

## Corporate Details

Ordinary Shares:  
780,917,069

Market Capitalisation:  
~\$145 million

Cash and bullion at 30 June  
2017:  
~\$27.7 million

Debt:  
NIL

ASX Code: MOY

## Board of Directors

Greg Bittar  
Non-Executive Chairman

Michael Chye  
Non-Executive Director

Tim Kennedy  
Non-Executive Director

Peter Lester  
Non-Executive Director

## Management

Peter Cash  
Chief Executive Officer

Dean Will  
Chief Operating Officer

Richard Hill  
Chief Financial Officer

Pierre Malherbe  
Company Secretary

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# Processing breakthrough at Nullagine paves way for significant growth in production and mine life

*Integrated CIL and flotation circuit set to deliver maximum flexibility in processing all ore types – supporting Millennium's objective of achieving +5 year mine life at +100kozpa*

## Key Points

- The preliminary results of the expansion study have established the preferred plant configuration for processing extensive fresh ore Resources (+850koz) at the Nullagine Gold Project
- Results received to date have established that an integrated CIL and flotation plant will deliver superior results to the initial concept which was based on a stand-alone 0.5Mtpa flotation circuit operating in parallel with the existing 2Mtpa CIL plant
- Plant throughput will vary depending on ore type, with throughput of ~1.5Mtpa now achievable when treating fresh ore only (compared with current ~2Mtpa capacity treating 80% oxide and 20% fresh ore)
- This increased throughput delivers significantly lower operating costs which will in turn lower cut-off grades for potential higher conversion of Resources to Reserves
- Metallurgical testwork demonstrates that the flotation circuit will produce a high-grade precious metals concentrate grading up to 60g/t gold
- The integrated plant design will also deliver the added benefit of improved recoveries for all free milling ores due to finer grinding through the ball mill
- Processing costs for free milling fresh ore are expected to be ~A\$19/t through the CIL circuit, with costs for fresh ore through the flotation circuit of ~A\$27.50/t (delivered to smelter) ~ current processing costs for oxide ore are ~A\$17/t
- The capital cost of achieving the new plant configuration is estimated in the range of \$40 - 46M
- Re-optimisation of the entire Mineral Resource inventory at Nullagine is underway and will underpin the expansion study economics due for release later this quarter

**Millennium Minerals Limited (Millennium or Company – ASX: MOY)** is pleased to announce that it has achieved a key breakthrough in its strategy to significantly grow the production profile and mine life of its flagship **Nullagine Gold Project** in WA (Appendix 1).

Preliminary results of the expansion study have established the extensive economic advantages of an alternative processing route for its +850koz (Appendix 2) fresh ore Mineral Resource inventory.



The new processing solution involves integrating a flotation circuit capable of treating sulphide ores through Millennium’s existing 2Mtpa CIL plant. This compares with the initial plan to build a stand-alone flotation circuit capable of processing 0.5Mtpa of sulphide ore.

The development builds on the significant breakthrough achieved by the Company earlier this year which demonstrated that in a number of instances fresh ore at Nullagine is free-milling and can be processed in the existing CIL plant, while in others it can be successfully processed in a conventional flotation circuit (refer ASX Announcement, 4 May 2017).

The processing portion of the expansion study has been undertaken by Millennium in partnership with external and internal consultants including DRA Global, OMC, Kyspy and Veritas Metallica. Key outcomes of the study included:

- **Recoveries of up to 90%** achieved via conventional CIL treatment of fresh ore from at least two deposits, Bartons and Shearers, demonstrating they can be processed through the existing circuit; and
- **Recoveries averaging 89%** from fresh ore sources (such as the Golden Eagle (86%) and Golden Gate (estimated at 90%) deposits) using conventional sulphide flotation techniques to produce a precious metal concentrate.

Based on these results, Millennium has identified the preferred long-term processing configuration for Nullagine to support the project’s growth and expansion as an integrated CIL and flotation circuit which has the ability to treat all types of ore.

The key additional requirements of this integrated flowsheet (see Figure 1 below) include the installation of a ball mill for additional grinding of fresh ore, a conventional flotation circuit and associated concentrate handling facilities.

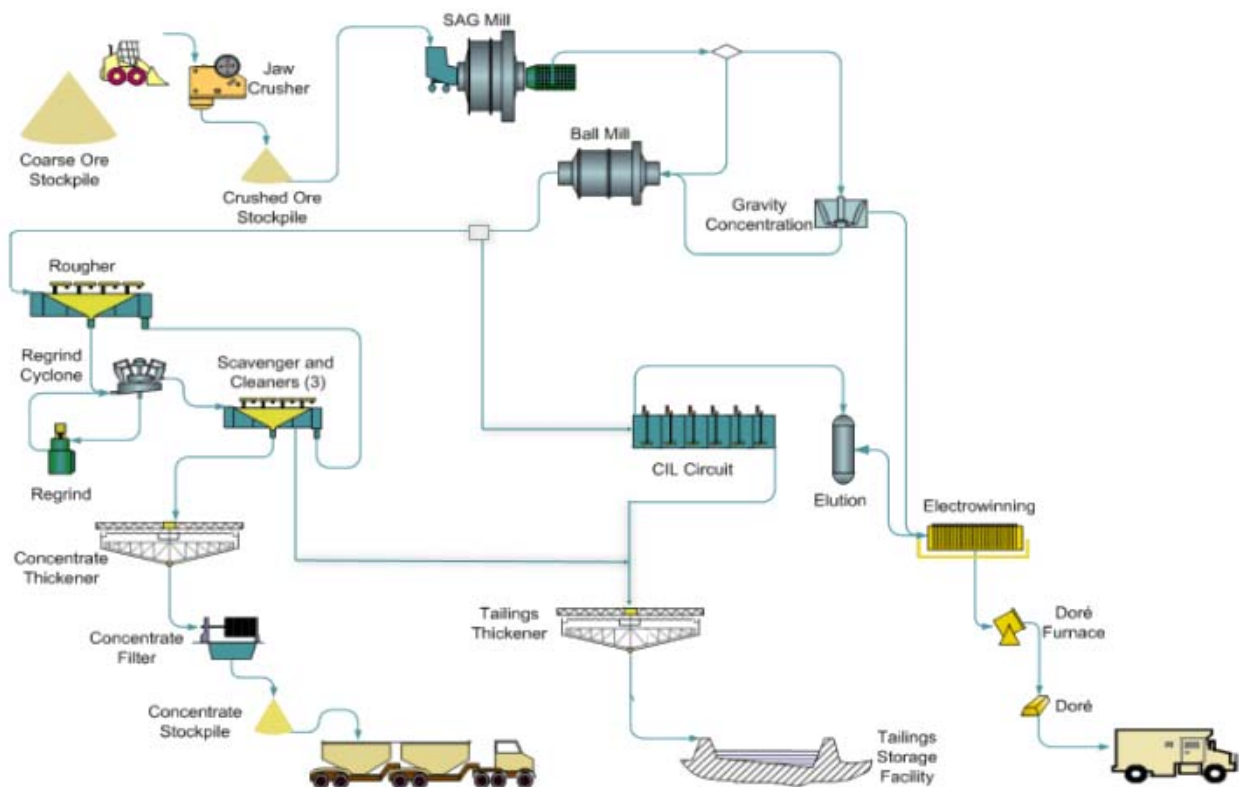


Figure 1: Conceptual integrated CIL / flotation circuit at Nullagine.



This flexible plant configuration, which combines standard, off-the-shelf processing methodologies, delivers a number of significant advantages for Millennium, namely:

- It utilises the maximum capacity of the currently installed fixed plant, and is therefore highly capital efficient compared with the dual processing streams originally contemplated;
- Improved economies of scale - increased throughput delivers significantly lower operating costs which in turn will lower cut-off grades for potential higher conversion of Resources to Reserves;
- It will allow Millennium to contemplate treatment of large-tonne open pit sulphide ore Resources not currently considered to be a priority focus for the study;
- Campaign treatment of both oxide and free milling fresh ore, as well as sulphide ore sources, giving the Company maximum flexibility in terms of processing all ore types at Nullagine;
- It will deliver increased recoveries and throughput through the existing CIL circuit when processing free milling ore;
- It provides flexibility to the life-of-mine for variable throughput rates for different ore types; and
- It opens up the potential for the Company to consider toll-treatment of a broader range of third-party ore sources in the East Pilbara region, increasing the strategic value of the Nullagine plant which is the only significant gold processing facility within a 400km radius.

While treating 100% fresh ore, the plant will have an estimated throughput of 1.5Mtpa. This compares to the current CIL plant capacity of 2Mtpa treating roughly 80% oxide and 20% fresh ore.

The flotation circuit will produce a precious metal concentrate grading up to 60g/t gold (depending on deposit specific ore characteristics and head grade), for sale to smelters globally. Initial concentrate marketing activities have commenced, pending completion of bulk metallurgical testwork and further drilling.

The required capital expenditure to fund this plant modification is estimated to be in the order of A\$40-46 million, including contingency.

Processing costs for free-milling fresh ore are expected to be ~A\$19/t, which compares to the current processing cost for oxide ore of A\$17/t. The processing cost for sulphide ore through the flotation circuit is estimated to be an average of A\$27.50/t.

Sulphide ore will be sourced from open pit deposits such as Golden Eagle, and from potential underground operations such as Golden Gate. Underground operations at Bartons will deliver free milling ore capable of being processed through the existing CIL plant. Fresh ore at an additional ~30 deposits at Nullagine remain metallurgically untested and open at depth.

Millennium's Chief Executive Peter Cash said the processing results amounted to a significant breakthrough for the Company with the potential to deliver a step-change in its growth profile at Nullagine.

"The identification of an integrated processing solution is a major step forward which puts in place the most important foundation required to complete the expansion study," he said.

"The ability to process any ore type at Nullagine in the future as and when our mining schedule determines will give us unparalleled ability to exploit the vast resource inventory across the project. It will also allow us to fast-track the development of new open pit and underground ore sources which are currently being drilled."



“This breakthrough delivers flexibility to mine whichever deposits we wish at any time, tailoring the process flowsheet as our mining schedule changes, thereby allowing us to immediately undertake optimisations on a much broader range of deposits than previously envisaged.”

“We can now see a pathway to achieve our objective of establishing a +100kozpa production profile at Nullagine with a +5 year life, establishing a long-term gold business which has a significantly greater scope than the current open pit oxide gold operation,” he said.

“This is an exciting development for the Company which could underpin the future of Nullagine as a long-term open pit and underground mining operation.”

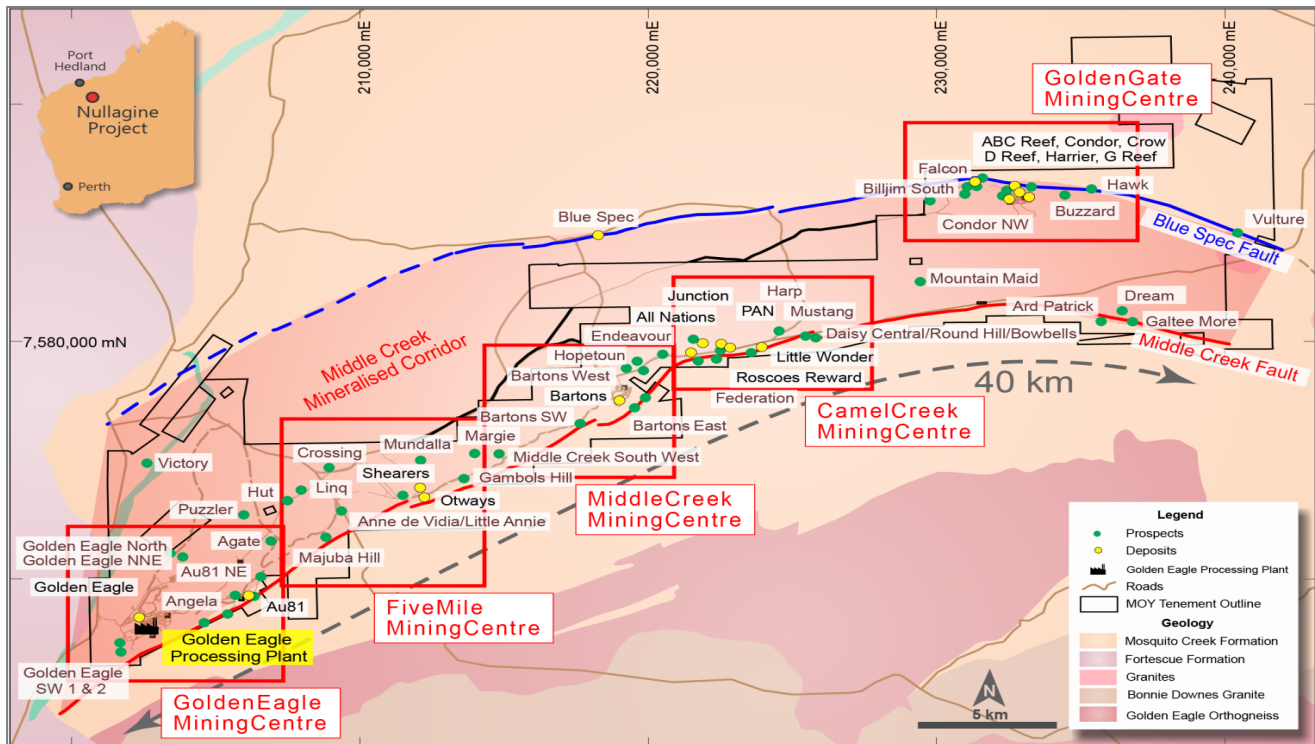
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*Appendix 1: Nullagine Gold Project Location Plan over regional geology*



*Appendix 2: Mineral Resources and Ore Reserves*

On 15 February 2017, the Company announced an updated Mineral Resources and Ore Reserves statement reported in accordance with the JORC Code 2012, which included the following:

December 2016 Mineral Resource estimate – Including Ounces in Fresh Ore

Mineral Resource Category	Million Tonnes (Mt)	Grade (g/t Au)	Thousand Ounces (Koz)	Incl. Ounces in Fresh Ore (Koz)
Measured	11.02	1.3	459.7	283
Indicated	11.37	1.3	470.1	270
Inferred	9.37	1.2	350.6	294
<b>Total</b>	<b>31.76</b>	<b>1.3</b>	<b>1,280.4</b>	<b>847</b>

In accordance with Listing Rule 5.23, the Company confirms it is not aware of any new information or data that materially affects the information included in its announcement of 15 February 2017, and that all material assumptions and technical parameters underpinning the estimates in that announcement continue to apply and have not materially changed.