

REPORT

Waihi Gold Company Limited

Martha Exploration Project:
Application for a Variation to Mining
Licence 32 2388 and AEE

Report prepared for:

Waihi Gold Company Limited (trading as Newmont Waihi Gold)

Report prepared by:

Tonkin & Taylor Ltd

September 2011

T&T Ref: 27939



Table of contents

	Application for a variation of mining licence conditions	i
1	Introduction	1
	1.1 Newmont Waihi Gold	1
	1.2 Project overview	1
	1.3 Statutory Context	2
	1.4 Variation to Mining Licence 32 2388	2
	1.5 Existing mining activities and authorisations that will be utilised as part of the MEP	3
	1.5.1 Martha Mine and Extended Project	3
	1.5.2 Trio Underground Mine	4
	1.6 Exploration and drilling activities outside of ML 32 2388	5
2	Site Description	6
	2.1 Location	6
	2.2 Geological description	6
	2.3 Surrounding environment	6
3	Project Description	9
	3.1 Project components	9
	3.2 Project Activities	10
	3.2.1 Mining Schedule	10
	3.2.2 Work force	10
	3.2.3 Hours of work	10
	3.2.4 Surface works and structures	11
	3.2.5 Lighting	11
	3.2.6 Blasting activities	11
	3.2.7 Hazardous substances	12
	3.2.8 Dewatering	13
	3.2.9 Waste rock and ore	13
	3.2.10 On-going monitoring and management	13
	3.2.11 Closure and Rehabilitation	14
4	Assessment of Effects on the Environment	15
	4.1 Introduction	15
	4.2 Settlement	15
	4.3 Geotechnical investigations and pit wall stability	15
	4.3.1 Pit wall stability	15
	4.3.2 Stability of Underground Development	16
	4.3.3 Summary	19
	4.4 Geochemistry of waste rock and ore	19
	4.4.1 Assessment	19
	4.4.2 Summary	20
	4.5 Blasting and vibration	20
	4.5.1 Mining Licence vibration limits	20
	4.5.2 Blasting activities	21
	4.5.3 Vibration effects associated with blasting activities	21
	4.5.4 Air overpressure effects	22

4.5.5	Monitoring of effects	23
4.5.6	Summary and conclusions	23
4.6	Noise	24
4.6.1	Potential noise sources	24
4.6.2	Existing consent requirements	24
4.6.3	Assessment of noise from machinery and equipment	25
4.6.4	Summary	25
4.7	Air quality	26
4.7.1	Vent shaft	26
4.7.2	Above ground vehicle movements	26
4.7.3	Stockpiling of ore and waste rock	27
4.7.4	Summary	27
4.8	Landscape and visual amenity	27
4.9	Effects of the minor amendments and administrative variations	27
5	Consultation	28
6	Conclusion	29
7	Applicability	30
Appendix A:	Schedule of existing consents and authorisations	
Appendix B:	Technical assessments	
Appendix C:	Consultation information	
Appendix D:	Certificates of Title for the MEP Area	

1 Introduction

1.1 Newmont Waihi Gold

Waihi Gold Company Ltd (trading as Newmont Waihi Gold) is the owner and operator of the Martha Mine, an open pit mining operation located more-or-less in the middle of Waihi township within 100m of the main street through the town. NWG also owns and operates the Favona Mine, an underground mine in the vicinity of the process plant several kilometres east of the Waihi township, and is currently developing the Trio Underground Mine which is located under Union Hill about halfway between the existing process plant and the Martha open pit.

1.2 Project overview

Newmont Waihi Gold's (NWG) near-mine exploration programme has identified potential underground mine opportunities in Waihi, one of which would involve underground mining of the remnant Martha orebody beneath the existing Martha open pit. However there is significant uncertainty around the quantity and grade of the remnant resource and around the geotechnical conditions that exist around the historic workings of the old Martha underground mine. The Martha Exploration Project (MEP) provides NWG with the opportunity to confirm the nature and extent of the remnant ore body and determine whether mining beneath the existing Martha pit is viable.

The MEP comprises drives and a spiral decline (tunnel) located beneath the existing Martha open-pit mine in Waihi, entirely within the area of Mining Licence (ML) 32 2388, from which NWG can complete an underground drilling and trial stoping programme. While surface drilling to date has indicated a resource that could potentially lead to a viable mine, the level of exploration detail required to increase confidence in the resource definition to a level at which the viability of mining can be confirmed can only be achieved by underground drilling. A further level of complexity relates to the existence of old underground workings in and around the potential underground mine. For this reason trial stoping (i.e. ore extraction / mining) is also proposed in remnant Martha deposits as part of the exploration project. This trial stoping is essential for determining and refining the method of mining and approach to mine design.

The MEP requires a variation to ML 32 2388 and a 'regional' resource consent from the Waikato Regional Council (WRC) which has been applied for separately. Depending on the results of the MEP, consents and a variation to the Mining Licence required for mining may follow and if so, will be subject to a separate set of applications. Only the necessary variations to ML 32 2388 (and regional consent) for the MEP are currently being sought.

This report provides an assessment of the actual and potential environmental effects of the works associated with the MEP for which variations to ML 32 2388 are sought. NWG and its predecessors have successfully managed mining operations in close proximity to a residential and urban environment for over 20 years. In essence and as further detailed in this report, this proposal is a continuation of this approach relying on established and effective procedures and noting that exploration activities are less intensive than mining and mining operations¹, and in the case of the MEP will be located within ML 32 2388 and the Martha open-pit rim.

¹ The approximate quantities of material expected to be produced during the two year project life for the MEP are the equivalent to approximately one calendar month of open pit mining.

1.3 Statutory Context

ML 32 2388 is an existing privilege, as defined by section 106 of the Crown Minerals Act 1991 (CMA). Accordingly, NWG continues to have the same statutory rights in respect of ML 32 2388 as it would have had if the Mining Act 1971 had not been repealed and the CMA and Resource Management Act 1991 (RMA) had not been enacted.

The Mining Act specifically excluded the ambit of the Town and Country Planning Act 1977 - the predecessor legislation to the RMA. As a result, no district land use consent was required to be held by the holder of a mining licence in respect of land use activities carried out within the mining licence area.

Further, section 103D of the Mining Act provided for the variation of the conditions of an existing mining privilege. Therefore, NWG is able to apply for the variation of the conditions contained in ML 32 2388 to the extent required for the MEP.

The transitional provisions of the CMA (namely section 108) provide for the administration of existing mining privileges, and essentially splits the responsibilities in respect of ML 32 2388 between the Minister of Energy and Resources, Waikato Regional Council (WRC), Hauraki District Council (HDC) and the Health and Safety Inspector.

This application to vary ML 32 2388 has been made to the Minister of Energy and Resources, WRC and HDC, to the extent that the variations fall within their respective roles as set out in section 108 of the Crown Minerals Act 1991.

The procedure to be followed in processing the application for the variations to ML 32 2388 is set out in section 103D of the Mining Act. In summary, each of the relevant authorities must consider the variations sought, and consult with the other two authorities, and other prescribed parties set out in section 103D of the Mining Act. The authorities must then notify their recommendations on the variations sought to ML 32 2388 and objections from the public are called for. Objections must be filed with the Environment Court within 20 working days after the date of the public notice. The Environment Court then holds a hearing into any objections lodged and makes a decision on the application.

The only component of the MEP not already provided for by the suite of 'regional' resource consents for existing mining activities and operations is the discharge to land of waste rock into the MEP area and the discharge of groundwater from the flooded MEP workings into ground following closure. This consent is presently being sought from WRC and has been applied for separately from this application to vary ML 32 2388. The matters addressed in the application to WRC are only addressed in this AEE to the extent relevant to the consideration of Mining Licence matters.

1.4 Variation to Mining Licence 32 2388

The MEP is entirely contained within the boundaries of ML 32 2388. Condition 1(b) of ML 32 2388 provides for, amongst other things, the following activities:

b. Mining

Open pit and minor underground mining and exploratory work, using explosives and mechanical excavating, truck handling of material within the pit area and that portion of the rest of the licence area that lies to the west of Junction Road, conveyor belt handling to a chemical processing plant, beneficiation and ore treatment including waste and tailings disposal within the licence area.

The Mining Licence therefore anticipates some level of underground mining and exploratory work. However this is limited by Condition 16 as follows:

Underground workings

16. The licensee may undertake minor underground mining operations within the open pit area provided that:
- (a) The stability of overlying land, both during and after mining operations, is not likely to be endangered;
 - (b) No mining operation shall extend beyond the surface pit perimeter;
 - (c) No mining operation shall be carried out at a depth greater than one hundred (100) metres below sea level. This shall not prohibit exploratory drilling below that depth.

While the nature and scale of work associated with the MEP is already contemplated in the Mining Licence, part of the MEP extends to a depth greater than 100 metres below sea level (although only 20 metres below the existing pit floor). A variation to ML 32 2388 is therefore required to allow the project to proceed.

In summary, and as set out in detail in the attached application document, NWG is seeking a variation of conditions contained in ML 32 2388 for the following purposes:

- To remove the restriction on underground workings at a depth greater than 100 metres below sea level presently found within Condition 16(c).
- To specifically provide for the MEP including the necessary drives, shafts and trial stoping.
- To provide for underground operations to be undertaken 24 hours per day, 7 days per week. However other than some limited exceptions which are described in Section 3.2.3 of this report, activities associated with the MEP which are not located underground must otherwise comply with the current open pit hours of operation set out in condition 19(a) of the Mining Licence.
- To provide for blasting for the underground operations to be undertaken in a blast window of 7am – 7pm Monday – Friday and 10am – 12pm Saturday, and up until 7pm on Saturday where this is necessary for safety or for minor maintenance purposes. The vibration level must meet the current Mining Licence limit of 5mm/s and consistent with current operations, there will be no blasting on Sunday. Blasting activities are further described in Section 3.2.6 and assessed in Section 4.5 of this report.
- To seek minor variations to existing conditions that are in large part administrative, which update the Mining Licence to reflect current operations and/or correct some typographical errors.

1.5 Existing mining activities and authorisations that will be utilised as part of the MEP

1.5.1 Martha Mine and Extended Project

The Martha Mine open pit operation commenced in 1988 in accordance with ML 32 2388 which was granted in July 1987 and covers an area of approximately 400 hectares comprising two main elements; the open pit (approximately 40 ha) located in the middle of Waihi, and the processing and waste disposal areas located approximately 2 km away to the south east. These two areas are linked by a conveyor which is also within the boundary of ML 32 2388. No land use consent is required from the district council in respect of land use activities carried out within the Mining Licence area.

The Martha Mine Extended Project provides for the existing pit to be mined to a depth of 250m instead of the originally permitted 200m, meaning that the pit needed to be wider and longer than initially planned. The consenting process for the Extended Project was partly by way of

applications for new resource consents, including Land Use Consent 97/98-105 granted by Environment Court decision A114/99, and partly by way of an application for variations to the existing Mining Licence which was granted by the Minister of Energy in October 1999.

Land Use Consent 97/98-105 provides for activities that take place outside the area of land subject to the Mining Licence and expressly provides, in condition 2.3, for the following activities:

- Earthworks for the purpose of mining operations in Area B;
- Stockpiling of ore, waste rock, topsoil and tramp material in Area B;
- Establishment of surface facilities including the crusher, offices, workshops, sample preparation areas, the extension of the conveyor and stockpiles in Area B;
- Storage and use of hazardous substances in association with mining and mining operations in Area B;
- Carrying out of mining operations in Areas B and D.

The activities associated with the MEP that will be undertaken in Area B (the surface facilities area) of the land use consent, including the use of existing surface facilities and infrastructure (e.g. stockpiles, magazine, crusher and conveyor) and the potential establishment of limited new surface facilities (an amenity facility and workshop partly or wholly located within the land use consent area), as further detailed in Section 3, are expressly listed in condition 2.3 above and will be undertaken in full accordance with the conditions of Land Use Consent 97/98-105. There will be no discernible change in the use of existing surface facilities and infrastructure compared to current operations considering the very small volumes associated with the MEP (i.e. the equivalent of approximately one calendar month of open pit mining spread over the two year project life for the MEP).

The Extended Project commenced in 1999 and increased the life of the mine by an additional seven years. A stability cutback of the south wall, including limited ore recovery, was completed in late-2010 under the conditions of the Mining Licence and existing resource consents. The layback to the East pit wall is currently underway. Mining of the Martha Mine open pit including the layback to the East wall is expected to be completed by the end of 2014.

NWG holds a suite of resource consents from WRC which comprehensively cover all mining and associated discharge activities for the Mining Licence and Extended Project areas. These are set out in detail in Appendix A.

The MEP will be undertaken in full accordance with the resource consents granted at the time of the Extended Project including land use consent 97/98-105. Except as otherwise provided for in this application, the MEP will also be undertaken in full accordance with Mining Licence 32 2388.

1.5.2 Trio Underground Mine

The Trio Underground Mine is located in the vicinity of Union Hill about half way between the process plant and Waihi township. Resource consents for the Trio Development Project (including the construction of an access decline and incline, and drives and shafts around the Trio system) were granted in 2010 and resource consents for the underground mine, including a variation to ML 32 2388, were granted in mid-2011. Work commenced on the development project in July 2010 with mining scheduled to commence in April 2012 and be completed towards the end of 2014.

The Trio Development consents provide for groundwater in the Trio system to be pumped down to around 755m RL. The Trio system is connected to the Martha groundwater system and there is no additional dewatering required for the MEP as further set out in Section 3.2.8 below.

1.6 Exploration and drilling activities outside of ML 32 2388

The MEP comprises drives and a spiral decline from which NWG can complete an underground drilling (as well as trial stoping) programme. Underground exploration and drilling activities within ML 32 2388 are already provided for by the existing conditions of the Mining Licence. Where underground exploration and drilling activities extend outside of the Martha open pit and ML 32 2388, the provisions of the operative Hauraki District Plan 1997 (District Plan) apply. The District Plan provides for prospecting and exploration as a permitted activity in surrounding Rural Zones, and as a permitted activity in all other zones within the vicinity of the open pit up to a maximum of 20m³ of excavation per allotment. Any exploration and drilling undertaken from the MEP outside ML 32 2388 will therefore be undertaken as a permitted activity consistent with NWG's existing exploration and drilling programme within the wider Waihi basin and surrounds (noting that in any case exploration and drilling undertaken from the MEP will not start on the surface but from underground).

In terms of the requirements of the CMA, outside of ML 32 2388 these activities are covered by Exploration Permit (EP) 51 771 to the north and north east of the open pit, and EP 40 767 to the west as well as further north of the pit.

2 Site Description

2.1 Location

The MEP is located within the current pit rim beneath the northern wall of the Martha pit (refer Appendix D for MEP area Certificates of Title). Entry to the exploration decline is from the haulage ramp on the northern wall of the pit via two portals located at 80 metres and 180 metres below ground level (referred to as the upper and lower portals, respectively). All development sits below the current Martha open pit mining area and is wholly contained within ML 32-2388 (refer Figure 1 below). This area is zoned Martha Mineral Zone in both the operative Hauraki District Plan and the Proposed Hauraki District Plan.

2.2 Geological description

The remnant resource beneath the Martha open pit is part of the greater Waihi epithermal vein system. The principal vein systems at the Martha Pit are the Martha Vein, the Empire Vein, the Edward Vein and the Welcome Vein. Trial stoping is proposed in the Martha Vein beneath the north eastern end of the open pit, and the Ella Lode beneath the north western end of the open pit (refer Figure 1). Stopping in the Martha Vein will occur in previously mined areas while stoping in the Ella Lode will occur in previously unmined areas where the rock is intact and undisturbed.

Geology of the wider area consists of variably layered andesite host rocks. The geology of the north side of the Martha Pit consists of propylitic andesite with small amounts of argillised andesite, overlain by a very thin layer of ignimbrite. Sections through the north wall of the pit indicate that the propylitic andesite extends very close to ground surface. Shallow alluvium could be present in some low-lying areas.

2.3 Surrounding environment

The Martha Mine open pit is located immediately to the north of the Waihi town centre. As noted above, all development is located below the current open pit and within the current pit rim. Land immediately to the north and west is principally residential and rural residential. The surface facilities area is located to the north east and east of the open pit.



Figure 1: Location and general layout plan view

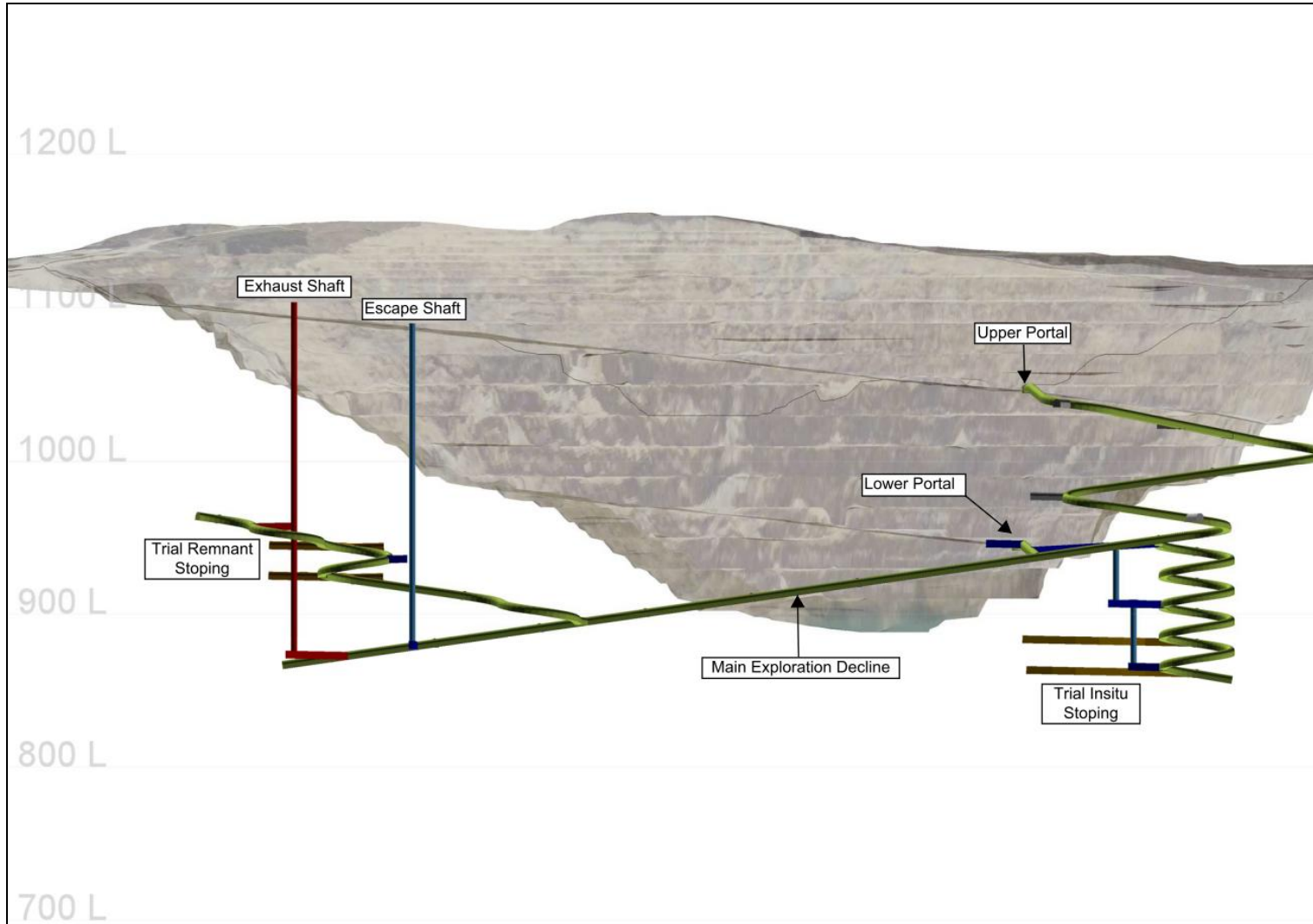


Figure 2: Long section view

3 Project Description

3.1 Project components

The MEP is located within the current pit rim beneath the northern wall of the Martha pit. The exploration decline extends to an elevation approximately 280m below the surface and 20m below the bottom of the pit at approximately 860mRL. Entry to the exploration decline is from two portals located on the haulage ramp on the northern wall of the pit. Both portals are located towards the western end of the northern wall. The MEP also involves the construction of drives and shafts around the Martha underground system as well as a vent rise (or shaft) and escape shaft towards the eastern end of the northern wall, and trial stoping within the Ella Lode and the Martha Vein.

The MEP involves all activities and facilities associated with exploration and trial stoping of the remnant Martha resource through to rehabilitation of the land including, but not limited to:

- An exploration decline, including spiral decline, approximately 5m wide by 5m high and approximately 2.6km long constructed from two portals located on the pit haulage ramp in the northern wall approximately 80m and 180m below the surface (pit rim), respectively. The lower portal will also be used for egress and fresh air intake.
- An underground ventilation shaft which daylights in the northern wall approximately 25m below the surface (pit rim).
- An underground escapeway shaft which daylights in the northern wall approximately 40m below the surface (pit rim).
- The use of existing surface facilities and infrastructure including stockpiles and existing crushing, conveying, processing and waste disposal facilities.
- The establishment and use of limited additional surface facilities (staff amenities and a workshop).
- Stockpiling excavated material within the existing in-pit stockpile (when operating outside of standard open pit operational hours).
- Working within the historic workings of the old Martha underground mine².
- Exploration, definition and probe drilling activities.
- Blasting activities and the removal of waste rock and ore (from development and trial stoping – see below).
- Level development for the purpose of accessing trial stoping areas.
- Trial stoping of in-situ resources and Martha remnant areas within the Ella Lode and Martha Vein which are located towards the western and eastern ends of the pit, respectively. The trial stoping zones will be finalised once some exploratory drilling has been conducted from the decline.
- Rehabilitation activities including backfilling of the trial stopes and shafts, and backfilling of the openings to the portals in the northern wall with waste rock obtained from the mine development or from open pit mining activities, and reflooding of the workings which will occur as part of the pit lake formation provided for under the current Rehabilitation and Closure Plan.

The MEP will be located in proximity to old underground mine workings, although historic development drives and stopes are planned to be avoided. However as survey data is not

² Historic mine records indicate that the workings are post 1900 and are therefore not an archaeological site for the purpose of the Historic Places Act 1993.

completely reliable, caution will be exercised in all development activities. Probe drilling will be used to determine the exact location of any old workings that come in close proximity to the proposed development.

As noted above trial stoping is proposed in remnant Martha deposits as part of the exploration project. As further described in Section 4 below, trial stoping within the Ella Lode occurs in previously unmined areas where the rock is intact and undisturbed. However trial stoping in the Martha Vein is in ground which has been previously mined. Due to the challenges associated with mining in this disturbed ground, trial stoping is essential for determining and refining the method of mining and approach to mine design. Accordingly the trial stoping is a critical component of the overall exploration project.

3.2 Project Activities

3.2.1 Mining Schedule

The MEP is scheduled to commence in July 2012 and be completed by June 2014. This is well within the timeframe for completion of the layback to the east wall of the Martha pit which is scheduled to be completed around the end of 2014.

3.2.2 Work force

The MEP will require between 20 and 45 full time employees with skills in underground mining and related maintenance. No spare capacity exists within the Favona and Trio workforce and additional labour will be recruited and trained for the MEP. Existing employees involved in administration and support functions associated with the Martha, Favona and Trio mines will also provide services associated with the MEP.

Commencing works on the exploration and access drives reduces, as far as practicable, downtime associated with plant and equipment not being used to full capacity. It also provides for additional employment as no spare capacity currently exists within the Favona and Trio workforce.

3.2.3 Hours of work

The MEP will operate 24 hours a day, 7 days a week. However it is important to note that this relates to operations which, for the most part, are located underground. Activities associated with the MEP which are not located underground must otherwise comply with the current open pit hours of operation set out in condition 19(a) of the Mining Licence, and similarly reflected in condition 3.7(b) of Land Use Consent 97/98-105. The only exceptions to this are as follows:

- The use of surface amenities by underground staff (for example toilets, meal room, showers). This will mainly be around shift changes which typically occur at 7am and 7pm;
- Underground staff accessing the MEP. As above, this will mainly take place at shift changes with a limited number of vehicle movements outside of this time (e.g. to access the workshop and the magazine);
- Limited refuelling and service type activities; and
- Stockpiling within the pit when operating outside of the standard operational hours for the open pit.

Along with underground activities, these activities can also be carried out 24 hours a day, 7 days a week so long as the noise standards within the Mining Licence and Land Use Consent can be complied with. Otherwise, the hours of operation will be in accordance with the hours currently provided for under the existing conditions of ML 32 2388 and/or Land Use Consent 97/98-105.

Consistent with the existing open pit operations and as provided for under ML 32 2388 and Land Use Consent 97/98-105, servicing and minor maintenance work on underground mobile equipment will occur outside of the standard operational hours for the open pit.

3.2.4 Surface works and structures

Surface works and structures required for the MEP are limited to the upper portal, which is located approximately 80m below the surface, a fresh air intake and lower portal located approximately 180m below the surface, a ventilation shaft collar approximately 25m below the surface, and an escapeway shaft collar approximately 40m below the surface. The ventilation shaft will discharge the emissions from development blasting and from underground vehicles associated with the MEP. The fresh air intake portal will also serve initially as an escapeway. The escapeway shaft will serve as the long term escapeway for the MEP.

In terms of support facilities, an amenity facility (toilets, showers, cafe) will be established for underground staff. This facility will be contained within portacabins located immediately adjacent to the open pit contractor's "Whitehouse" in the surface facilities area (SFA) partly or wholly within ML 32 2388. In addition to this, a new enclosed workshop area, comprising a single workshop bay with two sea containers, will be established either near the Whitehouse in the SFA or on the north-eastern extent of the pit wall near the existing McMahons workshop (within the boundary of Land Use Consent 97/98-105). The MEP will otherwise utilise existing Martha Mine and Extended Project surface facilities and infrastructure. This includes the existing Martha magazine, the in-pit stockpile established as part of the works associated with the layback to the east pit wall, the waste rock and ore stockpiles in the surface facilities area, and existing crushing, conveying, processing and waste disposal

3.2.5 Lighting

The only lighting associated with the MEP will be located in the pit at the portal entrances which are located approximately 80m and 180m below the surface (pit rim) and on the existing in-pit stockpile at the bottom of the open pit. Otherwise all lighting will be as per the existing open pit operations / there will be no additional lighting associated with the MEP.

3.2.6 Blasting activities

The construction of the MEP is expected to be completed with practices typical of small blasthole development blasting. The approach is consistent with blasting undertaken for Favona and Trio development activities.

Development blasting is very different from production blasting. The primary objective of development blasting is to allow access to and within an ore body. It uses small blast hole diameter and short blast hole length and hence relatively small quantities of explosives. Because development blasting occurs at the face of a drive, development blasts are initiated over a 10 second window, which is necessary to allow the ejection of blasted rock from the face before subsequent holes fire. Without the delay in initiation, the fractured rock "freezes" (remains locked in the face) and the explosives are ejected from the face generating additional vibration and potentially damaging underground infrastructure.

Production blasting occurs after the accesses have been developed and is restricted to blasting within the ore body. Compared to development blasting, production blasting uses greater volumes of explosive in larger diameter and longer holes. Production blasts can occur over a shorter period, typically a couple of seconds, without the risk of freezing.

The only production blasting undertaken as part of the MEP will be for the trial stoping. This blasting will occur underground and within the Martha pit rim where blasting has occurred for the

past 20+ years, and is more-or-less located close to the northern wall and close to the pit floor so is further away from receivers (i.e. deeper) than blasting around the open pit. The associated blasting will comply with the existing daytime blast vibration limits as further detailed in Section 4.5 below.

The MEP provides for blasting up to the existing maximum vibration limit of 5mm/s to occur outside of the current window set out in ML 32 2388 of Monday – Friday: 10am – 3pm; and Saturday 10am – 12pm. Initially it was proposed that blasting would be undertaken 24 hours a day, 7 days a week, provided that the maximum vibration level outside of the existing window did not exceed 1mm/s (consistent with the maximum night time vibration levels adopted for the Favona and Trio Underground Mines). However detailed vibration assessment and modelling shows that this is not feasible for the MEP.

Instead, the MEP provides for blasting up to the existing vibration limit of 5mm/s to occur within the following blast window:

- Monday – Friday: 7am – 7pm
- Saturday: 10am – 12pm (and up until 1900 where necessary for safety or minor maintenance purposes)

While this is an expanded blast window to that originally contemplated, it is important to note that it is no longer proposed to undertake blasting activities 24 hours a day, 7 days a week. Consistent with current operations, blasting will not occur at night time and there will not be any blasting activities on a Sunday. Further, blasting will only occur on a Saturday afternoon in limited circumstances where it is specifically required for minor maintenance and/or safety purposes.

In addition to the expanded blast window described above, it is proposed to amend the Mining Licence to specifically refer to the 95% design compliance threshold for blast activities. This design compliance threshold is currently applied to blasting activities. This change therefore ensures that the Mining Licence reflects current practise.

In terms of overpressure, blasting activities will continue to meet the existing limit of 128dBL set out in ML 32 2388 as further described in section 4.5 below.

3.2.7 Hazardous substances

The following hazardous substances will be stored underground for the exploration project:

Hazardous substances	Quantity
Emulsion	8 tonnes
Gasser	1,000 litres
Oil	1,000 litres
Grease	30 kilograms
Diesel	1,500 litres

The emulsion and gasser are combined in blast holes to form the required explosive for the exploration. As separate components, they are not inherently explosive. These are stored underground as they commonly degrade when exposed to sunlight. The storage and use of these products is a continuation of the current practices at Favona and Trio where the same quantities are held underground.

Detonators will continue to be stored in the Martha magazine on the surface and transported underground only as required.

The storage of hazardous substances will continue to be in accordance with relevant New Zealand Standards or Codes of Practice.

3.2.8 Dewatering

The exploration decline extends to an elevation approximately 280m below the surface and 20m below the bottom of the pit at approximately 860m RL. The Trio Development consents provide for groundwater in the Trio system to be pumped down to around 755m RL. The Trio system is connected to the Martha groundwater system, and dewatering for Trio will occur from the base of the Martha pit as well as underground. Accordingly, there is no additional dewatering required for the MEP. Water will continue to be pumped to the Water Treatment Plant for treatment and discharge in full accordance with existing conditions of consent.

3.2.9 Waste rock and ore

The MEP entails the excavation of waste rock material with the same geological composition of the rock that has been mined from the Martha pit over the past 20+ years. Other than waste rock which will be used for backfilling³, all of this excavated material will be crushed and conveyed to the waste disposal area in the same manner as current operations. Some stockpiling of material will also occur, outside of the standard operational hours of the open pit, within the current in-pit stockpile which was established as part of the works associated with the layback of the east wall.

The approximate quantities of material expected to be produced from the MEP are as follows:

- 234,000 tonnes of waste (approximately 40,000 – 50,000 tonnes is expected to be returned to underground as backfill); and
- 50,000 tonnes of ore.

By way of comparison, in terms of the volume of material produced from the MEP, the full two year project life for the MEP is equivalent to approximately one calendar month of open pit mining. The net waste rock (i.e. that is not otherwise used for backfilling purposes) will be contained within the existing consented Tailings Storage Facility 1A.

In summary, with the exception of the hours of use of the in-pit stockpile (addressed in Section 3.2.3 above), the stockpiling, crushing, transport and disposal of waste rock extracted as part of the MEP will continue in accordance with, and within the ambit of, the conditions of the Mining Licence and resource consents already held by NWG. Similarly any ore that is recovered as part of the trial stopping and development will be processed in accordance with existing ML 32 2388 and resource consent conditions.

3.2.10 On-going monitoring and management

The existing conditions of the consents and Mining Licence for the Extended Project require that NWG submit an Annual Work Programme which outlines the anticipated activities to be performed during the following year and the management systems under which those activities will be undertaken.

Subject to the variation being granted, NWG will provide the Councils with an Annual Work Programme for the MEP in the same way that it does for the Martha Mine (as well as the Favona and Trio mines). Where relevant, the MEP will also be included in the monitoring and management plans required to be prepared by NWG under the conditions of consents and Mining

³ This activity is the subject of the MEP application to WRC.

Licence for the Martha Mine. This includes the monitoring recommendations identified in the supporting technical assessments contained in Appendix B and outlined in Section 4 below.

3.2.11 Closure and Rehabilitation

Closure of the MEP will involve the removal of the underground infrastructure. As noted above, backfilling will occur as a part of trial stopping, the shafts will be backfilled and the portals will be plugged or otherwise blocked off. Otherwise, all closure works are already provided for under the Mining Licence and conditions of consent for the Martha Mine Extended Project.

Reflooding of the workings will occur naturally from groundwater recharge once dewatering required for the Trio Underground Mine project has ceased, and will also occur as part of the consented pit lake formation.

The MEP is scheduled to be completed by June 2014 which is prior to the completion of the layback to the east wall of the Martha pit which is scheduled to be completed around the end of 2014. Therefore the project does not impact on closure and rehabilitation timeframes. In any case, ML 32 2388 expires in 2017. It is also noted that NWG has undertaken significant rehabilitation to date around the open pit and will continue to undertake rehabilitation activities where this is practicable and does not impact on mining activities.

The closure works for the MEP will be included in the existing rehabilitation and closure plan required by condition 1(c) of ML 32 2388, and in the quantum of the rehabilitation bond which is maintained in favour of both WRC and HDC. It should be noted that the closure works are covered in the application to WRC along with any incremental bond requirements related to the MEP.

In the event that a future Martha Underground Mine is found to be viable and is consented, no rehabilitation in relation to the MEP will be required as the access drives will be used to provide access to the mine.

4 Assessment of Effects on the Environment

4.1 Introduction

The following assessment of effects is provided to support this application to vary ML 32 2388. This assessment addresses the following effects:

- Settlement effects
- Geotechnical and pit wall stability
- Geochemistry
- Noise
- Vibration
- Air quality
- Visual
- Effects of the minor administrative variations

4.2 Settlement

Trevor Matuschka from Engineering Geology Ltd was engaged by NWG to undertake a review of the potential for regional ground settlement from any lowering of groundwater levels. The Engineering Geology report is contained in Appendix B and key observations and conclusions are set out below.

The Trio groundwater system is connected to the Martha groundwater system. Dewatering for the Trio project will result in lowering of the groundwater table below the level of the proposed MEP decline and trial stopes at a maximum depth of approximately 860mRL below the ground surface⁴. Consequently Engineering Geology considers that while some small settlement may arise due to relaxation of the ground as a result of excavation of the decline and stopes, there will be no additional settlement as a result of the MEP beyond that already expected and consented for the Trio project.

Engineering Geology recommends the installation of a deep groundwater monitoring well on the northern side of Martha Pit to provide confirmation of the depth of dewatering. This recommendation will be incorporated into the existing Dewatering and Settlement Monitoring Plan required by the Mining Licence and Land Use Consent 97/98- 105 as well as regional resource consents.

4.3 Geotechnical investigations and pit wall stability

4.3.1 Pit wall stability

Tim Sullivan from PSM Ltd was engaged to confirm the methodology to ensure pit wall stability both during and post operations in accordance with ML 32 2388 and land use consent requirements. The PSM Ltd report is contained in Appendix B with key points reproduced below.

⁴ Groundwater take permit 121446 granted for the Trio project provides for dewatering of the Trio system down to 755mRL

PSM Ltd identifies the main geometric, groundwater and geotechnical factors of note applicable to the MEP as follows:

- Apart from the two portals and shafts no other part of the MEP will intersect any of the pit walls.
- There will be no additional dewatering undertaken as part of this project.
- All the development is located outside the Hazard Zones and the “Milking Cow” cave zone.
- The rock mass conditions along the whole of the north wall are the best encountered anywhere in the Martha Pit and characterised as a very strong, relatively unjointed rock mass. The two core holes drilled sub horizontally from the two decline portals confirm that these sound geotechnical conditions continue at depth behind the north wall.
- There are no known major adverse geological structures that could interact with the MEP and/or the pit and cause instability.
- The north walls of all the Martha pits have always been stable, with only minor local movements around old workings that intersected the pit walls.
- The monitoring data for the north wall shows only minor elastic movements have occurred to date and this pit wall is not moving. The pit walls are stable and not sensitive to any disturbance from the planned MEP works.
- The underground developments are small in size, and apart from the entrances and shafts described above, are remote from the pit walls.
- The two planned stopes will be backfilled with rockfill after mining is completed.

The PSM Ltd assessment does not identify any element of the MEP that will have an adverse effect on the stability of the pit walls or any movements within the Martha pit. Apart from the small increase in storage due to the volume of rock excavated, the MEP will have no impact on geotechnical stability aspects associated with pit flooding.

The main recommendation arising from the PSM Ltd assessment is the need to install monitoring in the pit above the planned remnant Martha vein stope. This monitoring will be incorporated into the existing pit slope monitoring regime required by ML 32 2388 and the Extended Project land use consent.

4.3.2 Stability of Underground Development

NWG also commissioned a report by Tom Parrott (Parrott) of Newmont’s Perth Technical Services division to assess the stability of underground development constructed as part of the MEP and outline management plans for controlling local stability both in the short term (i.e. the life of the active MEP) and the long term (i.e. following cessation of exploration and any future mining activities). The Parrott report is contained in Appendix B and summarised below.

Portals and immediate pit bench area

The portals are located within the north wall of the Martha Pit. These sites have been chosen as the rock mass conditions here are the best encountered anywhere in the Martha Pit (PSM Ltd). These conditions have been confirmed to significant depth into the north wall with dedicated geotechnical diamond drill holes. Detailed geotechnical mapping of the portal locations reinforces this position.

Local instability immediately around the portal sites for the life span of the project is managed through a range of measures including the following:

- Detailed understanding of the rockmass as set out above.
- Pre-reinforcement and support of the pit wall immediately around the portal locations prior to drilling and blasting commencing.
- The use of modified drilling and blasting practices which limit the potential for instability when establishing the portals.

Local stability immediately around the portal sites beyond the life span of the project will be managed through backfilling of the first 50m of the portals following the cessation of mining. While this is not required from a stability perspective, it is consistent with commitments made by NWG during the permitting of the Favona Portal.

Decline and development tunnelling

Analysis of the geotechnical boreholes indicates that rock mass conditions are good to very good for over 80% of the rockmass in which the decline and development tunnelling occurs. Zones of poor ground are generally quite narrow and limited in area.

Local stability will be further ensured by the following measures:

- Locating development well away from known historic voids, unless where planned for resource definition purposes.
- The installation of specific rock mass stabilising measures (surface support and reinforcement) based on a detailed understanding of the rockmass.
- Design of ground support systems in accordance with industry best practise.
- The use of a conservative bolt spacing pattern (minimum 2m and further reduced in areas of poorer ground) and surface support. Even though empirical data indicates this latter measure is not required, it is NWG policy to install surface support in all underground excavations.

Local stability around development tunnels beyond the life span of the MEP is not considered an issue. As identified by PSM Ltd, the MEP will be located in good rockmass conditions and situated at a depth that will have no long term effect on stability of the pit or ground surface.

Trial stopes

Trial stoping is planned to be conducted in two limited areas within the Ella Lode and Martha Vein as part of the MEP project. Stoping in the Ella Lode will occur in previously unmined areas where the rock is intact and undisturbed. However the Martha Vein trial stope will intersect historically mined and backfilled stope areas. Local stability around the MEP trial stopes will be managed through a number of measures including:

- Diamond drilling and geotechnical logging of drill cores in advance of development to understand and characterise the rock mass.
- Detailed geotechnical mapping of ore drives to characterise rock mass and optimise stope design.
- Use of stope (rock mass) reinforcement practices where necessary (i.e. cable bolting).
- Rapid sequential and controlled backfilling of stopes upon completion of mining.
- Monitoring stope performance and the response of the rock mass when exposed to mining.

Long term local stability around trial stoping areas following the completion of the MEP is not considered an issue as the trial stopes will be backfilled.

Vertical shafts

Two vertical shafts, an escape shaft and a ventilation shaft, will be excavated as part of the MEP project. Local stability of these shafts will be managed through the following measures:

- Dedicated drilling of geotechnical boreholes along the axis of each proposed shaft location to characterise the rock mass in detail.
- Use of raiseboring technology to excavate the shafts as this method provides a smooth-walled excavation and does not require the use of explosives reducing the amount of fracturing to the rock.
- Provision of an engineered lining if required.

Long term stability immediately around the shafts following the completion of the MEP is not considered an issue as the shafts will be backfilled, hence removing the risk of instability altogether.

Historic voids

Many historic voids, which are typically old development drives (tunnels) or old stoping areas that were not filled at the time of mining, exist beneath the Martha pit. The location of these historical mine workings are generally well documented and known, although there is the possibility that previously unsurveyed voids may be encountered. Every measure will be taken to detect and manage unsurveyed voids as further described below.

Historic voids are typically planned to be avoided during the MEP, however there are some cases where it is necessary to plan an intersection with an old drive or stope as a routine part of development. This is not unusual for modern mines with historic workings to enable access to certain areas of the project. Local stability surrounding the intersection with old voids will be managed through implementation of a voids management plan. This will include measures such as:

- Detailed electronic record keeping of a voids model, and updating on a regular basis with new information.
- Measures to detect voids including routine probe drilling during development, use of cavity auto-scanning laser technology to provide full 3D images of nearby voids, and other potential technologies.
- Implementation of detailed standard operation procedures through the entire mining process from design through to execution.
- Where intersection with historic voids occurs, appropriate measures will be taken including use of ground control techniques (reinforcement, surface support and backfill) to provide a serviceable workplace.
- Electing not to mine trial stopes if this is deemed to pose an unacceptable risk to local stability. This can only be known once additional drilling and development of tunnels has been undertaken.

4.3.3 Summary

The PSM Ltd assessment does not identify any element of the MEP that will have an adverse impact on the stability of the pit walls or any movements within the Martha pit. Investigations to date have shown that good to very good and strong rockmass conditions exist at depth in the north wall.

The Parrott report concludes that any local stability issues around portal locations, vertical shafts, decline and level development and existing historic voids can be managed effectively through detailed knowledge of the rockmass and application of appropriate control measures (management plans, reinforcement and surface support of rockmass, backfill etc). This is standard practice for all NWG underground mines. Beyond the life span of the MEP local stability is not considered to be an issue due to backfilling of the first 50m section of the portals, and backfilling of the shafts and trial stopes with waste rock. Overall, the Parrott report concludes that the effect on stability posed by the MEP is local only, will be controlled locally and poses no risk to the stability of the Martha Pit.

4.4 Geochemistry of waste rock and ore

URS New Zealand Limited (URS) was engaged by NWG to assess whether the current understanding of waste rock geochemistry is sufficient, to determine whether current waste management practices are adequate for the MEP, and whether the MEP is likely to have an effect on the predicted quality of the Martha pit lake. The URS report is contained in Appendix B and key points are discussed below.

4.4.1 Assessment

Management of waste rock

Rock extracted from the MEP is expected to comprise predominantly propylitically altered andesites of similar composition to those encountered within the current Martha pit, with testing indicating a range of non acid forming (NAF) and mildly potentially acid forming (PAF) wastes. URS considers that existing mine waste management practices for waste rock disposal at the waste disposal area would therefore be appropriate for this material.

URS considers that the potential for propylitically altered rock from the MEP to generate acidity outside the range of that likely to be observed from waste rock from the Martha Mine is limited. Characterisation of the MEP material should verify this and confirm that the trace element composition of these materials does not vary from that observed in the Martha samples.

Effect on pit lake water quality

Given the relatively neutral quality of groundwater presently abstracted from beneath the Martha pit and the current understanding of geochemistry, URS considers that any changes associated with the MEP are unlikely to adversely affect pit lake water quality (noting that this will depend to a degree on how waste rock materials are used to backfill stopes).

There is a high degree of interconnection between the proposed MEP and the Martha pit and potential for rock exposed during tunnelling and that placed as backfill to influence lake water quality (noting that any change that did occur would be managed using the same methods as currently proposed for the pit lake). For this reason URS considers that characterisation of the MEP material is required to confirm that trace element composition of these materials does not vary from that observed in the Martha samples. The URS report contains a range of recommendations in this respect which have been incorporated into the suggested conditions of consent for the regional resource consent required for the MEP.

Tailings

URS also considers that any small quantity of tailings generated from the MEP is likely to be generally consistent with that produced from the Martha Mine and management in a similar manner is appropriate. Due to the small volume of materials likely to be processed, any deviations from the expected geochemistry will likely have minimal effect on decant water quality. However, URS recommends testing of ore from the MEP project to verify the geochemistry is consistent with the wider Martha waste rock. This recommendation will be incorporated into the Tailings Storage Facility Monitoring Plan required by existing discharge permit 971304 which provides for the discharge of tailings into Storage 1A.

4.4.2 Summary

The scale of the MEP is small by comparison to the level of activity currently occurring and that has occurred in the Martha pit. The current quantity of waste rock and tailings generated through the two year life of the MEP is approximately 281,000 tonnes which is the equivalent of the current quantity excavated each month from the Martha pit (around 250,000 tonnes).

Based on the current understanding of geochemistry of the Martha Mine, URS considers that any changes associated with the MEP are unlikely to adversely affect lake water quality. However characterisation of MEP material is recommended to confirm that effects on lake water quality are likely to be minor. The URS recommendations are reflected in the proposed conditions of consent in the application to WRC.

4.5 Blasting and vibration

Heilig & Partners (Heilig) was engaged by NWG to undertake an assessment of the potential vibration and over pressure effects from drilling and blasting practices associated with the MEP including development blasting as well as the planned trial stoping activities⁵. The Heilig report is contained in Appendix B and the results of this assessment are identified and discussed below.

4.5.1 Mining Licence vibration limits

Condition 20 of ML 32 2388 sets out the requirements in relation to blasting and vibration. Relevant requirements are set out as follows:

- (d) Blasting shall be restricted to within the following hours:

Monday-Friday	1000-1500
Saturday	1000-1200

 - (a) The peak overall sound pressure level due to air blasts shall not exceed 128dB linear (unweighted), measured at any affected residence excluding those properties owned by the licensee within the area shown on the plan attached hereto.
 - (b) After the 12 month period referred to in condition 10(e) has expired, vibration levels measured in the ground closest to any affected residence excluding those properties owned by the licensee within the area shown on the plan attached hereto shall comply with the provisions of Rule 9.4.3 of the Operative Hauraki District Plan.

Section 9.4.3.3 of the operative Hauraki District Plan requires that:

The maximum level for ground vibration resulting from impulsive blasting (VMax) is:

Monday to Saturday (0700 to 2100) - 5.0mm/s (vector sum velocity)
At all other times and on Public Holidays - 1.0mm/s (vector sum velocity)

⁵ The underground location of the MEP eliminates any potential fly rock effects.

Section 9.4.3.4 further indicates that:

The VMax level referred to in this Plan is the maximum value of instantaneous peak particle velocities calculated from the vector sum of the three orthogonal components of vibration occurring within the frequency range of 2Hz – 80Hz.

The variation provided for under this application seeks to provide for blasting outside of the blasting window currently set out in Condition 20 above, but subject to the existing maximum vibration level of 5mm/s. The amended blast window for underground operations of 7am – 7pm Monday – Friday and 10am – 12pm Saturday (and up until 7pm on Saturday where this is necessary for safety or for minor maintenance purposes) enables blast activities to be better aligned with shift changes, and allows for a safer operation with the firing of blasts occurring when personnel are not within the exploration decline.

The vibration limits are intended to protect 'quality of life' and personal amenity for persons living around blasting operations and ensure that vibration effects do not exceed levels of normal personal tolerance. They are based upon international standards, peer reviewed papers and technical documents and limit effects to levels deemed acceptable to the majority of residents. When compared to other standards and accepted literature (in particular British Standard BS 6472-2, German DIN 4150-3, Austrian Mining Blast Regulation BSpV), the vibration limit for the Martha Mine is amongst the most rigorous regulating any mining activity.

It is also relevant to note that while the proposed blast window is greater than the blast window for the open pit set out in the Mining Licence, it is less than that otherwise provided for under the operative District Plan as a permitted activity outside of the Mining Licence area.

4.5.2 Blasting activities

Given the consistency between the rock mass for the exploration decline, planned trial stopes and the Martha open pit, it is expected that all excavation will require drilling and blasting with the exception of the vent and escape shafts, which will be raised bored.

Development blasting is small scale horizontal or inclined blasting specifically undertaken to provide access to the orebody. For the MEP, development blasting is expected to produce approximately 234,000 tonnes of waste rock. The level of vibration from development activities will be controlled to the existing 5mm/s limit by adjusting the scale of blasting. This will be achieved through monitoring and where necessary, changing the blasthole diameter, the length of the blasthole or the type of explosive

Production blasting is restricted to blasting associated with trial stoping within the ore body at the eastern and western extremities of the exploration drive. The stope sizes are small and combined will yield a bulk sample of around 50,000 tonnes of material. This blasting will occur underground and within the Martha pit rim area where blasting has occurred for the past 20+ years, and is more-or-less located close to the northern wall and close to the pit floor so is further away from receivers (i.e. deeper) than blasting around the open pit. The blasting will comply with the existing daytime blast vibration limits.

4.5.3 Vibration effects associated with blasting activities

Vibration monitoring

Since 2004, Newmont Waihi Gold has implemented a state-of-the-art vibration monitoring and management system for blasting activities. The vibration system has permitted detailed vibration analyses. Effectively all blasts within the Martha open pit have been monitored at multiple locations including a large number of blasts monitored at locations along the north wall. The Martha vibration data is considered particularly relevant because the MEP exploration

development drive and stoping is in the same immediate area and therefore a similar rock mass. Moreover this data is also statistically valid in that it covers a wide range of vibration levels, measured at varying distances from the blast and using different explosive quantities.

Ground vibration effects

Modelling undertaken by Heilig indicates that the expected level of vibration around the MEP will comply with the existing 5mm/s limit. For those sections of the exploration drive where development is closest to residences, the quantity of explosive per blasthole, and therefore the length and/or diameter of the blasthole, will need to be designed and selected to ensure compliance with the vibration criteria. Otherwise, the majority of the MEP can be blasted with advances of 3 metres (or greater) and comply with the 5mm/s criterion.

The vibration results provide a reasonable guarantee that the MEP can be completed using explosive quantities typical of that used at the Favona site. However in the event that the modelling has underestimated the level of vibration, as set out in the Heilig report several procedures are available to further limit vibration effects and ensure compliance with the 5mm/s limit.

In summary, the Heilig report confirms that that the blasting activities can comply with existing environmental limits, or where necessary, indicates how the scale of blasting can be adjusted to ensure compliance.

Effects on buildings and structures

The vibration limits are intended to protect personal amenity and are well below the threshold of damage to buildings, including to heritage items such as the Pumphouse and Grand Junction Refinery Building. This is demonstrated by the lack of effect of vibration on the Pumphouse located on the south wall of the Martha Pit. The vibration compliance limit set for blasts near the Pumphouse (25mm/s) is significantly greater than the vibration expected to be experienced at the Grand Junction Refinery Building. No damage or effect on the integrity of the Pumphouse due to the blasting in close proximity has been noted during the regular inspections of the structure over a period of 23+ years.

4.5.4 Air overpressure effects

Overpressure refers to the elevated levels of pressure above atmospheric pressure as a result of blasting. Heilig has undertaken an assessment of overpressure effects associated with the MEP based on data from other mining sites as well as recorded overpressure measured by Hegley Acoustic Consultants Ltd at the Favona portal. Overpressure was then modelled taking into account, amongst other things, the elevation of the portal, reflection from the pit walls, topography and weather conditions.

Data collected from monitoring blasting activities at the Favona portal suggests that blasting within the initial 80m of development will produce the highest levels of overpressure at the portal, however the levels will attenuate to less than 128dB at the nearest properties. Blasting of the trial stopes will produce minimal overpressure on the basis of the stope locations and the separation between the stope areas and the portal, or exit of the overpressure to the atmosphere.

In addition, blasting for the Favona portal explored options of implementing external procedures, such as shields, rubber curtains, insulation, or blockages in the decline to further limit overpressure. This data, together with overpressure data collected at other sites, suggests that these measures can also be used if required to successfully reduce overpressure.

In summary, modelling of the 'worst-case scenario' (i.e. blasting near the entrance to the portals) indicates that the existing 128dB_L for overpressure will continue to be complied with. However in the event that the level of overpressure exceeds this limit, there are a number of blast design parameters (e.g. blasthole diameter and length, stemming, initiation sequence etc) that could be adjusted to control or reduce the level of overpressure. Physical deflectors within the MEP can also be used to ensure compliance.

4.5.5 Monitoring of effects

The procedure for demonstrating vibration and overpressure compliance will remain essentially unchanged from current practices employed for the open pit operation. Monitoring systems will be positioned at the closest residences along the north wall (Pitt Street and Islington Terrace) and configured to detect any increase in the ambient vibration level above a pre-set threshold value. The system will be automated and allow for the immediate analysis of blast events. Measured data will be analysed and collated regularly to allow the continual refinement of the vibration and air overpressure predictions.

NWG has developed Vibration Management and Mitigation Plans for the Martha Mine. The Vibration Mitigation Plan sets out mitigation measures which, amongst other things, aims to ensure compliance and provide a systematic approach that employs international best practice to blast design. While these plans are not required under the conditions of the Mining Licence, NWG will continue to undertake blasting activities in accordance with these plans and will update them as required to reflect blasting activities associated with the MEP.

4.5.6 Summary and conclusions

The MEP will operate to the same vibration limits as the Martha open pit operation albeit within a longer blast window. However blasting will not occur at night time and there will not be any blasting activities on a Sunday. Further, blasting will only occur on a Saturday afternoon in limited circumstances where it is specifically required for minor maintenance and/or safety purposes.

As noted previously, while the proposed blast window set out in this application is greater than the blast window for the open pit set out in the Mining Licence, it is less than that otherwise provided for under the operative District Plan as a permitted activity outside of the Mining Licence area.

In addition to the expanded blast window it is proposed to amend the Mining Licence to specifically refer to the 95% design compliance threshold for blast activities. This design compliance threshold is currently applied to blasting activities. This change therefore ensures that the Mining Licence reflects current practise.

NWG has complied with an overpressure limit of 128dB_L for around 23 years and will continue to comply with this existing limit. In any case similar or greater levels of overpressure are routinely produced by naturally occurring phenomena such as winds.

Over the life of the Martha Mine a high degree of compliance with existing Mining Licence and consent conditions has been achieved. The analysis undertaken by Heilig indicates that the MEP will continue to comply with the vibration limit of 5mm/s (vector sum velocity) for all activities associated with the MEP. While the vibration from blasting associated with MEP will be perceptible on occasions to some residents, the level is expected to remain below that identified in the international literature as being considered 'annoying' and well below that representing the onset of building damage. The 'quality of life' for persons living near to an operating mine, as well as the integrity of adjacent residential or commercial properties, will therefore be ensured through attention to the blast design details and ultimately compliance with the conditions set out in ML 32 2388.

4.6 Noise

NWG engaged Hegley Acoustic Consultants (Hegley) to undertake an assessment of the potential noise effects of the MEP against the noise performance standards in ML 32 2388 and the Extended Project land use consent. The Hegley report is contained in Appendix B and summarised below.

4.6.1 Potential noise sources

The Hegley report addresses the following potential sources of noise:

- Machinery used to construct the portals, ventilation and escape shafts within the northern wall of the open pit (development of the mine portals will be undertaken using a drilling jumbo, bogger and trucks; the ventilation shaft and escape shaft will both be constructed using a Raise Bore drilling machine which is currently being used at the Trio Project).
- Portable generator(s) located at the portals during the initial stages of exploration (e.g. an Aggreko 750kW generator and/or an Ingersoll Rand Portable generator, both of which were used during the Favona Project);
- Ventilation fans located immediately outside the portals once the mine shaft has progressed and until such time as the exhaust ventilation shaft has been constructed;
- Noise from the removal of material from the portals, transport to and processing in the SFA.

The construction aspects of this assessment focus on the worst case scenario i.e. with an emphasis on the operation of machinery above ground, where the portals and shafts daylight in the northern wall of the open pit.

The waste rock from exploration and trial stoping will be loaded onto mine trucks using a bogger. The operational aspects of this assessment includes an assessment of the noise effects of transporting material within the pit to the surface facilities area (SFA) using an articulated truck such as a Volvo A40E, and the use of a Cat D10 bulldozer or similar operating in the SFA (this machinery has already been used as part of the current operations in the pit).

It is important to note that the actual equipment to be used for the MEP has been measured in operation at the existing Martha, Favona or Trio mines. Accordingly there is expected to be a good correlation between predicted and actual noise levels.

4.6.2 Existing consent requirements

The Mining Licence sets out the following requirements in relation to hours of work and noise limits:

Hours of work	Noise limit L ₁₀ dBA
Monday-Friday 7am – 9pm*	55dBA
Saturday 7am – 12pm	55dBA
At all other times	40dBA

*7pm – 9pm only if the operations are of an urgent nature and necessary for the effective carrying out of mining operations

The conditions of the Mining Licence are reflected in the requirements of the Extended Project Land Use Consent. The main difference is that the Land Use Consent establishes noise control boundaries around the mine and includes a 50dBA L₁₀ limit rather than the 55dBA L₁₀ limit above. This more restrictive noise limit generally applies outside of the Mining Licence and Extended Project Area (except immediately to the north / north-east of the pit where the higher 55dBA L₁₀ limit is retained). In any case, as NWG propose to operate the MEP 24 hours a day and seven days a week, the more restrictive night time limit of 40dBA L₁₀ has been used in the noise modelling and assessment undertaken by Hegley.

4.6.3 Assessment of noise from machinery and equipment

Noise modelling indicates that the lower portal can be constructed such that the noise level does not exceed 40dBA L₁₀ at any dwelling not owned by the company. However for the initial construction of the upper portal the noise contours exceed 40dBA L₁₀ in the Pitt Street and Cambridge Road area to the north of the mine. In this case NWG would need to restrict the initial portal construction activities to daytime hours of operation. Once the jumbo has drilled 10 – 15m into the north wall mine the noise is likely to meet the night time noise standard of 40dBA L₁₀. The noise from both locations will be well within the existing noise conditions during the daytime.

Modelling of noise from the ventilation fans and generators located outside the upper portal indicates that even where this activity is undertaken in conjunction with trucks transporting the mine waste to the SFA, the 40dBA L₁₀ noise contour is well within company land. However NWG does not propose to operate trucks transporting waste rock to the SFA at night time / outside of the standard open pit operational hours. Hence the 40dBA L₁₀ noise contour will be even further contained within land owned by NWG and compliance will be achieved for the lower night time noise level with a good factor of safety.

When using a Raise Bore to construct the ventilation shaft and the escape shaft, noise modelling undertaken by Hegley indicates that the 40dBA L₁₀ noise contour is within the pit and well clear of any dwellings in the area.

In terms of cumulative noise effects, Hegley notes that the highest noise level at any dwelling not owned by the company is at or below 45dBA L₁₀ for all construction and operational activities modelled, and other than two non-company owned properties in the Pitt Street/Cambridge Road area is below 40dBA L₁₀. If operated during the daytime the design limit is 50dBA L₁₀. Where there is a 10dBA or greater difference between the noise levels there is no additive effect to the higher noise level. Thus, Hegley concludes that because the noise is not additive the daytime noise level would not be affected by the above work. For the two properties where the upper daytime noise level is currently between 40 - 45dBA L₁₀, taking a conservative approach and adopting the existing mining operation and MEP both at the upper level of 45 dBA L₁₀, the cumulative noise effects of the existing mine and the MEP will be 48dBA L₁₀ which is within the 50dBA L₁₀ design limit.

4.6.4 Summary

NWG proposes to operate the MEP 24 hours a day, seven days a week and for this reason the assessment set out in the Hegley report is based on the more stringent night time limit of 40dBA L₁₀. However the majority of the work will be carried out under ground level so noise will not be heard on the surface. Associated work on the surface is limited, is located below the perimeter of the pit rim, and includes the construction of the portals, ventilation and escape shafts within the northern wall of the open pit which require the use of machinery, and use of the existing in pit stockpile.

The assessment of noise from this machinery demonstrates that, with the exception of the initial development (e.g. 10 – 15m) of the upper portal which will need to be undertaken during the daytime, compliance will be achieved for the lower night time noise levels with a good factor of safety. This is further supported by NWG's commitment to not operate in the SFA outside of the hours of existing operations.

In terms of noise effects during the daytime, the machinery and equipment that will be operating within the pit and in the SFA have already been used as part of the existing Martha pit operations. Considering the relatively small amounts of excavated material being removed as part of the MEP, Hegley concludes that the daytime operation of a bogger, dump trucks and bulldozer in the open pit and SFA will not be discernible above existing operations. All noise associated with the MEP will continue to comply with existing ML 32 2388 and land use consent conditions.

It is noted that noise from trucks operating in the surface facilities area, stockpiling waste rock and ore extracted from the MEP will not change as the activities will remain as they have been for the last approximately 22 years. While the MEP will operate 24 hrs/day and 7 days/week, excavated material will only be hauled to the SFA and worked/processed when the existing open pit operations currently occur.

4.7 Air quality

Kevin Rolfe & Associates Limited (Rolfe) was engaged by NWG to assess the air quality implications of the MEP. The Rolfe report is contained in Appendix B and key observations and conclusions are set out below. It should be noted that the MEP can be undertaken in full accordance with existing air discharge permit 971281 and no additional resource consent is required.

4.7.1 Vent shaft

The ventilation shaft will be located on the northern wall of the Martha pit at an elevation of approximately 25m below the top of the pit. Discharges from the ventilation shaft will be contaminants from blasting activities and from the operation of underground vehicles. Even with a high degree of conservatism incorporated into the assessment, for all contaminants the predicted maximum concentrations are less than the assessment criteria by a wide margin (i.e. between 32 – 3,700 times). In particular, the 150 times ratio between the predicted maximum nitrogen dioxide concentration and the assessment criterion (based on health effects) also provides adequate protection from odour effects as a result of blasting activities. Rolfe therefore concludes that the environmental health effects of discharges from the vent shaft including odour are expected to be insignificant.

4.7.2 Above ground vehicle movements

In assessing the effects of above ground vehicle movements, the Rolfe report notes the small scale of the MEP relative to the open pit operation⁶. The MEP will result in an increase in vehicle movements of approximately 6% over current operations. The report further notes that the current level of vehicle movements at the Martha Mine is significantly less than in the past, and this previous level of activity occurred without causing adverse air quality effects from vehicles movements.

Rolfe concludes that the minor increase in aboveground vehicle movements and the stockpiling of ore and excess waste rock from the MEP are unlikely to have significant air quality effects.

⁶ As noted previously, the quantity of excavated material associated with the entire project life for the MEP is the equivalent of one calendar month of open pit mining

4.7.3 Stockpiling of ore and waste rock

Depending on scheduling and the availability of stopes to receive backfill, some waste rock will need to be stored in the existing Martha stockpile (along with the in-pit stockpile formed as part of the east layback to the pit wall). It is estimated that the maximum quantity of waste rock to the Martha stockpile in the SFA will be approximately 30,000 tonnes. This stockpile is limited to 300,000 tonnes, and the waste rock from the MEP will be handled within that maximum quantity.

The net quantity of waste rock from the MEP (approx. 234,000 tonnes) is also small when compared to the 2.8 million tonnes from the Martha Mine over the same period, and approximately 40 million BCM in total provided for over the life of the Martha Mine.

4.7.4 Summary

The air quality effects of discharges from the vent shaft have been very conservatively assessed and are still considered to be insignificant. Rolfe concludes that the MEP is unlikely to give rise to any significant air quality effects, and that it will not impact on NWG's ability to continue to comply with existing consent and Mining Licence requirements.

4.8 Landscape and visual amenity

The MEP is located within the boundary of ML 32 2388 and below the pit rim. Associated surface works and structures are described in Section 3 and are limited to portals and shafts which daylight on the northern wall within the open pit, and a small workshop and underground staff amenities facility.

The ventilation shaft collar which is closest to the surface/pit rim is still located on the northern wall at a depth of approximately 25m below the pit rim. The workshop consists of a single work bay and two sea containers located either near the Whitehouse or the existing McMahons workshop, and the amenities facility will be housed in portacabins immediately adjacent to existing surface amenities. These facilities are small scale in nature and will blend in with existing surface facilities.

Any surface works and structures will barely be discernible, particularly within the context of existing mining operations and activities. Accordingly, there are no landscape and visual effects associated with the MEP.

4.9 Effects of the minor amendments and administrative variations

In addition to the variations to conditions 19 and 20 discussed above, several minor amendments are proposed to the Mining Licence to provide for the MEP. This includes changes to the introductory ambit of the Mining Licence and a limited number of conditions to explicitly provide for the MEP. In addition, several minor amendments are sought to address typographical errors, clarify conditions and/or to reflect the current situation.

As described in section 1.4, these amendments relate to the modification of existing wording to provide for the MEP and/or are largely administrative in nature and are proposed so that ML 32 2388 reflects the current situation and pit design. Beyond the effects assessed in the section above, these variations to ML 32 2388 will have no environmental effect.

5 Consultation

NWG released details on the Golden Link project which incorporates the MEP on 23rd August 2011. A letter and information including project details was delivered to 111 properties located within the general vicinity of the MEP, to the north and northwest of the Martha open pit, on this date (refer Appendix C). MEP information was also delivered to an additional 441 properties in Waihi East along with material specific to the Correnso underground proposal.

NWG staff have followed up the initial delivery of information by door knocking at the 111 houses in the vicinity of the MEP. In addition, NWG has opened a Golden Link information office in Seddon Street where staff are available to answer questions and take on board suggestions.

Information packs have been sent to stakeholder groups and other interested parties including Waihi Community Vision, Vision Waihi Trust, school principals and iwi groups. Community meetings have been held with Waihi GreyPower, NWG contractor and supplier representatives, real estate agencies, Waihi East School, Waihi Fire Service, Waihi Probus Group and Waihi Visitor Centre volunteers. Local and national government representatives as well as industry bodies have also been briefed on the projects.

Key issues that have been raised in the course of this consultation include noise and dust, property values / impact on ability to sell house, blasting and vibration. Noise, air quality and vibration effects are assessed in Section 4 above. Effects on property values are not an 'environmental effect', however in any case it is noted that previous studies including those undertaken for the Trio project have demonstrated that the Waihi residential market as a whole has not suffered as a result of mining activity within the town and has generally benefited from it (Townhend Cullen Associates, December 2010). Further, the MEP is located entirely below the open pit and all development is located within the boundary of ML 32 2388. There is no development below residential properties.

The MEP and Correnso underground proposal have also been the subject of extensive media coverage at a local level, as well as at a regional and national level.

Considering the small-scale nature of the MEP (i.e. the quantities involved over the 2 year project life are the approximate equivalent of one calendar month of open pit activities) and the fact that for the most part exploration and mining operations and activities are located underground, this level of consultation is considered to be more than adequate for a project of this nature. This is further supported by the fact that the MEP is located entirely within the boundary of ML 32 2388 and the pit rim on land that is zoned Martha Mineral.

6 Conclusion

ML 32 2388 already provides for minor underground mining and exploratory work. While NWG is applying for a variation to ML 32 2388 to provide for the MEP, the nature and scale of the work associated with the MEP is already contemplated in the Mining Licence.

The MEP is considered to represent the efficient use and management of New Zealand's mineral resources, particularly in that it is an exploration project to determine whether mining the remnant resource within an existing mining area, the Martha open pit, is viable. As assessed in Section 4 above, the potential adverse effects on the environment of the proposed variations are no more than minor.

NWG and its predecessors have successfully managed mining operations in close proximity to a residential and urban environment for over 20 years, and have operated the Martha Mine with a high level of compliance with the existing conditions of consent and related management plans. The same careful and proactive approach to monitoring and environmental management will continue throughout the life of the MEP.

7 Applicability

This report has been prepared for the benefit of NWG with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose without our prior review and agreement.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

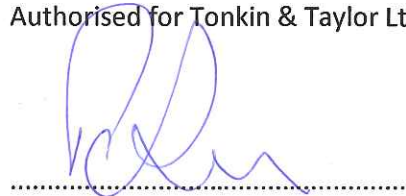
Report prepared by:



Karen Baverstock

Senior Resource Management Planner

Authorised for Tonkin & Taylor Ltd by:



Peter Roan

Director

Appendix A: Schedule of existing consents and authorisations

MARTHA MINE AND EXTENDED PROJECT

Table 1: Mining licences and key land use consent

Type	Reference	Summary	Consent authority	Expiry date
Mining licence	32 2388	Original mining licence to open the mine granted in 1987 – applies only to land within Martha Mineral zone	Ministry of Energy	16/07/2017
Variations to mining licence	32 2388	Variations to the mining licence granted on 13/10/99 for the Extended Project.	Ministry of Energy	16/07/2017
HDC land use consent	Env Court Decision A114/99 Land use consent 97/98 – 105	Land use consent for Extended Project mining operations outside of the area subject to the mining licence	HDC	15/06/2019

Table 2: Waikato Regional Council resource consents – Mine pit activities

Type	Reference	Summary	Expiry date
Land use (vegetation removal) consent	Env Court Decision A114/99^ Land use consent 971282	To remove up to 20 hectares of vegetation from Areas A and B	15/07/17
Land use (earthworks)*	Env Court Decision A114/99 Land use permit 971283	To carry out earthworks and contouring of land of up to 82 hectares for mining, mining operations and rehabilitation in Areas A and B	15/07/17
Discharge permit (to land)	Env Court Decision A114/99 Discharge permit 971284	To place ore, waste rock, topsoil and tramp material in stockpiles in Area B and noise bunds created in Areas A and B	15/7/17
Water take (ground)	Env Court Decision A114/99 Water permit 971286	To dewater the pit (Areas A and B) and surrounding areas at a rate of 15,000m ³ of surface water and groundwater per day, at or about NZMS260 T13:620 202	15/07/17
Water permit (diversion)	Water permit 1339020	To divert clean stormwater in the Surface Facilities Area (at Martha Mine)	2017 (to be confirmed)
Land use permit (culvert)	Land use permit 930088	To construct a culvert for access purposes at Williams St (mine pit)	08/06/28

Type	Reference	Summary	Expiry date
Discharge permit (air)+	Env Court Decision A114/99 Discharge permit 971281	Air permit to discharge contaminants to air for all of the site including the process plant area including dust, carbon dioxide, waste heat, water vapour, vehicle fumes and other minor fugitive emissions from mining operations, from Area D only smoke from the burning of tramp material	15/07/17

^ Environment Court decision on the Extended Project. * Also relevant to rehabilitation. + Applies to mine pit and process and waste areas.

Table 3: Waikato Regional Council 'rehabilitation specific' resource consents for mine pit area

Type	Reference	Summary	Expiry date
Water permit (surface water take)	Env Court Decision A114/99 Water permit 971287	To take up to 15,000m ³ /day of surface water from the Ohinemuri River at or about NZMS260 T13:634-189 (Area E3), for the purposes of accelerating the filling of the lake	Commences 13/10/11. Lapses 13/10/13. Expires 13/10/21
Discharge permit	Env Court Decision A114/99 Discharge permit 971289	To discharge up to 15,000m ³ /day of surface water from the Ohinemuri River into the pit (Areas A and B), to accelerate the filling of the lake following mining	Commences 13/10/11. Lapses 13/10/13. Expires 13/10/21
Land use permit (intake structure)	Env Court Decision A114/99 Land use permit 971288	To construct and place a water intake structure in the Ohinemuri River at or about NZMS260 T13:634-189 (Area E3), for the purposes of taking water to accelerate the filling of the lake	Commences 13/10/11. Lapses 13/10/13. Expires 13/10/21
Water permit (diversion)	Env Court Decision A114/99 Water permit 971290	To divert groundwater during the construction of the pit lake outlet structure (Areas H and I)	Commences 13/10/11. Lapses 13/10/13. Expires 13/10/21
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971291	To discharge groundwater diverted during the construction of the pit lake outlet to the Mangatoetoe Stream, at or about NZMS260 T13:614-197 (Area I)	Commences 13/10/11. Lapses 13/10/13. Expires 13/10/21
Land use permit (outlet structures)	Env Court Decision A114/99 Land use permit 971292	To place and use outlet structures in the Mangatoetoe Stream, at or about NZMS260 T13:614-197 to allow the discharge of lake overflow water to enter the stream (Area I)	Commences 13/10/11. Lapses 13/10/13. Expires 13/10/46
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971293	To discharge overflow from the lake via an outlet structure and channel to the Mangatoetoe Stream, at or about NZMS260 T13:614-197, at a max rate of 2,700 l/s and at an average rate of 13 l/s (Area I)	Commences 13/10/21. Lapses 13/10/23. Expires 13/10/56

Table 4: Waikato Regional Council resource consents – Conveyor, Process and Waste Areas

Type	Reference	Summary	Expiry date
Land use consent (earth works)*	Env Court Decision A114/99 Land use permit 971294	To carry out earthworks of up to 383 hectares associated with the construction of Storage 1A, haul and service roads, silt and collection ponds, the extension of the conveyor, stockpiles and post – mining rehabilitation in Area D	30/04/34
Discharge permit (to land)	Env Court Decision A114/99 Discharge permit 971295	To place ore, waste rock, topsoil and other materials in stockpiles within Area D	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971296	To divert natural water (farm run-off and intercepted groundwater) around Oxidised Stockpile N2 at the northern end of Storage 2 (Area D)	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971297	To discharge natural water (farm run-off and intercepted groundwater) diverted around Oxidised Stockpile N2 at the northern end of Storage 2 (Area D), into an unnamed tributary (Unnamed Stream 1) of the Ohinemuri River	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971298	To divert an unnamed tributary (Unnamed Stream 2) of the Ohinemuri River at the northern end of Storage 2 (Area D)	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971299	To divert part of an unnamed tributary (Unnamed Stream 1) of the Ohinemuri River by way of culverting at the northern end of Storage 2 (Area D)	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971300	To divert natural water (farm runoff and intercepted groundwater around surplus soil stockpiles via the southern diversion drain (Area D)	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Water permit 971301	To discharge natural water (farm runoff and intercepted groundwater), diverted around surplus soil stockpiles via the southern diversion drain, into an unnamed tributary (Unnamed Stream 3) of the Ruahorehore Stream	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971302	To divert an unnamed tributary (Unnamed Stream 3) of the Ruahorehore Stream at or about NZMS260 T13:662-180 around the eastern end of the eastern stockpile (eastern diversion drain) (Area D)	13/10/34
Water permit	Env Court Decision A114/99	To divert natural water (farm runoff and intercepted groundwater) around the eastern side of Storage 1A	13/10/34

Type	Reference	Summary	Expiry date
(diversion)	Water permit 971307	via the southern diversion drain (Area D)	
Discharge permit (to water)	Env Court Decision A114/99 Water permit 971308	To discharge natural water (farm runoff and intercepted groundwater), diverted around the eastern side of Storage 1A via the southern diversion drain, into an unnamed tributary (Unnamed Stream 3) of the Ruahorehore Stream at or about NZMS260 T13:660-179	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971309	To divert natural water (farm runoff and intercepted groundwater) around Storage 2 (and part of Storage 1A) via the northern diversion drain (Area D)	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Water permit 971310	To discharge natural water (farm runoff and intercepted groundwater), diverted around the Storage 2 (and part of Storage 1A) via the northern diversion drain, into an unnamed tributary (Unnamed Stream 2) of the Ohinemuri River	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit 971316	To divert natural water (farm runoff and intercepted groundwater) to the south on the western side of the Process Plant site area within Area D	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Water permit 971317	To discharge natural water (farm runoff and intercepted groundwater), diverted to the south on the western side of the Process Plant site area within Area D, into the Ohinemuri River at or about NZMS260 T13:642-191 (Area E)	13/10/34
Land use permit (ground water monitoring)	Env Court Decision A114/99 Land use permit 3617	Land use consent for the establishment of monitoring bores within Area D	15/06/34
Water permit (groundwater take)	Env Court Decision A114/99 Water permit 971322	To divert and take water from the monitoring bores within Area D	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971311	To discharge settled stormwater from temporary silt ponds within Area D into the Ohinemuri River and the Ruahorehore Stream, at or about NZMS260 T13:645-198, 646-197, 646-196, 641-194, 650-174, 651-173, 653-173, 661-182 and 661-180 (Area E)	13/10/34
Land use permit (structures in water)	Env Court Decision A114/99 Land use permit	To place and use structures across a watercourse for the purpose of constructing a collection pond for the Water Treatment Plant area (Area D)	13/10/34

Type	Reference	Summary	Expiry date
course)	971313		
Water permit (dam)	Env Court Decision A114/99 Water permit 971314	To dam a watercourse for constructing a collection pond for the Water Treatment Plant area (Area D)	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971315	To discharge water from the collection pond to the Ohinemuri River at or around NZMS260 T13:641-195 (Area E)	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971312	To discharge water from the collection ponds within Area D to the Ohinemuri River and to the Ruahorehore Stream at or around NZMS260 T13:642-199, 647-180, 647-179, 654-174 and 659-179 (Area E)	13/10/34
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971318	To discharge treated water from the Water Treatment Plant into the Ohinemuri River via two discharge points located at or around NZMS260 T13:641-194 (Area E1) and 634-188 (Area E2)	13/10/34
Land use permit (structures in water course)	Env Court Decision A114/99 Land use permit 971319	To place and use structures in the Ohinemuri river at or around NZMS260 T13:634-188 for the discharge of treated water from the Water Treatment Plant into the Ohinemuri River (Area E2)	13/10/34
Land use permit (structures in water course)	Env Court Decision A114/99 Land use permit 971320	To place and use structures in the Ohinemuri river at or around NZMS260 T13: 641-194 for the discharge of treated water from the Water Treatment Plant into the Ohinemuri River (Area E1)	13/10/34
Discharge permit (to land)	Env Court Decision A114/99 Discharge permit 971303	To place waste rock and other material onto the ground to establish Storage 1A (Area D)	13/10/34
Discharge permit (to land)	Env Court Decision A114/99 Discharge permit 971304	To discharge tailings into Storage 1A (Area D) (an application to change the conditions of this and other consents is in progress)	13/10/34
Discharge permit (to land)	Env Court Decision A114/99 Discharge permit 971305	To discharge seepage from Storage 1A into the ground (Area D)	13/10/34
Water permit (diversion)	Env Court Decision A114/99 Water permit	To divert groundwater from within the footprint of Storage 1A into subsoil drains (Area D)	13/10/34

Type	Reference	Summary	Expiry date
	971306		
Discharge permit (to water)	Env Court Decision A114/99 Discharge permit 971323	To discharge water from the tailings ponds (Area D) following rehabilitation into an unnamed tributary (Unnamed Stream 2) of the Ohinemuri River, at or around NZMS260 T13:650-192 (NWG has recently activated this consent and are discharging water from the Storage 2 pond).	13/10/54 (or earlier on request)
Land use permit (earthworks & trenching)	Env Court Decision A114/99 Land use permit 971321	To carry out earthworks, trenching and other activities in watercourses necessary for the construction of the pipeline corridor and the laying of pipes within Area F	13/10/34

Table 5: Earlier (non Extended Project) consents

Type	Reference	Summary	Expiry date
Water permit	Water permit W1750	To construct an impoundment structure for containment of tailings (disposal area)	1/10/26
Discharge permit (to water)	Discharge permit W1761	To discharge water beneath Storage Area 2 and the holding pond.	1/10/26
Water permit (surface water take)	Water permit 114554	To take up to 430m ³ per day of water from the Ohinemuri River for elution water purposes at Baxter Rd (process plant area)	15/07/17
Water permit (dam)	Water permit W1749	To dam watercourses at Waihi (disposal area)	1/10/26
Land use permit (works in a watercourse)	Land use permit 103820	To undertake stabilisation works on an existing river crossing of the Ohinemuri River (below disposal area)	31/08/35
Water permit	Water permit W1751	To dam unnamed watercourses to construct a perimeter bund and access road (disposal area)	1/10/26
Conveyor consents			
Discharge permit (to water)	Discharge permit W1743	To discharge intercepted groundwater and stormwater at Waihi (near conveyor Black Hill)	24/07/17
Discharge permit (to water)	Discharge permit W1742	To discharge clean stormwater from surface facilities, overland conveyor trench and portal at Union Hill tunnel into Eastern Stream.	24/07/17

*Also relevant to rehabilitation.

FAVONA

- Mining Permit 41 808 was granted by Crown Minerals pursuant to the Crown Minerals Act 1991 on 22/3/04 for a period of 25 years and expires on 22/3/29. This covers an area of approximately 121.4 ha.

Table 6: Favona Decline Consents

Type	Ref.	Summary	Expiry date
Mining licence	32 2388	Variations to the mining licence granted on 11/02/03 for Favona	16/07/2017
HDC land use consent		Construct and use of exploration decline within Favona Exploration Project Area.	Granted for an unlimited duration
Water permit (groundwater take)	108554	To take groundwater by passive means for dewatering exploration decline.	21/04/08
Discharge permit (to land)	108556	To discharge treated wastewater from the treatment plant to ground to flood the exploration decline.	21/04/09

Table 7: Favona Mine Consents

Type	Ref.	Summary	Expiry date
Mining licence	32 2388	Variations to the mining licence granted on 11/02/03 for Favona	16/07/2017
HDC land use consent	Consent order ENV A00009/04 (19 Aug 04)	Mining and mining activities for Favona Underground Mine Project.	Unlimited term
Discharge permit (to air)	109741	To discharge contaminants (dust, CO ₂ , blast & exhaust fumes) to air from the mine portal, vent shafts, and project area.	31/12/28
Water permit (groundwater take)	109742	To take groundwater and mine water for dewatering the underground mine.	31/12/28
Water permit to divert and discharge water	109743	To divert and discharge ground and surface water from around the project area.	31/12/28
Discharge permit (to land)	109744	To discharge waste rock and ore onto land in temporary surface stockpiles and to discharge seepage from the temporary stockpiles.	31/12/28

Discharge permit (to land)	109745	To discharge waste rock onto land underground in the project area as backfill and to allow degraded quality groundwater to discharge from the flooded workings into surrounding ground post closure.	31/12/28
Discharge permit (to land)	109746	To discharge treated mine water from the treatment plan to ground in assoc. with flooding the underground mine on completion of the project.	31/12/28

TRIO

Table 8: Trio Development Project Consents

Type	Ref.	Summary	Expiry date
Mining licence	32 2388	Variations to the mining licence granted on 27/07/11 for Trio	16/07/2017
HDC land use consent	RC-15735	To develop land under and around Union Hill, Waihi, between the existing Martha mine and water treatment plant adjacent to the Favona mine as part of the Trio Development Project.	Unlimited term
Land use consent and discharge permit (to land)	121416	Place waste rock (overburden) into land underground as backfill, and to discharge groundwater from the flooded workings into the ground following closure, all associated with the Trio Development Project.	3/12/28
Water permit (surface water take)	121417	Take up to 15,000 cubic metres of water per day from the Ohinemuri River associated with the flooding of the Trio Development Project underground workings on closure (note: cannot be exercised simultaneously with 121695 or 971287).	13/10/25
Discharge permit (to land)	121418	Discharge untreated and treated water into ground for the purposes of flooding the underground workings following closure, all associated with the Trio Development Project.	31/12/28
Water permit (groundwater take)	121446	Underground dewatering of the underground workings (including groundwater and mine water) associated with the Trio Development Project and any associated authorised mine.	31/12/28

Table 9: Trio Underground Mine Consents

Type	Ref.	Summary	Expiry date
Mining licence	32 2388	Variations to the mining licence granted on 27/07/11 for the Trio Project.	16/07/2017
HDC land use consent	RC-15774	To develop land under and around Union Hill, Waihi, between the existing Martha mine and water treatment plant adjacent to the Favona mine as part of the Trio Underground Mine.	Unlimited term
Land use consent (deposit) and discharge permit	121694	Place waste rock (overburden) into land underground as backfill, and to discharge groundwater from the flooded workings into the ground following closure, all associated with the Trio Underground Mine Project.	31/12/28
Water permit (surface water take)	121695	Take up to 15,000 cubic metres of water per day from the Ohinemuri River associated with the flooding of the Trio Underground Mine Project underground working on closure (note: cannot be exercised simultaneously with 121417 or 971287).	13/10/25
Discharge permit (to land)	121696	Discharge untreated and treated water into ground for the purposes of flooding the underground workings following closure, all associated with the Trio Underground Mine Project.	31/12/28
Discharge permit (to air)	121697	To discharge contaminants to air from a vent shaft associated with the Trio Underground Mine Project.	31/12/28

Appendix B: Technical assessments

1. Settlement effects: Engineering Geology Ltd.
2. Geotechnical investigations and pit wall stability: PSM Ltd and Parrott (Newmont Technical Services, Perth).
3. Geochemistry of ore and tailings: URS Ltd.
4. Noise: Hegley Associates Ltd.
5. Vibration: Heilig & Partners Pty. Ltd.
6. Air quality: Kevin Rolfe & Associates Ltd.

Appendix C: Consultation information

Appendix D: Certificates of Title for the MEP Area