

## ASX Announcement – 28 July 2017

### MDI's revamped Sandstone gold mill to also process harder ores

Western Australian gold developer, Middle Island Resources (ASX: "MDI") notes recent public statements by the Company's neighbouring tenement holder, Alto Metals Limited (ASX: "AME") and a research report commissioned by Alto (released this week) into that Company's historic and greenfields Sandstone gold mines, deposits and prospects.

The Alto statement (21/7/2017) and the research report refer to the potential opportunity for Alto to regionally process some of its historic and fresh hard rock gold inventory present within its Sandstone holdings, and the adequacy of operating and proposed gold processing plants within a 200km radius to service such a requirement.

Middle Island's Sandstone tenements, to the south of the township of Sandstone, are close to Alto's acreage. The MDI assets at Sandstone include the existing 600,000tpa gold processing plant. The Company plans to refurbish that plant to service both MDI's own future gold treatment requirements, and offer toll treatment or production sharing options to gold miners in the wider Sandstone district.

Strategically, MDI's Sandstone mill is within 25km of Alto's deposits, offering the potential for distinct competitive cartage and revenue upside compared to the nearest operating mills, which are at least a further 150km distant.

Critically, not only has the Sandstone mill historically treated softer oxide ores, but between 1994 and 2010 under previous ownerships, processed a proportion of harder primary and lateritic gold ores.

Middle Island said today that its Pre-Feasibility Study (PFS) completed earlier this year into refurbishing and recommissioning its Sandstone mill, included a focus on being able to process hard rock ore. Key PFS outcomes included:

- **A suitably designed contract crushing circuit was incorporated into the PFS, producing a ~12 mm SAG mill feed size, to achieve target mill throughput using a blend of hard and soft ore.**
- **GR Engineering Services and MDI completed a detailed mill refurbishment plan and cost estimate as part of the PFS.**
- **There is significant supporting infrastructure and services at or near the Sandstone mill.**
- **Due to the significant cost, and hence impact on Ore Reserves, of long distance road ore haulage, the MDI mill will be a competitive option for third party deposits.**

#### **Background**

The following background details the hard rock treatment capability at MDI's Sandstone mill under the Company's proposed upgrade program.

As part of the comprehensive PFS completed by MDI early in 2017, considerable work was undertaken on being able to treat both hard and soft rock in the future, and a detailed assessment and cost estimate was completed by GR Engineering Services (GRES) and MDI on the mill refurbishment.



The treatment plant at Sandstone ran from 1994 to 2010 with several upgrades and design changes over the years. This included the addition of a ball mill in 2000 and two additional leach tanks in 2005. Previous owner/operator Troy Resources processed a significant quantity of both laterite and hard rock, usually as a blend with softer material.

Since acquiring the Sandstone project in July 2016, and as part of the due diligence prior to that, MDI has reviewed technical and operating data, conducted additional metallurgical test work and completed a PFS on the total project, including what is required to upgrade the mill to process harder ores (comprising feed blends containing banded iron formation (BIF) and pisolitic laterites), expand the existing licenced tailings dam and an evaluation of all other existing infrastructure.

A view of the plant from the run-of-mine (ROM) pad is shown in Figure 1.

**Figure 1**  
**View of the plant from the ROM pad**



## **Crushing**

In most cases, processing of hard rock requires primary and secondary crushing, as well as primary and secondary grinding. The major historic limitation on the Sandstone mill being able to process harder ore types at the 600,000tpa design throughput was the original crushing circuit. The original contracted crusher, utilised by Troy and located on the ROM pad, was removed from site well before the Sandstone project was acquired by Middle Island. **As such, a new, purpose-designed crushing circuit, capable of treating harder primary and pisolitic ore types has been incorporated into the PFS and costings for the proposed re-commissioning.**

The PFS incorporates a well-designed, tailor-made crushing circuit (comprising a jaw crusher, two cone crushers and a triple-deck screen) that will feed the two existing semi-autogenous grinding (SAG) mills. The material is then reground in the larger ball mill, resulting in a mill throughput of at least 0.5 Mtpa. This will be at the required grind size for high (>90%) gold recovery onto activated carbon in the large capacity leaching circuit.



Capital considerations led to the PFS selection of contract crushing and two quotes were received. The specifications for the contract crusher included 0.6 Mtpa capacity at p80 of 12mm. Historically, the circuit limitation has frequently been excessive mill scats production on harder ore. However, it is considered that the proposed grinding circuit throughput will be significantly more robust with the reduced crushed feed size. Additional crushing of scats was commonly practised by Troy and could be implemented again if required.

### **Mill Refurbishment**

As part of the PFS, a tender process was initiated to quote on refurbishing the mill and associated infrastructure. Seven companies were invited to tender and GR Engineering Services (GRES) was selected as the preferred contractor. Seven representatives from GRES visited the site in December 2016 and completed a comprehensive structural, mechanical and electrical evaluation of the plant, providing detailed costings to effect refurbishment in accordance with the scope of work provided by MDI.

The following areas were also addressed for upgrade or modification during the refurbishment:

- Replacement of the carbon regeneration kiln;
- Installing a stairway at the northern end of the CIP tanks;
- Modification and major upgrade of the cyanide mixing area;
- Upgrading of the diesel fuel dispensing area near the mill;
- Installing covers to protect the two SAG mill motors; and
- Painting the plant.

There have been no major flowsheet changes proposed or required for the existing plant refurbishment.

Capital cost estimates in the PFS included \$8.05 million for the GRES scope of work, plus \$1.23 million for plant equipment and services, to be provided by MDI. There will be additional general and administration costs during the refurbishment period (and concurrent mine pre-stripping) to cover flights, and accommodation and catering in the MDI-owned camp in the Sandstone township.

### **Other Infrastructure and Services**

As previously reported, the MDI Sandstone project acquisition included all peripheral infrastructure (and a substantial inventory of spares) relevant to any mining and milling in the Sandstone district.

Power on site is derived from a 2.24MW diesel power station owned by Pacific Energy (KPS) Pty Ltd. Very little work is required to make this fully operational and KPS has provided detailed, competitive costings for power provision.

Process and potable water supplies remain unchanged and MDI holds a current licence to extract up to 650,000 kilolitres of water per year.

An existing, licenced tailings storage facility (TSF), located adjacent to the mill, has approximately six months remaining capacity. As part of the PFS, a cost-effective design to expand the TSF was completed by Coffey.

MDI also has a 100-person camp, parts of which are in regular use, on its freehold title in the Sandstone Township (12km from MDI's mill).

Other site infrastructure includes offices, workshops, warehouse, fuel storage and dispensing, and a mine laboratory.



### **The case for using Sandstone mill or hauling ore to more distant processing centres**

Ore haulage costs to a distant mill some 150km away or more is equivalent to ~0.4 g/t increase in the ore cut-off grade. For a low grade (e.g. <2 g/t) deposit, this often means a very significant reduction in economic mill feed (Ore Reserves), and hence net revenue, compared to treatment at a nearby mill.

MDI requires a modest increase in available mill feed to justify a mill refurbishment and would then represent a very competitive milling option for third party deposits within, say, a 100km road haulage distance.

MDI remains open to negotiations with all third party interests, including Alto Metals, as to future third-party toll treatment or production sharing partnerships using its upgraded Sandstone gold plant.