

**BEFORE THE AN INDEPENDENT HEARINGS PANEL
OF THE WAIKATO DISTRICT COUNCIL**

IN THE MATTER of the Resource Management
Act 1991

AND

IN THE MATTER of the proposed Waikato
District Plan (Stage 1) Hearing
19

**STATEMENT OF EVIDENCE OF GARY ROGER GRAY
ON BEHALF OF THE RALPH ESTATES**

MINERAL RESOURCE VALUATION

13 August 2020

 **Simpson Grierson**
Barristers & Solicitors

W S Loutit / S J Mitchell
Telephone: +64-9-358 2222
Facsimile: +64-9-307 0331
Email: sarah.mitchell@simpsongrierson.com
Private Bag 92518
Auckland

INTRODUCTION

- 1 My name is Gary Roger Gray. I am a Mining Engineer and director of Mine Design Systems Ltd.
- 2 I hold the degrees of Bachelor of Mineral Technology (with Honours) and a Master of Mineral Technology, both from the Otago School of Mines at the University of Otago, New Zealand.
- 3 I am a professional member of the Australasian Institute of Mining and Metallurgy (**AusIMM**), the Canadian Institute of Mining Metallurgy and Petroleum (**CIM**), and the Society for Mining, Metallurgy and Exploration (**SME**)(USA).
- 4 Mine Design Systems Ltd provides independent professional services to clients in the mining industry. These services include mining engineering advice, mine planning, mining optimisation, mining evaluations, resource assessments, mine costings and feasibility analysis.
- 5 I have 35 years of experience as a Mining Engineer and have worked on mining projects across the full range of project development stages with a variety of minerals. A significant proportion of that time I have offered specialist advice in relation to coal and coal mining.
- 6 Of particular relevance is that I have previously undertaken an estimate of the Market Value of a coal deposit in the Huntly area, and I have previously provided written evidence to the Environment Court on matters relating to coal mining in the Huntly area.
- 7 I am also a Director of New Zealand Tungsten Mining Ltd (**NZTM**) and since 2001 I have been responsible for coordinating and undertaking exploration, resource assessments, costings and feasibility studies of their underground mining projects in Central Otago.
- 8 I have read the Code of Conduct for Expert Witnesses outlined in the Environment Court's Consolidated Practice Note 2014 and confirm that I will comply with it in preparing my evidence. I confirm that the issues I will address are within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses. I also confirm that I will not omit to

consider material facts known to me that might alter or detract from my opinions.

SUMMARY OF EVIDENCE

- 9 I was asked by the Public Trust to estimate the quantity of coal assets owned by the Ralph Estates (**Ralph Coal**) that will be rendered inaccessible (sterilised) by the proposed rezoning by Ambury Properties Limited (**APL**) of land at Ohinewai, and to estimate the market value of this coal as of 31 July 2020. I undertook the valuation in accordance with the VALMIN Code.
- 10 The estimated total amount of Ralph Coal that will be sterilised as a result of the proposed land rezoning is 7,497,077 tonnes.
- 11 The estimated Market Value of sterilised Ralph Coal ranges from \$4,087,810 to \$7,000,000 as summarised in Table 1 below.

Table 1 -Summary of Estimated Market Values

Valuation Approach	Estimated Market Value	
	Lower	Upper
Cost Based	\$ 4,200,000	\$ 7,000,000
Market Based	\$ 6,147,603	
Income Based (Royalty)	\$ 4,087,810	\$ 6,425,177

INFORMATION AND DATA REVIEWED AND RELIED ON

- 12 The following documents, information and data supplied to me by Public Trust has been reviewed and relied on:
- a) Appendix 3 to the Hearing 19 (Ohinewai Rezoning and Development) Section 42A Report (13 March 2020) Rezoning Land Location Map by Submitter;
 - b) Appendix C to the Ambury Properties Limited Rezoning Submission to the Waikato Proposed District Plan Review Assessment of Environmental Effects Report and section 32AA Evaluation (December 2019) Zoning Plan;
 - c) Solid Energy New Zealand Ltd Waikare Coalfield Ohinewai Project Resource Estimate, 23/10/2015, Don Maclean;

- d) Digital files exported from the Solid Energy 3-D Vulcan Resource Model produced by Don Maclean in 2015;

LOCATION OF LAND PROPOSED FOR REZONING AND RALPH COAL

- 13 The location of the land proposed to be re-zoned by APL and the Ralph Coal is shown in Figure 1 below.

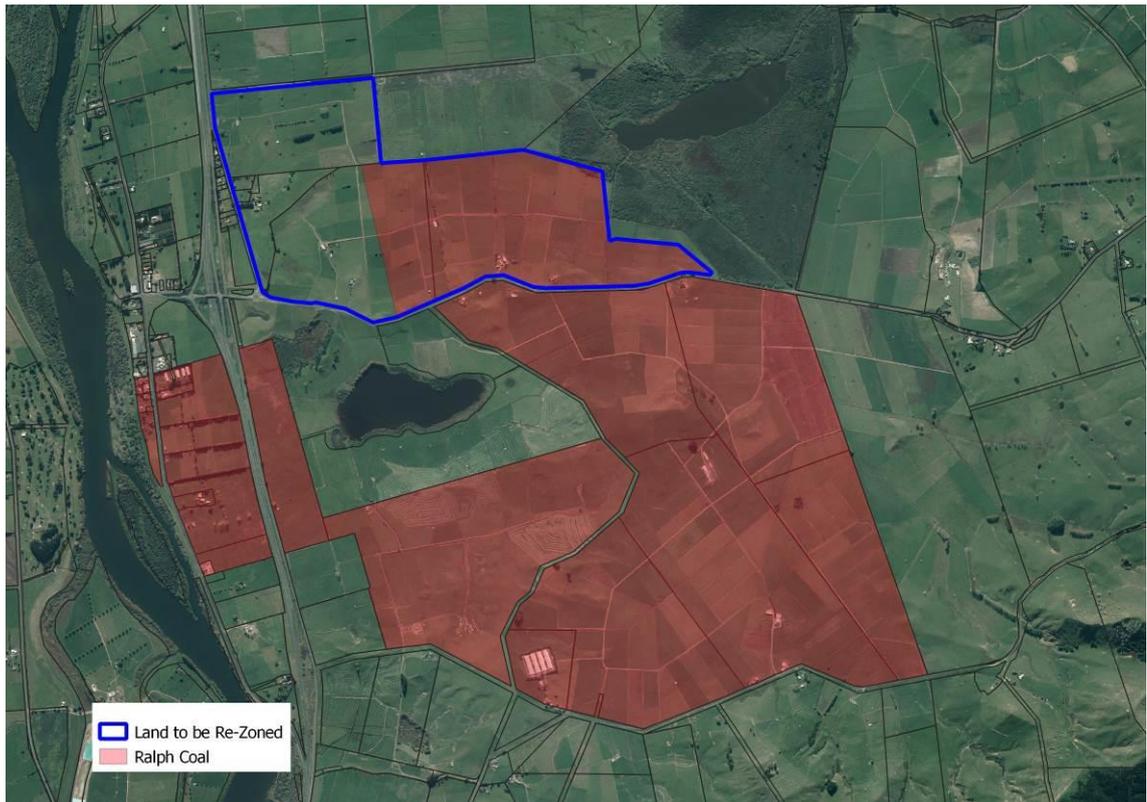


Figure 1 – Location of Land proposed for rezoning and Ralph Coal

IN GROUND COAL RESOURCES

Coal Resource Model

- 14 In 2015 Solid Energy New Zealand Ltd (**SENZ**) undertook a comprehensive assessment of coal resources at Ohinewai.
- 15 A three dimensional model of all coal seams was constructed using Vulcan software, and a resource estimate report produced by Mr Maclean dated 25/10/2015. In this resource estimate report the Ralph Coal at Ohinewai was classified as JORC (2012) Resources.

- 16 A copy of the SENZ 2015 Vulcan coal resource model was re-constructed by myself from the data files supplied to Ralph Estates by SENZ using MineMap Mine Planning software.
- 17 The MineMap model contains the Renown and Kupakupa coal seams and key overburden surfaces. The estimated amount of coal resources and sterilised Ralph Coal have been calculated from the MineMap model.

Coal Density

- 18 Based on the SENZ information and experience the average coal density at Ohinewai is 1.3 tonnes per cubic metre.

Open Pit Coal Resources

- 19 SENZ studies in 2004, 2013 and 2015 identified coal resources with seam thickness greater than 0.5 metres that can be mined by surface mining methods (open pit coal).
- 20 The most recent open pit design from the SENZ 2015 study (the “SENZ 2015 open pit”) has been used to estimate the amount of Ralph Coal at Ohinewai that can be mined by open pit methods (open pit coal”). The extents of the SENZ 2015 open pit design, and the location of open pit coal within it, are shown in Figure 2.

Underground Coal Resources

- 21 SENZ underground mining experience indicates that underground mining of coal deposits is technically feasible if the coal is a minimum of 6 metres thick and has a minimum of 40 metres of Te Kuiti Group rock above it for roof stability.
- 22 If both the Renown and Kupakua seams are more than 6 metres thick at a given location only the Renown seam can be mined due to the limited vertical separation.
- 23 The location of Ralph Coal mineable by underground methods (“underground coal”) adjacent to the SENZ 2015 open pit design is shown in Figure 2 below.

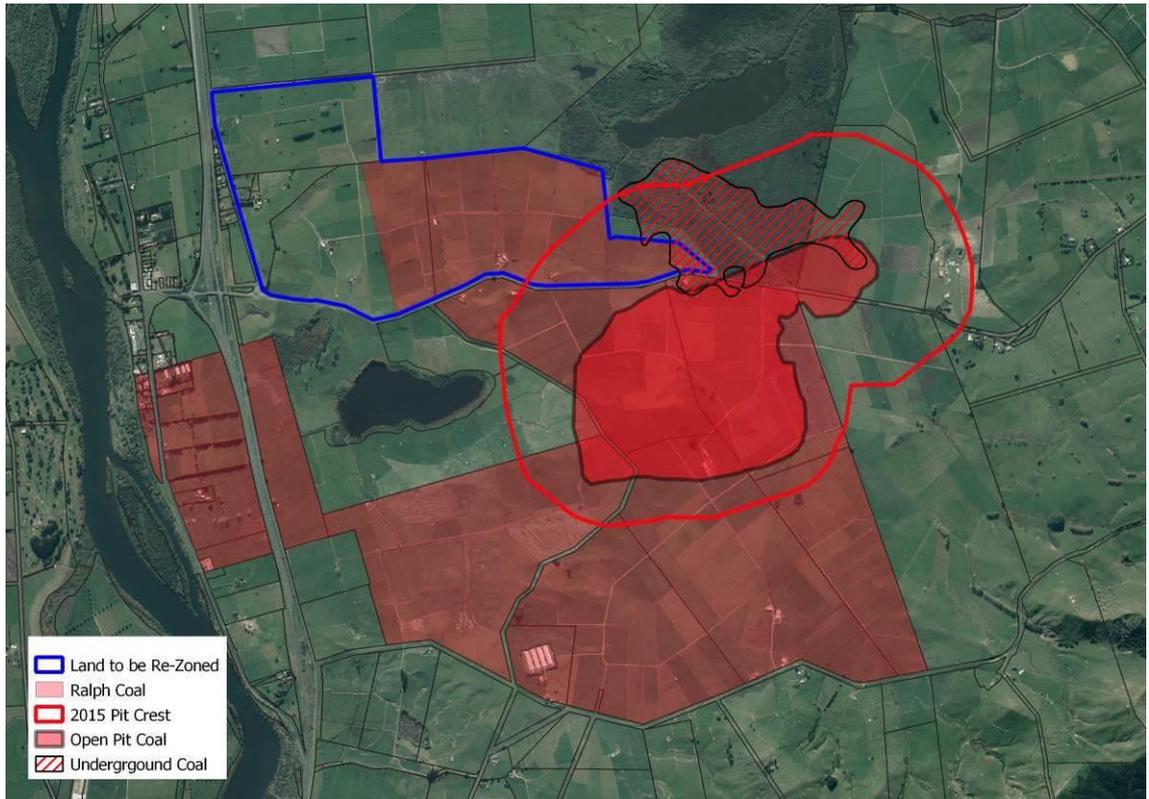


Figure 2 – Location of the SENZ 2015 open pit design, open pit coal and underground coal resources

Resource Tonnage

24 The amount (in tonnes) of open pit and underground Ralph Coal within and immediately adjacent to the SENZ 2015 open pit design was calculated from the resource model and is summarised in Table 2 below.

Table 2 – Ralph Estates Coal Affected by Land Rezoning

Ralph Coal Resources (tonnes)	
Within and Adjacent to SENZ 2015 Open Pit	
Open Pit (>0.5m)	14,380,309
Underground (>6m)	314,746
Total	14,695,055

STERILISED COAL

Sterilised Open Pit Coal

- 25 The proposed rezoning of land will mean that the size of the open pit will need to be reduced from the SENZ 2015 design by limiting its extents in the north to a buffer zone offset from Tahuna Road. This will directly sterilise open pit coal.
- 26 To estimate the amount of sterilised open pit coal, a revised open pit was designed using the following parameters and constraints:
- Overall cut slope of 11 degrees above Waikato Coal Measures
 - Overall cut slope of 34 degrees in Waikato Coal Measures
 - 100 metre offset from Tahuna Road to provide a buffer against any effects of ground instability
- 27 The cut slope angles are based on a combination of Solid Energy experience and geotechnical stability assessment of similar slopes in the Waikato.
- 28 The SENZ 2015 open pit, the revised open pit design, and sterilised open pit coal are illustrated in the cross section from the resource model in Figure 3 below.

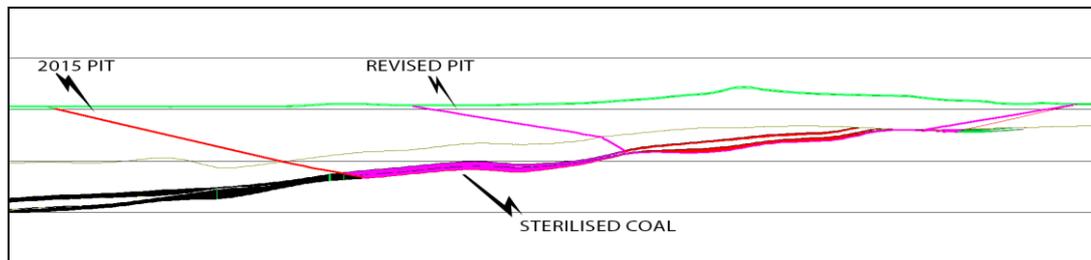


Figure 3 - Cross section illustrating the SENZ 2015 open pit (red), revised open pit (magenta) and sterilised open pit coal (magenta)

- 29 The extent of the revised open pit and the location of sterilised open pit coal, is shown in Figure 4 below.
- 30 The estimated amount of sterilised open pit Ralph Coal is 7,434,128 tonnes.

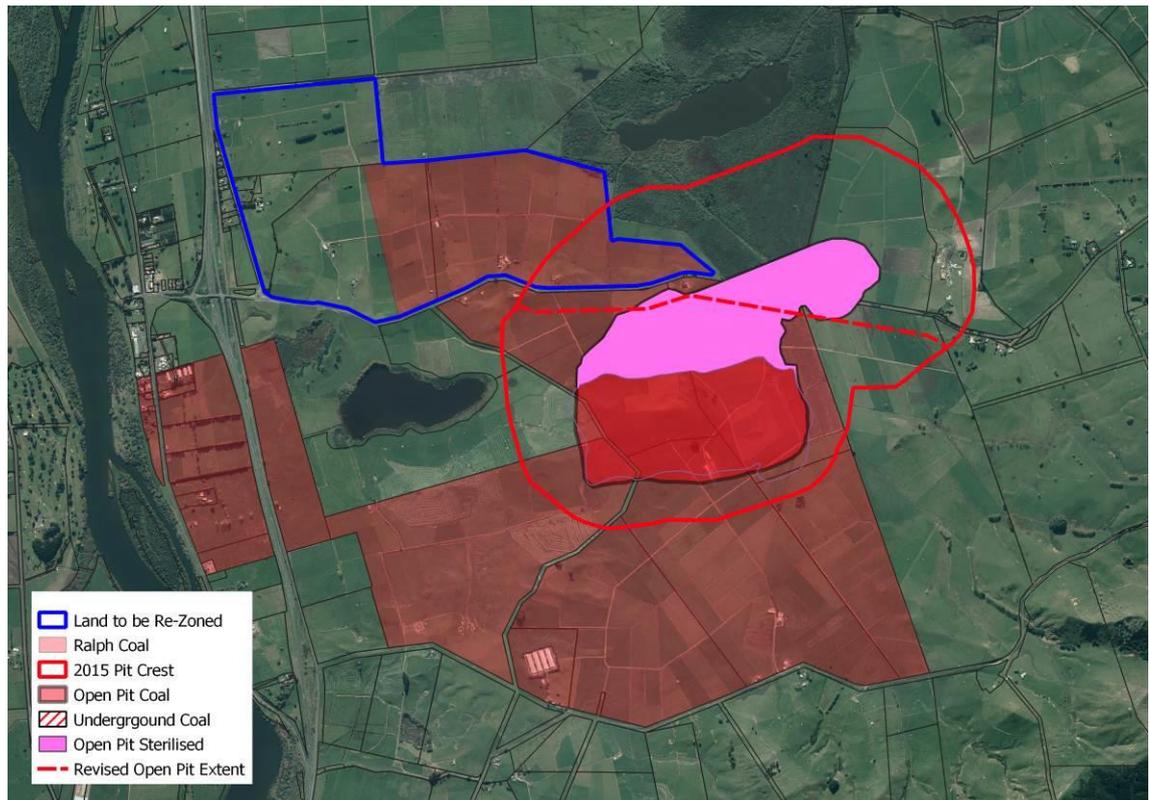


Figure 4 – Location of sterilised open pit coal

Sterilised Underground Coal

- 31 The proposed rezoning of land will mean that subsidence of the land surface due to underground coal mining will no longer be acceptable.
- 32 When mine workings collapse, subsidence occurs above the workings and propagates outwards at an angle called the Angle of Draw. Figure 5 below illustrates how the Angle of Draw relates to subsidence at the surface and the sterilisation of coal. The Angle of Draw observed by Resource and Reserve Ltd (RARL) at underground coal mines in Huntly is 35 degrees and this is considered applicable for use at Ohinewai.
- 33 It is considered reasonable to assume that given the proposed land use after rezoning no prudent underground coal miner will mine coal that could cause subsidence of the re-zoned land surface.
- 34 To protect the re-zoned land and any buildings on it from surface subsidence, mining of coal will need to be avoided beneath and directly adjacent to the re-zoned land, sterilising coal.

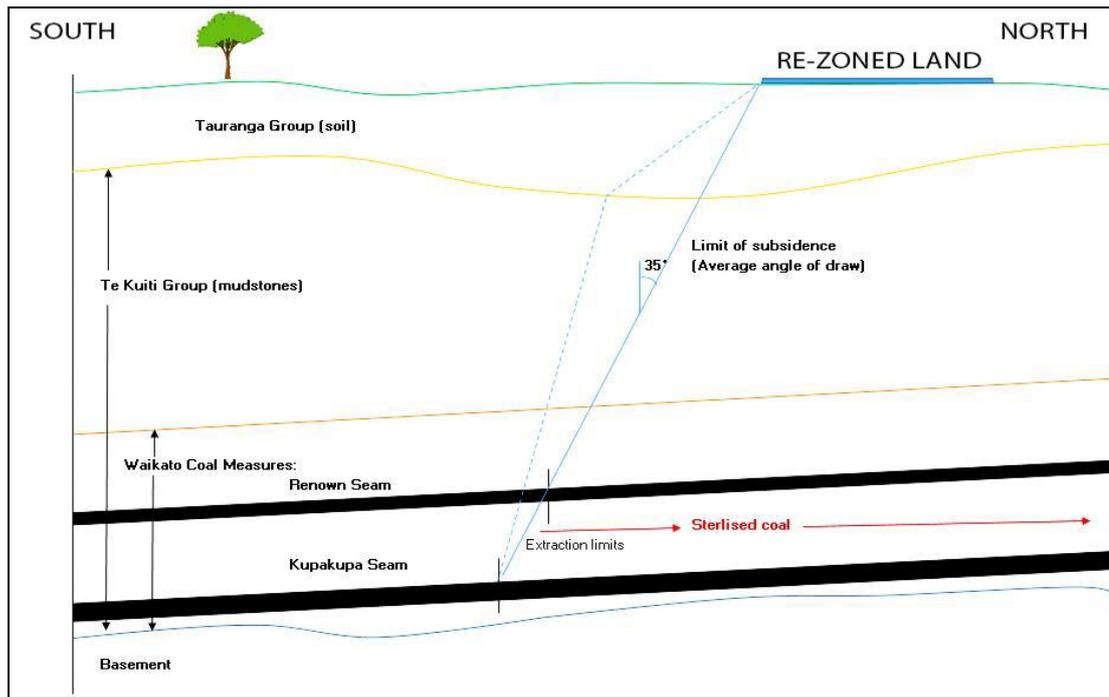


Figure 5 – Relationship of Angle of Draw to coal sterilisation (from RARL)

- 35 To identify underground coal that will be sterilised by proposed rezoning, the land boundaries were projected downwards at the Angle of Draw until they intersected the identified underground coal.
- 36 The location of underground coal sterilised by the rezoning of land is shown in Figure 6 below.

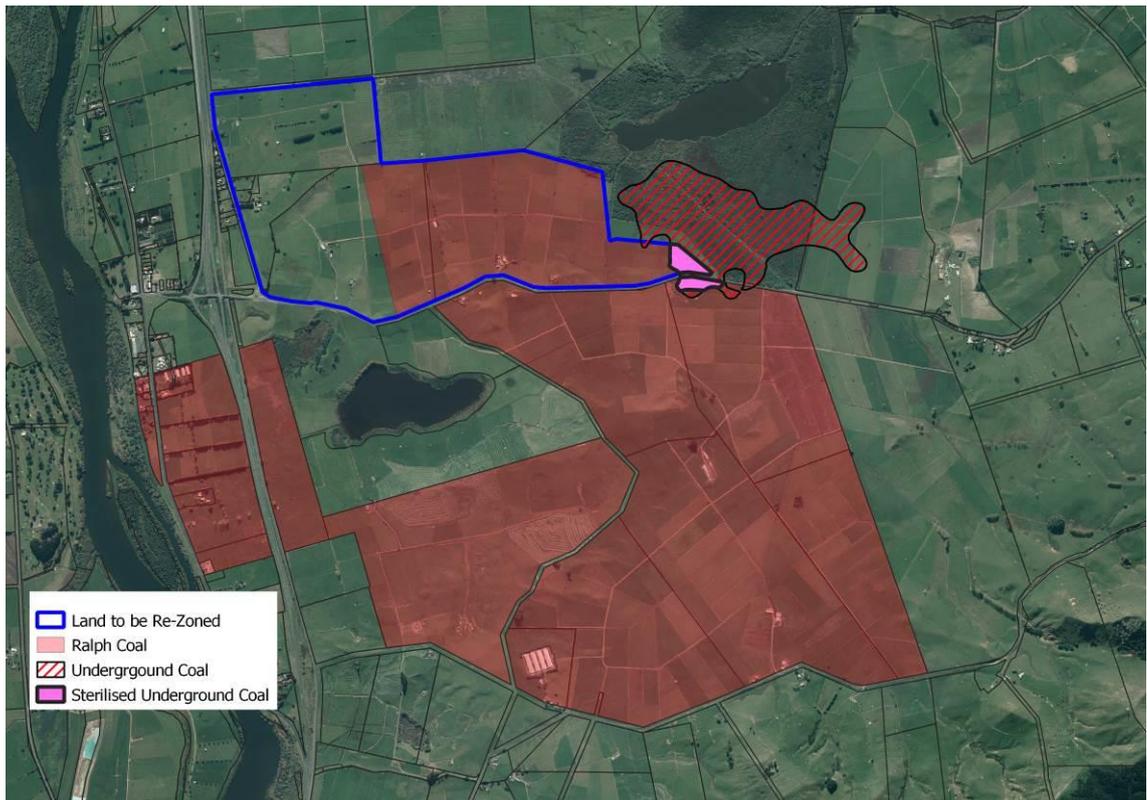


Figure 6 – Location of sterilised underground coal

37 Based on work that I have previously undertaken for Public Trust in relation to underground coal mining recoveries in the Huntly Coalfield, underground mining recoveries of 20% are technically achievable in coal seams with a thickness greater than 6 metres.

38 The amount of underground Ralph Coal that will be sterilised is the tonnes of underground coal multiplied by the mining recovery.

39 The estimated amount of sterilised underground coal is therefore:

$$20\% \times 314,746 \text{ tonnes} = \underline{62,949 \text{ tonnes}}$$

Total Amount of Sterilised Coal

40 In summary the total amount of coal sterilised as a result of the proposed land rezoning is sterilised open pit coal (7,434,128 tonnes) plus sterilised underground coal (62,949 tonnes).

$$\text{Total Sterilised Coal} = 7,434,128 + 62,949 = \underline{7,497,077 \text{ tonnes}}$$

VALUATION RATIONALE - THE VALMIN CODE

- 41 Valuation of the Ralph Coal has been undertaken in accordance with the 2015 Australasian Code for the Public Reporting of Technical Assessments and Valuations of Mineral Assets (the VALMIN Code).
- 42 The VALMIN Code is the accepted and recognised code in Australasia and globally for estimating the Market Value of Mineral Assets. It provides appropriate valuation methodologies based on international good practice as currently employed in the Mineral industry and allows for professional judgement in certain instances.

Mineral Assets

- 43 The VALMIN Code defines a Mineral Asset as “all property including (but not limited to) tangible property, intellectual property, mining and exploration Tenure and other rights held or acquired in connection with the exploration, development of and production from those Tenures. This may include the plant, equipment and infrastructure owned or acquired for the development, extraction and processing of Minerals in connection with that Tenure”.
- 44 By this definition the Ralph Coal is a Mineral Asset.

Market Value

- 45 The VALMIN Code defines the Market Value of a Mineral Asset as “the estimated amount of money (or the cash equivalent of some other consideration) for which the Mineral Asset should exchange on the date of Valuation between a willing buyer and a willing seller in an arm’s length transaction after appropriate marketing wherein the parties each acted knowledgeably, prudently and without compulsion”.
- 46 The implication of this is that a buyer for the Ralph Coal does not need to be identified at the date of valuation for the Ralph Coal to have a Market Value.

Development Status

- 47 The Development Status of a Mineral Asset is used to determine the appropriate Valuation Approaches to be used for valuation.

- 48 The VALMIN Code classifies the Development Status for most Mineral Assets as either an Early-stage Exploration, Advanced Exploration, Pre-Development, Development or Production project.
- 49 It is considered that Ralph Coal in the vicinity of the land to be re-zoned qualifies for a Development Status of a Pre-Development Project as defined by the VALMIN Code, repeated below:

Pre-Development Projects – Tenure holdings where Mineral Resources have been identified and their extent estimated (possibly incompletely), but where a decision to proceed with development has not been made. Properties at the early assessment stage, properties for which a decision has been made not to proceed with development, properties on care and maintenance and properties held on retention titles are included in this category if Mineral Resources have been identified, even if no further work is being undertaken;

Valuation Approaches.

- 50 The VALMIN Code states that there are three widely accepted Valuation Approaches and that whenever practical, the valuation of a Mineral Asset should be made after considering at least two of the Valuation Approaches listed below:
- a) **Market-Based Approach** - With a Market-Based Approach the Mineral Asset being valued is compared with the transaction value of similar Mineral Assets under similar time and circumstance on an open market.
 - b) **Income-Based Approach.** Income-Based Approach is based on **the** notion of cash flow generation the anticipated benefits of the potential income or cash flow of a Mineral Asset are analysed. Valuation Methods include but are not limited to discounted cash flow and multiples of earnings.
 - c) **Cost-Based Approach.** The Cost-Based Approach is based on the notion of cost contribution to Value. In this Valuation Approach the costs incurred on the Mineral Asset are the basis of analysis. Valuation Methods include but are not limited to sunk costs or current replacement costs.

Selection of the Appropriate Valuation Approaches

51 The VALMIN Code provides a general guide to the applicability of each Valuation Approach for each Development Status as summarised in Table 3 below.

Table 3 - Valuation Approaches for Project Development Stages

Valuation Approach	Project Development Stage			
	Exploration Projects	Pre-development Projects	Development Projects	Production Projects
Market Based	Yes	Yes	Yes	Yes
Income Based	No	In some cases	Yes	Yes
Cost Based	Yes	In some cases	No	No

52 With the Development Status of a Pre-Development Project it is considered that all approaches being Market Based, Income Based and Cost Based Valuation Approaches are applicable to the valuation of the Ralph Coal at Ohinewai.

MARKET VALUE

53 The Valuation Date is 31 July 2020.

54 A range of Market Values have been estimated using Cost Based, Market Based and Income Based and approaches.

Cost Based Approach Valuation

55 A Cost-Based Approach is an accepted method for estimating the Market Value of a Mineral Asset where the estimate of value is made by multiplying the money or value historically invested in the project (for instance in exploration drilling) by a factor, typically between 100% and 300% for an exploration project.

56 A large amount of drilling and mining studies have been undertaken historically to investigate the Ohinewai coal resources.

57 Between 1975 and 1986, the government sponsored New Zealand Coal Resource Survey drilled 460 drill holes totalling 58,196 metres at Ohinewai. Of this meterage, 6,200 metres were cored, logged and analysed. It is

estimated that the cost of this exploration would have been approximately \$10 million.

- 58 From 2004 until 2016 SENZ undertook resource and mining studies to assess the resource and mining potential of the Ohinewai coal. This work is estimated to have cost \$4 million.
- 59 Having considered the historic work undertaken and personal communication with RARL who worked on the Ohinewai project, I am of the opinion that a reasonable estimate of sunk costs is \$14,000,000.
- 60 Although the Ralph Estates did not pay for the past exploration they are the owners of the resource and mining studies that were undertaken by SENZ. The studies, combined with the historic drilling, have created the value of the Ralph Coal and their cost is sunk into the Mineral Asset.
- 61 In my opinion, it is considered reasonable that the Market Value would be between 30% and 50% of the estimated value of past work.
- 62 Market Value using a Cost Based Approach is between:

$$14,000,000 \times 30\% = \underline{4,200,000}$$

and

$$14,000,000 \times 50\% = \underline{7,000,000}$$

Market Based Approach Valuation

- 63 In 2012 New Zealand Transport Agency (NZTA) paid compensation to SENZ for coal that was sterilised by the Huntly Bypass at the Kimihia open pit mine in Huntly.
- 64 This transaction is considered directly comparable to the proposed rezoning of land as it was a payment for the sterilisation of coal through the change of land use.
- 65 The amount paid by NZTA to SENZ in 2012 equated to \$0.71 per tonne of coal. When PPI adjusted to July 2020 the rate becomes \$0.82 per tonne.
- 66 Based on this PPI adjusted rate of \$0.82 per tonne and a sterilised coal amount of 7,497,077 tonnes the estimated Market Value using a Market Based Approach is 7,497,077 tonnes x \$0.82 = \$6,147,603.

Income Based Approach Valuation

- 67 The Ralph Coal is privately owned. For over 100 years the Ralph Estates have derived income from royalties paid to them when their coal is mined in the same manner as the New Zealand government receives royalties for Crown owned coal when it is mined. Ralph Estates currently receive royalties for coal mined at the Rotowaro open pit mine in Huntly.
- 68 In June 2008, Ralph Estates entered into an agreement with SENZ that provided SENZ with the right to explore and the option to mine Ralph Estates coal at Ohinewai. In this agreement mining royalties were set to be paid to the Ralph Estates at \$1.95 per tonne of coal in 2008. When PPI adjusted to the Valuation Date the royalty rate is \$2.60 per tonne.
- 69 In my opinion, it is considered reasonable and appropriate to adopt the PPI adjusted royalty rate for calculating the value of future royalties that would be derived from mining the sterilised open pit coal, this being \$2.60 per tonne of coal.
- 70 A prudent mine operator would attempt to purchase the royalty stream in advance to remove their future royalty payment obligations and reduce their future costs. An investor would purchase the royalty stream to benefit from its investment value, these being the returns from future royalties.
- 71 As the royalty rate is indexed to the PPI and does not devalue over time the total royalty value to the Ralph Estates of sterilised open pit coal is equivalent to the product of the adopted royalty rate and the tonnage of sterilised open pit coal, this being 7,434,128 tonnes x \$2.60 = \$19,297,313.
- 72 It is considered that purchase of the royalty stream would be required to provide benefit to the purchaser and that the Market Value can be estimated as the Net Present Value (NPV) of the royalty stream with high discount factors of between 50% and 70% to recognise the investment risk and timeframes inherent in mining.
- 73 The NPV of future royalty streams have been calculated for production scenarios of 650,000, 750,000 and 850,000 tonnes of coal per year.
- 74 The NPV's calculated for future royalty streams using these production scenarios and discount rates of 50% and 70% are summarised in Table 4

below. The NPV as a percentage of the total royalty value (\$19,297,313) is also presented for each scenario in Table 4.

Table 4 – Summary of NPVs of Royalty Stream Scenarios

Annual Coal Production (tonnes)	Discount Rate	NPV	% of Total Royalty Value
850,000	50%	\$ 6,425,177	33.3%
	70%	\$ 5,305,200	27.5%
750,000	50%	\$ 5,734,760	29.7%
	70%	\$ 4,703,122	24.4%
650,000	50%	\$ 5,011,766	26.0%
	70%	\$ 4,087,810	21.2%

75 The estimated Market Value using an Income Based Approach of the future open pit coal royalty stream is between \$4,087,810 and \$6,425,177.

Summary of Estimated Market Values

76 The Market Values estimated by all Valuation Approaches range from \$4,087,810 to \$7,000,000 as presented in Table 5 below.

Table 5 - -Summary of Estimated Market Values

Valuation Approach	Estimated Market Value	
	Lower	Upper
Cost Based	\$ 4,200,000	\$ 7,000,000
Market Based	\$ 6,147,603	
Income Based (Royalty)	\$ 4,087,810	\$ 6,425,177

Gary Roger Gray

7 August 2020