annual report

# TANAMI (NT) Pty Ltd
# A.B.N. 58 141 658 933

## ANNUAL REPORT FOR ML 22934 (GROUNDRUSH)

For the Period 14 September 2014 to 13 September 2015

**Holders:** Tanami (NT) Pty Ltd, Northern Star (Tanami) Pty Ltd
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## DIGITAL APPENDICES

| FILE | DESC |
|---|---|
| ML22934_2015_A_02_DHCOLL | Drillhole Collar Data |
| ML22934_2015_A_04_DHLithologs | Drillhole lithology logging |
| ML22934_2015_A_03_AssayData | Drillhole assay file |
| ML22934_2015_A_06_DHSurveys | Drillhole survey file |
| ML22934_2015_A_05_DHmagsus | Drillhole MagSus Data |
| ML22934_2015_A_07_DHQAQC | Drillhole QAQC data |
| ML22934_2015_A_08_DHVeining | Drillhole Veining Data |
| ML22934_2015_A_09_surfaceSampleData. | Surface Sample Data |
| ML22934_2015_A_10_XRFData | Drillhole XRF Analysis Data |
| ML22934_2015_A_11_Appendix1.pdf | TGNL Geology codes |
| ML22934_2015_A_12_Appendix2.pdf | Lithological codes |
| ML22934_2015_A_Appendix3 | Petrology of AC chips (GRAC0004) |

# 1.0 SUMMARY

Tanami NT Pty Ltd (TNT), a wholly owned subsidiary of Tanami Gold NL, acquired Mineral Lease 22934, Groundrush, from Newmont Tanami Pty. Ltd. (Newmont), a wholly owned subsidiary of Newmont Asia Pacific on 30 March 2010. Tanami Gold NL entered into a Joint Venture agreement with Northern Star Resources Ltd (NSR) in 2015 with NSR owning 25% of the Central Tanami Project, which includes ML22934.

The tenement is located approximately 40km northwest of the Tanami Mine and covers the dormant Groundrush open pit gold mine site and surrounding ground (**Figure 1**).

Exploration during the year ending 13 September 2015 includes AC Drilling and portable XRF measurements:

- 5 Aircore drill holes for a total of 437 metres of drilling directly east of the Groundrush open pit.
- Project review of Groundrush by external consultants
- 3 rock chips of outcropping vein to the east of Groundrush

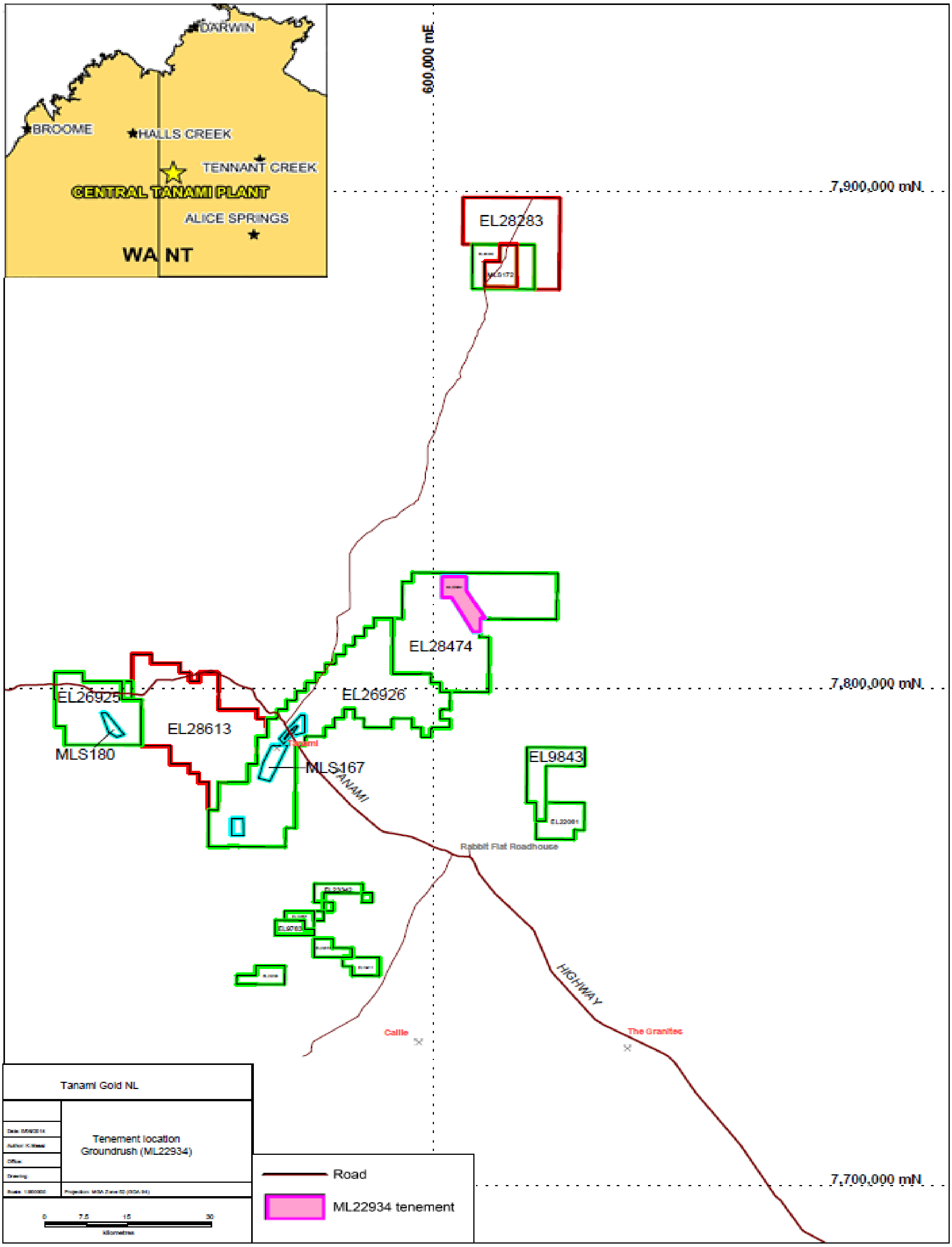


**Figure 1: Tenement Location Plan**

## 2.0 INTRODUCTION

Mineral Lease 22934 is located approximately 40km northwest of the former Tanami Mine plant site, which is currently on care and maintenance (Figure 1). Main access to the tenement is via the Tanami Road to the Tanami Mine, and then northeast by the sealed haul road to the Groundrush pit. Groundrush was mined over a three year period from 2001 to 2004. More than 600,000 ounces of gold were recovered with an average grade of approximately 5,000 ounces per vertical metre and a recovery grade of 4.3 g/t Au.

The Groundrush deposit consists of a mineralized dolerite sill (the Groundrush dolerite) within fine to coarse grained turbiditic sedimentary rocks of the Killi Killi Formation, part of the Tanami Group. The dolerite sill is a fractionated unit consisting of an outer less differentiated dolerite and an inner more highly differentiated quartz dolerite.

Gold mineralization at Groundrush has been interpreted to be entirely vein hosted and the bulk of this lies within the Groundrush quartz dolerite. Mineralization is interpreted to lie in three main lode orientations; a main sub-vertical steeply west dipping load, shallow to moderately southwest dipping loads, and a lesser component of moderate east dipping lodes. All lodes are interpreted to plunge shallowly to the south.

The climate is semi-arid with rainfall averaging approximately 430mm per annum. Most rainfall occurs as summer storms associated with the monsoon season between November and March. Daily temperatures range from winter minima of near zero to summer maxima of 48°C. The mean maximum temperature ranges from 26°C in June/July to 39°C in November/January.

This report covers the exploration activities for the year ended 13 September 2015.

## 3.0 TENURE

TNT, a wholly owned subsidiary of Tanami Gold NL, acquired ML 22934 from Newmont Tanami Pty Ltd, a wholly owned subsidiary of Newmont Asia Pacific, on 30 March 2010, together with a number of tenements including the Mineral Leases comprising the Central Tanami mine site. Tanami Gold NL entered into a Joint Venture agreement with Northern Star Resources Ltd (NSR) in 2015 with NSR owning 25% of the Central Tanami Project, which includes ML22934.

TNT became the registered holder of ML 22934 effective 9 November 2010.

Tenement details for ML 22934 are detailed below in Table 1.

| Title | Area Name | Area (HA) | Grant Date | Expiry Date |
|---|---|---|---|---|
| ML 22934 | Groundrush | 3950 | 24 Sep 2001 | 13 Sep 2026 |

**Table 1: Tenement Details**

The tenement lies on Aboriginal Freehold land held by the Central Desert Aboriginal Land Trust. Access to conduct activities is subject to the provisions of the Groundrush Mining Agreement with the Central Land Council.

# 4.0 GEOLOGY

## 4.1 Regional Geology

The Tanami region is centred 600 km northwest of Alice Springs and straddles the Northern Territory-Western Australia border. Its relationship to the surrounding tectonic units is poorly known. The contacts with the Arunta Province to the south and the Tennant Inlier to the east are not exposed but appear to be major shear zones in the magnetic data (Hendrickx et al, 2000). The geology of the Tanami region **(Figure 2**) comprises a sequence of folded Palaeoproterozoic metasediments and minor meta-mafic volcanic and intrusive rocks unconformably overlying Achaean basement. Much of this is hidden beneath thin unconsolidated cover.

The known Archaean is very restricted. Limited dating (SHRIMP zircon U-Pb) of the supracrustal rocks is consistent with an Archaean protolith (ca. 2500 Ma), with the high grade metamorphic activity ascribed to the Barramundi event at 1880 Ma (Hendrickx et al, 2000).

The basal part of the Palaeoproterozic stratigraphy is the Tanami Group, comprising the lower Dead Bullock Formation and the upper Killi Killi Formation. The Tanami Group is inferred to have been deposited in a transgressive passive marginal environment following the cessation of major extension and faulting associated with rifting (Hendrickx et al, 2000). The locally extensive mafic volcanic bearing Stubbins Formation and Mount Charles Formation are laterally correlated with the Dead Bullock Formation (Bagas et al, 2008).

Folding and low- to middle-greenschist facies regional metamorphism affected the Tanami Group at approximately 1840 Ma. The metamorphic grade tends to increase from the northwest to the south-east and adjacent to the local granites (see below) that accompanied this event, which has been denoted as the Tanami Orogenic Event (Vandenberg et al, 2001).

Unconformably overlying the Tanami Group is the complex Ware Group. This was deposited over the Tanami Group in a series of small extensional basins. The Ware Group includes the the Mount Winnecke Formation, the Nanny Goat Volcanics and the Wilson Formation (Crispe et al, 2002).

Granitic lithologies constitute approximately 60% of the geology of the Tanami Region, and predominantly comprise 'I-type' biotite±hornblende monzogranites and granodiorites (Dean, 2001). The granites suites are believed to represent over-lapping igneous events between approximately 1840 and 1790 Ma with the Winnecke Suite (1820-1830 Ma), the Coomarie Supersuite (1810-1820 Ma) and the Frederick Suite (1790-1810 Ma) defined by Dean (2001).

The age(s) of gold mineralisation in the Tanami region are poorly constrained, inferred based upon geological relationships that can be confusing and sometimes contradictory. Overall, most geochronological data point to an age of circa 1800 Ma for late ($D_5$) gold in the Tanami region. The age of the apparently earlier gold event ($D_1$ or $D_3$ at The Granites) is not constrained (Huston et al, 2006).

The post gold mineralisation Birrindudu Group has an interpreted Neoproterozoic age and unconformably overlies the other components of the Tanami region. The exact age is unconstrained but must be less than 1800 Ma owing to field relationships with the granites. The Birrindudu Group is interpreted as representing shallow marine platform sediments. Three constituents comprise the Birrindudu Group; Gardiner Sandstone, Talbot Well Sandstone and Coomarie Sandstone (Blake et al, 1979). Local exposures of the Cambrian Antrim Plateau Basalt also occur through the Tanami Region (Hodgson, 1975).

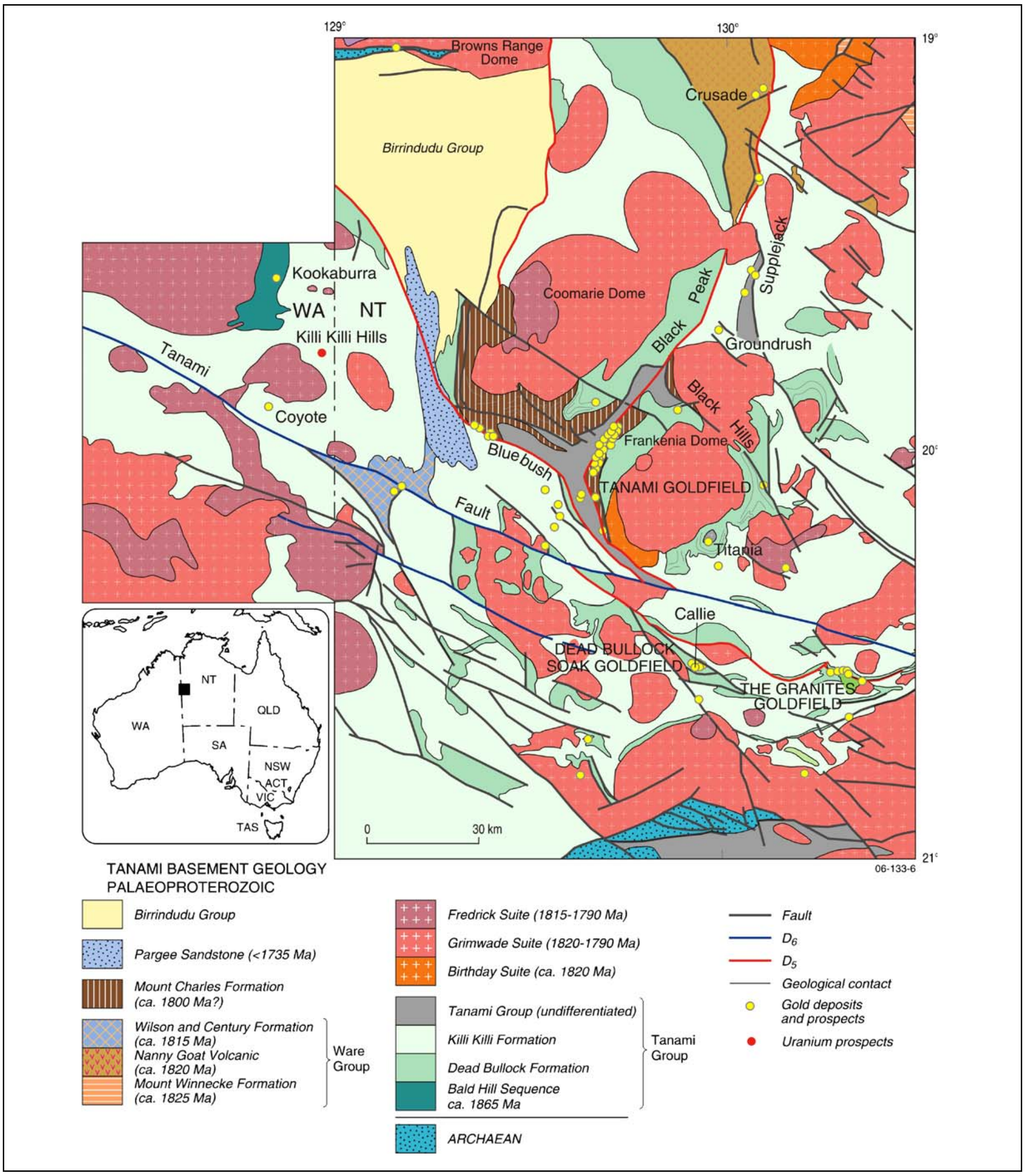


**Figure 2: Simplified basement geology of the Tanami region showing the location of major gold deposits (Huston 2007)**

## 4.2 Tenement Geology

Palaeoproterozoic rocks around Groundrush and in the Tanami region in general occur as small widely separated, discontinuous, deeply weathered or silicified outcrops among the sand plains that cover the bulk of the area. The geology and stratigraphy of the region are summarised in **Figure 3** modified after Hendrickx *et al*., 2000.

The gold mineralisation at Groundrush is interpreted to occur within the Killi Killi Formation of the Tanami Group. The Killi Killi Formation is generally composed of thick monotonous turbiditic siltstone and sandstone (commonly arkose and greywacke) sequence up to 4 km thick. It conformably overlies the Dead Bullock Formation, composed of variably carbonaceous siltstone with minor chert and iron rich horizons (BIF), which hosts the orebodies at Dead Bullock Soak and The Granites. Dolerite sills up to 200+m thick intrude the Tanami Group.

The Tanami Event (Vandenberg *et al*, 2001), a period of tectonism dated at around 1845-1840 Ma, with multiple deformation and metamorphism marked the end of deposition of the Tanami Group. Pargee Sandstone molasse type sediments are contemporaneous with this event. The Tanami Event was followed by a period of crustal extension with deposition of Mount Charles Formation basalts and turbiditic volcaniclastics followed by widespread granite intrusion and felsic volcanism (Mount Winnecke Formation). A period of peneplanation followed prior to deposition of Birrindudu Group siliciclastic sediments including the Gardiner Sandstone.

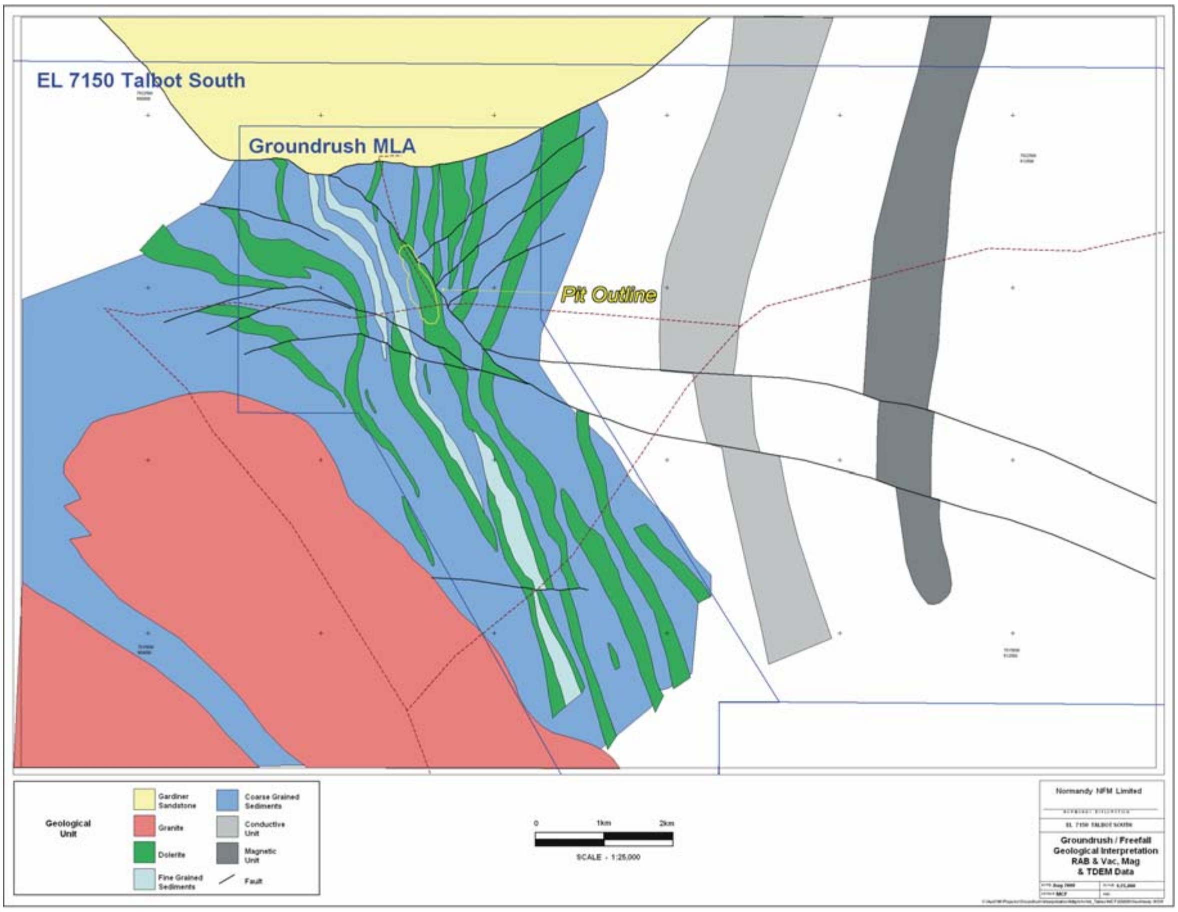


**Figure 3: Tenement Geology**

## 4.3 Geology of the Groundrush Deposit

The Groundrush deposit mine sequence consists of three steeply west dipping dolerite sills (west to east; the Western, Tombstone and Groundrush Dolerites) which intrude turbiditic metasediments of the Killi Killi Formation. All three dolerite sills strike approximately NNE (020°) and dip steeply to the west (70 – 80°) sub parallel to the metasediment sequence. Gold mineralization discovered to date is primarily hosted within the largest of these three sills, the Groundrush dolerite.
The Groundrush dolerite sill (150m true width) has undergone fractional crystallization from a mafic melt and consists of a core of more intermediate quartz dolerite within an outer more mafic dolerite. The two zones can be separated based on the presence of a spheroidal granophyric texture within the quartz dolerite and also by the higher proportion of felsic minerals (quartz and plagioclase), which bring the rock to an almost intermediate composition.

The transition between the two dolerite phases is commonly marked by a zone containing patchy quartz and feldspar clusters and blue coloured quartz crystals within the more mafic core of the dolerite. This transitional zone varies in width from one to ten metres. On the eastern side of the sill the transition from quartz dolerite into a more mafic dolerite has been identified indicating that the crystallization of the sill was not solely formed by gravity induced crystal settling, but by fractional crystallization.
Gold mineralization within the Groundrush Sill is found predominantly within the quartz dolerite and proximal to the zone of transition between the two phases.

The Tombstone Dolerite (30-50m true width), situated immediately to the west, predates and is cross cut by the Groundrush Dolerite. The point at which the Tombstone Dolerite is truncated by the Groundrush Dolerite occurs at approximately 200m below surface; however, this intersection plunges slightly towards the south of the deposit. A narrow chill margin within the Groundrush dolerite marks the contact between these two dolerites and can be observed in drill core. Mineralization identified within the Tombstone Dolerite to date is limited to the area where it abuts the Groundrush dolerite. In this area the combined width of the dolerite body is effectively increased, promoting brittle failure and mineralised shallowly west dipping veins propagate out across the Tombstone/Groundrush dolerite contact at this point.

A zone of metasediment (formerly the Groundrush Internal Sediments) separates the Groundrush and Tombstone dolerites below the point at which the two sills intersect. This sediment unit, now referred to as the Lower Turbidites, ranges from several metres wide below where the dolerite sills intersect to tens of metres wide at deeper levels as the two dolerite sills diverge. It has been interpreted that some narrow sediment intersections with the dolerite sills outside of the Lower Turbidites represent independent clasts which have been entrained or surrounded during the emplacement of the Tombstone and Groundrush dolerite sills. The Lower Turbidites do not host gold mineralization although some mineralized zones have been found along the margins of these sediments. Foliated dolerite is commonly observed on the western margin of the Groundrush sill in close proximity to the contact with the metasediments. This foliation has been interpreted as a ductile shear which formed along a zone of structural weakness that exists at the contact between these two units.

Up sequence, to the west of the Groundrush and Tombstone dolerites lies the Western Dolerite (50-80m true width). This dolerite sill is separated from the aforementioned units by a metasedimentary turbiditic sequence of sandstones and minor siltstones (150m true width). The orientation of the Western Dolerite is such that it cross-cuts the hanging wall sediments towards the south of the deposit, reducing the separation between it and the Tombstone and Groundrush sills.

Two narrow zones of gold mineralization have been intersected within the southern end of the Western Dolerite (between 24250mN and 24450mN). The central region of the dolerite sill within this zone is

slightly more felsic than the surrounding dolerite showing signs of weak crystal fractionation of the unit. It is interpreted that due to the narrower width of the Western Dolerite, it was cooled relatively quickly and therefore, was not able to fractionate to the same degree as the Groundrush Dolerite.
Three late dikes, a tonalite porphyry, quartz monzodiorite, and basaltic andesite intrude the Groundrush sill. All dikes are located proximal to shear zones and/or faults and cut across mineralized lodes. Where these dikes cut through the mineralization, they are weakly to non-mineralized suggesting that they were emplaced prior to mineralization, but that they were not favourable regions for gold precipitation. Where these intrusions have been found to contain gold mineralization, they are also cross-cut by quartz veining.

The Groundrush Quartz Monzodiorite dike (GQM) is the only dike that is found over the length of the deposit. Two sub-parallel GQM dikes exist between 25525mN and 24950mN, while south of 24925mN, only one QMZ dike has been identified. The GQM dike can then be traced through to the southernmost extent of TGNL drilling.

Some confusion surrounds the previously referred to Groundrush Andesite Intrusive (GAI), in that it only appears in areas where the GQM is interpreted to occur (i.e. surrounded on either side by the GQM). This dike was originally separated from the GQM by petrological studies however, the current belief is that this dike is conceivably a finer grained, more 'cooked' form of the GQM. Further petrological work is required to confirm this.

The Groundrush Tonalite Porphyry (GTP) is located from section 25200mN through to the southernmost extent of TGNL drilling. In the north of the deposit, the GTP is truncated by the footwall fault and in many sections multiple dikes of GTP have been intersected. Moving south as the footwall fault trends away from the Groundrush deposit, only one GTP dike has been identified in drilling.
The Groundrush Basaltic Andesite dike (GBA) is located between 25425mN and 24750mN. This narrow dike is often found in zones of foliated quartz dolerite and is sometimes replaced by a 5cm wide fault in its interpreted position.

In the south of the deposit the GTP and GQM are found in close proximity to one another, on the same orientation, suggesting that these intrusives may be located on the same structure. Both the GTP and GQM often contain 2-5cm wide clasts of dolerite and quartz material and the GQM has been found to contain clasts of GTP indicating that the quartz monzodiorite intruded after the tonalite dike. The orientation of the three intrusives is sub-parallel to the mineralized lodes.

A large, late-stage regional fault occurs immediately to the east of the Groundrush deposit. This Footwall Fault dips moderately to the west and strikes obliquely to the mine sequence geology, truncating the Groundrush Dolerite and mineralization towards the northern end of the deposit but veering away from both towards the south.

Numerous other dolerite sills have been interpreted in the area based on aeromagnetic imagery and scout RAB drilling. While the Groundrush dolerite remains the principle unit identified to date hosting economic gold mineralization, further promising gold discoveries have been delineated in the similar Ripcord dolerite 3km to the south.

The Groundrush area has a low magnetic signature. This is thought to be the result of magnetite destruction, due to intense metasomatic alteration associated with mineralization (Marjoribanks 2011). The magnetic low terminates against the Footwall Fault to the north of the pit, but can be traced south of the Groundrush Dolerite 3-4Km in the Ripcord Prospect area (Marjoribanks 2011).

## 4.4 Mineralisation of the Groundrush Deposit

The majority of veining at Groundrush is interpreted to have formed during the deformation event that created the anticline on which Groundrush sits (Stevens and Stevens 2004). Veining is focused within the central, quartz dolerite portion of the Groundrush dolerite and forms a network or mesh within this zone.

Veining consists of quartz ± carbonate ± chlorite extension, shear, and shear-extension veins. Gold mineralization is found within both extension and shear veins although, it is important to note that the bulk of mineralization lies within the extensional veins. Mineralized veins consist of quartz, chlorite (± pyrite, ± pyrrhotite ±arsenopyrite, ± gold) and quartz, carbonate (± chlorite, ± pyrite,± arsenopyrite, ± gold) and gold is typically found on vein margins or proximal to dolerite clasts within the veins. Visible gold is commonly observed in mineralized quartz chlorite veins and while fine gold is also present, it is generally associated with the more carbonate rich veins. Although very uncommon, gold mineralization has been found within the sediments, but is restricted to narrow quartz veins.

Large zones of lensoidal extensional veins are commonly found within the main shear-hosted mineralization at Groundrush making orientation measurements difficult in some areas due to irregular contacts with the host dolerite/quartz dolerite. As a result, the majority of vein orientation measurements have been taken on narrower veins.

Veins are predominantly moderate to steeply west dipping, however; a minor constituent of shallowly west dipping veins also exists. No apparent difference can be noted between the orientations of the mineralized and non-mineralized veins at Groundrush.

Mineralization trends at 017° (NNE), dips at 80° to the west and plunges 015° towards the south. Mineralized lodes at Groundrush include the main shear-hosted lodes, multiple flat lodes, the high grade vein, Groundrush deeps, and the southwest lodes.

As previously mentioned, the lion's share of mineralization at Groundrush is found within steeply west dipping shear lodes that range in width from 1 - 30m and are mainly composed of lensoidal, extensional quartz veins. These shear lodes are stacked upon each another, separated by either intrusions or narrow shear/fault zones. Flat lodes are found predominantly in the north and central portions of the deposit. The majority of these lodes dip shallowly to the west, while there is a small component of shallowly east dipping lodes. Both the west and east dipping flat lodes have been determined to undulate across the deposit and pinch and swell displaying an almost boudinaged appearance. All of the flat lodes plunge moderately to the south and south of section 24800mN the flat lodes have been either truncated by the footwall fault or have simply petered out.

The High Grade Vein (HGV) was identified at Groundrush near the end of mining operations by Newmont in 2004. As a result of the late discovery, this aspect of the deposit was not fully explored. HGV mineralization occurs in the form of a high grade, quartz shear vein and displays a more northerly strike than the main mineralized zone. Tanami has utilised RC drilling to target the HGV mineralization south of the pit. A zone of patchy, though predominantly high grade (30g/t Au) was outlined as far south as 24200mN. Where intercepts were found to be only weakly or non-mineralized at the expected target zone, the lithology was found to be predominantly tonalite. This tonalite dike runs up the same shear zone as the HGV, possibly 'blocking' or terminating mineralization in parts where adequate host material was not available for mineral precipitation.

Groundrush Deeps mineralization has been identified between 24675mN and 24200mN. This zone of mineralization was first detected while drilling two deep exploration holes on section 24400mN. A broad zone of mineralization was intersected in these two holes at 340 – 440m below surface. The next step-out drilling, 200m to the south, again intersected strong mineralization and confirmed continuation of the mineralised system down plunge and the considerable potential for new resource discoveries.

Mineralization in the Deeps region is similar to that of the main zone in that it appears to consist of multiple stacked lensoidal lodes, separated by either an intrusion or a shear zone. This mineralization differs to that of the main zone in that it is predominantly shear hosted and contains substantial pyrite within the well-defined shears. Mineralised extension veins consist predominantly of quartz, carbonate, and chlorite +/-arsenopyrite commonly with silica-sericite alteration halos. In contrast to the main shear hosted lodes further to the north, hematite alteration often associated with mineralization is largely absent from the Deeps lodes.

Drilling information in the area between the Main Zone, HGV and Groundrush Deeps is sparse at present, and as such a diamond drilling program is currently being undertaken to determine the nature and extent of mineralization in this under-drilled area.
RC drilling southwest of the Groundrush open pit has outlined two zones of mineralization located within the Western Dolerite. This zone has been called the West Zone. Where gold mineralization has been identified, the surrounding dolerite is composed of an increased proportion of felsic material giving evidence for a weak to moderately fractionated zone within this dolerite. More drilling is required in this area to delineate the extent of mineralization.

## 5.0 PREVIOUS EXPLORATION

Exploration completed during the year ended **13 September 2014** consisted of a spinifex sampling program and a surface XRF measurements progra. Statistics for all on-ground work completed by Tanami Gold to date is listed in
**Table** 2.

| Activity | Details |
|---|---|
| Spinifex Sampling | 36 samples |
| XRF Survey | 44 sample locations |

**Table 2: Exploration Completed Y/E 2014**

## 6.0 EXPLORATION COMPLETED

Exploration completed during the year ended **13 September 2015** consisted enlisting an external consultant conducting a detailed project review that included the Groundrush Project, in addition a small AC drilling program targeting an outcropping quartz vein to the southeast of the existing Groundrush Open pit (Figure 4).

### AC Drilling Program

The Foot wall fault has been documented many times in diamond drill holes, however the surface expression of the fault is interpreted from aeromagnetic images. At the approximate interpreted surface position a significant quartz blow occurs that is evident on google earth images and can be tracked along the ground as either outcrop or subcrop/float for at least 600m (Figure 4). A low elongate rise occurs along the best exposed section of the qtz veining. Outcropping rock shows an anastomosing network of Iron rich quartz veining with buck and cockscomb textures common, within strongly altered and sheared rock. The quartz veining has been sparsely rock chip sampled by both Tanami Gold (most recently in 2013) and previous explorers. The maximum Au value returned from a rock chip sample was 0.002 ppm from sample (X504703. The zone of quartz veining has also been drilled on 200m spaced grid lines by Newmont with Vacuum holes in 1998/1999 and again with selected lines for RAB in 2005.

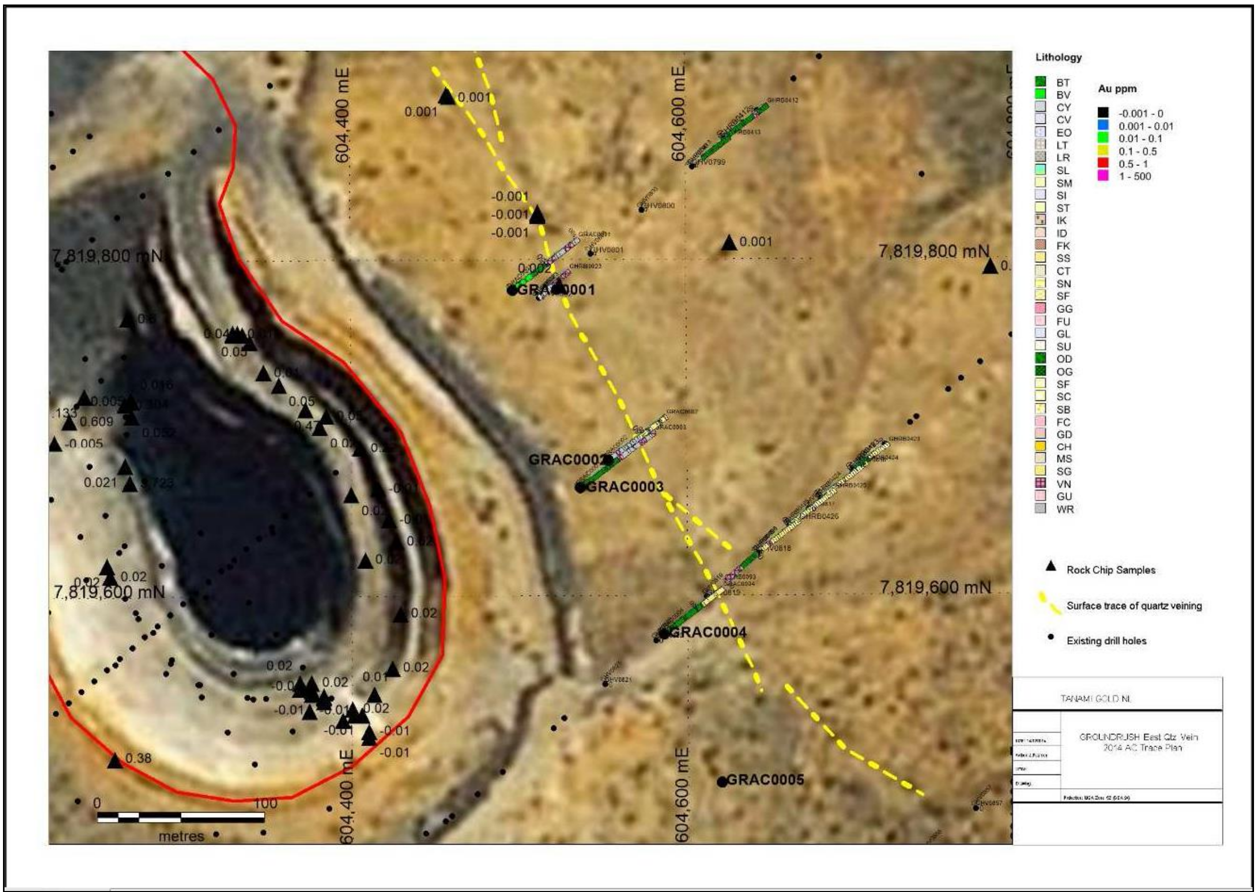


**Figure 4 Groundrush East AC Drilling**

Due to the proximity of the quartz vein to the Groundrush pit, the importance of the FWF in regards to controlling mineralisation boundaries and the location of surface nuggets detected by prospectors during 2014, it was decided to further test the quartz vein by selective AC holes on 100m spaced section lines over 400m strike length of the best outcrop of quartz veining.

A total of five air core holes were drilled, totalling 437 meters, targeted into the low quartz veined rise, shown on Figure 4. . In order to maximise the sample size collected for analysis, each meter was collected directly into a green plastic bag, and a sample collected by spear. Average sample size was 922grams. Water became a problem at depth within the quartz vein zone, restricting the size and quality of sample collected.

Drilling intersected massive dolerite, followed by a broad contact zone of clay and indeterminate totally altered rock, with zones of broad quartz veining, emerging into very felsic coarse grained greywacke rock commonly with a granitic appearance. Petrology carried out on a sample of the greywacke confirmed the greywacke/arkosic nature of the sediment (Appendix 3) Quartz veining commonly displayed haematitic staining and cockscomb textures and although the width of individual quartz veins is not possible to be determined from aircore chips, the zone appeared to be a more intense veining, rather than a single massive buck quartz blow.

Correlation between the surface trace of quartz veining, and between holes suggests that the quartz veining and alteration contact zone is vertical to steeply westerly dipping, and varies in width 20 – 30 true width. The percentage of quartz veining within the clay alteration contact zone varies between sections. Although haematite staining is intense through the quartz/clay/alteration zone, there is no other indication of mineralisation.

**Project Review Work**

The project Review at Groundrush focused on immediate regional exploration opportunities. The report confirmed that significant work was required to completely validate the surface geochemical dataset, and that work was require to develop reliable regolith and geology base maps for ML22934 and surrounding tenements.

## 7.0 CONCLUSION

No mineralisation is contained within the quartz veining outcropping on the low rise to the east of Groundrush pit. However the possibility that the quartz vein is the surface manifestation of the Groundrush footwall fault should be investigated. A brief review of section lines to the north and south of the current drilling suggest that the quartz vein/alteration zone and contact between dolerite and sediment can be traced to the north, albeit with a less quartz veined narrower alteration zone, but does not appear to continue to the south. This indicates a blow out of the zone in the vicinity of the drilling. The implications of this in relation to the Groundrush structural model needs to be evaluated.

Significant work is required to build the regional understanding up in the Groundrush area, from validating surface geochemistry to developing regional targeting models.

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