



ASX: HFR

03 November 2022

## MUGA FEASIBILITY STUDY: COMPELLING ECONOMICS RECONFIRMED

### HIGHLIGHTS

Highfield Resources (ASX: HFR) (“Highfield” or the “Company”) is pleased to provide an update to the Muga-Vipasca Potash Project (“Muga” or the “Project”) Feasibility Study (“FS”) that reconfirms the compelling economics of the Project.

- NPV<sub>8</sub> of €1.82 billion and 21% IRR
- At full production, EBITDA of around €410 million per annum
- Economics resulting in a 30-year mine life
- Sensitivity analysis using current flat real spot prices for the whole life of mine results in a post-tax NPV<sub>8</sub> of €3.1 billion and a 42% IRR
- The update to the Project Economics of the Feasibility Study is based on the results of the exhaustive external due diligence undertaken through the Project finance process and the progress that the Project technical team has made in the last few months incorporating updated offers, prices, and contracts related to construction of the Project. In the current global inflationary environment, the Company has taken prudent precautions with regards to costs in line with the total funding required by the banks to proceed with the Project finance facilities.
- As a result, the updated capex numbers are:
  - phase 1 capex of €436 million
  - phase 2 capex of €226 million
- Through the work with its Financial Advisor, Endeavour Financial, the Company has secured credit approvals from a consortium of experienced European mining finance lenders that includes BNP Paribas S.A., ING Bank N.V., Natixis, and Societe Generale (London Branch), for a €320.6 million senior secured project financing package.

**Cautionary Statement.** *The production target set out in this update is derived from Proved and Probable Ore Reserves, additional Measured, Indicated and Inferred Mineral Resources from the Muga-Vipasca tenement as well as the Exploration Target at the Vipasca and Muga Sur tenements. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical parameters underpinning the Mineral Resource in the market announcement dated 30 March 2021 and the Exploration Target in the market announcement dated 23 November 2021 continue to apply and have not materially changed.*

Highfield Resources  
ACN 153 918 257  
ASX: HFR

[www.highfieldresources.com.au](http://www.highfieldresources.com.au)

Head Office  
Avenida Carlos III, 13 - 1ºB 31002 Pamplona, Spain | +34 948 050 577

Registered Office  
169 Fullarton Road, Dulwich, SA Australia | +61 8 8133 5000

Highfield  
Resources



**Ignacio Salazar, CEO, commented:** “We are delighted to announce an update to the Feasibility Study for the Muga Project following the rigorous due diligence process undertaken during the Project financing process.

The Company has done a lot of work with the banks in reviewing and mitigating the effect of the current global inflationary environment resulting in a thoroughly reviewed and updated Feasibility Study which reconfirms the outstanding value of the Muga Project. The current geopolitical situation as well as Muga being the next European potash mine reinforces both the compelling strategic nature and the status of the Project.”

## Mine plan

The Project Economics of the Feasibility Study have been updated while maintaining the same Mineral resources and Mine Plan as presented in the 2021 Muga Feasibility Study Update (refer ASX release 7 December 2021, “Muga Feasibility Study – Update”). The 2021 Mine Plan was prepared by Highfield with technical mine planning support from the Spanish mining engineering consultants, IGAN Consulting Group. The portion of the plan that supports the Ore Reserve was reviewed by SRK Consulting (“SRK”) which incorporated various capital and operating cost sensitivities into their assessment to confirm its robustness in December 2021.

The Mine Plan is based on the Proved and Probable Ore Reserves, but also integrates Inferred Mineral Resources<sup>1</sup> as well as the abutting Exploration Target<sup>2</sup> tonnes that remain unchanged as per the ASX announcement released on the 23 November 2021 (refer ASX, “Updated Ore Reserve Estimate – Muga Project”), and the additional Measured, Indicated and Inferred Mineral Resources audited by SRK as per the ASX release on 30 March 2021 (refer ASX, “Annual Report to the stakeholders”).

All technical parameters in the 2021 Mine Plan continue to apply and have not changed in 2022.

Table 1 below describes the various sources that are included in the Mine Plan.

**TABLE 1: SOURCE THE MINE PLAN TONNES**

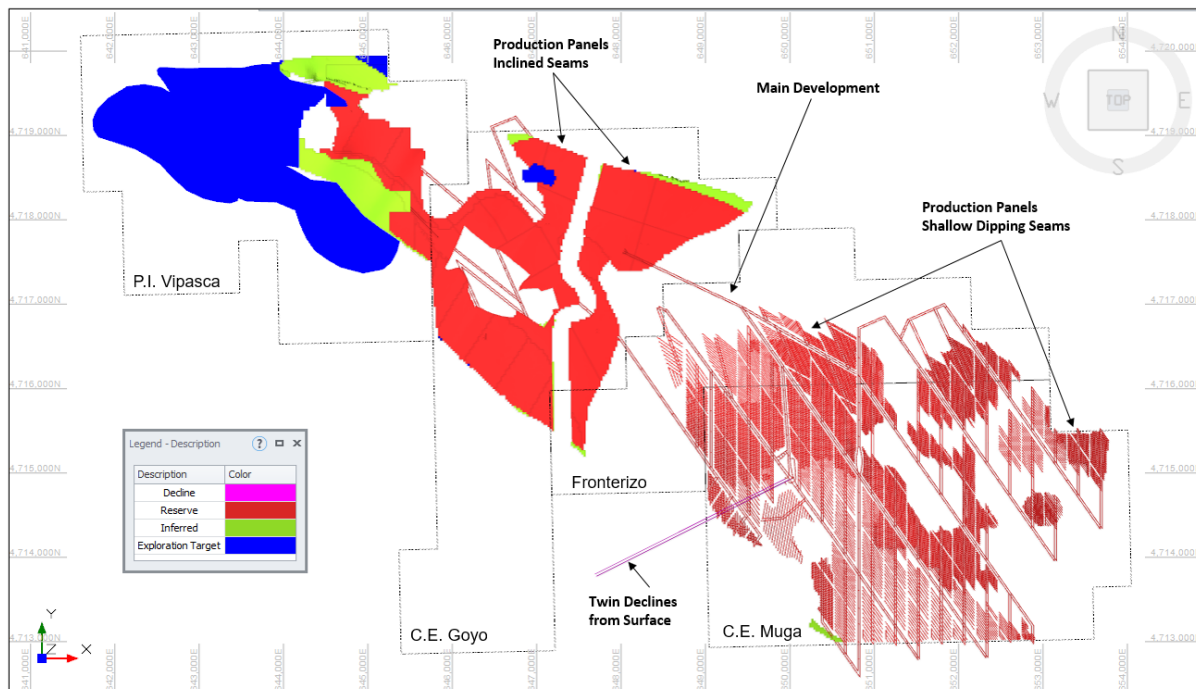
	Reserves, Resource or Exploration Target		Sources of tonnes included in the 2021 Mine Plan	
	Million Tonnes	Grade %K <sub>2</sub> O	Million Tonnes	Grade %K <sub>2</sub> O
<b>Proved and Probable Ore Reserves</b>	104.3	10.2	104.3	10.2
<b>Measured and Indicated Resources</b>	30.9	11.8	11	12.9
<b>Inferred Mineral Resources<sup>1</sup></b>	45	10.3	16	10.8
<b>Exploration Target<sup>2</sup></b>	80 to 130	8-10	43	10

<sup>1</sup> There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised..

<sup>2</sup> The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised.



**FIGURE 1: THE MINE PLAN DESIGN FOR MUGA**



Regarding the Inferred Resources included in the Mine Plan, specific areas with thickness below the expected minimum of 2 metres but greater than 1.6 metres have also been considered, given it has the potential to be mined with low profile equipment. The Measured and Indicated Resources that have been included in the Mine Plan refer to the pillars in the exclusion zones under towns and the Bardenas Channel. Highfield considers that these could potentially be mined in the future if and once the backfilling provides enough support to demonstrate there will be no impact on the surface.

The Mine Plan which has not changed from the December 2021 Muga Feasibility Study update with a planned production up to approximately 1,000,000 tpa of Muriate of Potash (“MOP”) over a mine life of 30 years<sup>3</sup> comprising approximately 18 years of mine life from Ore Reserves and 12 years from additional Mineral Resources and the Exploration Target. Graph 1 below shows the sequencing of the mine plan.

<sup>3</sup> This production target must be read in conjunction with the cautionary statement on page 1 that “there is a low level of geological confidence associated with inferred mineral resources and there is no certainty that further exploration work will result in the determination of indicated mineral resources or that the production target itself will be realised” and that “the potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical parameters underpinning the target in the market announcement dated 23 November 2021 continue to apply and have not materially changed.”

**Highfield Resources**

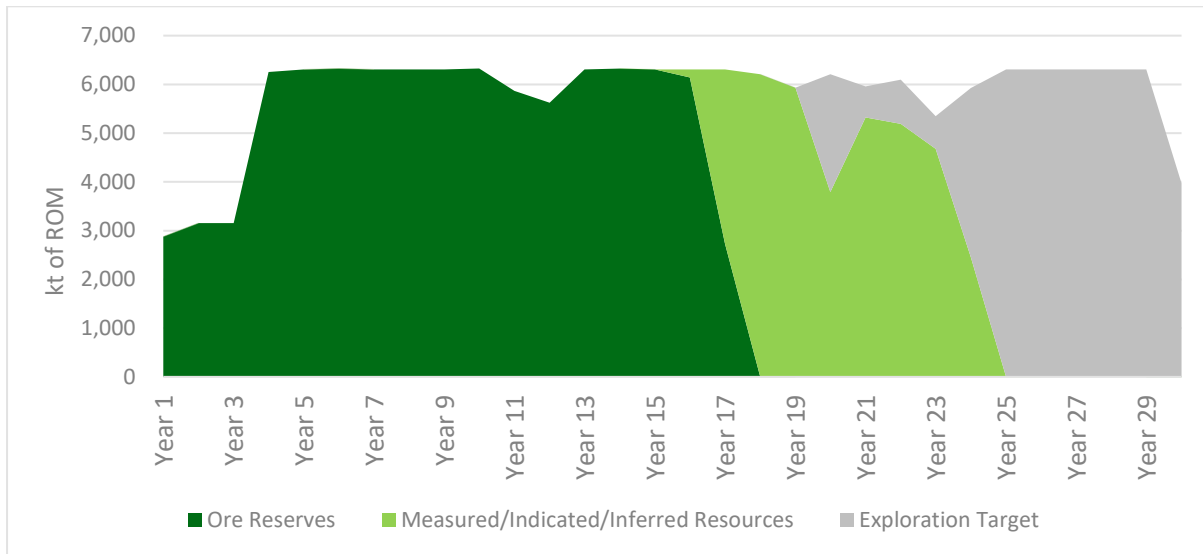
ACN 153 918 257

ASX: HFR

[www.highfieldresources.com.au](http://www.highfieldresources.com.au)



**GRAPH 1: THE MINE PLAN SEQUENCING ROM TONNES PROCESSED**



Appendix 1 incorporates the summary description of Ore Reserves, Mineral Resources and Exploration Target for the Muga Project.

## Mining

Developed by the engineering company Subterra Ingeniería S.L. (“Subterra”), the twin parallel declines have an approximate length of 2.6 km and are planned to be constructed at an average gradient of – 15%, which will provide underground access from surface (shown in pink in Figure 1 above) to an approximate depth of 350 metres. The two declines will be built 25 metres apart and will be linked by six cross-cuts. Both declines will have an arched profile and a cross-sectional area of approximately 31 m<sup>2</sup> and will be widened at the cross-cut connections and at other various points to accommodate pumping stations and electrical substations.

The West decline will accommodate the permanent backfill conveyor during mine operation and will work as the intake ventilation airway, while the East decline will contain the permanent ore conveyor and also act as the return ventilation airway to surface. A bypass will be constructed at the top of the East decline to accommodate the main fans. The planned decline gradients are suitable for both ore conveying and vehicle access, and the decline design provides for underground infrastructure requirements, i.e., staged pumping stations and underground electrical installations.

Five different levels of ground support have been specified depending on the various rock type and ground conditions expected along the full length of the declines. A single portal boxcut is shared by both declines and will be adequately protected against rainfall and surface water incursion into the decline developments.

The Company plans to implement mechanical excavation by roadheader and/or conventional excavator combined with conventional drilling and blasting. This has now been included in a revised construction project design, which does not include the use of a bolter miner in the West ramp as had been anticipated in the 2021 feasibility study. The bolter miner had a long lead time to construction that required significant advanced payments and did not provide as much flexibility as the Company



initially anticipated. This change was the result of extensive engagement with ramp construction contractors who confirmed that the current methodology provides more flexibility in terms of construction and scheduling.

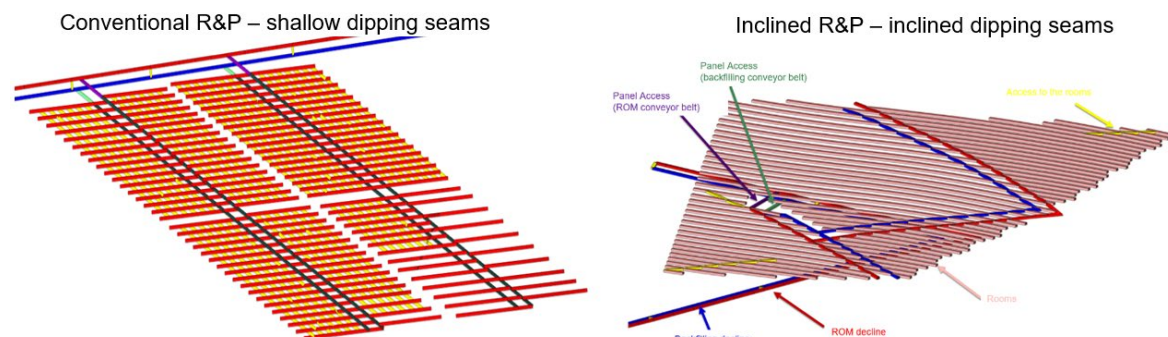
Both declines will be excavated using trackless mobile equipment. Roadheaders and/or conventional excavators in combination with two-boom jumbos will be utilised for excavation, face drilling and rockbolting, while 30-tonne low profile mining haul trucks and 14-tonne load-haul-dump loaders (“LHD”) will be used to transport material to surface. Development waste rock will initially be moved back from the faces to storage bays and then loaded onto trucks to be hauled to the surface during other development activities. The development excavation will be supported by sprayed concrete and rockbolts. The thickness of sprayed concrete and bolt spacing will be determined by the geological surveys developed by the horizontal drilling undertaken.

The detailed design of the shallow dipping seams utilises a set of two parallel roadways as the main development access, one for fresh air intake and access and the other for exhaust ventilation, both with conveyor belt materials handling systems. The mining method approach is a typical Room and Pillar (“R&P”) panel layout. The planned room width will be 8 metres with the pillar sizes determined by the room height, the total combined seam thickness, the geotechnical constraints due to the depth below surface and any equipment limitations (see “Production panels shallow dipping seams” in Figure 2 below).

The Northwest area of the deposit is a more steeply declining potash seam. To minimise dilution and maximise extraction, this area required an alternative mining approach to the R&P panel layout used for the shallow dipping seams, one that takes into consideration the geotechnical constraints and the equipment limitations. It consists of the development of inclined roadways and mining rooms, while maintaining the same production targets, and the utilisation of the same excavation, material handling and backfilling approach. In addition, the panel design and the extraction ratio applied take geotechnical constraints into account such as seam thickness, depth below surface and any equipment limitations (see “Production panels inclined seams” in Figure 2 below).

The pillars, in both types of seams, have been designed to provide an optimal extraction ratio while maintaining ground stability to ensure safe working and environmental conditions.

**FIGURE 2: CONVENTIONAL AND INCLINED ROOM AND PILLAR PATTERN MINING**





The mining equipment used will be based on the specific potash seams. The production will be supported by auxiliary machinery, including roof bolters to ensure roof stability in abnormal areas, and LHDs to load and dump material to intermediate storage points.

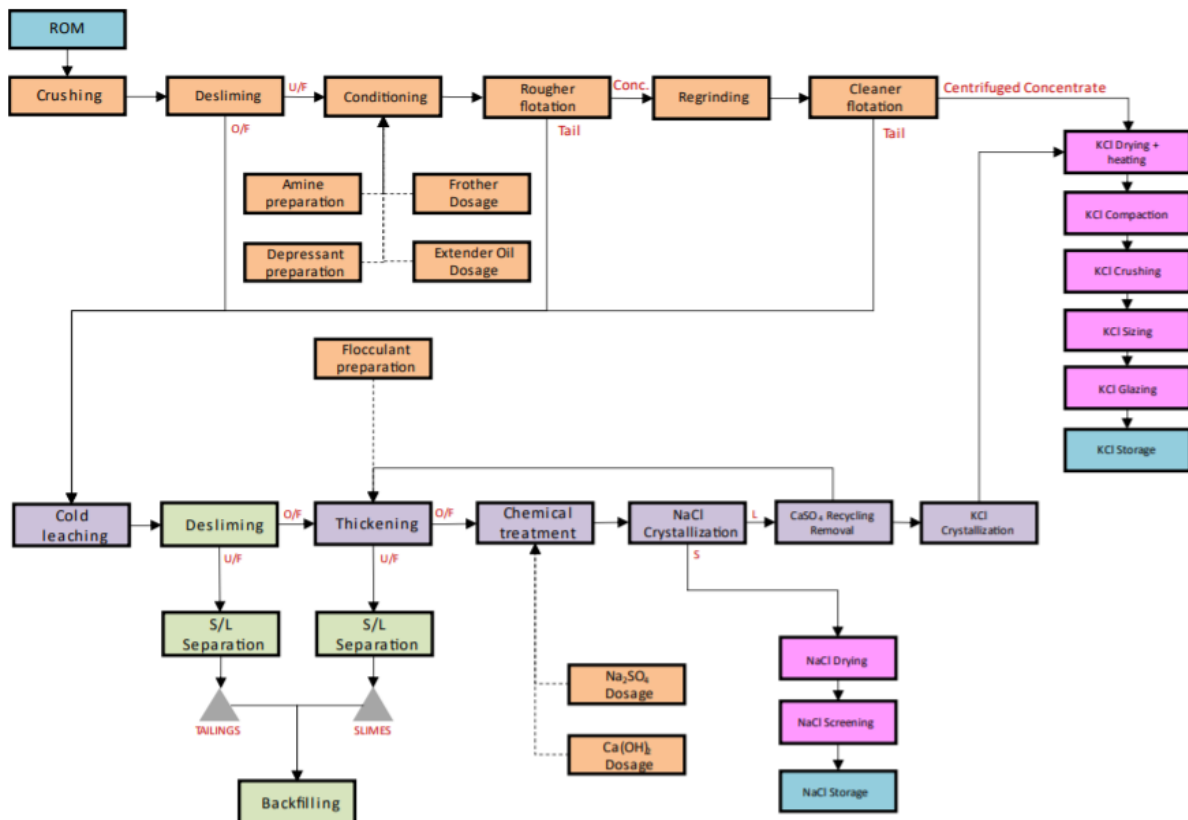
Ore will be loaded directly from the road header or continuous miner to electrical cable-tethered shuttle cars that will move the ore to a feeder breaker and then onto conveyor belts. At this point, the Run of Mine (“ROM”) ore will be transported via a series of conveyors to the surface via the East decline conveyor.

## Processing

Purchase contracts were signed for all the key components of the process plant equipment in early 2022 (refer ASX, 15 February 2022, “Remaining Purchase Contract Signed”). Following the signing of these contracts the Company received equipment engineering drawings that allowed for the further finetuning and optimisation of the detailed engineering of the processing plant.

Apart from some minor updates that were incorporated following comments as part of the due diligence process, the processing plant design is the same as was presented in the December 2021 Muga Feasibility Study Update.

**FIGURE 3: BLOCK DIAGRAM OF THE PROCESS**





The final process is represented in the above block diagram (Figure 3 above). In this process the ROM ore is crushed to the determined liberation size, attritioned and deslimed to separate insoluble particles and then conditioned with reagents prior to rougher flotation. Rougher concentrate is reground and transferred to the cleaner flotation in a column to obtain the final flotation concentrate. Slimes, rougher tails, and cleaner tails are cold leached prior to solid/liquid separation to remove final tails and slimes. This process results in a potassium chloride (“KCl”) concentrated brine, to which reagents are added to remove magnesium. The resulting brine feeds the crystallisation unit, where both vacuum salt and a high grade KCl product are obtained.

KCl product from the crystalliser is mixed with flotation product before passing to the drying stage, where moisture is reduced, and material is prepared for compaction and glazing.

These updates are all integrated in the site layout as shown in the Figure 4 below.

**FIGURE 4: PROCESS PLANT SITE LAYOUT, GRINDING, FLOTATION AND CRYSTALLISATION PLANT**



## Project Timetable

Construction started in June 2022 with the earth movement in the mine gate area.

The next stage in the construction schedule involves building and establishing key infrastructure to provide electricity to the Project, road access, water storage capacity for construction as well as basic above ground installations. Specifically these works include the electricity line from the main electricity network to the plant and the minegate as well as the road access to the Project from the main road, and the North ponds to storage water generated while building the ramps. Basic urbanisation at the processing plant will also be part of this stage.

The main part of the construction consists of the Ramps, Civil works and the Process plant and is expected to run for 2 to 2.5 years. Tendering is ongoing and construction agreements are being prepared. The award of the local town hall construction license in Navarra for the plant is the key permit required to proceed as well as completing the financing of the Project.



## CAPEX

Continued progress in detailed engineering as well as in contracting and procurement, along with the detailed technical due diligence undertaken during the credit approval process for phase 1 provides a more current and higher degree of confidence in this update:

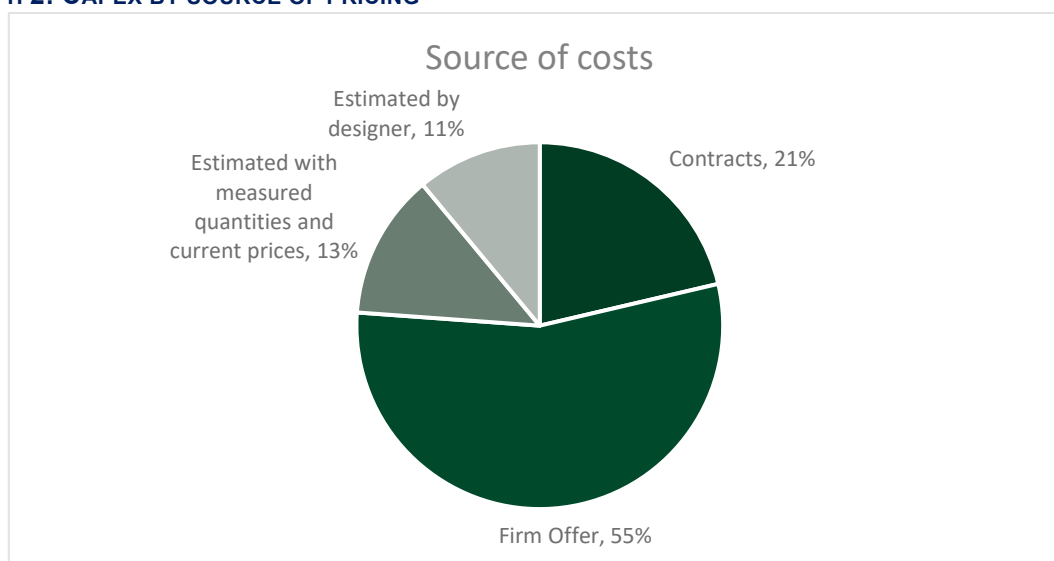
- phase 1 capital expenditure of €436 million
- phase 2 capital expenditure of €226 million

### Capex for Phase 1

The estimated capital and operating costs used to report the Ore Reserve estimate (refer ASX 23 November 2021, “Updated Ore Reserve Estimate – Muga Project”) are based on the Company’s signed agreements with contractors, detailed quotes, or estimations made by the Company and its third-party consultants. The Capex estimate that has been audited as part of the credit approval due diligence process includes firm and, recent quotes, budget prices from manufacturers, measured quantities and tested market rates. A small number of items were estimated from all-in rates based on ratios. The source of pricing is shown in Graph 2 and Table 2 below.

Contracts plus firm offers represent 76% of total in the current 2022 FS compared to 58% in the 2021 FS.

**GRAPH 2: CAPEX BY SOURCE OF PRICING**



Source of costs	2022 (%)	2021 (%)
Contracts	21%	17%
Firm Offer	55%	41%
Estimated with measured quantities and current prices	13%	28%
Estimated by designer	11%	14%
<b>TOTAL</b>	<b>100%</b>	<b>100%</b>





**TABLE 2: CAPEX BREAKDOWN FOR PHASE 1 OF THE MUGA PROJECT (AND DATE OF ESTIMATES)**

CAPEX BREAKDOWN (€ million)	September 2022	December 2021
Preliminaries	29.45	16.88
Underground capex	78.31	75.04
Aboveground civil works	39.45	39.96
Facilities building	5.81	5.26
Process plant capex	175.07	165.97
Dewatering and backfilling plant	55.32	31.33
Utilities	15.81	16.96
Indirect costs	21.43	30.27
Pre-production costs	15.41	16.28
<b>Total (€ million)</b>	<b>436.06</b>	<b>397.95</b>

## Capex for Phase 1 and 2

The updated Capex estimate for both Phase 1 and Phase 2 totals €662 million which is less than a 9% increase from the €607 million reported in December 2021 (refer ASX, 4 December 2021, “Muga Feasibility Study – Update”).

The main change is due to global cost inflation pressure and an increase in the contingency following a detailed third-party due diligence.

As announced in February 2022 (refer ASX, 14 February 2022, “Remaining Purchase Contracts Signed”) early procurement allowed the Company to mitigate part of the most recent inflation pressure in the markets.

## FINANCING

In 2017, the Project received initial credit approval from a syndicate of international lenders for a project finance facility of €185 million. Since then, the Company has continued to de-risk the Project which is now more economically robust, has a lower technical risk profile and has a significantly more socially and environmentally sustainable footprint.

The result, as announced in October 2022 (refer ASX, 24 October 2022, “Project Financing - Credit Approval Secured”) is that the Company received credit approval for a €300 million senior secured Project financing facility and a €20.6 million standby cost overrun facility resulting in an overall debt package of €320.6 million.

The approval was received from a group of international financial institutions, comprising BNP Paribas S.A., ING Bank N.V., Natixis and Societe Generale (London Branch).

The Company is continuing to hold discussions with potential strategic partners and is looking at other sources of capital to ensure the financing needs of the Muga Project are fully covered.



## PROJECT ECONOMICS

The updated parameters are based on more advanced engineering and firmer Capex estimates which provide a higher level of confidence in the Project assumptions. This update also includes price changes that incorporate increases due to the current global inflationary pressures. Despite these changes, this update reconfirms the fundamentals of the Project with an NPV<sub>8</sub> of €1.82 billion and an IRR of 21.2%.

Parameters underpinning these numbers include updated energy prices, foreign exchange rates and potash prices, as set out below, with the exception of parameters such as recoveries, salt by-product production, potash production which have not changed since the December 2021 update.

**TABLE 3: PROJECTED FINANCIAL METRICS FOR MUGA PROJECT (REAL TERMS UNLESS STATED OTHERWISE)**

	2022 Model	2021 Model
CAPEX phase 1 (500,000 tpa MOP)	€ 436 million	€ 398 million
CAPEX phase 2 (Additional 500,000 tpa MOP)	€ 226 million	€ 209 million
Total CAPEX	€ 662 million	€ 607 million
ROM Tonnes	173.7 million	173.7 million
Average plant tonnage feed rate	800 tph	800 tph
K2O grade	10.5%	10.5%
KCL recovery	91%	91%
LOM MOP production <sup>4</sup> in tonnes	27.5 million	27.5 million
LOM MOP Potash prices <sup>4</sup>	€449/t	€440/t
Foreign exchange Euro:USD	1:1.07	1:1.12
De-Icing salt production	8.5 Mt	8.5 Mt
Vacuum salt production	15.9 Mt	15.9 Mt
C1 cost (€/t)		
Mining	43	39
Processing incl. Waste and backfilling	75	66
Environmental and G&A	11	11
Sustaining capex	10	6
Salt by-product credit	(47)	(46)
Total (at mine gate)	€91/t	€76/t
Tax rate (Navarra)	28%	28%
Life of mine <sup>4</sup>	30	30
NPV <sub>8</sub>	€ 1.82 billion	€ 1.89 billion

<sup>4</sup> *Cautionary Statement. The production target set out in this update is derived from Muga Proved and Probable Ore Reserves and Inferred Mineral Resources from the Muga-Vipasca tenement as well as the Exploration Target at the Vipasca and Muga Sur tenements. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical and financial parameters underpinning the target in the market announcement dated 23 November 2021 continue to apply and have not materially changed.*



NPV <sub>8</sub>	US\$ 1.94 billion	US\$ 2.12 billion
IRR	21%	25%

The largest impact on the NPV has been the change in exchange rate from 2021 (offsetting the increase in energy costs) as can be seen in Table 4 below:

**TABLE 4: NPV AND IRR COMPARISON**

Improvements	NPV <sub>8</sub> (€ billion)	IRR (%)
<b>2021 ASX Model</b>	<b>1.89</b>	<b>25%</b>
Energy costs	-0.14	-3%
Mine equipment cost	-0.06	-1%
Potash Price	0.05	0%
Foreign exchange	0.17	1%
Inflation cost	-0.03	0%
Costs/others	-0.06	-1%
<b>2022 ASX Model</b>	<b>1.82</b>	<b>21%</b>

## Market pricing assumptions

Since December 2021, the tightness in the potash market has continued with sanctions on Belarus and the war in the Ukraine further impacting supply from Belarus and Russia. The result of this has seen prices for Muriate of Potash continue to rise with European-delivered spot prices currently reaching €875/t and the current Brazil-delivered spot price reaching US\$700/t, which compares to an average price of €449/t used in this feasibility study over the life of mine. The potash prices used in the financial modelling have therefore been updated and are now based on the last released March 2022 forecasts from the independent research company CRU Group (“CRU”). The potash price forecasts in the model remain similar to those used in 2021 (€449/t vs €440/t) given that the long-term fundamentals of the market have not significantly changed. The potash price forecasts also include the effect of updating foreign exchange rates to reflect current levels, as potash price forecasts are expressed in US dollars.

In line with other commodities, salt prices have seen a significant increase in 2022. However, to remain conservative, the salt by-product credit is based on the same forecast as in 2021. The forecast used is the most recent one from Argus Media and continues to reflect the commercial production of vacuum salt as well as de-icing salt. The mine gate sales price is €36/tonne for de-icing salt and €55/tonne for vacuum salt.

The destination sales strategy is based on the assumption that 50% of the total Phase 1 and 2 production is to be sold into local and regional markets with a further 25% sold into northern European markets and the remaining 25% to export markets. This has not changed from the strategies proposed in 2021 and 2019 (refer ASX, 14 October 2019, “Quarterly Activities Report and Appendix 5B”), and in the clarification document published in November 2019 (refer ASX, 21 November 2019, “Further Clarification – Muga Project”).



## Approval assumptions

The Company announced that it had been granted the construction licence for the construction of the Mine's mine gate and declines from the Townhall of Undués de Lerda in Aragon on 24 June 2022 (refer ASX, "Construction Licence Granted Muga Mine Gate and Declines"). This licence followed the receipt of the mining concession permit as reported in an announcement on 5 July 2021 (refer ASX, "Muga Project Receives Mining Concession"). This permit followed the positive environmental permit announced in June 2019 (refer ASX, "Muga Project Receives Positive Environmental Permit") and concluded the Government permitting process.

The Company is now awaiting the construction licence from the Townhall of Sangüesa in the province of Navarra for the construction of the Muga process plant.

## Financial Sensitivity Analysis

The Company has run sensitivity analysis on the key Project parameters which have the potential to have a significant impact on the projected returns. This analysis indicates that the projected returns for the Project are most sensitive to changes in the received potash price. The financial results use an MOP price forecast based on CRU Group's first half 2022 dataset. The sensitivity analysis indicates that even in the downside scenario of a fall of 20% in received potash prices the Project would still deliver a post-tax NPV<sub>8</sub> of €1.2 billion and an IRR of 17%.

The Company has also run a sensitivity using current, November 2022, spot prices on a flat real basis. The sensitivity analysis indicates that at current prices the Project would deliver a post-tax NPV<sub>8</sub> of €3.1 billion and an IRR of 42%.

The Company has run a financial analysis considering the scenario if the Exploration Target and the Muga Inferred Resource tonnes were deleted from the projected forecasts. This scenario yields an NPV<sub>8</sub> of €1 billion, although the Company considers that a better reflection of the impact is a range of €1.0 billion to €1.3 billion and an IRR of 20%.

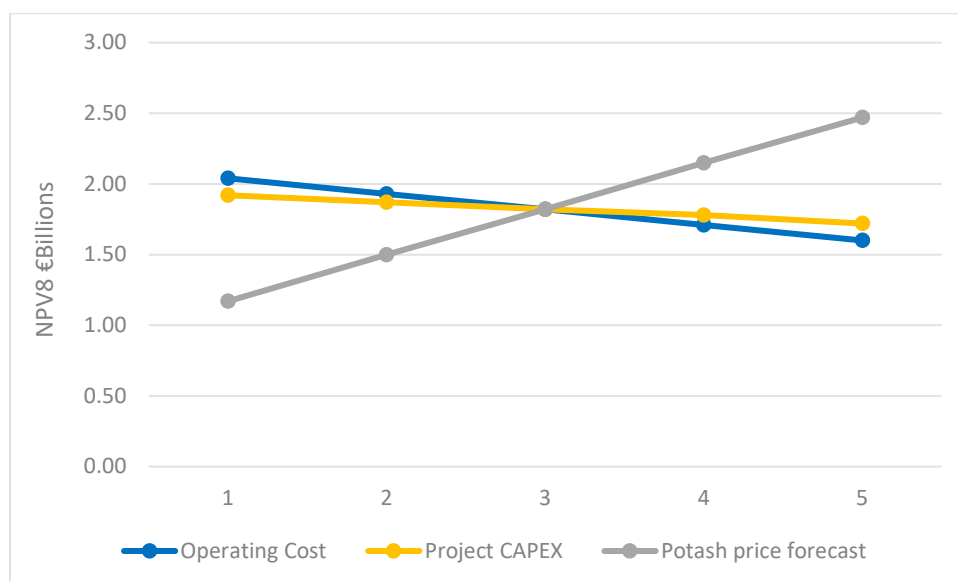
The Company has run financial sensitivity analysis to determine the impact of changes to the NPV<sub>8</sub> and IRR of the Project due to fluctuations of the operating cost, Project CAPEX and the potash price forecast. These can be seen in Tables 5 and 6 and Graph 3 below.

**TABLE 5: SENSITIVITY ANALYSIS IMPACT ON NPV<sub>8</sub>**

		NPV <sub>8</sub> (€ billion) output				
		-20%	-10%	Base	10%	20%
Sensitivity analysis	Operating Cost	2.04	1.93	1.82	1.71	1.60
	Project CAPEX	1.92	1.87	1.82	1.78	1.72
	Potash price forecast	1.17	1.50	1.82	2.15	2.47



**GRAPH 3: SENSITIVITY ANALYSIS IMPACT ON NPV<sub>8</sub>**



**TABLE 6: SENSITIVITY ANALYSIS IMPACT ON IRR**

		IRR %				
		-20%	-10%	Base	10%	20%
Sensitivity analysis	Operating Cost	23%	22%	21%	20%	19%
	Project CAPEX	24%	22%	21%	20%	19%
	Potash price forecast	17%	19%	21%	23%	25%

## Key Risks

Key risks identified in this document include:

- Future conversion of additional Resources (including Inferred) and the Exploration target into Ore Reserves;
- Adverse movement in key capital costs price;
- Adverse movement in key operating costs;
- Results of future detailed engineering can be uncertain; and
- Project funding.

-ENDS-

This announcement has been authorised for release by the Directors of Highfield Resources Limited

For more information:

**Highfield Resources**

ACN 153 918 257

ASX: HFR

[www.highfieldresources.com.au](http://www.highfieldresources.com.au)

# ASX ANNOUNCEMENT



## **Highfield Resources Limited**

Ignacio Salazar – Chief Executive Officer

Ph: +34 948 050 577

Olivier Vadillo - Investor Relations

Ph: +34 609 811 257

## **Australia based queries:**

Alex Cowie – NWR Communications – Director

Ph: +61 (0) 412 952 610

**Highfield Resources**

ACN 153 918 257

ASX: HFR

[www.highfieldresources.com.au](http://www.highfieldresources.com.au)



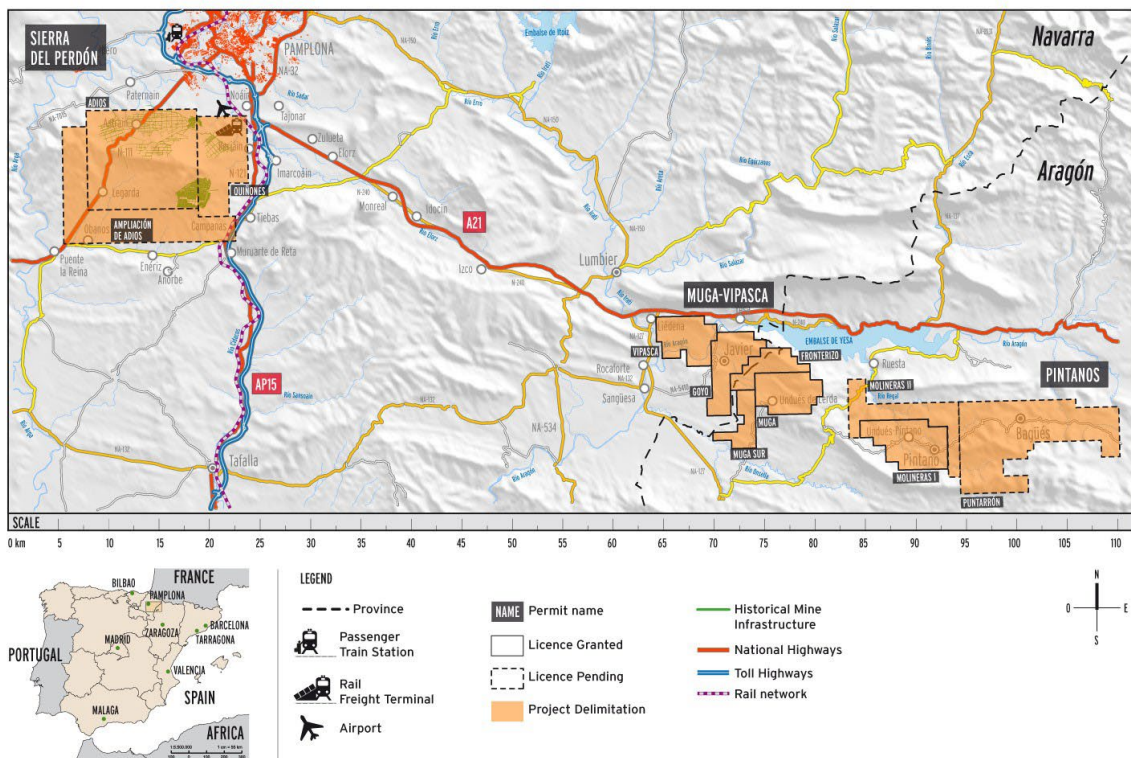
## About Highfield Resources

Highfield Resources is an ASX listed potash company which is focussing on the construction of its flagship low cost, low capex Muga Project in Spain having been granted the Mining Concession in July 2021 and the construction licence in Aragón in June 2022. Initial site works for the construction of the Muga mine gate and the two underground declines commenced shortly thereafter.

Muga is a unique project – with shallow mineralization with no aquifers above it there is no need to build a shaft. There is quality and readily accessible infrastructure already in place in the region and importantly, the Muga Project is located in the heart of a European agricultural region which has a clear deficit in potash supply. In addition to its secure southern European location, since February 2022 events in Russia and Belarus have increased the awareness of the strategic value of the Muga project for both Spain and the European Union.

Highfield’s potash tenements (Muga-Vipasca, Pintanos, and Sierra del Perdón) are located in the Ebro potash producing basin in Northern Spain, covering an area of around 250km<sup>2</sup>.

**FIGURE 5: LOCATION OF MUGA-VIPASCA, PINTANOS, AND SIERRA DEL PERDÓN TENEMENT AREAS IN NORTHERN SPAIN.**





## COMPETENT PERSONS STATEMENT FOR MUGA ORE RESERVES AND MUGA MINERAL RESOURCES

This update was prepared by Mr. Ignacio Salazar Director of Highfield Resources. The information in this update that relates to Ore Reserves is based on information prepared under the direction of Dr Mike Armitage, a Corporate Consultant with SRK Consulting (UK) Limited. Dr. Mike Armitage CEng, CGeol. is the Competent Person who assumes overall professional responsibility for the reported Ore Reserve. The information related with the review of the Life of Mine (“LOM”) that underpins the Ore Reserves has been prepared by Mr Chris Bray, who is a full-time employee of and Principal Consultant (Mining) at SRK. The information in this update that relates to Mineral Resources is based on information prepared by Ms Anna Fardell, a Senior Consultant at SRK Consulting (UK) Limited.

Dr Mike Armitage is a Member the Institute of Materials, Metals and Mining (“IMMM”) which is a ‘Recognised Overseas Professional Organisation’ (“ROPO”) included in a list promulgated by the Australian Stock Exchange (“ASX”) from time to time. Dr. Mike Armitage has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the ‘Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves’. Dr. Mike Armitage consents to the inclusion in this update of the matters based on this information in the form and context in which it appears.

Mr Chris Bray BEng, MAusIMM (CP) is taking responsibility for the review of the LOM plan, as reported by the Company. Mr Bray is a full-time employee and Principal Consultant (Mining) at SRK. He is a Member of and Chartered Professional in the Australasian Institute of Mining and Metallurgy. He is a Mining Engineer with 25 years’ experience in the mining and metals industry, including operational experience in underground mines as well as mine planning and review experience on underground potash, salt, lithium and borate projects, and as such qualifies as a CP as defined in the JORC Code. He has also been involved in the reporting of Ore Reserves on various properties internationally for over 10 years.

Ms Anna Fardell is a Senior Resource Geologist employed by SRK, and has over five years’ experience in estimating and reporting Mineral Resources relevant to the style of mineralisation and type of deposit described herein. Ms Fardell is a registered member of the Australian Institute of Geoscientists (6555) and considered a Competent Person (CP) under the definitions and standards described in the JORC Code 2012. Ms Fardell takes responsibility for the Mineral Resource Statement and Exploration Target presented here.

Ms Anna Fardell consents to the inclusion in this update of the matters based on their information in the form and context in which it appears.





## APPENDIX 1

### ORE RESERVES, RESOURCES AND EXPLORATION TARGET

The information in this release referring to the mine plan or mining activities, as defined by the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (“JORC Code”), is derived from Ore Reserve Estimate and Exploration Target related to Muga announced 23 November 2021 (refer ASX, “Updated Ore Reserve Estimate – Muga Project”) and the Mineral Resource statement related to Muga announced on 30 March 2021 (refer ASX, “Annual Report to the stakeholders”). The estimated Ore Reserves and Mineral Resources underpinning the production target have been reported by competent persons in accordance with the requirements of the JORC Code. The relevant Competent Persons’ statements are shown at the end of this ASX announcement.

#### Mineral Resource Estimate

*Cautionary Statement. The production target set out in this update is derived from Proved and Probable Ore Reserves and Measured, Indicated and Inferred Mineral Resources from the Muga tenement as well as the Exploration Target at the Vipasca and Muga Sur tenements. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical parameters underpinning the Mineral Resource in the market announcement dated 30 March 2021 (refer ASX announcement, “Annual report to Shareholders”) continue to apply and have not materially changed.*

The updated Mineral Resource Statement for the Project as authored by SRK (refer ASX announcement 30 March 2021, “Annual report to Shareholders”) has not changed materially from the previous statement released in October 2018. The Mineral Resource tonnage has increased by 14.91 Mt to 282.26 Mt and the grade of the Mineral Resource has decreased from 12.4% K<sub>2</sub>O to 11.8% K<sub>2</sub>O. The reasons for the decrease in grade and additional tonnage are:

- New drilling in the Vipasca Licence area has added new areas to the Mineral Resource.
- Lower grade mineralisation was intersected at Vipasca than previously in the Muga Licence area.
- The new thickness interpolation has decreased the thicknesses of the potash horizons at the edges of the basin which has decreased the tonnage in the Muga Licence area slightly.
- The lower grade intercepts in Vipasca have influence the grades at the western edge of the Muga Licence which has decreased the block model grades at the western edge of that licence.



The Mineral Resource Statement shows that the tonnage in the Muga Licence area is 12.1% K<sub>2</sub>O as opposed to the Vipasca Licence area where the average grade is 10.0% K<sub>2</sub>O.

The total Measured and Indicated Mineral Resource has increased by 2.58 Mt and decreased in grade by 0.3% K<sub>2</sub>O which SRK does not expect to have any material impact on the mine plan. The Inferred Mineral Resource has increased in tonnage from 32.6 Mt to 44.93 Mt and decreased in grade from 12.9% to 10.8% K<sub>2</sub>O. This is due to the low-grade mineralisation added in the Vipasca Licence area which has been predominantly classified as Inferred.

**TABLE 7: MUGA POTASH PROJECT DEPOSIT MINERAL RESOURCE ESTIMATE RELEASED ON MARCH 2021 AND COMPARED TO MINERAL RESOURCE ESTIMATE OF OCTOBER 2018 NOW SUPERSEDED.**

	31 December 2020		31 December 2019	
	Tonnes In Place (Mt)	Grade K <sub>2</sub> O (%)	Tonnes In Place (Mt)	Grade K <sub>2</sub> O (%)
Measured	103.2	12.3%	91.8	12.4%
Indicated	134.1	11.7%	143.0	12.1%
<b>Total Measured &amp; Indicated</b>	<b>237.3</b>	<b>12.0%</b>	<b>234.8</b>	<b>12.3%</b>
Inferred	44.9	10.8%	32.6	12.9%
<b>Total</b>	<b>282.2</b>	<b>11.8%</b>	<b>267.4</b>	<b>12.4%</b>

The Company confirms that it is not aware of any new information or data that materially affects the information included in this market announcement and that all material assumptions and technical parameters underpinning the estimates with regards to exploration results in the ASX announcement released on 30 March 2021 continue to apply and have not materially changed.

In order to report Mineral Resources in accordance with the JORC Code, it must be demonstrated that the mineralisation has the potential for eventual economic extraction. The upper horizons, P0 to PB are likely to be mined in a continuous sequence in the central part of the Muga Basin as there is very little interburden between them. In this instance the minimum thickness of the total unit P0, PA and PB has been assessed to ensure thinner central horizons are not excluded. A minimum thickness of 1.7 m has been applied to this combined package of horizons. In other areas where the horizons separate and cannot be mined together a minimum mining thickness of 1.5 m has been applied on the assumption the proposed equipment can be selective to 1.7 m.

A minimum thickness of 1.5 m was also applied to the P1, P2 and P4 potash horizons in order to constrain the Mineral Resources.

In addition, a cut-off calculation was derived to support limiting the Mineral Resource reporting of material above 8% K<sub>2</sub>O. Specifically, the horizons were visually assessed to delineate contiguous areas above cut-off and ensure they were still mining targets. It is assumed at this stage that the high levels of MgO seen in horizon PA could be managed through blending with adjacent horizons.

The cut-off grade was derived using technical and economic parameters provided by the Company. SRK reviewed the input parameters and the cut-off grade calculation, alongside the technical



reasoning behind the proposed production scenario, as well as the sensitivity of the cut-off grade to operating costs and a contingency and was satisfied that these are appropriate for the purposes of reporting Mineral Resources. SRK notes that the cut-off grade derived is considerably lower than the 8% applied. However, SRK deems a high cut-off grade appropriate as the processing recovery used in the calculation is not variable and applies to the average grade of the deposit. There is no testwork available to support processing recoveries of 95% for grades lower than 8% K<sub>2</sub>O and therefore SRK considers it appropriate to apply this limit to the Resources reported herein.

The SRK Mineral Resource Statement is shown in Table 8. The extents of the Mineral Resource occur between 180 m and 1,400 m below surface and it is contained entirely within the Investigation and Mining Permits held by the Company. The Mineral Resources have been presented according to licence area. The Mineral Resource Statement is valid as at 31 August 2020 and is based on the information available at that time.



**TABLE 8: AUDITED SRK MINERAL RESOURCE STATEMENT FOR THE MUGA-VIPASCA POTASH DEPOSIT EFFECTIVE DATE 31 AUGUST 2020**

Classification	Area	Horizon	Density (g/cm <sup>3</sup> )	Tonnage (Mt)	%K <sub>2</sub> O	%MgO	%Na <sub>2</sub> O	% Insolubles	True Thickness (m)	
Measured	Muga	P0	2.1	10.18	9.8	0.2	25.9	23.3	2.0	
		PA	2.0	17.81	11.7	0.8	24.2	20.3	1.7	
		PB	2.1	38.07	12.9	0.2	26.9	19	3.5	
		P1	2.2	20.53	12.5	0.1	31.5	17.1	2.8	
		P2	2.2	16.6	12.9	0.1	24.3	13.4	3.0	
Sub-total Measured			2.1	103.19	12.3	0.3	26.8	18.4		
Indicated	Muga	P0	2.1	34.47	10.1	0.5	27.7	28.5	4.1	
		PA	1.9	19.43	12.4	2	22.8	20.8	2.0	
		PB	2.1	17.69	11.8	0.4	27.4	20.6	1.6	
		P1	2.2	34.22	12.8	0.1	30.7	17.1	5.6	
		P2	2.2	11.72	12.9	0.1	26	14	3.4	
	Sub-total			2.1	117.53	11.8	0.6	27.5	21.3	
	Vipasca	P1	2.2	5.75	10.7	0.1	30	17.9	1.8	
		P2	2.2	10.86	11.2	0	31.1	18.7	2.8	
		Sub-total			2.2	16.61	11	0	30.7	18.4
	Sub-total Indicated			2.1	134.14	11.7	0.5	27.9	20.9	
Measured + Indicated	Muga	P0	2.1	44.65	10	0.4	27.3	27.3	3.6	
		PA	1.9	37.24	12.1	1.4	23.5	20.6	1.9	
		PB	2.1	55.76	12.6	0.3	27.1	19.5	2.9	
		P1	2.2	54.75	12.7	0.1	31	17.1	4.6	
		P2	2.2	28.32	12.9	0.1	25	13.6	3.2	
	Sub-total			2.1	220.72	12.0	0.4	27.2	19.9	
	Vipasca	P1	2.2	5.75	10.7	0.1	30	17.9	1.8	
P2		2.2	10.86	11.2	0	31.1	18.7	2.8		
Sub-total			2.2	16.61	11	0	30.7	18.4		
Sub-total Measured + Indicated			2.1	237.33	12.0	0.4	27.5	19.8		
Inferred	Muga	P0	2.1	0.3	9.9	0.4	28.3	28.4	2.6	
		PA	1.9	0.16	11.8	2.4	24.3	21.8	1.2	
		P1	2.2	1.75	12.4	0.1	29.5	15.7	5.0	
		P2	2.2	6.02	13.1	0.1	27.5	15.3	3.0	
		P4	2.2	7.55	13.7	0.2	31.7	17.1	2.1	
	Sub-total			2.2	15.78	13.2	0.2	29.7	16.5	
	Vipasca	P0	2.1	10.43	8.9	0.1	26.1	30.6	2.9	
		PA	2.1	4.2	9.4	0.1	27	27.6	1.6	
		PB	2.1	3.79	8.4	0	29.2	25.2	1.7	
		P1	2.2	2.37	9.5	0	29.4	19.3	2.8	
		P2	2.2	8.36	10.5	0	31.2	19.6	5.6	
		Sub-total			2.1	29.15	9.4	0.1	28.4	25.4
	Sub-total Inferred			2.2	44.93	10.8	0.1	28.8	22.3	
Grand Total	Muga	P0	2.1	44.95	10	0.4	27.3	27.3	3.6	
		PA	1.9	37.4	12.1	1.4	23.5	20.6	1.9	
		PB	2.1	55.76	12.6	0.3	27.1	19.5	2.9	
		P1	2.2	56.5	12.7	0.1	31	17.1	4.6	
		P2	2.2	34.34	12.9	0.1	25.4	13.9	3.1	
	Sub-total			2.1	236.5	12.1	0.4	27.4	19.7	
	Vipasca	P0	2.1	10.43	8.9	0.1	26.1	30.6	2.9	
		PA	2.1	4.2	9.4	0.1	27	27.6	1.6	
		PB	2.1	3.79	8.4	0	29.2	25.2	1.7	
		P1	2.2	8.12	10.3	0.1	29.8	18.3	1.9	
		P2	2.2	19.22	10.9	0	31.1	19.1	3.1	
		Sub-total			2.2	45.76	10	0	29.2	22.9
	<b>Total</b>			<b>2.1</b>	<b>282.26</b>	<b>11.8</b>	<b>0.4</b>	<b>27.7</b>	<b>20.2</b>	

\*Reported above a cut-off grade of 8% K<sub>2</sub>O and a minimum mining thickness (where horizons will be mined separately) of 1.5m

\*Insolubles refers to clays, gypsum and sulphates

\*Numbers have been rounded to reflect the relative level of accuracy and as such totals may include rounding discrepancies

## Ore Reserve Estimate

The updated Ore Reserve Statement prepared by Highfield, and reviewed by SRK, is presented in Table 9 below. The Proved and Probable Ore Reserve have been derived from the Measured and Indicated Mineral Resource of 237.3 Mt at 12.0% Potassium Oxide (“K<sub>2</sub>O”, potash) as previously reported and which is valid as at 31 August 2020 and comprises 104.3 million tonnes at 10.2% Potassium Oxide



("K<sub>2</sub>O", potash), with a Proved Ore Reserve of 45.3 million tonnes at 10.5% K<sub>2</sub>O and a Probable Ore Reserve of 58.9 million tonnes at 10.0% K<sub>2</sub>O.

The audited Ore Reserve Statement has been reported in accordance with the terminology and guidelines of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves ("JORC Code"). The Ore Reserve is presented in terms of plant feed and inclusive of losses and dilution incurred during mining and is a sub-set of, and not additive to, the most recent Mineral Resource estimate from which it was derived.

The Company confirms that it is not aware of any new information or data that materially affects the information included in this market announcement and that all material assumptions and technical parameters underpinning the estimates with regards to exploration results in the ASX announcement released on 23 November 2021 continue to apply and have not materially changed.

**TABLE 9: AUDITED SRK ORE RESERVE STATEMENT FOR THE MUGA POTASH PROJECT DEPOSIT EFFECTIVE DATE 31 OCTOBER 2021**

Ore Reserve Classification	Tonnage	%K <sub>2</sub> O	%MgO	%KCl
	(Mt)			
Proved Reserve	45.3	10.5%	0.3%	16.6%
Probable Reserve	59.0	10.0%	0.6%	15.8%
<b>Total Ore Reserve (Proved + Probable)</b>	<b>104.3</b>	<b>10.2%</b>	<b>0.5%</b>	<b>16.1%</b>

\* Additional notes to consider for the purposes of the Ore Reserve statement are as follows:

1. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, SRK does not consider them to be material. The Concession is wholly owned by and exploration is operated by Geocalci S.L.U., the wholly owned Spanish subsidiary of Highfield Resources.
2. The standard adopted in respect of the reporting of Ore Reserves for the Project, following the completion of required technical studies, is the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.
3. SRK reasonably expects the Muga deposit to be amenable to a variety of underground mining methods for the shallow and inclined potash seams. Ore Reserves are reported at an 8% K<sub>2</sub>O cut-off which is based on potash price assumptions, metallurgical recovery assumptions from initial testwork, mining costs, processing costs, general and administrative (G&A) costs, and other factors.
4. SRK notes that the Reserve Tonnes are reported as wet tonnes with a low moisture content of 0.8%.



## Ore Reserve Estimate

The updated Ore Reserve Statement prepared by Highfield, and reviewed by SRK, is presented in Table 10 below. The Proved and Probable Ore Reserve have been derived from the Measured and Indicated Mineral Resource of 237.3 Mt at 12.0% Potassium Oxide (“K<sub>2</sub>O”, potash) as previously reported and which is valid as at 31 August 2020 and comprises 104.3 million tonnes at 10.2% Potassium Oxide (“K<sub>2</sub>O”, potash), with a Proved Ore Reserve of 45.3 million tonnes at 10.5% K<sub>2</sub>O and a Probable Ore Reserve of 58.9 million tonnes at 10.0% K<sub>2</sub>O.

The audited Ore Reserve Statement has been reported in accordance with the terminology and guidelines of the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (“JORC Code”). The Ore Reserve is presented in terms of plant feed and inclusive of losses and dilution incurred during mining and is a sub-set of, and not additive to, the most recent Mineral Resource estimate from which it was derived.

The Company confirms that it is not aware of any new information or data that materially affects the information included in this market announcement and that all material assumptions and technical parameters underpinning the estimates with regards to exploration results in the ASX announcement released on 23 November 2021 continue to apply and have not materially changed.

**TABLE 10: AUDITED SRK ORE RESERVE STATEMENT FOR THE MUGA POTASH PROJECT DEPOSIT EFFECTIVE DATE 31 OCTOBER 2021**

Ore Reserve Classification	Tonnage	%K <sub>2</sub> O	%MgO	%KCl
	(Mt)			
Proved Reserve	45.3	10.5%	0.3%	16.6%
Probable Reserve	59.0	10.0%	0.6%	15.8%
<b>Total Ore Reserve (Proved + Probable)</b>	<b>104.3</b>	<b>10.2%</b>	<b>0.5%</b>	<b>16.1%</b>

\* Additional notes to consider for the purposes of the Ore Reserve statement are as follows:

5. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive sub-totals, totals and weighted averages. Such calculations inherently involve a degree of rounding and consequently introduce a margin of error. Where these occur, SRK does not consider them to be material. The Concession is wholly owned by and exploration is operated by Geocalcali S.L.U., the wholly owned Spanish subsidiary of Highfield Resources.
6. The standard adopted in respect of the reporting of Ore Reserves for the Project, following the completion of required technical studies, is the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves.
7. SRK reasonably expects the Muga deposit to be amenable to a variety of underground mining methods for the shallow and inclined potash seams. Ore Reserves are reported at an 8% K<sub>2</sub>O cut-off which is based on potash price assumptions, metallurgical recovery assumptions from initial testwork, mining costs, processing costs, general and administrative (G&A) costs, and other factors.
8. SRK notes that the Reserve Tonnes are reported as wet tonnes with a low moisture content of 0.8%.



## **Ore Reserve assumptions**

The updated Ore Reserve, effective date 31 October 2021, has been prepared by the Company and reflects the results of recent mine planning based on the revised geological model and updated MRE, effective date 31 August 2020; and further advances in the project design and cost estimation.

The approach, and the assumptions made, for the purpose of the Ore Reserve estimate are summarised in the following sections.

## **Ore Reserve cut-off grade approach**

The cut-off grade utilised to report the Ore Reserve is 8% K<sub>2</sub>O. SRK has verified the input parameters and the cut-off grade calculation together with the technical justification behind the production scenario proposed by Highfield. SRK also assessed the sensitivity of the Project economics to capital costs, operating costs and commodity prices with additional contingencies applied to test the robustness of the project economics. The Company and SRK are confident that the Ore Reserve has been reported in accordance with the JORC Code guidelines and is economically viable based on current forecast commodity prices.

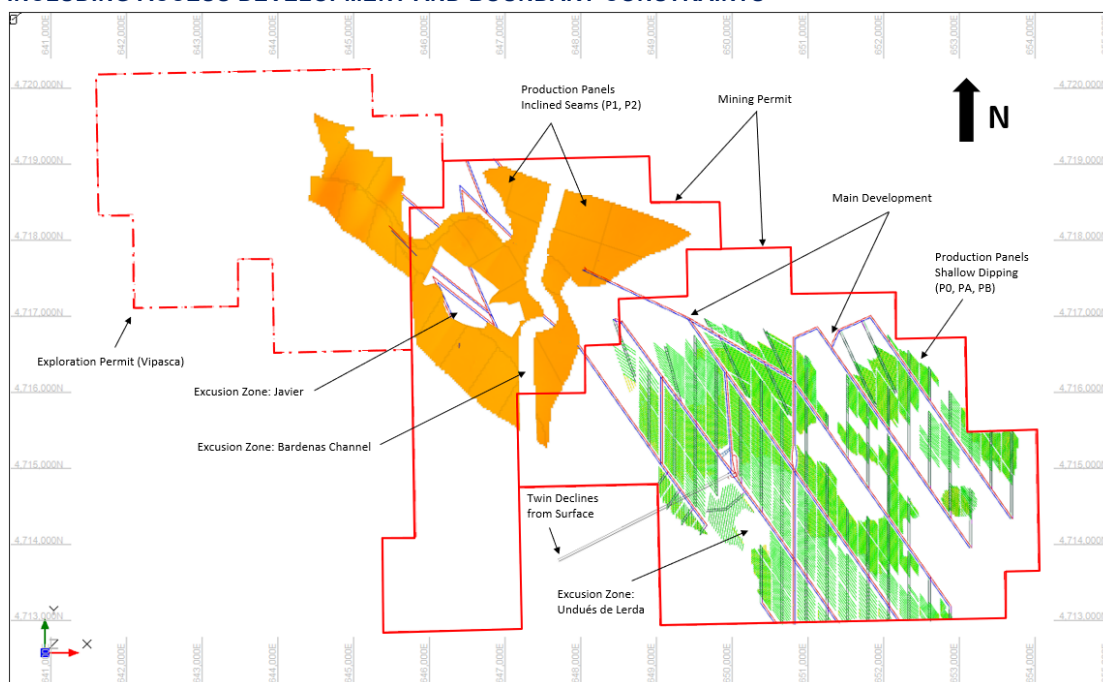
## **Mining method approach**

The revised mine plan, used as the basis for the Ore Reserve estimate, was developed by Highfield with technical mine planning support from IGAN and based on panel rib pillar guidance by SRK (following the methodology and modifying factors based on the Muga Project Update statement of 22 January 2019). The revised approach considers mining of shallow dipping seams referred to as P0, PA, and PB (the “shallow dipping seams”) and inclined seams referred to as P1 and P2 (the “inclined seams”), as shown in Figure 6. The mineable tonnes are comprised of approximately 66% from the shallow dipping seams and 34% from the inclined seams.

The potash seams are also constrained by a minimum mining height of 2 metres which is consistent with the planned mining equipment. The shallow dipping seams utilise a set of two parallel roadways as the main development access, one for fresh air intake and access and the other for exhaust ventilation and both with conveyor belt materials handling system. The mining method approach is a typical Room and Pillar (“R&P”) panel layout. The room width is specified at 8 metres and the height and pillar size is determined by the total combined seam thickness, geotechnical constraints due to depth below surface and/or any equipment limitations.



**FIGURE 6: PLAN VIEW OF REVISED ORE RESERVE ESTIMATION MUGA-VIPASCA MINING PANELS INCLUDING ACCESS DEVELOPMENT AND BOUNDARY CONSTRAINTS**



The more steeply inclined potash seams in the north west of the deposit required an alternative mining approach to the R&P panel layout used for the shallow dipping seams, to minimise dilution and maximise extraction, taking into consideration the geotechnical constraints and equipment limitations. An adaptation of the existing R&P method was considered for developing a practically achievable inclination for the roadways and mining rooms while maintaining the same production targets and utilising the same excavation, material handling and backfill approach.

The mine design includes a primary twin decline access at a maximum apparent dip of 15%. The revised mine plan also incorporates the requirements of the environmental and mining approval process, particularly related to subsidence controls and exclusion zones around towns, infrastructure and objects of significant cultural importance.

## Processing

The detailed economic analysis supporting reasonable prospects for eventual economic extraction of the Mineral Resource assumes processing with conventional crushing, flotation and crystallisation.

The proposed beneficiation process consists of a hybrid of two conventional beneficiation processes for sylvinitic ores, namely froth flotation and dissolution/crystallisation. Flotation is applied to the coarse fraction of the feed ore after crushing, and dissolution/crystallisation, which produces a higher quality product, is applied to fines and intermediate fractions to achieve an overall optimum level of recovery. Sufficient testwork has been conducted to support the development of the flowsheet. For the purpose of the Ore Reserve estimate 91% KCl average recovery is used, as validated by the metallurgical testwork.

The process design resulting of the testwork carried out at the Saskatchewan Research Centre (“SRC”) laboratories in Canada in 2018 has been optimised with minor updates to improve the robustness of





the process and included the production of vacuum salt as a by-product to reduce surface tailings storage.

## Capex

The capex estimate is comprehensive and confirmed in 2019 by Micon International Company Ltd. (“Micon”) to be superior to typical estimates at this stage of a project’s development. Allowances have been made for the full mining fleet to extract ore over the life of mine including refurbishment and replacement costs, ground support, conveying systems for ore and backfill operations, ventilation systems and other materials to support mining development. The process plant capex estimate has been calculated utilising the equipment purchase contracts. The Company has already signed purchase contracts for 85% of the process plant equipment (refer ASX 21 September 2021, “Purchase Contract Signed for Process Plant Equipment”) giving a high degree of confidence in the capex estimate.

## Sales and marketing

The product sales assumptions and forecast pricing used to support the ORE are also the same as used by the Company in the Muga Project Update statement of 15 October 2018 (refer ASX, “Muga Project Update”). This approach assumes that 100% of the first phase of production is assumed to be sold into local and regional markets and for the second phase, a conservative approach has been adopted which considers 25% of product is sold into northern European markets and 25% to export markets. Forecast Potash prices are based on Commodity Resource Unit (“CRU”) second half 2021 dataset. The forecast prices considered in the financial model for southern Europe price for 2021 range from €360-390/tonne of potash.

A flat €16.4/tonne for transport of potash product to the ‘point of sale’ has been applied in the economic assessment.

The mine gate sales price of €36/tonne for de-icing salt and the mine gate sales price of €55/tonne for vacuum salt have been applied based on Argus Media’s most recent prices.

## Social and environmental considerations

In addition to the statutory consultation required as part of the environmental approval process, the Company has implemented a comprehensive stakeholder engagement programme. This is based on a strategy that includes regular meetings with community leaders, community groups and an actively managed project website.

A range of environmental factors have been considered for the development of the Ore Reserve estimate. These include groundwater assessments, surface water management infrastructure, waste management, environmental controls around the temporary waste storage area and mining exclusion zones around surface infrastructure to mitigate against potential subsidence.

The Ore Reserve statement as included herein is materially compliant with the JORC Code guidelines effective October 31, 2021. In accordance with additional reporting requirements of the latest version of the JORC Code (2012), SRK’s review report includes an Appendix comprising the JORC checklist tables which include additional details and commentary on “Section 1 - Sampling Techniques and Data”, “Section 2 Reporting of Exploration Results”, “Section 3 - Estimation and Reporting of Mineral



Resources” and “Section 4 - Estimation and Reporting of Ore Reserves”. These tables are also appended to this press release.

## Mineral Resource Estimate

*Cautionary Statement. The production target set out in this update is derived from Proved and Probable Ore Reserves and Measured, Indicated and Inferred Mineral Resources from the Muga tenement as well as the Exploration Target at the Vipasca and Muga Sur tenements. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical parameters underpinning the Mineral Resource in the market announcement dated 30 March 2021 (refer ASX announcement, “Annual report to Shareholders”) continue to apply and have not materially changed.*

The updated Mineral Resource Statement for the Project as authored by SRK (refer ASX announcement 30 March 2021, “Annual report to Shareholders”) has not changed materially from the previous statement released in October 2018. The Mineral Resource tonnage has increased by 14.91 Mt to 282.26 Mt and the grade of the Mineral Resource has decreased from 12.4% K<sub>2</sub>O to 11.8% K<sub>2</sub>O. The reasons for the decrease in grade and additional tonnage are:

- New drilling in the Vipasca Licence area has added new areas to the Mineral Resource.
- Lower grade mineralisation was intersected at Vipasca than previously in the Muga Licence area.
- The new thickness interpolation has decreased the thicknesses of the potash horizons at the edges of the basin which has decreased the tonnage in the Muga Licence area slightly.
- The lower grade intercepts in Vipasca have influenced the grades at the western edge of the Muga Licence which has decreased the block model grades at the western edge of that licence.

The Mineral Resource Statement shows that the tonnage in the Muga Licence area is 12.1% K<sub>2</sub>O as opposed to the Vipasca Licence area where the average grade is 10.0% K<sub>2</sub>O.

The total Measured and Indicated Mineral Resource has increased by 2.58 Mt and decreased in grade by 0.3% K<sub>2</sub>O which SRK does not expect to have any material impact on the mine plan. The Inferred Mineral Resource has increased in tonnage from 32.6 Mt to 44.93 Mt and decreased in grade from 12.9% to 10.8% K<sub>2</sub>O. This is due to the low-grade mineralisation added in the Vipasca Licence area which has been predominantly classified as Inferred.



**TABLE 11: MUGA POTASH PROJECT DEPOSIT MINERAL RESOURCE ESTIMATE RELEASED ON MARCH 2021 AND COMPARED TO MINERAL RESOURCE ESTIMATE OF OCTOBER 2018 NOW SUPERSEDED.**

	31 December 2020		31 December 2019	
	Tonnes In Place (Mt)	Grade K <sub>2</sub> O (%)	Tonnes In Place (Mt)	Grade K <sub>2</sub> O (%)
Measured	103.2	12.3%	91.8	12.4%
Indicated	134.1	11.7%	143.0	12.1%
<b>Total Measured &amp; Indicated</b>	<b>237.3</b>	<b>12.0%</b>	<b>234.8</b>	<b>12.3%</b>
Inferred	44.9	10.8%	32.6	12.9%
<b>Total</b>	<b>282.2</b>	<b>11.8%</b>	<b>267.4</b>	<b>12.4%</b>

The Company confirms that it is not aware of any new information or data that materially affects the information included in this market announcement and that all material assumptions and technical parameters underpinning the estimates with regards to exploration results in the ASX announcement released on 30 March 2021 continue to apply and have not materially changed.

In order to report Mineral Resources in accordance with the JORC Code, it must be demonstrated that the mineralisation has the potential for eventual economic extraction. The upper horizons, P0 to PB are likely to be mined in a continuous sequence in the central part of the Muga Basin as there is very little interburden between them. In this instance the minimum thickness of the total unit P0, PA and PB has been assessed to ensure thinner central horizons are not excluded. A minimum thickness of 1.7 m has been applied to this combined package of horizons. In other areas where the horizons separate and cannot be mined together a minimum mining thickness of 1.5 m has been applied on the assumption the proposed equipment can be selective to 1.7 m.

A minimum thickness of 1.5 m was also applied to the P1, P2 and P4 potash horizons in order to constrain the Mineral Resources.

In addition, a cut-off calculation was derived to support limiting the Mineral Resource reporting of material above 8% K<sub>2</sub>O. Specifically, the horizons were visually assessed to delineate contiguous areas above cut-off and ensure they were still mining targets. It is assumed at this stage that the high levels of MgO seen in horizon PA could be managed through blending with adjacent horizons.

The cut-off grade was derived using technical and economic parameters provided by the Company. SRK reviewed the input parameters and the cut-off grade calculation, alongside the technical reasoning behind the proposed production scenario, as well as the sensitivity of the cut-off grade to operating costs and a contingency and was satisfied that these are appropriate for the purposes of reporting Mineral Resources. SRK notes that the cut-off grade derived is considerably lower than the 8% applied. However, SRK deems a high cut-off grade appropriate as the processing recovery used in the calculation is not variable and applies to the average grade of the deposit. There is no testwork available to support processing recoveries of 95% for grades lower than 8% K<sub>2</sub>O and therefore SRK considers it appropriate to apply this limit to the Resources reported herein.

# ASX ANNOUNCEMENT



The SRK Mineral Resource Statement is shown in Table 12. The extents of the Mineral Resource occur between 180 m and 1,400 m below surface and it is contained entirely within the Investigation and Mining Permits held by the Company. The Mineral Resources have been presented according to licence area. The Mineral Resource Statement is valid as at 31 August 2020 and is based on the information available at that time.



**TABLE 12: AUDITED SRK MINERAL RESOURCE STATEMENT FOR THE MUGA-VIPASCA POTASH DEPOSIT  
EFFECTIVE DATE 31 AUGUST 2020**

Classification	Area	Horizon	Density (g/cm <sup>3</sup> )	Tonnage (Mt)	%K <sub>2</sub> O	%MgO	%Na <sub>2</sub> O	% Insolubles	True Thickness (m)	
Measured	Muga	P0	2.1	10.18	9.8	0.2	25.9	23.3	2.0	
		PA	2.0	17.81	11.7	0.8	24.2	20.3	1.7	
		PB	2.1	38.07	12.9	0.2	26.9	19	3.5	
		P1	2.2	20.53	12.5	0.1	31.5	17.1	2.8	
		P2	2.2	16.6	12.9	0.1	24.3	13.4	3.0	
Sub-total Measured			2.1	103.19	12.3	0.3	26.8	18.4		
Indicated	Muga	P0	2.1	34.47	10.1	0.5	27.7	28.5	4.1	
		PA	1.9	19.43	12.4	2	22.8	20.8	2.0	
		PB	2.1	17.69	11.8	0.4	27.4	20.6	1.6	
		P1	2.2	34.22	12.8	0.1	30.7	17.1	5.6	
		P2	2.2	11.72	12.9	0.1	26	14	3.4	
	Sub-total			2.1	117.53	11.8	0.6	27.5	21.3	
	Vipasca	P1	2.2	5.75	10.7	0.1	30	17.9	1.8	
		P2	2.2	10.86	11.2	0	31.1	18.7	2.8	
		Sub-total			2.2	16.61	11	0	30.7	18.4
	Sub-total Indicated			2.1	134.14	11.7	0.5	27.9	20.9	
Measured + Indicated	Muga	P0	2.1	44.65	10	0.4	27.3	27.3	3.6	
		PA	1.9	37.24	12.1	1.4	23.5	20.6	1.9	
		PB	2.1	55.76	12.6	0.3	27.1	19.5	2.9	
		P1	2.2	54.75	12.7	0.1	31	17.1	4.6	
		P2	2.2	28.32	12.9	0.1	25	13.6	3.2	
	Sub-total			2.1	220.72	12.0	0.4	27.2	19.9	
	Vipasca	P1	2.2	5.75	10.7	0.1	30	17.9	1.8	
P2		2.2	10.86	11.2	0	31.1	18.7	2.8		
Sub-total			2.2	16.61	11	0	30.7	18.4		
Sub-total Measured + Indicated			2.1	237.33	12.0	0.4	27.5	19.8		
Inferred	Muga	P0	2.1	0.3	9.9	0.4	28.3	28.4	2.6	
		PA	1.9	0.16	11.8	2.4	24.3	21.8	1.2	
		P1	2.2	1.75	12.4	0.1	29.5	15.7	5.0	
		P2	2.2	6.02	13.1	0.1	27.5	15.3	3.0	
		P4	2.2	7.55	13.7	0.2	31.7	17.1	2.1	
	Sub-total			2.2	15.78	13.2	0.2	29.7	16.5	
	Vipasca	P0	2.1	10.43	8.9	0.1	26.1	30.6	2.9	
		PA	2.1	4.2	9.4	0.1	27	27.6	1.6	
		PB	2.1	3.79	8.4	0	29.2	25.2	1.7	
		P1	2.2	2.37	9.5	0	29.4	19.3	2.8	
		P2	2.2	8.36	10.5	0	31.2	19.6	5.6	
		Sub-total			2.1	29.15	9.4	0.1	28.4	25.4
	Sub-total Inferred			2.2	44.93	10.8	0.1	28.8	22.3	
Grand Total	Muga	P0	2.1	44.95	10	0.4	27.3	27.3	3.6	
		PA	1.9	37.4	12.1	1.4	23.5	20.6	1.9	
		PB	2.1	55.76	12.6	0.3	27.1	19.5	2.9	
		P1	2.2	56.5	12.7	0.1	31	17.1	4.6	
		P2	2.2	34.34	12.9	0.1	25.4	13.9	3.1	
	Sub-total			2.1	236.5	12.1	0.4	27.4	19.7	
	Vipasca	P0	2.1	10.43	8.9	0.1	26.1	30.6	2.9	
		PA	2.1	4.2	9.4	0.1	27	27.6	1.6	
		PB	2.1	3.79	8.4	0	29.2	25.2	1.7	
		P1	2.2	8.12	10.3	0.1	29.8	18.3	1.9	
		P2	2.2	19.22	10.9	0	31.1	19.1	3.1	
		Sub-total			2.2	45.76	10	0	29.2	22.9
	<b>Total</b>			<b>2.1</b>	<b>282.26</b>	<b>11.8</b>	<b>0.4</b>	<b>27.7</b>	<b>20.2</b>	

\*Reported above a cut-off grade of 8% K<sub>2</sub>O and a minimum mining thickness (where horizons will be mined separately) of 1.5m

\*Insolubles refers to clays, gypsum and sulphates

\*Numbers have been rounded to reflect the relative level of accuracy and as such totals may include rounding discrepancies



## Exploration Target<sup>5</sup>

*Cautionary Statement. The production target set out in this update is derived from Proved and Probable Ore Reserves and Inferred Mineral Resources from the Muga-Vipasca licences as well as the Exploration Target at the Vipasca and Muga Sur licences. There is a low level of geological confidence associated with Inferred Mineral Resources and there is no certainty that further exploration work will result in the determination of Indicated Mineral Resources or that the production target itself will be realised. The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical parameters underpinning the target in the market announcement dated 23 November 2021 continue to apply and have not materially changed.*

Since producing the up-to-date MRE, Geoalcali has also derived an Exploration Target as defined by the JORC Code for both the Vipasca Licence area and the Muga Sur Licence area. The Vipasca Exploration Target has been assumed to contain all five horizons P2 to P0 while the Muga Sur Exploration Target has been assumed to contain the PB, PA and P0 horizons only. The presence of the potentially economic potash has not been confirmed in these areas, but they comprise projected lateral extensions to the current Muga-Vipasca model that are either untested by drilling or contain historical data that is considered unreliable.

An Exploration Target is defined by the JORC Code (2012) as a statement or estimate of exploration potential of a mineral deposit in a defined geological setting where the statement or estimate, which must be quoted as a range of tonnes and a range of grade (or quality), relates to mineralisation for which there has been insufficient exploration to estimate a Mineral Resource.

SRK has reviewed both the tonnage and grade estimates for the exploration targets and the drilling programmes proposed to further explore these and projected cost of these. The tonnages in each case were calculated by delineating the target areas for each horizon, as shown in Figure 7, by applying a thickness for each horizon based on the nearest drilling intersection and by assuming a density of 2.13 g/cm<sup>3</sup> (the average density for the existing model). Three target areas were delineated for Vipasca and one for Muga Sur. The tonnage ranges were then derived by applying  $\pm 25\%$  thresholds to the calculations. The grade ranges were derived by projecting those in the existing block model estimates in the adjacent Vipasca and Muga licence areas.

The Exploration Target so derived for the Vipasca areas (West Vipasca, Northwest Vipasca and South Vipasca respectively) is between 80 and 130 Mt with a mean grade of between 8 and 10% K<sub>2</sub>O and for Muga Sur is between 0.5 and 1 Mt with a mean grade of between 8 and 12% K<sub>2</sub>O. Note that these have been rounded further from the numbers derived by Geoalcali.

It should be noted that these estimates are conceptual in nature, that there has been insufficient exploration to estimate a Mineral Resource for these areas and that it is uncertain if further exploration of these areas will result in the estimation of a Mineral Resource.

---

<sup>5</sup> *The potential quantity and grade of an Exploration Target is conceptual in nature, there has been insufficient exploration to determine a mineral resource and there is no certainty that further exploration work will result in the determination of mineral resources or that the production target itself will be realised. The technical parameters underpinning the target in the market announcement dated 23 November 2021 continue to apply and have not materially changed.*



The drilling programmes and envisaged expenditures are summarised in Table 13 and SRK has ensured that these have been allowed for in the operating costs assumed by the mine plan it used to underpin the Ore Reserve statement.

**TABLE 13: PLANNED DRILLING AND EXPENDITURE FOR EACH EXPLORATION TARGET**

Exploration Target	Planned Drilling Schedule	Description	Expenditure (USD)
West Vipasca	Y4-Y7 Mine Life	Underground fan drilling of 5 holes, total meterage 5,000m	650,000
Northwest Vipasca	Y4-Y7 Mine Life	Underground fan drilling of 5 holes, total meterage 5,000m	650,000
South Vipasca	Y4-Y7 Mine Life	Underground fan drilling of 5 holes, total meterage 5,000m	650,000
Muga Sur	2022-2023	1 drillhole, 750m	97,500

While the Exploration Targets were derived by Geocalci these have been reviewed by SRK and, as is the case for the Mineral Resource, the Competent Person responsible for these is Ms Fardell.

**FIGURE 7: EXPLORATION TARGET AREAS FOR THE MUGA AND VIPASCA LICENCES.**

