

6.4 Soils and contamination

This section summarises the results of a desktop investigation of the soils and geology underlying the proposal area and the *Great Western Highway Upgrade Medlow Bath Phase 1 Preliminary Site Investigation and Report* (Mott MacDonald, 2020), provided in Appendix G.

6.4.1 Existing environment

Geology

The geology of the proposed area is identified by the NSW Department of Planning, Industry and Environment's data as comprising:

- **Narrabeen Group:** Quartz-lithic to quartzose sandstone, conglomerate, mudstone, siltstone, rare coal
- **Early Triassic to Middle Triassic:** predominately sedimentary rocks; including sedimentary rocks of low metamorphic grade and diapiric breccias.

Soil landscape

The *1:100,000 Geology of Penrith Map* (Geological Survey of NSW, 1991), identifies the regional geology of the proposal area as a combination of the following landscape, as shown in Figure 6-8.

- **Medlow Bath (residual):** predominately a combination of Leptic Rudosols and Orthic Tenosols which are rapid to well-draining, achieving an approximate depth of 100 centimetres before bedrock.

Adjacent soil landscapes include:

- **Warragamba (erosional):** compromised of a combination between rapidly and well-drained soils to a maximum depth of 150 centimetres before bedrock appears
- **Wollangambe (erosional):** compromised of a variety of rapidly draining soils to a maximum depth of 150 centimetres before bedrock appears.

Acid sulphate soils

Acid sulphate soils include those where the sulfides in the soils have been exposed to air and acid is being generated (actual acid sulphate soil) and those which may form actual acid sulphate soil when drained or exposed to oxidisation processes (ie the exposure of iron sulphate minerals such as pyrite to oxygen).

A search of the NSW Department of Planning, Industry and Environment's database on Eastern Australian Acid Sulphate Soils on 26 November 2020 indicates that there are no known or risk of acid sulphate soils occurring within or in the vicinity of the proposal.

Salinity

Salinity is the accumulation of salts in soil and water to levels that impact on human and natural assets. Salinity occurs where salt in the landscape is mobilised and redistributed closer to the soil surface and / or into waterways by rising groundwater.

A search of the NSW Department of Planning, Industry and Environment's database on Eastern Australian Soil Salinity on 3 March 2021 did not include salinity data for the proposal area. However, records for the adjacent area states "no salting evident".

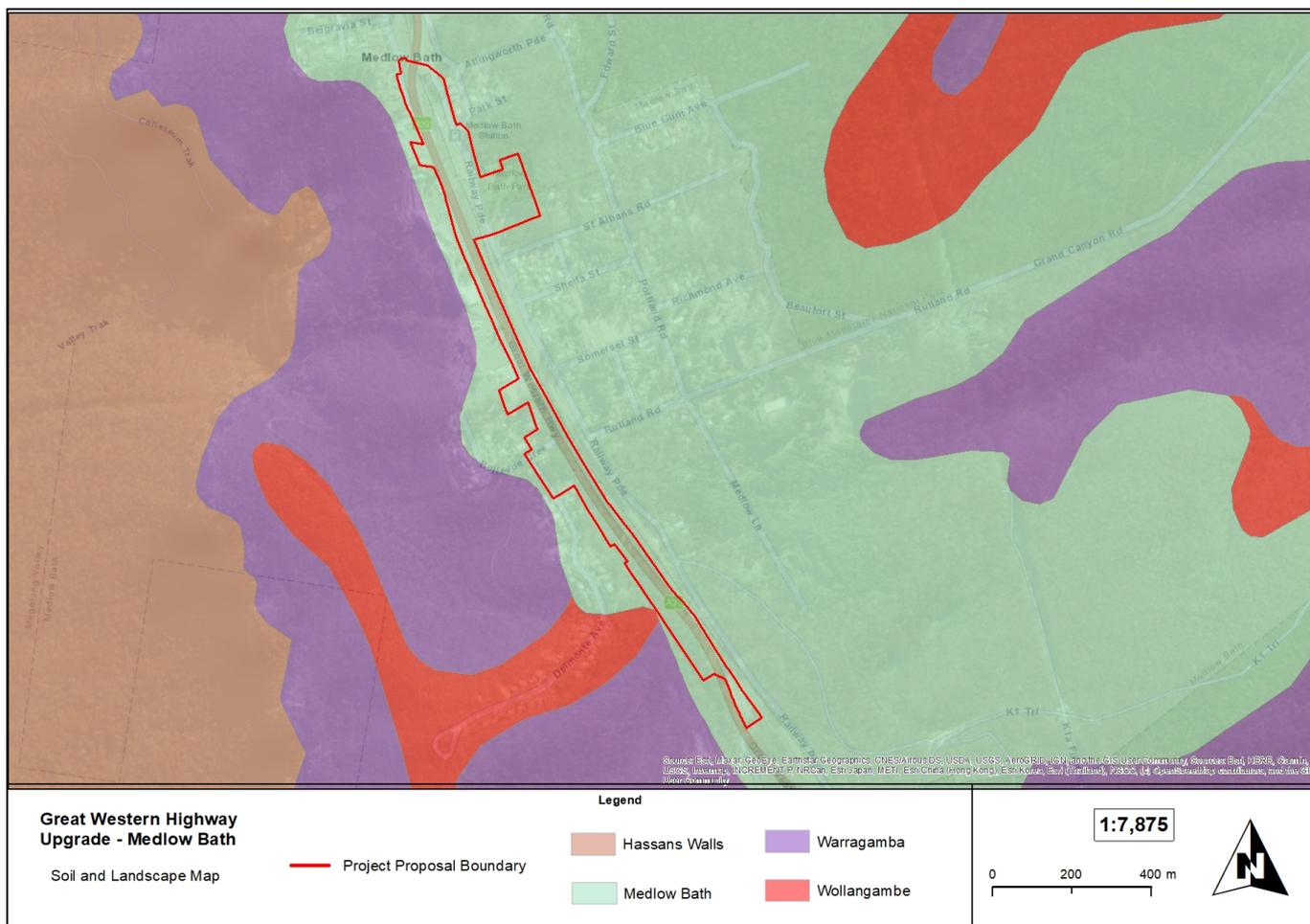


Figure 6-8: Soil landscape map for the proposal area (Source: Department of Planning, Industry and Environment)

Topography

The topography of the landscapes associated with the proposal have the following characteristics:

- Medlow Bath:** rolling rises to rolling low hills on Hawkesbury Sandstone and Narrabeen Group Sandstone in the south west of the Hunter Region. Slopes 10 per cent to 20 per cent, local relief 20 metres to 50 metres, elevation 464 metres to 1,184 metres. Partially cleared open forest and open woodland
- Warragamba:** steep, narrow, gorges on Narrabeen Group sandstone in the Hawkesbury Nepean and Hunter Central Rivers catchments. Slopes greater than 35 per cent, local relief 90 metres to greater than 300 metres, elevation 30 metres to 1,179 metres. Partially cleared tall open-forest and rainforest in sheltered gullies
- Wollongambe:** rolling low hills to steep hills on Narrabeen Group Sandstone mainly in the north-west of the Hawkesbury Nepean Catchment but also the rugged south-west of the Hunter Region. Slopes 20 per cent to 40 per cent, local relief less than 220 metres, elevation 200 metres to 600 metres.

Contamination

The information presented in this section is based on a review of readily available government information sources and information, a site inspection carried out 19 November 2020, and the findings of the *Phase 1 Preliminary Site Investigation and Report* (Mott MacDonald, 2020) provided in Appendix G.

Historical aerial photographs and land use changes

- **1958:** the Great Western Highway and railway line are present, having previously been developed. The proposal area also comprises a combination of cleared/grazed paddocks with sparse residential occupation. Of the disturbed land, the United Petrol Station located opposite Somerset Avenue appears to have had its petrol tanks directly in-line with the Proposal area.
- **1966:** relatively unchanged land use from that of 1958.
- **1994:** parcels of residential land have now had property developed on most lots. With a majority of these houses constructed between 1970s-1980s, it is likely that they contain asbestos. The vegetation that lines the Great Western Highway remains the same, however the canopy cover is larger. The Hydro Majestic Hotel has been significantly upgraded.
- **2006:** vegetation lining the Great Western Highway has not increased in number but has increased in canopy cover. The Hydro Majestic Hotel has undergone further restoration/upgrade.

Desktop review

An online search of the NSW EPA contaminated land record of notices database and the POEO Act public register database was carried out on 25 November 2020 and displayed no records to suggest the presence of contamination within the proposal area.

Site inspection

The site inspection noted the following potential areas of environmental concern within and adjacent to the proposal area:

- a petrol station at 90-92 Great Western Highway has existed in excess of 20 years and as such there is the potential of hydrocarbon contamination from uncontrolled spills, surface water run-off and leakage from underground petroleum storage systems (previous and existing). Groundwater monitoring wells were noted onsite during the site inspection
- evidence of unknown fill material and unregulated waste dumping, particularly between the Great Western Highway and the rail corridor
- an operational car dealership that includes a maintenance workshop is located at 42 Great Western Highway which presents a potential historic risk of soil and groundwater contamination due to the likelihood of hydrocarbon spills, chemical storage and battery storage
- utility conduits presumed to contain asbestos were found between the Great Western Highway and Medlow Bath Station and could occur in additional locations.
- fill material from an unknown source associated with historical road construction was identified within several locations (notably between the Great Western Highway and rail corridor)
- stockpiled ballast was observed at the proposed compound site located at 181-183 Great Western Highway.

6.4.2 Potential impacts

Surface and groundwater quality impacts which are linked to soils and contamination are discussed in Section 6.3.

Construction

Erosion and sedimentation

Ground disturbing activities such as vegetation clearance, earthworks, stockpiling etc increase erosion potential which can lead to sedimentation from increased soil exposure, and which in turn can affect local surface water quality. The risks are increased where there are uncompacted or unconsolidated materials (such as excavated and stockpiled soils) or works being undertaken in steep or unstable soil areas.

During construction, soil erosion risks would be managed in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and *Managing Urban Stormwater: Soils and Construction Volume 2* (Department of Environment and Climate Change, 2008), commonly referred to as the 'Blue Book'.

Contamination

Potential contaminants of concern relating to the activities observed during the site inspection (or identified during the desk top review of aerial maps or recorded on the EPA and POEO Act public register) included material suspected of containing asbestos (including fill and conduits), total coverable hydrocarbons, benzene, toluene, ethylbenzene and xylene, polycyclic aromatic hydrocarbons, organochlorine pesticides, organophosphate pesticides, polychlorinated biphenyls, phenols, volatile organic compounds and asbestos containing materials. During construction there is a risk of disturbance to soil layers that potentially contain these contaminants.

Operation

Erosion and sedimentation

There is potential for recently disturbed soils to be susceptible to erosion, which could occur during initial periods of landscaping and re-establishment of vegetation. This may occur in areas where soft landscaping is proposed for the proposal, including open space areas at Medlow Bath Station, adjacent to disturbed areas, along embankments and in the reinstatement of temporary ancillary facilities where topsoil is settling and vegetation is establishing. Landscaping at Medlow Bath Station also presents the greatest risk of sediment loads entering waterways through the stormwater system, due to the extent of landscaping proposed and the proximity to waterways. In terms of soil stability, retaining walls are proposed along the highway alignment to provide support and ensure long term erosion or collapse risks are eliminated.

Contamination

During operation, the likely sources of contamination would be from exhaust particles and discharges from vehicle engines, litter and other waste, materials from vehicle incidents and wear from vehicle parts such as tyres. This would be managed through the installation of dedicated diversion equipment for the storage of spills to avoid direct discharge to receiving watercourses.

6.4.3 Safeguards and management measures

Table 6-12: Safeguards and management measures – Soils and contamination

Impact	Environmental safeguards	Responsibility	Timing	Reference
Contaminated land	<p>A targeted Phase 2 investigation providing general coverage of the proposed alignment and areas of potential contamination sources (including areas where fill would be encountered during construction and hydrocarbon migration from the United Petrol Station) will be undertaken. The investigation will address the potential risk that fill material may pose to construction workers and future users of the site.</p> <p>Assessments will be carried out in accordance with guidance made or endorsed by the NSW EPA. The contaminated land investigations will be carried out and the report verified by a suitably qualified and experienced environmental consultant.</p>	TfNSW	Detailed design / Pre-construction	Appendix G
Contaminated land	<p>A Contaminated Land Management Plan will be prepared in accordance with the <i>Guideline for the Management of Contamination</i> (TfNSW, 2013) and implemented as part of the CEMP. The plan will include, but not be limited to:</p> <ul style="list-style-type: none"> capture and management of any surface runoff contaminated by exposure to the contaminated land any further investigations required to determine the extent, concentration and type of contamination. management of the remediation and subsequent validation of the contaminated land, including any certification required measures to ensure the safety of site personnel and local communities during construction. <p>If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any</p>	Contractor	Detailed design / Pre-construction	Section 4.2 of QA G36 <i>Environment Protection</i> Appendix G

Impact	Environmental safeguards	Responsibility	Timing	Reference
	<p>necessary site-specific controls or further actions identified in consultation with the TfNSW Environment Manager and/or EPA.</p>			
<p>Pollution from run-off</p>	<p>The following measures will be included to limit sediment and other contaminations entering receiving waterways:</p> <ul style="list-style-type: none"> • chemicals will be stored within a sealed or banded area • appropriate controls will be in place where plant is stored • run-off from ancillary facilities will be controlled and treated before discharging into downstream waterways • vehicle movements will be restricted to designated pathways where feasible. <p>Areas that will be exposed for extended periods, such as car parks will be stabilised where feasible.</p>	<p>Contractor</p>	<p>Construction</p>	<p>Additional safeguard</p>
<p>Accidental spill</p>	<p>A site specific emergency spill plan will be developed, and include spill management measures in accordance with the TfNSW <i>Code of Practice for Water Management</i> (RTA, 1999) and relevant EPA guidelines. The plan will address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including TfNSW and EPA officers).</p>	<p>Contractor</p>	<p>Detailed design / Pre-construction</p>	<p>Section 4.3 of QA G36 <i>Environment Protection</i></p>