6.12 Soils and contamination

The potential impacts of the proposal associated with soils and contamination are assessed in the *Hexham Straight Widening Phase 1 Soils and Contamination Assessment* provided in **Appendix K**. The potential impacts and safeguards to mitigate impacts, are summarised in this section.

6.12.1 Methodology

The assessment of soils and contamination involved the following:

- Collation of existing information from databases, websites, reports and other sources of information
- Undertaking a site inspection to ground truth the desktop assessment
- Development of description of existing environment
- Construction and operational impact assessment
- Development of management measures and safeguards.

6.12.2 Existing environment

Topography

Topography data depicts land surrounding the construction area as broad, generally flat, low lying floodplains. Elevation varies from two metres Australian Height Datum (AHD) in the north and 12 metres AHD in the south. The low-lying floodplains in the area appear to receive tidal flows from the Hunter River via a number of creeks. Hexham Swamp located to the west of Maitland Roads is generally below five metres AHD.

Hydrogeology

The NSW Department of Primary Industries – Office of Water registered groundwater bore database indicated that there were 33 registered groundwater bores located onsite or within 500 metres of the proposal in April and June 2020.

The proposal is situated on the Hunter Alluvium, Hawkesbury to Hunter Coastal Sands Aquifer and the Sydney Sandstone Central Coast Aquifer. The Hunter subregion hosts alluvial and non-alluvial aquifers and groundwater extraction from these aquifers is used for a range of purposes including domestic, irrigation, stock, town water supply and industrial purposes. Estuarine sediments next to the Hunter River and within the proposal are unlikely to contain any aquifers suitable for human uses generally due to the high salinity of the groundwater from the estuarine influences.

Geology

A review of the Newcastle 1:250 000 Geological Sheet SI/56-02 (Geological Survey of New South Wales, 1996) indicates the majority of the proposal is underlain by undifferentiated Quaternary alluvial (Qa) deposits of sand, silt, clay and gravels along with some residual and colluvial deposits. This includes channel, levee, lacustrine, floodplain and swamp deposits with the potential for some higher-level Tertiary terraces. The southern portion of the site is underlain by Tomago Coal Measures (Pt) comprising primarily of siltstone, sandstone, coal, tuff, claystone, conglomerate and minor clay. A review of the Bohena 1: 250 000 Geological Sheet in June 2020 indicates there is a concealed fault north east of Hexham Bridge running in a north east to south west direction.

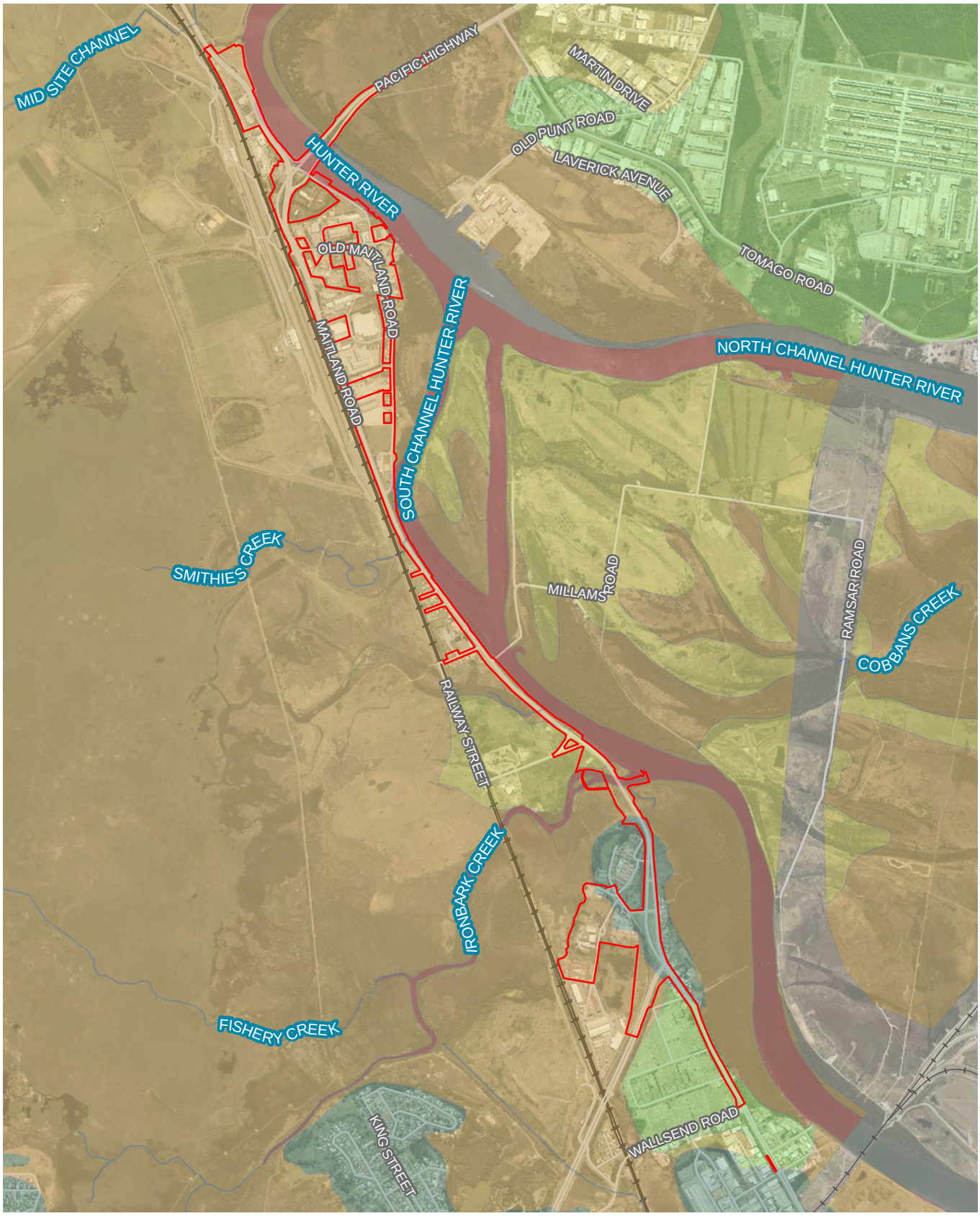
Soils

A review of the Newcastle 1:100,000 soil landscape sheet 9232 (Soil Conservation Service of NSW, 1995) indicates that the construction area traverses six soil landscapes. It is expected that the majority of the construction area would comprise the Millers Forest (ESmf), Disturbed Terrain (DTxx), Fullerton Cove (ESfc), Hexham Swamp (SWhs) soil units and that the southern portion would also include small areas of the Beresfield (REbe) and Hamilton (Rehm) soil units. Disturbed terrain occurs across a number of sections of the construction area and is often associated with cutting and filling activities and the potential presence of imported fill material of unknown origin.

Acid sulfate soils

Acid sulfate soils (ASS) are the common name given to naturally occurring sediments and soils containing iron sulfides. The exposure of the sulfide in these soils to oxygen by drainage or excavation leads to the generation of sulfuric acid.

ASS Risk Maps from the CSIRO Australian Soil Resource Information System (ASRIS) database indicates the majority of the proposal is located on Class 2 ASS (high probability of occurrence). There are small areas in the northern and central portion of the proposal, adjacent to the Hunter River and around Ironbark Creek Bridge, considered to have very high ASS risk (Class 1 ASS). The proposal also covers Class 3 (moderate risk ASS) and Class 4 (low risk ASS) soils, refer to **Figure 6.13**.



Date: 10/11/2021 Filename: IA301100_REF_F021_AcidSulfateSoils_v1

Legend

- REF area
- Railway
- Waterway

Acid Sulphate Soil Risk

- Class 1 - Any works
- Class 2 - Works below the natural ground surface
- Class 3 - Works more than 1m below the natural ground surface
- Class 4 - Works more than 2m below the natural ground surface
- Class 5 - Works within 500 m of Class 1, 2, 3, 4 that is below 5m AHD and by which the water table is likely to be lowered below 1 m AHD on adjacent Class 1, 2, 3 or 4 land

0 250 500 m

Scale 1:30,000 at A4

GDA94 MGA56

Data sources:

Jacobs 2020

Department Finance, Services and Innovation 2020

Figure 6.13 Acid sulfate soils

Contamination

Areas within and directly surrounding the proposal have increasingly commercial/industrial land use since the 1950s. The area has experienced historical high rail usage over at least the last 50 years and a variety of industrial land uses across the majority of the proposal.

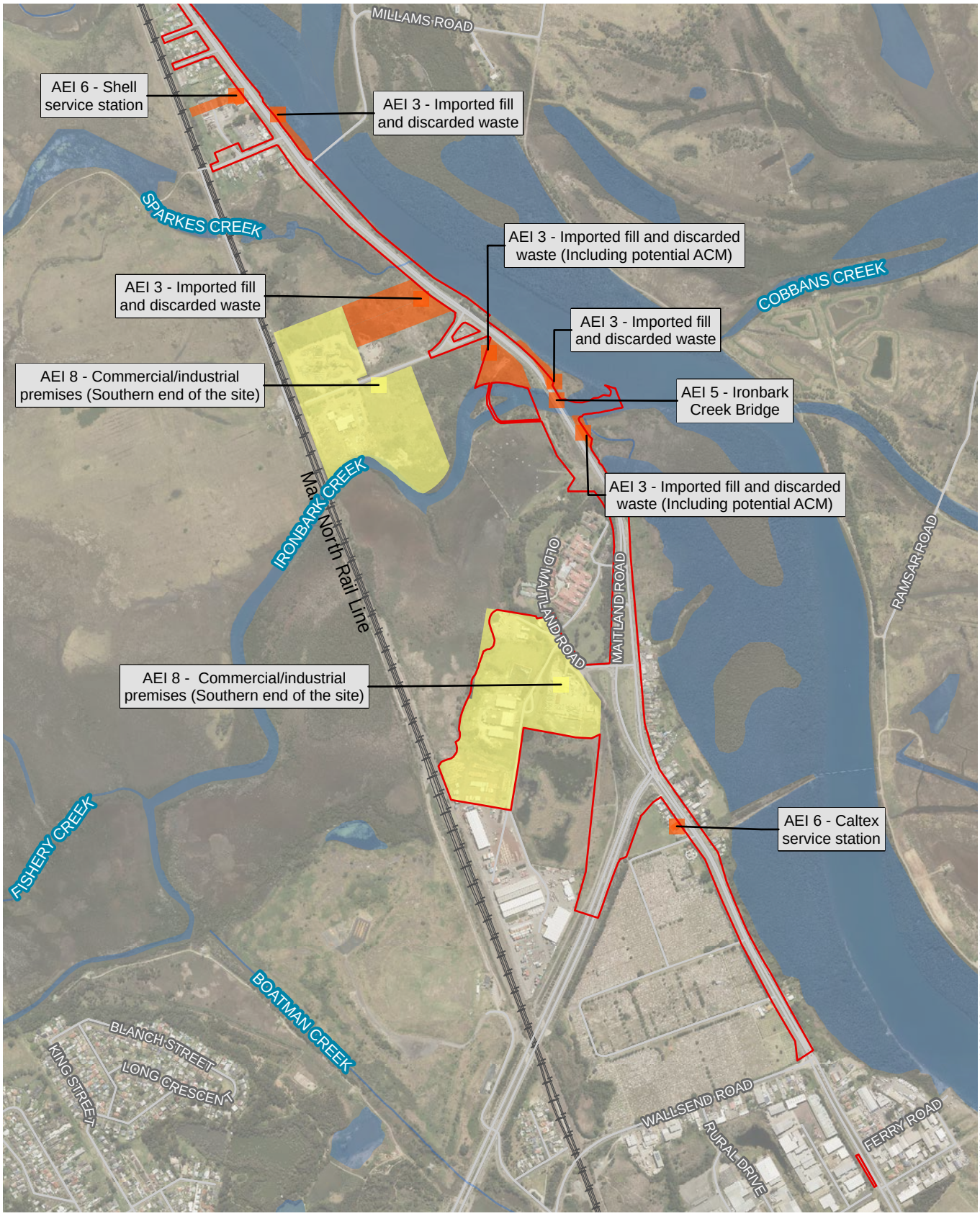
A review of EPA Public Register under section 308 of the POEO Act identified a total of 20 premises within the construction area or within 500 metres of the proposal which are either currently licensed or have historically been licensed by the EPA. These include railway systems activities, Onesteel Recycling, Industrial Galvanizers Corporation, Brancourts Manufacturing and Processing, Hexham Bowling Club, Hexham Engineering, Slattery Auctions Australia, CBP Contractors, Hexham Train Support Facility, Crei Industrial Nominees No 2 Pty Ltd, McDonald's, Sibelco Australia, NICB construction, Cummins South Pacific, Tomago Site, the Newcastle Wallsend Coal Co and four activities relating to herbicide use.

A search of the list of contaminated sites notified to the NSW EPA and the NSW EPA record of notices identified 13 sites within the construction area or within 500 metres of the proposal. These sites may pose a risk to construction and construction area workers.

In total, there are nine AEIs located within or near to the REF area that may present a low to high contamination or soil management risk to the proposed construction activities and/or temporary construction facilities. These include:

- Within the REF area and include:
  - AEI 1: Potential herbicide application in waterways that transect or run adjacent to the REF area (drainage lines, Ironbark Creek and Hunter River)
  - AEI 3: Imported fill and discarded waste along the eastern verge of Maitland Road, opposite McDonald's in the central portion of the site and around the bridge abutments of Ironbark Creek Bridge; Imported fill and discarded waste (including fragments of potential asbestos containing material) west of Maitland Road, on the land between Sparke Street and Ironbark Creek
  - AEI 4: Class 1 and 2 ASS
  - AEI 5: Potential contaminants associated with Ironbark Creek Bridge and its demolition
  - AEI 7: Historical and current commercial/industrial premises east and west of the alignment where temporary construction facilities are proposed.
- Less than 150 metres from the REF area and include:
  - AEI 2: Railway corridor
  - AEI 6: Service stations: BP Service Station, 366 Maitland Road, Hexham; Shell Coles Express Hexham, 25-27 Maitland Road, Hexham; Ampol Diesel Stop, 360 Maitland Road, Hexham; Caltex Sandgate, 162-164 Maitland Road, Hexham
  - AEI 8: Historical and current commercial/industrial premises west of the alignment
  - AEI 9: Potential groundwater and surface water contamination.

The location of AEIs within proximity to the construction area are identified in **Figure 6.14**, with the exception of AEI 4 – ASS which is shown in **Figure 6.13**.



Date: 10/11/2021 Filename: IA301100_REF_F016_AEI_v2

Legend

- REF area
- Areas of environmental interest
  - High risk
  - Moderate risk
- Road
- Waterway
- Railway

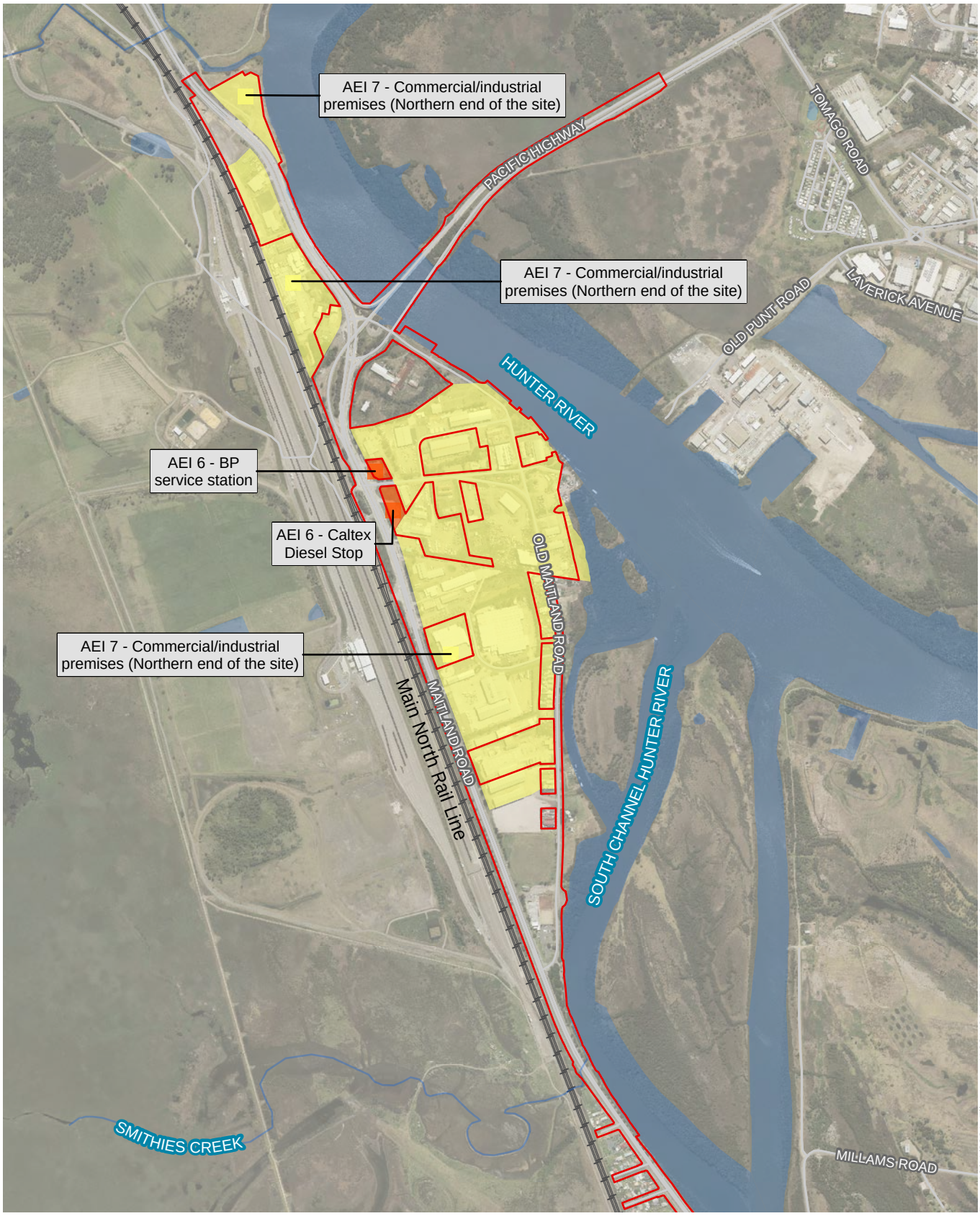
0 250 500 m

Scale 1:15,000 at A4

GDA94 MGA56

Data sources:
Jacobs 2020
Department Finance, Services and Innovation 2020

Figure 6.14a Areas of environmental interest



Legend

REF area

Areas of environmental interest
- High risk
- Moderate risk

Road

Waterway

Railway

0 250 500 m

Scale 1:15,000 at A4

GDA94 MGA56

Data sources:
Jacobs 2020
Department Finance, Services and Innovation 2020

Figure 6.14b Areas of environmental interest

6.12.3 Potential impacts

Construction

Exposure or disturbance of contaminated land and groundwater during construction of the REF area could result in the following impacts:

- Mobilisation of surface and subsurface contaminants during construction (impacting groundwater, surface water and soils)
- Migration of potential contaminants into surrounding areas (impacting groundwater, surface water and soils) via leaching, overland flow and/or subsurface flow (water and/or vapour)
- Mobilising potential groundwater and/or surface water contamination
- Risk of exposure to site workers, site users and site visitors
- Risk of exposure to surrounding environmental receptors (i.e. flora, fauna, surrounding ecosystems including groundwater dependent ecosystems).

Operation

Vehicle or plant and equipment leakages or a vehicle crash may cause spills of oils, lubricants, hydraulic fluids and chemicals during the operation of the REF area. Spills and leakages within the REF area have the potential to result in contamination. The severity of the potential impact would depend on the magnitude and/or location of the spill in relation to sensitive receivers, emergency response procedures and/or environmental management measures implemented on site and the nature of the receiving environment. Further, operational water quality basins which have been proposed will capture and treat runoff.

6.12.4 Safeguards and management measures

The environmental management measures that will be implemented to minimise soils and contamination impacts of the proposal within the REF area, along with the responsibility and timing for those measures, are presented in **Table 6.66**.

Table 6.66 Safeguards and management measures – soils and contamination

Impact	Environmental safeguards	Responsibility	Timing
Contaminated land	A detailed site investigation (Phase 2) will be undertaken in areas of potential contamination identified during the preliminary site investigation (Phase 1), in accordance with the *Roads and Maritime Services (2013) Guideline for the Management of Contamination*. An in-situ waste classification will be undertaken for any materials which are proposed to be excavated and removed from the proposal as part of a Phase 2 investigation.	Transport	Detailed design/ prior to construction
Contaminated land	A Contaminated Land Management Plan will 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 will 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	Transport/ Contractor	Detailed design/ prior to construction

Impact	Environmental safeguards	Responsibility	Timing
	extent, concentration and type of contamination, as identified in the detailed site investigation (Phase 2) • Acid sulfate soils management plan • 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.		
Contaminated land – temporary construction compounds	A pre and post lease condition assessment be conducted for all temporary construction facilities proposed within sealed areas.	Contractor	Prior to construction/ post construction
Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other work that may impact on the contaminated area will cease 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 Transport Environment Manager and/or EPA.	Contractor	Detailed design/ prior to construction
Accidental spill	A site specific emergency spill plan will be developed and include spill management measures in accordance with the Transport *Code of Practice for Water Management* (Roads and Traffic Authority, 1999) and relevant legislation and 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.	Contractor	Detailed design/ prior to construction