may be splays. The Kora veins average 3.1m true width; which is the entire extent of the known veins before cut-off grades are applied. The Kora veins range from 1.6m (Kora No. 3 vein) up to 4.2m true width (Kora No. 1 vein). The Mill veins at Irumafimpa average 1.2m true width, which is the minimum width used during resource estimation.

Eutompi is the area of mineralized lode between Kora and Irumafimpa, extending from around 58,900mN to 59,400mN. Limited drilling has been conducted in this region and only at high levels. Drill density is insufficient to generate a constrained resource. The drilling indicates this area may be more structurally complex than at other locations, but has confirmed that the intermediate and low sulphidation styles of mineralization continue throughout. Results include 25m @ 2.0 g/t Au, 4.2%

Cu, 88 g/t Ag (including 1m @ 22.6 g/t Au, 17% Cu, 1000 g/t Ag) in hole 107BD06 and 2.3m @ 13.39 g/t Au (108BD06).

**7.5 OTHER VEIN SYSTEMS**

**7.5.1 Judd**

A narrow intermediate and low sulphidation vein system located 200m east of and parallel to Kora which was partially tested by Barrick holes drilled to test the Kora lode at depth. This sporadic drill testing on the Judd lode returned a maximum intersection of 3m @ 278g/t Au. Surface mapping and sampling has indicated a mineralized strike length of over 2.5km. Judd is located 200m east of Kora on ML150. Holes designed to specifically target the Judd lode have the potential to yield resources within close proximity to the immediate mine environment.

**7.5.2 Karempa**

Karempa is a high grade vein system of over 3km strike extent (Figure 18, Figure 19) immediately west of Irumafimpa-Kora with only one drillhole testing the system to date. Epithermal boiling textures, strike continuity, an associated VTEM anomaly and high grade surface results (e.g.: 156g/t returned from colloform banded epithermal quartz veins) define this target. Rock chip characterisation sampling at four locations along the length of the vein system indicate a 1m to 2m width, and returned average grades of 6.7 g/t Au, 16.8 g/t Au, 45.2 g/t Au and 50.8 g/t Au.

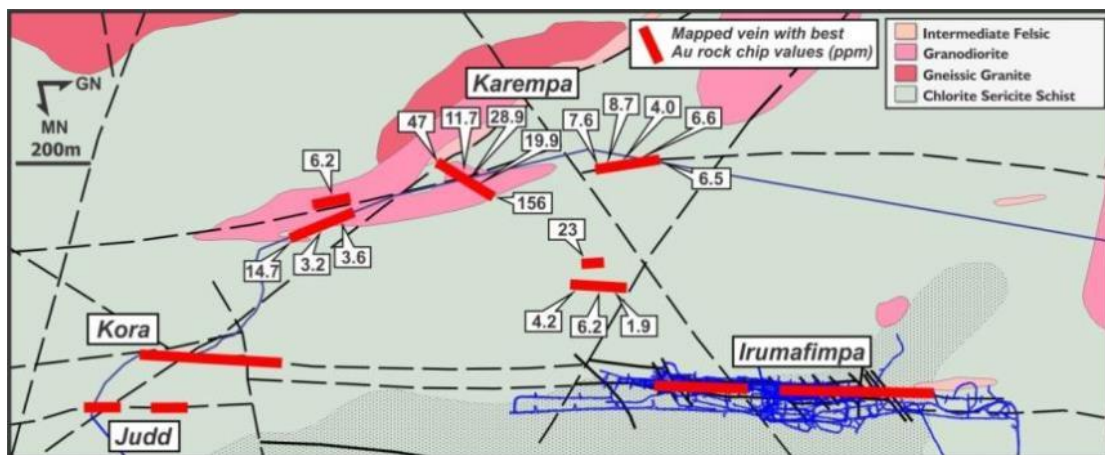


Figure 18. Karempa location plan showing mapped veins and rock chip results.

(Source Barrick 2014)

Prospect location in relation to property boundaries is shown in Figure 16, Figure 16, Figure 16

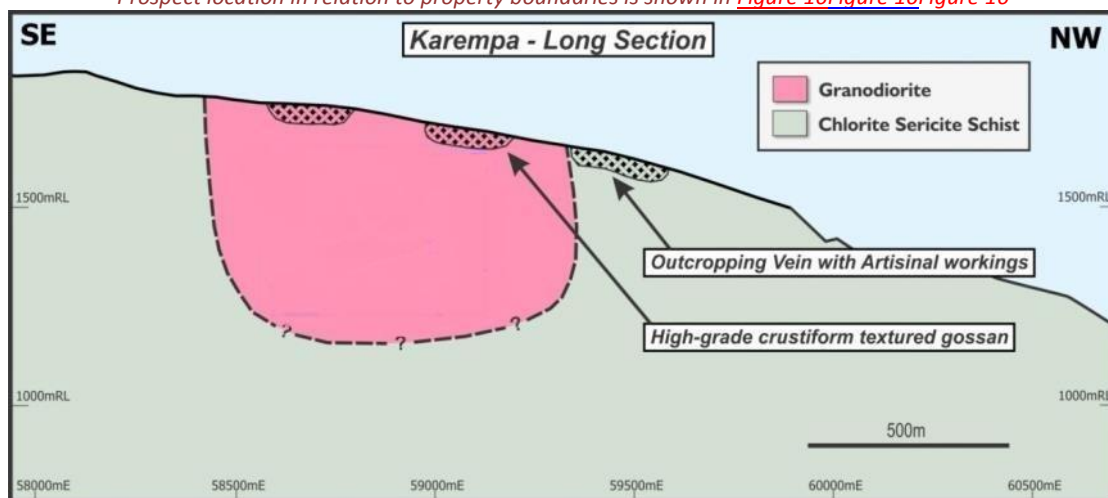


Figure 19. Karempa long section showing strike extent of known surface footprint.

(Source Barrick 2014)

Prospect location in relation to property boundaries is shown in [Figure 16](#)~~Figure 16~~~~Figure 16~~

### 7.5.3 Arakompa

Arakompa is a NNE trending low sulphidation Au vein system of at least 1km strike length ([Figure 20](#)~~Figure 20~~~~Figure 20~~) located approximately 4km north east of Irumafimpa-Kora. Eighteen holes drilled in the early 1990's returned average intersections from the Arakompa lode of 3.2m @ 13.3g/t Au.

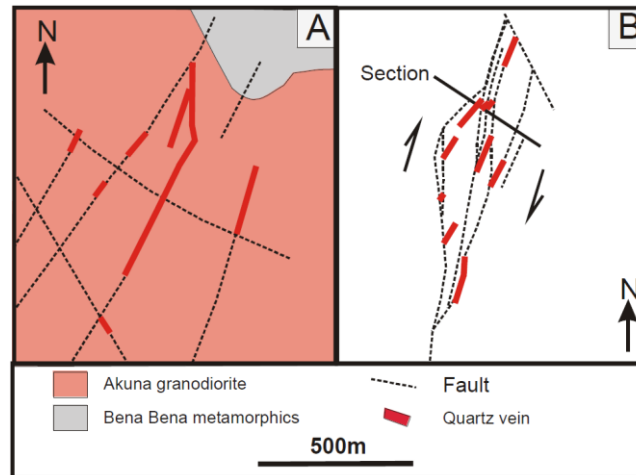


Figure 20. Map of (A) Arakompa and (B) Maniape lode structure.

(Source Gauthier, 2008)

Prospect location in relation to property boundaries is shown in [Figure 16](#)~~Figure 16~~~~Figure 16~~

### 7.5.4 Maniape

Maniape is a complex NNE trending low sulphidation Au vein system, of at least 1km strike length ([Figure 20](#)~~Figure 20~~~~Figure 20~~) which is located approximately 4km NE of Irumafimpa ([Figure 17](#)~~Figure 17~~~~Figure 17~~). Sixteen holes, drilled in the early 1990's returned an average intersection from the Maniape lode of 3.2m @ 17.2g/t within broad zones of anomalous gold geochemistry. Surface sampling and diamond drilling defined an area of near-surface mineralization with dimensions of 700m length x 34m wide x 125m depth, grading > 2g/t Au. Mineralization is open to the south and recent artisanal workings suggest mineralization is also open for approximately 1km to the north of existing drilling.

### 7.5.5 Mati/Mesoan

Mati is a reconnaissance stage prospect ([Figure 17](#)~~Figure 17~~~~Figure 17~~) that consists of narrow laterally continuous mineralized structures which are at least 1km in strike length and currently being mined by local artisanal miners. Rock chips collected by HPL at Mati returned an average of 28g/t Au and a maximum of 131g/t Au. Controls and continuity have not been defined.





**Figure 21. Artisanal miners mining on the Mati structure.**

*(Source Gauthier, 2008)*

#### 7.5.6 Kesar

Kesar is a reconnaissance stage prospect with similar oriented structures to those hosting Irumafimpa-Kora. Controls, dimensions and continuity have not been defined. Vein hosted gold mineralization is present and dacitic porphyry dykes with potassic alteration and copper mineralization have also been identified in adjacent creeks.

Mapping and rock chip sampling was carried out over the southern geochemically anomaly on the Kesar licence. Thin epithermal style quartz-sulphide veins with pyrite ± chalcopyrite ± galena ± sphalerite ± molybdenite ± covellite were identified and it was concluded that these were the source of the surface anomalism in this area. No drilling was conducted at Kesar by Barrick.

#### 7.6 PORPHYRY SYSTEMS

Prospects containing porphyry mineralization and high-sulphidation mineralization at Kainantu occur within an eight kilometre zone surrounding the Irumafimpa-Kora vein system and stretching to the east, south and west of the veins ([Figure 16](#)~~Figure 16~~~~Figure 16~~). Many of the porphyry targets that have been delineated in the Kainantu project area are early stage (reconnaissance) and have not been drill tested. They are summarised in figure 16 and described further below. These prospects have not shown economic mineralisation to-date and are not considered high priority targets as the current focus is on vein mineralisation.

**A1 Prospect** - The main prospect is a high-sulphidation lithocap at the interpreted intersection of the NW-trending Irumafimpa-Kora corridor and the NNE striking Maniape-Arakompa Faults that has been subject to reconnaissance rock chip and soil sampling. The area is characterised by brecciated vuggy silica and enargite rocks and anomalous molybdenum in soils with coincident subtle magnetic high features. A sample of massive enargite-pyrite float draining the lithocap area contained gold and copper mineralization. No drilling has been conducted at A1.

**Timpa** - This prospect includes a prominent Cu-Au-As soil anomaly coincident with a Cu-Au breccia unit and advanced argillic alteration located at the intersection of major NE and NW trending structures. Also present is a NNE oriented, quartz cemented, monomict breccia displaying relatively shallow quartz infill textures over an area of 500m by 100m. Soil sampling shows the breccia is anomalous in Au, As, Bi, Sb, W, and is depleted in Zn, Li & Sr. No drilling was conducted by Barrick at Timpa.

**Tankaunan** - The main target area comprises prominent Cu-Au-Mo soil/rock chip anomalies, multiple intrusions and breccias with associated intense magnetic highs all located at the intersection of NNE and NW mineralized trends. Barrick carried out mapping, rock chip sampling and soil sampling to cover areas which were not historically sampled due to access issues. A total of 8 diamond holes have been drilled at Tankaunan for 4048.8 metres in years 2011 and 2012. All holes

were targeted in the main Tankaunan prospect area under surface Cu-Mo±Au anomalism with coincident stock work veining and zoned porphyry alteration mapped in the local creeks. Best drill intersections include: 190m @ 0.29% Cu (BKDD0029 from 96m); 641m @ 0.23% Cu and 0.14g/t Au (BKDD0031 from 104m); 247m @ 0.19% Cu and 0.11g/t Au (BKDD0033 from 106m); 154m @ 0.21% Cu and 0.17g/t Au (BKDD0034 from 590m); 473m @ 0.19% Cu and 0.12g/t Au (BKDD0035 from 108m). Drilling at Tankaunan defined a system containing mineralization up to 0.15% Cu and 0.15g/t Au over a 500 m x 500 m area and over 500 m depth.

**Kokofimpa** There is porphyry style alteration was mapped in the area including potassic and phyllic alteration and clay advanced argillic alteration associated with breccia zones. Mapping identified a 3km x 3km argillic to advanced argillic lithocap and soil sampling delineated a broad coincident Cu/Mo soil anomaly and showed that BKDD0022 was the only hole that tested the anomalous geochemistry. A total of three diamond holes (BKDD0020 – BKDD0022) were drilled at Kokofimpa for a total of 2022.9m. Broad hypogene mineralization was intersected (167m @ 0.17% Cu in BKDD0022) and this is open to the west, north and south.

**Aifunka and Yompossa** - A separate intrusive centre located 15km SW of the Irumafimpa-Kora deposit ([Figure 16](#)~~Figure 16~~~~Figure 16~~) and project has not been reassessed since 1992. Dimensions and continuity have not been defined. The area is underlain by the Omaura Sediments and Akuna Intrusive Complex with narrow andesitic porphyry dykes and larger more mafic intrusives of the Elandora Porphyry. Mineralization (Au and Cu) is largely hosted within calc-silicate bands with a close spatial relationship with the brecciated porphyry dyke contacts. Historic diamond and RC drilling was carried out. An historical resource has been estimated on vein systems at Aifunka.

## 7.7 DISCUSSION

Nolidan notes that the current targets are the vein systems and although economic porphyry mineralization has not been discovered to date many of the mineralization occurrences documented, both veins and porphyries, are at an early stage of exploration.

## 8 DEPOSIT TYPES

Gold-copper deposits within the SW Pacific Magmatic Arcs have been classified into three main groups by Corbett and Leach (e.g. Corbett and Leach, 1997):

- Porphyry-related (including gold skarn).
- High sulphidation gold-copper.
- Low sulphidation (including sediment-hosted replacement).

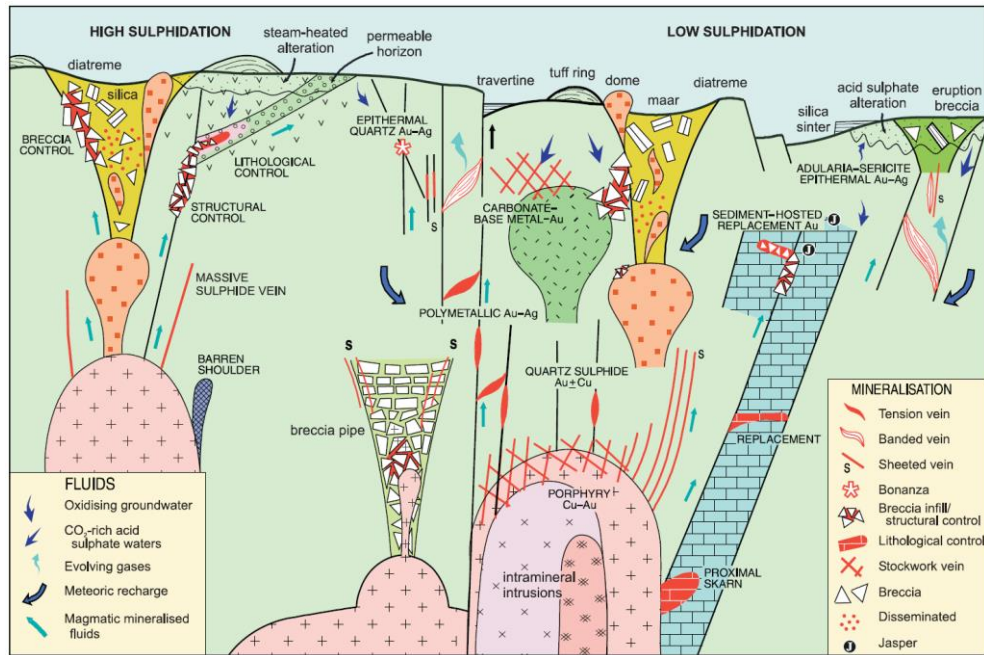


Figure 22. Conceptual model for porphyry and related low and high sulphidation mineralization.

Source: Corbett (1997)

Telescoping may overprint the varying styles of low sulphidation gold mineralization upon each other or upon the source porphyry intrusion.

Hydrothermal porphyry-related activity in the Kainantu area may have been protracted and associated with more than one intrusive phase (17 Ma to younger than 7 Ma). According to Corbett (2009), while the accepted wisdom is that porphyry Cu-Au mineralization in the Kainantu region is related to Elandora style porphyry intrusions, the coincidence of prograde alteration (Kokofimpa area; K-feldspar alteration) with Akuna-style diorite intrusions suggests alteration and mineralization may have been initiated at an earlier Akuna age and continued to an association with Elandora intrusions. The presence of Elandora clasts within advanced argillic altered breccias, is consistent with a protracted history of activity. The (17-13 Ma) extended age of Akuna intrusions provides for batholithic intrusions to be overprinted by the mineralized phase recognised herein and distinguished from the younger (9-7 Ma) Elandora-style intrusions. Corbett (2009) recommends limited age dating is conducted once field relationships are established.

These exploration models as used by HKL and Barrick emphasized the epithermal and porphyry geological setting, which is broadly correct, at least spatially. But these models were later refined by Espi and others (2006) who recognized that the high grade quartz-Au-telluride veins with common percent Cu grades and significant W and Bi (e.g. Irumafimpa and Kora) were likely a significant separate event not directly connected to a porphyry Cu-Au source. The term “intrusion-related lodes” was introduced to describe this mineralisation style. The consistent Au-Te association is interpreted to indicate an alkalic intrusion source at depth. Felsic dykes observed adjacent to some of the mineralised veins could be derived from such a source and may serve as a useful exploration guide.

## 9 EXPLORATION

No exploration has been carried out on the property by K92 Holdings.

Historic exploration is reported in Sections 6 and 7 of this report. Geological setting and styles of mineralisation in Section 8.

## 10 DRILLING

No drilling has been carried out on the property by K92 Holdings.

Historic drilling data is reported in Section 6 of this report. Sample Preparation, Analysis and Security in Section 11. Data Verification in Section 12 and data as used in resource estimation is described in Section 14, along with validation of these estimates and a discussion to establish accuracy and reliability of the previous operator's data, and that it is suitable to be used in the mineral resource estimate as described in that Section.

## 11 SAMPLE PREPARATION, ANALYSES AND SECURITY

### 11.1 SAMPLE PREPARATION

#### 11.1.1 Drill core (HPL)

Procedures for all HPL exploration sampling were not sighted by Nolidan. According to Logan (2006), the following procedures were followed by HPL for the sampling of drill core at least from 2004 onwards:

- A line was drawn down the drill core.
- Competent drill core was halved using a diamond saw.
- Less competent core was wrapped in packaging tape prior to cutting with a diamond saw.
- Pieces of broken core were halved whenever possible, if not possible random but representative pieces were sent for assay.
- Clay zones were halved using a knife when cutting by saw was not possible.
- Intervals of poor core recovery were sampled from core block to core block, because it is usually impossible to determine exactly where the core loss was.

#### 11.1.2 Mine Grade Control (HPL)

Written procedures for HPL grade control sampling were not sighted by Nolidan. The following comments were taken from comments in internal Barrick documents (Gauthier and Pridmore, 2007; Smith and Thomas, 2008).

- Grade control sampling was a standard channel sample with all crosscuts, active development and stope faces sampled.
- Every 3m cut on the development drives were sampled and mapped.
- Faces are not generally washed down prior to mapping and sampling. Mud and dust on mining faces increase the risk of contaminating samples and make accurate mapping difficult.
- Sample lines are frequently marked up by the sampler not the geologist. This means that samples are not readily related to geology.
- The location and extent of the gold bearing veins within the mineralized structures is not well understood by the majority of the geologists. As a consequence of this, the measurement of the gold-bearing vein widths is inaccurate.
- The samplers chip into their open hand, as opposed to directly into a sample bag. This is a serious contamination issue. The mine is humid and in places wet so that the some of the sample material usually sticks on the sampler's gloves after each sample.

#### 11.1.3 Drill core (Barrick)

All drill core was logged, photographed (wet and dry), then cut and sampled at Barrick's Kumian core yard. Logging data entry was completed using an in-house developed version of the AcQuire software. After logging, core was half-cut using diamond saws, and continuously sampled into numbered calico sample bags. The samples were submitted to the sample preparation facility of Intertek Laboratory Services in Lae (PNG). Sample preparation involved drying the samples at 105°C, crushing in a jaw crusher with 95% of the sample passing <2mm, riffle splitting and pulverising to 95% passing <75µm.

## 11.2 SAMPLE SECURITY

No written sample security procedures were sighted by Nolidan

## 11.3 SAMPLE ANALYSES

The following descriptions of analytical techniques used by HPL are taken directly from SRK (2006):

Drillhole and channel sample data used in the resource estimate has been analysed using a combination of fire assay and aqua regia techniques at a number of separate laboratories over the course of the project. Gold in tellurides can prove problematic to analyse using fire assay techniques as the tellurium content can lead to losses of precious metal during cupellation which subsequently results in a low bias in the results. In order to address this issue the sample is therefore oxidised either through the use of an oxidising flux, roasting the sample or a combination of both in order to oxidise the tellurium. These techniques are reported to have been used for all samples at Kainantu.

Between 1992 and 2002 the exploration data was analysed at the laboratory of Astrolabe Propriety Limited in Madang, Papua New Guinea. Gold was determined by Fire Assay with AA finish. The majority of the assays were undertaken using a 50g charge although some were assayed using two separate 25g charges the values of which were then combined.

Between 2002 and 2005 the exploration data was analysed by the Australian Laboratory Services (ALS) in Townsville, Australia. Gold was determined by Fire Assay with AA finish using a 50 g charge.

Since January 2006 (up to closure in 2008) all samples collected on the mine have been analysed by the mine laboratory at Kumian, Papua New Guinea. Gold is determined using aqua regia with AA finish 50 g charge as opposed to the Fire Assay approach utilised at the exploration stage. While aqua regia is an accepted technique for gold assaying care must be taken as the matrix of the sample can adversely affect digestion leading to understated concentrations. In particular, care should be taken with, for example, high silica (quartz) content. In these circumstances aqua regia techniques may understate the gold content relative to a Fire Assay.

During Barrick exploration at Kainantu analytical pulps were shipped to Intertek Laboratory Services in Jakarta (Indonesia) for analysis. Au was analysed by 50g fire assay (FA50) with AAS finish (gravimetric finish for samples with Au > 5 ppm). Multi-element analysis was done by multi acid digestion (HCl/HNO<sub>3</sub>/HClO<sub>4</sub>/HF) ICP (IC50) for 33 elements including Ag and Cu. Samples with > 0.5% Cu were re-analysed with AAS finish (GA50). Later samples were also assayed for Mn and S.

### 11.3.1 Laboratory Independence and Certification

The analytical laboratories of ALS in Townsville, Astrolabe in Madang and Intertek in Lae and Jakarta are all accredited by the National Association of Testing Authorities (NATA). Nolidan has not sighted any certification regarding the onsite Kumian Laboratory.

## 11.4 QUALITY ASSURANCE AND QUALITY CONTROL

Quality Assurance ("QA") concerns the establishment of measurement systems and procedures to provide adequate confidence that quality is adhered to. Quality Control ("QC") is one aspect of QA and refers to the use of control checks of the measurements to ensure the systems are working as planned.

The QC terms commonly used to discuss geochemical data are:

- Precision: how close the assay result is to that of a repeat or duplicate of the same sample, i.e. the reproducibility of assay results.
- Accuracy: how close the assay result is to the expected result (of a certified standard).
- Bias: the amount by which the analysis varies from the correct result.

Original reports regarding QAQC procedures and results during HPL and Barrick sampling programmes were not available to Nolidan for the preparation of this report.

Barrick is an established publicly traded Canadian mining company with multiple international mining, development and exploration operations. As such, it is reasonable to assume that for the Kainantu project Barrick used industry standard QAQC procedures as per the QAQC procedures they employ at their other projects (see section 11.4.1.5).

However, summaries of QAQC procedures and results occur in several different reports on the HPL drill samples and are compiled below.

### 11.5 QC PROGRAMS

QA/QC procedures usually involve the following types of QC samples being taken or inserted into the sampling stream by the personnel collecting the samples.

- Certified Reference Materials (“CRM”, or “standards”): low, medium and high grade added at a planned rate of about one every 20 samples or 5%. CRM assess accuracy.
- Field Duplicate Samples: one in every 20 samples is split and submitted as a field duplicate. Both samples are inserted into the sampling stream and prepared and assayed like any other sample. Field duplicates are used to monitor sample batches for poor sample management (bias), contamination and tampering and laboratory precision. Field duplicates also provide some measure of sample homogeneity.
- Field Blank: Samples of a “blank”, known to contain low level of economically interesting metals are inserted into the sample stream. Field blanks are usually inserted at a planned rate of one every 20 samples. Blanks assess contamination.
- Referee Laboratory duplicates (“check assays”): Sample pulps are sent for duplicate assay to another laboratory. Results are then plotted against the original laboratory results to check for anomalous results, contamination or equipment failure or calibration trends (bias).

Analysing laboratories also carry out their own internal QA/QC procedures involving the insertion of CRM, blanks and assay repeats.

QC programs are subdivided by company and time period. Descriptions of QAQC programmes up to 2006 are taken from SRK (2006).

#### 11.5.1 1992-2002 Exploration

Between 1992 and 2002, exploration data was analysed by Astrolabe. QA/QC procedures include the routine repeat analysis of 15% of the data together with the re-assaying at an external laboratory of all samples returning greater than 5 g/t Au. No standards were utilised. It is reported that no significant problems were detected. Figure 23 presents a scatter plot (sourced from the HPL DFS report) comparing the results of the Astrolabe internal repeat assays. Although the scale of the axes results in poor resolution at low values the overall result indicates a good level of precision.

#### 11.5.2 2001-2005 Exploration

Between 2002 and 2005, HPL exploration samples were analysed by ALS in Townsville. QA/QC procedures included the use of standards (every 10 to 20 samples), repeats and check assays at other laboratories including all samples greater than 5 g/t Au. It was reported that no significant problems were detected.

Figures 24 to 25 present scatter plots (sourced from the DFS report) of external check analyses (Genalysis) versus ALS and for ALS internal repeats analyses respectively. Although the scale of the axes results in poor resolution at low values the overall result indicates a good level of precision and no discernible bias. Figure 26 presents an example CRM control chart (again sourced from the DFS

report) which indicates (for this particular CRM) that deviations from the CRM value were typically less than 5%. This is considered an acceptable level of accuracy.

### 11.5.3 2006-2008 Mine Sampling

From 2006 to mine closure in 2008, mine samples were analysed at the on-site laboratory ("Kumian"). From the information supplied to Nolidan, it is not clear if this refers to only grade control samples, or all samples (including underground exploration drilling). It appears that no field QC samples were inserted in grade control assay batches, and the only QA/QC undertaken was by the laboratory itself. A Barrick review of the mine operations in 2008 referenced the inclusion by mine geologists of 'blind' CRM into assay batches.

QA/QC procedures at the Kumian Laboratory included the use of a blank, a standard, two repeats and two barren flushes for every 20 samples analysed. According to SRK (2006), check analyses for each batch check were undertaken at ALS (using aqua regia) and Intertek laboratory (using Fire Assay). However, according to a Barrick internal review in 2007, there were no check assays undertaken on grade control data. Barrick's review also indicated that check assay results were not being routinely recorded, and that written QA/QC procedures were not finalised.

Check analyses showed a low bias to Kumian results compared with ALS and Intertek. A low bias was also present in CRM control charts (both laboratory and mine CRM) for Kumian, in the order of 5-10%. Reasons for the low bias were apparently not fully examined, although one cause suggested by Barrick was incomplete digest using aqua regia. Aqua regia techniques often understate gold content relative to fire assay and Nolidan suggests that the installation of fire assay facilities at the Kumian laboratory should be investigated.

Repeat analyses showed a good level of precision.

### 11.5.4 2004-2006 Exploration

Exploration drilling at Eutompi and Kora from 2004-2006 was managed by Ross Logan and Associates. QA/QC included insertion of two gold CRMs and limestone blanks, but no mention is made of field duplicates. Insertion rates for QC samples are not specified. According to the report on drilling, these procedures were standard for HPL at the time.

Samples were analysed by ALS (2004 Kora drilling) and by Intertek Laboratories in Lae (other drilling). Results for CRMs plotted within acceptable limits for both laboratories, although some drift over time was noted for Intertek. Field blanks did not show any issues with contamination.

### 11.5.5 After 2008 Barrick Exploration

QA/QC procedures have not been sighted by Nolidan for Barrick exploration drilling since they acquired the property in 2008. However Barrick reports that routine quality control is conducted at various stages throughout the sample preparation and analytical stages of drillcore sampling including reference standards, replicate and duplicate sampling and blanks as detailed in the assay flowchart. QA/QC checks are done whilst importing each assay file and on a monthly basis. The levels of variability and accuracy at which actions are initiated are site specific but as a guide:

- Batches that have two standards in a row outside the two standard deviation limit are actioned; Any standards outside three standard deviations are actioned; and
- Batches with blanks greater than 10X expected value are actioned

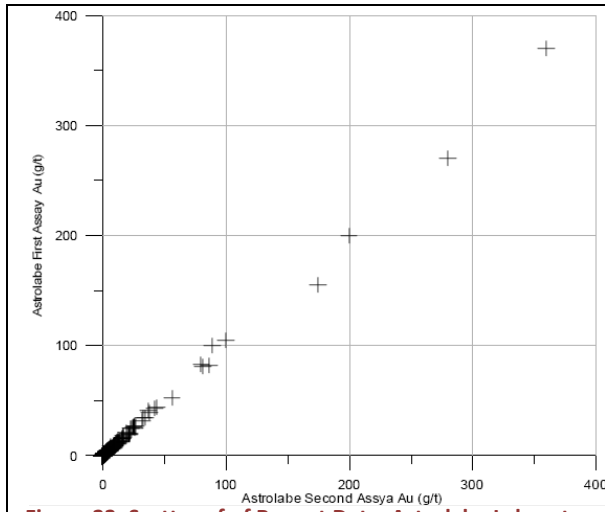


Figure 23. Scatter of of Repeat Data, Astrolabe Laboratory 1992-2002

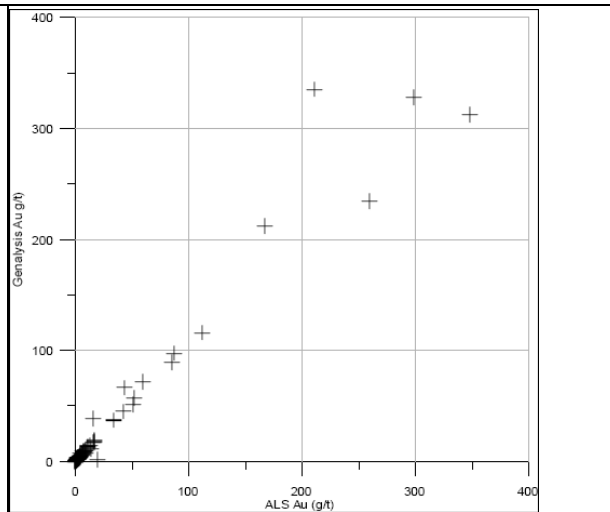


Figure 24. Scatterplot of ALS vs Genalysis Results, 2002-2005.

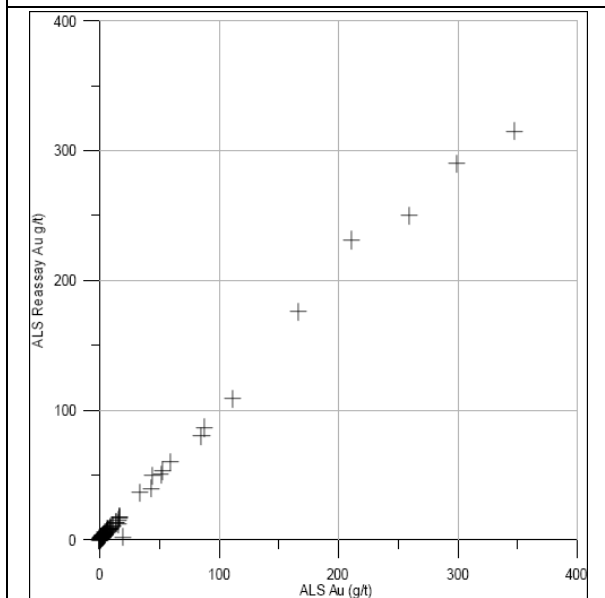


Figure 25. Scatterplot of ALS Repeat Assays, 2002-2005.

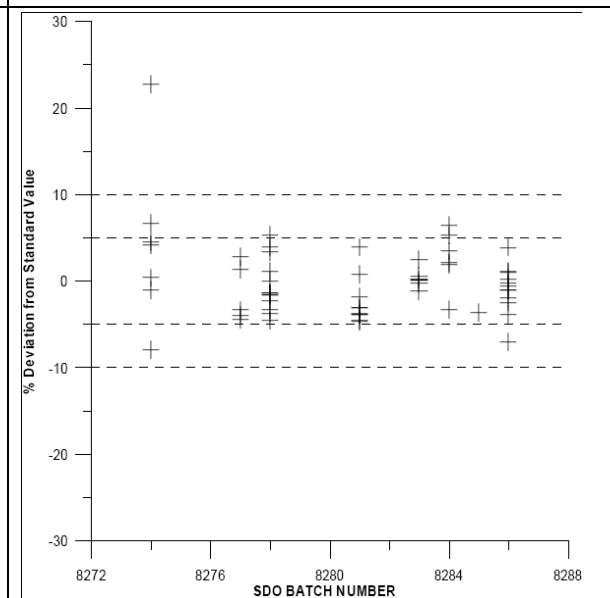


Figure 26. Example CRM Control Chart (2002-2005)

**11.6 ADEQUACY OPINION**

No independent review of the drillhole sampling was done by Nolidan. Although it appears that this work was done to an industry acceptable standard, there is always a risk involved with geological interpretations and grade continuity. Geological logs were compared to selected drill core laid out specifically for the task of validating the geological logs.

Generally, the results of the QA/QC program implemented are considered satisfactory for an advanced stage property. It is Nolidan’s opinion that the sample preparation, security and analytical procedures were adequate and follow accepted industry standards.

The classification of the current resource was restricted to Indicated and Inferred due to the drill spacing at Kora and limited confidence in underground sampling information from Irumafimpa.

It was concluded that Kainantu’s database is reliable and falls within the norms of reasonable variation and is suitable for disclosing resources.



## 12 DATA VERIFICATION

### 12.1 DATA VERIFICATION PROCEDURES

This report was prepared on the basis of information compiled by Highlands and Barrick as supplied to Nolidan by Barrick and a two day visit to the Kainantu gold mine including a review of the Kainantu drill core and drill sections at the Exploration office. Discussions were held with Barrick's Exploration Manager and Mine Manager while on site.

#### 12.1.1 Drillhole Database

All exploration data sourced by Barrick, including historic and Barrick data, is entered into an acQuire database located in Perth. This includes surface sample location and assay data, surveyed collar and downhole survey data, geological logs and assay data. Validation of the data entry is at the cell level and is controlled by predetermined validation tables. A number of checks are incorporated using SQL scripts to ensure the integrity of the data.

The drillhole database integrity was reviewed for internal inconsistencies, duplicate sample numbers and assay reference numbers. No significant errors were detected.

12 holes had duplication of survey results, results were the same except for the database field SURVTYPE duplicated records were logged as both CAMERA and FEFLEX. Nolidan removed the camera records from the database.

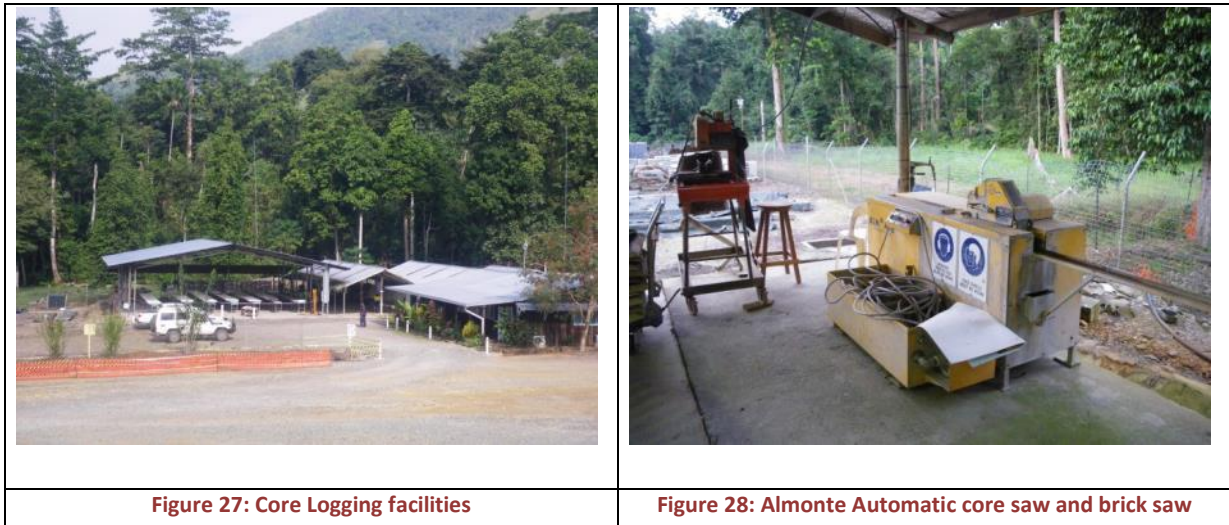
#### 12.1.2 Face Samples

Comparison of grade control face sampling and drilling in the same mineralized zones shows a significant bias towards lower average grades in drilling compared with the average grade of the face samples. For all veins the highest recorded values for gold (outliers) occurred in drillhole samples and grade capping was therefore used. Face samples are however concentrated in the higher grade mining areas, so were included in resource estimation.

Recoveries in diamond drilling were recorded as being typically less than 80% in mineralized zones (SRK, 2006), which may explain the assay bias in terms of gold loss in non-recovered material. However, there were also a number of problems noted with underground channel sampling by Smith and Thomas (2008), including potential bias introduced by over-sampling of softer material.

#### 12.1.3 Site Visit

Mr Anthony Woodward visited Kainantu Gold Mine from 12th November to 13th November 2014. The project was on care and maintenance. In the course of the site visit, Mr Woodward viewed mineralized vein systems in drill core, and examined the drill core processing and storage facilities (Figure 27). He also viewed photographs of mineralization in underground development headings and in drill core.



Barrick ceased mining and processing in January 2009. Site buildings and camp facilities are in a good functioning order and appear constantly maintained. Underground mobile equipment has been parked and exposed to the elements since mining ceased.

**12.1.4 Independent Samples**

No independent samples were collected. A review of drill core and mineralized intercepts was undertaken in the core yard (Figure 27). Examples of lodes and styles of mineralization in core were inspected. Drill logs were compared with drill core. Figure 29 shows localized shear brecciation with pyrite- chalcopyrite mineralization and minor carbonate and quartz. Red haematite stains can be seen around sub-angular quartz clasts. Figure 30 shows dominant fine grained foliated phyllite with crustiform quartz-pyrite and trace chalcopyrite veins within intervals of semi-massive pyrite and chalcopyrite in fine grained quartz.



Figure 29: BKDD0027 461.6 to 462.6 m 16.3 g/t Au, 131 g.t Ag and 6.48 g/t Cu



Figure 30: BKDD0026 583.25 to 584.2 m 0.49 g/t Au, 19.4 g/t Ag and 3.4% Cu

## 12.2 LIMITATIONS

No surface drill pads or holes were inspected during the site visit and no surface outcrops were inspected. An underground inspection was not possible as road access to the mine at the time of the site visit was temporarily blocked by landslides. Nolidan understands that current access is restricted to the 21 level; the rest of the mine is not maintained and the conditions of the workings are currently deemed unsafe for entry. Consultants have been engaged to assess mine rehabilitation requirements and there is at this stage no reasonable expectation to suggest that the rehabilitation of underground workings will not occur within the time frame stipulated by the mining lease renewal requirement.

Very limited mine production data has been located which limits the ability to gain an understanding of reconciliation problems. No face mapping has been found although some photographs of sampled development headings were located. Some stope mapping/sampling sheets from shrink stopes at Irumafimpa were located during the recent site visit. Smith and Thompson (2008) provide the only record of production data.

Nolidan has relied heavily on validation and verification carried out by Barrick in its reviews of the property in 2007-2008. Nolidan has not been able to fully review all aspects of the project, including:

- Sampling procedures and QA/QC
- Drill collar locations accuracy and reliability
- Drilling procedures
- On-site laboratory assay procedures and performance
- Descriptions of existing operations, performance and exploration prospects were obtained from existing documentation which is extensive. Not all documentation was able to be thoroughly reviewed.

However Barrick is an established publicly traded Canadian mining company with multiple international mining, development and exploration operations. As such, it is reasonable to assume that for the Kainantu project Barrick used industry standard procedures as per the procedures they employ at their other projects

## 12.3 VERIFICATION OPINION

Significant data is available from the previous operators (HPL and Barrick), and is included in the database supplied by Barrick. Based on the data verification performed, it is Nolidan's opinion that the data available and reviewed is adequate for the purposes used in this technical report for resource estimation.

## 13 MINERAL PROCESSING AND METALLURGICAL TESTING

This section refers to both historical information derived prior to commencement of Irumafimpa-Kora operations and subsequent reviews of operations and metallurgical performance which are being used as the basis for the planning of the refurbishment of the mill by the Company.

### 13.1 MINERALISATION CHARACTERISTICS

The main Irumafimpa-Kora lode of the Kainantu Project is sulphide-rich Cu-dominant mineralization overprinted by a quartz-rich Au-dominant crustiform quartz vein to breccia system with high gold associated with tellurides (calaverite AuTe).

There is currently no geometallurgical model for Irumafimpa or Kora. Assessment of the previous mining operation shows that the inability to inform the plant metallurgists of impending feed characteristics often resulted in dramatic consequences and inefficiencies in the operation of the plant.

### 13.2 NATURE OF TESTING AND RESULTS

#### 13.2.1 Samples 2000

Initial metallurgical testwork on Kainantu diamond drill core samples was conducted by Metcon Laboratories (Sydney) in 2000. Only a limited amount of testwork was conducted, which included gravity recovery and flotation testing. Leach and Carbon-In-Leach of the whole ore and the flotation concentrate was also conducted.

#### 13.2.2 Samples - March 2002

Two samples were provided by the Highlands Pacific Group for metallurgical testing. The sample used for testwork is cited in the HRL report as being from the Mill Vein. The quartz lode was originally classified as the Mill Lode, though it was later reclassified as probably being the Puma lode.

The sample tested at HRL was taken from a quartz lode that intersected the main adit drive at 29,934mE 60,060mN (local Irumafimpa Grid). The quartz lode was approximately 1.0 m true width. The sample was recovered from a blast across the full width of the lode, and as such the lode sampled at this point would represent close to a full mining width.

The sample sent to AMDEL for comminution testing was taken from the same location as the sample used for metallurgical testwork at HRL, and would have consisted largely of quartz.

Data from these tests were used for project feasibility studies and plant design.

#### 13.2.3 Kora Testwork 2009

In 2009, test work was completed by AMMTEC on two composite samples from Kora. Composite 1 was described as "High Au Intervals" and Composite 2 was described as "High Cu Intervals". The test work was divided into two stages, the first to determine the grind size and the second to optimise float and gravity recovery at that grind size.

The conclusions were:

- Composite 1 – The test work indicates a recovery of 91.9% of the gold, via gravity (66%) and copper mineral flotation (25.8%) with a concentrate gold content of 200–300 g/t. On the same sample, the copper recovery into the float concentrate is 91.3% with a copper concentrate grade of 20-30% copper. The flotation mass recovery is in the region of 30%.
- Composite 2 - The test work indicates a recovery of 90.3% of the gold, via gravity (61.6%) and copper mineral flotation (28.7%) with a flotation concentrate gold content of 6-7 g/t. On the same sample, the copper recovery into the float concentrate is 90.8% with a copper concentrate grade of 20-25% copper. The flotation mass recovery is in the region of 12%.
- Pyrite Flotation – The gold recovery from the pyrite flotation is relatively low with Composite 1 recovering 2-6% gold and Composite 2 about 5% recovery. The economics of installing a dedicated

flotation plant would have to be closely evaluated before concluding these recoveries in the overall recovery.

No additional metallurgical work has been undertaken since the testwork was completed by Ammtec in May 2009.

**Table 19: Kora recoveries adjusted for saleable concentrate.**

Method	Element	Composite 1 High Au Interval	Composite 2 High Cu Interval
Gravity Recovery	Au	66.04%	61.62%
Copper Mineral Flotation recovery	Au Cu	25.86% 91.29%	28.71% 90.80%
Overall Recovery	Au Cu	91.90% 91.29%	90.33% 90.80%

### 13.3 ORIGINAL PROCESS SELECTION AND DESIGN

Test work was conducted for a number of process options including combinations of flotation and leaching. The final process selection was based on bulk flotation to a saleable high gold content concentrate.

The original plant design, engineering and construction were undertaken by Ausenco in 2005.

The plant design criteria were based on test work, owner’s information, engineers experience and industry practise. The basic design was:

- Primary jaw crusher;
- Double deck screen with recycle crushers;
- Ball mill with cyclone;
- Flash flotation in the milling circuit;
- Rougher and cleaner flotation;
- Concentrate filtering;
- Tailings disposal dam.

There was initial consideration to install a gravity recovery plant, but this was subsequently removed from the design.

The test work conducted identified a suitable depressant to produce an acceptable level of fluorine in the concentrate.

Mass and solution balances were developed for 170,000 dry tonnes per year.

Equipment selection and sizing followed accepted industry practice and the plant was constructed to a sound quality for a minimum 10 year mine life.

### 13.4 OVERVIEW OF EXISTING PROCESS PLANT

The Kainantu processing plant is located approximately 7 km from the opening of the 800 portal which accesses the Irumafimpa Mine. The plant has been on care and maintenance since December 2008. Simple processing technology was used. Following crushing, screening and grinding the sulphide bearing material was separated from the non-mineralized host rock by flotation. The design throughput of the plant was 21 tonnes per hour (170,000tpa) and approximately 10% of the ore was recovered as a high-grade gold bearing concentrate with the waste material pumped to an engineered tailings storage facility. The gold bearing concentrate was packed in containers and trucked to Lae from where it was shipped to a smelter/refinery for the recovery of the gold.

A process flow sheet for the current processing plant design is presented in [Figure 31](#)~~Figure 31~~~~Figure 31~~ [Figure 31](#). [Figure 32](#)~~Figure 32~~~~Figure 32~~ [Figure 32](#) shows a general isometric view of the current Process Plant, and [Figure 34](#)~~Figure 34~~~~Figure 34~~ [Figure 34](#) how the processing plant and crushing circuit in their current layout. Cyanide is not used in the Kainantu process plant.



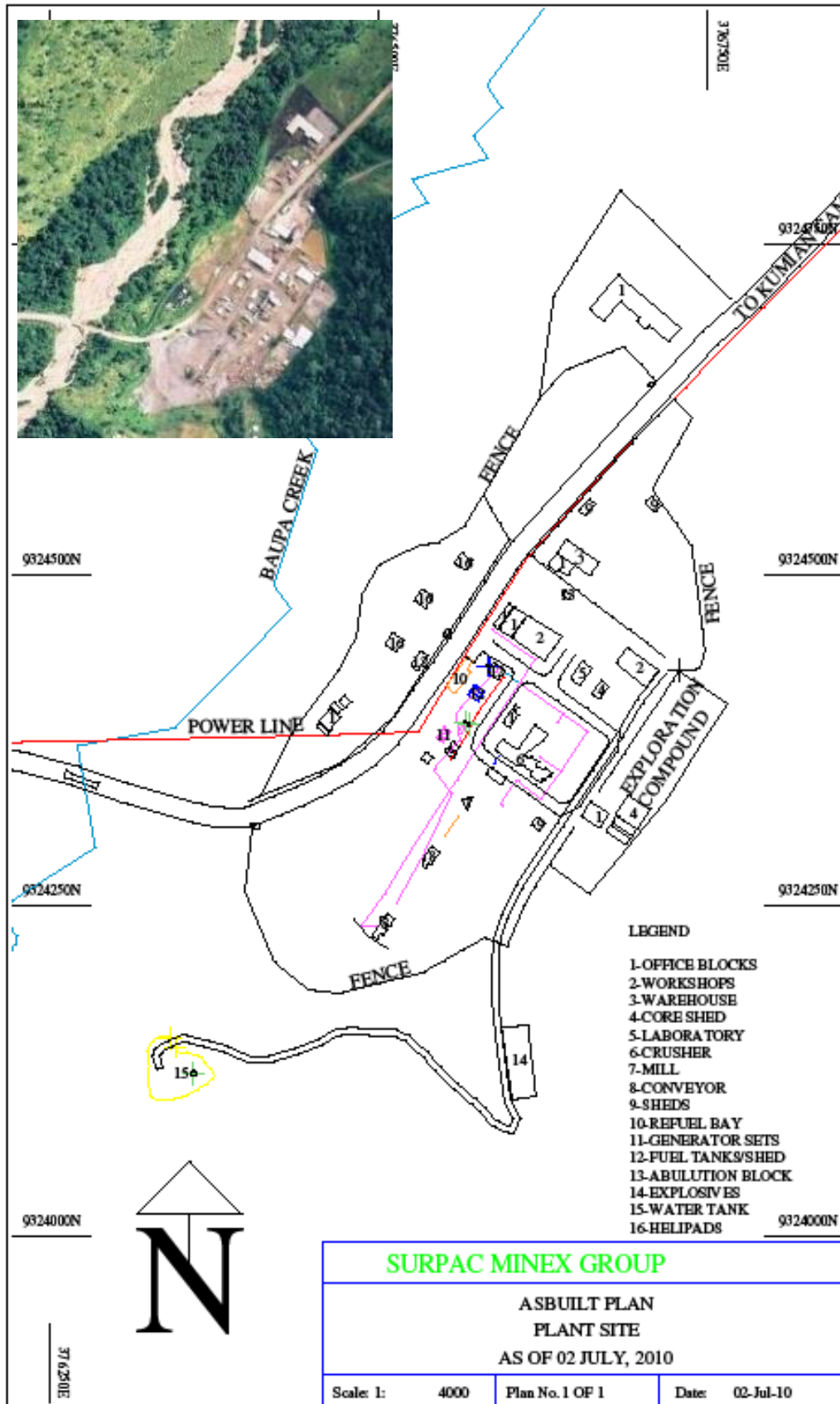


Figure 32: General View of the Process Plant Site and Offices

Source: Barrick (2014)



**Figure 33: Photograph of the processing plant (2008)**



**Figure 34: Photograph of the Crushing Circuit (2012)**

The Process Plant consists of the following unit processes:

- Ore Reveal and Crushing; to reduce the ROM sizing prior to reclamation for grinding. Screening and recycling was found to be problematical in previous operation and may be removed and replaced with a more suitable crusher operating in open circuit.
- Grinding and Classification; in which the crushed ore is reclaimed and ground to the required size for flotation. A gravity concentration circuit is to be considered to recover liberated free gold from within the classification circuit. This would require a gold room with associated equipment to allow production of gravity gold doré bars.
- Differential Flotation; commencing with an Outokumpu Skimair Flash Flotation unit in the classification circuit, combined with Outokumpu tank cells treating grinding product, to recover a gold bearing sulphide concentrate for export.
- Flotation tailings deposition in the tailings storage facility.
- On-site reagent storage and mixing facilities.
- Services for plant air and water distribution.

### **13.5 CURRENT PLANT CONDITION**

The processing plant has been idle, but under care and maintenance since processing ceased in 2009 and will require re commissioning work including refurbishing, repairing or replacing some equipment items. Ausenco have conducted a detailed review of the plant condition (Ausenco 2014)



including test operation of motors etc. (see section 26 for details). Minor corrosion has occurred in some sections due to the effect of sulphides.

Otterburn has engaged consultants to prepare studies including costing on the work required for the mill refurbishment. .

### 13.6 RECOVERY ASSUMPTIONS

In operation, gold recovery varied considerably since commissioning the plant. It was not possible to consistently realize the recoveries that were achieved with laboratory test work on the ore.

Test work was conducted on site during October-November 2006 by JK Tech. Based on recommendations from this work, operations improved.

Data between January 2007 and November 2007 were reviewed by Barrick to establish a reasonable estimate going forward. During this period, 125,341 tonnes of ore were treated to produce 8,178 tonnes of concentrate, equating to a mass pull of 6.5%. It was noted that mass pull in October and November was approximately 4.5%, which is believed to be due to the addition of lime as a pH modifier to suppress pyrite flotation and increase concentrate grade. However, for the purposes of the study it is assumed that this may not be a sustainable practice, and the average mass pull over the whole time period was used.

The average gold recovery over the same time period was 85% into a copper-gold sulphide concentrate.

### 13.7 REPRESENTIVITY

To the extent known, it is understood the test samples were representative of the various types and styles of mineralization and the mineral deposit as a whole. Added to this is the fact that this was an operational plant processing material directly from the mine.

### 13.8 FACTORS AFFECTING POTENTIAL ECONOMIC EXTRACTION

Previous operation of the process plant on ore from the Irumafimpa resource provides confidence in the ability to operate and the base assumptions for economic evaluation of future operations – throughput, gold recovery and concentrate grade. The identified issues from testing and early operations, of high fluorine in concentrate and low concentrate gold grade, were successfully mitigated through the use of specific gangue depressant and general pyrite depression with lime addition.

The previous operations were able to achieve concentrate sales at satisfactory terms to traditional markets for copper sulphide concentrates and there is every likelihood that a new operation would be able to do the same.

## 14 MINERAL RESOURCE ESTIMATE

After a review of previous resource estimates (see section 6.4: ~~HistoricAL EstimatesHistoricAL EstimatesHistorical Estimates~~) Nolidan recommended to Otterburn that the current resource estimate should be quoted:

- a) Using a standard Ordinary Kriging estimation approach. Grade caps should be selected to restrict the influence of outliers where drilling was sparse.
- b) Cut-offs should be based on a combination of thickness and grade reflecting potential mining methods. Lower cut-off grades of 5g/t AuEq for wide veins (> 3m width) and 6g/t AuEq for veins between 1.2m and 3m width were suggested.
- c) Resources should not be reported at confidence levels above Indicated due to the current drill spacing at Kora and limited confidence in underground sampling information from Irumafimpa.

Following Nolidan’s recommendations to Otterburn a resource estimate was completed for the Irumafimpa-Kora vein systems based on the historical surface and underground drilling conducted by previous owners, Barrick and HPL. Face channel and grade control samples collected during previous mining operations were also used but have only a local influence.

Comparison of grade control face sampling and drilling in the same mineralized zones shows a significant bias towards lower average grades in drilling compared with the average grade of the face samples. For all veins the highest recorded values for gold (outliers) occurred in drillhole samples and grade capping was therefore used. Face samples are however concentrated in the higher grade mining areas, so were included in resource estimation.

Nolidan considered that estimation in unfolded 2D space for grade and thickness across narrow veins with allowance for minimum mining widths and unfolding was most applicable to the Kainantu vein system. Industry standard methods were used to conduct the estimate using GEOVIA Surpac™ software. The method utilises estimation in unfolded space. A detailed description is presented in Section 14.7.1 Methodology, and similar methods are widely used in resource estimation (Glacken et al 2014). Vein thickness and grades for Au, Ag, and Cu were estimated in unfolded 2D space before being translated back into a true 3D block model. The model has to incorporate a level of conceptual interpretation (implicit modelling) as the veins are very narrow. Traditional cross section interpretation (explicit modelling) is near impossible due to changes in drill-hole orientation with difficulty in maintaining a true separation of the vein hanging wall and footwall.

#### 14.1 APPROACH

Nolidan considers that there is no appreciable difference in mineralization across the veins, which are narrow (less than 1m in places) and no mining selectivity across the vein is possible. Thus a two dimensional estimate of grade and thickness was considered to be a better method to apply at the Irumafimpa-Kora deposit. In principle the true thickness and grade (and geostatistics) of a vein domain are estimated in unfolded space, i.e. on a 2D grid. This vertical plane is sub-parallel to the vein direction, and grades and thicknesses are absolutely tied to informing samples/composites. The process of "unfolding" and "refolding" results in some smoothing of vein contacts, which may result in minor apparent spatial departures of the vein wireframes from some composite centroids.

#### 14.2 SUPPLIED DATA

Nolidan was supplied with a drillhole database named BARexpldata.mdb. Table 20 shows a summary of the database structure.

**Table 20. Master Database Structure**

Table Name	Description	Record Count
Collar	Collar information associated with drill type and location	2,611
Survey	Downhole azimuth, dip and depth	8,882
Assay	Assay intervals with associated gold , copper, silver and other results	47,686
Alteration	Logged alteration intervals and descriptions	8,451
Drill	Logging information per hole	85
Veins	Logged intervals with type and degree of veining	6,668
zone_code	Mineralized intercepts used for previous mineral resource estimates	2,679
Structure	Logged intervals of structural geology	7,064

Within the Irumafimpa-Kora resource area, the types of holes available were diamond drilled from the surface (DD), diamond drilled from underground workings (DDUG) and face samples (FS).

A new table was created (named “intercepts”) to store vein intercepts in, which were initially copied from the zone code intercept table. MS Access queries were run to ensure mineralization was not excluded adjacent to defined intercepts and un-necessary waste samples were not included. There

are examples of vein intercepts with material below cut-off being included, however these tags are required to constrain vein geometry and ensure vein continuity.

There were some mineralized intervals that were not used for resource estimation. These intercepts were given a “UN-“prefix in the “intercepts” table, and present targets for development.

**Table 21: Mineralized samples outside vein tags.**

Hole_id	depth_from	depth_to	Au_ppm	Ag_ppm	Cu_%
002BD92	87	91	20.24	2.25	0.057
002BD92	201	207	4.391	12	0.093
002BD92	213	214	2.5	4	0.53
003BD92	43.65	44.4	280	26	0.041
004BD92	132.5	133.1	25.3	2.5	0.115
004BD92	156.95	159	4.611	1.378	0.315
011BD94	84	86.3	1.4991	42.3522	1.959
017UG02	6	11	2.952	1.84	0.456
017UG02	23	25	8.835	6.8	0.684
018BD94	240.5	241.5	1.5	65.4	1.05
056BD02	73.5	75	2.28	41	7.76
057BD02	26	28	2.53	11.7	0.232
072BD03	136	138	11.975	11.95	0.235
090BD04	122	124	1.785	106.35	3.212
114UG06	29.5	34.6	3.523	-	-
538AUG08	22.5	25.5	19.6437	-	-

The MS Access database was connected directly to GEOVIA Surpac™ for data display, vein compositing, wire-framing, unfolding, estimation refolding storing in a 3D block model.

The following files were also supplied by K92 Holdings:

- Topography wireframe (Surpac™ DTM) derived from airborne laser (LIDAR) survey
- Surveyed mine workings (declines, inclines, stopes etc. as Surpac™ lines) for Irumafimpa underground development
- Original geological interpretation of veins and faults (Surpac™)

A local mine grid (denoted IG99) oriented roughly parallel to the strike of mineralization was set up by HPL. This grid was used for resource estimation and is based on a 2D rotation from Australian Map Grid (AMG66) coordinates used in exploration. Transformation parameters from AMG66 to IG99 are:

Rotation: 45.4° east, X shift: -9258890.5 m, Y shift: -34421.2 m, Z shift: 0 m

Existing vein intercepts table from the previous vein interpretation was used as a starting point.

### 14.3 DIMENSIONS

Database extents (Table 22, Figure 35) are for the Irumafimpa-Kora resource area. These coordinates are in mine grid. The database fields used for mine grid are “KAINANTU\_IG\_X” and “KAINANTU\_IG\_Y”.

**Table 22: Database Extents**

Database	Min (m)	Max (m)	Extents (m)
Northing	58207.074	61398.587	3191.513
Easting	29334.635	30413.42	1078.785
RL	730.727	1940	1209.273
Hole Depth	0.3	971.9	971.6

The Irumafimpa-Eutompi-Kora vein system is a 3 km long, 300m wide, northwest trending continuous lode structure with veins across three distinct mineralizing events. As modelled, veins at Kora are between 58100mN and 58950mN, and veins at Irumafimpa are between 59400mN and 61000mN. Between the Irumafimpa and Kora vein systems is the Eutompi area (Figure 31), only one vein (E4) lies in this area and overlaps the Kora area from 58600 mN to 58950 mN.

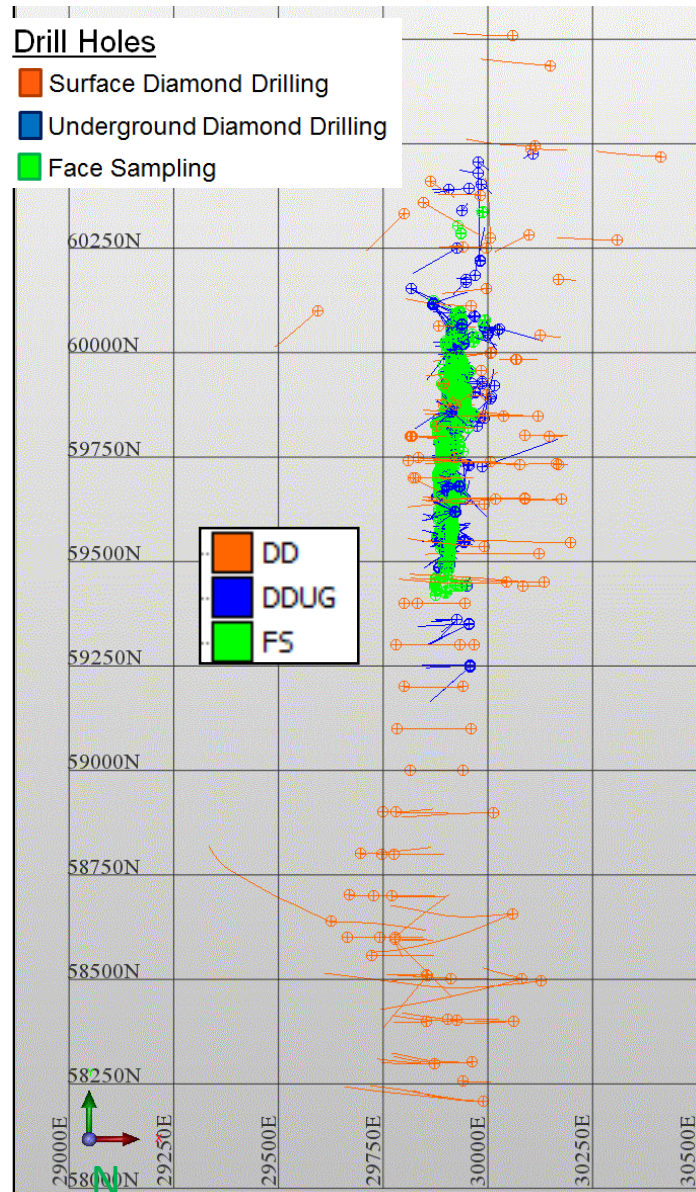


Figure 35: Plan view of the Irumafimpa-Kora Resource drilling, coloured by drillhole type.

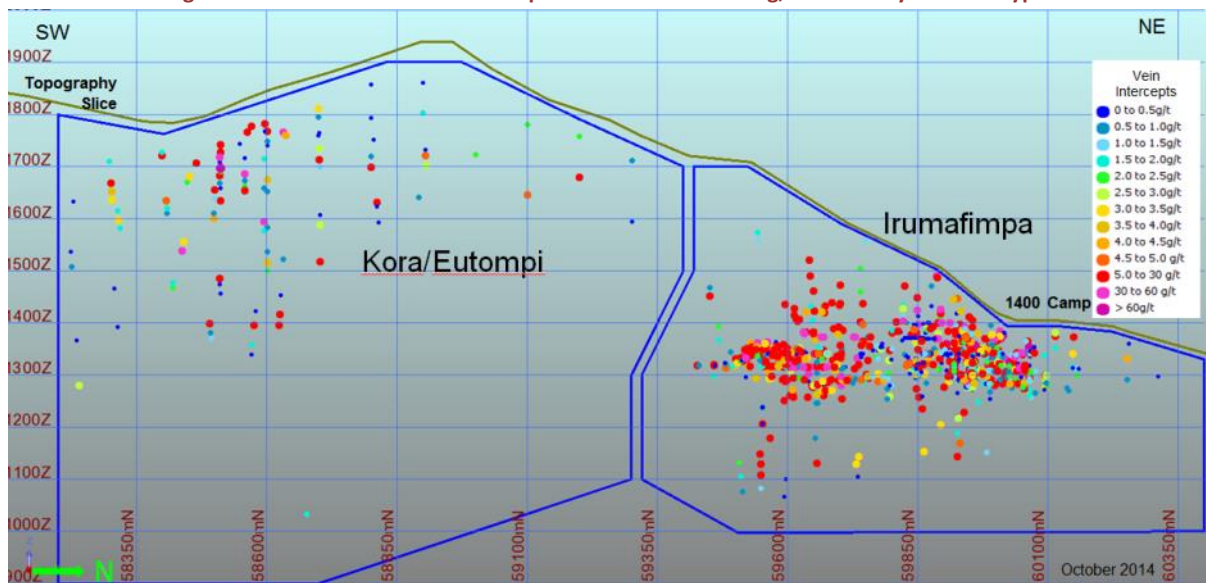


Figure 36: Long section view of Kainantu Resource Areas with Vein Composites colour coded for Au Eq

#### 14.4 GEOLOGIC INTERPRETATION

A 3D wireframe model and block model was constructed using a series of procedures within Surpac™.

Existing vein intercepts table from the previous vein interpretation was used as a starting point for modelling. Veins were identified as drillhole intercepts greater than 3 g/t AuEq, however assays less than this were incorporated between intercepts to maintain continuity. Printed level plans from site were incorporated into interpretations.

Gold equivalent values were generated in the database using the following formula:

$$AuEq = (Gold\ ppm) + (Ag\ ppm * 0.0185) + (Cu\ \% * 1.7308)$$

This gold equivalent formula is based on past average metal prices. For more detailed explanation, see section 14.13: [Assumptions for 'reasonable prospects for eventual economic extraction'](#) Assumptions for 'reasonable prospects for eventual economic extraction' Assumptions for 'reasonable prospects for eventual economic extraction'.

#### 14.5 DATA PREPARATION AND STATISTICAL ANALYSIS

Prior to a statistical analysis, grade domaining is normally required to delineate homogeneous areas of grade data. At Irumafimpa-Kora individual veins are assumed to represent sufficiently homogenous mineralization, although geochemistry of different veins does vary from Kora to Irumafimpa. Statistical analysis does not take into account spatial relationships of the data.

The purpose of statistical analysis is to define the main characteristics of the underlying grade distribution to assist with geological and grade modelling work. This process is important as the statistics of the individual sample populations can influence how grade data is treated and application of grade estimation techniques. For example highly skewed data may require special grade capping and indicator semivariogram analysis.

Statistical analysis of the grade data was principally carried out using the Surpac™ Software package. Surpac™ was used to export composite drillhole data as a comma separated file (CSV) for importation into Supervisor™. More detailed spatial analysis (semi-variograms) was conducted within Supervisor. The Supervisor package is an internationally recognised geological and mining software toolbox which incorporates geostatistical tools that can be used at all stages of the mining process from initial feasibility studies through to production control.

##### 14.5.1 Drillhole Spacing

Drillhole data spacing is variable within each domain.

At Kora, from surface to about 300-500m below surface, there is an average spacing between drillhole intercepts at Irumafimpa-Kora of about 50-70m. Vein intersections below this depth are sparser.

Irumafimpa is much more densely sampled because of underground development. Spacing between vein intercepts is on the order of 20-50 m.

##### 14.5.2 Domains & Stationarity

A domain is a three-dimensional volume that delineates the spatial limits of a single grade population, has a single orientation of grade continuity, and is geologically homogeneous. Statistical and geostatistical parameters are applicable throughout the volume (i.e. the principles of stationarity apply). Typical controls that can be used as boundaries to domains include structural features, weathering, mineralization halos and lithology.

Due to tight geological domaining, stationarity concerns are minimised as each domain contains only one population of grade data.

Kora and Irumafimpa veins have the same strike and dip, and appear to line up on the same structural trend. To determine if the veins could be considered the same domains, and so be reinterpreted and possibly joined into a single large vein system, existing vein composites were extracted and the vein chemistries were inspected (Figure 37).

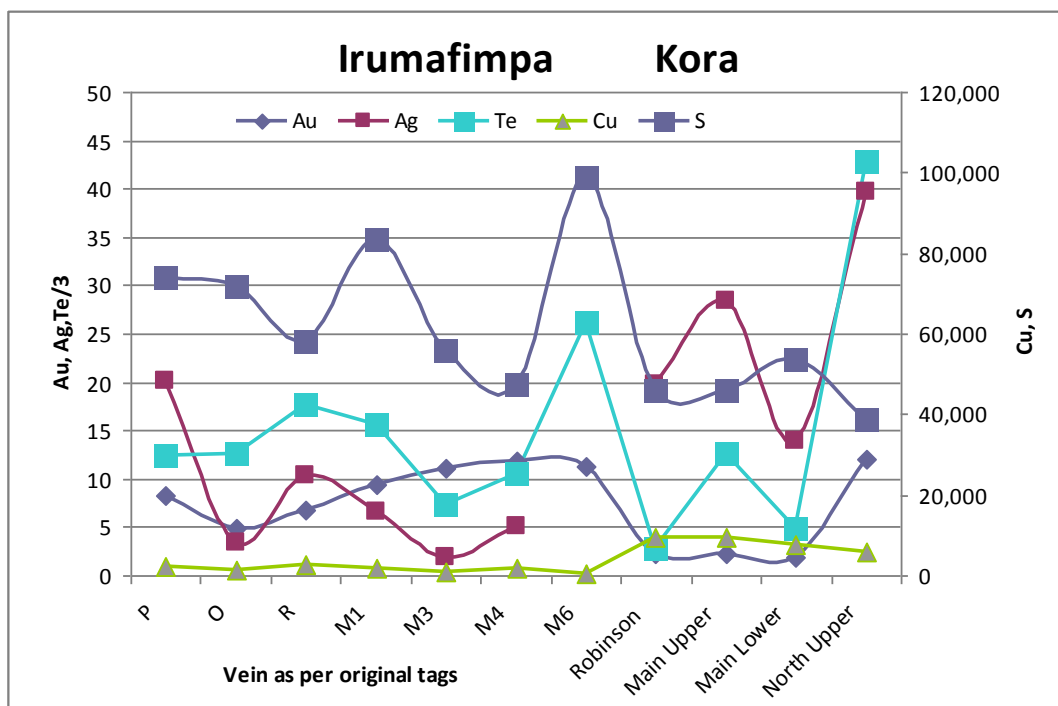


Figure 37: Comparison of Vein Chemistries

Kora veins were found to have relatively higher copper and silver grades and lower tellurium and sulphur grades than Irumafimpa veins, suggesting that they are part of a different phase of mineralization. In addition to this, grades at Eutompi were too low to allow interpretation of any vein mineralization from Kora to Irumafimpa.

Kora and Irumafimpa veins remain separate domains in this resource. However Nolidan believes that with additional drilling the two deposits may join or at least overlap at depth below current Eutompi drilling. In addition Nolidan believes that there has been insufficient drilling to confirm or disprove whether the “IJ” (Irumafimpa Judd) and “J” (Judd) veins are continuous between prospects.

**14.5.3 Compositing**

The two-dimensional technique used to estimate resources at Irumafimpa-Kora uses a single down-hole (or along channel) composite sample extracted from the drillhole database for each intercept within the vein. True thickness was calculated using the overall dip and dip direction of the vein. It is assumed that the grade of the vein at each location is the grade of the intercept thus reducing concerns of volume variance and negating the need for constant length samples. Scatter plots showed no correlation between grade and thickness, thus grade and thickness are treated as independent samples.

**14.5.4 Basic Statistics**

Summary statistics for gold, silver and copper in vein intercept composites by vein are presented in Table 23. Informing sample grades range from a minimum of 0.7 g/t Au for Judd 2 (“J2”) to a maximum of 45.6 g/t Au for Judd 1 (“J1”).

**Table 23: Univariate uncapped statistics for gold, silver and copper by vein**

Vein	No. Composites	Mean Grade			Maximum Grade			CoV		
		Au g/t	Ag g/t	Cu %	Au g/t	Ag g/t	Cu %	Au g/t	Ag g/t	Cu %
E4	21	4.4	26.9	2.0	19.5	110.4	6.3	1.23	1.08	0.83
J1	8	45.6	29.5	1.0	347.7	102.9	3.6	2.68	1.11	1.12
J2	7	0.7	25.9	1.6	1.6	52.1	3.8	0.64	0.74	0.73
J3	7	5.4	15.2	1.0	28.4	32.6	3.9	1.88	0.61	1.34
K1	32	9.8	32.2	2.5	93.1	145.3	7.4	1.95	1.11	0.68
K2	34	12.3	33.8	1.6	178.1	254.9	7.5	2.80	1.50	1.20
K3	13	1.7	21.6	1.2	6.8	74.5	3.1	1.26	0.96	0.65
K5	11	2.6	47.8	1.6	11.0	224.1	3.6	1.15	1.44	0.90
M1	321	10.7	6.0	0.3	155.0	35.3	2.0	1.82	1.27	1.55
M3	173	8.1	1.9	0.1	466.5	4.4	0.8	4.79	0.80	1.54
M4	159	19.7	4.4	0.2	1095.1	14.6	0.9	4.78	0.78	1.15
M5	449	15.8	8.8	0.3	507.9	59.0	1.7	2.69	1.39	1.31
M6	122	12.6	2.5	0.2	205.7	2.5	0.7	2.16	n/a	1.58
O1	79	4.7	3.7	0.2	61.2	13.7	0.9	2.09	1.05	1.22
P2	77	5.9	12.2	0.3	53.1	104.0	1.5	1.34	1.77	1.26
R3	116	6.0	10.4	0.4	70.5	79.4	2.4	1.56	1.25	1.50
IJ1	10	2.2	25.0	0.4	5.8	126.9	1.3	0.71	1.61	1.18
IJ2	9	3.0	6.6	0.3	9.6	27.0	1.3	0.95	1.18	1.46
IJ3	6	2.8	10.2	0.2	4.6	33.0	0.8	0.68	1.25	1.76

#### 14.5.5 Grade Capping

Capping is the process of reducing the grade of the outlier sample to a value that is representative of the surrounding grade distribution. Reducing the value of an outlier sample grade minimises the overestimation of adjacent blocks in the vicinity of an outlier grade value. At no stage are sample grades removed from the database if grade capping is applied. The risks associated with the treatment of the high grades are to potentially overestimate or underestimate the contained metal of the deposit.

Gold and silver are naturally nuggety (Poisson distribution) in nature and prone to outliers. Statistical parameters such as coefficient of variation and mean plots, metal loss, histograms and log probability plots were used as guides to determine the appropriate grade cap. The effect of capping can be seen by comparing statistics of uncapped and capped distributions.

In previous estimates of Irumafimpa-Kora, composite grades were capped to create an estimate. This was done because high grade outlier composites have an overwhelming influence on any blocks for which they are used to estimate. Capping the grade reduces the amount of metal that will be estimated into blocks informed by these outlier samples, hopefully preventing overestimation. Outlier composites have passed QA/QC, and so are considered real values that represent the grade of the vein at the composite location. The problem with these outlier composites is not strictly that the grades are too high or are not considered real or reliable, but that the effect on the blocks within the range of these high grade outlier composites will be higher than for other composites.

To effectively deal with high grade outliers in this resource, the composites for gold grades were reviewed and appropriate caps assessed.

Composite caps were applied to the grade values (g/t for Au and Ag, % for Cu) before estimation. Capped versus uncapped grade statistics were generated for gold, silver, and copper. Sulphur did not have enough samples so was not capped.

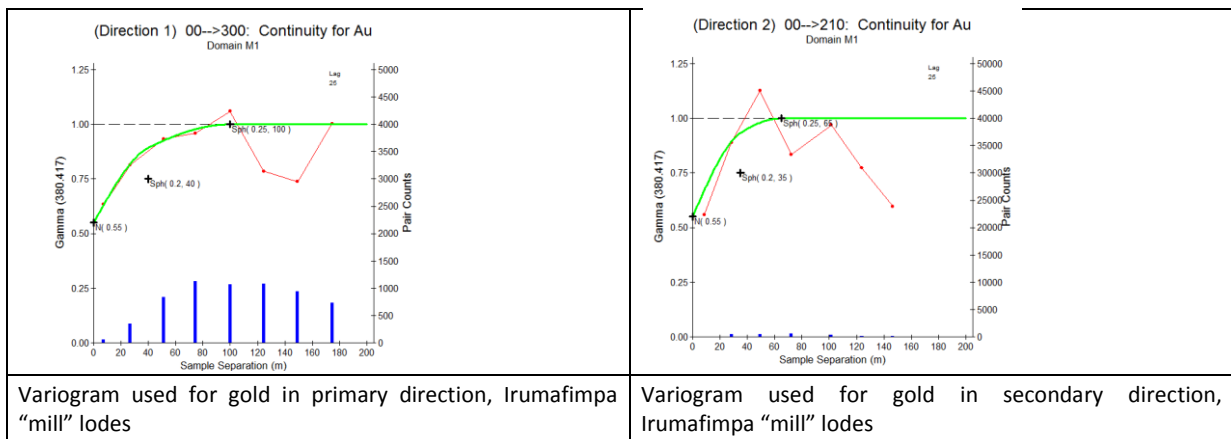
Table 24: Grade caps for gold by vein

Vein	No. Samples	Uncapped Mean Grade	Capped Mean Grade	Uncapped Coefficient of Variation	Capped Coefficient of Variation	Uncapped Maximum Grade	Suggested real cap	No. Samples capped
E4	21	4.4	4.3	1.23	1.21	19.5	n/a	0
J1	8	45.6	30.8	2.68	2.60	347.7	150	1
J2	7	0.7	0.7	0.64	0.63	1.6	n/a	0
J3	7	5.4	4.9	1.88	1.80	28.4	n/a	0
K1	32	9.8	9.3	1.95	1.85	93.1	80	1
K2	34	13.3	12.3	2.80	2.29	178.1	80	2
K3	13	1.7	1.7	1.26	1.26	6.8	n/a	0
K5	11	2.6	2.6	1.15	1.15	11.0	n/a	0
M1	321	10.7	10.2	1.82	1.65	155.0	80	6
M3	173	8.1	5.2	4.79	2.15	466.5	80	2
M4	159	19.7	10.7	4.78	2.03	1095.1	80	7
M5	449	15.8	13.7	2.69	1.91	507.9	150	6
M6	122	12.6	10.6	2.16	1.51	205.7	80	3
O1	79	4.7	4.3	2.09	1.84	61.2	38	2
P2	77	5.9	6.3	1.34	1.23	53.1	n/a	0
R3	116	6.0	5.8	1.56	1.37	70.5	n/a	0
IJ1	10	2.2	2.2	0.71	0.68	5.8	n/a	0
IJ2	9	3.0	2.9	0.95	0.91	9.6	n/a	0
IJ3	6	2.8	2.8	0.68	0.68	4.6	n/a	0
IJ4	3	1.8	1.8	0.57	0.57	2.5	n/a	0

14.6 VARIOGRAPHY

The most important bivariate statistic used in geostatistics is the semivariogram. The experimental semivariogram is estimated as half the average of squared differences between data separated exactly by a distance vector ‘h’. Semivariogram models used in grade estimation should incorporate the main spatial characteristics of the underlying grade distribution at the scale at which mining is likely to occur.

The semivariogram analysis was undertaken for individual elements within each vein domain that contain sufficient data to allow a semivariogram to be generated. 2D semivariograms were generated using two orthogonal principal directions.



Variogram used for gold in primary direction, Irumafimpa “mill” lodes

Variogram used for gold in secondary direction, Irumafimpa “mill” lodes



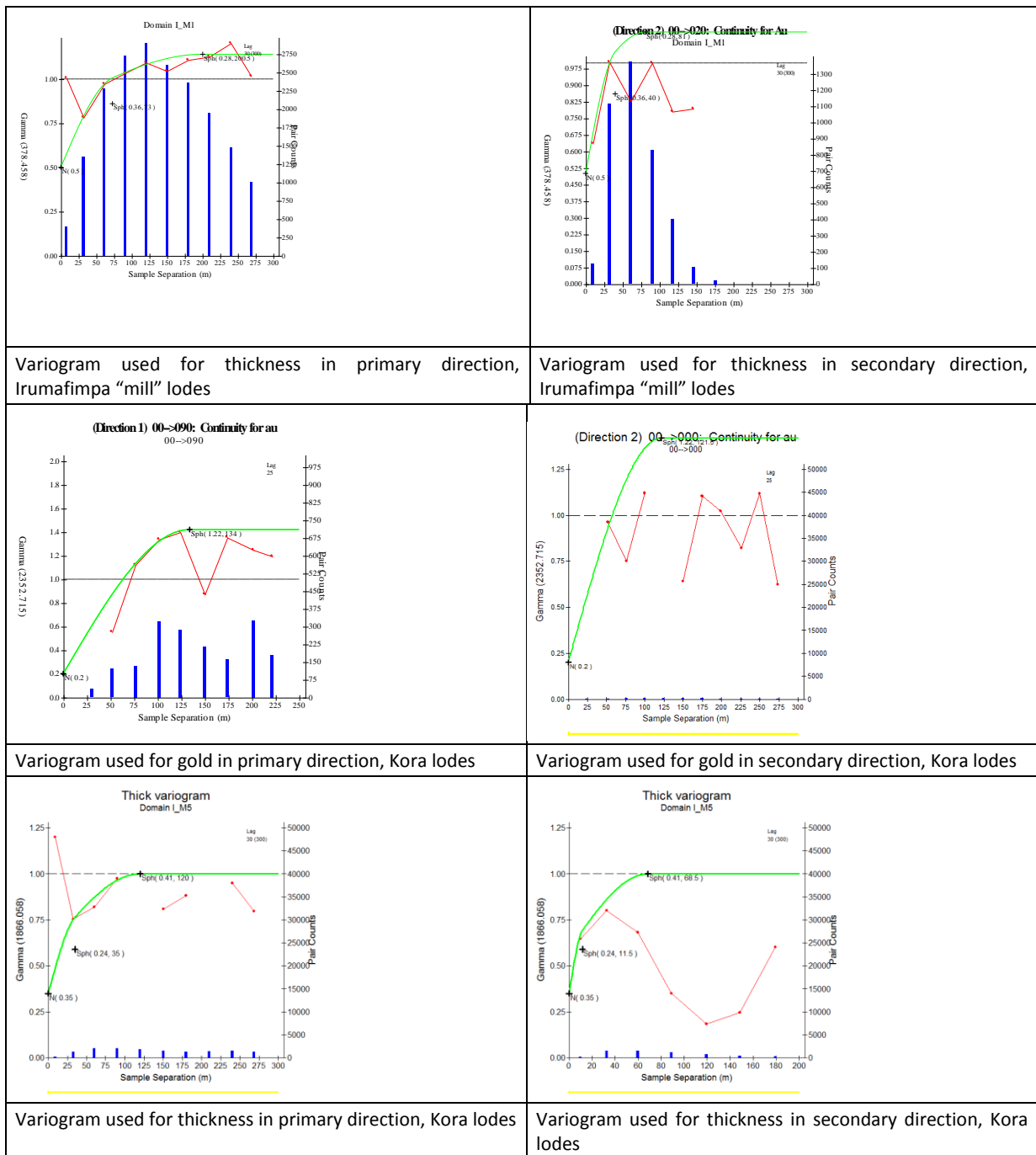


Figure 38 Variograms generated for veins.

14.6.1 Methodology

All variograms were 2D and in the plane of the vein. Anisotropic variograms were constructed for vein domain true widths, as well as gold and copper grade values in all vein domains. This was performed using vein composites individually, although most veins had too little data to generate reliable variograms. There were not as many sulphur and silver assays as gold or copper, so reliable variograms were not able to be constructed using these values. Sulphur and silver showed the closest relationship to gold values and so were interpolated using gold variogram parameters.

After extensive testing of changing variogram and other estimation parameters for each variable the estimation results were found to be sensible and consistent.

### 14.6.2 Variogram Models and Parameters

There were insufficient vein composites to allow variograms to be constructed for every vein. Variogram models were instead constructed for the veins or groups of veins with sufficient data and used for other veins nearby which did not have enough intercepts.

At Kora, a variogram was constructed for gold for the combined Kora veins (all Kora veins except for Judd). These variogram parameters were used to estimate gold for all of Kora and all of the Judd veins. At Irumafimpa, a gold variogram was constructed from domain M1. These variogram parameters were used to estimate gold for all Irumafimpa veins. A full table of estimation parameters for all veins and attributes can be found in Table 25.

**Table 25: Semivariogram Parameters used for Irumafimpa-Kora estimation**

Vein Set	Attribute	plunge	Max Range	C <sub>0</sub>	C <sub>1</sub>	A <sub>1</sub>	C <sub>2</sub>	A <sub>2</sub>	ratio1	ratio2
Kora, Judd	Au, Ag, S	80	130	0.2	1.24	130	0	0	2	2
Irumafimpa	Au, Ag, S	300	100	0.55	0.2	40	0.25	100	1.14	1.54
All veins	Cu	80	130	0.2	0.3	50	0.62	140	2	2
Kora, Judd	Width	80	130	0.3	0.38	88	0.18	256	1	1.44
Irumafimpa	Width	300	200	0.5	0.23	35	0.27	200	3.5	2.5

### 14.7 GRADE ESTIMATION

Estimates were made for the grades and true widths of veins. This is done in unfolded space using 10m x and y grid spacing. The estimation area is extended beyond the outer data points by expansion of a fixed distance to create a boundary perimeter; the boundary is then smoothed with the result that the expansion is reduced to less than the target thickness at the extremities. The expansion distance is therefore a maximum, rather than a fixed value. The expansion for Irumafimpa-Kora is a maximum of 50m.

Grade estimations are made using five different methods so that the results can be compared: Nearest Neighbour (capped), Inverse Distance Squared (capped), Ordinary Kriging (uncapped), Ordinary Kriging (capped) and metal content (gram-metres). True widths are estimated directly using Ordinary Kriging (no capping).

One block model was created, covering the entire deposit. The final 3D block model utilised 2.5(x)\*10(y)\*10(z) m cubic blocks sub-blocked to 0.625(x)\*2.5(y)\*2.5(z) metres.

#### 14.7.1 Methodology

Comprises the following steps:

1. **Database** – validation of the drillhole database.
2. **Intercept Selection.** The drillhole data is displayed in section and elevation slices showing assays. Intercepts are selected and coded for each vein based on the following selection criteria, in priority order;
  - a. Grade – select intervals with a value above cut-off, in this case 3 g/t AuEq. Also, internal waste intervals and/or geologically continuous intervals just below cut-off may be included, as long as the composite remains above cut-off.
  - b. Continuity – waste (<3 g/t AuEq) values in the projected plane of continuity of a particular vein being modelled will be coded as that vein.
3. **Basic Statistics and Upper Caps.** The basic statistics of the vein composites for each vein are then examined using basic statistics for grades and true width. The mean, median, standard deviation and variance are calculated for both normal and log-transformed data. A cumulative probability plot is prepared for each data set in both normal and log-transformed formats. Breaks in the plot indicating more than one population are highlighted and their spatial position relative to the total data set examined in 3D space. If more than one

population is considered possible, the total population is decomposed into its component populations and these are highlighted again in 3D space. If a small high-grade population is indicated, and this cannot be physically domained from the remainder, then an estimate with an upper cap will be included in the resource estimates.

4. **Unfolding and Variography.** Vein composites are unfolded into a single plane. Original coordinates are stored in the model so the model may be refolded after estimation. Variography is then undertaken in this 2D space. Values for anisotropy and variogram models are recorded for gold, thickness and copper or silver as appropriate. Where no directional variograms are clearly determined (as commonly happens with less than 50 data points, or where the data is unevenly distributed) isotropic variograms were used or variograms from similar veins sets where utilised.
5. **Unfolded Grid Model and Extension** – Generates a model of the vein centre using coded intercepts, and estimates grades and vein true widths. This is done in unfolded space using selectable x and y grid spacings. The estimation area is extended beyond the outer data points by expansion of a fixed distance (50 m Kora, Eutompi and Judd, 25m Irumafimpa) to create a boundary perimeter; the boundary is then smoothed with the result that the expansion is reduced to less than the target expansion at the extremities. The expansion distance is therefore a maximum, rather than a fixed value. In extreme cases, say where the extension is based on an isolated single drillhole, no extension will occur at all. Expanded wireframes are checked in 3D space to ensure the expansion does not intersect waste drillholes. The thickness of this boundary is set to 0.2 m. This prevents an overflow of grade contours past the limits of estimation. Grade estimates are made using 5 different methods so that the results can be compared. These are Nearest Neighbour Capped, Inverse Distance Squared Capped, Ordinary Kriging Uncapped and Ordinary Kriging Upper Capped and gram-metre estimates. True widths are estimated directly using Ordinary Kriging.
6. **Minimum Width application and consequent Grade Dilution** – Every 10 x 10 m block in unfolded space with a vein width (in the perpendicular direction to strike) less than 1.2m is set to a width of 1.2 m. Grades for each block are then diluted according to the original width and waste grade ( 0.0 g/t), using the following formula:  
  

$$\text{Diluted grade} = (\text{grade} \times [\text{true thickness}/\text{minimum thickness}]) + (0 \text{ g/t} \times [\text{dilution thickness}/\text{minimum thickness}])$$

Blocks with a width greater than 1.2 m have no change. This dilution will raise the tonnes and reduce the grade of the model; however, the total ounces of gold will remain about the same. The process of applying a minimum width is to reflect the minimum mining width and apply an appropriate dilution where veins are thinner than the mining width.
7. **Refolding and True Width Correction** – The grid is re-folded to its original 3D position. This is done by replacing the unfolded coordinates with the stored real coordinates. Some smoothing of the surface using surface modelling algorithms (not geostatistics) is undertaken; this removes local spikes and steps due to clustering of data. Changes are small, generally less than half the grid spacing. The “slope” of the surface in 3D space relative to the 2D surface is then measured as a percentage gradient; this value is recorded as it is similar to that used in “Connolly Diagrams” (Schwartz 1986). The True Width value is then corrected using this factor. Note that “slope” value is measured at each node of the grid and is a function of the surface geometry; the more the surface moves from the projection plane the greater the correction – in effect an “auto-correction”. This is considered much better than using an average strike and dip for the surface (too general), a drill core measurement (too local) or geostatistics (too smoothed).

8. **Solid Creation** – The 3D centre plane of the vein is then converted to a closed 3D solid. Footwall and hanging wall surfaces are created by translating the 3D centre plane half the width of the vein to create footwall and hanging wall surface. These are then joined at the edge, which is a common boundary, to create a vein solid. If more than one vein is being estimated, then the interaction between the resultant solids is examined and portions of the minor veins removed via “clipping”.
9. **Block Model** – The volumes from the final closed 3D solids are used to flag blocks in the final 3D block model for each vein. The variables from the solids, including grades, widths, slope, kriging variance, number of informing samples, nearest drillhole name and distances, etc., are all stored in the block model. Each vein block is given a vein name and number.

Determining the Krige Combined Grade:

- a. All blocks are assigned the capped Krige estimated grade.
  - b. The nearest neighbour estimate is performed using uncapped grades, if the NN grade is higher than the grade cap, and the Krige uncapped value is assigned, provided the block is within 25 m of the outlier assay.
  - c. NN estimate is then capped to the appropriate capped value.
10. **Bulk Density** – The bulk densities for each block below the topographical surface are set to a constant value.
  11. **Missing Blocks** – blocks that are not present are flagged as air (above the original topography), pit (mined out in an open pit), stoped (removed by underground mining).
  12. **Mineral Resource categories** – the resource categories are defined in long-section view for each vein, based on a combination of the number of informing samples, sample distances and kriging variance. The mineral resource categories are stored in the block model field.
  13. **Validation** – The values within the block model are compared to the informing drill composites. Basic statistics for block model and drill composites are compared. Distributions of grades in space (by elevation and northing) are compared. Blocks nearest to drillholes are compared with the informing drillholes. The estimates using the different estimation methods are compared in total and above cut-off.
  14. **Reporting** – the resource can be reported by resource category, by vein, by cut-off grades, by different methods (sensitivity to method and upper cuts), by elevation (tonnes per vertical m), by thickness, and by x and y dimensions.

#### 14.7.2 Block Model

The Irumafimpa-Kora 3D block model uses regular shaped blocks measuring 10m (y) x 2.5m (x) x 10m (z) (Table 26). The choice of the block size was patterned with the trend and continuity of the mineralization, taking into account the dominant drill pattern and size and orientation of the veins. The orientation of the block model is normal to the direction of the local grid. To accurately measure the volume of the mineralized wireframe inside each block, volume sub-blocking to 2.5m (y) x 0.625m (x) x 2.5m (z) was used. Blocks above topography were tagged and excluded from model estimation.

**Table 26: Block Model Extents**

Type	Y	X	Z
Minimum Coordinates	58,000	29,700	900
Maximum Coordinates	61,200	30,250	2000
User Block Size	10	2.5	10
Min. Block Size	2.5	0.625	2.5
Rotation	0.0	0.0	0.0

### 14.7.3 Informing Samples and Search Parameters

Informing samples are composited across the vein, providing a local average across the vein width before estimation. Using average grades across a vein requires careful consideration of the number of informing samples used to prevent over smoothing of the estimate. A minimum of one vein composite and a maximum of eight vein composites were permitted to inform a block. The number of samples per vein composites depends on the thickness of the vein and the orientation of the drillhole to the vein.

Search radii were found to be optimal at or near the distance that the variogram reached the sill. Thus the variogram ranges were utilised in the maximum search distances (Table 27). Anisotropy apparent in the variogram analysis is reflected in the search ellipse. Only one pass was used to inform the blocks. All of the plunges in Table 27 are relative to the plane of the vein (dip-90, dip direction 270).

Table 27: Search Parameters

Veins	Gold			Width		
	Search Distance (Au)	2D Anisotropic ratio (Au)	Plunge Direction	Search Distance (m)	2D Anisotropic ratio (m)	Plunge Direction
K1	130	2	80	130	1.44	80
K2	130	2	80	130	1.44	80
K3	130	2	80	130	1.44	80
E4	130	2	80	130	1.44	80
K5	130	2	80	130	1.44	80
J1	130	2	80	130	1.44	80
J2	130	2	80	130	1.44	80
J3	130	2	80	130	1.44	80
J4	130	2	80	130	1.44	80
M1	100	1.54	300	200	2.5	80
M3	100	1.54	300	200	2.5	80
M4	100	1.54	300	200	2.5	80
M5	100	1.54	300	200	2.5	80
M6	100	1.54	300	200	2.5	80
M7	100	1.54	300	200	2.5	80
O1	100	1.54	300	200	2.5	80
P2	100	1.54	300	200	2.5	80
R3	100	1.54	300	200	2.5	80
IJ1	130	2	80	130	1.44	80
IJ2	130	2	80	130	1.44	80
IJ3	130	2	80	130	1.44	80

### 14.7.4 Discretisation

The Krigé estimate used a 4 x 4 x 1 discretization (XYZ), giving discretization nodes spaced evenly within the block. The projection plane direction has no thickness (2D unfolded space) thus one discretization point is applied, which corresponds with the across vein direction.

### 14.7.5 Block Model Attributes

Interpreted mineralized veins were coded to the block model. Sufficient variables were added to allow grade estimation, resource classification and reporting. Blocks above the original topography were coded as air and not estimated. Blocks that have been mined were flagged in the final block model; these blocks were estimated for reconciliation purposes. To simplify and reduce the size of the block model several attributes were removed from the final model. Block model attributes are defined in Table 28.

**Table 28: Block Model Attributes**

Attribute Name	Type	Decimals	Background	Description
ag_ok_ct	Real	3	0	Ag_ok_ct -> diluted
au_gm	Real	-	0	Au g.m
au_gm_ct	Real	3	0	Au g.m -> diluted
au_id_ct	Real	3	0	Au_id_un -> diluted
au_nn_ct	Real	3	0	Au_nn_ct -> diluted
au_ok_ct	Real	3	0	Au_ok_ct -> diluted
au_ok_un	Real	3	0	Au_ok_un -> diluted
cu_ok_ct	Real	3	0	Cu_ok_ct -> diluted
density	Real	2	2.5	density of rock
dh_length	Real	2	0	DH_length
hole_id	Character	-		hole id
hori_thk	Real	-	0	horizontal thickness
min_mining_wdh	Real	-	0	minimum mining width
min_thk	Real	-	0	minimum thickness
mined	Integer	-	0	0 insitu 1 mined
rescat	Integer	-	4	1 measured, 2 indicated, 3 inferred, 4 waste
s_ok_ct	Real	3	0	S_ok_ct -> diluted
slope	Real	-	0	slope
true_width	Real	-	0	true width
vein_name	Character	-	W	Vein Name
vert_thk	Real	-	0	vertical thick
zok_cbs	Real	-	0	Conditional bias
zok_dns	Real	-	0	distance to nearest sample
zok_kv	Real	-	0	kriging variance
zok_ns	Integer	-	0	number samples

#### 14.8 VALIDATION AND COMPARISON WITH ALTERNATIVE ESTIMATES

Block models were validated by visual and statistical comparison of drillhole and block grades and through grade-tonnage analysis. Initial comparisons occurred visually on screen, using extracted composite samples and block models.

**Table 29: Alternate estimation results at a 5g/t Au cut-off (drill samples only)**

Estimation method cut-off used	Mt	Au g/t	Oz Au
Ordinary Kriging capped	3,882,000	9.7	1,211,000
Ordinary Kriging uncapped & undiluted	4,064,000	18.5	2,413,000
Gram Metres capped	4,352,000	9.2	1,281,000
Inverse Distance squared capped	3,546,000	10.4	1,185,000
Nearest Neighbour capped	2,726,000	13.0	1,141,000

Alternative estimation methods using drill samples only (Table 29) were utilised to ensure the kriging estimates were not reporting a global bias, such as nearest neighbour and the back-calculated grades from grams x metres (g.m) estimates. The alternate estimates provided expected correlations. Nearest neighbour shows less tonnes and higher grade as it does not employ averaging techniques to assign the block grade. The Ordinary Kriging uncapped undiluted estimate highlights the narrow nature of the deposit, not accounting for mining thickness allows significant narrow tonnes to be included (>5g/t) which are diluted to below 5g/t Au when mining thickness is considered, and also extends the very high grade areas much further than is realistic where drilling is sparse (inferred areas). The ID<sup>2</sup> estimate is closer to kriging as it uses distance weighted averages, but cannot assign anisotropy nor has the ability to decluster input data or nugget effect. Gold grades back-calculated from g.m appeared over-smoothed, a predictable consequence of using the thickness variogram for both g.m and thickness. The ordinary Kriging estimate is the most reliable due to the ability of kriging to decluster data and weight the samples based on a variogram (which incorporates anisotropy). Grade capping has a deliberate impact on grade; a harsh grade cap was applied to limit the effect of outliers in areas of limited data. The ordinary Kriging combined (the tightly controlled combination of uncapped blocks in close proximity to high grade drill intercepts and the capped Kriging estimate)

accounts for the expected high grade shoots, without over-smoothing the outliers or increasing the expected number of high grade shoots in areas that have not demonstrated the existence of shoots.

The ordinary Krigge capped estimate is used for reporting of mineral resources.

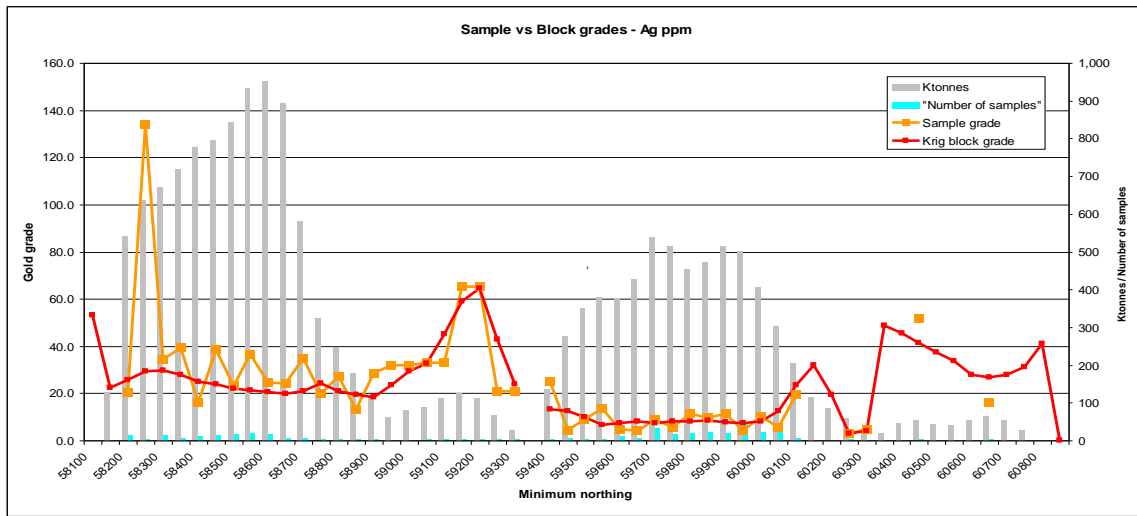


Figure 39: Trend analysis by northing for Ag g/t. (Kora to the left)

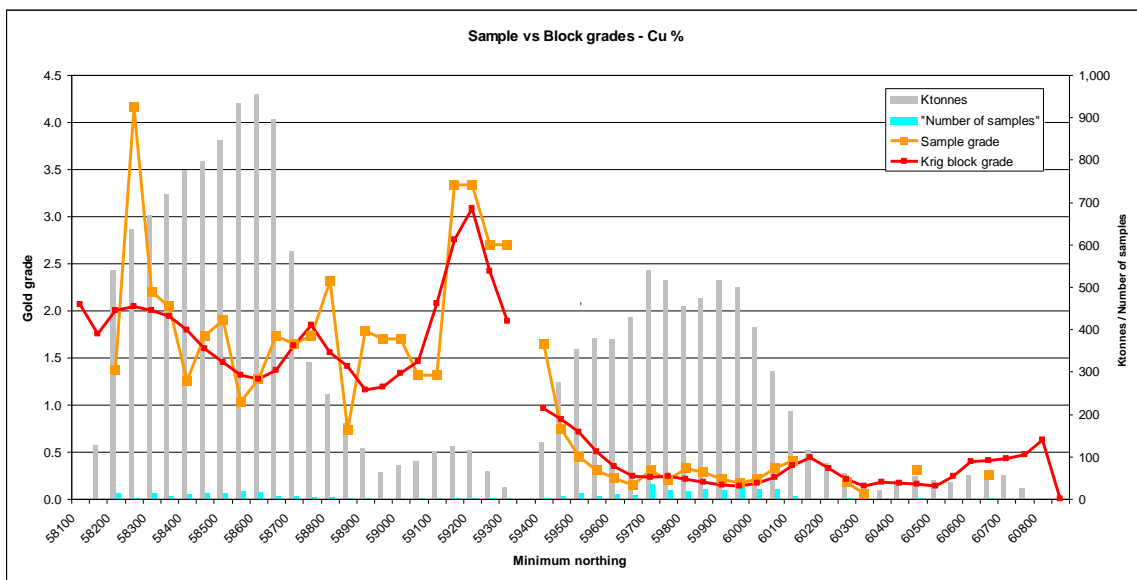


Figure 40: Trend analysis by northing for Cu % (Kora to the left)

Trend analysis was performed to compare input data (informing drillhole composites) with block estimates. Silver and copper (Figure 39 & Figure 40) showed good correlation across the entire deposit, and different mineralogy in the different areas become very apparent. Features expected from a successful trend analysis were shown, with block estimates showing a smoother, more averaged grade trend line than the more variable input data. More variability was found where there were fewer blocks or available informing composites.

Gold trend analyses were created with multiple estimation techniques displayed on them to further validate the resource. These did not initially show the same good correlation between input data and estimation results, especially at Irumafimpa (Figure 41).

Capping the high grade outliers at Kora caused much lower estimates than the uncapped input data. The very high input data grades shown are the product of only very few clustered high grade outliers. With the uncapped estimate trend line lying roughly between the input data and the final

combined estimate it is Nolidan’s opinion that the capping is applicable and the Kora estimate is correctly conservative in this case.

Initially at Irumafimpa none of the block estimates reflected the high grades shown in the input data, with the uncapped block estimate not even showing the same relative jump as was shown at Kora. It was found that when Irumafimpa veins were split into the Judd and Mill vein systems, a much more satisfactory sample block comparison was displayed (Figure 42).  
~~Figure 42~~  
~~Figure 42~~

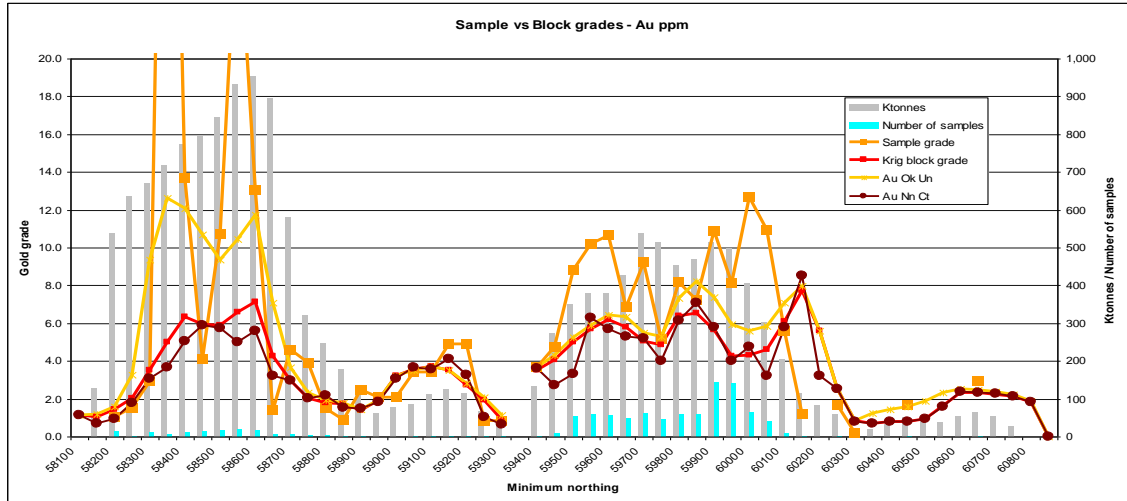


Figure 41: Trend analysis by northing for Au g/t (Kora to the left)

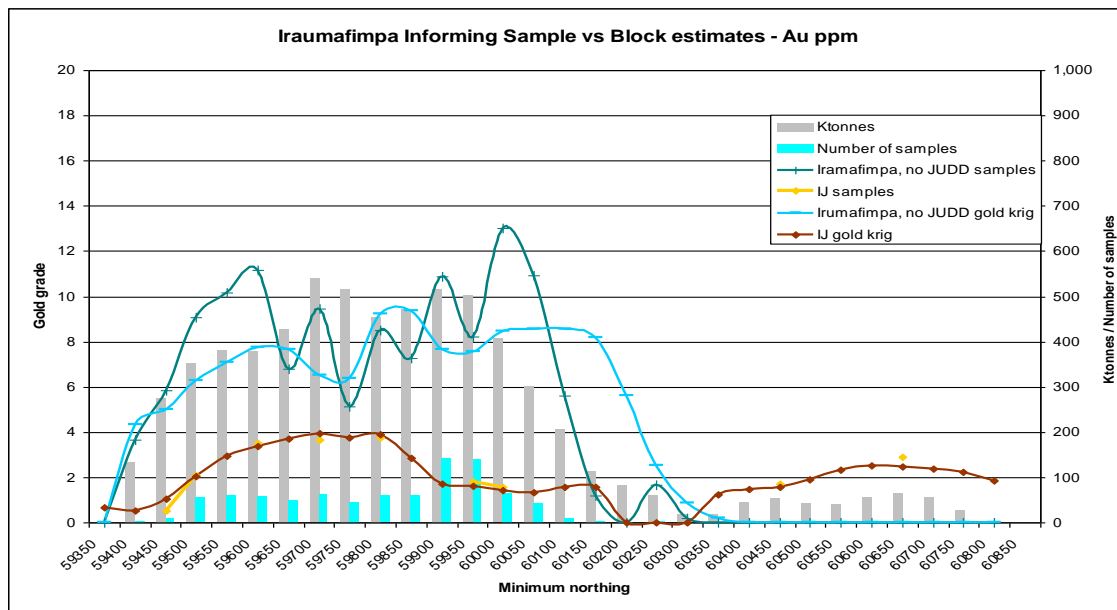


Figure 42: Trend analysis by northing for Au g/t at Irumafimpa with Judd and Mill veins separated

### 14.9 ECONOMIC CUT-OFF PARAMETERS

All resources have been stated above a combination gold equivalent and thickness cut-off. The model has been diluted to 1.2m thickness, so technically there are no resource blocks less than 1.2 m thick, however blocks still need to be above the grade cut-off. The two mutually exclusive cutoffs used (which took mining method, metallurgical recoveries, and royalties into consideration) were:

1. Narrow Vein -Shrink Stopes - 1.2m – 3m thick and  $\geq 6\text{g/t AuEq}$
2. Wide Vein – Mechanised Stopes -  $>3\text{m}$  thick and  $\geq 5\text{g/t AuEq}$

These parameters are based on the different mining methods that would be used depending on the width of the vein. Parts of the vein between 1.2m and 3m thick could be most efficiently mined



using a method such as shrink stoping, which typically has a higher cost than methods used in larger stopes such as cut and fill. Veins greater than 3m thick are typically mined using cheaper mechanised mining techniques; hence the lower gold equivalent cut-off grades used in the thicker parts of veins. This combination of different mining methods matched with cut-offs is to ensure that all material reported in the resource has a reasonable prospect of extraction.

Grade tonnage charts (Figure 43) are reported above 0 g/t AuEq (irrespective of vein thickness, but with 1.2m width applied) in 1 g/t increments. The charts indicate the current indicated resource has only a slightly higher grade than the inferred resource, and similar charts. The resource is expected to be mined by different mining methods depending on vein thickness and geological complexity; both vein thickness and grade need to be considered when defining a resource cut-off.

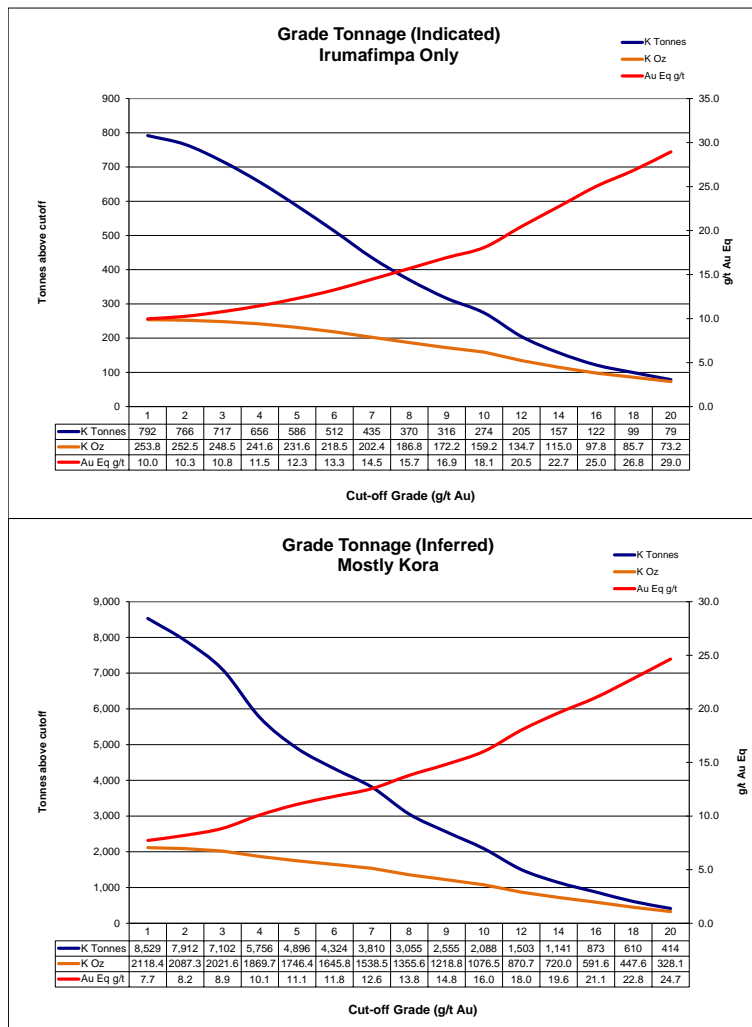


Figure 43: Irumafimpa-Kora Grade Tonnage Charts

**14.10 BULK DENSITY**

All vein blocks were assigned a density of 2.75 g/cm<sup>3</sup>. This is the average dry bulk density value determined by Barrick for Kora vein material (Mill and Robinson lodes). The average density was based on 428 measurements of mineralized drillcore from 7 drillholes through the Kora lode. Densities were determined using the water immersion method (Bond, R., Dobe, J., & Fallon, M., 2009).

During the initial feasibility study HPL carried out density determinations on 35 samples sourced predominantly from the exploration adit. Density of these samples ranged from 2.9 to 3.7. HPL used

a default density of 2.9 incorporating a correction for voids which constitute approximately 10% of the total volume of the Irumafimpa lodes (SRK, 2006),

#### 14.11 MOISTURE

No measurements were recorded; the bulk density figure applied was dry.

#### 14.12 MINING & METALLURGICAL FACTORS

The tonnes and grade of the mineral resource estimates are reported in situ.

#### 14.13 ASSUMPTIONS FOR 'REASONABLE PROSPECTS FOR EVENTUAL ECONOMIC EXTRACTION'

Assumptions for reasonable prospects for eventual economic extraction applied to this deposit include but may not be limited to the following:

- Underground mining by either shrink stoping or mechanised mining depending on vein width.
- Copper price at US\$3.03/lb (12 month average to June 2014 (\$3.13))
- Gold price at US\$1200/Oz (12 month average to June 2014 (\$1296); discounted due to apparent falling trend)
- Silver price at US\$22.26/Oz (12 month average to June 2014 (\$20.63); silver is a minor economic contributor)
- Assumed Mill Recoveries of 85% for all metals (and is therefore not a factor in the equivalence formula).

Gold equivalent values were generated in the database using the following formula:

$$AuEq = (Gold\ ppm) + (Ag\ ppm * 0.0185) + (Cu\ \% * 1.7308)$$

\*Metal prices were obtained from [www.kitco.com](http://www.kitco.com) and [www.kitcometals.com](http://www.kitcometals.com)

Therefore cut-off grades for reporting were a combination of thickness and grade reflecting mining methods:

- a. Narrow Vein - Shrink Stopes - 1.2 m – 3 m thick and  $\geq 6\text{g/t AuEq}$
- b. Wide Vein – Mechanised Stopes -  $>3$  m thick and  $\geq 5\text{g/t AuEq}$

#### 14.14 RESOURCE CLASSIFICATION

Based on the study herein reported, delineated mineralization of the Irumafimpa-Kora deposit are classified as a mineral resources according to the JORC Code 2012 Edition definitions which are considered as being not materially different from how those terms are defined under CIM Definition Standards.

Reporting of tonnages and grade figures reflects the relative uncertainty of the estimate, and rounding to the appropriately significant figures have been reported, some discrepancy in the addition of rounded figures may occur. Mined blocks have been removed prior to reporting.

For the classification of Mineral Resources for the Project, a block had to pass the reasonable prospects for extraction criteria based on an assumed mining method, that is;

1.2m to 3m thick and  $\geq 6\text{g/t AuEq}$ , (assumed appropriate for hand held mining equipment)

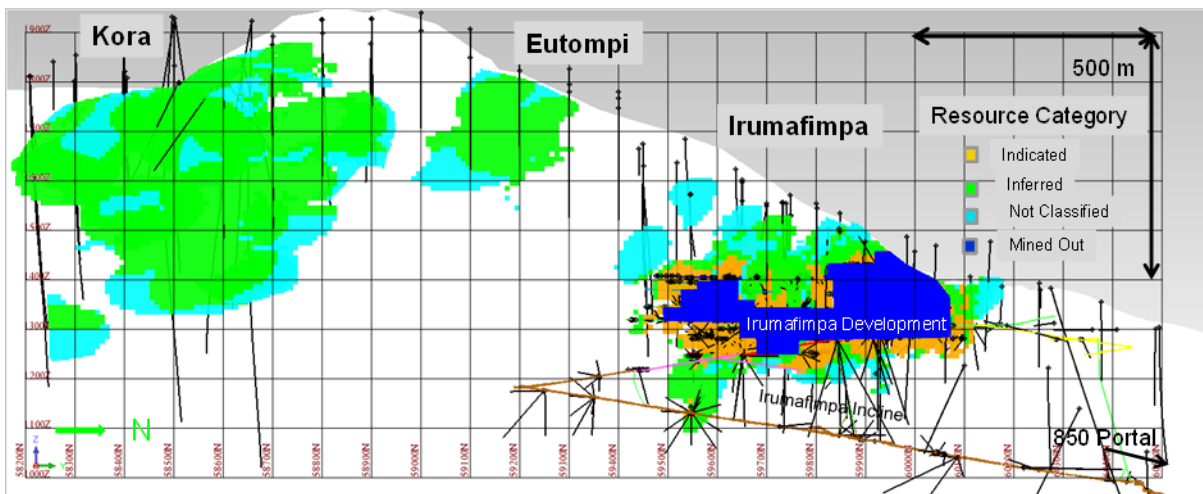
or

$>3\text{m}$  thick and  $\geq 5\text{g/t AuEq}$  (assumed appropriate for mechanical mining).

**Table 30. Resources by Area, Mining Method and Category**

Deposit	Resource	Mining	Tonnes	Gold		Silver		Copper		Gold Equivalent	
	Category	Method	Mt	g/t	MOz	g/t	MOz	%	Mlb	g/t	MOz
Kora/Eutompi	Inferred	Wide	3.36	7.1	0.77	32.9	3.55	2.2	161	11.5	1.24
		Narrow	1.06	7.2	0.25	40.0	1.37	2.3	55	12.0	0.41
Irumafimpa	Indicated	Wide	0.01	11.5	0.00	2.2	0.00	0.3	0	12.1	0.00
		Narrow	0.56	12.6	0.23	8.9	0.16	0.3	3	13.3	0.24
	Inferred	Wide	0.07	7.2	0.02	7.4	0.02	0.2	0	7.7	0.02
		Narrow	0.45	11.3	0.16	9.6	0.14	0.3	3	12.0	0.17

M in Table is millions. Reported tonnage and grade figures have been rounded from raw estimates to reflect the order of accuracy of the estimate. Minor variations may occur during the addition of rounded numbers. Gold equivalents are calculated as  $AuEq = Au\ g/t + Ag\ g/t * 0.0185 + Cu\% * 1.7308$ .



**Figure 44: ML150 Long Section with blocks coloured by resource category (looking west)**

In addition to passing the criteria listed above, the following definitions were adopted and applied to each domain separately;

**14.14.1 Indicated Mineral Resource**

- Defined as those portions of the deposit estimated with a drill spacing of 25m x 25m that demonstrates a high level of confidence in the geological continuity of the mineralization.
- Must have at least 8 informing samples

**14.14.2 Inferred Mineral Resource**

- Defined as those portions of the deposit with a smaller number of intersections but demonstrating a reasonable level of geological confidence.
- Must have at least 2 informing samples (i.e. drillholes).
- Maximum projection is half the drill spacing (50m).

**14.15 DISCUSSION ON FACTORS POTENTIALLY AFFECTING MATERIALITY OF RESOURCES**

The following factors could potentially impact on the materiality of the mineral resource estimate:

- An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

- The mineral resource is based on historical information generated by HPL and Barrick..
- Insufficient density measurements. Only 428 measurements for Kora were reported by Barrick. Densities reported by HPL for Irumafimpa were higher but based on only 35 measurements.
- Potential underestimation or overestimation of gold grade due to poor core recovery in mineralized zones.
- The vein systems are structurally complex and this complexity may lead to problems with correct interpretation of vein continuity.
- A resource is an estimate of quantity and grade; the reported figures are rounded to reflect the uncertainty associated with such an approximation.
- Fluctuation in metal or commodity prices, results of additional drilling, metallurgical testing, receipt of new information and production and the evaluation of mine plans subsequent to the date of any mineral resource estimate may require revision of such an estimate.
- Nolidan has considered the Mineral Resource estimates in light of known environmental, permitting, legal, title, taxation, socio-economic, marketing, political, and other relevant issues and has no reason to believe at this time that the Mineral Resources will be materially affected by these items.

#### 14.16 MINERAL RESOURCE ESTIMATE STATEMENT

Mineral Resources for ML150 deposits have been classified in accordance with NI43-101 as Indicated and Inferred confidence categories on a spatial, areal and zone basis and are listed in Table 31.

**Table 31: ML150 resources by category**

Resource by category									
Resource	Tonnes	Gold		Silver		Copper		Gold Equivalent	
Category	Mt	g/t	MOz	g/t	MOz	%	Mlb	g/t	MOz
Indicated	0.56	12.6	0.23	9	0.2	0.3	3	13.3	0.24
Inferred	4.94	7.5	1.20	32	5.1	2.0	219	11.6	1.84

*M in Table is millions. Reported tonnage and grade figures have been rounded from raw estimates to reflect the order of accuracy of the estimate. Minor variations may occur during the addition of rounded numbers. Gold equivalents are calculated as AuEq = Au g/t + Cu%\*1.7308 + Ag g/t\*0.0185.*

##### 14.16.1 Notes to accompany resource statement:

1. The current sample exploration database was supplied by Barrick in MS Access format.
2. Estimation undertaken in Surpac™, using ordinary kriging (“OK”) in unfolded space.
3. The estimation block size was 10m in Y and 10m in Z with width estimated in unfolded space as a variable. Grade was interpolated by domain using OK estimation with parameters based on directional variography by domain. Thickness of the vein was also estimated by OK estimation.
4. Results validated against drill data and Inverse Distance Squared, Nearest Neighbour, Gram M Accumulation estimates and Ordinary Krige uncapped estimates.
5. Minimum mining width of 1.2 m horizontal. Grade was diluted to account for minimum width.
6. This mineral resource estimate is based on 78,935 metres of drilling from 767 holes, and 18,312 metres of assayed intervals across all lodes. A single vein composite was used for each drill intercept on each lode – cut-off for selection was 3 m-gms Au Equivalent. There are a total of 2,003 vein composites across 19 veins, including 349 face composites.
7. A mined out area representing the extent of current mining projected across all lodes were removed from the final model as the exact location of individual stopes is not clear.
8. Top caps were applied to the composites for each vein. Grade caps were selected to restrict the influence of outliers where drilling was sparse, and varied by vein.
9. A minimum of 2 samples and maximum of 12 samples were used for each block. Search distances varied by lode and reflect the variogram ranges of 100-200 m, maximum projection beyond last drill-hole is 50 m.

10. The volume for each vein was defined by a wireframe in 3D space and is used to constrain the resource blocks.
11. Lower cut-off grades for reporting were a combination of thickness and grade reflecting mining methods, metallurgical recovery, and royalties:
  - a. Narrow Vein - Shrink Stopes - 1.2 m – 3 m thick and  $\geq 6\text{g/t AuEq}$
  - b. Wide Vein – Mechanised Stopes -  $>3$  m thick and  $\geq 5\text{g/t AuEq}$
12. Resource categories are based on estimation confidence and number of informing samples as a guide. Resource categories are based on estimation confidence and number of informing samples as a guide. Blocks with only one sample supporting them are not included in the resource estimate and are considered Unclassified (Figure 56, [Figure 43](#)~~Figure 43~~).
13. Density of 2.75 t/m<sup>3</sup> was used for every vein block.

## 15 MINERAL RESERVE ESTIMATES

This item is not applicable for this report.

## 16 MINING METHODS

This item is not applicable for this report.

## 17 RECOVERY METHODS

This item is not applicable for this report.

## 18 PROJECT INFRASTRUCTURE

This Item is not applicable for this report.

## 19 MARKET STUDIES AND CONTRACTS

This Item is not applicable for this report.

## 20 ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT

This Item is not applicable for this report.

## 21 CAPITAL AND OPERATING COSTS

This item is not applicable for this report.

## 22 ECONOMIC ANALYSIS

This item is not applicable for this report.

## 23 ADJACENT PROPERTIES

Kainantu occurs within a well-endowed belt of epithermal and porphyry style mineralization that reportedly contains several major deposits ([Figure 45](#)~~Figure 45~~Figure 45). Nolidan is unable to verify this information and the information is not necessarily indicative of the mineralization on the property that is the subject of this technical report.

Otterburn does not have any interest in any adjacent properties.

## 24 OTHER RELEVANT DATA AND INFORMATION

The Kainantu project has been under care and maintenance since January 2009 and currently remains on care and maintenance. The process facility and underground workings have remained idle for approximately 5 years. A summary of the project infrastructure is contained in Section 5.5.

During the mining operation at Irumafimpa between 2006 and 2009, mining was predominantly shrink stoping with some bench (longhole) stoping. The method applied was based on the geological structure and varying vein widths. Multiple independent reviews have shown that previous operators had considerable difficulty with dilution issues during mining which has been mainly attributed to the geological complexity of the veins and a poor understanding of grade distribution within the veins.

The plant was designed and constructed in 2005 and treated ore from the Irumafimpa lodes over two separate periods between 2006 and 2008 (HPL and Barrick). Concentrate from the Kainantu Mine was sold to a number of smelters including Japanese smelters. The specification generally fell into that acceptable to copper smelters seeking high gold and high sulphur feedstock although it did not contain significant copper.

The remaining capacity of the tailings facility (TSF) is approximately 280,000m<sup>3</sup>. This equates to approximately 3 years at a planned tonnage of 180,000 tpa. Hence, additional geotechnical studies and environmental approvals will be required prior to construction of a second lift to allow extra capacity to accommodate tailings for any future mine production.

Nolidan understands that Otterburn is currently using consultants to gather information and review past operations with the goal of refurbishing the mine and process plant by 31 December 2015.

## 25 INTERPRETATION AND CONCLUSIONS

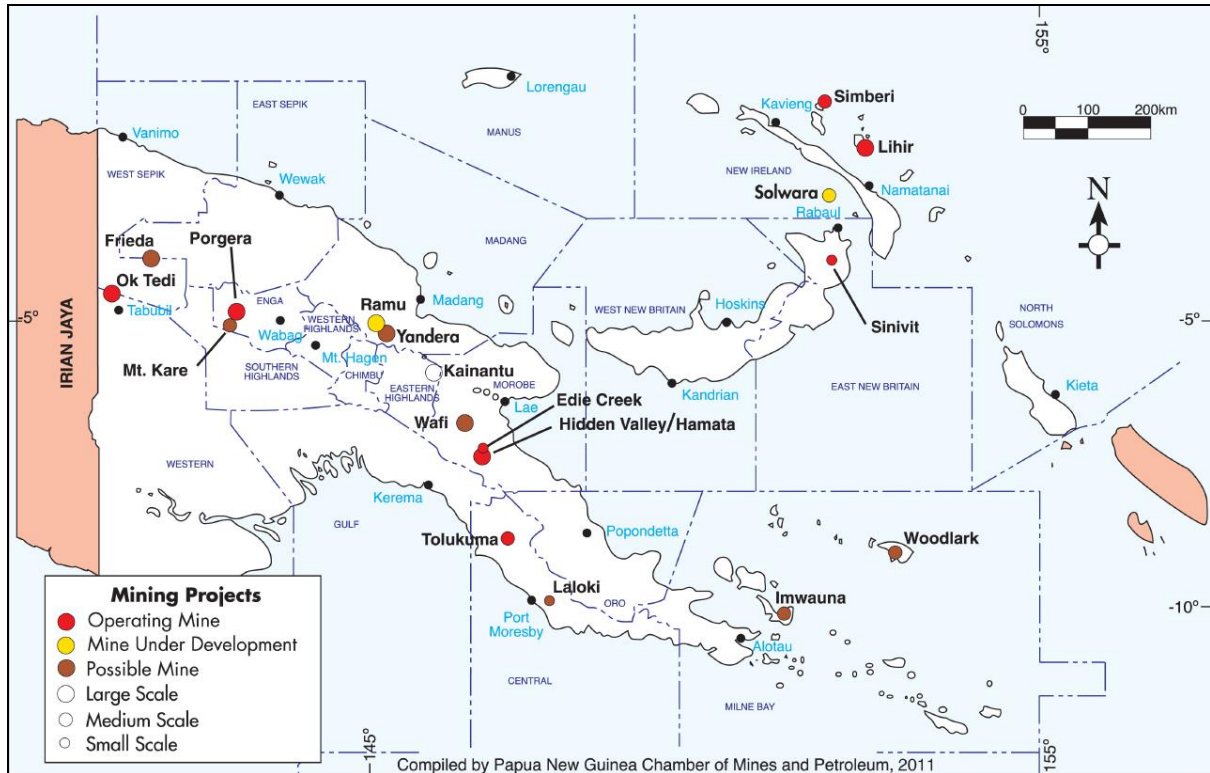
### 25.1 EXPLORATION POTENTIAL

The Kainantu project is located in a recognized copper-gold province, as evidenced by the underlying geology and presence of nearby major projects operated by global majors Barrick, Newcrest and Harmony. Nolidan concludes that based on a review of historical exploration and the identified mineralization within the Kainantu Project package there remain a significant number of major untested and early stage targets. Within ML150 are the Kora lodes which are strongly mineralized at the limit of drilling and open in all directions, as well as the Judd, Karempa and other unnamed mineralized lodes parallel to defined resources which have economically attractive grade in surface and/or drill samples from very limited work to date. Outside the ML there are continuations of the lodes listed above, as well as the strongly mineralized Mati, Mesoan, Arakompa and Maniape lodes proximal to the mining lease. A porphyry Cu-Au target is evident at shallow depth in the A1/ Tempe/ Tankuanan area to the southeast of ML150. Further away there is substantial mineralization at the Aifunka and Kathnel deposits on EL1341 in a separate mineralization centre.

Nolidan notes that Barrick originally purchased the Kainantu Project for the porphyry Cu-Au potential and internal reports rank the project very highly on a global scale. The decision to divest the project was made for corporate rationalisation reasons based on global competition for exploration expenditure rather than geological prospectivity reasons. This combined with the challenging land access meant that field work and drilling was not optimally conducted (e.g. at the A1 area). Within the four EL's surrounding the mine area there are numerous high quality porphyry and epithermal Cu-Au prospects which were not available for land access until late in Barrick's tenure. It is the view of Nolidan that all exploration targets in the Project remain untested or under-tested by modern exploration.

Figure 46: shows the main exploration targets defined by Barrick at Kainantu and their development stage. Nolidan recommends a complete review and prioritisation of exploration activities early in the operational phase. Exploration philosophy and expenditure should be based on a risk-reward approach (aligned with company strategy and timeframes). In particular, time to project realisation should be considered with opportunities for resource additions on the current ML150 given priority, and aspects including target size, likelihood of success and proximity to mining infrastructure and metallurgical compatibility being key ranking factors off the current mining lease. Prospect prioritisation for expenditure could be improved by a combination of:

- a) District scale targeting over the whole Kainantu project tenement package facilitated by 3D integration of available topographic, geological, structural, geochemical, geophysical and geochronological data.
- b) Benchmarking of the above against similar projects either in the same area or of similar geological setting
- c) Economic target considerations of size, grade, mining concept and development costs vs expected exploration expenditure requirements.



**Figure 45. Location of Kainantu project and gold deposits within major mineralized province.**

*Source: PNG Chamber Mines and Petroleum 2011*

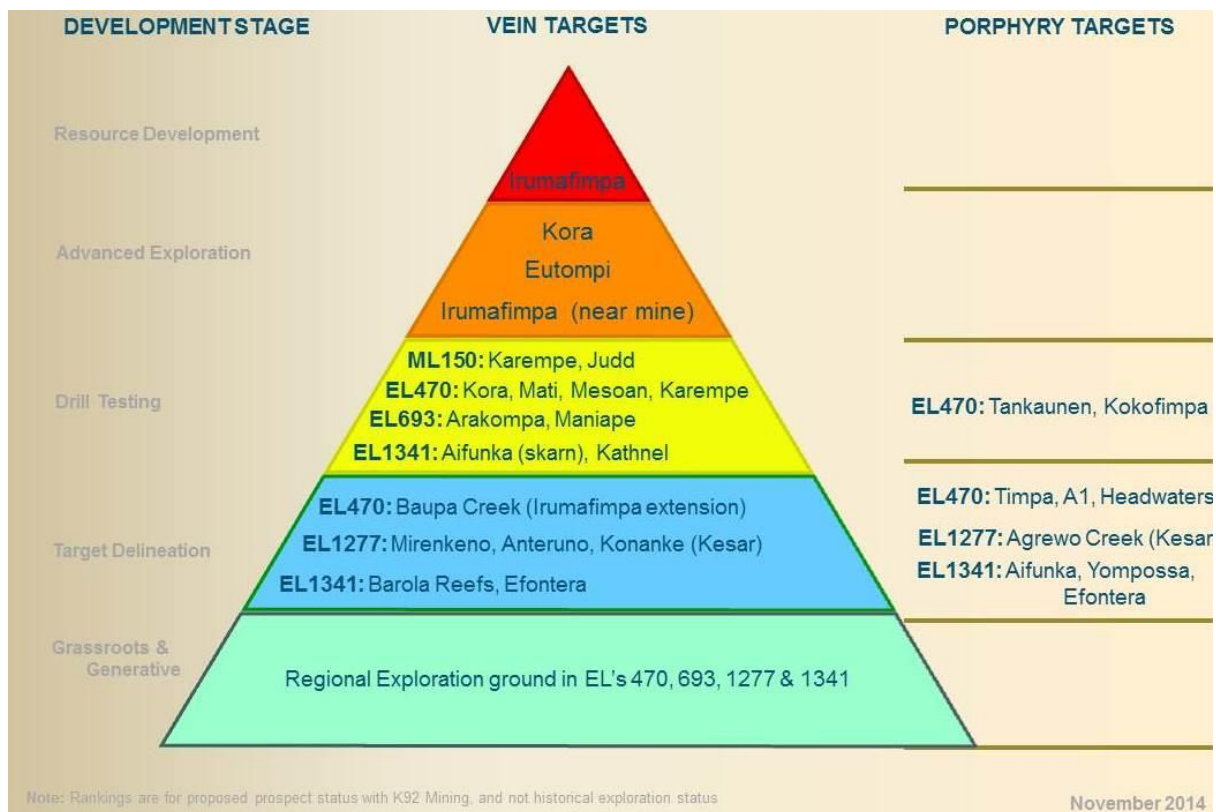


Figure 46: Kainantu Current Exploration Targets.

Source: Barrick, 2014

### 25.1.1 ML150

- Judd is located 200m east of Kora on ML150. Holes designed to specifically target the Judd lode have the potential to yield resources within close proximity to the immediate mine environment. Surface sampling indicates high grade and apparently continuous mineralization. Limited drill testing returned inconsistent results with some high grade intercepts. Core theft is a potential but unverified explanation for the inconsistency and further drilling is required to assess the target.
- Nolidan notes that untested geophysical targets for both EM and IP methods occur within ML150 and recommends these be assessed, and that the extent of electrical geophysical surveying within and around the ML be extended.
- The Irumafimpa-Kora system remains open to depth and along strike. Potential has been identified for sulfide copper lodes within the Irumafimpa area where copper mineralization was not the target for previous operators.
- Structural mapping assessments of lode controls have been undertaken (Blenkinsop, 2005). The environment is complex and highly variable. This is possibly due to intersection of subvertical foliation with subvertical veins which can result in splays and dramatic pinch and swell. Shoot plunges of 45 degrees within the lodes are interpreted (according to Blenkinsop reports) or 20 degrees according to Barrick (P Dale, pers comm., 2014). A review may establish whether this information could be used in a predictive capacity or whether drilling intensity is the optimal solution to exploration along the structure. In addition there is some evidence for cross linking structures that has not yet been evaluated.
- It is envisaged that further drill definition of the Eutompi area at depth to confirm dimensions and continuity of the Irumafimpa-Kora vein system would occur from underground.



- Testing of the Judd, Karempa and any cross structures would be conducted from the existing underground development and from new Kora development as the program progresses.

### 25.1.2 Vein Targets

Numerous other outcropping vein targets on the property are suitable for resource assessment drilling ([Figure 17](#)~~Figure 17~~~~Figure 17~~).

Karempa - The high grade central zone has yet to be drill tested and ample space exists to define a Kora sized lode within this area. Karempa straddles the western boundary of ML150. Drilling of the target will be conducted from underground if mine development is extended to Kora. However, a new mine lease extending the footprint currently covered by ML150 may be needed before commercial production could commence from Karempa.

Mati/Mesoan - this structure has potential to yield high grade resources within close proximity to Irumafimpa-Kora and remains to be drill tested.

### 25.1.3 Porphyry Targets

Barrick located several porphyry prospects but Otterburn has no plans for these prospects to be immediate exploration targets. The summary below is from Barrick (2014).

Timpa - The mapping and geochemistry suggests potential for the breccia to be a high level representation of a deeply emplaced porphyry (Tosdal, 2012).

Tankaunan - The initial wide space drilling shows promise for a significant Cu-Au porphyry deposit with the high intensity of alteration and presence of extensive low tenor mineralization and prospective veining evidence of a large and strong hydrothermal system.

A1 Target - Community access to some of the A1 target area was granted in June 2012. Limited surface work has been completed and mapping and surface sampling are currently active. First pass surface coverage has been completed through approximately half the target region. These results confirm the presence of a lithocap with alteration vectors indicating a higher temperature core to the lithocap in the vicinity of Breccia Hill. These factors are indicative of the presence of a buried porphyry system and further surface work is required to define the best areas for drill testing. Multiple drill targets exist in the area with some surface sampling and mapping required to prioritise these targets.

Kokofimpa remains a drill ready target defined by porphyry style alteration and mineralization where limited initial drilling has identified low tenor Cu-Au mineralization and demonstrated the potential for additional similar material to be identified. Additional well-targeted drilling could define further mineralization with the possibility for higher grade mineralization still present. Drilling confirmed the size of the system (potential to 1km) and suggested that the hottest parts of the system associated with the Cu/Mo soil geochemistry and mapped potassic alteration are still to be tested.

### 25.1.4 Prospect Ranking & Prioritisation

Prospect ranking criteria will be determined by peer review upon commencement of the exploration program and before budgetary allocation. All budget allocation processes will refer to the agreed ranking criteria to ensure rigour to the allocation process. A preliminary ranking and prioritisation allocation is presented here based upon Barrick status, adjusted for Otterburn's business plan (P Dale, pers comm., 2014).

**Table 32. Exploration Prospect Ranking.**

Prospect	Style	Lease	Rank	Resource	Target Size	Access	Infrastructure	Stage
<b>NARROW VEIN TARGETS</b>								
Irumafimpa (in-mine)	Alkalic Vein ± Sulfidic Vein	ML150	1-1	Y	M	1	In place	DD
Irumafimpa (near mine)	Alkalic Vein ± Sulfidic Vein	ML150	1-2	N	S	1	In place	AE
Kora	Sulfidic Vein ± Alkalic Vein	ML150	1-3	Y	L	1	<1km	AE
Eutompi	Sulfidic Vein ± Alkalic Vein	ML150	1-4	Y	L	1	<1km	AE
Judd	Alkalic Vein	ML150	1-5	Y	M	1	<1km	DT
Karempa	Alkalic Vein	ML150/EL 470	1-6	N	M	1	<1km	DT
Kora Extension	Sulfidic Vein ± Alkalic Vein	EL470	1-7	N	L	1	<5km	DT
Karempa	Alkalic Vein	EL470	1-8	N	M	1	<1km	DT
Maniapa	Sulfidic Vein	EL693/EL470	2-1	Y (historic)	M	2	<5km	DT
Arakompa	Sulfidic Vein	EL693	2-2	Y (historic)	M	2	<5km	DT
Mati/Mesoan	Alkalic Vein	EL470	2-3	N	U	2	<1km	DT
Baupa Creek	Alkalic Vein	EL470	2-4	N	U	2	<1km	TD
Aifunka	Skarn	EL1341	3-1	Y (historic)	M	3	<20km	DT
Barola Reefs	Quartz Vein	EL1341	3-2	N	U	3	<20km	TD
Atagana	Sulfidic Vein ± Alkalic Vein	EL1341	3-3	N	U	3	<20km	TD
Efontera	Quartz Vein	EL1341	3-4	N	U	3	<20km	TD
Kathnel	Sulfidic Vein ± Alkalic Vein	EL1341	3-5	N	S	4	<20km	DT
Mirenkeno, Anteruno, Konanke (Kesar)	Sulfidic Vein ± Alkalic Vein	EL1277	3-6	N	U	4	<15km	TD
<b>PORPHYRY TARGETS -- not immediate exploration targets</b>								
Timpa	Blind Porphyry Cu-Au	EL470	P-1	N	P	2	<20km	TD
A1	Blind Porphyry Cu-Au	EL470	P-2	N	P	2	<20km	TD
Breccia Hill	Blind Porphyry Cu-Au	EL470	P-3	N	P	3	<20km	TD
Headwaters	Blind Porphyry Cu-Au	EL470	P-4	N	P	3	<20km	TD
Ivavarun	Porphyry Cu-Au	EL470	P-5	N	P	2	<20km	TD
Tankaunen	Blind Porphyry Cu-Au	EL470	P-6	N	P	2	<20km	DT
Kokofimpa	Porphyry Cu-Au	EL470	P-7	N	P	2	<20km	DT
Yompossa	Porphyry Cu	EL1341	P-8	N	P	2	<20km	TD
Aifunka	Potential Porphyry	EL1341	P-9	N	P	2	<20km	TD
Kunarunta	Porphyry Cu	EL1341	P-10	N	P	3	<20km	TD
Atagana	Potential Porphyry	EL1341	P-11	N	P	3	<20km	TD
Efontera	Potential Porphyry	EL1341	P-12	N	P	3	<20km	TD
Agrewo Ck	Porphyry Cu-Au	EL1341	P-13	N	P	4	<15km	TD

Notes:

- Resource: Y=Yes, resource available; N=No, No resource available. (historic) = not verified by Qualified Person.
- Target Size: S=small; M=medium; L=large; U=unknown, P=porphyry

- Access: 1=Ready access; 2=variably available; 3=variably challenging; 4=challenging
- Stage: DD=delineation development and drilling; AE=advanced exploration; DT=drill testing; TD=target delineation

**25.2 RISK ASSESSMENT**

Key risks identified by Nolidan are summarised in [Table 33](#)~~Table 33~~~~Table 33~~.

**Table 33. Kainantu Project Current Risk Matrix – Prior to Mitigation**

#	Risk Event	Likelihood	Consequences	Current Risk	Comment and Possible Mitigation
1	Geology and Resource model incorrect	Possible	Major	High	Geological risk. The Resource model is mostly inferred because of drill spacing at Kora and limited confidence in underground sampling results from Irumafimpa. Reliance on historical data; the effect of poor core recovery on reliability of gold values, and possible inaccuracies in density determination are also considered risk factors. Due to the inability to produce reconciliations it was not possible to assess the validity of historical Reserve or Resource Models. Further drilling is required to improve confidence in existing resources (upgrade to indicated and measured) and allow conversion to reserves.
2	Project growth/sustainability (no new discoveries)	Possible	Major	High	Mitigation is that exploration can recommence. In Nolidan's opinion the Kainantu project tenure is comprised of about 510km <sup>2</sup> of exploration tenure in a world class province, with the majority of exploration at a reconnaissance stage. There remains significant exploration upside and opportunity for major discoveries of Cu-Au porphyry and IRG deposits to facilitate project growth and sustainability. Nolidan believes the exploration risk to be low due to the historical identification of mineralization.
3	Land ownership and access issues	Possible	Moderate	Moderate	Inter-clan fighting. Access to areas with existing surface miners is challenging. This results in delays in assessment and advancement of exploration properties. Mitigated by ongoing and proactive community relations engagement.
4	Permitting	Unlikely	Major	High	Approved EIA. Ongoing permitting requirements. Ongoing and proactive government and community relations engagement required. Failure to refurbish Kainantu mine and processing facility by 31 December 2016 could lead to cancellation of ML150. Failure to commence mining operations on the Kora deposit by 30 June 2018 could lead to cancellation of ML150.

### 25.3 DISCUSSION

It is Nolidan’s opinion that further investigation is required to understand the geological complexity of the veins at Kainantu and the controls on high grade shoots. This will require better resource definition.

The ML150 resource documented in this report is mostly in the Inferred category, and this itself is dominated by the Kora area, which also shows higher copper and silver values than Irumafimpa. No mining dilution or loss has been taken into account with these resource numbers (other than using a minimum width of 1.2m). Mining dilution or loss will be higher in the narrow lodes at Irumafimpa than the wider sulphide lodes at Kora. Figures previously used by Barrick for conversion of resources to reserves of 92% for tonnage and 65% for ounces seem appropriate and should be kept in mind when reviewing resource numbers.

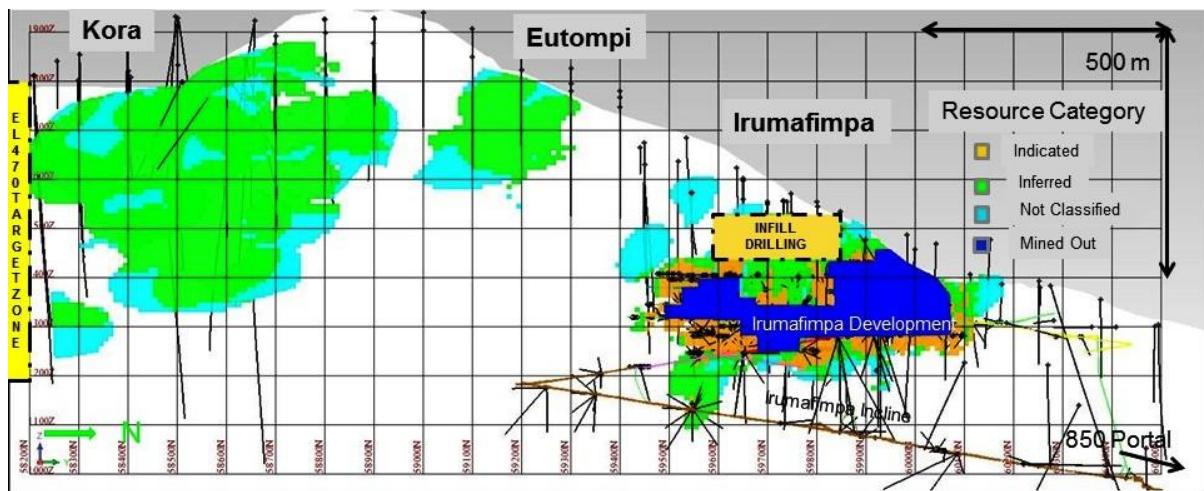


Figure 47: Kainantu Targets of 2016 Work Program and Budget

Significant opportunity remains for resource extension within the immediate mine environment, including:

- The Irumafimpa-Kora vein system is open at depth, in the central areas beneath the top of the mountain (Eutompi) and to the South (Kora) beyond the ML150 boundary.
- Drillhole BKDD0023 below Kora is well mineralized with a significant intercept at depth (30.6m from 920.8m @ 2.0 g/t Au, 4.8 g/t Ag and 1.3%Cu or 4.3 g/t AuEq) and about 300m from the nearest other drilling. It represents a potential extension to the resource of at least 300m.
- Blocks shown in the Longitudinal Section in the resource section of this summary have been coloured by resource category. Turquoise blocks are blocks with only one sample supporting them and are not included in the resource estimate. These areas are extensive and represent obvious targets for immediate drillhole targeting.
- The area between Kora and Irumafimpa (Eutompi) is untested at depth.
- The parallel lodes on ML150, the Judd and Karempa in particular, have been outlined at surface showing similar widths and grades but have had little drill testing.

The Kainantu project tenure is comprised of about 405 km<sup>2</sup> of exploration tenure in a recognized copper-gold mineralized province, with the majority of exploration at a reconnaissance stage. There remains significant exploration upside and opportunity for major discoveries of further vein deposits and Cu-Au porphyries to facilitate project growth and sustainability.

Nolidan notes that although all of the Resource is in the Indicated or Inferred category, dominantly the latter, this is not unusual for a vein style deposit situated well below the surface. Exploration and upgrading to measured and indicated categories will require closed spaced drilling and development along the veins. The general sequence of work suggested by Nolidan is as follows:

- Exploration at surface using drilling and geophysics to identify the mineralized structures.
- Drilling to Inferred category from surface and underground at nominal 100m spacing (vertical and horizontal) sufficient to quantify the likely resource for geological continuity, general mining methods and metallurgical performance.
- Drilling to Indicated category at nominal 25m spacing (vertical and horizontal)
- Drilling to Measured category at a nominal 10m spacing (vertical and horizontal).

The Work Program proposed by Otterburn for 2016 is summarized in [Table 34](#)~~Table 34~~~~Table 34~~. Expenditure is concentrated on exploration within ML150 and EL470 (75% of total proposed expenditure for 2016). Within ML150 Otterburn proposes close spaced drilling from existing underground workings to confirm indicated resources at Irumafimpa ([Figure 47](#)~~Figure 47~~~~Figure 47~~). The mineral resource is summarized in Table 31 and detailed in Table 30 as well as in the 'Summary' chapter of this report.

The ML150 renewal terms do not require the mine to restart production, only that the mine and mill are returned to the condition they were in prior to suspension of mining operations. It is K92ML's objective to use the results of the recommended drilling to update the mineral resource estimates which can then be used to support a new mine plan to support a re-start of the mine.

## 26 RECOMMENDATIONS

Nolidan recommends that:

The current resource should be reviewed and a strategy to convert inferred resource to indicated or measured resources be instigated to facilitate geology/resource model interpretation and to improve resource confidence (reducing project risk). Not all current inferred resources will be able to be converted to a higher resource category.

- Drilling should concentrate on infill drilling of current resources and extensions to veins within ML 150.
- Nolidan agrees with the budget proposal for infill drilling to commence from existing underground workings at Irumafimpa.
- Consideration should be given to converting the Kumian laboratory to allow fire assaying of exploration and underground samples.

Exploration activities on the exploration licences should commence as soon as practical so that expenditure commitments can be satisfied on exploration leases EL470 and EL693. Drilling on EL470 and EL693 is prioritized below.

- Priorities for drilling on EL470 should include the Karempa and Mati/Mesoan prospects and extensions to the Kora lodes to the south east.
- Priorities for drilling on EL693 should include follow-up drilling of the Arakompa and Maniapa deposits where historic resources have previously been identified.
- Further review and compilation of existing exploration data to generate new drilling targets.
- District scale targeting over the Kainantu project could be facilitated by 3D integration of available geological, structural and geochemical data.

**26.1 EXPLORATION WORK PROGRAM AND BUDGET**

Minimum expenditures and work programs for the 2016 Anniversary year as committed to the Mineral Resources Authority (“MRA”) in application for renewal of exploration tenements are presented in the table below. The expenditure commitments are a minimum commitment to the MRA and actual expenditure commitments are anticipated to be significantly higher to meet the proposed minimum work programs. The MRA will expect additional work to be completed by K92ML in the 2016 Anniversary year to compensate for K92ML’s lower expenditure in the 2015 anniversary year which did not meet the minimum requirement. As K92ML must meet both expenditure and work program commitments to maintain the tenements in good standing, the expenditure planned for the 2016 anniversary year has been increased beyond that required for the year to include expenditure not made in 2015. K92ML expended K154,967 (EL470), K62,154 (EL693), and K73,343 (EL1341) on exploration work in 2015.

Table 34. Exploration Work Program and Budget

Tenement No.	Expiry Date	Commitment 2016 PGK	Period Ending	Minimum Expenditure Commitment 2015/2016	Proposed Work Program Budget		Proposed 2016 Work Program
					Unit	Amount	
EL470	4/02/2017	1,000,000	4/02/2017	PGK 2,000,000	PGK	1,845,000	30 wks access negotiations, 2 wks Library search & data review, 10 wks Reconnaissance & Detailed geological mapping, significant sampling of soil + rock + wacker, samples for petrology & whole rock analysis, ground magnetic surveying, significant trenching & channel sampling, two cored drillholes testing extensions to Kora veins.
					USD	590,000	
					CAD	785,000	
					% Total	60%	
EL693	4/02/2017	400,000	4/02/2017	PGK 600,000	PGK	540,000	10 wks access negotiations, 2 wks Library search & data review, 9 wks Reconnaissance & Detailed geological mapping, significant sampling of float + BCL streams + soil + rock + channel + wacker, samples for petrology & whole rock analysis, two cored drillholes testing vein targets
					USD	175,000	
					CAD	230,000	
					% Total	18%	
EL1277	29/5/2009*	400,000	29/05/2016	PGK 400,000*	PGK		
					USD		
					CAD		
					% Total	0%	
EL1341	20/06/2016	150,000	20/06/2016	PGK 290,000	PGK	220,000	6 wks review, 4 wks reconnaissance, 12 wks mapping & data interp, significant sampling of float + stream + soil + rock + wacker holes, samples for petrology
					USD	70,000	
					CAD	95,000	
					% Total	7%	
ML150	3/06/2024	N/A	N/A	N/A	PGK	450,000	Close spaced underground drilling to confirm indicated resources at Irumafimpa. Estimated 8,000m – 100 holes
					USD	150,000	
					CAD	200,000	
					% Total	15%	
Total					PGK	3,055,000	
					USD	985,000	
					CAD	1,300,000	
					Total	100%	

Notes - \*Renewal date and expenditure commitment for EL1277 yet to be agreed with Minister for Mining and the Mining Advisory Council.

## 26.2 MINE REFURBISHMENT

PSI consultants were engaged by K92ML to plan and cost refurbishment of the underground workings.

AMC Consultants of Australia (AMC) were commissioned to prepare a preliminary mine plan. Input from the PSI study and costings supplied by Mining Processing & Project Consulting (MPPC) were used by AMC. The mine plan recommends the use of a mechanized mining method such as longhole stoping rather than the shrinkage stoping methods used in the past. (AMC Consultants, 2015). A preliminary ventilation plan for the mine was also included in the AMC report. The cost to rehabilitate the mine was estimated as CAD \$700,000. Australian Mine Design & Development are currently refining the AMC mine plan.

Geotechnical studies of the mine workings and a more detailed ventilation plan are still required.

K92ML have proposed that in the initial refurbishment phase of the mine a bulk sample of approximately 20,000 tonnes would be mined from areas on 21 Level that were developed by Barrick immediately prior to the mine closure (Lewins, 2016)

## 26.3 MILL REFURBISHMENT

A preliminary study was carried out in December 2014 by Ausenco the results of which are summarized below (Kramer Ausenco, 2014):

The site visit was carried out over the period 12 to 19 November 2014. Findings from the site visit show that the process facility is in a reasonable condition and can be re-started with a modest amount of expenditure.

Although Ausenco recommended a third party Operating and Maintenance (O&M) contract as an efficient way of making the plant operational in a timely manner K92ML has decided to operate and maintain the plant itself.

Following completion of studies on the redesign of the crushing circuit to handle wet clay rich mill feed Mincore has been engaged by K92ML to undertake the plant refurbishment and the installation of a drum scrubber (Mincore, 2015).

Mincore estimated a total cost of AUD \$1,325,330 to refurbish the existing plant and an additional cost of AUD \$685,680 to install the drum scrubber into the crushing circuit.

The proposed bulk sample from 21 Level would be used to fully commission the plant and provide a representative sample for further metallurgical testwork, including generating a bulk sample of final concentrates to be treated by the offtake smelter. K92ML proposes that the sample be processed in the first quarter of 2017 when all refurbishment work has been completed.

## 26.4 MINE AND MILL REFURBISHMENT BUDGET AND WORK PROGRAM

In order to comply with the terms of ML150 K92ML is required to refurbish the mine and mill by December 31, 2016. It is recommended that K92ML undertake the following:

1. Development of an detailed mine plan with costing for refurbishment of the underground workings
2. Rehabilitation of the mine and mill as defined by the above studies and as required by the terms of ML150

### Further Recommendations

1. Metallurgical studies to determine the optimum processing system for mined material from the ore at Irumafimpa including flotation test work designed to produce an Au-Te concentrate and separate copper concentrate and gravity recovery test work.
2. Studies to optimize the milling circuit including costing
3. Once the underground is rehabilitated, undertake close 10 x 10 meter spaced drilling in order to increase the confidence in parts of the indicated resource at Irumafimpa

**Table 35 Mine and Mill Refurbishment and Associated Studies Budget 2016**

Item	Amount ,000's CAD	Description
Studies -Metallurgical Testwork	\$0	No work planned
Studies -Mill optimization and crushing circuit redesign and costing studies	\$0	No work planned
Studies - Mine rehabilitation and design	\$100	Geotechnical and Ventilation surveys
Office, Camp and Security Refurbishment	\$0	Office currently in working order.
Mine refurbishment	\$700	For Main incline and access to working levels, make safe and compliant with Mines Safety regulations, including: re-install transformers, compressors and ventilation systems, test electrical cables and replace connections where necessary, re-install pumps and water supply network, dewater control and systems, replace or improve ground support where necessary to make many access drives safe, emergency systems, communication systems
Bulk Sampling of Underground Mineralization	\$878	Mine bulk sample from 21 Level of the mine and treat at refurbished Mill
Mine and Mill Refurbishment	\$2,000	Initial costs for capital items required under the Refurbishment phase, including drum scrubber. Crushing and screening, Reclaim, Ball Mill, Flotation, TSF, Concentrates, Reagents, Water, Air, Power, Control Systems, Engineering Design, First Fill and Provisions
<b>Total</b>	<b>\$3,678</b>	

Nolidan notes that these are direct costs, and do not include general and administration costs.

For and on behalf of Nolidan Mining Consultants

Anthony Woodward BSc Hons., M.Sc., MAIG

Effective Date: 15 April 2016



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## CERTIFICATE OF QUALIFIED PERSON

### ANTHONY JAMES WOODWARD

I, Anthony James Woodward hereby certify that:

I am a Consulting Geologist and Professional Geoscientist residing at 14 Carlia Street, Wynnum West, Queensland 4178, Australia (Telephone +61-7-3396 9584). I am independent of the issuer as independence is described in Section 1.5 of NI 43-101.

I graduated from the University of Nottingham, UK in 1968 with a B.Sc. (Hons) in Geology and from James Cook University, Townsville, Australia in 1976 with a M.Sc in Exploration and Mining Geology.

I have over 35 years' experience in the minerals industry as a Geologist in the fields of mineral exploration, mine geology and mineral resource estimation. I have had senior exploration roles with Buka Gold, Niugini Mining, Eltin Minerals and Oakbridge Ltd. I have conducted evaluation of advanced exploration and mining projects in Australia, Brazil, Fiji, Indonesia, Kazakhstan, New Zealand, and Turkey. I worked as Technical Services Manager and Chief Geologist at the Vatukoula Gold Mine in Fiji (Emperor Mines Ltd) from 1995 to 2005 and as Technical Services Manager for Anvil Mining Congo at the Kinsevere copper mine, DRC from 2007 to 2008. At these mines I was responsible for mine and exploration geology, surveying, mine planning, environment, drilling, and assay laboratory. At both operations I spent time as Acting General Manager of Operations. In this role I supervised multiple disciplines and integrated their work into operational mine plans. Most recently, I have been an exploration consultant in the Philippines involved with total exploration program management on tenements prospective for both epithermal gold-molybdenum and porphyry copper-gold deposits including regional exploration targeting through to deposit resource drilling.

Applicable to the Kainantu Project is my extensive experience in mineral deposits in volcanic terrains, specifically the Vatukoula and Tuvatu epithermal gold deposits in Fiji. I have also worked on epithermal/hydrothermal and porphyry-style mineralization in similar environments in Papua New Guinea, Fiji, New Zealand, Philippines, Indonesia, Brazil and Turkey as well as Australia.

I am a Member of the Australian Institute of Geoscientists (Member No. 2668).

For the purposes of the Technical Report entitled: "INDEPENDENT TECHNICAL REPORT, RESOURCE ESTIMATE, AND SUMMARY OF MINING FACILITIES, KAINANTU PROJECT, PAPUA NEW GUINEA" 15th April 2016, of which I am the author and responsible person, I am a Qualified Person as defined in National Instrument 43-101 ("the Rule").

I visited the Kainantu Project on the 12th and 13th of November, 2014 and have had no prior involvement with the Kainantu property.

I have read the Rule and this technical report is prepared in compliance with its provisions. I have read the definition of "qualified person" set out in the Rule and certify that by reason of my education, affiliation with a professional association (as defined in the Rule) and past relevant work experience, I fulfil the requirement to be a "qualified person" for the purposes of the Rule.

To the best of my knowledge, information and belief the technical report contains all scientific and technical information that is required to be disclosed in order to make this report not misleading.

I have no direct or indirect interest in the properties which are the subject of this report and I have had no prior involvement with the Property. I do not hold, directly or indirectly, any shares in K92ML, K92PNG, K92 Holdings, Otterburn or other companies with interests in the exploration assets thereof. I am independent of K92ML, K92PNG, K92 Holdings, Otterburn, and, the Property, as independence is described by Section 1.5 of NI 43-101.

I will receive only normal consulting fees for the preparation of this report.

Dated at Brisbane this 15th April 2016.

Respectfully submitted

(signed) "Anthony James Woodward"

Anthony James Woodward, BSc Hons, M.Sc., MAIG  
Qualified Person

## APPENDIX 1: GLOSSARY OF TECHNICAL TERMS AND ABBREVIATIONS

This glossary comprises a general list of common technical terms that are typically used by geologists. The list has been edited to conform in general to actual usage in the body of this report. However, the inclusion of a technical term in this glossary does not necessarily mean that it appears in the body of this report, and no imputation should be drawn. Investors should refer to more comprehensive dictionaries of geology in printed form or available in the internet for a complete glossary.

"2D"	Two dimensional space, typically Y and Z planes
"3D"	Three dimensional space, Y, X, Z planes
"200 mesh"	the number of openings (200) in one linear inch of screen mesh (200 mesh approximately equals 75 microns)
"AAS"	Atomic Absorption Spectroscopy
"Ag"	chemical symbol for silver
"Au"	chemical symbol for gold
"AuEq"	Gold equivalent, assumptions include metal prices and assumed metallurgical recoveries.
"BLA"	Billimoian Landowners Association
BSc (Hons)	Bachelor of Science with Honours
"block model"	A block model is a computer based representation of a deposit in which geological zones are defined and filled with blocks which are assigned estimated values of grade and other attributes. The purpose of the block model (BM) is to associate grades with the volume model. The blocks in the BM are basically cubes with the size defined according to certain parameters.
"bulk density" "BD"	The dry in-situ tonnage factor used to convert volumes to tonnage. Bulk density testwork is carried out on site and is relatively comprehensive, although samples of the more friable and broken portions of the mineralized zones are often unable to be measured with any degree of confidence, therefore caution is used when using the data.
"°C"	Degrees Celsius
"Cu"	Chemical symbol for copper
"DDH" "diamond drilling, diamond core"	Rotary drilling technique using diamond set or impregnated bits, to cut a solid, continuous core sample of the rock. The core sample is retrieved to the surface, in a core barrel, by a wireline.
"down-hole survey"	Drillhole deviation as surveyed down-hole by using a conventional single-shot camera and readings taken at regular depth intervals, usually every 50 metres.
"drill-hole database"	The drilling, surveying, geological and analyses database is produced by qualified personnel and is compiled, validated and maintained in digital and hardcopy formats..
"EL "	Exploration Lease
"FA"	Fire Assay
"g.m"	Grams x metres, metal accumulations across the width of the vein
"grade cap, also called top cut"	The maximum value assigned to individual informing sample composites to reduce bias in the resource estimate. They are capped to prevent over estimation of the total resource as they exert an undue statistical weight. Capped samples may represent "outliers" or a small high-grade portion that is volumetrically too small to be separately domained.
"g/t"	grams per tonne, equivalent to parts per million
"g/t Au"	grams of gold per tonne
"HGL "	Highlands Gold Limited
"HPL "	Highlands Pacific Limited
"ID" "inverse distance estimation"	It asserts that samples closer to the point of estimation are more likely to be similar to the sample at the estimation point than samples further away. Samples closer to the point of estimation are collected and weighted according to the inverse of their separation from the point of estimation, so samples closer to the point of estimation receive a higher weight than samples further away.  The inverse distance weights can also be raised to a power, generally 2 (also called

	inverse distance squared, ID <sup>2</sup> ). The higher the power, the more weight is assigned to the closer value. A power of 2 was used in the estimate used for comparison with the OK estimates.
"Inferred Resource"	An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade (or quality) are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade (or quality) continuity. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes. An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to an Ore Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.
"Indicated Resource"	An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes, and is sufficient to assume geological and grade (or quality) continuity between points of observation where data and samples are gathered. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Ore Reserve.
"IRG" or "IRGC"	Intrusion Related Gold or Intrusion Related Gold Copper
"JORC"	The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, 2012 (the 'JORC Code' or 'the Code') sets out minimum standards, recommendations and guidelines for Public Reporting in Australasia of Exploration Results, Mineral Resources and Ore Reserves. The Code is a required minimum standard for Public Reporting b. JORC also recommends its adoption as a minimum standard for other reporting. Companies are encouraged to provide information in their Public Reports that is as comprehensive as possible. The definitions in the JORC Code are either identical to, or not materially different from, those similar codes, guidelines and standards published and adopted by the relevant professional bodies in Australia, Canada, South Africa, USA, UK, Ireland and many countries in Europe.
"kriging neighbourhood analysis, or KNA"	The methodology for quantitatively assessing the suitability of a kriging neighbourhood involves some simple tests. It has been argued that KNA is a mandatory step in setting up any kriging estimate. Kriging is commonly described as a "minimum variance estimator" but this is only true when the block size and neighbourhood are properly defined. The objective of KNA is to determine the combination of search neighbourhood and block size that will result in conditional unbiasedness.
"km"	Kilometre Unit of Length = 1000 metres. km <sup>2</sup> unit of area = 1km x 1 km
"kVa"	1000 volt-amperes
"lb"	Avoirdupois pound (= 453.59237 grams). Mlb = million avoirdupois pounds
"micron (μ)"	Unit of length (= one thousandth of a millimetre or one millionth of a metre).
"mm"	Millimetre (=1/1000 metre)
"LMP"	licence for mining purposes
"LOM"	Life of Mine
"LTC"	Land Titles Commission
"m"	Metric Metre
MAusIMM(CP)	Member of The Australian Institute of Mining and Metallurgists (Certified Professional)
MAIG	Member of The Australian Institute of Geoscientists
"Measured Resource"	A 'Measured Mineral Resource' is that part of a Mineral Resource for which quantity, grade (or quality), densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes, and is sufficient to confirm geological and grade (or quality) continuity between points of observation where data and samples are gathered. A Measured Mineral

	Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Ore Reserve or under certain circumstances to a Probable Ore Reserve.
“Mineral Resource”	A ‘Mineral Resource’ is a concentration or occurrence of solid material of economic interest in or on the Earth’s crust in such form, grade (or quality), and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade (or quality), continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.
“ME”	Mining Easements
“ML”	Mining Lease
“MOA”	Memorandum of Agreement
“MRA”	Mineral Resources Authority of Papua New Guinea
“NN” “nearest neighbour estimation”	Nearest Neighbour assigns values to blocks in the model by assigning the values from the nearest sample point to the block attribute of interest.
“OH&S”	Occupational Health and Safety
“OK” “ordinary Kriging estimation”	Kriging is an inverse distance weighting technique where weights are selected via the variogram according to the samples distance and direction from the point of estimation. The weights are not only derived from the distance between samples and the block to be estimated, but also the distance between the samples themselves. This tends to give much lower weights to individual samples in an area where the samples are clustered. OK is known as the “best linear unbiased estimator. The kriging estimates are controlled by the variogram parameters. The variogram model parameters are interpreted from the data while the search parameters are optimised during kriging neighbourhood analysis.
“oz”	Troy ounce (= 31.103477 grams). Moz = million troy ounces
“PGK”	Papua New Guinea Currency, Kina.
“pH”	measure of the acidity or basicity of an aqueous solution (scale 1 to 14)
“PhD”	Doctorate of Philosophy
“PNG”	Papua New Guinea
“Portal”	Opening/access to the underground Mine, Adit
“QA/QC”	Quality Assurance (“QA”) concerns the establishment of measurement systems and procedures to provide adequate confidence that quality is adhered to. Quality Control (“QC”) is one aspect of QA and refers to the use of control checks of the measurements to ensure the systems are working as planned.
“RC drilling”	Reverse Circulation drilling. A method of rotary drilling in which the sample is returned to the surface, using compressed air, inside the inner-tube of the drill-rod. A face-sampling hammer is used to penetrate the rock and provide crushed and pulverised sample to the surface without contamination.
“ROM”	Run of Mine, usually referring to an ore stockpile near the crusher
“survey”	Comprehensive surveying of drillhole positions, topography, and other cadastral features is carried out by the Company’s surveyors using ‘total station’ instruments and independently verified on a regular basis. Locations are stored in both local drill grid and UTM coordinates.
“Stoping”	An underground excavation made by the mining of ore from steeply inclined or vertical veins
“t”	Metric Tonne (= 1 million grams) “kt” = thousand tonnes
“te”	Chemical symbol for tellurium
“t/h”	Tonnes per hour
t/m <sup>3</sup>	Tonnes per metre cubed (density units)
“TSF”	Tails Storage Facility
“unfolded space”	Undulating 3D veins projected onto a 2D plane.
“variogram”	The variogram (or more accurately the Semi-variogram) is a method of displaying and modelling the difference in grade between two samples separated by a distance h, called the “lag” distance. It provides the mathematical model of variation with distance upon

	which the Krige estimation method is based.
"wireframe"	This is created by using triangulation to produce an isometric projection of, for example, a rock type, mineralization envelope or an underground stope. Volumes can be determined directly of each solid.