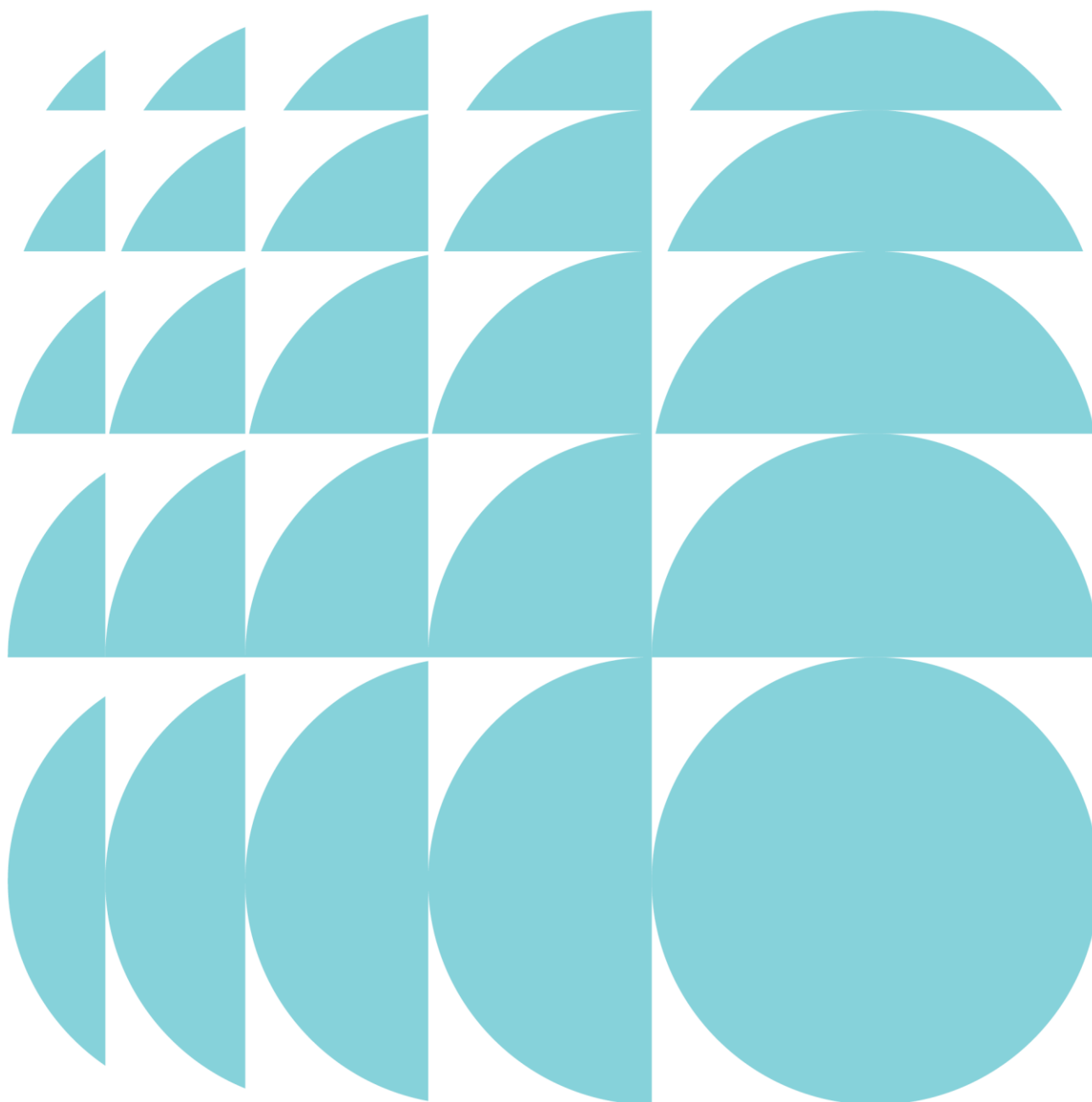


State Significant Infrastructure - Modification: Detailed Environmental Assessment Report

Maitland Road, Hexham
NSW Train Support Facility

Submitted to Department of Planning and
Environment
On behalf of Aurizon Operations Limited

12 June 2019 | 17413



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Aurizon

Executive Summary

The NSW Long Term Train Support Facility (LTTSF) includes the construction and operation of a facility for the maintenance and provisioning of trains at Hexham, NSW.

The LTTSF was granted State Significant Infrastructure (SSI) Approval MP07_0171 in accordance with Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) by the NSW Minister for Planning and Infrastructure (under delegation) on 10th October 2013, subject to a number of conditions (the State Significant Infrastructure Approval).

Since the project was approved and constructed, growth in Hunter Valley network demand has seen the Aurizon fleet increase ahead of the assumptions underpinning the original LTTSF business case. This has resulted in significant operational constraints relating to the inability to turn locomotives at the site. It is now proposed to alter the approved LTTSF to complete:

- Installation and operation of a new turning angle, including new rail tracks and level crossings comprising:
 - Excavation works for railway track foundation and ballast;
 - Approximately 1.5km of rail track and associated signal and turnout infrastructure comprising a single track straight of approximately 400m in length extending from the existing rail yard to the proposed turning angle;
 - A turning angle with two arcs approximately 250m in length and a straight of approximately 275m;
 - Two 85m straight single tracks at either end of the turning angle;
 - Four tangential turnouts; and
- Construction of vehicular access tracks and associated lighting;
- Installation of culverts within existing drainage channels, under the rail track and access tracks;
- Associated civil and stormwater works; and
- Changes to the wording of Condition E33.

As a result of the proposed changes there would be minor changes to the infrastructure footprint. A consistency assessment of the proposed design changes identified that a modification to the approval under the EP&A Act was required. This modification environmental assessment report has been prepared to describe the proposed modification, provide justification for the modification, and assess the potential environmental impact of the proposed modification relative to the project's existing approval.

This modification report addresses the key issues identified in the original Environmental Impact Statement (EIS) prepared by ADW Johnson (dated November 2012) and the approved Preferred Project Report (PPR) prepared by BA (dated June 2013). In general, the impacts of the proposed modification are considered to be consistent with those described in the EIS, the PPR and associated documentation with the exception of:

- Changes to stormwater flows and catchment areas, resulting in higher peak flows from the Basin 03 outlet to Hexham Swamp due to the increase in impervious catchment area that is directed to the basin. This increase is generally mitigated (especially for less frequent stormwater events) by the proposed mitigation measure of routing the runoff through the 'triangle' of the turning angle, which acts as an additional attenuation basin. There is also a minor increase in nutrient concentrations at the outlet of Basin 03 however these are still well below the discharge criteria applicable to the LTTSF site; and
- Minor changes to flow paths during a 1% Annual Exceedance Probability (AEP) flood event through the redistribution of paths from the site to Hexham Swamp in the south, with a peak flood level of 3.7m AHD in Hexham Swamp. The rearrangement of flow paths due to the turning angle and associated culverts would have a negligible impact on broader flooding due to the existing substantial flood flows (over 2,700m³/s at the 1% AEP event) that moves through the main flow path in Hexham Swamp, compared to the flow path on-site across the coal tailings (approximately 35m³/s at the 1% AEP event), representing an approximate 1% increase along that alignment.

Additional mitigation measures associated with these impacts and other minor changes to construction methodology have been included. Mitigation measures established within the PPR, within the existing consent conditions and all relevant revised environmental management commitments will be adopted for the modification.

1.0 Introduction

The NSW Long Term Train Support Facility (LTTSF) includes the construction and operation of a facility for the maintenance and provisioning of trains at Hexham, NSW.

The LTTSF was granted State Significant Infrastructure (SSI) Approval MP07_0171 in accordance with Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) by the NSW Minister for Planning and Infrastructure (under delegation) on 10th October 2013, subject to a number of conditions (the State Significant Infrastructure Approval). The key components of the approved SSI are:

- New connections to the Great Northern Railway;
- Seven new train tracks parallel to the existing mainline and a shunt track at the northern part of the facility comprising 10.5 kilometres of new railway track;
- A provisioning building, a combined maintenance and administrative centre and service vehicle garage;
- A bulk fuel storage area with capacity for up to 630,000L of diesel fuel in seven above ground fuel storage tanks;
- Vehicular intersection and new road from the Tarro Interchange and construction of sealed internal access roads;
- Civil earthworks and importation of fill material;
- Permanent stockpiling of up to 150,000m³ of Potential Acid Sulfate Soils;
- Utility connections and the protection or diversion of existing utilities; and
- A wastewater treatment plant with on-site effluent irrigation.

The project has been constructed and is currently operational.

1.1 Overview of Proposed Modification

It is now proposed to alter the LTTSF by addition of the following components:

- Installation and operation of a new turning angle (**Figure 6**), including new rail tracks and level crossings comprising:
 - Excavation works for railway track foundation and ballast;
 - Approximately 1.5km of rail track and associated signal and turnout infrastructure comprising a single track straight of approximately 400m in length extending from the existing rail yard to the proposed turning angle;
 - A turning angle with two arcs approximately 250m in length and a straight of approximately 275m;
 - Two 85m straight single tracks at either end of the turning angle;
 - Four tangential turnouts; and
- Construction of vehicular access tracks and associated lighting;
- Installation of culverts within existing drainage channels, under the rail track and access tracks;
- Associated civil and stormwater works; and
- Changes to the wording of Condition E33.

This SSI modification is submitted to the Department of Planning and Environment pursuant to Part 5.1 of the EP&A Act.

The report has been prepared by Ethos Urban on behalf of Aurizon Operations Limited, and is based on the Engineering Plans provided by GHD (see **Appendix B**) and other supporting technical information appended to the report (see Table of Contents).

1.2 Secretary's Environmental Assessment Requirements

In accordance with Section 5.16 of the EP&A Act, the Secretary of the Department of Planning and Environment issued the requirements for the preparation of the modification application EIS on 19 December 2018. A copy of the Secretary's Environmental Assessment Requirements (SEARs) is included in **Appendix A**.

Table 1 provides a detailed summary of the individual matters listed in the SEARs and identifies where each of these requirements has been addressed in this report and the accompanying technical studies.

Table 1 Secretary's Environmental Assessment Requirements

Requirement	Location in Environmental Assessment
Environmental Impact Assessment Process	
The modification assessment must be prepared in accordance with Part 5, Section 5.25 of the <i>Environmental Planning and Assessment Act 1979</i> (the Act).	This report
It is the Proponent's responsibility to determine whether the modification needs to be referred to the Commonwealth Department of the Environment for an approval under the Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). The Proponent must contact the Commonwealth Department of the Environment immediately if it is determined that an approval is required under the EPBC Act, as supplementary environmental assessment requirements may need to be issued.	Not applicable.
The onus is on the Proponent to ensure legislative requirements relevant to the modification are met.	Refer to Section 4.0.
Environmental Impact Statement	
The EIS must include, but not necessarily be limited to, the following:	Executive Summary
(a) executive summary;	
(b) a description of the modification, including all components and activities (including ancillary components and activities) required to establish and operate it;	Section 3.0
(c) a statement of the objective(s) of the modification;	Section 3.1
(d) a summary of the strategic need for the modification ,with regard to relevant State Government policy;	Section 3.2
(e) an analysis of any feasible alternatives to the modification ;	Section 3.3
(f) a description of feasible options within the modification;	Section 3.3
(g) a description of how alternatives to and options within the modification were analysed to inform the selection of the preferred alternative I option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to and options(s) within the modification were selected;	Section 3.3
(h) a concise description of the general biophysical and socio-economic environment that is likely to be impacted by the modification (including offsite impacts). Elements of the environment that are not likely to be affected by the modification do not need to be described;	Section 6.0
(i) a demonstration of how the modification has been designed and developed to avoid or minimise likely adverse impacts;	Section 6.0
(j) the identification and assessment of key issues as provided in the 'Assessment of Key Issues' performance outcome;	Section 6.0
(k) a statement of the outcome(s) the proponent will achieve for each key issue;	Section 6.0
(l) measures to avoid, minimise or offset impacts must be linked to the impact(s) they treat, so it is clear which measures will be applied to each impact;	Section 6.0 Section 7.0
(m) consideration of the interactions between measures proposed to avoid or minimise impact(s), between impacts themselves and between measures and impacts;	Section 6.0
(n) an assessment of the cumulative impacts of the modification taking into account other projects that have been approved but where construction has not commenced, projects that have commenced construction, and projects that have recently been completed;	Section 6.0

Requirement	Location in Environmental Assessment
(o) statutory context of the modification as a whole, including: <ul style="list-style-type: none"> - how the modification meets the provisions of the EP&A Act and EP&A Regulation; - a list of any approvals that must be obtained under any other Act or law before the modification may lawfully be carried out; 	Section 4.0
(p) a chapter that synthesises the environmental impact assessment and provides: <ul style="list-style-type: none"> - a succinct but full description of the modification for which approval is sought; - a description of any uncertainties that still exist around design, operational methodologies and how these will be resolved in the next stages of the modification; - a compilation of the impacts of the modification that have not been avoided; - a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during establishment and operation) or offset these impacts; - a compilation of the outcome(s) the proponent will achieve; and - the reasons justifying carrying out the modification as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts. 	Section 6.0
(q) relevant project plans, drawings, diagrams in an electronic format that enables integration with mapping and other technical software.	Appendices
The modification must only include data and analysis that is reasonably needed to make a decision on the proposal. Relevant information must be succinctly summarised in the modification and included in full in appendices. Irrelevant, conflicting or duplicated information must be avoided.	Noted.
Assessment of Key Issues	
The level of assessment of likely impacts must be proportionate to the significance of, or degree of impact on, the issue, within the context of the proposal location and the surrounding environment. The level of assessment must be commensurate to the degree of impact and sufficient to ensure that the Department and other government agencies are able to understand and assess impacts.	Section 6.0
For each key issue the Proponent must: <ul style="list-style-type: none"> (a) describe the biophysical and socio-economic environment, as far as it is relevant to that issue; (b) describe the legislative and policy context, as far as it is relevant to the issue; (c) identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence (including worst case scenario) of the impact (comprehensive risk assessment), and the cumulative impacts; (d) demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies); (e) detail how likely impacts that have not been avoided through design will be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant); and (f) detail how any residual impacts will be managed or offset, and the approach and effectiveness of these measures (this may include how existing commitments and conditions would apply to the modification). 	Section 6.0
Where multiple options to avoid or minimise impacts are available, they must be identified and considered and the proposed measure justified taking into account the public interest.	Section 6.0
Consultation	
The modification must be informed by consultation, including with relevant government agencies, infrastructure and service providers, special interest groups, affected landowners, businesses and the community. The consultation process must be undertaken in accordance with the current guidelines.	Section 5.0
The Proponent must document the consultation process and demonstrate how the modification has responded to the inputs received.	Section 5.0
The Proponent must describe the timing and type of community consultation proposed during the design and delivery of the modification, the mechanisms for community feedback, the mechanisms for keeping the community informed, and procedures for complaints handling and resolution.	Section 5.0

Requirement	Location in Environmental Assessment
Water - Hydrology	
<p>The Proponent must assess (and model if appropriate) the impact of the construction and operation of the modification and any ancillary facilities (both built elements and discharges) on surface and groundwater hydrology in accordance with the current guidelines, including:</p> <ul style="list-style-type: none"> (a) natural processes within rivers, wetlands, estuaries, marine waters and floodplains that affect the health of the fluvial, riparian, estuarine or marine system and landscape health (such as modified discharge volumes, durations and velocities), aquatic connectivity and access to habitat for spawning and refuge; (b) impacts from any permanent and temporary interruption of groundwater flow, including the extent of drawdown, barriers to flows, implications for groundwater dependent surface flows, ecosystems and species, groundwater users and the potential for settlement; (c) changes to environmental water availability and flows, both regulated/licensed and unregulated/rules-based sources; (d) direct or indirect increases in erosion and siltation; and (e) water take (direct or passive) from all surface and groundwater sources with estimates of annual volumes during construction and operation. 	<p>Section 6.2 Section 6.3</p>
<p>The Proponent must identify any requirements for baseline monitoring of hydrological attributes.</p>	<p>Section 6.2</p>
Water – Quality	
<p>The Proponent must:</p> <ul style="list-style-type: none"> (a) state the ambient NSW Water Quality Objectives (NSW WQO) and environmental values for the receiving waters relevant to the modification, including the indicators and associated trigger values or criteria for the identified environmental values; (b) identify and estimate the quality and quantity of all pollutants that may be introduced into the water cycle by source and discharge point and describe the nature and degree of impact that any discharge(s) may have on the receiving environment, including consideration of all pollutants that pose a risk of non-trivial harm to human health and the environment; (c) identify the rainfall event that the water quality protection measures will be designed to cope with; (d) assess the significance of any identified impacts including consideration of the relevant ambient water quality outcomes; (e) demonstrate how construction and operation of the modification will, to the extent that the modification can influence, ensure that: <ul style="list-style-type: none"> - where the NSW WQOs for receiving waters are currently being met they will continue to be protected; and - where the NSW WQOs are not currently being met, activities will work toward their achievement over time; (f) justify, if required, why the WQOs cannot be maintained or achieved over time; (g) demonstrate that all practical measures to avoid or minimise water pollution and protect human health and the environment from harm are investigated and implemented; (h) identify sensitive receiving environments (which may include estuarine and marine waters downstream) and develop a strategy to avoid or minimise, impacts on these environments; and 	<p>Section 6.2</p>
<p>identify proposed monitoring locations, monitoring frequency and indicators of surface and groundwater quality.</p>	<p>Section 6.2</p>
Flooding	
<p>The Proponent must assess and (model where required) the impacts on flood behaviour during construction and operation for a full range of flood events up to the probable maximum flood (taking into account sea level rise and storm intensity due to climate change) including:</p> <ul style="list-style-type: none"> (a) any detrimental increases in the potential flood affectation of other properties, assets and infrastructure; (b) consistency (or inconsistency) with applicable Council floodplain risk management plans; (c) compatibility with the flood hazard of the land; (d) compatibility with the hydraulic functions of flow conveyance in flood ways and storage areas of the land; (e) downstream velocity and scour potential; (f) impacts the development may have upon existing community emergency management arrangements for flooding. These matters must be discussed with the State Emergency Services and Council; and 	<p>Section 6.3</p>
<p>any impacts the development may have on the social and economic costs to the community as consequence of flooding.</p>	<p>Section 6.3</p>

Requirement	Location in Environmental Assessment
Soils	
The Proponent must verify the risk of acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Risk Map) within, and in the area likely to be impacted by, the modification.	Section 6.5
The Proponent must assess the impact of the modification on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines.	Section 6.5
The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past, existing and future land uses. Where assessment and/or remediation is required, the Proponent must document how the assessment and/or remediation would be undertaken in accordance with current guidelines.	Section 6.5
The Proponent must assess whether salinity is likely to be an issue and if so, determine the presence, extent and severity of soil salinity within the modification area.	Section 6.5
The Proponent must assess the impacts of the modification on soil salinity and how it may affect groundwater resources and hydrology.	Section 6.5
The Proponent must assess the impacts on soil and land resources (including erosion risk or hazard). Particular attention must be given to soil erosion and sediment transport consistent with the practices and principles in the current guidelines.	Section 6.5
Transport and Traffic	
The Proponent must assess construction transport and traffic (vehicle, pedestrian and cyclists) impacts, including, but not necessarily limited to: (a) a considered approach to route identification and scheduling of transport movements; (b) the number, frequency and size of construction related vehicles (passenger, commercial and heavy vehicles, including spoil management movements); (c) construction worker parking; (d) the nature of existing traffic (types and number of movements) on construction access routes (including consideration of peak traffic times and sensitive road users and parking arrangements); (e) access constraints and impacts on public transport, pedestrians and cyclists; and (f) the need to close, divert or otherwise reconfigure elements of the road and cycle network associated with construction of the modification.	Section 6.6
The Proponent must assess the operational transport impacts of the modification, including forecast travel demand and traffic volumes for the modification and the surrounding road, cycle and public transport network.	Section 6.6
Noise and Vibration - Amenity	
The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to sensitive receivers including small businesses, and include consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration (for example, low frequency noise).	Section 6.7
The Proponent must demonstrate that blast impacts are capable of complying with the current guidelines, if blasting is required .	No blasting is proposed.
Heritage	
The Proponent must identify and assess any direct and/or indirect impacts (including cumulative impacts) to the heritage significance of: (a) Aboriginal places and objects, as defined under the National Parks and Wildlife Act 1974 and in accordance with the principles and methods of assessment identified in the current guidelines; (b) Aboriginal places of heritage significance, as defined in the Standard Instrument - Principal Local Environmental Plan; (c) environmental heritage, as defined under the Heritage Act 1977; and (d) items listed on the National and World Heritage lists.	Section 6.8
Where archaeological investigations of Aboriginal objects are proposed these must be conducted by a suitably qualified archaeologist, in accordance with section 1.6 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (DECCW 2010).	Section 6.8
Where impacts to Aboriginal objects and/or places are proposed, consultation must be undertaken with Aboriginal people in accordance with the current guidelines.	Section 6.8

Requirement	Location in Environmental Assessment
Climate Change Risk	
The Proponent must assess the risk and vulnerability of the modification to climate change in accordance with the current guidelines.	Section 6.9
The Proponent must quantify specific climate change risks with reference to the NSW Government's climate projections at 10km resolution (or lesser resolution if 10km projections are not available) and incorporate specific adaptation actions in the design.	Section 6.9
Protected and Sensitive Lands	
The Proponent must assess the impacts of the modification on environmentally sensitive land and processes (and the impact of processes on the modification) including, but not limited to: (a) land to which State Environmental Planning Policy (Coastal Management) 2018 applies; (b) protected areas (including land and water) managed by OEH and/or DPI Fisheries under the <i>National Parks and Wildlife Act 1974</i> and the <i>Marine Estate Management Act 2014</i> ; (c) Key Fish Habitat as mapped and defined in accordance with the <i>Fisheries Management Act 1994</i> (FM Act); and (d) biodiversity stewardship sites, private conservation lands and other lands identified as offsets.	Section 6.10
Waste	
The Proponent must assess predicted waste generated from the modification during construction and operation, including: (a) classification of the waste in accordance with the current guidelines; (b) estimates I details of the quantity of each classification of waste to be generated during the construction of the modification, including bulk earthworks and spoil balance; (c) handling of waste including measures to facilitate segregation and prevent cross contamination; (d) management of waste including estimated location and volume of stockpiles; (e) waste minimisation and reuse; (f) lawful disposal or recycling locations for each type of waste; and (g) contingencies for the above, including managing unexpected waste volumes.	Section 6.11
The Proponent must assess potential environmental impacts from the excavation, handling, storage on site and transport of the waste particularly with relation to sediment/leachate control, noise and dust.	Section 6.11 Section 6.12

2.0 Site Analysis

2.1 Site Location and Context

The site is located at Maitland Road, Hexham within the Newcastle Local Government Area approximately 16km north-west of Newcastle CBD. The site is bounded by the GNR and the Pacific Highway to the east and the New England Highway to the north. To the south and west are rural properties and the Hexham Swamp Nature Reserve. The site is located within an industrial setting with only a small number of dwellings within the local vicinity of the site.

The Hexham LTTSF site has a total area of 255ha with the LTTSF developed on a 38ha portion of the site parallel to (and to the west of) the Great Northern Railway (GNR).

The LTTSF is located on the eastern edge of the site. East of the LTTSF the site is dominated by a large coal washery reject stockpile located centrally to the site, which is heavily grassed, as well as land that formerly contained a rail loop and an old tailings pond. In the northern part of the site Middle Creek, a modified estuarine channel, connects the Hunter Swamp with the Hunter River via low lying land which contains Swamp Oak Forest Endangered Ecological Community.

The site's locational context is shown at **Figure 1**.

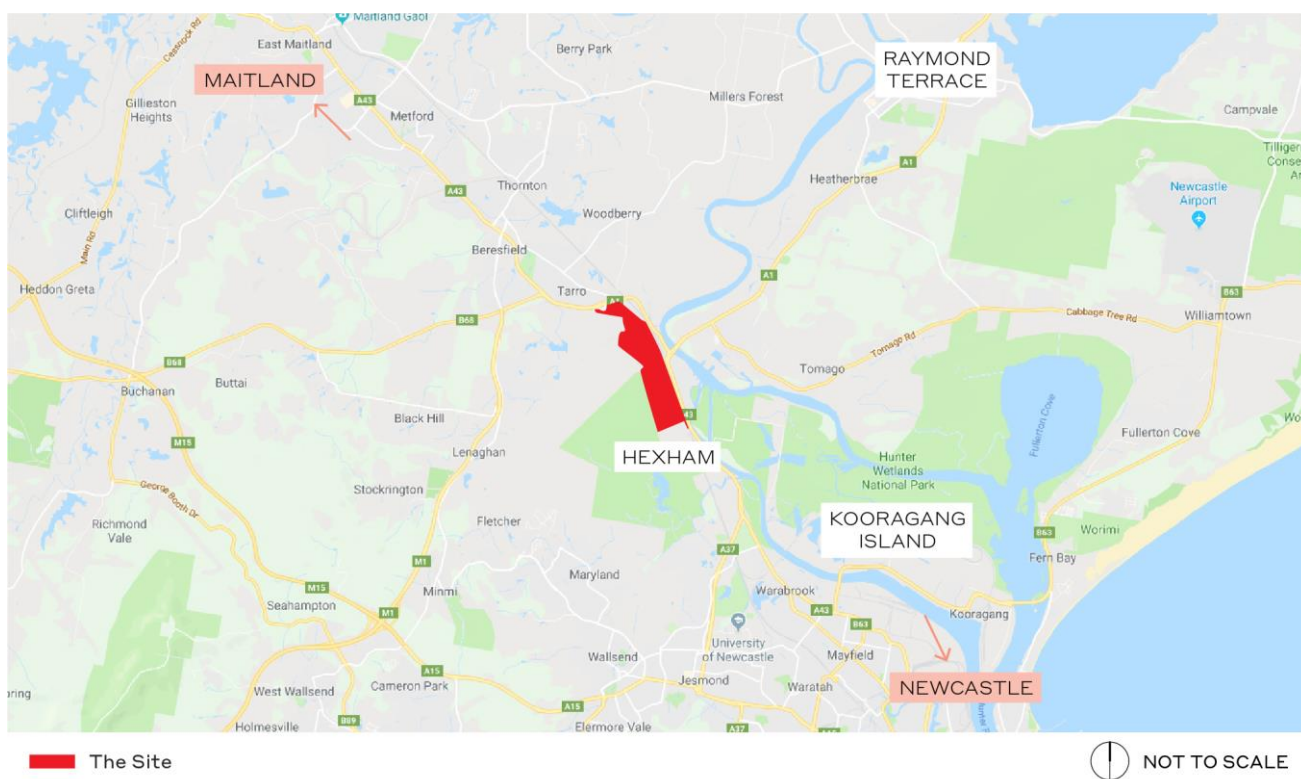


Figure 1 The Hexham LTTSF is located north-west of Newcastle

Source: Google

2.2 Site Description

The proposed works are fully contained within Lot 104 DP1189565 which is owned by Aurizon. The broader LTTSF site covers multiple lots which are not affected by the modification proposal.

The site has an area of approximately 255ha and is generally rectangular in shape. An aerial photo of the site is shown at **Figure 2**. The existing LTTSF footprint occupies approximately 38ha and is predominantly located along the eastern boundary of the site.

The area subject to the proposed turning angle has been heavily disturbed due to historical coal handling activities and a significant portion of the alignment previously supported rail infrastructure with an historical turning loop. The area is currently undeveloped and generally flat in its topographical nature as shown in **Figure 3** to **Figure 5**. The southern extent of the turning angle utilises the elevated engineered embankment of the historic rail loop alignment. Site drainage is characterised by an existing swale drain located along the eastern extent of the proposed turning angle which reports to detention Basin 3. Additionally, two constructed drainage channels collecting water from non-operational areas direct water off-site to the west and south west.

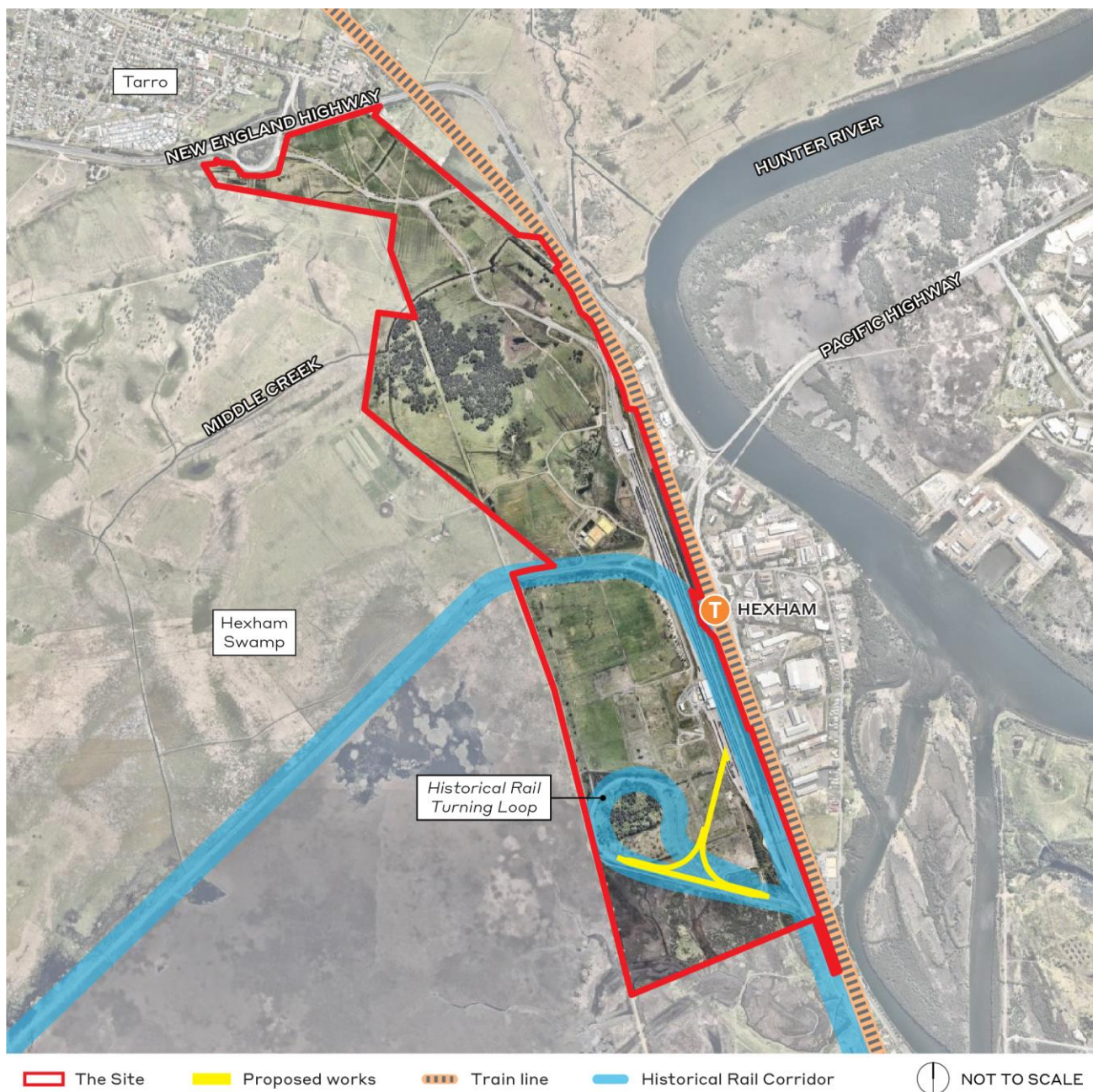


Figure 2 The turning angle location on the Hexham LTTSF site

Source: Nearmap



Figure 3 Site photo of the turning angle location looking north



Figure 4 Site photo of the turning angle location looking north



Figure 5 Site photo of the turning angle location looking north

3.0 Description of the Development

This modification application seeks approval for the following changes to the SSI consent:

- Installation and operation of a new turning angle, including new rail tracks and level crossings comprising:
 - Excavation works for railway track foundation and ballast;
 - Approximately 1.5km of rail track and associated signal and turnout infrastructure comprising a single track straight of approximately 400m in length extending from the existing rail yard to the proposed turning angle;
 - A turning angle with two arcs approximately 250m in length and a straight of approximately 275m;
 - Two 85m straight single tracks at either end of the turning angle;
 - Four tangential turnouts; and
- Construction of vehicular access tracks and associated lighting;
- Installation of culverts within existing drainage channels, under the rail track and access tracks;
- Associated civil and stormwater works; and
- Changes to the wording of Condition E33.

The turning angle utilises approximately 480m of the existing formation from the previous turning loop on the site, with around 50m being located adjacent to the existing formation. Approximately 250m of an existing cess drain is to be relocated.

It is estimated that a maximum of 13,000m³ of spoil material will be excavated with a maximum excavation depth of approximately 1.5 metres depending upon sub surface conditions.

The construction works are estimated to take approximately 12 weeks.

3.1 Changes to conditions

Condition E33 is proposed to be modified as outlined below to ensure clarity in terms of validation of the turning angle site, through the Site Audit Report process. Words proposed to be deleted are shown in **bold strike through** and words proposed to be inserted are shown in **bold italics**.

E33. The Proponent shall engage a suitably qualified contaminated land consultant to prepare a Validation Report upon completion of the remediation of the areas identified in the Remediation Action Plan. The Validation Report shall verify that the site has been remediated in accordance with the Remediation Action Plan (if and as amended) and to a standard consistent for the intended land use. The Proponent shall engage an accredited NSW Site Auditor to prepare a Site Audit Report to determine the appropriateness of the Validation Report. The Validation Report and Site Audit Report shall be submitted to the Director-General **upon completion of construction related activities and finalisation of the Site Audit Report and Site Audit Statement process** ~~prior to the laying of track in the remediated area(s)~~. A copy of the reports shall also be submitted to the City of Newcastle for its information.

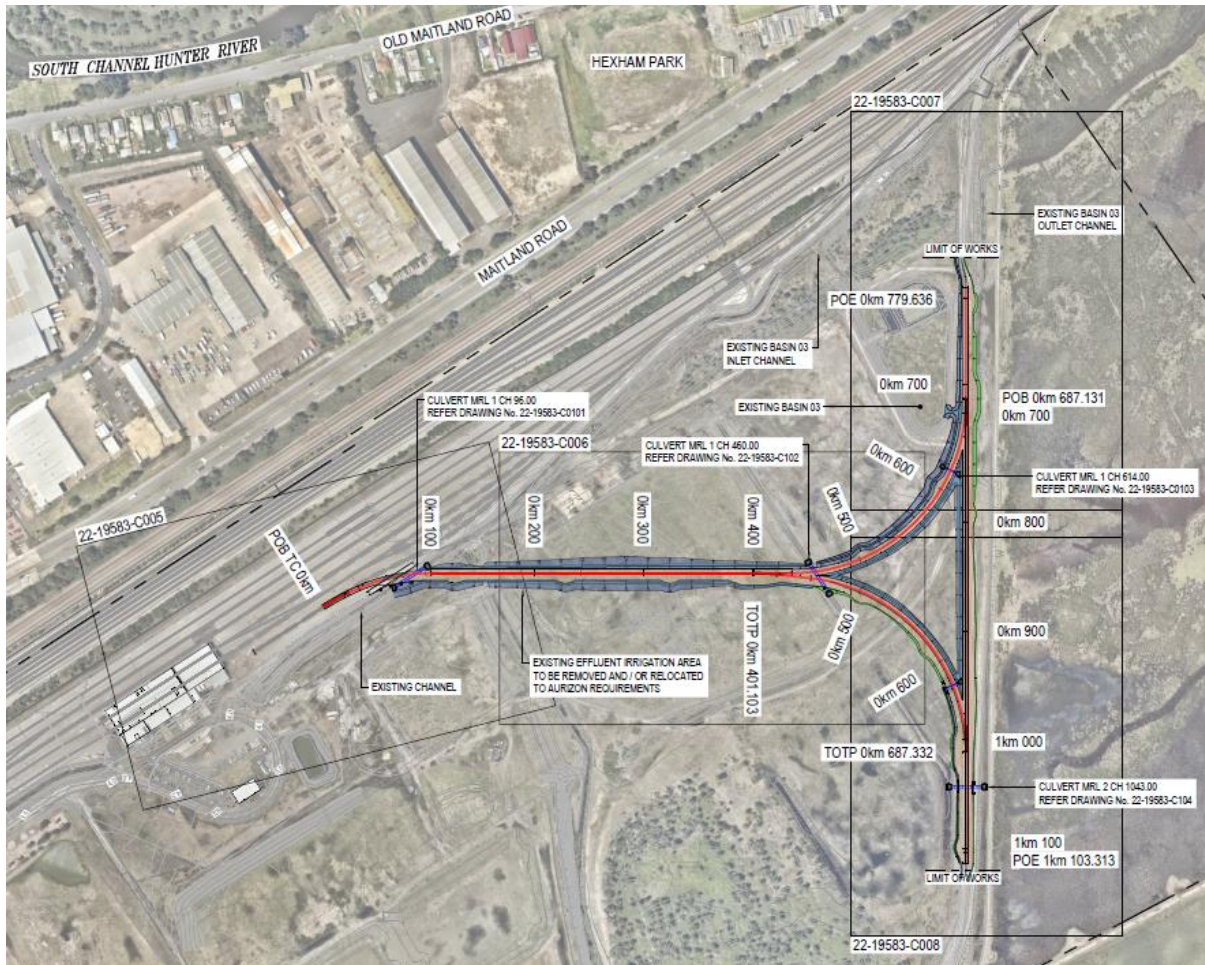


Figure 6 The proposed turning angle

Source: GHD

3.2 Construction Methodology

Construction activities will consist of excavation of in situ material and construction of associated rail (track) infrastructure rail, sleeper, ballast, formation, lighting, access road and drainage.

The works will be completed by heavy vehicles consisting of graders, dozers, excavators and rollers. Deliveries of fill will be by trucks certified and registered by the Roads and Maritime Service (RMS).

The construction period will be over an estimated 12 weeks with onsite activities restricted to standard industry hours Mon-Fri 7am to 5pm with Saturday 7am to 2pm.

Construction will be undertaken by 10 to 30 workers on a part time basis, depending on the stage of construction.

3.3 Objective of the Proposed Works

The proposed infrastructure additions will improve the operational efficiency of the LTTSF, enabling flexibility in how trains are turned around at the site.

3.4 Need for the Proposed Works

Growth in Hunter Valley rail demand has seen the Aurizon fleet increase well ahead of the assumptions underpinning the initial Hexham LTTSF business case.

This growth has resulted in operational constraints which have been compounded by marshalling changes. The operational constraints relate to the inability to turn locomotives and wagons at Hexham TSF as there is no infrastructure in place at the facility to perform this operation.

To minimise the need for costly turns Aurizon routinely swap locomotives. When a swap cannot be done to satisfy configuration requirements, then a turn is done to avoid cancellations. Turning of a locomotive requires the request of an additional service (non-revenue, light engine movement) to be scheduled and run to available turning locations on the network. Each time a locomotive is required to be swapped or turned in a day of operations, this can result in a delay or a cancellation to operational service.

The proposed turning angle will allow for trains and rolling stock to be turned around on the site rather than being required to exit the site and enter the general railway network. Whilst it will increase the efficiency for Aurizon it will also improve performance of the Hunter Valley rail network as a whole.

3.5 Options and Alternatives

There were eight initial options identified as part of the concept design process for the turning angle.

Aurizon undertook a number of internal workshops to identify the most appropriate option. Detailed assessment criteria prepared by GHD to evaluate each option were used to assess these options. This criteria consisted of:

- Track length (17% weighting);
- Future proofing (15%);
- Property impact (14%);
- Environmental impact (17%);
- Maintenance and operation (10%);
- Impacts on existing infrastructure (11%); and
 - Impacts on the sediment basin;
 - Cess drain relocation;
 - Impacts on access road;
- Constructability (14%).
 - Use of old formation;
 - Proposed track adjacent to existing formation.

A summary of the key options is provided below, including the relative strengths and weaknesses of the options.

3.5.1 Option 1 – Do Nothing

As a freight business Aurizon are required to maintain rolling stock and locomotives to ensure efficient and prompt servicing of clients on the rail network. Maintaining the status quo with no turning angle restricts the ability of locomotives to turn around on site and restricts the efficient operation of the LTTSF. It also impacts on the efficiency of the Hunter Valley rail network as a whole.

3.5.2 Option 2 – Star-shaped layout (Concept 4)

A different turning angle shape was identified which formed a star-shape, wrapping around the existing coal washery pile to the west of the site, and utilising part of the historical turning loop alignment. This layout option used a 160m radius, required multiple road crossings, turnouts in the middle of curves and additional ground improvement being required. Additional modification to existing drainage networks was also required. It required additional track due to the longer arms, and as such is not the preferred option.

3.5.3 Option 3 – Turning Angle re-alignment (Concept 1)

This option was investigated based on a 140m radius of track and was rated as having a medium impact on environmental matters including the required modifications to existing drainage networks. This option was also rated as higher risk on neighbouring properties due to its alignment through increasing infrastructure and rail movements near the eastern side of the site.

3.5.4 Option 4 – The Proposed Turning Angle (Concept 8)

The preferred option, as proposed, is the construction of a turning angle at the southern end of the subject site. This was rated the highest and most appropriate option to proceed with based on its impacts on environmental, property and operational matters.

4.0 Planning Framework and Context

4.1 Relevant Legislation

The relevant legislative requirements are outlined below.

4.1.1 Environment Protection and Biodiversity Conservation Act 1999

Approval is required under the Commonwealth *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act), where a proposal is deemed likely to have a significant impact on Matters of National Significance and is deemed a controlled action under that Act. A referral of the original application was submitted to the Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC) and the proposal was deemed not to be a controlled action on 20 March 2012 by DSEWPaC (EPBC referral 2012/6285).

The proposed modifications will not result in any new impacts, or likely impacts to Matters of National Environmental Significance compared to what was assessed in the original referral and, as such, will not trigger a controlled action. As such no referral is required for the proposed modification.

4.1.2 Environmental Planning and Protection Act 1979

The original application for consent was submitted under the now repealed Part 3A of the EP&A Act. Pursuant to the transitional provisions the assessment of the proposal was progressed under Part 3A, including acceptance and exhibition of the environmental assessment. On 16 August 2013 the Minister declared the application to be SSI pursuant to (then) Clause 5(2) of Schedule 6A of the EP&A Act.

Accordingly, the project was assessed and approved as SSI under Part 5.1 of the EP&A Act.

Section 5.25 of the EP&A Act regulates the modification of a SSI approval. Section 5.25(2) states that “the proponent may request the Minister to modify the Minister’s approval for state significant infrastructure. The Minister’s approval for a modification is not required if the infrastructure as modified will be consistent with the existing approval under this Part”.

Aurizon has determined that the proposed modification to the infrastructure is not consistent with the existing approval, and therefore a modification of the SSI approval is required per Section 5.25 of the EP&A Act.

4.1.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) replaced the previous *Native Vegetation Act 2003* and provides measures for offsetting and land conservation. The BC Act looks to conserve biodiversity at a bioregional and state-wide scale, maintain the diversity and quality of ecosystems and to supporting biodiversity conservation.

Section 7.17 of the BC Act identifies that the biodiversity assessment requirements under the BC Act only apply if the SSI approval was granted after the commencement of the Act. However, this is inconsistent with clause 30 of the Biodiversity Conservation (Savings and Transitional) Regulation 2017, which specifically states:

“The new Act applies to the modification of a planning approval even if the planning approval was granted before the commencement of the new Act (unless the application for the modification of the planning approval is a pending or interim planning application).”

This confirms the BC Act applies to the proposed SSI modification. As such, should the modification propose vegetation removal exceeding the thresholds within the BC Act, a Biodiversity Development Assessment Report (BDAR) is required.

The subject site has a split minimum lot size under the LEP 2012 of 1000m² and 40ha. In this scenario the smaller lot size applies. This provides a clearing threshold under the Biodiversity Conservation Regulations 2017 Section 7.2 of 0.25ha. The area threshold applies to all proposed native vegetation clearing associated with a proposal, regardless of whether this clearing is across multiple lots.

The location of the turning angle is not mapped on the Biodiversity Values Map or the Native Vegetation Regulatory Map.

The previous ecological assessment supporting the original SSI approval indicated that areas near to the proposed turning angle contained Endangered Ecological Communities (EEC), specifically *Phragmites australis* and *Typha orientalis* coastal freshwater wetlands (**Figure 7**), however per the Ecological Assessment at **Appendix G** are not considered to adequately meet the criteria for EEC. This vegetation is contained to an existing constructed swale to the north of the proposed turning circle that will not be directly impacted by the turning angle works (which are shown in yellow in **Figure 7**).

Whilst there may be minor changes to the area of the catchment flowing into this swale as a result of stormwater diversion associated with the access road and new rail infrastructure, it should be noted that the alignment of the turning angle is consistent with the location of a historical rail turning loop infrastructure. Consequently, a waiver for the provision of a BDAR is sought from the DPE per Clause 7.17(c) of the BC Act which provides that a BDAR is not required if the authority is satisfied that the modification will not increase the impact on biodiversity values. Refer to **Appendix G**.



Figure 7 Previously mapped vegetation and ecological communities on the site from the original SSI approval
 Source: Ecological

4.1.4 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) outlines the environmental regulatory framework and includes a licensing requirement for certain activities (Schedule 1), with environment protection licences granted as a means to control the localised, cumulative and acute impacts of pollution in NSW.

Clause 33 of Schedule 1 relates to railway systems activities and applies where track is being installed of more than 30kms in length. The proposed works include approximately 1.5km and therefore do not trigger Clause 33. The works including construction activities are not anticipated to trigger the need for an environment protection licence with no scheduled activities proposed.

In this situation Newcastle Council is therefore the Appropriate Regulatory Authority under the POEO Act.

4.1.5 Coastal Management Act 2016

The *Coastal Management Act 2016* replaces the *Coastal Protection Act 1979* which applied to the original SSI application. The Act defines four coastal management areas forming the coastal zone:

- Coastal Wetlands and Littoral Rainforests Area; areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26;
- Coastal Vulnerability Area; areas subject to coastal hazards such as coastal erosion and tidal inundation;
- Coastal Environment Area; areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included; and
- Coastal Use Area; land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The subject site is affected by the proximity to coastal wetlands, the coastal environment area and the coastal use area.

The *Coastal Management Act 2016* is supported by the State Environmental Planning Policy (Coastal Management) 2018 (Coastal SEPP) which replaces SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection). Consideration of the Coastal SEPP is provided in **Section 6.10** below.

4.2 Relevant EPIs, Policies and Guidelines

The relevant strategies, environmental planning instruments, policies and guidelines applicable to the proposal are outlined below.

4.2.1 State Environmental Planning Policy (Coastal Management) 2018

The Coastal SEPP gives effect to the objectives of the *Coastal Management Act 2016* from a land use perspective. The Coastal SEPP identifies how proposals are to be assessed if they affect the coastal zone. The site of the turning angle is mapped as being within the 'Proximity Area for Coastal Wetlands', and as such must not impact on the biophysical, hydrological or ecological integrity of the adjacent coastal wetland. The development must also not significantly impact on the quantity or quality of surface and ground water flows to and from the adjacent coastal wetland, being the Hexham Swamp.

The proposed turning angle works involve earthworks and construction of rail tracks and access roads. The design of the track is such that the permeability of the alignment will be generally maintained and therefore will result in minimal impacts to water flows across the site. Further assessment is provided below in **Section 6.2** and **6.3**.

4.2.2 State Environmental Planning Policy (Infrastructure) 2007

State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) provides a planning process for infrastructure and the provision of services across NSW, along with providing for consultation with relevant public authorities during the assessment process. The SEPP supports flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency. The proposed development is not exempt from the requirement for consent by way of this SEPP as Aurizon is not a public authority, however the Australian Rail and Track Corporation (ARTC) were consulted as part of the original SSI application.

4.2.3 State Environmental Planning Policy (State and Regional Development) 2011

The State Environmental Planning Policy (State and Regional Development) 2011 (SEPP SRD) identifies the triggers for development to be SSI. While the proposed works do not specifically trigger this requirement, the Minister has the ability to call in development as SSI, which occurred to the original Part 3A application for the LTTSF.

4.2.4 State Environmental Planning Policy No. 55 – Remediation of Land

State Environmental Planning Policy No. 55 – Remediation of Land (SEPP55) provides a decision-making framework and heads of consideration to be taken into account when assessing proposals for development or subdivision of land that may be contaminated.

A number of contamination concerns were identified during the preparation of the Remediation Action Plan (RAP) (approved as part of MP07_0171). These mainly related to historical coal washery reject, hazardous building materials, acid sulphate soils and hydrocarbon hotspots. Contamination concerns relating to the turning angle consists primarily of coal washery reject and acid sulphate soils. The RAP identifies the process for remediation of each area containing potential contaminants.

Remediation activities on the site have been completed in general accordance with the RAP requirements. Validation Reports detailing remediation efforts have been completed and reviewed by the appointed Site Auditor. A Site Management Plan (SMP), inclusive of an unexpected finds procedure has been developed and approved by the Site Auditor. The Site Audit Report and Site Audit Statement is due for submission to Aurizon and subsequently the Department of Planning and Environment in April 2019.

Consistent with Conditions E30 to E33 of the SSI Approval, the RAP will be updated (or a Supplementary RAP prepared) to detail areas of contamination associated with the proposed turning angle, and to ensure that remediation is carried out to a standard consistent for the intended land use. Pursuant to Condition E33 a NSW EPA Accredited Site Auditor will prepare a Site Audit Report which will be provided to the Department of Planning and Environment.

4.2.5 Newcastle LEP 2012

The site is located on land zoned IN3 Heavy Industry, SP2 Infrastructure, and E2 Environmental Conservation under the Newcastle Local Environmental Plan 2012 (LEP 2012), noting that the area affected by the proposed modification is located on land zoned only as IN3 Heavy Industry. The proposal is permissible in land zoned IN3 as it meets the definition of a freight transport facility, which is permissible with consent.

Notwithstanding, clause 5(3) of Schedule 6A of the EP&A (Savings, Transitional and Other Provisions) Regulation 2017, states that “despite anything to the contrary in any environmental planning instrument, any such development that is declared to be State significant infrastructure is taken to be development that may be carried out without development consent under Part 4”.

As the proposal is declared to be SSI, pursuant to the provisions of clause 5(3) of Schedule 6A of the EP&A (Savings, Transitional and Other Provisions) Regulation 2017, it can be carried out on any land without development consent.

The site is situated to the south of an existing local heritage item, described as the Minmi to Hexham Railway (I332), which is the historical alignment of the now-defunct railway line.

The proposed modification achieves the IN3 Heavy Industrial land use objectives as outlined in **Table 2** below.

Table 2 IN3 Heavy Industrial Land Use Objectives

Objective	Assessment
To provide suitable areas for those industries that need to be separated from other land uses.	The LTTSF site is located to the south of the existing Tarro township, and west of Hexham, in an area identified as appropriate for industrial uses. The proposed turning angle is additional infrastructure in an established rail servicing facility and as such is appropriately located for its intended use.

Objective	Assessment
To encourage employment opportunities.	The existing LTTSF provides employment for the area, however the modification is not anticipated to create new jobs outside of the construction period.
To minimise any adverse effect of heavy industry on other land uses.	The site is located adjacent to the existing railway corridor, with the proposed turning angle situated within the bounds of the existing LTTSF, approved as SSI.
To support and protect industrial land for industrial uses.	The site will remain as an industrial use, being the LTTSF, for the foreseeable future as Aurizon anticipate the long-term viability of the site will remain to service the existing rail freight industry in the Newcastle and Hunter regions.

4.2.6 Legislation which is not applicable

Under Section 5.23 of the EP&A Act, the approvals generally obtained through the following legislation do not apply to SSI:

- Controlled Activity Approvals under the *Water Management Act 2000*;
- *Fisheries Management Act 1994*;
- *Heritage Act 1977*;
- *National Parks and Wildlife Act 1974*; and
- *Rural Fires Act 1997*.

Approvals under these pieces of legislation would not have been required in any case.

Aquifer Interference Approvals under the *Water Management Act 2000* still apply to SSI where relevant, however excavations required for the new turning angle infrastructure are not intended to intersect groundwater and so an Aquifer Interference Approval is not expected to be required.

5.0 Consultation

5.1 Initial SSI Consultation

The original SSI application involved a detailed consultation process with key stakeholders, both public agencies and private landowners including adjacent neighbours.

Key public agencies involved in the consultation process include:

- Department of Planning and Environment;
- Office of Environment and Heritage;
- Department of Primary Industries: Water;
- Department of Primary Industries: Fisheries;
- RailCorp;
- Catchment Management Authority – Hunter Central Rivers
- Hunter Development Corporation;
- Roads and Maritime Services;
- Australian Rail and Track Corporation (ARTC); and
- Newcastle City Council.

Previous consultation efforts include briefings to key stakeholders, newsletters, a telephone information line and email contact address, media advertising and one-on-one meetings.

Throughout the original SSI application, a range of key issues were raised by stakeholders and addressed as part of the Preferred Project Report and Response to Submissions of June 2013. The key issues included:

- Flood management;
- Stormwater discharge;
- Ecology;
- Traffic management;
- Noise and air;
- Visual impact; and
- Contamination.

These matters were addressed as part of the original SSI approval process. In particular Condition C16 of the SSI Approval identified flood management measures to be undertaken which have been implemented.

Since this time, ongoing engagement with key neighbouring landowners has been a priority of Aurizon to ensure concerns are addressed promptly. Key landowner concerns since the project has been constructed include flooding, landscaping, security and the consultation and issues resolution process.

5.2 SSI Modification Consultation

The intended engagement approach for the turning angle modification involves consultation with identified adjacent landowners and key stakeholders to address any concerns as early as possible. This approach is based on:

- The low to no impact from the turning angle modification on identified community and adjacent landholders.

- Recognition that any issues raised in relation to the turning angle modification are expected to be of a legacy nature and should be managed separately to the assessment of the turning angle modification. Existing stakeholder consultation procedures are in place for managing legacy issues.
- The fact that previous issues from the construction of the LTTSF and the relevant consent conditions relating to community and landholders' concerns have all been resolved and should not be re-visited as part of the turning angle modification.
- Consideration of any concerns by adjacent landholders with the operations of the LTTSF and ongoing actions being taken to address these as separate operational matters. Existing stakeholder consultation procedures are in place for managing ongoing operational issues.

5.2.1 Adjacent landowners

Aurizon regularly consults with key neighbours directly adjacent to the LTTSF and provide frequent updates on locomotive movements and general maintenance activities. Key items of concern for adjacent landowners generally relates to stormwater impacts, noise and dust, all which are managed through Aurizon's regular consultation program. All adjacent neighbours were approached for this modification to discuss the proposal. No significant issues were raised during this process.

Consultation was undertaken with key adjacent private landholders on the 18 December 2018 and 6 March 2019.

The consultation in December was undertaken post completion and submission of the Preliminary Environmental Assessment and prior to the issuing of the project's SEARs.

The purpose of the consultation was to notify the landholders of the proposed project and to gauge potential concerns to allow these to be addressed in the Environmental Assessment Report. Key concerns related to the impact of the proposed turning angle on flooding, generation of noise during construction and traffic volumes.

Consultation completed in March occurred upon the completion of the turning angle flood and noise assessment and confirmation of project related traffic movements. The findings of the assessments (including a copy of the flood assessment) were detailed at these meetings. No objections were raised to the findings of the reports.

The landholders were notified that the modification application was submitted to the DP&E on the 2 April 2019 as requested by both landholders.

5.2.2 Public agencies

As part of this consultation process a number of agencies have been approached for commentary as per **Table 2**.

Table 3 Detailed Environmental Assessment Report Consultation

Agency	Nature of Engagement	Response	Engagement Date	Response Date
Department of Planning and Environment	Meeting at DP&E offices relating to the preliminary environmental assessment prior to submission.	N/A	17/10/2018	N/A
Department of Planning and Environment	Response to Draft SEARs	N/A	30/11/2018	N/A
DPI Fisheries	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	No further requirements to add to SEARs or the assessment process.	19/02/2019	20/02/2019
Natural Resource Access Regulator	Request contact to undertake consultation relating to issued SEARs	Automated response received (CSP627105) saying enquiry had been logged. No follow up received.	19/02/2019	No response

Agency	Nature of Engagement	Response	Engagement Date	Response Date
NSW Environmental Protection Agency	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	Contact for consultation provided. Consultation correspondence issued but no response received.	19/02/2019	No response
Hunter Development Corporation	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	No response received	19/02/2019	No response
Local Land Services	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	Automated response received saying enquiry had been logged. No follow up received.	19/02/2019	No response
Newcastle City Council	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	Receipt of correspondence has been confirmed.	19/02/2019	11/03/2019
Office of Environment and Heritage - Heritage Division	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	Heritage Division was not engaged during development of the SEARs. No comment on current SEARs or Environmental Assessment, other than to confirm the Environmental Assessment is considering heritage.	19/02/2019	27/02/2019
Office of Environment and Heritage - Conservation and Regional Delivery Division	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	Copy of SEARs provided.	19/02/2019	19/02/2019
Roads and Maritime Services	Request feedback on issued SEARs and the project to ensure all issues are addressed in the Environmental Assessment.	RMS response provided.	19/02/2019	4/03/2019

Responses to additional comments received during this process are provided throughout this report and addressed below where required.

5.2.3 Roads and Maritime Services

Additional comments were received from RMS on 4 March 2019 and are addressed below.

Table 4 Roads and Maritime Services Additional Comments

Requirement	Location in Environmental Assessment or Comment
Roads and Maritime are currently developing a concept design for the proposed M1 Pacific Motorway extension to Raymond Terrace. The investigations to date indicate that if the proposal proceeds, it may affect the Aurizon access road which connects directly to the existing Tarro Interchange. At this time the project has not been approved or secured construction funding. For further information, it is recommended to contact Project Development Manager, Brad Parkes via email at.	Noted. It is considered that due to timeframes associated with the road extension to the M1 this will not impact the delivery of the turning angle on the LTTSF site.
It is recommended that the Operational Traffic Management Plan be updated to reflect the recent changes at the Weakleys Drive intersection.	The OTMP will be amended accordingly.
It is noted that Aurizon have raised their own safety concerns with accessing the site via the Tarro Interchange. It is recommended that Aurizon assess and address any safety concerns with this access.	Noted. This is a matter for consideration outside of this SSI modification.

Requirement	Location in Environmental Assessment or Comment
The property has a common boundary with the New England Highway (HW9) which has been declared as Controlled Access Road by notification in Government Gazette No 33 of 14/03/2008 Folio 2274. Direct access across this boundary is restricted.	Noted. Access is provided by the existing access road.

5.2.4 Office of Environment and Heritage

Further comments were received from OEH on 27 November 2018 as provided to the DPE during the request for SEARs. These are outlined below to indicate where these matters are addressed in this assessment or addressed directly below if required.

Table 5 Office of Environment and Heritage Additional Comments

Requirement	Location in Environmental Assessment or Comment
Biodiversity	
1. Biodiversity impacts related to the proposed development (MP07_0117 MOD 1) are to be assessed in accordance with the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method.	The DPE have confirmed that a BDAR is not required if justification is provided which confirms the works do not increase the impacts on biodiversity values. Refer to Section 6.4 and Appendix G .
2. The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.	
3. The BDAR must include details of the measures proposed to address the offset obligation as follows; <ul style="list-style-type: none"> The total number and classes of biodiversity credits required to be retired for the development/project; The number and classes of like-for-like biodiversity credits proposed to be retired; The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; Any proposal to fund a biodiversity conservation action; Any proposal to conduct ecological rehabilitation (if a mining project); Any proposal to make a payment to the Biodiversity Conservation Fund. <p>If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.</p>	
4. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.	
Aboriginal cultural heritage	
5. The Environmental Impact Assessment (EIS) must identify and describe the Aboriginal cultural heritage values that exist across the whole area that will be affected by the development and document these in the Aboriginal Cultural Heritage Assessment Report (ACHAR). This may include the need for surface survey and test excavation. The identification of cultural heritage values should be guided by the Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW (DECCW, 2011) and consultation with OEH regional branch officers.	A Heritage Assessment has been completed. Refer to Section 6.8 and Appendix I .
6. Consultation with Aboriginal people must be undertaken and documented in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010 (DECCW). The significance of cultural heritage values for Aboriginal people who have a cultural association with the land must be documented in the ACHAR.	
7. Impacts on Aboriginal cultural heritage values are to be assessed and documented in the ACHAR. The ACHAR must demonstrate attempts to avoid impact upon cultural heritage values and identify any conservation outcomes. Where impacts are unavoidable, the ACHAR must outline measures proposed to mitigate impacts. Any objects recorded as part of the assessment must be documented and notified to OEH.	

Requirement	Location in Environmental Assessment or Comment
Historic heritage	
<p>The EIS must provide a heritage assessment including but not limited to an assessment of impacts to State and local heritage including conservation areas, natural heritage areas, places of Aboriginal heritage value, buildings, works, relics, gardens, landscapes, views, trees should be assessed. Where impacts to State or locally significant heritage items are identified, the assessment shall:</p> <ul style="list-style-type: none"> • outline the proposed mitigation and management measures (including measures to avoid significant impacts and an evaluation of the effectiveness of the mitigation measures) generally consistent with the NSW Heritage Manual (1996), • be undertaken by a suitably qualified heritage consultant(s) (note: where archaeological excavations are proposed the relevant consultant must meet the NSW Heritage Council's Excavation Director criteria), • include a statement of heritage impact for all heritage items (including significance assessment), • consider impacts including, but not limited to, vibration, demolition, archaeological disturbance, altered historical arrangements and access, landscape and vistas, and architectural noise treatment (as relevant), and • where potential archaeological impacts have been identified develop an appropriate archaeological assessment methodology, including research design, to guide physical archaeological test excavations (terrestrial and maritime as relevant) and include the results of these test excavations. 	<p>No State and local heritage items are situated within the footprint of the proposed works.</p>
Water and soils	
<p>The EIS must map the following features relevant to water and soils including:</p> <ul style="list-style-type: none"> • Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map). • Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method). • Wetlands as described in s4.2 of the Biodiversity Assessment Method. • Groundwater. • Groundwater dependent ecosystems. • Proposed intake and discharge locations. 	<p>Refer to Section 6.2 and 6.5.</p>
<p>The EIS must describe background conditions for any water resource likely to be affected by the development, including:</p> <ul style="list-style-type: none"> • Existing surface and groundwater. • Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. • Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters. • Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government. 	<p>Refer to Section 6.3 and 6.4.</p>
<p>The EIS must assess the impacts of the development on water quality, including:</p> <ul style="list-style-type: none"> • The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction. • Identification of proposed monitoring of water quality. 	
<p>The EIS must assess the impact of the development on hydrology, including:</p> <ul style="list-style-type: none"> • Water balance including quantity, quality and source. • Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas. • Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems. 	

Requirement	Location in Environmental Assessment or Comment
<ul style="list-style-type: none"> Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches). Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options. Identification of proposed monitoring of hydrological attributes. 	
Flooding and coastal erosion	
<p>The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:</p> <ul style="list-style-type: none"> Flood prone land. Flood planning area, the area below the flood planning level. Hydraulic categorisation (floodways and flood storage areas). 	<p>Refer to Section 6.3. It must be noted the proposed turning angle is minor in terms of its impact.</p>
<p>The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.</p>	
<p>The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios:</p> <ul style="list-style-type: none"> Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500 year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change. 	
<p>Modelling in the EIS must consider and document:</p> <ul style="list-style-type: none"> The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories. Relevant provisions of the NSW Floodplain Development Manual 2005. 	
<p>17. The EIS must assess the impacts on the proposed development on flood behaviour, including:</p> <ul style="list-style-type: none"> Whether there will be detrimental increases in the potential flood affection of other properties, assets and infrastructure. Consistency with Council floodplain risk management plans. Compatibility with the flood hazard of the land. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council. Emergency management, evacuation and access, and contingency measures for the development considering the full range of flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES. Any impacts the development may have on the social and economic costs to the community as consequence of flooding. 	

6.0 Environmental Assessment

This section of the report assesses and responds to the environmental impacts of the proposed SSI modification. It addresses the matters for consideration set out in the SEARs issued on 19 December 2018 for the modification. The mitigation measures at **Section 7.0** complement the findings of this section.

As part of the assessment of the original application the DP&E considered the following key issues: hydrology and flooding, groundwater, contamination, ecology, noise and vibration, traffic and access and heritage.

Condition F2 of the SSI consent required the preparation of an Operational Environmental Management Plan (which has been subsequently approved by the Department), which will continue to apply across the site and manage environmental impacts associated from the operation of the development inclusive of the turning angle.

6.1 Scope of Environmental Assessment

An assessment has been carried out to compare the environmental impact of the proposed changes to the project (as described in **Section 3.0**) relative to the environmental impact of the approved project. Where appropriate, the assessment is supported by technical reports assessing the minor changes.

Table 5 provides a summary of the environmental assessment of the proposed changes.

Table 6 Environmental Assessment of the proposed modification

Environmental Issue	Anticipated change in impact
Stormwater and Water Quality	There are minor changes anticipated to stormwater across the proposal footprint based on changes to stormwater catchments. See Section 6.2 and Appendix E .
Flooding	There are no significant changes expected to flooding impacts as outlined in Section 6.3 below and Appendix D .
Biodiversity	No additional impacts outside those previously assessed as part of the original EIS are anticipated, with no increased impact to the biodiversity values outlined by the BC Act, and as such, a waiver is sought in relation to the preparation of a BDAR. Refer to Section 6.4 and Appendix G .
Contamination and Soils	No impacts on contamination or soils, including groundwater, is anticipated as excavation is minimal. The existing Unexpected Finds Protocol will continue to apply. Refer to Section 6.5 and Appendix F .
Transport and Traffic	The additional impact from traffic and transport associated with the proposed construction works are anticipated to be negligible due to the low number of vehicle movements each weekday to and from the site as outlined in Section 6.6 .
Noise and Vibration	Noise and vibration impacts are expected to be negligible given the separation of the proposed works from the nearest sensitive receivers. See Section 6.7 and Appendix K .
Air Quality	Site construction works may result in localised air quality impacts associated with dust however, these impacts are highly unlikely to exceed those assessed as part of the original EAR and PPR. The Construction Environmental Management Plan (CEMP) manages impacts on air quality. No further assessment necessary.
Aboriginal Heritage	The marginal additional project footprint of the current revised design has been assessed as part of an Aboriginal Heritage Assessment Due Diligence completed, which did not identify any Aboriginal items or artefacts on the site. The proposed changes would not result in any additional impact on Aboriginal heritage. No items of non-Aboriginal heritage are present on the site. No further assessment necessary. Refer to Section 6.8 and Appendix I for further details.
Infrastructure	No utilities or services infrastructure will be affected by the proposed works. New lighting proposed for the access roads can be accommodated within the existing utility network. No further assessment necessary.
Hazards and Risks	No changes to the volume or storage arrangements for other dangerous goods are expected, including diesel stored within the Bulk Fuel Storage Facility. No further assessment necessary.
Climate Change Risk	The proposed works are not expected to have any impacts outside those originally considered in the Preferred Project Report in terms of climate change. Refer to Section 6.9 .

Environmental Issue	Anticipated change in impact
Protected and Sensitive Lands	The works do not impact on the biophysical, hydrological or ecological integrity of the adjacent coastal wetland. Additionally, the works do not impact on land identified as estuarine or key fish habitat. Refer to Section 6.10 .
Waste Management	Construction activities would be carried out as detailed in the Construction Waste Management Plan (CWMP) and CEMP to minimise the potential for exposure to contaminated soils. Potential wastes from the turning angle construction would include scrap metal, used lubricating oil, engine oil, machinery parts and timber/wood framing. Refer to Section 6.11 .

As indicated in **Table 5**, the proposed changes to the project are unlikely to substantially change the approved project's overall impact on the following factors:

- Air quality;
- Infrastructure; and
- Hazards and risks.

For this reason, a detailed assessment of the above impacts has not been undertaken, with the project's overall impact on these factors remaining consistent with those described in the PPR. Other matters outlined in the SEARs for further assessment are addressed below.

6.2 Stormwater, Water Quality and Groundwater

The proposed turning angle (and associated access roads) will comprise of a permeable track and access road formation. All surface water runoff will report to Basin 3 by drainage swales constructed along the base of the rail embankment.

6.2.1 Existing Environment

The existing LTTSF site is situated adjacent to the Hexham Swamp and comprises generally flat topography with a natural ground surface ranging between 0m AHD and 2m AHD. Manmade features such as drainage channels, tracks and the historical coal preparation plant and coal reject stockpile located north of the site sit above these levels, with the highest point at 16m AHD.

The slopes of the site are generally less than 1% and the terrain of the low-lying areas do not form defined watersheds.

As part of the SSI approval, there were 35 groundwater monitoring wells sampled which identified:

- Substantial mounding of groundwater in the coal washery reject area with groundwater flows moving from the centre of this area towards the south; and
- A hydraulic divide running approximately north-south with groundwater levels in the range of RL2.0 to RL1.0, with flow primarily to the east and west on the respective parts of the site.

The site is identified as having shallow groundwater levels, including in the area affect by the proposed turning angle. Groundwater has been encountered at depths between 1.5m and 3.5m below ground level.

Stormwater Management

The Stormwater Management Plan (SWMP, prepared by Worley Parsons 2014) prepared as part of the SSI approval identifies the hydrodynamics of the site as being highly altered by historical uses, including coal stockpiling, infilling of wetlands, construction of tailings ponds and drainage swales, and irrigation of waste water effluent. The SWMP proposes the following stormwater management strategy:

- Prevention: minimising the area of development footprint and the provision of best practice arrangements for dispensing of fuel and other provisions to locomotives and on-site vehicles;
- Isolation: isolate potential activities generating contamination from the greater stormwater system;

- Treatment: runoff would be treated or controlled by a series of stormwater management devices prior to discharge;
- Contingencies: provide appropriate measures to isolate an area for clean up; and
- Monitoring: conduct a comprehensive surface water and ground water monitoring plan.

Stormwater controls currently in operation on the site (and subject to management under the Operational SWMP that forms part of the approved Operational Environmental Management Plan (OEMP)) include track areas draining to pipes, and falling to the west of the site, with culverts spaced at approximately 100m centres. Stormwater pits are also located between each set of rail lines within roadways, with gross pollutant control units within collection pits located at the outfall for Basins 1 to 3.

The location of the proposed turning circle is situated within two stormwater catchments – Catchment 6-1 and Catchment 6-2, identified as being within Catchment Area 6. The outlet for this catchment area is the same as for Basin 3, being discharge outlet 5. Catchment 6-1 outlets to Hexham Swamp and Catchment 6-2 drains to the existing cess drain that runs through the catchment.

In terms of low flow events for existing conditions the Catchment Area 6 has a total area of 37.5ha with an existing impervious area of 8.02ha (21.4%). Peak flow event analysis under existing conditions result in Catchment Area 6 having an area of 25.3ha with an impervious area of 2.06 (7%).

The southern portion of the site (the old rail loop and adjacent areas to the west) drain to a vegetated low point that is typically full of water during normal conditions. Surface water runoff from non-infrastructure areas within this catchment (6.1) discharges offsite to the south.

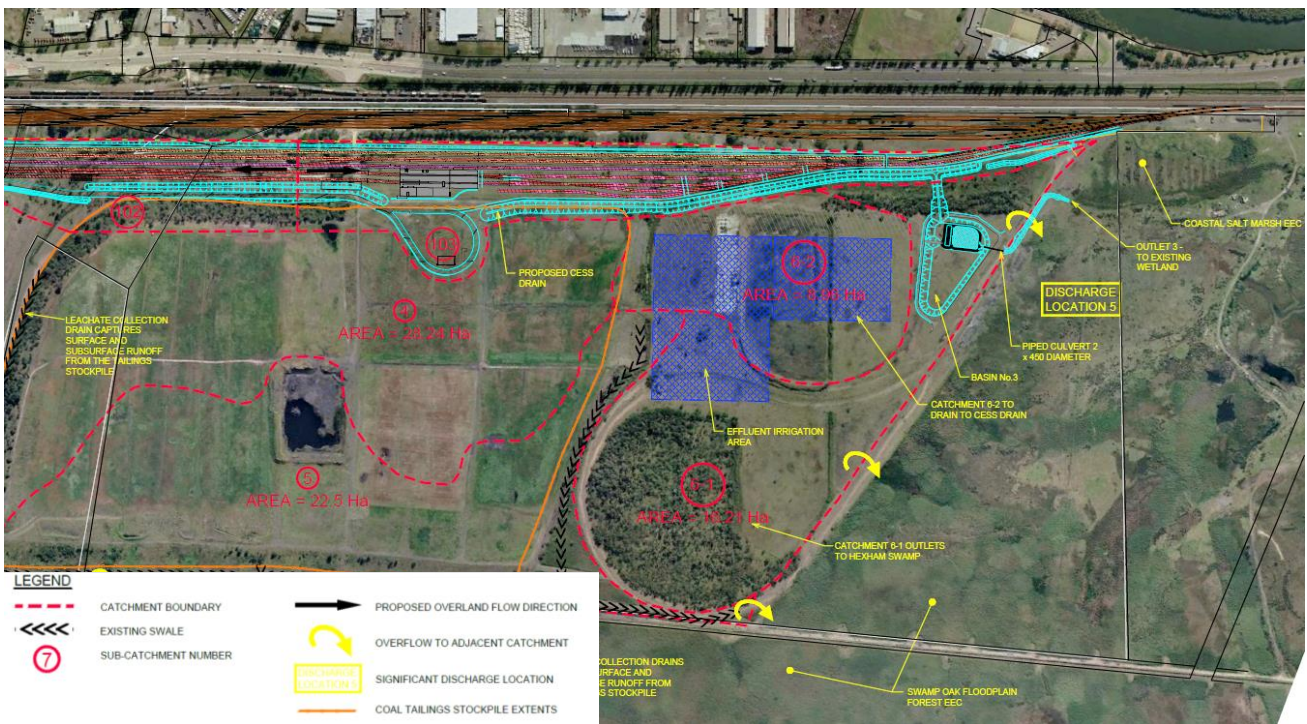


Figure 8 Operational Stormwater Management Plan catchment areas

Source: Worley Parsons

Stormwater Basins

Surface water runoff from the operational area flows to the onsite Basin 01, Basin 02 and Basin 03 via an existing drainage line along the western boundary of the LTTSF infrastructure operational area. Water within the basins is retained allowing settlement of suspended particulates and bioremediation through floating wetlands.

Areas outside the operational area drain to the Hexham Swamp via culverts around the boundary of the site. The site of the proposal is currently outside the existing operational areas and drains via two drains towards the west.

The site of proposed turning angle is adjacent to the Basin 03. Stormwater flows to Basin 03 along a stormwater drain from the north and overflows via two 450mm diameter culverts at the south east corner of the LTTSF site (discharge outlet 5), which crosses Maitland Road via an existing culvert before entering the Hunter River some 330m east of the site (via the South Channel Hunter River). Channel 02, which feeds into Basin 3 has a predicted peak flood level for the 1% AEP flood event equal to 1.94m AHD. A weir located at the Basin 3 outlet headwall has a level of 1.6m AHD – the basin has been designed to operate between 1.0m AHD and 1.86m AHD. Basin 3 has a total surface area of 6,560m².

The proposal will redirect the catchment area that is currently outside the operational area of the LTTSF site to the existing water management system that flows to Basin 03. Basin 03 has the following parameters as outlined in **Table 6**.

Table 7 Basin 03 design parameters (MUSIC modelling)

Basin	Pond Surface Area (m ²)	Pond Permanent Volume (m ³)	Water Extended Detention Depth (m)
Basin 3	6400	240	0.30

Source: GHD

Water Quality

An operational surface and groundwater quality monitoring program has been undertaken at the LTTSF site since 2015. The program includes surface water monitoring location 5 (SW5). SW5 is located at the outlet of Basin 03. SW5 is monitored when flow is present and has been sampled for laboratory analysis approximately 20 times over an approximately three-year period.

The appropriate water quality objectives for the proposal are protection of aquatic ecosystems and visual amenity. Site specific trigger values (in the form of discharge criteria) have been established for the site for the relevant indicators relating to these objectives.

SW5 surface water quality trigger values utilised for this assessment have been adopted from the approved Discharge Criteria B performance criteria included in the Operational Surface and Groundwater Management Plan. These criteria were approved by the Department as part of the SSI approval and conditioning process.

The Discharge Criteria B performance criteria were established using the *ANZECC Guidelines and Water Quality Objectives in NSW* (NSW WQO) as utilised in this assessment and historically for the LTTSF project. The NSW WQO provides guidance on applying appropriate trigger values from ANZG (2018) (formerly ANZECC 2000), including 'tailoring' trigger values to local conditions.

This guideline was considered in this assessment, by informing the site-specific trigger values (in the form of discharge criteria) established for the site, as described in the approved Operational Surface and Groundwater Management Plan. Therefore, the adopted criteria are consistent with the NSW WQOs.

The City of Newcastle (CN) Development Control Plan 2012 (CN 2012) outlines pollution reduction criteria for water quality (**Table 8**), with these pollution reduction criteria used to inform the discharge criteria outlined in **Table 9**.

Table 8 Pollution reduction criteria

Parameter	Units	Reduction target
Total Suspended Solids (TSS)	kg/year	85%
Total Phosphorus (TP)	kg/year	65%
Total Nitrogen (TN)	kg/year	45%

Parameter	Units	Reduction target
Gross pollutants	kg/year	90%

Source: GHD

Table 9 Discharge criteria

Parameter	Units	Discharge criteria (Category B, Hexham Nature Reserve)
Total Nitrogen (TN)	mg/L	4
Total Phosphorus (TP)	mg/L	7.9
Total Suspended Solids (TSS)	mg/L	40

Source: GHD

A recent review of surface monitoring results identified that turbidity (2 samples), iron (all 5 samples), nickel (all 5 samples) and zinc (1 sample) exceeded the relevant trigger value for SW5 during 2018. Observed exceedances of approved trigger values are consistent with historical data trends which pre-date construction of the LTTSF. Exceedances are attributable to surface and groundwater interaction with the underlying coal washery reject fill material. In-situ fill material is associated with the sites former use as a coal handling facility.

All water reporting to Basin 03 is detained to settle out suspended sediment with nutrients reduced by the presence of floating wetlands.

6.2.2 Potential Impacts

The potential impacts of the proposal relate to the changes in catchments surrounding the site and an increase in impervious catchment area. Stormwater from the area of the turning angle will be redirected from outside the existing operation area of the LTTSF (that currently drains to the Hexham Swamp in the west) to Basin 03 and SW5. The catchments relating to the turning angle are shown in **Figure 9** below.

Sub-catchment 1 drains to the existing north-south drainage channel and ultimately into Basin 03, sub-catchment 2 drains to sub-catchment 3, and sub-catchment 3 drains directly into Basin 03.

During construction, earthworks and other construction activities have the potential to disrupt flow paths and increase the concentration of suspended sediments in stormwater due to erosion. The risk of impact from suspended sediment in response to erosion are deemed to be minor due to the sites pre-existing stormwater management infrastructure and the sites flat gradient resulting in reduced flow velocities.

Impacts from erosion will be mitigated through a range of mitigation measures outlined in **Section 6.2.3**.

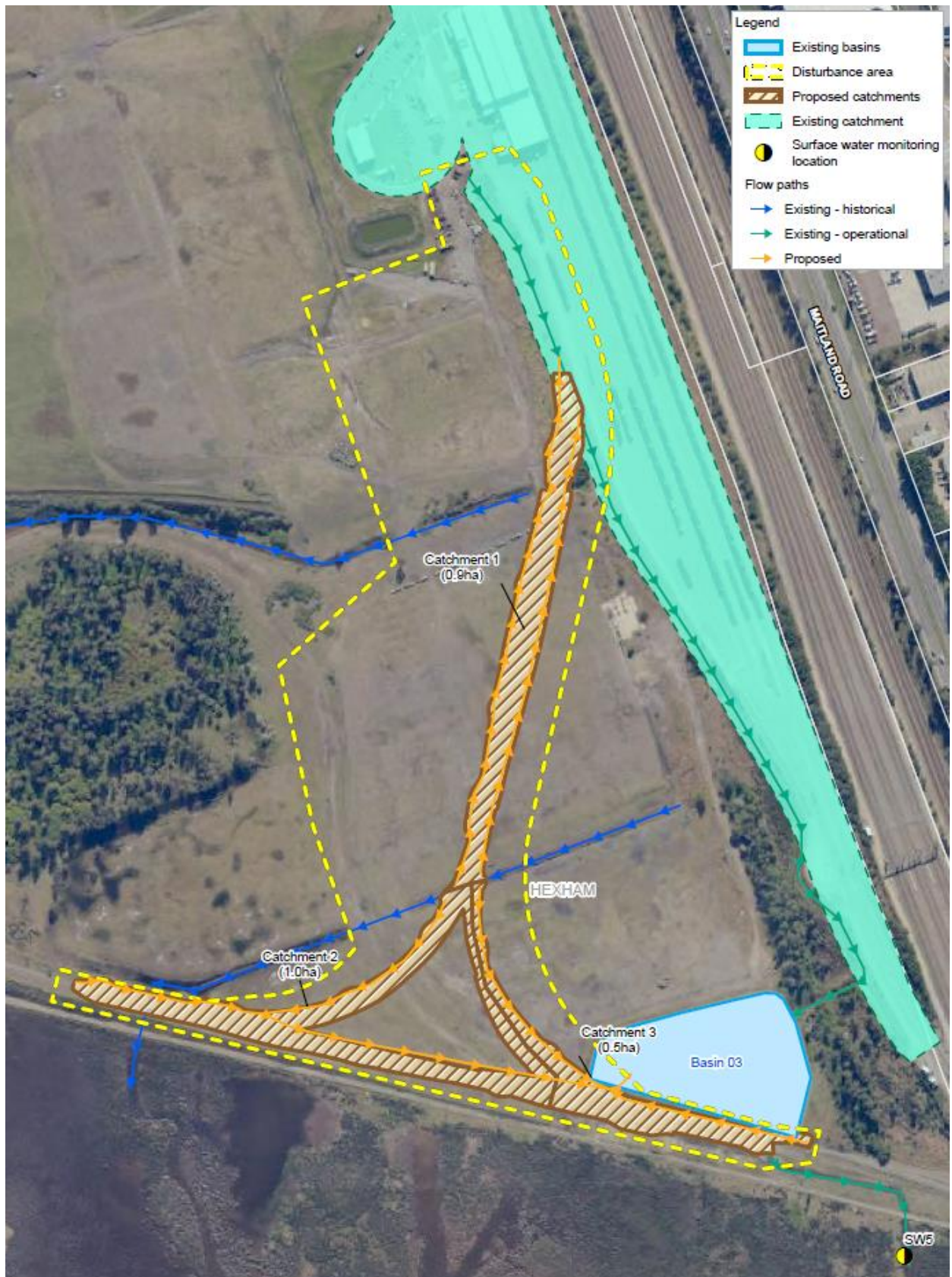


Figure 9 Turning angle stormwater catchments

Source: GHD

Stormwater Quantity

The assessment criteria for stormwater quantity have been based on the SSI approval, consistent with the previously prepared SWMP:

- Runoff volumes are maintained, as far as practicable, to pre-construction levels;
- Site stormwater is directed to stormwater detention basins for treatment; and
- The stormwater system shall be capable of treating at least a 1% AEP stormwater event.

The drainage design proposes to direct all stormwater from the turning angle toward Basin 03, instead of to the western outlet per the current situation. There will be minor increases in total impervious footprints within Catchment Area 6 due to the proposed turning angle and access track works, resulting in increased stormwater runoff volumes to be managed by the on-site stormwater system. These impacts will be mitigated through the attenuation of Basin 03 and also the use of the 'triangle' of the turning angle which will function as a pseudo-basin. The impact on peak flows is summarised in **Table 8**. The design of the site is based upon the design outcomes of the LTTSF and will result in the design for Channel 02 and Basin 03 remaining unaltered from that which exists.

Table 10 Impact on peak flows from Basin 03 outlet

Design frequency	Peak flow from Basin 03 outlet (m ³ /s)			
	Pre-development	Existing	Proposed mitigation - without	Proposed
12 exceedances per year (EY)	0.30	0.14	0.21	0.15
6EY	0.32	0.15	0.21	0.17
4EY	0.34	0.16	0.24	0.19
3EY	0.36	0.18	0.25	0.21
2EY	0.38	0.20	0.28	0.23
1EY	0.44	0.24	0.34	0.28
50% AEP	0.48	0.26	0.38	0.33
20% AEP	0.65	0.41	0.59	0.54
10% AEP	0.75	0.52	0.76	0.71
5% AEP	0.90	0.58	0.88	0.82
2% AEP	1.05	0.83	1.18	1.03
1% AEP	1.21	0.95	1.36	1.18

Source: GHD

The proposal is expected to result in higher peak flows from the Basin 03 outlet to Hexham Swamp when compared to existing conditions due to the increase in impervious catchment area that is directed to the basin. This increase is generally mitigated (especially for rarer stormwater event) by the proposed mitigation measure of routing the runoff of sub-catchment 2 through the 'triangle' of the turning angle, which acts as an additional attenuation basin.

As seen in **Table 8** the peak flow for the 1% AEP design flood is still within the hydraulic capacity of the existing Basin 03 (being 240m³) and no further excavation to increase the capacity or area of Basin 03 is required or proposed. As such, the existing stormwater management system is expected to provide similar levels of treatment under the proposed turning angle conditions, with the impacts considered to be minor overall.

The Operational SWMP will be updated to document the changes to the operational catchments.

The majority of groundwater and surface water interaction with Hexham Swamp and other groundwater dependent ecosystems on the western parts of the site occurs well away from the proposed LTTSF development area. There are no proposed changes to the hydrogeology on this side of the site as part of the turning angle works and therefore impacts to groundwater levels on the western parts of the site are expected to be insignificant. No impacts to

groundwater are expected as all earthworks are proposed above the existing groundwater table with no excavation in excess of 1.5m in depth.

Stormwater Quality

MUSIC modelling was undertaken to assess the impact of the proposal on stormwater quality. This model utilised an impervious fraction of 90% to account for the capture of stormwater runoff in the subsoil system which would require treatment, notwithstanding the majority of the site is earth allowing infiltration.

The MUSIC modelling indicates that the existing stormwater system is expected to continue to achieve the relevant water quality reduction criteria as outlined in **Table 7** except for discharge of total nitrogen. The modelling does however indicate that the proposal is expected to result in an increase in nutrient concentrations at the outlet of Basin 03 however these are still well below the discharge criteria of Category B (**Table 11**) as currently applying to the site (including total nitrogen). This is as a result of the increase in undisturbed catchment reporting to Basin 03. As such, impacts to stormwater quality as a result of the proposed turning angle are expected to be minor.

Table 11 Treatment train effectiveness

Parameter	Annual load	Reduction	Criteria
Flow (ML/yr)	258	6.9%	NA
Total Suspended Solids (kg/yr)	52 900	82.1%	80%
Total Phosphorus (kg/yr)	107	74.2%	74%
Total Nitrogen (kg/yr)	743	68.6%	69%
Gross Pollutants (kg/yr)	6 770	99.6%	99.5%

Source: GHD

Table 12 Median nutrient concentrations at Basin 03 outlet

Parameter	Units	Category B Discharge Criteria	Existing	Proposed
Total Suspended Solids (TSS)	mg/L	40	1.21	1.48
Total Phosphorus (TP)	mg/L	1.9	0.028	0.031
Total Nitrogen (TN)	mg/L	4	0.108	0.170

Source: GHD

The design of the existing and proposed water quality protection measures has been found to adequately convey the 1% AEP design flood event.

6.2.3 Mitigation measures

The proposed turning angle and associated vehicle access roads will add additional operational areas requiring an updated SWMP (as per Condition C9) prepared to demonstrate that appropriate performance standards (in terms of stormwater flow rates, volumes and water quality parameters) are achieved and considering the new catchment areas.

The existing surface and groundwater monitoring program (the Program), as detailed in the Operational Surface and Groundwater Management Plan, consists of surface and groundwater monitoring points along the perimeter of the site boundary inclusive of internal site Retention Basins 1 - 3.

The Program has been designed to ensure potential surface water runoff and groundwater migration to offsite receivers can be monitored and assessed against approved performance criteria.

The proposed turning angle stormwater management infrastructure directs all surface water runoff from the disturbed area to Basin 3. As the existing monitoring program includes Basin 3 and multiple surface water monitoring points located within the swale drain at the outlet of Basin 3 no additional surface water monitoring locations are proposed.

The existing monitoring program is ongoing with cessation of monitoring requiring DPE approval as per the existing conditions of Approval. Frequency of monitoring is as below:

- Rainfall event >75mm/5 day period;
- Site basins monthly; and
- Surface and groundwater quarterly.

No change to the frequency of monitoring or its duration is proposed.

Proposed mitigation measures are outlined below:

Table 13 Stormwater and Water Quality Mitigation Measures

Environmental aspect	Mitigation measure	Timing	Responsibility
Stormwater quantity and quality	Mitigation measures as detailed in soil assessment (GHD 2019).	Construction	Aurizon
Stormwater quantity and quality	Construct stormwater drainage of the proposal as per the design.	Construction	Aurizon
Stormwater quantity and quality	Maintain the existing stormwater management system as per the existing Operational Stormwater Management Sub-Plan.	Operation	Aurizon
Stormwater quantity and quality	Update the Operational Stormwater Management Sub-Plan for consistency once construction of the proposal is complete.	Operation	Aurizon

Existing conditions of consent and Statements of Commitment will continue to apply to the modification.

Table 14 Existing applicable stormwater management conditions

Condition of Consent or Statement of Commitment	Response
Conditions	
C7. The SSI shall be designed, and employ surface water management techniques, such that runoff volumes, rates and pollutant loads are maintained as far as practicable to pre-construction levels and there are no adverse effects to adjoining lands as a result of runoff;	The turning angle and associated infrastructure has been designed to provide a stormwater management outcome consistent with pre-construction levels.
C8. The SSI shall be designed and constructed to incorporate operational stormwater management measures, including (but not limited to): (a) areas of high sediment, areas of storage and use of oil and grease and areas containing nutrient loads (including the wash bays, provisioning sheds and servicing sheds) shall be separated from the general site stormwater system through the use of separate drainage systems, bunds and hardstands and subject to separate discharge to trade waste or re-use in the wash down bays; (b) where connection to the reticulated sewer system is identified to not be feasible, subject to justification based on further investigations, wastewater from the administration buildings, toilets, showers, lunch rooms, etc. shall be managed through a water treatment plant and be disposed via irrigation into existing agricultural pasture land. (c) site stormwater shall be directed into a drain on the western boundary of the SSI site and directed into one of three stormwater detention basins for treatment of suspended sediments and nutrients through floating wetlands, prior to its offsite discharge. This stormwater system shall be capable of treating at least a 1% AEP stormwater event; and (d) access roads shall be provided with road side swales to provide treatment through flow attenuation and entrainment of suspended sediments.	The proposed modification will be managed consistently with existing management measures outlined in the site-wide Operational Environmental Management Plan. Cess drains are provided either side of the turning angle and access road alignment consistent with Condition C8(d).
C10. Excavation activities near the Hexham Swamp Nature Reserve shall be undertaken in a manner which prevents the drawdown of groundwater within the Nature Reserve to a level which results in desaturation of acid sulfate soils within the Nature Reserve.	The TSF site is characterised by shallow regional groundwater levels

Condition of Consent or Statement of Commitment	Response
	<p>which are responsive to significant rainfall events.</p> <p>All excavation activities for the turning angle will be minimised where practical, with all earthworks planned to a maximum depth of 1.5 meters. All excavations are proposed to occur above the groundwater table.</p>
<p>C11. All drainage structures, including but not limited to pits, pipes, cess drains, sediment basins and detention basins, shall be designed and constructed so as to minimise long term connection with groundwater. The stormwater system components, including but not limited to detention basins and floating wetlands, shall be designed and constructed to ensure that there is no permanent interception of, and/or connection with groundwater.</p>	<p>The proposed cess drains either side of the rail track and access roads will contribute to the removal of water from the track ballast and direct its flow towards Basin 3 and the appropriate management location. They will be designed to avoid long term connection with groundwater.</p>
<p>C19. A Surface Water and Groundwater Monitoring Program shall be prepared and implemented to monitor impacts on surface water and groundwater quality and hydrology. The Program shall be developed in consultation with the EPA, NoW and Hunter-Central Rivers CMA and shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> (a) identification of works and activities during construction of the SSI, including emergencies and spill events, that have the potential to impact on surface and groundwater water quality and groundwater depths and flows; (b) identification of surface and groundwater monitoring locations which are representative of the potential extent of impacts from the construction and operation of the SSI on water quality and groundwater depths and flows (including watercourses, waterbodies, wetlands, drainage swales and licensed discharge points); (c) a description of the parameters (including physico-chemical) and standards against which any changes to water quality will be monitored and assessed, having regard to the principles of the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000</i> (ANZECC, 2000); (d) details of representative background monitoring of surface and groundwater quality parameters and groundwater depths and flows undertaken to date (or required to be undertaken) to establish baseline conditions; (e) identification of 'trigger points' for further investigation or action to be taken; (f) identification of the frequency and methodology of monitoring during background, construction and operation monitoring periods; (g) details on how the results of monitoring would be recorded; (h) details of how interactions with the ARTC Hexham Relief Roads Project and potential cumulative impacts would be monitored and managed; (i) contingency and ameliorative measures in the event that adverse impacts to surface waters and groundwater are identified consequent to the construction and/or operation of the SSI; and (j) methodology for reporting of the monitoring results to the Department and EPA. <p>Monitoring shall be undertaken in accordance with the requirements of the approved Construction Soil and Water Management Plan required under Condition E63 (d) and Operation Environment Management Plan required by condition F2. The Program shall be submitted to the Director-General for approval at least one month prior to the commencement of construction of the SSI, or as otherwise agreed by the Director-General.</p>	<p>The monitoring program has been ongoing since the inception of the LTTSF and will continue to proceed as required.</p>
<p>E39. Changes to hydrogeology, including groundwater depths, interception and connection with surface water, shall be minimised to the greatest extent practicable.</p>	<p>Hydrological changes will be minimised through the detail design and construction phase of the turning angle.</p>
<p>E40. Dewatered groundwater shall not be discharged from the construction site or applied on site unless in accordance with an EPL.</p>	<p>Noted.</p>
<p>E63. As part of the Construction Environment Management Plan for the SSI required under condition E62 of this approval, the Proponent shall prepare and implement the plans listed at (a) to (f) below. Where a plan is required to be prepared in consultation with an authority or stakeholders, the plan shall provide details on the consultation undertaken including any comments received and where these have been addressed in the plan.</p> <p>(d) A Construction Soil and Water Management Plan to manage surface water and groundwater impacts during the construction of the SSI. The Plan shall be developed in</p>	<p>The Construction Soil and Water Management Plan prepared as part of the CEMP will continue to apply to the turning angle works.</p>

Condition of Consent or Statement of Commitment	Response
consultation with the City of Newcastle, NoW and Hunter-Central Rivers CMA...[continues]	
Commitments	
The Stormwater management Plan prepared by Worley Parson's forms part of this project and the management, monitoring and maintenance requirements set out in that plan will be implemented. The Plan will be reviewed and updated as part of the detailed design process.	The Stormwater Management Plan will continue to apply. It contains appropriate management measures to mitigate the impacts of stormwater across the site.
A Construction Water Quality Management Plan will be prepared and implemented as part of the CEMP once the final construction methodology is confirmed. The Plan will identify a range of preventative, treatment and contingency measures for the construction phase of the TSF project including further details regarding appropriate erosion and sediment controls to be implemented at discharge locations and spillways to prevent the discharge of sedimentation during construction. Stormwater management measures for the construction phase will be developed in accordance with the Landcom 'Blue Book' and incorporated in the Construction Environmental Management Plan prior to the commencement of construction.	The CEMP will be updated to accommodate the proposed turning angle works and will include an updated Surface and Groundwater Management Plan.
Gross Pollutant Traps (GPTs) will be utilised to provide primary screening of stormwater. A secondary system of GPTs will be located at the outlet of each Water Quality Control Pond as a final barrier to remove suspended solids, remaining floating debris and hydrocarbons.	Basin 3 uses a GPT at the existing outlet which will continue to operate post-construction of the turning angle.
Access roads will be constructed with road side swales to provide treatment through flow attenuation and sedimentation of suspended sediments.	Cess drains are provided along either side of the turning angle and access roads.
Surface water and groundwater monitoring will be regularly undertaken during the ongoing operation of the TSF to: a) identify any change in water quality; and b) determine the appropriate treatment strategies to be implemented to maintain or improve water quality. The water monitoring program for the TSF project will include monitoring of changes in hydrological regime associate with discharges to catchment 2 (which contains the Swamp Oak Forest EEC) in the northwest and to Catchment 5 (which contains the Coastal Saltmarsh EEC) to the south. Further opportunities will be investigated to manage stormwater flows on the site to assist in creating favourable water flows and levels that support rehabilitated and offset areas of significant ecological value.	Monitoring will continue to be undertaken during operation of the turning angle as per the Surface and Groundwater Management Plan.

6.3 Flooding

The proposed turning angle (and associated access road) will be located on land that is above the 2% AEP flood level and is therefore unaffected by a 2% AEP flood event. A 1% AEP event does introduce partial submergence of the proposed turning angle. It should be noted that in events equal to or larger than a 5% AEP event the entire Hexham Swamp around the site is subject to inundation. The proposed turning angle subject is therefore elevated above most of the surrounding areas, and its partial inundation during a 1% AEP flood event is not expected to substantially alter the existing flood characteristics of such an event.

6.3.1 Existing Environment

Flooding was assessed as part of the approved SSI application, with numerous flood mitigation works implemented as part of the project. A Joint Flood Impact Assessment was prepared for the Hexham Relief Roads and the LTTSF as part of the Preferred Project Report for the SSI Application.

The Joint Flood Impact Assessment identified that the southern part of the site was not a significant contributor to flood behaviour through the site due to its relatively higher elevation compared to the northern part of the site. Further, it is not proposed to elevate the new turning angle substantially above the existing ground level meaning that the existing flood flows through this part of the site won't be changed. The minor increase in height along the southern boundary of the site is therefore not anticipated to impact on the flood levels off-site.

The BMT WBM Detailed Flood Impact Assessment (March 2013) submitted in support of the PPR identifies that the Hexham area is generally flood-free for a 10% Annual Exceedance Probability (AEP) event. In these events the Ironbark Creek floodgates (approximately 2km to the south of the site) and other smaller hydraulic structures manage floodwaters between the Hunter River and Hexham Swamp.

Flood events in the order of a 5% AEP frequency results in a significant increase in volume of floodwaters in Hexham Swamp, with floodwater discharge still confined to Ironbark Creek. The turning angle site (situated atop historic coal tailings fill) is flood free during this event (**Figure 12**). During a 5% AEP event the Hexham Swamp south of the proposed turning angle area has been modelled as having flood levels of -0.02m to 0.02m AHD during such an event, and this is not expected to change because of the proposed turning angle

In flood events between 5% and 1% AEP frequency the overtopping flood volumes from the Hunter River increases in significance. Hexham Swamp, in this scenario, acts as an alternative flood flow path parallel to the Hunter River, with flood waters in Hexham Swamp overtopping the Pacific Highway to the south of Hexham. At a 2% AEP event, with the flood storage of the Swamp being substantially larger than the 5% AEP, results in the southern part of the turning angle site being inundated by backwater.

A 1% AEP event results in the Hexham Swamp floodplain storage being fully drowned (**Figure 14**), with flood levels between the Swamp and Hunter River being generally equal, with the Hunter River and Hexham Swamp floodplains being fully connected. During this event, a flood flow path passes through the footprint of the proposed turning angle, the existing LTTSF, relief roads, and Pacific Highway.

For rarer flood events greater than a 1% AEP frequency, flood behaviours generally remain consistent with that of the 1% AEP.

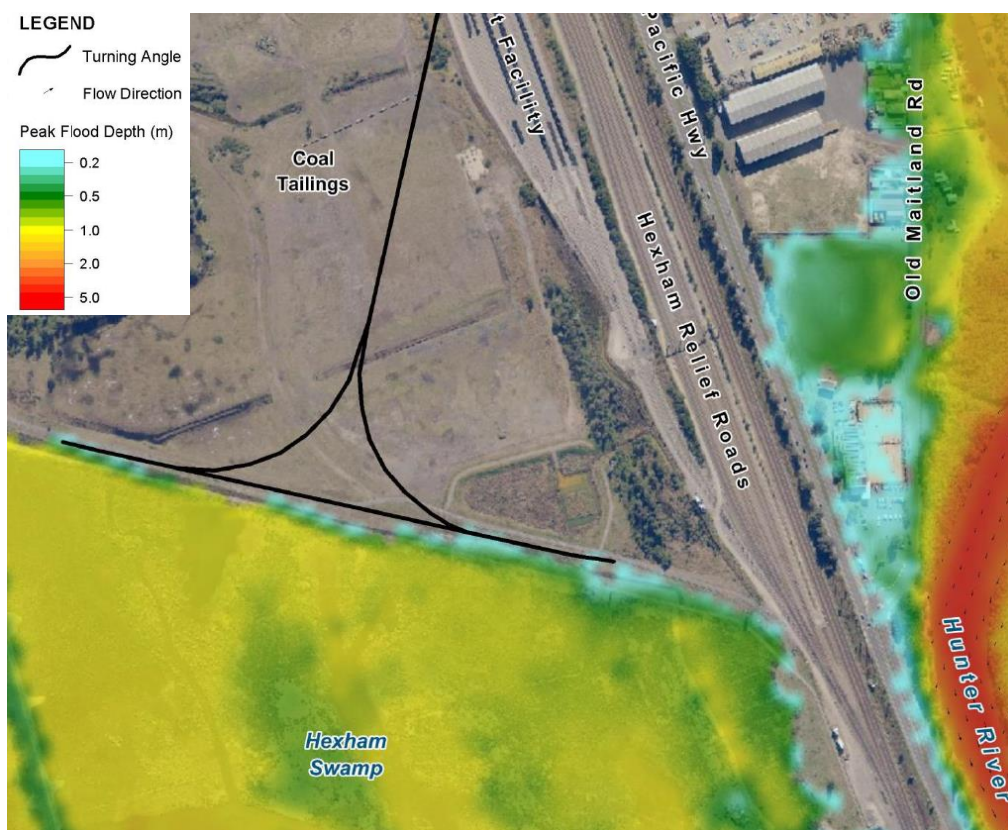


Figure 10 Current 5% AEP flood conditions

Source: BMT

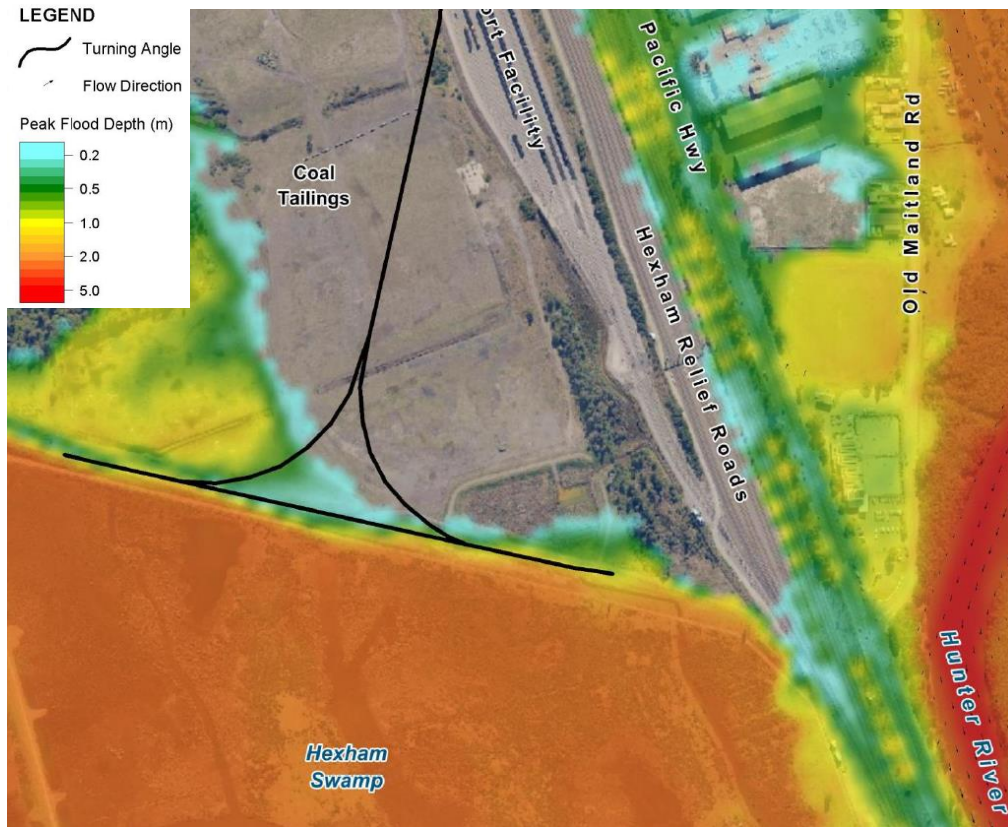


Figure 11 Current 2% AEP flood conditions
Source: BMT

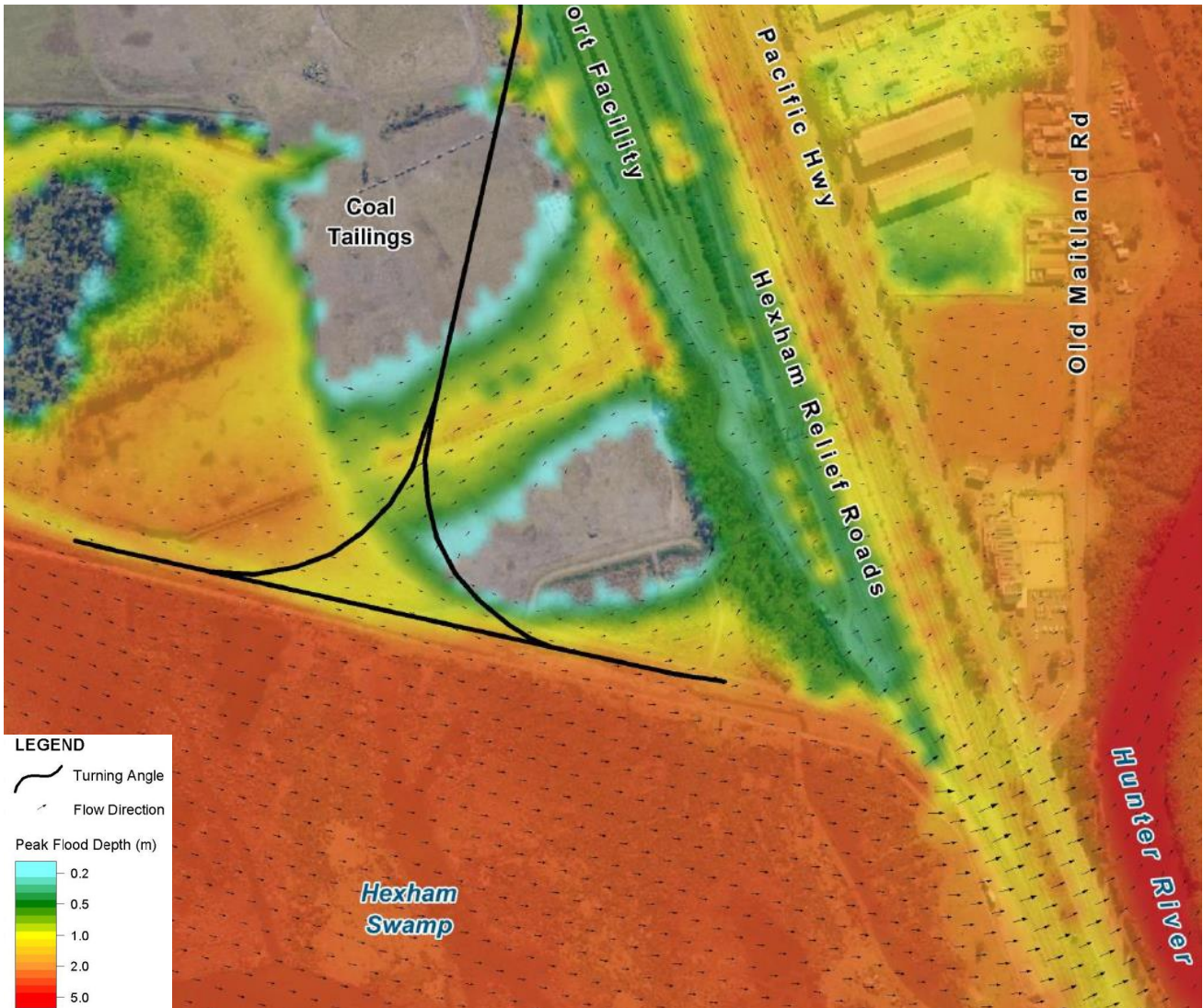


Figure 12 Current 1% AEP flood conditions

Source: BMT

6.3.2 Potential Impacts

An additional flood assessment has been completed by BMT WBM (**Appendix D**) to assess whether the existing flood impact assessment sufficiently addresses the potential impacts from the proposed turning angle.

As outlined above and shown in **Figure 12** the turning angle site is not impacted by a 5% AEP flood event. During a 2% AEP event the southern extent of the proposed turning angle becomes impacted by backwater inundation, however this is less than 1m in depth and is non-convective (**Figure 13**). Additionally, the peak flood level of the 2% AEP is approximately 2.9m AHD in Hexham Swamp, below the proposed level of the turning angle works. Therefore, potential flood impacts are negligible in this scenario as the existing topography already blocks the flood flows.

For a 1% AEP event (and rarer), a flow path is established over the coal tailings on the LTTSF site through the footprint of the proposed turning angle works, with a peak flood level of 3.7m AHD in Hexham Swamp. The turning angle would obstruct the flowpath in the 1% AEP event.

Five box culverts are proposed to manage flow paths (refer to the engineering plans at **Appendix B**), resulting in conveyance of flood waters being limited by their capacity, which results in a minor reduction in flood volumes of the eastern flow path of the turning angle. These flows would be redistributed to the main flow path through Hexham Swamp, resulting in a minor increase in flow in this area.

There are no implications for downstream velocity and scour potential based on the localised redistribution of flood flows, and as such no further scour protection measures are required.

The rearrangement of flow paths due to the turning angle and associated culverts would have a negligible impact on broader flooding due to the substantial flood flows (over 2,700m³/s at the 1% AEP event) that moves through the main flow path in Hexham Swamp, compared to the flow path on-site across the coal tailings (approximately 35m³/s at the 1% AEP event). The redistribution of part of the flow path on-site to the Hexham Swamp flow path would therefore represent an approximate 1% increase along that alignment.

In summary, there is no expected change to flood levels and velocities at other properties, assets and infrastructure at the 2% AEP and rarer events associated with the proposed turning angle works. The proposed modification also does not affect the original SSI approval's consistency with the relevant Council floodplain risk management plans and is consistent with the broader flood hazard compatibility of the original approval, therefore not impacting the existing emergency management arrangements.

6.3.3 Mitigation measures

The SSI Approval includes a number of conditions to manage and mitigate flood impacts from the existing LTTSF development. These include C12 which requires that:

The SSI shall be designed and constructed so that it does not result in flooding impacts greater than those predicted in the documents referred to in condition B1. The cumulative impacts of the SSI and the proposed ARTC Hexham Relief Roads shall be considered in these requirements.

Additionally, Condition F5 requires a Flood Review Report be prepared following each flood event of 1% AEP, 2% AEP, 5% AEP and 10% AEP to assess the actual flood impacts against those outlined in the BMT WBM Detailed Flood Impact Assessment and identify mitigation measures if required.

Furthermore, a Flood Emergency Management Plan has been prepared as per the Statement of Commitments and Condition C15.

Based on the above, it is considered that the existing conditions of approval will ensure that no additional flooding impacts will arise as result of the proposed turning angle.

6.4 Biodiversity

The area to be impacted by the proposed works are within the existing project boundary and within areas highly modified during the Hexham LTTSF construction phase, or land affected by the historical coal handling activities.

6.4.1 Existing Environment

The site is situated within the Watagan to Stockton 'green corridor' identified in the Lower Hunter Regional Strategy, with the Hexham Swamp located to the west and south.

The site, being highly disturbed from historical uses, contains a variety of degraded vegetation communities. Of these, approximately 12ha was impacted as part of the LTTSF construction, with 7.74ha being considered an EEC. Of the impacted communities 1.32ha were identified as *Phragmites australis* and *Typha orientalis* (with the corresponding EEC of Freshwater wetland on coastal floodplain). The remainder of the community will be managed for long term conservation purposes.

There is a small area of vegetation near to the turning angle connection into the main track mapped as Swamp Oak forest (rehabilitation) which sits to the south of the new rail alignment.

A site visit was conducted by Jacobs on 12 February 2019 to identify any vegetation communities present. No targeted surveys were conducted due to the previous survey data and existing information available being sufficient to inform the assessment.

6.4.2 Potential Impacts

The groundcover of the site is dominated by *Cynodon dactylon* (Common Couch), which is not indigenous to the Hunter region however is now widespread across the area.

Existing swale drains (that generally run dry except during heavy rainfall events) on the site contain a range of native species, including *Phragmites australis* (Common Reed), *Typha orientalis* (Bulrush), *Persicaria lapathifolia* (Pale Knotweed), *Persicaria decipiens* (Slender Knotweed) and *Alternanthera denticulate* (Lesser Joyweed). These swale drains are located to the north and south of the proposed turning circle, passing under the intended alignment. More permanent wet areas outside of the works footprint have been mapped previously as being consistent with the endangered ecological community (EEC) Freshwater wetlands on coastal floodplains of NSW North Coast, Sydney Basin and South East Corner bioregions, listed under the BC Act. The existing drains are not mapped and are generally dry due to being raised up above the level of the surrounding wetland. Consequently they are not considered to meet the criteria for the freshwater wetlands EEC.

This vegetation will not be directly impacted by the works as shown in **Figure 15**.

The Swamp Oak forest (rehabilitation) mapped vegetation is not anticipated to be impacted by the proposed works due to its location off-site.

Saltmarsh vegetation to the south of the footprint and within the Hexham Swamp is mapped as 'Coastal Wetlands' under the Coastal Management SEPP, resulting in a proximity area for coastal wetlands entering into the site. This area is highly modified with drainage channels and would not result in run-off being discharged into the swamp. As such, no additional impacts are expected. Furthermore, part of the sites south-eastern corner is mapped as a 'Coastal Environment Area' – again, this area is highly modified and no adverse impacts are anticipated.

Further analysis and detail is provided in the Biodiversity Assessment at **Appendix G**. The Biodiversity Assessment provides an assessment against the relevant biodiversity values as outlined in Section 1.5 of the BC Act. A summary is provided here:

- Vegetation integrity: native vegetation is very limited in the footprint of the proposed works, with existing vegetation having been highly modified from its original state, resulting in a poor vegetation integrity. No high-quality native vegetation will be directly impacted;
- Habitat suitability: the area is limited in terms of its habitat suitability, with no important threatened species habitat being present. Impacts to the adjacent wetlands and saltmarsh have been avoided through locating the turning angle on the existing spoil area;
- Threatened species abundance: no threatened species are known to occur in the area of the turning angle, and none are likely to be significantly impacted by the works;
- Vegetation abundance: there is no native vegetation within the footprint other than *Cynodon dactylon*;
- Habitat connectivity: the stormwater drains may provide some functional habitat connectivity for ground dwelling fauna as a 'stepping stone'. The Green and Golden Bell Frog is considered to have a low likelihood of occurring on the site, noting the drains offer connectivity only during high rainfall periods, being dry most of the time;
- Threatened species movement: although there will be a temporary disturbance to the drains, connectivity will be re-established through the proposed culverts;
- Flight path integrity: it is likely that migratory birds will fly over the footprint on occasion however due to the height of the proposal they will unlikely be interrupted; and
- Water sustainability: the proposal is located near EECs and groundwater dependent ecosystems however is to be constructed within an already disturbed area. New drains and culverts will direct run-off to the existing basin within the site.

As above, the proposed modification is unlikely to result in an increased impact to the biodiversity values outlined by the BC Act, and as such, a Biodiversity Development Assessment Report waiver is sought.

Monitoring as required by the SSI consent has been ongoing throughout operation. Importantly, the monitoring results from 2018 indicate that key performance criteria developed to meet conditions E4, E5 and C3(b-i) of MP07_0171 have been met including the increase in proportion of native species from the baseline level of 25% to 49% within the areas to be rehabilitated. With the performance criteria being met on site for three consecutive years biodiversity monitoring has been approved to cease by DP&E following completion of the 2018 monitoring program.



Figure 13 The turning angle does not impact on the existing swale which is mapped as *Phragmites australis* and *Typha orientalis* vegetation and shown by the orange boundary

Source: GHD

6.4.3 Mitigation measures

There are a range of existing conditions of consent and commitments that will continue to apply to the development and are considered appropriate to manage impacts from the proposed turning angle. In this regard and due to the anticipated minimal impacts on vegetation, no further assessment is considered necessary relating to ecological impacts.

Table 15 Existing applicable biodiversity management conditions

Condition of Consent or Statement of Commitment	Response
Conditions	
E1. The Proponent shall ensure that clearing of native vegetation and infilling of SEPP 14 Wetland No. 833 is limited to the minimal extent required for the construction and operation of the SSI, and no greater than 12 hectares (including SEPP 14 wetlands).	There is no additional clearing anticipated to be required other than minor grass clearing works located adjacent the existing southern access track and along the intended alignment of the turning angle.
E2. The Proponent shall implement all mitigation measures as identified in the Construction Flora and Fauna Management Plan (condition E63 (b)), to minimise the potential for damage to native vegetation (particularly threatened species and endangered ecological communities and their habitat) not proposed to be cleared as part of the SSI, to ensure that there is no incursion into, or clearing of the vegetation.	A revised Construction Flora and Fauna Management Plan to meet new approval conditions will be implemented for these works.
E3. The Proponent shall mark areas of endangered ecological communities and threatened species habitat not to be impacted by the SSI with flagging tape or similar prior to commencing construction to ensure that there is no incursion into or clearing of the areas.	These areas will be marked as required prior to construction commencing.
E4. Any areas temporarily disturbed during construction (including access tracks and compound sites) shall be rehabilitated to a standard equal to or better than the existing condition, as soon as feasible and reasonable following the completion of construction activities in the affected location. Replanting of affected vegetation shall be undertaken using locally occurring native species.	Rehabilitation will occur post-completion of the turning angle works, consistent with Condition E4.
E5. The Proponent shall ensure that any coarse woody debris removed from the site, including timber from felled trees (particularly hollow bearing timber), shall be relocated to the Northern Offset site as identified in Appendix G of the document referred to in condition B1(c) of this approval, for the enhancement of the ecological values of that site.	There are no trees to be removed as part of the works.
E6. Prior to construction, pre-clearing surveys and inspections for threatened flora and fauna species and habitat features (including hollow bearing trees) shall be undertaken. The surveys and inspections, and any subsequent relocation of species, shall be undertaken under the guidance of a suitably qualified and experienced ecologist. The methodology for pre-clearance surveys shall be incorporated into the Construction Flora and Fauna Management Plan (condition E63 (b)).	Pre-clearing surveys and inspections of the works area will be undertaken.
E7. Should pre-clearing surveys reveal the need to remove tree hollows to construct and/or operate the SSI, the Proponent shall consider the need for the preparation of a Nest Box Plan. If a Plan is required, it shall be included as part of the Biodiversity Offset Package required by condition C4 and detail the number and type of nest boxes to be installed, which shall be justified based on the number and type of hollows removed, the density of hollows in the area to be cleared and in adjacent areas, and the availability of adjacent food resources. The Plan shall also consider the relocation of any hollows removed from the site to provide for potential nesting habitat. The Plan shall also provide details of maintenance protocols for any nest boxes installed including responsibilities, timing and duration.	No trees are to be removed as part of the works.
E8. The Proponent shall prepare a management plan that identifies the strategies that would be implemented in the event that the Green and Golden Bell Frog is identified during construction. The plan shall be developed in consultation with the OEH and include details on the mitigation measures to be implemented to minimise the risk to this species, including direct and indirect impacts to its habitat. The plan is to be submitted to the Director-General at least one month prior to construction, unless otherwise agreed by the Director-General. Nothing in this condition precludes the inclusion of this plan in the Flora and Fauna Management Plan (condition E63 (b)).	A Flora and Fauna Management plan revised to address new approval conditions will be implemented.
E9. In the event that the Green and Golden Bell Frog is identified to occur during construction, all work in the vicinity of the sighting shall stop to the extent necessary to allow the procedures set out in the management plan (condition E8) to be implemented.	A Flora and Fauna Management plan revised to address new approval conditions will be implemented.
E10. In the event that other threatened fauna or flora species are identified during construction, all work in the vicinity of the sighting shall stop and management measures to minimise the risk to the species implemented in accordance with the procedure required by condition E63 (b)(iv).	A Flora and Fauna Management plan revised to address new approval conditions will be implemented.

Condition of Consent or Statement of Commitment	Response
<p>E11. The Proponent shall implement measures to minimise impacts to fauna species and their habitat as far as practicable (and where feasible and reasonable), during the construction of the SSI, including:</p> <ul style="list-style-type: none"> (a) protocols for the removal and relocation of fauna during clearing, including a two stage clearing strategy; (b) establishing “no go” zones, including at freshwater wetland and coastal saltmarsh sites outside of the construction zone; (c) provision of setbacks; (d) presence of a suitably qualified and experienced ecologist to oversee clearing activities and facilitate fauna rescues and relocation; (e) timing construction to be outside of the breeding season of threatened species with the potential to occur on the site; (f) maintaining and reinstating habitat features (such as large woody debris, bush rock, leaf litter/mulch and topsoil etc.); (g) developing measures for minimising the incidence of fauna being trapped in excavation cells (such as minimising the length of time that cells are left exposed) and measures to deal with trapped or injured fauna; (h) implementing drainage controls to prevent the extension of <i>Gambusia holbrooki</i> (Eastern Mosquitofish) into the Hexham Swamp Nature Reserve; and (i) progressive re-vegetation of areas temporarily disturbed by construction. 	<p>The requirements of Condition E1 will be implemented during the construction process for the turning angle.</p>
<p>E12. Where reasonable and feasible, all private access tracks and internal service roads are to be at least 50 metres from SEPP 14 wetlands and the Hexham Swamp Nature Reserve, unless this is in conflict with condition C33, or as otherwise agreed by the Director-General, or as specified at an alternative distance in the documents listed under conditions B1 (c) of this approval.</p>	<p>The access tracks located along the southern boundary of the LTTSF site are existing and will be upgraded as part of the works. These tracks are necessary to provide access to the turning angle and also to provide access to properties to the south of the site.</p>
Commitments	
<p>The Construction Environmental Management Plan will include the ecological management measures / procedures set out in the Ecological Investigations report, as follows:</p> <ul style="list-style-type: none"> a) Site-specific environmental induction for all staff. b) Identification of clearing limits and avoiding the storage of materials and vehicles under the drip line of retained vegetation. c) Ecological surveys will be undertaken prior to clearing or filling of the wetland to minimise impacts on threatened and endangered species and ensure that direct impacts to flora and fauna are avoided. d) When clearing vegetation timber, particularly sections with hollows will be retained as Coarse Woody Debris for enhancement of the Northern Offset area. e) Cease work immediately if any previously unknown threatened flora or fauna species are encountered. WIRES should be consulted if any injured fauna are encountered. f) Provide appropriate controls to manage exposed soil surfaces and stockpiles to prevent erosion and subsequent sediment discharge into surrounding wetlands. g) Clearly identify stockpile and storage locations and provide erosion and sediment controls around stockpiles. h) Stockpiles of topsoil to be stored in windrows no higher than 2m and be maintained free of weeds. i) Undertake dust suppression where required in accordance with the Protection of the Environment Operations Act 1997 (POEO Act) where there is a risk of increased dust outside of acceptable levels j) Establish and implement a Hygiene Protocol for vehicles entering and leaving the site to minimise spread of weeds and other biological risks such as alligator weed. k) Develop a monitoring program during construction (including a weekly checklist) to ensure that all mitigation measures proposed have been undertaken. The checklist should include items such as fencing and sediment and erosion control. 	<p>The existing CEMP will be updated to reflect the proposed turning angle works and will be implemented during the construction period.</p>

6.5 Contamination and Soils

The new infrastructure will be located on land that was disturbed during the construction phase of the LTTSF and is located either within the project footprint or within the area formerly used for coal handling activities.

The proposed new turning angle is located on land identified on the Newcastle City Council Acid Sulfate Soils (ASS) Map as containing Class 2 ASS. The coal washery reject material has also been previously identified as comprising potential acid generating material.

6.5.1 Existing Environment

The proposal area surface geology is modern fill on quaternary deposits, adjacent to alluvial deposits of Hexham Swamp, with the near surface geology being fine grained estuarine deposits typically comprising gravel sand, silt and clay. The area is within the Disturbed Terrain Soil Landscape of the Newcastle 1:100,000 Soil Landscape Map, which defines the landscape as being extensively disturbed by human activity, including the complete disturbance, removal or burial of soil. This landscape is associated with the previous use of the site as a coal washery. Geotechnical investigations indicate that subsurface conditions are consistent with the mapping.

Acid Sulfate Soils

As part of the original SSI works approximately 150,000m³ of Acid Sulfate Soils (ASS) and Potential Acid Sulfate Soils (PASS) were stored in stockpiles within the area of the proposed turning angle.

Soils were progressively neutralised with Grade 1 agricultural lime in accordance with the rates detailed in the Acid Sulfate Soils Management Plan (ASSMP). These areas have been remediated as required in accordance with the ASSMP prepared for the SSI. Validation Reports have been prepared and issued to the Site Auditor to facilitate issue of a Site Audit Report and Site Audit Statement at the appropriate time.

The site is mapped on the Beresfield 1:25,000 scale Acid Sulfate Soil Risk Map as having a high probability of actual or potential ASS within 1m of the ground surface, with the Newcastle ASS map showing the site is Class 2.

Site investigations undertaken on 27 ASS field screening tests identified both ASS and potential acid forming (PAF) materials within the proposal area. PAF material is associated with the historical coal washery reject placed on the site. Approximately half of the tested samples were confirmed as Actual ASS or potential ASS due to a field pH level of less than or equal to 4, or between 4 and 5.5 respectively, with the remainder not considered as Actual ASS due to a higher field pH level greater than 5.5.

Contamination

Part of the subject site was assessed in the original SSI application as being contaminated from a range of contaminants, generally related to existing coal washery reject being present on the site from historical uses. The remains of the former Coal & Allied Balloon Loop are present on the south-western part of the site near to the turning angle location.

Site contaminants of concern across the site consisted of hazardous materials, hydrocarbons, coal washery reject and potential acid sulphate soils. Previous soil results from samples of the site indicate the presence of semi-volatile hydrocarbons in the proposal area, however concentrations were generally below the relevant assessment criteria at the time of the investigation. Three tests pits did return higher results, however only marginally exceeded the criteria. The site also has potential for asbestos containing material due to former buildings on the site, however asbestos was not detected during site investigations.

Remediation of the site has been generally completed in accordance with the RAP. Condition E33 of the SSI approval requires the site be validated as appropriate for its intended use by a Site Auditor with the issue of a Site Audit Report and related Site Audit Statement (SAS).

The following remediation methodologies were utilised to the proposed turning angle area:

- Fill materials with TPH contamination – further defined and updated based on the results of additional sampling;
- Hazardous building materials (asbestos) – off-site disposal or on-site containment by a licenced contractor. Once the final design for construction work is received, an appropriate method for asbestos management during works will be selected;

- Miscellaneous stockpiles of waste – characterise the material and dispose off-site, re-use on-site or manage in-situ depending on the waste classification results. Aurizon has indicated that all identified hazardous materials were disposed off-site.

Excavation of TPH impacted soils was limited to the former UST area and not in the proposal footprint.

Some asbestos containing material was identified within soils and stockpiles throughout the LTTSF site however one within the turning angle area.

Soil Salinity

Based on site investigations it is considered that soil salinity within the proposal area is likely to be variable, with some localised areas of saline soils potentially occurring.

Groundwater detected at depths of 1.5 to 3.5m below ground level has been identified as being brackish to saline based on annual groundwater monitoring results within the proposal area.

6.5.2 Potential Impacts

Construction of the turning angle will require excavation of land to establish ballast and levels for the track. Potential impacts on soils and contamination is outlined below.

Acid Sulfate Soils

The existing coal washery reject material on the site presented significant issues during the construction of the LTTSF in terms of acid generation. Based on this, it is anticipated acid generation will be similar during the construction of the turning angle.

While interaction with the groundwater table is not expected due to the shallow excavations (1.5m or less and approximately 13,000m²), groundwater interaction may occur due to fluctuating meteorological and hydrological conditions. This may result in PAF material and natural ASS being exposed to oxygen. Accordingly the approved Acid Sulphate Soil Management Plan, prepared pursuant to Condition E63(d) of the SSI Approval will be implemented to ensure environmental impacts are mitigated.

It is not expected that there will be disturbance of ASS or PAF during operation of the turning angle.

Contamination

The existing fill materials on the site, identified as containing semi-volatile hydrocarbons, should not pose a vapour intrusion risk from the proposed excavation works.

All fill imported for the construction of the LTTSF was Virgin Excavated Natural Material. No imported fill contained volatile hydrocarbons or other contaminants.

During construction of the LTTSF in-situ material was excavated from areas that contained hydrocarbon hotspots inclusive of an area containing a former hydrocarbon underground storage tank (UST). This fill was either remediated onsite within the site treatment pads or disposed of offsite at a licenced facility.

Residual hydrocarbon contamination has been identified as being retained within the former UST area. It is not proposed that this area will be disturbed during construction of the turning angle.

Due to the site's extensive industrial history predating Aurizon ownership extensive contamination is likely as being present sub surface throughout. Due to this understanding it is conservatively assumed that disturbance of unidentified hydrocarbon hotspots may occur during excavation activities associated with the construction of the proposed turning angle.

Disturbance of any unidentified hydrocarbon hotspots will be managed in accordance with all relevant guidelines and standards.

There is a low potential for asbestos containing material to be present on the site as it has not previously been identified within the turning angle footprint.

Whilst the initial EIS and PPR approved as part of MP07_0171 was based on a design that avoided the need to undertake excavation in these areas, the RAP prepared as part of the PPR assessed the potential for contamination across the area and did not identify any areas of concern in relation to contamination.

As per Site Audit Statement (SAS) (#0503-1401) remediation undertaken a part of the original LTTSF construction was generally compliant with the RAP. The SAS deemed that, subject to the implementation of the approved Site Management Plan (Aurizon 2019), the site is considered suitable for the proposed land use (i.e. commercial / industrial) as defined in Section 3 of Schedule B7 NEPC 2013.

The proposed turning angle is within the footprint of the SAS boundary as shown in Figure 14 below and as such further remediation works are not expected to be required.



Figure 14 Site Audit Statement Boundary

Soil Salinity

Vegetation and topsoil removal through cut and fill operations could result in exposure of saline sub-soils. These soils would be exposed during the earthworks phase for a short timeframe however will be covered by structural fill as part of construction activities. Impacts from saline soils are therefore not anticipated.

During the construction phase, earthworks and other construction activities have the potential to disrupt flow paths and increase the concentration of suspended sediments in stormwater due to erosion based on removal of vegetation.

Given the short duration of the construction phase, the potential impacts to stormwater other than erosion are considered minor, particularly with structural fill to be placed on top of open soils during the construction process.

It must be noted that the erosion hazard within the site varies throughout the year and is subject to the frequency and intensity of rainfall, however the site is considered to have a very low hazard rating across the year.

Increased salinity of surface soils can result in salinisation of otherwise fresh surface water and groundwater resources, however the proposal is not anticipated to result in impacts to existing soil salinity.

Surface water runoff and groundwater infiltration is not expected to be impacted and as such changes to groundwater and hydrology as a result of soil salinity are not anticipated. As such, no otherwise fresh groundwater and surface water resources would be impacted as a result of the proposal.

Impacting on groundwater flows through footings and retaining walls within the groundwater table is not proposed and therefore no interception of the groundwater table is anticipated. No impacts on salinity or groundwater is expected during operation.

6.5.3 Mitigation measures

A range of mitigation measures are proposed to manage the impacts on soil and water from the proposed turning angle. Mitigation measures proposed to be utilised for the management of contamination are consistent with the approved Site Management Plan. Detailed erosion and sediment controls for construction are outlined within the Soil Assessment completed by GHD at **Appendix F**.

Table 16 Contamination and Soils Mitigation Measures

Environmental aspect	Mitigation measure	Timing	Responsibility
Acid Sulfate Soils	<p>As per the ASSMP soil characterised in-situ as ASS that requires disturbance and excavation due to construction activities will be managed utilising the following process:</p> <ul style="list-style-type: none"> • Characterised soil will be excavated and stockpiled • Prior to backfilling of the excavation floor and walls will undergo validation sampling to confirm absence of ASS or if neutralisation is required. • Proposed treatment pads and immediate surround will undergo baseline sampling to assist in determining potential impacts of treatment activities. • Excavated soil (and subsequent leachate) will be placed within a fully bunded and impermeable based landfarm for further characterisation and neutralisation. • Neutralisation will be undertaken as per relevant standards and guidelines. • Upon completion of neutralisation validation testing will be completed to ensure compliance with relevant criteria. • All soil will be stockpiled onsite above the 1:100 flood event depth. <p>As required by MP07_0171, upon completion of remediation activities associated with the proposed turning angle project the existing Site Audit Statement and Site Management Plan will be updated detailing remediation activities associated with the proposed turning angle project.</p> <p>The site Audit Statement and associated report will be issued to the DPE upon completion.</p>	Construction	Contractor Aurizon
Contamination	Identified contamination is to be managed in accordance with the previously approved RAP (GHD 2014) and the measures listed in the Site Management Plan (SMP).	Construction	Contractor Aurizon

Environmental aspect	Mitigation measure	Timing	Responsibility
	<ul style="list-style-type: none"> Soils are to be managed in accordance with the SMP, which may include: <ul style="list-style-type: none"> Soils requiring disturbance which exhibit visual or olfactory signs of contamination or coal wash reject are to be excavated. Laboratory analysis by a NATA accredited laboratory will be required to confirm presence/absence of contamination. Prior to backfilling the excavation floor and walls will undergo validation sampling to confirm absence of contamination or if further neutralisation of coal washery reject is required. Excavated soil which is to be transported to a different area from its existing location will also be subject to waste classification. If any ACM is observed during construction, work is to cease until the ACM has been disposed of to a licenced facility and the area has been cleared by an authorised consultant. 		
Soil Salinity	The following mitigation measures will be implemented to minimise potential impacts to soil salinity: <ul style="list-style-type: none"> Earthworks will be staged where possible to minimise the time that any potentially saline subsoils are exposed. Erosion and sediment control measures will be implemented to prevent mobilisation of any potentially saline soils. All deep-rooted trees are to be retained where possible to minimise impacts to groundwater levels. The surface and groundwater monitoring program currently undertaken by Aurizon is to continue. Any exceedances of the adopted conductivity performance criteria are to be investigated to determine the cause, potential impacts and feasible mitigation measures. 	Construction Operation	Contractor Aurizon
	Site drainage is to be designed to maintain existing levels of runoff and infiltration where possible.	Design	Aurizon
Soil and Land Resources	General mitigation measures are to be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) and Volume 2 (DECC, 2008), including: <ul style="list-style-type: none"> Define access and no/go areas on site. Early installation of physical controls, including cross drainage to convey clean water around or through the site. 	Pre-construction	Contractor
	<ul style="list-style-type: none"> Minimising the duration of exposed topsoil by retaining topsoil cover, grassed drainage lines and shrub cover on the soil surface for as long as possible minimising the extent of disturbed areas. Interim stockpiling of materials (minimal permanent stockpiles). Minimising the lengths of slopes by limiting the extent of excavations and/or using diversion drains to reduce water velocity over disturbed areas. Progressive rehabilitation or sealing of works areas. 	Construction	Contractor

Existing conditions of consent applicable to the turning angle from the original SSI Approval will continue to apply to the works.

Table 17 Existing applicable contamination management conditions

Condition of Consent or Statement of Commitment	Response
Conditions	
C20. The Proponent shall ensure that all acid sulfate soils and acid generating material excavated on site is disposed offsite in an appropriately licensed landfill facility, unless proposed to be re-used on site. Any acid sulphate soils or acid generating material to be	Should ASS or PASS be identified during the turning angle works, the procedures within the ASSMP will

Condition of Consent or Statement of Commitment	Response
re-used on site shall be temporarily stored and treated on site to required standards in an appropriately lined and bunded storage area located above the 1% AEP flood level. Procedures for the treatment, temporary storage and monitoring of these materials shall be in accordance with the Acid Sulfate Soil Management Plan required to be prepared under condition E63 (d) (xi) of this approval.	continue to be followed as per Condition 20.
C21. No acid sulfate soils or acid generating material shall be permanently stored on site, unless the material has been treated and validated as neutralised and the material is stored above the 1% AEP flood level and protected by appropriate erosion and sediment control measures, and as agreed to by the EPA and the Director-General.	Noted.
E27. Fluvial geomorphology, soil and water management measures consistent with the recommended mitigation measures in Appendix E of the document referred to in condition B1(c) and the measures in Managing Urban Stormwater - Soils and Construction Volumes 1 and 2, 4th Edition (Landcom, 2006) shall be employed prior to and during the construction of the SSI (including prior to clearing) to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.	These will be implemented on-site.
E28. Facilities shall be provided (including at all exit points leading onto public roads) to minimise tracking mud, dirt or other material onto a public road or footpath. In the event of any spillage, the Proponent shall remove the spilled material as soon as practicable within the working day of the spillage.	These will be implemented on-site.
E29. Where reasonable and feasible, the Proponent shall undertake the upgrade of waterway crossing during periods of dry weather.	This will be included in the construction program.
E30. Prior to the commencement of construction the Proponent shall undertake further investigations as recommended in the Remediation Action Plan included in Appendix H of the document referred to in condition B1 (c), to confirm the presence of contaminants on site, based on detailed design requirements. Upon confirmation of the contaminated areas on site, the Proponent shall update the Remediation Action Plan as required to take into account any new or updated procedures relevant to any new areas of contamination identified and remediate the identified sites in accordance with the updated Remediation Action Plan, prior the commencement of construction in the impacted areas.	The Remediation Action Plan was updated prior to construction of the LTTSF to address areas of concern in the impacted areas. The Remediation Action Plan will continue to apply to the site and turning angle works.
E31. Where unexpected contaminated materials are identified during construction works, these materials would be identified, managed, treated and disposed of in accordance with the procedures outlined in the updated Remediation Action Plan. Where required, the Proponent shall engage a suitably qualified contaminated land consultant to prepare an addendum to the Validation Report referred to in condition E33 to cover the additional areas of contamination identified and additional remediation measures undertaken. The Proponent shall also engage an accredited NSW Site Auditor to prepare an updated Site Audit Report to assess the addendum Validation Report and submit a copy of both reports to the Director-General and City of Newcastle.	A Site Auditor has been engaged to prepare a Site Audit Statement in response to the Validation Reports that have been prepared.
E32. Prior to the reuse of ballast, chitter or tailings within the existing railway corridor, the Proponent shall undertake sampling and testing of the materials to establish whether: (a) the materials are of a quality suitable for the intended reuse; and (b) the removal and reuse of the materials would not result in contaminated runoff. Materials that are not suitable for reuse are to be classified in accordance with the Waste Classification Guidelines (DECCW, 2009) or any superseding document	Sampling will be undertaken.
E33. The Proponent shall engage a suitably qualified contaminated land consultant to prepare a Validation Report upon completion of the remediation of the areas identified in the Remediation Action Plan. The Validation Report shall verify that the site has been remediated in accordance with the Remediation Action Plan (if and as amended) and to a standard consistent for the intended land use. The Proponent shall engage an accredited NSW Site Auditor to prepare a Site Audit Report to determine the appropriateness of the Validation Report. The Validation Report and Site Audit Report shall be submitted to the Director-General prior to the laying of track in the remediated area(s). A copy of the reports shall also be submitted to the City of Newcastle for its information.	Validation reports have been prepared by A.D. Envirotech and Environmental Earth Sciences for the site. These reports have been reviewed by the appointed Site Auditor.
E38. The Proponent shall ensure that all areas used for the storage and treatment of acid sulfate soils during construction of the SSI are located or elevated above the 1% AEP flood level, unless otherwise agreed by the Director-General.	Noted.
E63. As part of the Construction Environment Management Plan for the SSI required under condition E62 of this approval, the Proponent shall prepare and implement the plans listed at (a) to (f) below. Where a plan is required to be prepared in consultation	The Construction Soil and Water Management Plan will be updated to

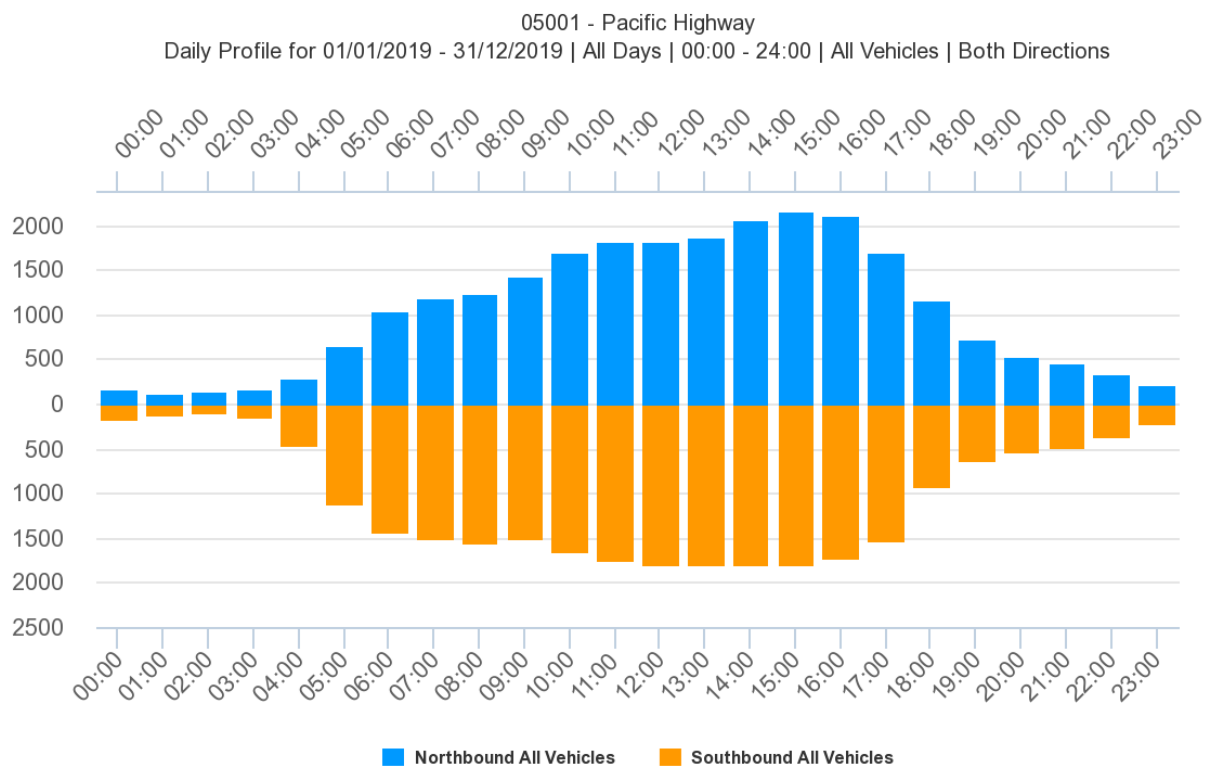
Condition of Consent or Statement of Commitment	Response
<p>with an authority or stakeholders, the plan shall provide details on the consultation undertaken including any comments received and where these have been addressed in the plan.</p> <p>(d) A Construction Soil and Water Management Plan to manage surface water and groundwater impacts during the construction of the SSI. The Plan shall be developed in consultation with the City of Newcastle, NoW and Hunter-Central Rivers CMA and include, but not necessarily be limited to:</p> <p>(xi) an Acid Sulfate Soils Management Plan consistent with the Acid Sulfate Soils Manual, including a contingency plan to deal with the unexpected discovery of actual or potential acid sulfate soils, including procedures for the investigation, handling, treatment and management of such soils and water seepage;</p>	<p>reflect the new works proposed as part of the turning angle.</p> <p>The ASSMP will continue to apply to the construction of the turning angle and associated works.</p>
Commitments	
<p>Remediation will be carried out in accordance with the Remedial Action Plan to:</p> <p>a) remediate hydrocarbon contamination present in fill material;</p> <p>b) remove by localised excavation those hydrocarbons impacted soil associated with former fuel tank (Pit 128) and the former refuelling area (Bore 102 and Pit 128); and</p> <p>c) Asbestos from within buildings to be demolished, and asbestos containing soils, will be removed for disposal in appropriate licenced landfill facilities. Asbestos will be removed by a suitably licenced contractor in accordance with WorkCover requirements.</p>	<p>Remediation across the site has generally been completed in accordance with the Remediation Action Plan.</p>
<p>The ASSMP prepared by Douglas Partners forms part of the project. The ASSMP will be updated following further soil sampling and validation of ASS, and the confirmation of construction methodology.</p>	<p>The ASSMP will continue to apply to the site.</p>

6.6 Transport and Traffic

6.6.1 Existing Environment

The site is situated adjacent to the New England Highway and Pacific Highway, with access provided to the site via the Tarro Interchange and a dedicated access road. The two highways are two lanes each way, generally divided, with speed limits of 80km/hr near to the site. The Tarro Interchange has a speed limit of 60km/hr.

Traffic volumes of the Pacific Highway to the east of the site (across the Hunter River) at Station 05001 indicate that volumes have steadily increased since 2006, with the current 2019 data indicating an average daily traffic count of 50,371 vehicles, both north and southbound. This equates to 26,402 northbound vehicles and 27,558 southbound vehicles per day. A breakdown of peak traffic volumes at this monitoring station is provided in **Figure 16** below to indicate key movements past the site. It must be noted that these numbers do not necessarily imply that all vehicles pass under the Tarro Interchange on the New England Highway, as the Pacific Highway branches south of the monitoring station towards Newcastle. As such, traffic volumes are likely to be less near the Tarro Interchange (and the access point to the Hexham LTTSF site).



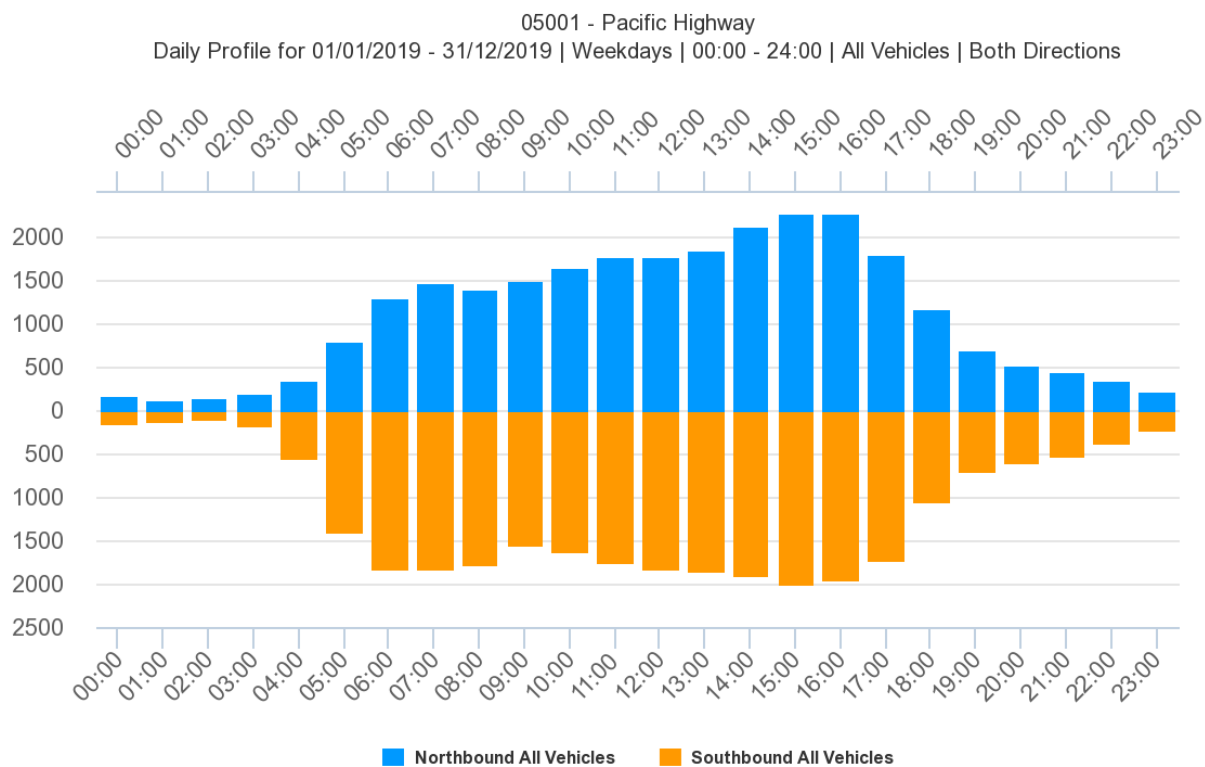
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Figure 15 Traffic Volumes near to the site at Station 05001 on all days

Source: Roads and Maritime Services

As shown, peak traffic volumes generally occur in the afternoon between 1pm and 5pm northbound, and 12 noon and 4pm southbound on all days.

During weekdays there is a clear shift in traffic volumes, with northbound vehicles increasing beyond 2,000 vehicles between 2pm and 4pm, and southbound vehicles having two peaks between 6am and 8am and 2pm and 5pm.



Exported on Fri Mar 15 2019 at 0:0:0. © Roads and Maritime Services 2015.

Figure 16 Traffic Volumes near to the site at Station 05001 on weekdays

Source: Roads and Maritime Services

Existing daily traffic movements to and from the site are generally as per the below dependent on operational demands. Movements are both inbound and outbound:

- - 60 light vehicle movements;
- - 6 heavy vehicle (refuelling); and
- - 20 medium vehicle movements (deliveries).

6.6.2 Potential Impacts

During the proposed works the increase in traffic volumes is anticipated to be relatively minor in terms of daily traffic movements:

- Heavy vehicles including trucks delivering fill, ballast and capping for the proposed works are estimated to be approximately 30 movements a day, for an eight-week period, for a total of 1,200 vehicle movements each way (inbound and outbound);
- Miscellaneous deliveries on a range of heavy vehicles and light vehicles including signalling equipment is estimated to be approximately three movements per day for a 12-week period for a total of 120 movements each way (inbound and outbound); and
- Light vehicles accessing the site are estimated to be approximately three to 10 movements per day for 12 weeks, for a total of 600 movements each way (inbound and outbound).

All movements are to occur during weekday business hours (7am till 6pm) and will utilise the existing access road to the site from the Tarro Interchange.

Based on these, the average increase in vehicle movements per weekday during the construction period is estimated to be approximately 43 vehicles. This equates to an approximate 0.16% northbound and 0.15% southbound increase on existing average daily traffic volumes at Station 05001 (notwithstanding that as outlined above, the Pacific Highway branches east of the site to direct traffic to both the New England Highway towards Sydney and along Maitland Road towards Newcastle).

Consequently, the impact from traffic movements to and from the site is considered to be negligible in terms of existing traffic volumes on the surrounding road network, noting that access is afforded directly from the New England Highway via the existing access road. Access will continue to be via the existing main access road into the LTTSF site. Internal access tracks associated with construction will be situated adjacent to the turning angle footprint as shown in **Figure 17** below.

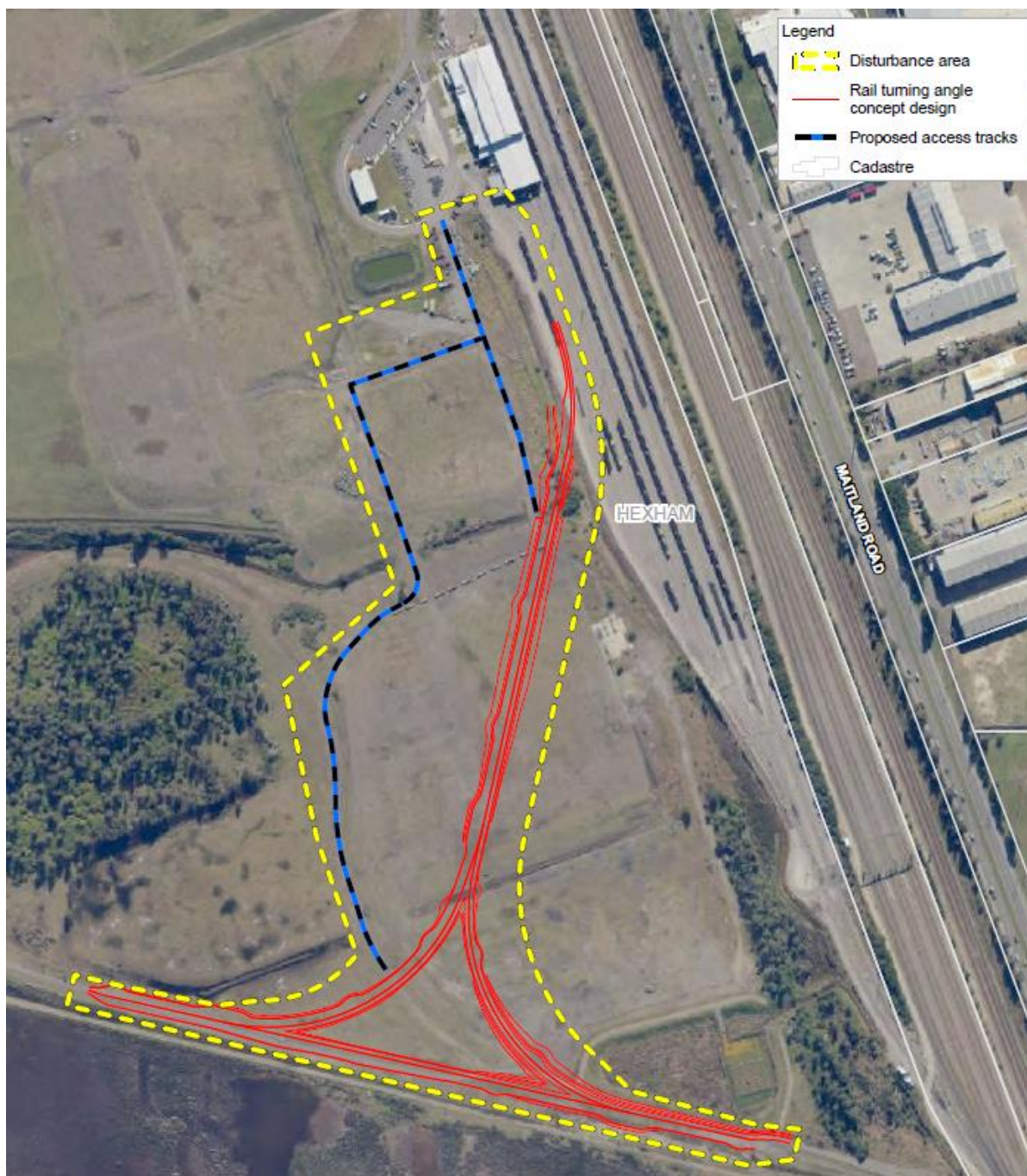


Figure 17 Proposed internal access tracks
 Source: GHD

There are no anticipated parking impacts from the proposed works as all vehicles can park on-site and there is no reliance on off-site parking.

6.6.3 Mitigation Measures

Based on the negligible impact assessed above, no additional mitigation measures are proposed outside those forming part of the conditions of the SSI consent. An Operational Traffic Management Plan will be prepared to manage traffic movements to ensure that impacts are minimised.

6.7 Noise and Vibration

An Acoustic Assessment has been prepared by SLR (**Appendix K**) which identifies the potential impacts from the proposed modification, above those previously assessed in the original SSI.

There were nine sensitive receivers identified as part of the assessment process, including private residential properties, a primary school, church and light industrial premises.

The nearest sensitive receiver to the site is R7, a residential dwelling on Maitland Road located approximately 500m to the south of the southern-most extent of the proposed turning angle. Receivers R8 (Church Old Maitland Road) and R6 (Old Maitland Road South) are situated to the east of the site however are not residential in nature.

6.7.1 Existing Environment

The original SSI application was assessed in accordance with the NSW Industrial Noise Policy (INP) which has now been superseded by the Noise Policy for Industry (NPfI). As such, the operational criteria for the project has been set in accordance with the later NPfI.

To establish the ambient noise levels surrounding the site, noise surveys were completed in March 2008 as part of the original SSI assessment. These measured background noise levels (RBLs) are therefore considered to be conservative due to a likely increase in traffic counts in the area. Based on these RBLs, Project Trigger Noise Levels (PTNLs) have been developed for all sensitive receivers as outlined in the Acoustic Assessment (**Appendix K**). **Table 17** outlines the relevant noise criteria for R7, the nearest residential receiver to the proposed works.

Table 18 Operational Project Trigger Noise Levels

Receiver	Period	Adopted RBL	Project Intrusiveness Criteria LAeq(15min)	Project Amenity LAeq(15min)	Project Trigger Noise Level
Source		(taken from the original SSI)	(RBL + 5dB)	(Project Amenity (period) plus 3dBA)	(lower of project intrusiveness and project amenity (15 minute) noise level)
R7 – Maitland Road	Day	56 dBA	61 dBA	58 dBA	58 dBA
	Evening	53 dBA	58 dBA	48 dBA	48 dBA
	Night	47 dBA	52 dBA	43 dBA	43 dBA

Source: SLR

6.7.2 Potential Impacts

To assess the operation of the proposed turning angle in addition to the wider LTTSF project, a desktop assessment was completed using a sound power level of 106dBA taken from a database of similar operations. The assessment included a night-time train movement at the closest location to the nearest sensitive receiver (R7), with which compliance with the conservative scenario of R7 would indicate compliance for the project.

Table 19 Predicted Operational Noise

Location	Period	PTNL	Predicted Noise Level
R7 – Maitland Road	Day	58 dBA	43 dBA
	Evening	48 dBA	43 dBA
	Night	43 dBA	43 dBA

Source: SLR

These predictions consider a locomotive being active for a full 15-minute period at the closest extent of the project to R7, in addition to regular LTTSF operations. Based on these results, it is considered that the change in noise levels at other receivers would be lower than at R7 due to it being the closest receiver to the site.

Site construction works may result in noise emissions however, these impacts are highly unlikely to exceed those assessed as part of the EAR and PPR. Therefore, mitigation and management measures are consistent with the previous assessment and should be undertaken in accordance with the site Noise Management Plan.

Due to the separation distance between the subject site and the nearest relevant receivers, vibration levels generated by the turning angle are likely to fall below the threshold of human perception. The proposal is therefore also expected to fall below the criteria for “minimal risk of cosmetic damage” at surrounding residential and commercial premises.

6.7.3 Mitigation Measures

Based on the above, the existing mitigation measures applying to the site and as outlined in the OEMP will continue to apply and be appropriate for managing impacts of noise from the development including the proposed turning angle. A revised Noise Management Plan will also apply to the works.

6.8 Heritage

The NPW Act provides for the protection of Aboriginal objects and Aboriginal places in NSW. Under s90 of the NPW Act it is an offence to knowingly destroy, deface, damage or desecrate, or cause or permit the destruction, defacement, damage or desecration of an Aboriginal object or Aboriginal place, without the prior written consent from the Director-General of the NSW Office of Environment and Heritage (OEH).

An Aboriginal Archaeology Due Diligence Assessment has been completed by Jacobs (**Appendix I**) in accordance with the Due Diligence Code of Practice for the Protection of Aboriginal objects in New South Wales, to identify if further archaeological assessment is required. The Due Diligence Code to assist individuals and organisations to exercise due diligence when carrying out activities that may harm Aboriginal objects and to determine whether they should apply for consent in the form of an AHIP.

A previous assessment completed as part of the original SSI Preferred Project Report was prepared by McCardle Cultural Heritage, which was supported by the outcomes of archaeological test excavations related to the Hexham Relief Roads project by ARTC, with the testing completed by Australian Museum Business Services.

The 45 excavation test pits to identify whether those works would impact on archaeological objects were conducted in two areas at the northern extent of the LTTSF footprint covering the access road to the site, approximately 2.7km north of the turning angle site.

6.8.1 Existing Environment

Historically the subject site was used to support the coal industry from the 1930s onwards, with a coal washery introduced in 1955. The Hexham facility finished operating as a coal handling facility in 1988 with demolition of site infrastructure commencing in 1989. Since that time the site has been largely underutilised until the construction and now operation of the LTTSF.

The site itself sits within the Hexham Wetland floodplain, prone to flooding during large storm events. At the 2% AEP the Hexham Wetland flood storage volume is substantially larger, although the flood waters are still largely non-

6.8.3 Mitigation Measures

The following recommendations are made if Aboriginal objects or sites are unexpectedly found during excavation:

- All activity in the vicinity of the find should cease immediately. Aboriginal objects are protected by the National Parks and Wildlife Act 1974. It is an offence under the NPW Act 1974 to disturb or destroy an Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). A qualified archaeologist should be contacted to assess the find and the OEH and the Local Aboriginal Land Council (LALC) notified.
- If human remains, or suspected human remains, are found during excavation, all work in the vicinity should cease immediately, the site should be secured and the NSW Police and the OEH should be notified.

It is considered that the existing mitigation measures forming part of the SSI approval can continue to apply and will be appropriate for managing any potential impacts on unexpected finds.

6.9 Climate Change Risk

Climate change was considered as part of the original SSI application and supported through the Joint Flood Impact Assessment prepared by BMT WBM (part of the Preferred Project Report) in terms of sea level rise and increase rainfall.

In terms of temperature changes, the Hunter region is anticipated to see an increase in maximum temperatures by 0.4-1.0 degree in the near future (2030 averages) and 1.6-2.6 degrees in the far future (2070 averages). Consequently there are expected to be an increase in 'hot days' (days above 35 degrees each year), by between five (2030) and 14 (2070) more hot days each year. With this increase sees the projected increase in severe fire weather through summer and spring.

Rainfall has been projected to increase in autumn and decrease in spring. Seasonal rainfall projections for the near future and far future span both drying and wetting scenarios. In the near future (2030) the range of changes are:

- Summer: -16% to +9%;
- Autumn: -19% to +48%;
- Winter: -15% to +16%; and
- Spring: -22% to 24%.

In the far future the range of projected changes are:

- Summer: -8% to +22%;
- Autumn: -4% to +46%;
- Winter: -25% to +30%; and
- Spring: -18% to +39%.

The NSW Government has adopted planning benchmarks for sea level rise above 1990 mean sea levels of 0.4m by 2050 and 0.9m by 2100. To assess the impact, the Joint Flood Impact Assessment from the original SSI included a sensitivity test on the 1% AEP design event with a 0.9m increase in water levels at Newcastle Harbour. An increased rainfall intensity of 10% was also considered as part of the study. This results in an increase of the peak flood level of the 1% AEP event in Hexham Swamp of approximately 0.15m.

The outcomes at 2100 based on this scenario indicate an increase in peak flood level to approximately 4.1m AHD. This is 0.4m higher than the modelled 3.7m AHD peak flood level of the 1% AEP event on the turning angle site based on the modelling prepared by BMT for the turning angle assessment (**Appendix D**). At this level, the turning angle works would obstruct the flow path over the coal tailings as described in **Section 6.3** above. **Figure 19** below shows the flood mapping with the location of the turning angle indicated approximately.

In summary, the proposed works would broadly have similar impacts under future flood condition scenarios incorporating climate change. The broad flood behaviour locally in the Hexham area will be similar under climate change scenarios, though the frequency of particular magnitude events may change. Although sea level rise does have some level of impact at the site it is minor compared to the overall variance in design event magnitude. Accordingly, the potential for flood impacts associated with the proposed turning angle does not change, however there is some level of reduction in the overall flood immunity.

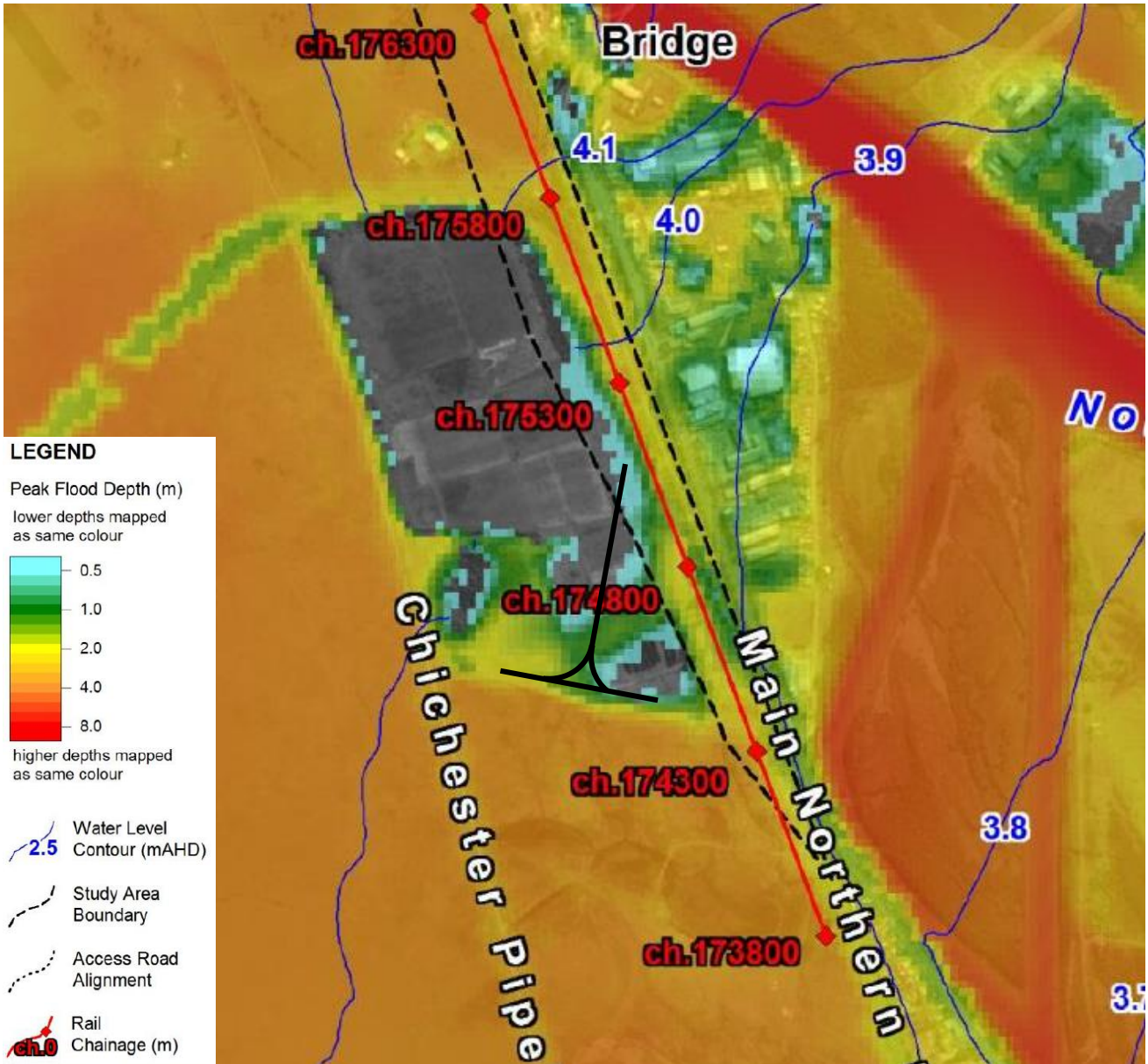


Figure 19 1% AEP peak flood depths and levels with a 0.9m sea level rise to 2100 and 10% increase in rainfall
Source: BMT

6.10 Protected and Sensitive Lands

Under the Coastal Management SEPP the site is identified as 'Proximity Area for Coastal Wetlands', and as such Clause 11 of the SEPP would normally apply to development that impacts on these areas. Clause 11 requires that development consent must not be granted unless the consent authority is satisfied the development will not significantly impact on:

- The biophysical, hydrological or ecological integrity of the adjacent coastal wetland; or

- The quantity and quality of surface and ground water flows to and from the adjacent coastal wetland.

However, as the proposed development is SSI under Part 5 of the EP&A Act, and therefore does not require development consent, these requirements of the Coastal Management SEPP do not apply to the proposed works. Notwithstanding, this Environmental Assessment provides a detailed assessment of the proposed turning angle on the adjacent coastal wetland, and concludes that there are no significant impacts on the integrity of the wetland or any of its values.

Although the footprint of the now proposed turning angle intersects the mapped 'Proximity Area of the Coastal Wetland', the intersected land is highly modified with artificial drainage that would not result in run-off being discharged into the saltmarsh. The historically modified land within the proposal footprint is a buffer to the wetland although lacks biophysical, hydrological or ecological integrity.

The mitigation applicable to the protection of the proximity mapped coastal wetlands relates to stormwater from the site being diverted to a drain on the western boundary of the turning angle where it is directed into one of three constructed stormwater detention basins for treatment of suspended sediments and nutrients through floating wetlands, prior to its offsite discharge.

The biophysical, hydrological, or ecological integrity of the adjacent coastal wetland is not expected to change as result of the modification and no additional or significant impacts to Coastal Wetlands as described in Clause 11 of the Coastal Management 2018 SEPP are expected as part of the proposed modification.

Part of the southern area of the site is also mapped as 'Coastal Environment Area' under the SEPP, which under Clause 13 requires that an adverse impact cannot be caused on the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment, as well as environmental values and other matters. The site is already heavily disturbed in this area and as such the proposed modification is not considered to create additional adverse impacts.

The proposed modification does not significantly impact on either of the SEPP requirements as addressed in **Section 6.4**.

The site is not mapped as estuarine habitat and is not identified as key fish habitat. Whilst it is adjacent to land mapped as key fish habitat being the Hexham Swamp and Hunter River, it will not impact on the biodiversity values of the estuarine or fish habitat.

6.11 Waste Management

6.11.1 Existing Environment

The site is currently occupied by the LTTSF which generates waste including cardboard, paper, plastic, glass, used cartridges, food/organic waste, vegetation/green waste, machinery parts, scrap metal, oils, used rags, spent solvents, empty paint cans, chemical containers, used lubricating oil, batteries, lighting equipment and engine oil.

All generated waste is appropriately classified, segregated and disposed of offsite by a licenced contractor.

During remediation works associated with the LTTSF construction process materials that could not be remediated were classified in accordance with the Waste Classification Guidelines and disposed of at a suitably licenced facility off-site.

6.11.2 Impact Assessment

During construction of the turning angle the existing Construction Waste Management Plan (CWMP) would be utilised to address appropriate waste classification, handling, storage and disposal.

Construction activities would be carried out as detailed in the CWMP and CEMP to minimise the potential for exposure to contaminated soils. Storage of hazardous waste would prevent or control accidental releases to the air, soil and

water resources of the area. It is anticipated that potential wastes from the turning angle construction would include scrap metal, used lubricating oil, engine oil, machinery parts and timber/wood framing.

During operation it is not anticipated the turning angle would introduce substantially more waste products than currently produced by the LTTSF.

Anticipated construction waste sources for the works include:

- ASS;
 - Excavated spoil material (retained and treated onsite);
- General solid waste (non-putrescible);
 - Packaging and wrapping materials;
 - Geofabric (6m rolls);
 - Timber dunnage, pallets;
 - Cardboard boxes of track jewellery (sleepers, lighting equipment);
 - Excess concrete from installation of light pole foundations; and
 - Timber fence post.

The estimated volumes of waste for the proposed works are:

- Plastic wrapping and packaging;
- 5% (175m²) of the overall 3,500m² of geofabric will be waste;
- 13,000m³ of acid sulphate soil;
- Approximately 100 fence posts (1.5 tonne);
- Excess concrete from pours (minor volumes); and
- Cardboard packaging (recycled).

Recycling and co-mingled waste skip bins will be used to manage generated waste. Disposal of all waste will be to licenced waste facilities via Remondis under Aurizon's national waste disposal agreement.

Excavated spoil material will be stockpiled and managed as required. An estimated maximum of 13,000m³ of spoil material will be stockpiled onsite. This upper estimate is subject to the quality of the in-situ subgrade such that should the subgrade provide 95%MDD an estimated 5,000m³ of material will not need to be cut for the purpose of sub grade replacement.

The 13,000m³ of material will likely result in a stockpile approximately 100m x 65m and up to 2m in height.

The design identifies approximately 12,275m³ of material to be 'cut to spoil stockpile'. Refer to GHD MTO 22-19583-MTO-C0001-R0.

Key waste measures to be undertaken include:

- Characterised soil will be excavated and stockpiled;
- Prior to backfilling of the excavation floor and walls will undergo validation sampling to confirm absence of ASS or if neutralisation is required;
- Proposed treatment pads and immediate surround will undergo baseline sampling to assist in determining potential impacts of treatment activities;
- Excavated soil (and subsequent leachate) will be placed within a fully bunded and impermeable based land farm for further characterisation and neutralisation;

- Neutralisation will be undertaken as per relevant standards and guidelines;
- Upon completion of neutralisation validation testing will be completed to ensure compliance with relevant criteria; and
- All soil will be stockpiled onsite above the 1:100 flood event height.

As required by the SSI approved MP07_0171, upon completion of remediation activities associated with the proposed turning angle project the existing Site Audit Statement and Site Management Plan will be updated detailing remediation activities associated with the proposed turning angle project.

The Site Audit Statement and associated report will be issued to the DP&E upon completion.

6.11.3 Mitigation / management

Several conditions and commitments relate to waste management on the site that will continue to be adhered.

Table 20 Existing applicable waste management conditions

Condition of Consent or Statement of Commitment	Response
Conditions	
C25. The Proponent shall ensure that all liquid and/or non-liquid waste generated on the site is assessed and classified in accordance with Waste Classification Guidelines (DECCW, 2009), or any future guideline that may supersede that document, and that it is appropriately handled.	This condition will continue to be followed, with all wastes to be classified in accordance with the Waste Classification Guidelines as outlined in the Operational Environmental Management Plan.
C26. The Proponent shall maximise the reuse and/or recycling of waste materials generated on site as far as practicable, to minimise the need for treatment or disposal of those materials off site.	Materials will be re-used where possible during the construction of the turning angle.
C27. The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997, if such a licence is required in relation to that waste. This condition is independent of the operation of the Brancourts facility and Sewerage Treatment Plant.	Noted.
C28. All waste materials removed from the site shall be appropriately tracked and shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.	This condition continues to apply to the site.
Commitments	
A Construction Waste Management Plan will be prepared prior to the commencement of construction on the site. The Construction Waste Management Plan will address the following: a) appropriate waste identification, handling, storage and disposal in accordance with the Department of Environment Climate Change and Water Guidelines; and b) procedures for how the different waste streams will be stored, collected and disposed of by licensed waste contractors.	The Construction Waste Management Plan forming part of the CEMP will be updated to reflect the works associated with the turning angle.
An Operational Waste Management Plan will be prepared to address the ongoing handling, storage and disposal of waste. The Operational Waste Management Plan will provide: a) identification of the types of waste likely to be generated during construction; b) appropriate storage of waste on site; c) measures to minimise the amount of waste produced; d) measures to increase the potential for waste to be re-used and recycled; e) appropriate methods to assess if waste can be re-used, recycled or disposed to landfill; and f) maintaining records of waste re-use, recycling and/or disposal.	The Operational Waste Management Plan will continue to apply to the site.
Licensed waste contractors will be made responsible for collection and appropriate disposal of waste.	This commitment will continue to be applied to the modification works.

6.12 Construction Management

It is expected that the construction works associated with the installation of the new infrastructure can be undertaken in compliance with the Construction Environmental Requirements specified in Schedule E of the SSI Approval, including the existing CEMP and relevant sub-plans specified in Conditions E62 and E63. These Schedule E conditions, where relevant or not already satisfied, of the SSI Approval will continue to apply to all works associated with the installation, alteration or addition of infrastructure elements. The CEMP and related sub-plans will be amended where necessary and re-submitted to the Secretary for approval prior to commencement of works associated with the proposed modification.

It is considered the following sub-plans of the CEMP will need to be updated to reflect the proposed turning angle and associated works proposed as part of this modification and to reflect where existing conditions of approval have been satisfied:

- Construction Soil and Water Management Plan;
- Surface and Groundwater Management Plan;
- Acid Sulfate Soil Management Plan;
- Flora and Fauna Management Plan;
- Flood Emergency Management Plan;
- Construction Noise and Vibration Management Plan; and
- Construction Waste and Spoil Management Plan.

7.0 Mitigation Measures

Mitigation and management measures identified in the original SSI Approval conditions of consent are considered generally sufficient to address the impacts of the proposed modification and are summarised in **Table 21** below. Key mitigation measures detailed in the CEMP and OEMP relevant to the proposed turning angle works are summarised below.

7.1 Construction Environmental Management Plan Mitigation Measures

The CEMP was prepared to specify environmental mitigation measures to be implemented during the construction phase of the LTTSF. It is proposed that this document, along with the relevant sub plans identified below, will be updated and retained for use to address construction matters during the turning angle works. The updated plans will be submitted to the DP&E prior to the turning angle construction works commencing for review and approval.

The key relevant mitigation measures proposed to be applied to the turning angle have been drawn from the appropriate existing sub-documents of the CEMP. These measures have been summarised below.

7.1.1 Surface and Groundwater Management Plan

The Surface Water and Groundwater Management Plan includes the following key monitoring requirements which will be applied to the turning angle construction works:

- Surface water monitoring will occur over the full duration of the construction program, with wet weather sampling undertaken following rainfall events of 75 mm/5 days.
- Groundwater monitoring will occur over the full duration of the construction program with sampling events to coincide with surface water sampling.

This plan will be implemented for the turning angle construction works. Mitigation measures will consist of those listed above and other measures relevant to address the conditions of approval.

7.1.2 Construction Soil and Water Management Plan

The Construction Soil and Water Management Plan includes the following key requirements which will be applied to the turning angle construction works:

- Ensure wheel washes, rumble grids and designated access and egress locations are included on construction drawings and identified clearly on-site.
- Consider meteorological conditions prior to commencement of excavation. Where possible works should not be undertaken during inclement weather as it will increase the potential for sediment laden runoff.
- All ASS stockpiles will be placed above the 1% AEP flood event water level.
- All erosion and sediment controls will be consistent with the Managing Urban Stormwater soils and construction (Blue Book).
- Undertake regular maintenance of sediment and erosion control works and rehabilitated areas.
- All runoff from the turning angle construction footprint will be directed to Basin 3,
- Inspections of works in or near waterway areas are to be undertaken in conjunction with sediment control inspections by the contractor and Aurizon Environmental Officer.
 - Visual inspections are to be carried out on a weekly basis or daily where active construction is near the wetlands and southern drainage line.
- Where blockages in waterways occur as a result of construction of the SSI sediment shall be removed with care to mitigate further impacts to as per below:
 - If the sediment is causing a blockage of channels hand tools should be used as care taken to ensure the dimensions of the bed and bank are not altered.

- Removed material is to be placed in one of the approved stockpile areas unless originating from the adjacent location and directed for replacement by the Environmental Officer.
- Stabilise areas as necessary and reinstall any sediment control structures as necessary.
- Management of blockages should be generally consistent with the NSW Office of water Guidelines for Instream Works on Waterfront Land.

This plan will be implemented for the turning angle construction works. Mitigation measures will consist of those listed above and other measures relevant to address the conditions of approval.

7.1.3 Flora and Fauna Management Plan

The Flora and Fauna Management Plan includes the following key mitigation measures which will be applied to the turning angle construction works:

- Pre-construction/clearing;
 - Identify trees and significant vegetation (EECs, Offset areas, retained SEPP 14 wetlands) close to work areas which are at risk during construction and install protective fencing to delineate the area and reduce risk of damage during the construction phases.
 - Operational or construction related activities are not permitted within identified areas of significance as detailed above.
 - Clearing of trees or potential habitat areas are not proposed however a clearing management procedure will be developed.
- Fauna at risk of injury are to be relocated to suitable habitat a safe distance from the proposed works by qualified personnel.
- Revegetation of stockpiles to utilise sterile cover crops which are non-invasive with revegetation of natural areas to use species locally indigenous to the area.

This plan will be implemented for the turning angle construction works. Mitigation measures will consist of those listed above and other measures relevant to address the conditions of approval.

7.1.4 Acid Sulphate Soils Management Plan and Remediation Action Plan

The Acid Sulphate Soil Management Plan and RAP will continue to apply to the turning angle works, and addresses the management of any ASS or PASS identified on the site through measures including:

- Characterisation procedures for the turning angle footprint, stockpiles and treatment pads.
- Placement and neutralisation methodologies for ASS stockpiles.
- Adoption of performance criteria and implementation of validation procedures to determine neutralisation effectiveness.
- Procedures to manage leachate and runoff from stockpile areas.
- Daily inspections and monitoring of:
 - Operations during excavation to manage soil neutralisation.
 - Stockpiles for signs of ASS affected seepage.
 - pH testing of any seepage from stockpiles.
 - Sampling leachates within the bunded area for temporary storage and neutralisation as necessary.
- Weekly monitoring of sediment levels within the leachate collection system.

These two plans will be implemented for the turning angle works and the range of other mitigation measures contained therein will apply.

7.1.5 Traffic Management Plan

The anticipated traffic movements associated with the turning angle are significantly less than those of the original SSI as addressed in the Construction Traffic Management Plan, which assumed approximately 380 vehicle movements per day. As such, this Plan is anticipated to be generally appropriate in its current form to accommodate the proposed traffic volumes of the turning angle works, and will utilise the mitigation measures contained therein, including the access points, traffic control measures (if required) and the driver code of conduct.

7.1.6 Noise and Vibration Management Plan

The Construction Noise and Vibration Management Plan includes the following key mitigation measures which will be applied to the turning angle construction works:

- Equipment will be kept well maintained to prevent unnecessary noise and vibration. Equipment will be selected to minimise noise impacts through the use of silencers and smart reversing alarms where practical.
- Conducting works within the appropriate EPA work hours.
- Access roads will be regularly graded to reduce noise from trucks rattling.
- Ensuring trucks are fully loaded to maximise the volume of deliveries and minimise traffic movements.
- Switching off equipment when not in use, including during breaks and down times of more than 30 minutes.
- Undertake vibration and noise monitoring at the request of the community (from any complaints) where reasonable.

7.1.7 Construction Waste and Spoil Management Plan

The Construction Waste and Spoil Management Plan will be retained for use. The control measures contained within the Plan will be implemented, including:

- All waste and fill materials, whether imported or removed from site shall be assessed, classified, managed and disposed of in accordance with the Waste Classification Guidelines (DECCW 2009).
- Waste will be managed and disposed of in accordance with the POEO Act. Wastes that are unable to be reused or recycled will be classified and disposed of offsite at an appropriately licensed waste facility.
- All waste will be transported offsite by appropriately licenced contractors.
- Waste will be sorted onsite into designated bins for steel, concrete, timber, plastic and scrap metal.
- A separate and designated waste bin must be provided for contaminated soils which result from spills. The bin is to be appropriately identified, have a lid, and be sufficient to accommodate a minimum of 1000L. If a spill occurs, all contaminated soils must be relocated to the bin as soon as is possible within a period of 48 hours;
- All loads of waste removed from site will be covered to prevent spillage.
- A wastewater collection and treatment system will be provided for all vehicles, plant, and equipment maintenance and cleaning areas to prevent the discharge of pollutants to stormwater. Wastes arising from such activities will be collected and disposed of in accordance with the OEH guidelines.
- ASS will be managed in accordance with the ASSMP.
- Potentially contaminated spoil will be classified in accordance with the CWSMP and managed as per RAP requirements.
- Dust generation and erosion of spoil stockpiles will be managed in accordance with the Construction Air Quality Management Plan and Construction Soil and Water Management Plan.

- Restoration of stockpile areas must be undertaken progressively following completion of stockpiling operations in each area.

7.2 Operational Environmental Management Plan Mitigation Measures

The OEMP was prepared to specify the environmental mitigation measures to be implemented during the operational phase of the LTTSF and will be retained across the site. It is proposed that this document will be updated as required to address construction matters during the turning angle works. The updated OEMP will be submitted to the DP&E prior to the turning angle construction works commencing.

A number of key mitigation measures to be applied have been drawn from the appropriate sub-documents of the OEMP. The below represents a summary of those mitigation measures that are included in the current OEMP and which will remain relevant for the operation of the turning angle.

7.2.1 Operational Surface and Groundwater Management Plan

The operational Surface and Groundwater Management Plan details the monitoring undertaken onsite to validate approved surface and groundwater performance criteria is being adhered to.

As the existing monitoring program is deemed to be sufficient to assess the impacts of the operation of the site, inclusive of the proposed turning angle, no changes to the monitoring program or other controls within this plan are deemed required. Regardless, this plan will be updated to reflect the inclusion of the turning angle and will be submitted to the DP&E for approval.

7.2.2 Operational Stormwater Management Plan

The Operational Surface and Groundwater Management Plan will remain in place and will be updated as needed to incorporate the turning angle. Applicable controls include:

- Disturbance of ground will be approved by the 14-FRM-006-WHS Permit to Work which will detail required erosion and sediment controls.
- All implement erosion and sediment control structures will comply with the Blue Book.
- All water way and drainage inspection undertaken as per the Stormwater Maintenance Checklist.

7.2.3 Flora and Fauna Management Plan

The Operational Flora and Fauna Management Plan will continue to apply to the turning angle construction works. Applicable controls include:

- Noxious weeds must be controlled by landowners as per the *Noxious Weeds Act 1993 (NSW)*. Fauna at risk of injury are to be relocated to suitable habitat a safe distance from the proposed works by qualified personnel.
- Rehabilitation of native vegetation areas impacted by approved site activities are to be undertaken immediately following the completion of works, where practicable. Areas subject to rehabilitation due to clearing during the construction phase (EECs) of the project are to be maintained throughout the operational lifetime of the facility.
- Identified significant vegetation (e.g. SEPP 14 wetland and EEC) adjacent to work areas inclusive of permanent structures or access routes is to be identified, designated and protected as required for the duration of the works to prevent impact.

7.2.4 Transport and Traffic Management Plan

The OEMP contains the traffic management controls that will continue to be in place during operation of the turning angle, which include the following measures:

- During the operational phase the requirement for operational staff and deliveries to access the site will be limited to the constructed permanent access road off the Tarro Interchange and immediate vicinity of the provisioning facility.
- Minimal operational staff will be required to access the provisioning facility associated with the operation of the Provisioning Facility.
- Operational staff will be required to access the CMF car parking areas, and Service Vehicle Garage however, peak traffic associated with access to the facility is likely to occur during the hours 0730 to 1830;
- The projected number of operational staff on-site at any one time is approximately 30 during normal operating conditions;
- Heavy vehicles (HV) must stand down and give way to light vehicles (LV) at all times on shared access roads.
- All operational staff and contractors will be required to complete an induction communicating key elements of this traffic management plan prior to accessing the site.

7.2.5 Waste Management Plan

The Waste Management Sub-Plan, forming part of the OEMP, identifies a number of waste management strategies to manage the liquid and solid waste products at the site including, but not limited to:

- Where waste cannot be avoided, reused, recycled or recovered, it will be classified and appropriately disposed of. Waste generated by operations will be classified in accordance with the *Waste Classification Guidelines* (EPA, 2014).
- All wastes must be handled in such a manner to avoid accidental release of product to the environment.
- Any waste generated outside the Site is not to be received for storage, treatment, processing, reprocessing, or disposal, except where permitted by licence under the *Protection of the Environment Operations Act 1997*, if such a licence is required for the particular waste.
- All containers and vessels containing hazardous liquid wastes will be stored in bunded areas or tanks that have the capacity to store 110% the volume of the largest stored container to prevent any leaks or spills that may contaminate the receiving environment.
- All wastes are to be transported by a licenced waste transporter and only disposed of at an appropriately licensed waste management facility or premises lawfully permitted to accept the materials.

7.3 Summary of Mitigation Measures

The proposed mitigation measures are outlined below in **Table 21**.

Table 21 Summary of collective mitigation and management measures

Issue/Condition	Environmental Safeguard	Timing	Responsibility	
Stormwater and Water Quality				
Stormwater and quality	quantity	Mitigation measures as detailed in soil assessment (GHD 2019).	Construction	Aurizon
Stormwater and quality	quantity	Construct stormwater drainage of the proposal as per the design.	Construction	Aurizon
Stormwater and quality	quantity	Maintain the existing stormwater management system as per the existing Operational Stormwater Management Sub-Plan.	Operation	Aurizon
Stormwater and quality	quantity	Update the Operational Stormwater Management Sub-Plan for consistency once construction of the proposal is complete.	Operation	Aurizon
Existing Consent Conditions and Commitments				
Condition C7		The SSI shall be designed, and employ surface water management techniques, such that runoff volumes, rates and pollutant loads are maintained as far as practicable to pre-construction levels and there are no adverse effects to adjoining lands as a result of runoff;		
Condition C8		The SSI shall be designed and constructed to incorporate operational stormwater management measures, including (but not limited to): (a) areas of high sediment, areas of storage and use of oil and grease and areas containing nutrient loads (including the wash bays, provisioning sheds and servicing sheds) shall be separated from the general site stormwater system through the use of separate drainage systems, bunds and hardstands and subject to separate discharge to trade waste or re-use in the wash down bays; (b) where connection to the reticulated sewer system is identified to not be feasible, subject to justification based on further investigations, wastewater from the administration buildings, toilets, showers, lunch rooms, etc. shall be managed through a water treatment plant and be disposed via irrigation into existing agricultural pasture land. (c) site stormwater shall be directed into a drain on the western boundary of the SSI site and directed into one of three stormwater detention basins for treatment of suspended sediments and nutrients through floating wetlands, prior to its offsite discharge. This stormwater system shall be capable of treating at least a 1% AEP stormwater event; and (d) access roads shall be provided with road side swales to provide treatment through flow attenuation and entrainment of suspended sediments.		
Condition C10		Excavation activities near the Hexham Swamp Nature Reserve shall be undertaken in a manner which prevents the drawdown of groundwater within the Nature Reserve to a level which results in desaturation of acid sulfate soils within the Nature Reserve.		
Condition C11		All drainage structures, including but not limited to pits, pipes, cess drains, sediment basins and detention basins, shall be designed and constructed so as to minimise long term connection with groundwater. The stormwater system components, including but not limited to detention basins and floating wetlands, shall be designed and constructed to ensure that there is no permanent interception of, and/or connection with groundwater.		
Condition C19		A Surface Water and Groundwater Monitoring Program shall be prepared and implemented to monitor impacts on surface water and groundwater quality and hydrology. The Program shall be developed in consultation with the EPA, NoW and Hunter-Central Rivers CMA and shall include, but not necessarily be limited to: (a) identification of works and activities during construction of the SSI, including emergencies and spill events, that have the potential to impact on surface and groundwater water quality and groundwater depths and flows; (b) identification of surface and groundwater monitoring locations which are representative of the potential extent of impacts from the construction and operation of the SSI on water quality and groundwater depths and flows (including watercourses, waterbodies, wetlands, drainage swales and licensed discharge points);		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
	<p>(c) a description of the parameters (including physico-chemical) and standards against which any changes to water quality will be monitored and assessed, having regard to the principles of the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000</i> (ANZECC, 2000);</p> <p>(d) details of representative background monitoring of surface and groundwater quality parameters and groundwater depths and flows undertaken to date (or required to be undertaken) to establish baseline conditions;</p> <p>(e) identification of 'trigger points' for further investigation or action to be taken;</p> <p>(f) identification of the frequency and methodology of monitoring during background, construction and operation monitoring periods;</p> <p>(g) details on how the results of monitoring would be recorded;</p> <p>(h) details of how interactions with the ARTC Hexham Relief Roads Project and potential cumulative impacts would be monitored and managed;</p> <p>(i) contingency and ameliorative measures in the event that adverse impacts to surface waters and groundwater are identified consequent to the construction and/or operation of the SSI; and</p> <p>(j) methodology for reporting of the monitoring results to the Department and EPA.</p> <p>Monitoring shall be undertaken in accordance with the requirements of the approved Construction Soil and Water Management Plan required under Condition E63 (d) and Operation Environment Management Plan required by condition F2. The Program shall be submitted to the Director-General for approval at least one month prior to the commencement of construction of the SSI, or as otherwise agreed by the Director-General.</p>		
Condition E39	Changes to hydrogeology, including groundwater depths, interception and connection with surface water, shall be minimised to the greatest extent practicable.		
Condition E40	Dewatered groundwater shall not be discharged from the construction site or applied on site unless in accordance with an EPL.		
Condition E63	<p>As part of the Construction Environment Management Plan for the SSI required under condition E62 of this approval, the Proponent shall prepare and implement the plans listed at (a) to (f) below. Where a plan is required to be prepared in consultation with an authority or stakeholders, the plan shall provide details on the consultation undertaken including any comments received and where these have been addressed in the plan.</p> <p>(d) A Construction Soil and Water Management Plan to manage surface water and groundwater impacts during the construction of the SSI. The Plan shall be developed in consultation with the City of Newcastle, NoW and Hunter-Central Rivers CMA...[continues]</p>		
Existing Commitment	The Stormwater management Plan prepared by Worley Parson's forms part of this project and the management, monitoring and maintenance requirements set out in that plan will be implemented. The Plan will be reviewed and updated as part of the detailed design process.		
Existing Commitment	A Construction Water Quality Management Plan will be prepared and implemented as part of the CEMP once the final construction methodology is confirmed. The Plan will identify a range of preventative, treatment and contingency measures for the construction phase of the TSF project including further details regarding appropriate erosion and sediment controls to be implemented at discharge locations and spillways to prevent the discharge of sedimentation during construction. Stormwater management measures for the construction phase will be developed in accordance with the Landcom 'Blue Book' and incorporated in the Construction Environmental Management Plan prior to the commencement of construction.		
Existing Commitment	Gross Pollutant Traps (GPTs) will be utilised to provide primary screening of stormwater. A secondary system of GPTs will be located at the outlet of each Water Quality Control Pond as a final barrier to remove suspended solids, remaining floating debris and hydrocarbons.		
Existing Commitment	Access roads will be constructed with road side swales to provide treatment through flow attenuation and sedimentation of suspended sediments.		
Existing Commitment	<p>Surface water and groundwater monitoring will be regularly undertaken during the ongoing operation of the TSF to:</p> <p>a) identify any change in water quality; and</p> <p>b) determine the appropriate treatment strategies to be implemented to maintain or improve water quality.</p> <p>The water monitoring program for the TSF project will include monitoring of changes in hydrological regime associate with discharges to catchment 2 (which contains the Swamp Oak Forest EEC) in the northwest and to Catchment 5 (which contains the Coastal Saltmarsh EEC) to the south. Further opportunities will be investigated to manage stormwater flows on the site to assist in creating favourable water flows and levels that support rehabilitated and offset areas of significant ecological value.</p>		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
Flooding			
Existing Consent Conditions and Commitments			
Condition C12	The SSI shall be designed and constructed so that it does not result in flooding impacts greater than those predicted in the documents referred to in condition B1. The cumulative impacts of the SSI and the proposed ARTC Hexham Relief Roads shall be considered in these requirements.		
Condition C15	The Proponent shall prepare a Flood Emergency Management Plan which sets out the management requirements and procedures for managing flood risks during the construction and operation of the SSI, including flood recovery measures. The Plan shall be prepared in consultation with City of Newcastle and the OEH and be submitted to the Director-General at least one month prior to the commencement of construction, or as otherwise agreed by the Director-General.		
Condition F5	<p>A Flood Review Report shall be prepared following each of the following flood events at the SSI site – 1%, 2%, 5% and 10% AEP flood events to assess the actual flood impacts against those predicted in Appendix D of the Preferred Infrastructure Report referred to in condition B1(c). The Report shall be prepared by an appropriately qualified person(s) and include:</p> <p>(a) identification of the properties and infrastructure affected by flooding during the reportable event;</p> <p>(b) a comparison of the actual extent, level and duration of the flooding event against the impacts predicted Appendix D of the document referred to in condition B1(c);</p> <p>(c) where the actual extent and level of flooding exceeds the predicted level with the consequent effect of adversely impacting on property(ies), structures and infrastructure, identification of the measures to be implemented to reduce future impacts of flooding including the timing and responsibilities for implementation.</p> <p>Flood mitigation measures shall be developed in consultation with the affected property/structure/infrastructure owners, NoW and City of Newcastle.</p>		
Existing Commitment	A Flood Emergency Management Plan will be prepared which provides mitigation and management measures to be implemented in the event of a flood on site.		
Existing Commitment	The TSF will be constructed using flood compatible material and site power facilities will be placed above the 1% AEP flood levels.		
Biodiversity Management			
Existing Consent Conditions and Commitments			
Condition E1	The Proponent shall ensure that clearing of native vegetation and infilling of SEPP 14 Wetland No. 833 is limited to the minimal extent required for the construction and operation of the SSI, and no greater than 12 hectares (including SEPP 14 wetlands).		
Condition E2	The Proponent shall implement all mitigation measures as identified in the Construction Flora and Fauna Management Plan (condition E63 (b)), to minimise the potential for damage to native vegetation (particularly threatened species and endangered ecological communities and their habitat) not proposed to be cleared as part of the SSI, to ensure that there is no incursion into, or clearing of the vegetation.		
Condition E3	The Proponent shall mark areas of endangered ecological communities and threatened species habitat not to be impacted by the SSI with flagging tape or similar prior to commencing construction to ensure that there is no incursion into or clearing of the areas.		
Condition E4	Any areas temporarily disturbed during construction (including access tracks and compound sites) shall be rehabilitated to a standard equal to or better than the existing condition, as soon as feasible and reasonable following the completion of construction activities in the affected location. Replanting of affected vegetation shall be undertaken using locally occurring native species.		
Condition E5	The Proponent shall ensure that any coarse woody debris removed from the site, including timber from felled trees (particularly hollow bearing timber), shall be relocated to the Northern Offset site as identified in Appendix G of the document referred to in condition B1(c) of this approval, for the enhancement of the ecological values of that site.		
Condition E6	Prior to construction, pre-clearing surveys and inspections for threatened flora and fauna species and habitat features (including hollow bearing trees) shall be undertaken. The surveys and inspections, and any subsequent relocation of species, shall be undertaken under the guidance of a suitably qualified and experienced ecologist. The methodology for pre-clearance surveys shall be incorporated into the Construction Flora and Fauna Management Plan (condition E63 (b)).		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
Condition E8	The Proponent shall prepare a management plan that identifies the strategies that would be implemented in the event that the Green and Golden Bell Frog is identified during construction. The plan shall be developed in consultation with the OEH and include details on the mitigation measures to be implemented to minimise the risk to this species, including direct and indirect impacts to its habitat. The plan is to be submitted to the Director-General at least one month prior to construction, unless otherwise agreed by the Director-General. Nothing in this condition precludes the inclusion of this plan in the Flora and Fauna Management Plan (condition E63 (b)).		
Condition E9	In the event that the Green and Golden Bell Frog is identified to occur during construction, all work in the vicinity of the sighting shall stop to the extent necessary to allow the procedures set out in the management plan (condition E8) to be implemented.		
Condition E10	In the event that other threatened fauna or flora species are identified during construction, all work in the vicinity of the sighting shall stop and management measures to minimise the risk to the species implemented in accordance with the procedure required by condition E63 (b)(iv).		
Condition E11	The Proponent shall implement measures to minimise impacts to fauna species and their habitat as far as practicable (and where feasible and reasonable), during the construction of the SSI, including: (a) protocols for the removal and relocation of fauna during clearing, including a two stage clearing strategy; (b) establishing “no go” zones, including at freshwater wetland and coastal saltmarsh sites outside of the construction zone; (c) provision of setbacks; (d) presence of a suitably qualified and experienced ecologist to oversee clearing activities and facilitate fauna rescues and relocation; (e) timing construction to be outside of the breeding season of threatened species with the potential to occur on the site; (f) maintaining and reinstating habitat features (such as large woody debris, bush rock, leaf litter/mulch and topsoil etc.); (g) developing measures for minimising the incidence of fauna being trapped in excavation cells (such as minimising the length of time that cells are left exposed) and measures to deal with trapped or injured fauna; (h) implementing drainage controls to prevent the extension of <i>Gambusia holbrooki</i> (Eastern Mosquitofish) into the Hexham Swamp Nature Reserve; and (i) progressive re-vegetation of areas temporarily disturbed by construction.		
Condition E12	Where reasonable and feasible, all private access tracks and internal service roads are to be at least 50 metres from SEPP 14 wetlands and the Hexham Swamp Nature Reserve, unless this is in conflict with condition C33, or as otherwise agreed by the Director-General, or as specified at an alternative distance in the documents listed under conditions B1 (c) of this approval.		
Existing Commitment	The Construction Environmental Management Plan will include the ecological management measures / procedures set out in the Ecological Investigations report, as follows: a) Site-specific environmental induction for all staff. b) Identification of clearing limits and avoiding the storage of materials and vehicles under the drip line of retained vegetation. c) Ecological surveys will be undertaken prior to clearing or filling of the wetland to minimise impacts on threatened and endangered species and ensure that direct impacts to flora and fauna are avoided. d) When clearing vegetation timber, particularly sections with hollows will be retained as Coarse Woody Debris for enhancement of the Northern Offset area. e) Cease work immediately if any previously unknown threatened flora or fauna species are encountered. WIRES should be consulted if any injured fauna are encountered. f) Provide appropriate controls to manage exposed soil surfaces and stockpiles to prevent erosion and subsequent sediment discharge into surrounding wetlands. g) Clearly identify stockpile and storage locations and provide erosion and sediment controls around stockpiles. h) Stockpiles of topsoil to be stored in windrows no higher than 2m and be maintained free of weeds. i) Undertake dust suppression where required in accordance with the Protection of the Environment Operations Act 1997 (POEO Act) where there is a risk of increased dust outside of acceptable levels j) Establish and implement a Hygiene Protocol for vehicles entering and leaving the site to minimise spread of weeds and other biological risks such as alligator weed. k) Develop a monitoring program during construction (including a weekly checklist) to ensure that all mitigation measures proposed have been undertaken. The checklist should include items such as fencing and sediment and erosion control.		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
Contamination Management			
Acid Sulfate Soils	The ASSMP previously prepared will continue to apply to the works. See the Soil Assessment at Appendix F for specific details.	Construction	Contractor
Contamination	<p>Identified contamination is to be managed in accordance with the previously approved RAP (GHD 2014) and the measures listed in the Site Management Plan (SMP)</p> <ul style="list-style-type: none"> Soils are to be managed in accordance with the SMP/ASSMP, which may include: <ul style="list-style-type: none"> Soils requiring disturbance which exhibit visual or olfactory signs of contamination or coal wash reject are to be excavated. Laboratory analysis by a NATA accredited laboratory will be required to confirm presence/absence of contamination. Prior to backfilling the excavation floor and walls will undergo validation sampling to confirm absence of contamination or if further neutralisation of coal washery reject is required. Excavated soil which is to be transported to a different area from its existing location will also be subject to waste classification. <p>If any ACM is observed during construction, work is to cease until the ACM has been disposed of to a licenced facility and the area has been cleared by an authorised consultant.</p>	Construction	Contractor
Soil Salinity	<p>The following mitigation measures will be implemented to minimise potential impacts to soil salinity:</p> <ul style="list-style-type: none"> Earthworks will be staged where possible to minimise the time that any potentially saline subsoils are exposed. Erosion and sediment control measures will be implemented to prevent mobilisation of any potentially saline soils. All deep-rooted trees are to be retained where possible to minimise impacts to groundwater levels. <p>The surface and groundwater monitoring program currently undertaken by Aurizon is to continue. Any exceedances of the adopted conductivity performance criteria are to be investigated to determine the cause, potential impacts and feasible mitigation measures.</p>	Operation	Contractor
	Site drainage is to be designed to maintain existing levels of runoff and infiltration where possible.	Design	Aurizon
Soil and Land Resources	<p>General mitigation measures are to be implemented in accordance with Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom 2004) and Volume 2 (DECC, 2008), including:</p> <ul style="list-style-type: none"> Define access and no/go areas on site. <p>Early installation of physical controls, including cross drainage to convey clean water around or through the site.</p>	Pre-construction	Contractor
	<ul style="list-style-type: none"> Minimising the duration of exposed topsoil by retaining topsoil cover, grassed drainage lines and shrub cover on the soil surface for as long as possible minimising the extent of disturbed areas. Interim stockpiling of materials (minimal permanent stockpiles). Minimising the lengths of slopes by limiting the extent of excavations and/or using diversion drains to reduce water velocity over disturbed areas. <p>Progressive rehabilitation or sealing of works areas.</p>	Construction	Contractor
Existing Consent Conditions and Commitments			
Condition C20	The Proponent shall ensure that all acid sulfate soils and acid generating material excavated on site is disposed offsite in an appropriately licensed landfill facility, unless proposed to be re-used on site. Any acid sulphate soils or acid generating material to be re-used on site shall be temporarily stored and treated on site to required standards in an appropriately lined and bunded storage area located above the 1% AEP flood level. Procedures for the treatment, temporary storage and monitoring of these materials shall be in accordance with the Acid Sulfate Soil Management Plan required to be prepared under condition E63 (d) (xi) of this approval.		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
Condition C21	No acid sulfate soils or acid generating material shall be permanently stored on site, unless the material has been treated and validated as neutralised and the material is stored above the 1% AEP flood level and protected by appropriate erosion and sediment control measures, and as agreed to by the EPA and the Director-General.		
Condition E27	Fluvial geomorphology, soil and water management measures consistent with the recommended mitigation measures in Appendix E of the document referred to in condition B1(c) and the measures in Managing Urban Stormwater - Soils and Construction Volumes 1 and 2, 4th Edition (Landcom, 2006) shall be employed prior to and during the construction of the SSI (including prior to clearing) to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.		
Condition E28	Facilities shall be provided (including at all exit points leading onto public roads) to minimise tracking mud, dirt or other material onto a public road or footpath. In the event of any spillage, the Proponent shall remove the spilled material as soon as practicable within the working day of the spillage.		
Condition E29	Where reasonable and feasible, the Proponent shall undertake the upgrade of waterway crossing during periods of dry weather.		
Condition E30	Prior to the commencement of construction the Proponent shall undertake further investigations as recommended in the Remediation Action Plan included in Appendix H of the document referred to in condition B1 (c), to confirm the presence of contaminants on site, based on detailed design requirements. Upon confirmation of the contaminated areas on site, the Proponent shall update the Remediation Action Plan as required to take into account any new or updated procedures relevant to any new areas of contamination identified and remediate the identified sites in accordance with the updated Remediation Action Plan, prior the commencement of construction in the impacted areas.		
Condition E31	Where unexpected contaminated materials are identified during construction works, these materials would be identified, managed, treated and disposed of in accordance with the procedures outlined in the updated Remediation Action Plan. Where required, the Proponent shall engage a suitably qualified contaminated land consultant to prepare an addendum to the Validation Report referred to in condition E33 to cover the additional areas of contamination identified and additional remediation measures undertaken. The Proponent shall also engage an accredited NSW Site Auditor to prepare an updated Site Audit Report to assess the addendum Validation Report and submit a copy of both reports to the Director-General and City of Newcastle.		
Condition E33	E33. The Proponent shall engage a suitably qualified contaminated land consultant to prepare a Validation Report upon completion of the remediation of the areas identified in the Remediation Action Plan. The Validation Report shall verify that the site has been remediated in accordance with the Remediation Action Plan (if and as amended) and to a standard consistent for the intended land use. The Proponent shall engage an accredited NSW Site Auditor to prepare a Site Audit Report to determine the appropriateness of the Validation Report. The Validation Report and Site Audit Report shall be submitted to the Director-General upon completion of construction related activities and finalisation of the Site Audit Report and Site Audit Statement process prior to the laying of track in the remediated area(s) . A copy of the reports shall also be submitted to the City of Newcastle for its information.		
Condition E32	Prior to the reuse of ballast, chitter or tailings within the existing railway corridor, the Proponent shall undertake sampling and testing of the materials to establish whether: (a) the materials are of a quality suitable for the intended reuse; and (b) the removal and reuse of the materials would not result in contaminated runoff. Materials that are not suitable for reuse are to be classified in accordance with the Waste Classification Guidelines (DECCW, 2009) or any superseding document		
Condition E38	The Proponent shall ensure that all areas used for the storage and treatment of acid sulfate soils during construction of the SSI are located or elevated above the 1% AEP flood level, unless otherwise agreed by the Director-General.		
Condition E63	As part of the Construction Environment Management Plan for the SSI required under condition E62 of this approval, the Proponent shall prepare and implement the plans listed at (a) to (f) below. Where a plan is required to be prepared in consultation with an authority or stakeholders, the plan shall provide details on the consultation undertaken including any comments received and where these have been addressed in the plan. (f) a Construction Contamination Management Plan to detail how contaminated materials, water and soil will be managed to protect human health and the environment. The Plan shall include, but not necessarily be limited to: (i) location of areas identified as contaminated; (ii) procedures for the sampling and assessment of excavated material at depth consistent with the requirements of condition E30; (iii) procedures for the sampling and testing of ballast, chitter and tailings consistent with the requirement of condition E32;		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
	(iv) procedures for the classification, remediation, handling and monitoring of contaminated materials, water and soils identified during construction (including asbestos), consistent with the Remediation Action Plan included as Appendix H in the document referred to in condition B1(c). (v) a contingency plan to be implemented in the case of unanticipated discovery of contaminants; (vi) a procedure for updating the Remediation Action Plan consequent to amendments in the remediation procedures or the discovery of contaminants during construction; (vii) program for validating soil quality upon completion of remediation; and (viii) mechanisms for the monitoring, review and amendment of this Plan.		
Existing Commitment	Remediation will be carried out in accordance with the Remedial Action Plan to: <ol style="list-style-type: none"> remediate hydrocarbon contamination present in fill material; remove by localised excavation those hydrocarbon impacted soil associated with former fuel tank (Pit 128) and the former refuelling area (Bore 102 and Pit 128); and Asbestos from within buildings to be demolished, and asbestos containing soils, will be removed for disposal in appropriate licenced landfill facilities. Asbestos will be removed by a suitably licenced contractor in accordance with WorkCover requirements. 		
Existing Commitment	The ASSMP prepared by Douglas Partners forms part of the project. The ASSMP will be updated following further soil sampling and validation of ASS, and the confirmation of construction methodology.		
Heritage			
Unexpected finds	<ul style="list-style-type: none"> All activity in the vicinity of the find should cease immediately. Aboriginal objects are protected by the National Parks and Wildlife Act 1974. It is an offence under the NPW Act 1974 to disturb or destroy an Aboriginal object without an Aboriginal Heritage Impact Permit (AHIP). A qualified archaeologist should be contacted to assess the find and the OEH and the Local Aboriginal Land Council (LALC) notified. If human remains, or suspected human remains, are found during excavation, all work in the vicinity should cease immediately, the site should be secured and the NSW Police and the OEH should be notified. 		
Waste Management			
Existing Consent Conditions and Commitments			
Condition C25	The Proponent shall ensure that all liquid and/or non-liquid waste generated on the site is assessed and classified in accordance with Waste Classification Guidelines (DECCW, 2009), or any future guideline that may supersede that document, and that it is appropriately handled.		
Condition C26	The Proponent shall maximise the reuse and/or recycling of waste materials generated on site as far as practicable, to minimise the need for treatment or disposal of those materials off site.		
Condition C27	The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the Protection of the Environment Operations Act 1997, if such a licence is required in relation to that waste. This condition is independent of the operation of the Brancourts facility and Sewerage Treatment Plant.		
Condition C28	All waste materials removed from the site shall be appropriately tracked and shall only be directed to a waste management facility or premises lawfully permitted to accept the materials.		
Existing Commitment	A Construction Waste Management Plan will be prepared prior to the commencement of construction on the site. The Construction Waste Management Plan will address the following: <ol style="list-style-type: none"> appropriate waste identification, handling, storage and disposal in accordance with the Department of Environment Climate Change and Water Guidelines; and procedures for how the different waste streams will be stored, collected and disposed of by licensed waste contractors. 		

Issue/Condition	Environmental Safeguard	Timing	Responsibility
Existing Commitment	An Operational Waste Management Plan will be prepared to address the ongoing handling, storage and disposal of waste. The Operational Waste Management Plan will provide: <ul style="list-style-type: none"> a) identification of the types of waste likely to be generated during construction; b) appropriate storage of waste on site; c) measures to minimise the amount of waste produced; d) measures to increase the potential for waste to be re-used and recycled; e) appropriate methods to assess if waste can be re-used, recycled or disposed to landfill; and f) maintaining records of waste re-use, recycling and/or disposal. 		
Existing Commitment	Licensed waste contractors will be made responsible for collection and appropriate disposal of waste.		

8.0 Conclusion and Next Steps

This Environmental Assessment Report has been prepared to consider the environmental, social and economic impacts of the proposed modification to the SSI approval for the Hexham LTTSF project.

In light of the environmental assessment provided within the report, it is considered that the environmental impacts of the turning angle and ancillary development can be appropriately managed with the implementation of the existing mitigation and management measures established under the existing SSI Approval.

Additional environmental management documentation relate to updates of the OEMP (to include the turning angle site) and a range of environmental management plans pursuant to the conditions of the SSI Approval. It is considered that these management documents can be appropriately prepared prior to the commencement of construction of the proposed turning angle and are not necessary for the assessment of the modification application.