

Executive Summary

The NorthConnex Urban Design and Landscape Plan (UDLP) has been prepared in accordance with Condition of Approval B33. The UDLP is a logical development of the objectives and principles outlined in the initial UDLP included in the NorthConnex Environmental Impact Statement.

The UDLP Stage 1 focussed on noise barriers, tunnel portals and drive structures, retaining walls, associated landscaping and signature design elements. It was exhibited for community feedback in November 2016 and approved by the Department of Planning, Industry and Environment (DPIE) in May 2017.

Stage 1b related to a wall and associated landscaping at the Motorway Operations Complex, West Pennant Hills. As the impacts of the wall affected a small number of properties, targeted consultation with these property owners was carried out in April and May 2017 and the plan approved in December 2017.

Stage 1c was approved in October 2019 and provided minor editorial edits and design changes for:

- A revised alignment of the westbound on-ramp from Pennant Hills Road to merge with NorthConnex (instead of the Hills M2 mainline)
- Relocation of the Hills M2 Motorway westbound bike path connection from Pennant Hills Road and revised design of the cycleway overbridge on the NorthConnex exit
- Adjustment to and replacement of the Hills M2 Motorway westbound noise barriers along Carmen Drive and Coral Tree Drive
- A revised design of the Hewitt Avenue shared path connection to Pennant Hills Road
- A replacement noise barrier on the M1 Pacific Motorway northbound between Pennant Hills Road and the Pacific Highway overbridge.

Urban Design and Landscape Plan Stage 2

The UDLP Stage 2 encompasses the overall NorthConnex urban design principles and objectives, urban design experience, and design methodology for the project. Elements specific to Stage 2 are the tunnel design, tolling structures and architectural and landscape design of the operational ancillary facilities including:

- Northern ventilation facility
- Motorway operations complex
- Coral Tree Drive substation

Preparation and development of the UDLP Stage 2 benefited from the review and comment by the NSW Government Architect's Design Review Panel. The Panel comprised experienced and independent design practitioners to provide feedback on the developing design to the NorthConnex project team. The Panel personnel were:

- Adrian Pilton – Chair + Landscape Architect
- Darlene van der Breggan – Independent Architect
- Jane Threlfall – Principal Urban Designer, Office of the Government Architect, DPIE
- Gareth Collins – Centre for Urban Design, Roads and Maritime Services

The Design Review Panel reviewed and provided comment on the development of the design during the preparation of the Urban Design and Landscape Plan Stage 2. These meetings occurred on 23 July and 31 July 2017. In relation to UDLP Stage 2c, the Panel agreed that the tunnel could be considered as a 'long room' in which the occupant progresses through a series of different visual experiences. The detail design

had not been fully developed at that time.

Stage 2 was exhibited for community feedback from late August to early October 2017. Following feedback on Wilson and Trelawney permanent tunnel support facilities, this section of the UDLP was withdrawn for further development and consideration. Stage 2 was finalised and approved on 4 October 2018 without the permanent tunnel support facilities design.

Stage 2b describes the revised design for the permanent tunnel support facilities. The revised design reduces the footprint and visual impact of the Trelawney and Wilson permanent tunnel support facilities. Targeted consultation on the revised design was carried out with directly impacted residents and property owners.

Urban Design and Landscape Plan Stage 2c

Stage 2c was developed to enhance driver safety and experience in the tunnel and proposes tunnel aesthetic designs to maximise driver focus. The designs include:

- Australian bird silhouettes at the entry portals on angled panels reflecting the sky, not direct sunlight or headlights
- A backlit silhouette of trees along the northbound tunnel
- Lit lines of light leading the eye onwards in the southbound tunnel
- A night sky simulating the different intensity of stars in the southbound tunnel
- Two types of patterns reflecting the direction of travel:
 - organic features referencing Ku-ring-gai Chase National Park and the NSW coast to the north in the northbound tunnel
 - geometric features referencing Sydney sandstone linking with the warm colours of the Hills M2 Motorway and Lane Cove Tunnel in the southbound tunnel.

Public exhibition and consultation process

Consultation on Stage 2c was open from Monday 26 August to Friday 6 September 2019. Late submissions were accepted up to Tuesday 9 October 2019. Stakeholders were encouraged to provide their feedback via email (enquiries@northconnex.com.au), phone (1800 997 057) or in person (NorthConnex Community Information Centre, 118 Yarrara Road, Pennant Hills).

The project database including residents, motorists, local councils (Hills Shire Council, Hornsby Shire Council, Parramatta City Council and Ku-ring-gai Council), the project Community Involvement Group and community interest groups were emailed to invite feedback. The project Community Involvement Groups were briefed on the plan by the project team on Monday 19 August and Monday 26 August 2019.

The plan was displayed online at www.northconnex.com.au/UDLP.

Submissions received

A total of 18 submissions were received from 13 individuals and Abbotsleigh School, Combined Probud Club of Saratoga, Hornsby Council, Bike North Advocacy, and Community Involvement Group. One individual provided two submissions. All submissions were received via email.

Stakeholders who submitted feedback were provided with an acknowledgement of receipt. Additional information was provided upon request where possible. Residents continue to be responded to on matters involving current construction.

Appendix A – UDLP Stage 2c Submissions and Responses



Common issues raised in submissions

There were a number of common issues raised in the submissions. A breakdown of the issues raised is provided in the following table:

Issue	Number of comments	UDLP 2c related	
Safety	9	Yes	
Design Suggestion	3	Yes	
Air Quality	2		No
Facilities	1		No
Bicycle Detour	1		No
Clarification Request	1	Yes	
Other	1	Yes	

Summary of responses to submissions

Nine submissions expressed a measure of support for the proposal. Submissions only expressing support and the Hornsby Shire Council submission did not require a response.

Issues not related to UDLP Stage 2c were identified and responded to as follows:

- Respondents raising issues categorised as 'Air Quality' and 'Facilities' were referred to the relevant sections of the NorthConnex website for information
- Respondent noting the issue categorised as 'Bicycle Detour' will be updated on the reopening of cycle lanes.

Issues related to UDLP Stage 2c fall into four categories:

- Safety – concerns that aesthetic design features would be a distraction to drivers and pose other safety risks were addressed with relevant information
- Design Suggestions – suggestions to amend the design in a variety of ways were provided with an explanation of the overall design concept
- Clarification Request – a request for clarification of possible changes in the design was advised that no changes are planned
- Other – issue relating to the depiction of a car travelling in the right hand lane in contravention of road rules was addressed.

Changes in response to submissions

No changes to the proposal are recommended on the basis of the submissions received.

Appendix A – UDLP Stage 2c Submissions and Responses



ID	Type	Date	Issue	Submission	Project team response	Incorporated in design ✓ or ✗ or Noted
UDLP2C-1	Email	26/8/2019	Safety	Most of the suggestions - bird silhouettes, tree silhouettes, night sky and stars sound very pretty - perhaps in an art gallery, restaurant or on the outside of buildings, water reservoirs and silos etc. but DEFINITELY NOT in a vehicle tunnel. What a distraction !! Passengers, especially children distracting the driver by pointing out all the interesting artworks - instead of leaving the driver to concentrate on DRIVING. The sandstone features and warm colours are ok and the "lit lines of light leading the eye onwards..". But the rest is unbelievable. Was there any communication from the NSW Centre for Road Safety on whether this is in the best interest of driver and passenger safety ?? I think it is a terrible idea and I for one will NOT be driving in either of the tunnels if these designs go ahead. If Safety is your number one priority - you need to re- think this idea and re-design the whole plan.	<p>Safety is a critical consideration in the urban design of the tunnel. The design adds interest to the experience without compromising road awareness. The design has been certified by the Projects Independent Certifier to meet standards of RMS and Austroads publications and relevant Australian Standards.</p> <p>There was no communication from the NSW Centre for Road Safety. Roads and Maritime Services as the NSW Road Authority were consulted on the design.</p> <p>The majority of the 40 kilometres of panels within the tunnel are plain. The purpose of the aesthetic lights and graphic panels is to provide interest and maintain alertness while travelling in the tunnel. Interest is created in a number of ways and the combined elements have an overall effect of maintaining alertness.</p> <p>The trip duration is about seven minutes from end to end. The graphic panels have a transit time of four or five seconds which is significantly less distracting than surface road structures and lighting, such as shopping strips.</p>	✗
UDLP2C-4	Email	26/8/2019	Safety	The ideas that you propose seem to be quite good, although I think that Figure 5-8 appears to be a bit dark. You need more light for drivers to see better, otherwise I agree with the proposals presented.	The tunnel will be illuminated to the Australian Standard required for safe operation. The light level depicted in the UDLP Stage 2c is not an accurate representation of actual tunnel lighting levels.	✓
UDLP2C-5	Email	26/8/2019		Thank you for the opportunity to review and comment on the tunnel aesthetic design. Having reviewed that material I feel it is the best looking tunnel I've seen. I particularly like the forest, and also like the use of lighting for the star scape. Looking forward to the opening.	Noted.	✓
UDLP2C-6	Email	26/8/2019	Safety	The panel colours and motifs are ridiculous. They are a distraction to drivers. The panels should be plain.	<p>Safety is a critical consideration in the urban design of the tunnel. The design adds interest to the experience without compromising road awareness. The design has been certified by the Projects Independent Certifier to meet standards of RMS and Austroads publications and relevant Australian Standards.</p> <p>The majority of the 40 kilometres of panels within the tunnel are plain. The purpose of the aesthetic lights and graphic panels is to provide interest and maintain alertness while travelling in the tunnel. Interest is created in a number of ways and the combined elements have an overall effect of maintaining alertness.</p> <p>The trip duration is about seven minutes from end to end. The graphic panels have a transit time of four or five seconds which is significantly less distracting than surface road structures and lighting, such as shopping strips.</p>	✗
UDLP2C-7	Email	26/8/2019	Safety	A quick response. I was once DMR Deputy Commissioner and approved enhanced lighting on General Holmes Drive which had a flickering effect in the tunnel. There were a lot of complaints from people with epilepsy. A long time ago, 1980s and I would think your people are aware of the issue. I look forward to driving through your tunnel. Too long coming. We stopped at Pearce's Corner in 1988!!	<p>Lighting technology in the 1980s was either fluorescent or sodium vapour lamps, both of which can lead to flickering effects.</p> <p>Overhead and side lighting in the NorthConnex tunnel is LED which does not flicker, and the visually long lengths will not have a stroboscopic effect.</p>	✓

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UDLP2C-8	Email	26/8/2019	Design Suggestion	I would vote for this design concept: a backlit silhouette of trees along the northbound tunnel	The design includes a number of different elements to provide interest and maintain alertness. The backlit silhouette of trees will be one of the combined elements.	✓
UDLP2C-9	Email	26/8/2019	Safety	No thanks sounds like a complete waste of money. Nobody will care what the inside of the tunnel looks like. Maybe just spend a tiny bit of cash on current safety and add some more speed limit signs on the M2 at Pennant hills road where its changes to 80kmh as I have previously requested. I'm sick of the other traffic doing 100kmh+ in the 80 zone and so far no additional signage has been added. I look forward to your positive response or most likely another pass the buck "the signage complies" "but we will make the highway patrol work harder" email.	<p>Safety is a critical consideration in the urban design of the tunnel. The design adds interest to the experience without compromising road awareness. The design has been certified by the Projects Independent Certifier to meet standards of RMS and Austroads publications and relevant Australian Standards.</p> <p>The majority of the 40 kilometres of panels within the tunnel are plain. The purpose of the aesthetic lights and graphic panels is to provide interest and maintain alertness while travelling in the tunnel. Interest is created in a number of ways and the combined elements have an overall effect of maintaining alertness.</p> <p>The trip duration is about seven minutes from end to end. The graphic panels have a transit time of four or five seconds which is significantly less distracting than surface road structures and lighting, such as shopping strips.</p>	✗
UDLP2C-10 Bike North Advocacy	Email	27/8/2019	Design Suggestion Safety	<p>Bike North is pleased to be included in consultation on the NorthConnex project. As it is understood cyclists will not be permitted in the tunnel, our comments are more of a general nature. The design aesthetics look very interesting and should provide a pleasant journey through the tunnel. Would it be of interest to include a graphic at various stages of the suburb above the tunnel to give a point of reference?</p> <p>Another area of comment is the overhead lighting. I have personally travelled in the longest road tunnel in the world, this being the Laerdal Tunnel in Norway, which is 24.51km in length. They experienced issues with drivers becoming mesmerised by the regular "flash" of overhead lights through the windscreen and so introduced a more random pattern of overhead lighting and colour changes to reduce the hypnotic effect. Regular lighting patterns may also impact those with epileptic conditions. It is suggested consideration be given to this point if it is not too late in the design.</p>	<p>Locality names were considered as an aesthetic design feature but were assessed as not practical as their relevance can change or they may cease to exist over a relatively short period of time compared to the life of the tunnel. Additionally the tunnel is a motorway to motorway connection with no useful information to be gained from locality names as no exits are provided at these locations.</p> <p>All tunnel lighting is close spaced LED fittings which will not result in regular flashes of light or a stroboscopic effect which could impact those with epilepsy.</p>	✗ ✓
UDLP2C-11 Combined Probus Club of Saratoga	Email	27/8/2019		Thank you for the information below and like all the folk who travel on Pennant Hills road, we look forward to the completion of the project. The aesthetics of the landscape design looks most effective and "so well done" to your design department.	Noted.	✓
UDLP2C-12	Email	28/8/2019	Other	I clicked on the Urban design and Landscape plan and the first page you have a 'Right Lane Hugger!?' Which marketing legend let that through??	The front page of the UDLP Stage 2c showcases the graphic panels on the left hand side of the tunnel. The vehicle graphic is provided for scale and located in the right lane so as not to obscure the graphic panels.	Noted

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UDLP2C-13 Community Involvement Group – North	Email	29/8/2019	Design Suggestion	<p>Thank you for the opportunity to comment on the In-tunnel Urban Design. I am impressed with the thoughts behind the designs and like the idea of the North and South tunnels reflecting the migration from country to city scape. The silhouettes and light features (bird design, backlit trees, lit lines of light and night sky) are most appealing and novel and I think will help drivers keep attentive by breaking up the long tunnel with these features.</p> <p>The emphasis on yellows reflecting sandstone in the southbound and greens reflecting national parks in the northbound tunnels seems most appropriate. However, the organic patterns in the northbound seem far more interesting than the geometric patterns in the southbound. Given the different colour emphasis in both tunnels could the southbound have a few of the more interesting features of the northbound?</p>	Equivalent aesthetic features, including 'starscape' and 'speedlines' lighting have been included in the southbound tunnel. Both tunnels are distinctly different to provide a different visual experience when moving between urban and country environments.	✓
UDLP2C-14	Email	30/8/2019	Safety	<p>I am a resident of Normanhurst and I live very close to the junction of Pennant Hills Road and the M1 motorway exit at Pearces Corner. I expect to use NorthConnex regularly to travel to Canberra. I have 2 concerns about the proposed designs:</p> <ol style="list-style-type: none"> 1. The "night sky" and "lit lines of light" patterns on the tunnel roof seem a bit "over the top" to me and I am concerned that they may be distracting for drivers, even though their intention is to keep drivers interested. I really wonder whether the extra cost of these features is worthwhile. 2. I could not find in the report any mention of the type of material from which the lightweight tunnel wall cladding panels will be made. I would like to think that they have very low combustible potential as it would be horrendous if a vehicle fire were to spread along the tunnel via the panels. <p>Otherwise I like the bird silhouettes at the entry portals, and the colours and patterns intended for the tunnel walls.</p>	<p>Safety is a critical consideration in the urban design of the tunnel. The design adds interest to the experience without compromising road awareness. The design has been certified by the Projects Independent Certifier to meet standards of RMS and Austroads publications and relevant Australian Standards.</p> <p>The purpose of the aesthetic lighting and graphic panels is to provide interest and maintain alertness while travelling in the tunnel. Interest is created in a number of ways and the combined elements have an overall effect of maintaining alertness.</p> <p>The trip duration is about seven minutes from end to end. The majority of the tunnel alignment does not have aesthetic lighting. The aesthetic lighting has a transit time of four or five seconds which is significantly less distracting than surface road structures and lighting, such as shopping strips.</p> <p>Tunnel cladding panels are described in the UDLP Stage 2, Section 5.5 'Tunnel Cladding'. The panels are non-combustible compressed fibre cement sheets and have an extremely low spread of flame index. The tunnel is also fitted with an automatic deluge fire suppression system. Risk of fire spreading in the tunnel is very low.</p>	✓
UDLP2C-15	Email	5/9/2019	Safety	<p>I think making about 50m inside of all the tunnels interfaces lighting bit brighter than rest of tunnel lighting, helps people be ready for change in conditions to the much brighter outside tunnel daylight.</p>	<p>The tunnel has increased lighting levels at the entry and exit portals to aid eye adaptation. This increased lighting can extend up to 200 metres into the tunnel. Lighting brightness is automatically adjusted by photometer controls to suit the external ambient light conditions.</p>	✓

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UDLP2C-16a	Email	5/9/2019	Clarification Request Safety	<p>The proposed graphics for the tunnel and the approaches is a good idea however 2 matters need to be thought through a little more. Those matter are as follows:</p> <p>1. There obviously has been a great deal of thought in the design of the graphics, however in the later stages of the presentation the following comment is given:</p> <p>Enhanced lighting effects depicted are based on concept designs. Actual colour rendering from lights and effect are subject to design development. Graphics on wall panels will vary.</p> <p>The obvious question is if this presentation is only based on concepts then what will be the actual final design? The comment that 'Graphics on wall panels will vary' does not bode well at all for the final design. I trust that the wording is at best poorly worded and the design will be somewhat akin to the presentation given. If not then this could be seen to be a waste of time.</p> <p>2. Many years ago some group decided to remove the ground cover vegetation that existed on the rock faces on the Eastern rock walls on the M1 where it passed through the cutting near Mount Kur-Ring-Gai Railway station. Very soon after the clearing there was a crash on the M1 which resulted in the death of the driver.</p> <p>I was suggested by many that the removal of the vegetation exposing the rock face created what was described as a 'false wall/horizon' when viewed by the Drivers of the vehicles travelling in the Southern direction. Even today it is obvious that drivers actually slow down as they approach the cutting as they 'see' the rock wall in front of them.</p> <p>It is recommended that the provision of graphics on the approaches and within the tunnel should not have this impact of the Drivers.</p> <p>Good luck with the graphics but be wary of the distraction to everyone.</p>	<p>The graphics on the panels will remain as proposed with no alteration of the design planned.</p> <p>The difference between the referenced unlit motorway in an open environment and the NorthConnex tunnel, is that the tunnel has lighting which provides the motorist positive guidance for the curves within the tunnel. The wall is a secondary reinforcement of the curve. Additionally, the viewing distances ahead with the tunnel are not as long as the referenced motorway, and the posted speeds are lower.</p> <p>Safety is a critical consideration in the urban design of the tunnel. The design adds interest to the experience without compromising road awareness. The design has been certified by the Projects Independent Certifier to meet standards of RMS and Austroads publications and relevant Australian Standards.</p>	✓
UDLP2C-16b	Email	9/10/2019	Safety	<p>I refer you to my previous email dated 6 September 2019, a word of warning regarding the placement of signs, graphics and pictures in the new M1 linking tunnel from Wahroonga to West Pennant Hills I forgot to mention that if the signs, graphics and pictures are placed a certain distance apart then some people who suffer from Epilepsy may suffer an attack with the constant flicking of the signs, graphics and pictures as they are passed.</p> <p>This was found to be the cause of Epileptic attacks with steel structured bridges as well as the stripped markings on Railway platforms that were on platforms to show the designated areas for passengers to stand when the trains were of a shortened length or had carriages locked up. I am sure you will find information regarding the safety concern.</p>	<p>Lighting in the NorthConnex tunnel is close spaced LED fittings which does not flicker, and the visually long lengths will not have a stroboscopic effect which could impact those with epilepsy.</p>	✓

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UDLP2C-2	Email	26/8/2019	Facilities Air Quality	Let me know regarding the aesthetic design of the smoke stack spewing poisonous chemicals onto Wahroonga schools and aged homes.	The ventilation facilities and air quality is of out of scope of this plan. Refer to the UDLP Stage 2 for information on facilities, and the Air Quality and Air Quality Community Consultative Committee sections of the NorthConnex website for information on air quality.	Noted
UDLP2C-17	Email	26/8/2019	Air Quality	The tunnel would be much more acceptable with filtered exhaust outlets. Think of our environment, don't worry about decorating the tunnel.	Air quality is of out of scope of this plan. Refer to the Air Quality and Air Quality Community Consultative Committee sections of the NorthConnex website for information on air quality	Noted
UDLP2C-3	Email	26/8/2019	Bicycle Detour	In regards to the below email, my only comment is that the M2 bicycle Detour that you have provided between Windsor Rd and Pennant Hills Roads adds at least 20 minutes to my commute which from Kellyville Ridge to the City is now about 2 hours. If there is any way to speed up the reopening of either the east bound (towards the City) or westbound (coming back) sections it would be greatly appreciated. It looks like there is almost room to squeeze in a narrow bike lane for us apart from a couple of barriers that look like they could be moved a couple of feet to the left to allow us through. Anyway, I look forward to hearing back as soon as you have an update on either the east bound or west bound lanes.	The M2 temporary bicycle detour is out of scope of this plan. The respondent will be updated on the reopening of bicycle lanes.	Noted
UDLP2C-18 Hornsby Shire Council	Email	2/9/2019		As per attached email from our Landscape Coordinator, Council has no comment in relation to the proposal.	Noted.	Noted