

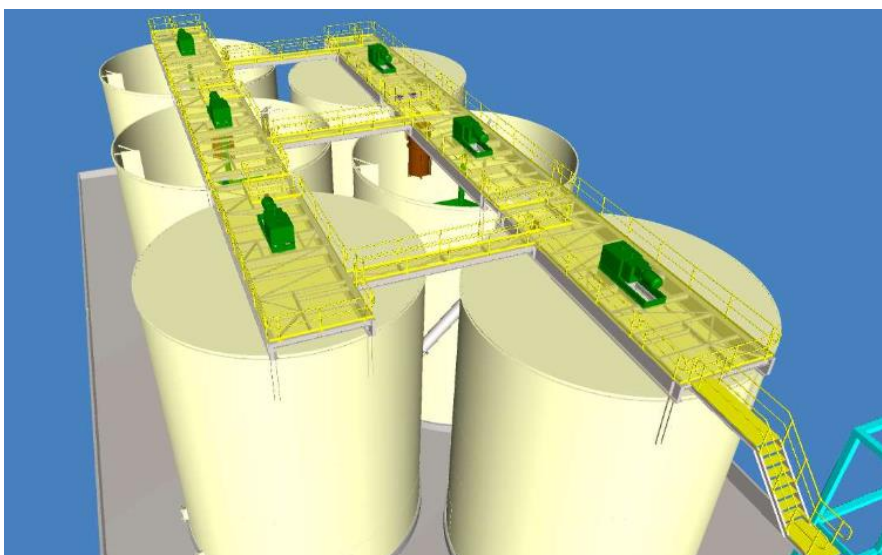
**KIN MINING LTD**

**LEONORA GOLD PROJECT**

**FATAL FLAW ANALYSIS:- ENGINEERING**

**Job No 3438.08**

**May 2018**



**Prepared by**

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By	Checked	For Issue
GB/AF	BC	Rev D

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## Appendices

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App-001 Preliminary Updated General Arrangement Drawing

App-002 Equipment list with some comments

App-003 Capex review info

## 1 Executive Summary

Kin Mining Ltd (KIN) engaged Como Engineers (Como) to undertake a Fatal Flaw Analysis of the Leonora Gold Project (LGP) to identify factors which could impact on the successful achievement of production targets for the LGP.

Como has prepared this study based on information supplied by KIN, which consists primarily of:

- Equipment List 7053-LS-M-002\_B 1.5Mtpa Expansion Case Equipment List REVC, also issued Rev D
- General arrangement drawing GA-001 Rev S
- Power Station tender Q13643
- Capex LGP Build model 180403 Rev2.0.1
- Schedule LGP Schedule 2018.04.21

This report is examining the following areas of the Fatal Flaw Analysis:

- Equipment list
- Plant layout
- Capital cost estimate
- Schedule

The review conducted by Como Engineers on the Leonora Gold Project has found that there are no fatal flaws; however, the following areas are of concern:

### General Arrangement

The general arrangement drawing should be optimised to improve access, vehicle movements and compliance to dangerous goods storage requirements. An updated drawing showing some changes described in the body of the report and attached in the appendix.

### **Equipment List**

The equipment list reviewed appears to be incomplete and lacking critical data for design and project controls. The equipment list requires updating to include:

- Equipment numbers
- Duty points
- Missing equipment
- All drives
- Source

The sizing and selection of the equipment is generally appropriate however there are some concerns including:

- ROM Bin residence time
- Stock pile arrangement
- Emergency feeder arrangement
- Mill feed convey length and details
- Thickener transfer pumps
- Elution circuit

### **Capital Cost Estimate**

The review of the Capex has been done as a high level review based on the time available, and indication of whether items appear under or overestimated have been made on the limited understanding of the estimating methodology employed. In order to formulate a more accurate cost estimate that could be used a project control budget, the estimate would need to be re-worked based on finalised layouts, equipment lists and Lawlers refurbishment requirements.

The following table supplied by Kin Mining indicates the current Summary Cost Forecast for the LGP Build Model, including general infrastructure, mining and process plant forecast costs.

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Summary	ESTIMATE	% Contingency	Total Contingency Cost (\$)	TOTAL Cost	% of Total Cost
Provisional Items	\$295,000	15%	\$44,250	\$339,250	1%
Infrastructure	\$1,180,673	15%	\$177,101	\$1,357,773	3%
Dismantle and Relocate	\$1,755,138	15%	\$4,879,840	\$37,775,283	84%
Refurbish, Install and Upgrade	\$31,140,305				
Taills Dam	\$1,443,448	15%	\$216,517	\$1,659,966	4%
<b>Sub total</b>	<b>\$35,814,564</b>				
Sub Total Contingency			<b>\$5,317,708</b>		
		<b>Total</b>		<b>\$41,132,272</b>	
First fill + critical spares	\$600,000	15%	\$90,000	\$690,000	2%
Lawlers mill acquisition (Payment 1 - August 2017)	\$1,200,000				
Lawlers mill acquisition (Payment 2 - September 2018)				\$1,200,000	
Mining (Workshop, ROM, survey equipment, software & mobilization)	\$1,704,967	15%	\$255,745	\$1,960,711	4%
Leonora Lodge upgrade/camp	\$0	15%	\$0	\$0	
<b>Sub total</b>	<b>\$2,304,967</b>				
Sub Total Contingency			<b>\$345,745</b>		
	<b>\$38,119,530</b>	<b>Grand total</b>	<b>\$5,663,453</b>	<b>\$44,982,984</b>	

The scope of this CAPEX review is confined to the following items as indicated in the summary above:

- Provisional Items
- Dismantle and Relocate
- Refurbish, Install and Upgrade
- First Fills + Critical Spares
- Lawlers Mill Acquisition (Payment 2 – September 2018)

The current total Kin Mining forecast costs based on Como Engineers scope are \$40,004,533 including contingency of approximately 14.3% (\$5,014,090).

The review has generated the following table which indicates those areas of the cost estimate where there is potential for cost over runs and cost savings. Overall costs appear to have been under estimated, and it is expected that total costs on completion will exceed the current budget estimate. Preliminary indications are that the costs as provided by Kin Mining are under estimated by 10% to 20%. A more detailed investigation into the project cost estimate would need to be undertaken to formulate an accurate control budget for the project.

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LAWLERS PLANT	Potential additional costs / cost savings
MILL ACQUISITION	-
DISMANTLE & RELOCATE	+\$
<b>LGP PROCESS PLANT</b>	
EPCM	+\$
GENERAL	-
BUILDINGS	-
ELECTRICAL	+\$
BULK EARTHWORKS	+\$
CONCRETE	-\$
STRUCTURAL STEEL	+\$
PLATEWORK	+\$
EQUIPMENT	-
PIPING	+\$
OPERATIONAL SUPPORT	+\$
OWNERS COSTS	-
COMMISSIONING, CRITICAL & OPERATIONAL SPARES	-
FIRST FILLS	-
SMP LABOUR	-\$
<b>TOTAL PROJECT</b>	<b>+\$</b>

Table showing potential variation to budget by commodity

### Execution Plan

There does not appear to be a well-defined PEP for the LGP project and a detailed project execution plan needs to be developed for the project to ensure alignment within the project team and management as to how the project will be delivered.

### Schedule

The current schedule indicates a construction period of approximately 12 months, having commenced in January 2018, with construction completion due in January 2019.

The schedule indicates a 2 month commissioning period with handover to operations after commissioning expected in March 2019.

This schedule should be achievable given the availability of equipment and structures that have already been purchased for the project, as well as the advanced stage of tank construction for the CIL tank farm.



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There is a high risk of slippage from the current schedule, given the lack of engineering design, lack of final approved design documents, including layouts, equipment lists, load lists, etc. The lack of this information will make it difficult to tender the works with any confidence.

### Recommendations

Como Engineers believe that the identified areas of concern should be addressed by undertaking the following work:

- Update the flowsheets (included in current works)
- Detailed updating of equipment list including load list (included in current works)
- Generate work breakdown structure (WBS) for project
- Update site layout drawing
- Generate area general arrangement drawings for finalisation of layout and utilisation in the updating of the Capital cost estimate
- Generate detail P&IDs for updating of instrument list and capex
- Generate single line drawings
- Generate cable schedule
- Update Capex that follows WBS
- Update schedule and manning list
- Generate project execution and packaging strategy

## 2 Introduction

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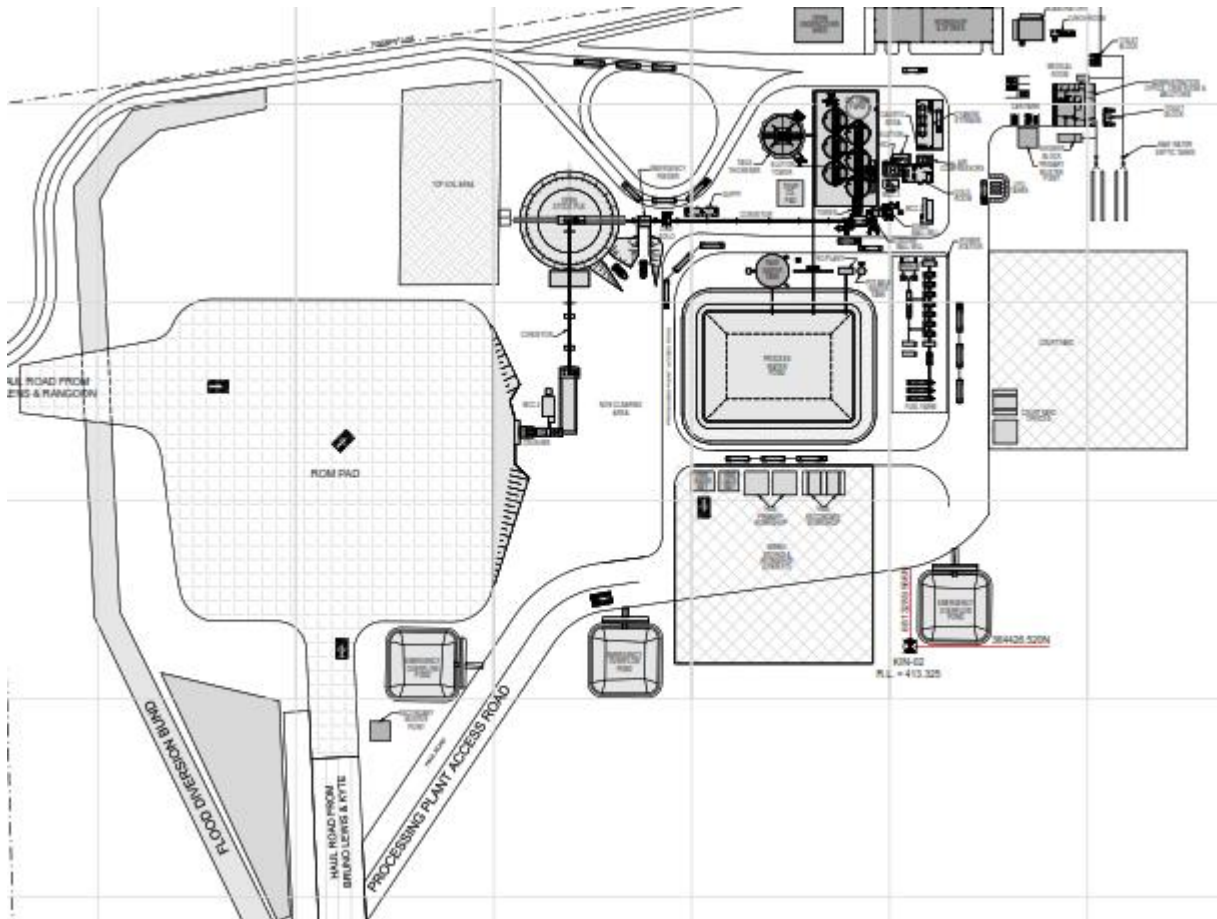
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- Schedule LGP Schedule 2018.04.21

This report is examining the following areas of the Fatal Flaw Analysis:

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- Capital cost estimate
- Schedule

### 3 General Arrangement Drawing

A high level review and preliminary update has been conducted on the site layout drawing GA001 Rev S



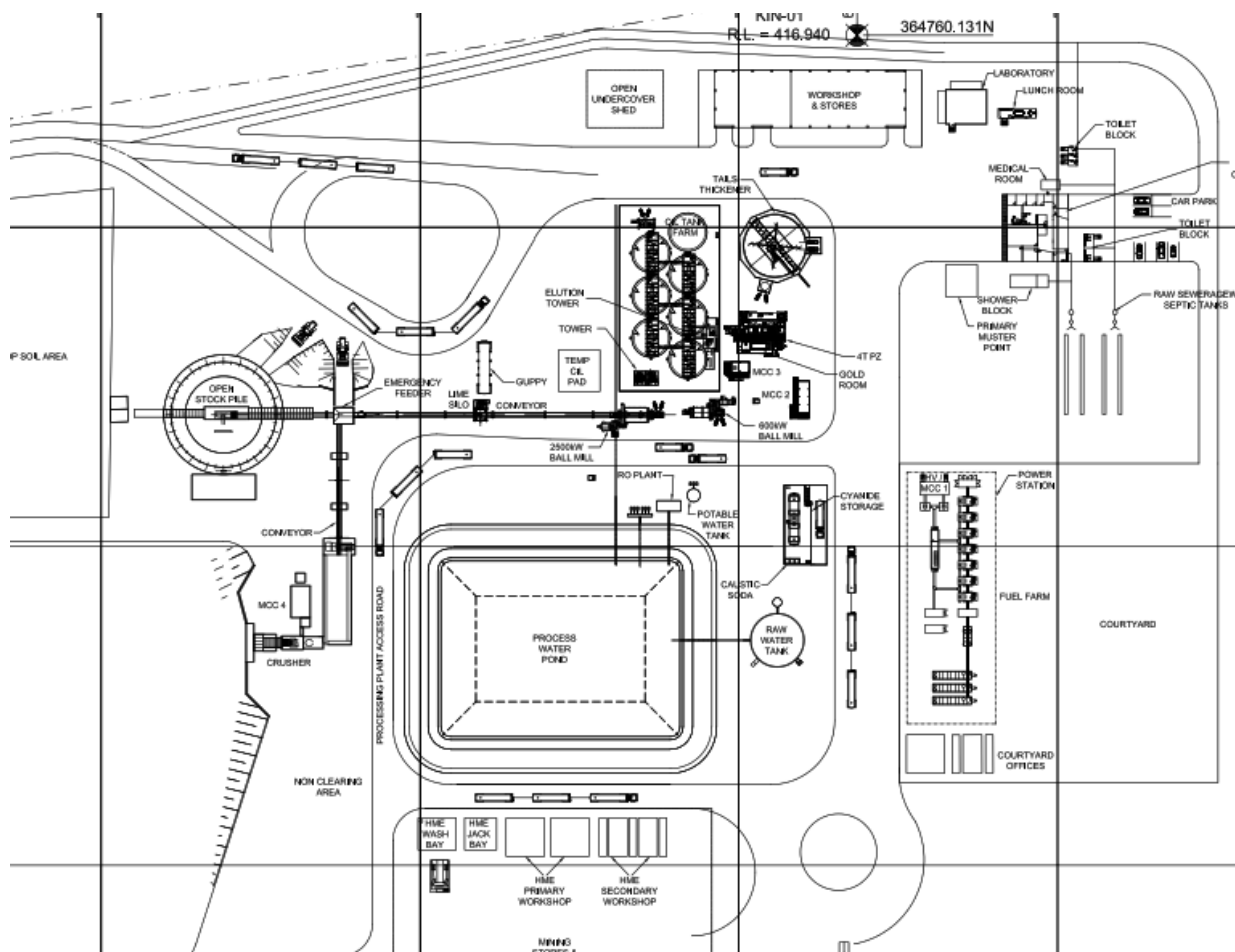
The review has identified the following:

- Review separating the HV and LV access to the plant
- Add plant access for LVs around the back of the workshop and offices
- Have visitor access to rear of offices so they don't need to go through plant to get onto site
- Remove live stockpile and convert to dead stockpile/re-feed hopper arrangement
- Shorten mill feed conveyor
- Open up area adjacent to mill for better access to scats bunker
- Move cyclone feed pumps to other side of mill for better pipe run

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- Move mill to right hand side of CIL area and relocate gravity structure. This will open up an area for the inclusion of the Stage 2 ball mill
- Move thickener to open up one side of the plant of future development
- Move the cyanide tank due to Dangerous Goods requirements (30m exclusion zone)
- Move power station to other side of road to open up pond area

An extract from the preliminary updated site layout drawing is shown below



## 4 Equipment List

A review has been undertaken on the equipment list 7053-LS-M-002\_B 1.5Mtpa Expansion Case Equipment List REVC followed by updated revision D both provided by Kin Mining.

The review of the equipment list has examined the following areas

1. Equipment sizing and selection
2. Equipment list content including
  - a. Completeness
  - b. Numbering and naming convention
  - c. Duty points
  - d. Accuracy

### 4.1 Equipment Sizing and Selection

Sizing and selection of the equipment in the provided equipment list has been review based provided flowsheets, Design Criteria and first principle calculations. The following is a list of the outcomes of the review.

#### Crushing

- ROM Bin, - **low residence time** based on provided volumes and may need to have hungry boards fitted to increase residence time
- Primary Crushers, - **ok for duty**
- Secondary crusher, - **ok for duty** (Raptor XL400 relocated from tertiary).  
Original secondary Symons 4 1/4 **crusher too small for duty**
- Crushing Conveyors - **ok for duty**
- Magnets and metal detectors, - **require additional**
- Screen 2.4m x 6.1m screen, - **ok for duty** using rubber and high open area poly decks
- Dust collection system - **not shown in Rev C**

**Milling and Classification Circuit**

- Stockpile as designed, single reclaim feeder has potential to **limit live capacity** when clayey type ores are treated. Recommend utilising overflow bin and dead stockpile arrangement
- Mill feed conveyor - **no details provided**
- Emergency feed bin and CV potentially undersized for duty, - **requires further examination**. Needs to be used to for ball addition to ball mill
- Stage 1 Primary mill - **ok for duty** of 1.5Mtpa Will draw close to name plate 2500kW
- Stage 2 (Month 36) Primary mill plus 600kW mill - **ok for duty** of 1.2Mtpa
- Cyclone selection 12 off 250 CVX10 - **ok for duty**
- Knelson concentrators - ok for duty
- Cyclone feed pumps Weir 10/8 AH VSD 200kW - **ok for duty**

**CIL and Thickening Area**

- Trash and carbon safety screens - **ok for duty**
- CIL tanks - **large** and will require close control of carbon concentrations to maintain low GIC
- CIL agitators and gearbox - **ok for duty**
- Interstage screens - **ok for duty**
- Carbon transfer pumps - **undersized** and too small for required carbon transfers. Consider replacing with airlifts
- Loaded carbon screen - **ok for duty**
- Barren carbon screen - **ok for duty**
- Tails Thickener Feed Pumps 6/4 AH - **under sized for duty**, require 8/6. The 6/4 should be used as tailings pumps, need to check frame size
- Thickener - **ok for duty**
- Tails pumps, - **see above**

**Elution and Regeneration Circuit**

- Acid wash column - **undersized** for duty 1t versus required 4t
- Elution column - **ok for duty**
- Elution heater - **ok for duty**, lack specifications

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- Heat exchanger, - **no details provided**
- Eluate tank, - **not included in MEL**
- Electrowinning cells - 4 off 600mm x 600mm 9 and 12 cathode conflicting information on material of construction. Linear velocity on very upper edge of acceptable range. **Cells not ideal**
- Furnace - **ok for duty**

### Reagents and Services

- Lime silo arrangement 60t provides residence time of 3.5days, - **not sufficient**. MEL Rev C shows allowance for 100t guppy storage which should be adequate
- Cyanide storage 65kL capacity - **ok for duty**, no details on loading arrangement
- Flocculent mixing and dosing system - **limited detail** unable to confirm
- Process water pumps flowrate - ok, **motors undersized**
- Raw water pumps flowrates but - **no TDH stated**
- Ro Plant 100m<sup>3</sup> day - **ok for duty**, no specifications or water quality provided
- Air compressors - **ok for duty**

### 4.2 Equipment List Contents

The contents of the equipment lists have been reviewed identifying the following:

- a. Completeness: there appears to be a number of items missing from the equipment list including;
  - Majority of chutes
  - Ancillary equipment to the mills and crushers
  - Some safety showers
  - Some sump pumps
  - Equipment items
- b. Numbering and naming convention

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- There appears to be no equipment numbers, the MEL should contain the Old Lawlers numbers and the assigned LGP numbers
  - Area numbers should also allocated which are in line with the WBS
  - Equipment names should be specified and made consistent throughout all documents
  - Equipment codes should be added i.e. CR for crusher, PP for pumps etc.
  - Equipment source should be identified i.e. new, Lawler
- c. Duty points
- Duty points and specifications need to be added to the MEL to ensure equipment is inline with duty.
- d. Accuracy
- The current equipment list has some errors and inconsistencies that need to be rectified especially regards the loads.



## 5 Capital Cost Estimate

### 5.1 Summary

The following table indicates those areas of the cost estimate where there is potential for cost over runs and cost savings. Overall costs appear to have been under estimated, and it is expected that total costs on completion will exceed the current budget estimate. A more detailed investigation into the project cost estimate would need to be undertaken to formulate an accurate control budget for the project.

LAWLERS PLANT	Potential additional costs / cost savings
MILL ACQUISITION	-
DISMANTLE & RELOCATE	+\$
LGP PROCESS PLANT	
EPCM	+\$
GENERAL	-
BUILDINGS	-
ELECTRICAL	+\$
BULK EARTHWORKS	+\$
CONCRETE	-\$
STRUCTURAL STEEL	+\$
PLATEWORK	+\$
EQUIPMENT	-
PIPING	+\$
OPERATIONAL SUPPORT	+\$
OWNERS COSTS	-
COMMISSIONING, CRITICAL & OPERATIONAL SPARES	-
FIRST FILLS	-
SMP LABOUR	-\$
<b>TOTAL PROJECT</b>	<b>+\$</b>

### 5.2 Introduction

The current forecast cost estimate spreadsheet supplied by Kin Mining for review appears to have been built up over time by different people with differing estimating methodologies. It seems that there is no one currently involved with the project who has knowledge of the overall cost estimate or the history behind some of the assumptions and allowances. This makes it difficult to review the individual items within the CAPEX.

The review of the Capex has been done as a high level based on the time available. Indication of whether items appear under or overestimated have been made on the limited understanding

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of the estimating methodology employed. In order to formulate a more accurate cost estimate that could be used a project control budget, the estimate would need to be reworked based on finalised layouts, equipment lists and Lawlers refurbishment requirements.

The following table supplied by Kin Mining indicates the current Summary Cost Forecast for the LGP Build Model, including general infrastructure, mining and process plant forecast costs.

Summary	ESTIMATE	% Contingency	Total Contingency Cost (\$)	TOTAL Cost	% of Total Cost
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Leonora Lodge upgrade/camp	\$0	15%	\$0	\$0	
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	<b>\$38,119,530</b>	<b>Grand total</b>	<b>\$5,663,453</b>	<b>\$44,982,984</b>	

The scope of this CAPEX review is confined to the following items as indicated in the summary above:

- Provisional Items
- Dismantle and Relocate
- Refurbish, Install and Upgrade
- First Fills + Critical Spares
- Lawlers Mill Acquisition (Payment 2 – September 2018)

The current total forecast costs based on this scope are \$40,004,533 including contingency of approximately 14.3% (\$5,014,090).

### 5.3 Battery Limits and Exclusions

The capital cost estimate has been reviewed against the following battery limits, exclusions and specific inclusions that were discussed and agreed with KIN Mining:

#### 5.3.1 Battery Limit

- Top of ROM grizzly.
- Back of ROM wall.
- Gold dore.
- Discharge spigots to TSF.
- Incoming nozzle on raw water tank.

#### 5.3.2 Exclusions

- GST.
- Permitting/licencing.
- Bulk earthworks external to process plant site requirements.
- Roads external to the process plant site (Access road, HV internal roads, etc.).
- Haul road.
- Tailings storage facility (TSF).
- Accommodation village or upgrade to existing.
- Borefields/Water supply.
- Power Station (Including earthworks, concrete, etc.).
- Electrical supply to mining workshop or other infrastructure.
- Electrical supply to TSF.
- Post production capital.

#### 5.3.3 Specific Inclusions

- Lawlers mill acquisition, dismantle, relocation, refurbishment, upgrade and installation at LGP.
- Plant site bulk earthworks, including ground modifications for load conditions.
- Owners costs.
- Operational support capital costs.

- Commissioning, critical and operational spares
- First fills

#### 5.4 Work Breakdown Structure

A work breakdown structure (WBS) is a hierarchical breakdown of the deliverables associated with a project that defines and groups a project's discrete work elements. It allows for the allocation of time and cost estimates for all aspects of the project work packages/sections, which can then be used to track the overall progress of the project both from a time as well as a cost perspective.

Currently the project cost tracking is being carried out against the original cost estimate format, with no clearly defined WBS. This results in a situation where budget cost allowances are difficult to determine or measure against. This makes it difficult to determine how the project is tracking to budget, with the result that the project could suffer cost blowouts that go undetected until such time as the project budget is exhausted.

It is recommended that a WBS be formulated for the overall project to allow both cost budgets and time schedules to be aligned with each other to ensure that the Project Management team has the necessary tools available to adequately track and report the project progress on an ongoing basis. This will assist in highlighting potentially cost overruns at an early stage, where it is possible to make decisions to minimise the impact on the overall project delivery.

## 5.5 Cost Review

For the CAPEX review, the Kin Mining cost estimate has been manipulated into a basic breakdown by commodity/discipline to allow bench-marking of costs and to try and identify any gaps in the estimate that may exist. This basic breakdown used for the process plant CAPEX assessment is as follows:

<b>1</b>	<b>LAWLERS PLANT</b>
<b>1.1</b>	MILL ACQUISITION
<b>1.2</b>	DISMANTLE & RELOCATE
<b>2</b>	<b>LGP PROCESS PLANT</b>
<b>2.1</b>	EPCM
<b>2.2</b>	GENERAL
<b>2.3</b>	BUILDINGS
<b>2.4</b>	ELECTRICAL
<b>2.5</b>	BULK EARTHWORKS
<b>2.6</b>	CONCRETE
<b>2.7</b>	STRUCTURAL STEEL
<b>2.8</b>	PLATEWORK
<b>2.9</b>	EQUIPMENT
<b>2.10</b>	PIPING
<b>2.11</b>	OPERATIONAL SUPPORT
<b>2.12</b>	OWNERS COSTS
<b>2.13</b>	COMMISSIONING, CRITICAL & OPERATIONAL SPARES
<b>2.14</b>	FIRST FILLS

### 5.5.1 Lawlers Plant Mill Acquisition

It is understood that the Lawlers plant acquisition cost was \$2.4M, with \$1.2M already having been paid to Goldfields. This initial \$1.2M payment has been excluded from the current project forecast cost estimate, as it is presumed to be treated as a sunk cost.

The second payment for the plant acquisition of \$1.2M is included in the current project forecast cost estimate.

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### 5.5.2 Lawlers Plant Dismantle & Relocate

The current project forecast cost estimate for the dismantle and relocation of the Lawlers Plant is \$2,015,503, including contingency of \$260,364.

It is assumed that this allows for all costs associated with the relocation of the Lawlers plant, including any rehabilitation of the Lawlers site that may be required based on the contract with Goldfields.

Kin Mining has a valid lump sum proposal of \$1,867,734 for the dismantle and relocation of those parts of the Lawlers plant that will be used at the LGP site. (This proposal is qualified with exclusions that include relocation of buildings or spare parts, electrical isolation/disconnection/cable removal, piping removal/relocation).

This means that there is \$147,769 left within the forecast costs for any additional costs that may be incurred within this overall scope of works. These additional costs may include:

- Contractor flights, accommodation & messing
- Removal and disposal of any items that are not part of the contractor relocation scope of works.
- Rehabilitation of the Lawlers site as required by the sale agreement.

Given the above, the overall forecast estimate for the Lawlers plant dismantle and relocation may be low and should be reforecast based on all costs associated with these works.

### 5.5.3 EPCM

For projects of this nature, industry standards would normally put EPCM at 15% - 18% of total contract value, with a typical breakdown between the subcomponents as follows:

Engineering/Design	-	5% - 6% (of total project value)
Procurement	-	2%
Construction Management	-	6% - 8%
Commissioning	-	2%

The forecast cost estimate includes an amount of \$3,011,427 for engineering, procurement and construction management, including contingency of \$388,569. This equates to approximately 8% of the current total costs which appears to be low.

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The current estimate includes the following:

Description	Current Cost Allowance	% Overall Project Cost
Engineering/Design	\$ 398,443	1.1%
Procurement	\$ 326,592	0.9%
Construction Management	\$ 2,286,392	6.2%
Commissioning	\$ -	0.0%

On inspection of included costs, the following observations have been made:

- No allowance for a Project Manager
- No allowance for a back-to-back construction manager to cover R&R breaks
- Low allowance for project and discipline engineers on site during the construction phase of the project.
- Minimal engineering design allowance.
- No commissioning allowance.

### 5.5.4 General

Costs that have been reported into this section include:

- Mobilisation/demobilisation.
- Construction equipment (including LV's, craneage, access equipment, etc.)
- Fuel (for construction activities).
- Freight.
- Flights, accommodation & messing for all tradesmen, electricians, contractors and external consultants.
- Project insurances.

Total cost allowance for these items is \$4,597,089 including \$615,192 contingency.

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Although there are certain items that do not appear to have cost allocation, the overall estimate for general costs appears to be fair for a project of this size.

Items that have no specific allocation or minimal allocation include:

- Mobilisation/demobilisation.
- Flights, accommodation & messing for earthworks contractor.
- Flights, accommodation & messing for concrete contractor
- Flights, accommodation & messing for tank construction contractor.
- Flights, accommodation & messing for external consultants.
- Insurances

### 5.5.5 Bulk Earthworks

Bulk earthworks estimates have been based on estimated MTO's with unit rates to obtain overall cost.

Rates that have been used appear lower than would be expected, however it is noted that earthworks onsite have already commenced, and a more accurate assessment could be made based on actual costs against work completed to date.

Areas/Volumes for bulk earthwork cost calculations appear to be a lot lower than expected, and increased costs can be expected based on these additional areas/volumes and the higher earthwork rates

### 5.5.6 Electrical

The current forecast estimate for electrical costs \$2,981,106. It is believed that the value of electrical equipment from the Lawlers plant to the project is in the order of \$3M - \$3.5M, giving a total indicate value for electrical works of \$6M - \$6.5M. This equates to approximately 16% - 17.5% of total contract value.

Although this estimated electrical value falls within the typical 15% - 18% of project value, consideration must be made to the use of second hand equipment reducing overall project cost. The electrical estimate could be considered low for this reason, however it depends on the final level of instrumentation and automation for the plant. Based on previous experience and in



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consultation with an electrical contractor, it is believed that the overall electrical estimate could be inadequate for a gold CIL plant with minimal automation and instrumentation.

### Received Information

- 2.5MW mill motor details & nameplate
- UON Power Station BOO tender submission
- Load List
- LGP Equipment List 7053-LS-M-002 revision D
- LGP General Site Plan Layout
- Photos of 3-off transformer nameplates from MCE
- Lawlers High Voltage Single Line Diagram from Electrel

### Electrical Lists

#### Equipment

- Como Engineers has not received an Electrical Equipment List for either Lawlers or LGP.
- On review of the Equipment List 7053-LS-M-002, some MCCs & switchrooms are listed; however, the list is lacking the following
  - Transformers
  - High Voltage Switchgear
  - MCC detail – whether they come in a switchroom or are rated for outdoor use
  - Switchroom dimensions
  - Condition of equipment to be reused
  - Determination if above equipment is required new.
- If instruments are to be included in the Electrical Equipment List, the LGP Instrument List is required, with determination as to what can be reused from Lawlers
- Como Engineers have created a separate Electrical Equipment list for Lawlers. The list summarises critical long-lead equipment and availability for reuse in LGP – from informal

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discussion with Jeff from MCE and an old Lawlers Single Line Diagram from Electrel. This list needs to be reviewed by Kin Mining.

### Load List

- The load list received is assumed to be for LGP Plant. The nameplate loads correlate with those shown in the LGP Equipment List.
- The load list has been updated to revise loads in the Global section, as these did not seem to be correct. All other nameplate loads are unaltered.
- Diversity factors have been revised in line with Como Engineers database
- A utilisation factor of 0.91 has been added. This parameter is required in forming BOO powerstation contracts.
- Most significant loads expected of a gold processing plant seem to be captured.
- It is noted that the primary mill lubrication and lift pump system is missing.

### Single Line Diagrams

- There are no single line diagrams for LGP available for review – neither High Voltage nor Low Voltage versions.
- As previously mentioned to Kin Mining in regards to reviewing tenders for High Voltage equipment such as transformers and switchgear, single line diagrams are required.
- A preliminary HV Single Line Diagram has been drafted, using the following as a basis to work off
- LGP Site Plan Layout
- Lawlers Electrical Equipment List compiled by Como Engineers
- Reusing Lawlers equipment, where identified in forementioned list
- To finalise this HV SLD, the LGP load list must be finalised, with certainty around the largest loads; and confirmation of equipment details to be reused from Lawlers
- Until this HV SLD is finalised, no HV equipment should be ordered.

### **HV Electrical Equipment Specification**

- This specification requires the HV SLD to be compiled first.
- Local fault levels, voltages, current capacity can then be determined.
- Details of Lawlers HV equipment to be reused is also required, so equipment type and brand can be specified to minimise maintenance requirements.

### **Power Station Tender**

- The tender submission from UON is in budget form and cannot be converted to contract.
- The revised load list has a diversified (running load) of 5.3MW. Diesel generators are normally run at 70-75% duty, so 6MW of duty generators will be insufficient to run the plant. Assuming that the proposed generators are rated for 45°C ambient heat, 7MW prime generation is required.
- Additionally, at least one (1) spare standby generator will be required to ensure availability of supply during maintenance or breakdown.
- The total power generation charge cost will be more than that proposed. (To cover revised load, two additional 1MW sets or upsizing the proposed generators)
- 0.415/11kV step up transformer mentioned, but 3.3kV for site is required.
- The UON tender lists a fixed charge per month, which is not favourable to either party. The client will be paying more than required if the charge is set at a forecast plant load higher than actual. On the flip side, if the charge is set too low, the contract will not be sustainable over multiple years for the Power Service Providers (PSP), resulting in midterm contract negotiation or disruption of power supply when changing to new PSP.
- Upfront costs are listed, and would presumably be charged to the client.
- Under a more typical Build, Own, Operate (BOO) contract with PSP, this upfront cost is amortised into the ongoing operating charge – shifting the cost to client from upfront capital expenditure to operating expense.
- A fuel farm is offered as part of the package. Typically, the client will own a central fuel farm servicing the power station and vehicle fleet together. A day tank is deployed in the fuel farm located a serviceable distance away from power station.

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- Further clarification and negotiation with UON is required to determine validity of the estimate.
- Other PSPs should be approached for price comparisons. If quick lead time is required, the modular sea containerised power station detailed in the proposal is necessary. Gas sets will not be possible with quick lead time requirements.
- There are other companies that provide a similar solution – such as Aggreko and Power West.
- If lead time is not a concern, traditional well established BOO PSPs providers such as KPS can be approached to quote. They house the generators in an engine hall and typically run the power station for Life-of-Mine. They have more experience in operating & maintaining power stations in a mining environment than the PSPs offering just modular sea containerised solutions.
- Tenderers can present charge costs in a variety of forms.
  - Some PSPs use a fixed monthly generation charge, and add a c/kWh operating charge on top.
  - Some PSPs add a fuel efficiency guarantee, derisking/minimising the supply cost of fuel usage.
  - The client should negotiate for a contract model to suit.

### 5.5.7 Buildings

It is understood that most of the buildings have already been procured for the project or are second hand being relocated from Lawlers. We believe that based on this, the estimate for building costs is likely correct for this project.

### 5.5.8 Commodities

#### 5.5.8.1 Concrete

Total volume of concrete allowed in the current forecast estimate is 1,877m<sup>3</sup>, which would seem to be substantially higher than expected.

Rates for concrete that have been used are \$1,800/m<sup>3</sup> for slabs and basic footings and \$2,875/m<sup>3</sup> for walls, plinths and large foundations.

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No additional allowance has been made for concrete contractor Preliminary and General (P&G) costs (mobilisation, project management, supervision, etc.), which could be in the order of \$150,000 - \$200,000.

Typical cost rates for the Leonora area obtained from a reputable concrete contractor indicate expected rates between \$1,400/m<sup>3</sup> and \$2,450/m<sup>3</sup>.

Overall the concrete allowance appears much higher than could be expected and potential cost savings in this area should be realised.

### **5.5.8.2 Structural Steel**

Structural steel has not been estimated based on steel MTO's and fabrication rates, but has rather just had general allowances made for steel refurbishment or new fabricated steel requirements.

The overall allowance for fabricated steel is \$836,250, which includes \$250,000 for general blast and paint of second hand structures and equipment in the plant. This allowance may be low, depending on how many new structures are required to supplement those from Lawlers, or for modifications & repairs to existing structures.

There is a large amount of labour allocated to structural steel works (\$1.3M), which is appropriate given the requirement for refurbishment and repairs to existing Lawlers steel structures.

### **5.5.8.3 Platework**

Platework has not been estimated based on MTO's and fabrication rates, but has been rather just had general allowance made against certain items.

The total allowance in the estimate for fabricated platework material is \$617,500, which includes \$550,000 for the CIL tanks.

The tank cost estimate is based on actual costs incurred by way of existing PO on the tank construction contractor, so this cost is accurate, with no potential for overall savings based on the estimate.

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All other fabricated platework requirements only have an allowance of \$67,500. With a typical fabricated platework rate of \$15,000/t, this would indicate an allowance of approximately 4-5t for all other requirements on the plant.

There appear to be gaps in the costed platework items within the forecast estimate, with very few launders, chutes and bins listed.

Overall, the allowance for platework looks very low, and it is expected that there would be a number of additional costs for additional hoppers, chutes, bins and launders.

### 5.5.8.4 Piping, Valves & Fittings

The total piping, valve and fittings allowance is \$511,219 including \$65,963 contingency.

As a benchmark, piping costs would typically be in the order of 16% - 20% of installed equipment cost, whereas the allowance accounts for approximately 5%.

Given that piping removal and relocation has been excluded from the Lawlers contractors scope, it appears that most piping would be new supply and the overall allowance within the estimate is very low.

### 5.5.9 Equipment

The forecast cost estimate includes the majority of items listed in the equipment list, however there are some omissions and these would necessarily lead to additional costs. In addition, with the review of the equipment list highlighting items of equipment that have been omitted from the equipment list, there would be additional costs associated with those items as well.

The following table indicates those items that are included on the current mechanical equipment list, but have no corresponding costs in the cost estimate:

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CAPEX REVIEW SUMMARY TABLE		
EQUIPMENT NUMBER	EQUIPMENT DESCRIPTION	INCLUDED IN CAPEX
	<b>GLOBAL</b>	
MCC4	Crushing Area MCC	N
	Crusher Control Room	N
MCC1	Powerstation Switchroom	N
	Mill Control Room	N
	Mining Workshop Building	N
	<b>CRUSHING AND SCREENING</b>	
	ROM Flood Light Towers	N
RB01	Rock Breaker	N
MEA01A	Electro Magnet Drive	N
ME01	Electro magnet	N
	Cone Crusher Feeder	N
	Metal Detector	N
PP18	Water Supply pump	N
	Lime removable storage (lime quippy)	N
FT03	Emergency feed hopper	N
CT09	Emergency feed conveyor	N
	<b>GRINDING AND CLASSIFICATION</b>	
	Primary Ball mill feed conveyor weightometer	N
	PRIMARY BALL MIL FEED WEIGHTOMETER	N
	PRIMARY BALL MILL TROMMEL	N
	PRIMARY BALL MILL TROMMEL UNDERSIZE CHUTE	N
	PRIMARY BALL MIL TROMMEL OVERSIZE CHUTE	N
	PRIMARY BALL MILL BALL CHARGING KIBBLE	N
	PRIMARY BALL MILL MAINTENANCE DAVIT	N
	PRIMARY BALL MIL BALL CHARGING HOIST	N
	<b>LEACH / ADSORPTION</b>	
	Final carbon dewatering screen	N
	<b>TAILINGS</b>	
	TAILS THICKENER P-Duc motor	N
	Thickener underflow pump No1	N
	Thickener underflow pump No2	N

In addition to the above, specific items identified include:

- It is noted that the cost estimate includes approximately \$400,000 for the installation of the 600kW Allis Chalmers ball mill that is currently not required for the process plant, so this is potentially an area of cost saving.
- In general, allowances for refurbishment or repair to second hand equipment that is intended for use at the LGP appear to be lower than would be expected.
- The existing Lawlers gold stripping plant is undersized for this project, and it is believed that a new 4T circuit would be required. This would likely lead to a cost increase of approximately \$2.4M over the current allowance of \$547,466.

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- Total cost for 2 x tails pumps are \$500,000 which appears higher than required.
- \$170,000 allowance included for gravity circuit equipment which is not required for initial plant operation.

### 5.5.10 Labour

Hourly trades labour rates have been used in the estimate whereby tasks are considered based on the number of man hours expected for completion.

The rate used is a composite labour rate which includes hourly wage rate, R&R travel and flight costs, accommodation, messing and consumables. An efficiency factor of 90% has been applied to account for travel time, pre-start meetings and other OHS requirements.

The hourly tradesman cost rate that has been used is a flat \$75/hr + 30% on-costs. This is considered extremely high. Current labour hire rates for qualified tradesmen would be in the range of \$65-\$70/hr, with trades assistants around \$55-\$60/hr. As these are labour hire rates, there would be minimal on-costs over and above this costs.

The total SMP trades labour allowance for the project is approximately 60,000hrs, which is potentially higher than what could be expected, however it is noted that there is likely an inclusion for refurbishment and modifications to Lawlers relocated steel structures, bins, etc.

It is expected that the overall labour forecast cost estimate is higher than required and could be reduced.

### 5.5.11 Operational Support

Costs that would typically be included in this section would be items procured in readiness for use by the operations team and could include:

- Light vehicles
- Bus
- Crane
- Forklift / telehandler
- Access equipment
- Lighting towers



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- General workshop tooling
- Office fit-out, including IT, furniture
- Laboratory fit-out

The current estimate includes an allowance of \$295,000. It is believed that Kin Mining has already purchased a crane, telehandler and boom lift and the cost of these items alone has exceeded the cost estimate.

Overall, the allowance for these costs appears low, and additional costs are expected.

### 5.5.12 Owners Costs

Costs that are envisaged here would include:

- Corporate costs associated with the setup of the project and ongoing during the project development.
- Operational readiness costs – hiring of operational staff, training, etc.

The included amount of \$1.5M is probably sufficient for these items.

### 5.5.13 Commissioning, Critical and Operational Spares

Total allowance of \$345,000 including \$45,000 contingency may be sufficient given that the Lawlers plant has been purchased with all spares included, and these would be relocated to LGP.

It is not known whether there are critical spares available for the Mill that has been purchased, including spare motor, pinion or ring gear, but thought should be given to holding spares of these items to reduce overall operational risk.

Additional costs may be incurred in this area, depending on the current inventory of second hand spares as well as the approach to critical spares holding on site.

### 5.5.14 First Fills

An overall allowance of \$345,000 including \$45,000 contingency is included in the estimated costs which is likely sufficient for initial plant startup.

## **6 Project Execution**

The current project execution strategy is based on an “Owner-Build” model.

The project has been centred around the reuse of the second hand Lawlers plant which will be relocated to the LGP site.

Minimal engineering design appears to have been done to produce final engineering documents, resulting in on-the-run engineering being done in parallel with onsite development activities. This has the potential to negatively impact the overall project budget and schedule.

### **6.1 Project Execution Plan**

The Project Execution Plan (PEP) is the primary document that defines how the project will be undertaken. It details the specific activities in the project, the resources applied to the project, and the organization of the project.

The major elements of a project execution plan are:

- Scope definition
- Goal statements
- Quality and technical specifications
- Resource allocation
- Project scheduling

There does not appear to be a well-defined PEP for the LGP project and a detailed project execution plan needs to be developed for the project to ensure alignment within the project team and management as to how the project will be delivered.

### **6.2 Document Control**

A document control system needs to be implemented to ensure revision control of all critical documents and drawings for the project. This will prevent old superseded documents being referred to with resulting mistakes being made and rework required.

This will allow ready access to the latest project information, without having to spend a lot of time trying to verify latest revisions, changes required, etc.

### 6.3 Schedule

The current schedule indicates a construction period of approximately 12 months, having commenced in January 2018, with construction completion due in January 2019.

The schedule indicates a 2 month commissioning period with handover to operations after commissioning expected in March 2019.

This schedule should be achievable given the availability of equipment and structures that have already been purchased for the project, as well as the advanced stage of tank construction for the CIL tank farm.

There is a high risk of slippage from the current schedule, given the lack of engineering design, lack of final approved design documents, including layouts, equipment lists, load lists, etc. The lack of this information will make it difficult to tender the works with any confidence.

It is recommended that the schedule be updated based on current progress to date, with the inclusion of an engineering design/definition stage, where critical engineering design and project management documents will be developed, finalised and agreed.

It is believed that given the correct execution strategy, the current scheduled construction completion of January 2019 could be achieved, however this is also dependent on any long lead items that have yet to be identified and ordered.

## 7 Disclaimer

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If any there are any questions, or additional information required, related to the material presented in the Study we would be very pleased to provide our assistance.



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**Date: May 2018**