

Phase 1 Preliminary Site Investigation and Report

Great Western Highway Upgrade Program -
Medlow Bath Preferred Concept Design, Detailed
Design and REF

18 December 2020

Confidential

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Great Western Highway Upgrade – Medlow Bath

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1 Introduction

The Medlow Bath Upgrade is a 1.2km section of the approximately 34km Great Western Highway Upgrade program between Katoomba and Lithgow which Transport for New South Wales is planning to upgrade to a four-lane carriageway. The purpose of the Great Western Highway Upgrade is to reduce congestion and deliver safer, more efficient and reliable journeys for those travelling in, around and through the Blue Mountains, while also better connecting communities in the Central West.

Medlow Bath is a town located between Katoomba and Blackheath and is approximately 115km West of the Sydney CBD. The Great Western Highway Upgrade Program - Medlow Bath project (Medlow Bath project) involves upgrading the existing single lane carriageway to a dual carriageway along the alignment.

A Strategic Design has been prepared and requires further development after consultation and engagement with key stakeholders and refinements through workshop reviews.

In November and December 2019, Transport for NSW held the first round of community consultation on the proposed upgrade from Katoomba to Lithgow. Further details are available on RMS's website at:

<https://www.rms.nsw.gov.au/projects/great-western-highway/katoomba-to-lithgow/index.html>

MRB has been engaged by Transport for NSW to conduct a Phase 1 preliminary contamination report to guide the proposed upgrade of the Great Western Highway – Medlow Bath (the Proposal). This report includes a review of current and previous activities within the Proposal area, along with an assessment of potential risks associated with the characteristics of the surrounding landscape. The investigation will be used to identify opportunities, constraints and risks to be considered as part of the delivery of the project.

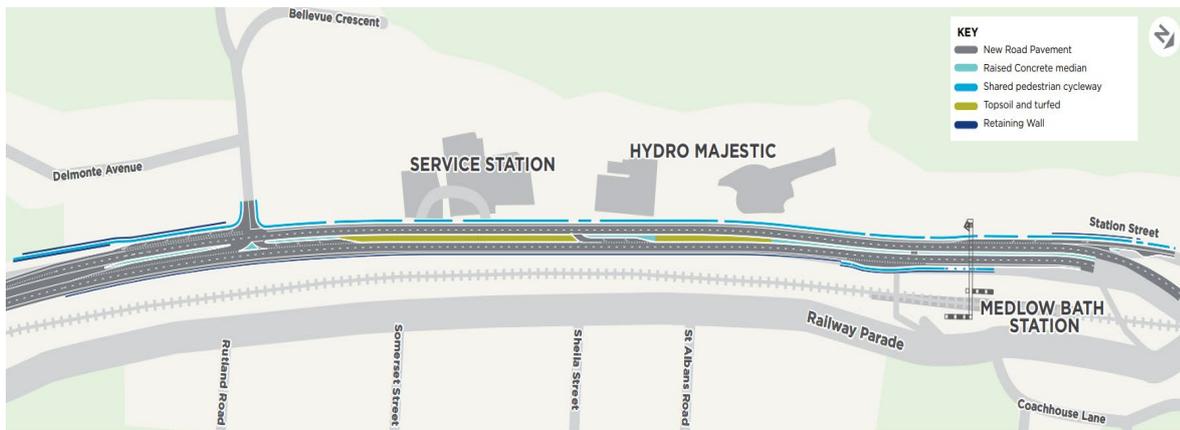
1.1 Regional context

Medlow Bath is located about 6 kilometres west of Katoomba, 107 kilometres west of Sydney Central Business District (CBD) via the Great Western Highway and lies within the Blue Mountains City Council local government area.

The Proposal is a part of the Great Western Highway Upgrade program, which intends to deliver a four-lane divided highway between Katoomba and Lithgow. The upgrade of this section of the Great Western Highway will result in improved connection for freight, businesses and tourism between Central West NSW and Sydney, supporting regional economic growth. As part of the Proposal, this connectivity for pedestrians and bicycles will be improved by the installation of a new footbridge linking Railway Parade and the Medlow Bath Train Station as well as the eastern and western sides of the Great Western Highway.

At the 2016 census (Australian Bureau of Statistics), Medlow Bath had a population of 611 people, with the area predominately zoned residential.

Figure 1-1: Draft Medlow Bath Strategic Design (TfNSW, 2020)



1.2 Study area

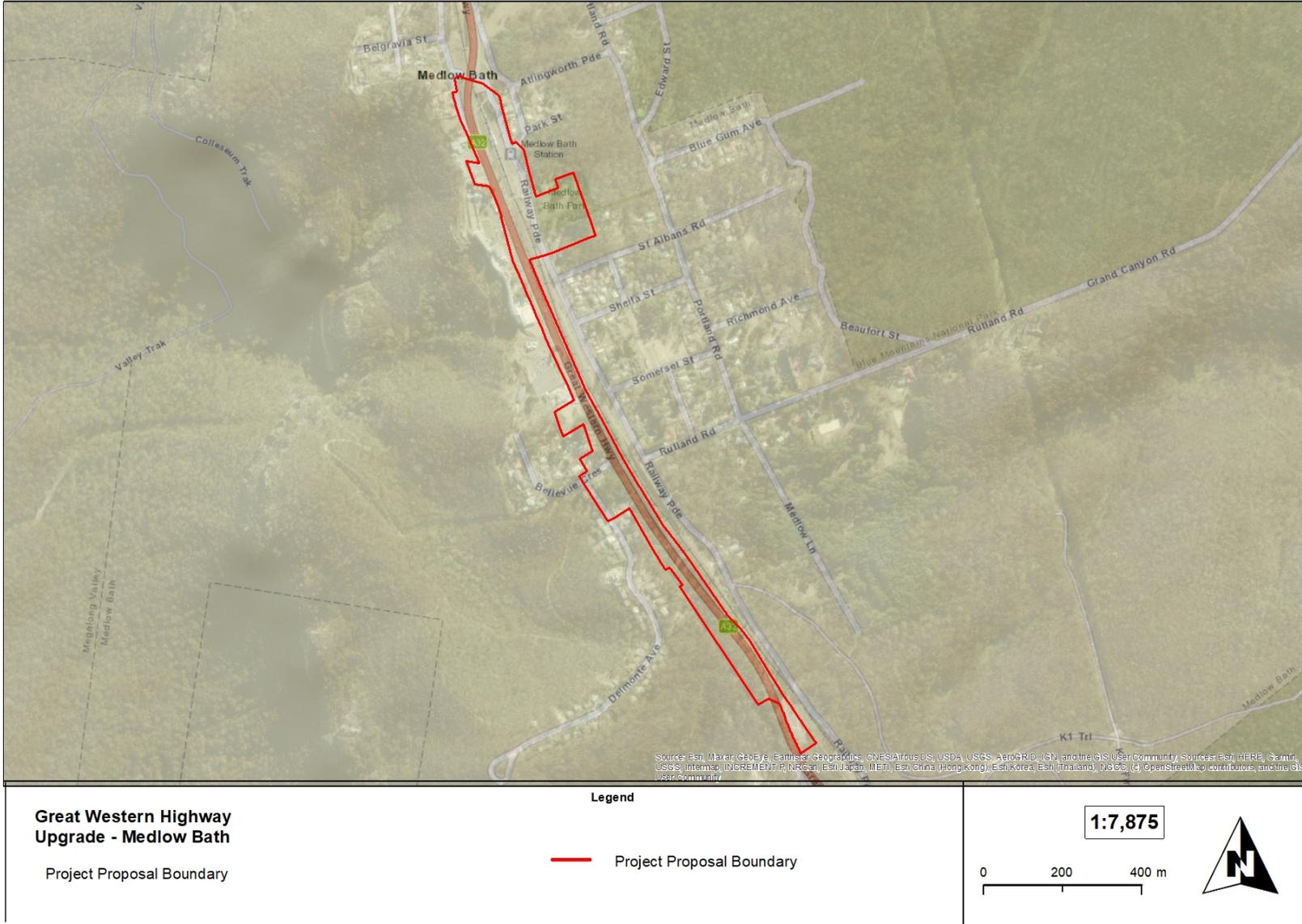
The Study area for this assessment includes the area within the construction boundary for the Proposal and associated works including potential drainage upgrade, ancillary facilities, laydown areas, sedimentation basins and a compound site at the address 181-183 Great Western Highway, Medlow Bath. Figure 1-2 and

Figure 1-3 show the Study area. The majority of the Proposal uses the existing Great Western Highway, and a small portion of Railway Parade adjacent to Medlow Bath Station.

The Study area comprises several categories of land use, with the majority being SP2 (infrastructure) as a part of the Great Western Highway. Surrounding the Study area is predominately residential (E4) and National Park (E2).

The Study area also includes Medlow Bath Station (a historic train station built prior to 1900), several public spaces and adjacent residential/commercial properties. It has been noted that a service station adjacent to the Study area may present issues regarding contamination that may warrant further investigation.

Figure 1-3 The Proposal



1.3 Proposed development

Transport for NSW (TfNSW) proposes to upgrade approximately 1.2 kilometres of the Great Western Highway at Medlow Bath between Railway Parade and approximately 330 metres south of Bellevue Crescent (the Proposal). This upgrade is part of the Great Western Highway Duplication project between Katoomba and Lithgow which is needed to provide a safer and more efficient link between Central West NSW and the Sydney Motorway Network for freight, tourist and general traffic. In addition to the road modifications, the Proposal will improve pedestrian access to the area by the installation of a bridge that connects Railway Parade, Medlow Bath Station and both sides of the Highway.

Key features of the Proposal would include:

- Construction of a four-lane divided carriageway with consolidated access points at upgraded intersections
 - Upgraded intersection providing auxiliary turning lanes for access/egress at Bellevue Crescent
 - Provision of a U-turn bay for traffic turning southbound to northbound at Bellevue Crescent
 - Right turn bay in southbound carriageway median for Hydro Majestic Hotel (no right turn egress)
 - Improvements on Railway Parade to formalise parking provisions, U-turns and commuter parking
- Construction of full depth highway pavement and associated local road, driveway, footpath, kerb and gutter reconstruction work within the Proposal area
- Construction of a new pedestrian bridge that connects Railway Parade, Medlow Bath Station and new indented bus bays on both sides of the Highway in line with Transport Access Program requirements.
- Shared use (pedestrian/cyclist) path adjacent to westbound carriageway
- Retaining wall and traffic barrier construction adjacent to existing rail corridor
- Utility relocation and stormwater drainage upgrade as required over length of the project
- Provision of 6 metre raised landscaped median for trees protected with modified redirective kerb

1.4 Purpose of report

The purpose of this Phase 1 – preliminary contamination report is to provide the following:

- A review of the Study area's potential for contamination resulting from current or previous land uses
- A summary of key issues that may present liabilities or constraints on future development
- Recommendations for further investigation to assist with quantifying the risks and constraints for future development.

1.5 Scope of works

As part of this Phase 1 - preliminary contamination investigation, MRB has undertaken the following tasks:

- Review of the project's environmental setting, with reference to published maps and publicly available spatial data
- Review relevant published topographical, geological and hydrological data
- Review of the acid sulphate soils map and provisions in the relevant local environment plans
- Review of historical aerial photographs
- Review of *City of Blue Mountains HW5 Great Western Highway Corridor Upgrade – Katoomba to Mount Victoria - Geotechnical Strategic Desktop Study (GSPO)*.
- Review of *Great Western Highway Katoomba to Mount Victoria – Preliminary Environmental Investigation (RMS)*.
- Search of the NSW Environmental Protection Authority (EPA) public register for contamination
- Search of the NSW EPA's *Protection of Environment Operations Act 1997* licence database to identify high risk land uses
- Site walkover inspection of accessible areas to assess current land use and to make observations on current conditions including identification and mapping of potential areas of environmental concern (AECs)
- Assess the potential for contamination, based on site history and any observations made during a site inspection of accessible areas
- Provide maps that categorise sites in relation to their level of known contamination
- Provide recommendations for further investigations, if required.

1.6 Investigation guidelines

The scope of works and methodology adopted for this contamination investigation were generally based on the guidance provided in the following documents:

- ANZECC/NHMRC (2003)
- NEPC (1999), National Environment Protection (Investigation of Site Contamination) Measure, December 1999 (ASC NEPM) as amended in 2013
- NSW Environmental Protection Authority (1997). Guidelines for Consultants Reporting on Contaminated Sites.

1.7 Site contamination investigation framework

Soil and groundwater contamination has the potential to adversely impact human health and the environment. For a significant or identifiable risk to be present, there must be an exposure pathway. The exposure pathway comprises the following three components:

- The source, which is the presence of a substance that may cause harm
- The receptor, which is the presence of an ecological or human receiver that might be harmed at an exposure point, and
- The pathway, which is the existence of a means or mechanism of exposing a receptor to the source.

In the absence of a plausible exposure pathway, there would be minimal risk. Therefore, the presence of 'something measurable', e.g. volumes of a chemical or presence of asbestos, does not necessarily imply that there would be measurable human harm. For an impact to occur, it is necessary to have a significant source of contamination, an appropriate or effective pathway for

this to be presented to a receptor, and the receptor must have a negative response to this exposure.

The nature and importance of sources, receptors and exposure pathways will vary with every site, situation, intended end use and environmental setting. Management measures, design considerations and land use planning decisions can be implemented to reduce the risks associated with site contamination.

For the Proposal, the contamination risk considerations include:

- The potential impact to workers during construction works, including demolition of existing structures, disturbance of surface and near surface soils, excavation of service trenches, landscaping activities and potential interception of shallow groundwater
- The potential exposure to residents and the environment due to the presence of unknown fill material located within the Study area (particularly children and the elderly) from residual contamination
- The potential impact to the public, including contact with soil in public reserves and other public open spaces
- The potential impacts to human health and the environment from historical land use within and adjacent to the Study area that may be a source of soil and groundwater contamination.

1.8 State Environmental Planning Policy No 55 - Remediation of Land

State Environmental Planning Policy No 55 - Remediation of Land (SEPP 55) provides for a state-wide planning approach to the remediation of contaminated land. It aims to promote the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment as per *Clause 2*:

2 - Object of this Policy

- a. by specifying when consent is required, and when it is not required, for a remediation work*
- b. by specifying certain considerations that are relevant in rezoning land and in determining development applications in general and development applications for consent to carry out a remediation work in particular*
- c. by requiring that a remediation work meet certain standards and notification requirements*

With regard to rezoning of land the following provisions are required as per *Clause 6*:

6 - Contamination and remediation to be considered in zoning or rezoning proposal

- 1. In preparing an environmental planning instrument, a planning authority is not to include in a particular zone (within the meaning of the instrument) any land specified in subclause (4) if the inclusion of the land in that zone would permit a change of use of the land, unless:*
 - a. the planning authority has considered whether the land is contaminated, and*
 - b. if the land is contaminated, the planning authority is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for all the purposes for which land in the zone concerned is permitted to be used, and*
 - c. if the land requires remediation to be made suitable for any purpose for which land in that zone is permitted to be used, the planning authority is satisfied that the land will be so remediated before the land is used for that purpose.*

Note - In order to satisfy itself as to paragraph (c), the planning authority may need to include certain provisions in the environmental planning instrument.

- 2. Before including land of a class identified in subclause (4) in a particular zone, the planning authority is to obtain and have regard to a report specifying the findings of a preliminary investigation of the land carried out in accordance with the contaminated land planning guidelines.*
- 3. If a person has requested the planning authority to include land of a class identified in subclause (4) in a particular zone, the planning authority may require the person to furnish the report referred to in subclause (2).*
- 4. The following classes of land are identified for the purposes of this clause:*
 - a. land that is within an investigation area,*
 - b. land on which development for a purpose referred to in Table 1 to the contaminated land planning guidelines is being, or is known to have been, carried out,*
 - c. to the extent to which it is proposed to carry out development on it for residential, educational, recreational or childcare purposes, or for the purposes of a hospital—land*
 - i. in relation to which there is no knowledge (or incomplete knowledge) as to whether development for a purpose referred to in Table 1 to the contaminated land planning guidelines has been carried out, and*
 - ii. on which it would have been lawful to carry out such development during any period in respect of which there is no knowledge (or incomplete knowledge).*
- 5. In this clause, planning authority has the same meaning as it has in section 145A of the Act.”*

2 Desktop study

2.1 Surrounding land use

The land use zones surrounding the Study area is a combination of Environmental Living (Land zoning code E4), Environmental Conservation (E2), Tourist (SP3), Public Recreation (RE4) and National Parks and Nature Reserves (E1). Figure 2-1 shows the adjacent land use zones to the Study area, in accordance with the Blue Mountains Local Environment Plan 2015.

The existing Great Western Highway is zoned as Infrastructure (SP2). In this land use zone, the use of the land is limited to the following:

- Aquaculture
- Roads

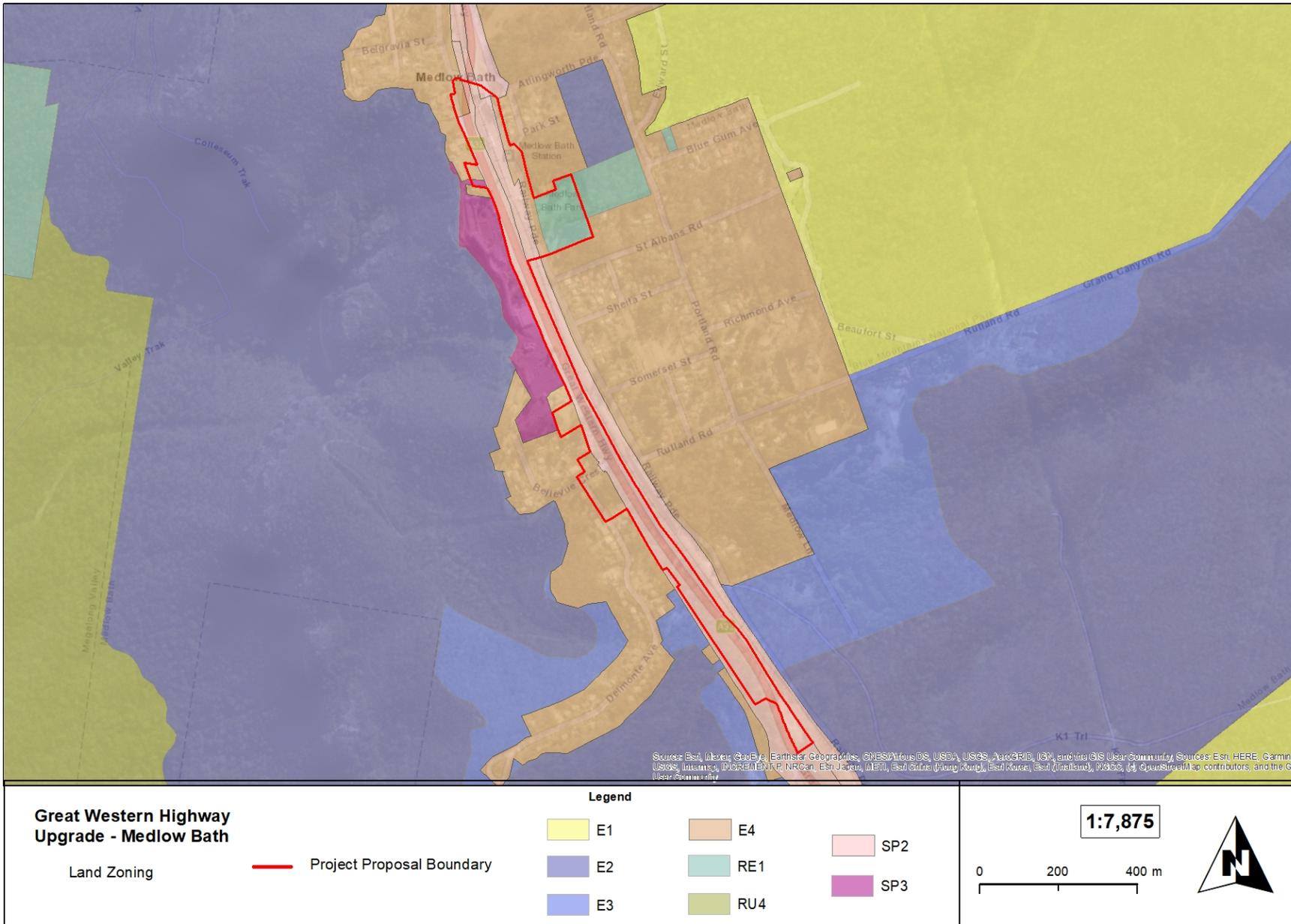
Environmental protection works and flood mitigation works can take place without consent in SP2 zoned areas.

The Proposal includes an area zoned as Environmental Living (E4), as well as Infrastructure (SP2), where the alignment follows the existing Great Western Highway. In the E4 land use zone, the use of the land is limited to the following:

- Business: bed and breakfast accommodation, home businesses, home base childcare and home industries
- Community services: community facilities and recreational areas
- Infrastructure: building identification signs, business identification signs, heliports, roads, water reticulation systems
- Environmental: Environmental facilities, environmental protection works, and flood mitigation works
- Residential: dwelling houses.

Home occupations can take place without consent in E4 zoned areas.

Figure 2-1: Surrounding land zoning (Blue Mountains City Council Local Environmental Plan, 2015)



Source: Blue Mountains Local Environment Plan (sourced through NSW Environment Planning Instrument)

2.2 Regional soils and geology

The regional geology and hydrogeological characteristics of the Study area are summarised below.

2.2.1 Regional geology

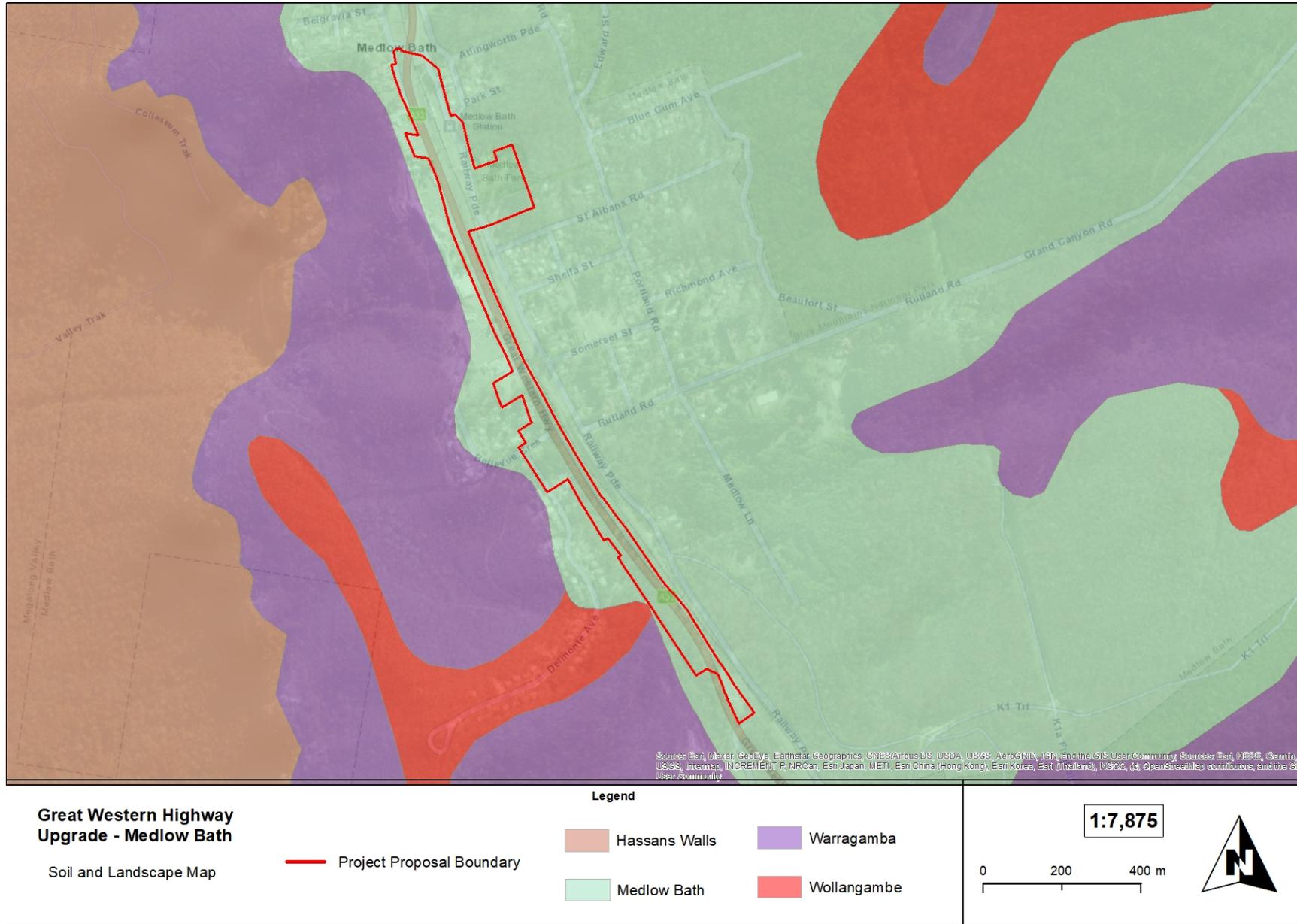
A search of the NSW Department of Planning, Industry and Environment eSPADE website (undertaken on 27 November 2020), and the 1:100,000 Geology of Penrith Map (Geological Survey of NSW, 1991), identifies the regional geology of the Study area as Medlow Bath (residual). Additionally, the geology is characterised by a combination of Warragamba (colluvial), Hassans Walls (colluvial) and Wollangambe (erosional) landscapes adjacent to the Study area (see Figure 2-2). Table 2-1 outlines the geological characteristics of each landscape.

Table 2-1 Geology in the Study area

Landscape Name	Location	Geology	Existing Erosion
Medlow Bath	Developed extensively on the Newnes Plateau, Blue Mountains Plateau and Wanganderry Tablelands.	Narrabeen Group, particularly the Banks Wall Sandstone, Mount York Claystone and Burra-Moko Head Sandstone Members - quartz-lithic sandstones and quartz sandstone interbedded with thin red, grey and green claystone, shale and occasional conglomerate and ironstone lenses. Small outliers of Hawkesbury Sandstone occur in places, particularly in the north-eastern part of the Katoomba 1:100 000 topographic map sheet.	Existing erosion is confined to areas being cultivation purposes, from a variety of concentrated and non-concentrated flows. Slight erosion caused by concentrated flows as a result of grazing and urban activity.
Warragamba	Deeply incised rugged gorges in the Hawkesbury Nepean and Hunter Regions on Narrabeen Sandstone. Type location is the mapped occurrence on Bells Line of Road in the Hawkesbury-Nepean Catchment	Undifferentiated Narrabeen Group sediments consisting of sandstone, interbedded sandstone and siltstone, claystone, conglomerate and sandstone.	Existing erosion ranges from very high to extreme in this landscape from a variety of land uses including cultivation, grazing and urban. This landscape is prone to localised gully erosion and widespread sheet erosion.
Hassans Walls	Located throughout the Blue Mountains Plateau amongst various cliffs and hillslopes.	Predominately comprised of sandstone-lithic. Its presence is amongst cliffs and hillslopes within escarpment on Narrabeen Group Sandstone and Permian Illawarra Coal Measures (sandstone-lithic) in the Blue Mountains Plateau.	Sheet erosion throughout this landscape has been highly observed, with gully erosion localised.
Wollangambe	Very extensive map unit within National Parks consisting of rolling to steep hills on Narrabeen Sandstone. Includes the rugged south-west of the Hunter Region and north-west of the Hawkesbury Nepean catchment.	Narrabeen Group - quartz sandstone and quartz-lithic sandstone interbedded with thin red, grey and green claystone, shale and occasional conglomerate and ironstone lenses.	Due to an erosional categorisation, existing and future erosion range from very high to extreme from all types of land uses.

Source: NSW Environment, Energy and Science eSPADE (sourced through NSW Soil and Land Information System)

Figure 2-2: Regional geology and soil landscape



Source: NSW Department of Planning, Industry and Environment (sourced through NSW Sharing and Enabling Environmental Data portal)
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As shown in Figure 2-2 and Table 2-2, the Study area includes Medlow Bath, Warragamba, Hassans Walls and Wollangambe landscapes. Table 2-2 outlines the soil characteristics of each landscape.

Table 2-2 Soil landscape in the Study area

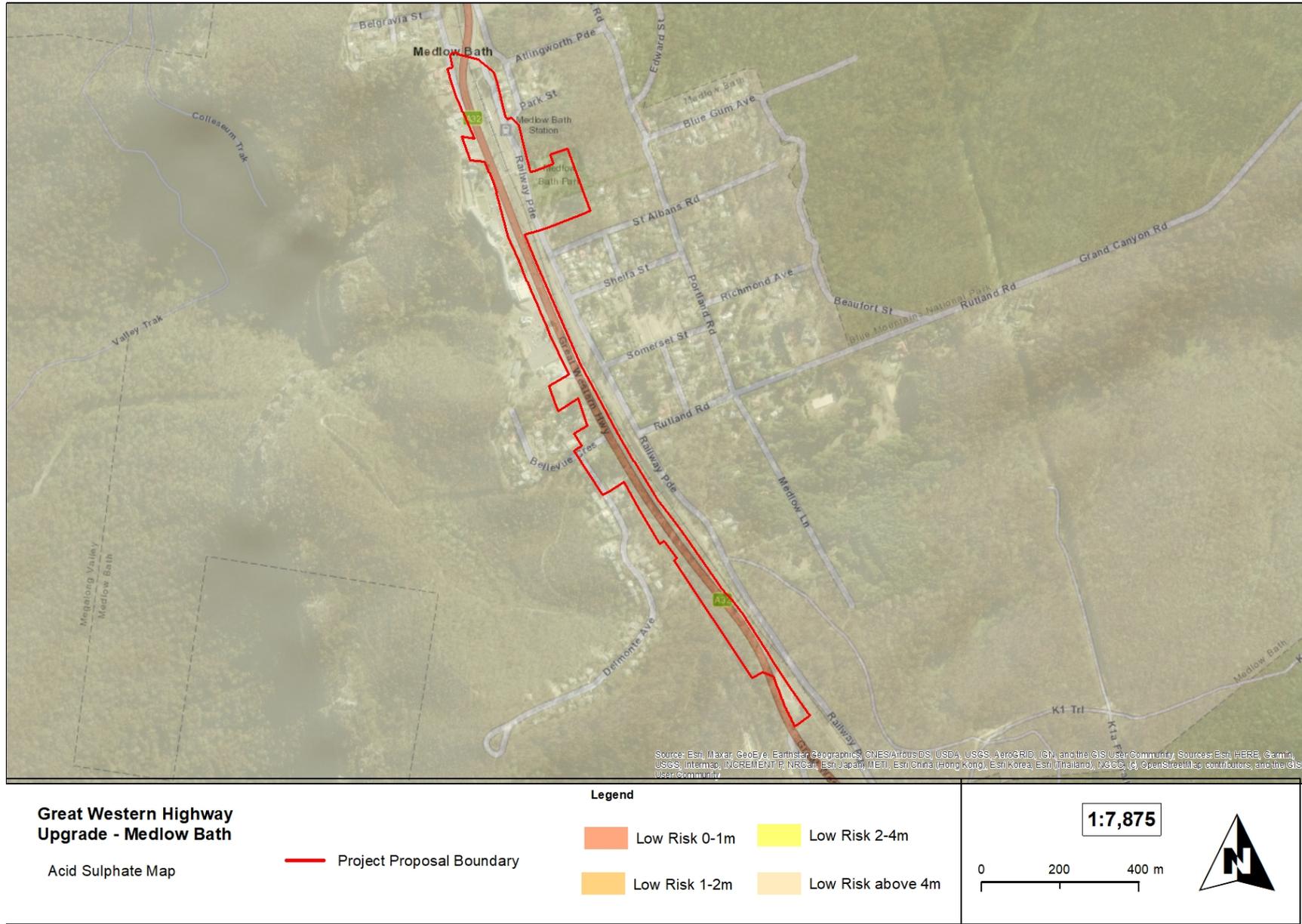
Landscape Name	Soil Landscapes	Soils
Medlow Bath	Predominately a combination of Leptic Rudosols and Orthic Tenosols which are rapid to well-draining, achieving an approximate depth of 100cm before bedrock.	<ul style="list-style-type: none"> • mbz1— Shallow (25 - <50 cm), rapidly drained Leptic Rudosols and Tenosols (Siliceous Sands and Lithosols). • mbz2— Moderately deep (50 - <100 cm) well-drained Orthic Tenosols (Earthy Sands) and Brown Kandosols (Yellow Earths)
Warragamba	Compromised of a combination between rapidly and well-drained soils to a maximum depth of 150cm before bedrock appears.	<ul style="list-style-type: none"> • wbz1— Shallow to moderately deep (25 - <100 cm), rapidly drained Leptic Rudosols (Siliceous Sands and Lithosols) and well-drained Orthic Tenosols (Earthy Sands). • wbz2— Shallow to deep (25 - <150 cm), well-drained Brown and Yellow Dermosols (Brown Earths), Yellow Kandosols (Yellow Earths) and Red and Yellow Kurosols (Red Podzolic Soils and Yellow Podzolic Soils).
Hassans Walls	Landscape data unavailable for this landscape type.	<ul style="list-style-type: none"> • Soil data unavailable for this landscape type.
Wollangambe	Compromised of a variety of rapidly draining soils to a maximum depth of 150cm before bedrock appears.	<ul style="list-style-type: none"> • wox1- Shallow to moderately deep (<50 - 100 cm), well-drained Brown Orthic Tenosols and Kandosols (Earthy Sands and Yellow Earths). • wox2- Shallow to moderately deep (<50 - 100cm), rapidly to well-drained Rudosols and Tenosols (Siliceous Sands) • wox3- Moderately deep to deep (50 - 150 cm), moderately well-drained Brown Kandosols (Brown Earth) and Yellow, Brown and Red Kurosols and Chromosols (Yellow, Red and Brown Podzolic Soils) • wox4- Shallow (<50 cm) rapidly drained Rudosols and Tenosols (Lithosols and Siliceous Sands).

Source: NSW Environment, Energy and Science eSPADE (sourced through NSW Soil and Land Information System)

2.2.2 Acid sulphate soils

A search of the Department of Planning, Industry and Environment's database on Eastern Australian Acid Sulphate Soils (undertaken on 26 November 2020) indicates that there no known presence or risk of acid sulphate soils occurring in the vicinity of the Study area (refer to Figure 2-3).

Figure 2-3 Acid sulphate soil risk



Source: Department of Planning, Industry and Environment

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2.3 Topography and surface water features

As discussed in Section 2.2 and Table 2-2, the Study area includes Medlow Bath, Warragamba, Hassans Walls and Wollangambe landscapes. Table 2-3 outlines the topography characteristics of each landscape.

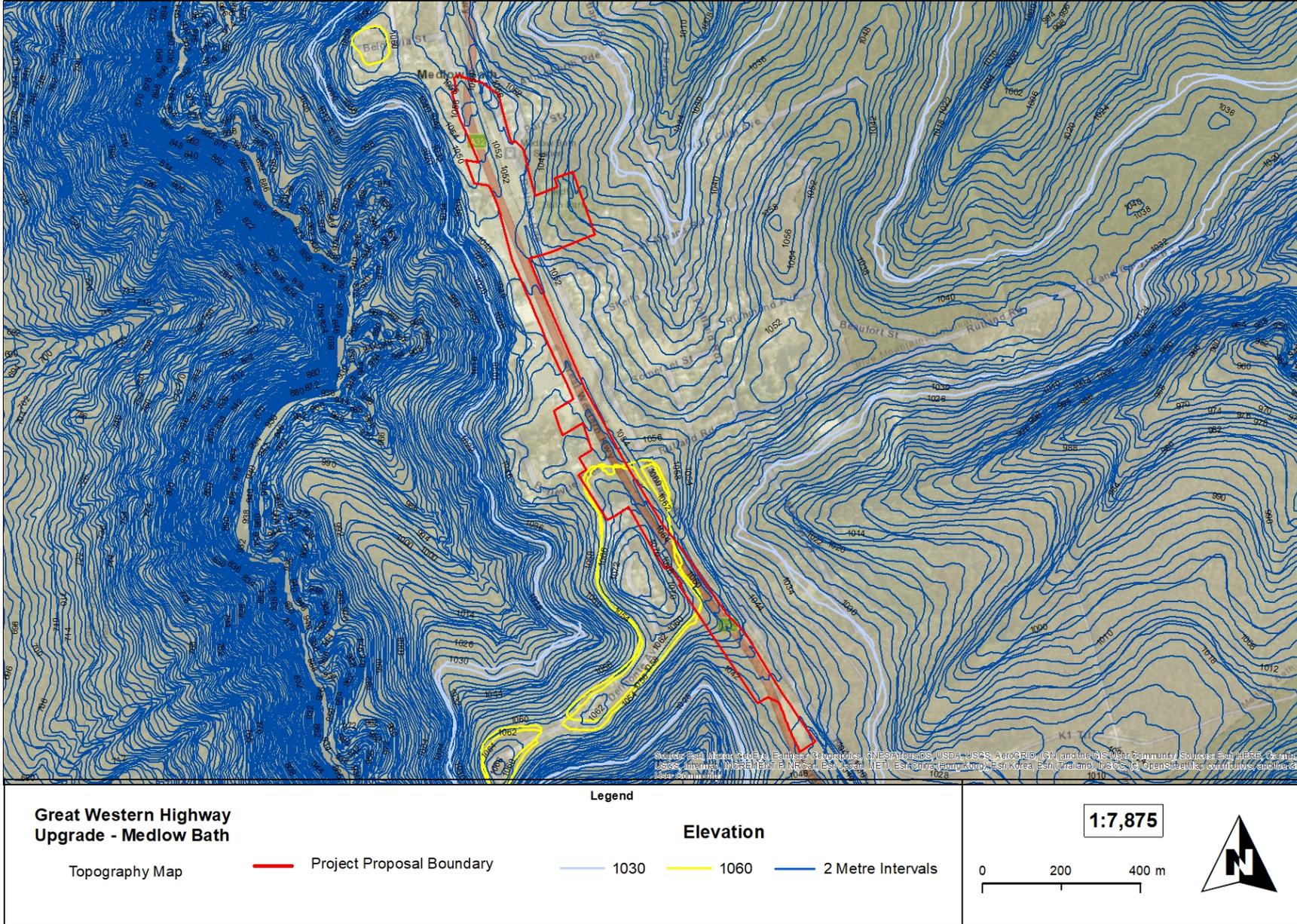
Table 2-3 Topography of landscapes in the Study area

Landscape Name	Topography
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 - 20%, local relief 20 - 50 m, elevation 464 - 1184 m. 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 >35%, local relief 90 - >300 m, elevation 30 - 1179 m. Partially cleared tall open-forest and rainforest in sheltered gullies.
Hassans Walls	Occuring near cliffs and hillslopes within escarpment on Narrabeen Group Sandstone. Local relief 100-500 m; altitude 99-1160 m; slopes 40-100%; rock outcrop 20-50%.
Wollangambe	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 - 40%, local relief <220m, elevation 200 - 600 m.

Source: NSW Environment, Energy and Science eSPADE (sourced through NSW Soil and Land Information System)

The surrounding landscape generally slopes west towards the Warragamba landscape, which greatly influences the flow of groundwater, in an area with very shallow soil depth. Figure 2-4 shows the topography of the Study area.

Figure 2-4: Topography



2.4 Groundwater

The Study area does not have any recorded hydrological landscape data according to the NSW Department of Planning, Industry and Environment; however, it lies adjacent to the Megalong Valley Hydrological Landscape (MVHL), which provides data that is useful to determine the likely nature of groundwater in this landscape. Characteristics of this adjacent landscape were obtained through the NSW Department of Planning, Industry and Environment eSPADE website. The key hydrogeological landscape characteristic of MVHL is that of a long sandstone escarpment, with moderately to steeply inclined colluvial slopes and drainage lines. This characteristic is positively associated with the soil and geology landscape seen within the *Medlow Bank Landscape*.

This landscape is that of low salinity, with a low salt load (export) and hence, a relatively high quality of fresh water. In correlation with the acid sulphate data for the area, pyrites are not present. It is an area of moderate rainfall (800-900 mm per year).

As it is noted that the Medlow Bath Landscape is that of shallow soil, and with a topography leading to a rapid cliff-like drop, it is highly likely that the groundwater flow from the Medlow Bank Landscape discharges into the lithosols/siliceous sands below the sandstone escarpment, flowing then on the surface of the granite bedrock.

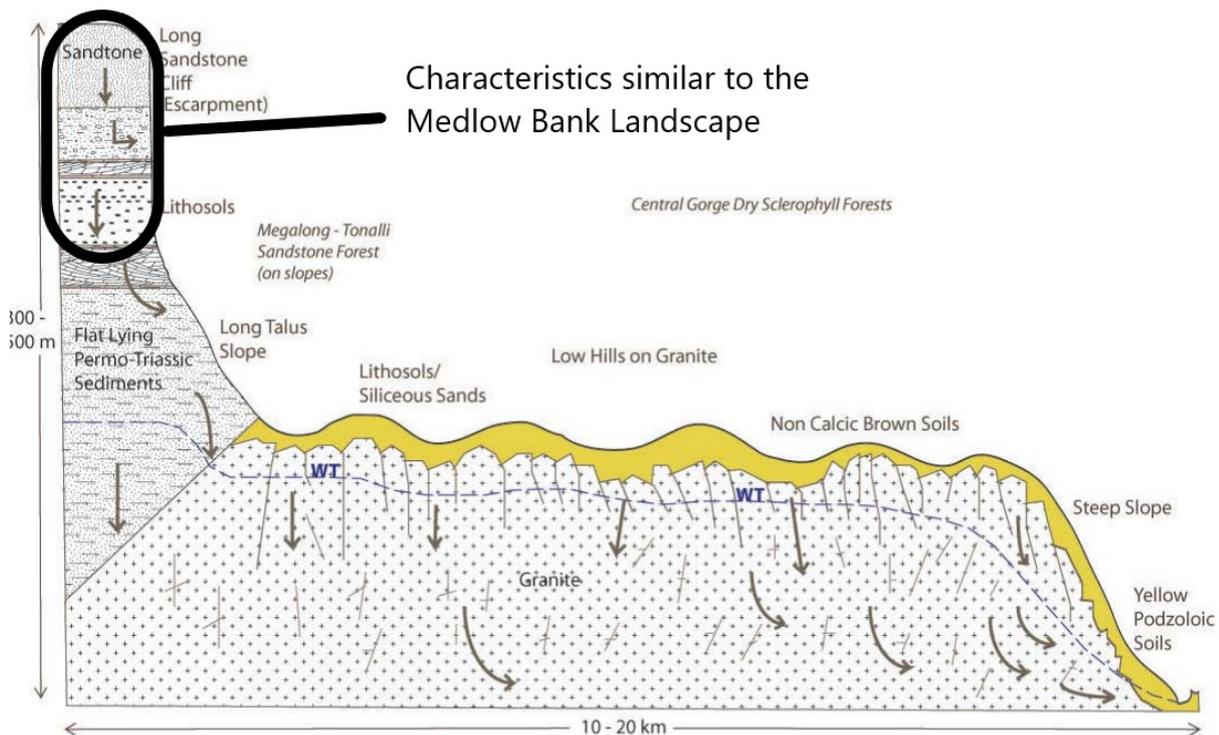


Figure 2-5: Edited - Conceptual cross-section for Megalong Valley, HGL showing the distribution of; regolith landforms, salt sites and flow paths of water infiltrating the system. Source: NSW Planning, Industry and Environment.

2.5 NSW EPA contaminated land public record database

The NSW EPA contaminated land public record is a searchable database of:

- Orders made under Part 3 of the *Contaminated Land Management Act 1997* (CLM Act)
- Approved voluntary management proposals under the CLM Act that have not been fully carried out and where the approval of the EPA has not been revoked
- Site audit statements provided to the EPA under section 53B of the CLM Act that relate to significantly contaminated land
- Where practicable, copies of anything formerly required to be part of the public record
- Actions taken by EPA under section 35 or 36 of the *Environmentally Hazardous Chemicals Act 1985* (EHC Act)
- Notices (actions taken by the EPA as written notices).

An online search for the NSW EPA contaminated land record database was undertaken on the 8 December 2020 for records within the Blue Mountains City Council. The search yielded no records for contaminated land near or within the Study area (within 500m).

2.6 NSW EPA POEO public register

The NSW EPA *Protection of Environment Operations Act 1997* (POEO) public register under Section 308 of the POEO Act records the following:

- Environment protection licences
- Applications for new licences and to transfer or vary existing licences
- Environment protection and noise control notices
- Penalty notices issued by the EPA
- Convictions in prosecutions under the POEO Act
- The results of civil proceedings
- Licence review information
- Exemptions from the provisions of the POEO Act or regulations
- Approvals granted under clause 9 of the POEO (Control of Burning) Regulation
- Approvals granted under clause 7A of the POEO (Clean Air) Regulation
- Audits required to be undertaken in relation to a licence
- Pollution studies required by a condition of a licence
- Pollution reduction programs required by a condition of a licence
- Penalty notice issued in relation to a premise.

An online search of the NSW EPA POEO register database was undertaken on the 25 November 2020 for records that lie within or near (within 500m) the Study area. The search identified no records within this vicinity.

Table 2-4 Licenced activities listed in the POEO Act register

Name	EPA Licenced Activity
Nil	

Source: NSW Environment Protection Authority

2.7 Hazardous chemical database - SafeWork NSW

SafeWork NSW maintains a database of hazardous chemicals (under Schedule 11 of *Work Health and Safety Regulations 2017*) that are stored, handled or processed on premises. The site visit and desktop review have confirmed the premise at 90-92 Great Western Highway have petroleum on-site including stored within underground tanks. This relates to the operational United Petrol Station – no further information regarding previous site investigations nor tank volumes associated with this site were identified as part of this assessment.

2.8 Historical research

2.8.1 Aerial maps

Historic aerial maps were sourced from the NSW Department of Finance, Services and Innovation on the 26 November 2020. A summary of the key changes within the area are presented in Table 2-5. The aerial photos reviewed are provided in Appendix A.

Table 2-5 Key changes within the Study area and surrounding land

Year	Observations
1958	<p>Study area – The Great Western Highway was completely developed and served as a two-lane rural road. The area proposed for the Medlow Bath upgrade was a combination of cleared/grazed paddocks with sparse residential occupation. The construction area proposed for the upgrade has been previously disturbed with the original construction of the Great Western Highway and railway line respectively. Of the disturbed land, the United Petroleum store located opposite Sommerset Ave appears to have has it petrol tanks directly in-line with the proposed area for the widening of Great Western Highway.</p> <p>Surrounding land – The surrounding land was primarily virgin land owned under State jurisdiction. The area was predominately used for tourist visitation at the Hydro Majestic Hotel. Small parcels of residential land was cleared/grazed paddocks with patches of native vegetation.</p>
1966	<p>Study area – Relatively unchanged from that of 1958. Still maintaining the 2-laned highway with residential parcels of land maintaining their size and use.</p> <p>Surrounding land – In accordance with the Study area, it appears the area remains unchanged from that of 1958.</p>
1994	<p>Study area – Parcels of residential land have now had property developed on most lots. With a majority of these houses constructed between 1970's-1980's, 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 adjacent Hydro Majestic Hotel has been significantly upgraded.</p> <p>Surrounding land – Alike the Study area, residential land which were cleared parcels have now had property developed on them. With a majority of these houses constructed between 1970's-1980's, it is likely that they contain asbestos.</p>
2006	<p>Study area – Vegetation lining the Great Western Highway has not increased in number but has increased in canopy cover. Hydro Majestic Hotel has undergone further restoration/upgrade.</p> <p>Surrounding land – Native vegetation patches had increased in canopy cover density, residential properties have ceased clearing activities, with signs of very minimal agricultural activity.</p>

Source: NSW Government Department of Finance, Services and Innovation (2020)

3 Site inspection

Mott MacDonald specialist, Greg Byrnes (Environment Technical Director) conducted an inspection of the Study area on 18 November 2020 to identify areas of potential or actual contamination. The site inspection comprised of a walk-through of areas along the Great Western Highway to identify evidence of contamination and potential sources of contamination from current land uses. The following potential areas of environmental concern (PAEC) were identified within the Study area.

- A petrol station has existed at the address 90-92 Great Western Highway, Medlow Bath 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
- There was evidence of unknown fill material and unregulated waste dumping, particularly between the Great Western Highway and the Blue Mountains Rail Line. As illustrated in Appendix B
- An operational car dealership that includes a maintenance workshop is located at 42 Great Western Highway, Medlow Bath, which presents a potential historic risk of soil and groundwater contamination due to the likelihood hydrocarbon spills, chemical storage and battery storage
- Though no evidence was identified during the site inspection, historical road crashes are a common cause of soil and groundwater contamination (including hydrocarbons, chemicals and PFAS) within road reserves
- Asbestos utility conduits were found between the Great Western Highway and the Medlow Bath Station (refer to Figure 3-1) within the study area 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 compound site located at 181-183 Great Western Highway, Medlow Bath.

Relevant site inspection photos are provided in Appendix B, Figure 3-1 shows the approximate locations of each PAEC, with Table 4-1 providing further details on each PEAC including source, exposure pathway and potential contaminants of concern.

Figure 3-1 Site inspection areas of potential contamination risks



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Taiwan), NSIC, (c) OpenStreetMap contributors, and the GIS User Community

<p>Great Western Highway Upgrade - Medlow Bath</p> <p>Site Inspection Map</p>	<p>Legend</p> <p> Project Proposal Boundary</p> <p> Car Dealership</p> <p> Uncontrolled Dumping</p> <p> Unknown Fill</p> <p> Asbestos Containing Material</p> <p> Ballast</p>	<p>1:7,875</p> <p>0 200 400 m</p>

4 Summary of findings and recommendations

4.1 Summary of study findings

4.1.1 Acid sulphate soil risk

The probability of acid sulphate soils occurring within the Study area is low.

4.1.2 Contamination

There were several key changes to the landscape within the Study area and surrounding areas between the early 1900's through to 1950. There was the construction of the Medlow Bath railway station (early 1900) that opened the area to higher visitation, leading to an increase in residential properties. With this came the increase in commercial and residential properties within and adjacent to the Study area. Due to the presence of a petrol station and visual inspection of introduced fill and previous vehicle accidents, there is a potential risk of soil and groundwater contamination from the discharge of residual petrochemicals and other unknown contaminants within the introduced fill.

The site inspection identified several potential sources of contamination within the Study area; including the petrol station located at 90-92 Great Western Highway, . The property located at 42-44 Great Western Highway being a car dealership with a service centre on-site. These facilities provide the potential risk of soil and groundwater contamination from the discharge of petrochemicals.

Uncontrolled dumping of waste material was also noted within a stormwater catchment between the Great Western Highway and the Railway (as shown in Figure 3-1). Additionally, it was found that near an existing stormwater pipe that may potentially contain asbestos.

Vast amounts of ballast were observed at the compound site located at the address 181-183 Great Western Highway, Medlow Bath, which has been cleared of vegetation.

Potential contaminants of concern relating to the activities observed during the site inspection, and identified on aerial maps including uncontrolled fill and the operation of a service station include total recoverable hydrocarbons, benzene, toluene, ethylbenzene and xylene, polycyclic aromatic hydrocarbons, organochlorine pesticides, organophosphate pesticides, polychlorinated biphenyls, phenols, volatile organic compounds and asbestos containing materials. Accordingly, the following safeguards and management measures are recommended.

The evidence to date suggests there is a low risk of contamination of the Study area, however further investigation (including soil sampling) is necessary to assess the extent of soil and groundwater contamination. This additional testing will also provide information for preliminary waste classification and the likelihood of re-use of material on site.

4.2 Recommendations

- A targeted Phase Two investigation providing general coverage of the proposed alignment and areas of potential contamination sources (including areas where fill will be encountered during construction and hydrocarbon migration from the service station) should be undertaken. This investigation should address the potential risk that fill material may pose to construction workers and future users of the site. Assessments should be carried out in accordance with guidance made or endorsed by the NSW EPA. The contaminated land investigations should be carried out and the report verified by a suitably qualified and experienced environmental consultant
- A Contaminated Land Management Plan should be prepared in accordance with the Guideline for the Management of Contamination (Roads and Maritime Services, 2013) and implemented as part of the CEMP. The plan should include, but not be limited to:
 - Capture and management of any surface runoff contaminated by exposure to the contaminated land
 - Further investigations required to determine the extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2)
 - 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.
- If contaminated areas are encountered during construction, appropriate control measures should be implemented to manage the immediate risks of contamination. All other work that may impact on the contaminated area will stop until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the TfNSW Environment Manager and/or EPA.

Table 4-1 Contaminants of Potential Concern

PAEC	Source	Exposure Pathway	Potential contaminants of concern
Petrol Station	Underground petroleum storage tanks	Earthworks, stockpiling contaminated material, excavation dewatering	Petrochemicals, Heavy metals, TRH, BTEX and PAH
Car Dealership	Spills, chemical storage	Earthworks, stockpiling contaminated material, excavation dewatering	Petrochemicals, Heavy metals, TRH, BTEX, PCB, PAH and asbestos
Compound site	Stockpiled ballast material	Ground disturbance	Heavy metals, TRH, BTEX, PCB, PAH and asbestos
Unknown Fill (Figure 3-1)	Historic uncontrolled fill material	Earthworks, stockpiling contaminated material, excavation dewatering	Heavy metals, TRH, BTEX, PCB, PAH and asbestos

5 Disclaimer

MRB has prepared this report based on generally accepted practices and standards in operation at the time that it was prepared. No other warranty is made as to the professional advice included in this report. All parties should satisfy themselves that the scope of work conducted and reported herein meets their specific needs before relying on this document.

MRB believes that its opinions have been developed according to the professional standard of care for the environmental consulting profession at the date of this document. That standard of care may change as new methods and practices of exploration, testing, analysis and remediation develop in the future, which may produce different results.

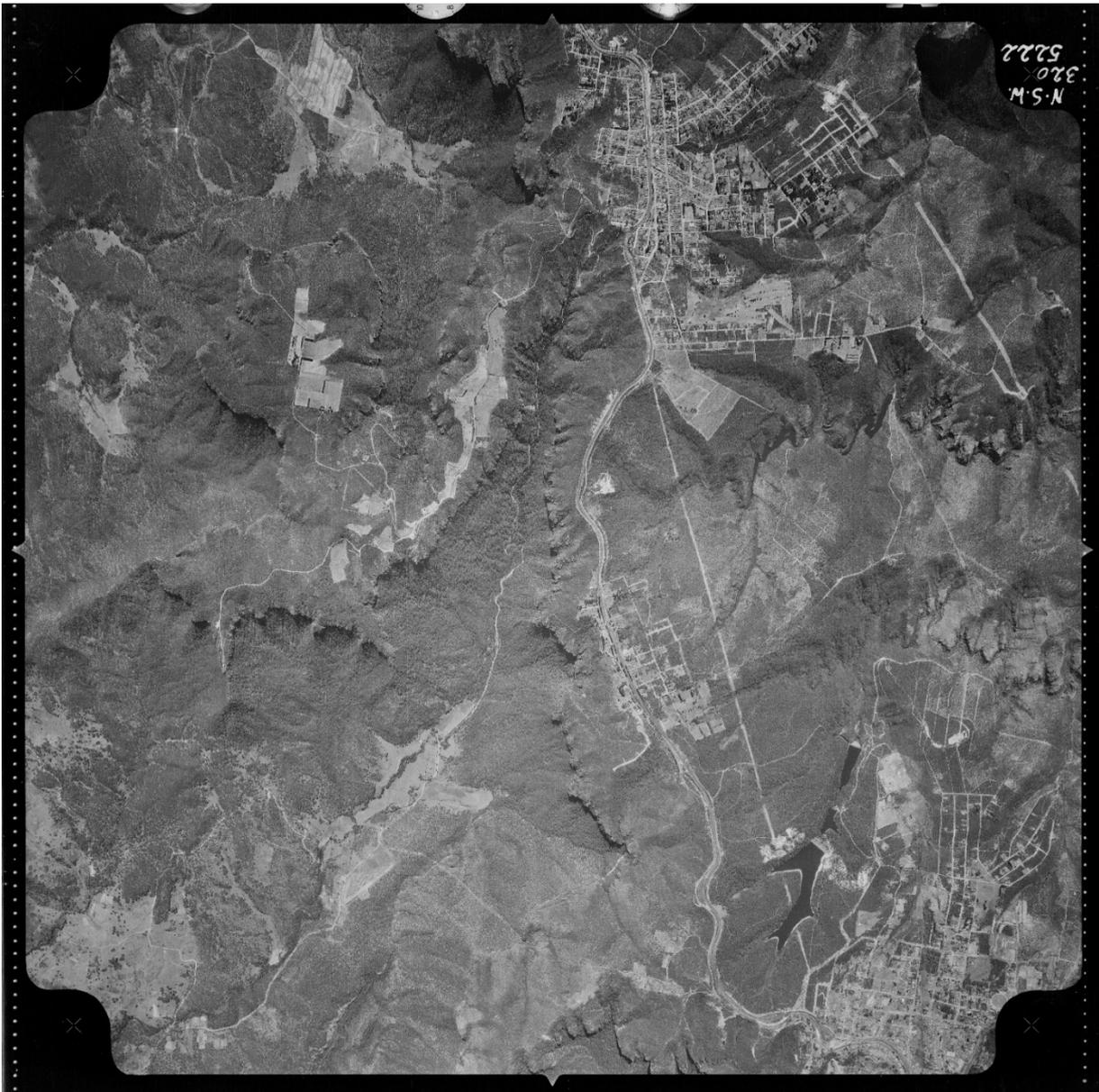
The studied environmental conditions are created by natural processes and human activity, and as such may change over time e.g. groundwater levels may rise or fall and contamination may migrate. This report therefore presents a point in time investigation of the BRC area, and as such can only be valid for the time at which the investigation was undertaken.

The methodology adopted and the sources of information used are outlined in this report. MRB has limited its investigation to the scope agreed for this contract and as a result there is a limit to the conclusions that could be reached. Additional sampling and analysis would provide further insight and could produce different results and/or opinions. MRB has made no independent verification of the desk-based information used beyond the agreed scope of works and assumes no responsibility for any inaccuracies or omissions.

This report does not include the investigation or consideration of hazardous building materials, including asbestos. Such materials should be assessed and managed by a qualified and licensed assessor/contractor.

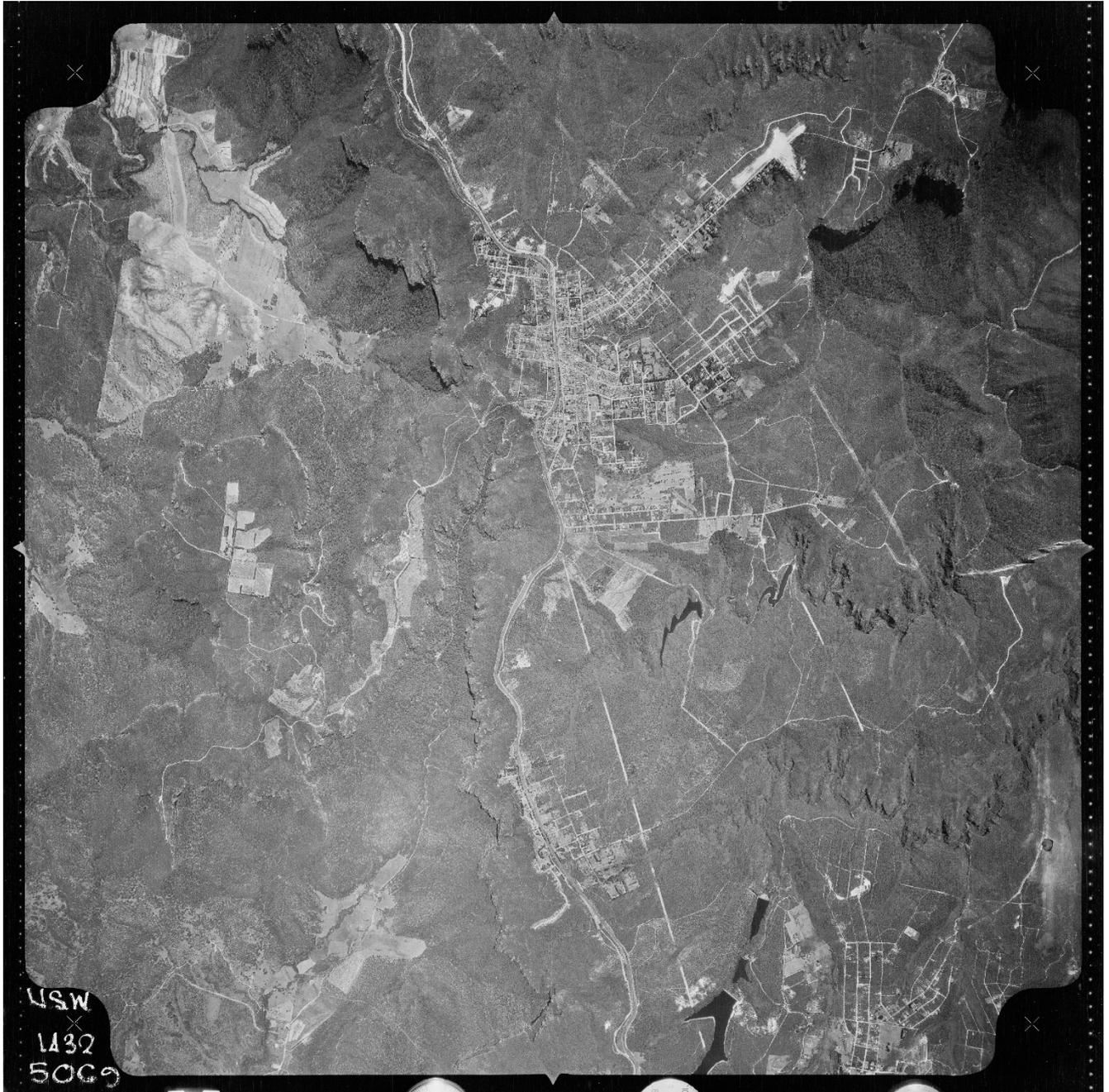
Appendix A - Aerial Photos

1958



Source: NSW Department of Customer Service (2020)

1966



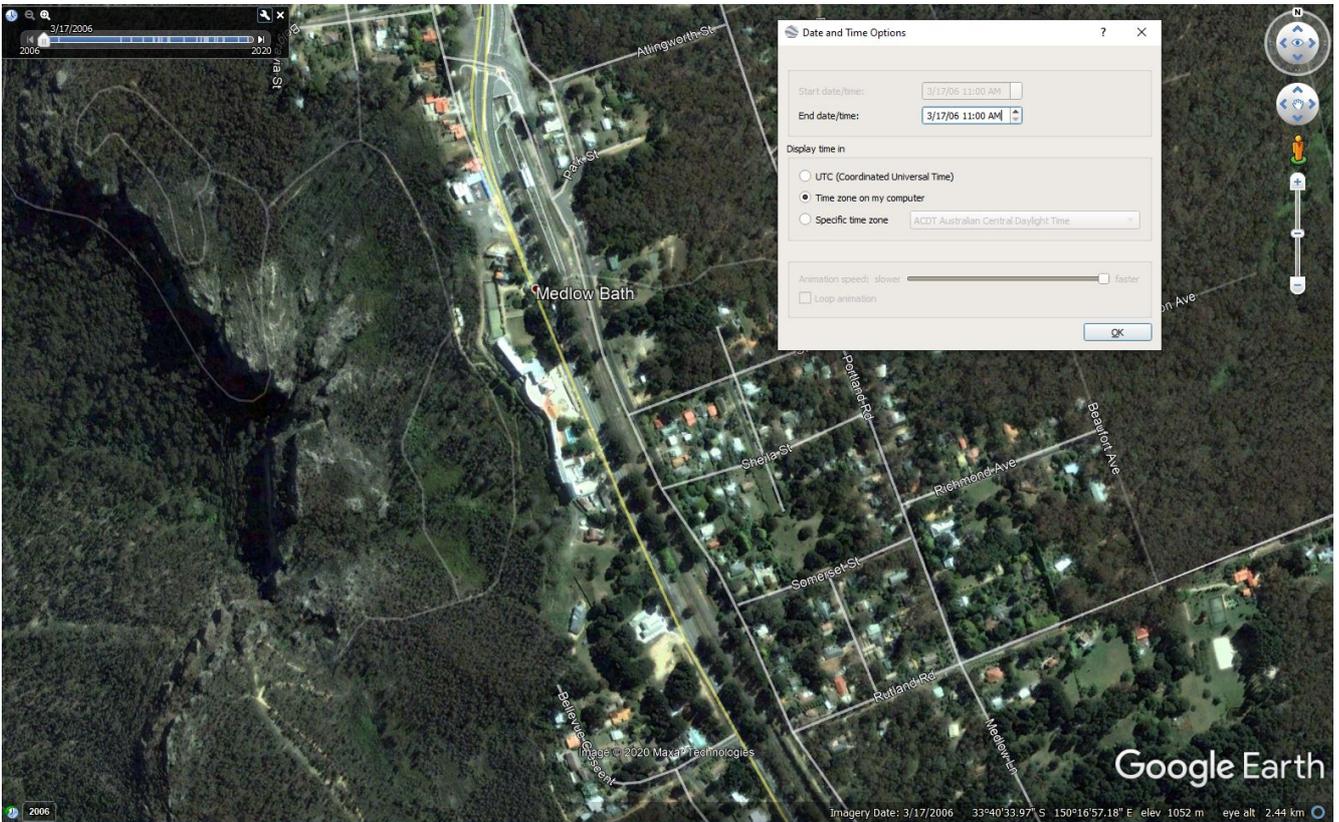
Source: NSW Department of Customer Service (2020)

1994



Source: NSW Department of Customer Service (2020)

2006



Source: Google Earth, Maxar Technologies 2020

Appendix B – Site Visit Photos (MRB, 2020)

Photo 1: Petrol Station – Presence of Underground Tanks (looking South-West).



Photo 2: Petrol Station (looking West).



Photo 3: Petrol Station – Groundwater Monitoring Well (looking West).



Photo 4: Car dealership with service shop on-site (looking West).



Photo 5: Evidence of fill – North-East side of Medlow Bath Station (facing South-West).



Photo 6: Evidence of fill – North-East side of Medlow Bath Station (facing South-West).



Photo 7: Evidence of fill making its way through the drainage system and conduit that potentially contains asbestos. Location is between Great Western Highway and Medlow Bath Station (looking West).



Photo 8: Example of existing stormwater pipe potentially containing asbestos (looking West)



Photo 9: Uncontrolled dumping (looking South)



Photo 10: Compound Site with Stockpiled Ballast (looking South)



