



PR Ref	Report Ref	Recommendation	Action
8.6	6.3.5	Include a separate figure in section 6.3.5 "Martha Groundwater Assessment" which provides P107 to P110 and P113A – P116 water level hydrographs. It is difficult for the reader to discern the piezometer water levels on Figure 15 due to the number of piezometer plots.	New figure added
8.11	6.3.8	Consider installing piezometers near private bores to confirm if future groundwater changes are directly influenced by mining activities.	A well search has been undertaken and three wells identified (two northeast and one southwest of the Martha Pit, along strike of the Martha vein system) that OGNZL will investigate monitoring going forward, subject to access arrangements.
8.12	12	Modelling is updated on a yearly basis which takes into account changes in mine planning and water management practices. Alternatively, a numerical groundwater model is developed and updated yearly based on mine planning data and recalibration.	Section updated with the latest information from the WWLA Technical Memo (MUG Dewatering Rate Predictions, 18 September 2024). Note: Depth of drawdown and inflows are derived based on the mining plan. Extent of drawdown is not assessed.
8.15	11	Summary of water chemistry results are included in the D & S annual report, possibly as a subsection in Section 10 or 11.	Summary of water chemistry results are included in section 11.2.
	15	Currently the DW&S Report does not have a section on Predicted Post Closure Effects. The Peer Reviewer recommends that a section on "Predicted Post Closure Effects" should be included in future DW&S Reports.	Improvement Activities for 2025 include developing Conceptual and Numerical groundwater models to assist with predicting dewatering impacts post closure.
8.16	6.3.6	Sampling of standpipe piezometers P76D, P76I, P77D and P77I should be included in the groundwater chemistry sampling program of aquifer systems.	These piezometers were not able to be sampled as the bore diameters are too narrow for sampling equipment.
8.17	App F	Conceptual hydrogeological sections should be updated on an annual basis when new data comes available, i.e. significant changes in piezometric levels, additional data from new installed piezometers, changes/additions to mine infrastructure.	Sections updated for 2024 report.



14.2 Hauraki District Council

Table 14. Hauraki District Council recommendations and actions

Report Ref	Recommendation	Action
pg14	As there is now access to the pit from underground, the first sentence in section 3.1 should be changed to “Access from the surface to Martha Pit ...”.	Updated
pg14	Are the relatively new connections (via portals) between the underground and Martha Pit worthy of a mention?	Not updated as these have been in place since 2023.
pg 32	The last paragraph mentions the two new VWP's, P122 and P123 and it would be helpful if reference could be made to their respective locations (Figure 13 for P122 and Figure 16 for P123) even though that occurs later in the text.	Cross references to Figures 13 & 16 added.
pg 33	The location of piezometer P112 has not been included in Figure 13 – this was requested in the response to the 2022 Dewatering and Settlement Monitoring Report.	P112 has been added to this figure.
pg 34	Figure 14 is illegible and should be removed if a clearer copy can't be created.	Figure replaced with a clearer version.
pg 36	Is the last sentence about Favona piezometers being presented in Figures 18 to 35 correct?	Yes
pgs 43-44	It would be beneficial to include the conceptual hydrogeological sections in Appendix F in the main text as a summary of the overall hydrological conditions for the Martha area.	OGNZL's view is that this supplementary report, produced by our groundwater consultant at the request of the peer review panel, sits best in the appendices.
pg 54	Is it possible to improve the resolution of the total settlement contour levels in Figure 38 so values can be read? Without that, Figure 38 has limited value in the report.	Zoomed in and higher resolution figures have been used.
pg 63	A minor typo in Section 6.2.4, paragraph 2, exceeded should be “exceed”.	Corrected
pg 67	New mark 34CB has not been included in Table 10b - this was requested in the response to the 2022 Dewatering and Settlement Monitoring Report.	34CB has been added for 2024 (both May & Nov)
pg 71	It would be helpful if a Figure (like Figure 47) showing the location and labels for markers relevant to Martha could be included ahead of Table 10.	New figure added
pg 99	Is condition 39 of the HDC Favona consent still relevant/worthy of inclusion?	Condition 39 of resource consent 85.020.326.E is included in Appendix A



Report Ref	Recommendation	Action
pg 41	The newly installed piezometer P123-1 measures water at just 12m below the surface behind the NW wall of Martha pit. This result seems unusual as Andesite extends to the surface on this western side and the source of the water is not mentioned in the report. If this extends closer to the north wall of Martha it may well have implications for pit wall stability for the wall further west from the current failure. I think both Peer Reviewers need to be advised of this result (assuming that hasn't already occurred) so they can consider its origin and implication to pit wall stability.	Peer Reviewers have been advised of this result via the 2023 report.
App D	While separate plots of piezo results have been included for the instruments above the Rex workings, results for settlement markers 34BE, 2.04B and 34CB are still 'buried' in the overall plot in the Figure for Zone 6 in Appendix D. Can we ask (again) that these be included separately, preferably in the main text where they refer to settlement above Rex?	A separate plot has been created for the REX settlement markers and included in Appendix D.

14.3 Waikato Regional Council

Table 15. Waikato Regional Council recommendations and actions

Report Ref	Recommendation	Action
App F	Review the sections presented in Appendix F (Figures 4, 6, 8) and extend them to edge of the basin	The sections have been extended to include only GLD04-D to retain vertical resolution.
App F	Develop a section along strike to show the likely largest extent of groundwater drawdown effects	New section (Figure 10) added to Appendix F.
6.3.8	Undertake a well search to identify users that could be affected by the pumping. Depending on the outcome that may lead to assessment of likely drawdown effects of any users identified and review of monitoring requirements for private wells.	A well search has been undertaken and three wells identified (two northeast and one southwest of the Martha Pit, along strike of the Martha vein system) that OGNZL will investigate monitoring going forward, subject to access arrangements.
	Install two additional monitoring wells within the lobe of alluvium under the urban area where previously P4-3, WC203-4 were operative	WC203-4 has been rediscovered and is now being monitored again. OGNZL is considering installing a shallow standpipe as



Report Ref	Recommendation	Action
		part of a new piezo installation southwest of the Martha Pit along strike of the Martha vein system.
5.3.1	It is noted in Section 5.3.1 of the report that as the result of a review of the groundwater monitoring network undertaken by GWS a number of new and replacement monitoring piezometers were installed in 2023 (including P122 as discussed above). A copy of the GWS review has not been sighted by this reviewer and would likely provide helpful information to support the comments made herein.	The GWS report was supplied to WRC on 07/02/25.



15 RESOURCE CONSENT EVALUATION

Comments on compliance with all conditions of the Martha, Favona, Trio, Correnso and Project Martha consents, including any reasons for non-compliance or difficulties in achieving conformance with the consent conditions, are summarised below in Table 16. Note that the Correnso/Golden Link take 124860 has been superseded by Project Martha Water Permit 139551.

Table 16. Favona, Trio, Correnso, SUPA, Project Martha consent condition compliance assessment.

Description	Consent (Condition)	Compliance	Comment
Favona Dewatering and Settlement Plan	109742 - 109746		
Favona groundwater take	109742 (3)	Full	Favona discharge plumbed into main dewatering line, new meter installed on Favona line.
Divert and discharge ground and surface water (farm run-off and intercepted groundwater) from around the (Favona) project area.	109743	Full	Non-mine run-off has been diverted to natural drainage.
Discharge waste rock and ore onto land in temporary surface stockpiles and to discharge seepage from the temporary stockpiles into ground.	109744	Full	Stockpile area design & construction. Water quality monitoring in manholes and shallow bores (the subject of a separate report – <i>Favona Water Quality Monitoring Annual Report</i>).
Discharge waste rock into land underground in the project area as backfill and to allow degraded quality groundwater to discharge from the flooded workings in the project area into the surrounding ground post closure.	109745	Full	Favona back-filling completed. Dewatering being maintained
Discharge treated mine water from the Martha Mine Water Treatment Plant to ground in association with flooding the underground mine on completion of the project.	109746	Full	Favona Water Quality Monitoring Annual Report
109742 – 109746			
Schedule 2			
Water Management Plan	(1)	Full	Environmental Material Risk Management Plan – Water, December 2023



Description	Consent (Condition)	Compliance	Comment
Prior to exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Settlement, Dewatering and Water Quality Monitoring Plan	(2)	Full	Dewatering and Settlement Monitoring Plan, June 2023
The monitoring regime shall be designed to assess the effects of: a) mine dewatering on the regional groundwater system, b) mine dewatering on settlement; c) leachate from stockpiles containing potentially acid forming material on shallow groundwater quality, and d) the discharge of degraded-quality water from the backfilled and flooded workings on groundwater quality.	(2)	Full	Defined in this document. c) Reported annually in Favona Water Quality Monitoring Report d) Combined dewatering sample taken monthly
Final details of the monitoring locations are to be agreed with the Council. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.	(2)	Full	Section 6 Stockpile water quality bores agreed in Nov 2006
The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed, and updated as necessary, by the consent holder at least once every two years. Any updated Plan shall be promptly forwarded to the Council for approval and following approval the updated Plan shall be implemented in place of the previous version.	(2)	Full	Consent activated following approval of Plan. Combined plan, approved by WRC, May 2023
In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Settlement, Dewatering and Water Quality Monitoring Plan, then the conditions of this consent shall prevail.	(2)	Full	No inconsistency identified
In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Council in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then:	(3)	Full	Section 8 Correspondence in Tilt Reports
a) explain the cause of the non-conformance,	(3)	Full	Section 8
b) agree with the Council on the appropriate settlement contingency measures to be implemented as described,	(3)	Full	Propose ongoing monitoring
c) implement settlement contingency measures as appropriate,	(3)	Full	Not considered necessary as on company owned farmland



Description	Consent (Condition)	Compliance	Comment
d) advise the Council on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.	(3)	Full	Propose ongoing monitoring
The report shall include at least the following information:	(4)	Full	
a) volume of groundwater abstracted	(4)	Full	Section 5
b) data from monitoring undertaken during the previous year including groundwater contour plans	(4)	Full	Section 6
c) an interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions.	(4)	Full	Section 6 & 10
This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information.	(4)	Full	WWLA & OGNZL staff
d) any contingency actions that may have been taken during the year.	(4)	Full	Section 10
e) comment on compliance with all conditions of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of this consent.	(4)	Full	This section
Trio Dewatering and Settlement Plan - General conditions	121416 - 121418, 121446 & 121447		
Prior to exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Settlement, Dewatering and Water Quality Monitoring Plan	Schedule 1 (5)	Full	Combined plan Approved by WRC May 2023
The monitoring regime shall be designed to assess the effects of:	Schedule 1 (5)	Full	Defined in plan
i) dewatering on the regional groundwater system,			
ii) dewatering on settlement;			
iii) the discharge of degraded-quality water from the backfilled and flooded workings on groundwater quality.			iii) No significant flooded workings as yet
Final details of the monitoring locations are to be agreed with the Council. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.	Schedule 1 (5)	Full	Defined in approved Plan



Description	Consent (Condition)	Compliance	Comment
The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed, and updated as necessary, by the consent holder. Any updated Plan shall be promptly forwarded to the Council for written approval and following approval, the updated Plan shall be implemented in place of the previous version.	Schedule 1 (5)	Full	Consent activated following approval of Plan Jul 2014
In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Settlement, Dewatering and Water Quality Monitoring Plan, then the conditions of this consent shall prevail.	Schedule 1 (5)	Full	No inconsistency identified
Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:	Schedule 1 (6)	Full	
i) volume of groundwater abstracted	Schedule 1 (6)	Full	Section 5
ii) data from monitoring undertaken during the previous year including groundwater contour plans	Schedule 1 (6)	Full	Section 6
iii) an interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions.	Schedule 1 (6)	Full	Section 6 & 10
This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information.	Schedule 1 (6)	Full	WWLA & OGNZL staff
iv) any contingency actions that may have been taken during the year.	Schedule 1 (6)	Full	Section 10
v) comment on compliance with all conditions of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of this consent.	Schedule 1 (6)	Full	This section
Monitoring - Tilt:	Schedule 1 (7)	Full	
In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations, installed in accordance with the Settlement, Dewatering and Water Quality Monitoring Plan required pursuant to condition 2 above, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Council in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then:	Schedule 1 (7)	Full	Section 8
i) explain the cause of the non-conformance,	Schedule 1 (7)	Full	Section 10



Description	Consent (Condition)	Compliance	Comment
ii) agree with the Councils on the appropriate settlement contingency measures to be implemented,	Schedule 1 (7)	Full	Propose ongoing monitoring
iii) implement settlement contingency measures as appropriate,	Schedule 1 (7)	Full	Not considered necessary
iv) advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.	Schedule 1 (7)	Full	Propose ongoing monitoring
The consent holder shall provide to the Council an annual Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:	Schedule 1 (7)	Full	This report
a) The volume of groundwater abstracted;	Schedule 1 (7)	Full	Section 5
b) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;	Schedule 1 (7)	Full	Section 6
c) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;	Schedule 1 (7)	Full	Annual Report reviewed by WWLA and Engineering Geology
d) Any contingency actions that may have been taken during the year; and	Schedule 1 (7)	Full	Section 10
e) Comment on compliance with Conditions 27 to 34 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.	Schedule 1 (7)	Full	This section
Golden Link Project Area Groundwater Take – General conditions	124860		
Monitoring - Abstraction Volume 4.The consent holder shall monitor the volume of water abstracted on a weekly basis and shall report this to the Waikato Regional Council on a quarterly basis.	(4)	Full	Section 5
Dewatering and Settlement Monitoring Plan 5. Prior to the exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.	(5)	Full	Latest plan June 2023



Description	Consent (Condition)	Compliance	Comment
The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system, as proposed in the consent application. The monitoring regime shall be designed to assess the effects of:			
(i) dewatering on the regional groundwater system; and (ii) dewatering on settlement; and (iii) the discharge of degraded quality water from the backfilled and flooded workings on groundwater quality.	(5)	Full	Defined in plan iii) No significant flooded workings as yet
Monitoring locations are to provide appropriate resolution of surface tilt relative to the scale of surface infrastructure and final details are to be agreed with the Councils. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.	(5)	Full	Defined in plan
The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed and updated as necessary by the consent holder. Such updated Plans shall relate to the Correnso Mine or to any new mine within Area L. Any updated Plan shall be promptly forwarded to the Council for written approval and following approval, the updated Plan shall be implemented in place of the previous version. In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of this consent shall prevail.	(5)	Full	Plan June 2023
Dewatering and Settlement Monitoring Report 6.The consent holder shall provide to the Councils an annual Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:	(6)		This report
a) The volume of groundwater abstracted;	(6)	Full	Section 5
(i) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;	(6)	Full	Section 6
(ii) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post	(6)	Full	Section 6 & 10



Description	Consent (Condition)	Compliance	Comment
closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;			
(iii) Any contingency actions that may have been taken during the year; and	(6)	Full	Section 10
(iv) Comment on compliance with condition 5 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent. The report shall be forwarded in a form acceptable to the Councils.	(6)	Full	Section 15
Monitoring - Tilt 7. In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations installed in accordance with the Dewatering and Settlement Monitoring Plan required pursuant to condition 5 of this consent, and such tilt is caused by the de-watering and/or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Councils in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then engage in a process with the Councils:	(7)	Full	Section 8
(i) explain the cause of the non-conformance,	(7)	Full	Section 10
(ii) Propose appropriate settlement contingency measures for discussion with Councils and agree with the Councils on the appropriate settlement contingency measures and the timing for their implementation as described,	(7)	Full	Propose ongoing monitoring
(iii) implement agreed settlement contingency measures as appropriate within the agreed time limit,	(7)	Full	Not considered necessary
(iv) advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.	(7)	Full	Propose ongoing monitoring
Monitoring – Water Quality 8. The consent holder shall monitor throughout the period of operation, the chemistry of the groundwater, pit run-off and pit discharge water abstracted from the open pit. The monitoring data is to be used to correlate these inflows with pit lake water quality predictions, and to provide a database for input into the closure plans. The sampling parameters and frequencies shall be described in the Martha Extended Project dewatering consent (unless agreed otherwise with the Waikato Regional Council) with the results forwarded to the Waikato Regional Council on an annual basis.	(8)	Partial	Pit sampling limited, dewatering sampled monthly. Favona and Correnso Underground WQ measured separately. Underground dewatering from Project Martha bores commenced.
Other Water Users	(9)	Full	



Description	Consent (Condition)	Compliance	Comment
9. If, in the opinion of the Waikato Regional Council, the exercise of this consent adversely affects stock, domestic or other water supplies, then the consent holder shall, at its own cost, be responsible for providing to the owner of those water supplies an alternative equivalent water supply, to the satisfaction of Waikato Regional Council. The consent holder shall be responsible for making an alternative water supply available within 12 hours of being directed to do so by the Waikato Regional Council.			
Project Martha – Common Conditions	202.2018.00000857.001		
Dewatering and Settlement Monitoring Plan 14. The objectives of the groundwater and settlement management system shall be to ensure that dewatering operations do not give rise to surface instability and differential settlement beyond that authorised by this consent. 15. Two months prior to dewatering below 700 m RL (mine datum), the consent holder shall prepare, and submit to the Councils for their certification, a Dewatering and Settlement Monitoring Plan. The purpose of the Dewatering and Settlement Monitoring Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded. 16. The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system set out in Condition 14 of this schedule. The monitoring regime shall be designed to assess the effects of: a. Dewatering on the regional groundwater system; and b. Dewatering on settlement. 17. Monitoring locations are to provide appropriate resolution of mine inflows and pumping, groundwater levels (both for shallow and deep aquifers) and ground surface tilt relative to the scale of surface infrastructure, throughout the area within the maximum extent of the groundwater cone of depression and particularly in the areas above and adjacent to the mining activities provided for in this consent. Final details are to be agreed with the Councils, but are to include additional piezometers and extensometers located along the line of upper level workings in the Rex Orebody. The Dewatering and Settlement Monitoring Plan shall also provide groundwater and settlement trigger limits that will initiate the implementation of contingency mitigation and / or monitoring measures and shall detail any linkages with the operation of the Martha Pit and Martha Underground Mine.	(14) (15) (16) (17)	Full	Dewatering and Settlement Monitoring Plan approved June 2023 (Conditions 14-18)



Description	Consent (Condition)	Compliance	Comment
18. The exercise of this consent shall be in accordance with the Dewatering and Settlement Monitoring Plan as certified by the Councils. The Dewatering and Settlement Monitoring Plan shall be reviewed and updated as necessary by the consent holder. Any updated Dewatering and Settlement Monitoring Plan shall be promptly forwarded to the Councils for certification, and following this process, the updated plan shall be implemented in place of the previous version.	(18)		
19. In the event that a tilt greater than 1 in 1,000 occurs between any two network monitoring locations installed in accordance with the Dewatering and Settlement Monitoring Plan required pursuant to Condition 15 of this schedule, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Councils in writing within 20 working days of receiving the results of the monitoring. The consent holder shall then: a. Explain the cause of the non-conformance; b. Propose appropriate settlement contingency measures to the Councils and the timing of implementation thereof by the consent holder; c. Implement settlement contingency measures as appropriate within the agreed time limit; and d. Advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.	(19)	Full	Notification of tilts greater than 1:1000 provided in Tilt Report No non-conformances
20. The consent holder shall as a matter of urgency, advise the Councils of any significant anomalies identified by the regular reading of groundwater levels in the piezometer network. Such advice is to include an explanation of the anomalous results and actions proposed to address any issues identified. This report is to be provided to the Councils within 10 working days of the anomalous results being identified. A "significant anomaly" is defined as a drop in groundwater level greater than the seasonal variation in piezometers within the alluvium and younger volcanic rocks and a drop of 15 m or more in the recordings from piezometers tapping the upper 50 m of Andesite over a one month period.	(20)		No significant anomalies identified
Dewatering and Settlement Monitoring Report 22. The consent holder shall provide to the Councils (within one month of an agreed anniversary date) an annual Dewatering and Settlement Monitoring Report. The report shall, as a minimum, provide the following information:	(22)	Full	This report
a. The volume of groundwater abstracted;	(22)	Full	Section 5



Description	Consent (Condition)	Compliance	Comment
b. The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;	(22)	Full	Section 6
c. An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of the future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions, this analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;	(22)	Full	Sections 6, 7 and 10
d. Any contingency actions that may have been taken during the year; and	(22)	Full	Section 10
e. Comment on compliance with Conditions 14 to 21 of this schedule including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.	(22)	Full	This section
f. The report shall be forwarded in a form acceptable to the Councils.			
Project Martha Groundwater take permit	139551		
Dewatering Level	(1)	Full	Groundwater level not lowered below 500 mRL.
1. The exercise of this consent shall not result in groundwater lowering to a level below 500mRL.			
MONITORING	(2)	Full	Abstraction volumes reported to Council via Hyquest
2. Upon commencement of this consent, the consent holder shall monitor the volume of water abstracted on a weekly basis and shall report this to the Waikato Regional Council.			
3. Upon the first exercise of this consent the consent holder must telemeter – via a telemetry system developed after liaison with the Waikato Regional Council to ensure that the telemetry system is compatible with the Waikato Regional Council telemetry system standards and data protocols – continuous 15 minute values of: gross take volume (in units of cubic metres). The data must be reported once daily to the Waikato Regional Council via the telemetry system. There must be 96 values, respectively, per daily report. When no water is being taken the data must specify the gross take volume and calculated net take volume as zero.	(3)	Full	As above.



Description	Consent (Condition)	Compliance	Comment
4. The consent holder shall monitor the chemistry of the water abstracted under this consent. Prior to the commencement of this consent the sampling parameters and frequencies shall be agreed with the Waikato Regional Council, with the results forwarded to the Waikato Regional Council on an annual basis. The consent holder may change the sampling parameters and frequencies with the agreement of the Waikato Regional Council.	(4)	Full	Appendix E
OTHER WATER USERS 5. If, in the opinion of the Waikato Regional Council, the exercise of this consent adversely affects any existing stock, domestic or other water supplies, then the consent holder shall, at its own cost, be responsible for providing to the owner of those water supplies an alternative equivalent water supply, to the satisfaction of Waikato Regional Council. The consent holder shall be responsible for making an alternative water supply available within 12 hours of being directed to do so by the Council.	(5)	N/A	
MONITORING OF THE SHALLOW AND DEEP AQUIFERS 6. The consent holder shall upon commencement of this consent and at five yearly intervals thereafter, provide a report to the Waikato Regional Council commenting on the effect the groundwater take and dewatering activity is having on the deep and shallow aquifers under the Martha Pit and immediate surrounds. The report shall as a minimum, provide the following information: (a) The nature of the geology under the Martha Pit and immediate surrounds; (b) Comment on the existing groundwater chemistry for the deep and shallow aquifers; (c) Comment on the groundwater levels in the deep and shallow aquifers; and (d) Provide details of any wetland areas and any other known aquatic ecological values that are dependent on the surface contribution of shallow and deep groundwater outflows. Taking into account all of this information (and any other relevant data) the consent holder shall provide comment on the effects the dewatering activity is having on the shallow and deep aquifers under the Martha Pit and immediate surrounds.	(6)	Full	Provided to Waikato Regional Council in July 2024
Favona Underground Mine HDC Land Use Consent	85.020.326.E		



Description	Consent (Condition)	Compliance	Comment
Settlement and De-watering Monitoring Report 39. The consent holder shall provide to the Council an annual Settlement and De-watering Monitoring Report. The report shall include at least the following information:	(39)		This report
a) The volume of groundwater abstracted;	(39)	Full	Section 5
b) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;	(39)	Full	Section 6
c) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;	(39)	Full	Section 6 & 10
d) Any contingency actions that may have been taken during the year; and	(39)	Full	Section 10
e) Comment on compliance with Conditions 33 - 38 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent. The report shall be forwarded in a form acceptable to the Council.	(39)	Full	Section 15

16 CONCLUSIONS

16.1 Dewatering

Monitoring of the groundwater levels and dewatering, ground surface settlement, ground surface tilt, and water quality in and around the Martha, Favona, Trio, Correnso, SUPA and Project Martha operations was undertaken by OGNZL during 2024 in accordance with the consent conditions and the approved monitoring plan.

By the end of 2024 the underground groundwater levels had been lowered to a maximum depth of approximately 636 mRL.

Groundwater levels remained stable in the Martha area during 2024, with an increase in piezometric levels in response to seasonal rainfall. Two triggers were reached during the monitoring period. A greater than 2m level change over one month occurred for both piezometer P113A (74m deep) and piezometer P114 (55m deep). These were reported to HDC and are discussed in more detail within the report.

At Favona the underground water level was maintained at around 800 mRL. As observed in previous years, this dewatering has maintained a steep but localised depression of the groundwater (contour pattern) along the NE-SW trending vein structure. Water levels in the young volcanic materials and overlying alluvium have not responded to the significant dewatering of the underlying vein-hosting andesite. Minor or no response has been seen in wells monitoring the upper layers of the andesite rock body. Response is only evident in deeper wells constructed in the andesite rock mass that intercept structures connected to the vein systems.

16.2 Settlement and Tilt

Settlement monitoring, to assess any ground surface movement effects from groundwater changes, was conducted by OGNZL in May/June and November/December 2024. These settlement survey results indicated that 95.7% (330/345) of marks were within the predicted settlement ranges, based on the Project Martha predicted settlement. Of the greater-than-predicted settlements, five were above or near the Favona Underground Mine. The other ten exceedances are generally associated with sites that are considered to be affected by unstable ground or soil creep due to proximity to stream banks or drains. At all these locations no visible effects were noted nearby, and shallow piezometers have not shown any abnormal changes.

Variable settlement was measured across the Waihi Township settlement monitoring network through the 2024 monitoring period. This is considered to be a response to ongoing dewatering of structures within the deeper andesite of the Martha groundwater system. No widespread ongoing dewatering effects were observed in the young volcanic or upper andesite rock that would give rise to such widespread settlement.

Settlement continues to be observed in marks near and overlying the Favona Mine, although the total amount of settlement is similar to previous years. The deep monitoring wells connected to the Favona vein system are the only wells showing dewatering changes consistent with this settlement, indicating the settlement is likely to be a response to dewatering of the deeper structures of the Favona vein system and/or to changes in the rock mass volume associated with mining at Favona. Tilt is also apparent between marks near and overlying the Favona Mine which is occurring on farmland owned by OGNZL (and therefore is not expected to be an issue).

16.3 Groundwater Quality

Some elevated trace metal results were measured during laboratory testing of underground water samples during the 2024 monitoring period. However, this is expected, and all underground water is currently collected and treated.

17 DEFINITIONS

Term	Definition
CEPA	Correnso Extensions Project Area
CRD	Cumulative Rainfall Departure
HDC	Hauraki District Council
MDDP	Martha Drill Drives Project
OGNZL	OceanaGold New Zealand Ltd
VWP	Vibrating Wire Piezometer
WRC	Waikato Regional Council
WWLA	Williamson Water & Land Advisory

18 REFERENCES

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WWLA, 2024: Martha Underground (MUG) and Wharekirauponga Underground (WUG) Dewatering Rate Predictions. Technical Memo for OGNZL, September 2024.

Appendix A Relevant Consent Conditions

Extract from conditions of Waikato Regional Council Resource Consents 109742 to 109746 (Favona), pertaining to Dewatering and Settlement:

SCHEDULE TWO – GENERAL CONDITIONS

The granting of consents (109742 to 109746 inclusive) is subject to the following conditions, which shall apply to each individual consent.

Water Management Plan

1. Prior to exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Water Management Plan describing the water management system to be applied across the project area, with emphasis on management of stormwater including water storage options, decline and mine dewatering, and stockpile runoff.

The consent holder shall exercise this consent in accordance with the approved Water Management Plan.

The Plan shall be reviewed at least annually by the consent holder. Any updated Plan shall be promptly forwarded to the Council for approval and following approval the updated Plan shall be implemented in place of the previous version.

The Plan may form part of the Water Management Plan associated with consent numbers 971311, 971318-971320, W1742 and W1743.

In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Water Management Plan, then the conditions of this consent shall prevail.

Settlement, Dewatering and Water Quality Monitoring Plan

2. Prior to exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Settlement, Dewatering & Water Quality Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of the activities on land settlement, the groundwater hydraulic regime and on water quality, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.

The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system, as proposed in the consent application. The monitoring regime shall be designed to assess the effects of:

- a) mine dewatering on the regional groundwater system,
- b) mine dewatering on settlement;
- c) leachate from stockpiles containing potentially acid forming material on shallow groundwater quality, and
- d) the discharge of degraded-quality water from the backfilled and flooded workings on groundwater quality.

Final details of the monitoring locations are to be agreed with the Council. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.

The Plan shall be consistent with the recommendations included in the reports to the Council entitled;

- *“Proposed Favona Underground Mine – Review of Groundwater Assessment” dated October 2003 and prepared by Pattle Delamore Partners; and*

- *“Technical Review of Water Quality and Geochemistry Issues - Favona Underground Project”, dated October 2003 and prepared by GEOKEM.*

The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed, and updated as necessary, by the consent holder at least once every two years. Any updated Plan shall be promptly forwarded to the Council for approval and following approval the updated Plan shall be implemented in place of the previous version.

In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Settlement, Dewatering & Water Quality Monitoring Plan, then the conditions of this consent shall prevail.

3. In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations, installed in accordance with the Settlement, Dewatering & Water Quality Monitoring Plan required pursuant to condition 2 above, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Council in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then:
- a) explain the cause of the non-conformance,
 - b) agree with the Council on the appropriate settlement contingency measures to be implemented as described,
 - c) implement settlement contingency measures as appropriate,
 - d) advise the Council on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.

Settlement, Dewatering & Water Quality Monitoring Report

4. The consent holder shall provide to the Council (with a copy provided to the Hauraki District Council) an annual Settlement, Dewatering & Water Quality Monitoring Report. The report shall include at least the following information:
- a) the volume of groundwater abstracted,
 - b) the data from monitoring undertaken during the previous year including groundwater contour plans (derived from the data) in respect of the piezometer network,
 - c) an interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information,
 - d) any contingency actions that may have been taken during the year,
 - e) comment on compliance with all conditions of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of this consent.

The report shall be forwarded in a format acceptable to the Council.

Extract from conditions of Hauraki District Council Resource Consent 85.020.326.E (Favona), as pertaining to Dewatering and Settlement:

Settlement, Dewatering & Water Quality Monitoring Report

39. The consent holder shall provide to the Council an annual Settlement and De-watering Monitoring Report. The report shall include at least the following information:
- a) The volume of groundwater abstracted;
 - b) The data from monitoring undertaken during the previous year including groundwater contour plans (derived from the data) in respect of the piezometer network;
 - c) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;
 - d) Any contingency actions that may have been taken during the year;
 - e) Comment on compliance with Conditions 33 – 38 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of this consent.

The report shall be forwarded in a format acceptable to the Council.

Extract from conditions of Hauraki District Council Resource Consent 97/98-105, pertaining to Dewatering and Settlement:

3.30 Settlement

- a) The consent holder shall prepare a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of dewatering on land settlement and the effects of the mining activities on the subsurface hydraulic regime. The Dewatering and Settlement Monitoring Plan shall address at least the following:

- i) An overall description of the groundwater and settlement monitoring system and the measures to be adopted to meet the objectives of the groundwater and settlement monitoring system.
- ii) Details of the piezometer network proposed to monitor the effects of pit dewatering on the aquifers under Waihi township.

Any monitoring bores additional to the existing piezometer network shall be installed and operational prior to the exercising of this consent.

- iii) Details of the settlement monitoring network proposed to monitor the extended zone which has been, or is likely to be, affected by settlement caused by mine dewatering.

Any settlement monitoring network locations additional to the existing monitoring locations shall be installed and operational prior to exercising this consent.

- iv) Details of the survey of facilities in the Waihi township considered by the consent holder to be potentially "at risk" of damage from ground settlement caused by mine dewatering. The survey to be completed shall include collection of information about the facility's location, the nature of construction materials, the nature of sensitive equipment that might be potentially "at risk", and the sensitivity of this equipment to ground settlement caused by mine dewatering and/or tilt.

This survey shall be completed prior to exercise of the Waikato Regional Council consent number 971286.

- v) A settlement contingency plan to include mitigation measures to be implemented in the event that ground settlement caused by mine dewatering induces a tilt that exceeds 1 in 1000 between any two network monitoring locations spaced no less than 25 metres apart. The settlement contingency plan shall particularly address those facilities identified by the consent holder as being potentially "at risk" of damage from ground settlement caused by mine dewatering.
- vi) A dewatering contingency plan that describes the steps the consent holder shall implement in the event that dewatering results in adverse impacts on affected aquifer systems and associated groundwater supplies used for domestic, stock or other purposes.

In detailing the monitoring programmes the consent holder shall provide information on the monitoring methods proposed, the parameters to be monitored, and the calibration and maintenance of monitoring equipment.

In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of Waikato Regional Council consent number 971286 shall prevail.

- b) The Dewatering and Settlement Monitoring Plan shall be submitted to Hauraki District Council for approval at least one month prior to the exercise of this consent. The Hauraki District Council shall consult with the Waikato Regional Council prior to approving the Dewatering and Settlement Monitoring Plan. The consent holder shall review and update

(as necessary) the Plan and shall provide promptly such updated Plan to the Hauraki District Council annually for approval.

- c) If in the opinion of Hauraki District Council the dewatering adversely affects land or facilities, then the consent holder shall at its own cost be responsible for reinstating the facilities to an equivalent standard to the reasonable satisfaction of Council.
- d) The consent holder shall measure and record the daily volume of water abstracted from the pit.
- e) The consent holder shall undertake monthly water level monitoring of the piezometer network in accordance with the Dewatering and Settlement Monitoring Plan.
- f) The consent holder shall monitor ground settlement at a minimum of six monthly intervals in accordance with the Dewatering and Settlement Monitoring Plan.
- g) In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations spaced no less than 25 metres apart, and such tilt is caused by mine dewatering, or there is a significant variance from the predicted settlement rates described in the evidence of Dr Semple (Table 5, Figure 8 dated 13 November 1997 as presented to the Joint Hearing Committee – attached hereto as Appendix C), the consent holder shall notify the Hauraki District Council and the Waikato Regional Council, in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then:
 - explain the cause of the non-conformance,
 - agree with the Hauraki District Council and Waikato Regional Council on the appropriate settlement contingency measures to be implemented as described,
 - implement settlement contingency measures as appropriate,
 - advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.
- h) The consent holder shall provide to the Hauraki District Council and the Waikato Regional Council an annual dewatering and settlement monitoring report. The report shall include at least the following information:
 - The data from monitoring undertaken during the previous year including ground water contour plans (derived from the data) in respect of the piezometer network.
 - Identification of any environmentally important trends in settlement and dewatering behaviour.
 - Interpretation and analysis of any change in ground water profile over the previous year, any contingency actions that may have been taken during the year, predictions of future impacts on other bore users that may arise as a result of any trends that have been identified, and what contingency actions, if any, the consent holder proposes to take in response to those predictions.
 - A comparison of the settlement survey data with that predicted in Table 5 and Figure 8 (dated 13 November 1997) by Dr Semple of Woodward Clyde (NZ) Ltd as provided in evidence to the Joint Hearing Committee.
 - Comment on compliance with this condition.
 - A summary and analysis of complaints relevant to this condition.
 - Any reasons for non-compliance or difficulties in achieving conformance with this condition.

- Any works that have been undertaken to improve environmental performance or that are proposed to be undertaken in the forthcoming year to improve environmental performance in relation to activities permitted by this condition.

The report shall be forwarded in a format acceptable to the Hauraki District Council.

(Note: This condition is complementary to Waikato Regional Council consent number 971286).

Extract from conditions of Hauraki District Council Resource Consent RC-15735 (Trio), as pertaining to Dewatering and Settlement:

Dewatering and Settlement Monitoring Plan

14. Within 2 months of the exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.

The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system, as proposed in the consent application. The monitoring regime shall be designed to assess the effects of:

- (i) dewatering on the regional groundwater system; and
- (ii) dewatering on settlement.

Final details of the monitoring locations are to be agreed with the Council. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.

The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed and updated as necessary by the consent holder. Any updated Plan shall be promptly forwarded to the Council for written approval and following approval, the updated Plan shall be implemented in place of the previous version.

In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of this consent shall prevail.

Dewatering and Settlement Monitoring Report

15. The consent holder shall provide to the Council an annual Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:
- (i) The volume of groundwater abstracted;
 - (ii) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;
 - (iii) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;
 - (iv) Any contingency actions that may have been taken during the year; and
 - (v) Comment on compliance with condition 14 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.

The report shall be forwarded in a form acceptable to the Council.

Monitoring – Tilt

16. In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations installed in accordance with the De-watering and Settlement Monitoring Plan required pursuant to condition 14 of this consent, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Hauraki District and Waikato Regional Councils in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then:
- (i) Explain the cause of the non-conformance,
 - (ii) Agree with the Councils on the appropriate settlement contingency measures to be implemented as described,

- (iii) Implement settlement contingency measures as appropriate,
- (iv) Advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.

Extract from conditions of Waikato Regional Council Resource Consents for Trio – 121416, 121417, 121418, 121446, and 121447, pertaining to Dewatering and Settlement:

SCHEDULE ONE – GENERAL CONDITIONS

Resource Consents **121416, 121417, 121418, 121446, and 121447** are subject to the following general conditions, which are applicable to all consents.

Dewatering and Settlement Monitoring Plan

- 5 Prior to exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.

The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system, as proposed in the consent application. The monitoring regime shall be designed to assess the effects of:

- (i) dewatering on the regional groundwater system; and
- (ii) dewatering on settlement, and
- (iii) the discharge of degraded quality water from the backfilled and flooded workings on groundwater quality.

Final details of the monitoring locations are to be agreed with the Council. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.

The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed and updated as necessary by the consent holder. Any updated Plan shall be promptly forwarded to the Council for written approval and following approval, the updated Plan shall be implemented in place of the previous version.

In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of this consent shall prevail.

Dewatering and Settlement Monitoring Report

6. The consent holder shall provide to the Councils an annual Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:
- (i) The volume of groundwater abstracted;
 - (ii) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;
 - (iii) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;
 - (iv) Any contingency actions that may have been taken during the year; and
 - (v) Comment on compliance with condition 5 of this schedule including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.

The report shall be forwarded in a form acceptable to the Council.

Monitoring – Tilt

7. In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations installed in accordance with the De-watering and Settlement Monitoring Plan required pursuant to condition 5 of this schedule, and such tilt is caused by the de-watering and/or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Councils in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then engage in a process with the Councils:
- (i) explain the cause of the non-conformance,
 - (ii) agree with the Councils on the appropriate settlement contingency measures to be implemented as described,
 - (iii) implement settlement contingency measures as appropriate,
 - (iv) advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.

Extract from conditions of Mining Licence 32 2388, pertaining to Dewatering and Settlement:

Dewatering

11. (a) The licensee shall prepare a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of dewatering associated with the extended project on land settlement and the effects of the mining activities on the subsurface hydraulic regime. The Dewatering and Settlement Monitoring Plan shall address at least the following:
- (i) An overall description of the groundwater and settlement monitoring system and the measures to be adopted to meet the objectives of the groundwater and settlement monitoring system.
 - (ii) Details of the piezometer network proposed to monitor the effects of pit dewatering on the aquifers under Waihi township.

Any monitoring bores additional to the existing piezometer network shall be installed and operational prior to the commencement of the extended project.
 - (iii) Details of the settlement monitoring network proposed to monitor the extended zone which has been, or is likely to be, affected by settlement caused by mine dewatering.

Any settlement monitoring network locations additional to the existing monitoring locations shall be installed and operational prior to the commencement of the extended project.
 - (iv) Details of the survey of facilities in the Waihi township considered by the licensee to be potentially "at risk" of damage from ground settlement caused by mine dewatering. The survey to be completed shall include collection of information about the facility's location, the nature of construction materials, the nature of sensitive equipment that might be potentially "at risk", and the sensitivity of this equipment to ground settlement caused by mine dewatering and/or tilt.

This survey shall be completed prior to the commencement of the extended project.
 - (v) A settlement contingency plan to include mitigation measures to be implemented in the event that ground settlement caused by mine dewatering induces a tilt that exceeds 1 in 1000 between any two network monitoring locations spaced no less than 25 metres apart. The settlement contingency plan shall particularly address those facilities identified by the licensee as being potentially "at risk" of damage from ground settlement caused by mine dewatering.
 - (vi) A dewatering contingency plan that describes the steps the licensee shall implement in the event that dewatering results in adverse impacts on affected aquifer systems and associated groundwater supplies used for domestic, stock or other purposes.

In detailing the monitoring programmes the licensee shall provide information on the monitoring methods proposed, the parameters to be monitored, and the calibration and maintenance of monitoring equipment.

In the event of any conflict or inconsistency between these conditions and the provisions of the Dewatering and Settlement Monitoring Plan, these conditions shall prevail.
- (b) The Dewatering and Settlement Monitoring Plan shall be submitted to the Minister for approval at least one month prior to the commencement of the extended project. The licensee shall review and update (as necessary) the Plan and shall provide promptly such updated Plan to the Minister annually for approval.
- (c) If in the opinion of the Minister the dewatering adversely affects land or facilities, then the licensee shall at its own cost be responsible for reinstating the facilities to an equivalent standard to the reasonable satisfaction of the Minister.

- (d) The licensee shall measure and record the daily volume of water abstracted from the pit.
- (e) The licensee shall undertake monthly water level monitoring of the piezometer network in accordance with the Dewatering and Settlement Monitoring Plan.
- (f) The licensee shall monitor ground settlement at a minimum of six monthly intervals in accordance with the Dewatering and Settlement Monitoring Plan.
- (g) In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations spaced no less than 25 metres apart, and such tilt is caused by mine dewatering, or there is a significant variance from the predicted settlement rates described in the evidence of Dr Semple (Table 5, Figure 8 dated 13 November) the licensee shall notify the Minister, in writing, within 20 working days of receiving the results of the monitoring. The licensee shall then:
 - Explain the cause of the non-conformance;
 - Agree with the Minister on the appropriate settlement contingency measures to be implemented as described;
 - Implement settlement contingency measures as appropriate;
 - Advise the Minister on the steps the licensee proposes to take in order to prevent any further occurrence of the situation.
- (h) The licensee shall provide to the Minister an annual dewatering and settlement monitoring report. The report shall include at least the following information:
 - The data from monitoring undertaken during the previous year including ground water contour plans (derived from the data) in respect of the piezometer network;
 - Identification of any environmentally important trends in settlement and dewatering behaviour;
 - Interpretation and analysis of any change in groundwater profile over the previous year, any contingency actions that may have been taken during the year, predictions of future impacts on other bore users that may arise as a result of any trends that have been identified, and what contingency actions, if any, the licensee proposes to take in response to those predictions;
 - A comparison of the settlement survey data with that predicted in Table 5 and Figure 8 (dated 13 November 1997 by Dr Semple of Woodward Clyde (NZ) Ltd);
 - Comment on compliance with this condition;
 - A summary and analysis of complaints relevant to this condition;
 - Any reasons for non-compliance or difficulties in achieving conformance with this condition;
 - Any works that have been undertaken to improve environmental performance or that are proposed to be undertaken in the forthcoming year to improve environmental performance in relation to activities permitted by this condition;
 - The report shall be forwarded in a format acceptable to the Minister.

Extract from conditions of Hauraki District Council Resource Consent 202.2012 (Correnso), as pertaining to Dewatering and Settlement:

Dewatering and Settlement Monitoring Plan

- 27 The objectives of the groundwater and settlement management system shall be to ensure that dewatering operations do not give rise to surface instability and differential settlement beyond that authorised by this consent.
- 28 Within 2 months of the exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.
- 29 The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system set out in Condition 27. The monitoring regime shall be designed to assess the effects of:
- a) Dewatering on the regional groundwater system; and
 - b) Dewatering on settlement.
- 30 Monitoring locations are to provide appropriate resolution of groundwater levels and surface tilt relative to the scale of surface infrastructure, particularly in the areas above and adjacent to the mining activities provided for in this consent. Final details are to be agreed with the Council. The Plan shall also provide settlement trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.
- 31 The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed and updated as necessary by the consent holder. Any updated Plan shall be promptly forwarded to the Council for written approval and following approval, the updated Plan shall be implemented in place of the previous version.
- 32 In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations installed in accordance with the Dewatering and Settlement Monitoring Plan required pursuant to Condition 28 of this consent, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Hauraki District and Waikato Regional Councils in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then:
- a) Explain the cause of the non-conformance;
 - b) Propose appropriate settlement contingency measures to the Councils and the timing of implementation thereof by the consent holder;
 - c) Implement settlement contingency measures as appropriate within the agreed time limit;
 - d) Advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.
- 33 The consent holder shall as a matter of urgency, advise the Council of any significant anomalies identified by the regular (monthly) reading of groundwater levels in the piezometer network. Such advice is to include an explanation of the anomalous results and actions proposed to address any issues identified. This report is to be provided to the Council within 10 working days of the anomalous results being identified.
- A "significant anomaly" is defined as 15m or more offset occurring in piezometer recordings over a 1 month period.
- 34 In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of this consent shall prevail.

Advice notes:

1. The Dewatering and Settlement Monitoring Plan shall be consistent with the Dewatering and Settlement Monitoring Plan prepared as a condition of the ground dewatering consent (RC 124860) granted by the Waikato Regional Council.
2. The monitoring undertaken in terms of the Dewatering and Settlement Monitoring Plan may need to be continued for a period beyond the term of this consent depending on recharge of the groundwater following cessation of underground mining activities and the filling of the Martha Pit.

Dewatering and Settlement Monitoring Report

35 The consent holder shall provide to the Council an annual Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:

- a) The volume of groundwater abstracted;
- b) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;
- c) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;
- d) Any contingency actions that may have been taken during the year; and
- e) Comment on compliance with Conditions 27 to 34 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.

The report shall be forwarded in a form acceptable to the Council.

Advice note:

The Dewatering and Settlement Monitoring Report shall be consistent with the Dewatering and Settlement Monitoring Report prepared as a condition of the ground dewatering consent (RC 124860) granted by the Waikato Regional Council.

Extract from conditions of Waikato Regional Council Resource Consent 124860 (Correnso), pertaining to Dewatering and Settlement:

Monitoring - Abstraction Volume

4. The consent holder shall monitor the volume of water abstracted on a weekly basis and shall report this to the Waikato Regional Council on a quarterly basis.

Dewatering and Settlement Monitoring Plan

5. Prior to the exercise of this consent, the consent holder shall prepare, and submit to the Council for its written approval, a Dewatering and Settlement Monitoring Plan. The purpose of this Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.

The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system, as proposed in the consent application. The monitoring regime shall be designed to assess the effects of:

- (i) dewatering on the regional groundwater system; and
- (ii) dewatering on settlement; and
- (iii) the discharge of degraded quality water from the backfilled and flooded workings on groundwater quality.

Monitoring locations are to provide appropriate resolution of surface tilt relative to the scale of surface infrastructure and final details are to be agreed with the Councils. The Plan shall also provide trigger limits that will initiate the implementation of contingency mitigation and/or monitoring measures and shall detail any linkages with the Martha pit operation.

The exercise of this consent shall be in accordance with the Plan as approved by the Council. The Plan shall be reviewed and updated as necessary by the consent holder. Such updated Plans shall relate to the Correnso Mine or to any new mine within Area L. Any updated Plan shall be promptly forwarded to the Council for written approval and following approval, the updated Plan shall be implemented in place of the previous version.

In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of this consent shall prevail.

Dewatering and Settlement Monitoring Report

6. The consent holder shall provide to the Councils an annual Dewatering and Settlement Monitoring Report. The Report shall, as a minimum, provide the following information:
 - (i) The volume of groundwater abstracted;
 - (ii) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;
 - (iii) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions. This analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;
 - (iv) Any contingency actions that may have been taken during the year; and
 - (v) Comment on compliance with condition 5 of this consent including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.

The report shall be forwarded in a form acceptable to the Councils.

Monitoring - Tilt

7. In the event that a tilt greater than 1 in 1000 occurs between any two network monitoring locations installed in accordance with the Dewatering and Settlement Monitoring Plan required pursuant to condition 5 of this consent, and such tilt is caused by the de-watering and/or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Councils in writing, within 20 working days of receiving the results of the monitoring. The consent holder shall then engage in a process with the Councils:
 - (i) explain the cause of the non-conformance,
 - (ii) Propose appropriate settlement contingency measures for discussion with Councils and agree with the Councils on the appropriate settlement contingency measures and the timing for their implementation as described,
 - (iii) implement agreed settlement contingency measures as appropriate within the agreed time limit,
 - (iv) advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.

Monitoring – Water Quality

8. The consent holder shall monitor throughout the period of operation, the chemistry of the groundwater, pit run-off and pit discharge water abstracted from the open pit. The monitoring data is to be used to correlate these inflows with pit lake water quality predictions, and to provide a database for input into the closure plans. The sampling parameters and frequencies shall be described in the Martha Extended Project dewatering consent (unless agreed otherwise with the Waikato Regional Council) with the results forwarded to the Waikato Regional Council on an annual basis.

Other Water Users

9. If, in the opinion of the Waikato Regional Council, the exercise of this consent adversely affects stock, domestic or other water supplies, then the consent holder shall, at its own cost, be responsible for providing to the owner of those water supplies an alternative equivalent water supply, to the satisfaction of Waikato Regional Council. The consent holder shall be responsible for making an alternative water supply available within 12 hours of being directed to do so by the Waikato Regional Council.

Extract from conditions of Waikato Regional Council Resource Consent 124861 (Correnso), pertaining to Dewatering and Settlement:

Groundwater Monitoring

5. Piezometers shall be installed at sites to be approved by the Waikato Regional Council for the purpose of monitoring changes in groundwater arising from the exercise of this consent. The groundwater monitoring system shall be detailed in the dewatering and Settlement Monitoring Plan, prepared pursuant to condition 5 of consent number 124860.

Extract from common conditions of Hauraki District Council and Waikato Regional Council Resource Consent for Project Martha (202.2018), as pertaining to Dewatering and Settlement:

Dewatering and Settlement Monitoring Plan

14. The objectives of the groundwater and settlement management system shall be to ensure that dewatering operations do not give rise to surface instability and differential settlement beyond that authorised by this consent.
15. Two months prior to dewatering below 700 m RL (mine datum), the consent holder shall prepare, and submit to the Councils for their certification, a Dewatering and Settlement Monitoring Plan. The purpose of the Dewatering and Settlement Monitoring Plan is to monitor and assess the effects of the activities on land settlement and the groundwater hydraulic regime, and also to detail the contingency measures that will be actioned should groundwater or surface settlement triggers be exceeded.
16. The Plan shall, as a minimum, provide an overall description of the groundwater and settlement monitoring system and the measures to be adopted, including contingency measures, to meet the objectives of the groundwater and settlement management system set out in Condition 14 of this schedule. The monitoring regime shall be designed to assess the effects of:
 - a) *Dewatering on the regional groundwater system; and*
 - b) *Dewatering on settlement.*
17. Monitoring locations are to provide appropriate resolution of mine inflows and pumping, groundwater levels (both for shallow and deep aquifers) and ground surface tilt relative to the scale of surface infrastructure, throughout the area within the maximum extent of the groundwater cone of depression and particularly in the areas above and adjacent to the mining activities provided for in this consent. Final details are to be agreed with the Councils, but are to include additional piezometers and extensometers located along the line of upper level workings in the Rex Orebody. The Dewatering and Settlement Monitoring Plan shall also provide groundwater and settlement trigger limits that will initiate the implementation of contingency mitigation and / or monitoring measures and shall detail any linkages with the operation of the Martha Pit and Martha Underground Mine.
18. The exercise of this consent shall be in accordance with the Dewatering and Settlement Monitoring Plan as certified by the Councils. The Dewatering and Settlement Monitoring Plan shall be reviewed and updated as necessary by the consent holder. Any updated Dewatering and Settlement Monitoring Plan shall be promptly forwarded to the Councils for certification, and following this process, the updated plan shall be implemented in place of the previous version.
19. In the event that a tilt greater than 1 in 1,000 occurs between any two network monitoring locations installed in accordance with the Dewatering and Settlement Monitoring Plan required pursuant to Condition 15 of this schedule, or there is a significant variance from the predicted settlement rates, the consent holder shall notify the Councils in writing within 20 working days of receiving the results of the monitoring. The consent holder shall then:
 - a. Explain the cause of the non-conformance;

- b. Propose appropriate settlement contingency measures to the Councils and the timing of implementation thereof by the consent holder;
 - c. Implement settlement contingency measures as appropriate within the agreed time limit; and
 - d. Advise the Councils on the steps the consent holder proposes to take in order to prevent any further occurrence of the situation.
- 20. The consent holder shall as a matter of urgency, advise the Councils of any significant anomalies identified by the regular reading of groundwater levels in the piezometer network. Such advice is to include an explanation of the anomalous results and actions proposed to address any issues identified. This report is to be provided to the Councils within 10 working days of the anomalous results being identified.
- 21. A “significant anomaly” is defined as a drop in groundwater level greater than the seasonal variation in piezometers within the alluvium and younger volcanic rocks and a drop of 15 m or more in the recordings from piezometers tapping the upper 50 m of Andesite over a one month period.
- 22. In the event of any conflict or inconsistency between the conditions of this consent and the provisions of the Dewatering and Settlement Monitoring Plan, then the conditions of this consent shall prevail.

Advice Note:

The monitoring undertaken in terms of the Dewatering and Settlement Monitoring Plan may need to be continued for a period beyond the term of this consent depending on recharge of the groundwater following cessation of underground mining activities and filling of the Martha Pit.

Dewatering and Settlement Monitoring Report

- 23. The consent holder shall provide to the Councils (within one month of an agreed anniversary date) an annual Dewatering and Settlement Monitoring Report. The report shall, as a minimum, provide the following information:
 - a) The volume of groundwater abstracted;
 - b) The data from monitoring undertaken during the previous year, including groundwater contour plans (derived from the data) in respect of the piezometer network;
 - c) An interpretation and analysis of the monitoring data, in particular any change in the groundwater profile over the previous year, predictions of the future impacts that may arise as a result of any trends that have been identified including review of the predicted post closure effects based on actual monitoring data, and what contingency actions, if any, the consent holder proposes to take in response to those predictions, this analysis shall be undertaken by a party appropriately experienced and qualified to assess the information;
 - d) Any contingency actions that may have been taken during the year; and
 - e) Comment on compliance with Conditions 14 to 21 of this schedule including any reasons for non-compliance or difficulties in achieving conformance with the conditions of consent.
 - f) The report shall be forwarded in a form acceptable to the Councils.

Appendix B Surveyor Reports

MEMORANDUM

TO: MARK BURROUGHS

FROM: BRUCE MORRISON

DATE: 26TH JUNE 2024

SUBJECT: GROUND SETTLEMENT MONITORING -MAY 2024

Introduction

This report outlines the results from the May 2024 Ground Settlement Monitoring Survey.

Field Method

The settlement monitoring marks were levelled during May and June 2024, for OceanaGold by myself utilising a surveyor Jason Kerr, and an experienced *Kauri Gold* assistant under my supervision.

Equipment used for this 'May 2024' event was a new LEICA LS15 0.3 electronic digital level (SN 710477) paired with the LEICA 3 section 4.05 metre fibreglass bar coded GKNL4F staff. To minimise 'windage', the staff was typically used in 2 section 'mode'. A field calibration check was carried out by myself before commencing this event and the check result was satisfactory.

A summary of the above framework 'misclosures' for the last thirty-six events is tabulated below.

Event	West –East misclose (mm)	North –South misclose (mm)
	AP2 > 34BE > AP1	34BE > AP6
May 2007	+2.4	+6.4
Nov 2007	+2.7	+3.1
May 2008	+13.2	+4.0
Nov 2008	-8.1	+7.3
May2009	+8.8	+3.7
Nov 2009	-5.8	+2.0
May 2010	-8.1	+4.3
Nov 2010	-0.6	+6.4
May 2011	+2.0	+2.7
Nov 2011	+6.9	+6.5
May 2012	+4.1	+6.7
Nov 2012	+23.3	+5.3
May 2013	+2.7	+9.5
Nov 2013	-0.9	+4.5

May 2014	-1.1	+11.5
Nov 2014	-2.6	+7.0
May 2015	+1.6	+6.3
Nov 2015	-8.0	+10.3
May 2016	+9.2	+12.2
	AP20 No 2 > AP2 > 34BE > AP1	34BE > AP6
Nov 2016	+14.2	+3.6
	AP19 > AP2 > 34BE > AP1	34BE > AP6
May 2017	+1.0	+0.4
Nov 2017	-10.2	-0.5
May 2018	+6.4	+4.0
Nov 2018	-11.1	+3.6
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP6
May 2019	See page 2	See page 2
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP6
May 2019	-7.9	-6.9
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP24A > 34BE
Nov 2019	+0.3	-1.3
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP24A > C1
May 2020	-5.5	-1.7
Nov 2020	-3.2	-2.5
May 2021	-38.7	-9.2
Nov 2021	-0.8	+1.7
May 2022	+10.6	+2.3
Nov 2022	+30.7	+9.7
May 2023	+14.1	+10.7
Nov 2023	+14.4	+10.2
May 2024	+13.3	+4.9

Extending Levelling

This levelling event included LINZ benchmarks AP2, AP20 No 2, AP19, (to the west of Waihi), AP1 and BUH5 (to the east of Waihi). AP24 a.k.a control mark AP6 (south of Waihi) and AP25 have been lost to road works. AP24A and C1 have been established as a replacement for the lost AP6 control mark in this vicinity. AP2 and AP20 No 2 have now been 'unfixed' and AP19 is the fixed benchmark west of Waihi. The 'fixed' elevation value for AP19 was deduced from LINZ data comparing the relative levels of AP19, AP2, AP20 No2, and AP24 dating back to the year 1990. East of Waihi, AP1 is now 'unfixed, and there has never been any LINZ

data for this mark although AP1 appears to be constructed to the same specifications as AP19 and AP26. The R.L. for the 'new' fixed eastern control mark (BUH5) was the mean value from two close values (relative to AP19) levelled in May 2021 and Nov 2021.

Photographs

The order of levelling of the monitoring points has now been fixed. This has been achieved by photographing all of the settlement points and placing them in 22 albums –generally in the order the points are to be levelled. This will achieve repeatable error distribution and should therefore give better results. I believe **all** the marks now have accurate GPS fixes. In the future, this should make the task of locating these marks easier if the marks are covered over by re-seal etc, or quickly confirm if the marks have definitely been 'lost' to street maintenance etc.

I recommend continuing these 'maintenance' details before or during the next levelling event.

Adjustments

Disturbed marks BM20 and 2.44 are excluded from the settlement contouring- as are marks F18, F20, and F24. All the above marks are excluded from the settlement contouring. Mark 1PA was again missed owing to a road gravel heap over it. Mark 3.16 was missed owing to a gravel heap over this mark.

Mark 2.18 was again missed as it was under the same large pile of tree prunings at the time of this survey.

Marks 18F, F07A, F09A, and F14C have been lost. New marks 18FB and F09B have been established.

Results

Two A1 plans are attached -one (T20240625A) is colour coded by seven zones as identified in the 'Settlement and Groundwater Monitoring Plan. The original Zone boundaries and 'trigger' settlement values have been modified to match *Engineering Geology Ltd* Drawing No. 8332-Fig 16.

The second A1 plan "Total Settlement Contours" (T20240625B) shows the contours (in 20 millimetre intervals) deduced from the settlement marks. The locations of these settlement marks are shown with black 'stars'.

The first A1 plan "Total Settlement Values" (T20240625A) shows the location, station I.D., and total settlement value in millimetres for each mark.

The Settlement and Groundwater Monitoring Plan identifies gradients steeper than 1:1000 to be cause for concern. BM20 has been a large mover in the past and has been identified in past surveys as being placed on shrinking material. There are no buildings in this area anymore. I understand (from Mark Halloran) BM20A was placed near BM20 with a 'foot' bedded in firm ground. Significant differential settlement (1:114) is now occurring between BM20A and BM20 –sufficient to decide to omit BM20 from the settlement 'contour' calculation.

These contours represent the total negative (–ve) movement (or settlement) around Waihi since monitoring began.

The closest contours (omitting disturbed marks) are between marks 20AC and BM20A. The distance between these marks using GPS measurements, calculates at 126.706 metres, and show 0.1859 metres of relative vertical movement to give a gradient of 1:682. The distance between marks BM20A and 20D using GPS measurements, calculates at 137.047 metres, and shows 0.1567 metres of relative vertical movement to give a gradient of 1:874. The distance between marks 20C and BM20A, when checked by GPS measurements, calculates at 126.865 metres, and show 0.1272 metres of relative vertical movement to give a gradient of 1:997.

Some cracks are visible in the sealed pavements in this area of closest contours.

Table 1 (pages 3 -11) lists all the marks used for this settlement levelling event with the marks sorted first by Zone and then by settlement value. Marks that record 'exceedences' in terms of zone predictions (for Martha (2019) are highlighted with colour and have comments attached. All marks that 'exceeded' in Table 1 were analysed further and field inspections were conducted where required.

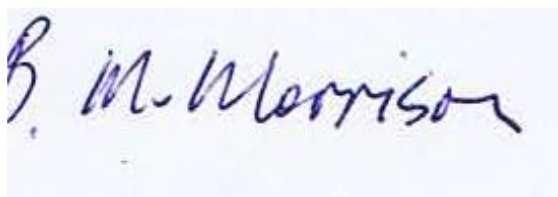
The comments included below attempt to explain the probable reason for 'excess' movement. The comments are *Dist'd* for BM20 in Zone 6. For Zone4, 7 of the 8 marks are near Zone 5. For Zone 3, 6 of the 6 marks

are located near Zone 4 or Zone 5. For Zone 2, 12 of the 14 marks are located near Zone 3 or Zone 4. For Zone 1, 2.44 is *Dist'd*, 10 of 13 other marks are located near Zone 2 or Zone 3.

The 'Favona' marks were installed for monitoring the effects of dewatering in the original underground mine area. The underlying original 'Martha' zone was Zone 3 but the Favona marks were never given zone exceedence parameters in terms of the original Martha zones. The Favona marks all report significant settlement. Note marks F18, F20, and F24 are tentatively labelled as 'Dist'd' and not used for contouring the settlement.

The five extra 'Favona' settlement marks are again shown on the plan. These are FP1, BLOCK-S, BLOCK-N, TRIG 22, and TRIG 24. The settlements for these marks have generally been deduced relative to original reduced levels measured around the year 1987 –although FP1 (at the Favona portal) was established about the year 2000. The underlying zone for the Favona marks is now Zone 5 Martha (2019).

I understand that Time-History plots for all survey marks grouped by zone will be produced by other persons in accordance with the "Settlement and Groundwater Monitoring Plan 31 July 2005"



Bruce Morrison

Registered Professional Surveyor

Table 1. Total Movement

	Zone	station i.d.	SURVEY			TOTAL	SETTLEMENT	Comments
			DATE	X	Y	Z	May-24	
1	Zone7	BM19B	1/05/2024	2117.17	1244.355	35.5198	-0.3462	
1	Zone7	19BB	1/05/2024	2191.56	1292.022	35.5157	-0.3421	
1	Zone7	17CB	1/05/2024	2014.23	1201.01	35.4512	-0.3224	
3	Zone6	BM20	1/05/2024	2342.50	1476.25	35.5639	-0.4169	Dist'd
1	Zone6	BM20A	1/05/2024	2345.50	1484.901	35.7409	-0.3363	
1	Zone6	19CB	1/05/2024	2296.71	1381.4	34.9086	-0.3213	
1	Zone6	17BB	1/05/2024	1919.52	1160.787	37.3395	-0.2915	
1	Zone6	17AB	1/05/2024	1841.32	1104.802	36.8617	-0.2536	
1	Zone6	34GC	1/05/2024	2211.33	1119.517	32.1214	-0.2304	
1	Zone6	2.04B	1/05/2024	1893.21	968.34	29.0718	-0.219	
1	Zone6	34H	1/05/2024	2233.59	970.561	32.1455	-0.2016	

1	Zone6	2.10	1/05/2024	2143.92	950.387	30.2676	-0.2013
1	Zone6	18EE	1/05/2024	1750.73	809.328	23.4252	-0.1962
1	Zone6	34AD	1/05/2024	1470.88	886.92	29.7534	-0.1934
1	Zone6	18C	1/05/2024	1494.95	767.19	27.4617	-0.1932
1	Zone6	18IB	1/05/2024	1611.19	784.79	25.8241	-0.1913
1	Zone6	34BE	1/05/2024	1732.56	931.603	28.32	-0.1867
1	Zone6	10BC	1/05/2024	1560.13	1062.92	38.0897	-0.1779
1	Zone6	34CB	1/05/2024	1967.74	983.20	30.0288	-0.1777
1	Zone6	BM34	1/05/2024	1528.38	903.297	30.3089	-0.1742
1	Zone6	34FC	1/05/2024	2120.79	587.93	19.0338	-0.1722
1	Zone6	BM17A	1/05/2024	1724.44	1088.919	40.0201	-0.1681
1	Zone6	11AC	1/05/2024	1308.26	859.512	29.3298	-0.1671
1	Zone6	10AB	1/05/2024	1430.61	1036.998	34.989	-0.164
1	Zone6	18AB	1/05/2024	1632.39	667.733	22.133	-0.1584
1	Zone6	2.08B	1/05/2024	2289.75	782.64	24.5281	-0.1583
1	Zone6	2.11C	1/05/2024	2292.35	896.99	26.6085	-0.1552
1	Zone6	1.28B	1/05/2024	1987.03	447.706	12.0919	-0.153
1	Zone6	2.09C	1/05/2024	2228.35	868.63	28.6369	-0.147
1	Zone6	34I	1/05/2024	2229.55	765.534	28.4594	-0.1388
1	Zone6	2.06	1/05/2024	2351.95	334.473	11.2723	-0.1294
1	Zone5	20C	1/05/2024	2450.61	1413.86	36.2983	-0.2091
1	Zone5	21DC	1/05/2024	2573.96	1304.152	37.747	-0.1927
1	Zone5	20E	1/05/2024	2535.65	1542.672	37.0686	-0.1922
1	Zone5	A10B	1/05/2024	1298.62	1049.614	30.6776	-0.1892
1	Zone5	25D	1/05/2024	2547.05	1248.02	36.8525	-0.1883
1	Zone5	21O	1/05/2024	2527.37	1356.342	35.9889	-0.1869
1	Zone5	16BC	1/05/2024	1252.81	1336.473	39.4427	-0.1848
1	Zone5	25A	1/05/2024	2505.13	1203.768	35.9257	-0.1841
1	Zone5	25E	1/05/2024	2472.35	1162.013	34.7618	-0.1817
1	Zone5	20D	1/05/2024	2482.07	1473.478	36.5378	-0.1796
1	Zone5	BM25	1/05/2024	2424.91	1100.253	33.4691	-0.179
1	Zone5	24L	1/05/2024	2761.67	1181.326	39.3041	-0.1741
1	Zone5	10DC	1/05/2024	1279.04	1198.326	35.291	-0.1741

1	Zone5	BM16	1/05/2024	1418.09	1218.03	46.4225	-0.1719
1	Zone5	21N	1/05/2024	2623.25	1342.435	38.2776	-0.1714
1	Zone5	2.41	1/05/2024	3296.32	685.398	46.248	-0.1684
1	Zone5	25G	1/05/2024	2594.60	1149.415	37.5774	-0.1671
1	Zone5	25H	1/05/2024	2648.48	1232.956	38.9087	-0.167
1	Zone5	25CB	1/05/2024	2615.91	1190.496	38.2849	-0.1664
1	Zone5	25F	1/05/2024	2542.53	1116.24	35.9878	-0.1651
1	Zone5	10CB	1/05/2024	1222.46	1025.86	29.7696	-0.1625
1	Zone5	25B	1/05/2024	2497.67	1105.828	34.8168	-0.1602
1	Zone5	12CE	1/05/2024	1499.92	543.077	20.9753	-0.1601
1	Zone5	BM12	1/05/2024	1370.27	607.735	23.9487	-0.158
1	Zone5	24AC	1/05/2024	2743.58	1218.9	40.0775	-0.1579
1	Zone5	2.03	1/05/2024	1930.08	745.94	22.5863	-0.1571
1	Zone5	13AC	1/05/2024	1751.98	327.376	18.588	-0.1569
1	Zone5	34EB	1/05/2024	2073.93	705.952	24.6307	-0.1569
1	Zone5	25I	1/05/2024	2537.20	1045.036	34.6769	-0.1558
1	Zone5	18G	1/05/2024	1669.05	554.602	18.4682	-0.1546
1	Zone5	24DC	1/05/2024	2718.29	1323.127	39.6265	-0.1543
1	Zone5	21C	1/05/2024	2651.57	1389.816	38.4579	-0.1543
1	Zone5	24F	1/05/2024	2772.80	1257.274	40.1201	-0.1536
1	Zone5	22F	1/05/2024	2815.91	1325.407	40.2242	-0.1533
1	Zone5	24E	1/05/2024	2758.43	1303.234	40.355	-0.1531
1	Zone5	18B	1/05/2024	1510.36	650.578	23.5543	-0.1527
1	Zone5	BM24	1/05/2024	2794.55	1279.361	40.3909	-0.1522
1	Zone5	24K	1/05/2024	2783.89	1387.719	40.6061	-0.1518
1	Zone5	1.28A	1/05/2024	1888.26	505.887	13.2041	-0.1514
1	Zone5	34D	1/05/2024	2038.90	783.431	25.3348	-0.1513
1	Zone5	24G	1/05/2024	2705.96	1170.464	39.7922	-0.1506
1	Zone5	20AC	1/05/2024	2461.04	1536.905	37.0087	-0.1504
1	Zone5	2A	1/05/2024	1069.03	1111.858	23.7942	-0.1486
1	Zone5	21EB	1/05/2024	2799.95	1429.087	41.6257	-0.1479
1	Zone5	BM18	1/05/2024	1771.96	674.528	19.4234	-0.147
1	Zone5	12DC	1/05/2024	1596.95	435.491	19.96	-0.1455

1	Zone5	12AC	1/05/2024	1388.32	488.888	19.0405	-0.1446	
1	Zone5	13BC	1/05/2024	1850.36	246.587	13.7164	-0.1446	
1	Zone5	24H	1/05/2024	2630.70	1072.279	36.1493	-0.1445	
1	Zone5	18HC	1/05/2024	1821.52	466.47	14.8834	-0.1445	
1	Zone5	24J	1/05/2024	2749.39	1365.756	40.2267	-0.1444	
1	Zone5	20BB	1/05/2024	2533.26	1622.291	37.8687	-0.1424	
1	Zone5	24B	1/05/2024	2667.67	1126.399	39.3796	-0.1417	
1	Zone5	15A	1/05/2024	1204.79	818.863	28.7678	-0.1409	
1	Zone5	21M	1/05/2024	2694.90	1439.648	39.1766	-0.1389	
1	Zone5	AP22A	1/11/2023	1868.44	188.565	12.4012	-0.1378	
1	Zone5	1.10B	1/05/2024	1597.98	284.28	16.7772	-0.137	
1	Zone5	12BC	1/05/2024	1405.27	368.295	14.911	-0.1367	
1	Zone5	15BC	1/05/2024	1169.90	708.855	26.3288	-0.1361	
1	Zone5	20F	1/05/2024	2605.79	1575.98	37.5655	-0.1361	
1	Zone5	BM13	1/05/2024	1426.61	269.34	13.5703	-0.1348	
1	Zone5	11BB	1/05/2024	1348.57	710.573	26.9268	-0.1321	
1	Zone5	4DB	1/05/2024	1033.26	1550.66	32.246	-0.1318	
1	Zone5	BM21	1/05/2024	2654.80	1515.397	39.4216	-0.1318	
1	Zone5	21K	1/05/2024	2681.11	1572.207	39.9941	-0.1312	
1	Zone5	21BC	1/05/2024	2719.27	1477.799	41.2645	-0.1304	
1	Zone5	2.17A	1/05/2024	3085.76	555.866	36.9017	-0.1278	
1	Zone5	4B	1/05/2024	1021.54	1448.629	31.2489	-0.1255	
1	Zone5	2BC	1/05/2024	970.20	1241.898	30.3812	-0.1248	
1	Zone5	30C	1/05/2024	2573.54	1675.395	38.4385	-0.1154	
1	Zone5	BM9B	1/05/2024	1220.25	1523.285	34.7469	-0.1105	
1	Zone5	7CB	1/05/2024	1161.74	1597.63	30.6077	-0.1081	
1	Zone5	AP3	1/05/2024	918.94	1140.585	26.0629	-0.1074	
1	Zone5	26F	1/05/2024	1392.77	1680.261	43.8553	-0.0846	
1	Zone5	26Q	1/05/2024	1963.00	1982.711	73.6687	-0.0824	
1	Zone5	26R	1/05/2024	1905.59	1927.165	71.3551	-0.0801	
1	Zone5	26PB	1/05/2024	1834.84	1893.106	67.9426	-0.08	
3	Zone5	18F	1/05/2024	1752.28	551.027	LOST	LOST	LOST
3	Zone5	18FB	1/05/2024	1794.53	557.104	15.9427	new mark	new mark
1	Zone4	23C	1/05/2024	2856.14	1068.014	37.5409	-0.2252	Nr Zone 5

1	Zone4	23AB	1/05/2024	3145.42	1078.73	37.1854	-0.1864	?
1	Zone4	22C	1/05/2024	2846.39	1352.544	40.3054	-0.1739	Nr Zone 5
1	Zone4	2.24	1/05/2024	2885.91	1215.469	41.2733	-0.1737	Nr Zone 5
1	Zone4	BANK1	1/05/2024	2866.21	1023.248	37.7859	-0.1684	Nr Zone 5
1	Zone4	23D	1/05/2024	2861.42	1154.885	38.8487	-0.1682	Nr Zone 5
1	Zone4	23E	1/05/2024	2774.82	972.514	37.6959	-0.1656	Nr Zone 5
1	Zone4	23F	1/05/2024	2700.77	968.793	36.6327	-0.1649	Nr Zone 5
1	Zone4	2.25	1/05/2024	2874.51	1097.261	37.9716	-0.1636	Nr Zone 5
1	Zone4	MATAURA1	1/05/2024	2831.84	1250.806	41.0601	-0.1597	
1	Zone4	22GB	1/05/2024	2862.88	1387.968	40.8367	-0.1575	
1	Zone4	2.13	1/05/2024	2725.42	874.951	47.1993	-0.1566	
1	Zone4	2.14A	1/05/2024	2853.28	838.669	41.3133	-0.1543	
1	Zone4	2.19B	1/05/2024	3270.21	916.063	38.5551	-0.1538	
1	Zone4	23B	1/05/2024	2856.49	949.794	38.7472	-0.1529	
1	Zone4	BARRY1	1/05/2024	3047.74	926.576	38.1126	-0.1522	
1	Zone4	MORTON	1/05/2024	2975.42	1231.913	40.7102	-0.1495	
1	Zone4	BARRY3	1/05/2024	3176.85	895.991	37.682	-0.1486	
1	Zone4	21P	1/05/2024	2849.17	1456.9	41.8379	-0.1454	
1	Zone4	BARRY4B	1/05/2024	3320.16	912.693	38.886	-0.1446	
1	Zone4	BARRY2B	1/05/2024	2937.67	943.59	38.5528	-0.1445	
1	Zone4	BARRY5	1/05/2024	3397.59	904.647	40.9902	-0.1422	
1	Zone4	1.11B	1/05/2024	1675.83	133.622	9.0212	-0.1418	
1	Zone4	22BC	1/05/2024	2916.75	1435.77	42.1	-0.1418	
1	Zone4	STAFORD	1/05/2024	3139.86	998.179	37.3124	-0.1418	
1	Zone4	BARRY6	1/05/2024	3432.52	904.356	42.4761	-0.1412	
1	Zone4	22E	1/05/2024	3055.20	1231.504	40.783	-0.1405	
1	Zone4	BM23	1/05/2024	3107.42	921.049	38.0867	-0.1404	
1	Zone4	2HB	1/05/2024	1078.24	886.849	24.3855	-0.1398	
1	Zone4	22I	1/05/2024	2918.98	1461.367	41.9094	-0.1398	
1	Zone4	22H	1/05/2024	2869.25	1441.796	41.618	-0.1388	
1	Zone4	2.16	1/05/2024	3007.62	739.64	33.5892	-0.1386	
1	Zone4	2.20	1/05/2024	3467.69	904.56	43.7839	-0.1372	
1	Zone4	2.23	1/05/2024	3560.02	1212.795	36.6356	-0.1369	
1	Zone4	22M	1/05/2024	2973.44	1434.656	41.6692	-0.1368	
1	Zone4	2.15	1/05/2024	2918.94	723.52	38.3618	-0.1351	

1	Zone4	22A	1/05/2024	3003.28	1429.771	41.6421	-0.1306
1	Zone4	22L	1/05/2024	3047.70	1499.876	40.9911	-0.1306
1	Zone4	BARRY8	1/05/2024	3592.28	871.451	37.9314	-0.1303
1	Zone4	BARRY7	1/05/2024	3518.87	901.897	43.6112	-0.1301
1	Zone4	CUBA	1/05/2024	3224.32	1079.177	35.8245	-0.1287
1	Zone4	GW	1/05/2024	3128.83	1140.936	38.5412	-0.1282
1	Zone4	AP100	1/05/2024	1893.80	81.273	11.7802	-0.1276
1	Zone4	22J	1/05/2024	2944.47	1489.763	42.4225	-0.1272
1	Zone4	BM2	1/05/2024	915.74	1091.799	24.8242	-0.1263
1	Zone4	2.22	1/05/2024	3339.13	1206.603	40.3516	-0.1262
1	Zone4	22D	1/05/2024	3100.02	1335.441	41.4505	-0.1256
1	Zone4	1.05	1/05/2024	1176.96	473.454	21.8139	-0.1255
1	Zone4	21FB	1/05/2024	2861.65	1512.211	42.645	-0.1253
1	Zone4	21L	1/05/2024	2806.79	1575.074	43.0823	-0.1215
1	Zone4	21AC	1/05/2024	2716.64	1617.767	39.6879	-0.1211
1	Zone4	2.29B	1/05/2024	2953.39	1548.172	42.587	-0.1198
1	Zone4	BM22	1/05/2024	3115.79	1442.952	40.6178	-0.1164
1	Zone4	2.27	1/05/2024	3379.40	1371.481	37.7542	-0.1164
1	Zone4	27KB	1/05/2024	2320.23	2120.206	63.3294	-0.1162
1	Zone4	1.26	1/05/2024	1926.81	30.053	15.0908	-0.116
1	Zone4	2GB	1/05/2024	922.38	967.661	22.6698	-0.1157
1	Zone4	26BE	1/05/2024	1408.78	1800.553	38.8108	-0.1153
1	Zone4	15C	1/05/2024	1156.82	571.077	24.2065	-0.1151
1	Zone4	21Q	1/05/2024	2899.60	1571.317	43.124	-0.1132
1	Zone4	1.06	1/05/2024	1159.34	302.26	17.2183	-0.1128
1	Zone4	21I	1/05/2024	2854.70	1668.793	41.6406	-0.1119
1	Zone4	22KB	1/05/2024	2981.80	1603.49	42.8472	-0.1095
1	Zone4	30BB	1/05/2024	2604.86	1726.50	41.546	-0.1089
1	Zone4	26CE	1/05/2024	1377.77	1711.891	40.5959	-0.1077
1	Zone4	21J	1/05/2024	2773.44	1688.923	39.9595	-0.1072
1	Zone4	21GC	1/05/2024	2901.12	1614.054	43.441	-0.1058
1	Zone4	2.31B	1/05/2024	3201.23	1637.289	42.091	-0.1023
1	Zone4	1.09B	1/05/2024	1344.14	117.48	9.923	-0.1021
1	Zone4	SM822	1/05/2024	2512.91	1841.132	41.4565	-0.1016
1	Zone4	27N	1/05/2024	2179.57	2075.985	71.911	-0.0996

1	Zone4	BM15	1/05/2024	976.94	783.004	20.5172	-0.0993	
1	Zone4	2.30B	1/05/2024	3000.35	1672.941	43.1691	-0.0985	
1	Zone4	27E	1/05/2024	2494.09	2171.622	50.3408	-0.0974	
1	Zone4	4.08	1/05/2024	2350.64	2022.324	73.2111	-0.096	
1	Zone4	21HC	1/05/2024	2916.84	1728.842	42.8802	-0.0958	
1	Zone4	7BB	1/05/2024	1105.69	1689.902	35.9365	-0.0908	
1	Zone4	26AE	1/11/2023	1432.47	1883.479	37.5432	-0.0896	
1	Zone4	4.07	1/05/2024	2554.47	2079.237	45.0468	-0.0863	
1	Zone4	3.01	1/05/2024	1291.95	1690.334	37.2936	-0.0859	
1	Zone4	4.05	1/05/2024	2809.68	1897.682	40.6156	-0.0858	
1	Zone4	3.04B	1/05/2024	1123.76	1821.498	39.2801	-0.0848	
1	Zone4	27H	1/05/2024	2413.27	2149.757	57.0265	-0.084	
1	Zone4	27J	1/05/2024	2344.14	2136.138	62.1323	-0.0836	
1	Zone4	BM30	1/05/2024	2715.36	1996.207	44.0834	-0.0802	
1	Zone4	26H	1/05/2024	1452.90	1729.593	49.9599	-0.0789	
1	Zone4	27F	1/05/2024	2466.48	2164.026	52.3179	-0.077	
1	Zone4	3.02	1/05/2024	1344.87	1837.735	34.9411	-0.0761	
1	Zone4	3.09	1/11/2023	1618.51	1870.174	51.9163	-0.0757	
1	Zone4	26MB	1/05/2024	1593.46	1750.66	58.9677	-0.0754	
1	Zone4	26JB	1/05/2024	1495.71	1756.55	53.7283	-0.0741	
1	Zone4	3.11A	1/05/2024	1786.17	1929.216	62.1483	-0.0738	
1	Zone4	30AB	1/05/2024	2685.64	1898.443	46.235	-0.0736	
1	Zone4	27DC	1/05/2024	2541.24	2190.709	48.1866	-0.0729	
1	Zone4	27AB	1/05/2024	2009.08	2064.33	73.4802	-0.0704	
1	Zone4	27L	1/05/2024	2280.24	2115.405	65.838	-0.0699	
1	Zone4	3.10A	1/05/2024	1689.03	1978.29	53.435	-0.0694	
1	Zone4	27O	1/05/2024	2101.57	2042.821	75.022	-0.0685	
1	Zone4	BM26	1/11/2023	1542.45	1837.805	45.4207	-0.0654	
1	Zone4	3.13	1/05/2024	1744.89	2097.492	53.7598	-0.0648	
1	Zone4	1.12B	1/05/2024	794.14	-73.011	11.0417	-0.063	
1	Zone4	26OB	1/05/2024	1706.93	1812.27	67.1804	-0.0544	
1	Zone4	3.6A	1/05/2024	1526.28	2015.74	38.9175	-0.0481	
3	Zone4	2.18	1/05/2024	3218.04	712.756	missed	missed	missed

1	Zone3	2CE	1/05/2024	774.75	1313.19	34.6066	-0.1193	Nr Zone 5
1	Zone3	2.34	1/05/2024	3452.45	1683.502	37.7018	-0.1115	Nr Zone 4

1	Zone3	14DB	1/05/2024	876.99	411.215	15.1471	-0.1067	Nr Zone 4
1	Zone3	A33C	1/05/2024	456.03	1219.226	35.8436	-0.0963	Nr Zone 5?
1	Zone3	2.36	1/05/2024	3433.14	1534.879	35.9191	-0.0961	Nr Zone 4
1	Zone3	1.25	1/05/2024	2175.94	-129.105	20.0507	-0.0953	Nr Zone 4
1	Zone3	2.40B	1/05/2024	3572.85	1526.452	33.1456	-0.0945	
1	Zone3	4.02	1/05/2024	2797.90	2143.571	45.755	-0.0941	
1	Zone3	2.33	1/05/2024	3294.51	1691.952	40.2997	-0.0932	
1	Zone3	4EC	1/05/2024	782.01	1687.78	41.1176	-0.0921	
1	Zone3	1.07	1/05/2024	924.43	267.487	12.4924	-0.0912	
1	Zone3	31BC	1/05/2024	3159.33	1954.857	45.4927	-0.0898	
1	Zone3	4A	1/05/2024	815.01	1494.154	40.6834	-0.089	
1	Zone3	BM31	1/05/2024	2967.04	1873.475	43.2766	-0.0889	
1	Zone3	2DA	1/05/2024	682.15	1189.579	35.7997	-0.0889	
1	Zone3	4.03B	1/05/2024	2794.90	2044.783	43.7926	-0.0883	
1	Zone3	15DB	1/05/2024	917.56	466.148	15.5932	-0.0868	
1	Zone3	2FC	1/05/2024	720.33	843.055	23.9212	-0.0853	
1	Zone3	4.01C	1/05/2024	2891.78	2113.146	47.2935	-0.0846	
1	Zone3	14EA	1/05/2024	808.56	504.723	17.0843	-0.0845	
1	Zone3	14CB	1/05/2024	759.10	389.766	18.8127	-0.0831	
1	Zone3	4.04	1/05/2024	2662.60	2131.765	45.9124	-0.0828	
1	Zone3	31AC	1/05/2024	3059.04	1910.629	44.0603	-0.0822	
1	Zone3	29DB	1/05/2024	2996.63	2106.664	47.7988	-0.0801	
1	Zone3	1.08	1/05/2024	1052.91	107.171	16.5194	-0.0794	
1	Zone3	1.21A	1/05/2024	1939.94	-325.504	19.6507	-0.079	
1	Zone3	14BC	1/05/2024	535.45	340.672	20.9068	-0.0787	
1	Zone3	2EB	1/05/2024	689.02	1054.621	29.2541	-0.0779	
1	Zone3	1.22	1/05/2024	1510.00	-249.925	15.8557	-0.0771	
1	Zone3	3.25	1/05/2024	3116.90	2107.056	49.8058	-0.0756	
1	Zone3	14FB	1/05/2024	705.60	649.144	20.1468	-0.0726	
1	Zone3	3.24B	1/05/2024	3012.46	2251.58	51.9874	-0.0681	
1	Zone3	29AC	1/05/2024	2641.62	2218.071	48.5105	-0.0654	
1	Zone3	29CE	1/05/2024	2891.84	2285.59	51.5658	-0.0638	
1	Zone3	29B	1/05/2024	2772.84	2242.217	49.9965	-0.0502	
1	Zone2	1K	1/05/2024	511.74	957.174	29.5917	-0.0773	Nr Zone 3
1	Zone2	7AC	1/05/2024	994.54	1781.823	43.516	-0.0759	Nr Zone 3

1	Zone2	3.03	1/05/2024	1134.46	1917.237	39.3398	-0.0751	Nr Zone 4
1	Zone2	3.14	1/05/2024	1752.75	2214.323	48.7516	-0.075	Nr Zone 4
1	Zone2	BM4	1/05/2024	689.21	1555.547	42.269	-0.0717	Nr Zone 3
1	Zone2	33F	1/05/2024	347.95	1511.678	42.0369	-0.0716	Nr4FBbelo
1	Zone2	3.12	1/05/2024	1599.68	2152.411	40.2572	-0.0706	Nr Zone 4
1	Zone2	4FB	1/05/2024	562.51	1370.97	39.3627	-0.0704	Nr Zone 3
1	Zone2	BM7	1/05/2024	1057.32	1843.069	44.1072	-0.0692	Nr Zone 4
1	Zone2	1C	1/05/2024	421.48	1098.886	34.7821	-0.0665	Nr Zone 3
1	Zone2	6A	1/05/2024	946.43	1928.115	47.502	-0.066	Nr Zone 4
1	Zone2	33E	1/05/2024	437.71	1437.524	40.9804	-0.0659	Nr4FBabov
1	Zone2	1JB	1/05/2024	604.79	822.761	26.4045	-0.0657	Nr Zone 3
1	Zone2	33A	1/05/2024	338.15	1303.893	36.713	-0.0656	Nr Zone 3
1	Zone2	1.04	1/05/2024	795.98	129.359	12.7953	-0.0636	
1	Zone2	1B	1/05/2024	337.50	1062.935	33.9951	-0.0621	
1	Zone2	3.07	1/05/2024	1362.08	2096.82	48.0381	-0.0611	
1	Zone2	1I	1/05/2024	468.34	761.228	27.2686	-0.0604	
1	Zone2	BM14	1/05/2024	718.16	485.955	19.8288	-0.0588	
1	Zone2	33DB	1/05/2024	265.40	1714.719	46.3598	-0.0586	
1	Zone2	BM6	1/05/2024	881.86	1837.081	46.2256	-0.058	
1	Zone2	5C	1/05/2024	705.43	1754.71	45.1601	-0.0569	
1	Zone2	33GA	1/05/2024	415.95	1621.638	45.3447	-0.0558	
1	Zone2	14AC	1/05/2024	515.17	457.622	24.0193	-0.0538	
1	Zone2	1FB	1/05/2024	210.46	850.779	29.8248	-0.0527	
1	Zone2	3.22A	1/05/2024	2891.15	2398.649	56.652	-0.0527	
1	Zone2	BM29	1/05/2024	2608.80	2400.756	55.9563	-0.0521	
1	Zone2	1EB	1/05/2024	388.60	912.09	30.4268	-0.0521	
1	Zone2	3.15	1/05/2024	1696.24	2315.821	39.0966	-0.0514	
1	Zone2	1HC	1/05/2024	299.70	702.8	27.0398	-0.0511	
1	Zone2	1A	1/05/2024	249.92	1026.38	33.3257	-0.05	
1	Zone2	1O	1/05/2024	-271.35	814.183	22.7077	-0.05	
1	Zone2	3.05	1/05/2024	966.29	1990.771	47.1827	-0.0497	
1	Zone2	1GB	1/05/2024	-2.87	769.742	29.2864	-0.0483	
1	Zone2	BM5	1/05/2024	325.93	1806.47	47.7981	-0.0473	
1	Zone2	1ME	1/05/2024	-155.40	879.887	26.0966	-0.0466	
1	Zone2	BM1	1/05/2024	152.75	994.869	32.7686	-0.046	

1	Zone2	33B	1/05/2024	156.88	1430.80	34.4074	-0.0456	
1	Zone2	5AC	1/05/2024	470.30	1688.454	47.0325	-0.0453	
1	Zone2	1.03B	1/05/2024	365.55	323.37	19.3817	-0.0435	
1	Zone2	1.01	1/05/2024	56.47	604.075	25.4438	-0.0431	
1	Zone2	33C	1/05/2024	222.53	1621.241	44.4055	-0.0426	
1	Zone2	1.02D	1/05/2024	85.42	283.3	18.6577	-0.0403	
1	Zone2	1RA	1/05/2024	-579.06	750.356	16.7301	-0.0377	
1	Zone2	1.14	1/05/2024	496.74	-535.095	8.4358	-0.0338	
1	Zone2	AP2	1/05/2024	-1276.40	954.13	5.767	-0.029	
1	Zone2	1.16	1/05/2024	1552.97	-1086.27	18.3549	-0.0231	
3	Zone2	1PA	1/05/2024	-351.51	787.24	missed	missed	missed
3	Zone1	2.44	1/05/2024	2734.64	421.025	27.2193	-0.6094	Dist'd
1	Zone1	2.05	1/05/2024	2535.68	272.682	20.7571	-0.123	Nr Zone 3
1	Zone1	31NE	1/05/2024	4349.43	1927.421	33.3235	-0.1051	?
1	Zone1	31LC	1/05/2024	4168.53	1862.106	32.0668	-0.1008	Nr Zone 3
1	Zone1	31FC	1/05/2024	3614.22	1954.15	43.4022	-0.0999	Nr Zone 3
1	Zone1	2.35	1/05/2024	3609.80	1652.681	34.0882	-0.0975	Nr Zone 3
1	Zone1	31HC	1/05/2024	3810.83	1924.65	40.306	-0.0895	Nr Zone 3
1	Zone1	31JD	1/05/2024	4005.65	1911.423	35.5324	-0.0881	Nr Zone 3
1	Zone1	31DD	1/05/2024	3400.43	1989.833	46.6722	-0.0877	Nr Zone 3
1	Zone1	31PC	1/05/2024	4393.52	1991.662	37.7047	-0.078	?
1	Zone1	31QC	1/05/2024	4417.71	2035.374	39.6003	-0.0754	?
1	Zone1	28AE	1/05/2024	2128.26	2448.76	85.9052	-0.0711	Nr Zone 2
1	Zone1	3.21	1/05/2024	2585.77	2493.375	64.9082	-0.068	Nr Zone 2
1	Zone1	3.30	1/05/2024	3296.29	2235.94	50.3652	-0.0575	Nr Zone 2
1	Zone1	3.26B	1/05/2024	3200.09	2347.92	55.4038	-0.0507	
1	Zone1	1.23	1/05/2024	1013.01	-440.769	13.2594	-0.0492	
1	Zone1	1.20B	1/05/2024	1995.49	-664.093	22.0243	-0.0482	
1	Zone1	1.24	1/05/2024	2225.16	-613.228	16.6861	-0.0475	
1	Zone1	3.23	1/05/2024	3035.80	2453.651	59.6115	-0.0461	
1	Zone1	3.29	1/05/2024	3662.64	2323.533	44.9052	-0.0453	
1	Zone1	AP1A	1/05/2024	4557.10	2288.33	42.4547	-0.0453	
1	Zone1	AP1	1/05/2024	4486.29	2137.008	41.3492	-0.0433	
1	Zone1	3.27B	1/05/2024	3148.37	2510.53	60.2696	-0.042	
1	Zone1	AP2A	1/05/2024	-766.18	738.506	12.3086	-0.0411	

1	Zone1	1.13	1/05/2024	591.36	-310.80	7.0514	-0.0411	
1	Zone1	1.27B	1/05/2024	1401.56	-701.57	15.3267	-0.0344	
1	Zone1	1UA	1/05/2024	-914.75	759.054	8.722	-0.0326	
1	Zone1	1.17B	1/05/2024	2082.20	-1093.92	25.5746	-0.029	
1	Zone1	AP24A	1/05/2024	2114.57	-1292.93	28.0476	-0.0276	
1	Zone1	1.15	1/05/2024	923.35	-995.413	14.3452	-0.0268	
1	Zone1	AP20No2	1/05/2024	-2303.63	731.69	20.185	-0.0202	
1	Zone1	BM28/2	1/05/2024	2282.46	2770.684	101.8814	-0.0043	
1	Zone1	AP19	1/05/2024	-3242.58	480.68	-6.5213	0	Control
1	Zone1	BUH5	1/05/2024	5480.15	2780.649	52.7029	0	Control
1	Zone1	C1	1/05/2024	2183.23	-1759.33	32.8139	0	Control
1	Zone1	3.16	1/05/2024	2195.60	2563.077	missed	missed	missed
3	Favona	F18	1/05/2024	3423.83	648.3	39.9448	-0.3866	dist'd?
3	Favona	F20	1/05/2024	3411.70	665.722	40.8757	-0.3284	dist'd?
1	Favona	F21	1/05/2024	3405.99	671.998	40.7182	-0.2951	
1	Favona	F17B	1/05/2024	3405.48	613.912	43.9456	-0.2939	
3	Favona	F24	1/05/2024	3388.13	690.846	40.5987	-0.2892	dist'd?
1	Favona	F22	1/05/2024	3399.79	678.393	40.6637	-0.2727	
1	Favona	F15C	1/05/2024	3297.17	585.319	57.305	-0.2115	
1	Favona	BLOCK-S	1/05/2024	3295.82	124.324	24.8059	-0.2061	
1	Favona	F16B	1/05/2024	3367.38	578.696	46.3613	-0.2047	
1	Favona	F26	1/05/2024	3374.47	705.541	40.5659	-0.2	
1	Favona	BLOCK-N	1/05/2024	3336.45	215.694	24.2763	-0.1867	
1	Favona	F10B	1/05/2024	3176.88	446.75	49.2446	-0.1835	
1	Favona	F12C	1/05/2024	3207.32	503.824	53.4711	-0.1817	
1	Favona	F34C	1/05/2024	3339.49	849.569	40.1604	-0.1801	
1	Favona	F28B	1/05/2024	3365.21	727.17	40.4869	-0.1728	
1	Favona	F30B	1/05/2024	3359.36	748.26	40.6739	-0.1636	
1	Favona	F08A	1/05/2024	3126.97	430.49	42.7209	-0.1566	
1	Favona	F32B	1/05/2024	3348.78	769.103	40.84	-0.152	
1	Favona	F35B	1/05/2024	3336.68	896.063	39.7507	-0.1465	
1	Favona	F06	1/05/2024	3107.08	445.21	40.475	-0.1428	
1	Favona	ITXCIVB	1/05/2024	2943.85	542.17	32.5826	-0.1401	
1	Favona	F02	1/05/2024	3097.60	490	38.1762	-0.1345	
1	Favona	FP1	1/05/2024	3004.15	131.25	45.388	-0.121	

1	Favona	TRIG 24	1/05/2024	3260.76	-615.678	25.6642	-0.0658	
1	Favona	TRIG 22	1/05/2024	3681.97	89.358	26.1301	-0.0599	
3	Favona	F07A	1/05/2024	3110.57	437.24	lost	lost	lost
3	Favona	F14C	1/05/2024	3275.29	551.312	lost	lost	lost
3	Favona	F09B	1/05/2024	3150.37	376.268	45.4118	new mark	New mark

MEMORANDUM

TO: MARK BURROUGHS

FROM: BRUCE MORRISON

DATE: 28TH JANUARY 2025

SUBJECT: GROUND SETTLEMENT MONITORING -NOVEMBER 2024

Introduction

This report outlines the results from the November 2024 Ground Settlement Monitoring Survey.

Field Method

The settlement monitoring marks were levelled during November 2024, for OceanaGold by myself utilising a surveyor Jason Kerr, and an experienced *Kauri Gold* assistant under my supervision.

Equipment used for this 'November 2024' event was a LEICA LS15 0.3 electronic digital level (SN 710477) paired with the LEICA 3 section 4.05 metre fibreglass bar coded GKNL4F staff. A field calibration check was carried out by myself before commencing this event and the check result was satisfactory.

A summary of the above framework 'misclosures' for the last thirty-seven events is tabulated below.

Event	West –East misclose (mm)	North –South misclose (mm)
	AP2 > 34BE > AP1	34BE > AP6
May 2007	+2.4	+6.4
Nov 2007	+2.7	+3.1
May 2008	+13.2	+4.0
Nov 2008	-8.1	+7.3
May2009	+8.8	+3.7
Nov 2009	-5.8	+2.0
May 2010	-8.1	+4.3
Nov 2010	-0.6	+6.4
May 2011	+2.0	+2.7
Nov 2011	+6.9	+6.5
May 2012	+4.1	+6.7
Nov 2012	+23.3	+5.3
May 2013	+2.7	+9.5
Nov 2013	-0.9	+4.5
May 2014	-1.1	+11.5

Nov 2014	-2.6	+7.0
May 2015	+1.6	+6.3
Nov 2015	-8.0	+10.3
May 2016	+9.2	+12.2
	AP20 No 2 > AP2 > 34BE > AP1	34BE > AP6
Nov 2016	+14.2	+3.6
	AP19 > AP2 > 34BE > AP1	34BE > AP6
May 2017	+1.0	+0.4
Nov 2017	-10.2	-0.5
May 2018	+6.4	+4.0
Nov 2018	-11.1	+3.6
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP6
May 2019	See page 2	See page 2
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP6
May 2019	-7.9	-6.9
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP24A > 34BE
Nov 2019	+0.3	-1.3
	AP19 > AP2 > 34BE > AP1 > BUH5	34BE > AP24A > C1
May 2020	-5.5	-1.7
Nov 2020	-3.2	-2.5
May 2021	-38.7	-9.2
Nov 2021	-0.8	+1.7
May 2022	+10.6	+2.3
Nov 2022	+30.7	+9.7
May 2023	+14.1	+10.7
Nov 2023	+14.4	+10.2
May 2024	+13.3	+4.9
Nov 2024	+17	+1

Extending Levelling

This levelling event included LINZ benchmarks AP2, AP20 No 2, AP19, (to the west of Waihi), AP1 and BUH5 (to the east of Waihi). AP24 a.k.a control mark AP6 (south of Waihi) and AP25 have been lost to road works. AP24A and C1 have been established as a replacement for the lost AP6 control mark in this vicinity. AP2 and AP20 No 2 have now been 'unfixed' and AP19 is the fixed benchmark west of Waihi. The 'fixed' elevation value for AP19 was deduced from LINZ data comparing the relative levels of AP19, AP2, AP20 No2, and AP24 dating back to the year 1990. East of Waihi, AP1 is now 'unfixed, and there has never been any LINZ

data for this mark although AP1 appears to be constructed to the same specifications as AP19 and AP26. The R.L. for the 'new' fixed eastern control mark (BUH5) was the mean value from two close values (relative to AP19) levelled in May 2021 and Nov 2021.

Photographs

The order of levelling of the monitoring points has now been fixed. This has been achieved by photographing all of the settlement points and placing them in 22 albums –generally in the order the points are to be levelled. This will achieve repeatable error distribution and should therefore give better results. I believe **all** the marks now have accurate GPS fixes. In the future, this should make the task of locating these marks easier if the marks are covered over by re-seal etc, or quickly confirm if the marks have definitely been 'lost' to street maintenance etc.

I recommend continuing these 'maintenance' details before or during the next levelling event.

Adjustments

Disturbed marks BM20 and 2.44 are excluded from the settlement contouring- as are marks F18, F20, and F24. All the above marks are excluded from the settlement contouring. Mark 1PA was again missed owing to a road gravel heap over it. Mark 21J has been lost to section development.

Marks 18F, F07A, F09A, and F14C have been lost. Marks 18FB and F09B established in May 2024 have deduced previous settlement applied.

Results

Two A1 plans are attached -one (T20250124C) is colour coded by seven zones as identified in the 'Settlement and Groundwater Monitoring Plan. The original Zone boundaries and 'trigger' settlement values have been modified to match *Engineering Geology Ltd* Drawing No. 8332-Fig 16.

The second A1 plan "Total Settlement Contours" (T20250124B) shows the contours (in 20 millimetre intervals) deduced from the settlement marks. The locations of these settlement marks are shown with black 'stars'.

The first A1 plan "Total Settlement Values" (T20250124C) shows the location, station I.D., and total settlement value in millimetres for each mark.

The Settlement and Groundwater Monitoring Plan identifies gradients steeper than 1:1000 to be cause for concern. BM20 has been a large mover in the past and has been identified in past surveys as being placed on shrinking material. There are no buildings in this area anymore. I understand (from Mark Halloran) BM20A was placed near BM20 with a 'foot' bedded in firm ground. Significant differential settlement (1:114) is now occurring between BM20A and BM20 –sufficient to decide to omit BM20 from the settlement 'contour' calculation.

The total settlement contours represent the total negative (–ve) movement (or settlement) around Waihi since monitoring began.

The closest contours (omitting disturbed marks) are between marks 20AC and BM20A. The distance between these marks using GPS measurements, calculates at 126.706 metres, and show 0.1891 metres of relative vertical movement to give a gradient of 1:670. The distance between marks BM20A and 20D using GPS measurements, calculates at 137.047 metres, and shows 0.1588 metres of relative vertical movement to give a gradient of 1:863. The distance between marks 20C and BM20A, when checked by GPS measurements, calculates at 126.865 metres, and show 0.1278 metres of relative vertical movement to give a gradient of 1:992.

Some cracks are visible in the sealed pavements in this area of closest contours.

Table 1 (pages 3 -11) lists all the marks used for this settlement levelling event with the marks sorted first by Zone and then by settlement value. Marks that record 'exceedences' in terms of zone predictions (for Martha (2019) are highlighted with colour and have comments attached. All marks that 'exceeded' in Table 1 were analysed further and field inspections were conducted where required.

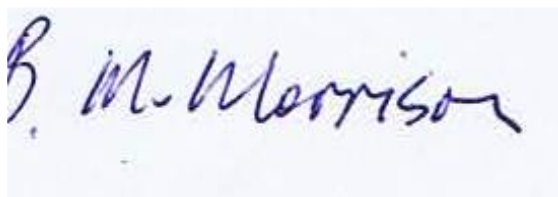
The comments included below attempt to explain the probable reason for 'excess' movement. The comments are *Dist'd* for BM20 in Zone 6. For Zone 4, 9 of the 10 marks are near Zone 5. For Zone 3, 13 of the 15 marks

are located near Zone 4 or Zone 5. For Zone 2, 20 of the 22 marks are located near Zone 3 or Zone 4. For Zone 1, 2.44 is *Dist'd*, 7 of 15 other marks are located near Zone 2 or Zone 5.

The 'Favona' marks were installed for monitoring the effects of dewatering in the original underground mine area. The underlying original 'Martha' zone was Zone 3 but the Favona marks were never given zone exceedence parameters in terms of the original Martha zones. The Favona marks all report significant settlement. Note marks F18, F20, and F24 are tentatively labelled as 'Dist'd' and not used for contouring the settlement.

The five extra 'Favona' settlement marks are again shown on the plan. These are FP1, BLOCK-S, BLOCK-N, TRIG 22, and TRIG 24. The settlements for these marks have generally been deduced relative to original reduced levels measured around the year 1987 –although FP1 (at the Favona portal) was established about the year 2000. The underlying zone for the Favona marks is now Zone 5 Martha (2019).

I understand that Time-History plots for all survey marks grouped by zone will be produced by other persons in accordance with the "Settlement and Groundwater Monitoring Plan 31 July 2005"



Bruce Morrison

Registered Professional Surveyor

Table 1. Total Movement

	Zone	station i.d.	SURVEY		X	Y	TOTAL	SETTLEMENT	
			DATE				Z	Nov-24	Comments
1	Zone7	BM19B	1/11/2024		2117.17	1244.355	35.511	-0.355	
1	Zone7	19BB	1/11/2024		2191.56	1292.022	35.508	-0.3498	
1	Zone7	17CB	1/11/2024		2014.23	1201.01	35.441	-0.3326	
3	Zone6	BM20	1/11/2024		2342.50	1476.25	35.559	-0.4218	Dist'd
1	Zone6	BM20A	1/11/2024		2345.50	1484.901	35.736	-0.3412	
1	Zone6	19CB	1/11/2024		2296.71	1381.4	34.902	-0.3279	
1	Zone6	17BB	1/11/2024		1919.52	1160.787	37.326	-0.305	
1	Zone6	17AB	1/11/2024		1841.32	1104.802	36.852	-0.2633	
1	Zone6	34GC	1/11/2024		2211.33	1119.517	32.117	-0.2348	
1	Zone6	2.04B	1/11/2024		1893.21	968.34	29.064	-0.2268	
1	Zone6	34H	1/11/2024		2233.59	970.561	32.142	-0.2051	
1	Zone6	2.10	1/11/2024		2143.92	950.387	30.264	-0.2049	

1	Zone6	18EE	1/11/2024	1750.73	809.328	23.418	-0.2034
1	Zone6	18C	1/11/2024	1494.95	767.193	27.453	-0.2019
1	Zone6	18IB	1/11/2024	1611.19	784.79	25.815	-0.2004
1	Zone6	34AD	1/11/2024	1470.88	886.92	29.749	-0.1978
1	Zone6	34BE	1/11/2024	1732.56	931.603	28.313	-0.1937
1	Zone6	10BC	1/11/2024	1560.13	1062.92	38.081	-0.1866
1	Zone6	34CB	1/11/2024	1967.74	983.202	30.023	-0.1835
1	Zone6	BM17A	1/11/2024	1724.44	1088.919	40.009	-0.1792
1	Zone6	BM34	1/11/2024	1528.38	903.297	30.304	-0.1791
1	Zone6	34FC	1/11/2024	2120.79	587.931	19.03	-0.176
1	Zone6	11AC	1/11/2024	1308.26	859.512	29.324	-0.1729
1	Zone6	10AB	1/11/2024	1430.61	1036.998	34.981	-0.172
1	Zone6	18AB	1/11/2024	1632.39	667.733	22.127	-0.1644
1	Zone6	2.08B	1/11/2024	2289.75	782.64	24.524	-0.1624
1	Zone6	2.11C	1/11/2024	2292.35	896.99	26.604	-0.1597
1	Zone6	1.28B	1/11/2024	1987.03	447.706	12.088	-0.1569
1	Zone6	2.09C	1/11/2024	2228.35	868.63	28.633	-0.1509
1	Zone6	34I	1/11/2024	2229.55	765.534	28.456	-0.1422
1	Zone6	2.06	1/11/2024	2351.95	334.473	11.271	-0.1307
1	Zone5	20C	1/11/2024	2450.61	1413.86	36.294	-0.2134
1	Zone5	20E	1/11/2024	2535.65	1542.672	37.063	-0.1978
1	Zone5	A10B	1/11/2024	1298.62	1049.614	30.671	-0.1958
1	Zone5	21DC	1/11/2024	2573.96	1304.152	37.744	-0.1957
1	Zone5	25D	1/11/2024	2547.05	1248.02	36.848	-0.1928
1	Zone5	16BC	1/11/2024	1252.81	1336.473	39.437	-0.1905
1	Zone5	25A	1/11/2024	2505.13	1203.768	35.922	-0.1878
1	Zone5	25E	1/11/2024	2472.35	1162.013	34.757	-0.1865
1	Zone5	21O	1/11/2024	2527.37	1356.342	35.99	-0.1858
1	Zone5	20D	1/11/2024	2482.07	1473.478	36.535	-0.1824
1	Zone5	BM25	1/11/2024	2424.91	1100.253	33.466	-0.1821
1	Zone5	BM16	1/11/2024	1418.09	1218.03	46.413	-0.1814
1	Zone5	10DC	1/11/2024	1279.04	1198.326	35.284	-0.1811
1	Zone5	21N	1/11/2024	2623.25	1342.435	38.275	-0.174

1	Zone5	25G	1/11/2024	2594.60	1149.415	37.574	-0.1705
1	Zone5	2.41	1/11/2024	3296.32	685.398	46.246	-0.1704
1	Zone5	25CB	1/11/2024	2615.91	1190.496	38.281	-0.1703
1	Zone5	25H	1/11/2024	2648.48	1232.956	38.906	-0.1697
1	Zone5	10CB	1/11/2024	1222.46	1025.855	29.763	-0.1691
1	Zone5	25F	1/11/2024	2542.53	1116.24	35.984	-0.1689
1	Zone5	24L	1/11/2024	2761.67	1181.326	39.31	-0.1682
1	Zone5	12CE	1/11/2024	1499.92	543.077	20.97	-0.1654
1	Zone5	BM12	1/11/2024	1370.27	607.735	23.943	-0.1637
1	Zone5	18FB	1/11/2024	1794.53	557.104	15.938	-0.1635
1	Zone5	25B	1/11/2024	2497.67	1105.828	34.814	-0.163
1	Zone5	2.03	1/11/2024	1930.08	745.943	22.581	-0.1624
1	Zone5	13AC	1/11/2024	1751.98	327.376	18.583	-0.1619
1	Zone5	34EB	1/11/2024	2073.93	705.952	24.628	-0.1596
1	Zone5	18G	1/11/2024	1669.05	554.602	18.464	-0.1588
1	Zone5	25I	1/11/2024	2537.20	1045.036	34.674	-0.1587
1	Zone5	24DC	1/11/2024	2718.29	1323.13	39.623	-0.1578
1	Zone5	18B	1/11/2024	1510.36	650.578	23.55	-0.157
1	Zone5	1.28A	1/11/2024	1888.26	505.887	13.199	-0.1565
1	Zone5	24AC	1/11/2024	2743.58	1218.90	40.079	-0.1564
1	Zone5	21C	1/11/2024	2651.57	1389.816	38.456	-0.1562
1	Zone5	2A	1/11/2024	1069.03	1111.858	23.787	-0.1558
1	Zone5	24K	1/11/2024	2783.89	1387.719	40.603	-0.1549
1	Zone5	22F	1/11/2024	2815.91	1325.407	40.223	-0.1545
1	Zone5	24E	1/11/2024	2758.43	1303.234	40.354	-0.1541
1	Zone5	34D	1/11/2024	2038.90	783.43	25.332	-0.1541
1	Zone5	24F	1/11/2024	2772.80	1257.274	40.12	-0.1537
1	Zone5	BM18	1/11/2024	1771.96	674.528	19.417	-0.1534
1	Zone5	BM24	1/11/2024	2794.55	1279.361	40.39	-0.1531
1	Zone5	20AC	1/11/2024	2461.04	1536.905	37.007	-0.1521
1	Zone5	21EB	1/11/2024	2799.95	1429.087	41.622	-0.1516
1	Zone5	24G	1/11/2024	2705.96	1170.464	39.792	-0.1508
1	Zone5	12DC	1/11/2024	1596.95	435.491	19.955	-0.1505

1	Zone5	24B	1/11/2024	2667.67	1126.399	39.372	-0.1493	
1	Zone5	12AC	1/11/2024	1388.32	488.888	19.036	-0.1491	
1	Zone5	13BC	1/11/2024	1850.36	246.587	13.712	-0.149	
1	Zone5	18HC	1/11/2024	1821.52	466.47	14.879	-0.1489	
1	Zone5	24J	1/11/2024	2749.39	1365.756	40.223	-0.1481	
1	Zone5	15A	1/11/2024	1204.79	818.86	28.761	-0.1477	
1	Zone5	24H	1/11/2024	2630.70	1072.279	36.147	-0.1468	
1	Zone5	20BB	1/11/2024	2533.26	1622.291	37.866	-0.1451	
1	Zone5	21M	1/11/2024	2694.90	1439.648	39.171	-0.1445	
1	Zone5	1.10B	1/11/2024	1597.98	284.28	16.772	-0.1422	
1	Zone5	BM13	1/11/2024	1426.61	269.34	13.563	-0.1421	
1	Zone5	AP22A	1/11/2024	1868.44	188.57	12.397	-0.1420	
1	Zone5	15BC	1/11/2024	1169.90	708.855	26.323	-0.1419	
1	Zone5	12BC	1/11/2024	1405.27	368.295	14.907	-0.1407	
1	Zone5	11BB	1/11/2024	1348.57	710.573	26.919	-0.1399	
1	Zone5	4DB	1/11/2024	1033.26	1550.66	32.238	-0.1398	
1	Zone5	20F	1/11/2024	2605.79	1575.98	37.562	-0.1396	
1	Zone5	BM21	1/11/2024	2654.80	1515.397	39.417	-0.1364	
1	Zone5	4B	1/11/2024	1021.54	1448.63	31.241	-0.1334	
1	Zone5	21K	1/11/2024	2681.11	1572.207	39.992	-0.1333	
1	Zone5	21BC	1/11/2024	2719.27	1477.799	41.262	-0.1329	
1	Zone5	2BC	1/11/2024	970.20	1241.898	30.374	-0.132	
1	Zone5	2.17A	1/11/2024	3085.76	555.866	36.901	-0.1285	
1	Zone5	30C	1/11/2024	2573.54	1675.395	38.435	-0.1189	
1	Zone5	BM9B	1/11/2024	1220.25	1523.285	34.74	-0.1174	
1	Zone5	7CB	1/11/2024	1161.74	1597.63	30.6	-0.1158	
1	Zone5	AP3	1/11/2024	918.94	1140.585	26.057	-0.1133	
1	Zone5	26F	1/11/2024	1392.77	1680.261	43.849	-0.0909	
1	Zone5	26Q	1/11/2024	1963.00	1982.711	73.663	-0.0881	
1	Zone5	26PB	1/11/2024	1834.84	1893.106	67.935	-0.0876	
1	Zone5	26R	1/11/2024	1905.59	1927.165	71.348	-0.0872	
1	Zone4	23C	1/11/2024	2856.14	1068.014	37.538	-0.2281	Nr Zone 5
1	Zone4	23AB	1/11/2024	3145.42	1078.732	37.183	-0.1888	?
1	Zone4	22C	1/11/2024	2846.39	1352.544	40.304	-0.1753	Nr Zone 5
1	Zone4	2.24	1/11/2024	2885.91	1215.469	41.273	-0.174	Nr Zone 5

1	Zone4	BANK1	1/11/2024	2866.21	1023.248	37.783	-0.1713	Nr Zone 5
1	Zone4	23D	1/11/2024	2861.42	1154.885	38.846	-0.1709	Nr Zone 5
1	Zone4	23E	1/11/2024	2774.82	972.514	37.697	-0.1645	Nr Zone 5
1	Zone4	2.25	1/11/2024	2874.51	1097.26	37.973	-0.1622	Nr Zone 5
1	Zone4	MATAURA1	1/11/2024	2831.84	1250.806	41.059	-0.1608	Nr Zone 5
1	Zone4	22GB	1/11/2024	2862.88	1387.968	40.834	-0.1602	Nr Zone 5
1	Zone4	23F	1/11/2024	2700.77	968.793	36.639	-0.1586	
1	Zone4	2.19B	1/11/2024	3270.21	916.063	38.554	-0.1549	
1	Zone4	BARRY1	1/11/2024	3047.74	926.576	38.112	-0.1528	
1	Zone4	2.14A	1/11/2024	2853.28	838.669	41.315	-0.1526	
1	Zone4	23B	1/11/2024	2856.49	949.794	38.748	-0.1521	
1	Zone4	2.13	1/11/2024	2725.42	874.951	47.205	-0.1509	
1	Zone4	MORTON	1/11/2024	2975.42	1231.913	40.709	-0.1507	
1	Zone4	BARRY3	1/11/2024	3176.85	895.991	37.681	-0.1496	
1	Zone4	2.18	1/11/2024	3218.04	712.756	44.539	-0.1477	
1	Zone4	1.11B	1/11/2024	1675.83	133.622	9.016	-0.147	
1	Zone4	BARRY4B	1/11/2024	3320.16	912.693	38.884	-0.1466	
1	Zone4	2HB	1/11/2024	1078.24	886.849	24.379	-0.1463	
1	Zone4	22E	1/11/2024	3055.20	1231.504	40.779	-0.1445	
1	Zone4	BARRY5	1/11/2024	3397.59	904.647	40.988	-0.1444	
1	Zone4	BARRY2B	1/11/2024	2937.67	943.59	38.553	-0.1443	
1	Zone4	22BC	1/11/2024	2916.75	1435.773	42.098	-0.1438	
1	Zone4	BARRY6	1/11/2024	3432.52	904.356	42.474	-0.1433	
1	Zone4	21P	1/11/2024	2849.17	1456.9	41.841	-0.1423	
1	Zone4	22H	1/11/2024	2869.25	1441.796	41.615	-0.1418	
1	Zone4	2.23	1/11/2024	3560.02	1212.795	36.631	-0.1415	
1	Zone4	22I	1/11/2024	2918.98	1461.367	41.908	-0.1412	
1	Zone4	BM23	1/11/2024	3107.42	921.049	38.087	-0.1401	
1	Zone4	22M	1/11/2024	2973.44	1434.656	41.666	-0.14	
1	Zone4	STAFORD	1/11/2024	3139.86	998.179	37.315	-0.1392	
1	Zone4	2.20	1/11/2024	3467.69	904.56	43.782	-0.1391	
1	Zone4	22L	1/11/2024	3047.70	1499.876	40.985	-0.1367	
1	Zone4	2.16	1/11/2024	3007.62	739.64	33.5915	-0.1363	
1	Zone4	AP100	1/11/2024	1893.80	81.273	11.773	-0.1348	
1	Zone4	2.15	1/11/2024	2918.94	723.52	38.363	-0.1339	

1	Zone4	22A	1/11/2024	3003.28	1429.771	41.639	-0.1337
1	Zone4	2.22	1/11/2024	3339.13	1206.603	40.345	-0.1328
1	Zone4	BM2	1/11/2024	915.74	1091.799	24.818	-0.1325
1	Zone4	GW	1/11/2024	3128.83	1140.936	38.538	-0.1314
1	Zone4	1.05	1/11/2024	1176.96	473.454	21.808	-0.1314
1	Zone4	BARRY8	1/11/2024	3592.28	871.451	37.93	-0.1303
1	Zone4	CUBA	1/11/2024	3224.32	1079.177	35.823	-0.1302
1	Zone4	22D	1/11/2024	3100.02	1335.441	41.446	-0.1301
1	Zone4	BARRY7	1/11/2024	3518.87	901.897	43.609	-0.1301
1	Zone4	22J	1/11/2024	2944.47	1489.763	42.42	-0.1297
1	Zone4	21FB	1/11/2024	2861.65	1512.211	42.642	-0.1283
1	Zone4	21L	1/11/2024	2806.79	1575.074	43.079	-0.1248
1	Zone4	21AC	1/11/2024	2716.64	1617.767	39.685	-0.124
1	Zone4	2.29B	1/11/2024	2953.39	1548.172	42.583	-0.1238
1	Zone4	26BE	1/11/2024	1408.78	1800.553	38.803	-0.1231
1	Zone4	1.26	1/11/2024	1926.81	30.053	15.084	-0.1228
1	Zone4	27KB	1/11/2024	2320.23	2120.206	63.323	-0.1226
1	Zone4	2GB	1/11/2024	922.38	967.661	22.664	-0.1215
1	Zone4	BM22	1/11/2024	3115.79	1442.952	40.613	-0.1212
1	Zone4	15C	1/11/2024	1156.82	571.077	24.201	-0.1206
1	Zone4	2.27	1/11/2024	3379.40	1371.481	37.75	-0.1206
1	Zone4	1.06	1/11/2024	1159.34	302.262	17.212	-0.1191
1	Zone4	21Q	1/11/2024	2899.60	1571.317	43.12	-0.1172
1	Zone4	21I	1/11/2024	2854.70	1668.793	41.636	-0.1165
1	Zone4	22KB	1/11/2024	2981.80	1603.49	42.842	-0.1147
1	Zone4	26CE	1/11/2024	1377.77	1711.891	40.589	-0.1146
1	Zone4	30BB	1/11/2024	2604.86	1726.496	41.543	-0.1119
1	Zone4	1.09B	1/11/2024	1344.14	117.48	9.915	-0.1101
1	Zone4	21GC	1/11/2024	2901.12	1614.054	43.437	-0.1098
1	Zone4	BM15	1/11/2024	976.94	783.004	20.509	-0.1075
1	Zone4	2.31B	1/11/2024	3201.23	1637.289	42.086	-0.1073
1	Zone4	SM822	1/11/2024	2512.91	1841.132	41.452	-0.1061
1	Zone4	27N	1/11/2024	2179.57	2075.99	71.905	-0.1056
1	Zone4	2.30B	1/11/2024	3000.35	1672.941	43.164	-0.1036
1	Zone4	27E	1/11/2024	2494.09	2171.622	50.335	-0.1032

1	Zone4	21HC	1/11/2024	2916.84	1728.842	42.875	-0.101
1	Zone4	4.08	1/11/2024	2350.64	2022.324	73.207	-0.1001
1	Zone4	7BB	1/11/2024	1105.69	1689.902	35.929	-0.0983
1	Zone4	3.01	1/11/2024	1291.95	1690.33	37.286	-0.0935
1	Zone4	4.07	1/11/2024	2554.47	2079.237	45.041	-0.0921
1	Zone4	3.04B	1/11/2024	1123.76	1821.498	39.273	-0.0919
1	Zone4	26AE	1/11/2024	1432.47	1883.479	37.542	-0.0908
1	Zone4	4.05	1/11/2024	2809.68	1897.682	40.612	-0.0894
1	Zone4	27J	1/11/2024	2344.14	2136.138	62.127	-0.0889
1	Zone4	27H	1/11/2024	2413.27	2149.757	57.023	-0.0875
1	Zone4	26H	1/11/2024	1452.90	1729.593	49.952	-0.0868
1	Zone4	26MB	1/11/2024	1593.46	1750.663	58.959	-0.0841
1	Zone4	BM30	1/11/2024	2715.36	1996.207	44.08	-0.0836
1	Zone4	3.02	1/11/2024	1344.87	1837.735	34.934	-0.0832
1	Zone4	27F	1/11/2024	2466.48	2164.026	52.312	-0.0829
1	Zone4	3.09	1/11/2024	1618.51	1870.174	51.91	-0.082
1	Zone4	26JB	1/11/2024	1495.71	1756.55	53.721	-0.0814
1	Zone4	3.11A	1/11/2024	1786.17	1929.216	62.141	-0.0811
1	Zone4	30AB	1/11/2024	2685.64	1898.443	46.229	-0.0796
1	Zone4	27DC	1/11/2024	2541.24	2190.709	48.181	-0.0785
1	Zone4	27AB	1/11/2024	2009.08	2064.334	73.474	-0.0766
1	Zone4	3.10A	1/11/2024	1689.03	1978.29	53.428	-0.0764
1	Zone4	27L	1/11/2024	2280.24	2115.41	65.832	-0.0759
1	Zone4	3.13	1/11/2024	1744.89	2097.492	53.751	-0.0736
1	Zone4	27O	1/11/2024	2101.57	2042.821	75.018	-0.0725
1	Zone4	BM26	1/11/2024	1542.45	1837.805	45.414	-0.0721
1	Zone4	1.12B	1/11/2024	794.14	-73.011	11.033	-0.0717
1	Zone4	26OB	1/11/2024	1706.93	1812.27	67.173	-0.0618
1	Zone4	3.6A	1/11/2024	1526.28	2015.739	38.912	-0.0536
3	Zone4	21J	1/11/2024	2773.44	1688.923	lost	missed

1	Zone3	2CE	1/11/2024	774.75	1313.191	34.6	-0.1259	Nr Zone 5
1	Zone3	14DB	1/11/2024	876.99	411.215	15.137	-0.1168	Nr Zone 4
1	Zone3	2.34	1/11/2024	3452.45	1683.502	37.699	-0.1143	Nr 2.33
1	Zone3	A33C	1/11/2024	456.03	1219.226	35.838	-0.1019	Nr 2CE
1	Zone3	2.36	1/11/2024	3433.14	1534.879	35.914	-0.1012	Nr Zone 4

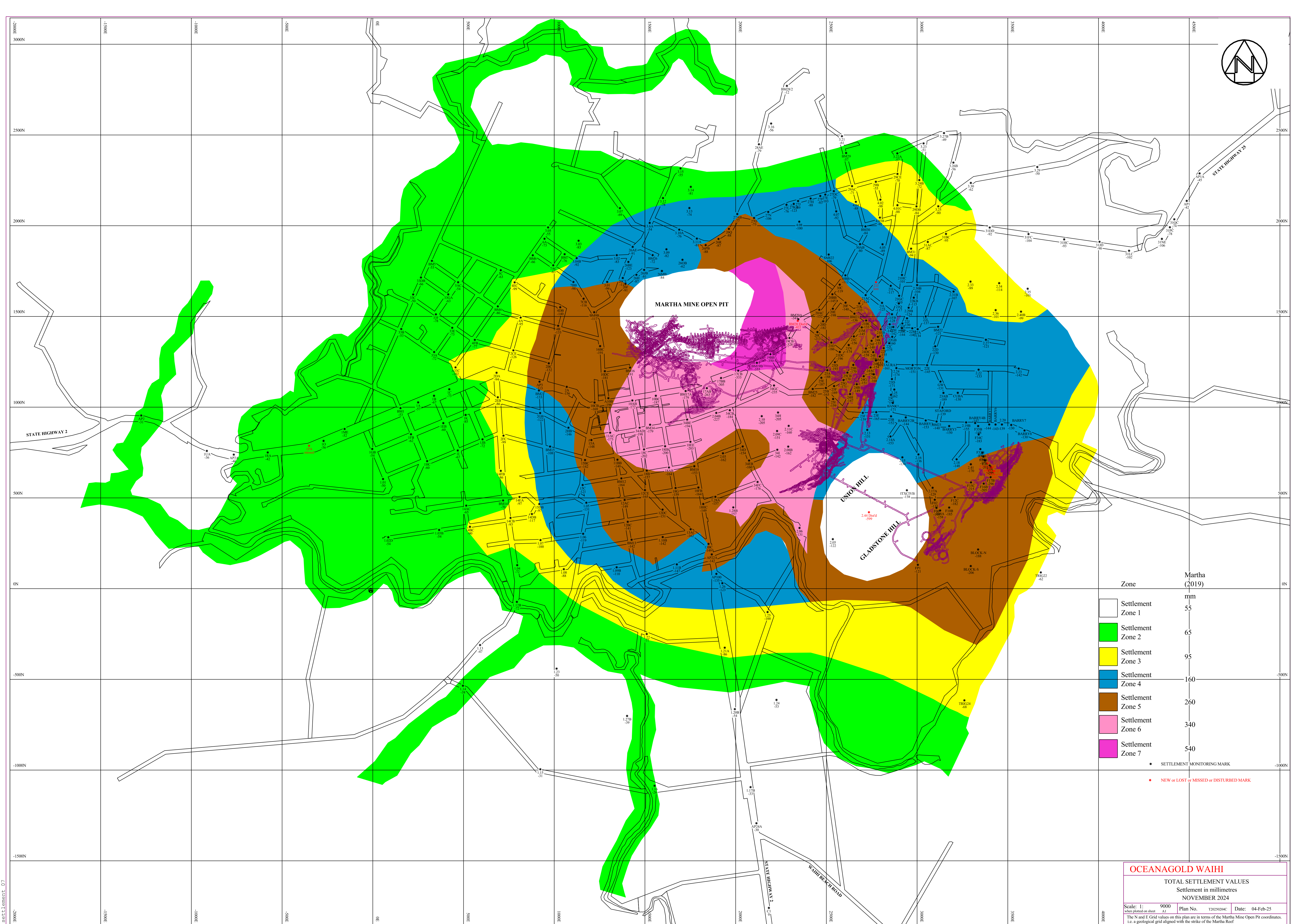
1	Zone3	1.25	1/11/2024	2175.94	-129.105	20.046	-0.1	Nr Zone 4
1	Zone3	1.07	1/11/2024	924.43	267.487	12.484	-0.0996	Nr Zone 4
1	Zone3	2.40B	1/11/2024	3572.85	1526.452	33.141	-0.0991	Nr Zone 4
1	Zone3	2.33	1/11/2024	3294.51	1691.952	40.294	-0.0989	Nr Zone 4
1	Zone3	4EC	1/11/2024	782.01	1687.78	41.111	-0.0987	Nr Zone 5
1	Zone3	2FC	1/11/2024	720.33	843.055	23.908	-0.0985	Nr Zone 4
1	Zone3	4.02	1/11/2024	2797.90	2143.571	45.751	-0.0981	Nr Zone 4
1	Zone3	15DB	1/11/2024	917.56	466.148	15.583	-0.097	Nr Zone 4
1	Zone3	14EA	1/11/2024	808.56	504.723	17.072	-0.0968	Nr Zone4
1	Zone3	4A	1/11/2024	815.01	1494.154	40.677	-0.0954	Nr Zone 5
1	Zone3	31BC	1/11/2024	3159.33	1954.857	45.488	-0.0945	
1	Zone3	2DA	1/11/2024	682.15	1189.579	35.795	-0.0936	
1	Zone3	BM31	1/11/2024	2967.04	1873.475	43.272	-0.0935	
1	Zone3	14CB	1/11/2024	759.10	389.766	18.803	-0.0928	
1	Zone3	4.03B	1/11/2024	2794.90	2044.783	43.789	-0.0919	
1	Zone3	14BC	1/11/2024	535.45	340.67	20.896	-0.0895	
1	Zone3	4.04	1/11/2024	2662.60	2131.765	45.907	-0.0882	
1	Zone3	4.01C	1/11/2024	2891.78	2113.146	47.29	-0.0881	
1	Zone3	1.08	1/11/2024	1052.91	107.171	16.511	-0.0878	
1	Zone3	31AC	1/11/2024	3059.04	1910.629	44.056	-0.0865	
1	Zone3	14FB	1/11/2024	705.60	649.144	20.133	-0.0864	
1	Zone3	2EB	1/11/2024	689.02	1054.621	29.246	-0.086	
1	Zone3	1.21A	1/11/2024	1939.94	-325.504	19.644	-0.0857	
1	Zone3	29DB	1/11/2024	2996.63	2106.66	47.795	-0.0839	
1	Zone3	3.25	1/11/2024	3116.90	2107.056	49.801	-0.0804	
1	Zone3	1.22	1/11/2024	1510.00	-249.925	15.856	-0.0768	
1	Zone3	3.24B	1/11/2024	3012.46	2251.58	51.984	-0.0715	
1	Zone3	29AC	1/11/2024	2641.62	2218.071	48.505	-0.0709	
1	Zone3	29CE	1/11/2024	2891.84	2285.59	51.56	-0.0696	
1	Zone3	29B	1/11/2024	2772.84	2242.22	49.992	-0.0547	
1	Zone2	1K	1/11/2024	511.74	957.174	29.584	-0.085	Nr Zone 3
1	Zone2	7AC	1/11/2024	994.54	1781.82	43.509	-0.0829	Nr Zone 4
1	Zone2	3.03	1/11/2024	1134.46	1917.237	39.332	-0.0829	Nr Zone 4
1	Zone2	3.14	1/11/2024	1752.75	2214.323	48.746	-0.0806	Nr Zone 4
1	Zone2	BM4	1/11/2024	689.21	1555.547	42.261	-0.0797	Nr Zone 3

1	Zone2	3.12	1/11/2024	1599.68	2152.411	40.25	-0.0778	Nr Zone 4
1	Zone2	33F	1/11/2024	347.95	1511.678	42.031	-0.0775	Nr 33E
1	Zone2	4FB	1/11/2024	562.51	1370.97	39.356	-0.0771	Nr Zone 3
1	Zone2	BM7	1/11/2024	1057.32	1843.069	44.1	-0.0764	Nr Zone 4
1	Zone2	33E	1/11/2024	437.71	1437.524	40.973	-0.0733	Nr Zone 3
1	Zone2	6A	1/11/2024	946.43	1928.115	47.495	-0.073	Nr Zone 4
1	Zone2	1C	1/11/2024	421.48	1098.886	34.776	-0.0726	Nr Zone 3
1	Zone2	1JB	1/11/2024	604.79	822.761	26.398	-0.0722	Nr Zone 3
1	Zone2	1.04	1/11/2024	795.98	129.359	12.787	-0.0719	Nr Zone 3
1	Zone2	33A	1/11/2024	338.15	1303.893	36.707	-0.0716	Nr Zone 3
1	Zone2	BM14	1/11/2024	718.16	485.955	19.818	-0.0696	Nr Zone 3
1	Zone2	3.07	1/11/2024	1362.08	2096.818	48.03	-0.0692	Nr Zone 4
1	Zone2	1B	1/11/2024	337.50	1062.935	33.99	-0.0672	Nr Zone 3
1	Zone2	1I	1/11/2024	468.34	761.228	27.262	-0.067	Nr Zone 3
1	Zone2	33DB	1/11/2024	265.40	1714.719	46.352	-0.0664	On pole
1	Zone2	BM6	1/11/2024	881.86	1837.081	46.218	-0.0656	Nr Zone 3
1	Zone2	14AC	1/11/2024	515.17	457.622	24.008	-0.0651	Nr Zone 3
1	Zone2	5C	1/11/2024	705.43	1754.71	45.154	-0.0630	
1	Zone2	33GA	1/11/2024	415.95	1621.638	45.338	-0.0625	
1	Zone2	1FB	1/11/2024	210.46	850.779	29.816	-0.0615	
1	Zone2	1HC	1/11/2024	299.70	702.8	27.031	-0.0599	
1	Zone2	1EB	1/11/2024	388.60	912.09	30.419	-0.0599	
1	Zone2	BM29	1/11/2024	2608.80	2400.756	55.951	-0.0574	
1	Zone2	1A	1/11/2024	249.92	1026.38	33.319	-0.0567	
1	Zone2	3.22A	1/11/2024	2891.15	2398.649	56.648	-0.0567	
1	Zone2	1O	1/11/2024	-271.35	814.183	22.702	-0.0557	
1	Zone2	3.05	1/11/2024	966.29	1990.771	47.177	-0.0554	
1	Zone2	3.15	1/11/2024	1696.24	2315.821	39.093	-0.055	
1	Zone2	1.03B	1/11/2024	365.55	323.37	19.371	-0.0542	
1	Zone2	1.02D	1/11/2024	85.42	283.3	18.644	-0.054	
1	Zone2	5AC	1/11/2024	470.30	1688.454	47.024	-0.0538	
1	Zone2	1GB	1/11/2024	-2.87	769.742	29.281	-0.0537	
1	Zone2	BM5	1/11/2024	325.93	1806.47	47.792	-0.0534	
1	Zone2	33B	1/11/2024	156.88	1430.804	34.4	-0.053	
1	Zone2	BM1	1/11/2024	152.75	994.869	32.762	-0.0526	

1	Zone2	1ME	1/11/2024	-155.40	879.887	26.091	-0.0522	
1	Zone2	33C	1/11/2024	222.53	1621.241	44.398	-0.0501	
1	Zone2	1.01	1/11/2024	56.47	604.075	25.437	-0.0499	
1	Zone2	1RA	1/11/2024	-579.06	750.356	16.726	-0.0418	
1	Zone2	1.14	1/11/2024	496.74	-535.095	8.432	-0.0376	
1	Zone2	AP2	1/11/2024	-1276.40	954.13	5.765	-0.031	
1	Zone2	1.16	1/11/2024	1552.97	-1086.27	18.352	-0.026	
3	Zone2	1PA	1/11/2024	-351.51	787.24	missed	missed	
3	Zone1	2.44	1/11/2024	2734.64	421.025	27.23	-0.5987	Dist'd
1	Zone1	2.05	1/11/2024	2535.68	272.682	20.758	-0.1221	Nr Zone 5
1	Zone1	31NE	1/11/2024	4349.43	1927.421	33.323	-0.1056	Nr river
1	Zone1	31FC	1/11/2024	3614.22	1954.151	43.398	-0.1041	Nr 31DD
1	Zone1	31LC	1/11/2024	4168.53	1862.106	32.066	-0.1016	Nr River
1	Zone1	2.35	1/11/2024	3609.80	1652.681	34.085	-0.1007	Nr Zone 3
1	Zone1	31HC	1/11/2024	3810.83	1924.654	40.303	-0.0925	Nr 31FC
1	Zone1	31DD	1/11/2024	3400.43	1989.833	46.668	-0.0919	Nr Zone 3
1	Zone1	31JD	1/11/2024	4005.65	1911.423	35.531	-0.0895	Nr 31HC
1	Zone1	28AE	1/11/2024	2128.26	2448.76	85.897	-0.0793	Nr Zone 2
1	Zone1	31PC	1/11/2024	4393.52	1991.662	37.705	-0.0777	Nr 31NE
1	Zone1	31QC	1/11/2024	4417.71	2035.374	39.602	-0.0737	Nr 31PC
1	Zone1	3.30	1/11/2024	3296.29	2235.94	50.3605	-0.0622	Nr Zone 2
1	Zone1	3.21	1/11/2024	2585.77	2493.375	64.915	-0.0612	Nr Zone 2
1	Zone1	3.16	1/11/2024	2195.60	2563.077	95.596	-0.0564	Nr 28AE
1	Zone1	3.26B	1/11/2024	3200.09	2347.92	55.399	-0.0555	Nr Zone 2
1	Zone1	1.20B	1/11/2024	1995.49	-664.093	22.019	-0.0535	
1	Zone1	1.24	1/11/2024	2225.16	-613.228	16.681	-0.0526	
1	Zone1	3.23	1/11/2024	3035.80	2453.651	59.607	-0.0506	
1	Zone1	1.23	1/11/2024	1013.01	-440.769	13.259	-0.0496	
1	Zone1	3.29	1/11/2024	3662.64	2323.533	44.901	-0.0495	
1	Zone1	3.27B	1/11/2024	3148.37	2510.53	60.263	-0.0486	
1	Zone1	1.13	1/11/2024	591.36	-310.80	7.046	-0.0465	
1	Zone1	AP2A	1/11/2024	-766.18	738.506	12.304	-0.0457	
1	Zone1	AP1A	1/11/2024	4557.10	2288.33	42.455	-0.045	
1	Zone1	AP1	1/11/2024	4486.29	2137.008	41.351	-0.0415	
1	Zone1	1.27B	1/11/2024	1401.56	-701.57	15.3225	-0.0386	

1	Zone1	1UA	1/11/2024	-914.75	759.054	8.719	-0.0356	
1	Zone1	1.17B	1/11/2024	2082.20	-1093.92	25.571	-0.0326	
1	Zone1	1.15	1/11/2024	923.35	-995.41	14.341	-0.0310	
1	Zone1	AP24A	1/11/2024	2114.57	-1292.93	28.045	-0.0302	
1	Zone1	AP20No2	1/11/2024	-2303.63	731.69	20.184	-0.0212	
1	Zone1	BM28/2	1/11/2024	2282.46	2770.684	101.874	-0.0117	
1	Zone1	AP19	1/11/2024	-3242.58	480.68	-6.5213	0	control
1	Zone1	BUH5	1/11/2024	5480.15	2780.649	52.7029	0	control
1	Zone1	C1	1/11/2024	2183.23	-1759.33	32.8139	0	control
3	Favona	F18	1/11/2024	3423.83	648.3	39.941	-0.3904	Dist'd?
3	Favona	F20	1/11/2024	3411.70	665.722	40.873	-0.3311	Dist'd?
1	Favona	F21	1/11/2024	3405.99	671.998	40.716	-0.2973	
1	Favona	F17B	1/11/2024	3405.48	613.912	43.944	-0.2955	
3	Favona	F24	1/11/2024	3388.13	690.846	40.598	-0.2899	Dist'd?
1	Favona	F22	1/11/2024	3399.79	678.393	40.662	-0.2744	
1	Favona	F15C	1/11/2024	3297.17	585.319	57.302	-0.2145	
1	Favona	BLOCK-S	1/11/2024	3295.82	124.324	24.806	-0.206	
1	Favona	F16B	1/11/2024	3367.38	578.696	46.361	-0.205	
1	Favona	F26	1/11/2024	3374.47	705.541	40.563	-0.2029	
1	Favona	BLOCK-N	1/11/2024	3336.45	215.694	24.275	-0.188	
1	Favona	F10B	1/11/2024	3176.88	446.75	49.243	-0.1851	
1	Favona	F34C	1/11/2024	3339.49	849.569	40.158	-0.1825	
1	Favona	F12C	1/11/2024	3207.32	503.824	53.471	-0.1818	
1	Favona	F28B	1/11/2024	3365.21	727.17	40.483	-0.1767	
1	Favona	F30B	1/11/2024	3359.36	748.26	40.672	-0.1655	
1	Favona	F08A	1/11/2024	3126.97	430.49	42.72	-0.1575	
1	Favona	F32B	1/11/2024	3348.78	769.103	40.839	-0.153	
1	Favona	F35B	1/11/2024	3336.68	896.063	39.749	-0.1482	
1	Favona	F06	1/11/2024	3107.08	445.21	40.474	-0.1438	
1	Favona	ITXCIVB	1/11/2024	2943.85	542.17	32.585	-0.1377	
1	Favona	F02	1/11/2024	3097.60	490	38.176	-0.1347	
1	Favona	FP1	1/11/2024	3004.15	131.25	45.388	-0.121	
1	Favona	TRIG 24	1/11/2024	3260.76	-615.678	25.662	-0.068	
1	Favona	TRIG 22	1/11/2024	3681.97	89.358	26.128	-0.062	

Appendix C Plans of Settlement Marks & Contours



Zone	Martha (2019)
Settlement Zone 1	55 mm
Settlement Zone 2	65
Settlement Zone 3	95
Settlement Zone 4	160
Settlement Zone 5	260
Settlement Zone 6	340
Settlement Zone 7	540

• SETTLEMENT MONITORING MARK

• NEW or LOST or MISSED or DISTURBED MARK

OCEANAGOLD WAIHI

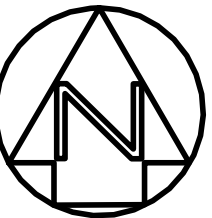
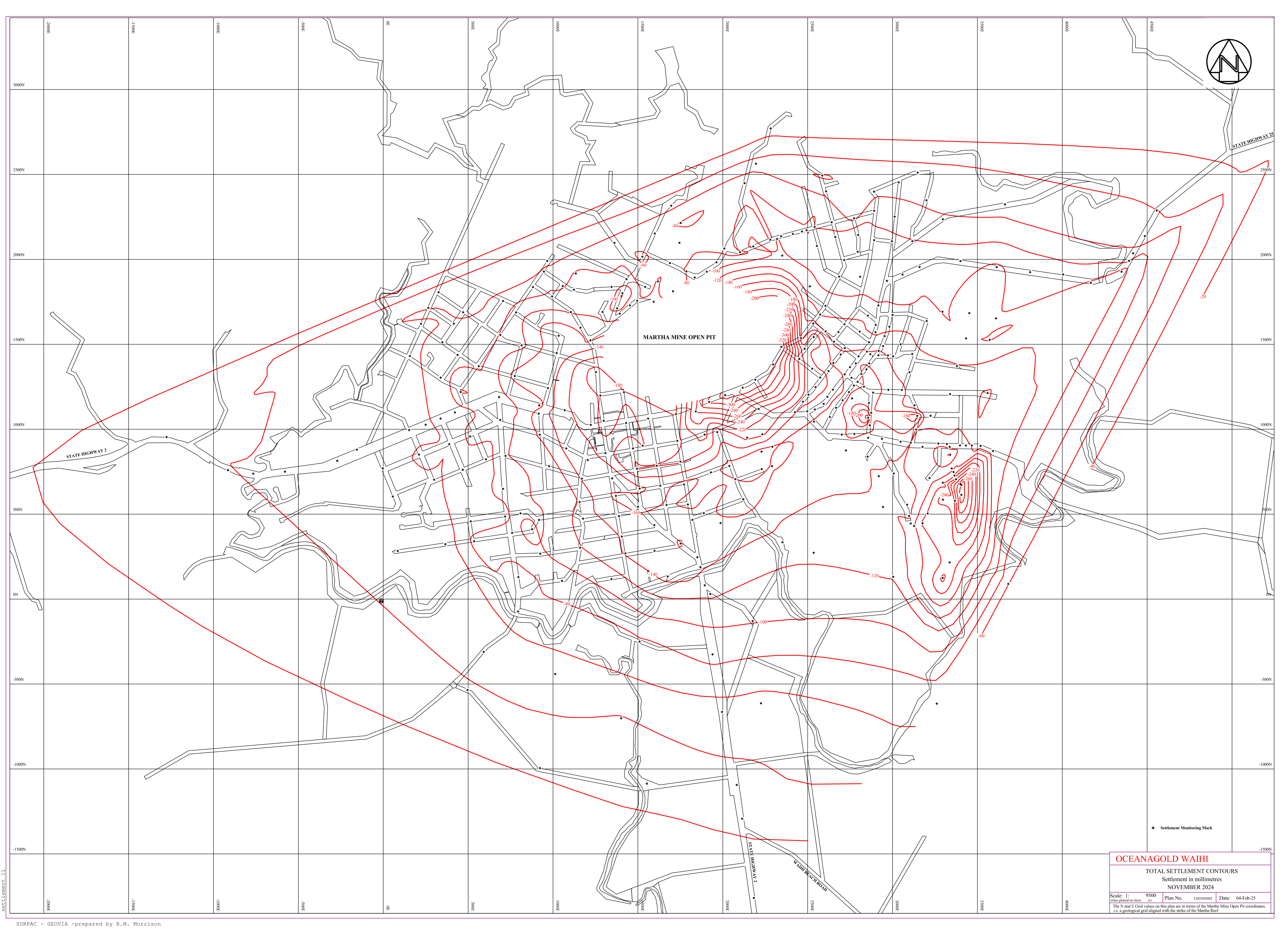
TOTAL SETTLEMENT VALUES
Settlement in millimetres
NOVEMBER 2024

Scale: 1: 9000
when plotted on sheet A1

Plan No. T20260204C

Date: 04-Feb-25

The N and E Grid values on this plan are in terms of the Martha Mine Open Pit coordinates.
i.e. a geological grid aligned with the strike of the Martha Reef



STATE HIGHWAY 25

MARTHA MINE OPEN PIT

STATE HIGHWAY 2

STATE HIGHWAY 2

WAIHI BEACH ROAD

* Settlement Monitoring Mark

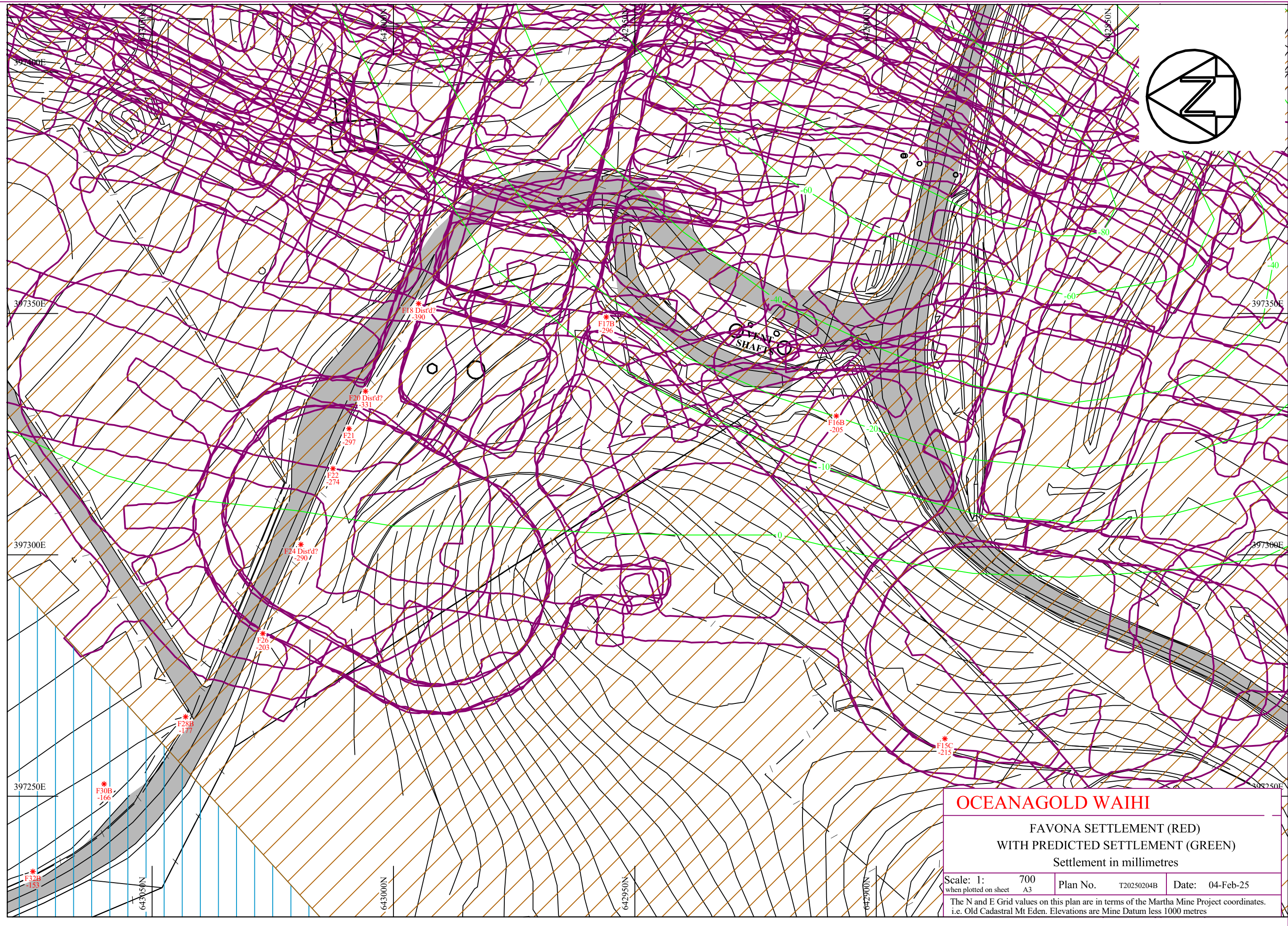
OCEANAGOLD WAIHI

TOTAL SETTLEMENT CONTOURS
Settlement in millimetres
NOVEMBER 2024

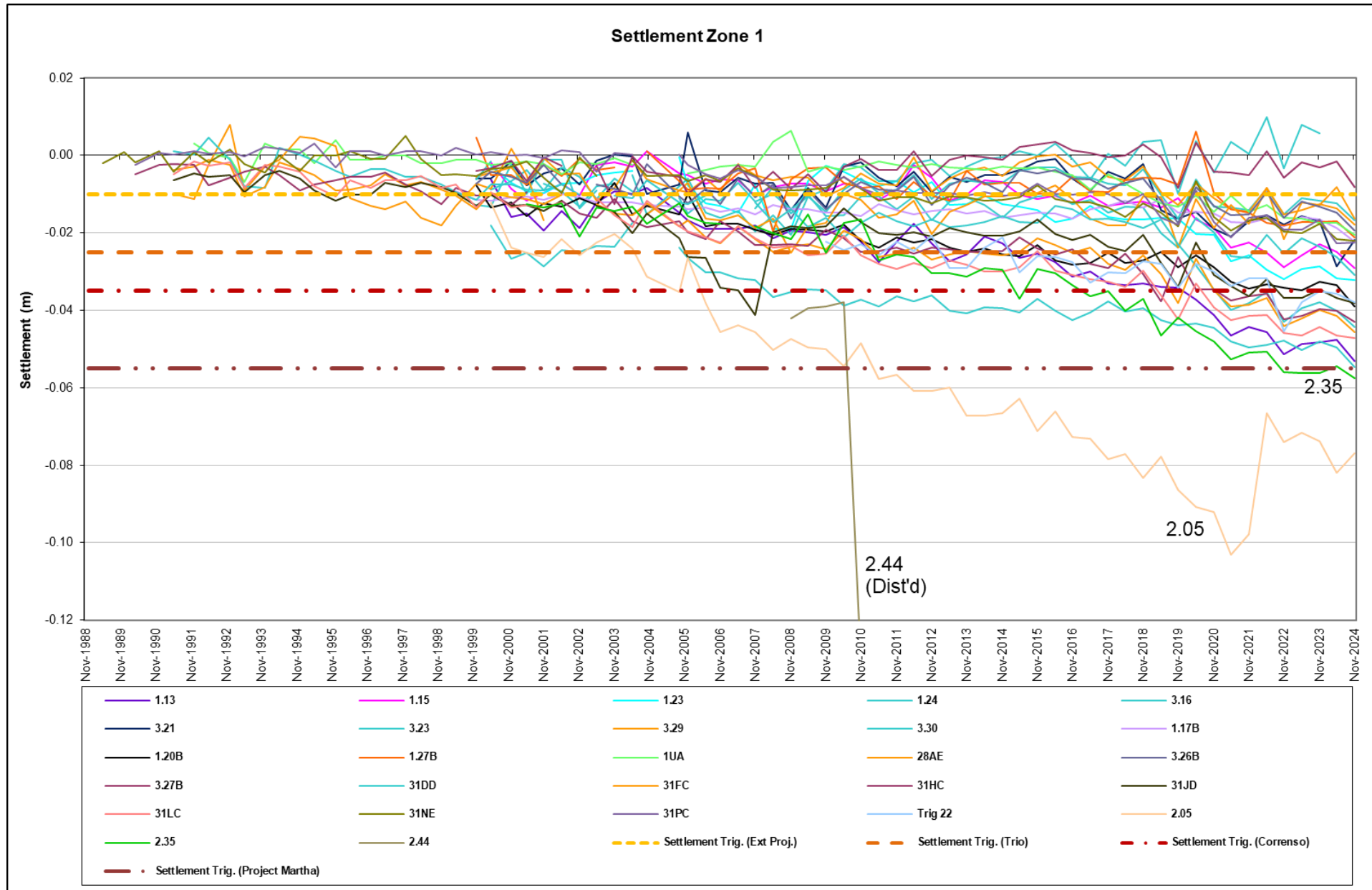
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The N and E Grid values on this plan are in terms of the Martha Mine Open Pit coordinates.
i.e. a geological grid aligned with the strike of the Martha Reef

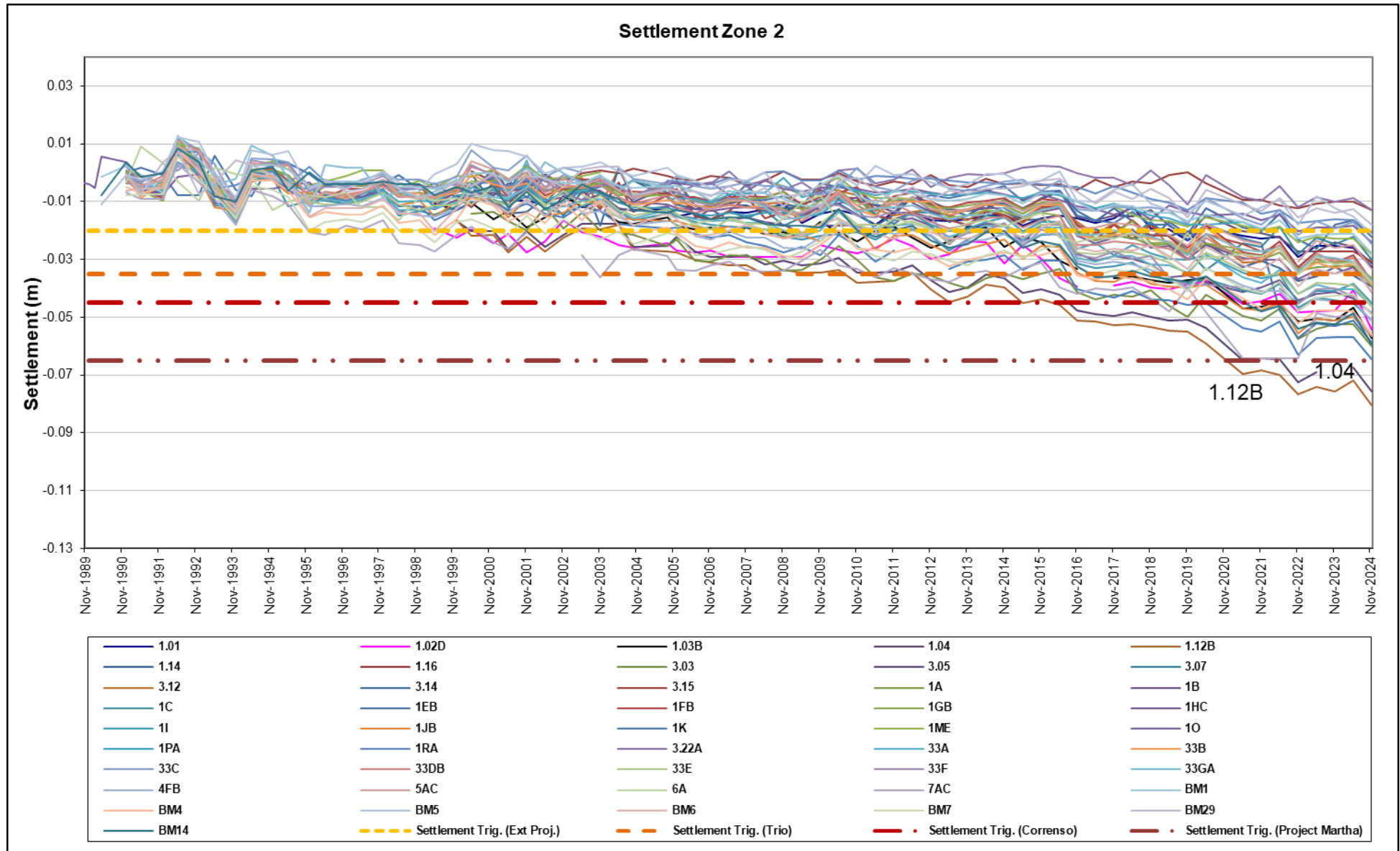
Plan No. T202502040 Date: 04-Feb-25

favona 11

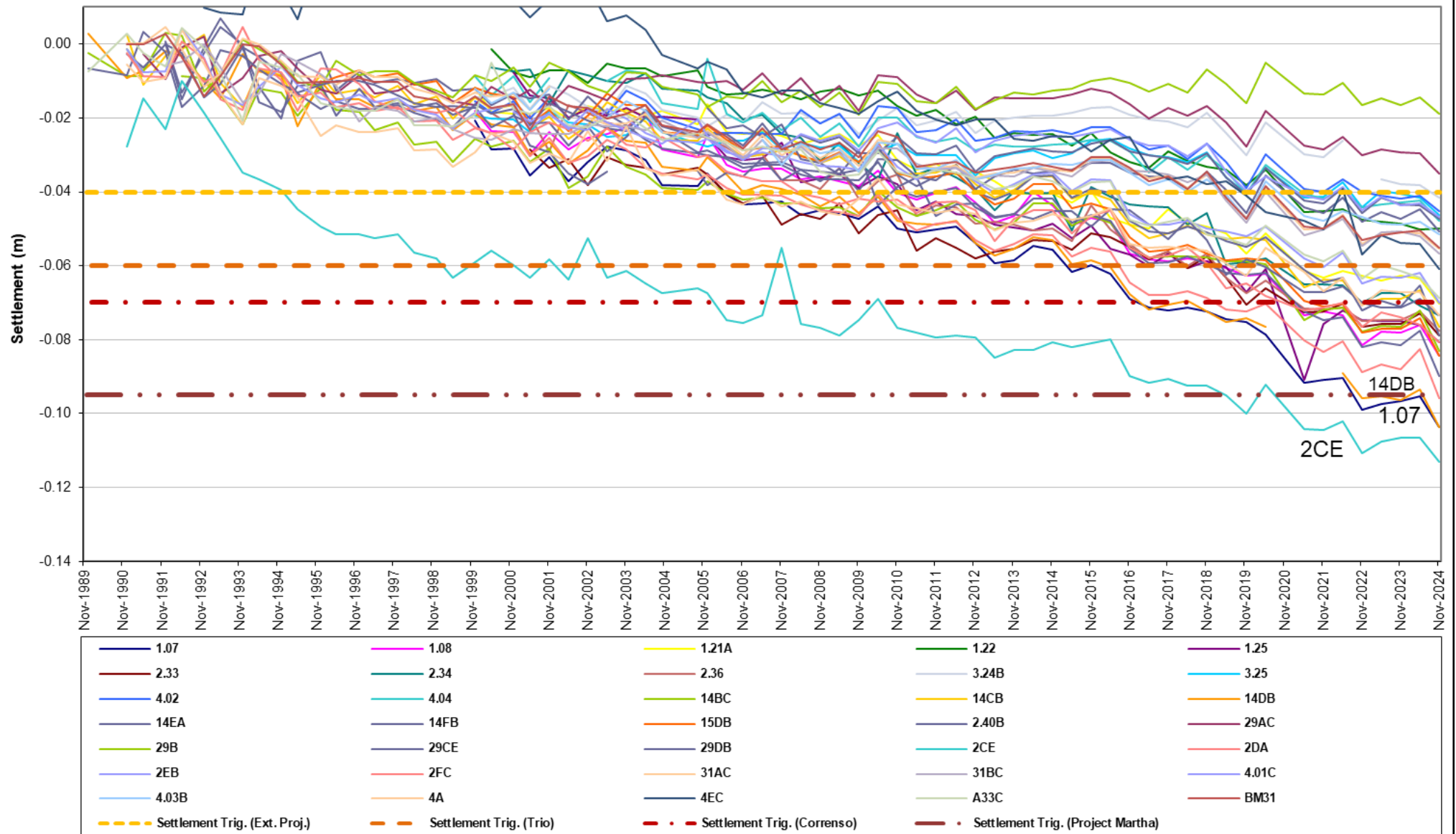


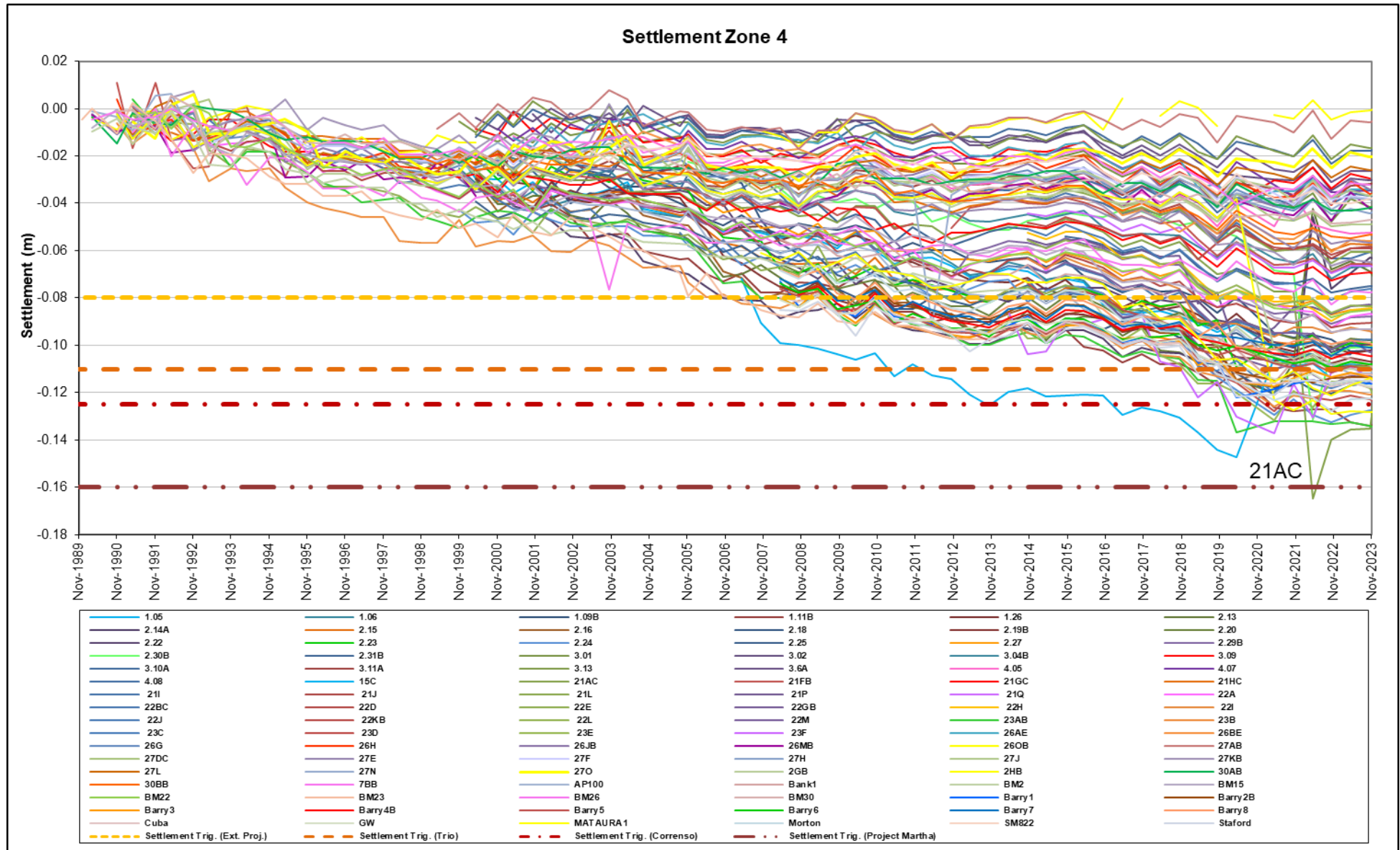
Appendix D Trend Plots of Settlement Zone

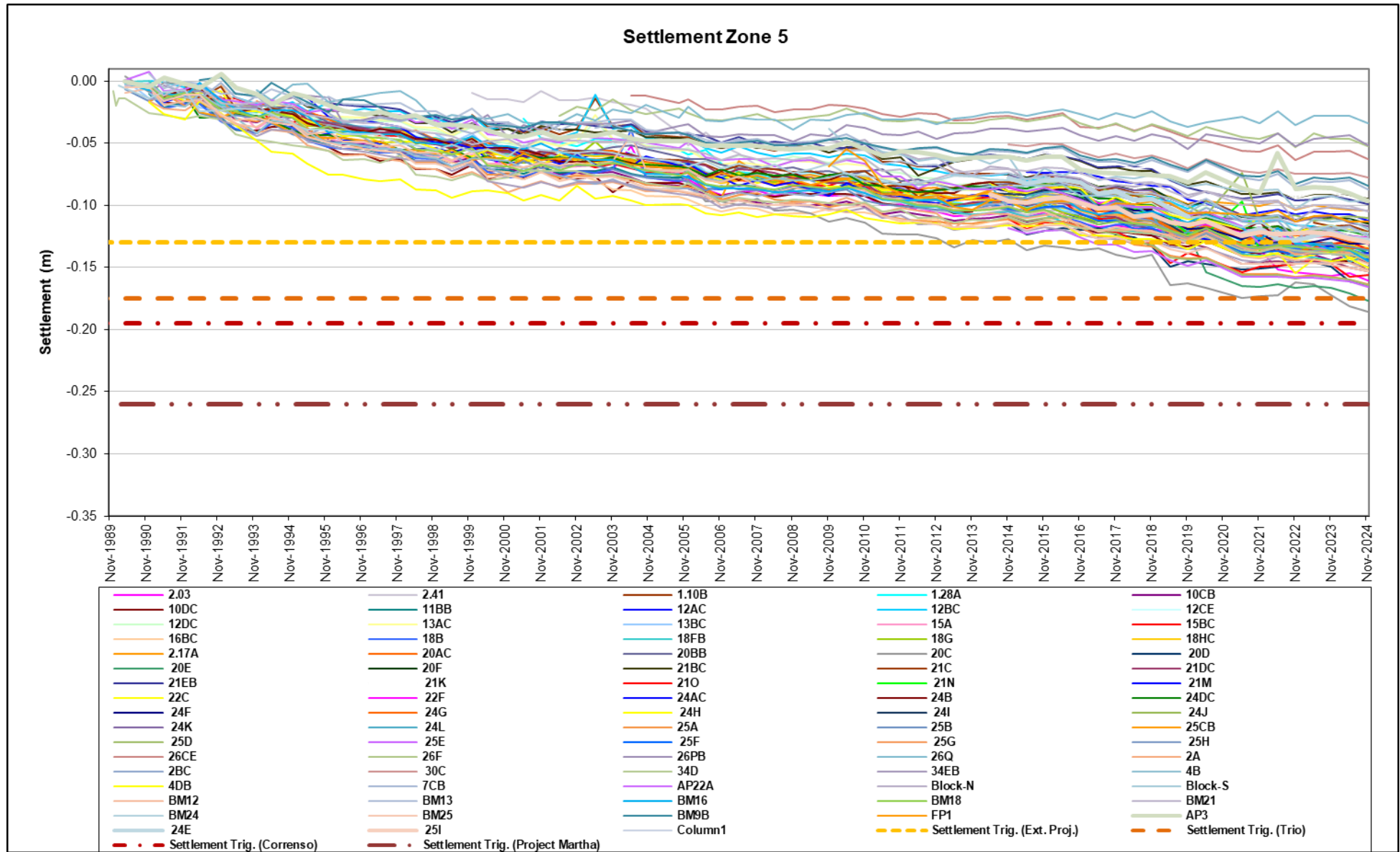


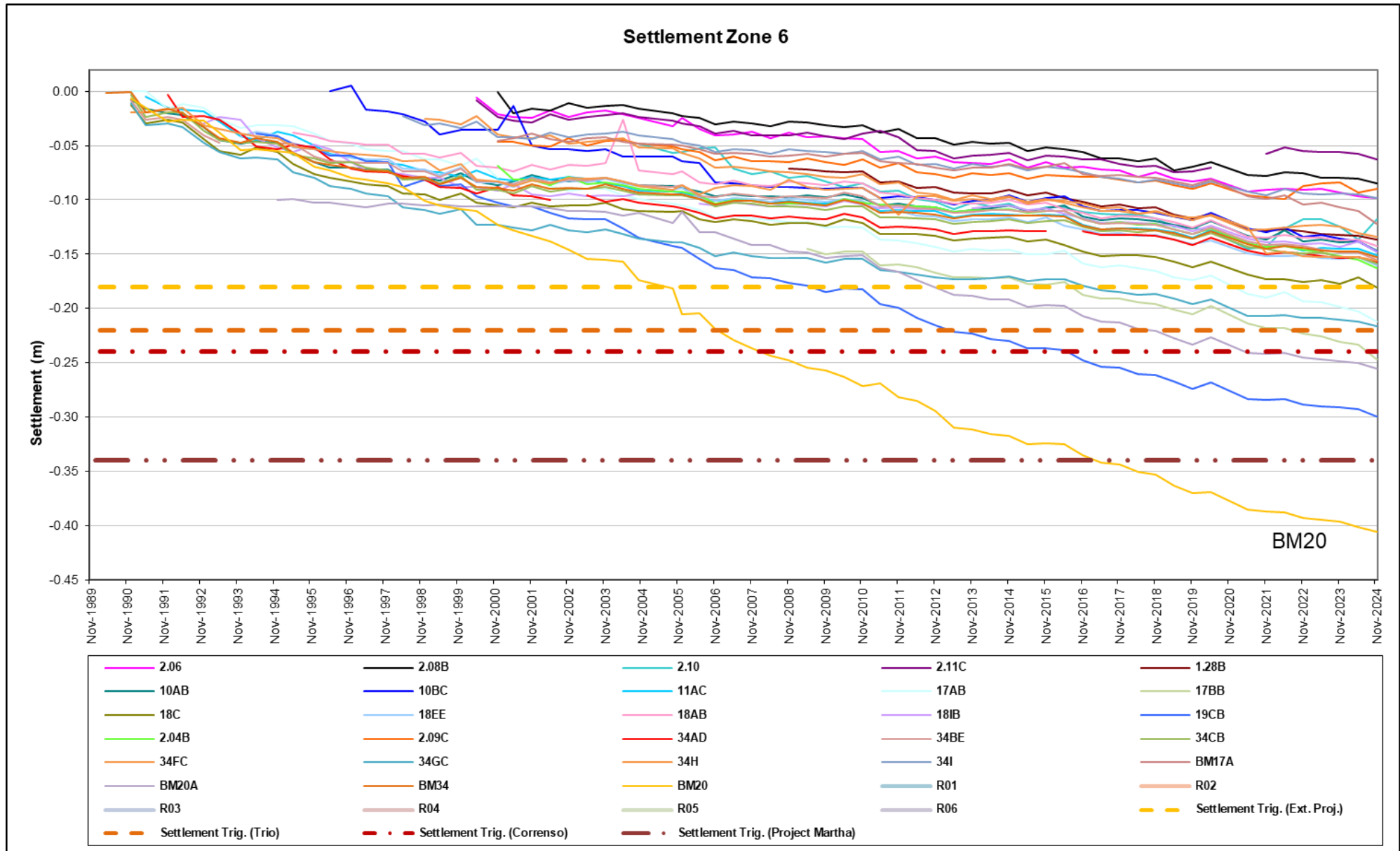


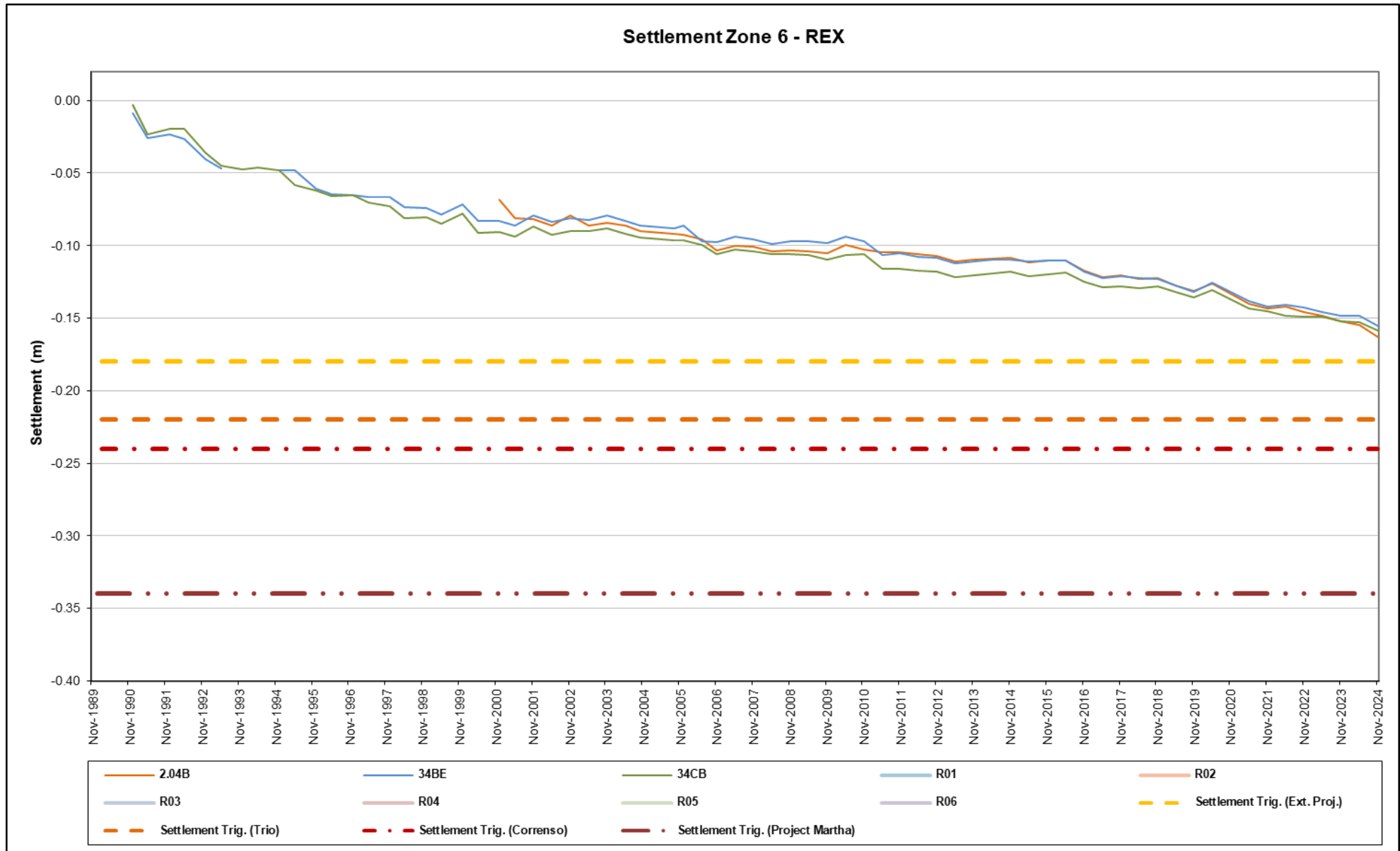
Settlement Zone 3

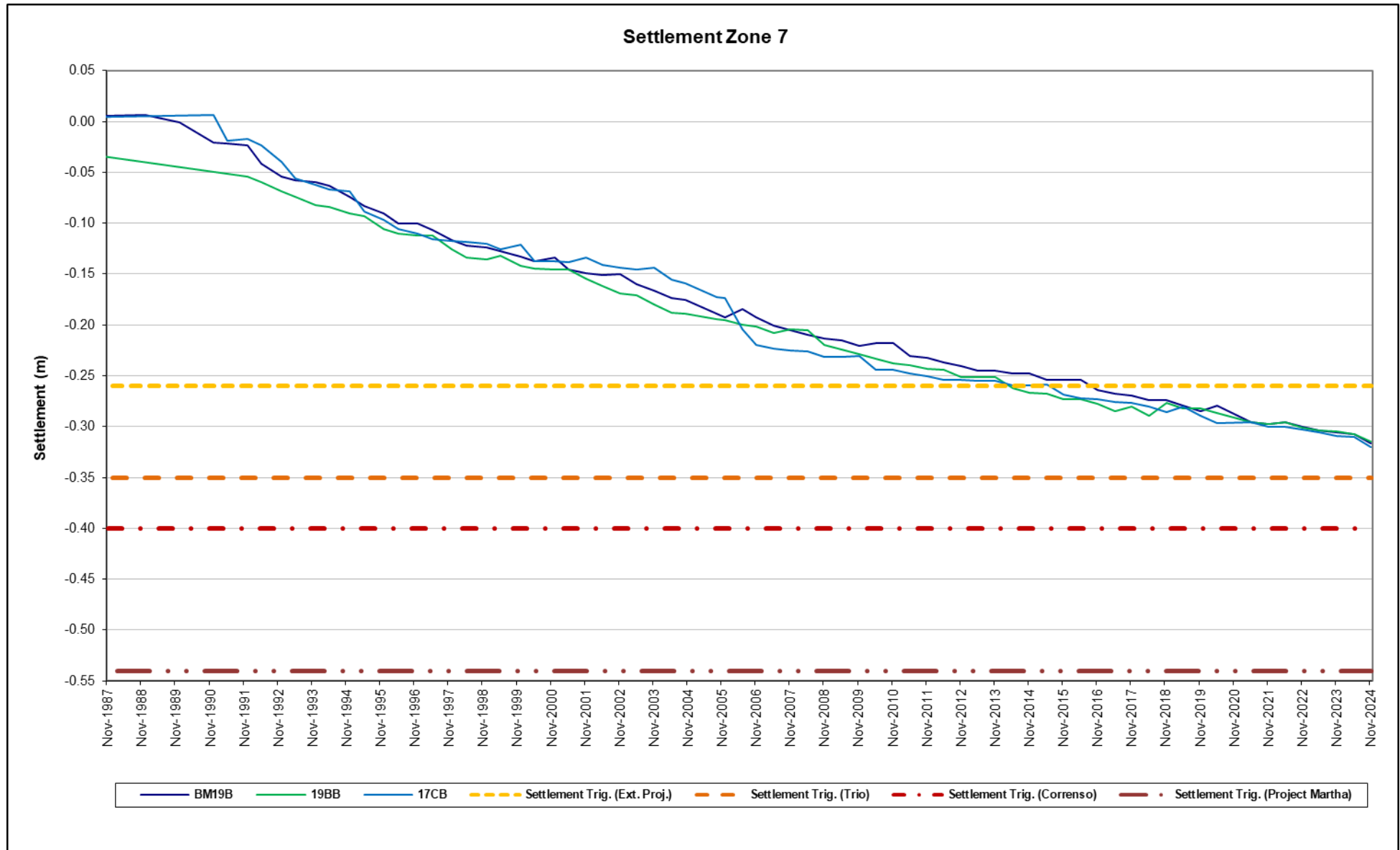












Appendix E Water Quality Results 2024

Pit/Underground Dewatering Water Quality Results 2024

Date	Data Point	FLS Comments	FLS EC (mS/m)	FLS pH	FLS Temp	Acidity (pH 3.7)	Alk-Bicarb	Alk-T	AIA	AlS	SbA	SbS	AsA	AsS	Bicarb	CdA	CdS	CaSO	COD	Cl	CrA	CrS	Cr6col	CoA	CoS
29/05/2024	705 Gladstone sump					1	70	71		0.012		0.0146		0.0046	86		0.00026	360	11	9		0.0005	0.01		0.0043
4/11/2024	800 PC1	Clear water sampled from tap at pump station				1	113	113	0.021	0.007	0.0007	0.0006	0.004	0.002	138	0.0028	0.0029	550		11	0.001	0.001	0.001	0.0151	0.0155
3/10/2024	800 PC1	Sample collected by Zibo				1	113	114	0.013	0.006	0.0004	0.0004	0.002	0.002	138	0.00195	0.002	520		13	0.001	0.001	0.001	0.0131	0.0133
29/05/2024	800 PC1					1	145	145		0.006		0.0017		0.031	177		0.0032	490	7	7		0.001	0.01		0.015
21/02/2024	800 PC1					1	152	152		0.006		0.0011		0.04	185		0.00044	580	6	11		0.001	0.01		0.007
29/05/2024	800 PC2					1	161	161		0.006		0.0004		0.002	196		0.0001	420	19	7		0.001	0.01		0.0024
21/02/2024	800 PC2					1	93	93		0.015		0.0005		0.002	113		0.0025	570	6	10		0.001	0.01		0.0165
4/11/2024	Favona 800 sump	High sediment load in sample due to runoff into sump				1	370	370	55	0.03	0.0054	0.0036	0.081	0.002	460	0.0083	0.0028	510		17	0.059	0.001	0.001	0.23	0.118
5/12/2024	Underground Dewatering		302.6	6.9	26.5	1	162	162	2	0.01	0.0029	0.0035	0.019	0.003	197	0.00152	0.00113	560		15	0.0061	0.001	0.001	0.0158	0.0127
6/11/2024	Underground Dewatering	High temp possibly due to water sitting in black pipe	295.8	7.3	29.0	1	220	220	1.4	0.011	0.0025	0.0024	0.01	0.003	260	0.002	0.0018	550		12	0.0041	0.001	0.001	0.0155	0.0135
1/10/2024	Underground Dewatering		297.0	7.1	25.8	1	165	165	3.5	0.011	0.0026	0.0021	0.029	0.003	200	0.00163	0.00122	540		13	0.0119	0.001	0.001	0.0189	0.0124
4/09/2024	Underground Dewatering		279.4	6.3	25.6	1	99	99	1.66	0.017	0.0018	0.0021	0.0149	0.0024	120	0.0031	0.0032	480		11	0.0046	0.0009	0.001	0.026	0.024
12/08/2024	Underground Dewatering		294.6	6.8	25.9	1	158	158	2.9	0.008	0.0031	0.0036	0.018	0.0029	192	0.0023	0.00176	520		17	0.0077	0.0005	0.001	0.021	0.0162
2/07/2024	Underground Dewatering		201.2	6.9	18.0	1	79	79	0.27	0.024	0.0016	0.0016	0.004	0.003	96	0.00156	0.00173	290		9	0.001	0.001	0.001	0.02	0.022
24/06/2024	Underground Dewatering		271.1	6.7	22.7	1	141	141	6.6	0.022	0.0042	0.0026	0.024	0.003	172	0.0082	0.0064	470		11	0.0133	0.0012	0.001	0.07	0.054
16/05/2024	Underground Dewatering		192.0	6.8	20.2	1	90	90		0.011		0.0042		0.005	110		0.00138	370	16	17		0.001	0.01		0.0181
2/04/2024	Underground Dewatering		301.3	6.5	25.3	1	138	138		0.015		0.0032		0.014	168		0.0009	550	132	13		0.001	0.01		0.0135
20/03/2024	Underground Dewatering		340.1	6.5	28.1	1	167	167		0.01		0.0041		0.008	200		0.00107	590	81	14		0.001	0.01		0.0117
25/01/2024	Underground Dewatering		297.6	6.8	29.6	1	240	240		0.015		0.0055		0.006	290		0.00117	540	6	16		0.001	0.01		0.0135

Date	Data Point	CuA	CuS	CNTOT	EC (mS/m)	F-	NH3	AuS	Hard	FeA	FeS	FeT	PbA	PbS	MgSO	MnA	MnS	HgA	HgS	HgT	NiA	NiS	NO3-N	NOxN	NO2-N	NH4N	pH	PTO	KSO	DRP	SeA	SeS	SeT	SI
29/05/2024	705 Gladstone sump		0.002	0.02	405		3.3	0.0006	1120	0.18		0.55		0.0001	50		1.76	8E-05		8E-05		0.0151	280	280	1.69	240	7.8	0.102	14.2	0.2		0.0018	0.002	38
4/11/2024	800 PC1	0.0065	0.0055	0.002	286	0.38	0.00191		1920	0.29	0.08		0.042	0.027	136	11.5	12.2		8E-05	8E-05	0.029	0.03	1.93	2	0.1	1.39	6.8	0.017	11.2		0.002	0.002		36
3/10/2024	800 PC1	0.0046	0.003	0.002	289	0.39	8E-05		1880	0.29	0.04		0.035	0.0038	143	11.8	12.5		8E-05	8E-05	0.024	0.025	0.28	0.28	0.1	0.03	7.1	0.004	11.8		0.002	0.002		37
29/05/2024	800 PC1		0.0031	0.02	272		0.00025	0.0006	1610	0.38		0.44		0.0007	92		8.9	8E-05		8E-05		0.026	0.1	0.1	0.1	0.049	7.4	0.025	9.2	0.004		0.002	0.0021	38
21/02/2024	800 PC1		0.001	0.02	268		0.0002	0.0006	1890	0.54		0.59		0.0002	105		9.5	8E-05		8E-05		0.0087	0.1	0.1	0.1	0.055	7.2	0.013	9.3	0.004		0.002	0.0021	39
29/05/2024	800 PC2		0.001	0.02	286		3.2E-05	0.0006	1640	83		83		0.0002	146		8.3	8E-05		8E-05		0.0055	0.1	0.1	0.1	0.025	6.7	0.004	12	0.04		0.002	0.0021	14.4
21/02/2024	800 PC2		0.0053	0.02	289		2.3E-05	0.0006	2100	0.58		0.63		0.021	162		12.6	8E-05		8E-05		0.045	1.15	1.17	0.1	0.036	6.4	0.004	12.4	0.004		0.002	0.0021	38
4/11/2024	Favona 800 sump	0.3	0.001	0.02	251	0.16	4E-05		1630	58	0.04		0.26	0.0002	84	10.3	6.8		8E-05	0.0026	0.24	0.123	0.26	0.28	0.1	0.01	7.2	8.2	9.3		0.002	0.002		27
5/12/2024	Underground Dewatering	0.0138	0.0018	0.002	292	0.4	0.0065		1980	3	0.05		0.067	0.0005	138	10.7	11.1		8E-05	8E-05	0.027	0.021	4.4	5.1	0.68	1.18	7.4	0.35	12.6		0.0017	0.0022		33
6/11/2024	Underground Dewatering	0.01	0.0012	0.002	282	0.35	0.0159		1910	1.93	0.04		0.042	0.0006	129	10.3	9.8		8E-05	8E-05	0.026	0.023	2.9	3.4	0.48	1.12	7.8	0.53	12.5		0.002	0.002		39
1/10/2024	Underground Dewatering	0.035	0.0024	0.003	284	0.34	0.00106		1960	5.8	0.05		0.139	0.0005	151	12.6	11.8		8E-05	0.00023	0.033	0.021	1.67	2.1	0.39	0.33	7.2	0.53	11.8		0.002	0.002		35
4/09/2024	Underground Dewatering	0.032	0.0095	0.002	261	0.36	0.00041		1700	2.5	0.06		0.076	0.0045	122	10.3	10.4		8E-05	9E-05	0.061	0.052	2.9	3.1	0.23	0.4	6.6	0.195	12.1		0.0012	0.0015		34
12/08/2024	Underground Dewatering	0.027	0.0025	0.006	284	0.32	0.0037		1820	3.9	0.02		0.086	0.00019	127	10.3	9.1		8E-05	0.00013	0.046	0.035	4.4	4.8	0.41	1.89	6.9	0.39	11.8		0.002	0.002		32
2/07/2024	Underground Dewatering	0.0064	0.0049	0.002	182	0.31	0.0018		1030	0.2	0.04		0.0024	0.0002	73	4.6	4.6		8E-05	8E-05	0.051	0.053	14.7	14.9	0.17	0.39	7.3	0.057	7.6		0.002	0.002		21
24/06/2024	Underground Dewatering	0.165	0.0103	0.002	247	0.31	0.00072		1600	5.6	0.04		0.166	0.0009	103	13.7	11.1		8E-05	0.00035	0.176	0.142	11.2	11.4	0.24	0.34	7	0.62	9.6		0.002	0.002		33
16/05/2024	Underground Dewatering		0.21	0.14	206		0.0024	0.0012	1220	0.24		0.63		0.0002	75		5.5	8E-05		8E-05		0.031	4.3	4.6	0.33	1.17	7	0.031	10.9	0.004		0.004	0.0023	23
2/04/2024	Underground Dewatering		0.0024	0.02	290		0.0182	0.0006	1870	3.1		10.9		0.0003	123		9.6	8E-05		0.00015		0.025	8.2	8.3	0.11	6	7.1	0.039	11.5	0.004		0.002	0.0021	35
20/03/2024	Underground Dewatering		0.001	0.02	269		0.00039	0.0006	2000	12.4		105		0.0006	125		9.8	8E-05		0.0021		0.022	1.39	1.57	0.18	0.29	6.8	0.24	12.7	0.004		0.002	0.0022	36
25/01/2024	Underground Dewatering		0.0013	0.02	288		0.0047	0.0006	1830	14.7		142		0.0005	117		9.4	8E-05		0.00052		0.026	5	5.9	0.92	1.8	7.1	0.96	13.7	0.004		0.002	0.0037	34

Date	Data Point	AgA	AgS	NaSO	SO4	Sum Anion	Sum Cation	TiA	TiS	TKN	TSS	UA	US	CNWAD	ZnA	ZnS
29/05/2024	705 Gladstone sump		0.0001	32	1070	44	41			240	200			0.02		0.043
4/11/2024	800 PC1	0.0002	0.0002	49	1930	43	41	0.00042	0.00045	2.1	10	9E-05	7E-05	0.002	1.09	1.13
3/10/2024	800 PC1	0.0002	0.0002	49	1810	40	41	0.00037	0.00037	0.11	3	7E-05	7E-05	0.002	0.74	0.75
29/05/2024	800 PC1		0.0002	51	1680	38	35			0.16	7			0.02		1.49
21/02/2024	800 PC1		0.0002	57	1680	38	41			0.13	3			0.02		0.51
29/05/2024	800 PC2		0.0002	45	1820	41	35			0.1	13			0.02		0.084
21/02/2024	800 PC2		0.0002	51	1900	42	45			0.22	3			0.02		0.97
4/11/2024	Favona 800 sump	0.0002	0.0002	37	1670	43	35	0.00098	0.00022	4.2	22000	0.00141	0.00021	0.02	4.4	0.69
5/12/2024	Underground Dewatering	0.0002	0.0001	56	1900	44	43	0.00041	0.00034	1.76	940	0.00016	0.00012	0.002	0.59	0.42
6/11/2024	Underground Dewatering	0.0002	0.0002	53	1910	45	41	0.00043	0.00039	2.1	1710	0.00016	0.00011	0.002	0.93	0.73
1/10/2024	Underground Dewatering	0.0002	0.0002	52	1910	44	42	0.00045	0.00034	0.81	1480	0.00018	7E-05	0.002	0.73	0.38
4/09/2024	Underground Dewatering	0.0001	0.0001	48	1730	39	37	0.00052	0.00046	1.1	590	0.00016	0.00013	0.002	1.15	1.1
12/08/2024	Underground Dewatering	0.0002	0.0001	50	1760	41	39	0.00049	0.00034	2.3	1100	0.00017	0.00011	0.004	0.85	0.53
2/07/2024	Underground Dewatering	0.0002	0.0002	28	960	23	22	0.00031	0.00031	0.63	19	0.00024	0.00024	0.002	0.53	0.54
24/06/2024	Underground Dewatering	0.0002	0.0002	35	1490	35	34	0.00086	0.00046	1.05	1590	0.00054	0.00031	0.002	2.8	1.92
16/05/2024	Underground Dewatering		0.001	51	1190	27	27			2.4	35			0.11		0.6
2/04/2024	Underground Dewatering		0.0002	53	1770	41	41			7.7	101			0.02		0.48
20/03/2024	Underground Dewatering		0.0002	57	1830	42	43			1.05	1220			0.02		0.38
25/01/2024	Underground Dewatering		0.0002	54	1830	44	40			3.7	3700			0.02		0.26

Appendix F Conceptual Hydrogeologic Sections

At the request of the independent peer review panel for OGL's Waihi gold mining operation, the following presents three conceptual hydrogeologic sections at key locations through Waihi. Figures 1 and 2 show the section locations relative to the interpreted groundwater flow systems. It has been proposed that these sections are updated and included in the annual dewatering and settlement compliance report. Figures 3 to 8 below show the details of the sections, and a brief discussion is provided for each.

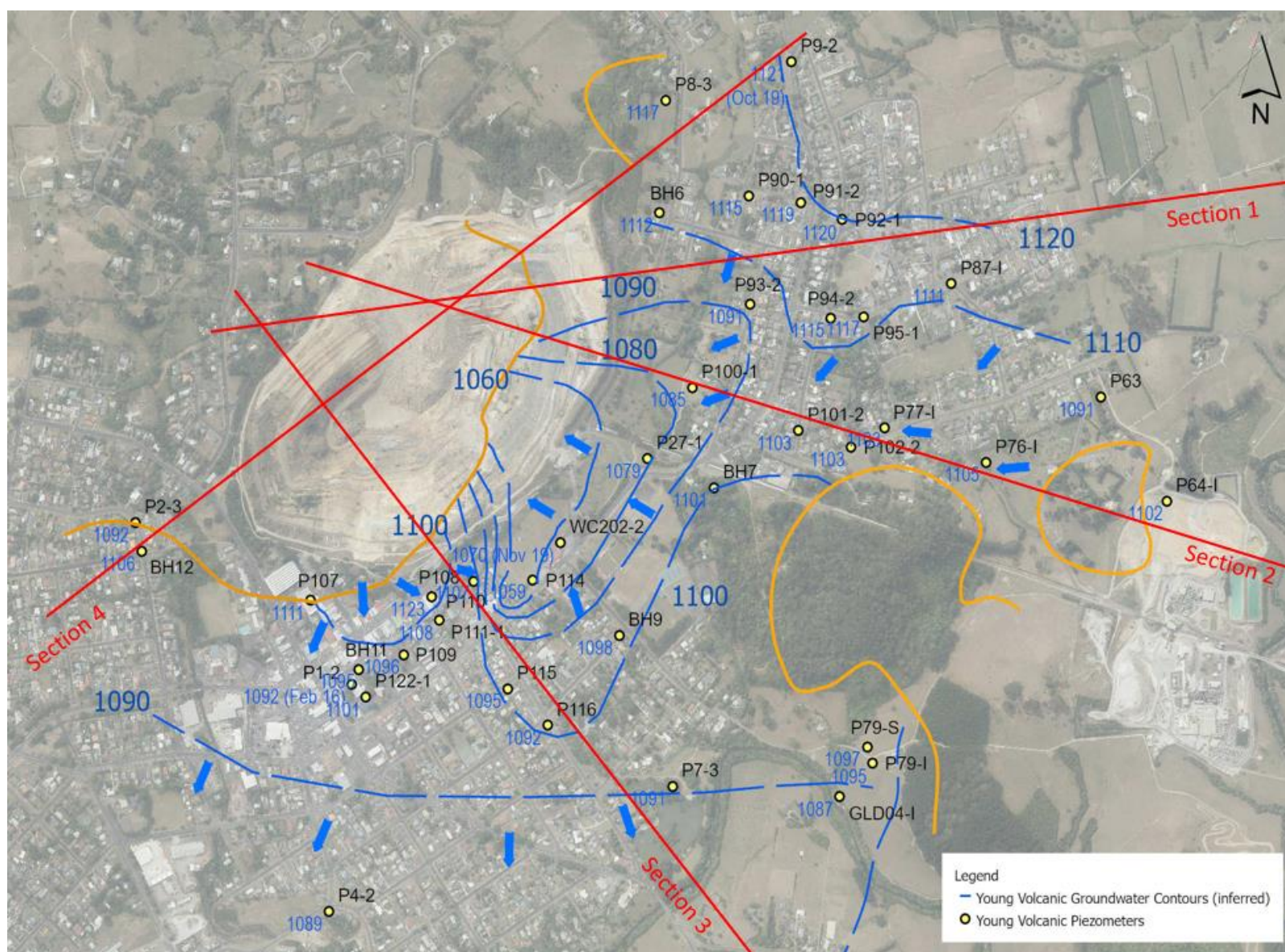


Figure 1 Section Line Locations Relative to Young Volcanics Interpreted Piezometric Surface

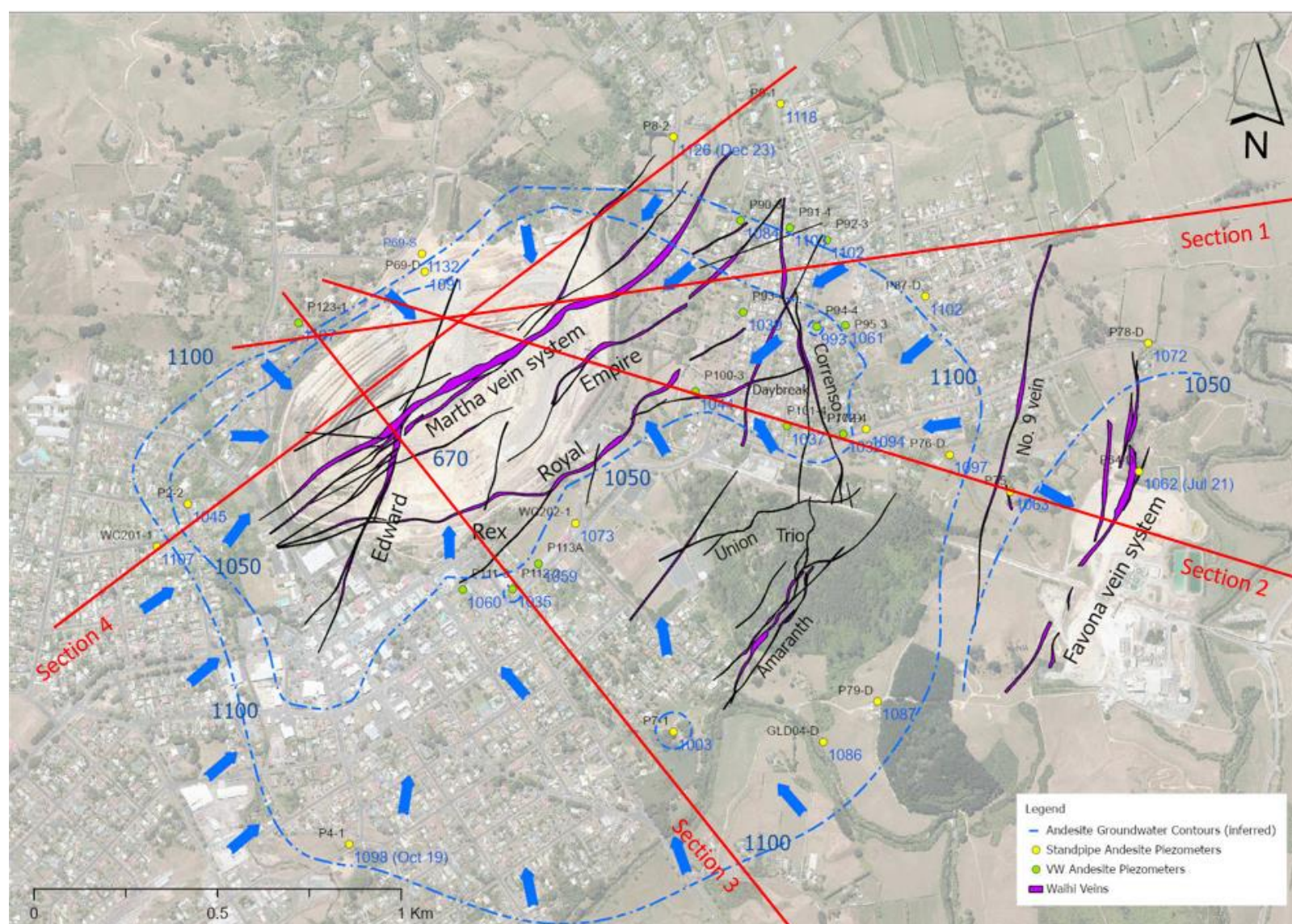


Figure 2 Section Line Locations Relative to Andesite Interpreted Piezometric Surface

Section 1 - P90 Series

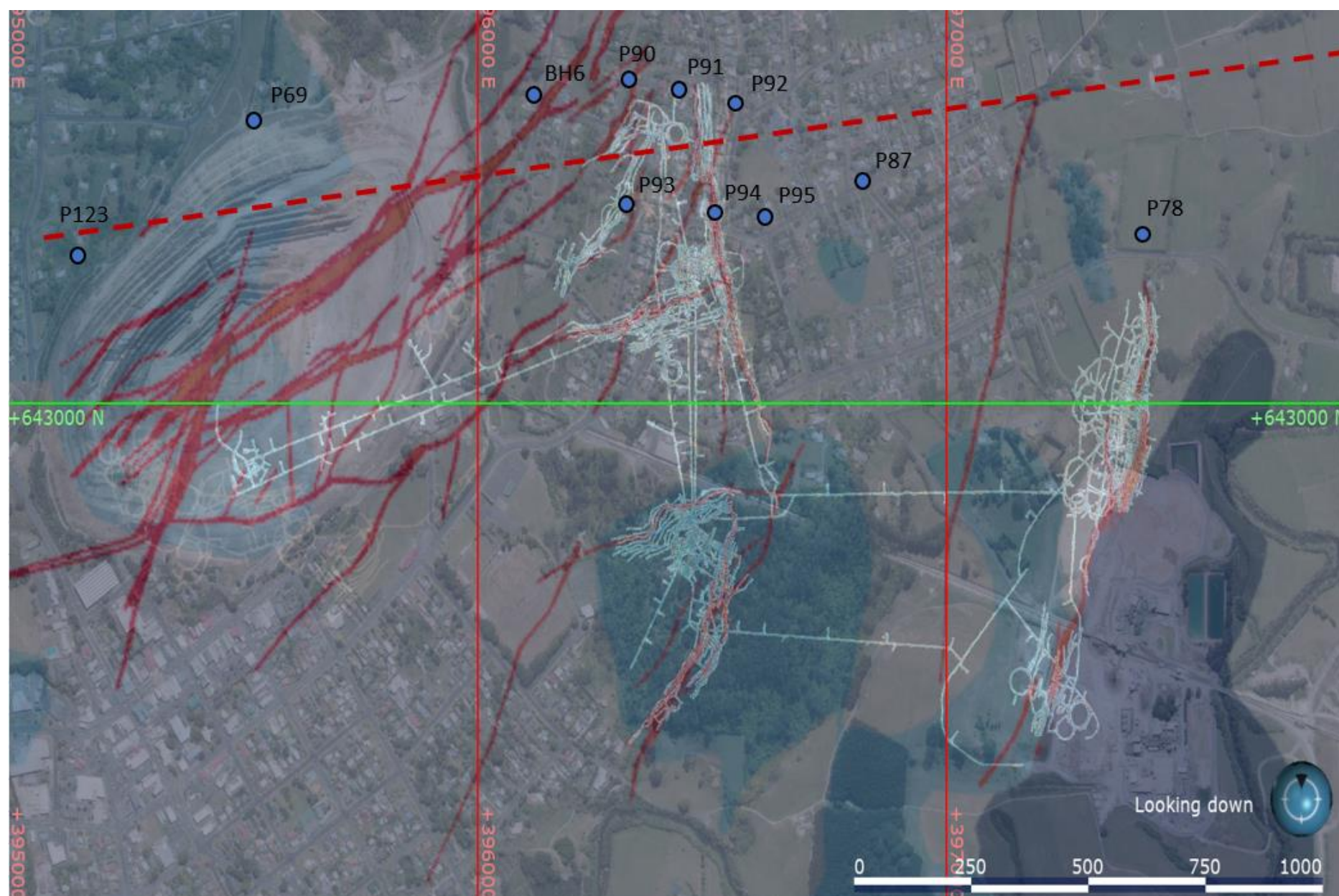


Figure 3 Section 1 P90 Series Section Location – Vein Systems and Underground Workings Shown

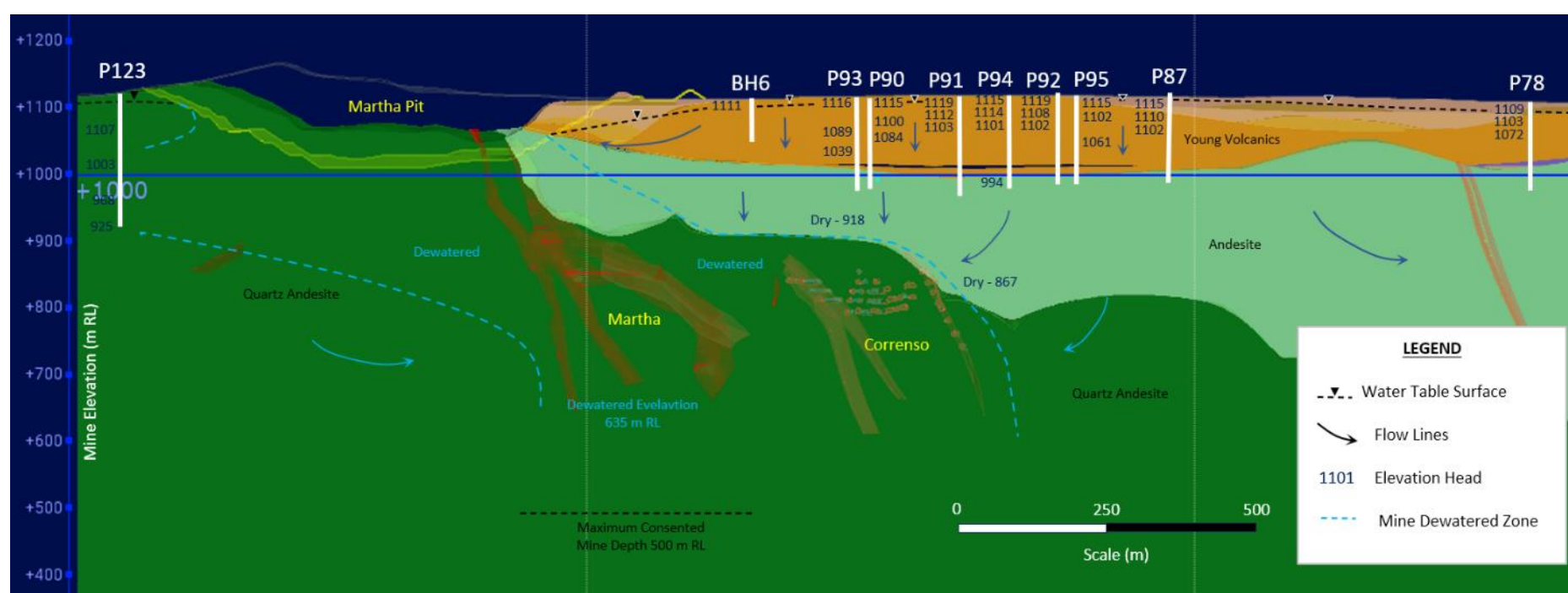


Figure 4 Section 1 P90 Series Conceptual Hydrogeologic Section

Description

The P90 series piezometers were constructed through Waihi East for the purpose of monitoring effects associated with underground mining of the Correnso and Martha ore bodies. The section shows a sequence of young volcanic materials some 100 m in thickness that overlie post mineralisation andesite that thickens to the east. The groundwater flow direction is oblique to the section orientation with most flow coming out of the plane (as shown in Figures 1 and 2) with some flow paths moving towards the Martha Pit.

The section illustrates that there is a dewatered zone in the Andesite host rock that extends from the Correnso underground workings to the Martha Pit. This dewatered zone exists within the Quartz Andesite with some limited propagation up into the overlying post-mineralization Andesite. The installation of an additional andesite piezometer P123 has shown a depressurised zone exists, extending out to the northwest behind the pit wall.

A permanent water table is observed within the Young Volcanic units that are perched over the post-minealization Andesite due to low permeability materials at the contact of the two geologic units. Vertically downward hydraulic gradients are noted to occur that increases locally where under drainage effects occur due to underground dewatering. The groundwater flow directions are illustrated in Figure 4 with some groundwater being lost to the underground to the west and further east flowing away from the Martha Pit. Some shallow groundwater within the Young Volcanics discharges near the edge of the pit.

Section 2 – P100 Series

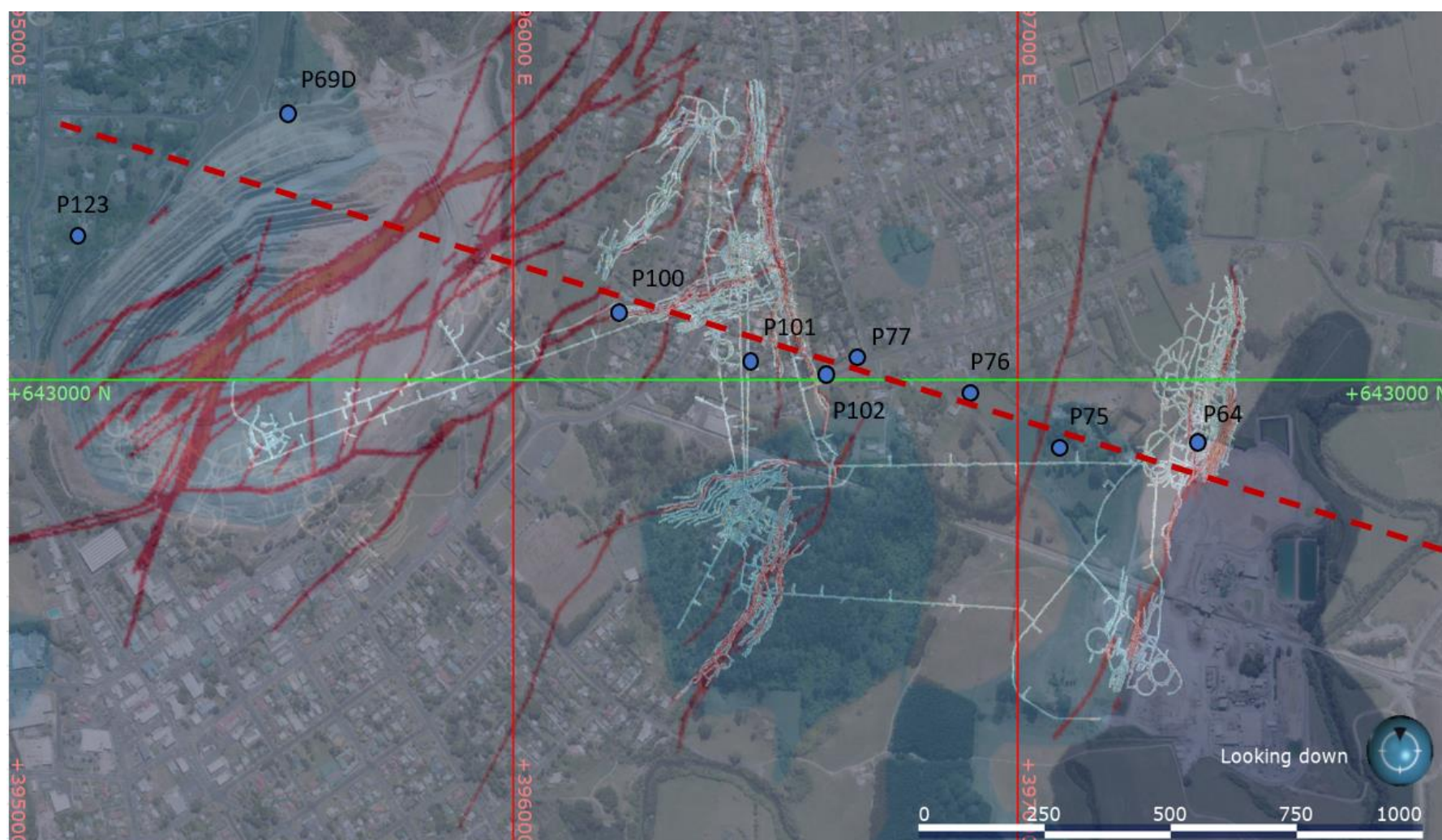


Figure 5 Section 2 P100 Series Section Location – Vein Systems and Underground Workings Shown

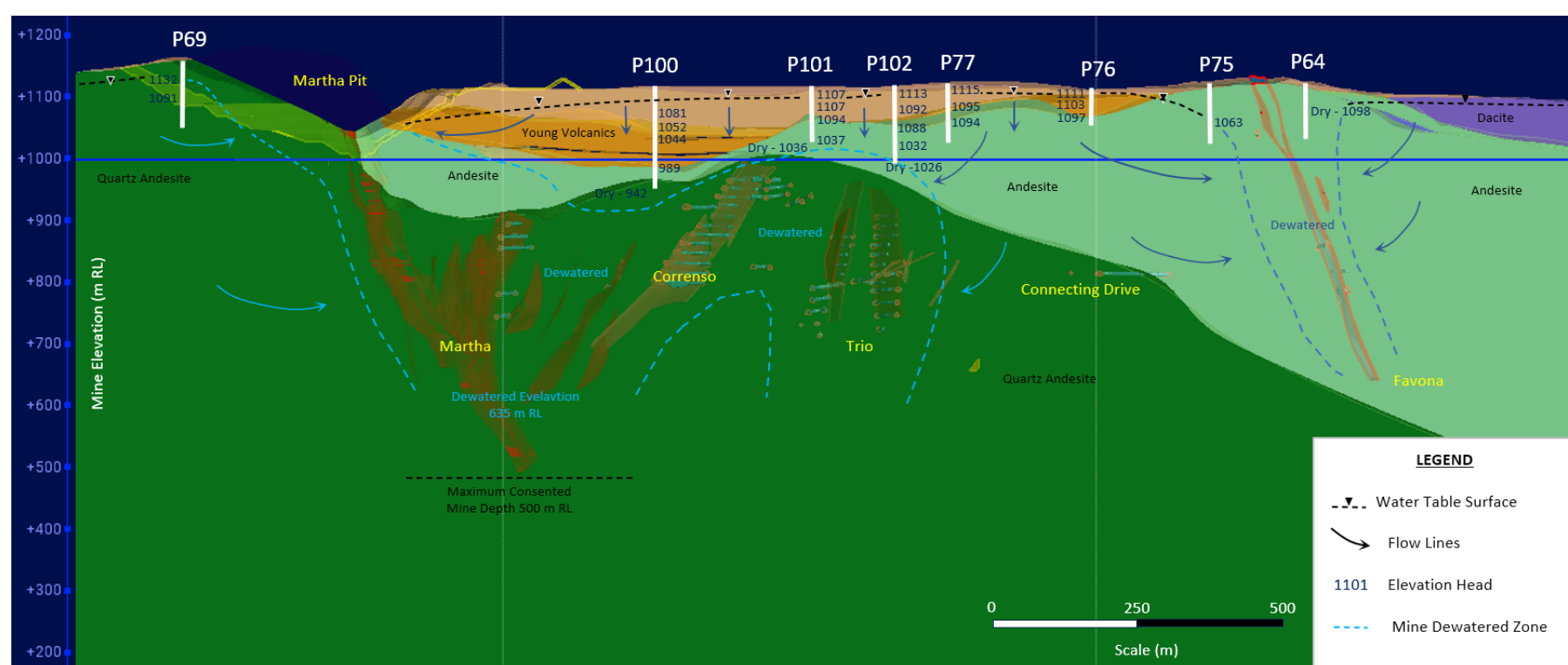


Figure 6 Section 2 P100 Series Conceptual Hydrogeologic Section

Description

The P100 series piezometers were constructed through Waihi for the purpose of monitoring effects associated with underground mining of the Correnso, Trio and Favona ore bodies. The section shows a sequence of young volcanic materials some 150 m in maximum thickness that thins to the east towards Union Hill. These deposits overly post mineralisation andesite that thickens to the east. The groundwater flow direction is oblique to parallel to the section orientation with most of the flow in the Andesite moving towards underground workings and Martha Pit in the west or Favona underground workings in the east. Groundwater flow in the young volcanics is towards the Martha Pit in the west and also downward leakage.

The section illustrates that there is a dewatered zone that extends between the Martha, Correnso and Trio underground workings in the Andesite host rock. The dewatered zone is limited in its eastern extent and does not propagate out to Favona which has its own localised dewatered zone. The low permeability rockmass between the zones creates this separation. An access drive physically connects Favona to the other ore bodies and a localised dewatered zone exists around it. A groundwater divide exists between the Favona and Trio with groundwater flowing either west towards Trio/Correnso or east towards Favona.

A permanent water table is observed within the Young Volcanic units that are perched over the post-mineralization Andesite due to low permeability materials at the contact of the two geologic units. A vertically downward hydraulic gradient is noted to be present that increases locally where under drainage effects occur due to underground dewatering. Some shallow groundwater within the Young Volcanics discharges near the edge of the pit.

Section 3 – P110 Series

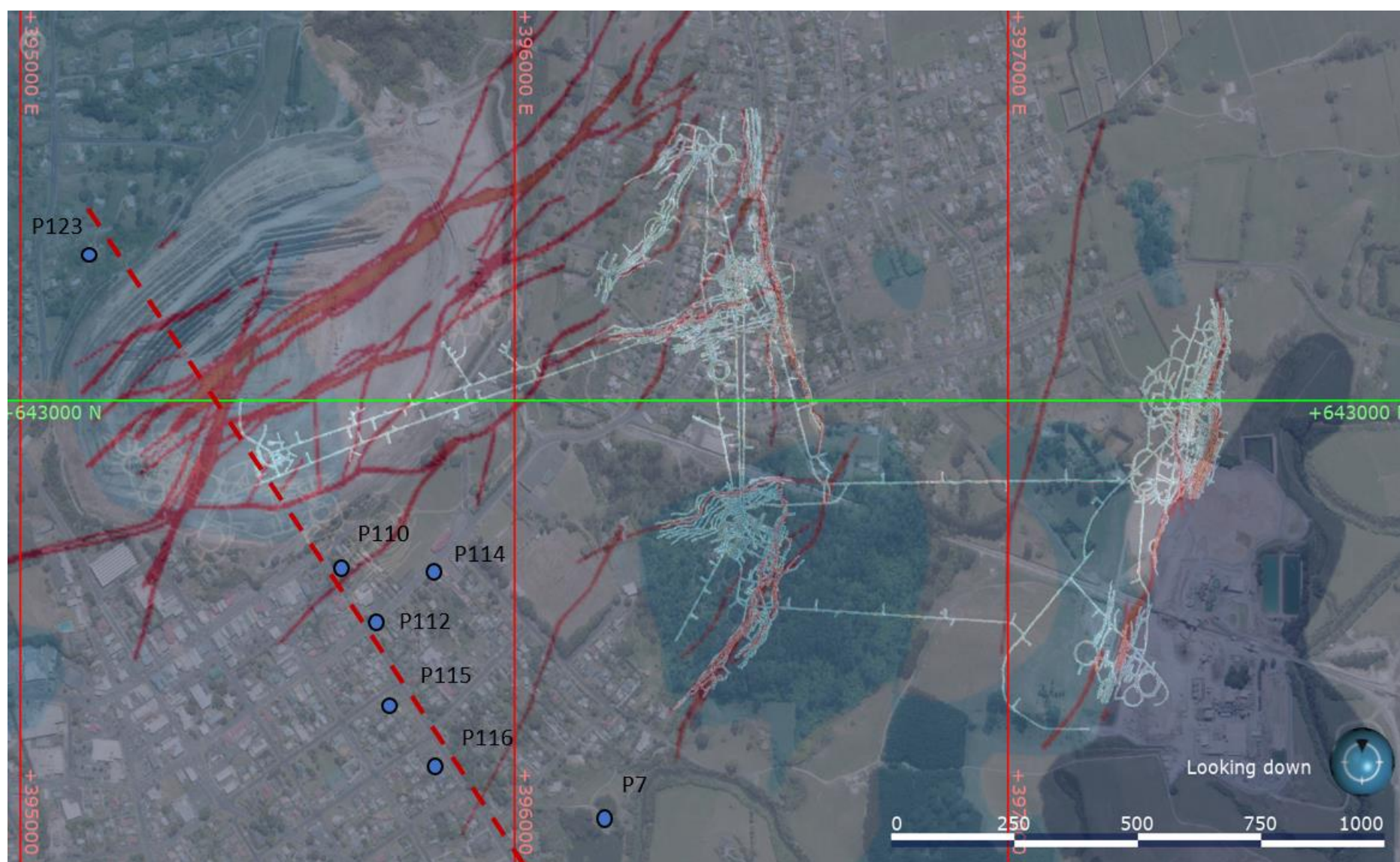


Figure 7 Section 3 P110 Series Section Location – Vein Systems and Underground Workings Shown

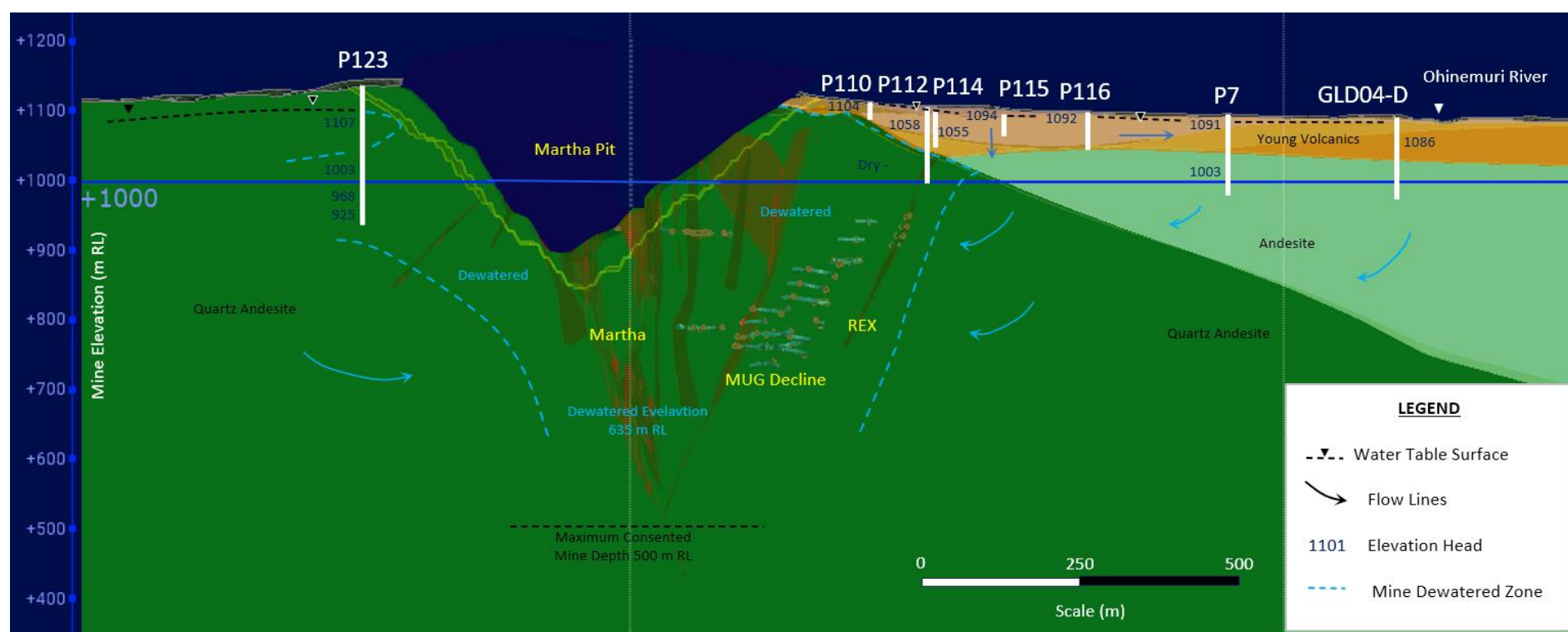


Figure 8 Section 3 P110 Series Conceptual Hydrogeologic Section

Description

The P110 series piezometers were constructed through Waihi for the purpose of monitoring effects associated with the Martha Pit and underground mine. The section shows a sequence of young volcanic materials up to 80 m in thickness overlying post-mineralization Andesite which thickens considerably to the east. The groundwater flow direction is parallel to the section orientation.

A dewatered zone exists around the Martha Pit and the decline that is being advanced to allow the underground mining of the Martha ore body. The dewatering extends out to include the Rex and Royal vein systems via crosscutting structures. Groundwater flow towards the dewatered zone in the mineralised host rock to the north. There is a groundwater divide between P115 and P116 where groundwater in the post-mineralization Andesite flows to the south. The installation of an additional andesite piezometer P123 has shown a depressurised zone exists, extending out to the northwest behind the pit wall.

A permanent water table is observed within the Young Volcanic units that are perched over the host Andesite and post-mineralization Andesite due to low permeability materials at the contact of the two geologic units. Vertically downward hydraulic gradients are noted to be present that increases locally where under drainage effects occur due to underground dewatering. Shallow groundwater within the Young Volcanics flows to the south down gradient where it discharges into the Ohinemuri River.

Section 4 – MUG Line of Strike

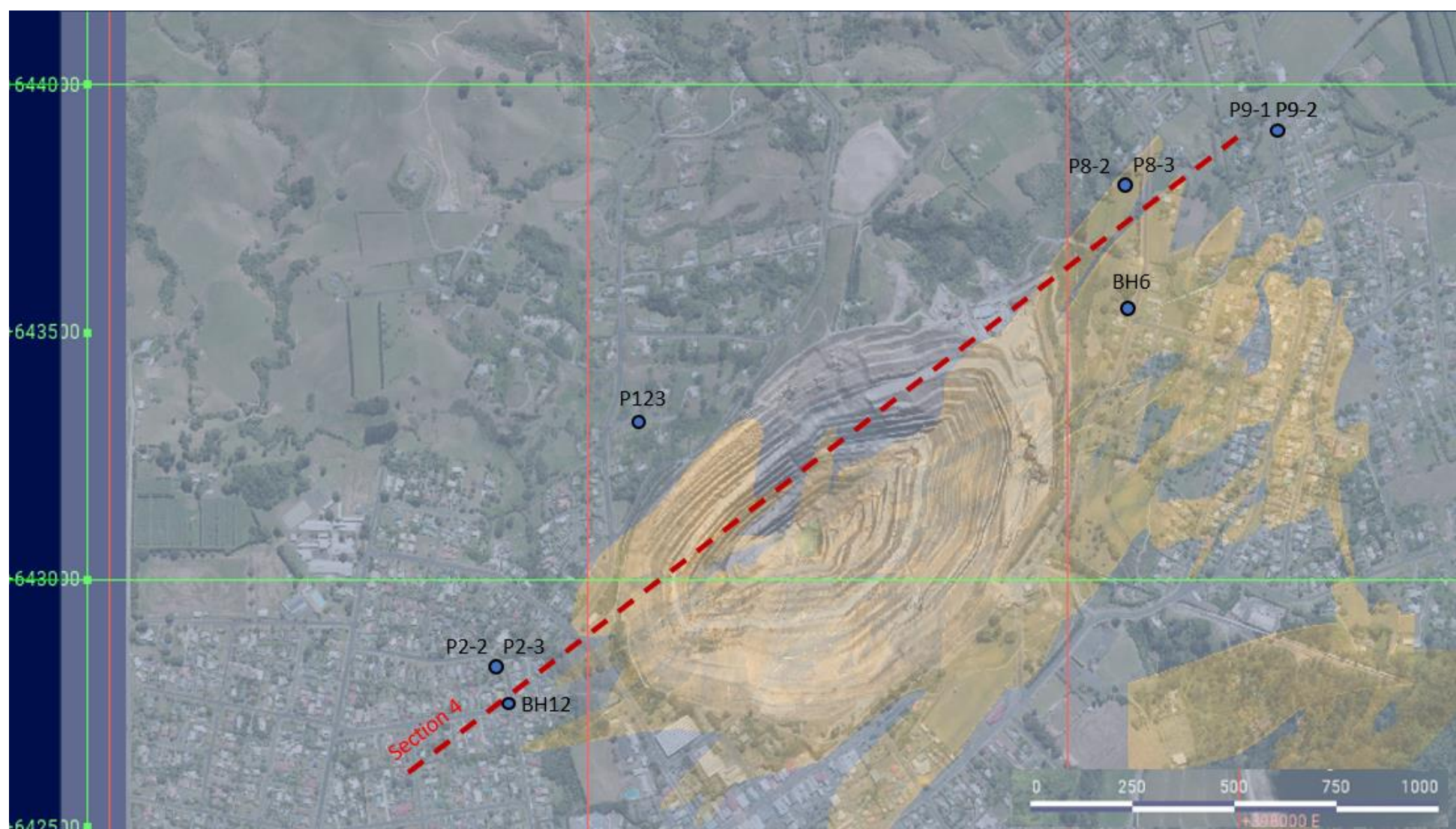


Figure 9 Section 4 MUG Line of Strike Section Location – Vein Systems and Underground Workings Shown

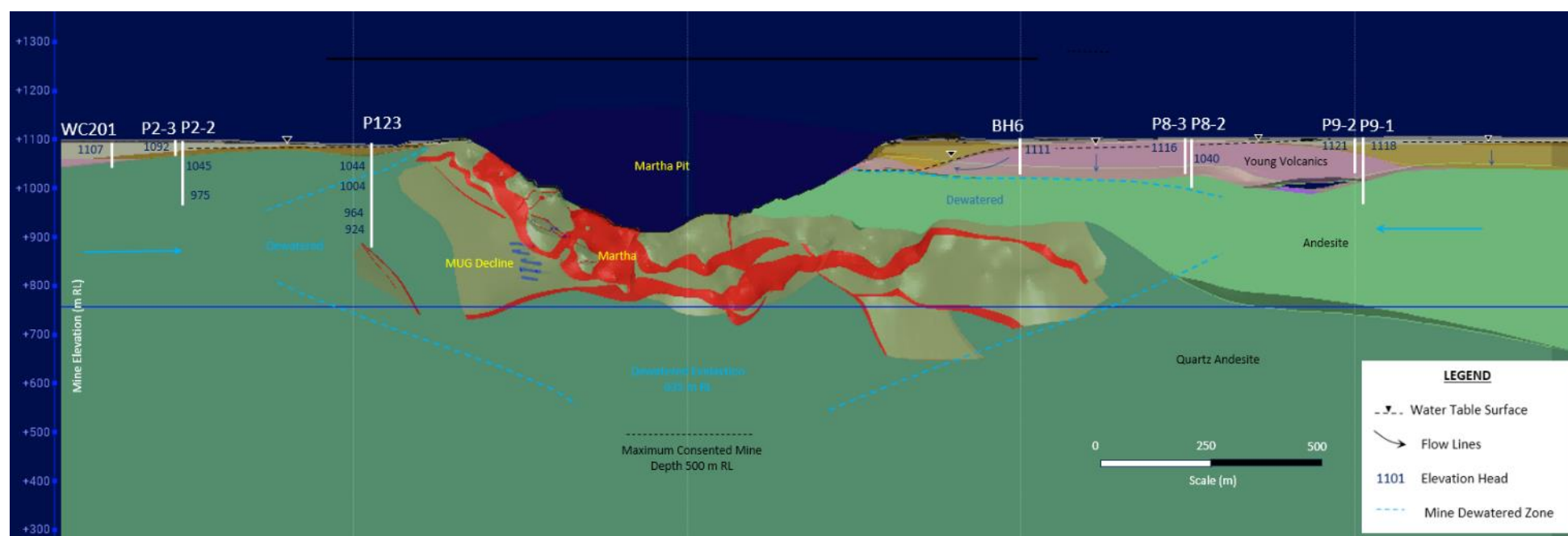


Figure 10 Section 4 MUG Line of Strike Section Location Conceptual Hydrogeologic Section

A conceptual hydrogeologic section has been developed along strike of the dominant structures hosting the vein systems. The purpose of the section is to determine the extent of dewatering within the andesite rock unit. The section shows a sequence of young volcanic materials up to 100 m in thickness overlying post-mineralization Andesite which thickens considerably to the east. The groundwater flow direction is parallel to the section orientation.

Conceptually, the section shows that dewatering occurs along the length of the MUG vein system and shows that the andesite host rock is dewatered at depth. The lateral extent of dewatering within the andesite at depth is not completely closed out along strike. As indicated by P123, a piezometric surface is present in the andesite in the near surface but is dewatered at depth. That is interpreted to be a function of the lower rockmass permeability in the near surface due to the effects of alteration and higher permeability at depth due to veining and fracturing.

A permanent water table is observed within the Young Volcanic units that are perched over the host Andesite and post-mineralization Andesite due to low permeability materials at the contact of the two geologic units. Vertically downward hydraulic gradients are noted to be present that increases locally where under drainage effects occur due to underground dewatering.