



CURRAGHINALT PROJECT COUNTY TYRONE

PREPARED FOR DALRADIAN GOLD LIMITED
AUGUST 2019

Addendum to the Socio-Economic Impact Assessment and
The Statement of Economic Impacts

Contents

1	Introduction	3
2	Assessment of effects of the 2019 update	5
3	Freshwater Pearl Mussel initiatives	10
4	Conclusions	12
	Annex 1	13

1 Introduction

- 1.1 Dalradian Gold Ltd (DGL) (the Applicant) submitted a planning application for the Curraghinalt Project (the 2017 Design) for consideration by the Northern Ireland Department for Infrastructure in November 2017. Since the time of submission, the Applicant has made some changes to the proposals. The description of these changes (known as the 2019 update) can be found in the Addendum to the Environmental Statement.
- 1.2 This Addendum assesses the socio-economic impact of these changes and, where necessary, updates the findings of the previously submitted assessments. This Addendum updates the findings of two submission documents:
 - The Socio-Economic Impact Assessment (2017 Appendix C12, referred to hereafter as C12)
 - The Statement of Economic Impacts (2017 Appendix C13, referred to hereafter as C13).

Summary of changes in effects

- 1.3 In summary, the broad effects of the 2019 update, when compared to the previous assessment are:
 - The direct employment effects (number of direct jobs created during both construction and operation) remain unchanged.
 - Capital investment and labour cost in construction has increased as have the associated benefits of construction Gross Value Added (GVA) and indirect and induced jobs during construction. (a full account of the changes to the cost assumptions is included at **Annex 1** of this Addendum)
 - The Project will export mineral concentrate (rather than processed material) which will reduce the operational costs, and reduce the export value and revenue of the Project. This will reduce the operational GVA effects and induced and indirect jobs during operation. It will reduce the scale of impact on the trade balance.
 - Changes in site layout (including moving crushing activities underground) will reduce noise effects and will not change the assessment of likely effects on tourism (which remain negligible).
 - There will be a small increase in HGV movements and associated noise and traffic effects, but this is not expected to be significant and will not change the assessment of likely effects on tourism (which remain negligible).
 - Cyanide will no longer be used on-site. This is likely to improve public perception of the Project, which will be beneficial, and will not change the assessment of likely effects on tourism (which remain negligible).
 - While some effects have changed as a result of the proposals, the nature and significance of effects has not changed for any assessment area and the conclusions of the original Socio-Economic Impact Assessment and the Statement of Economic Impacts remain valid.
- 1.4 Further detail of these assessments is presented below.

- 1.5 The methodology used in this assessment is the same as that used for the assessment of the Submitted Project (as set out in Chapter 2 of C12 and Appendix 1 of C13). The assumptions have been updated in line with the proposals for the 2019 update and an updated Assumptions list is presented in Annex 1 of this Addendum.

Submission of additional and supplementary information

- 1.6 Alongside the assessment of the 2019 update, the Applicant wishes to present additional information which is relevant to the topics covered in C13. This relates to the further commitments with respect to the protection and enhancement of Freshwater Pearl Mussels. This matter is dealt with in brief in Section 3 of this report.

2 Assessment of effects of the 2019 update

Introduction

- 2.1 DGL has updated its cost and expenditure models to reflect the 2019 updated proposals and to reflect other market shifts, such as the exchange rate between US\$ and GBP£.
- 2.2 This assessment reviews each of the calculations that formed part of the 2017 assessment and, where relevant, updates these calculations and conclusions drawn from them.

Direct Employment and associated effects

- 2.3 The changes in the Project mostly alter the nature and amount of capital expenditure. The labour demand for the 2017 Design is not expected to decrease – although some employees may be diverted to alternative activities.
- 2.4 The 2019 update will not change the direct employment generated by the Project during either construction or operation (as reported in Paragraph 3.7 and 4.6 of C12).
- 2.5 Other effects associated with direct employment (i.e. effect on accommodation supply, house prices and effects on demand for social infrastructure) remain unchanged.

Table 1: Direct Employment Effects

Effect	2017 Design	2019 update
Direct Employment - Construction	Up to 300	No change
Direct Employment - operation	350	No change

Indirect Employment effects

Indirect employment effects resulting from construction expenditure

- 2.6 The 2017 ES identified that the indirect effects of investment and job creation were estimated to be temporary, short term, minor to moderate beneficial at a District level and negligible at a Northern Ireland level (Paragraph 3.17 of C12).
- 2.7 The following table sets out the indirect effects of the 2017 Design compared to the 2019 update:

Table A3-2¹: Construction Spending Indirect Effects

Effect	Total over 18-24 months construction 2017 Design	Total over 18-24 months construction 2019 update
Investment*	£160m	£158.5m
Supply Chain Expenditure**	£107m	£108m

¹ Updates Table 3.2 from C12

Effect	Total over 18-24 months construction 2017 Design	Total over 18-24 months construction 2019 update
Multiplier effects: additional 1 year indirect ²	720	730
Multiplier effects: additional 1 year induced jobs	170	180

Figures have been rounded

**including contingency*

***not including contingency*

2.8 In the context of the district and Northern Ireland economies, the construction effects of the 2019 update have increased compared to the 2017 Design but the nature and significance of the effects remain the same.

Indirect and Induced employment effects resulting from operational expenditure

2.9 The 2017 ES identified that supply chain expenditure of £66m on average annually during operation would result in 520 indirect jobs in the economy (1 year jobs). Induced jobs would amount to 100 (1 year jobs). In the context of the economy of Northern Ireland, this expenditure and job creation was projected to have a likely beneficial but negligible effect at a Northern Ireland level and a **long term, major beneficial at a District level**.

2.10 The following table sets out the indirect effects of the 2017 Design compared to the 2019 update:

Table A4-1³ Operational Expenditure Indirect and induced Effects

Effect	Annual operational effect 2017 Design	Annual operational effect 2019 update
Total Supply Chain Expenditure per annum	£66m	£46m
Indirect Jobs	520	480
Induced Jobs (1 year)	100	90

Figures have been rounded

2.11 Indirect and induced employment resulting from the operation of the 2019 update is estimated to be lower, but the nature and significance of the effects remain the same.

² Note that this is stated as “induced jobs” in the 2017 ES, Document C12. This was a typographical error and should read “indirect” in line with the explanatory text in the paragraph that follows.

³ Updates table 4-1 of C12

Macro-Economic Effects: Gross Value Add (GVA)

GVA generated by construction

- 2.12 Indirect and induced GVA effects during construction were assessed to be **temporary, short term, major beneficial effect at District level** for the 2017 Design. The following table sets out the GVA effects of the 2017 Design compared to the 2019 update:

Table A3-3⁴: Construction GVA Effects

Effect	Total over 18-24 months construction 2017 Design	Total over 18-24 months construction 2019 update
Direct GVA	£64m	£63.4m
Indirect GVA	£39m	£40.0m
Induced GVA	£8m	£7.8 m
Total GVA	£112	£111.2m
GVA per year over 24 months	£56m	£55.6m

Figures have been rounded

- 2.13 GVA resulting from the construction of the 2019 update is estimated to be broadly the same and the nature and significance of the effects remain the same.

GVA generated by operation

- 2.14 The operation of the Curraghinalt Gold Project would generate a significant amount of GVA, making a substantial contribution to Northern Ireland's GDP, and generating indirect and induced GVA effects as well. The estimated operational GVA effects for the Submitted Project were set out in Table 4.2. The following table sets out the GVA effects of the 2017 Design compared to the 2019 update. These show a substantial decrease in estimated GVA. Estimates of Direct GVA have been reduced because the processing of the extracted minerals (where the greatest value is added in the mining process) has been removed from the project (to be carried out abroad).
- 2.15 Indirect GVA has decreased by c.£2m. Induced GVA has decreased by c.£1m.

Table A4-2⁵: Operational GVA Effects

Effect	Annual operational effect 2017 Design	Annual operational effect 2019 update
Direct	£120m	£60m
Indirect	£24m	£22m
Induced	£5m	£4m

⁴ Updates table 3.3 of C12

⁵ Updates table 4.2 of C12

Effect	Annual operational effect 2017 Design	Annual operational effect 2019 update
Total	£150m	£86m

Figures have been rounded

- 2.16 GVA effects resulting from the operation of the 2019 have decreased, but the Project remains regionally significant to the Northern Ireland economy and this reduction, in the local and regional context, does not change the conclusions of the 2017 assessment.
- 2.17 GVA generated by the annual operation of the Curraghinalt Project will amount to £60 million. It would equate to 0.019% of NI's total GVA – significant for single project.

Export effects during operation

- 2.18 As well as boosting GDP, the proposed Curraghinalt Gold Project would help reduce the Northern Ireland trade deficit, which was £6,100m in 2012. 100% of production is expected to be exported. Based on the 2017 Design, this equated to over £180m of exports each year or c.3% of the deficit (Paragraph 4.22 of C12). Based on the 2019 update, the value of exports every year will be reduced (to £112m or 2% of the total deficit) although the Life of Mine – so the time over which the effects will be generated – will be longer.

Tax effects during operation

- 2.19 The project will make a significant contribution to the national exchequer. The Government will collect income tax from the workers' salaries (both direct and indirect), from shareholders (on their dividends) and from landowners who receive royalties. They will also receive Capital Gains Tax, National Insurance, Corporation Tax and VAT (on domestic sales). DGL would also pay local taxes and duties, including business rates and royalties. Of these, Corporation Tax is likely to be the most significant. Total estimated tax gains for local and national government were estimated to average £15.4m per year for the Submitted Project (Paragraph 4.20 – 4.21 of C12). For the 2019 update this equates to an estimated £8m. This reduction is because the reduced sales value of the product reduces the total profits, and therefore reduces the estimated tax liability of the Project.

Further payments would include land royalties, dividends (some of which may go to local shareholders living in the District) and business rates. Business rates estimates remain unchanged for the 2019 update. Royalties and dividends are expected to be lower, in line with the reduced sales values.

Conclusion: project wide macroeconomic effects during operation

- 2.20 The Curraghinalt Gold Project would make substantial contributions to direct, indirect and induced employment, GVA and National Government tax. This remains the case under the 2019 update.
- 2.21 The Curraghinalt Gold Project would have substantial and positive economic benefits, directly, through employment and output and, indirectly, through the supply chain and employee expenditure. It would result in an increase in GDP; a nationally significant reduction in the

Northern Ireland trade deficit of 4%; c.500 person years of construction employment (a peak of 260 on-site) and at least 350 direct operational jobs – and many more in the supply chain, boosting the employment rate and spending power; corporate and income tax receipts; and royalty payments. The Curraghinalt Gold Project would be effective in contributing to substantially strengthen the Northern Ireland economy.

- 2.22 The in-combination macro-economic effects at the Northern Ireland level with respect to exports remain **major beneficial and long term**. The combined economic macro-effects at a local and District level remain **major beneficial and long term**.

Indirect effects on the local economy: tourism effects (during construction and operation)

- 2.23 The Submission Assessment identified it was very unlikely that a tourist visiting the Sperrins would experience any effects at all from the Project. If any are, these effects would only be experienced by any visitors for a very small portion of the time, without any significant impact on their trip overall. A typical visitor would not be interrupted by the activities at all.

- 2.24 The residual effect on tourism during construction was therefore assessed to be **negligible at all spatial levels** (Paragraphs 3.42-3.43 and 4.38-4.39 and of C12).

- The key relevant changes resulting from the construction of the 2019 update are summarised in each of the relevant Addendum submissions:
- Noise and Vibration - relevant to effects on visitor amenity caused by construction and operational noise/vibration; effects on tranquillity;
- Traffic and Transportation - relevant to effects on traffic disruption on visitors and businesses;
- Landscape and Landscape - relevant to effects on visitor amenity caused by adverse effects on views and local landscape/townscape character; effects on feelings of remoteness; diversity of landscape;
- Water Resources and Waste – relevant to effects on rivers and lakes that may be used for recreational uses including recreational fishing.
- Releases to Air - relevant to effects on visitor amenity caused by dust and air pollution; and,
- Cultural Heritage - relevant to any architectural, archaeological and historical features, or local traditions, that may attract tourists.

- 2.25 The Addendum assessments do not identify any changes in effects under the above listed topics that will change the conclusions of the assessment of effects on tourism.

- 2.26 The 2019 update has been amended to remove any onsite use of sodium cyanide. There is no longer any risk from onsite exposure to sodium cyanide, and no risk to community, occupational or animal health. The overall impact on groundwater quality will be positive on the basis that cyanide will no longer be used in the process. Perceptions of risks associated with cyanide will be similarly reduced or eradicated.

- 2.27 These changes do not change the conclusions of the assessment of the Submitted Project with respect to the tourism impact, which remains negligible at all spatial levels.

3 Freshwater Pearl Mussel initiatives

- 3.1 As set out in C13 (**Paragraphs 4.7.1-4.7.3**) the one local asset that does have a regular visitor economy associated with it is the Owenkillev River.
- 3.2 The river is used for fishing and recreation and has ecological value. The activity of the mine could result in a small reduction in the flow of the Owenkillev River and could result in the discharge of treated water. This is set out in detail in the Environmental Statement⁶. This is not expected to have any significant effect on the freshwater pearl mussel or salmon populations (including salmon holding, spawning and nursery areas, for which the Owenkillev Special Area of Conservation is of European importance).
- 3.3 DGL's activities are not expected to impact on any other species for which the Owenkillev River or the Drumlea and Mullan Woods Areas of Special Scientific Interest (ASSI) are considered to be of conservation importance. No significant impacts are predicted on the fisheries interest of this river.
- 3.4 DGL is proactive in protecting neighbouring river habitats which will ensure the health of the river for fishing and other leisure activities, and support the sustainability of the local ecosystem. Part of this commitment is to voluntarily provide investment into the protection and enhancement of the freshwater pearl mussel and its local habitat. Since the submission the details of these commitments have been developed further.
- 3.5 DGL is committed to investing in the conservation of the freshwater pearl mussel in the Owenkillev River SAC and the Owenreagh River ASSI and to working with local Non-Governmental Organisations (NGOs) to deliver these measures in the most effective manner. These measures are not in response to any likely significant environmental effect of the Project, but are being voluntarily offered up by DGL as a community and ecological benefit in an area where the River and its wildlife are important to local people and to some visitors.
- 3.6 The catchment areas of the Owenkillev and the Owenreagh rivers, upstream of the Crooked Bridge (H 493 867) at Gortin village have been identified as the 'area of conservation interest' for the focus of catchment based conservation action. DGL has commissioned River Care Ltd to:
- Undertake an assessment of the potential opportunities for suitable freshwater pearl mussel population conservation projects (Conservation Action Planning. This has included suggested strategies for
- implementing or installing an appropriate programme of initiatives (Conservation Action Implementation);and

⁶ Ecological Impact Assessment and Baseline Reports (Document C8)
ES Vol 3 – Chapter 3, Section 8.3-8.4
ES Vol 3 - Appendix C6 - Groundwater Impact Assessment
ES Vol 3 - Appendix C4 - Surface Water Impact Assessment
ES Vol 1 - Non-technical summary, Section 4.2- 4.3
Addenda to the above submitted to reflect the 2019 Update.

Monitor the outcomes in terms of freshwater pearl mussel population, host fish populations and habitat conditions (for comparison with pre-works baseline) (Conservation Action Monitoring).

- 3.7 Further possible conservation measures under consideration could also include operating a fish hatchery (with permission to handle and hold freshwater pearl mussel) and obtaining permission for a delivering a conservation breeding unit (and obtaining relevant permissions) and obtaining adult freshwater pearl mussel and salmon breeding stock. If judged to be appropriate, this option could support an on-going husbandry and breeding programme in the area.
- 3.8 As set out above, these initiatives do not respond to effects identified in the Environmental Statement and do not constitute mitigation of an effect of the Project. This does not affect the conclusions of the ES.

4 Conclusions

- 4.1 While some effects have changed as a result of the 2019 update, the nature and significance of effects has not changed for any assessment area and the conclusions of the original Socio-Economic Impact Assessment and the Statement of Economic Impacts remain valid.
- 4.2 The most substantial change is the reduced estimate of GVA effects resulting from the operation. Despite this reduction, the Project remains regionally significant to the Northern Ireland economy and this reduction, in the local and regional context, does not change the conclusions of the 2017 assessment.
- 4.3 GVA generated by the annual operation of the Curraghinalt Project will amount to £60 million. It would equate to 0.019% of NI's total GVA – significant for single project
- 4.4 Further commitments have been made with respect to the protection and enhancement of freshwater pearl mussel populations which would both result in beneficial effects but does not change any conclusions in the above listed documents.

Annex 1

Assumptions and Sensitivity Testing

Overview

- 1.1 The impacts of the scheme are a function of assumptions we have made on both the construction and operation of the Curraghinalt Project. This Annex sets out the key assumptions for both, and how they influence the overall economic impact assessment of the scheme.
- 1.2 A full Feasibility Study was commissioned by DGL and the results were published in December 2016. To support the assessment of the proposed changes to the Development, DGL has remodelled the expenditure models and refined assumptions for both construction and operation.
- 1.3 An update has been prepared for the updated Project. This sets out projected quantity and sales value of the output of the Curraghinalt Project and estimates costs of construction and operation.
- 1.4 The main changes are:
 - A change in the exchange rate assumption between US\$ and GBP£, which has effects on all cost inputs (as all modelling is initially done in US\$ and converted to GBP£ for the purposes of modelling benefits). A significant portion of the changes set out below is accounted for by the decrease in relative value of the pound against the US\$.
 - A small decrease in overall capital investment in £ during the two construction years.
 - A small shift in capital intensity of construction with an increase in purchases in £ (not including contingency) and a decrease in labour cost in £.
 - A decrease in operational expenditure in £, with processing costs moved off-site (and the cost moved off DGL's accounts). Annual average OPEX has decreased.
 - The value of the exported product in £ (as sold in concentrate rather than higher value process material) has decreased.
- 1.5 The methodology follows standard economic appraisal techniques and has been shaped by conversations with Department for the Economy officials (although the calculations and conclusions herein are Quod's own and Quod accepts responsibility for them accordingly.)

Sales Value

- 1.6 The central-case price of gold is US \$1,250 per oz as is the case in the Feasibility Study. This has not changed for the 2019 update. This Report presents the potential effects of a fall or a rise in the price of gold within these parameters. The submitted assessment included a Sensitivity Testing section and the conclusions of this testing remain valid in the context of this updated assessment.
- 1.7 Silver is US \$15 per oz (slightly lower than tested previously) and Copper, extraction of which now forms part of the model, is \$US2.5 per lb. The effect of silver and copper sales in the context of the Curraghinalt Project as a whole is minimal so sensitivity testing is not necessary.

Export Value

- 1.8 It is likely that all of the Curraghinalt Project's production will be exported. 100% export rates have been assumed.

Exchange Rate

- 1.9 All calculations have been undertaken using Pound Sterling (£). An exchange rate of US \$1.35⁷ to £1.00 has been applied where assumptions were provided in US\$. This is revised from US\$1.2 in the previous assessment and accounts for some of the changes in projected expenditure.

Capital Investment

- 1.10 The scale and nature of DGL's capital investment will determine the scale and nature of the economic impacts – including employment, Gross Value Added, supply chain and multiplier benefits to the local and NI economy.
- 1.11 Since the Feasibility Study, DGL has done a detailed plan of the capital investment and the workforce that will be required to deliver the Curraghinalt Project within 18 to 24 months.
- 1.12 The Project will have a total construction cost of £158 million, including labour costs. This expenditure is broken down as follows:

Annex 1, Table 1: Construction Expenditure: Pre-operation

Construction Expenditure: Pre-operation	
This includes:	Expenditure in £
Purchases (construction materials and contracting, utilities, business services, etc.)	£108,300,000
Labour costs (including on- costing and contracting costs)	£36,400,000
Contingency	£13,900,000
Total	£158,500,000

Figures may not sum due to rounding

- 1.13 The construction workforce is not expected to change for the 2019 update, at c. 6,000 person-months of construction employment. While the nature of the construction activities may have changed slightly as a result of the 2019 update, the overall labour requirement is expected to be the same (although there may be small shifts in the requirement between different activities).
- 1.14 In addition to direct employment, construction expenditure will create further indirect jobs elsewhere in the supply chain. DGL has produced an estimate of how construction expenditure will be split between a range of Standard Industrial Classifications (as set out above). Quod has applied standard Office for National Statistics estimates of output per worker in each sector to turn that spending into an estimate of indirect jobs. These have not changed for the 2019 update.
- 1.15 The spending power of construction employees will also create induced employment – for example in retail or leisure services, or other household spending. This has also been calculated using standard assumptions about spending and employment in the NI economy. It is acknowledged that some of this expenditure will be displaced from elsewhere, and this has been accounted for in these calculations. These have not changed for the 2019 update.

⁷ In line with average daily spot rate 2017/2018

Operational Impacts

Expenditure

- 1.16 The impacts that arise from the operational phase are determined by the amount of gold, silver and copper that DGL extracts and the price at which it will sell. They also arise from the expenditure by DGL on the goods and services necessary for the operation of the Project.
- 1.17 As with the construction workforce, DGL has reviewed operational workforce requirements to identify the number and occupation of workers required to produce the target production. Again, a full profile of the operational workforce, by skill, is set out in the Operational Impacts section of this Report.
- 1.18 The Curraghinalt Project will have an annual average operational cost of £60m. This expenditure includes labour and on-going capital investment/maintenance costs.
- 1.19 A full Economic Appraisal would include deadweight and displacement. In this case we estimate both to be zero – in the absence of the mine, the gold would not be extracted, so all effects are net additional to the economy. Resources required to deliver the project are relatively specialist so the economic activity of the mine and its construction would not be displacing activity that would otherwise be occurring somewhere else in the local or Regional economy. Further commentary on displacement is set out in the relevant responses to the Department for the Infrastructure request for further environmental information (FEI).

Measuring indirect and induced effects (multipliers)

- 1.20 The multipliers used are not the standard ONS average multipliers for the UK. Quod has established a bespoke model to calculate the potential multipliers based on the estimated employment and spending patterns set out by DGL. This means that, where indirect jobs are estimated, there is a direct relationship between the number of indirect jobs expected and the expenditure by DGL that will support them. Likewise with induced effects, the actual wage effect of DGL's activities has been considered with respect to how many jobs may be induced by the wage injection in the wider economy. The table below shows how the multipliers in this report differ from the industry standards, and gives a brief overview of why this might be the case.

Annex 1, Table 2: Multiplier Effects

Multiplier	Total Impact, Type 2 (not including leakage)	Industry benchmarks (Type 2)	2015 ONS Input-Output Analytical Tables Multipliers and effects (product) (assumed not to include induced)	Suggested reason for difference
Construction Employment multiplier (TYPE 2)	2.47	2.0	2.174	Capital intensive cost profile = relatively high spend in the supply chain compared to labour cost – especially in construction related supply chain, which supports a higher level of indirect employment for every £ spent. Some leakage outside NI likely. ONS 2015 benchmarks do not include induced effects.
Construction GVA Multiplier	1.75	1.9	2.041	Expenditure on manufactured goods and energy offering relatively low indirect GVA. Some leakage outside NI likely. ONS 2015 benchmarks do not include induced effects.
Operational Employment multiplier (TYPE 2)	2.45	2.17	1.974	Significantly higher expenditure on supply chain relative to on-site labour costs, which supports a higher level of indirect employment. Some leakage outside NI likely. ONS 2015 benchmarks do not include induced effects.
Operational Output Multiplier	1.44	1.46	1.521	Expenditure on manufactured goods and energy offering relatively low indirect GVA. ONS 2015 benchmarks do not include induced effects.

Sensitivity testing

- 1.21 There is potential for a variance around some of the figures used in the economic impact calculations.
- 1.22 With the Submission Assessment, Quod ran a series of sensitivity tests demonstrating that reasonably foreseeable fluctuations in the gold price and the exchange rate between the dollar and the pound could be expected to affect sales value and therefore the value of exports. This also affects Gross Value Added, rising up or down with sales value. Taxes, some of which being proportionate to profit, may also be affected.
- 1.23 However, the magnitude of these effects is such that, even with a reduction of sales value by up to 8%, the impact on GVA and the trade deficit was identified as still substantial enough to register and make a significant contribution at a Regional level. This conclusion has not changed.