OCEANAGOLD
WAIHI OPERATION

Correnso/SUPA/MDDP/Project Martha Stability 2020 Annual Report

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1. PURPOSE

The purpose of the OceanaGold Waihi (OGW) Correnso/SUPA/MDDP Stability Annual Report is to comply with the requirements of the following Hauraki District Council (HDC) consent conditions:

- LUC 202.2012 (Correnso) Condition 25 – Surface Stability;
- LUC 202.2016 (SUPA) Condition 19 – Surface Stability;
- LUC 202.2017 (MDDP) Condition 25 – Surface Stability; and
- LUC 202.2018 (Project Martha) Condition 75 – Underground and Surface Stability.

Please note that the anniversary for the Correnso report was originally 20 December, the date in 2013 when the first blast was initiated in the Correnso Consent Area. In agreement with HDC, this anniversary was revised to 31 December to coincide with other calendar year data collation and reporting. The agreed anniversary for the SUPA, MDDP and Project Martha stability reports was also agreed to be 31 December to allow the information from the linked projects to be amalgamated into one combined report.

1.1 AS REQUIRED BY CONDITION 25 OF LUC 202.2012 (CORRENSO)

25. The consent holder shall provide to the Council on an annual basis (within one month of the agreed anniversary) a report:
- *a) Describing the location, depth height and volume (m³) of stopes; and a summary of the data required by Condition 26 regarding unfilled stope voids; and*
- *b) Describing the lengths of development that, due to the encountered geotechnical conditions where multiple levels overlap, will require backfilling prior to mine closure; and*
- *c) Describing the backfilling and compaction associated with each stope; and*
- *d) Describing the ground conditions revealed by the mine excavations; and*
- *e) Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in Condition 23 and the outcomes of such measures; and*
- *f) Describing the location and depth of exploratory drives;*
- *g) Confirming that the extent of the mining works is confined to CEPPA, as defined in Figure 1.*

1.2 AS REQUIRED BY CONDITION 19 OF LUC 202.2016 (SUPA)

19. The consent holder shall provide to the Council an annual report (within one month of the agreed anniversary established in condition 4 or as otherwise agreed in writing by the Council):
- *a) Describing the location, depth height and volume (m³) of stopes; and a summary of the data required by Condition 20 regarding unfilled stope voids; and*
- *b) Describing the lengths of development that, due to the encountered geotechnical conditions where multiple levels overlap, will require backfilling prior to mine closure; and*
- *c) Describing the backfilling and compaction associated with each stope; and*
- *d) Describing the ground conditions revealed by the mine excavations; and*
- *e) Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in Condition 15 and the outcomes of such measures; and*
- *f) Describing the location and depth of exploratory drives;*
- *g) Confirming that the extent of the mining works is confined to SUPA, as defined in Figure 1.*

These reports may be prepared in conjunction with similar reports prepared in accordance with the consent conditions applying to the Correnso Underground Mine.

1.3 AS REQUIRED BY CONDITION 25 OF LUC 202.2017 (MDDP)

25. *The consent holder shall provide to the Council an annual report (within one month of the agreed anniversary established in condition 4 or as otherwise agreed in writing by the Council):*
    a) *Describing the location and depth of the exploratory drives and any intentional interceptions of historic development, rises and access drives; and*
    b) *Describing the lengths of development that, due to the encountered geotechnical conditions or where multiple levels overlap, will require backfilling prior to MDDP closure; and*
    c) *Describing the ground conditions revealed by the MDDP excavations using key identification criteria as defined by an independent geotechnical specialist and*
    d) *Describing the monitoring and measures adopted to ensure ground surface stability, particularly as provided for in condition 21 and the outcomes of such measures; and*
    e) *Confirming that the extent of the underground works is confined to the MDDP area as defined in Figure 1.*

    Advice Note:
    These reports may be prepared in conjunction with similar reports prepared in accordance with the consent conditions applying to the CEPPA and SUPA.

1.4 AS REQUIRED BY CONDITION 74 OF LUC 202.2018 (PROJECT MARTHA)

74. *The consent holder shall provide to the Council on an annual basis (within one month of an agreed anniversary date) a report:*
    a) *Describing the location, depth height and volume (m3) of stopes and a summary of the data required by Condition 75 regarding unfilled stope voids; and*
    b) *Describing the lengths of the development that, due to the encountered geotechnical conditions or where multiple levels overlap, will require backfilling prior to mine closure; and*
    c) *Describing the backfilling associated with each stope; and*
    d) *Describing the ground conditions revealed by the mine excavations; and*
    e) *Describing the monitoring and measures adopted to ensure surface stability, particularly as provided for in Condition 71 and the outcomes of such measures; and*
    f) *Describing the location and depth of exploratory drives; and*
    g) *Confirming that the extent of the mining works is confined to the Project Martha area as defined in Plan A of Appendix 2.*

2. LOCATION, DEPTH, HEIGHT AND VOLUME OF STOPES

(Consent conditions: Correnso c.25a, SUPA c.19a)

Stoping activities during 2020 were concentrated around the upper and lower parts of Correnso, the central component largely having been mined out.

The main stoping methodology is Modified Avoca (refer to Appendix A for a graphical representation). This method requires a ‘bottom-up’ mining technique, whereby each successively higher stope is mined out by driving on the surface of the previously laid backfill

of underlying stopes. This technique also requires development firstly to the extremities of the ore body, then mining back towards the access points. Schematics of Correnso mining operations for the period are presented in Figure 2.

Some areas of the Louis and upper levels of the Correnso orebodies have been extracted using an Overhand Cut and Fill (flat backing) method and are filled after the ore is extracted. Specific narrow-vein single-boom jumbos, air-legs, production drills and boggers have been introduced to work in these confined 2.5 to 3m wide areas.

A crown pillar at about 795 mRL separates the main Correnso workings and Correnso Deeps. The pillar is comprised of 5m thick cemented rock fill (CRF) through most of northern Correnso; an intact remnant rock pillar separates the workings in the south.

Stope extraction began in mid-2015, with production continuing through 2020. At any time, multiple stopes are in various states of the production cycle (drilling, blasted stocks, bogging, and backfilling). This means that some stopes may have open voids at the end of the month. By the end of the reporting period, 573,288 m³ of stope volume had been extracted, with 573,188 m³ backfilled (Figure 1). The upper level of mining remained at the 965 level on the Daybreak Vein. The upper level of Correnso was increased from the 928 level to the 942 level during 2020 to facilitate access to Correnso Upper. The mine was deepened during 2019 to extract lower levels of Correnso below 725 mRL, and at the end of 2020 the lowest level in the mine remains at approximately 705 mRL.

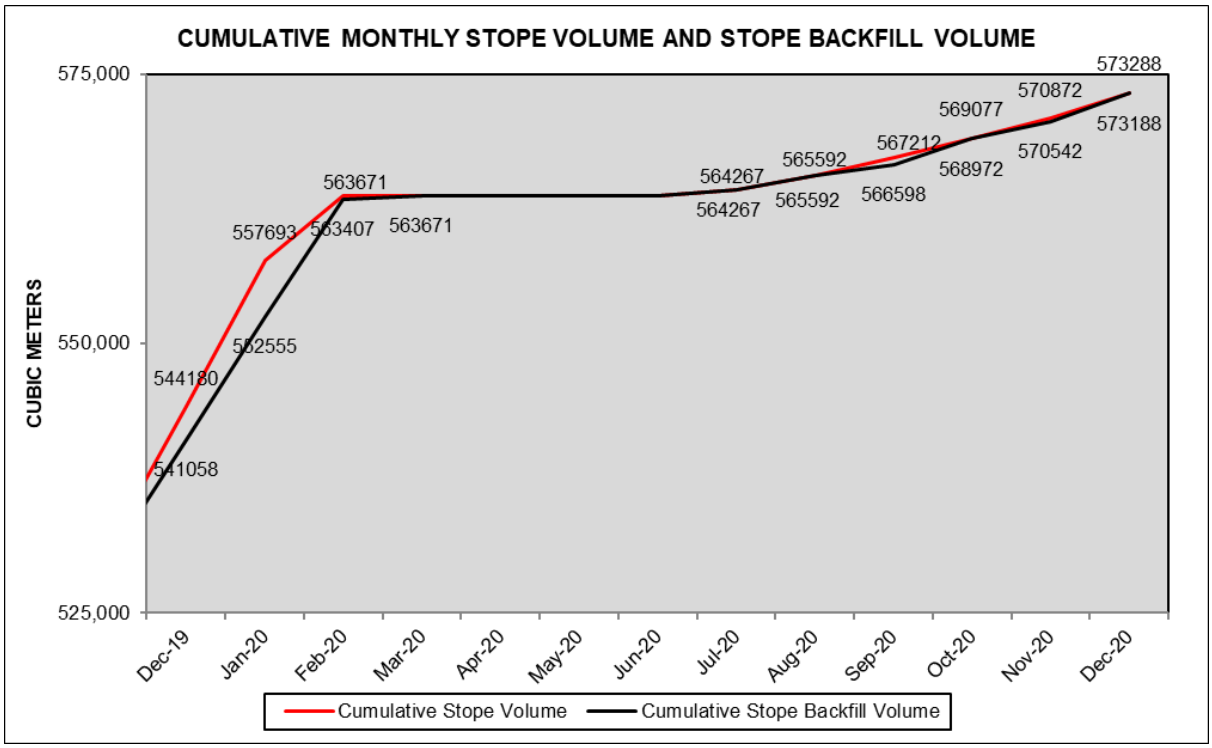


Figure 1: Cumulative monthly stope voids and backfill volumes 2020
Note: No stoping or backfilling for Project Martha was undertaken during the reporting period.

As in previous years, stope design during the period primarily consisted of 5 to 6 m wide drives with up to 15 m stope panels between the drives. In the upper levels of Correnso, a 10 m stope height was the maximum, limited to an extent by blast vibration limits; however, the deeper levels of Correnso are less constrained allowing an increase in level separation. The maximum void height is 25 m in the area of the mine termed Correnso Deeps; made up of the

15 m stope and two 5 m drives (one above and one below the stope). The maximum void height through the rest of Correnso and SUPA was 20 m.

No stoping occurred in the Project Martha project area during the reporting period.

3. DEVELOPMENT & EXPLORATION DRIVES

(Consent conditions: Correnso c.25b&f, SUPA c.19b&f, MDDP c.25a, Project Martha c.74f)

Areas of the mine in which development occurred during 2020 are:

- Correnso Upper (predominantly air-leg drives);
- Louis;
- Martha Underground access drives.

Figures 3 to 5 indicate development progress across the operations as at 31 December 2020.

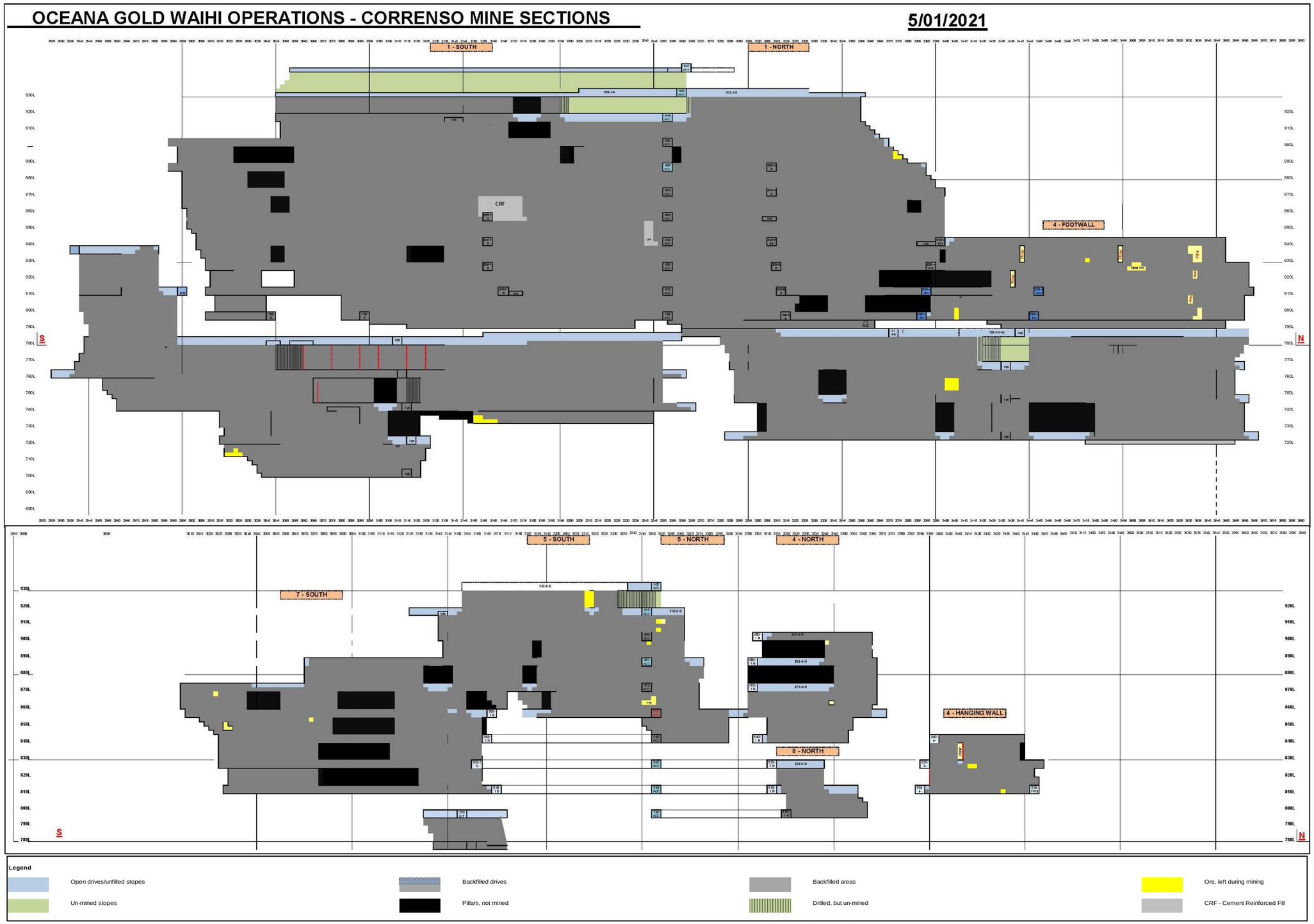


Figure 2: Schematic of Current Long Section of Correnso Veins

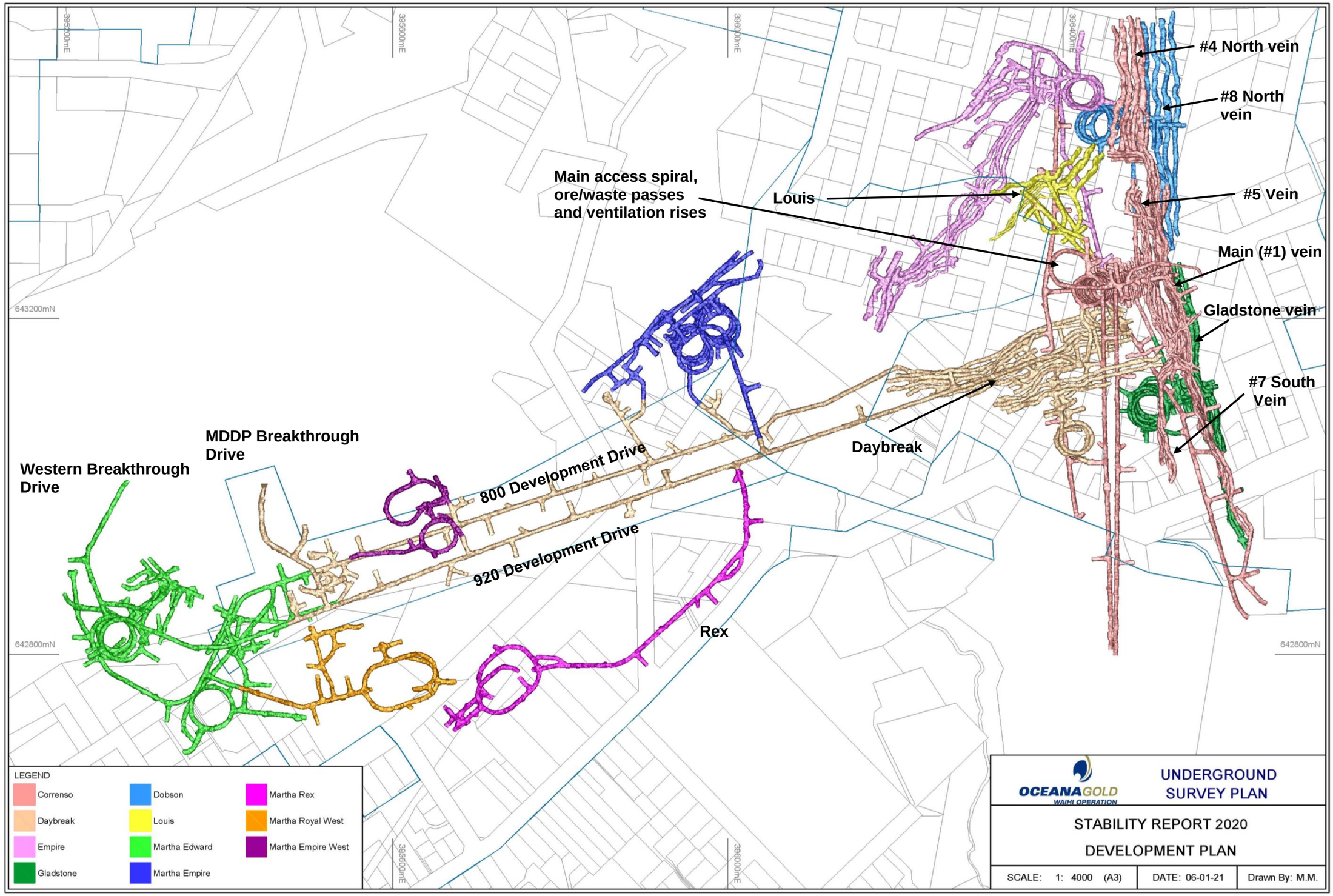


Figure 3: Correnso Development – Plan View (overlaying property boundaries)

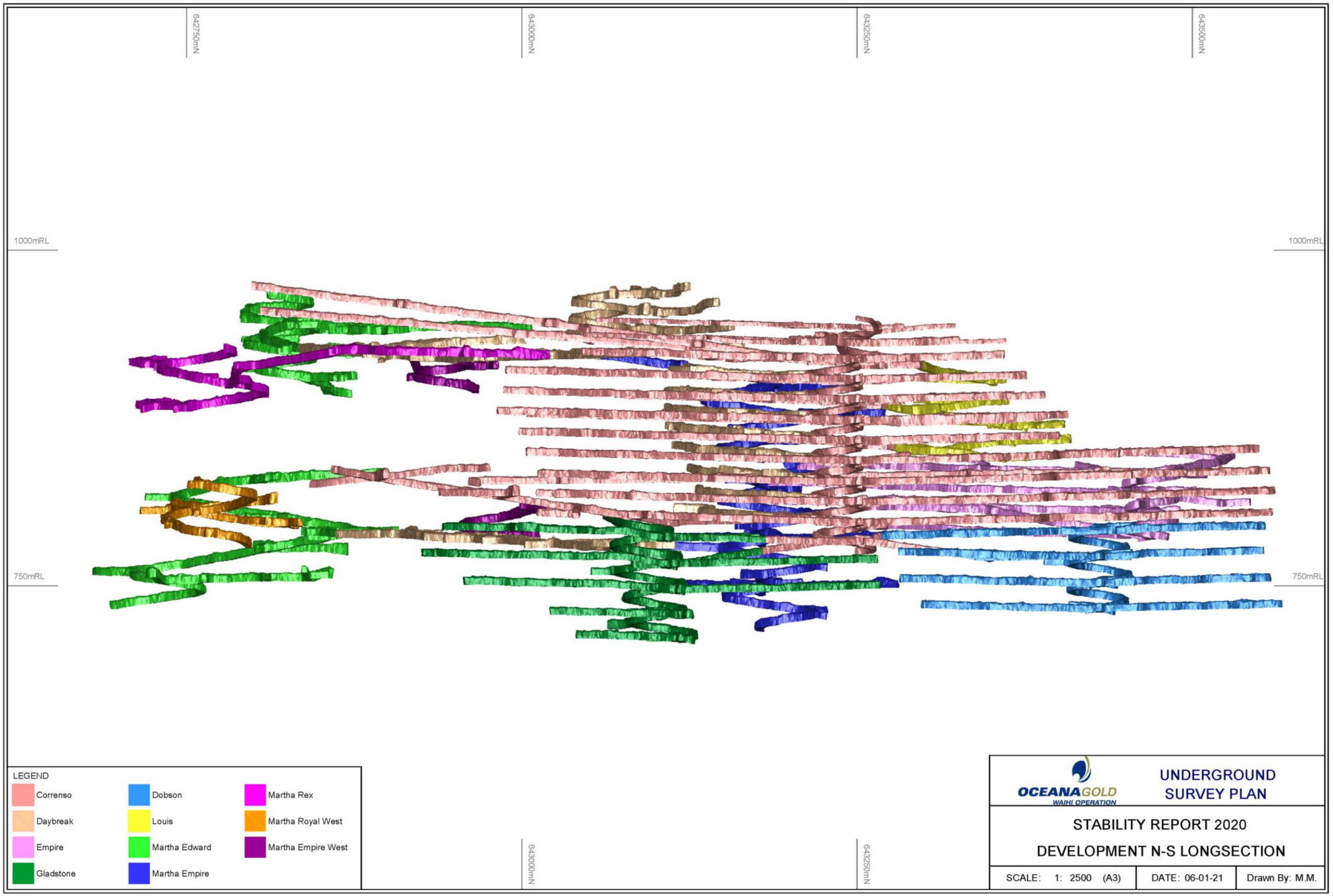


Figure 4: Development – Long Section View (left to right: south to north)

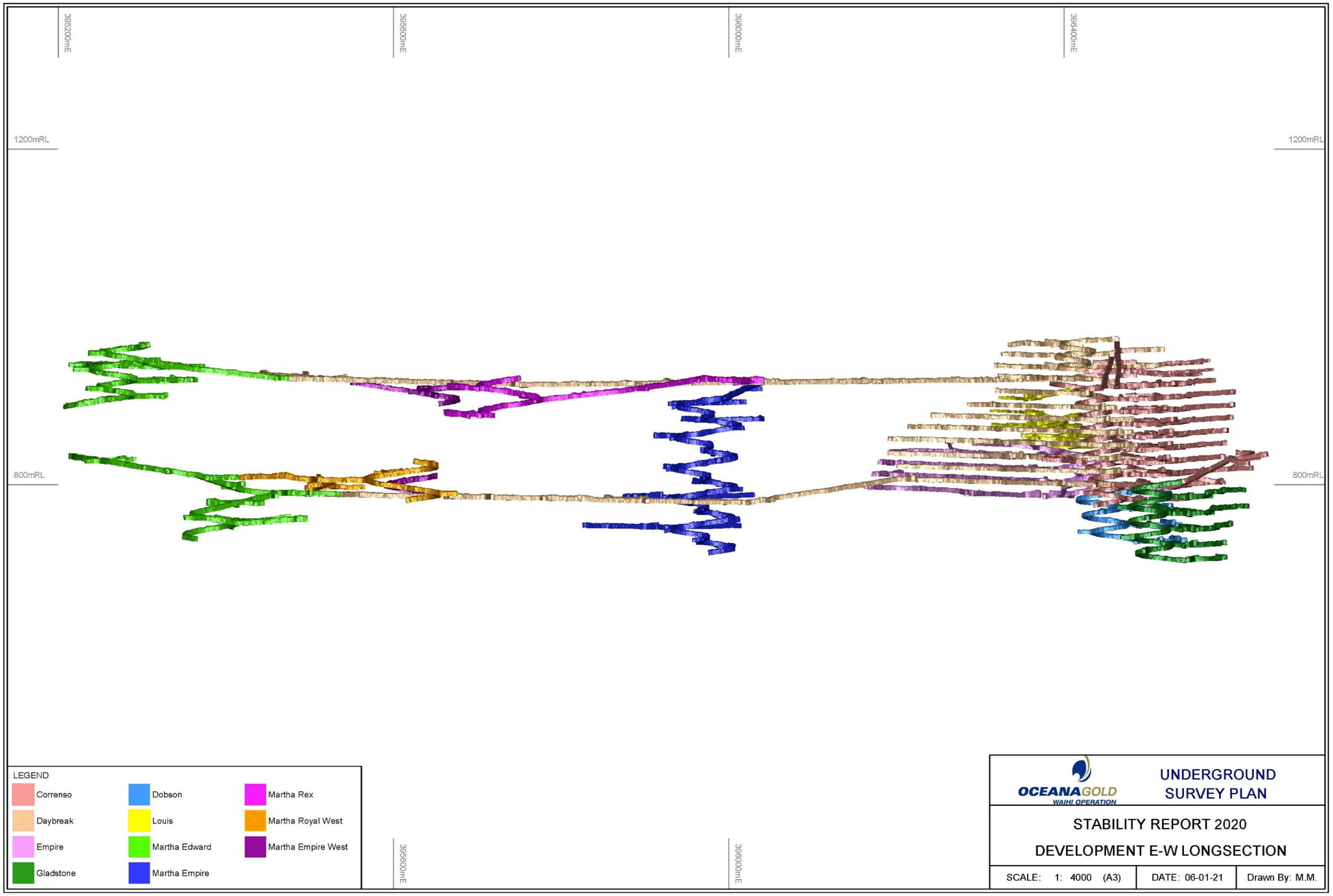


Figure 5: Development – Long Section View (left to right: east to west)

4. BACKFILLING AND COMPACTION

(Consent conditions: Correnso c.25c, SUPA c.19c, MDDP c.25b, Project Martha c.74c)

All stopes extracted to date are backfilled as is dictated by the mining method and conditions. Compaction occurs during backfilling by the machine placing the fill in the stope, then continues with subsequent operations of heavy machinery on top of the backfill. Historically this gives good compaction and the high clay-content of the fill provides a good binding medium.

Extensions of drives beyond stoped areas were also backfilled.

5. GROUND CONDITION REVEALED BY EXCAVATIONS

(Consent conditions: Correnso c.25d, SUPA c.19d, MDDP c.25c, Project Martha c.74d; Consent conditions: Correnso c.25b, SUPA c.19b, MDDP c.25b, Project Martha c.74b)

Ground conditions encountered were mostly as expected. Summary descriptions for the separate areas are given below. The capitalised descriptors Very Poor, Poor, Fair, Good, Very Good are the NGI (Barton, 1974) Q-value rock mass classifications based on a combination of the blockiness of the rock mass, the frictional properties of the joints and the stress environment.

The upper levels of Correnso, above 915 level, are in Good to Very Good ground conditions. Development has been mostly using air-leg equipment and the drives are of significantly smaller dimensions than below 915.

Development was carried out on southern extensions of Correnso on the 815 and 840 levels. Ground conditions were mostly Good to Very Good. There were no areas of significantly poorer ground.

Louis is a relatively shallow-dipping vein(s) trending northeast towards Correnso North, dipping southwest. Host rock conditions are generally Good or better.

The Daybreak 800 drive was extended west during 2019 to access the deeper levels of the Edward Vein system. The 800 Edward Incline and Decline commenced. Apart from persistent moderate oxidation on joints, ground conditions were mostly favourable. Shotcreting was carried out locally through the more intensely oxidised areas as a corrosion-preventative measure but for the most part no secondary support has been needed.

The upper Edward development encountered significantly poorer ground conditions. The rock mass is strongly jointed and oxidised with the most intense oxidation associated with numerous vein structures and late-stage joints. Local exsolution cavities occur within the zones of veining and discontinuous shear zones are not uncommon in the sections of poorer ground. Extensive secondary support (shotcrete / in-cycle fibrecrete and cable bolts) have been installed as additional reinforcement during development. Rock mass classifications are locally Very Poor and mostly not better than Fair.

Development for the Empire lodes from both the 920 and 800 levels is in consistently favourable rock mass conditions: Good to Very Good. No secondary support has been required beyond standard installation practices.

A ventilation drive was developed from the 920 DD to break-out into the open pit at around 920 RL in January 2019. The rock mass became increasingly oxidised close to the pit walls, although the oxidation is still strongly associated with veining. Close to the breakthrough the western end of a backfilled Edward stope was intersected, slightly beyond its position inferred from old mine plans. The stope was 3 – 4 m wide and development through the stope fill utilised spiling bars, double mesh and

two shotcrete layers. Either side of the stope the rock mass was relatively competent. The breakthrough drive was shotcreted from 50 m before breakthrough and cable bolted from 20 m before breakthrough as per Council-approved breakthrough support regimes.

Development of the Rex Access intersected a 40 m wide intensely sheared fault zone - most likely an up-dip termination of the Royal Vein. Historical mine plans record the Royal Vein as being cut-off by a “blue shear” and the up-dip projection is approximately consistent with the position encountered, albeit the shear zone is significantly wider than expected. Q-value classifications are Very Poor to Extremely Poor through the most intensely sheared sections. Ground conditions required in-cycle fibrecrete across the 40 m section of faulted ground plus cable bolts on 2 m ring spacings.

Unless ground conditions have been encountered that create geotechnical instability, or where multiple levels overlap, development areas are not expected to require backfilling prior to closure.

6. MONITORING AND MEASURES FOR STABILITY

(Consent conditions: Correnso c.25e, SUPA c.19e, MDDP c.25d, Project Martha c.74e)

Multipoint Borehole Extensometers (MPBX) were previously installed during the early stages of mine development on the Correnso 795, 810, 825, 855 and 900 levels and on the Daybreak 938 level. The instruments were all installed in the intersections between the access and the main ore-drives as representing the widest openings on the vein, as well as being the areas expected to see the most induced stresses as mining retreats towards the accesses. All the instruments were progressively destroyed as stoping progressed with none showing any evidence of stress-related displacements before they were destroyed.

Similarly, the five 2-anchor “clock-it” extensometers installed into the backs of the 915 level (upper level of the “main” Correnso) were also destroyed by stoping. All the above stope panels have been back filled.

None of the above instruments showed any indications of significant ground movement or stress concentrations.

A series of Clock-its were installed at approximate 10 m intervals into the backs of the Dobson 785 level to monitor the crown pillar between Correnso 795 and Dobson during the final stages of Correnso extraction. As expected, the instruments showed increasing displacement as the remaining pillar diminished with up to 35 mm of movement recorded. As an additional check the drives were regularly point-cloud surveyed. Overall closure of the walls and backs was very minor, and it is likely much of the movement on the clock-its was dilational.

A micro-seismic monitoring system was installed (as per consent conditions: Correnso c.23d, SUPA c.15d, & MDDP c.21c) to provide additional reassurance that mining activity would not be causing instability. Micro-seismicity can be basically described as micro-earthquakes less than 0 magnitude, too small to be felt on surface but detectable by sensitive equipment located underground.

The purpose of the seismic system is to monitor regional stability and the rock mass response to mining activities in the critical areas. Given the shallow depth of stoping and a relatively benign stress regime, the seismic system is not expected to record many non-blasting related seismic events. The maximum horizontal stresses pre-mining at 300m depth are measured at 22 MPa; with maximum vertical stresses (due to depth of the overlying rock) are around 15 MPa. These stresses are well below the 60 to 120 MPa average range of measured strengths of the rock mass that hosts the ore-bodies in the region.

It is generally accepted in industry that event magnitudes of:

Magnitude	Potential impact
mL ≤ 0.0	does not impact on operations
0.0 < mL ≤ 0.5	could potentially impact on operations, but typically marginally.
0.5 < mL ≤ 1.0	prudent to utilises dynamic ground support systems
1.0 < mL ≤ 2.0	could require special energy absorbent support systems
mL > 2	requires specifically designed dynamic ground support systems.

The agreed critical magnitude for Correnso is a conservative ML = -0.5. Any seismic event of ML = -0.5 and above are thus defined as an "anomalous result", and has to be reported to the HDC on a monthly basis and the following details are required:

- Event magnitude and location coordinates;
- Image plot of the seismic events that includes existing openings and significant geological structures; and
- Explanation of the probable cause of the seismic events.

The system was extended during 2018 to monitor SUPA and MDDP areas. Seismic levels remained low throughout 2018 and 2019. There we no reportable seismic events in 2020. The seismic system will be upgraded in early 2021 with geophones being relocated for expanded monitoring to cater for mining activities in Martha Underground and Rex mining regions.

7. MINING CONFINED TO CONSENT BOUNDARIES

(Consent conditions: Correnso c.25g, SUPA c.19g, MDDP c.25e, Project Martha c.74g)

Figure 6 displays the current mine development overlying an aerial projection, with the consent boundaries superimposed. All current works are entirely within the consent boundaries.

Surveying methodology has been previously audited and found to be well within the standards prescribed. This accuracy has been utilised to ensure that works stay conservatively within consent boundaries.

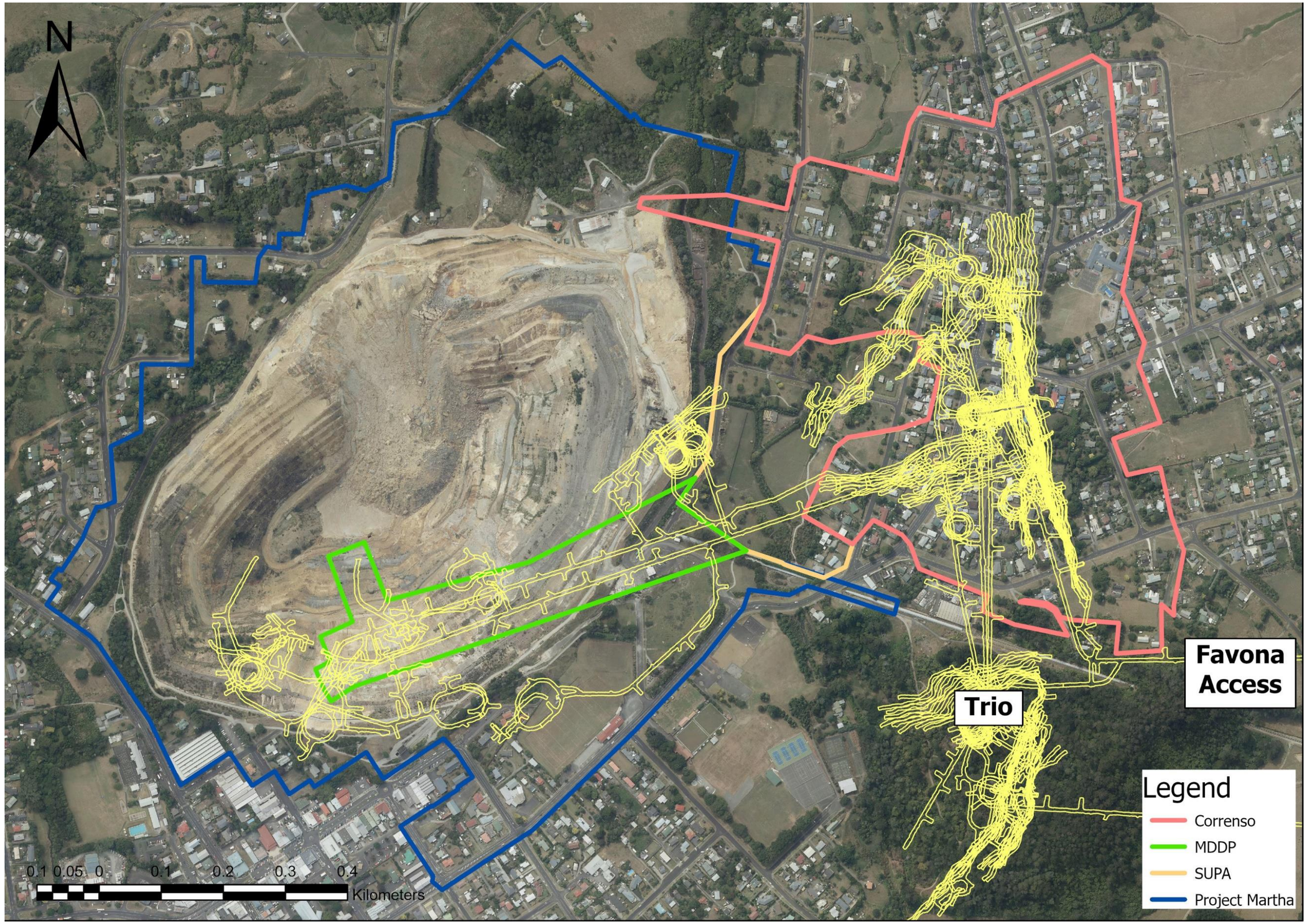


Figure 6: Development – Plan View (with CEPPA, SUPA, MDDP and Project Martha boundaries)

8. REVIEW OF CONSENT CONDITION REQUIREMENTS

a) Mining methods used require stope voids to be backfilled
   All stopes are backfilled as is required for the Avoca mining method (pictorial representation in Appendix A).

b) Limits to upper levels of stoping
   The uppermost level on which stoping has been carried out by the end of 2019 was the 965 Daybreak (950 – 965).

c) Development backfilling where required by geotechnical conditions
   Refer Section 5.

d) Seismic monitoring and rock movement monitoring
   Refer Section 7 above for monitoring systems.

e) Grouting of surface-drilled holes
   No surface-drilled exploration has been undertaken over Correnso during the reporting period.

f) Interception of surface-drilled holes with water flows, and their treatment
   There were no surface drillholes intercepted during 2020 (refer Appendix B).

g) Works confined within consent boundaries
   Refer Figure 8 for work locations.

9. CONCLUSION

OceanaGold believes it has fully complied with Conditions 25 (of HDC LUC 202.2012), 19 (of HDC LUC 202.2016), 25 (of HDC LUC 202.2017) and 74 (of Project Martha HDC LUC 202.2018) and that the risk of ground surface instability is extremely low due to the geology of the area and best practice underground mining methodologies which have been employed.

Please note also that the 6 monthly tilt surveys have continued to show there is no evidence of mining induced surface instability.

10. REFERENCES

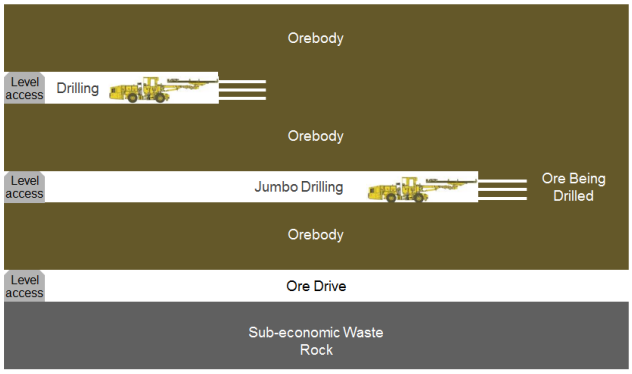
Barton et al (1974). Barton, N., Lien, R. and Lunde, J. 1974. Engineering classification of rock masses for the design of tunnel support. Rock Mech., May. 189-236.

Appendix A

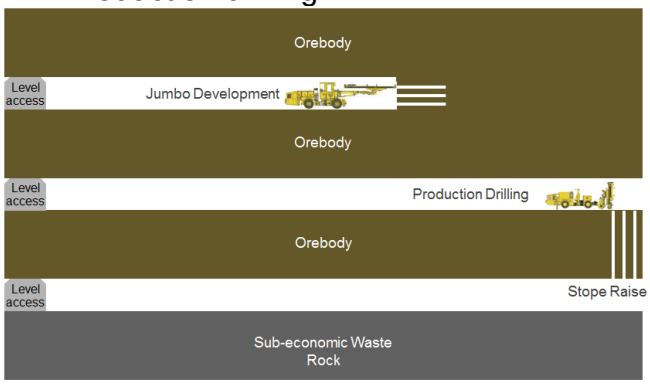
Modified Avoca Technique

Schematic of Modified Avoca Technique

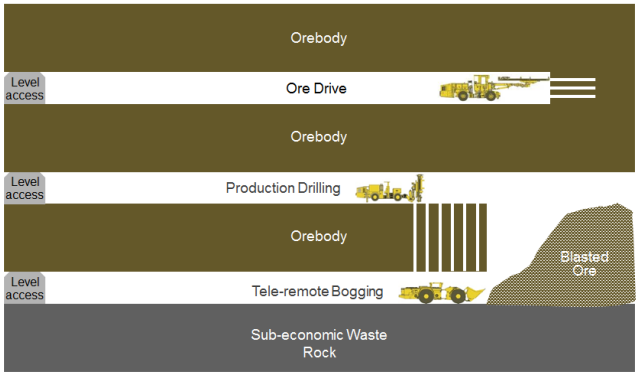
1 Drill drive access



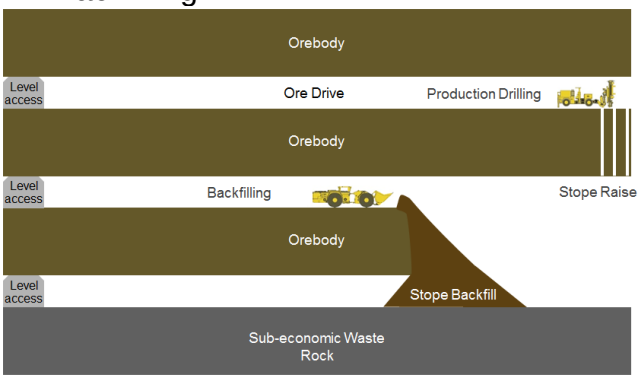
2 Production drilling



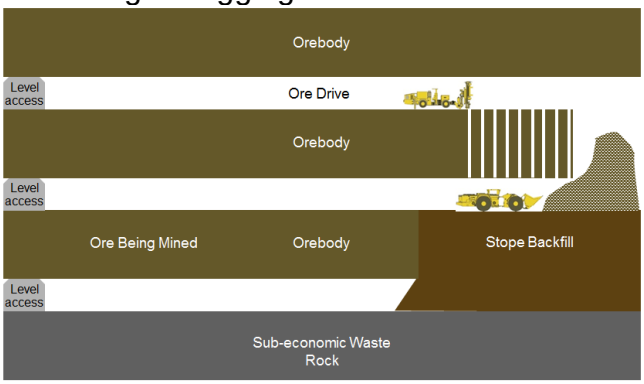
3 Production blasting & bogging



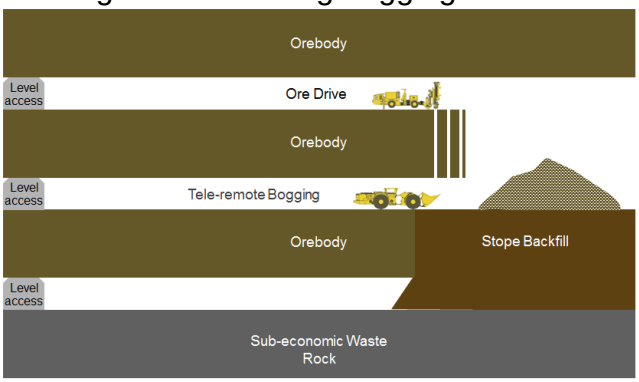
4 Backfilling



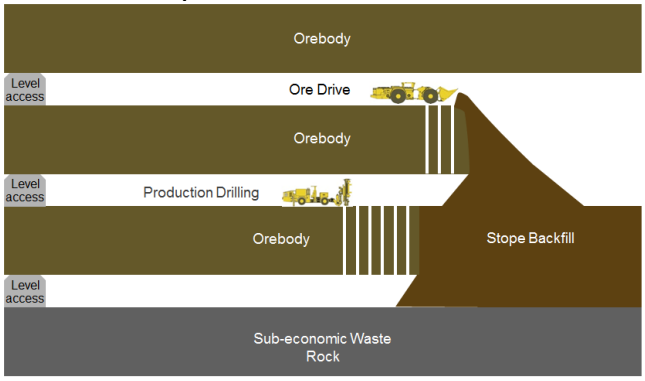
5 Blasting & bogging over backfill



6 Progressive blasting/bogging



7 Multi-level production/backfill



Appendix B

Surface Drillholes Intersecting Workings

Hole ID	Level	Drive	E	N	m.R.L	Date intersected	Pickup	Grouting status	Comments
CGD008	810	C4-FW	396488.5	643473.4	821.4	13/06/2015	Estimated	Not grouted	Hole dry - no evidence of being a water conduit at this level: no Fe staining
UW320	912	ACC	396431.997	643265.11	917.774	13/04/2015	Surveyed	Not grouted	Hole dry
UW348	900	C1-N	396520.5	643263.45	907.62	14/12/2015	Estimated	Grouted	Trickling water which ceased within a day - grouted 16/12/2015
UW358A	900	C1-S	396586.70	643035.20	910.55	25/07/2016	Estimated	Grouted	Low flow, originally grouted within 12 hours, re-grouted after 36 hours. Surrounding split sets grouted as were acting as a conduit. Flow was approximately 1ltr/min
UW365	810	C4-FW	396488.4	643474.8	821.4	9/06/2015	Estimated	Not grouted	Hole dry
UW368	825	C7-S	396515.304	643114.23	833.067	26/08/2015	Surveyed	Grouted	Minor flow - hole re-grouted 16/12/2015
UW386	915	ORE PASS	396482.291	643218.53	914.937	4/02/2015	Surveyed	Not grouted	Hole dry - now in ore pass
UW390	840	C1-S	396541.39	643198.97	844.082	25/03/2015	Surveyed	Not grouted	Hole dry - no evidence of being a water conduit at this level: no Fe staining
UW393	840	C4-HW	396472.922	643416.31	851.398	16/08/2015	Estimated	Not grouted	Hole dry
UW402	953	CDD	396449.3	643126.9	930.5	17/12/2014	Surveyed	Grouted	Hole was producing minimal water for only a few hours
UW402	855	C7-S	396515.03	643092.42	864.645	18/10/2015	Surveyed	Not grouted	Dry - second time intersecting hole with development - was grouted on the 953
UW374	860	DB-HWW	396237.72	643120.73	871.896	16/12/2016	Surveyed	Not grouted	Hole was dry, no indication of previous water - i.e. no Fe staining, etc.
CGD003	942	ACC	396486.76	643260.62	941.1	12/03/2017	Estimated	Not grouted	Only a very light trickle and ceased completely within 24 hours
UW339	~775	Dobson RAD	396489.45	643296.31	778.239	10/06/2017	Surveyed	Not grouted	Hole intercept in backs dry but producing water from the floor due to being below the current water table. Floor intercept plugged 26/6/17 but no need to plug the backs intercept.

Below is a plan view section showing development on Correnso, Daybreak and Empire mine areas. Surface drillholes which intersect development, along with their pierce points, are shown; green points indicate the drillhole collars in the view while the red points indicate the approximate intersection point of surface drillholes with development (no surface holes have yet been intersected by Empire development).