

Division 5.2 and EPBC Act Approval

Appendix F: Urban design, and Landscape and character and visual impact assessment

Proposed changes between Eaton Road,
Luddenham and Littlefields Road, Luddenham

**The Northern Road Upgrade – Mersey Road,
Bringelly to Glenmore Parkway, Glenmore Park**

December 2018



Transport
Roads & Maritime
Services

The Northern Road

Stage 6

Modification Assessment

Urban Design, and Landscape Character and Visual Impact Assessment

Final
29th November 2018

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Introduction

Background

As part of Western Sydney Infrastructure Plan, Roads and Maritime Services (Roads and Maritime) have been working towards the upgrade of 35km of The Northern Road (TNR). In 2017, an Environmental Impact Statement (EIS) was developed for a 16km section of The Northern Road Upgrade from Mersey Road, Bringelly to Glenmore Parkway, Glenmore (Stages 4, 5 and 6). The EIS included an Urban Design Concept and Landscape Character and Visual Impact Assessment (LCVIA) for all three stages of the upgrade.

In June 2017, the EIS was publicly exhibited and community and stakeholder submissions were addressed by Roads and Maritime in the *Submissions and Preferred Infrastructure Report* (SPIR) and the Final EIS in December 2017.

In May 2018, the Minister for Planning approved the TNR upgrade under Section 5.19 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), which included the Minister's Conditions of Approval (CoA).

The TNR upgrade was also approved, in June 2018, by the Commonwealth Minister for the Environment under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and was subject to a number of conditions. It was assessed due to its potential impact on Commonwealth land (i.e. Defence Establishment Orchard Hills and the Western Sydney Airport site).

Purpose of report

Subsequent to final EIS approval, Roads and Maritime proposes to modify the approved project design for an approximate 4km section of The Northern Road between Eaton Road, Luddenham to Littlefields Road, Mulgoa (Stage 6). The proposed changes to the approved project (discussed on the following page) are substantial and, thus, Roads and Maritime has lodged a request with the NSW Planning Secretary to modify the Minister's approval under Section 5.25 of the EP&A Act.

This report provides an urban design, and landscape character and visual impact assessment for the proposed modification. This assessment considers the impacts of the approved project and, where relevant, assesses any new or changed impacts against the Secretary's Environmental Assessment Requirements (SEARs) and Conditions of Approval issued for the project.

This report should be read in conjunction with the EIS, SPIR and accompanying Urban Design and Visual Impact Assessment Technical Paper.

The purpose of this report is to:

- Determine if the modified design remains consistent with the Commonwealth and NSW Conditions of Approval relating to urban design
- Determine if the modified design is consistent with the approved urban design objectives and strategies in the EIS/SPIR
- Assess the impact of the modified design to the landscape character zones (LCZs) identified in the EIS/SPIR, and identify any additional LCZs if required
- Assess the impact of the modified design to the relevant viewpoints identified in the EIS/SPIR, and identify any additional viewpoints if required
- Recommend any additional mitigation measures as a result of the modified design to reduce its impact.

Description of the modified design

The modified design includes the following changes from the SPIR design. These changes are also depicted in Figures 1 – 6:

1. Twin bridges over Adams Road replaced with an at-grade signalised intersection. Bridge abutments removed. Resulting vertical alignment changes extend approximately 400 metres north and south of the intersection
2. Adams Road regraded to tie-in with revised The Northern Road, involving up to 8 metres of fill. Left and right turn lanes added on Adams Road and The Northern Road at this intersection
3. Reduced median width and cross-sectional area between intersections, while maintaining provisions for an ultimate eight lane configuration in the future as demand requires
4. Replace kerb and gutter with grass swale, except at footpath locations near Adams Road and Elizabeth Drive intersections
5. Removal of 5.0 metre verge and replacement with 1.0 metre verge along the eastern side of The Northern Road
6. Other minor refinements to the vertical and horizontal alignment of the road at various locations
7. Cut and fill batter slopes revised from 1:4 to 1:3 in most places. Benching added to high cuts between chainage 6320 – 6620
8. Changes to drainage structures (pit, pipes, culverts, swales) to suit horizontal and vertical geometry
9. Refinements to water quality infrastructure at various locations including additional construction phase sediment basins and additional permanent grass swales, within the approved project boundaries
10. Removal of street lighting mid-block. Street lighting added for turning heads along Elizabeth Drive
11. Filling of one additional dam along Adams Road at south-east corner of intersection with The Northern Road, to suit intersection
12. Partial fill and reform dam at north-west corner of The Northern Road and Adams Road intersection
13. Bus stop areas added on north-bound and south-bound lanes at Adams Road and Elizabeth Drive intersections
14. Various private property driveway amendments, including some new accesses
15. 2 x cantilevered variable messaging signs (VMS) added over The Northern Road approximately 700m south and 660m north of Elizabeth Drive
16. Removal of some additional vegetation along Adams Road (east of the proposed intersection)
17. Additional crash barriers and line marking along Adams Road
18. Changes to utilities such as removal of poles and relocation electrical wires underground.

Proposed changes to the approved construction and operational project boundaries are limited to:

- Increased construction footprint along Adams Road either side of the proposed The Northern Road to allow for the intersection
- Reduction of the construction boundary and ancillary facility area at the south-east corner of the Elizabeth Drive and The Northern Road intersection, thereby retaining two farm dams previously due to be filled
- Negligible rationalisation (increase) in operational boundary.

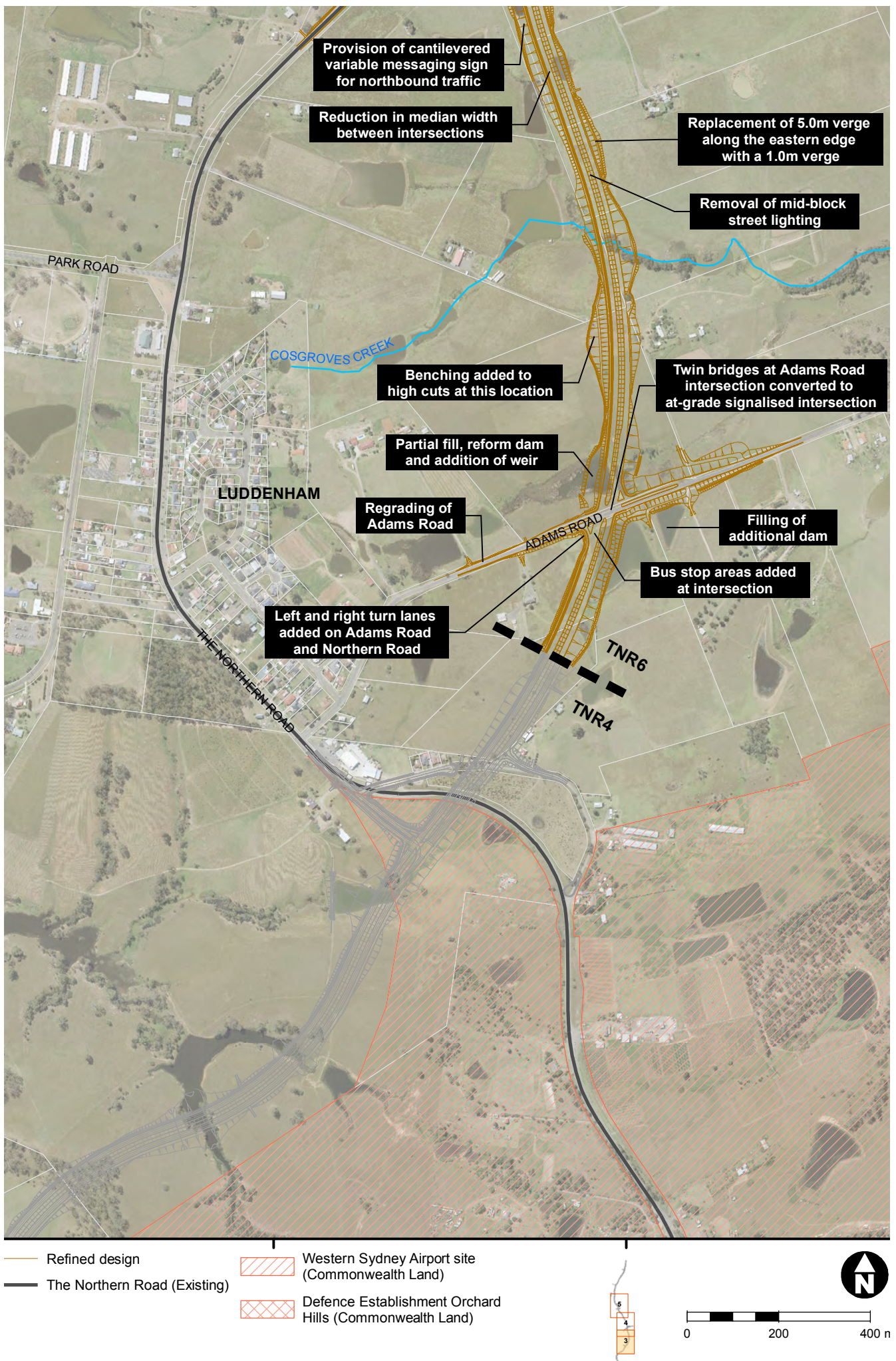


Figure 1. Modified design - Page 1 (source: Jacobs)

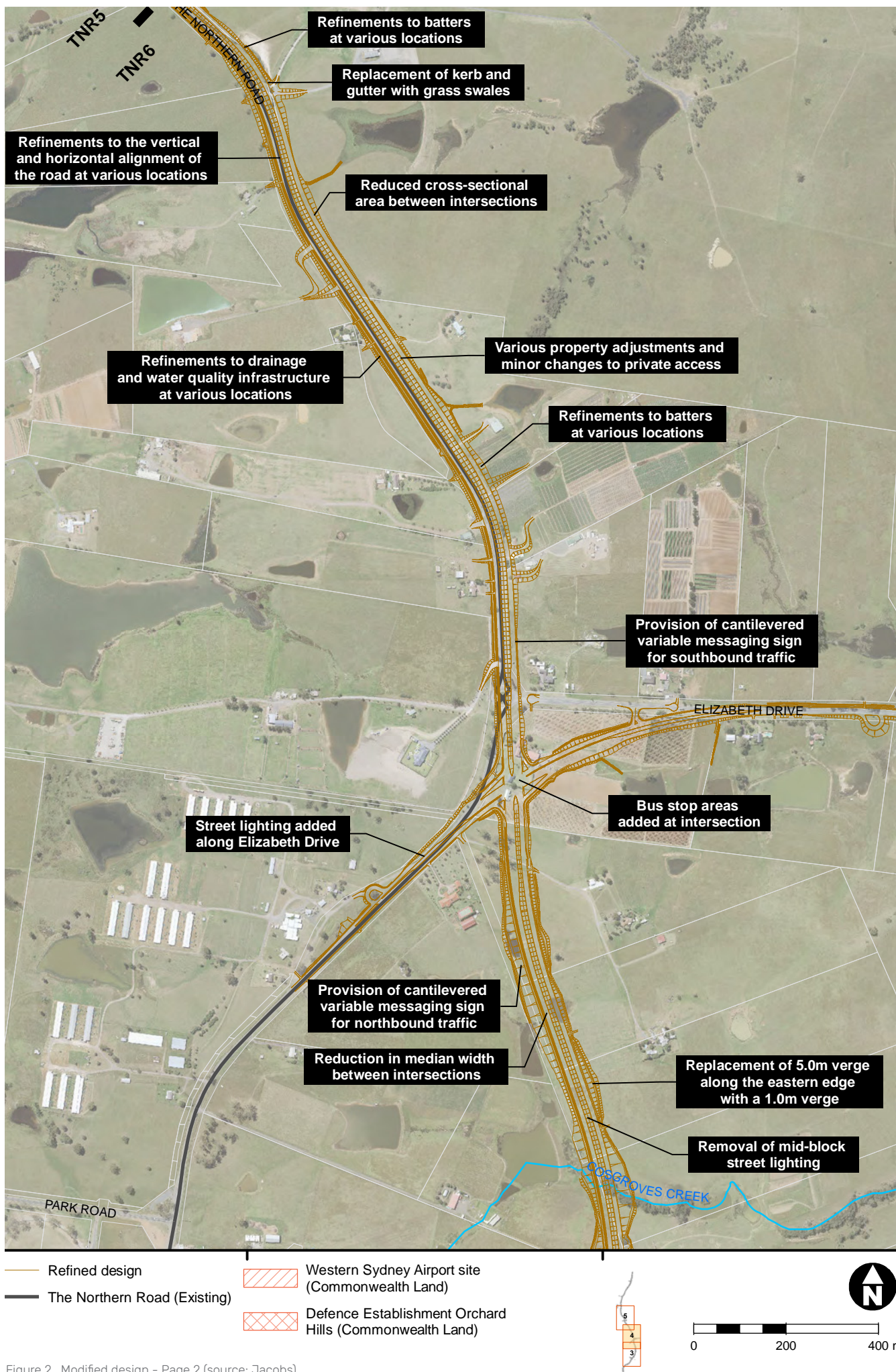
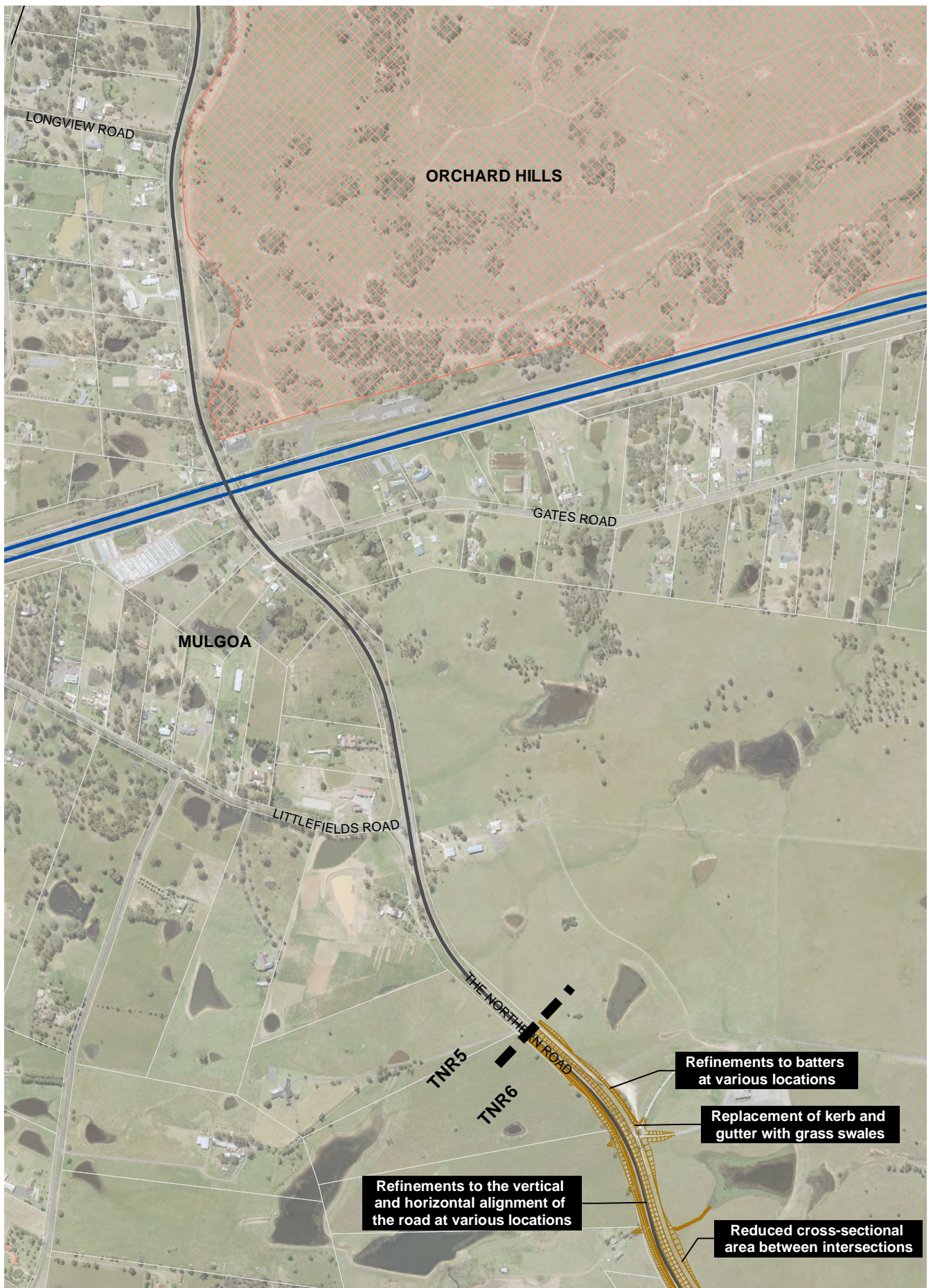


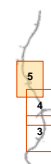
Figure 2. Modified design – Page 2 (source: Jacobs)



— Refined design
 — The Northern Road (Existing)

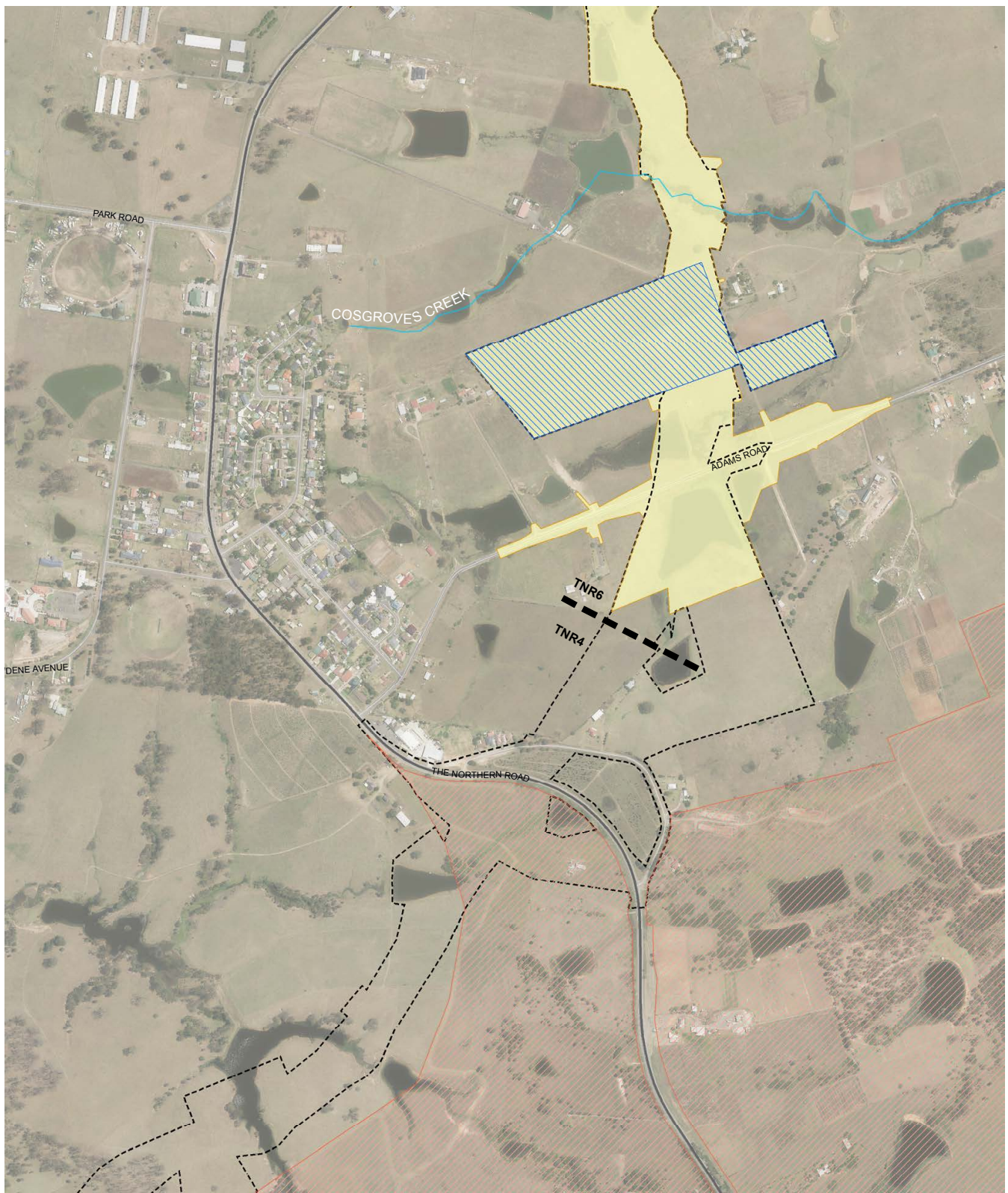
Western Sydney Airport site (Commonwealth Land)
 Defence Establishment Orchard Hills (Commonwealth Land)
 WaterNSW supply pipelines

Figure 3. Modified design - Page 3
 (source: Jacobs)



0 200 400 m





Legend

- Submissions design construction footprint
- TNR6 Modification assessment construction boundary
- Construction compound sites
- Western Sydney Airport site (Commonwealth Land)



0 250 500 m
A3
1:7,500



Figure 4. Construction boundary and compound sites - Page 1 (source: Jacobs)



JACOBS NSW SPATIAL - GIS MAP file : IA086100_TNR6_MAConsBoundary_SPIRConstFootprint_R3V1 | 13/09/2018 | DRAWN BY: AA

Legend

- Submissions design construction footprint
- TNR6 Modification assessment construction boundary
- Construction compound sites

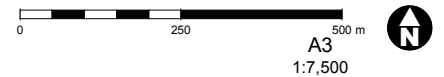
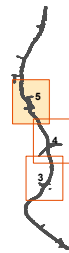


Figure 5. Construction boundary and compound sites - Page 2 (source: Jacobs)



Legend

- Submissions design construction footprint
- TNR6 Modification assessment construction boundary
- Defence Establishment Orchard Hills (Commonwealth Land)



0 250 500 m
A3



Figure 6. Construction boundary and compound sites - Page 3 (source: Jacobs)

Conditions of Approval

Commonwealth Conditions of Approval

Conditions of Approval were issued on 15 June 2018, in accordance with sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The conditions were reviewed as part of this assessment and the modified design deemed to be in agreement with the Commonwealth conditions relevant to urban design.

Minister's Conditions of Approval

Conditions of Approval were issued on 30 May 2018, in accordance with section 5.19 of the *EP&A Act for Critical State Significant Infrastructure (CSSI)*. Table 1 states the conditions of relevance to the urban design and visual impacts and provides comment as to whether the condition remains applicable.

Table 1. The NSW Conditions of Approval (30 May 2018)

Condition		Comment
General		
A1	The CSSI must be carried out in accordance with the terms of this approval and generally in accordance with the description of the CSSI in the EIS as amended by the SPIR.	The project description has changed as a result of the removal of the twin bridges at Adams Road and replacement with an at-grade intersection. Other more minor changes proposed are described in Section 1 of this report. The modified design, therefore, can not be carried out in accordance with this condition without approval from the Minister. Should the Minister approve the proposed modification, Roads and Maritime will request this condition to be amended to reflect changes made as a result of the proposed modification.
Urban Design and Visual Amenity		
E60	The CSSI must be designed to retain as many trees as possible. The planting, retention and replacement of trees is to be carried out in accordance with the EIS. Trees removed during construction that are not within an endangered ecological community are to be replaced at a rate of two trees for every tree removed. Tree planting must occur within the CSSI boundary unless otherwise envisaged in the EIS, in consultation with the relevant Council, or otherwise agreed by the Secretary.	While the proposed modification has been designed to retain as many trees as possible, it is anticipated that the proposed changes will require the removal of additional trees. However, removal and replacement of such trees would be carried out in accordance with this condition.
E61	Tree species selection is to be consistent with the plans and planting palette in the EIS. Pot sizes of selected tree species are to be consistent with part 3.2.1 (Rural road reserves) in the RMS Landscape Guideline (April 2008), subject to the long-term viability of the plant.	This condition is applicable to the proposed modification and would be adhered to through an update to the Urban Design and Landscape Plan for the approved project, to cover the proposed modification.
E62	An Urban Design and Landscape Plan must be prepared based on the detailed design, and in accordance with the commitments made in the documents listed in Condition A1.	An updated Urban Design and Landscape Plan would be prepared based on the detailed design for the proposed modification. The modified design does not require a change to the intent or overall outcomes of this condition.
E63	The Urban Design and Landscape Plan must incorporate monitoring and maintenance procedures for the built elements, rehabilitated and replacement vegetation and landscaping (including visual screening and weed control) and performance indicators, responsibilities, timing and duration and contingencies where rehabilitation of vegetation and landscaping measures fail.	An updated Urban Design and Landscape Plan would be prepared based on the detailed design for the proposed modification. The modified design does not require a change to the intent or overall outcomes of this condition.

02

Condition	Comment
E64 The Urban Design and Landscape Plan must be finalised following consultation with the relevant Councils and the community. The Urban Design and Landscape Plan shall incorporate evidence of consultation on the proposed urban design and landscape measures and the monitoring and maintenance procedures.	The Urban Design and Landscape Plan would be updated to reflect the proposed modification and the outcome of consultation with the relevant Councils and the community. The modified design does not require a change to the intent or overall outcomes of this condition.
E65 The Urban Design and Landscape Plan must be made publicly available and submitted to the Secretary for information prior to the commencement of works for which the Urban Design and Landscape Plan requires community consultation under the Plan, or within another timeframe agreed by the Secretary.	The updated Urban Design and Landscape Plan would be subject to the terms of this condition. The modified design does not require a change to the intent or overall outcomes of this condition.

Urban Design Objectives and Strategy

Urban design objectives and principles

A review of the modified design against the urban design objectives and principles, outlined in the EIS/ SPIR, was undertaken as part of the assessment (Table 2). The assessment includes each modified design change with the relevant objective and an assessment as to whether the objective remains aligned with the updated design. Comments around whether the change results in a more positive, neutral or negative outcome in relation to the objective have also been included.

Table 2. Assessment of modified design changes against the Urban Design Objectives

Design change	Relevant Objective	Comments
1. Twin bridges over Adams Road replaced with an at-grade signalised intersection. Bridge abutments removed. Resulting vertical alignment changes extend approximately 400 metres north and south of the intersection.	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Structures - Road footprint - Visual and landscape character 	The introduction of an at-grade intersection is considered to integrate more seamlessly into the existing landscape than the bridge therefore meeting this objective with a more positive urban design outcome. The intersection also improves access and connectivity for vehicles, cyclists and pedestrians, and better supports planned land use changes.
2. Adams Road regraded to tie-in with revised The Northern Road, involving up to 8 metres of fill. Left and right turn lanes added on Adams Road and The Northern Road at this intersection	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Road footprint - Visual and landscape character 	<p>The regrading of Adams Road results in new embankments up to 8m high. The embankments should be integrated with the natural topography as much as possible to align with this objective.</p> <p>The widening of Adams Road increases the corridor footprint in this location, however, does not alter the magnitude of the project overall.</p>
3. Reduced median width and cross-sectional area between intersections, while maintaining provisions for an ultimate eight lane configuration in the future as demand requires	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape:</i></p> <ul style="list-style-type: none"> - Road footprint - Visual and landscape character 	The reduction in median width reduces the overall project footprint, therefore the design change remains aligned with the urban design objective.
4. Replace kerb and gutter with grass swale, except at footpath locations near Adams Road and Elizabeth Drive intersections.	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Water sensitive urban design 	The introduction of grass swales is aligned with this objective and is considered more responsive to the landscape context.

Design change	Relevant Objective	Comments
5. Removal of 5.0 metre verge and replacement with 1.0 metre verge along the eastern side of The Northern Road	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Road footprint - Visual and landscape character <p><i>Objective 3: Facilitate the provision of good urban design outcomes for areas adjoining the road.</i></p> <ul style="list-style-type: none"> - Maximise access, connectivity, and opportunities for active transport 	The reduction in verge width reduces the overall project footprint, however, it also reduces the potential for the construction of a pedestrian/ shared path in the future as the surrounding land is developed.
6. Other minor refinements to the vertical and horizontal alignment of the road at various locations	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Road footprint - Visual and landscape character 	Refinements to the alignment generally involve the reduction of the overall project footprint, therefore are considered a more positive outcome for the urban design objective and principles.
7. Cut and fill batter slopes revised from 1:4 to 1:3 in most places. Benching added to high cuts between chainage 6320 – 6620	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape:</i></p> <ul style="list-style-type: none"> - Road footprint - Visual and landscape character 	Increasing the batter slopes and benching is considered a reduced urban design outcome as they don't integrate as well in to the natural landform.
8. Changes to drainage structures (pit, pipes, culverts, swales) to suit horizontal and vertical geometry	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Drainage structures 	The design changes to drainage infrastructure includes pits, pipes, culverts and swales results and remains aligned with this objective and has a neutral urban design outcome.
9. Refinements to water quality infrastructure at various locations including additional construction phase sediment basins and additional permanent grass swales, within the approved project boundaries	<p><i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i></p> <ul style="list-style-type: none"> - Water sensitive urban design 	The introduction of additional water sensitive urban design measures is aligned with this objective and considered a more positive urban design outcome.
10. Removal of street lighting mid-block. Street lighting added for turning heads along Elizabeth Drive	<p><i>Objective 4: Develop a simple and unified palette of elements and details that are attractive and easily maintained.</i></p> <ul style="list-style-type: none"> - Generally limit road lighting to major intersections to reduce glare and retain the character of existing rural areas along the corridor 	The removal of lighting is aligned with this objective and principle as it maintains the rural character particularly at night.

Design change	Relevant Objective	Comments
11. Filling of one additional dam along Adams Road at south-east corner of intersection with The Northern Road, to suit intersection	<i>Objective 1: Protect and enhance existing views, character and cultural values of the corridor.</i> <ul style="list-style-type: none"> - Views and vistas - Visual and landscape character - Cultural values 	The filling of the dam is required to accommodate the regrading of Adams Road. Dams are considered to be attractive elements in the rural landscape, therefore a reduced urban design outcome for this objective.
12. Partial fill and reform dam at north-west corner of The Northern Road and Adams Road intersection	<i>Objective 1: Protect and enhance existing views, character and cultural values of the corridor.</i> <ul style="list-style-type: none"> - Views and vistas - Visual and landscape character - Cultural values 	The partial filling of the dam is required to accommodate the regrading of Adams Road. Dams are considered to be attractive elements in the rural landscape, therefore a reduced urban design outcome for this objective.
13. Bus stop areas added on north-bound and south-bound lanes at Adams Road and Elizabeth Drive intersections	<i>Objective 3: Facilitate the provision of good urban design outcomes for areas adjoining the road.</i> <ul style="list-style-type: none"> - Access to public transport 	The provision of bus stops at these locations improves access to public transport and is therefore considered a more positive urban design outcome, which remains aligned with this objective.
14. Various private property driveway amendments, including some new accesses	<i>Objective 3: Facilitate good urban design outcomes for areas adjoining the road:</i> <ul style="list-style-type: none"> - Provide access to all properties 	Access to rural properties is maintained with the modified design, therefore the design remains aligned with the urban design objective and principle.
15. 2 x cantilevered variable messaging signs (VMS) added over The Northern Road approximately 700m south and 660m north of Elizabeth Drive.	<i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape:</i> <ul style="list-style-type: none"> - Visual and landscape character - Views, structures and detailing 	Signs are integral to project functioning and the proposed signs are consistent with what might be expected along a major arterial road.
16. Removal of some additional vegetation along Adams Road (east of the proposed intersection)	<i>Objective 1: Protect and enhance existing views, character and cultural values of the corridor.</i> <ul style="list-style-type: none"> - Views and vistas - Visual and landscape character 	The removal of vegetation is considered a reduced urban design outcome for this objective.
17. Additional crash barriers and line marking along Adams Road	<i>Objective 2: Provide a flowing road alignment that is responsive to, and integrated with the natural and built landscape.</i> <ul style="list-style-type: none"> - Road footprint - Visual and landscape character 	Crash barriers are considered standard road safety structures. They also assist in reducing the clear zones allowing tree planting to be closer to the road corridor, which contributes to the landscape character.
18. Changes to utilities such as removal of poles and relocation electrical wires underground.	<i>Objective 3: Facilitate good urban design outcomes for areas adjoining the road:</i> <ul style="list-style-type: none"> - Visual amenity 	The relocation of utilities underground remains aligned with the objective as it results in improved views and visual amenity along the corridor.

Urban design strategy

A review of the modified design against the urban design strategy outlined in the EIS/SPIR, was undertaken as part of this assessment. The strategy in the EIS/SPIR focussed on opportunities for planting and maintaining views, and improving access and connections. The design opportunities for each of these strategies are described and assessed in the tables below.

Table 3. The assessment of the modified design against the urban design strategy relating to **vegetation and views**

Design opportunity	Comment
1. Complement the existing character of a mix of open pasture and stands of Cumberland Plain Woodland vegetation	The proposed changes do not affect the ability of the project to realise this design opportunity
2. Reinforce creeks as ecological corridors as well as potential future open space links and networks. In particular, reinstate Cosgrove Creek and farm dams and associated vegetation	The proposed changes do not affect the ability of the project to realise this design opportunity
3. Provide for views to the Blue Mountains	The proposed changes do not affect the ability of the project to realise this design opportunity
4. Use vegetation to screen designated future employment lands	The proposed changes do not affect the ability of the project to realise this design opportunity
5. Design intersections as landscape features	The proposed changes do not affect the ability of the project to realise this design opportunity
6. Use vegetation to provide visual buffers to protect the outlook to the east for residents in Luddenham	The proposed changes do not affect the ability of the project to realise this design opportunity
7. Provide predominantly low vegetation along the corridor through the Luddenham High Plateau to maintain distinctive long-distance views to both the east and the west	The proposed changes do not affect the ability of the project to realise this design opportunity
8. Provide sporadic small tree clumps through the Luddenham High Plateau to complement the existing character of paddocks with remnant trees. Strategically locate trees to maintain residents' views towards the Blue Mountains	The proposed changes do not affect the ability of the project to realise this design opportunity

Table 4. An assessment of the urban design strategy relating to **access and connections**

Design opportunity	Comments relating to the modified design
1. Design the road to maintain the opportunity for a future a pedestrian/ cyclist connection linking The Northern Road and Adams Road and adjoining future employment lands	The reduction of the verge on the eastern side of The Northern Road from 5m to 1m reduces the opportunity for a future pedestrian path, to connect to adjoining future employment lands on this side. However, the intersection provides direct access between the shared path on the western side and Adams Road/ future employment areas
2. Maintain the opportunity for a future a pedestrian/ cyclist connection to Luddenham town centre along the existing The Northern Road.	The proposed changes do not affect the ability of the project to realise this design opportunity

04

Landscape Character Assessment

Introduction

As outlined in the LCVIA prepared for the EIS/SPIR, the landform and vegetation, views and vistas, settlement pattern and built structures within and adjoining the study area combine to define the landscape character of the area.

The contextual analysis undertaken for the SPIR identified five landscape character zones (LCZs) along the length of the project, based on the interplay of existing natural and built features. Of these, two are located within the project area for the modified design and have been reassessed taking into consideration the proposed changes identified in Section 1. These are:

- LCZ 3: Luddenham Plateau
- LCZ 4: Cosgrove Creek.

As the modified design has a similar footprint to the approved project, no new LCZs are required to be assessed.

The following landscape character assessment includes the original text describing the existing landscape character for each of the LCZs. The text describing the proposed works includes details of the original EIS/SPIR design and the changes as a result of the modified design. The changes to the landscape character assessment are focussed on the modified design only.

Landscape Character Zone 3 - Luddenham Plateau

Existing landscape character

The Luddenham Plateau LCZ is characterised by a broad ridge with scenic panoramic views over a gently sloping pastoral landscape.

Topography and views

A broad ridge line runs north to south through LCZ 3 along the existing North Road alignment. The lower ground within this zone has both undulating topography and flat, open plains.

Hydrology

LCZ 3 is situated within the upper catchment of Duncans, Mulgoa, Blaxland and Cosgrove Creeks. There are only minor ephemeral watercourses. A network of farm dams provide visual interest and are an attractive and important visual and landscape character feature.

Vegetation

LCZ 3 has largely been extensively cleared for rural and urban purposes. A large woodland remains near St James Anglican Church. The remainder of LCZ 3 features limited scattered trees.

Vegetation within Luddenham town centre consists of a mix of native vegetation remnants and cultural plantings associated with residential properties. There are also pockets of freshwater wetland flora around farm dams.

Built form and heritage

The built form within Luddenham town centre generally consists of low density dwellings, as well as community buildings such as a post office, churches and schools, and a number of shops including cafés, service stations and a supermarket.

Beyond the town built form is limited and includes rural dwellings and structures.

Heritage items within the study area in LCZ 3 include the site of Lawson's Inn, remnants of The Northern Road in Eaton Road, and at 2,778 The Northern Road, the site of Miss Lawson's Guesthouse, 'Pleasant View' at 2,901 The Northern Road, and two weatherboard houses and associated huts and sheds including the Old Dairy at 2,778 The Northern Road.

Other nearby heritage items include the Luddenham Public School and St James Anglican Church and cemetery. There are also a number of Aboriginal heritage items and sites. Refer *Non-Aboriginal Heritage Working Paper* (Appendix N of the EIS) and *Aboriginal Cultural Heritage Assessment Report* (Appendix M of the EIS).

Spatial quality

There is an open and expansive spatial quality to LCZ 3 due to the high elevation and long distance views. The sky and the landscape are the predominant visual features, together with the blue ribbon of the Blue Mountains providing a backdrop to the west.

This is in contrast with the spatial quality of Luddenham town centre which is more enclosed as a result of denser development including buildings and vegetation.

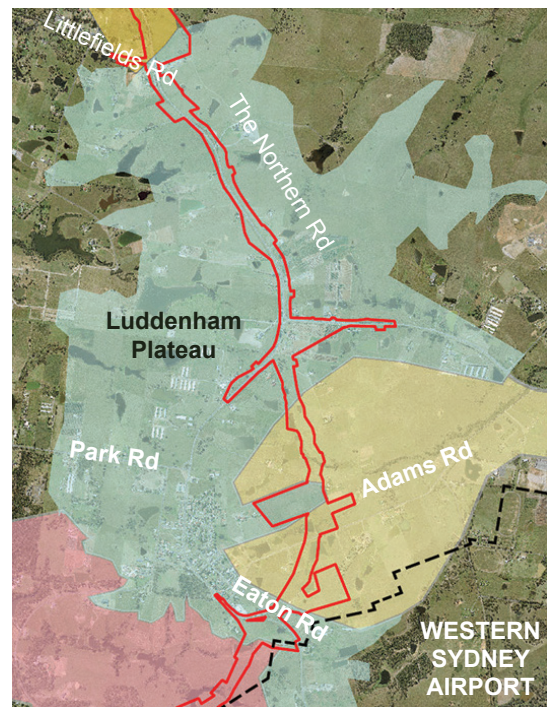


Figure 7. Location of the Luddenham Plateau LCZ 3 (Source: Spackman Mossop Michaels, 2017)

KEY
 Luddenham Plateau LCZ 3

Connectivity and access

The Northern Road is the primary access route through LCZ 3, together with Elizabeth Drive. There are a number of secondary roads to surrounding areas such as Park Road and Adams Road. There is a network of local streets within Luddenham town centre. There are currently no dedicated cycle paths or footpaths beyond the Luddenham town centre.

Key activity areas

Luddenham town centre functions as the local centre servicing the surrounding rural area. It is the key activity area in LCZ 3 with a public school, catholic primary school, shops, cafés, a showground and parks, as well as a number of churches.

The other key activity area is The Northern Road itself. It carries large volumes of local and regional traffic including tourism traffic.

Public domain

The public domain within LCZ 3 includes the public roads and footpaths within the Luddenham town centre. The Luddenham showground is an important community and agricultural venue. Sales Park is a major oval. Wilmington Reserve in Jamison Street also provides for community recreation.

04

The proposed works

The proposed works within LCZ 3 from the SPIR design includes:

- Construction of a new road alignment south of Elizabeth Drive
- Widening the existing Northern Road north of Elizabeth Drive
- New intersections
 - With the existing The Northern Road south of Luddenham town centre including realignment of the existing The Northern Road
 - With the eastern part of Eaton Road
 - With Elizabeth Drive including re-alignment of Elizabeth Drive to create a four-way intersection with the existing The Northern Road
- Modifications to the existing Elizabeth Drive to provide a new left-in intersection from the proposed new Elizabeth Drive alignment and changing the existing intersection with The Northern Road to left-out only
- Cut and fill embankments
- Eight construction compounds:
 - Two compounds south of the existing The Northern Road near Eaton Road
 - One compound north of Eaton Road and west of the proposed new alignment of The Northern
 - One compound along The Northern Road, opposite 2,342 The Northern Road
 - One compound between the existing The Northern Road and the existing Elizabeth Drive
 - One compound at 2,778 The Northern Road, Luddenham
 - Two compounds south of Littlefields Road, one on each side of the corridor
- Alterations to property access to generally left-in left-out only
- Removal of rural dwellings and structures

- Partial infilling of farm dams
- Clearing of remnant vegetation and Christmas tree farms near Eaton Road and Elizabeth Drive
- Road drainage and water quality controls utilising swales or drainage channels, drainage inlets, culverts and pipe networks
- Road-side furniture and elements such as barriers, fences and signs
- Lighting is not required on the main carriageway, but it would be provided for local road intersections as appropriate.

The proposed works as a result of the modified design within LCZ 3 includes:

- Reduced cross-sectional area while maintaining provisions for an ultimate eight lane configuration in the future as demand requires
- Grass swales (instead of kerb and gutters), except at footpath locations at the Elizabeth Drive intersection
- Changes to drainage structures (pit, pipes, culverts, swales) to suit horizontal and vertical geometry
- Cut and fill batter slopes revised from 1:4 to 1:3 in most places
- Some benching added to high cuts
- Bus stop areas added at Elizabeth Drive intersection
- 2 x cantilevered VMS added over TNR approximately 700m south and 660m north of Elizabeth Drive
- Removal of street lighting mid-block
- Street lighting added for turning heads along Elizabeth Drive
- Reduction in median width
- Removal of 5.0 metre verge and replacement with 1.0 metre verge along the eastern side
- Refinements to the vertical and horizontal alignment of the road at various locations (maximum height of batters reduced to six metres).



Figure 8. Expansive sky, farm dams and the constant ribbon of the Blue Mountains in the west are characteristic features of the Luddenham Plateau (Source: LCVA from EIS)

Landscape character changes

The following changes to the landscape characteristics are described below in relation to the modified design.

Topography

The height of some embankments have been reduced as a result of the modified design, and the slope of increased from 1:4 to 1:3 and benching introduced. However, the modifications don't change the overall magnitude of the project which would introduce a large unnatural landform in a visually open and exposed area.

Hydrology

The modified design results in grass swales being introduced along The Northern Road in replacement of kerb and gutters, which results in a higher degree of visual consistency with the existing rural character. In addition, two farm dams near Elizabeth Drive now don't require filling due to the reduction of the construction boundary and an ancillary site.

Vegetation

There are no additional changes to the vegetation as a result of the modified design.

Built form and heritage

Two cantilevered variable messaging signs (VMS) have been included over The Northern Road approximately 700m south and 660m north of Elizabeth Drive.

Spatial quality

The overall open quality of LCZ 3 would not change as a result of the modified design.

Connectivity and access

Bus stops near the Elizabeth Drive intersection and a new turning circle along Elizabeth Drive have now been included. In addition, the verge on the eastern side has been reduced from 5m to 1m. This means that's the design no longer makes provision for a future shared or pedestrian path, which may reflect the potential of the project to support planned land use changes in the area.

Key activity areas

There are no additional changes to key activity areas as a result of the modified design.

Public domain

There are no additional changes to the public domain as a result of the modified design.

Construction activities

The boundary of the construction compound near the corner of Elizabeth Drive has been reduced as a result of the modified design,

Landscape character assessment

Sensitivity

The sensitivity of LCZ 3 has not changed since the EIS/SPIR. It was described as: LCZ 3 attracts a larger number of potential viewers including residents and visitors to Luddenham and motorists and tourists along The Northern Road. Due to its open and exposed ridge top location LCZ 3 has a low capacity to absorb major changes. The elevated plateau provides a spectacular setting for views over an attractive rural landscape to the Blue Mountains.

Overall, the LCZ remains as assessed in the SPIR to have **high** sensitivity.

Magnitude

As a result of the modified design, many embankments have been reduced and the construction boundary reduced. However, the upgrade would still introduce a major new road corridor into a rural setting in the south, and increase the width of the existing road north of Elizabeth Drive more than fourfold.

Therefore, the assessment of the magnitude of the modified design remains as **moderate** as previously assessed.

Landscape character impact

The qualitative assessment indicates that the landscape character impact of the modified design in LCZ 3 is:

Sensitivity	High
Magnitude	Moderate
Landscape character impact	High to moderate

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the landscape character impact of the modified design on LCZ 3 remains as **high to moderate** as previously assessed.

04

Landscape Character Zone 4 – Cosgrove Creek

Existing landscape character

The landscape of LCZ 4 is comprised of a rural valley surrounded by steep slopes leading up to the ridges of the surrounding Luddenham Plateau.

Topography and views

LCZ 4 is comprised of a valley along Cosgrove Creek and its tributaries and has a relatively broad valley floor framed by steep slopes. Views are contained by surrounding ridges and range from short to long distance along the valley floor.

Hydrology

LCZ 4 lies within the upper catchment of Cosgrove Creek. It includes a number of tributaries extensively dammed to create a series of cascading dams that characterised the view along the valley.

Vegetation

LCZ 4 has largely been widely cleared. Stands of vegetation remain along creek lines and farm dams, as well as on rural properties.

Built form and heritage

The built form in this zone is limited to rural dwellings and structures.

The study area within LCZ 4 features several Aboriginal heritage sites and no Non-Aboriginal heritage items. For more detail refer *Aboriginal Cultural Heritage Assessment Report* (Appendix M of the EIS).

Spatial quality

The spatial quality is that of an open valley framed by bald ridge lines.

Connectivity and access

Adams Road, a two-lane country road, is the primary vehicular link between Luddenham town centre and the north-eastern parts of Luddenham along Luddenham Road. It has been identified as a future arterial road within the WSPGA, linking to employment areas in Erskine Park together with Luddenham Road. Additionally, the proposed alignment around Luddenham town centre deviates from the existing road through existing properties. This would result in new segments of land that require access to the proposed alignment.

Key activity areas

Adams Road is the major activity area but carries relatively low volumes of traffic.

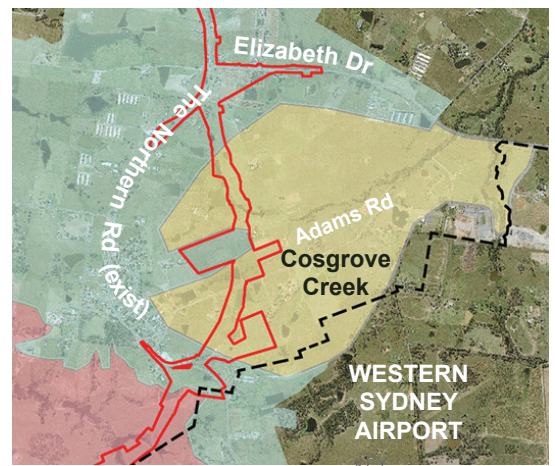


Figure 9. Location of the Cosgrove Creek LCZ 4 (Source: Spackman Mossop Michaels, 2017)

KEY
Cosgrove Creek LCZ 4



Figure 10. Looking east along Adams Road showing the steep hillsides of the Cosgrove Creek Valley, as well as the series of dams stepping down along the creek (Source: LCVIA from EIS)

The proposed works

The proposed works within LCZ 4 from the SPIR design includes:

- Construction of a new road alignment south of Elizabeth Drive.
- Cut and fill embankments in excess of ten metres tall in some areas
- Two construction compounds north of Adams Road
- Partial infilling of farm dams
- Clearing of remnant vegetation
- Road drainage and water quality controls utilising swales or drainage channels, drainage inlets, culverts and pipe networks
- Road-side furniture and elements such as barriers, fences and signs
- Lighting is not required on the main carriageway, but it would be provided for local road intersections as appropriate.

The proposed works as a result of the modified design within LCZ 4 includes:

- Reduced cross-sectional area while maintaining provisions for an ultimate eight lane configuration in the future as demand requires
- Grass swales (instead of kerb and gutters), except at footpath locations at the Elizabeth Drive intersection
- Changes to drainage structures (pit, pipes, culverts, swales) to suit horizontal and vertical geometry
- An at-grade signalised intersection at Adams Road (previously proposed as twin bridges)
- Adams road regraded to tie-in with the revised northern road
- Left and right turn lanes added on Adams road and Northern road at Adams road intersection
- Cut and fill batter slopes revised from 1:4 to 1:3 in most places
- Some benching added to high cuts
- Bus stop areas added at Adams Road intersection
- Various private property driveway amendments, including one new
- Removal of street lighting mid-block
- Reduction in median width
- Removal of 5.0 metre verge and replacement with 1.0 metre verge along the eastern side
- Refinements to the vertical and horizontal alignment of the road at various locations
- Filling of one additional dam along Adams Rd at south-east corner of intersection, to suit intersection
- Partial fill and reform dam at north-west corner of TNR and Adams Rd intersection
- Removal of some additional vegetation along Adams Road (east of the proposed intersection)
- Additional crash barriers and line marking along Adams Road
- Adjustments to property boundaries.

Landscape character changes

The following changes to the landscape characteristics are described below in relation to the modified design.

Topography

The height of some embankments have been reduced as a result of the modified design, and the slope increased from 1:4 to 1:3, reducing their integration into the natural landform. New embankments approximately 500m long across the intersection and up to 8m high are also required along Adams Road. These would be highly unnatural in this setting closing off the open valley and visible from a number of nearby rural properties on Adams Road. The property at 125 Adams Road, approximately 200m from the intersection, is particularly affected with views towards the proposal from a higher elevation. The views from this property would have been towards the bridge in the EIS/SPIR design but now will be of the intersection and the high embankments, altering the outlook not just to the west but also to the north.

Hydrology

The modified design results in grass swales being introduced along The Northern Road in replacement of kerb and gutters, except at footpath location near the Adams Road intersection.

Vegetation

The modified design requires additional clearing of vegetation along Adams Road. Re-vegetation is proposed but will take time to mature.

Built form and heritage

There is a reduction of built form in LCZ 4 due to the removal of the bridge.

Spatial quality

The spatial quality will change within this LCZ largely associated with the introduction of large batters along Adams Road. A wider portion of the LCZ is directly affected including associated changes in the outlook from a larger number of houses.

Connectivity and access

There is improved vehicle, cyclist and pedestrian connectivity from The Northern Road to future employment areas as a result of the new intersection. However, the reduction in the eastern verge width no longer makes provision for a potential future shared or pedestrian path. This reduces the ability of the project to support planned land use changes, namely future employment lands.

Changes to property access are also required at 180 Adams Road which will be relocated approximately 100m east. In addition, there are slight modifications to driveway entrances at 45, 102 and 125 Adams Road.

Key activity areas

The modified design setting supports access to future activity areas (ie. employment lands) likely reducing through traffic in Luddenham by giving direct access to future employment lands via the new intersection.

Construction activities

There are no additional changes to the construction activities as a result of the modified design.

04-

Landscape character assessment

Sensitivity

The sensitivity of LCZ 4 has not changed from the EIS/SPIR. It was described as: The generally open and attractive rural valley has a low capacity to absorb major infrastructure, but has a potentially large number of viewers including residents and visitors to Luddenham.

Overall, the LCZ remains as assessed in the SPIR to have **high** sensitivity.

Magnitude

The modified design has replaced the twin bridges with an at-grade intersection which reduces the built form in this setting. The intersection also better supports future/planned land uses and improves outcomes to the town of Luddenham by reducing through traffic. However, there is a notably larger footprint along Adams Road through increased infrastructure and large earthworks formations. In summary, the project would still introduce a major new piece of infrastructure into a greenfield site that is a rural valley with currently low levels of development.

Therefore, the assessment of the magnitude of the modified design would remain **high**.

Landscape character impact

The qualitative assessment indicates that the landscape character impact of the modified design in LCZ 4 is:

Sensitivity	High
Magnitude	High
Landscape character impact	High

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the landscape character impact of the modified design on LCZ 4 remains **high** as previously assessed.

04

Landscape Character Assessment Summary

The summary table below includes the landscape character impacts of both the EIS/SPIR design and the modified design. It illustrates that despite some design difference the overall landscape character impact has no changed relative to the approved project.

Table 5. Summary table of the landscape character impact of the EIS/SPIR and modified designs.

Landscape Character Zone	Impact rating	
	EIS/SPIR	Modified design
LCZ 3: Luddenham Plateau	High-moderate	High-moderate
LCZ 4: Cosgrove Creek	High	High

Introduction

The LCVIA prepared as part of the EIS/SPIR assessed the potential visual impacts of the project on a total of 19 viewpoints. Viewpoints were selected considering the existing pattern of land use and development adjoining the project area, including the number of potential viewers, and to generally be representative of the range of viewpoints within and beyond the road corridor.

Previously assessed viewpoints

Of the 19 viewpoints in the EIS/SPIR eight viewpoints fall within project area and were assessed against the modified design (listed below). The eight viewpoints from the EIS/SPIR were considered sufficient to assess the modified design therefore no additional viewpoints were included. The 11 viewpoints in the EIS/SPIR not covered in this assessment fall outside the project area and are therefore not included in this report.

- Viewpoint 5: looking north-east into Cosgrove Valley from Wilmington Reserve on Jamison Street, Luddenham
- Viewpoint 6: looking west along Adams Road
- Viewpoint 7: looking south from private property driveway at 2,901 The Northern Road
- Viewpoint 8: looking east at The Northern Road Luddenham, opposite the Park Road intersection.
- Viewpoint 9: looking west from private property driveway at 2,901 The Northern Road
- Viewpoint 10: looking west along Elizabeth Drive
- Viewpoint 11: looking south at the existing roundabout at the Elizabeth Road intersection at The Northern Road
- Viewpoint 12: looking west at 2,776 The Northern Road.

The visual impact ratings determined by the EIS/SPIR were reviewed for the above eight viewpoints, taking into consideration the proposed changes identified in Section 1 to assess whether the visual impact ratings would change as a result of the modified design.

The original summary text of the Visual Impact Assessment from the EIS/SPIR for the eight viewpoints has been reviewed and updated where relevant based on the modified design.

Two of the eight viewpoints (5 and 6) also have updated photomontages as they include the new Adams Road intersection in the viewpoint.

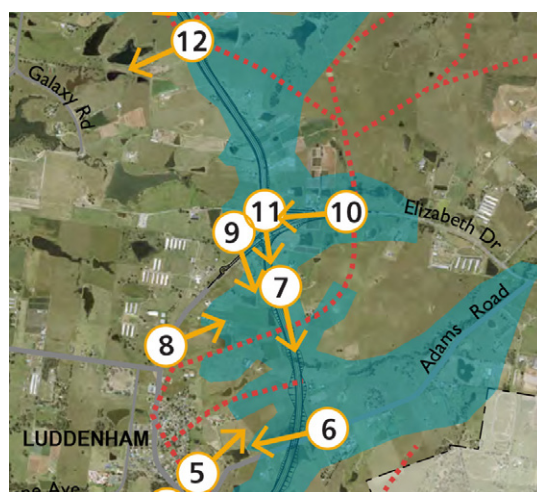


Figure 11. Visual Envelope and Viewpoint Location Map for TNR 6 (Source: Spackman Mossop Michaels, 2017)

Legend

- Study Area
- Visual catchment
- Ridges
- View direction
- # Viewpoint

Viewpoint 5

Location description

Wilmington Reserve on Jamison Street, Luddenham, looking north-east into Cosgrove Valley.

Potential viewers

Local community, including residents from nearby dwellings, park users, and motorists along Jamison Street.

Visible project elements

SPIR design (Figure 13):

- New road alignment including cut and fill embankments
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design (Figure 14):

- Twin bridges at Adams Road removed and replaced with an at-grade signalised intersection
- Traffic signals and lighting at the Adams Road intersection
- Reduced cut and fill embankments
- Mid-block lighting removed.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was described as: The rural landscape has a low capacity to absorb the proposed introduction of a major new road. There are a large number of viewers in Luddenham that overlook the valley, including sensitive residential and recreation users.
Magnitude	Moderate	The modified design introduces a new at-grade intersection at Adams Road in replacement of the twin bridges. The intersection also requires traffic signals and street lighting, which would be highly visible at night. The proposal requires embankments along The Northern Road which have been reduced from the SPIR design. As described in EIS/SPIR assessment the proposal introduces new road infrastructure and associated traffic, and the long distance to the proposal from the viewpoint reduces its scale. Therefore, the magnitude of the project from this viewpoint remains to be moderate as previously assessed in the EIS/SPIR.
Impact	High to moderate	The visual impact of the modified design remains high to moderate as assessed in the SPIR.

Summary

The modified design has not altered the overall magnitude of the project as approved in the SPIR. As a result, the visual impact of the modified design from Viewpoint 5 remains **high to moderate** as previously assessed.



Figure 12. Viewpoint 5 - looking north east from Wilmington Reserve - existing (source: Spackman Mossop Michaels, 2017)



- Cut
- Fill embankment
- Adams Road bridge

Figure 13. Viewpoint 5 - looking north east from Wilmington Reserve - original photomontage from EIS/SPiR (source: Spackman Mossop Michaels, 2017, prepared by Spatial Media)



- Cut
- Fill embankment
- Adams Road intersection

Figure 14. Viewpoint 5 - looking north east from Wilmington Reserve - photomontage of *the modified design* (prepared by Spatial Media)

Viewpoint 6

Location description

Adams Road, looking west.

Potential viewers

Motorists and residents on rural properties. Residents of the area accessing Luddenham town centre for services or daily needs.

Visible project elements

SPIR design (Figure 16)

- New road alignment and associated fill embankments
- Modifications to farm dams including partial filling in
- Modifications to Cosgrove Creek including culvert, headwall and transition apron
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design (Figure 17):

- Twin bridges at Adams Road intersection converted to at-grade signalised intersection
- Widening of Adams Road to the north by approximately eight metres on the approach to the intersection to accommodate turning lanes
- New embankments on both sides of Adams Road to meet the level of the intersection (up to eight metres high close to the intersection)
- Traffic signals and lighting at the Adams Road intersection
- New line marking and crash barriers on both sides of Adams Road
- Removal of electrical poles and wires
- Mid-block lighting along The Northern Road removed
- The Northern Road embankments reduced
- Modified property access.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was describes as: This view would have low capacity to absorb the proposed changes. It is situated in a rural environment on the outskirts of Luddenham where viewers would be sensitive to change. It is characterised by the rural landscape outlook, including a series of cascading farm dams along Cosgrove Creek.
Magnitude	High	The modified design results in the removal of the twin bridges over Adams Road and replaces it with an intersection. As a result Adams Road is elevated towards the intersection, introducing embankments on both sides of the road up to eight metres high. The proposed vegetation would help mitigate the impact of the embankments but would take time to mature. The intersection also introduces new traffic signals and street lighting, which would be visible at night. The combined changes of the modified design results in the magnitude remaining high.
Impact	High	The visual impact of the modified design remains high as assessed in the SPIR.

Summary

Although the twin bridges were removed at the Adams Road intersection, the introduction of batters up to 8m high and the increase in road infrastructure contributes to a combined visual impact from Viewpoint 6 to remain high.



Figure 15. Viewpoint 6 - looking west along Adams Road - existing (source: Spackman Mossop Michaels, 2017)



Figure 16. Viewpoint 6 - looking west along Adams Road - original photomontage from EIS/SPiR (source: Spackman Mossop Michaels, 2017, prepared by Spatial Media)

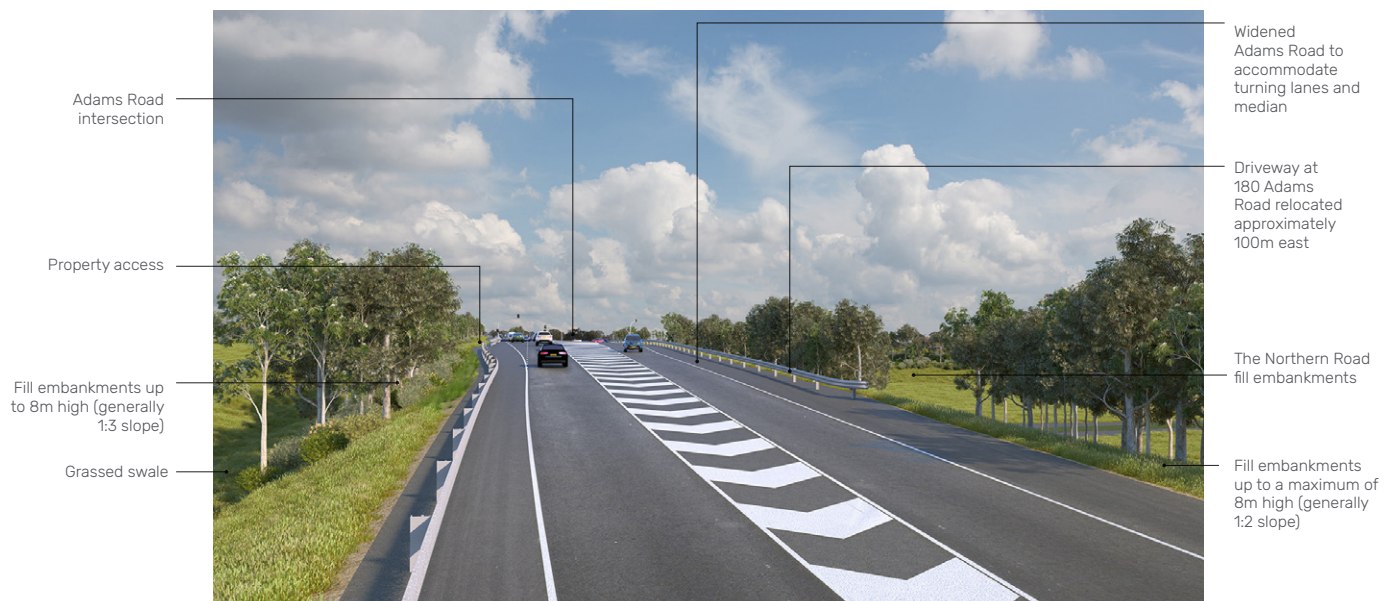


Figure 17. Viewpoint 6 - looking west along Adams Road - photomontage of the modified design (prepared by Spatial Media)

Viewpoint 7

Location description

Private property driveway at 2,901 The Northern Road, Luddenham, looking south.

Potential viewers

Residents on small farms, motorists along the proposed new road alignment.

Visible project elements:

SPIR design:

- New road alignment/ Luddenham bypass including cut and fill embankments
- Modifications to farm dams including partial filling in
- Modifications to Cosgrove Creek including culverts
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design:

- VMS on the southern approach to the intersection with Elizabeth Drive
- Mid-block lighting removed.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was described as: The elevated outlook over the picturesque rural landscape would be highly sensitive to the introduction of a major new arterial road. Rural residents would be highly sensitive to change in their surroundings.
Magnitude	High	The modified design introduces a VMS into this setting which would increase the magnitude of the project from this view. As described in SPIR assessment the road alignment introduces a major new built form into a greenfield site, requiring cut and fill embankments, modifications to farm dams and bisecting the property. Therefore, the magnitude of the project remains high as previously assessed in the EIS/SPIR.
Impact	High	The visual impact of the modified design remains high as assessed in the SPIR.

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the likely visual impact of the modified design from Viewpoint 7 remains **high** as previously assessed.

Viewpoint 8

Location description

The Northern Road, Luddenham, opposite the Park Road intersection, looking east.

Potential viewers

Motorists. Residents on rural properties. Residents of the area accessing Luddenham town centre for services or daily needs.

Visible project elements

SPIR design:

- New road alignment including cut and fill embankments
- Modifications to farm dams including partial filling in
- Modifications to watercourses including culverts and headwalls
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design:

- VMS on the southern approach to the intersection with Elizabeth Drive
- Reduced embankments
- Mid-block lighting removed.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was described as: The elevated outlook over the picturesque rural landscape would be highly sensitive to change as it has limited capacity to absorb a major new arterial road. Rural residents would be highly sensitive to change in their surroundings.
Magnitude	Low	A VMS in this location is included as result of the modified design, however, would not be discernible from this viewpoint due to distance. The reduced embankments would also not be seen. Therefore, there is no change to the magnitude of the proposal as a result of the modified design.
Impact	Moderate	The visual impact of the modified design remains moderate as previously assessed in the EIS/SPIR.

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the likely visual impact of the modified design from Viewpoint 8 remains **moderate** as previously assessed.

Viewpoint 9

Location description

Private property driveway at 2,901 The Northern Road, Luddenham, looking west

Potential viewers

Residents on small farms, motorists along the proposed new road alignment

Visible project elements

SPiR design:

- New road alignment/ Luddenham bypass including cut and fill embankments
- Incident response facility including roads, car parks and associated building structures
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design:

- Reduced fill embankment
- Mid-block lighting removed.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPiR. It was described as: The view is characterised by a rural setting of pastures, remnant trees and rural dwellings. It has limited capacity to absorb the proposed changes. Rural residents would be highly sensitive to change in their surroundings.
Magnitude	High	The modified design reduces the height of the embankment in this view, however, the proposal still introduces the new road alignment and incident response facility. Therefore, there is no change to the magnitude of the proposal as a result of the modified design.
Impact	High	The visual impact of the modified design remains high as assessed in the EIS/SPiR.

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPiR. As a result, the likely visual impact of the modified design from Viewpoint 9 remains **high** as previously assessed.

Viewpoint 10

Location description

Elizabeth Drive, looking west.

Potential viewers

Local and regional motorists. Residents on rural properties.

Visible project Elements

SPIR design:

- New Elizabeth Drive alignment including widening and changes to existing road levels
- Partial removal of boundary fence
- Vegetation clearing including inside private property
- Landscape works.

Changes as a result of the modified design:

- No changes to this view as a result of the modified design.

Visual impact assessment

Sensitivity	Moderate	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was described as: The view is along the existing Elizabeth Drive which currently remains a two lane rural road. While motorists may be accepting of a certain amount of change within the road corridor, the road passes through a rural landscape. Remnant and planted trees as well as glimpses into adjoining farmland are important visual elements that contribute to the driver experience.
Magnitude	High	There are no changes to this view as a result of the modified design. The proposal still introduces the road infrastructure changing the scale and scenic quality in this view. In addition, large amounts of mature trees lining the road would be removed changing the outlook and spatial qualities. Therefore the magnitude of the proposal has not changed as a result of the modified design.
Impact	High to moderate	The visual impact of the modified design remains high to moderate as assessed in the EIS/SPIR. It may reduce somewhat over time as new vegetation establishes and matures.

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the likely visual impact of the modified design from Viewpoint 10 remains **high to moderate** as previously assessed.

Viewpoint 11

Location description

The Northern Road, roundabout at the existing Elizabeth Drive intersection, looking south.

Potential viewers

Motorists along the Northern Road. Resident from surrounding areas accessing Luddenham as the local service centre.

Visible project elements

SPIR design:

- Removal of the existing roundabout and replacement with a left-out intersection
- New road alignment and widening of The Northern Road south of the existing Elizabeth Drive intersection
- New intersection with the re-aligned Elizabeth Drive and the existing The Northern Road
- Removal of existing dwellings and associated structures
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design:

- Reduction in median width
- Mid-block lighting removed.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was described as: The view is characterised by a pleasant outlook over the open rural landscape. Exposed on the high plateau, the view would have a low capacity to absorb the proposed changes.
Magnitude	High	The modified design results in the reduction in the width of the median from this view, however, due to the road widening, re-alignment, levelling, tree removal, and earthworks introduced as a result of the SPIR design the magnitude of the proposal remains high.
Impact	High	The visual impact of the modified design remains high as assessed in the EIS/SPIR.

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the likely visual impact of the modified design from Viewpoint 11 remains **high** as previously assessed.

Viewpoint 12

Location description

2,776 The Northern Road, Luddenham, looking west.

Potential viewers

Motorists. Residents in surrounding rural areas travelling along The Northern Road to Penrith or to access the local centre at Luddenham.

Visible project elements

SPIR design:

- Widening of The Northern Road including additional lanes, shared path, level changes and associated earthworks
- Vegetation clearing
- Landscape works.

Changes as a result of the modified design:

- Reduction in median width
- Mid-block lighting removed.

Visual impact assessment

Sensitivity	High	The sensitivity of the viewpoint has not changed since the EIS/SPIR. It was described as: The view is located along one of the most scenic sections of The Northern Road. It affords long-distance views over farmland and dams towards the Blue Mountains. These views are shared by residents in adjoining rural properties. They would be sensitive to changes in the outlook.
Magnitude	Moderate	The modified design results in the reduction in the width of the median from this view, however, the project still results in an increase in road infrastructure. Therefore, there is no change to the magnitude of the proposal as a result of the modified design.
Impact	High to moderate	The visual impact of the modified design remains high to moderate as assessed in the EIS/SPIR.

Summary

The modified design has not altered the overall magnitude of the project as approved in the EIS/SPIR. As a result, the likely visual impact of the modified design from Viewpoint 12 remains high to **moderate** as previously assessed.

05

Visual Impact Assessment Summary

The summary table below lists the visual impacts of both the EIS/SPIR design and the modified design for the eight viewpoints. It illustrates that despite some design difference the overall visual impact to the chosen viewpoints has no changed relative to the approved project.

Table 6. Summary table of the visual impacts of the EIS/SPIR and modified designs.

Viewpoint	Impact rating	
	EIS/SPIR	Modified design
Viewpoint 5	High-moderate	High-moderate
Viewpoint 6	High	High
Viewpoint 7	High	High
Viewpoint 8	Moderate	Moderate
Viewpoint 9	High	High
Viewpoint 10	High-moderate	High-moderate
Viewpoint 11	High	High
Viewpoint 12	High-moderate	High-moderate

Mitigation Strategies

The mitigation strategies outlined in the LC VIA developed for the EIS still apply for the modified design. One additional mitigation measure suggested as a result of the modified design relates to the embankment along Adams Road east of the new intersection. This is up to eight metres high on the southern side of Adams Road, and located approximately 180m from the rural property at 125 Adams Road (Figure 18). The property is also on a hill and looks down towards the proposal. It is therefore suggested that additional planting be included to screen the proposal from the property, as indicated

below. It is noted that the 100% drawing now includes the extension of planting to the east closest to the property as previously suggested (see below). Planting should include tall shrubs and trees between the safety barrier and modified access driveways to provide effective screening.

Other properties along Adams Road are not considered to require additional mitigation due to their distance from the proposal, orientation and/ existing vegetation screening views towards the proposal.

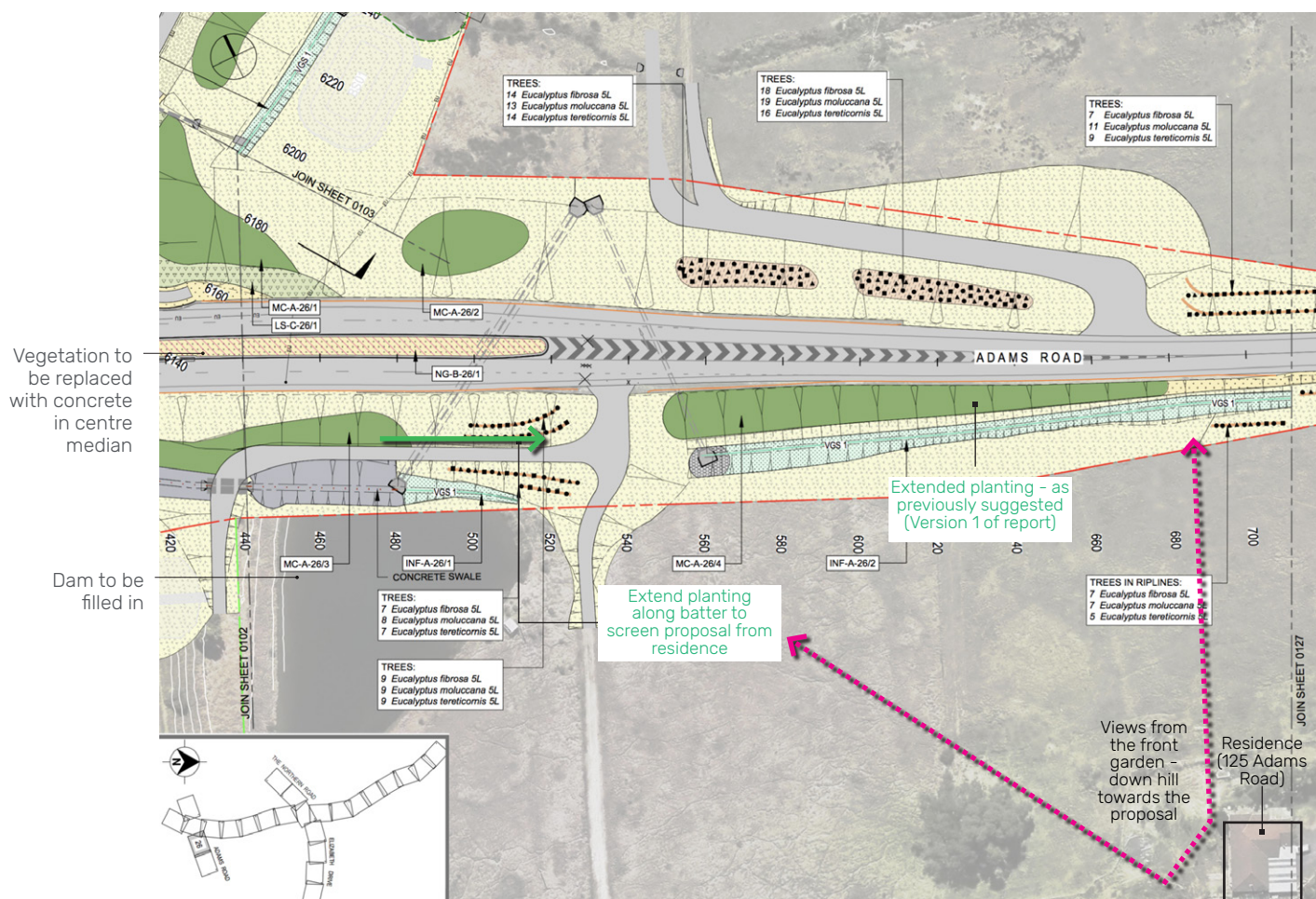


Figure 18. Landscape plan (100% design - LA-0126) for Adams Road east of the intersection with The Northern Road (Source: Ki Studios)

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Conclusion

The modified design for the upgrade of The Northern Upgrade between Eaton Road, Luddenham to Littlefields Road, Mulgoa has been assessed against the Urban Design Concept and LCVIA component of the EIS/SPIR. The key change to the design from the SPIR design is the replacement of the twin bridges at Adams Road with an at-grade signalised intersection. Minor changes include a reduced median and eastern verge, modified embankments, removal of mid-block lighting and inclusion of grass swales.

As a result of this assessment, the modified design is considered to be:

- Generally consistent with the approved urban design objectives, principles, and strategy
- Of equal landscape character impact to the two landscape character zones (LCZ 3 and LCZ4) as assessed in the EIS/SPIR
- Of equal visual impact to all eight viewpoints assessed for the visual impact assessment in the EIS/SPIR.

In summary, the key change to the design from the EIS/SPIR is the replacement of the twin bridges at Adams Road with an at-grade intersection. This is considered to be an improved outcome from an urban design perspective, however, the introduction of high embankments and increased road infrastructure on Adams Road result in locally increased landscape character and visual impacts. As these were previously assessed as high, there has been no significant change in the impact overall. The modified design is considered to have the same landscape character and visual impact to the EIS/SPIR. Localised increases in impact are addressed through additional mitigation measures.

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