Bendigo-Ophir Fast-Track

Report for Sustainable Tarras

Economics

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31 March 2026

NOTICE:

Nothing in this report is intended to represent or convey financial or investment advice. Any party relying on this report for investment purposes does so at their own risk, and such reliance constitutes acceptance of these terms.

Contents

1. Introduction

1.1 Scope of this Memorandum

1. I have been asked by Sustainable Tarras Incorporated (**Sustainable Tarras**) to assess the economic analysis (**the Analysis**) provided by Benje Patterson on behalf of Santana Minerals Limited (**the Applicant**) in support of the Bendigo-Ophir Gold Project application (**the Application**) under the Fast-track Approvals Act 2024 (**FTAA**) for the development of gold mining operations at Bendigo-Ophir (**the Project**).

2. In particular, I have been asked whether, in my opinion as an expert economist, the Analysis credibly and robustly demonstrates the extent of the Project's regional or national benefits, and whether there are material adverse effects arising from the Project either not or inadequately accounted for in the Analysis. I have also been asked to provide my opinion on the extent of the Project's regional or national benefits.

1.2 Background, Experience and Code of Conduct

3. I am a professional economic consultant and researcher with 33 years' experience in providing economic and/or financial analysis and advice. My primary professional role is as Principal Economist at Cognitus Economic Insight, an economic consulting and research practice I founded in 2002. Since 2023 I have been an Adjunct Associate Professor at Griffith University, and was appointed a Lay Member of the High Court for Commerce Act matters in 2024. In June I retired after being on the organising committee of the Law & Economics Association of New Zealand for 10 years, having been president for three years, and Auckland vice president for six years.

4. Prior to founding Cognitus, I was an investment banker with Credit Suisse First Boston (1992-1998), through which I was a valuation and corporate finance specialist. I have also taught undergraduate and MBA finance and/or corporate finance for Victoria University of Wellington in New Zealand and Hong Kong multiple times, and completed a graduate-level course in finance as part of my PhD (further details below).

5. I have also been a Research Principal at the New Zealand Institute for the Study of Competition and Regulation (2001-2011), and a Senior Research Fellow at Auckland University of Technology (2015-2025). In addition to teaching finance or corporate finance, I have also lectured in industrial organisation and/or environmental economics at Auckland University of Technology and University of Auckland multiple times.

6. I hold the following qualifications: a PhD (awarded with Distinction) in industrial organisation and regulation, as well as an MPhil and MSc in economic theory and econometrics, all from Toulouse School of Economics. I also hold a BSc (Hons, First Class) in statistics and operations research (including papers in economics and finance), a BSc in statistics and operations research, and a BCA in economics and finance, all from Victoria University of Wellington.

7. I belong to multiple professional and academic associations, including the Law & Economics Association of New Zealand (Member), Competition Law & Policy Institute of New Zealand (Member), Asia-Pacific Industrial Organisation Society (Member), New Zealand Association of Economists (Member), the New Zealand Institute of Forestry (Ordinary Member), and the Australian Centre for International Commercial Arbitration (Associate Member).

8. Relevant examples of my work for this exercise include:

   8.1. Providing economic advice to a company with international mining interests;

   8.2. Undertaking numerous and often-times complex financial evaluations;

   8.3. Applying the total economic value (**TEV**) framework for describing and categorising the full range of economic values that attach to a given activity or resource, and also non-market valuation (**NMV**) techniques for ascribing monetary values to product or service attributes that are not traded in markets and hence which lack identifiable market prices;

   8.4. Providing expert economic evidence (including for multiple landmark cases) in the High Court, Waitangi Tribunal, and Environment Court – in the latter case, including in relation to clause 3.10 of the National Policy Statement for Highly Productive Land;

   8.5. Undertaking various studies for the Ministry for the Environment and/or Māori peak bodies on climate change policy and the transition to net zero in multiple sectors, and in particular how it affects Māori landowners (especially given the strong primary sector interests of Māori, and the cultural and socio-economic importance of whenua Māori);

   8.6. Assisting Māori peak bodies with their engagement with the Ministry for the Environment regarding the reform of the RMA (under both the previous and current governments), including a particular focus on Māori rights and interests in freshwater;

8.7. Undertaking research on how land use is affected when land provides cultural services as well as commercial value, as well as research more broadly on the role of cooperative ownership in affecting business viability and behaviour; and

8.8. Providing expert economic evidence in other FTA processes, including two others involving natural resource extraction.

9. I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses (**the Code**), and have complied with it in the preparation of this report. I also agree to follow the Code when participating in any subsequent processes, such as expert conferencing, directed by the Panel. I confirm that the opinions I have expressed are within my area of expertise and are my own, except where I have stated that I am relying on the work or evidence of others, which I have specified.

1.3 Documents Reviewed

10. In preparing this memorandum, I have reviewed the following:

10.1. A report prepared by Benje Patterson dated October 2025, B.01 *Economic Impacts of the Bendigo-Ophir Gold Project – October 2025 Update* (**BP Report**);

10.2. A study by Santana Minerals Limited dated 1 July 2025, *Bendigo-Ophir Gold Project Updated Pre-Feasibility Study (PFS)* (**Updated PFS**), which the BP Report relies upon for certain Project financial details;[1]

10.3. Section 6 of the Project's original substantive application, A.13, *Assessment of Environmental Effects* (**Environmental Effects Report**);

10.4. A report prepared by Engineering Geology Ltd dated 8 August 2025, B.21, *Matakanui Gold Limited Bendigo-Ophir Gold Project Shepherds Tailings Storage Facility Technical Report* (**EGL Report**);

10.5. A report prepared by Prof. Dr. Bernd Lottermoser dated 18 March 2026, *Technical Report: Critical Review of the Proposed Shepherds Tailing Storage Facility, Bendigo-Ophir Gold Project, Matakanui Gold Ltd, New Zealand* (**Lottermoser Report**); and

10.6. Other documents and materials as referenced throughout this report.

[1] BP Report, at s. 3.2 and footnote 3.

1.4 Summary of Main Conclusions

11. In the following sections I set out my detailed assessment of the Analysis. By way of summary, it is my opinion that:

    11.1. The Project's claimed total direct economic impacts of $5.8 billion over 16 years is overstated by a double count of $216 million PAYE and ACC payments, so should have instead been $5.6 billion.

    11.2. It is not meaningful to consider just total direct economic impacts when they occur over time, since this equally weights future impacts with current impacts when the same level of impacts occurring sooner is more socially valuable. Converting the claimed impacts into their present value (**PV**) – i.e. discounting future impacts to their current value – results in total direct economic impacts of $3.3 billion.

    11.3. As done in the BP Report, it is more meaningful to consider claimed Project direct economic impacts on an annualised basis, but for the reason just explained this requires use of an annualised equivalent impact producing the $3.3 billion present value in total – that annualised figure is $317 million (not the $359.7 million undiscounted annual average presented in the BP Report).

    11.4. However, that annualised equivalent amount of $317 million is based on an implausibly high and ahistorical gold price assumed to be sustained in every year of the Project's 16 year life – adopting a more plausible but still likely maximum sustainable gold price – a price relied upon by the Applicant itself – reduces the annual direct economic impact of the Project to $223 million.

    11.5. Furthermore, the Analysis incorrectly attributes all Project direct economic impacts to New Zealanders, when 60% of the Applicant's equity is owned by non-New Zealanders, so shareholder-related Project impacts should only be counted for the Applicant's 40% New Zealand shareholding. It also implausibly assumes any jobs created by the Project will go to employees that would otherwise have been idle for the Project's 16 year expected life (and not have any opportunity cost – i.e. alternative income, and/or leisure time), and only to New Zealand employees.

    11.6. Correcting for these assumptions reduces the Project's annualised direct economic impacts to $90 million.

11.7. The Project's claimed direct economic impacts are not the same as its benefits. It is the Project's benefits that are relevant under the FTAA. This approach inherently overstates direct Project benefits by mischaracterising Project costs as benefits, and also by using multipliers that are widely recognised as overly-inflating claimed impacts (and as recognised in the BP Report, resulting in only theoretical maximum impacts).

11.8. The Analysis does not quantify or account for economic disbenefits of the Project, though it acknowledges possible adverse effects in terms of increased housing pressures, increased labour demands, and possible displacement of economic activity due to the Project.

11.9. The Analysis also does not consider or allow for residual ecological, landscape, recreational and other adverse environmental adverse effects, adverse health effects, loss of highly productive land (**HPL**) for land-based primary production (**LBPP**), or long-term possible adverse effects regarding mine impacted waters and tailing storage facility failure risks.

11.10. The Analysis appropriately compares the Project's claimed economic impacts against regional GDP and employment levels, but fails to compare the claimed impacts with their national-level counterparts, and inappropriately compares them with sub-regional GDP and employment (which is not relevant under the FTAA).

11.11. Based on regional and national GDP and employment level comparisons, the Project's impacts (if not benefits) are modest at the regional level, and inconsequential at the national level.

11.12. To the extent that it assists the Panel to economically quantify the Project's adverse effects – the Project's impacts are even more modest once adverse effects have also been considered.

12. In conclusion, it is my opinion that:

12.1. The Analysis has used a methodology that inherently overstates the Project's benefits;

12.2. The Analysis contains errors and omissions;

12.3. The Analysis fails to properly define the Project's counterfactual, does not properly assess all relevant economic disbenefits, and overstates certain of the claimed impacts;

12.4. Even if the claimed impacts of the Project materialise, they are not germane at the Inland Otago level for FTA purposes, modest at even the regional (Otago) level, and essentially immaterial at the national level (even before accounting for Project adverse effects); and

12.5. Hence, the Application's claimed impacts have not been credibly and robustly established, and certainly not to the level of demonstrating significant regional or national benefits.

13. It is also my opinion that any systematic, transparent and comprehensive assessment of the Project's benefits requires a full cost-benefit analysis (**CBA**), not economic impact analysis (**EIA**) as provided, including suitable sensitivity analysis and scenario modelling to test the importance to claimed benefits of key uncertainties, which have not been provided.

2. Overstatement of BOGP Direct Economic Impacts

2.1 Overview

14. This section explains how the BP Report's claimed direct economic impacts of the Project have been overstated. It quantifies the extent of any overstatements, which has been possible due to details of the financial model underlying the BP Report's analysis having been published as part of the Updated PFS. That meant I was able to reproduce that financial model to well within 1% accuracy for almost all variables (mean absolute error less than 0.5%), and to use that model to calculate claimed Project impacts using different input assumptions to those applied in the BP Report – see Appendix A for model details.

15. In particular, this section demonstrates how claimed Project direct economic impacts hinge crucially on the US$3,138/Oz gold price, 100% New Zealand shareholding, and nil employment opportunity cost – all explicitly or implicitly assumed in the BP Report to apply in every year of the Project's expected 16 year life. It shows that each of those assumptions is unrealistic, and quantifies the Project's direct economic impacts under more realistic assumptions.

16. Highlighting key input assumptions and testing the sensitivity of claimed model results to changes in those assumptions is standard economic modelling practice. The BP Report fails to provide any such sensitivity analyses, which this section at least partially addresses (i.e. by showing how changes in certain if not all key assumptions affect the Project's claimed impacts and/or benefits).

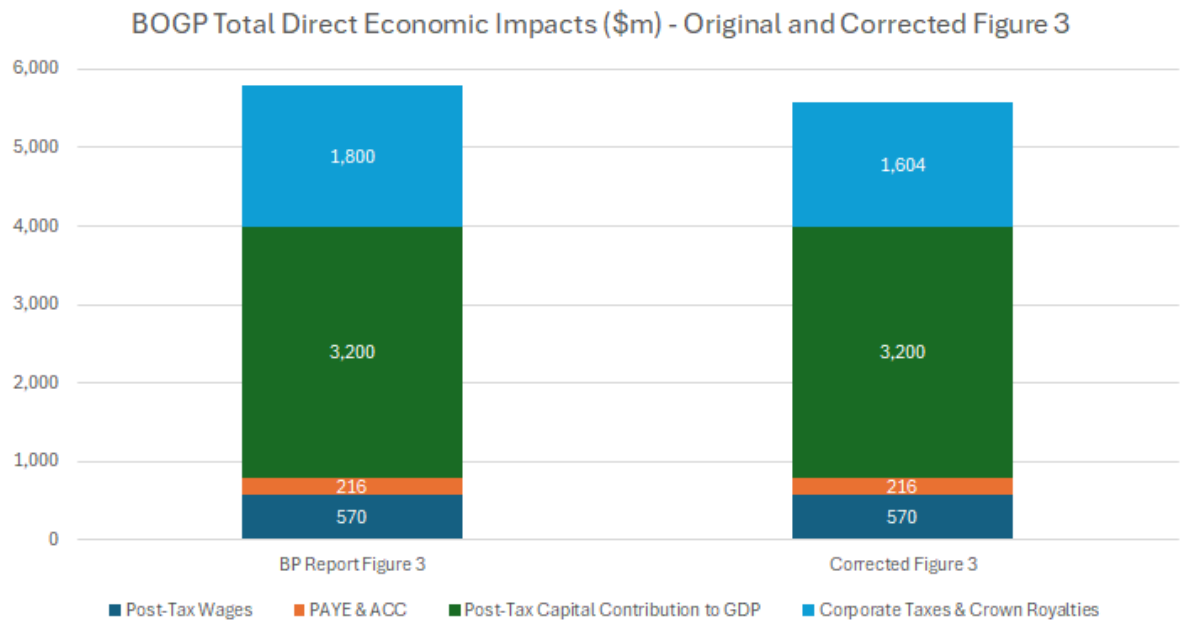
2.2 $216m Double-Count of PAYE and ACC Payments

17. According to Table 3 of the BP Report, the $1.8 billion of government revenues due to the Project includes $0.2 billion of PAYE and ACC payments. That $0.2 billion is also shown in Figure 3 of the BP Report, as part of "Labour's share of direct GDP" (second bar from the bottom).

18. However, the top of that figure "corporate taxes and royalties" is stated to be $1.8 billion (i.e. also including the $0.2 billion of PAYE and ACC payments). This means the PAYE and ACC payments have been double-counted in Figure 3.

19. Figure 1 below shows the impact of removing this double-count, by providing only $1.6 billion for corporate taxes and royalties in Figure 3 of the BP Report, consistent with Table 3 of that report. This reduces total claimed direct impacts from $5.8 billion to $5.6 billion (a reduction of 3.4%).

Figure 1 – Total Direct Economic Impacts After Removing Double-Count of PAYE and ACC Payments



Source: Data from BP Report. Figures created by the Author.

2.3 Failure to Express Multi-Year Impacts in Present Value Terms, and Other Timing Issues

20. When a project gives rise to benefits over multiple years, it is economically misleading to suggest that impacts realised in later years are as socially beneficial as the same impacts realised now. This is effectively how the Project's direct economic impacts are presented in the BP Report, since claimed Project impacts over multiple years are simply summed to present total impacts (as in Figure 3 of the BP Report).

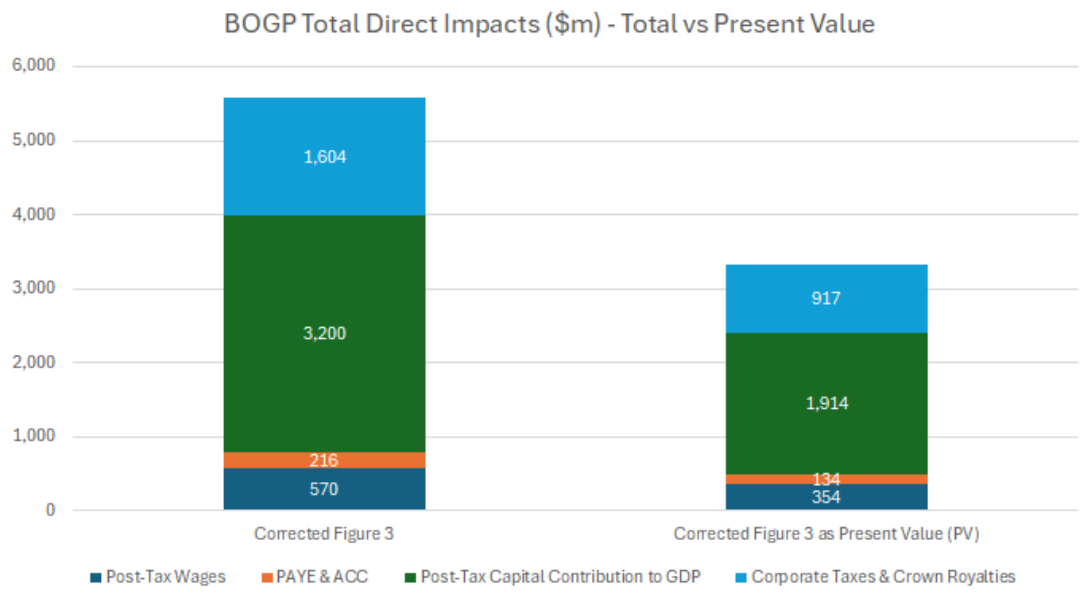
21. Rather, it is standard practice in economics to recognise that later impacts are less socially valuable than the same impacts if realised sooner, by "discounting" the relevant impacts at a suitable "discount rate" in order to express all impacts in present value (PV) terms.[2] Such discount rates typically combine an allowance for expected changes in price levels (i.e. expected CPI changes), the rate at which economic agents expected to be rewarded with increased future consumption possibilities if they defer consumption now (i.e. a positive expected real interest rate), and a reward for bearing project risk (since risk in a project's returns makes future consumption possibilities afforded by those returns less certain).

22. Treasury guidance indicates that a suitable (real) discount rate for projects that are mainly commercial – like the Project – is 8% per annum.[3] Figure 2 indicates how the total claimed direct economic impacts of the Project (with PAYE and ACC double-count removed) compare with the PV of those claimed impacts after applying Treasury's 8% discount rate. As can be seen, this causes a material reduction in the lifetime direct impacts of the Project, from a total of $5.6 billion to $3.3 billion (a reduction of 41%).

[2] For example, see NZTA/Waka Kotahi, 2024, *Monetised benefits and costs manual*, at pp 23-24 and Chapter 5.

[3] https://www.treasury.govt.nz/sites/default/files/2024-10/treasury-circular-2024-15.pdf, at paras 13-16.

Figure 2 – Total Direct Economic Impacts and Present Value of Direct Impacts



Source: Data from BP Report. Figures and PV created by the author.

23. It should be noted that the claimed corporate taxes and Crown royalties are theoretical maximums, calculated to be paid as and when the underlying mining returns are projected to arise:

    23.1. The reality is that the Project will generate tax losses in its earlier years (e.g. due to construction-related costs) that can then be used to offset corporate tax payments in later years, thus reducing the PV of claimed corporate taxes;

    23.2. Furthermore, the Applicant may have some ability to use transfer pricing to redistribute profits from New Zealand to other jurisdictions, further reducing the PV of any claimed corporate tax payments, and possibly also claimed Crown royalty payments; and

    23.3. The Applicant might commence other operations that are grouped for New Zealand tax purposes with the Project, providing further scope to reduce the Project's income and hence both corporate taxes and Crown royalties. I understand such issues are expanded upon in reports prepared for Sustainable Tarras by Dr Geoff Bertram, and Mr Ed Willis.

2.4 Need for Direct Economic Impacts to be Expressed in Annual Equivalent Terms to Aid Assessment of Significance

24. The FTA requires Projects to provide significant regional or national benefits. To assist in gauging significance, and as has been done in the BP Report, it is useful to compare claimed project benefits with suitable benchmarks, such as regional or national GDP for claimed GDP impacts, or regional or national employment, for claimed employment impacts.

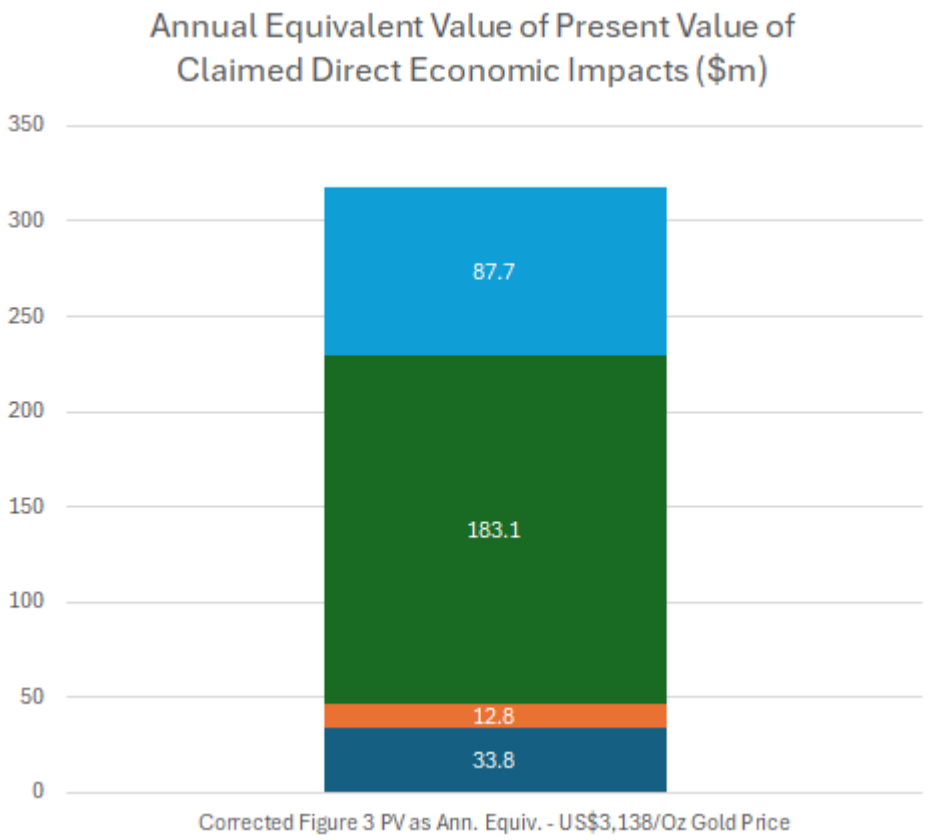
25. Since GDP is a flow per period (e.g. per annum), and not a stock (like the PV of multi-year impacts), it is not economically meaningful to compare total claimed GDP impacts (which arise over multiple years), or even the PV of total claimed benefits, with a single year's GDP.

26. Furthermore, since $1 of GDP realised in the future is less socially valuable than $1 of GDP realised now, it is also not meaningful to simply compute the average annual GDP impact of the Project and compare it with current regional or national GDP, which is how the BP Report attempts to provide an annual figure for comparison purposes (i.e. $359.7 million average annual total direct GDP, at the bottom of Table 2 of the BP Report).

27. As such, and to aid in assessing significance of claimed Project benefits, it is more economically meaningful to convert the PV of total claimed benefits into an annual equivalent amount, namely, the annual amount which if discounted at the relevant discount rate produces the PV of the Project's claimed direct economic impacts.

28. Figure 3 shows that this annualised amount totals $317 million, which is 12% less than the $359.7 million annual average amount used in the BP Report for comparisons with annual figures like GDP.

Figure 3 – Annualised Direct Economic Impacts



Source: Data from BP Report. Figures and annual equivalent of PV created by the author.

2.5 Implausibly High Gold Price Assumed to Prevail for Entire Project Life

2.5.1 Overview

29. The preceding analysis changes how the Project's claimed direct economic impacts have been presented, but leaves in place the assumed values of key input assumptions adopted in the BP Report. In reality, several of those key input assumptions are implausible or otherwise not reasonable.

30. The most consequential such input assumption is the US$/Oz gold price assumed in the BP Report to apply both at the commencement of the Project, and also in each and every year of the Project's assumed 16 year life (i.e. with no higher or lower gold prices provided for at any stage of the Project's assumed life).

31. Gold prices recently reached unprecedented highs – the maximum ever daily gold price of US$5,379/Oz was achieved on 29 January 2026, but has since fallen 16% in less than two months (in fact 15.5% in just over three weeks) to US$4,500/Oz on 26 March 2026.

However, it is a feature of historical gold prices that they sporadically experience short-lived spikes, followed by long periods where they are much lower than their realised highs. It is also true that gold prices – in 2026$ – reached their previous record high in October 2024, with a gold price that high having been realised 45 years earlier, in January 1980. In other words, for 45 of the past 46 years, gold prices have been below – indeed, as shown below, well below – the record prices set in both January 1980, October 2024, and more recently.

32. In the discussion below, I show why the US$3,138/Oz gold price assumed in the BP Report to apply in each and every year of the Project's 16 year life is ahistorical, and implausible. I show that 16 year moving average gold prices, and their underlying trend – i.e. measures of gold prices much more plausible for projecting the next 16 years of gold prices that might prevail over the Project's life – are each substantially lower than the assumed US$3,138/Oz gold price. I further show, based on historical gold price spike episodes, that average prices realised post-peak and over the operational phase of the Project will average significantly less than the US$3,138/Oz price assumed in the BP Report.

33. Finally, I show the impacts of different gold price assumptions – ranging from the implausible US$3,138/Oz gold price through to a more plausible level – on the annual equivalent PV of claimed Project direct economic impacts.

2.5.2 Gold Prices Experience Sporadic Spikes Followed by Prolonged Troughs

34. It is useful to first observe that until the early 1970s, gold prices were not very volatile and did not change much over time. It was when the Bretton Woods exchange rates system ended following the US' withdrawal in August 1971[4] – the so-called "Nixon Shock", causing major currencies to become decoupled from gold prices – that those prices became much more volatile, and have experienced sporadic spikes followed by often prolonged troughs.

35. Figure 4 provides a very long-term view on gold prices (1800-2010), while Figure 5 provides the last century of gold prices, in each case demonstrating the dramatic change in gold price behaviour from the early 1970s:

    35.1. In statistical terms, August 1971 represents a so-called "structural break" in the gold price data, since gold prices after that date have been generated by a different process (or different processes) and exhibit different characteristics to those

[4] https://history.state.gov/milestones/1969-1976/nixon-shock.

prevailing prior to that date – with the break arising due to a definable and explicable policy reason (the Nixon Shock).

Figure 4 – Very Long-Term Gold Prices (2010 US$/Oz)

Source: https://www.economist.com/news/2010/07/06/after-the-gold-rush.

36. As noted in Figure 4, the previous record gold price achieved in January 1980 arose in a period of economic uncertainty when inflation rates were spiking following the second oil price shock:

    36.1. This is pertinent for the current gold price spike, which arises at a time when inflation has spiked, and global economic uncertainty has surged in response to US trade and other policies.

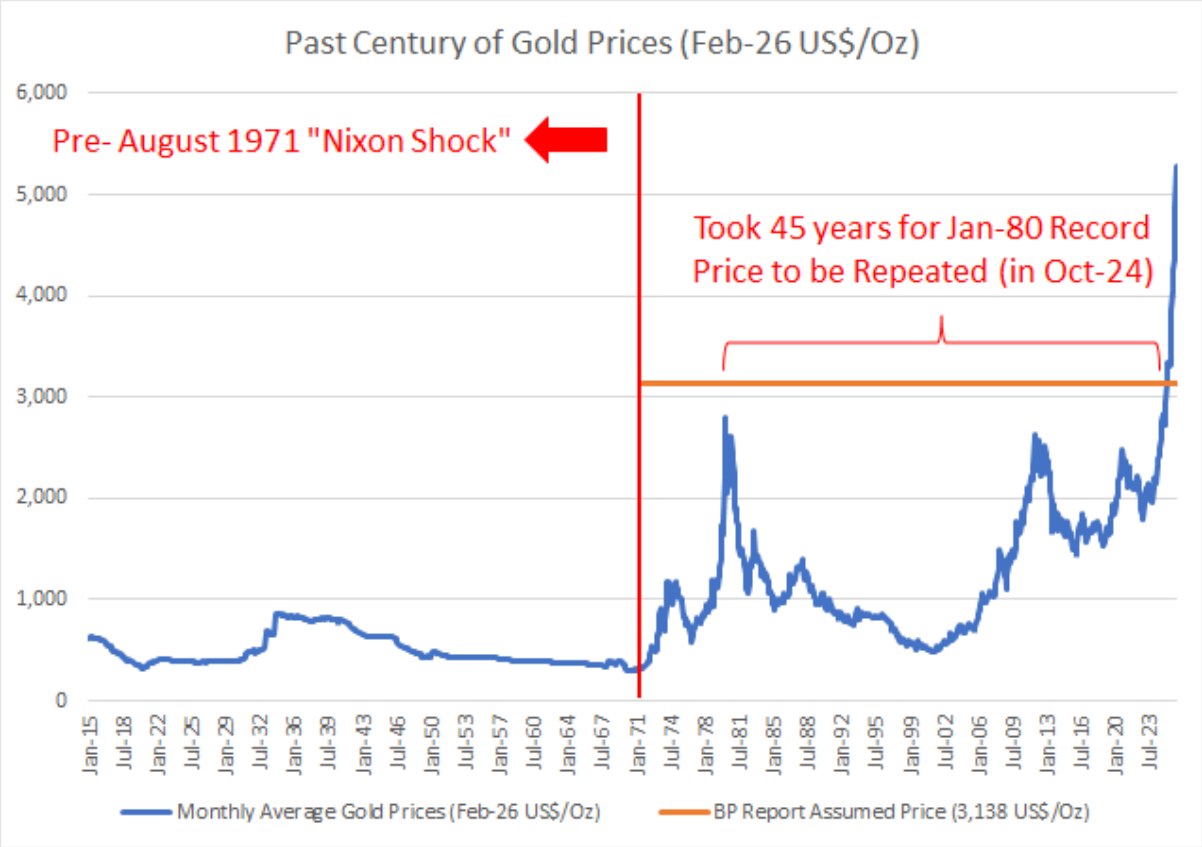
    36.2. The earlier spike proved to be short-lived, with a resulting rapid decline in gold prices.

    36.3. As and when the current economic uncertainties resolve, just as for previous gold price spikes,[5] current record gold prices can be expected to fall quite rapidly.[6]

[5] E.g. see commentary regarding the 2010 price spike: https://www.economist.com/news/2010/07/06/after-the-gold-rush.

[6] The *Economist* magazine recently questioned whether the tide is now turning on recent gold price highs: https://www.economist.com/finance-and-economics/2025/11/16/is-this-the-end-of-the-scorching-gold-rally.

Figure 5 – Past Century of Gold Prices (October 2025 US$/Oz)



Source: Data from https://www.macrotrends.net/datasets/1333/historical-gold-prices-100-year-chart, using data for table denoted "Adjusted for Inflation", figure produced by the author.

37. Notable features of Figure 5 are:

37.1. Until the early 1970s, gold prices were relatively low and fairly stable;

37.2. Since 1971, gold prices have spiked on about 10 occasions, but on all such occasions the spikes were not sustained (i.e. gold prices did not plateau at high levels for any prolonged period – not even for months, let alone for years);

37.3. For most of the 55 years since 1971, gold prices have tended to be much lower than the values at which they spiked – indeed, until October 2024 the highest ever recorded gold price occurred in January 1980.

2.5.3 US$3,138/Oz Assumed to Apply for 16 Years When Gold Prices Have Never Maintained that Level Except in the Past 12 Months

38. For the 45 years between the January 1980 and October 2024 price peaks (with the latter peak having now also been surpassed), the average gold price was US$1,340/Oz, which is

57% less than the US$3,138/Oz assumed in the BP Report to apply in each and every year of the Project's expected 16 year life.

39. Indeed, it has only been in the past 12 months that gold prices have ever been higher than US$3,138/Oz, so there has never been a period in history in which gold prices have been sustained at US$3,138/Oz for 16 years in a row, as assumed will be the case in the BP Report.

2.5.4 Average Gold Prices Over 16 Year Periods Have Never Reached US$3,138/Oz, and their Trend Will Not Achieve that Level During the Project's Life

40. According to the Updated PFS, the US$3,138/Oz price is the average spot price in the three months to 15 June 2025.[7] In other words, is it a fairly recent, very short-term average price.

41. I note that while the BP Report adopts that price as the gold price that will prevail over the Project's expected 16 year life, it does not explain or justify why that is a reasonable price to apply over that period. Nor does it explain or justify why the US$3,138/Oz price was adopted instead of the "Robust Base Case" price of US$2,220/Oz also applied in the PFS Update that the BP Report relies upon.[8] Indeed, neither the BP Report nor the PFS Update that it is based on engage at all with gold price dynamics.

42. That said, , since the BP Report adopts US$3,138/Oz as the single price that will be sustained in each and every year of the Project's expected 16 year life, it is pertinent to enquire into the average level of gold prices achieved in historical 16 year periods (i.e. 16 year moving average gold prices).

43. Figure 6 shows that the maximum 16 year average gold price achieved to date is just over US$2,100, achieved in February 2026. It also shows that 16 year moving average gold prices have a positive trend, and tend to be cyclical around that trend.

44. Figure 6 further shows that the 16 year moving average price projected over the Project's expected 16 year life reaches a maximum level of c. US$1,830/Oz by the end of the Project:

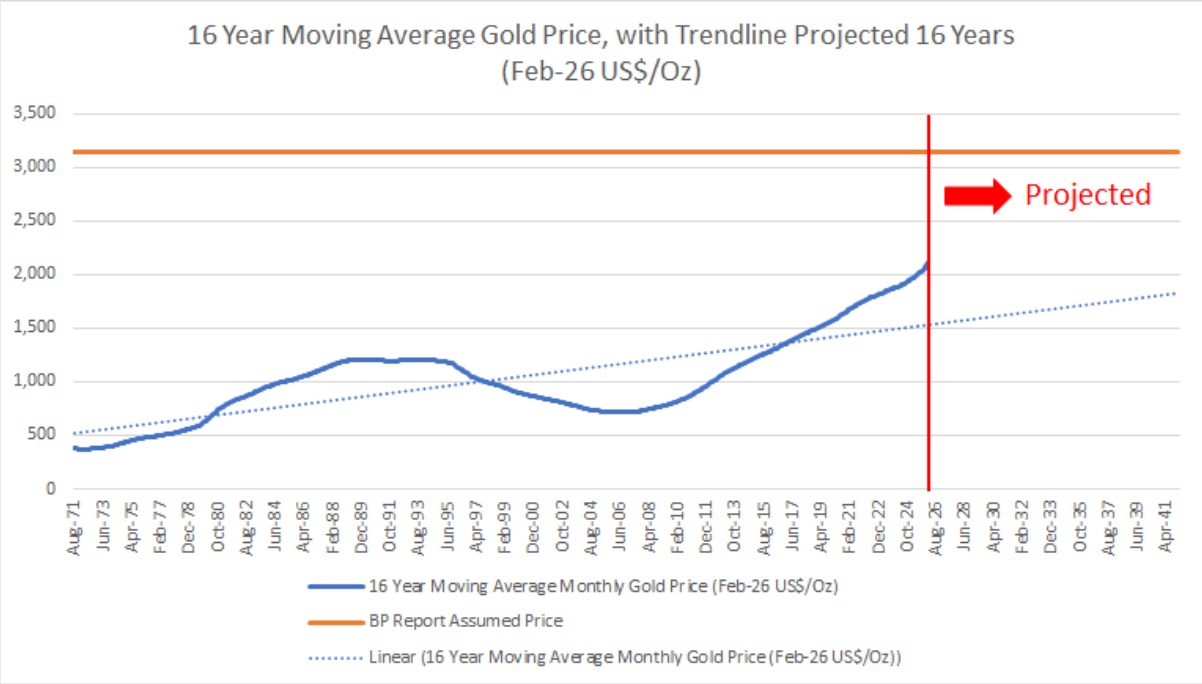
[7] Updated PFS, at pp 2 and 35.

[8] Updated PFS, at pp 2 and 35.

44.1. Hence, based on historical trends, the average gold price that can be expected to prevail over the Project's expected 16 year life is far below the assumed US$3,138/Oz price that is required to produce the level of economic impacts claimed in the BP Report.

44.2. Note that starting this analysis with the 16 year moving average figure in August 1971 is conservative despite being very historical, in that doing so steepens the Figure 6 trendline over the Project's expected 16 year life – i.e. makes it more likely that the trendline will achieve the BP Report's assumed US$3,138/Oz price (by contrast, developing that trendline using only later and higher 16 year moving average values would result in a flatter trendline, and hence lower chance of realising US$3,138/Oz).

Figure 6 – Trend 16 Year Moving Average Gold Prices



Source: data as for Figure 5, figure produced by the author.

2.5.5 Lifecycles of Previous Gold Price Spikes Also Suggest that US$3,138/Oz Price Will Not be Achieved over the Project's 16 Year Life

45. A limitation of the preceding analyses is that they do not specifically account for the recent record gold prices realised since October 2024 (although, for example, the current 16 year moving average price incorporates the recent peak prices). I do so in this section by analysing the lifecycles of previous gold price spikes, and use insights from that analysis to

illustrate plausible trajectories for the next 16 years' prices commencing with the recent peak prices.

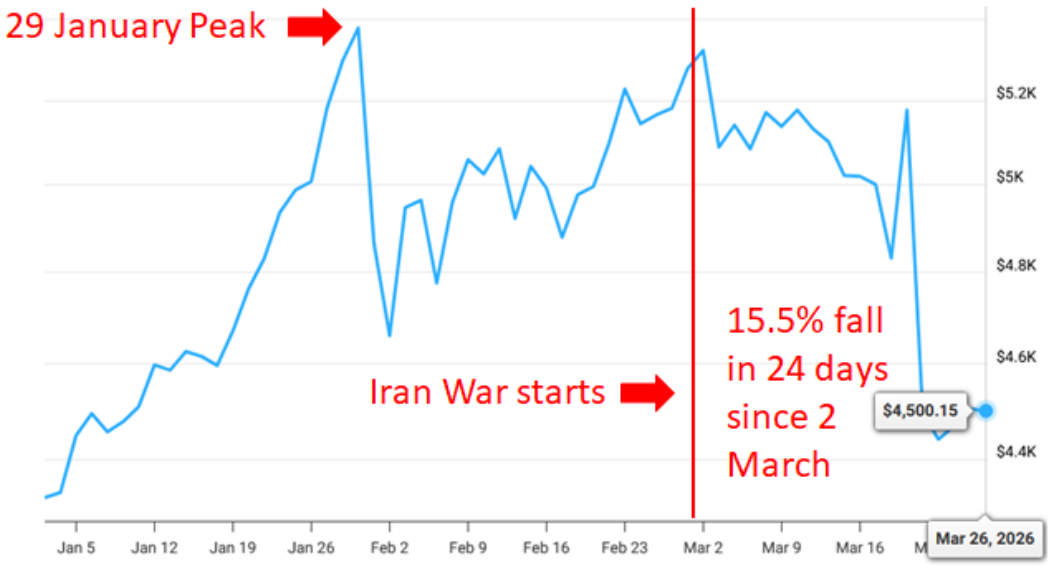
46. Importantly, and as noted earlier, the highest ever daily gold price of US$5,379/Oz was realised on 29 January 2026, but has since fallen 16% from that peak over the past two months – and in fact by 15.5% in just over three weeks – to be US$4,500/Oz (c. US$880/Oz lower) on 26 March – as shown in Figure 7:

    46.1. Notably, this precipitous fall in gold prices occurred over a period of significantly heightened global economic and political uncertainty – namely the commencement of the latest war in the Persian Gulf, which commenced on 28 February 2026 – which would normally be associated with a "flight to safety", and hence would normally be associated with steeply rising (not falling) gold prices.

    46.2. In "normal" times gold is considered a safe haven for investors, in that it is regarded as a store of value when other assets' returns are facing heightened uncertainty – however, given gold prices have already enjoyed a strong rally and achieved unprecedented levels, the risk of a collapse in gold prices is also now heightened, meaning gold is less of a safe haven than it might ordinarily be (which likely underlies the failure of gold prices to have surged following the start of the Iran War).

    46.3. This heightened risk of gold price collapse is further the case since gold offers no inherent return – i.e. it pays no interest like debt instruments, or dividends like shares – so it is less attractive to hold at times of rising real interest rates, such as might occur as a consequence of the Iran War causing oil and other commodity, fertiliser and hence transport, food and product prices to rise sharply, forcing central banks to raise interest rates to contain inflation.

Figure 7 – 2026 Year-to-Date Daily Gold Prices (US$/Oz)



Source: https://www.macrotrends.net/2627/gold-price-last-ten-years.

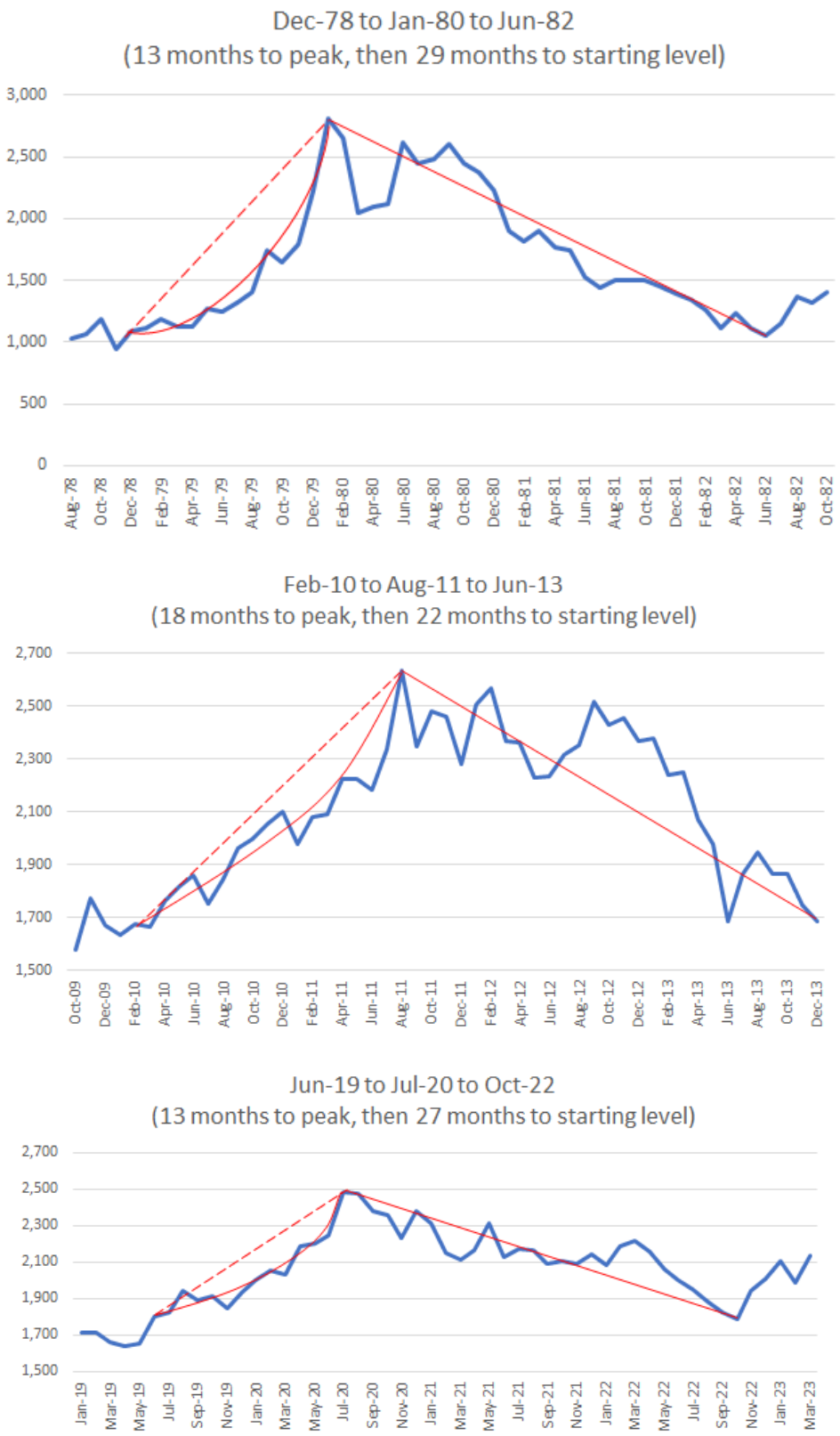
47. While it is notoriously difficult to predict either the start or turning points of gold price spikes, for the multiple reasons set out above the 29 January price record could mark the high point in the current spike, in which case it is pertinent to explore how gold prices might evolve following that peak, over the Project's expected 16 year life.

48. To do so, I analyse price spikes associated with the past peak prices achieved in January 1980, August 2011, and July 2020. As shown in Figure 8, features include:

    48.1. Exponentially rising prices (at an increasing rate) leading up to the peak, taking between 13-22 months; and

    48.2. Linearly declining prices subsequently, taking longer (on average 1.8 times longer – a figure that I apply below) to get back to the starting price before the spike.

Figure 8 – Past Price Spike Lifecycles (Feb-26 US$/Oz) – Monthly Peak Prices in January 1980, August 2011 and July 2020



Source: data as for Figure 5, figures produced by the author.

49. The current gold price rally has taken c. 29 months to reach the peak monthly price of US$ 5,278/Oz in February 2026 (as opposed to the maximum ever daily price of US$5,379/Oz on 29 January), with monthly average gold prices rising 169% over those 29 months:

    49.1. Notably, this is not the sharpest rally in gold prices in the Post "Nixon Shock" era;

    49.2. In particular, the January 1980 gold price spike remains the sharpest spike since August 1971, holding the record for the largest 12 month rise (152% to January 1980) and also the largest 12 month fall (-43% to September 1981);

    49.3. Indeed, the 1980 price spike involved compounded monthly average price rises of 7.6% per month – versus the 3.5% per month in the current rally – achieving almost the same proportionate increase as the current rally (159%, as opposed to 169%) but in less than half the time (13 months vs 29 months).

50. So it is true that the current price spike has been relatively sustained, and achieved the highest ever level of gold prices in absolute terms, but it is not true that the current spike is the most pronounced in proportionate terms or in terms of the pace of increase:

    50.1. Hence, in historical terms, the current price spike is not unique or exceptional (other than for the duration of the rally, and maximum price achieved) – the January 1980 spike remains the sharpest ever recorded;

    50.2. The fact that the current spike has been relatively sustained is further reason to expect that the current peak prices may continue to fall, as they have since their recent peaks.

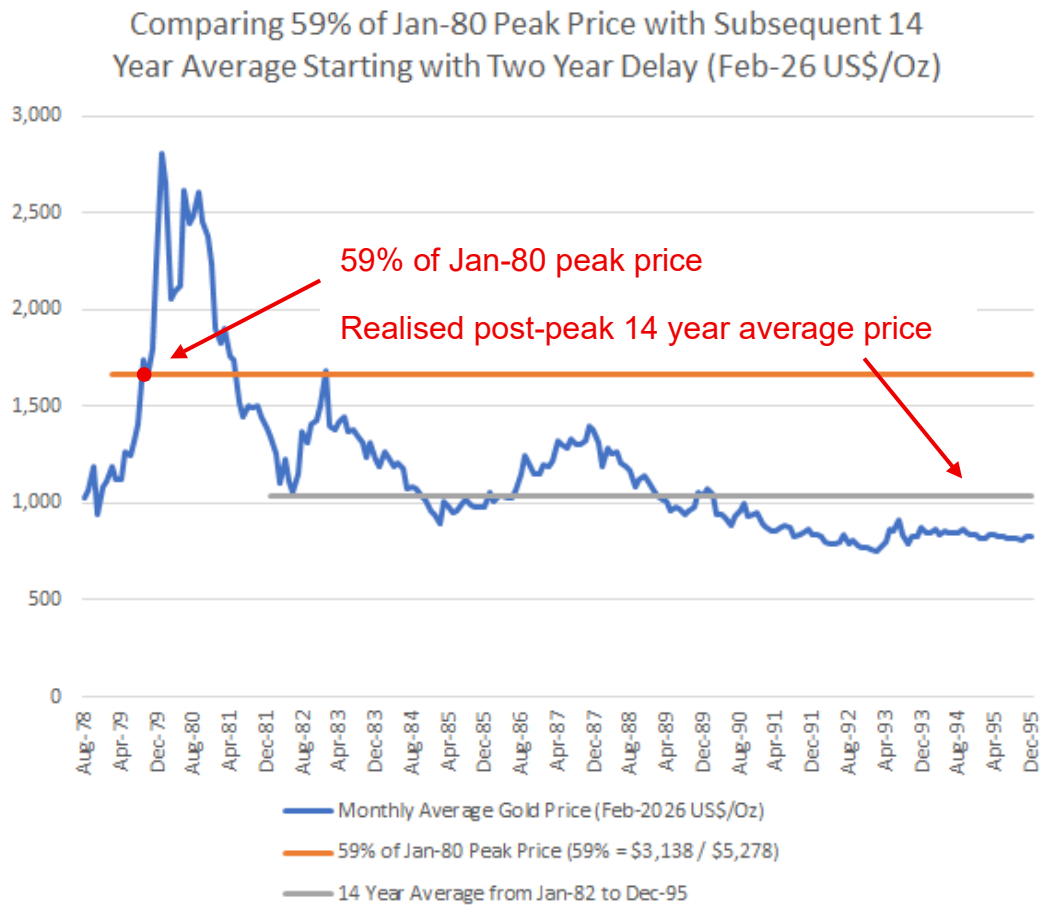
51. Figure 9 highlights a particular feature of the January 1980 price spike and subsequent prices of relevance for the Project. Specifically, if the BP Report's assumed US$3,138/Oz price as a percentage of the recent maximum price (i.e. 59%) is applied to the January 1980 peak price and projected 16 years ahead form that date, was that price higher or lower than subsequent realised prices:

    51.1. Of particular note, since the Project is not expected to commence operations for a minimum of two years, the average prices realised over 14 years starting after a two year delay (i.e. in this case, from January 1982) are pertinent for comparing average prices with the assumed reference price (i.e. 59% of US$3,138/Oz.

52. Figure 9 shows that despite there being two smaller price spikes in the 16 years following the January 1980 spike, the average gold price realised was materially lower than 59% of the January 1980 peak price:

52.1. This gives further cause to expect – based on this historical experience – that assuming a gold price that is 59% of the recent peak prices will be sustained for 16 years following those peaks is unrealistic, and not conservative as the US$3,138/Oz price has been characterised by the Applicant.[9]

Figure 9 – If the Project Had Assumed a 16 Year Gold Price that was 59% of the January 1980 Peak Price (the Same 59% that US$3,138/Oz Represents of the Recent Peak Prices) then Subsequent Gold Prices Would have Averaged Lower



Source: data as for Figure 5, figure produced by the author.

53. Based on the above insights, Figure 10 presents illustrative gold price scenarios for the 16 years from now, assuming for the reasons above that the recent peak prices represent the peak of the current spike, and assuming a linear decay in prices over 1.8 (cf above) x 29

[9] PFS Update, at pp 2 and 35.

months = 52 months – i.e. just as the current spike has been relatively long-lived, it is assumed that the decline in prices will also be relatively long-lived:

53.1. As above, since the Project is not expected to commence operations for a minimum of two years, the average prices realised from March 2028 (i.e. two years from now) and the 14 years from that date are pertinent for comparing average prices with the US$3,138 assumed in the BP Report;

53.2. Indeed, since Figure 10 depicts declining price scenarios, the longer it takes to commence mining, the lower will be the average gold price realised over the mine's expected 14 year productive life – making it harder to achieve the assumed US$3,138/Oz average price.

54. The principle trajectory illustrated in Figure 10 (dashed red line) draws from the lifecycles of previous spikes as discussed above, assuming a linear decline from the recent peak prices, with a duration informed by the average ratio of the duration of declines to the duration of rises:

54.1. To illustrate prices prevailing following that linear decline phase, it is assumed that prices will simply average the "Robust Base Case" price of US$2,220/Oz adopted by the Applicant in its Updated PFS (as further discussed below);[10]

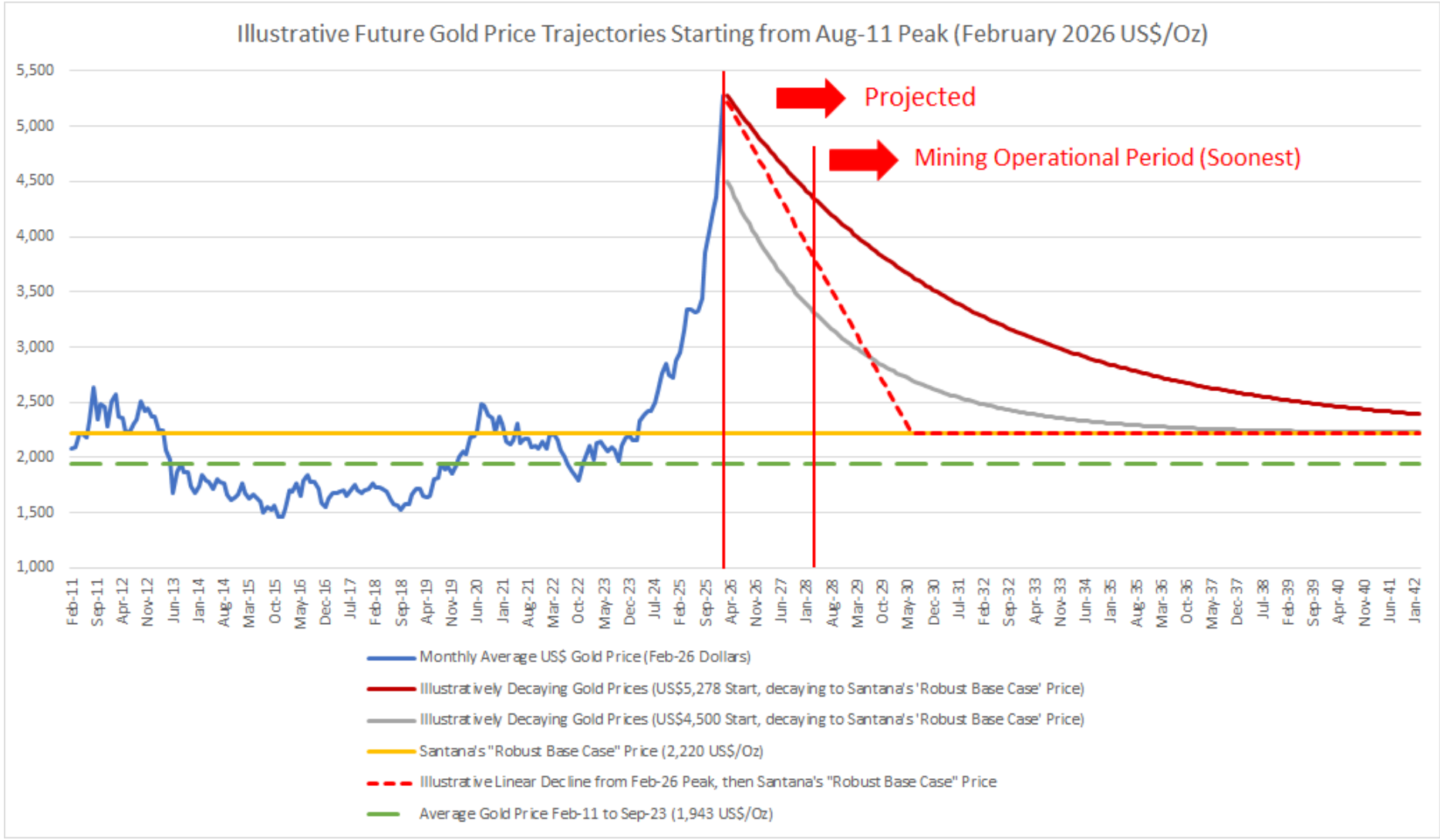
54.2. This illustrative future price trajectory produces an average price over the Project's 14 year expected operational phase of c. $2,350/Oz, well below the US$3,138/Oz price assumed in the BP Report, despite starting with very high post-peak prices.

55. I acknowledge that the actual price profile (rather than just average price) matters for present value calculations, in which case having higher-than-average prices earlier in the 14 year production phase may offset having lower-than -average prices subsequently:

55.1. However, it is also important to note that this illustrative price trajectory requires gold prices to remain above US$3,000/Oz for 38 months, when they have only ever been above that level for the past 12 months.

[10] Updated PFS, at p. 2.

Figure 10 – Illustrative Pricing Scenarios for the Next 16 Years, Assuming Recent Peak Gold Prices Mark the Peak of the Current Price Spike



Source: data as for Figure 5, figure produced by the author.

56. As can be seen from Figure 10, US$2,220/Oz is higher than the average price prevailing between the August 2011 peak and start of the current spike(and hence higher still compared to an average price incorporating the lower prices prevailing before the August 2011 peak), so that price is also possibly high relative to what might prevail following the conclusion of the current spike:

    56.1. So it is conservative for me to suppose that US$2,220/Oz will be the average price prevailing subsequent to the current spike, in the sense that adopting this higher-than-pre-spike average price makes it more likely that an average price of US$3,138/Oz will be realised.

57. Also in Figure 10 are two other illustrative future price trajectories, both of which assume a smoother price path than the principle trajectory described above:

    57.1. The first (orange line) assumes the next 16 years' prices start at the recent peak price (despite current prices being 16% lower than that price), and decay smoothly towards the Applicant's "Robust Base Case" price of US$2,220/Oz;

    57.2. The second (grey line) assumes the next 16 years' prices start at the current US$4,500/Oz price (rather than the peak price), and also decay smoothly towards the Applicant's "Robust Base Case" price of US$2,220/Oz.

58. The former smoothed scenario produces an average price over the Project's expected 14 year operational period of c. US$3,000/Oz, close to but still below the US$3,138/Oz price assumed in the BP Report:

    58.1. However, I consider this trajectory to be implausible, since it requires gold prices to be above US$3,000/Oz for 91 months – i.e. almost 8 years – when gold prices have only ever been above that level for 12 months.

59. The second smoothed scenario produces an average price over the Project's expected 14 year operational period of c. US$2,435/Oz, much less than the US$3,138/Oz price assumed in the BP Report:

    59.1. I consider this trajectory to be complementary to the principle trajectory described above (it is slightly below in earlier years, but slightly above in subsequent years), and more plausible because it starts from the actual current price, follows a more plausible (average) trajectory, and requires gold prices to be above US$3,000/Oz

for only 12 months, which clearly has precedent given the past 12 months' experience.

60. In conclusion, if the recent peak gold prices represent the peak of the current price spike, then based on historical post-peak price trajectories it can be expected that prices will return to more "normal" levels – in this case assumed to be represented by the Applicant's own "Robust Base Case" price of US$2,220/Oz (despite this being higher than the average price leading into the current spike) – over a period of about four years:

    60.1. In that case, average prices over the Project's expected 14 year operational will be less than the US$3,138/Oz price assumed in the BP Report;

    60.2. Under the principle trajectory described above, that average would be c. US$2,350/Oz (as compares with the average of c. US$2,435/Oz under the second smoothed trajectory described above) – both of which are well below the US$3,138/Oz price assumed in the BP Report, even taking into account the recent record prices,

2.5.6 Conclusions Regarding Gold Price Level that Might be Sustained Over the Project's Expected 16 Year Life

61. Based on the above, it is implausible that a US$3,138/Oz gold price will be sustained in each and every year of the Project's expected life, which is what is required for the BP Report's claimed economic impacts to be realised.

62. It would be optimistic to assume any sustained gold price above the Applicant's own "Robust Base Case" price of US$2,220/Oz over the Project's 16 year life:

    62.1. A higher average of US$2,350/Oz is suggested by the price trajectories discussed in Section 2.5.5 based on the lifecycles of past price spikes;

    62.2. But a lower average of c. US$1,835/Oz is suggested by the trend 16 year moving average price after 16 years, as discussed in Section 2.5.4.

63. Hence, in the following analysis I show how annualised direct economic impacts of the Project change for various project-long gold prices, ranging from US$2,220/Oz to US$3,138/Oz, but adopting US$2,220/Oz as the maximum plausible sustained gold price over the Project's expected life.

2.5.7 BOGP Claimed Direct Economic Impacts are Highly Sensitive to Assumed Sustained 16 Year Gold Price

64. It is standard practice in economic analyses to perform sensitivity analysis to show how model results change for different values of key input assumptions, particularly when the levels of those assumptions are uncertain:

    64.1. The BP Report fails to present such sensitivity analyses, when the gold price that can be sustained over the Project's 16 year life is both clearly highly uncertain (no one can accurately predict the gold price in a month's time, let alone in 16 years') and as will be shown below, highly material.

65. Notably, as discussed above, the Updated PFS itself applies a "Robust Base Case" gold price assumption of US$2,220/Oz, which is 29% less than the price assumed in the BP Report.

    65.1. Ordinarily, modelling analyses are presented for the "base case", emphasising those results, since base case usually means the case the analyst considers to be the most pertinent:

    65.2. Alternatives – such as results based on higher gold prices – are then typically presented as an alternative to the base case.

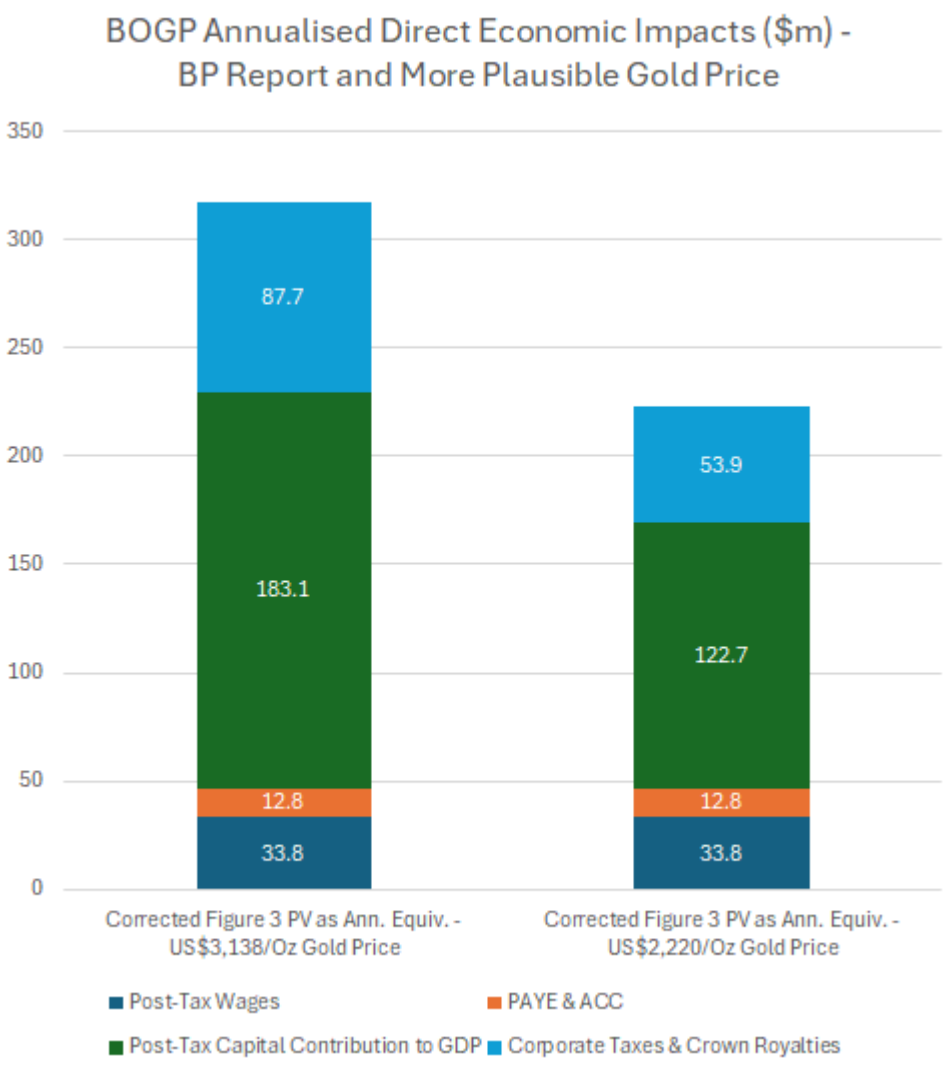
66. Both the Updated PFS and the BP Report depart from this modelling convention by stressing the results based on the far-from-conservative US$3,138/Oz gold price assumption:

    66.1. Presentationally, this serves to overstate the Project's claimed direct economic benefits, since even the Applicant considers a US$2,220/Oz gold price to be a "Robust Base Case" price.

67. Figure 11 shows that the annualised impact of $317 million at a sustained gold price of $3,138/Oz is 42% higher than the $223 million annual impact at the Applicant's "base case" US$2,220/Oz price:

    67.1. The gold price level assumed to be sustained over the Project's entire 16 year life is therefore highly material – any credible assessment of the Project's economic impacts must be based on a credible assumed level of that price.

Figure 11 – Sensitivity of Claimed BOGP Direct Economic Impacts to Changes in Assumed 16 Year Sustained Gold Price



Source: Data and figure produced by the author based on reproduction of financial model contained in the Updated PFS.

2.6 No Allowance for Overseas Ownership

68. Implicit in the BP Report's analysis is that all of the claimed benefits of the Project accrue to New Zealand residents. Benefit within New Zealand must be an inherent requirement of "regional or national benefits" under the FTAA:

    68.1. For example, if all of a project's benefits accrue to overseas parties instead of New Zealand residents, it seems implausible to suggest that the project creates any "regional or national" benefits of the sort required by the FTA.

69. However, the Applicant has stated that only 40% of its owners are New Zealand shareholders, which I assume means 40% of its equity is owned by New Zealanders:[11]

    69.1. This means that 60% of the direct economic impacts accruing to shareholders – in this case of the earnings before interest, tax, depreciation and amortisation (EBITDA) generated by the Project that is a core element of the BP Report's assessed economic impacts – are not "regional or national" benefits accruing to New Zealanders or New Zealand.

70. As such, the Project's claimed post-tax capital contribution to GDP (the $3.2 billion element in the BP Report's Figure 3), which is calculated as EBITDA less corporate taxes paid by Santana, less also corporate taxes paid by others (as detailed in the BP Report's Table 3), should instead be calculated as 40% x EBITDA less those corporate taxes.[12]

71. Figure 12 below shows how allowing for only a 40% New Zealand benefit from the Project's EBITDA affects the relevant Project economic impacts (for a gold price of US$2,220/Oz).

2.7 No Allowance for Employment Opportunity Costs

72. Employment attributable to the Project only represents a "benefit" if that employment is in some sense better than the situation enjoyed by the relevant employees absent the Project (i.e. better than those employees' "opportunity cost"). That would be the case for example, if:

    72.1. The employees were otherwise unemployed for each year of the Project's expected 16 year life and did not value leisure time; and/or

    72.2. Those employees might have otherwise been employed, but for the Project, but enjoyed worse pay and conditions in their alternative employment.

[11] From the Santana Minerals website, "About 40 percent of shareholders are kiwis." See: https://www.santanaminerals.com/faqs-3.The proportion of the company's shareholders that are New Zealanders is not informative if shareholders have different percentage stakes in that equity. My analysis would need to be updated if this assumption is incorrect.

[12] This is to be contrasted with the corporate taxes and Crown royalties claimed in the BP Report as Project economic impacts – they are paid to the government regardless of the Project's corporate ownership mix (subject to any transfer pricing or tax grouping issues, as discussed in Section 2.3).

73. The Otago Region unemployment rate has been lower than the national rate for all of the past 20 years,[13] indicating a tight regional labour market (i.e. generally, let alone for specific occupational classes like mining or mining support services). It is therefore implausible to suggest there is a pool of skilled workers in the Project region who will have been idle for each of the next 16 years unless the Project proceeds.

74. However, even if the above conditions were satisfied, the difference between the pay those employees enjoy if hired to work on the Project and their situation absent the Project might still not truly represent the Project's employment benefits:

    74.1. For example, if due to shortages of labour with the required skills in the Project's locale the Project results in greater competition for such workers, that would bid up the wages of those workers, benefitting workers of that type more generally, but also reducing the profitability of other firms (e.g. wineries, tourism operators, other miners) who rely on those workers, potentially threatening their viability, and creating offsetting economic disbenefits.

75. As such, the direct economic impact of the Project's claimed employment is at most equal to the claimed average annual income per worker ($140,300)[14] multiplied by the number of Project workers (BP Report Table 4), which is the approach adopted in the BP Report.

76. However, as is standard practice in economic analyses, it is essential that the opportunity cost of the relevant workers is allowed for, recognising that it is not zero (i.e. absent the Project, there is not a pool of skilled local workers who for the Project's entire 16 year life will enjoy an income, or money-equivalent value of leisure, that is zero). Indeed, according to the Treasury, the opportunity cost of employment is:[15]

    76.1. The market wage of the relevant skill class of workers if those workers are already employed; or

    76.2. 50% of that market wage if they are unemployed – recognising that unemployed workers are able to enjoy leisure, which provides them with value.

77. The opportunity cost of employed workers with the required skillset will exceed their opportunity cost if unemployed (otherwise they would choose leisure over employment).

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[13] https://regions.infometrics.co.nz/otago-region/employment/unemployment?compare=new-zealand.

[14] BP Report, at p. 2.

[15] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at pp 17-18.

Furthermore, all else equal, an employee with the relevant skills is unlikely to accept employment due to the Project unless the Project remuneration is at least as high as their current remuneration (otherwise they face a pay cut by taking a job with the Project):

77.1. These considerations point to the opportunity cost of the relevant Project employees being between 50% (if they are unemployed but at least having leisure time) and 100% (if they are already employed) of the $140,300 annual income assumed in the BP Report analysis;[16]

77.2. I assume an opportunity cost of 75% is relevant, being the midpoint between these two extremes – the true figure will be higher the greater the share of those Project employees are currently employed, or lower the lower the share of those employees that are currently employed.

78. Figure 12 below shows how allowing for this 75% opportunity cost – instead of the nil opportunity cost implicitly assumed in each and every year of the Project's 16 year life in the BP Report – affects the relevant Project economic impacts (for gold prices of US$3,138/Oz and US$2,220/Oz).

2.8 No Allowance for Likely FIFO Worker Requirements

79. As indicated above, the Otago Region labour market is tighter than the national labour market, with the regional unemployment rate having been lower than the national rate for every year in the past 20 years. As such, it is implausible to suppose that there is an adequate pool of skilled workers in the Bendigo-Ophir worker catchment sitting idle for each year of the Project's 16 year life absent the Project:

79.1. This is particularly the case since the Project is a greenfield mining project, meaning there is not already a pool of skilled mine workers, let alone such workers who are expected to be idle for the next 16 years, in the relevant catchment area.

80. This means at the very least it will take time – i.e. years – for the required labour force to materialise. The BP Report:

[16] In fact, some workers may be prepared to sacrifice income in order to enjoy lifestyle or other non-income benefits from working in Bendigo-Ophir – in that case the relevant opportunity cost would be greater than 100%, implying that capping the opportunity cost at 100% may be unduly conservative.

80.1. Suggests that employment growth of the scale indicated by the Project is achievable,[17] but does not address the achievability of attracting workers with the type of skills required, and also of workers that are prepared to relocate to the Project locale, which represent much more demanding requirements; and

80.2. Acknowledges that "sourcing hundreds of workers locally in a short space of time will be a complex recruitment exercise."[18]

81. Furthermore, the Project will create peak employment demands during its temporary construction phase,[19] possibly requiring workers to reside in temporary worker housing due to an already tight regional affordable housing market, making it unlikely that workers of the relevant types will relocate their entire families from outside of the Project catchment for such a temporary phase:

81.1. Initial indications appear to be that a worker camp of up to 80 workers, and a small caravan park for up to 20 caravans, are expected to be required.[20]

82. As such, it seems highly likely that at least some of the required workforce will be fly-in-fly-out (**FIFO**) workers from overseas (e.g. from Australia, or the Pacific Islands) – to supply skilled labour not otherwise available, and to supply temporary labour that does not involve workers' families having to relocate:

82.1. Little of those workers' incomes will likely be spent on major purchases such as property, vehicles or significant consumer durables, with most of it instead being remitted overseas to their places of residence;

82.2. As such, most if not all of FIFO incomes will not constitute regional or national benefits for FTA purposes, and hence should be excluded from any relevant claimed Project impacts.

[17] BP Report, at p. 16.

[18] BP Report, p. 16.

[19] BP Report, at Table 4.

[20] https://www.fasttrack.govt.nz/__data/assets/pdf_file/0022/15565/A.10-Section-3-Project-Description.pdf, at p. 166.

83. I allow a 10% employment share being FIFO over the Project's life, which will likely be too low during the construction phase, and possibly (though possibly not) too high otherwise:[21]

83.1. Evidence from mining in Australia is that FIFO shares can range from 22% in moderately remote areas of Queensland,[22] to 47% in Western Australia,[23] and 62% in remote parts of Queensland;[24]

83.2. This underscores the likely conservatism of my 10% assumption – Table 1 indicates the sensitivity of asserted employment impacts to both FIFO share and employment opportunity cost.

Table 1 – Sensitivity of Annualised Claimed Gross Direct Employment Impacts to Assumed FIFO Share and Employment Opportunity Cost ($m/year)

FIFO %	Annual Benefit to New Zealand ($m) for Opportunity Cost %						
	50%	60%	70%	75%	80%	90%	100%
0%	23.3	18.7	14.0	11.7	9.3	4.7	0.0
10%	21.0	16.8	12.6	10.5	8.4	4.2	0.0
20%	18.7	14.9	11.2	9.3	7.5	3.7	0.0
25%	17.5	14.0	10.5	8.8	7.0	3.5	0.0
50%	11.7	9.3	7.0	5.8	4.7	2.3	0.0
75%	5.8	4.7	3.5	2.9	2.3	1.2	0.0
80%	4.7	3.7	2.8	2.3	1.9	0.9	0.0
90%	2.3	1.9	1.4	1.2	0.9	0.5	0.0
100%	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Source: Author's calculations.

84. Figure 12 below shows how allowing for this 10% FIFO employment share – instead of the nil share implicitly assumed in each and every year of the Project's 16 year life in the BP Report – affects the relevant Project economic impacts (for a gold price of US$2,220/Oz).

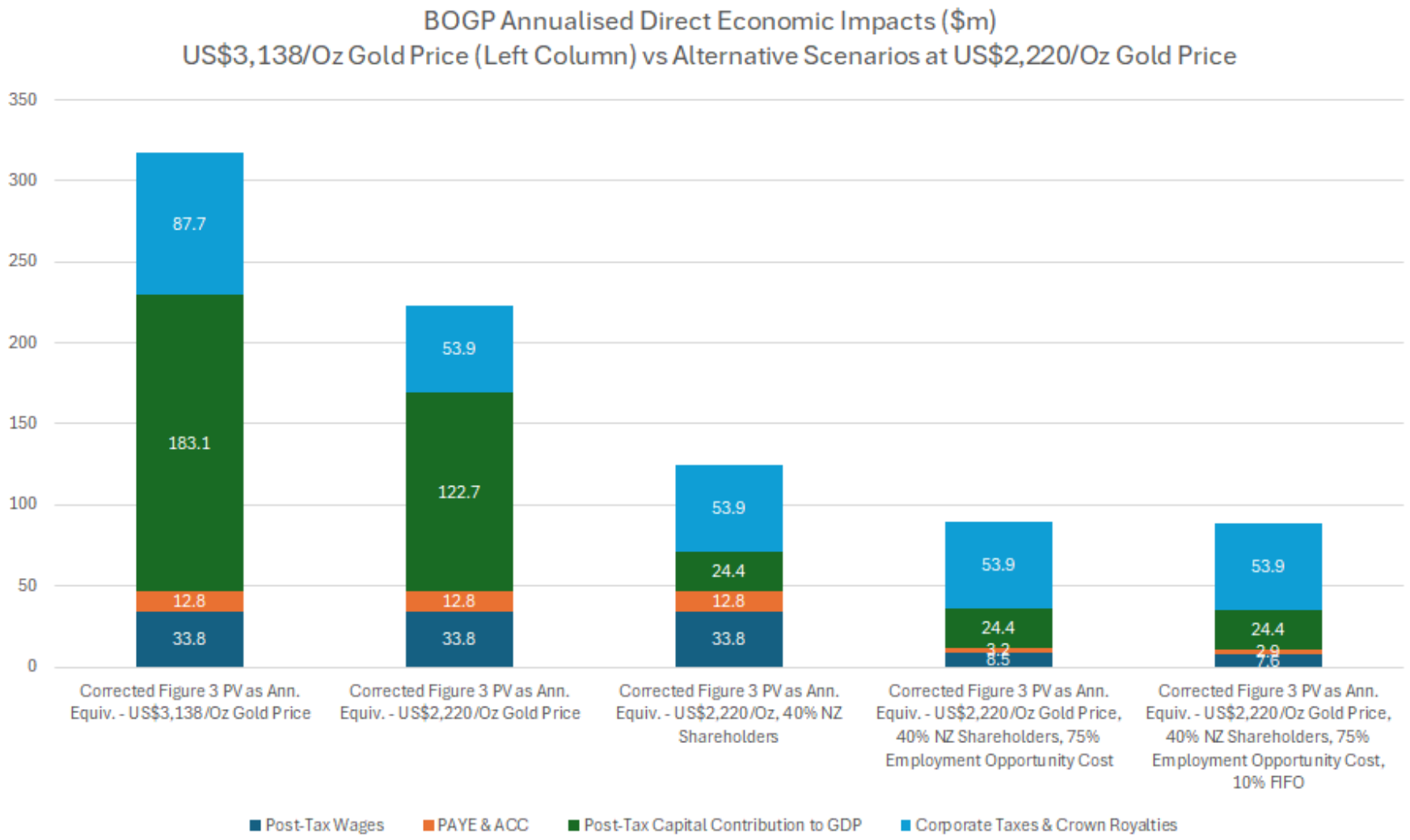
[21] Furthermore, by assuming a conservative FIFO rate, any income of FIFO workers spent in New Zealand can effectively be treated as having been allowed for.

[22] Bowen Basin, https://www.qgso.qld.gov.au/issues/3366/bowen-basin-population-report-2024.pdf, at p. 5.

[23] https://www.aph.gov.au/parliamentary_business/committees/house_of_representatives_committees?url=ra/fifodido/report/chapter2.pdf, at 2.32.

[24] https://www.qgso.qld.gov.au/issues/13246/north-west-region-resource-industry-workforce-2024.pdf, at p. 1.

Figure 12 – Annualised BOGP Direct Economic Impacts Allowing for 40% New Zealand Shareholding, 75% Employment Opportunity Cost and/or 10% FIFO Employment Share (US$3,138/Oz vs US$2,220/Oz 16 Year Sustained Gold Prices)



Source: Data and figure produced by the author based on reproduction of financial model contained in the Updated PFS

85. As can be seen from Figure 12:

85.1. The $317 million of annualised claimed direct economic impacts hinges crucially on the US$3,138/Oz gold price, 100% New Zealand shareholding, and nil employment opportunity cost – all explicitly or implicitly assumed in the BP Report to apply in every year of the Project's expected 16 year life;

85.2. Claimed annual impacts fall by 72%, to at most c. $90 million, at a US$2,220/Oz gold price, and allowing for only 40% of the Applicant's equity being owned by New Zealanders, a 75% employment opportunity cost, and with or without allowing for a 10% FIFO employment share.

2.9 Summary – Claimed Direct Economic Impacts in Annual Terms are Likely to be at Most $90 million

86. Figure 3 of the BP Report claims $5.8 billion of total direct economic impacts of the Project, though this figure reduces by 3.4% to $5.6 billion after removing a $216 million double-count of PAYE and ACC payments:

86.1. The latter figure falls by a further 41% (i.e. a cumulative 43% fall) to $3.3 billion once direct economic impacts for future years are discounted to provide figures comparable with current impacts, i.e. to produce their present value.

87. To ensure comparability of claimed Project impacts with annual metrics like GDP, it is necessary to convert total impacts into annualised equivalent terms. Since future impacts are not comparable in value terms with current impacts, it is not appropriate to simply compute the average annual impact (which Table 2 of the BP Report states is $359.7 million). Instead, it is necessary to compute the annualised equivalent of the PV of Project's claimed impacts, which is $317 million.

88. However, that annualised impact of $317 million hinges crucially on the US$3,138/Oz gold price, 100% New Zealand shareholding, and nil employment opportunity cost that are all explicitly or implicitly assumed in the BP Report to apply in each year of the Project's expected 16 year life. As discussed above:

88.1. That gold price is ahistorical and implausibly high, particularly given it must apply in each and every year of the Project's assumed 16 year life for the claimed Project direct economic impacts to be realised – an alternative impact assessment is presented assuming a more plausible but still historically high level of

US$2,220/Oz (the Applicant's own "Robust Base Case" assumption in its Updated PFS).

88.2. Only 40% of the Applicant's shares are owned by New Zealanders, meaning that 60% of the Project's returns accruing to shareholders (i.e. the EBITDA component of claimed direct impacts) accrue to non-New Zealanders and therefore cannot be considered a regional or national benefit for FTA purposes – alternative impact assessments are presented assuming only 40% of EBITDA impacts accrue to New Zealanders;

88.3. The BP Report effectively treats all Project-related jobs as wholly incremental and without opportunity cost – i.e. that the required pool of skilled local labour is currently available, and idle in each and every year of the Project's expected 16 year life, enjoying no income and no value from leisure:

88.3.1. The reality is that many of the Project's required employees will already be employed (and hence already earning income) or unemployed (with lower income – e.g. benefits – but also enjoying the value of leisure time);

88.3.2. As such, and based on Treasury guidance, the Project's claimed employment benefits should be reduced to reflect the opportunity cost of Project employees – alternative impact assessments are presented assuming a 75% opportunity cost;

88.4. Due to an already tight regional labour market, especially after recognising that the Project will require workers with specific skills and a willingness to work in Bendigo-Ophir, and further recognising that the Project's construction phase will create temporary peak labour demands, it is likely that at least some of the Project's employees will be overseas FIFO workers, in which case the bulk of their income will be remitted overseas, and so will not constitute a regional or national benefit for FTA purposes – alternative impact assessments are presented assuming a 10% FIFO employment share (and Table 1 shows the sensitivity of claimed employment benefits to different assumed levels of FIFO share and employment opportunity cost).

89. The net effect of applying these assumptions is to reduce the $317 million annualised value of claimed direct economic impacts to at most $90 million (at a US$2,220/Oz

sustained gold price) – i.e. a fall of 72% – with breakdowns between different components as shown in Figure 12:

89.1. $90 million is clearly a much lesser order of magnitude than the BR Report's headline $5.8 billion total for claimed direct economic impacts;

89.2. For the reasons discussed in Section 2.5.6, even lower assumptions can be justified for the gold price that will be sustained over the Project's 16 year expected life, meaning this $90 million figure is potentially too high.

90. It is this $90 million annualised figure – at most – that is relevant for assessing the extent of the Project's regional or national benefits.

3. Further Overstatement of BOGP Economic Impacts due to Use of I-O Multiplier Analysis

3.1 Overview

91. The analysis in Section 2 addresses claimed Project direct economic impacts, which form the bulk of the Project's claimed impacts. The BP Report further claims indirect and induced economic impacts, which rely on the use of input-output (I-O) multiplier analysis.

92. This section explains why for FTAA purposes – as well as for sound economic decision-making more generally – economic impact analysis (EIA) of the sort used in the BP Report can over-state true Project benefits, given the FTAA refers to benefits rather than economic impacts.:

92.1. It further explains how I-O multiplier analysis specifically overstates claimed economic impacts.

93. As explained below, the BP Report acknowledges the relevance of the latter issue, pointing to the conditions that would need to be satisfied in order for the claimed indirect/induced Project benefits (which are presented as a "theoretical maximum")[25] to materialise – and the consequences for net Project benefits if they are not.

[25] BP Report, at pp 15 and 17.

3.2 Multiplier-Based Economic Impact Analysis Has Known Limitations Leading to Overstated Benefits, Which Alternative Methods Avoid

94. Even if an EIA were deemed appropriate for establishing significant regional or national benefits, this requires use of an approach that more properly assesses the flow-on economic impacts of the Project than the I-O multiplier method used in the BP Report. That method has widely-acknowledged limitations due to the restrictive and unrealistic assumptions it is based upon, and systematically overstates economic benefits due to those limitations.[26]

95. For example, the Australian Bureau of Statistics (**ABS**) ceased publishing I-O multipliers almost 25 years ago due to the method's unrealistic assumptions and inherent bias, stating:[27]

> "Production of multipliers was discontinued with the 2001–02 issue for several reasons. There was considerable debate in the user community as to their suitability for the purposes to which they were most commonly applied, that is, to produce measures of the size and impact of a particular project to support bids for industry assistance of various forms. …
>
> "I–O multipliers are most commonly used to quantify the economic impacts (both direct and indirect) relating to policies and projects. While their ease of use makes I–O multipliers a popular tool for economic impact analysis, they are based on limiting assumptions that results in multipliers being a biased estimator of the benefits or costs of a project."

96. The ABS summarises the "inherent shortcomings and limitations of multipliers for economic impact analysis" as follows:[28]

    96.1. **Lack of supply–side constraints:** The most significant limitation of economic impact analysis using multipliers is the implicit assumption that the economy has no supply–side constraints. That is, it is assumed that extra output can be produced in one area without taking resources away from other activities, thus overstating economic

[26] For example, see Counsell, K., 2024, "Improving economic analysis in environmental decision-making: a tale of two coal mines", *Resource Management Journal*, August. A more comprehensive discussion of I-O multipliers and their alternatives for economic impact analysis is given in Dwyer, L., Forsyth, P. and W. Dwyer, 2020, chapter 9, "The Economic Impacts of Tourism", *Tourism Economics and Policy*, Channel View Publications.

[27] https://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/5209.0.55.001Main%20Features42009-10.

[28] https://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/5209.0.55.001Main%20Features42009-10.

impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity.

96.2. **Fixed prices:** Constraints on the availability of inputs, such as skilled labour [or housing], require prices to act as a rationing device. In assessments using multipliers, where factors of production are assumed to be limitless, this rationing response is assumed not to occur. Prices are assumed to be unaffected by policy and any crowding out effects are not captured.

96.3. **Fixed ratios for intermediate inputs and production:** Economic impact analysis using multipliers implicitly assumes that there is a fixed input structure in each industry and fixed ratios for production. As such, impact analysis using multipliers can be seen to describe average effects, not marginal effects. For example, increased demand for a product is assumed to imply an equal increase in production for that product. In reality, however, it may be more efficient to increase imports or divert some exports to local consumption rather than increasing local production by the full amount;

96.4. **No allowance for purchasers' marginal responses to change:** Economic impact analysis using multipliers assumes that households consume goods and services in exact proportions to their initial budget shares. For example, the household budget share of some goods might increase as household income increases. This equally applies to industrial consumption of intermediate inputs and factors of production.

96.5. **Absence of budget constraints:** Assessments of economic impacts using multipliers that consider consumption induced effects (type two multipliers) implicitly assume that household and government [e.g. local government] consumption is not subject to budget constraints.

96.6. **Not applicable for small regions:** Multipliers that have been calculated from the national I–O table are not appropriate for use in economic impact analysis of projects in small regions. For small regions multipliers tend to be smaller than national multipliers since their inter–industry linkages are normally relatively shallow. Inter–industry linkages tend to be shallow in small regions since they usually don't have the capacity to produce the wide range of goods used for inputs and consumption, instead importing a large proportion of these goods from other regions.

97. Notably, for the Project, the Analysis' methodology not allowing for supply–side constraints means that competition for things like (skilled) labour, materials, or accommodation for

construction and other workers – if there is not significant excess capacity for those things – might simply displace economic activity elsewhere:

97.1. In particular, where local labour is not available for the Project – especially for peak employment loads associated with development – this could either displace labour from other regions, drive up labour costs, and/or be resolved using overseas (e.g. FIFO) labour for which employment returns principally accrue overseas.

98. Likewise, due to implicitly assuming fixed input prices, the Project's purported impact may turn out to be much less beneficial than as assessed if competition for things like (skilled) labour or temporary accommodation for development and other workers bids up prices such as wages and rents:

98.1. Price rises like these will result in lower increases in activity, and could even crowd out activity in other sectors or developments – e.g. driving up the costs of accessing skilled tradespeople increases the cost structure of other firms and households in Bendigo-Ophir (including for wine or fruit exporters and international tourism operators competing on global markets), and the wider Central Otago region;

98.2. In particular, any peak influx of extra workers – which Table 4 of the BP Report highlights in the Project's first three years – should be expected to exacerbate already constrained housing supply in the region, thus representing an adverse effect of the Project.

99. Given these limitations, Treasury guidance when assessing project proposals is that I-O multipliers of the sort used in the Analysis of the Project should be ignored unless there is significant unemployment (I would add, or other significant spare capacity – e.g. in accommodation for construction workers, etc) in the economy:[29]

99.1. This means, at best, the Project's assessed value is at most that assessed in the Analysis;

99.2. In reality, since the Analysis ultimately measures gross economic impact, and does so using I-O multipliers, its assessment of the Project's economic impact will *overstate* the Project's actual benefits.

[29] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 16.

100. The BP Report acknowledges this point by describing both the potential GDP and employment multiplier effects of the Project in each case as a "theoretical maximum".[30] It further explains that the realisation of these indirect and induced multiplier effects hinges on:

100.1. "[A] substantial increase in supplier capacity across Otago which will take time"[31], failing which "businesses could service the mine by redirecting activities that currently support other industries",[32] risking lower Project economic impacts as a consequence; and

100.2. "Finding accommodation for [hundreds of] workers, without displacing others in the local economy, [which] will be crucial for unlocking the full economic impacts of the BOGP estimated in [the BP Report]."[33]

101. A technique better suited to assessing the economic impact of the Project is computable general equilibrium (**CGE**) analysis. Unlike I-O multipliers-based EIA, CGE more comprehensively and realistically accounts for how an economic stimulus ripples through other parts of the economy (either by sector or region), including by allowing for constraints in the supply of labour, housing (etc), and also allowing for prices to adjust in response to the proposed stimulus:

101.1. In my opinion, where an EIA is used, it is necessary, appropriate and feasible to undertake a full CGE analysis of the Project's regional and national impacts;

101.2. By better accounting for regional and economy-wide feedback loops than I-O multipliers-based EIA, CGE analysis would better identify whether the Project gives rise to net regional benefits, and also net national benefits (discussed further below).

3.3 Necessity of Using Cost-Benefit Analysis, Not Economic Impact Analysis

102. Following Treasury guidance, and based on my own assessment – for the purposes of sound economic decision-making – it is my opinion that any assessment of whether the Project

[30] BP Report, at pp 15 and 17 respectively.

[31] BP Report, at p. 15.

[32] BP Report, at p. 15.

[33] BP Report, p. 19.

gives rise to significant regional or national benefits under the FTAA necessarily requires a cost-benefit analysis (**CBA**), not an EIA as provided in the Analysis:

102.1. Such a CBA measures the net benefits of an undertaking like the Project, being the total incremental benefits of the Project, less its total incremental costs (including opportunity costs, and both indirect costs and benefits as well as direct ones), appropriately adjusted for time and risk, and allowing for any salient distributional impacts;

102.2. By contrast, EIA purports to measure the economic <u>impacts</u> of the Project, not its <u>benefits</u> (and hence not its contribution to social wellbeing) *per se* – including by treating Project costs as benefits,[34] even if national wellbeing could be improved by allocating fewer resources elsewhere.[35]

103. Treasury – as steward of limited public finances, and charged with ensuring those finances are used efficiently and equitably to maximise social welfare (i.e. national benefits) – advocates for the use of CBA as follows:[36]

103.1. "[A]ll advice that is aimed at helping decision-makers make a decision, should adopt a CBA framework as an organising principle"; and

103.2. Investment in systematic CBA is justified whenever decisions impact on large numbers of people.

104. By contrast, Treasury notes the following additional shortcomings of EIA (which measures components of GDP):[37]

104.1. It does not measure social welfare *per se* (even if it proxies for social welfare);

[34] The classic example of EIA indicating a benefit, when society is not in fact made better off by the relevant activity, is paying a person to dig a hole and then to fill it in again. This is counted as a gain under EIA, but not under CBA.

[35] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 54.

[36] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 39.

[37] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 47.

104.2. It (as in the BP Report – see Section 2.6 above) makes no inherent distinction between economic impact accruing to local parties and economic impact accruing to overseas parties;

104.3. It ignores non-market effects, which can be socially important; and

104.4. It offers no insight as to any distributional concerns – i.e. whether resources are allocated to groups deemed in need of greater access than others.[38]

105. Treasury concludes that:

> "EIA can provide useful contextual information for decision-makers, but it is not suitable as a tool for measuring the balance of costs and benefits of a decision to society"[39] [emphasis added].

106. In the present context, a CBA for the Project would compare the benefits of the proposed Project with the costs of realising those benefits (counting development costs (including employment-related costs), and any other direct or indirect/opportunity costs associated with the Project, as costs, instead of economic impact) – relative to what those benefits and costs would be absent the Project (discussed further in Section 4.3).

107. Failing to assess the Project in terms of its net social benefits under a CBA framework risks misallocating national resources, with purported regional or national benefits potentially being lower – and distributed more inequitably – than what could be achieved through more efficient and equitable use of resources (as might be identified using CBA):

107.1. The FTAA does not stipulate use of CBA, but provides for it at least qualitatively in the sense that the s. 85(3) proportionality weighting of adverse impacts and benefits is a form of CBA;

107.2. While a formal CBA may not be explicitly required by the FTAA, CBA provides a systematic and transparent framework for identifying and accounting for all relevant project benefits and costs/disbenefits (including adverse effects), and for incorporating monetary assessments of those benefits and costs/disbenefits

[38] This latter issue can be partially addressed through an alternative approach involving a social accounting matrix (**SAM**). The Analysis does not apply this approach, and even this alternative approach is subject to inherent limitations of multiplier-based EIAs, as discussed further in Section 3.3.

[39] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 39.

wherever possible, thereby assisting Panels by reducing the extent to which ad hoc judgements or evaluations are required;

107.3. Because it is a systematic and transparent framework, CBA helps to avoid any double-counting of any benefits or costs/disbenefits, since it makes it clear where they have or have not been incorporated;

107.4. Furthermore, while the FTAA may not explicitly require Panels to compare alternative Projects, doing so is an inherent part of determining overall regional and national benefits, since displacement effects and other external effects of any given Project necessarily involve its impacts on other possible activities and projects (both existing and expected);

107.5. CBA is therefore a practical tool for assisting Panels in systematically and transparently determining the extent and significance of a project's reginal or national benefits, and whether some or all of a project's adverse impacts are together or alone disproportionate relative to those benefits.

108. I consider a full CBA of the Project to be feasible, and warranted given its scale, and possibly material adverse effects (discussed further below).

3.4 Net Benefits – Not Gross – are Relevant

109. Any purported regional or national benefits should be assessed as net benefits (with any economic disbenefits deducted) – not gross benefits as assessed in the Analysis.

110. It is not clear that the Project's assessed benefits represent a net gain to the Otago region (or Bendigo-Ophir locale):

110.1. For the reasons discussed in Section 3.2 – and as acknowledged in the BP Report – the Project could displace economic activity from other parts of the region, meaning that its total economic impact proves to be less than claimed;[40]

110.2. Moreover, as discussed further in Section 5.4, the Project could serve to displace economic activity in the region for reasons over and above bidding up input supply

[40] BP report at pp 15 and 19.

costs (e.g. local housing and labour costs – as also discussed further, in Sections 5.2 and 5.3 respectively).

111. Similarly, even if the Project does lead to a net benefit to the Otago region, the analysis does not reveal whether that comes at a cost to other regions (e.g. due to displacing resources or economic activity from those other regions):

111.1. As such, to demonstrate regional (net) benefits, in my opinion it is further necessary to also assess inter-regional (net) benefits – to show that purported (net) benefits to a particular region have not come at the expense of offsetting costs to other regions;

111.2. Absent such an assessment of inter-regional (net) benefits, the level of any purported regional (net) benefits ought to be viewed with caution.

112. As above, failing to account for all relevant costs of the Project, and assessing only its gross benefits, risks socially-harmful decisions being reached:

112.1. For example, to illustrate the issues, and noting (as above) that considering the impacts of a project on other activities/projects is an inherent part of assessing that project's benefits, if a project with large gross benefits but low net benefits were fast-tracked, that could displace a similar activity or project that has lower gross benefits but higher net benefits – the latter project is the one that adds most to New Zealand's wellbeing, so is the one more likely to meet the "significant regional or national benefits" test that lies at the heart of the FTA's purpose;

112.2. Similarly, if two projects deliver exactly the same non-employment benefits, but one of them involves twice the employment level of the other:

112.2.1. EIA would suggest that the project with the higher employment level is to be preferred – but the other project is by assumption twice as labour-efficient as the other, since it can deliver the same non-employment benefits with only half the required employees (also meaning that the extra employees required to deliver the other, less efficient project could be deployed elsewhere in the economy, and thereby generate even further benefits for the region or nation);

112.2.2. A CBA would prefer the project that delivers the given level of non-employment benefits with the lower required workforce, and lead to better overall economic outcomes – i.e. would deliver greater economic "benefits"

as required for FTA purposes, if not higher economic "impacts" (as measured by EIA).

4. Full Cost-Benefit Analysis Not Provided

4.1 Overview

113. This section builds on Section 3 by further explaining how the BP Report has not fully allowed for all relevant Project costs and benefits when presenting its claimed economic impacts:

    113.1. Here, the full range of economic benefits and costs – beyond just market-based benefits – is highlighted, and other considerations relevant to properly assessing costs and benefits are discussed.

4.2 Necessity of Allowing for Full Range of Benefits and Costs

114. The Analysis considers only a very narrow range of benefits. In particular, it considers a subset of what might be called "market-based" benefits, such as extra employment and associated expenditure, extra royalties and taxes, etc.

115. Subject to appropriate definition and measurement, market-based benefits are indeed relevant, but only a subset of the full range of benefits has been identified in the Analysis:

    115.1. Moreover, costs (including both direct costs, and indirect/opportunity costs – e.g. foregone other benefits) have not been explicitly considered, and certain costs are counted as benefits (see further below).

116. Importantly, the Project can be expected to have a range of "non-market" (foregone) benefits and costs, which the Analysis has not explicitly accounted for. Unlike market-based values, which relate to things (like commodities, or labour) that are traded in markets and which can be valued by reference to market prices, non-market goods or services are not traded in markets:

    116.1. This does not mean non-market goods or services are unimportant (publicly-provided health or education services are a prominent example), but rather that their value is often overlooked or incompletely assessed because it is not possible to use market prices to estimate their value;

116.2. Such non-market costs/benefits are typically not immaterial just because they lack market prices – according to a prominent study assessing non-market values of New Zealand's land-based ecosystems, those non-market values can be at least as great as their market values.[41]

117. A framework commonly used by economists to characterise the full range of both market and non-market values is the so-called Total Economic Value (**TEV**) framework:[42]

117.1. For example, the TEV framework can be used to characterise the full range of values that can be attached to things like natural resources;[43]

117.2. Relatedly, economists have developed an extensive range of sophisticated non-market valuation (**NMV**) techniques to objectively estimate people's subjective non-market values.

118. A 2018 Treasury discussion paper applies the TEV framework to the valuation of natural capital (i.e. minerals, energy resources, land, soil, water, trees, plants and wildlife),[44] stating that the "general framework has been recognised for the past 30 years".[45]

119. In short, the TEV framework recognises that the value attaching to any given resource (e.g. minerals) is not confined to the value that can be realised in a market exchange of that resource or the commercial produce it can sustain, but can either:

119.1. Sustain a range of co-existing and additive other values (e.g. social, environmental or cultural values), even if market prices do not exist to directly quantify those other values; or

119.2. Conflict with those other values – e.g. creating non-market opportunity costs.

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[41] Patterson and Cole, 2013, *'Total Economic Value' of New Zealand's Land-Based Ecosystems and their Services.*

[42] A survey of the TEV literature is provided in NZIER, 2018, *What's the Use of Non-Use Values?*

[43] It is also increasingly being used to assess cultural value. For a survey, see Allan et al., 2013, Value and Culture, Motu Working Paper 13-09.

[44] van Zyl and Au, 2018, *The Start of a Conversation on the Value of New Zealand's Natural Capital*, Treasury Discussion Paper 18/03.

[45] van Zyl and Au, 2018, *The Start of a Conversation on the Value of New Zealand's Natural Capital*, Treasury Discussion Paper 18/03, at p. 7.

120. While there are numerous variants of the TEV framework applied in practice,[46] Figure 13 illustrates one such variant, based on a prominent study assessing TEV for New Zealand's land-based ecosystems.[47] Importantly, the Analysis:

120.1. Considers only benefits relating to what Figure 13 characterises as just a subset of use value relating to the Project resources, namely provisioning services value;

120.2. Does not consider the benefits – or in this case, possible foregone benefits (i.e. opportunity costs) – relating to other use values (regulating services value, and cultural value), or non-use values (option, bequest and existence values).

121. Notable in relation to the latter – as discussed further below in Section 5 – are possible adverse effects of the Project:

121.1. On local housing availability and costs;

121.2. On local labour costs – e.g. for skilled tradespeople, affecting other local firms, and households;

121.3. On local businesses – e.g. wineries, and tourism operators;

121.4. On particular at risk flora and/or fauna;

121.5. On local residents' health;

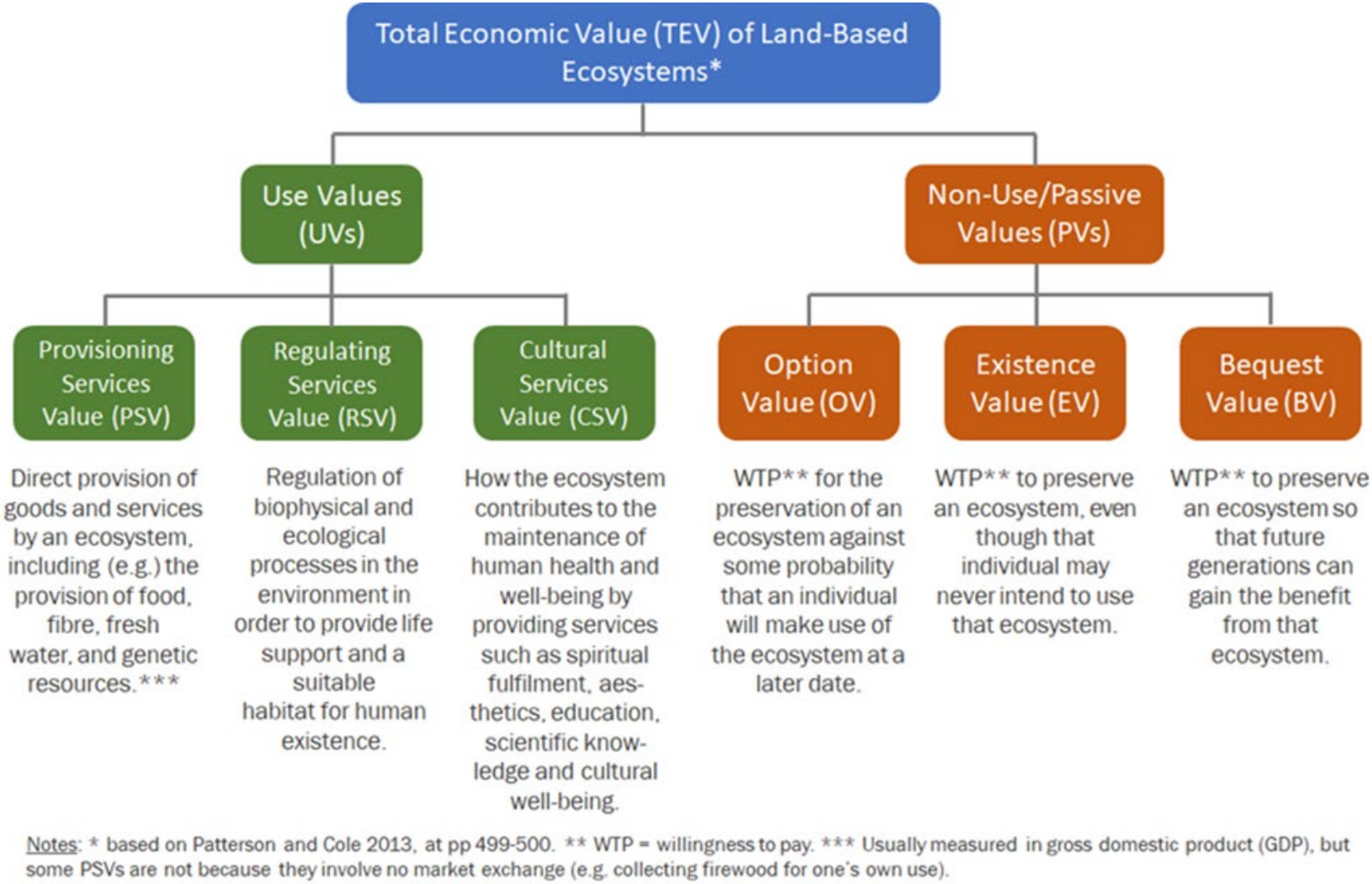
121.6. Due to loss of highly-productive land (**HPL**) for land-based primary production (**LBPP**); and

121.7. Due to long-term environmental risks associated with mine tailings and water contamination.

[46] For multiple examples, see van Zyl and Au, 2018, *The Start of a Conversation on the Value of New Zealand's Natural Capital*, Treasury Discussion Paper 18/03, Appendix 1, at pp 36-39.

[47] Patterson and Cole, 2013, *'Total Economic Value' of New Zealand's Land-Based Ecosystems and their Services*.

Figure 13 – Total Economic Value (TEV) Framework as Applied to New Zealand's Land-Based Ecosystems by Patterson and Cole 2013



Source: Author's adaptation of Patterson and Cole 2013.

122. Clearly it is open to the Panel to weigh any adverse impacts of the Project against claimed Project benefits (whether measured as impacts or benefits) with or without any or all of those adverse impacts being monetised. However:

    122.1. This would seem incongruous if any adverse effects are inherently monetisable and benefits/impacts have been presented in monetary terms – e.g. increased labour or housing costs, or reduced profits, of other firms or households in the region due to the Project bidding up input costs;

    122.2. It would also seem high-risk if the Project itself gives rise to major risks that can be quantified in monetary terms (especially if probabilities of those major risks can be reasonably well ascertained);

    122.3. Good modelling practice would be to systematically and transparently include all monetisable costs and benefits in the model itself, since omitting relevant and material costs or benefits clearly risks misleading modelling conclusions being reached;

    122.4. If relevant and material adverse effects are not monetised in some objective way, they can only be weighed in purely subjective terms against monetised (net) project benefits, which calls the very purpose of economic modelling into question (if it is not necessary for adverse effects, then is it necessary for benefits/impacts, and if not, then what would be the basis for assessing regional or national benefits?);

    122.5. Hence, monetising impacts – where possible – should assist Panels in their assessment of how project benefits compare with project adverse impacts.

123. In practice, many non-market benefits can only be monetised approximately. Equally, however, it is impossible to say with precision what gold prices will be in 12 months let alone 16 years (at best, statistical distributions and their expectations can be identified), so a high level of approximation is already inherent in evaluating the market-related (net) benefits of any gold mining project that spans multiple years:

    123.1. This is not to suggest that modelling should be abandoned – rather that it be applied as systematically, transparently and robustly as it can be, highlighting the implications of key areas of uncertainty for modelled results – e.g. performing sensitivity analyses on key input assumptions, as presented in Section 2;

123.2. That would then better support any remaining subjective trade-offs that need to be made, while avoiding the need for subjective trade-offs wherever possible.

4.3 Benefits Can Only Meaningfully Be Measured Relative to An Appropriate Counterfactual

124. Whether the Project's benefits are assessed using CBA or EIA (including whether any EIA is based on I-O multipliers or CGE analysis), it is imperative that that any purported regional or national benefits are measured relative to an appropriately defined counterfactual – i.e. relative to what would happen if the Applicant's FTA application is not granted.

125. Treasury identifies that the first step in evaluating a project proposal is to identify a suitable counterfactual,[48] defining the counterfactual to be "the situation that would exist if the [project approval is not given], if the [project] does not go ahead."[49]

125.1. New Zealand Transport Agency/Waka Kotahi does likewise in its well-established framework for transport-related CBA, stating:[50]

> "There should be careful consideration of what the counterfactual is, as this is what the activity will be measured against. Overstating or understating the counterfactual can have an adverse effect on the CBA. Effort should therefore be applied early in the development of the analysis to define the future state if an activity did not proceed in order to establish a realistic baseline that options can be assessed against." [emphasis added]

126. The Analysis assumes an overly-narrow counterfactual, and one which fails to reflect the FTA context:

126.1. In particular, it presents the Project's claimed economic impacts as all or nothing – i.e. if the Project is not fast-tracked, then it or some other similar gold mining project will never take place – the reality is that if gold miners truly expect gold prices to be as high as those assumed to be sustained throughout the Project's life, then either the Applicant will proceed with the Project under normal consenting processes, or some other party will (e.g. by buying Santana's development plans and resource access rights);

[48] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 8.

[49] Treasury, 2015, *Guide to Social Cost Benefit Analysis*, July, at p. 9.

[50] NZTA/Waka Kotahi, 2024, *Monetised benefits and costs manual*, at p. 17.

126.2. As discussed in Section 2.7, it is untenable to suppose that any workers employed for the Project will not earn anything or not enjoy leisure for each and every year in the Project's 16 year expected life absent the Project – i.e. the claimed Project employment benefits cannot be purely incremental, or "all or nothing";

126.3. Likewise regarding the Project's claimed non-employment benefits.

4.4 Necessity of Adjusting for Riskiness/Uncertainty of Benefits and Costs

127. Except in the unrealistic case that all decision-makers are assumed to be indifferent to risk or uncertainty, it is standard in economic analysis to allow for not just the timing of any benefits or costs, but also their inherent riskiness/uncertainty. Hence, for example, if there is uncertainty regarding the realisation of claimed benefits, irrespective of their timing, those benefits ought to be discounted (in a general sense) when arriving at their equivalent risk-adjusted value:[51]

127.1. Likewise, if there are uncertain but high-consequence adverse possible effects – such as long-term failure of mine tailings with environmental, social and financial implications, those too should be appropriately accounted for, but have not been in the Analysis.

128. Methods like sensitivity testing and scenario analysis/modelling are also important for testing the robustness of any claimed benefits or possible significance of likely costs when there are uncertainties in key assumptions:[52]

128.1. This is especially important for critical assumptions like gold prices, employment benefit levels, and operating costs (if the latter have been under-estimated, as often proves to be the case for major infrastructure projects, then claimed EBITDA, corporate taxes and Crown royalties – i.e. claimed Project impacts – will all have been over-stated).

[51] Under standard financial models, the discount rate used to produce PVs or NPVs should incorporate a "risk premium" if a project's benefits co-vary (i.e. move together) with general market investment returns, which serves to reduce those PVs and NPVs in reflection of their "systematic" riskiness.

[52] For example, see NZTA/Waka Kotahi, 2024, *Monetised benefits and costs manual*, at pp 25-26 and Chapter 7.

129. No such sensitivity analysis or scenario modelling – and certainly not any analysis or modelling revealing at what value of key assumptions (e.g. gold prices) the net benefits of the Project turn negative – have been presented in the Analysis:

129.1. These considerations were highlighted and at least partially addressed in Section 2.

4.5 Necessity of Considering Project Economics in Context

130. Finally, even if any given application under the FTA can demonstrate clear and significant regional or national benefits, this is not to suggest those benefits should be considered in isolation:

130.1. Clearly a given benefit may be more significant in one region than in another – e.g. 1,000 new houses being built in a small region with significant housing needs is likely to be more significant than building 1,000 new houses in a larger region with a larger construction sector like Auckland;

130.2. More subtly, if any given application in some sense substitutes for existing economic activities, or competes with other FTA applications (e.g. for labour, housing, or other inputs), then for overall regional or national benefits to be realised it is necessary to ensure that resources are prioritised to projects that maximise those overall benefits.

131. This is pertinent given the Waihi North gold mine extension fast-track Panel's decision approving the Waihi project,[53] and it is also pertinent that OceanaGold has applied under the FTA to extend its activities at the Macraes mine:

131.1. That being the case, this creates competing demand for gold mining and related labour skills within New Zealand, potentially bidding up labour costs (including of overseas FIFO workers for whom incomes are largely remitted overseas) and thus reducing the profitability of the Waihi North, Macraes and Bendigo-Ophir gold mining projects.

132. It is also pertinent due to other nearby FTA applications that are likely to place significant demands on relevant workforces and housing demand, such as large-scale dam construction if the Lake Onslow pumped hydro storage scheme is fast-tracked (or even if it

[53] https://www.fasttrack.govt.nz/projects/waihi-north/draft-decision-and-conditions.

simply proceeds outside of the FTA process at a time when the Project requires similar labour, and also housing for labour drawn from outside the existing local workforce):

132.1. More generally, even local development projects unrelated to mining or dam construction will place pressure on labour (including trades and sub-trades, and supporting services such as health and education) and housing, which mean the Project cannot proceed on the assumption that any pressure it creates on labour and housing demand is related only to the Project itself, if there is a clear likelihood of other major projects also proceeding in the relevant areas at the relevant times.

133. To ignore such relevant contextual matters could lead to excess FTA approvals being granted, undermining the benefits of all of those projects (e.g. by bidding up input costs for all projects simultaneously), and/or creating compounding adverse effects extending beyond those of any one project (including on other economic activities in the region, which will also be affected by rising input costs):

133.1. In other words, if FTA project regional or national benefits (and any offsetting adverse effects) are considered for each project in isolation, ignoring interactions ("externalities") between those projects – which externalities could be either positive or negative – then this could lead to the collective regional or national benefits of those projects being much different to just the sum of those project's "standalone" benefits;

133.2. If FTA projects create significant negative externalities for each other, then their collective approval could undermine the significance of their regional or national benefits, and possibly result in regional or national disbenefits (especially once adverse economic impacts for other parties – e.g. other local businesses or households – are considered) .

5. Omitted Costs/Adverse Effects

5.1 Overview

134. This section summarises various adverse effects of the Project not accounted for in the BP Report. Some of these are non-commercial in nature, though monetisable, while others represent adverse commercial effects (e.g. increased costs for other local businesses). Where possible in the time available, indications in monetary terms are provided of the

orders of magnitude of certain adverse effects, showing their likely materiality relative to claimed economic impacts.

5.2 Likely Adverse Housing Cost Effects

135. The Central Otago region has well-known housing pressure issues, especially for unskilled, trades-related, or lower-income professional workers (e.g. teachers). The BP Report indirectly acknowledges these pressures:[54]

> "The hundreds of workers recruited to support the BOGP will place significant demands on housing across inland Otago … Finding accommodation for these workers, without displacing others in the local economy, will be crucial for unlocking the full economic impacts of the BOGP … If insufficient [sic – sufficient] housing does not become available then the net economic impacts could be smaller than estimated."

136. The BP Report notes that the area has coped with seasonal labour demand peaks in the tourism sector (i.e. in ski resorts), but much of that demand is for temporary workers, many of whom are from overseas and who are prepared to temporarily accept substandard and/or shared (e.g. worker dormitory) living conditions, favouring FIFO workers over long-term local workers and their families.

137. As discussed above, the Project will increase demands for housing, and therefore exacerbate local housing pressures, especially during the Project's construction phase when worker demand peaks:

    137.1. The BP Report notes that peak housing demand for the Project could amount to 500 housing units in Inland Otago.[55]

138. This is the case considering the Project in isolation, and is increased once other major developments in the region, including other possible FTA projects (e.g. the Lake Onslow pumped hydro scheme), are also considered – as discussed further below

139. This means input costs (e.g. wage premiums needing to be paid to attract workers so they can either afford local housing, or tolerate living in substandard conditions) are likely to rise for the Project, reducing its profitability (i.e. reducing EBITDA and hence the Project's

[54] BP Report, at p. 19.

[55] BP Report, at p. 20.

post-tax capital contribution to GDP), and hence also both corporate taxes and royalties paid by the Project (since they each relate directly to profitability):

139.1. However, by driving up housing costs for other producers in the region (e.g. winemakers, fruit growers, and tourism operators), and also driving up labour costs for those operators who must compete to attract labour to the region facing the same rising housing costs, that reduces the profitability of those other operators, creating an offsetting adverse economic effect;

139.2. By driving up the housing costs of other residents in the region, this too creates an adverse economic effect for those households (e.g. greater income share being spent on housing, and hence less discretionary income to spend on other local services such as hospitality, affecting that sector's profitability), albeit also offsetting gains for housing providers (e.g. landlords will be able to charge higher rents as a consequence of increased housing demand).

140. The Analysis treats any increased labour costs to the Project, and any associated increase in PAYE and ACC payments, as desirable "economic impacts", when clearly this is an adverse economic effect for both the Project and other affected businesses/households (if not for housing providers):

140.1. This serves to underscore why CBA is to be preferred to the EIA methodology used in the Analysis when assessing the Project's (net) regional or national benefits, since CBA clearly disentangles benefits and costs and treats them appropriately, whereas EIA conflates them.

141. The Analysis has not attempted to cost the consequences of these housing pressures beyond its proposed worker camp, either for the Project itself, or for other businesses or households in the region.

5.3 Likely Adverse Employment Cost Effects

142. As noted in Section 2.8, the BP Report acknowledges that "sourcing hundreds of workers locally in a short space of time will be a complex recruitment exercise:"[56]

[56] BP Report, p. 16.

142.1. This is especially the case given there are 20 other FTA projects currently listed on the FTA website in train in the region,[57] representing competition for labour and skills generally, but including the Macraes Phase 4 expansion of open pit and underground mining operations, which represents direct competition for regional mining skills;

142.2. It is also the case given there is currently a "workforce crisis" in the much larger Australian mining sector,[58] causing increases in the already attractive returns available to New Zealand workers prepared to migrate to or to be FIFO mining workers in Australia – and actively targeted for that work, [59] meaning the Project, and other local employers, will be competing not just locally but also with Australia (including for New Zealand workers in non-mining roles – e.g. trades).

143. Section 5.2 discusses why housing cost pressures will make it harder and more expensive to attract labour with the skills required for the Project, with labour costs in part rising due to rising housing costs:

143.1. However, labour costs are also likely to rise for the Project simply because there is not a readily available pool of idle labour with the requisite skills, meaning at least some – if not all – of the Project's required labour will need to be attracted from other sources.

144. Those other sources include:

144.1. Workers in non-mining sectors, such as in the trades (e.g. electricians) and contracting sectors (e.g. earthmoving equipment operators), whether local, from other regions, or from overseas (possibly including repatriating New Zealanders); and

144.2. Mining sector workers from elsewhere in the region, other regions, or from overseas (potentially including repatriating New Zealanders).

[57] https://www.fasttrack.govt.nz/projects?query=%21showall&f.projectRegion%7CprojectRegion=Otago.

[58] https://discoveryalert.com.au/western-australia-mining-workforce-crisis-2025/.

[59] https://au.news.yahoo.com/kiwi-fifo-worker-reality-glamourised-aussie-mining-industry-051642754.html?soc_src=social-sh&soc_trk=ma.

145. Where the Project is increasing demand for existing local/regional trades, contractors, or mining workers, such competition for these workers will bid up their pay and conditions:

145.1. This not only increases the cost structure of the Project, it increases the cost structure of other local/regional businesses (and households) relying on access to such workers – including for local exporters competing on global markets (e.g. winemakers, fruit growers, and overseas tourism operators);

146. As discussed in Section 5.2, this increase in labour costs is in principle treated under the EIA methodology in the BP Report as both a negative economic impact (reduced EBITDA, corporate taxes, and royalties) and a positive one (increased worker incomes, as well as PAYE and ACC payments):

146.1. In practice, however, the BP Report does not allow for such labour cost increases for either the Project itself, or for other regional businesses (e.g. winemakers, fruit growers, and tourism operators) and/or households (e.g. those needing access to tradespeople, if not for tradespeople themselves), despite these cost increases representing potentially significant adverse regional economic effects;

146.2. Moreover, as discussed above, the conflation of increased labour costs as a positive economic impact demonstrates why CBA is to be preferred over EIA when assessing regional or national (net) benefits, since raising the cost structure of regional or national businesses (and households) – including exporters and international tourism operators – through increased labour and/or housing costs is in principle a negative economic effect, not a positive one.

5.4 Other Possible Adverse Effects on Local Economy

147. As discussed above, the BP Report acknowledges that at least some of the Project's economic impacts, notably secondary GDP and employment impacts flowing from the Project's direct impacts, are a "theoretical maximum",[60] and hinge on local suppliers recruiting and investing in the new capacity required to service the Project's needs, failing which economic activity could simply be displaced from other parts of the economy:[61]

147.1. If that displacement occurred without also driving up housing and labour costs, it would suggest economic activity is simply being relocated around the regional or

[60] BP Report, at pp 15 and 17.

[61] BP Report, at pp 14-15, and 17.

national economy, rather than enhancing those economies (i.e. rather than creating regional or national benefits) – in which case it would not provide a significant regional or national benefit;

147.2. However, if such displacement was also associated with increased input (e.g. housing and labour) costs – which are experienced by other local businesses and households, not just the Project – then this could imply negative regional or national benefits from the Project – i.e. regional or national disbenefits – which should be accounted for to arrive at a net benefit.

148. One reason why local businesses may not recruit or invest in the required new capacity is that the Project is only expected to last 16 years, and much of its peak demand for local supplier capacity (e.g. during the construction phase), is very short-lived:

148.1. Local businesses are likely to be unwilling to make long-term investments in equipment or skilled staff with only the prospect of short-lived demand from the Project;

148.2. Conversely, if multiple other significant local projects (FTA or otherwise) are expected, that might justify such investments, though as above this will still be subject to likely having to bid up labour and housing costs (and possibly other costs – e.g. for certain types of equipment if it faces rapidly increasing demand).

149. As discussed above, such increased costs and displacement effects (e.g. increased demand for local tradespeople or contractors) are likely to adversely affect other local businesses (and households), such as local winemakers, fruit growers and tourism operators. They could also extend to the costs and ability to secure other resources, such as freshwater, given the Project requires significant bore access to local freshwater resources, and risks of groundwater contamination making that water unsuitable for irrigation or frost control.

150. Additionally, however, the Project may also adversely affect other local businesses by changing consumers' perception of the local region's attributes:

150.1. For example, I understand from Mr van der Mark of sustainable Tarras that makers of pinot noir wines in the Bendigo area (accounting for c. 25% of Otago wine

volume) brand their wines locally, reflecting the local landscape character (and organic practices they have adopted) in the area;[62]

150.2. Likewise, I understand from Professor James Higham's statement that premium tourism in Bendigo – associated with prestige pinot noir winemaking – likewise trades off the area's local landscape character and other natural values.

150.3. Professor Higham also indicates that Central Otago's positioning as one of New Zealand's premium tourist destinations as well as the country's "100% Pure New Zealand" are not compatible with open cast mining in the region, which also threatens other local sectors such as horticulture and creative sectors.

151. To the extent that large-scale industrial open-cast mining occurs in the locale due to the Project – visible to some extent from both roads and air corridors – risks undermining high-end consumers' perceived landscape character and other natural/organic appeal of the area (more so if the Project gives rise to visual and/or noise disturbances), risking a loss to the brand value and premium offerings of such local winemakers and/or tourism operators.

152. By way of example, NZIER has estimated that the economic value added of winemaking in Otago is $124 million per year,[63] which based on Bendigo's volume share implies $31 million per year for the local area, to which can be added c. $5 million per year for the area's proportionate share of GST and excise payments, for a total value of $36 million per year:

152.1. If the loss of the Bendigo area's perceived landscape character and other natural/organic appeal reduces that annual value by just 10%, that would amount to lost local value from winemaking of c. $3.5 million annually – this adverse economic effect alone accounts for 4-5% of the maximum $90 million annualised direct economic impacts of the Project discussed in Section 2.9;

152.2. Adding adverse impacts on high-end tourism in the Bendigo area would clearly increase such adverse economic effects as a share of the Project's direct economic impacts.

[62] Personal communication, 31 March 2026.

[63] NZIER, 2022, *Economic contribution of the New Zealand wine sector*, at pp 17-18.

153. Such adverse economic effects of the Project do not hinge on customer perceptions alone:

153.1. If the Project gives rise to chemical and/or dust drift or gaseous air contaminants that cause less than minor effects[64] (though see Section 5.6 for further discussion), they may still be sufficient for the Bendigo area to lose its organic certification, thereby compromising any value premium it currently enjoys due to that certification;

153.2. Likewise, if the Project's demand on local freshwater resources (or possible hazardous substance contamination arises from operations) compromises the quantity or quality of those resources, that too could lead to material adverse economic effects for local winemakers, fruit growers and/or tourism operators.

154. Finally, there is scope for the Project to give rise to significant costs that will be socialised to the local community rather than borne by the Applicant, e.g.:

154.1. For local roads and/or bridges – with increased heavy vehicle usage leading to increased maintenance costs borne by the Central Otago District Council; and

154.2. Electricity network upgrades – if extra network investments required for the Project are added to the local lines company's regulatory asset base, enabling it to increase its cost recovery from all local electricity users (unless the Applicant is contracted to repay those investment costs directly).

155. The BP Report focuses just on the claimed direct economic impacts of the Project, and claimed ("maximum theoretical") flow-on effects, but makes no account of such possible adverse economic effects of the Project for local businesses and /or households:

155.1. Importantly, no assessment is provided of how the relatively short-lived Project could give rise to potentially long-lived losses to other business or households in its locale.

[64] Environmental Effects Report, pp 347-348.

5.5 Residual Ecological or Other Environmental Effects

156. The Environmental Effects Report concludes that due to offsetting measures being adopted, any ecological effects of the Project will result in a net ecological gain, at least within 35 years of approvals:[65]

> "In summary, after implementation of avoidance, minimisation / mitigation and remediation measures, Alliance Ecology (2025) concludes there will be residual effects on a range of terrestrial and wetland ecological values as a result of the BOGP. Where residual effects are assessed as moderate or greater, offsetting and compensation measures comprising extensive ecological restoration and habitat enhancement in the landscape surrounding the DDF will be applied. Overall, Alliance Ecology (2025) consider these measures will result in demonstrable benefits to indigenous biodiversity values that outweigh impacts within 35 years of granting approvals."

157. As discussed in Section 2.3, it is essential that any claimed Project costs or benefits are appropriately adjusted to reflect their timing, since later benefits are worth less than current ones of the same magnitude, and vice versa for costs. As noted in Treasury guidance, this applies to non-commercial (hence ecological) values as well as commercial values:[66]

    157.1. As such, the claimed net gain in ecological values needs to be considered critically, since if the adverse ecological effects of the Project occur in the near term (i.e. during the Project's 16 year expected life), and any ecological gains occur more in the distant future (e.g. only by year 35), then the PV of those long-term gains may be insufficient to offset the PV of the short-term ecological losses;

    157.2. Without more precise information is it impossible to judge whether the PV of net ecological gains is positive or negative, so the claimed net ecological gain over 35 years might in fact be a net ecological *loss* in PV terms.

158. Moreover, a net gain (or loss) overall – which has been made based on non-transparent trade-offs and judgements of the relevant Applicant experts – masks significant diversity in Project ecological effects, including various notable specific losses:[67]

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[65] Environmental Effects Report, at p. 326.

[66] https://www.treasury.govt.nz/sites/default/files/2024-10/treasury-circular-2024-15.pdf, at paras 13-16.

[67] Environmental Effects Report, at p. 310.

"After measures to avoid or minimise adverse effects, the BOGP is expected to result in the direct loss and associated effects on 607 ha of terrestrial habitat that includes:

> 79.3 ha of low value exotic pasture and herbfield

> 103.8 ha of very high value mixed depleted herbfield (cushionfield) and grassland

> 187.4 ha of moderate value mixed tussock shrubland and exotic grassland

> 124.1 ha of moderate value mixed scrubland

> 25.3 ha of high value native dominant tussockland

> 1.86 ha of high value native taramea herbfield and shrubland

> 85.6 ha of very high value native dominated scrubland.

> Loss of individuals of various Threatened plant species, some of which have Very High ecological value.

"Additionally, direct impacts on wetlands within the DDF, and indirect drawdown effects on wetlands within the DDZ, will result in the loss of:

> 2.42 ha of high value swamp/marsh wetlands

> 0.19 ha of moderate value seepage wetlands

> 0.84 ha of moderate value gully fen wetlands" [original italics, underlines added]

159. Particular communities of interest are likely to attach different subjective weightings to some or all of these ecological losses, especially those involving high or very high ecological values:

    159.1. Local Ngāi Tahu Rūnaka, for example, cannot be assumed to hold the same values and therefore make the same subjective trade-offs between ecological losses and any long-term ecological gains as those expressed in the Environmental Effects Report.

160. I acknowledge that it is for Kā Rūnaka to speak to cultural values, but I note that the Environmental Effects Report says that Kā Rūnaka, among other things,[68] place particular value on the mauri (life essence found in all things) of the natural environment, consider that "the Project is significantly tapu in this location, due to the location of the proposed pit lakes, waste rock storage and tailings storage in the tributaries of the Mata-au, including the diversion of Shepherds Creek to construct tailings storage", and that "[t]he potential long-term risks associated with the Project to wāhi tīpuna, taoka species and wai Māori

[68] Environmental Effects Report, at pp 283-284.

risks undermining the efforts of whānau to restore the whenua and rekindle connections and mahika kai practices":

160.1. This points to at least one especially important relevant community of interest having significant reservations about the ecological and other environmental effects of the Project, including its long-term risks (see Section 5.8 below for further discussion).

161. Likewise, the Project area includes an area of outstanding natural landscape – a landscape fundamentally changed by open pit mining – valued by Kā Rūnaka as well as other local residents, but also by tourists to the region (local and international), and other New Zealanders who – under the TEV framework discussed in Section 4.2 – value either:

161.1. Directly enjoying that landscape – e.g. by visiting the area (whether for commercial tourism, or for non-commercial use of the area – e.g. by walking public tracks);

161.2. The option of possibly visiting the area in its natural condition in the future;

161.3. The ability to make a bequest of the area's outstanding natural landscape to future generations (i.e. preserving the area's outstanding natural landscape so that future generations can also enjoy it); or

161.4. Simply its existence – i.e. an appreciation of the very fact the area has such an outstanding natural landscape.

162. As such, any adverse ecological or other environmental effects are not confined to local Rūnaka or residents, but to a much greater community of interests. To gain a sense of the relevant order of magnitude of those costs when applied to the entire community of interest, published research on the willingness to pay (**WTP**) of New Zealanders to enhance biodiversity on farmed landscapes – importantly, areas with which they have no direct engagement (hence validly applying to non-residents) – at a midpoint value of c. $50/person/year in 2015 dollars,[69] which equates to c. $70/person/year in current dollars:

[69] Tait et al. 2017, *Assessing New Zealand public preferences for native biodiversity outcomes across habitat types: A choice experiment approach incorporating habitat engagement*, at Table 3.5.

162.1. While this figure may seem modest, when applied to the current New Zealand adult population of 4,353,500,[70] which is a typical reference population for assessing non-market values such as these,[71] this amounts to up to $305 million per year for relevant areas – as compares with the $90 million maximum annual Project direct economic impacts discussed in Section 2.9.

163. This illustrative quantification means the adverse ecological and other environmental effects of the Project – by themselves – could be of a similar order of magnitude to its direct economic impacts:

163.1. Adding other adverse effects – e.g. pressure on housing and labour costs, adverse economic effects for other businesses and households in the area – further indicates that the Project's adverse effects could in quantitative terms outweigh its regional or national benefits.

5.6 Risk of Adverse Health Effects

164. The Environmental Effects Report concludes that with suitable mitigation and monitoring measures, the Project's dust and air quality effects will be less than minor.[72]

165. The report further notes that potential constituents of concern (**PCOC**) include:[73]

> "TSS [total suspended solids in surface waters], aluminium (Al), antinomy (Sb), As [arsenic], cobalt (Co), copper (Cu), chromium (Cr), iron (Fe), molybdenum (Mo), nickel (Ni), lead (Pb), SO4, strontium (Sr), zinc, (Zn), cyanide (CN), ammoniacal nitrogen (Amm-N) and nitrate nitrogen (NO3-N)."

166. It concludes that environmental risks associated with mine-impacted waters (i.e. those affected by PCOC) can be managed provided that:[74]

[70] As at June 2025, from: https://infoshare.stats.govt.nz/SelectVariables.aspx?pxID=d2975a06-2290-428f-bce7-467090f1d5f3.

[71] E.g. see Patterson and Cole, 2013, *'Total Economic Value' of New Zealand's Land-Based Ecosystems and their Services*, at Table 14.

[72] Environmental Effects Report, at pp 347-348.

[73] Environmental Effects Report, at p. 295.

[74] Environmental Effects Report, at p. 294.

"the correct management processes are utilised, appropriate engineering controls are implemented, and performance monitoring is undertaken to support adaptive management principles if there is variation from the expected case."

167. If suitable mitigation measures are put in place, their effective implementation would hinge on effective compliance, monitoring and enforcement (**CME**) of any relevant consent conditions:

167.1. That CME issues can and do arise in the New Zealand mining sector has been highlighted by Otago Regional Council's 2024 audit of OceanaGold's Macraes mine compliance record, finding multiple and in some cases sustained compliance breaches, as well as declining aquatic health, over 2019-2024,[75] as per Figure 14.

Figure 14 – Resent Evidence of Compliance Issues with Otago Region Mining

OceanaGold 2019 - 2024 compliance audit

Report type	Period	Weeks overdue	Review grade
Quarterly water quality	Jun-Aug 2019		Not assigned
Quarterly water quality	Sep-Nov 2019		Not assigned
Quarterly water quality	Dec-Feb 2020		Not assigned
Quarterly water quality	Mar-May 2020	13.1	Not assigned
Quarterly water quality	Jun-Aug 2020	23.9	Not assigned
Quarterly water quality	Sep-Nov 2020	37.7	Low Risk Non-Compliance
Quarterly water quality	Dec-Feb 2021	36.7	Low Risk Non-Compliance
Quarterly water quality	Mar-May 2021	25	Low Risk Non-Compliance
Quarterly water quality	Jun-Aug 2021	26.9	Low Risk Non-Compliance
Quarterly water quality	Sep-Nov 2021	24.6	Low Risk Non-Compliance
Quarterly water quality	Dec-Feb 2022	33.9	Moderate Non-Compliance
Quarterly water quality	Mar-May 2022	49.6	Moderate Non-Compliance
Quarterly water quality	Jun-Aug 2022	40	Moderate Non-Compliance
Quarterly water quality	Sep-Nov 2022	36.4	Moderate Non-Compliance
Quarterly water quality	Dec-Feb 2023	31.6	Moderate Non-Compliance
Quarterly water quality	Mar-May 2023	20	Significant Non-Compliance
Quarterly water quality	Jun-Aug 2023		Significant Non-Compliance
Quarterly water quality	Sep-Nov 2023		Moderate Non-Compliance
Quarterly water quality	Dec-Feb 2024		Moderate Non-Compliance
Quarterly water quality	Mar-May 2024		Moderate Non-Compliance
Annual Aquatic	2019		Not reviewed
Annual Aquatic	2020		Low Risk Non-Compliance
Annual Aquatic	2021		Moderate Non-Compliance
Annual Aquatic	2022		Low Risk Non-Compliance
Annual Aquatic	2023		Moderate Non-Compliance

Source: https://www.rnz.co.nz/news/in-depth/533692/fast-tracked-gold-mine-has-shaky-compliance-history-audit-reveals.

[75] https://www.rnz.co.nz/news/in-depth/533692/fast-tracked-gold-mine-has-shaky-compliance-history-audit-reveals.

168. Added to this are well-known funding and incentive issues for Regional Councils to effectively monitor and enforce consent compliance – issues acknowledged by the previous government,[76] and also by the current government.[77]

169. Hence, in practice, there are compliance-related risks associated with mitigation measures and hence there remains a risk of the Project giving rise to potentially serious environmental contamination, with associated public health risks/costs.

170. The BP Report does not make any allowance for such risks, despite good modelling practice being to do so (e.g. see Section 4.4):

    170.1. The current measure used for policy analyses and evaluations in New Zealand of the value of avoiding a premature death stands at $12.5 million per life lost;

    170.2. This means that even if the Project gives rise to just one premature death per year, then the Project's economic impacts should be reduced by (the PV of) $12.5 million, which in current terms represents 14 of the $90 million of maximum annual economic impacts discussed in Section 2.9.

5.7 Loss of Highly Productive Land for Land-Based Primary Production

171. Parts of the proposed Project footprint encompass areas of land use class 3 rural land which constitutes highly productive land (**HPL**) under the National Policy Statement for Highly Productive Land (**NPS-HPL**). This is illustrated in Figure 15.

[76] See reference to "number of reports have observed low levels of monitoring and enforcement by some councils", at p. 7 of: https://environment.govt.nz/assets/Publications/Files/best-practice-guidelines-cme.pdf.

[77] See proposed creation of a national compliance regulator with a regional presence to take over "a function currently done poorly by regional councils": https://www.beehive.govt.nz/release/new-planning-laws-end-culture-%E2%80%98no%E2%80%99.

Figure 15 – Highly Productive Land Component of the Project Site

Source: http://www.fasttrack.govt.nz/__data/assets/pdf_file/0024/15495/C.16-Highly-Productive-Land.pdf.

172. It is evident from the figure that land in this area is irrigated pasture and/or arable land, or simply pasture. Either way it constitutes land-based primary production (**LBPP**) as defined in the NPS-HPL, so the limited exemptions available for non-LBPP uses are relevant..

173. There is a general exemption under clause 10.3 of the NPS-HPL, which sets out multiple requirements, the most fundamental of which being that (clause 3.10(1)(a)): "there are permanent or long-term constraints on the land that mean the use of the highly productive land for land-based primary production is not able to be economically viable for at least 30 years."

    173.1. Since the relevant land is already being used for evidently commercial LBPP (and hence is currently economically viable), this requirement is automatically violated, meaning the clause 3.10 exemption would not ordinarily be available to the Applicant.

174. Clause 3.9(2)(j)(iii) of the NPS HPL deems the use or development of HPL to not be inappropriate if that use or development is in association with "mineral extraction that provides significant national or regional public benefit and "there is a functional or operational need for the use or development to be on the highly productive land":

174.1. This means the Project's use of the relevant HPL may be consistent with the NPS-HPL provided it generates sufficient regional or national public benefit of the prescribed sort, and further provided that there is a functional or operational need for the relevant parts of Project infrastructure to locate on HPL;

174.2. The BP Report and this memorandum should assist the Panel in assessing whether sufficient regional or national public benefits are produced by the Project.

5.8 Management of long-term risks and impacts

175. The Project has at least two elements involving long-term environmental risks that are potentially very high impact (i.e. severe) and which could materialise well after the mine has been closed. Liability for addressing future environmental issues associated with the mine's (then former) operations is proposed to be addressed via a rehabilitation bond,[78] which must be sufficient to manage those issues. If it proves to be insufficient, the Applicant's shareholders – with 60% of the Applicant's equity being owned overseas – would be shielded by limited liability against future claims to make up any shortfalls in that bond (assuming the relevant ownership vehicle has not been wound up to even better shield shareholders from future possible liabilities). Specifically:

175.1. Active water treatment will be required within the Shepherds Creek catchment for 50 years to ensure certain PCOCs are within acceptable levels in mine impacted water;[79] and

175.2. A perpetual tailing storage facility (**TSF**) – i.e. a "dam" containing long-lived and highly-toxic mining byproducts (which the Applicant's geotechnical expert gives a "Potential Impact Classification" of "high")[80] – will be required to ensure mine tailings are safely stored and do not present a risk to the local environment and population for the indefinite future.

176. The Environmental Effects Report includes a recommendation to monitor the requirements for such treatment, indicating treatment requirements will need to be informed by outcomes arising during mine operations:[81]

[78] Environmental Effects Report, at p. 364.

[79] Environmental Effects Report, at pp 298-302.

[80] EGL Report, at p. 14.

[83] Re the latter, see the Environmental Effects Report, at p. 364.

176.1. As such, until the nature of these treatment requirements is better understood, adequate solutions are identified and implemented, and compliance with required water treatment requirements is subjected to adequate CME (see the discussion in Section 5.6), it is not possible as of now to conclude that these 50 year water treatment requirements will be met during the Project's expected 16 year life, or for the following decades when active treatment will still be required, or during the decades of passive treatment that follow;

176.2. This presents a risk that certain PCOCs will be above acceptable limits both during (as they have been at the Macraes mine – as was discussed in Section 5.6) and after mining operations, and that due to back-to-back wet years or otherwise,[82] such PCOCs might find their way into local waterways, with associated environmental, social, cultural and commercial costs (e.g. loss of wine or horticultural production, or of high-end tourism) – which possible costs ought to be incorporated in any thorough assessment of the Project's expected (or if relevant, worst case scenario) costs.

177. Similarly, the need for a TSF has been identified, analysis has been made of the facility's engineering requirements to ensure it is robust to certain challenges (e.g. certain severe rainfall events, or certain severe seismic challenges), and requirements for a rehabilitation bond based on such analysis have been identified:[83]

177.1. However, such analyses are necessarily constrained by available data, assumptions, and modelling limitations. The Lottermoser Report confirms that, while physical stability assessments have been undertaken (including for extreme rainfall and seismic events), key elements of the analysis remain incomplete or deficient, including gaps in flood modelling and the absence of critical input data (such as tailings characterisation – e.g. chemical stability analysis).[84] The Lottermoser Report further identifies that aspects of the design remain at a conceptual or pre-feasibility stage, rather than a fully developed feasibility-level assessment.[85]

[83] Re the latter, see the Environmental Effects Report, at p. 364.

[83] Re the latter, see the Environmental Effects Report, at p. 364.

[84] Lottermoser Report, at pp 10, 12-13.

[85] Lottermoser Report, at pp 6, 22-23.

177.2. In these circumstances, the long-term performance of the TSF cannot be predicted with confidence, particularly given the recognised range of failure mechanisms for such facilities, including earthquakes, overtopping, weak foundations and liquefaction.[86];

177.3. Further, the Application does not provide a robust, fully developed assessment of long-term closure and post-closure performance. In particular, the Lottermoser Report notes the absence of analysis of the chemical and mineralogical properties of the tailings, and the lack of any assessment of long-term chemical stability or metalliferous drainage risks.[87] It also identifies failures to meet key international requirements relating to lifecycle risk assessment and periodic review of closure and post-closure costs (including Global Industry Standard on Tailings Management (**GISTM**) requirements for ongoing risk assessment and cost review).[88]

177.4. These deficiencies indicate that long-term management requirements, and their associated costs, have not been comprehensively identified or assessed.

178. The Lottermoser Report further confirms that the proposed TSF adopts a conventional wet slurry impoundment approach, which is identified as the highest-risk form of tailings storage in terms of failure mechanisms, including liquefaction, overtopping and long-term instability:[89]

178.1. The report highlights that such facilities have a well-documented history of failure globally, with significant environmental and human consequences, that failure rates are materially higher than for conventional water dams, and that the number and frequency of catastrophic mine tailings dam failures is increasing globally.[90]

178.2. It further notes that best available techniques, such as dry stacking of filtered tailings – which are specifically designed to reduce or eliminate the risk of catastrophic failure – have not been adequately considered.[91]

[86] Lottermoser Report, at p. 8.

[87] Lottermoser Report, at pp5, 12-13.

[88] Lottermoser Report, at pp 18-20.

[89] Lottermoser Report, at pp 5, 8.

[90] Lottermoser Report, at p. 8.

[91] Lottermoser Report, at pp 5, 8-9, 19, 21-22.

178.3. Of particular note, the Lottermoser Report finds that the proposed TSF specifications conflict with global industry standards, by allowing for "Potential Loss of Life, damage to houses, infrastructure, environment, and community recovery time."[92]

178.4. In this context, the risk of potentially catastrophic failure over the life of the facility cannot be regarded as negligible and must be understood as an inherent feature of the proposed design approach.[93]

179. The Lottermoser Report concludes that only a limited subset of GISTM principles has been adopted, with numerous critical requirements – particularly those relating to lifecycle risk assessment, long-term performance, monitoring, and periodic reassessment of closure and post-closure costs – either not addressed or insufficiently addressed:[94]

179.1. It further concludes that the application does not meet modern expectations for tailings management and lacks the technical information required for a feasibility-level assessment.[95]

179.2. In the absence of such information and alignment, there remains a credible risk that future management obligations and costs may exceed those currently anticipated or provided for – something a fully-fledged CBA would help to clearly identify.

180. Regarding the risk assessment used to inform the Project's bond requirements, this has involved an assessment of the TSF's engineering requirements to withstand a severe rainfall event, or a severe earthquake and one aftershock of one lower scale of intensity,[96] following *New Zealand Dam Safety Guidelines*,[97] and incorporating "currently" available information regarding relevant geology.[98] However:

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[92] Lottermoser Report, at p. 22.

[93] A fully-fledged CBA would allow for such possibly low-probability but high-consequence events explicitly – just as transport CBAs such as those undertaken by Waka Kotahi or the Ministry of Transport explicitly allow for the social value of avoiding low-probability but high-consequence road fatalities.

[94] Lottermoser Report, at pp 5, 18-20.

[95] Lottermoser Report, at pp 6, 24.

[96] EGL Report, at pp 12-13, 23-24.

[97] https://nzsold.org.nz/dam-safety-guidelines-2024/.

[98] EGL Report, at p. 4.

180.1. As demonstrated by the construction of Lake Dunstan in the 1980s, newly-emerging risks (in that case, of landslides) can add many millions of dollars (in that project's case, $936 million in 2005$, so over $1.5 billion in 2026$) to overall project costs[99] – if such unforeseen risks materialise after mine closure, the Applicant will be shielded from having to meet those costs, which will then fall to future local ratepayers and/or New Zealand taxpayers;

180.2. Likewise, as demonstrated by the failure of Statistics House on Wellington's waterfront during the 2016 Kaikoura earthquake (occurring some 240 km away), even modern buildings constructed to high seismic standards can fail when earthquakes of a previously unknown nature occur[100] –if unforeseen seismic challenges to the TSF occur post mine closure, the costs of ensuring the TSF's integrity will be socialised, and not met by the Applicant;

180.3. The Stockton mine example shows that the possible socialisation of substantial mining-related environmental costs can indeed occur, and result in taxpayers paying more to remedy mining impacts than mining as a sector pays in royalties – i.e. potentially causing net national disbenefits from mining;[101]

180.4. No allowance is made for either simultaneous rather than independent TSF challenges (e.g. severe rainfall events coinciding with certain seismic challenges), for more than one major aftershock to occur after a major seismic challenge, or for the impacts of climate change on seismic risks (including more severe rainfall or snowfall events, or rising sea levels)– when published research indicates that severe rainfall or snowfall is associated with increased risk of severe seismic

[99] https://teara.govt.nz/en/landslides/page-4.

[100] A 2017 investigation report found that the "combination of factors that led to the partial collapse of floor units in Statistics House was not anticipated by the design standards in place when it was built in 2005." [emphasis added]. See: https://www.mbie.govt.nz/building-and-energy/building/investigations-and-reviews-for-safer-buildings/building-failure-investigations/statistics-house-investigation/2017-statistics-house-investigation-report.

[101] All of Govt's 2024 coal earnings spent treating damages at a single mine - Newsroom.

events,[102] as is sea level rise due to climate change,[103] and New Zealand has ample history of multiple severe aftershocks following major earthquakes;[104] and

180.5. The New Zealand Dam Safety Guidelines applied in the relevant risk assessments[105] clearly state they are "not a code or standard", are "not intended as design specifications or an all-inclusive instruction manual", should be interpreted in light of world-wide advances in knowledge and techniques, and "reflect recommended industry practice" – as such, the assessments of the Project's TSF engineering requirements and bond costs based on these guidelines cannot be taken to be either comprehensive or definitive.

181. These considerations point to potential risks of highly material future Project-related costs being socialised to future generations post mine closure, which are adverse effects not considered in the BP Report, and relevant to an assessment of the Project's overall effects.

6. Significance of Claimed BOGP Benefits

182. I agree with the BP Report's comparison of claimed Project impacts against regional metrics such as GDP or employment when assessing the significance of those impacts.[106] However, I believe:

182.1. It is also relevant to compare claimed impacts (preferably net benefits) against national GDP and employment levels, given the FTA requires projects to result in significant regional or national benefits;

182.2. But it is not relevant to compare claimed Project impacts against sub-regional (i.e. Inland Otago, as opposed to Otago Region) GDP and employment.

[102] https://news.mit.edu/2024/study-heavy-snowfall-rain-may-contribute-to-earthquakes-0508.

[103] https://www.gfz.de/en/press/news/details/mehr-erdbeben-durch-menschengemachten-klimawandel.

[104] E.g. the 2010 Canterbury quakes, which also revealed previously unknown faultlines (of the sort, if they are discovered post mine closure, that could give rise to increased TSF insurance and/or rehabilitation costs borne by future ratepayers and/or taxpayers): https://www.geonet.org.nz/earthquake/story/3366146.

[105] EGL Report, Executive Summary.

[106] BP Report, at Sections 6.1 and 6.3.

183. The BG Report compares average annual direct economic impacts of $359.7 million with Otago Region GDP, finding them to represent 1.9% of 2024 regional GDP:

183.1. However, as explained in Section 2, that hinges on assuming an implausibly-high sustained gold price of US$3,138/Oz, and also on 100% New Zealand ownership of the Applicant, nil opportunity costs of labour, and no FIFO workers.

184. As explained in Section 2, and summarised in Section 2.9, maximum annualised Project impacts are more plausibly $90 million:

184.1. Direct economic impacts of that level represent just 0.5% of Otago Region GDP, and only 0.02% of national GDP for the year to March 2024 ($413 billion).[107]

184.2. To the extent the Project gives rise to material adverse effects, which the BP Report has not quantified (but I indicatively quantify for selected effects in Section 5), the regional GDP share of the Project's net impacts will clearly be even less than 0.5%, and also even less than the national GDP share of 0.02% (which is already essentially immaterial – it wouldn't be missed if it did not occur).

185. To further put the 0.5% share of regional GDP in context, Otago Region GDP has a standard deviation of 1.9%[108] – i.e. in any given year, Otago Region GDP is highly likely to change up or down by almost 2%, so the Project's relative impact is a fraction of annual percentage changes in regional GDP (and an even smaller share once adverse effects are accounted for).

186. Adjusting the BP Report's Table 6 (which includes flow-on Project impacts for both Otago and the rest of New Zealand) pro rata based on $90 million instead of $359.7 million results in total annual Project benefits being just 0.03% of 2024 national GDP, which remains essentially rounding error (i.e. whether or not the Project proceeds makes no material impact on national-level GDP).

[107] https://www.rbnz.govt.nz/-/media/project/sites/rbnz/files/statistics/series/m/m5/hm5.xlsx.

[108] Using data from: https://regions.infometrics.co.nz/otago-region/economy/growth?compare=new-zealand.

187. In terms of employment effects, the BP Report states that in an average year the Project adds only 0.3% to Otago Region employment[109] (so a considerably smaller share of national employment):

187.1. Setting aside employment opportunity costs (see Section 2.7), and adverse effects for the Project as well as other local businesses and households from increasing labour costs (see Section 5.3), even these claimed benefits appear essentially immaterial – whether they do or do not occur as a consequence of the Project, they will not materially improve regional (let alone national) labour outcomes, especially since the region has for 20 years had a consistently lower unemployment rate than the rest of New Zealand.

188. Hence the Project does not appear to produce regionally significant economic or (positive) employment impacts (supposing impacts are equivalent to benefits), let alone significant national benefits.

7. Conclusions

188.1. The Analysis has used a methodology that inherently overstates the Project's benefits;

188.2. The Analysis contains errors and omissions;

188.3. The Analysis fails to properly define the Project's counterfactual, does not properly assess all relevant economic disbenefits, and overstates certain of the claimed impacts;

188.4. Even if the claimed impacts of the Project materialise, they are not germane at the Inland Otago level for FTA purposes, modest at even the regional (Otago) level, and essentially immaterial at the national level (even before accounting for Project adverse effects); and

188.5. Hence, the Application's claimed impacts have not been credibly and robustly established, and certainly not to the level of demonstrating significant regional or national benefits.

[109] BP Report, at Table 7.

189. It is also my opinion that any systematic, transparent and comprehensive assessment of the Project's benefits requires a full cost-benefit analysis (**CBA**), not economic impact analysis (**EIA**) as provided, including suitable sensitivity analysis and scenario modelling to test the importance to claimed benefits of key uncertainties, which have not been provided.

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