

# Northparkes Mines MOD 6

# Water management assessment

Northparkes Mines

10 November 2021

→ The Power of Commitment



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Printed date	10/11/2021 12:42:00 PM
Last saved date	10 November 2021
File name	https://projectsportal.ghd.com/sites/pp01_04/northparkesminescont/ProjectDocs/12548172-REP- Northparkes_Mines-Catchment_assessment.docx
Author	Jean Marie Macatanong
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Client name	Northparkes Mines
Project name	Northparkes Mines - Water management plan - 2021
Document title	Northparkes Mines MOD6   Water management assessment
Revision version	0
Project number	12548172

#### **Document status**

Status	Revision	Author	Reviewer		Approved for issue			
Code			Name	Signature	Name	Signature	Date	
S4	0	J M Macatanong	T Tinkler	T.G. Till	S Gray	Darran	10/11/21	

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# 1. Introduction

## 1.1 Background

Northparkes Mines is a copper and gold mine located 27 kilometres north-west of Parkes, in the Central West of NSW. Northparkes Mines is operated by CMOC Mining Pty Ltd (Northparkes). Northparkes was granted Project Approval (PA) 11\_0060 in 2014 which has been modified on five occasions. Approved operations at the Northparkes Mine include open cut and underground copper-gold mining, associated ore handling and processing and product transport through to December 2032.

Northparkes recently submitted a Scoping Report for the Northparkes E44 Rocklands Project. This State significant development (SSD) application will cover all operations at Northparkes and will supersede PA 11\_0060. However, in the interim, a number of reasonably minor changes to approved operations under PA 11\_0060 are required (MOD6). The changes which have implications for surface water management are:

- TSF2 embankment buttressing (including associated amendments to the approved disturbance area).
- Changes to TSF construction within the approved disturbance footprint associated with increased safety requirements for TSFs since first approved.
- Minor adjustments to disturbance areas for the approved E31 and E31N pits and associated infrastructure (roads, safety bunds, water management etc).
- Relocation of waste rock stockpile areas for the E31 and E31N pits to avoid unnecessary material rehandling in the future due to the proposed Rocklands TSF and avoid unnecessary material rehandling in the future.
- Relocation of rehabilitation material stockpiling areas to facilitate future development of the proposed Rocklands TSF.
- Establishment of clay and filter material borrow pits for TSF construction and lifts.
- Adjustments to mine water storage and management associated with the construction of the Infill TSF.

MOD 6 includes the construction and use of a new underground portal access (and associated infrastructure) for E22 underground mining operations. Some temporary disturbance around the portal will be required for construction activities. The runoff from the portal area itself is expected to report to the portal and be managed as part of the underground water management system.

Northparkes engaged GHD Pty Ltd (GHD) to assess the potential surface water management impacts of the MOD6.

## 1.2 Purpose of this report

The purpose of this report is to assess the potential surface water management impacts of MOD6. This report is intended to be read only as a technical assessment appended to the Modification Report for MOD6:

## 1.3 Scope and limitations

The scope of this report is to:

- Assess change in surface water catchments based on proposed disturbance boundary.
- Estimate the nominal sizing of any additional retention ponds to contain runoff from the proposed WREs.

The proposed conceptual water management system presented in this assessment is for the purpose of assessing the potential impacts to surface water management and the site water balance. The conceptual water management system is not intended to form basis for the design of the actual water management system.

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# 2. Water management system

### 2.1 Existing water management system

The existing water management system at Northparkes Mines is managed in accordance with approved Northparkes Mines Water Management Plan (Northparkes 2017). The objectives of the surface water management system are to:

- Divert clean water around operational areas of the mine.
- Capture and contain dirty and contaminated water.
- Maximise reuse of dirty and contaminated water to minimise the raw water demand.

Surface water is classified as clean, dirty or contaminated. The water management system at Northparkes Mines is zero discharge up to the relevant design criteria. The surface water management infrastructure at Northparkes Mines comprises drains, bunds, dams, pumps and pipes. Surface water at Northparkes is classified as summarised in Table 2.1.

Water class	Definition	Relevant performance criteria	Permanent management features
Clean water	Surface runoff from undisturbed areas not affected by mining operations	Minimise interception of clean water Capture and convey the 100 year ARI flood	Clean water diversions
Dirty water	Sediment-laden runoff from temporary disturbed areas during construction	In accordance with Managing Urban Stormwater (Landcom 2004)	
	Sediment-laden runoff from temporary disturbed areas during construction near named watercourses	In accordance with Guidelines for Controlled Activities on Waterfront Land (NRAR 2018) and Why Do Fish Need to Cross the Road (NSW Fisheries 2003)	
	Sediment-laden runoff from permanently disturbed areas, including waste rock stockpile areas, areas undergoing rehabilitation and surface infrastructure areas that are not classified as contaminated	Capture sediment laden runoff Capacity for the settling zone to contain runoff from 90th percentile 5-day duration rainfall event and sediment storage zone for minimum 2 months (Landcom, 2004 Table 6.1) A spillway sized in accordance with Figure 6-4 of Landcom (2004)	Dirty water capture drains Settlement ponds
Contaminated water	Runoff and process water associated with mining, ore processing and tailings storage	Capture contaminated runoff Maintain a minimum freeboard greater of 600 mm or to capture and contain 100 year ARI 72 hour duration rainfall event Suitably lined equivalent to 900 mm depth of 1 x 10 <sup>-9</sup> m/s	Contaminated water capture drains Retention ponds

#### Table 2.1 Water management system

### 2.2 Proposed water management

A conceptual proposed surface water management system for MOD6 was developed for the purpose of this assessment. The system includes drains and new retention ponds to capture and contain runoff from the proposed waste rock emplacements (WRE). Where practical, the proposed surface water management system is intended to manage clean, dirty and contaminated areas separately.

The proposed surface water management system is presented in Figure 2.1.



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#### 2.2.1 Clean water management

Clean water management consists of clean water diversion drains intended to divert overland surface flows around the contaminated areas. Clean water diversion drains would be located on the eastern and western sides of the WRE 1 (1a/1b) and on the northern and eastern sides of the WRE 2. These are designed to divert clean water runoff generated within the undisturbed areas upslope of WRE 1 and WRE 2 away from the areas to be disturbed.

Consistent with the approved operations, clean water diversions will also be constructed around the E31 and E31N open cut pits and clay and filter material borrow pits. These diversions will avoid interception of this water in areas managed as part of the Contaminated water system (E31 and E31N pits) and dirty water system (borrow pits).

#### 2.2.2 Dirty water management

The TSF2 eastern buttress extension will be located largely within the existing disturbance area. The extension of the disturbance area at the eastern side is associated with a relocation of the access road along the eastern side of the buttress and a realignment of existing water management infrastructure along the eastern side. These works only require a minor increase in the disturbed catchment area that would be temporarily managed as dirty water during construction until stabilised. Temporary soil stockpiles will also be established or relocated in this area due to these works.

Topsoil stockpiles will be temporarily managed as dirty water catchment until stabilised and then would be managed as clean water catchment. Controls applied will be consistent with temporary construction activity controls in Managing Urban Stormwater (Landcom 2004). Controls for the temporary disturbance of the stockpile areas include diversion of surface flows within the stockpile area to discharge offsite using temporary measures, such as sediment fence, sandbags or minor earthworks combined with a rolled erosion control product, if possible.

Consistent with current operations, clay and filter material borrow pits (that are constructed within the indicative extents shown in Figure 2.1) will include sumps to capture direct rainfall into the pits. Where the volume of water captured within the borrow pits requires removal for operational purposes (i.e. is required to continue clay/filter material extraction), this water will be recirculated into the contaminated water management system. Water captured in borrow pits will also be used for haul road dust suppression where reasonable and feasible. Once extraction activities have been completed in borrow pits, these pits will be retained as water storages for future mining or farm purposes<sup>1</sup>.

Areas disturbed as part of the construction of the E22 Portal will be managed as per Managing Urban Stormwater (Landcom 2004). These works do not present a contamination risk.

#### 2.2.3 Contaminated water management

The proposed contaminated water management consists of contaminated water diversion drains and retention ponds. Runoff from the WREs would be captured in the drains flowing towards the retention ponds.

Some of the clean and dirty runoff surface flows may be required to be intercepted by the proposed retention ponds (particularly Retention Pond A) or the open cut voids. This interception would be minor and incidental to the purpose of containing potentially contaminated runoff by means of gravity surface flows in open drains. All water captured by contaminated water catch drains would be contained in contaminated water storages and recirculated into the contaminated water management system as contaminated water.

The proposed water management system includes removal of the existing contaminated water storage RP09 and RP28 due to the construction of the Infill TSF. This will not result in a change to the contaminated water catchment and therefore is not assessed in Section 3. There is no change to the overall management of contaminated water, as potentially contaminated runoff cannot discharge off-site in any rainfall event up to the design criteria (refer to Section 2.1) due to the presence of the existing TSF Infill that blocks the natural drainage pathway.

<sup>&</sup>lt;sup>1</sup> It is noted that the E31 borrow pits located to the south of the Rosedale TSF will be filled with tailings should the Rocklands TSF be approved in this area.

#### 2.2.3.1 Nominal sizing of retention ponds

Nominal environment containment freeboard volumes for the conceptual contaminated water storages were estimated based on:

- Design rainfall depths consistent with Table 2.1.
- Delineated catchment areas based on the provided 0.2 m grid LiDAR data taken January 2020 by Northparkes (AAM 2020).
- Conservative volumetric runoff coefficient of 0.9.

The nominal sizing is summarised in Table 2.2.

Table 2.2	Nominal	retention	pond	sizing
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Storage	Dirty water catchment (ha)	Contaminat ed water catchment (ha)	Clean Water catchment (ha)	Total catchment area (ha)	Design rainfall (mm) (1% AEP 72 hour)	Volumetric runoff coefficient (Cv)	Environment containment freeboard requirement (ML)
Retention Pond A	3.76	19.66	0	23.42	179	0.9	38
Retention Pond B	0	9.12	0	9.12	179	0.9	15
Retention Pond C	0	4.95	0	4.95	179	0.9	8

# 3. Surface water management assessment

The changes to surface water management as part of MOD6 has the potential to change the volume of clean, dirty and contaminated water required to be managed by the surface water management system at Northparkes Mines. Potential impacts on the affected storages have been assessed by comparing total catchment areas for each affected surface water storage. The changes between approved and proposed conditions under MOD6 are slight, when the proposed water management system is compared to existing conditions.

The catchment areas of the reporting locations are summarised in Table 3.1.

Table 3.1 shows that, relative to existing conditions, under proposed conditions it is expected that there will be:

- Increase in the total catchment of potentially contaminated water storages. This corresponds to a decrease in the total catchment area that discharges offsite (south) to Goonumbla Creek, and that drains to borrow pits. This reflects the catchment areas excised by the approved pits and the WREs.
- Increase in the catchment area for RP20 by approximately 1.7% reflecting the increase in contaminated water catchment due to extension of TSF2 eastern buttress footprint and potential seepage from TSF2 eastern buttress. This in turn decreased the total catchment area that discharges offsite (northeast) to Cookopie Creek.

The catchment changes due to the construction of the E31 borrow pits are not considered in Table 3.1. The actual extent of the E31 borrow pits will be subject to the design of the TSF2 buttressing and the Rocklands TSF (subject to a separate approval). Runoff captured and contained within the borrow pits may be required to be managed within the contaminated water management system, depending on the construction sequencing and actual rainfall. A reasonable worse case is that the runoff from the catchment of entire indicative extent of the E31 borrow pits is required to be managed in the contaminated water management system. This would correspond to approximately an additional 36 ha of catchment not represented in Table 3.1.

As discussed in Section 2.2.3, the removal of the existing contaminated water storage RP09 and RP28 due to the construction of the Infill TSF wil not result in a change to the contaminated water catchment and therefore is not considered in Table 3.1

#### Table 3.1Change in catchment area

Reporting	Existing catchment (ha)				Proposed catchment (ha)			
location	Dirty water catchment (temporary disturbance area)	Contaminated water catchment	Clean water catchment	Total catchment area (ha)	Dirty water catchment (temporary disturbance area)	Contaminated water catchment	Clean water catchment	Total catchment area (ha)
RP20	0	58.39	0	58.39	0	59.39	0	59.39
E31 north	0	0	0	0	20.69	8.96	5.75	35.39
E31 south	0	0	0	0	0	7.24	0	7.25
Borrow pits	38.52	0	20.25	58.77	14.26	0	0	14.26
Offsite (east) to Cookopie Creek	12.42	0	120.40	132.82	18.77	0	114.05	132.82
Offsite (northeast) to Cookopie Creek	4.30	0	10.16	14.46	10.1	0	3.56	13.66
Offsite (south) to Goonumbla Creek	61.35	0	101.40	162.75	78.92	0	48.19	127.11
Retention Pond A	0	0	0	0	3.76	19.66	0	23.42
Retention Pond B	0	0	0	0	0	9.12	0	9.12
Retention Pond C	0	0	0	0	0	4.95	0	4.95
Total	116.6	58.4	252.2	427.2	146.5	109.3	171.6	427.4



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# 4. Conclusion and recommendations

Northparkes engaged GHD to assess the potential surface water management impacts of the MOD6. The assessment found that potentially contaminated water from the proposed MOD6 layout could be effectively isolated from the surrounding catchments, captured and contained. No additional permanent dirty water catchments area is required to be managed.

Overall, surface water impacts associated with MOD6 are expected to be generally consistent with approved operations. The additional potentially contaminated catchment is expected to be approximately 3% of the total existing potentially contaminated catchment and would be mitigated by the construction of additional contaminated water storages in accordance with the design criteria of the Northparkes Water Management Plan. Depending on material requirements, construction sequency and actual rainfall, the runoff captured and contained in the E31 borrow pits may be required to be managed within the existing contaminated water management system. This would increase the additional catchment area required to be managed by the contaminated water management system to approximately 5% of the total existing potentially contaminated catchment.

In either case, as the changes in total catchment areas are small, MOD6 would have only a negligible impact on the overall site water balance.

The proposed E31 borrow pits will be retained in the final landform as water storages for use in farming operations, subject to assessment against the licensing requirements at closure.

It is recommended that:

- Works within the area affected by MOD6 should be managed in accordance with the criteria set out in existing Northparkes Water Management Plan.
- The Northparkes Water Management Plan should be updated to reflect any changes to on-site management infrastructure.

# 5. References

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