Appendix B

Non-Aboriginal heritage impact assessment

Lake George Mine Remediation Works Addendum REF

Heritage Impact Assessment

Department of Regional NSW

14 December 2022

→ **The Power of Commitment**

Project name		Lake George Mine Remediation Works Addendum Review of Environmental Factors					
Document title		Lake George Mine Remediation Works Addendum REF | Heritage Impact Assessment					
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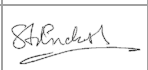
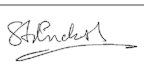
S4	0	Alistair Grinbergs Evie Packett	Stuart Winchester		Stuart Winchester		14/12/2022

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1. Introduction

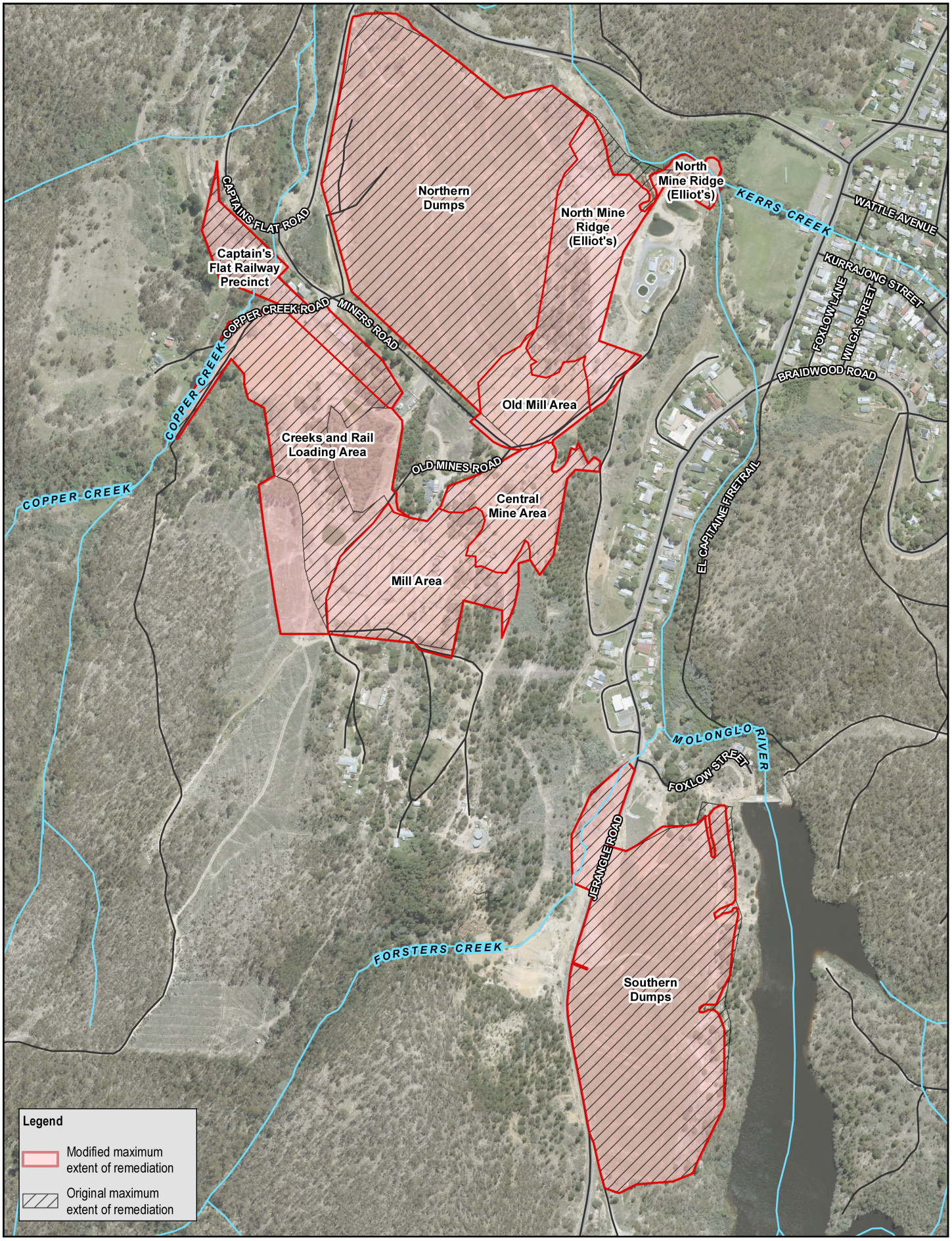
The Legacy Mines Program (LMP) within the Department of Regional NSW propose to undertake remediation works at the legacy Lake George Mine, located immediately west of the township of Captains Flat, New South Wales (NSW).

In April 2022, the Department of Regional NSW approved the Review of Environmental Factors (REF) document (GHD 2022) prepared to assess the proposed remedial works through a self-assessment under Part 5.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Following the REF approval, the LMP identified some modifications to the approved project that require assessment and approval under the EP&A Act.

This heritage impact assessment assesses the potential heritage impact of the proposed modifications.

Figure 1.1 shows the revised maximum extent of remediation. The key features of the proposed modifications are shown in Figure 1.2.



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Modified maximum extent of remediation

FIGURE 1.1

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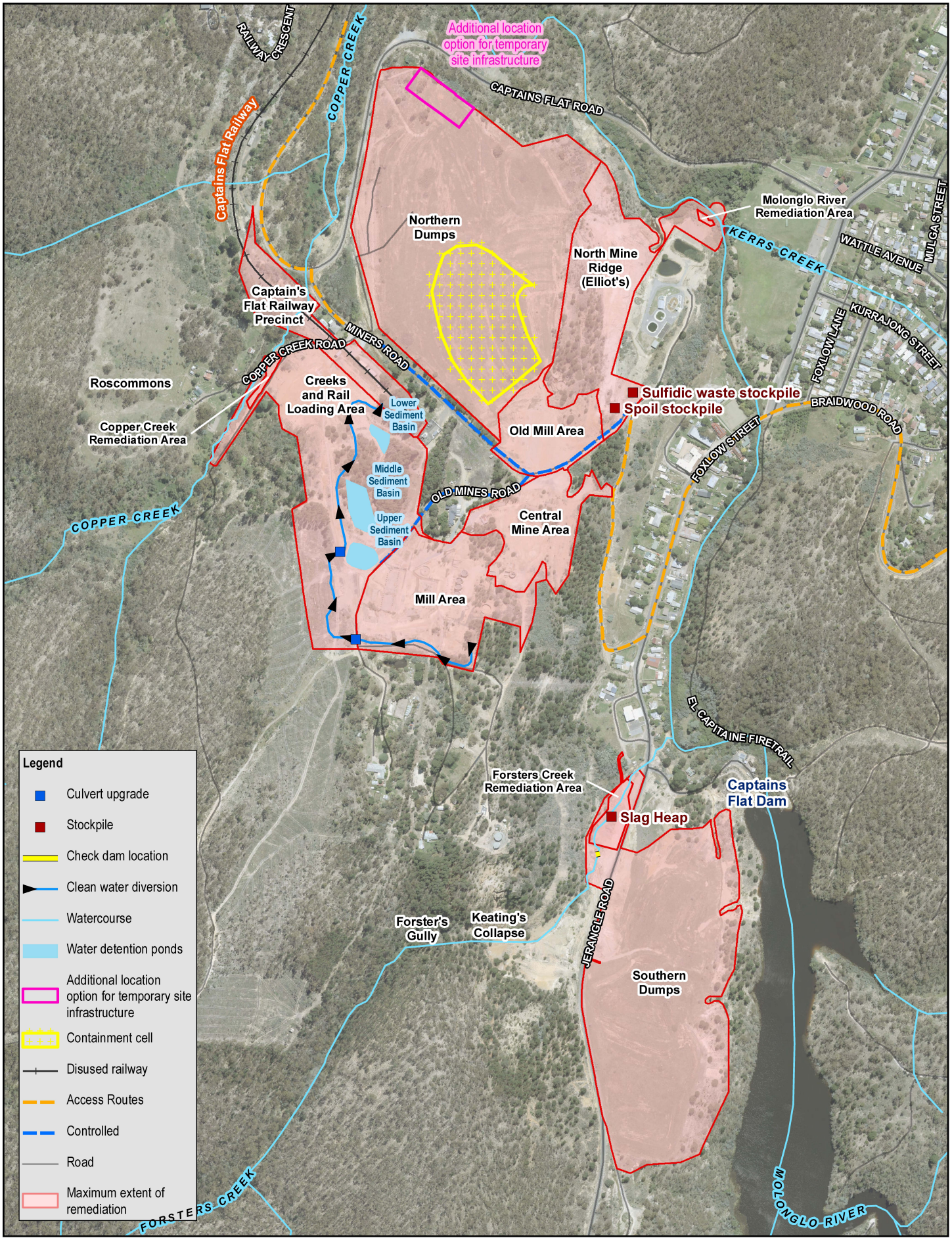

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Key features of the revised proposal

FIGURE 1.2

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2. Project description

2.1 Captains Flat Railway Precinct

2.1.1 Approved project

The original REF assessed remediation works at the Transport for NSW (TfNSW) land hosting the Captains Flat Railway Precinct. The approved remediation methodology at the Captains Flat Railway Precinct included the following:

– Prior to excavation of the contaminated surface soils, existing railway infrastructure including the railway line, signalling, gantry, signs, posts, and fencing would be removed and temporarily stored on, or nearby the site.
– Approximately the top 500 millimetres of contaminated topsoil would be removed for encapsulation in the containment cell on the Northern Dumps, before importing railway ballast, sub- and topsoil to site for backfilling.
– Once excavation and backfilling had been completed, the railway infrastructure would be replaced into its original location as far as reasonably practicable. It is understood that the railway turntable located on a short spur line northwest of the Station Master's Cottage, can remain *in situ* during remedial works.

2.1.2 Proposed modification

It is now proposed that only some of the railway infrastructure would be replaced, as far as reasonably practicable, after excavation of the contaminated surface soils. The railway line would not be replaced. It is also now proposed that the Captains Flat Railway Precinct would be backfilled with sub- and topsoil only rather than railway ballast.

2.2 Description of other modifications

2.2.1 Additional location option for temporary site infrastructure

The original REF included two options for the temporary site infrastructure that included a site office, ablutions block and other facilities as described below – being the NSW State Emergency Services building (the preferred option) and / or at the mine lookout parking area.

The amendment includes a third option for the location of the temporary site infrastructure, being at the northern extremity of the Northern Dumps, as shown in Figure 1.2. The temporary site infrastructure itself remains unchanged from the approved REF and includes a portable (demountable):

– site office (6m x 3m),
– lunchroom (12m x 3m),
– ablution block (6m x 3m),
– induction/training room (6m x 3m)
– first aid room (3.6m x 3m).

The temporary site infrastructure requires connection to grid electricity and temporary solutions for water and sewerage. Light vehicle parking would occur in this area.

Note that the worker decontamination / washroom facilities, including showers would be a packaged mobile facility that would be moved around the site to be proximal to live remediation areas.

2.2.2 Remedial work in waterfront land

The approved project included remedial work to the bank of Forsters Creek, however, did not include works on waterfront land at Copper and Forsters Creeks, nor the Molonglo River.

The remedial works are deemed to be a controlled activity on waterfront land as defined under the NSW *Water Management Act 2000*).

The proposed remedial works, as shown in Figure 2.1, are described below.

2.2.2.1 Copper Creek

The approved project included remedial works adjacent to Copper Creek within the Creeks and Rail Loading Area, however, remedial works to the south-eastern bank of Copper Creek were excluded. Further field inspections revealed that remediating the full extent of the slag on the south-eastern bank of Copper Creek is required, therefore remedial works on waterfront land are now proposed.

Designs for the proposed Copper Creek remedial work is provided in Figure 2.1.

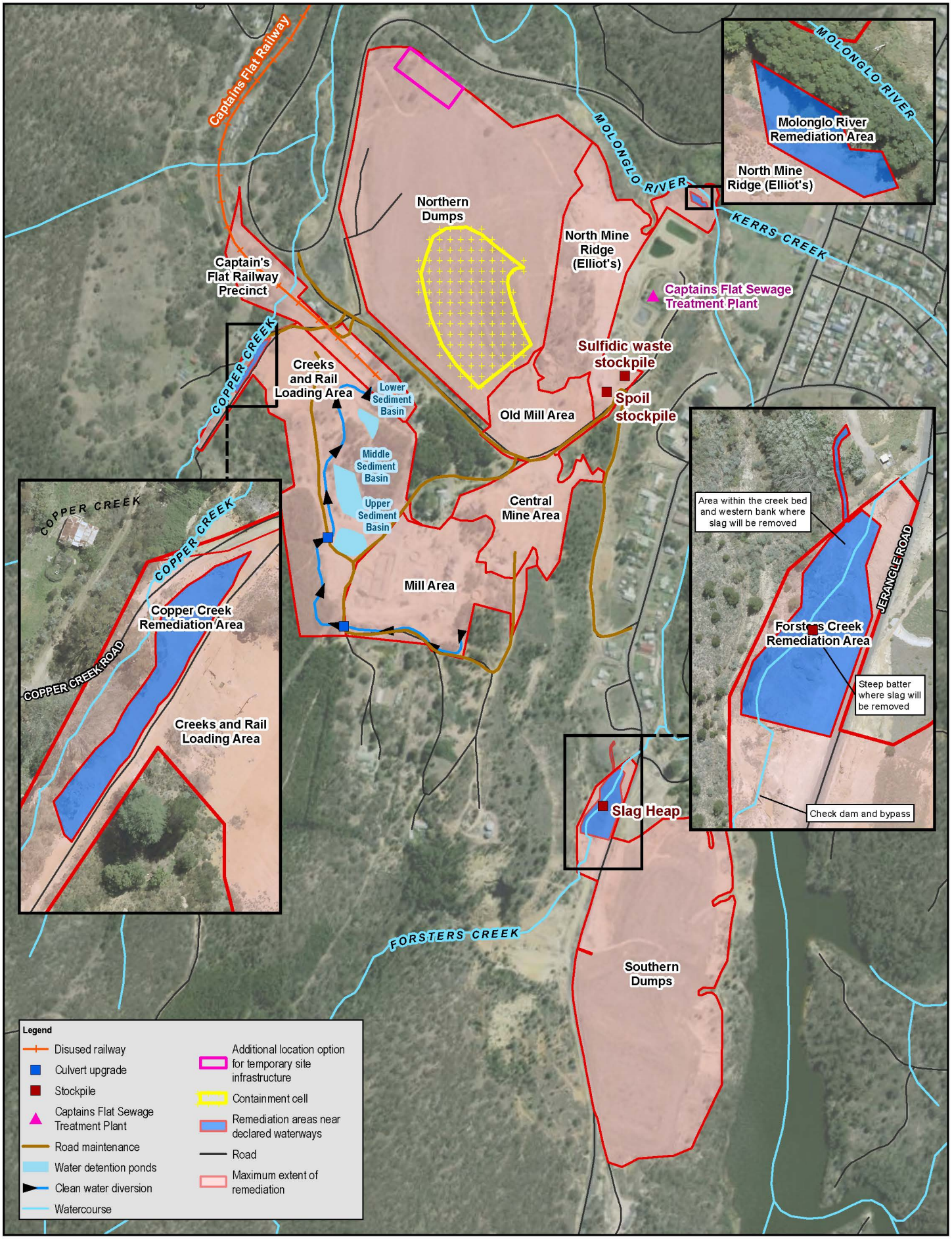
The remedial work in Copper Creek would involve excavation of contaminated material on the south-eastern bank as shown indicatively in Figure 2.1. Material would be removed from the unvegetated bank area between the track situated on the top of bank (i.e., the Crown road reserve) to approximately 800 mm above the baseflow channel, tying into stiff clay or rock. Placement of rip rap into the base flow channel would only be required where stiff clay or rock is not present in the base flow area. This would allow tie-in of the remediation work. Work would be undertaken nominally using a 20 tonne excavator or similar, stationed on, or adjacent to, the south-eastern bank of the creek, with the excavated material hauled to the contaminated cell using moxys or truck following amendment using lime or a lime alternative.

The Copper Creek remediation area would then be backfilled to the original profile using Capping Option 3 *(in situ* liming overlain with geotextile under appropriately sized rock mulch for bank scour protection – refer Appendix A). i.e., The rock mulch depth would not be greater than the depth of the contaminated material removed from the bank, meaning that the rock mulch would not reduce the capacity of Copper Creek, and thus, flood risk would not be increased.

The only scenario where works within the baseflow channel are anticipated is where riprap for the bank stabilisation can't be tied into *in situ* rock or still clay.

Scour bank protections were designed in accordance with *Catchments & Creeks Rock Sizing for Bank Stabilisation*, section 5 (Catchments & Creeks Pty Ltd, 2014).

Flood modelling informed the choice of rock sizing for the scour bank protections. The flood modelling used a K-value of 0.86 for supercritical flow and angular riprap with a minimum specific gravity of 2.6. The works area was reviewed against the 1 in 20 AEP HEC-RAS modelling results to identify flood velocities along the bank.



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Remedial works on waterfront land

FIGURE 2.1

2.2.2.2 Forsters Creek

The approved project included remediation of the slag heap within the Forsters Creek channel (refer Figure 2.2), and the removal of existing mineral waste material that may have spilled into the natural waterway (refer Figure 2.3). However, the original REF specified that the mobile civil plant used for remedial works would only operate from the top of bank and would not enter the watercourse *per se*. Further, no backfilling of excavated material for scour protection was assessed.

Further field inspections revealed that remediating the full extent of the slag within Forsters Creek would require access to the channel bed. As such, remedial works on waterfront land have been included in this modification, as shown indicatively in Figure 2.1.

A check dam would be installed upstream of the works, with a gravity feed pipe system to divert water around the work site on the western batter. The pipe discharge would be located downstream of the works area prior to the culvert under Foxlow Street.

Access to the slag would first occur from above the deposit, from the top of eastern bank adjacent to Jerangle Road. Access would then be from a formed track into the channel from the eastern bank as well as within the creek bed to the north from Foxlow Street. Excavation would then continue back up the eastern slope with benching utilised to access the full face.

Slag would be mechanically removed, nominally using 24 tonne excavators or similar. Excavations would continue to a depth where slag was no longer evident, likely natural *in situ* bedrock. Excavated material would be placed in trucks working from Jerangle Road and transported to the containment cell.

At the completion of excavation, where natural bedrock was not exposed, the batters and creek line would be re-shaped with existing site material to form consistent batters. Finally, the check dam would be released and returned to the natural creek flow.

The capacity of Forsters Creek would not be reduced by the works, thus flood risk would not be increased.

Figure 2.2 View downstream (north) in Forsters Creek showing slag to be removed from eastern bank

Figure 2.3 View across (west) Forsters Creek showing slag to be removed from the channel bed

2.2.2.3 Molonglo River

The southern bank of the Molonglo River immediately to the north of Council's water treatment plant contains contaminated mineral waste and slag. The previously approved project does not include remediation of this bank.

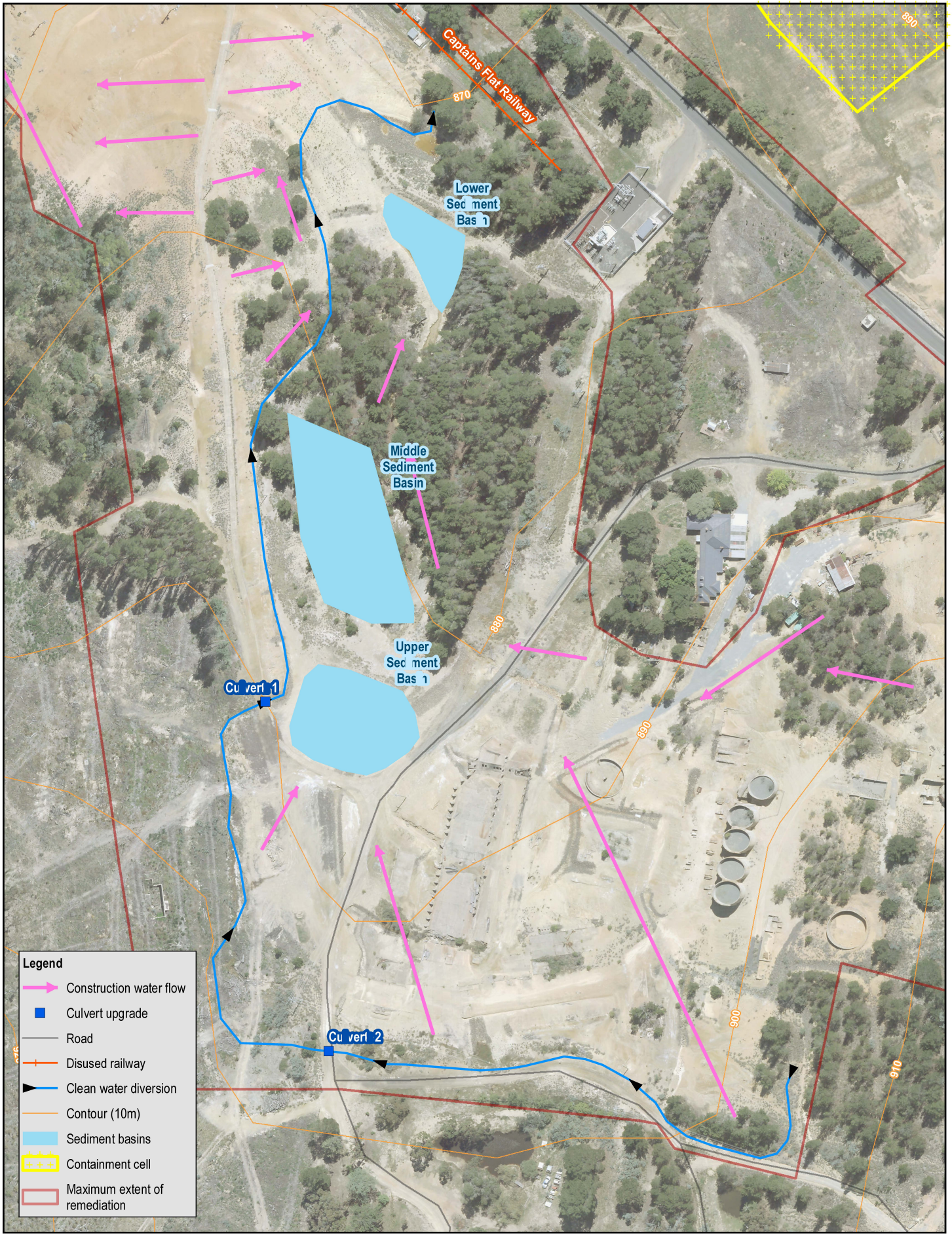
Works at Molonglo River would involve removal of the contaminated bank material in the area shown indicatively in Figure 2.1, with site remediation being undertaken using Capping Option 3 (*in situ* liming overlain geotextile and rock mulch). Once remediated this area would be revegetated as far as reasonably practicable considering the treatment. The use of rock mulch on the depositional point bar side of this reach of the Molonglo River reduces the risk of scouring should a flood event occur prior to vegetation becoming fully established.

The capacity of Molonglo River would not be reduced by the works, thus flood risk would not be increased.

2.2.3 Preliminary SWMP modifications

The approved project included a preliminary conceptual surface water management plan (SWMP) that detailed the approach to managing erosion and sediment controls, and site water management, provided as Appendix F of the original REF. The preliminary SWMP was developed to reduce impacts to water quality from the remedial works. Modifications to the preliminary SWMP, as shown in Figure 2.4, are described below.

At minimum, the modifications to the preliminary SWMP would be designed by the Principal Works Contractor in accordance with *Managing Urban Stormwater – Volume 1* (Landcom, 2004), *Managing Urban Stormwater – Volume 2* (DECC, 2008a) and *Managing Urban Stormwater – Volume 2E*, *Mines and quarries* (DECC, 2008b), informally known as the 'Blue Book'.



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Surface Water Management Plan amendments

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FIGURE 2.4

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Further, the SWMP will document enhanced controls to minimise the risk of erosion where possible, including consideration of best management practice and guidelines likely including:

– staging construction activities to minimise land disturbance at any one time
– using timber windrows during clearing to assist erosion control
– retaining vegetation within flow lines for as long as possible
– retaining groundcover on soils to minimise the potential loss of sediment
– treating topsoils with a high level of care to enable reuse in the rehabilitation phases
– using surface covers and binders to limit soil loss
– installing clean water diversions early
– ensuring prompt stabilisation and rehabilitation of the site
– reuse of construction water on site
– increased water holding storage on site.

The SWMP will also address vegetation clearing, initial site establishment, construction and operation of unsealed access roads, laydown areas, stockpile areas and permanent infrastructure (such as the containment cell) at minimum.

2.2.3.1 Culvert upgrade

At two locations, upgrades to existing, or installation of new culverts, are proposed to allow clean water to pass under existing site roads and tracks unimpeded. The culvert works will include upgrades at culvert location 1 and installation at culvert location 2 (refer Figure 2.4) to have both locations accommodate 3 x 600 mm diameter concrete pipes as follows:

– Cutting through the concrete road and excavating adjacent to the single culvert at Culvert 1 in the lower Mill Area west of the existing Upper Sediment Basin and preparing the sub-grade for installation of an additional two new 600 mm diameter circular culverts. This work will be completed prior to construction of the clean water diversion (refer below) to minimise water quality risk. If the existing pipe is found to be fatigued and/or too damaged to remain *in situ*, it will be removed and three new pipes will be installed.
– Installing three new 600 mm diameter circular culverts at Culvert 2 in the upper Mill Area.
– Backfilling and compacting the ground around the new culverts to reduce the risk of pipe failure and surface slumping.
– Installation of appropriately sized inlet and outlet scour protection.
– Backfilling and compacting excavated material to road sub-grade and reinstating the road pavement.

2.2.3.2 Sediment basins

There is currently an Upper and Lower Sediment Basin on site to manage contaminated surface water runoff in the Mill Area and Rail Loading / Creeks Area. It is proposed to increase the water holding capacity of the current basins and to construct a new Middle Sediment Basin between the Mill Area and Rail Loading / Creeks Area to assist with construction water management (refer Figure 2.4). Construction of the new basin would require some vegetation clearance.

Collectively, the three sediment basins would be operated together to:

– Improve water storage capacity on site thereby allowing water to be transferred from other small sediment basins in active remedial areas located around the site to the sediment basins. Where possible, the smaller sediment basins would be connected to the three larger sediment basins by pipes, otherwise, water would be transported to the three larger sediment basins by truck.
– Allow for construction water treatment as required. This would comprise a staged treatment method using flocculent/coagulant to remove suspended sediment and some metals followed by pH adjustment (alkalinity) to precipitate metals as metal hydroxides, followed by further pH adjustment (acidity) in the on site 200,000 L water storage tank to bring pH values back to a range suitable for on site beneficial reuse of the water as/via dust suppressant, revegetation watering and/or irrigation.

– Provide greater evaporation potential, thereby reducing the risk of discharge.
– Provide treated water for on-site use via irrigation.

Details of the three Sediment Basins are provided in Table 2.1.

To maximise the capacity of the existing Upper and Lower Sediment Basins, they require de-silting following de-watering to the site, or the newly constructed Middle Sediment Basin. It is proposed that excavated silt be temporarily stored on site in the Mill Area using appropriate erosion and sediment controls until such time that the on-site containment cell is constructed. The thermally dried, de-silted sludge would then be analysed for contaminants before being stoichiometrically lime amended and placed in the containment cell for long term storage along with the remainder of the sulfidic mineral waste to be excavated and removed from the Mill Area.

Table 2.1 Sediment basin details

Basin	Existing / new	Size (ML)	Purpose
Middle Sediment Basin	– New	2	– increase the water storage capacity on site by about 60%, thereby reducing the likelihood of licenced discharge under the site's Environment Protection Licence, while also increasing the potential for evaporation as a management strategy – onsite water treatment as required and used for: • construction water (to meet standard compaction) • dust suppression • vegetation establishment • site irrigation
Upper Sediment Basin	– Existing	2	– water storage – increase the water storage capacity on site – on-site water treatment as required
Lower Sediment Basin	– Existing	2	– water storage – increase the water storage capacity on site – on-site water treatment as required

2.2.3.3 Clean water diversion channel

A clean water diversion channel is proposed to divert runon from upslope of the Mill Area around the western edge of the Mill Area, through the Rail Loading / Creeks Area and off site (refer Figure 2.4). The purpose of the clean water diversion channel is to reduce runon by around 80% from the 22 ha catchment area upslope. This would significantly reduce run-on into the contaminated Mill Area, which in turn will reduce the volume of construction water to manage through remedial works. The three sediment basins described above would then be used to manage the construction water running off from the Mill Area.

The upslope component of the proposed clean water diversion channel would be positioned between the unimpacted area upslope of the Mill Area and the Mill Area works zone to divert clean water runoff around the remedial works. It is proposed that the clean water diversion channel and three sediment basins (above) would remain on site following remedial works to assist with site water management, both in terms of water quantity and quality.

The western side of the Mill Area proposed to host the clean water diversion channel was cleared of a pine plantation in 2021 (refer Figure 2.5). Given that this area was hosting vegetation, it is not expected to be contaminated, and therefore, would not require remediation as per the Mill Area. In that regard, the site boundary has been expanded to the west of the approved boundary simply to accommodate the clean water diversion channel.

Source: provided by LMP, taken in October 2021

Figure 2.5 Cleared vegetation on the western boundary of the Mill Area (circled in green). Use of spoil stockpile

2.2.4 Use of spoil stockpile

The approved project includes removal of a sulfidic waste stockpile in the North Mine Ridge/Elliot's domain (shown in Figure 1.2) and placement in the containment cell located on the Northern Dumps.

The amendment to the approved remedial strategy for the sulfidic waste stockpile is that the cleared stockpile footprint would optionally be backfilled to grade with material from an existing spoil stockpile located adjacent to the sulfidic waste stockpile (also shown in Figure 1.2).

The spoil stockpile was undergoing geochemical analysis at the time of writing the Addendum REF. If the geochemical analysis finds the spoil stockpile to be inert, then it would be used as backfill. Alternatively, if the spoil stockpile is found not to be inert then:

– the sulfidic waste stockpile would be removed and placed in the containment cell
– the area would be remediated with capping Option 2 and or 3, depending on the land grade, in accordance with the original REF
– the spoil stockpile may also be removed and placed in the containment cell, with the area remediated with capping Option 2 and or 3, depending on the land grade, in accordance with the original REF.

2.2.5 Remediation method in Old Mill Area

The original REF assessed remediation of the Old Mill Area using *in situ* liming followed by placement of a 300 mm thick (subsoil (200 mm) / growing media or topsoil (100 mm)) layer (remedial option 2). Some of the steeper areas were to be remediated by *in situ* liming then placement of a 300 mm thick rock mulch layer comprising a hard rock drainage aggregate (option 3).

It is now proposed that the Old Mill Area be excavated, with the contaminated material placed into the Northern Dumps containment cell. The Old Mill Area would then be backfilled using sub- and topsoil and revegetated (option 5).

2.2.6 Green waste management

The original REF assessed the generation and disposal of waste including excavated spoil, structural waste, and general waste. Green waste would also be produced from clearing and grubbing works, however green waste was not assessed in the original REF, rather, was implicit in the assessment due to its discussion in the appended Technical Specifications.

Green waste generated through clearing and grubbing would be managed as outlined in section 2.9 of Appendix B of the original REF. Green waste would be reused on site where possible (e.g., chipped wood), or disposed of at a licenced facility. Some supervised and managed burning of cleared pine may also be required in consultation with an agreed method as developed by the LMP, PWC, relevant landholders and Rural Fire Service (RFS).

2.2.7 Road maintenance

The original REF excluded road maintenance activities on site to support heavy vehicle traffic.

It is now proposed that the following road maintenance activities would occur to further reduce the potential for impacts to air and water quality, and improve road safety through improved road stability:

– Repair minor potholes, subsidence, and pavement instability.
– Repair drains next to road pavement. Drain and gutter maintenance may include cleaning sediment from drains, installing rock rip rap scour protection, and repairing existing culverts to be retained.
– Maintain road surface including paved and non-paved (gravel) surface roads. Works may include re-sheeting (gravel) and bitumen sealing.

2.2.8 Remedial works method

The remedial method, workforce and work hours, would be consistent with section 4.2 of the original REF. The duration of the works would be amended so that final site demobilisation would not occur until late 2024.

3. Methodology

3.1 Initial assessment

The proposed modifications outlined in section 2 were analysed to determine if they could cause a potential impact on heritage. Out of these proposed modifications only the culverts works and the change in remediation method of the Captains Flat Railway Precinct would be likely to have a potential impact on heritage. As such, a more detailed assessment in accordance with the *Statement of Heritage Impact Guidelines* (NSW Heritage, 2001) was carried out for these works.

3.2 Detailed assessment methodology

This assessment of potential heritage impacts included the following:

– A search of the NSW State Heritage Inventory, the Palerang LEP and the Australian Heritage Database to determine if there is any additional information on places of heritage significance in or near to the proposed activity area.
– A description of heritage items (and their significance) within the proposed activity area.
– An assessment of the site that focussed on consideration of the potential for the proposed works to impact upon identified heritage places and values within the proposed activity area, including:
    - Consideration of the questions posed in the NSW Heritage Office's Statement of Heritage Impact Guidelines as they relate to identified heritage places within the proposed activity area and heritage listed places adjacent to the proposed activity area; and
    - Consideration of the relevant questions posed in the requirements of the Palerang LEP.
– Description of any proposed impacts and Identification of any potential impacts and the methods proposed to avoid, ameliorate or mitigate those impacts.

3.3 Site inspections

On Tuesday 8 November 2022 an inspection was undertaken of the TfNSW Railway Precinct and two culverts at the Lake George Mine site.

3.4 NSW Heritage Register Criteria

The criteria employed to assess the heritage significance of the historic mining heritage sites at Captains Flat are those specified in the NSW *Heritage Act 1977*. Each item has been assessed according to these criteria. In considering the degree of significance, each item has been assessed as either meeting the criteria or not. In most cases, an item will meet more than one criterion. It should be recognised that it is not necessary for every criterion to be satisfied, as meeting just one criteria will be sufficient to warrant heritage protection.

The NSW State Heritage Register is established under Part 3A of the *Heritage Act 1977* (as amended in 1998) for listing of items of environmental heritage which are of state heritage significance.

To be assessed for listing on the State Heritage Register an item will, in the opinion of the Heritage Council of NSW, meet one or more of the following criteria:

A. An item is important in the course, or pattern, of NSW's cultural or natural history;
B. An item has strong or special association with the life or works of a person, or group of persons, of importance in NSWs cultural or natural history;
C. An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;
D. An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;

E. An item has potential to yield information that will contribute to an understanding of NSWs cultural or natural history;

F. An item possesses uncommon, rare or endangered aspects of NSWs cultural or natural history;

G. An item is important in demonstrating the principal characteristics of a class of NSWs cultural or natural places, or cultural or natural environments.

An item is not to be excluded from the Register on the ground that items with similar characteristics have already been listed on the Register.

4. Existing environment

The heritage items present in the proposed modification areas are discussed below.

4.1 Listed heritage items

A search of the NSW State Heritage Inventory undertaken on Wednesday 2nd November 2022 did not identify any sites or places within or near the proposed activity area that were:

– declared Aboriginal Places
– listed on the State Heritage Register
– listed in Interim Heritage Orders.

A search of the Australian Heritage Database undertaken on Wednesday 2nd November 2022 did not identify any sites or places within or near the proposed activity area that were included on the:

– National Heritage List
– Commonwealth Heritage List
– Register of the National Estate.

A review of the *Palerang Local Environment Plan 2014* identified three listings for the Lake George Mine and the associated rail facilities included in Schedule 5 of the LEP.

Table 4.1 Palerang LEP Schedule 5 – Listings within proposed activity area

Listing	Significance	Item No.	Property Description
Captains Flat railway goods shed, weighbridge, gantry and turntable	Local	I266	Railway land adjacent to Lots 155, 194, and 319 DP754870; Lot 1 DP189797 and Lot 1 DP36902
Stationmasters Residence (Former)	Local	I251	Lot 1, DP 572636

Two listings that are immediately adjacent to (share a boundary with one or more of) the above sites are also included in Schedule 5 of the Palerang LEP.

Table 4.2 Palerang LEP Schedule 5 – Listings adjacent to the proposed activity area

Listing	Significance	Item No.	Property Description
Railway Station (Former)	Local	I249	Lot 1, DP 189797 and adjacent land
Lake George Mine, including smelter site, mine processing sites, railway precinct, Fosters Gully and Keatings Collapse	Local	I267	Lot 2, DP229690; Lot 1, DP222274; Lot C, DP172630; Lot 319, DP 754870; Lot 2, DP 1033184 and adjacent Crown land
Roscommon	Local	I252	Lot 2, DP 369062; Lot 192, DP 754870

4.2 Heritage values

4.2.1 Weighbridge

The Weighbridge, shown in Figure 4.1 and Figure 4.2, is a prominent part of the mining fabric. The concrete road leads up a ramp built on concrete trestles with wooden trusses to a large shed, also built on trestles and constructed over the weigh station shed and the railway line. The shed walls and roof are constructed of galvanised iron and the floor is built of timber planks and logs. In the middle of the floor are two metal hopper bins, through which concentrates were deposited direct into the railway trucks. The weigh station is constructed of galvanised iron and includes a weighing machine. A voice pipe for sending messages from the upper shed floor to the weigh station is also intact.

Up until 2010 the weighbridge was substantially intact. It was demolished at that time without proper consideration of its identified heritage values and the current structure is a replacement made with original and new materials. As discussed in Table 5.2, this is an important site and is in a good condition. Some elements of this structure, including the milled timber and log access ramp were removed around 2010 without proper assessment. The value of this element lies in its ability to tell the story of mining at Captains Flat rather than any specific values attributable to the age or condition of its fabric. It remains a visually significant element of the precinct.

Figure 4.1 ***Weighbridge (reconstructed from original and new materials following unauthorised demolition). Image: GHD 2022***

Figure 4.2 ***Rail precinct – Aerial. Image: NSW Govt.***

4.2.2 Railway Lines, Gantry & Railway Platform

There are three railway lines in the area near the turntable and the railway platform. The gantry, shown Figure 4.3, is located 27 m south east of the site of the weigh station, and is constructed of metal and built on concrete blocks. It is in very good condition. The platform is located approximately 85 m east of the gantry and is in very good condition. All three railway lines continue for a further 30 m and terminate at a rock face.

Figure 4.3 Gantry. Image: McGowan 2006

Figure 4.4 Rail precinct – Aerial. Image: NSW Govt.

4.2.3 Turntable

The rail line diversion to the turntable is located about 270 m west of the weigh station. At this point, a separate rail line diverges from the most southerly of the three rail lines and runs in a south east direction for approximately 50 m, before passing over a deep concrete pit about 20 m long. Some small concrete blocks and a floor area are located on the south side of the line. The turntable, shown in Figure 4.5 and Figure 4.6, is located approximately 6 m south east of the pit. It is built on concrete pylons and constructed of timber and metal and is about 30 m long. The turntable appears to be in very good condition.

Figure 4.5 Turntable. Image: McGowan 2006

Figure 4.6 Turntable – Aerial. Image: NSW Govt.

4.2.4 Culverts

4.2.4.1 Culvert 1

A single pipe culvert located in the Creeks and Rail Loading Area, shown in Figure 4.7 and Figure 4.8, of concrete construction. The board construction mould formwork of the eastern end of the culvert is of a style contemporary to other concrete features throughout the mine site. The facing of the western end of the culvert appears to be constructed of vernacular hand-packed stonework. The culvert appears to be functioning well.

Figure 4.7 Culvert 1 – Western end

Figure 4.8 Culvert 1 – Eastern end

4.2.4.2 Culvert 2

There are no existing structures or culverts at the Culvert 2 site and thus, no relevant heritage values.

5. Impact assessment

5.1 Assessment of significance

The assessment of heritage significance for those elements of the Captains Flat Railway Precinct that are within the proposed activity area is provided in Table 5.1.

Table 5.1 Assessment against NSW Heritage Criteria - Captains Flat Railway (goods shed, weighbridge, gantry and turntable)

Criterion		General Statement	Elements that meet Criterion		
			Weighbridge	**Railway Lines, Gantry & Railway Platform**	**Turntable**
A	*An item is important in the course, or pattern, of NSWs cultural or natural history*	The Captain's Flat mining field is significant for its contribution to base metal mining in Australia, and in particular, New South Wales, over a period of 80 years. It was the major mining site in southern NSW in the 1890s and part of the 1880s and again in the period 1937 to 1962. In the 1880s-90s it was first a gold, then silver, and later, a predominantly copper mining operation. In the 1930s-60s period, Captain's Flat was one of the most important mining sites in Australia, as a producer of lead, silver, zinc and sulphur and to a lesser extent, copper and gold. Its production was particularly valuable during World War II. The highly complex mineralogy of the ore body and consequently the varied and changing processing technology was a unique aspect of mining at Captain's Flat. During both periods, Captain's Flat was one of the largest towns in the southern mining region and was economically significant as an employer and market for farm produce, timber and other raw materials. It had a considerable impact on development and settlement and was totally dependent upon the mines for its existence. The mines also had a significant negative impact on the natural landscape because of pollution and environmental degradation, both in the mine and town area and downstream of the mine area. Extensive rehabilitation works bear witness to the significance of this impact, and they can now be regarded as part of the mining heritage fabric.	This is a prominent part of the mining fabric dating to the 1936-1962 mining period. Concentrates from the flotation mill were trucked by road to the mill and dumped through hopper bins into railway trucks. This was the final step in the mining process. Up until 2010 the weighbridge was substantially intact. It was demolished at that time without proper consideration of its identified heritage values and the current structure is a replacement made with original and new materials. The value of this element lies in its ability to tell the story of mining at Captains Flat rather than any specific values attributable to the age or condition of its fabric. It remains a visually significant element of the precinct.	These three items are an important element of the railway precinct of the 1936-1962 mining period but are not as significant as weighbridge and turntable.	This was the area where the train engines were reversed so that railway trucks could be backed up towards the weigh station. The turntable dating from the 1930s would appear to be largely intact and in very good condition. However, part of it is overgrown with brambles, which makes a definitive assessment difficult. The turntable is an important part of the railway precinct.
B	*An item has strong or special association with the life or works of a person, or group of persons, of importance in NSWs cultural or natural history*	Not met	-	-	-

Criterion		General Statement	Elements that meet Criterion		
			Weighbridge	Railway Lines, Gantry & Railway Platform	Turntable
C	*An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW*	Not Met	-	-	-
D	*An item has strong or special associations with a particular community or cultural group in NSW for social, cultural or spiritual reasons*	The Captain's Flat mining and processing areas are important to the present community's sense of place and identity. Some of the town residents were former employees of the mining company or worked in other occupations in the town supporting the mine. The mining field and town have been the subject of a large number of feature articles and several local history books. A monument has been constructed near the recreation park in memory of men who were killed in the mining operations. Much of the town consists of buildings relating to the 1930-60s period of mining, and there are some buildings relating to the earlier period of mining in the 1890s. The mining past is important to the present community's sense of identity.	This is a prominent part of the mining fabric dating to the 1936-1962 mining period. Concentrates from the flotation mill were trucked by road to the mill and dumped through hopper bins into railway trucks. This was the final step in the mining process. Up until 2010 the weighbridge was substantially intact. It was demolished at that time without proper consideration of its identified heritage values and the current structure is a replacement made with original and new materials. The value of this element lies in its ability to tell the story of mining at Captains Flat rather than any specific values attributable to the age or condition of its fabric. It remains a	These three items are an important element of the railway precinct of the 1936-1962 mining period but are not as significant as weighbridge and turntable.	This was the area where the train engines were reversed so that railway trucks could be backed up towards the weigh station. The turntable dating from the 1930s would appear to be largely intact and in very good condition. However, part of it is overgrown with brambles, which makes a definitive assessment difficult. The turntable is an important part of the railway precinct.
E	*An item has potential to yield information that will contribute to an understanding of NSWs cultural or natural history*	The highly complex mineralogy of the Captain's Flat ore body and consequently the varied and changing mining emphases and technology were unique aspects of mining at Captain's Flat. This complexity and in turn the exceptional technical level of achievement is best demonstrated by 1930s-60s mining and processing sites. The Lake George Mine is important for its potential to yield information about past mining and processing techniques. The main mine and processing site, though not unique, is rare as there are few integrated base metal mining plants using the flotation system remaining in NSW (or in Australia) from the 1930s-60s period. Although all equipment has been removed there is enough integrity in the remaining structures to allow for a considerable degree of interpretation. Also important from an interpretative aspect is the Northern mine site and processing area (Kohinoor & Elliott's), slime dumps and tailing dams.			

Criterion		General Statement	Elements that meet Criterion		
			Weighbridge	Railway Lines, Gantry & Railway Platform	Turntable
F	*An item possesses uncommon, rare or endangered aspects of NSWs cultural or natural history*	Captain's Flat is significant as an uncommon historic mining centre by virtue of its mineralogy and the integrity of the remaining structures. The highly complex mineralogy of the Captain's Flat ore body and consequently the varied and changing mining emphases and technology were unique aspects of mining at Captain's Flat. It produced primarily gold, silver and then copper in association with other ores in the 1880s-90s period. In the 1930s-60s period it produced all the aforementioned commodities and was one of Australia's leading lead producers. Its complexity is best demonstrated by 1930s-60s mining and processing sites. It is one of the few integrated base metal mining and processing complexes demonstrating the past use of the flotation process in NSW, and of these it is probably the second most significant. Lead mining and processing sites, in particular, constitute a rare class of industrial activity. Some of the sites are subject to ongoing mine rehabilitation work and from that viewpoint can be regarded as endangered.	visually significant element of the precinct.	Not met	
G	*An item is important in demonstrating the principal characteristics of a class of NSWs cultural or natural places or cultural or natural environments*	Captain's Flat demonstrates the principal characteristics of a class of NSW's cultural places and environments as a complex base metal mining and processing centre. It retains almost all the key elements of such a centre and has considerable interpretative potential. There are few such sites in NSW and Australia compared to gold and copper sites, and they constitute a separate class of cultural places. Lead mining and processing sites, in particular, constitute a rare class of industrial activity.		These three items are an important element of the railway precinct of the 1936-1962 mining period but are not as significant as weighbridge and turntable.	

5.2 Statement of heritage impacts

An assessment of impacts on heritage items within the modification footprint listed in Schedule 5 of the Palerang LEP is provided in Table 5.2 and Table 5.3.

The assessment of potential impacts on heritage items listed in Schedule 5 of the Palerang LEP that are located immediately adjacent to the proposed activity area in included at Table 5.4.

Consideration of the potential impacts of the proposed remediation works in relation to the requirements of the Palerang Local Environment Plan 2014 are addressed in Table 5.5.

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Table 5.2 ***Statement of Heritage Impacts - Captains Flat Railway (goods shed, weighbridge, gantry and turntable)***

Question	Captains Flat Railway (goods shed, weighbridge, gantry and turntable)
The following aspects of the proposal respect or enhance the heritage significance of the item or conservation area for the following reasons:	The purpose of the proposed remediation works is to reduce the risk of off-site migration of airborne dust and contaminated runoff generated from the continued oxidation of sulfidic mineral waste at Lake George Mine. The proposed remediation works are required to prevent serious environmental and human health risks to people accessing the site, to residents on-site and in the town of Captains Flat, and to aquatic ecosystems and downstream users of the Molonglo River. The proposed works would enhance the amenity of the Captains Flat Railway site as the removal and/or containment of contaminated soil would make the sites safer for neighbouring residents and visitors. Proposed signage and interpretive material designed to help visitors gain an understanding and appreciation of the mining history and heritage of Captains Flat.
The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:	There are no identified detrimental aspects to the proposed activity. The improved amenity and safety resulting from the proposed works may potentially make the Captains Flat rail precinct a more attractive destination for visitors, and with that the attendant increased potential for inadvertent or deliberate damage to listed items.
The following sympathetic solutions have been considered and discounted for the following reasons:	The proposed works are the most appropriate solution to addressing the significant health risks associated with mine site contamination and although there will be some impact upon the heritage fabric of the rail precinct this is not considered sufficient to reduce the identified significance of the place. No other solution has been proposed.
Demolition of a building or structure Have all options for retention and adaptive re-use been explored? Can all of the significant elements of the heritage item be kept, and any new development be located elsewhere on the site? Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible? Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?	The remediation strategy for the Railway Precinct (including the weigh station, railway lines, gantry, platform and turntable) is to excavate and remove lead contaminated soil and relocate the contaminated material in the containment cell to be located on the Northern Dump. This would involve temporary removal and relocation of selected heritage fabric elements including signs, posts, signals, fencing and the rail tracks. Once the contaminated soil has been removed and replaced with clean fill the following heritage fabric elements would be reinstated in their original position: – Weighbridge; – Gantry; and – Switchgear. To mitigate any unintended harm the following measures would be taken: – Detailed mapping of the site will be prepared identifying all elements subject to removal and temporary relocation; – A detailed photographic record will be prepared of each element subject to removal and temporary relocation; – Elements subject to removal and temporary relocation will be securely stored at an appropriate location near the site; – Reinstatement of elements subject to removal and temporary relocation will occur as soon as practicable following completion of the remediation works.

Question	Captains Flat Railway (goods shed, weighbridge, gantry and turntable)
Partial Demolition Is the demolition essential for the heritage item to function? Are important features of the item affected by the demolition (e.g. fireplaces in buildings)? Is the resolution to partially demolish sympathetic to the heritage significance of the item? If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?	The fabric elements associated with the rails including rail spikes, fishplates, ties and timber sleepers will be removed along with the associated contaminated ballast and sub-grade. This will be replaced with clean fill. The proposed works are the most appropriate solution to addressing the significant health risks associated with mine site contamination and although there will be some impact upon the heritage fabric of the rail precinct this is not considered sufficient to reduce the identified significance of the place. To mitigate any unintended harm the following measures would be taken: – Detailed mapping of the site will be prepared identifying all elements; and – A detailed photographic record will be prepared of each element subject.
Major partial demolition Is the demolition essential for the heritage item to function? Are particular features of the item affected by the demolition (e.g. fireplaces in buildings)? Is the detailing of the partial demolition sympathetic to the heritage significance of the item (e.g. creating large square openings in internal walls rather than removing the wall altogether)? If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired? How is the impact of the addition on the heritage significance of the item to be minimised? Can the additional area be located within an existing structure? If no, why not? Will the additions visually dominate the heritage item? Is the addition sited on any known or potentially significant archaeological deposits? Is the resolution to partially demolish sympathetic to the heritage significance of the item? If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?	No major partial demolition of the existing heritage fabric is proposed as part of this activity.

Question	Captains Flat Railway (goods shed, weighbridge, gantry and turntable)
Minor additions How is the impact of the addition on the heritage significance of the item to be minimised? Can the additional area be located within an existing structure? If no, why not? Will the additions visually dominate the heritage item? Is the addition sited on any known or potentially significant archaeological deposits? If so, have alternative positions for the additions been considered? Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions, design)?	No Minor additions to the existing heritage fabric is proposed as part of this activity.
Major additions How is the impact of the addition on the heritage significance of the item to be minimised? Can the additional area be located within an existing structure? If not, why not? Will the additions tend to visually dominate the heritage item? Are the additions sited on any known or potentially significant archaeological deposits? If so, have alternative positions for the additions been considered? Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions, design)?	No major additions to the existing heritage fabric are proposed as part of this activity.
Change of use Has the advice of a heritage consultant or structural engineer been sought? Has the consultant's advice been implemented? If not, why not? Does the existing use contribute to the significance of the heritage item? Why does the use need to be changed? What changes to the fabric are required as a result of the change of use? What changes to the site are required as a result of the change of use?	No change of use is proposed as part of this activity. The site will continue as a historic rail precinct.
Repainting Have previous (including original) colour schemes been investigated? Are previous schemes being reinstated? Will the repainting effect the conservation of the fabric of the heritage item?	No re-painting of heritage fabric is proposed as part of this activity

Question	Captains Flat Railway (goods shed, weighbridge, gantry and turntable)
Re-roofing/re-cladding Have previous (including original) roofing/cladding materials been investigated (through archival and physical research)? Is a previous material being reinstated? Will the re-cladding effect the conservation of the fabric of the heritage item? Are all details in keeping with the heritage significance of the item (e.g. guttering, cladding profiles)? Has the advice of a heritage consultant or skilled tradesperson (e.g. slate roofer) been sought?	The weighbridge will be reinstated following completion of the decontamination works. Depending on an assessment of the condition of the roof of the weighbridge it may be necessary to replace some elements.
New services (e.g. air conditioning, plumbing) How has the impact of the new services on the heritage significance of the item been minimised? Are any of the existing services of heritage significance? In what way? Are they affected by the new work? Has the advice of a conservation consultant (e.g. architect) been sought? Has the consultant's advice been implemented? Are any known or potential archaeological deposits (underground and under floor) affected by the proposed new services?	No new services are proposed as part of this activity.
Fire upgrading How has the impact of the upgrading on the heritage significance of the item been minimised? Are any of the existing services of heritage significance? In what way? Are they affected by the new work? Has the advice of a conservation consultant (e.g. architect) been sought? Has their advice been implemented? Are any known or potential archaeological deposits (underground or under floor) affected by the proposed new services? Has the advice of a fire consultant been sought to look for options that would have less impact on the heritage item? Will this advice be implemented? How?	No fire upgrade to heritage fabric is proposed as part of this activity.

Question	Captains Flat Railway (goods shed, weighbridge, gantry and turntable)
New landscape works (including car parking and fences) How has the impact of the new work on the heritage significance of the existing landscape been minimised? Has evidence (archival and physical) of previous landscape work been investigated? Are previous works being reinstated? Has the advice of a consultant skilled in the conservation of heritage landscapes been sought? If so, have their recommendations been implemented? Are any known or potential archaeological deposits affected by the landscape works? If so, what alternatives have been considered? How does the work impact on views to, and from, adjacent heritage items?	The proposed activity would include the removal of highly contaminated soil from the rail precinct and relocation of that material to a containment cell located in the Northern Dump portion of the Lake George Mine site. Finishing and surfacing works would result in modifications to existing surface water management aimed at reducing surface erosion. This work would not impact on existing heritage fabric. The proposed activity would retain the existing form and contour of the surface and would not impact on views to, and from, the site.
Tree removal or replacement Does the tree contribute to the heritage significance of the item or landscape? Why is the tree being removed? Has the advice of a tree surgeon or horticultural specialist been obtained? Is the tree being replaced? Why? With the same or a different species?	Some trees may be removed as part of the proposed remediation works. Where this occurs, it would be to allow access to contaminated soil deposits or to avoid an impact on the built heritage fabric of the site. An ecological assessment has been undertaken to assess the environmental impacts should tree removal be required. None of the trees within the proposed activity footprint have been identified as having heritage value or contributing to significant aesthetic values. The proposal includes measures for re-vegetation once the earthworks have been completed. Plant variety would be site dependant according to the Revegetation Pan.
New signage How has the impact of the new signage on the heritage significance of the item been minimised? Have alternative signage forms been considered (e.g. free standing or shingle signs). Why were they rejected? Is the signage in accordance with section 6, Areas of Heritage Significance', in Outdoor Advertising: An Urban Design-Based approach? (1) How? Will the signage visually dominate the heritage item/ heritage conservation area or heritage streetscape? Can the sign be remotely illuminated rather than internally illuminated?	No new signage is proposed as part of this activity, however, it is understood that additional interpretive heritage signage will be considered as part of the ongoing management of the site that would be captured in a site Environmental Management Plan post-remediation works

Table 5.3 Statement of Heritage Impacts - Stationmasters Residence (Former)

Question	Stationmasters Residence (Former)
The following aspects of the proposal respect or enhance the heritage significance of the item or conservation area for the following reasons:	The purpose of the proposed remediation works is to reduce the risk of off-site migration of airborne dust and contaminated runoff generated from the continued oxidation of sulfidic mineral waste at Lake George Mine. The proposed remediation works are required to prevent serious environmental and human health risks to people accessing the site, to residents on-site and in the town of Captains Flat, and to aquatic ecosystems and downstream users of the Molonglo River. The proposed works would enhance the amenity of the former Stationmasters Residence site as the removal and/or containment of contaminated soil would make the site safer for public visitation. Revegetation work would contribute to stabilising the site.
The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:	There are no identified detrimental aspects to the proposed activity. The proposed works will improve the amenity and safety for residents of the former Stationmasters Residence
The following sympathetic solutions have been considered and discounted for the following reasons:	The proposed works are the most sympathetic solution to addressing the significant health risks associated with site contamination that does not involve physical impact upon the heritage fabric of the former Stationmasters Residence. No other solution has been proposed.
Demolition of a building or structure Have all options for retention and adaptive re-use been explored? Can all of the significant elements of the heritage item be kept, and any new development be located elsewhere on the site? Is demolition essential at this time or can it be postponed in case future circumstances make its retention and conservation more feasible? Has the advice of a heritage consultant been sought? Have the consultant's recommendations been implemented? If not, why not?	The remediation strategy for the former Stationmasters Residence is to excavate and remove lead contaminated soil and relocate the contaminated material in the containment cell to be located on the Northern Dump. This would involve temporary removal and relocation of selected non-heritage elements including signs, posts, and fencing. Once the contaminated soil has been removed and replaced with clean fill all elements would be reinstated in their original position or replaced with new items. To mitigate any unintended harm the following measures would be taken: A detailed photographic record will be prepared of the external elevations of the Stationmasters Residence and its setting; Non-heritage elements subject to removal and temporary relocation will be securely stored at an appropriate location near the site; and Reinstatement of non-heritage elements subject to removal and temporary relocation will occur as soon as practicable following completion of the remediation works.
Partial Demolition Is the demolition essential for the heritage item to function? Are important features of the item affected by the demolition (e.g. fireplaces in buildings)? Is the resolution to partially demolish sympathetic to the heritage significance of the item? If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?	No partial demolition of the existing heritage fabric is proposed as part of this activity.

Question	Stationmasters Residence (Former)
Major partial demolition Is the demolition essential for the heritage item to function? Are particular features of the item affected by the demolition (e.g. fireplaces in buildings)? Is the detailing of the partial demolition sympathetic to the heritage significance of the item (e.g. creating large square openings in internal walls rather than removing the wall altogether)? If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired? How is the impact of the addition on the heritage significance of the item to be minimised? Can the additional area be located within an existing structure? If no, why not? Will the additions visually dominate the heritage item? Is the addition sited on any known or potentially significant archaeological deposits? Is the resolution to partially demolish sympathetic to the heritage significance of the item? If the partial demolition is a result of the condition of the fabric, is it certain that the fabric cannot be repaired?	No major partial demolition of the existing heritage fabric is proposed as part of this activity.
Minor additions How is the impact of the addition on the heritage significance of the item to be minimised? Can the additional area be located within an existing structure? If no, why not? Will the additions visually dominate the heritage item? Is the addition sited on any known or potentially significant archaeological deposits? If so, have alternative positions for the additions been considered? Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions, design)?	No minor additions are proposed at this site

Question	Stationmasters Residence (Former)
Major additions How is the impact of the addition on the heritage significance of the item to be minimised? Can the additional area be located within an existing structure? If not, why not? Will the additions tend to visually dominate the heritage item? Are the additions sited on any known or potentially significant archaeological deposits? If so, have alternative positions for the additions been considered? Are the additions sympathetic to the heritage item? In what way (e.g. form, proportions, design)?	No major additions to the existing heritage fabric are proposed as part of this activity.
Change of use Has the advice of a heritage consultant or structural engineer been sought? Has the consultant's advice been implemented? If not, why not? Does the existing use contribute to the significance of the heritage item? Why does the use need to be changed? What changes to the fabric are required as a result of the change of use? What changes to the site are required as a result of the change of use?	No change of use is proposed as part of this activity.
Repainting Have previous (including original) colour schemes been investigated? Are previous schemes being reinstated? Will the repainting effect the conservation of the fabric of the heritage item?	No re-painting of heritage fabric is proposed as part of this activity
Re-roofing/re-cladding Have previous (including original) roofing/cladding materials been investigated (through archival and physical research)? Is a previous material being reinstated? Will the re-cladding effect the conservation of the fabric of the heritage item? Are all details in keeping with the heritage significance of the item (e.g. guttering, cladding profiles)? Has the advice of a heritage consultant or skilled tradesperson (e.g. slate roofer) been sought?	No re-roofing or re-cladding of heritage fabric is proposed as part of this activity

Question	Stationmasters Residence (Former)
New services (e.g. air conditioning, plumbing) How has the impact of the new services on the heritage significance of the item been minimised? Are any of the existing services of heritage significance? In what way? Are they affected by the new work? Has the advice of a conservation consultant (e.g. architect) been sought? Has the consultant's advice been implemented? Are any known or potential archaeological deposits (underground and under floor) affected by the proposed new services?	No new services are proposed as part of this activity. Certain aspects of the proposed earthworks would include modification to existing surface water management aimed at reducing surface erosion and managing stormwater. This work would not impact on existing heritage fabric.
Fire upgrading How has the impact of the upgrading on the heritage significance of the item been minimised? Are any of the existing services of heritage significance? In what way? Are they affected by the new work? Has the advice of a conservation consultant (e.g. architect) been sought? Has their advice been implemented? Are any known or potential archaeological deposits (underground or under floor) affected by the proposed new services? Has the advice of a fire consultant been sought to look for options that would have less impact on the heritage item? Will this advice be implemented? How?	No fire upgrade to heritage fabric is proposed as part of this activity.
New landscape works (including car parking and fences) How has the impact of the new work on the heritage significance of the existing landscape been minimised? Has evidence (archival and physical) of previous landscape work been investigated? Are previous works being reinstated? Has the advice of a consultant skilled in the conservation of heritage landscapes been sought? If so, have their recommendations been implemented? Are any known or potential archaeological deposits affected by the landscape works? If so, what alternatives have been considered? How does the work impact on views to, and from, adjacent heritage items?	The remediation works for the former Stationmasters Residence involve the excavation and removal of lead contaminated soil and relocation of the contaminated material in the containment cell to be located on the Northern Dump. Once the contaminated soil has been removed and replaced with clean fill finishing and surfacing works would be undertaken This work would not impact on existing heritage fabric. The proposed activity would retain the existing form and contour of the surface and would not impact on views to, and from, the site.

Question	Stationmasters Residence (Former)
Tree removal or replacement Does the tree contribute to the heritage significance of the item or landscape? Why is the tree being removed? Has the advice of a tree surgeon or horticultural specialist been obtained? Is the tree being replaced? Why? With the same or a different species?	Some trees may be removed as part of the proposed remediation works. Where this occurs, it would be to allow access to contaminated soil deposits or to avoid an impact on the built heritage fabric of the site. An ecological assessment has been undertaken to assess the environmental impacts should tree removal be required. As a working ethos, where trees remain, the soil logically is relatively uncontaminated and therefore, would not need to be remediated. None of the trees within the proposed activity footprint have been identified as having heritage value or contributing to significant aesthetic values. The proposal includes measures for re-vegetation once the earthworks have been completed. Plant variety would be site dependant according to the Revegetation Pan.
New signage How has the impact of the new signage on the heritage significance of the item been minimised? Have alternative signage forms been considered (e.g. free standing or shingle signs). Why were they rejected? Is the signage in accordance with section 6, Areas of Heritage Significance', in Outdoor Advertising: An Urban Design-Based approach? (1) How? Will the signage visually dominate the heritage item/ heritage conservation area or heritage streetscape? Can the sign be remotely illuminated rather than internally illuminated?	No new signage is proposed as part of this activity.

Table 5.4 Statement of Heritage Impacts – Neighbouring Listed Places: Captains Flat Railway Station and Roscommon.

Question	Railway Station	Roscommon
The following aspects of the proposal respect or enhance the heritage significance of the item or conservation area for the following reasons:	The proposed works would enhance the amenity of the Captains Flat rail precinct The improved amenity and safety resulting from the proposed works may potentially make the Captains Flat rail precinct a more attractive destination for visitors, and with that the attendant increased potential for inadvertent or deliberate damage to listed items.	The proposed works will neither enhance nor be of any detriment to the Roscommon site
The following aspects of the proposal could detrimentally impact on heritage significance. The reasons are explained as well as the measures to be taken to minimise impacts:	The proposed works will not detract from, or detrimentally impact the Railway Station site.	
The following sympathetic solutions have been considered and discounted for the following reasons:	The proposed works are the most sympathetic solution to addressing the significant health risks associated with mine site contamination. No other solution has been proposed.	
New development adjacent to a heritage item	Railway Station	Roscommon
How does the new development affect views to, and from, the heritage item? What has been done to minimise negative effects?	The proposed works would not impact the views to or from the heritage items, once complete.	
How is the impact of the new development on the heritage significance of the item or area to be minimised?	The proposed works would have no impact on the heritage significance of the items.	
Why is the new development required to be adjacent to a heritage item?	The proposed works involve remediation of a mine site and include measures to mitigate the impact of toxic mine waste. The works are location-dependant.	
How does the curtilage allowed around the heritage item contribute to the retention of its heritage significance?	The proposed works would not encroach upon or interfere with the heritage items curtilage.	
Is the development sited on any known, or potentially significant archaeological deposits? If so, have alternative sites been considered? Why were they rejected?	Potential archaeological deposits may be associated with the mine entrance, workshop and change rooms and at the Processing Site (Kohinoor & Elliots). The significance if these deposits is unknown. They would be protected from disturbance with physical barriers whilst remediation works are underway. These locations are at some distance from the Stationmasters Residence, Railway Station and Roscommon sites. The proposed works and the mitigative measures would have no impact on the identified heritage values of the Stationmasters Residence, Railway Station and Roscommon sites	
Is the new development sympathetic to the heritage item? In what way (e.g. form, siting, proportions, design)?	Yes. The proposed works involve the capping and sealing of contaminated soil, the removal of contaminated soil and landscaping consistent with the existing site topography.	
Will the additions visually dominate the heritage item? How has this been minimised?	No. The proposed works involve the capping and sealing of contaminated soil, the removal of contaminated soil and landscaping consistent with the existing site topography.	

Question	Railway Station	Roscommon
Will the public, and users of the item, still be able to view and appreciate its significance?	The proposed works would improve the ability of the public and other users to access, view or appreciate the significance of the Captains Flat Railway Station site.	The proposed works would not interfere with the ability of the public and other users to access, view or appreciate the significance of the Roscommon site.

Table 5.5 Consideration of Palerang LEP 2014 requirements - Captains Flat Railway (goods shed, weighbridge, gantry and turntable).

Objective	Captains Flat railway goods shed, weighbridge, gantry and turntable	Stationmasters Residence (Former)
To conserve the environmental heritage of the Queanbeyan-Palerang region	The purpose of the proposed remediation works is to reduce the risk of offsite contamination through airborne dust and surface erosion generating contaminated runoff from the continued residual lead contamination at rail facilities associated with Lake George Mine. The proposed remediation works are required to prevent environmental and human health risks to people accessing the site, to residents of the township of Captains Flat, and to aquatic ecosystems and downstream users of the Molonglo River.	
To conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views	The proposed works can be implemented without impacting on the heritage significance of the site, its fabric, settings and views.	
To conserve archaeological sites	No archaeological sites, or areas of archaeological potential have been identified within the proposed impact footprint that is within the curtilage of the Captains Flat railway goods shed, weighbridge, gantry and turntable site or the former Stationmasters Residence.	
To conserve Aboriginal objects and Aboriginal places of heritage significance	No Aboriginal objects and Aboriginal places of heritage significance will be impacted.	

5.3 Culvert 1

The culvert at Culvert 1 appears to be constructed in a manner that is contemporary with the other existing built elements of the Lake George Mine site. Whilst itis chronologically contemporary with the later years of the mine's operation, it is not considered to possess heritage values in their own right.

The removal of this culvert will not have a negative impact upon the identified heritage values of the Lake George Mine site. Nevertheless, the removal of any fabric element of a historic site does have an incremental impact on the way that the rest of the site is able to tell the story of its past. On that basis, the management preference should be for retention unless the safety, condition or functionality of the culvert is compromised.

6. Mitigation measures

Heritage safeguards and management related to the revised proposal, as well as those identified in the original REF, have been incorporated into Table 8.

New safeguards and management measures or additions to existing safeguards and management measures are shown in **bold** text, with deletions shown with a strikethrough. Names of key regulators have also been updated.

Table 6.1 Mitigation measures proposed to manage heritage impacts of the approved project and the proposed modifications

Non-Aboriginal heritage	
NAH1	The proposed activity must be confined to the proposed works footprint. This would ensure that neighbouring and adjacent heritage sites (Captains Flat Railway Station, Stationmasters Residence (Former) and Roscommon) are not impacted upon.
NAH2	To mitigate any unintended harm the following measures must be taken: – A detailed geospatial survey of the site must be prepared that identifies all elements subject to removal and temporary relocation – A detailed photographic record must be prepared of each element subject to removal and temporary relocation – Elements subject to removal and temporary relocation will be securely stored at an appropriate location at, or near, the site – Reinstatement of elements subject to removal and temporary relocation must occur as soon as practicable following completion of the remediation works. Fabric elements associated with the rails including rail spikes, fishplates and ties must be salvaged and, where that is not possible, they must be replaced with like components Replacement timbers (including rail sleepers) should be like items, where possible The rail ballast and sub-grade is to be replaced with new material. As the Captains Flat railway is no longer operating, the reinstatement of railway tracks may not require engineering and construction to meet operational railway standards. Advice should be obtained from Transport for NSW on this matter.
NAH3	Potential archaeological deposits are likely to be associated with the mine entrance, workshop and change rooms and at the Processing Site (Kohinoor & Elliots). These sites must be protected from disturbance with physical barriers whilst works are underway. The positioning of barrier fencing should be determined in consultation with an archaeologist with experience of the Lake George Mine site. The application of lime to surface deposits at the Processing Site (Kohinoor & Elliots) will be undertaken by hand and without disturbance to surface deposits to avoid any impact to potential archaeological deposits.
NAH4	If the Concentrate Loading Tunnels are to be removed, the following measures would be taken before the proposed activity commences in order to mitigate the impact: – A detailed archival recording of the Concentrate Loading Tunnels will be prepared including site plans and measured drawings **historic photographs**; and – A detailed archival photographic record of the Concentrate Loading Tunnels will be prepared.
NAH5	To mitigate any unintended harm to the Concentrate Bins, the following measures would be taken before the proposed activity commences: – A detailed archival recording of the Concentrate Bins will be prepared including site plans and measured drawings **historic photographs**; and – A detailed archival photographic record of the Concentrate Bins will be prepared. If removal of the inert gravel and the sulfidic waste causes the structural integrity of one or more of the Concentrate Bins to be compromised, additional heritage assessment will be required to determine the most appropriate future management of the structure(s).

Number	Mitigation measure
NAH6	To mitigate any unintended harm to the Surge Bin, the following measures would be taken before the proposed activity commences: – A detailed archival recording of the Surge Bin will be prepared including site plans and ~~measured drawings~~ **historic photographs**; and – A detailed archival photographic record of the Surge Bin will be prepared. If removal of the sulfidic waste causes the structural integrity of the Surge Bin to be compromised, additional heritage assessment will be required to determine the most appropriate future management of the structure.
NAH7	Prior to the commencement of the proposed remediation works, the Processing Site (Kohinoor & Elliots) should be secured with temporary fencing to restrict access, minimise on site safety risk, and to protect the historic structures from inadvertent damage during the works.
NAH8	At the completion of construction works, the following heritage elements should be secured with appropriate permanent safety fencing to restrict access. Final barrier design would be determined based on site specific conditions and the relevant Australian Design Standards. – Flotation Mill – Storage Bins, Sulphur Plant & Ball Mills – Surge Bin concrete footers.
NAH9	**To mitigate any unintended harm to the Captains Flat Railway, the following measures will be taken before the proposed activity commences:** – **A detailed archival recording of the Captains Flat Railway will be prepared including site plans and historic photographs; and** – **A detailed archival photographic record of the Captains Flat Railway will be prepared.**
NAH10	**The existing culvert structures will be retained unless the safety, condition or functionality of the culvert is compromised.**
Aboriginal heritage	
AH1	Implement unanticipated finds protocol. If unforeseen Aboriginal objects/sites are uncovered during the proposed remediation works, work would cease in the vicinity of the find and next step would be co-ordinated by LMP. This would likely involve consultation with an archaeologist, the Department of Planning~~, Industry~~ and Environment (DP~~I~~E) and the Local Aboriginal Land Council.
AH2	Implement unanticipated skeletal remains protocol. If human remains are found during the proposed remediation works, work would cease, the site would be secured, and the NSW Police and DP~~I~~E would be notified.
AH3	If a native title land claim is declared this will be investigated and a notice of the works will be forwarded to the native title claimants' representative body.

7. Conclusion

The proposed modifications would have a minor impact on the heritage fabric present within the Rail precinct. This impact is not considered to be of a nature that would alter the identified heritage values of the place. Overall, Lake George Mine would retain its heritage value as other key heritage structures would be retained and the remediation works would all the site to be available to the public. The heritage impact of the proposed modifications would be managed by the mitigation measures discussed in section 5.3.

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