

ASX: ANX

06 DECEMBER 2021

## EXCELLENT RESULTS FROM HEAP LEACH TEST WORK WITH POTENTIAL TO UPGRADE FREE CASH

- **Over 95% of copper and zinc recovered in the bench scale test work with rapid leach kinetics**
- **Up to 15% of the mined copper and zinc will be delivered to the heap through the (second stage) sorting process and gravity circuit**
- **Current scoping study results do not assign any value to the proposed heap leaching process and will be revised**
- **Heap leaching of the (second stage) sorting products through the refurbished site infrastructure will generate additional revenue streams for the project and increase free cash**
- **Amenability tests demonstrate ideal leaching conditions**
- **Column testing has commenced to verify recoveries and generate indicative operating costs for DFS**
- **Future ore sorting tests designed to remove acid-consuming minerals from heap leach feed**

Anax Metals Limited (ASX: ANX, **Anax**, or the **Company**) is pleased to provide an update on the heap leach amenability test work undertaken on Mons Cupri low-grade, "middlings" concentrates from bulk ore sorting test work<sup>2</sup>.

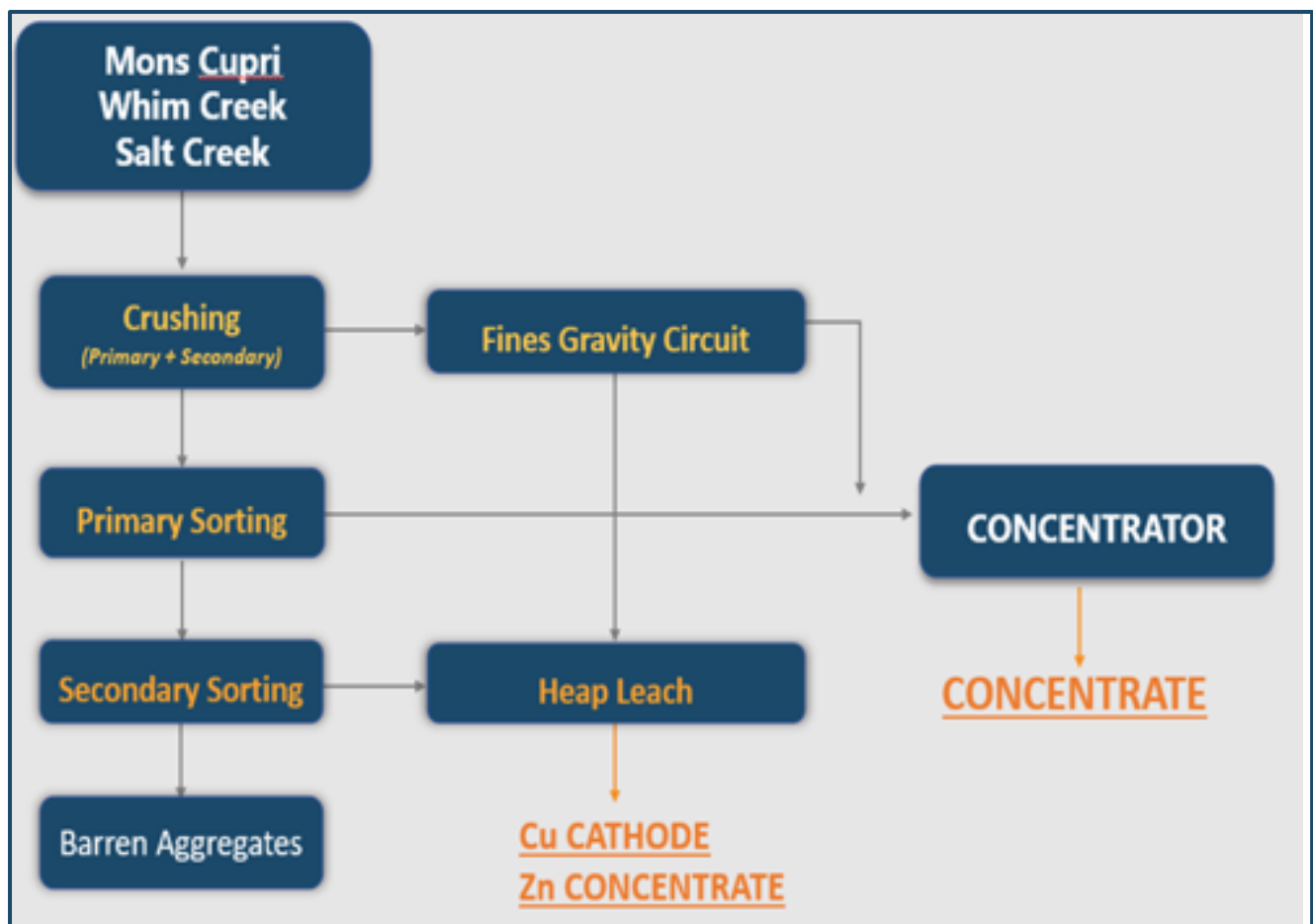
The Company's Managing Director, Geoff Laing commented:

*"The results of the first stage heap leach amenability test work were very positive as they indicated that the Mons Cupri ore sorter "middlings" were amenable to heap leaching using commercially available bacterial cultures. While the amenability tests were carried out under controlled laboratory conditions, and produced 'best case' outcomes, the rapid leaching of copper and zinc and the high levels of dissolution achieved increased Anax's confidence that bioleaching has the potential to generate additional revenue streams for the Whim Creek Project. The column test work currently in progress will provide key information for the ongoing feasibility study."*

## The Role of Heap Leaching in the Whim Creek Project Development

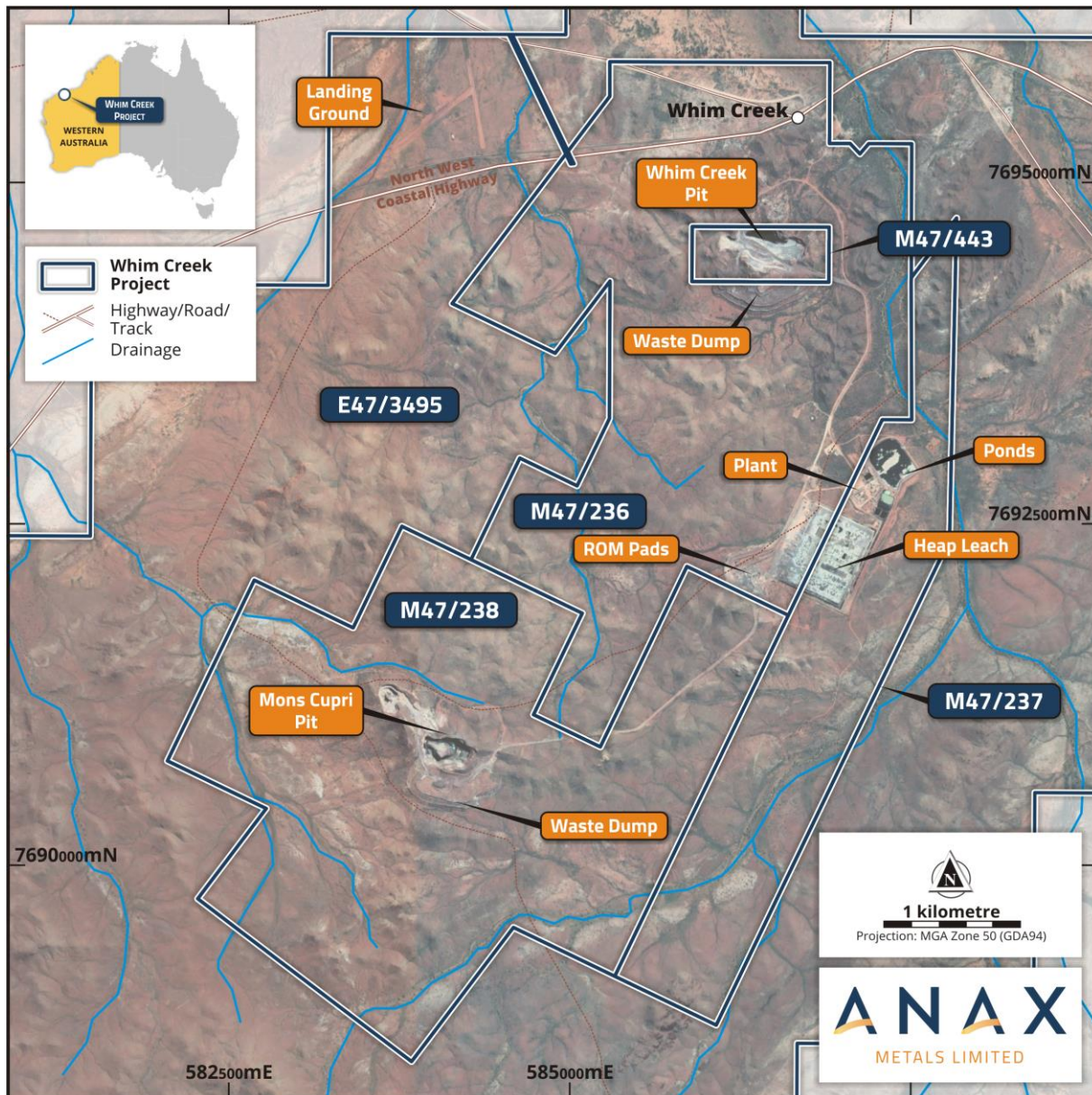
The Scoping Study<sup>1</sup> financial model made provision for capital and operational expenditure associated with heap leaching and the forthcoming Updated Scoping Study will include conservative revenue estimates for the recovery of copper and zinc from the bacterial heap leach.

Anax’s conceptual ore sorting flowsheet (Figure 1) illustrates the opportunity that ore sorting provides, generating products suited to different processing pathways. The model is inherently robust, enabling the optimal separation of primary, high-grade pre-concentrates for flotation from secondary, lower grade “middlings” for leaching. Secondary sorting (processing the rejects from primary sorting) provides control over the grade of material that is directed to the heap (“middlings”) and the grade of the final rejects – barren aggregate for use on site or for sale.



**Figure 1: Whim Creek Project Conceptual Ore Sorting Flowsheet.**

As detailed in the recently completed Scoping Study for the Whim Creek Project<sup>1</sup>, the proposed bacterial heap leach will play an important role in optimising metal recovery through treatment of secondary sorting products. Bioleaching will utilise the existing heap leach infrastructure at Whim Creek (see Figure 2) to process the “middlings”, along with the rejects from the fines gravity circuit, in order to maximise the recovery of metals.



**Figure 2: Whim Creek Site Plan showing the location of the Heap Leach Infrastructure**

### Heap Leach Amenity Test Work

Anax has commissioned bacterial heap leach test work at three leading specialist laboratories, namely BioHeap Limited in Perth, Bureau Veritas in Adelaide and another Perth laboratory. The amenability tests represented the first stage of evaluation of potential metal recovery from heap leaching. As such, they represent the 'best case' recoveries under the controlled conditions applied. High recoveries in amenability test work indicate a high level of activity and potency of the microbial cultures.

## Test Work Results

The bulk of the proposed heap leach feed (>90% based on current modelling) will be derived from the second stage ore sorting of lower grade copper-zinc domains.

Using material from Mons Cupri bulk ore sorting tests<sup>2</sup>, heap leach amenability test samples were composited from “middlings” derived from samples MC3 and MC4. The composite feed samples assayed 1.3% Cu and 0.3%-0.5% Zn. The heap leach test work primarily tested copper recovery from chalcopyrite by bacterial leaching, though zinc recovery was also recorded as sphalerite leaches under the same conditions.

Diagnostic leaches and heap leach amenability test work have so far been completed at BioHeap and Bureau Veritas, with test work at a third facility currently underway. The tests were carried out using moderate thermophile bacterial cultures maintained at ~50°C, with regulated acidity, representative of the conditions that prevail in the heap leach as a result of exothermic oxidation reactions. The dissolution of metals was monitored periodically throughout the amenability tests by taking samples of the solution for analysis, with final analysis of leachate residues after completion of the tests to establish overall metal recovery.

## BioHeap Test Work

The low-grade composite ore sample was ground to 80% passing 75µm and combined with BioHeap™ moderate thermophile bacterial cultures, maintained at 50°C and controlled pH in a stirred flask. The copper and zinc recoveries from BioHeap™ amenability tests are summarised in Table1.

Test	pH	Duration	Cu recovery %	Zn Recovery %
1	<2.2 to 1.2	79 days	60	98
2	<1.7	37 days	68	97
3	<1.7	38 days	81	88

Test 3 was the final test after optimising the key parameters derived from the earlier two tests. In this test, copper recovery increased to over 80% after 20 days and peaked at 88% after 32 days, before recording a final recovery of 81% after 42 days (test termination). As expected, zinc leaching was more rapid, with zinc recovery increasing to over 80% after 4 days and peaking at 88%.



## Bureau Veritas Test Work

Composited ore samples were crushed to 100% passing 75µm and underwent Bioleach batch tests (BAT), with pH in the range 1.5-2.0 for the duration of the tests. The copper and zinc recovery data from the amenability tests carried out at Bureau Veritas in Adelaide are shown in Table 2.

Test	pH	Duration	Cu recovery %	Zn Recovery %
Mesophile BAT 1	1.5-2.0	23 days	19.0	93.7
Mesophile BAT 2	1.5-2.0	23 days	19.4	95.0
Moderate Thermophile Mod-A	1.5-2.0	27 days	95.7	99.6
Moderate Thermophile Mod-B	1.5-2.0	27 days	95.2	99.5

The first two tests were carried out at 40°C using mesophile (lower temperature tolerant) bacterial cultures and recorded low copper recoveries and high zinc recoveries. The subsequent two tests Mod-A and Mod-B were carried out at 50°C, using moderate thermophile bacterial cultures. In the Mod-B test the temperature was increased to 55°C after 15 days.

The moderate thermophile tests exhibited rapid leaching kinetics. In the Mod-A test, more than 90% of the copper had dissolved after eight days (with a final copper recovery of 95.7% after 27 days). In the Mod-B test approximately 88% of copper had dissolved after eight days with a final recovery of 95.2% after 27 days.

Zinc dissolution was also rapid in the moderate thermophile tests with peak recovery achieved after only eight days.

## Next Steps

The next round of test work will make use of bacteria native to the Whim Creek Project and these cultures are currently under development.

Additionally, column tests are proceeding at Bureau Veritas, using coarser ore material to approximate to actual heap leaching conditions more closely, in order to assess recoveries and indicative operating costs.

Future test work is likely to incorporate ore from the Whim Creek deposit and suitable ore sorter middlings are available for this work.

Authorised for ASX release by the Board of the Company.

**For further information, please contact:**

Anax Metals Limited  
20 Kings Park Road, West Perth WA 6005  
Telephone: 08 6143 1840

**References**

The information provided in this announcement refers to the following Anax Announcements to the ASX:

1. Whim Creek Scoping Study Demonstrates Outstanding Value, 30 August 2021
2. Sorting Tests unlock Whim Creek Value, 28 April 2021

Anax confirms that all the material assumptions underpinning the production target and the forecast financial information in the Scoping Study dated 30 August 2021 continue to apply and have not materially changed.

**COMPETENT PERSON'S STATEMENT**

*The information in this report that relates to heap leach test work results is based on and fairly represents information compiled by Dr Tony Parry. Dr Parry is Managing Director of consultancy OreSort Solutions and a shareholder of Anax Metals Ltd and a Member of the Australian Institute of Mining and Metallurgy.*

*Dr Parry has sufficient experience of the metallurgical test work procedures, sampling and analytical techniques under consideration to be aware of problems that could affect the reliability of the data and to qualify as a Competent Person as defined in the 2012 Edition of the Joint Ore Reserves Committee (JORC) Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Dr Parry consents to the inclusion in this report of the matters based on information in the form and context in which they appear.*