



**SYMBOL**  
MINING

ASX: SL1

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# Symbol Completes Scoping Study and Confirms Plan to Commence Mining at Macy

## Highlights

- The Scoping Study results are highly attractive and indicates strong potential for a high-grade-low-capex zinc and lead mining operation.
- The Scoping Study base case shows strong free cashflow to Symbol over the 12 month period.
- Low capital expenditure requirement of US\$3.2m, with a substantial amount of camp and mine infrastructure already completed and in place for mining.
- Regulatory approvals are well advanced with no insurmountable hurdles to transition into mining.
- Based on the completion of the very encouraging results from the evaluation of this study, the Company has decided to advance activities for the commencement of mining at the Macy Deposit.
- The commencement of mining is subject to the Company confirming additional funding of A\$5m (US\$3.8m) in working capital to fund the mining start up, administration and operational costs, through debt and equity.
- Scoping Study is based on the Macy Indicated Resources only and does not include the Macy Inferred Resources and does not include any exploration targets and potential upside from additional drilling at the highly prospective Aisha Project and numerous other regional targets.

### **ASX Chapter 5 Compliance and Scoping Study Cautionary Statement**

The information and production target presented herein is based on a Scoping Study. A scoping study is a low-level technical and economic assessment and is insufficient for the estimation of an Ore Reserve, assurance of economic development, and for the findings of this study to be realised.

The Scoping Study is completed to an overall  $\pm 35\%$  level of accuracy and examined all facets of geology, mining, processing and supporting infrastructure at a \$3,200 zinc price and \$2,200 lead price with a long-term foreign exchange rate of USD0.75:AUD1.00. All amounts are USD unless otherwise stated.

The production target referred to is based on Indicated JORC Resources. The Company's JORC Resource is classified as 85% Indicated and 15% Inferred. However, the Company has only conducted this study on the Indicated JORC Resource Estimates.

All JORC modifying factors have been sufficiently considered, including: mining studies, processing studies, metallurgical testwork, conceptual engineering and infrastructure assessments. Capital and operating costs, where applicable, are based on actual quotes from contractors to undertake the services costs and estimates received from independent experts with appropriate contingencies added. Third party accredited consultants have been used to complete or have contributed to the majority of technical aspects of the study, with the remainder of the work completed by Company technical staff. These studies support the assumptions that have been made in the Scoping Study.

The Company has concluded it has a reasonable basis for providing the forward-looking statements included in this ASX Release.

The Company also believes it has a reasonable basis to expect to be able to raise the funds required to develop more advanced study phases and subject to obtaining additional financing it is also reasonable to expect that the Macy Project will be developed and mined as planned in the future. All material assumptions on which the forecast financial information is based, are set out in this announcement. Please refer to Annexures A to E for further information.

## MACY PROJECT – SCOPING STUDY

**Symbol Mining Limited (ASX:SL1, Symbol or the Company)** is pleased to report highly encouraging results from the evaluation of the Company's 60% owned Macy Deposit within the Imperial Project.

- The Scoping Study demonstrates viability of a traditional open pit mining operation.
- The high-grade resources in the production model indicate very strong cashflow for 12 months.
- Low upfront capital requirements with contract mining to be undertaken that significantly reduces capital expenditure and risk.
- Metallurgy confirms DSO product that simplifies processing capital expenditure and operational expenditure costs.

The Macy Deposit is contained within the area of the Mining Lease (ML) application that has been lodged with the Mines Cadastre Office (MCO) for approval. It is anticipated that the MCO will grant the ML within the statutory 45 days to permit the Company to undertake the operations for the production targets and financial forecasts contained in this Study.

The Study assumes that all Minerals and Mining Act & Minerals and Mining Regulation approvals are granted for mining to commence in Q2 as planned.

The results of the Scoping Study indicate strong potential for a high-grade-low-capex zinc and lead mining operation.

The Scoping Study is completed and it examined all facets of geology, mining, processing and supporting infrastructure at a zinc price of US\$3,200/t, lead price of US\$2,200/t & mixed product price of US\$580/t shipped Lagos with a long-term foreign exchange rate of USD1.00:AUD0.75. All amounts are USD unless otherwise stated.

Key approximate results from the base case development, pre-tax financial modelling are:

- Approximate A\$20.3 million Life of Mine (LOM) free cash flow.
- LOM production of 90,242t for 38,100t of shippable product (28,250t of Zn (50%), 2,900t of Pb (60%) and 6,950t of mixed product (30% Zn).
- Pre-production capital expenditure of approximately US\$3.2 Million.
- Total working capital funding requirement of approximately A\$5 million (US\$3.8 million) to be funded from Debt and Equity.
- Approximate LOM C1 cost/lb Zn payable: US\$0.51/lb.
- Initial Life of mine (LOM) of Period under study: 12 months.

The net cash flow based on the current 12 month mining life.

*All values in US\$ unless stated:*

100 % JV outcomes	Low Case	Base Case	High Case
Zinc Price	\$2,800	\$3,200	\$3,600
Lead Price	\$2,000	\$2,200	\$2,400
LOM Revenue <sup>1</sup> (net TC/RC & deductions)	\$38.9m	\$44.0m	\$49.1m
<b>LOM EBITDA</b>	<b>\$20.5m</b>	<b>\$25.4m</b>	<b>\$30.2m</b>
<b>Symbol share</b>			
<b>LOM EBITDA (60%) - A\$ (FX:0.75)</b>	<b>\$16.4m</b>	<b>\$20.3m</b>	<b>\$24.2m</b>

1. Revenue is net of TC/RC & smelter deductions

The key financial assumptions and outcomes are set out in Section 4 of the Scoping Study. All costs are in USD.

**Table 1: Key Assumptions and Outcomes**

Assumption	Outcome
Development period	2 months
Mine life (months)	12
Indicated Resources used in study	100%
Inferred Resources used in study	0%
Total LOM zinc metal	14,054t
Total LOM lead metal	1,731t
Total LOM mixed ore	6,950t
Mining dilution assumption	10%
Mining recovery assumption	90%
Zinc price- LOM Average (\$/t)	\$3,200/t
Lead price- LOM Average (\$/t)	\$2,200/t
Mixed product	\$580/t
Mixed product make up	Zn:30%, Pb:4%
Royalties - LOM average	3%
<b>Opex Costs</b>	
Smelter deductions – Zinc metal	8%
Smelter deductions – Lead metal	3%
TC charge - lead & zinc (\$/t treated)	\$50/t
Exchange rate - LOM Average (AUD:USD)	\$1.00 : \$0.75
LOM Average Cost \$/t ore Mined	
Mining	\$51.9/t
• Processing	\$13.4/t
• Logistics and shipping	\$70.9/t
• General and administration	\$25.7/t
Total cash cost (C1) US\$/lb Zn payable	\$0.51/lb
<b>Capex Costs</b>	
Pre-production CAPEX estimate (\$)	\$3.2m

**All amounts are USD unless otherwise stated.**

Symbol Mining CEO, Tim Wither said: “We are very pleased with the positive results of the scoping study, confirming the low cost, low capex and, low technical risk of the Macy high grade zinc and lead deposit. The completed scoping study is an important milestone for Symbol, providing confidence in our decision to continue the rapid advancement of the Macy deposit, which is the first of 30 highly prospective targets within the Imperial Project.

After a relatively short development period of two months, Macy is expected to generate substantial cashflow, funding our aggressive exploration activities at both Imperial and Tawny projects, advancing Symbol’s vision of creating a mid-tier mining company.”

**Tim Wither**  
**Chief Executive Officer**

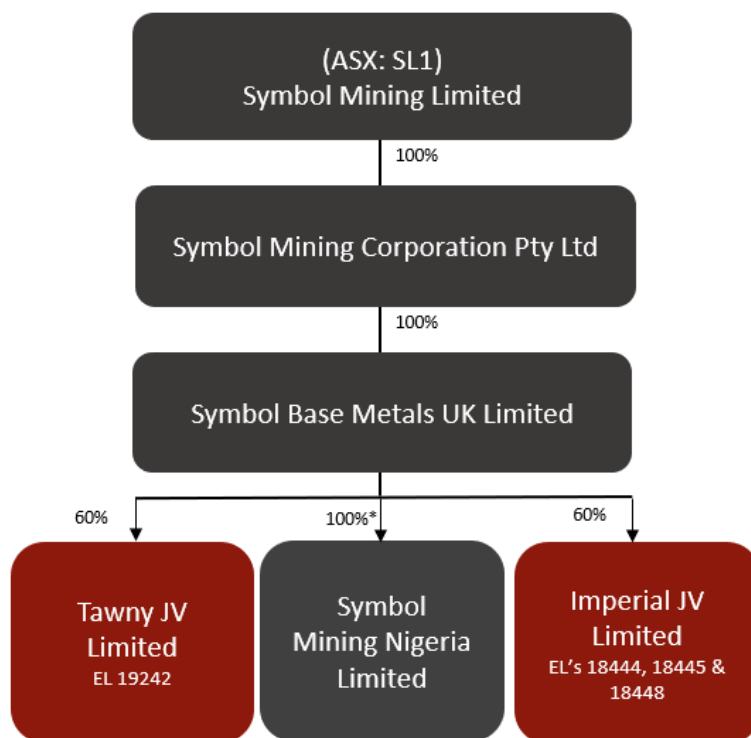
# MACY SCOPING STUDY

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## 1. Introduction

Symbol Mining Limited (“Symbol” or “the Company”) is a mineral exploration company listed on the Australian Securities Exchange (“ASX”) which holds 60% interest in 2 base metals projects in Nigeria – the Imperial Project and the Tawny Project – which are prospective for zinc (Zn), lead (Pb) and silver (Ag). Symbol holds these interests via incorporated joint venture structures.



\* Note: 99% held by Symbol Base Metal UK Limited and 1% Held by Symbol Base Metals Pty Ltd

The Imperial Project consists of three exploration licences and three small scale mining leases (~500km<sup>2</sup>), highly prospective for zinc, lead and silver. The project is a joint venture (Symbol 60%) that is controlled by a Symbol subsidiary which includes marketing rights.

Symbol engaged consultants, independent contractors and used its in-house expertise to prepare the various inputs for this Scoping Study.

## 2. Regional Location and Access

The **Macy Deposit** is located within the wider Imperial Project area. The Imperial Project is developing the Macy zinc and lead deposit which is located on the border of Bauchi and Taraba states approximately 420km east/north-east of Abuja, Nigeria.



**Figure 1. Regional Location and Access for the Imperial Project**

Access to the site is via the A345 highway just past Alkaleri. The majority of the road is of good standard bitumen to the village of Yalo, after which access to site is via a 13km dirt track. This final section of road will be upgraded to allow site access for heavy vehicle loads.

### **3. Mineral Rights, Licenses and Land**

The Imperial Project consists of three exploration licences and three small scale mining leases (~500km<sup>2</sup>). The existing mineral rights and exploration licences are confirmed to be in good standing with Mining Cadastre Office. The Company is currently completing and lodging the Environment Plan and Rehabilitation Plan for the renewal of EL 18444 and EL 18445 to be endorsed by the Mines Cadastre Office.

The Company has applied for a Mining Lease over the Macy Deposit with the Mines Cadastre Office (MCO). It is assumed that the MCO will grant the ML within the statutory 45 days to permit the operations to commence for the production targets and financial forecasts contained in this Study.

#### 4. Scoping Study Parameters and Material Assumptions

The key considerations in the Scoping Study were:

- Indicated and Inferred JORC Resource of 132,700t at 18.3% Zn and 2.1% Pb<sup>1</sup> at the Macy Deposit, however only the Indicated Resource of 109,800t at 18.6% Zn (20,423t Zn metal) and 3.3% Pb (3,623t Pb metal) has been used in this Scoping Study production forecast;
- Base case zinc price of US\$3,200/t, lead price of US\$2,200/t & mixed product price US\$580/t shipped Lagos;
- FX rates used AUD: USD \$1.00: \$0.75;
- Open pit earthmoving will be conducted by contractor PW Group, Nigeria;
- Crushing and screening will be conducted by Imperial JV using leased equipment from PW Group, Nigeria;
- Processing and sorting managed on a manual basis by Imperial JV; and
- Product trucked to Lagos port and shipped by contractors – Bolloré Africa Logistics.

##### ***PW Group, Nigeria***

<http://www.pwlimited.com>

As noted on the PW group web site:

PW is at the forefront in developing Africa's roads, bridges and other civil infrastructure. In partnership with government and multi-national companies PW are active in construction and natural resources and apply sound environmental standards to all their projects.

The PW Group provides jobs for more than 5,000 people on the African continent and has moved more than 50 million tonnes of earth and rock during mining and road works operations during the company's history. Through its extensive mining experience in Ghana, Tanzania and Sierra Leone, PW Group have developed systems and procedures that have enabled them to work with leading companies in the ore extraction business.

##### ***Bolloré Africa Logistics***

<http://www.bollore.com/en-us/activities/transportation-and-logistics/bollore-africa-logistics>

As noted on the Bolloré web site:

Bolloré is a multinational company with its headquarters in France, its subsidiary, Bolloré Africa Logistics is the biggest transport and logistics operator in Africa, where it has a network without equal with 250 subsidiaries and almost 25,000 employees in 55 countries, including 46 in Africa.

It operates in the container terminal at Lagos-Tincan in Nigeria.

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<sup>1</sup> JORC Resources completed by Competent Person Lynn Widenbar of Widenbar and Associates 23 March 2018. Refer to the ASX Announcements released to ASX on 23 March 2018 and 16 April 2018 for more details on the JORC Resource Estimates and JORC tables 1, 2 and 3.



The period under study is 12 months, however the LOM has significant potential to be increased as there are several high priority targets close to the Macy deposit. The Scoping Study is therefore considered to be a base case scenario.

**Table 1: Key Assumptions and Outcomes**

<b>Assumption</b>	<b>Outcome</b>
Development period	2 months
Mine life (months)	12
Indicated Resources used in study	100%
Inferred Resources used in study	0%
 Total LOM zinc metal (before smelter deductions)	 14,054t
Total LOM lead metal (before smelter deductions)	1,731t
Total LOM mixed ore	6,950t
Mining dilution assumption	10%
Mining recovery assumption	90%
 Zinc price– LOM Average (\$/t)	 \$3,200/t
Lead price– LOM Average (\$/t)	\$2,200/t
Mixed product (per t of product shipped)	\$580/t
Mixed product make up	Zn:30%, Pb:4%
Royalties – LOM average	3%
 <b>Operating Costs</b>	
Smelter deductions – Zinc metal	8%
Smelter deductions – Lead metal	3%
TC charge – lead & zinc (\$/t treated)	\$50/t
Exchange rate – LOM Average (AUD:USD)	\$1.00 : \$0.75
LOM Average Cost \$/t ore Mined	
○Mining	\$51.9/t
○Processing	\$13.4/t
○Logistics and shipping	\$70.9/t
○General and administration	\$25.7/t
Total cash cost (C1) US\$/lb Zn payable	\$0.51/lb
 <b>Capital Costs</b>	
Pre-production capital cost estimate (\$)	\$3.2m

**All amounts are USD unless otherwise stated.**

## **5. Local Geology and Mineralisation**

The known prospects at the Imperial Project are fault-controlled veins that have many of the characteristics of significant Pb/Zn deposits described as poly metallic or clastic hosted veins. Product previously mined at the site had reported grades of 38% Pb and 19% Zn with discrete



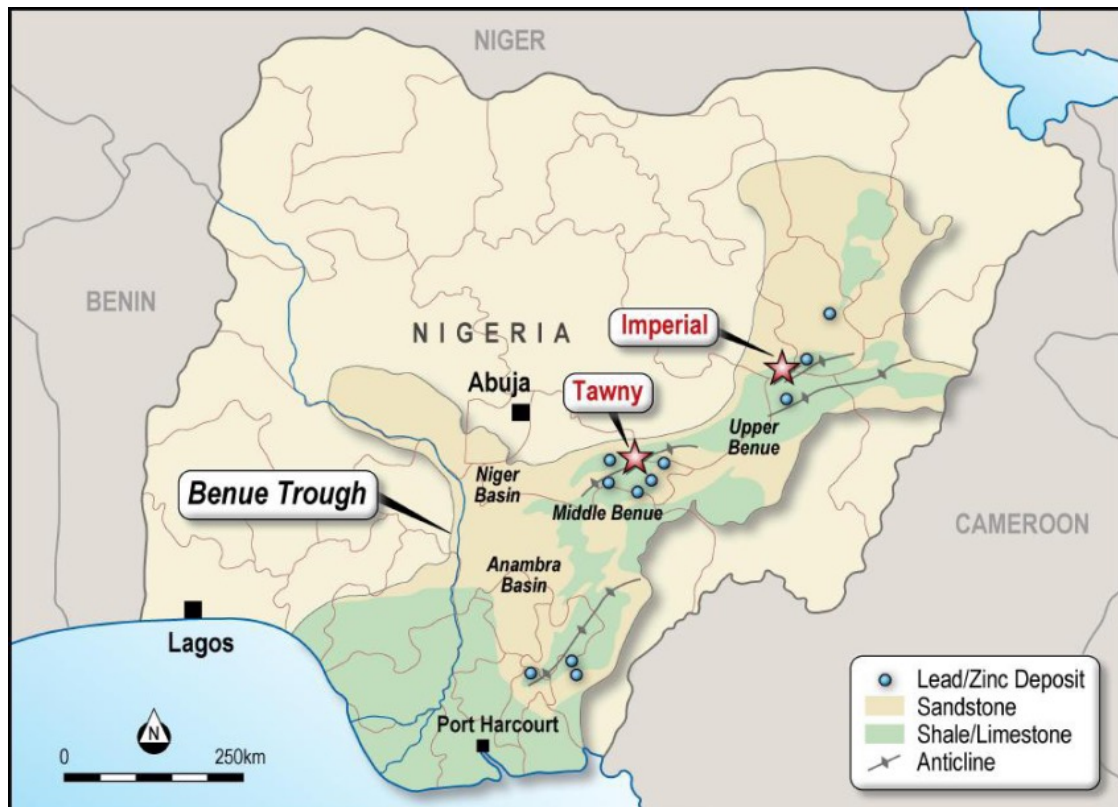
layers of galena and sphalerite over significant strike distance. With over 500km<sup>2</sup> of tenement package there is significant regional prospectivity.

The Imperial main vein is a sandstone hosted 1,600m strike length of artisanal, open pit and underground historical mining. Significant tonnage has been extracted from the site historically. The orebody is clearly defined with extensive weathered massive sulphides of galena and sphalerite with minor pyrite and chalcopyrite through multiple veins.

The Macy Deposit lies to the north within the 1.6km of strike length.

The confidence in the geological interpretation is considered good, as the geological logging and interpretation allows extrapolation of drill intersections between adjacent sections.

The geological boundaries are determined by the spatial locations of the various mineralised structures, and the geological host rocks. Factors affecting continuity are cross faults, old historic workings and the potential complexity of the mineralized systems.



**Figure 2. Regional geology and mineralisation**

The Benue Trough Zn, PB mineralisation has close geological analogies with Coeur d'Alene (USA) and the Huize District of Yunnan Province (China).

## 6. Mineral Resources and Estimation

The production target and financial forecast are derived from the Indicated JORC Resource at the Macy Deposit completed by Competent Person Lynn Widenbar of Widenbar and Associates on 23 March 2018 (Refer to the ASX Announcements released to ASX on 23 March 2018 and 16 April 2018).

The Macy Deposit has an Indicated and Inferred JORC Resource of 132,700t at 18.3% Zn and 2.1% Pb. The Company recently completed a 1,200m reverse circulation infill drill programme, the result of which was released to the market on 23 March 2018. This represents an increased confidence in the ore body with the zinc resource increasing from 75% indicated to 85% indicated.

**Table 1 showing Indicated and Inferred zinc JORC Resource at the Macy Deposit**

Macy Zinc Resources				
Category	Tonnes	Zn%	Pb%	% of Total
Indicated	104,300	19.0	2.2	85
Inferred	18,000	20.0	2.7	15
<b>TOTAL</b>	<b>122,300</b>	<b>19.2</b>	<b>2.3</b>	<b>100</b>
Reported under 2012 JORC using a Zinc cut-off grade of 2%				

**Table 2 showing Indicated and Inferred lead JORC Resource at the Macy Deposit**

Macy Lead Resources				
Category	Tonnes	Pb%	Zn%	% of Total
Indicated	5,500	24.4	11.1	53
Inferred	4,900	30.2	5.9	47
<b>TOTAL</b>	<b>10,400</b>	<b>27.2</b>	<b>8.3</b>	<b>100</b>
Reported under 2012 JORC using a Lead cut-off grade of 2%				

**Table 3 showing combined zinc and lead Indicated and inferred JORC Resource at the Macy Deposit**

Macy combined zinc and lead Resources				
Category	Tonnes	Zn%	Pb%	% of Total
Indicated	109,800	18.6	3.3	83
Inferred	22,900	17.0	8.6	17
<b>TOTAL</b>	<b>132,700</b>	<b>18.3</b>	<b>2.1</b>	<b>100</b>
Reported under 2012 JORC using a zinc and lead cut-off grade of 2%				

Note: JORC Resources completed by Competent Person Lynn Widenbar of Widenbar and Associates 23 March 2018. Refer to the ASX Announcements released to ASX on 23 March 2018 and 16 April 2018 for more details on the JORC Resource Estimates and JORC tables 1, 2 and 3.

#### **Competent Person's Statement - Resources**

The information in this report that relates to Mineral Resources has been compiled by Mr Lynn Widenbar. Mr Widenbar, who is a Member of the Australasian Institute of Mining and Metallurgy, is a full time employee of Widenbar and Associates and produced the Mineral Resource Estimate based on data and geological information supplied by Symbol. Mr Widenbar has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity that he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves.

Mr Widenbar consents to the inclusion in this report of the matters based on his information in the form and context that the information appears.

## 7. Modifying Factors

### 7.1 Mining

Minesure Pty Ltd and SCME Pty Ltd were engaged as independent consultants by Symbol to complete a Mining Study of the Macy Deposit. The Mining Study covers all the areas typical for a Scoping Study and has addressed the technical issues that are foreseeable at this level of study.

#### *Geotechnical assumptions and Pit optimisations*

The pit optimisations were completed by SCME Pty Ltd, an independent consultant, and were based on costs and physical inputs supplied by Symbol and verified by actual quotes received from PW Group, Bollore Logistics and the Noble Group.

Whittle 4D software was used to determine the optimum shell upon which the pit design was based.



**Figure 3: Final Mine Design.**

Geotechnical parameters used for the pit designs were based on actual pits with similar rock types and oxidation profiles. The ground has a shallow oxidation depth and most of the rock appears to be competent. It was assumed that an overall slope angle of 60° would be stable for the short duration and shallow depth (50m). Further geotechnical investigations are required and are being

currently undertaken. These investigations will require completion prior to further studies and or the commencement of mining operations.

The Macy pit design is integrated with the three or six metre bench heights the inter berm height was set at twelve metres.

The overall slope angle of 60° was achieved by having 70° steep batters of 12m height with 2.5m wide berms. In effect the overall slope angle is substantially less than 60° because of the impact of the haul road.

Within these assumptions it was determined that for the type, style and geometry of mineralisation it is appropriate to apply a 10% mining dilution and 90% mining recovery factor for the deposit.

Waste from the pit will be dumped very closely to the pit, taking care to leave enough room in case a cutback is warranted at some stage in the future.

### ***Mining***

Conventional mining will be implemented using hydraulic excavators, articulated 4WD haulage trucks and a dozer to assist in maintaining organised mining benches. Where ripping by dozer is not capable of breaking the waste (and to a far lesser extent the ore), drill and blast will be used. A contractor will supply drill and blasting services.

Ore will be extracted with the excavator and haulage trucks. It is envisaged that the ore will be easily distinguishable from surrounding waste due to colour differential, minimising excessive dilution. Where necessary, labourers will be used to gather high-grade ore from waste prior to the use of the excavator and also to reject waste from the ore zone. This should significantly reduce contamination of the high-grade ore with waste. Ore will only be mined on day shift.

The nominated mining equipment consists of:

- 1 x 30t Excavator, D9 Dozer, Grader, Blast Hole Rig, Water Cart; and
- 2 x All Wheel Drive 40t trucks

Based on experience in similar environments it is possible for the excavator to produce 1,500 bcm per day on double shift.

It has been assumed that all the ore and approximately 64% of the waste will require blasting. The Company will make an application to the Mines Inspectorate Department (MID) for an explosives licence and it is assumed that the MID will grant the ML to the Company with the explosives licence for the commencement of the operations.

An economic cut-off grade (COG) was estimated based on the product price, transport costs and treatment charges (TC) available at the time of optimisation (as at April 2018). The COG was estimated to be 5.8%Zn or 7.6%Pb or 10% of the mixed ore.

Mining factors of 10% dilution and 90% recovery were applied to the contained Resources to derive the production schedule.

No hydrogeological studies have been undertaken. However, pumping trials have been completed that resulted in rapid draw down of the water in the exposed workings. It is proposed than any surface water will be directed away from the pit and any groundwater will be directed into sumps

and pumped out of the pit into a settling pond for re-use as dust suppression water.

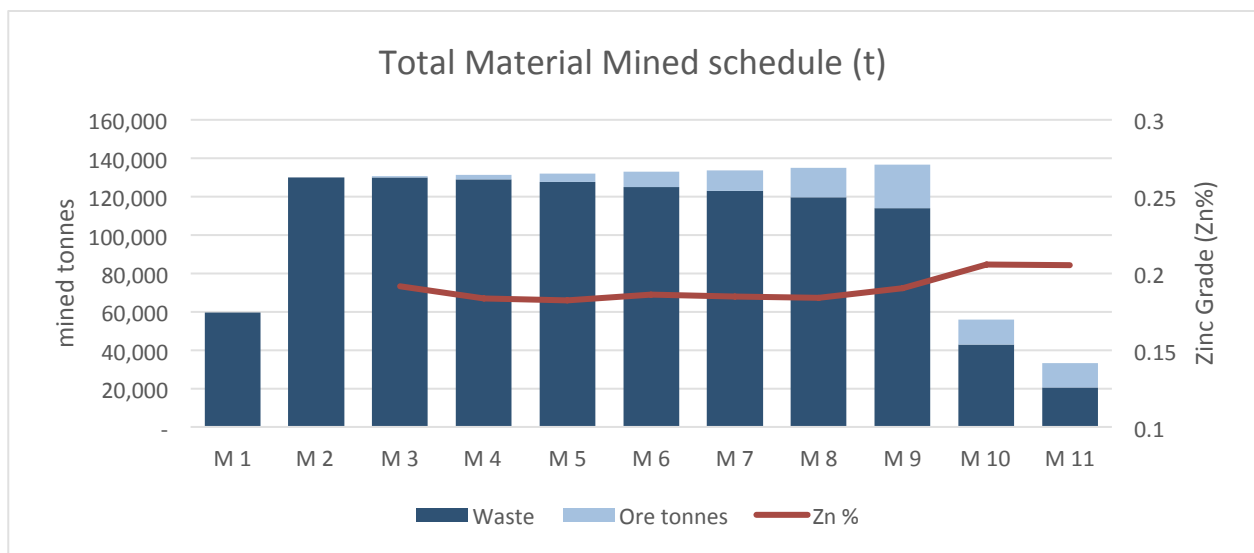
## 7.2 Production Schedule

The Scoping Study mining schedule includes two months of waste mining before any mineralisation is exposed. The third month provides a small quantity of feed with which the plant can be commissioned. Full scale mineral production occurs in month four and continues through to the end of the projected mine life

The total mined quantity is maintained at 50,000 bcm per month until the final two months when there will be insufficient operating area to guarantee higher rates of production.

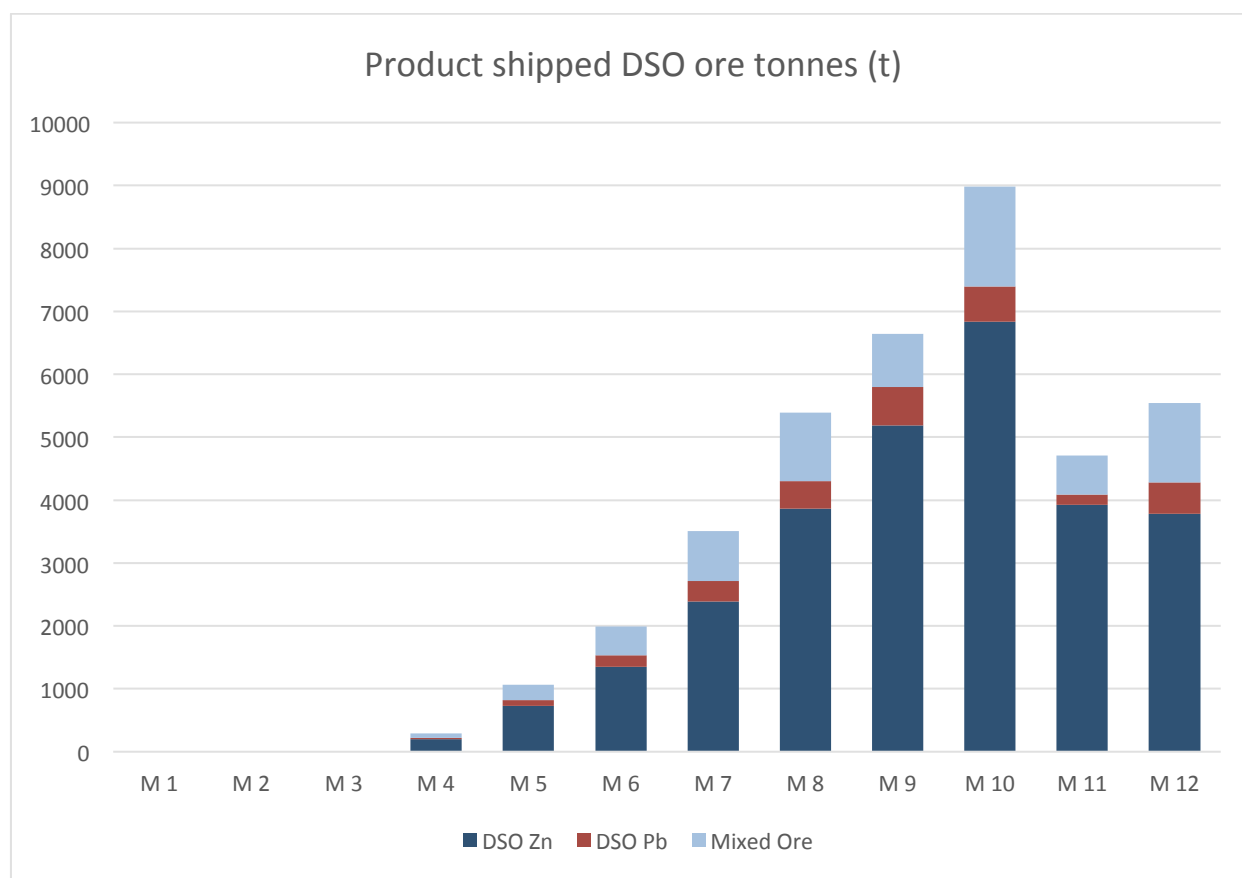
The tables and graphs below present the Scoping Study mine schedule and production schedule by month:

**Mine Schedule**



Months	ROM Mined	Zinc %	Lead %	Waste t
1	-			59,474
2	-			129,999
3	654	19%	2%	130,004
4	2,412	18%	3%	128,914
5	4,513	18%	4%	127,575
6	7,975	19%	4%	124,975
7	10,914	18%	4%	122,838
8	15,322	18%	4%	119,605
9	22,789	19%	3%	113,935
10	13,073	21%	3%	42,829
11	12,591	21%	2%	20,492
<b>Total</b>	<b>90,242</b>			<b>1,120,640</b>

### Production schedule



Product shipped	ROM Processed	Shipped Product	Zinc Product (50% Zn)	Lead Product (60% Pb)	Mixed Product (30% Zn)
M 1	-	-			
M 2	-	-			
M 3	654	-			
M 4	2,412	288	196	26	65
M 5	4,513	1,061	724	96	241
M 6	7,975	1,986	1,354	181	451
M 7	10,914	3,509	2,392	319	797
M 8	15,322	5,390	3,863	437	1,091
M 9	22,789	6,639	5,185	613	841
M 10	13,073	8,981	6,837	557	1,588
M 11	12,591	4,705	3,922	168	615
M 12	-	5,540	3,777	504	1,259
<b>Total</b>	<b>90,242</b>	<b>39,707</b>	<b>28,250</b>	<b>2,900</b>	<b>6,950</b>

The Production target is based on the Indicated Resources only and therefore no scheduling of the Inferred Resources are included in the production schedule or in this study.

### **Competent Persons Statement - Mining Production Schedule**

The scoping level mining assessment of the Macy Deposit has been completed by Mr Nigel Spicer who is a Member of the Australasian Institute of Mining and Metallurgy. Mr. Spicer has sufficient experience relevant to the styles 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'. Mr Spicer is the principal of Minesure Pty Ltd and is a consultant to Symbol Mining Limited and consents to the inclusion in the presentation of the matters based on his information in the form and context in which it appears.

It should be noted that as the Mining assessment has been conducted at a scoping level no Ore Reserves are being reported for the Macy Deposit.

### **7.3 Metallurgy**

In preparation for metal balance calculations for the mineral separation test work, two composite samples were taken from the Macy Deposit from a recently completed test pit. The samples consisted of one composite sample from the zinc domain and one from the lead domain.

The assays for both composite samples were completed by MS Analytical, Canada and the results of the composite samples are shown below:

- Zinc composite. 140 kg 49.5 % Zn 1.9% Pb
- Lead composite. 236 kg. 46.7% Pb & 2.6% Zn

From the composite samples metal balance calculations were completed by Symbol and resulted in the following:

Zinc Composite Sample	Zinc Grade Zn%	Mass Balance (Zn)
Concentrate	55.5 %	83.5 %
Mixed Product	36.2 %	14.4 %
Tailings	16.7 %	2.1 %
<b>Total</b>		<b>100 %</b>

Lead Composite Sample	Lead Grade Pb %	Mass Balance (Pb)
Concentrate	63.0 %	78 %
Mixed Product	26.4 %	21 %
Tailings	5.6 %	1.0 %
<b>Total</b>		<b>100 %</b>

Additionally, the mineralisation is very coarse grained and is not disseminated therefore the sphalerite and galena are not intermixed like most disseminated orebodies.

The feed to the concentrator is expected to be high grade, thus the recovery of the separate galena and sphalerite ore is expected to be similar to current high-grade concentrates received by the smelters averaging in excess of 95%.



#### 7.4 Processing and plant

All ore will require crushing and a two stage crushing circuit will be required to reduce the ore to at least 100% passing 10mm. Crushing to 100% passing 10mm will be necessary to allow proper sampling prior to shipment.

All ore will be processed on day shift and will be processed at a rate of about 45 tonnes per hour. Ore will be recovered from the respective stockpiles by a small front-end loader and fed to a small jaw crusher. Underflow from the jaw crusher will be washed and screened to clean the surface of the ore and screened at 1mm. The minus 1mm material will be pumped to a stockpile (mixed product). The plus 1mm material will be conveyed to a cone crusher set to reduce the product to at least passing 10mm.

Manual ore sorting will be carried out on the cone crusher feed conveyor and the cone crusher discharge conveyor.

The products of the processing circuit (including in pit hand sorting) will be as follows;

- Sphalerite: 50 % Zn (approximately 31% of the ore)
- Galena: 60% Pb (approximately 3% of the ore)
- Mixed 30% Zn & 4% Pb (8% of the ore)

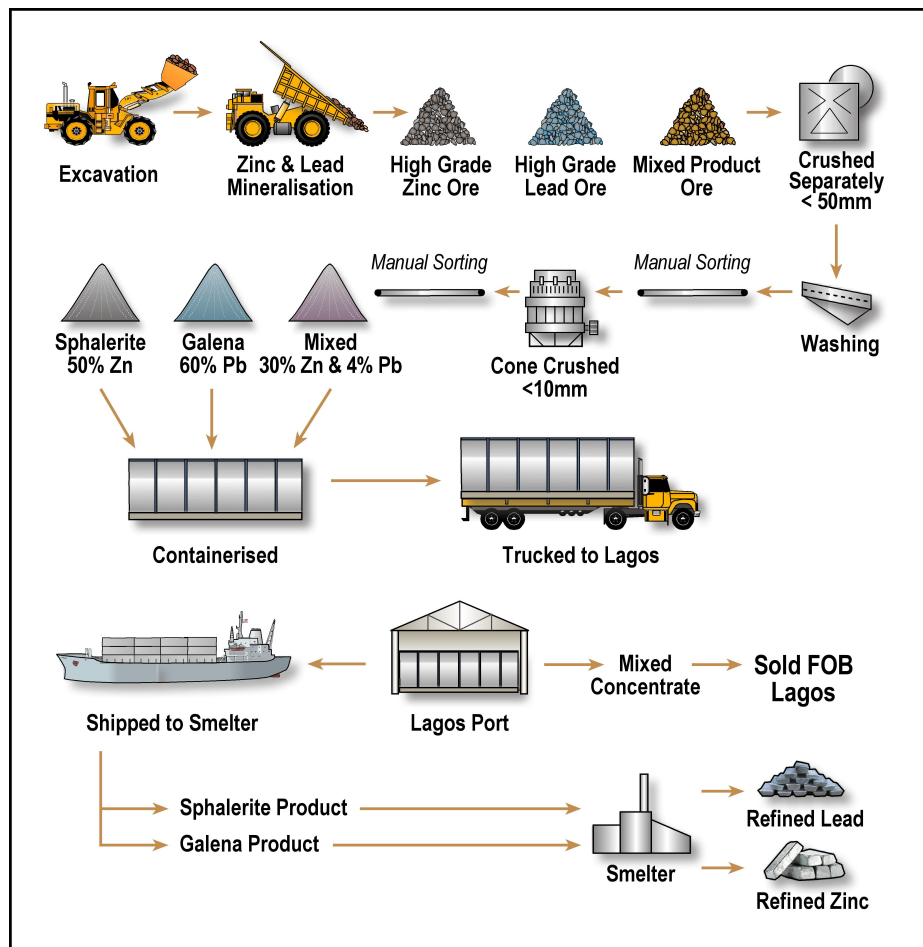


Figure 4. Process flow sheet

## **7.5 Infrastructure**

The major project infrastructure that will be required prior to operations includes:

### ***Access road to mine site***

The majority of the road to access the Imperial Project is of good standard bitumen road to the village of Yalo, after which access to site is via a 13km dirt road. This final section of road will be upgraded to allow site access for heavy vehicle loads. The Company has commenced construction of a Bailey Bridge to provide all weather access to the operations, exploration activities and campsite. The Company has executed an agreement for the Bailey Bridge footings to be constructed prior to the commencement of the wet season.

### ***Camp and administration buildings***

The Company has substantially completed the camp accommodation and facilities that are sufficient for transition into mining activities.

### ***Site security***

Ensuring the safe and secure operation of the mine and ancillary functions is a key factor in developing a successful operation in Nigeria.

Major security requirements have been addressed in the areas of:

- Mine security including employee transport to and from the site;
- Logistics security;
- Head office and accommodation security; and
- Visitor security.

### ***Water supply***

Water will be extracted from sumps and/or from boreholes located nearby and will be more than adequate to supply the Project's process and potable water needs.

The Company intends to apply for a water use permit to attach to the Mining Lease over the Macy Deposit with the Mines Cadastre Office (MCO). It is assumed that the MCO will grant the water use permit to the Company to allow for the commencement of production as noted in the production targets.

### ***Power supply***

The Company has purchased generators that will be sufficient to provide all the power requirements for operations and administration. In-pit lighting will be provided by PW Group.

## **7.6 Environmental and Social Permitting**

Symbol has engaged Dune Engineering Limited (recognised environmental specialists) to complete an extensive Environmental Impact Assessment ("EIA") for the Imperial Project.

During the first quarter of 2018 the Company progressed the approval of the EIA with the Federal Ministry of Environment and a public consultation meeting was convened on 23 March 2018, at

which the EIA was approved by stakeholders. The Company has received notification from the Federal Minister Of Environment that the EIA has been judged satisfactory by the review panel and stakeholders and the EIA Certificate shall be issued.

The Community Development Agreement (CDA) has been completed and executed by the relevant parties. The CDA details the development of facilities and employment opportunities which will provide current and ongoing financial and social benefits to the community.

Community relations in Bauchi and around the Macy district are good with strong support for the implementation of the Project and the prosperity that it will bring to the region.

Both the EIA and CDA are required to be approved by the Federal Ministry of Environment before lodgement at the Mines and Mineral Department prior to the commencement of any mining activity.

## **7.7 Economic Assumptions**

A financial model for the mining of the Macy Deposit with a LOM of 12 months has been generated internally by Symbol to estimate the overall capital and operating expenditure from the mine pit up to and including the export of the Product CIQ China (to Lagos Port FOB for the mixed product). Based on various assumptions, the model predicts income through sales and the generation of cash flows, including relevant economic variables, and the ability to assess the economical outcome of the proposed open-cut mining at the Macy Deposit.

A total capital expenditure requirement of approximately US\$3.2M (including a 15% contingency applied to mine capital cost), has been estimated for the project (See section 7.7.1 below). The model assumes the ability to produce ROM ore production within 2 months from the commencement of mining at Macy.

It is anticipated that including corporate costs, the total funding requirement to commence mining operations through to positive cash flow will be approximately US\$3.8m (A\$5.0m) in equity and/or debt funding to ensure solid liquidity through ramp up and into steady state operations.

The model allows for the assumption of funding for the project through a combination of equity and debt at 15% interest or with equity only. The model is to EBIDTA, but the Company has assumed no company tax will be payable during the period, as it is assumed the Company will be eligible to apply for pioneer tax status, which is a tax concession applicable to mining companies in Nigeria. The concession provides that no Company tax is payable for 3 to 5 years.

Production profiles over the project life of 12 months, as set out above in section 7.2, have been taken from the scheduling results of the independent Mine Study, including all of the Indicated Resource tonnages (no Inferred Resources tonnages) with a total ROM production of **90,242** tonnes assumed for financial modelling purposes.

Other inputs to the financial model were based on the following assumptions which are set out in section 4 (see Table 1) above and sections 7.7.1, 7.7.2 and 7.7.3 below.

### **7.7.1 Capital Cost Estimate**

The capital budget was estimated by Symbol based on actual costs from the recent construction and commissioning of the camp and administration facilities. The estimate includes all surface

infrastructure and pre-production mine development. The table below summarises the pre-production capital cost.

Capital Cost	US\$'000
Pre-production activity	518
Pre-strip	776
Access road upgrade	100
Site Infrastructure	597
Bailey Bridge	574
Working Capital	250
Contingency (15%)	422
<b>TOTAL</b>	<b>3,237</b>

The Company has commenced some pre-production activity and site infrastructure works in preparation for the decision to commence mining (camp and administration facilities, water supply, site civil works, Bailey Bridge footings construction). No mine closure or rehabilitation costs have been included at this stage as the Company intends to assess and review these costs once final mine plans have been completed as part of the mining approval process (see section 7.9 below).

### 7.7.2 Operating Cost Estimate

Operating costs were based on the Scoping Study mining schedule and Symbol management's experience with mining contractors. These contract mining costs were validated by tendered contract rates supplied by PW Group.

Logistics and ship loading costs were based on quotes received from Bolloré Africa Logistics.

Life of Mine Average Operating Cost Estimates	US\$/tonne ore	US\$/lb Zn payable
Mining	51.9	0.13
Processing	13.4	0.03
Logistics, transport & Ship loading	68.0	0.17
General and Administration	25.7	0.06
By-product credit		(0.10)
<b>Total</b>	<b>\$159.0</b>	<b>0.30</b>

<b>Total cash cost (C1) <sup>1</sup></b>	<b>243.5</b>	<b>0.51</b>
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1. C1 costs represent total mine site costs, transport and offsite costs, smelting and royalties

### 7.7.3 Sensitivity Analysis

Overall the Project is sensitive to movements in the zinc and lead price. The Study assumed a zinc price of \$3,200 and a lead price of \$2,200, noting the average LME price for the last 3 months (February to April) was Zn: \$3,337/t and Pb: \$2,445/t. These prices are held steady over the study

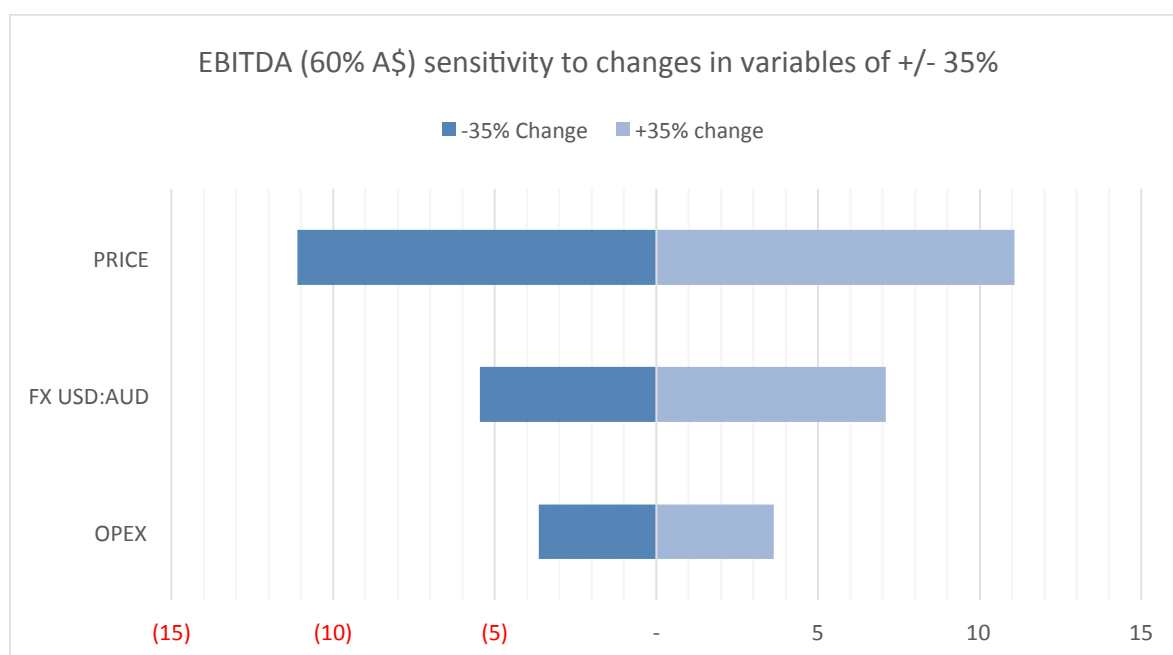
period with no escalation. Positive and negative movements in the assumed zinc and lead prices have the following effects on the net cash flow based on the current 12-month mining life.

*All values in US\$ unless stated:*

100 % JV outcomes	Low Case	Base Case	High Case
Zinc Price	\$2,800	\$3,200	\$3,600
Lead Price	\$2,000	\$2,200	\$2,400
LOM Revenue <sup>1</sup>	\$38.9m	\$44.0m	\$49.1m
<b>LOM EBITDA</b>	<b>\$20.5m</b>	<b>\$25.4m</b>	<b>\$30.2m</b>
<b>Symbol share</b>			
<b>LOM EBITDA (60%) - A\$ (FX:0.75)</b>	<b>\$16.4m</b>	<b>\$20.3m</b>	<b>\$24.2m</b>

2. Revenue is net of TC/RC & smelter deductions

The table below shows the sensitivity to three key variables that have a material impact on the project.



## 7.8 Marketing

Under the Debt Restructuring Agreement with the Noble Group (“Noble”), 30% of the product’s marketing may be carried out by Noble. The Company has not made any formal decision or arrangements for the marketing, sale and/or offtake of the remaining 70% of product. Symbol is continuing discussions with numerous trading companies regarding the marketing and sales programme.

Under the proposed Marketing Agreement with Noble, Noble will take control of the material based on FOB Lagos. An initial “Free on Board” (FOB) payment will be 85% of the estimated

concentrate value, minus costs that will be incurred in regard to transport, concentration and smelting. The final 15% payment will be made on settlement of assays, less associated actual costs.

During January 2018, the Company's representatives visited zinc and lead smelters in China with the Noble Group, to discuss the potential sale of the Company's three products. Based on these discussions, and indicative offers and interest received from trading companies, the Company is confident that it will be able to sell the DSO product at competitive prices.

It has been assumed that all mixed product will be marketed and sold to a commodities trader on a FOB Lagos basis.

### **7.9 Government and Legal**

The Minerals and Mining Act 2007 (the "MMA") is the principal legislation that regulates the Nigerian mining sector. It regulates all aspects of the exploration and exploitation of solid minerals in Nigeria.

Under the MMA, a Mining Lease (ML) must be granted and issued within 45 days from receiving a valid application.

To undertake mining activities under the ML the Company must complete and lodge the following documents with the relevant departments in the Ministry prior to the commencement of mining operations:

- Environmental Impact Assessment (EIA);
- Community Development Agreement (CDA);
- Evidence of Compensation payments/agreements with land holders;
- Detailed works programme and mine plan;
- Mine closure plan/rehabilitation plan; and
- Any relevant reports from state bodies.

The Company has received notification from the Federal Minister Of Environment that the EIA has been judged satisfactory by the review panel and stakeholders and the EIA Certificate shall be issued.

The Community Development Agreement (CDA) has been completed and executed by the relevant parties.

The production target and financial forecasts assume that all government approvals required for mining and export are granted within the timeframe for the commencement of mining as modelled.

## **8. Financing Options**

Symbol holds the right to 60% ownership of the Imperial Project which is managed by Symbol, with no debt or other covenants. This clean ownership structure enhances opportunities and provides maximum flexibility for potential funding structures for the Project's development as required.

The Company notes that its current cash balance is lower than the required working capital of US\$3.8m and thus additional funding will need to be sourced to bring the Macy Deposit into

production. It is possible or likely (as the case may be) that the required funding may only be available on terms that may be dilutive to or otherwise affect the value of shares currently held.

The Company's current market capitalisation of \$16.4 million (9/05/18) is significantly greater than the total capital required. As a result, Symbol believes there are reasonable grounds for concluding that funding will become available to it as and when it is required by the projects development or production schedules. The Company's Board has extensive experience in financing and developing mining projects.

The Study has provided positive economic metrics and the planned timetable of activities to deliver key development milestones and thus a platform for traditional debt funding discussions.

In summary, the Board and management of Symbol have a demonstrated track record of success with mining projects and proven ability to identify, acquire, define, develop and operate quality mineral assets. The Macy Deposit is an open cut mine, which will require straightforward mining methods and minimal technical processing to achieve the stated outputs for sale. The Company has advanced a number of discussions with key market traders and smelters that are willing to purchase zinc and lead products FOB Lagos, providing key support for the project.

All the material assumptions on which the forecast financial information is based is included in this announcement.

For the reasons outlined above, the Board believes that there is a 'reasonable basis' to assume that future funding will be available.

## **9. Next Steps**

In evaluating the assumptions and modifying factors contained in this Study, it can be concluded that there are no obvious insurmountable matters in planning, designing and implementing an open-cut mining operation at the Macy Deposit. Based on the current information available, the production modelling and evaluation processes appear to be practical and of a quality and accuracy as could be expected at this level of study.

The positive results from this Study indicates the Macy Deposit's value and potential to provide substantial value to shareholders. The Company will look to advance all facets of the Project's development as soon as practicable and has commenced work to refine key elements of the Project to undertake further feasibility studies and commence mining operations.



***Annexure A: Forward Looking Statement***

The announcement may contain certain forward-looking statements. Words ‘anticipate’, ‘believe’, ‘expect’, ‘forecast’, ‘estimate’, ‘likely’, ‘intend’, ‘should’, ‘could’, ‘may’, ‘target’, ‘plan’, ‘potential’ and other similar expressions are intended to identify forward-looking statements. Indication of, and guidance on, future costings, earnings and financial position and performance are also forward-looking statements.

Such forward looking statements are not guarantees of future performance, and involve known and unknown risks, uncertainties and other factors, many of which are beyond the control of Symbol Mining Limited, its officers, employees, agents and associates, which may cause actual results to differ materially from those expressed or implied in such forward-looking statements.

Actual results, performance, or outcomes may differ materially from any projections or forward-looking statements or the assumptions on which those statements are based.

You should not place any undue reliance on forward-looking statements and neither Symbol nor its directors, officers, employees, servants or agents assume any responsibility to update such information.

The stated production target is based on the Company’s current expectations of future results or events and should not be relied upon by investors when making investment decisions. Further evaluation work and appropriate studies maybe required to establish sufficient confidence that this target will be met.

This announcement has been prepared in compliance with the JORC Code 2012 Edition and the current ASX Listing Rules.

### ***Annexure B: Reasonable Basis***

Symbol believes that it has a reasonable basis for making the forward-looking statements in this announcement, including with respect to the production target and forecast financial information. The following information is specifically provided in support of the Board's belief:

- (a) The Scoping Study has been prepared to what the Company considered equal or better than a Scoping Study level of accuracy of  $\pm 35\%$ . Furthermore, the Company believes that the level of detail of work carried out for this Study exceeds what is required/expected at a Scoping Study level;
- (b) The production targets referred to are based on Mineral Resources which are classified Indicated only, No Inferred classified material of the Macy resource has included in production;
- (c) The MRE's for Macy were recently updated and published:
  - Refer to the ASX Announcements released on 23 March 2018 "Symbol updates Macy JORC Resource" and 16 April 2018 "Amended Macy JORC Resource Update"
 The material assumptions and technical parameters used in these MRE's continue to apply, and have not changed;
- (d) All the mineral rights and exploration licences for Macy are confirmed to be in good standing with the Mining Cadastre Office. The Nigerian Mining Act and Regulations provide clear and established guidance and procedures for the issuing of Mining Leases and related permits and for access and approvals for the commencement of mining activities.;
- (e) Community relations in Nigeria and around the Macy deposit are excellent, with widespread strong support for the implementation of the Project, and the subsequent prosperity that it will bring to the region;
- (f) Operating costs where applicable were based on actual costs as quoted by the Company's contractors who will be providing the service. These costs are considered both representative, reliable and better than accepted Scoping Study accuracy;
- (g) Pit geotechnical regime for Macy deposit have been reasonably assumed based on actual pits with similar rock types and oxidation profiles as part of the assumptions for the scoping study.
- (h) Capital costs are based on actual costs (camp and administration infrastructure substantially completed), quotes and draft contract that are close to finalisation with the Company's key contractors;
- (i) The Scoping Study was completed with a mix of external consultant, and internal expertise by the Company, using both employees and directors. Independent consultants were used for key areas of the Study, in particular site Infrastructure and basic engineering, resource estimation and mining engineering. The financial model has been reviewed and checked by an independent consultant to ensure integrity and completeness. All material assumptions on which the forecast financial information is based have been included in the announcement;
- (j) As a group, the Symbol Board and management has a long and successful track record in identifying, discovering, developing, implementing, commissioning and operating resource industry projects; and
- (k) The sale of zinc and lead ores are a relatively simple transaction with trading companies already established in Nigeria, thus management anticipates few complications in this regard.

### ***Annexure C: Competent Person's Statements***

#### ***Competent Person's Statement - Resources***

The information in this report that relates to Mineral Resources has been compiled by Mr Lynn Widenbar. Mr Widenbar, who is a Member of the Australasian Institute of Mining and Metallurgy, is a full-time employee of Widenbar and Associates and produced the Mineral Resource Estimate based on data and geological information supplied by Symbol. Mr Widenbar has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity that he is undertaking to qualify as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Minerals Resources and Ore Reserves.

Mr Widenbar consents to the inclusion in this report of the matters based on his information in the form and context that the information appears.

#### ***Competent Persons Statement - Mining Production Schedule***

The scoping level mining assessment of the Macy Deposit has been completed by Mr Nigel Spicer who is a Member of the Australasian Institute of Mining and Metallurgy. Mr. Spicer has sufficient experience relevant to the styles 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'. Mr Spicer is the principal of Minesure Pty Ltd and is a consultant to Symbol Mining Ltd and consents to the inclusion in the presentation of the matters based on his information in the form and context in which it appears.

It should be noted that as the Mining assessment has been conducted at a scoping level no Ore Reserves are being reported for the Macy Deposit.

The information in this ASX Release that relates to metallurgy, metallurgical test work, and mineral processing in the Scoping Study was undertaken or reviewed by Mr Barry Bolitho who is a Fellow of the Australasian Institute of Mining and Metallurgy. Metallurgy. Mr. Bolitho has sufficient experience relevant to the styles 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'. Mr Bolitho is an Executive Director of Symbol Mining Limited, in which he is also a shareholder. Mr Bolitho is a Metallurgist with over 40 years' experience as a mining professional.

Mr Bolitho consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

***Annexure D: Project Risks***

Key risks identified during the Scoping Study work include, but are not limited to:

- Adverse movements in the US\$ zinc and lead prices;
- Adverse movements in the AUD:USD exchange rate;
- Conversion of existing Mineral Resources to Ore Reserves;
- Access to project funding;
- Timely approval of various licenses and permits required;
- Sovereign and legal risks of Nigeria;
- Changes to capital and operating costs;
- The Company depends on key management personnel and may not be able to attract and retain qualified personnel;
- General global economic conditions that may adversely affect the Company's growth and future prospects; and
- Results of future Pre-Feasibility and Definitive Feasibility Studies.

**Annexure E: Material Assumptions used in the Scoping Study**

Criteria	Commentary																		
<b>Status of Study</b>	<ul style="list-style-type: none"> <li>The information and production target presented herein is based on a Scoping Study with accuracy of +/- 35%. A scoping study is a low-level techno-financial assessment, and is not sufficient for the estimation of a Mineral Reserve Estimate, assurance of economic development, or that the findings of this study will be realised</li> <li>All Project costs are in US Dollars (\$)</li> </ul>																		
<b>MRE supporting Production Targets</b>	<ul style="list-style-type: none"> <li>For the Competent Person's Consents, material assumptions, and technical parameters underpinning the Macy MRE, including JORC Table 1, Sections 1, 2, and 3, refer to ASX Announcements:               <ul style="list-style-type: none"> <li>Refer to the ASX Announcements released on 23 March 2018 "Symbol updates Macy JORC Resource" and 16 April 2018 "Amended Macy JORC Resource Update"</li> </ul> </li> <li>The MRE has not been updated since, nor is Symbol aware of new data/information that could materially affect information contained within those announcements. All material assumptions and technical parameters relating to the MRE continue to apply. The form and context in which the Competent Person's findings have been presented have not been materially modified since those announcements.</li> </ul>																		
<b>Capital Costs</b>	<ul style="list-style-type: none"> <li>All costs have been estimated to a Scoping Study level of accuracy</li> <li>The pre-production CAPITAL estimates used in the Scoping Study are as follows:               <table border="1" data-bbox="491 1411 1329 1848"> <thead> <tr> <th></th><th>(\$M)</th></tr> </thead> <tbody> <tr> <td>Pre-production activity</td><td>518</td></tr> <tr> <td>Pre-strip</td><td>776</td></tr> <tr> <td>Access road upgrade</td><td>100</td></tr> <tr> <td>Site Infrastructure</td><td>597</td></tr> <tr> <td>Bailey Bridge</td><td>574</td></tr> <tr> <td>Working Capital</td><td>250</td></tr> <tr> <td>Contingency (15%)</td><td>422</td></tr> <tr> <td><b>TOTAL</b></td><td><b>3,237</b></td></tr> </tbody> </table> </li> </ul>		(\$M)	Pre-production activity	518	Pre-strip	776	Access road upgrade	100	Site Infrastructure	597	Bailey Bridge	574	Working Capital	250	Contingency (15%)	422	<b>TOTAL</b>	<b>3,237</b>
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Working Capital	250																		
Contingency (15%)	422																		
<b>TOTAL</b>	<b>3,237</b>																		

Criteria	Commentary							
Revenue Inputs			Units	US Dollars (\$M)				
		Zinc Price	\$/t	\$3,200				
		Lead price	\$/t	\$2,200				
		Sea Freight and Insurance	\$/t	\$20/t				
		Zinc deductible	Metal	8%				
		Lead deductible	Metal	3%				
		Toll treatment Charge (TC/RC)	\$/t	\$50				
		Exchange Rate	AUD/USD	LOM 0.75				
Mining Assumptions	<ul style="list-style-type: none"><li>The production target is based on conventional load and haul open pit mining, using a contract mining fleet, at a production/processing rate of 95,000 /pa ore</li><li>Geotechnical parameters were based on actual pits with similar rock types and oxidation profiles</li><li>Material mining assumptions<table><tr><td>Mining Dilution</td><td>10%</td></tr><tr><td>Mining Recovery</td><td>90%</td></tr></table></li></ul>				Mining Dilution	10%	Mining Recovery	90%
Mining Dilution	10%							
Mining Recovery	90%							
Infrastructure	<ul style="list-style-type: none"><li>Infrastructure costs were estimated to a Scoping Study level of accuracy.</li><li>Costs were factored from actual costs from the recently built camp facility and recent quotes from key contractors</li><li>General information regarding the Company’s Macy Project can be found on the Company’s website</li></ul>							
Classification	<ul style="list-style-type: none"><li>The production targets referred to are based on Mineral Resources which are classified Indicated only.</li></ul>							
Economic Cut-off	<ul style="list-style-type: none"><li>All costs have been estimated to a Scoping Study level of accuracy</li><li>A design production/processing rate of 95,000t/pa was used, while conventional load and haul open pit mining is the chosen mining method</li><li>The cut-off grade used in the reporting of the MRE 2%/t of Zn and 2%/t Pb</li></ul>							

***Appendix F - summary of the information provided in the JORC Tables 1, 2 and 3******Sampling techniques***

Interpreted mineralised intervals were marked up and cut via a diamond saw, with half core submitted for analysis. Length of intervals selected and cut ranged from 0.5 to 1.0 metre and were based on geological boundaries were appropriate.

Drill hole collar locations were recorded by handheld GPS survey with accuracy +/-2 metres.

Analysis was conducted by submitting the half core 2-4kg sample whole for preparation by crushing, drying and pulverising at Intertek Genalysis Laboratories for base metal analysis via FP1/OE, whereby sodium peroxide fusion and subsequent hydrochloric acid to dissolve the melt is completed followed by analysis via inductively coupled plasma.

***Sub-sampling techniques***

HQ diamond core was sawn in half along orientation lines or cut lines marked by the geologist in the field. Sample preparation involved oven drying, fine crushing to 95% passing 4mm, followed by rotary splitting and pulverisation to 85% passing 75 microns, with sample preparation for all recent samples follows industry best practice.

Quality Control for sub sampling follows Intertek procedures in which:

- Field duplicates were taken at a rate of 1:17.
- Blanks were inserted at a rate of 1:17
- Standards were inserted at a rate of 1:17.

Sample sizes are considered appropriate to the grain size of the material being sampled.

***Drilling techniques***

The drilling consisted of HQ Triple Tube from surface (78 mm) for the diamond drill holes and the reverse circulation drill holes used 118mm diameter hammers.

Downhole surveys were completed by Century using a KSP-2D Compass Inclinometer on nominal 30 metre downhole intervals. Drill holes SDD010 to SDD014 were not downhole surveyed due to problems with the driller's equipment. In general the diamond holes stayed relatively straight with the dips remaining relatively constant.

***Sample analysis method***

Assaying has been carried out on the diamond core samples by Intertek Laboratories and MS Analytical on the RC samples with the resource estimate focusing on Zn and Pb. Independent Laboratory QA/QC involves the use of internal lab standards using certified reference material, blanks, splits and duplicates as part of the in house procedures. Repeat and duplicate analysis for samples shows that the precision of analytical methods is within acceptable limits.

Extractions are considered near total. The methods are considered appropriate to the style of mineralisation and no geophysical tools were used to determine any element concentrations at this stage.



### ***Estimation methodology***

The Block model interpolation was carried out using Ordinary Kriging in Micromine 2016 (SP5). All estimation was carried out in Micromine 2016 (SP5) software.

- The block models were constructed using a 1m (E) by 5m (N) by 5m (Z) block size, constrained by a series of individual wireframes, with sub-cells to 0.25m x 1m x 1m to accurately represent wireframe shapes.
- Block size is generally half to one quarter the sample spacing.
- No deleterious elements have been identified.
- No assumptions regarding recovery of by-products have been made.
- The geological interpretation follows a steeply dipping fault in contact with flat lying and variably reactive sedimentary host rocks.
- Validation was carried out in a number of ways, including:
  - Visual inspection section, plan and 3D; and
  - Model vs composite statistics.

The resources estimation used the following methodologies:

- Sample data was composited to 1m down-hole composites prior to analysis and estimation. Breaks in mineralised zone interpretation. Were honoured by the compositing process
- Statistical and variogram analysis was carried out to determine optimal parameters for resource estimation.
- Search ellipsoids used an unfolding methodology to account for variations in dip and strike.
- The search ellipsoid had dimensions of 50m (N-S) by 50m vertically by 5m across the mineralisation, with a minimum of 6 samples and a maximum of 12. This pass also requires a minimum of 2 holes, with a minimum of 2 samples per hole and a maximum of 6 samples per hole.
- The number of samples used, the kriging variance and the average distance of samples from each block, were all stored in the block model for later use in resource classification.

The Grade estimation using an Ordinary Kriging methodology has been used. Two wireframes have been used to subset and constrain the data points used in the interpolation and only individual grades from individual wireframes were used.

### ***Classification Criteria, including drill and data spacing and distribution.***

The Macy Mineral Resource has been classified in the Indicated and Inferred categories, in accordance with the 2012 Australasian Code for Reporting of Mineral Resources and Ore Reserves (JORC Code). A range of criteria has been considered in determining this classification including:

- (a) Geological continuity;
- (b) Data quality;
- (c) Drill hole spacing;
- (d) Modelling technique;
- (e) Estimation properties including search strategy, number of informing data and average distance of data from blocks.

The resource classification methodology incorporated a number of parameters derived from the kriging algorithms in combination with drill hole spacing and continuity and size of mineralised domains.

### ***Geological Continuity***

Geological continuity is understood with reasonable confidence. The classification reflects this level of confidence.

### ***Data Quality***

Resource classification is based on information and data provided from the Imperial database, which has subsequently been validated by Widenbar. Descriptions of drilling techniques, survey, sampling/sample preparation, analytical techniques and database management/validation provided indicate that data collection and management is within industry standards. Widenbar considers that the database represents an accurate record of the drilling undertaken at the project.

### ***Drilling Spacing***

Drill hole location plots have been used to ensure that local drill spacing conforms to the minimum expected for the resource classification. Section spacing is 25m along strike. All of the nine drill sections have three or four holes, with down-dip mineralisation intersections typically between 10 and 20m apart.

### ***Modelling Technique***

The resource model was generated using an Ordinary Kriging interpolation method, with a multi-pass search approach. The search ellipsoid had dimensions of 50m (N-S) by 50m vertically by 5m across the mineralisation, with a minimum of 6 samples and a maximum of 12. This pass also requires a minimum of 2 holes, with a minimum of 2 samples per hole and a maximum of 6 samples per hole.

The number of samples used, the kriging variance and the average distance of samples from each block, were all stored in the block model.

In general the kriging variance, search pass and average distance are all broadly correlated with a combination of drill hole spacing and domain thickness.

The above parameters were used as a guide in combination with drill spacing to arrive at a final resource classification.

### ***Final Classification***

The final classification is shown below in long section, Maxima of 0.45 (Kriging Variance) and 25m (Average Distance) are used to define Indicated; other material is classified as Inferred.

Since the Kriging Variance in the variogram parameters is standardized to a sill of 1 a value of 0.45 represents a distance of about 20m, which is well within the range of the variogram (+/- 60m). The resulting Indicated block model also is a single coherent mass, corresponding essentially to where there are contiguous drill holes within 25m on section and in plan.