

Fifteenth Avenue Smart Transit Corridor Design Framework

Liverpool's vision for a liveable,
productive and sustainable
transit corridor



**FIFTEENTH
AVENUE
SMART
TRANSIT
CORRIDOR**

Abbreviations

ARRT	Autonomous rail rapid transport
BRT	Bus rapid transport
FAST Corridor	Fifteenth Avenue Smart Transit Corridor
GANSW	Government Architect New South Wales
GSC	Greater Sydney Commission
LCC	Liverpool City Council
LSPS	Local Strategic Planning Statement
WSIA	Western Sydney International Airport
WSUD	Water Sensitive Urban Design

This document has been prepared by SJB
in collaboration with Liverpool City Council.

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Executive summary

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This design framework document outlines Liverpool City Council's vision to deliver a place-led transit corridor between Liverpool city centre and the Western Sydney International (Nancy-Bird Walton) Airport (WSIA). The Fifteenth Avenue Smart Transit (FAST) corridor will support significant growth, improve regional transport connectivity and be guided by the existing landscape and character of South West Sydney.

The framework explores six distinctive character areas along the FAST corridor which can be protected and enhanced. Drawing on Council and Government policy as well as guidance from the NSW Government Architect, this framework document adopts a 'vision and validate' approach.

The framework forms part of Liverpool City Council's place-led infrastructure approach for development in Liverpool. Place-led infrastructure focuses on combining the existing place and the desired character to establish new sustainable places for a growing community. It requires a thorough understanding of the current place, how it is used by the community and how this might change over time.

A place-led approach encourages us to re-evaluate how we design and make decisions about infrastructure. It is a fiscally prudent approach to infrastructure development and place-making and will provide a more accurate context for strategic planning and infrastructure decision making.

The framework deliberately precedes technical optioneering and concept design work to ensure that place is the starting point for project development. This document will be an important reference throughout the project, ensuring ongoing focus on validating Council's place-led vision for this project.

“While many aspects of Liverpool are changing and opportunities abound, I am also mindful of the things about Liverpool we love and want to retain – the local and rural character of our suburbs, our significant heritage, our fantastic bushland, our civic pride and our commitment to diversity.”

— Wendy Waller, Mayor of Liverpool



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Vision

A place-led transit corridor connecting Liverpool to Western Sydney International Airport through South West Sydney's distinctive landscape. The multi-modal corridor will link urban places which are sensitive to their bushland and farming landscape. It will serve residents, workers and visitors and support a range of housing types and employment opportunities.



2.1 Elements of Fifteenth Avenue

1. Existing South West Sydney Landscape

- Protect natural environment
- Integrate Aboriginal perspectives
- Celebrate the beauty of the Western Sydney landscape
- Celebrate local biodiversity and habitat

2. Existing Character and Place

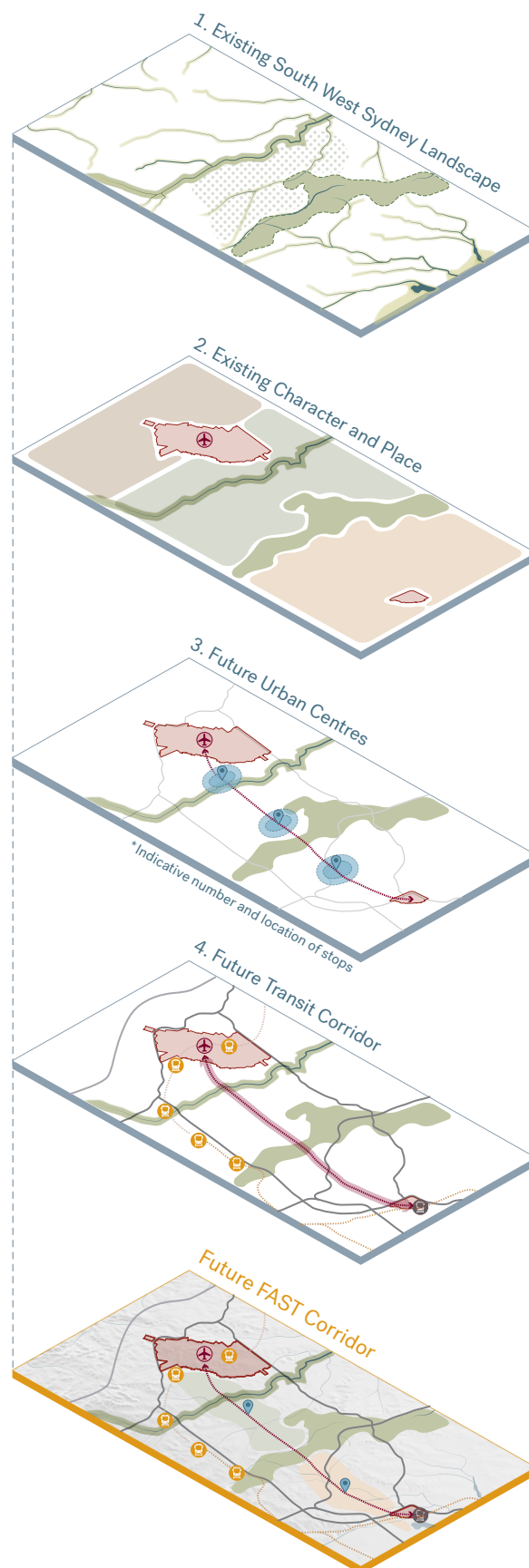
- Strengthen existing character
- Create a sense of transition through the parkland landscape
- Make reference to history
- Consult with community
- Acknowledge existing productive agriculture in the area

3. Future Urban Centres

- Encourage density around transport nodes
- Design high quality streets and public open spaces
- Plan for a diverse range of housing tenures
- Prepare site specific design
- Transition from parkland to urban condition
- Create water-sensitive, cool, green spaces

4. Future Transit Corridor

- Prioritise sustainable and active transport
- Design place-led transport infrastructure
- Create an efficient connection
- Provide multi-modal connectivity
- Ensure that it is cool, green and walkable



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Place-led approach

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This section explains how a place-led approach to designing the Fifteenth Avenue corridor might offer more opportunities for Liverpool and Western Sydney than the status quo.

3.1 Why is it different?

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Liverpool is one of the fastest growing regions in Australia accompanied by more than \$20 billion of infrastructure investment in the airport and surrounding area. There are several important reasons why Liverpool needs to adopt a place-led approach to the design of the FAST Corridor.

First, is the potential for the FAST Corridor to be a multi-modal corridor that is functionally different to other east-west car focused roads in the area (e.g. Bringelly Road and Elizabeth Drive).

Secondly, having a flexible public transport link between the airport and Liverpool city centre will enable workers and visitors to use sustainable transport to access WSIA before it opens.

Thirdly, public infrastructure, when designed in a way that is responsive to the social, economic and environmental landscape, unlocks the potential for a broader range of commercial enterprises to locate themselves near the airport. A range of suitable employment locations will be important to host the predicted 200,000 jobs in the area.

Finally, a compact and walkable city will be more productive and sustainable. It will reduce car dependence and infrastructure requirements while increasing city revenues.

Place-led infrastructure will establish the spatial framework for the right types of physical and social infrastructure investment needed to accommodate Liverpool's growth as the major centre of the South West and the third CBD of metropolitan Sydney.



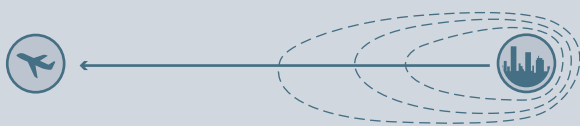
View looking along Fifteenth Avenue today. This dynamic part of Sydney will experience significant growth as the Western Sydney International Airport is established.

3.2 Benefits of a place-led approach compared to the status quo

The status quo



Uninterrupted connection between Liverpool city centre and WSIA but poor north-south connectivity (20 mins)



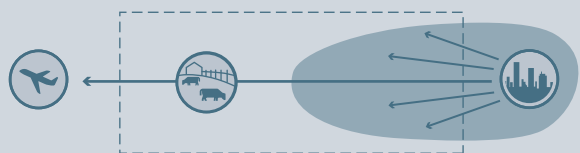
Built form spread along corridor with density focused around centre of transport stops



Wide road for private vehicles and express bus service from Liverpool city centre to WSIA



Employment and commercial land uses evenly spread along corridor



Existing peri-urban landscape transformed into suburban and industrial land uses

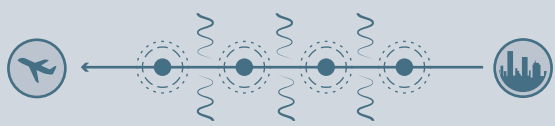


Blue and green landscape considered as drainage and ecological constraints

Place-led approach



Series of connected centres between Liverpool city centre and WSIA (20-30 mins)



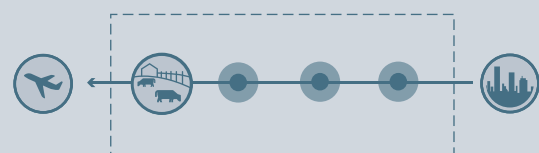
Built form defined by linear green breaks with density oriented around place, amenity and transport stops



Multi-functional transit corridor with potential for bus rapid transit, trackless trams, other rapid transit modes and active transport



Considered clustering of employment and commercial land uses oriented around the airport away from corridor



Retention and strengthening of existing productive peri-urban farming



Blue and green landscape shapes urban form from the outset and is integrated into the transit corridor, public spaces and streets

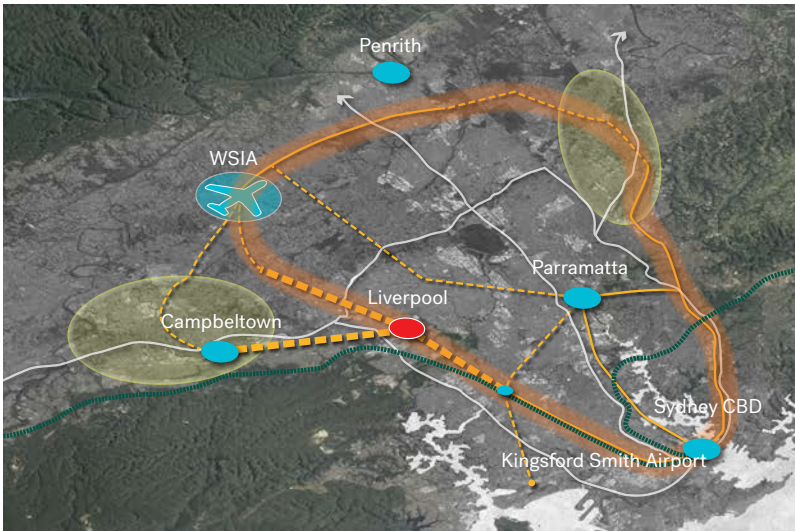
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Metropolitan context

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This section explores the spatial opportunities for Liverpool and its relationship to Metropolitan Sydney. It explains the need for integration of the future Aerotropolis with the future workforce of Liverpool, as well as the strategic and economic merit of creating better connectivity with the Liverpool city centre.

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The success of WSIA and the Aerotropolis depends on efficient transit connections to and from WSIA. The FAST Corridor will catalyse a new type of growth in Liverpool and be pivotal to the successful growth of South West Sydney.

Over the coming decades, the areas surrounding the FAST Corridor will experience significant growth. The Western Sydney Aerotropolis Growth Area is anticipated to generate 200,000 jobs and include 60,000 homes. Fifteenth Avenue will be required to serve as a key transit corridor for those working and living in Western Sydney.

Due to its scale and proximity, Liverpool is strategically placed to complement and leverage the employment opportunities offered by WSIA. Situated midway between WSIA and the existing Kingsford Smith Airport it will serve as a transit point between the two airports as well as hosting business operations for the Aerotropolis. Business will also be attracted to Liverpool city centre as the home of the airport company.

Liverpool already has a wide range of industries including manufacturing, health, education and public administration, and a ready workforce of young, well-educated, diverse people. Liverpool city centre has a key role in supporting the Aerotropolis operations with a complementary offer.



Liverpool is one of the fastest growing local government areas in Australia with the population doubling in just 20 years. Family households and those with young children form a large part of the community.

More than half of all households speak a language other than English at home and many were born overseas. Liverpool also has one of the largest concentrations of people from a refugee background in Australia, with numbers tripling between 2015 and 2016.

This strategy is a part of Liverpool City Council's aspiration to cater to a growing and diverse population. The FAST Corridor will provide access to high quality employment and housing opportunities for current and future communities.

52%
SPEAK A LANGUAGE
OTHER THAN
ENGLISH AT HOME

60%
POPULATION
INCREASE
BETWEEN 2019 AND 2036

33
MEDIAN AGE

37%
LESS THAN
25 YEARS OLD

TOP LANGUAGES
ENGLISH ARABIC
VIETNAMESE
HINDI SPANISH

41%
BORN
OVERSEAS

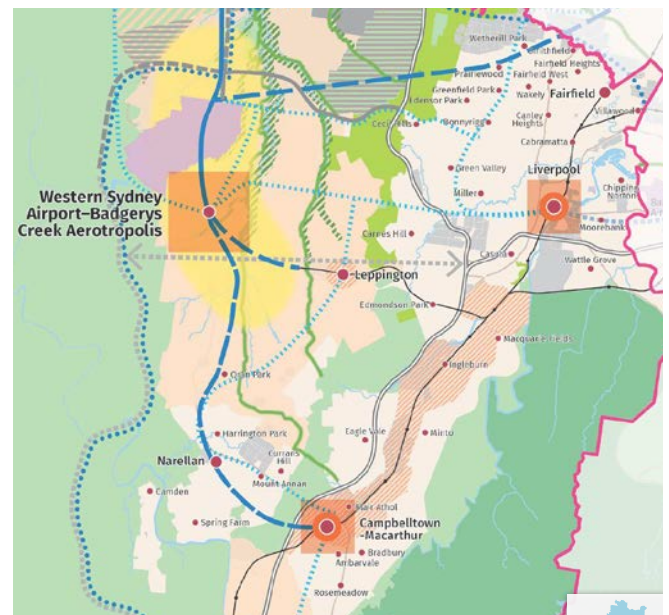
Above: Liverpool community arts project

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Strategic planning and policy

12 This section explores the planning and policy opportunities for the FAST Corridor.

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Greater Sydney Region Plan: A Metropolis of Three Cities; and the Western City District Plan, Greater Sydney Commission, 2018

The Region Plan and District Plan set out the overarching strategy for landuse planning in Greater Sydney. Central to both documents is the concept of the 30 minute city, creating opportunity and access to jobs across the three cities of Sydney. The FAST Corridor draws on key themes contained in the plans such as:

- Improving the ecological and environmental performance of the region
- Creating housing and direct access to jobs for the local population
- Supporting access to jobs in specialised industry
- Strengthening a city for people with local identity, heritage and cultural values in proposed urban centres
- Prioritising urban density with access to sustainable and active transport modes
- Exploring the opportunity for road-based public transport to enable 'landscaped boulevards along new and major transport corridor upgrades as appropriate to the existing environment' (p70).

Building Momentum: NSW State Infrastructure Strategy 2018-2038

The State Infrastructure Strategy identifies the importance of prioritising sustainable transport connections, particularly walking and cycling infrastructure in Sydney. The FAST Corridor is identified for a rapid bus connection to WSIA, noting the opportunity to build on existing rapid bus infrastructure to provide high user amenity and accessibility (p133).

Future Transport Strategy 2056, Transport for NSW, 2017

Future Transport 2056 aligns the planning for the future transport network with the GSC's vision for a metropolis of three cities, where people have access to jobs and services within 30 minutes by public transport. Connectivity between the new Aerotropolis and Liverpool is outlined as a priority over the next 20 years.

The Western Sydney City Deal, 2018

The Western Sydney City Deal is a multi-billion dollar agreement between all three levels of government in Western Sydney. It contains a series of funding commitments for education, business and employment opportunities throughout the region. The City Deal has a central focus on improved transport connectivity and includes a NSW Government commitment to deliver a rapid bus connection from Liverpool to WSIA and the Aerotropolis before the airport opens.

Draft Western Sydney Aerotropolis Plan, 2019

The draft Western Sydney Aerotropolis Plan has been prepared by the NSW Government to guide development in the vicinity of WSIA and the Aerotropolis. The plan identifies the Fifteenth Avenue transit corridor as a proposed transit corridor (p37) to provide an efficient and reliable linkage to WSIA and support the construction of new centres as a city-shaping corridor.

The document thematically outlines the vision and mechanisms that will be used to plan and design the series of character areas which make up the airport and aerotropolis. It also identifies the potential for a new network of connections stating, 'Fifteenth Avenue Smart Transit (FAST) Corridor will run east-west through Austral and connect to the Airport, Aerotropolis and Liverpool' (p14). This plan and its subsequent iterations will continue to be a key reference point for the future planning of Western Sydney.

Infrastructure Priority List, Infrastructure Australia, 2019

The Infrastructure Priority List sets out the priorities of Infrastructure Australia for business case analysis and future financing. Many of the projects address the need for frequent and accessible public transport to reduce congestion and maintain the liveability of Australian cities. Since 2016 the Priority List has identified the Western Sydney Airport public transport connections - including rapid bus from Liverpool to WSIA - as a nationally significant priority.

Better Placed: An Integrated Design Policy for the Built Environment of New South Wales, GANSW, 2017

Better Placed is a policy document that seeks to enhance design quality in the NSW built environment. It 'establishes a baseline of what is expected to achieve good design, across all projects in NSW.' Consistent with Better Placed this design framework adopts a 'vision and validate' approach to design from the commencement of each project.

The Sydney Green Grid: South West District: Spatial Framework and Project Opportunities, GANSW, 2017

The Sydney Green Grid proposes a network of green spaces that connects town centres, public transport hubs and major residential areas.

South Creek and Kemps Creek have been identified as priority projects. They present opportunities for creating a continuous open space that intersects with the landscaped FAST Corridor. The Green Grid policy seeks to create a regionally significant open space corridor that provides ecological protection and enhancement, improved water quality and recreational opportunities for local communities.

Connected Liverpool 2050: Local Strategic Planning Statement (LSPS), Liverpool City Council, 2019

The draft LSPS identifies Liverpool City Council's key priorities to give effect to the vision outlined in the District Plan and Regional Plan. The FAST Corridor is central to the LSPS, identified as a flagship infrastructure project for Liverpool City Council.

Other important policy and guidance documents include:

- GANSW 'Aligning Movement and Place', 2019
- GANSW Draft 'Greener Places', 2017
- GANSW 'Good Urban Design' Discussion Paper, 2019
- GSC 'The Pulse of Greater Sydney', 2019
- TFNSW & Commonwealth 'Western Sydney Rail Needs Study', 2017
- Western Sydney Parklands Trust 'Southern Parklands Framework', 2018
- Infrastructure Australia, 'Outer Urban Public Transport: Improving Accessibility in Lower Density Areas', 2018

6

South West Sydney landscape

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This section explores the existing landscape and elements that should be enhanced and celebrated. The landscape of South West Sydney is rich with ecologically significant areas that need protection, restoration and celebration. There are many opportunities for the corridor to highlight views across the bushland landscape and the beauty of natural systems, such as creeks, ridgelines and riparian environments.

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6.1 Principles of landscape and environment



Protect natural environment

Protect the local environment from degradation and ensure natural systems are enhanced by new urban centres.



Strengthen local habitat

Ecological systems have been degraded by industry and urban activities over many years. Restoration and best practice water-sensitive urban design will create a thriving environment for future residents.



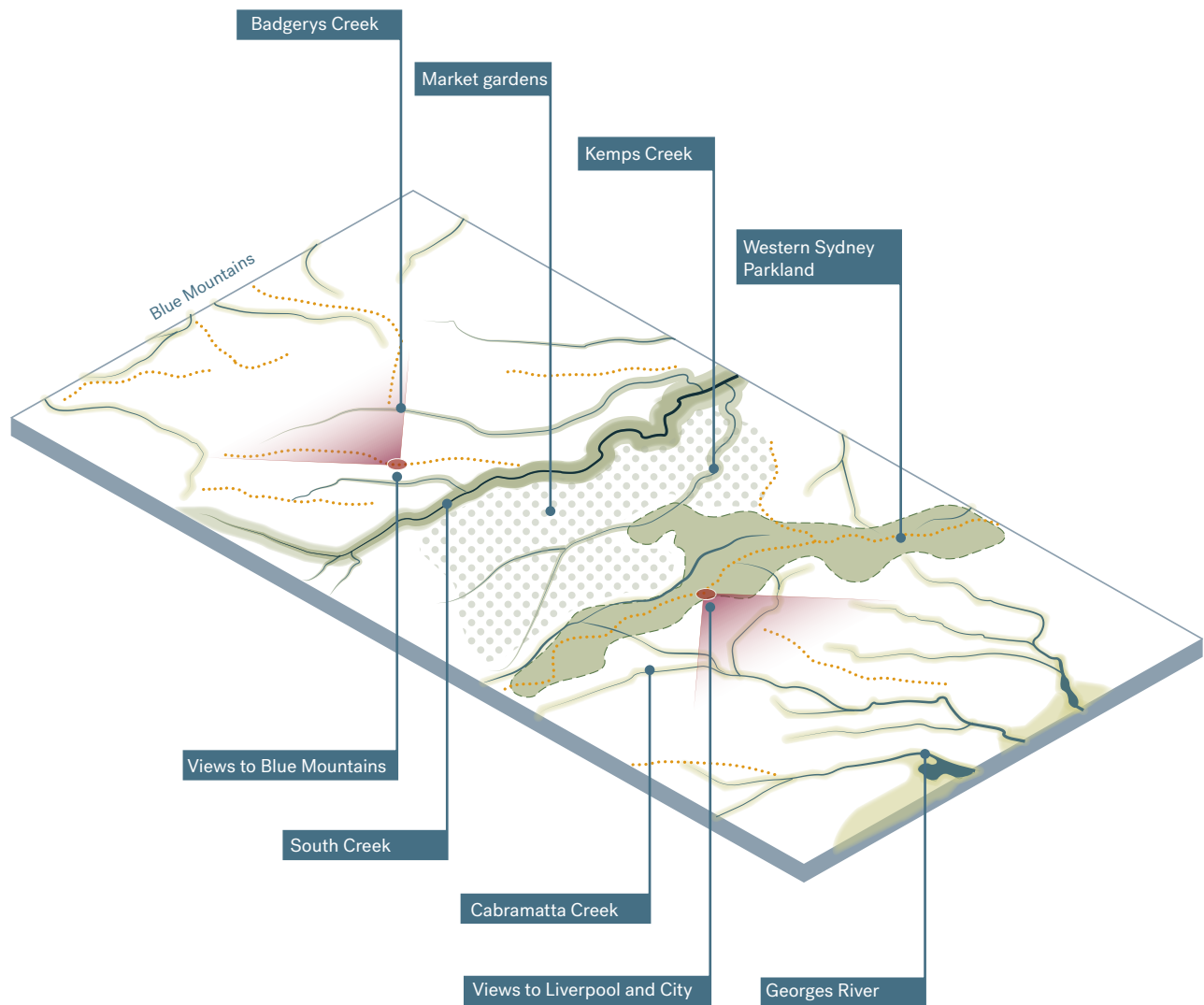
Integrate Aboriginal perspectives

The Liverpool area is recognised as the land of the people of the Cabrogal clan of the Darug (Dharug) nation and the people of the Dharawal Nation.



Celebrate the beauty of the Western Sydney landscape

Highlight the beauty of the Western Sydney landscape by capitalising on the terrain, viewlines, existing trees and water bodies along the corridor.



6.2 Existing landscape features

- Undulating landscape of valleys and ridges with vistas across the Sydney basin to the east and Blue Mountains to the west.
- A low-density suburban landscape on the fringe of Liverpool that abruptly stops at the Western Sydney Parklands. Houses front open spaces with hard fences rather than addressing them.
- Bushland meanders into suburban areas.
- North-south riparian corridors are in varied condition; Badgerys, Kemps, Cabramatta and South Creeks all sit within riparian zones that consist of primarily native vegetation with natural creeklines. Others have been transformed into concrete basins and stripped of vegetation.
- Towards WSIA there is a productive mixed rural landscape with extensive peri-urban activities.
- Although the South West Sydney landscape has been Aboriginal land for more than 60,000 years, much of this identity is lost or invisible to residents and visitors in the area.

6.3 Landscape opportunities

- The beauty of the undulating landscape of South Western Sydney should be experienced and celebrated while travelling the length of Fifteenth Avenue by enhancing key viewlines from high points along the corridor.
- Create cooler, more walkable environments with increased canopy cover in existing suburban areas.
- Restore creeks and riparian zones that are currently in poor condition by naturalising creek beds, native planting, clearing of invasive weeds and rubbish, and implementing 'water sensitive urban design' practices.
- Connect watercourses into the broader system of Sydney's riparian creeks as identified in the GSC 'Green Grid' document.
- Leverage the benefits of Western Sydney Parklands, including planned community infrastructure and access to public open space.
- Find opportunities to celebrate local Aboriginal identity in the landscape through naming conventions, art, landcare practices, design and management of the wider area in consultation with local Aboriginal leaders.
- Protect productive market gardens from the continued spread of urban dwellings and incorporate urban farming practices into new centres.



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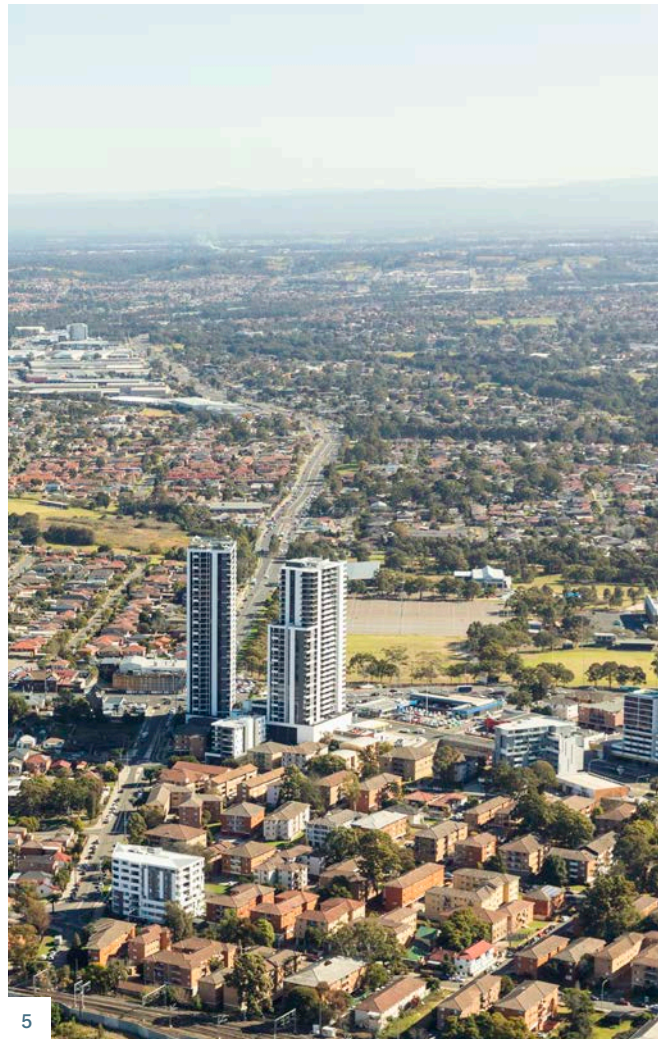
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Rivers and estuaries

There are several significant creeks that intersect with the FAST Corridor. Kemps Creek and South Creek remain naturalised and are noted as significant opportunities for recreation and public open space in the NSW Government's Green Grid policy.

1. Maxwells Creek in Miller industrial park
2. Edge of Western Sydney Parklands
3. Landscaped swale in Austral
4. Views across WSIA site to Liverpool
5. View from Liverpool toward WSIA with Blue Mountains in distance.

Western Sydney parklands

Western Sydney Parklands stretches 27 kilometres from Quakers Hill to Leppington. The 5,280 hectare area is the largest urban parkland system in Australia, and is divided into 16 distinct areas that have a specific character, opportunities and management priorities.

The corridor passes through the West Hoxton Precinct which has remnant farms, the Fifteenth Avenue village and the State Heritage listed Upper Canal system.



1



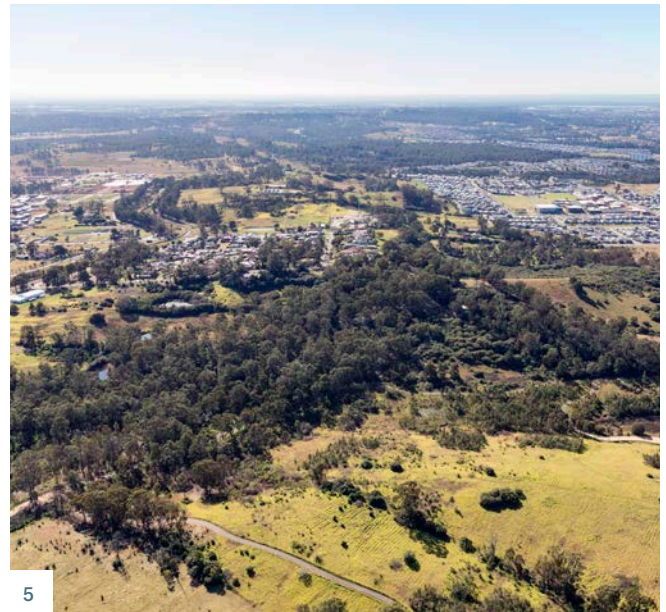
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Viewlines

Views throughout the area vary depending on the topography and vegetation. Fifteenth Avenue rises to its highest point at Western Sydney Parklands offering views to the east over Liverpool and Sydney CBD and views west that capture the rural landscape framed by the Blue Mountains.

There is a strong sense of the horizon which blends into the skyline due to the gentle undulation of the terrain which enables long views. Close views often feature native trees along fencelines.

1. Kemps Creek remains heavily vegetated among farmland
2. Close views across a market garden, framed by trees along the fenceline
3. Close views across grazing paddocks, there are many textures and colours in the Western Sydney landscape
4. Drainage channels in suburban areas could be celebrated instead of having backs turned to them
5. Western Sydney Parklands is an iconic North South public space that intersects the FAST Corridor

7

Character and place

18

This section explores the character areas along the FAST Corridor. There are six distinctive existing and future character areas. They transition from the urban setting of Liverpool city centre to the new airport through newly-developed low density suburbs, Western Sydney Parklands, historic market gardens to peri-urban and rural areas.

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7.1 Principles of character and place



Strengthen and integrate with existing character

The corridor will enhance the existing character and places with creative forms of expression in the built environment and landscape.



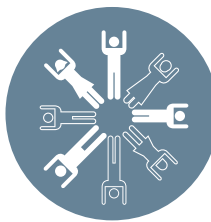
Reference to history

The corridor will reflect the evolution of the cultural and environmental landscape with references to both Aboriginal and post-colonial history.



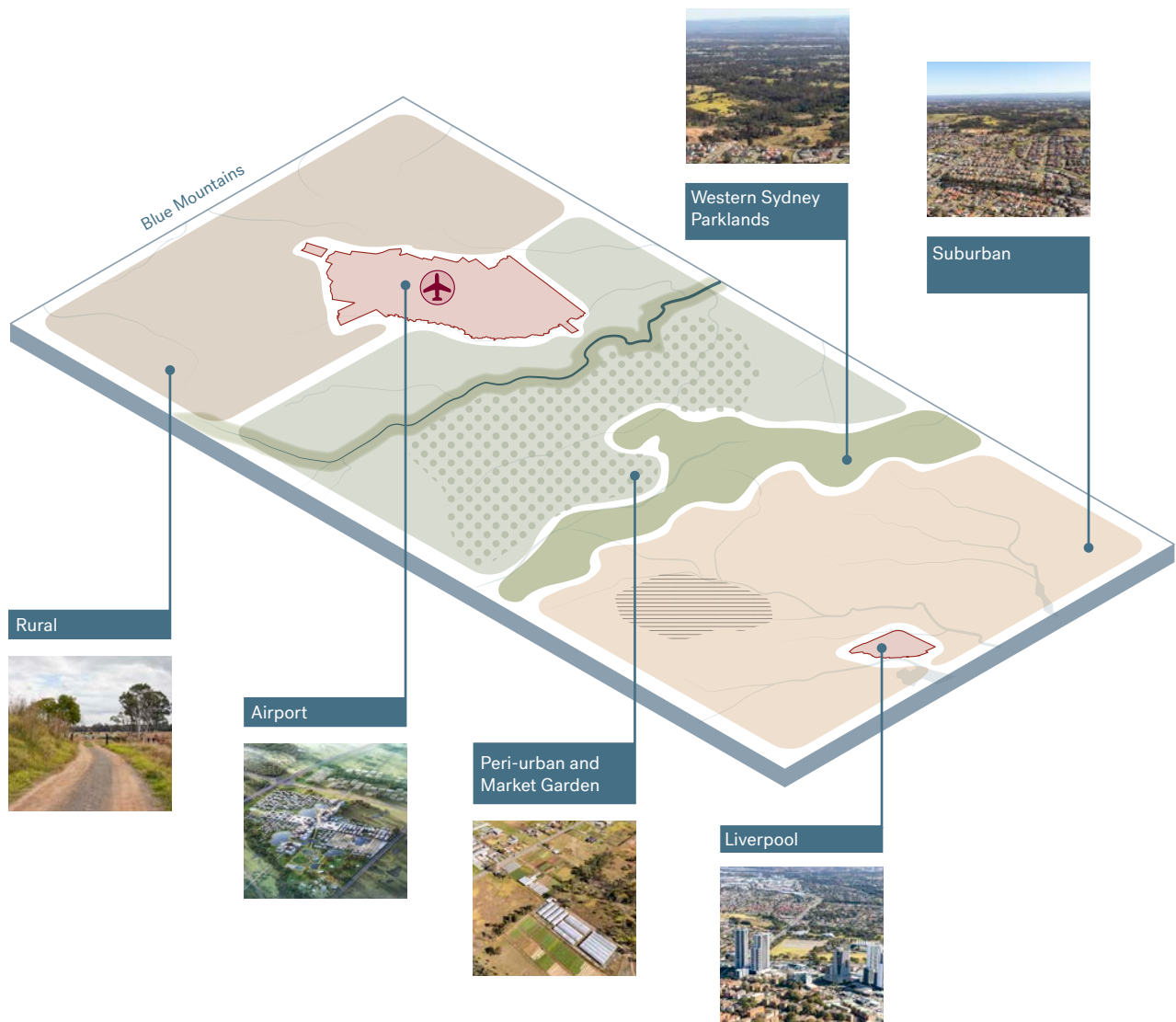
Create a sense of transition through the landscape

Corridor users will experience a transition through the distinctive places along the corridor between the airport and Liverpool city centre.



Made for community

Enable a sense of place and identity to grow through high quality public spaces that connect people and provide a range of recreation opportunities.



7.2 Existing character of Fifteenth Avenue

- The six prominent character areas are illustrated above. They are Liverpool city centre, the suburban fringe of South West Sydney, the Western Sydney Parklands, the peri-urban and market gardens, and WSIA.
- The growing population of Liverpool has a rich cultural heritage that has been shaped by waves of immigration to Australia. The cultural diversity has shaped the local landscape with varied housing types, industries and farming practices.
- The predominant sources of employment are linked to land uses such as productive agricultural land and large scale employment land, although some of this will inevitably change with the establishment of WSIA.
- Market gardens throughout the peri-urban area are interspersed with suburban and bushland areas and transition to the east through rural farmland to the base of the Blue Mountains.

7.3 Opportunities for placemaking

- Highlight the transition in landscape from Liverpool CBD to suburbia and then into peri-urban and market garden.
- The natural environment and landscape character should define the character of the local area, with planting and material choices that encapsulate this distinctive beauty.
- Investment in the arts and community facilities will assist in shaping cohesive, diverse communities.
- Town centres should be people-focused and encourage socially vibrant communities by providing positive streetscapes, public spaces and activation of these spaces.
- Encroachment of urban development should be carefully managed to prevent compromising the economic viability of small agricultural and horticultural producers and protect existing industry.
- The corridor and new urban centres should be context driven. Development should complement and take design cues from the existing urban fabric and land uses.
- Market gardens need to be protected. Urban farming practices should be included in the town centres to reflect the character and heritage of the local area.
- New employment opportunities should be provided that are suitable for a young, educated, migrant population.
- The design of roads and centres should find ways to celebrate the community of Liverpool, both past and present, through public arts, cultural celebrations and food.



1

Urban Liverpool

Liverpool city centre is one of Sydney's most important regional cities and will continue to grow, supported by its proximity to WSIA. Liverpool thrives because of a diverse mix of industries, strong residential market, and a young population. Liverpool CBD is strategically located halfway between WSIA and Sydney Kingsford Smith Airport and has aspirations to become Sydney's third CBD.



2

Suburban Liverpool

There is diversity in the stock of stand-alone suburban dwellings bounding Hoxton Park Road and Fifteenth Avenue. Dwelling styles and age appear to be consistent with migration waves to Sydney since the inter-war period to the present day. Urban release areas in Liverpool are some of the fastest growing areas in NSW. Suburban areas have spread west to the edge of the Western Sydney Parklands, interspersed with riparian zones and light industry. Not all suburban development has been sympathetic to the surrounding landscape or place.



3



4

1. View over Liverpool city and the suburban context that frame the start of the Fifteenth Avenue Corridor.
2. Typical suburban development alongside Fifteenth Avenue.
3. The edge of the Western Sydney Parkland is addressed by the rear fences of residential development in Hoxton Park.
4. Recent suburban development in the study area with buildings occupying a significant proportion of each block.



1



2

Peri-urban and rural

The peri-urban and rural setting of West Hoxton, Austral, Rossmore and Badgerys Creek is closely tied to the market garden operations in the local area. These areas have historically supported semi-rural communities in the local area, with essential services provided in small town centres.

1. The suburban landscape of Hoxton Park hits the Western Sydney Parklands, abruptly transitioning into the rural and peri-urban setting of West Hoxton, Austral and Rossmore, which stretches into the horizon. The Blue Mountains can also be seen in the distance.
2. Housing and industrial land is interspersed with productive agricultural land
3. West Hoxton is a rural community that adjoins the Western Sydney Parkland, The South West Channel can be seen intersecting north-south.



3



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3

Market gardens

Market gardens are small-scale farms (typically about two hectares) on the edge of urban centres that play a vital role in the city's food supply. Rossmore and Austral still support market gardeners that grow a wide variety of fresh vegetables, herbs, fruit and flowers. Market gardens have flourished as a direct result of waves of immigration to Australia. Horticulture is a skill brought to Australia from around the world. The diversity of produce from this area is a testament to migrant innovation and versatility.

1. Fifteenth Avenue currently concludes with an unsealed track leading to a farm gate. This is indicative of the local character as you get closer to the WSIA site and the future Aerotropolis.
2. Market garden typology: the range of produce in the region has changed as new migrant communities have brought new farming methods and preferred types of produce.
3. View from above: the market gardens create a rectilinear patterning in the landscape. Farmhouses and warehouses adjoin the road, while produce is cultivated behind. Many of the paddocks sit dormant.



1



2

Proposed Western Sydney International Airport and Aerotropolis

The idea behind the Aerotropolis, or 'airport city', is broadly defined as 'a metropolitan subregion whose infrastructure, land use and economy are centred on an airport'. The intention is that WSIA will be more than just an airport terminal, it will underpin an economic precinct that will deliver jobs and new opportunities, fully integrated with the economic and urban fabric of Western Sydney. WSIA is expected to provide 11,000 jobs during its construction, and up to 28,000 direct and indirect jobs by the early 2030s. WSIA is now under construction and opens in 2026.

1. Present day (2019): WSIA began early works and construction in late 2018 to transform the rural setting around Badgerys Creek. The scope of works required before operations begin in 2026 is significant.
2. Future state: The WSIA will be a modern and sustainable transport hub and employment centre. Visualisations are only indicative of the future character of the precinct. Image courtesy of Western Sydney Airport Company Ltd.

8

Future urban centres

This section explores the broad principles that should be applied to new urban centres that will be located along the FAST Corridor in the future. Best practice transit-oriented design and landscape oriented development should underpin the future character of each new centre with mixed use integrated townships, medium density housing, pedestrian friendly streets and high quality public spaces.

8.1 Principles of urban centres



Encourage density and amenity around transport nodes

Each new centre will be based around a station, with height and density focused at the core. This will transition down to the existing context at the margins.



Diversity of housing

Allow for variation in size, typology and affordability of housing to accommodate a diverse population who live, work and travel through the area.



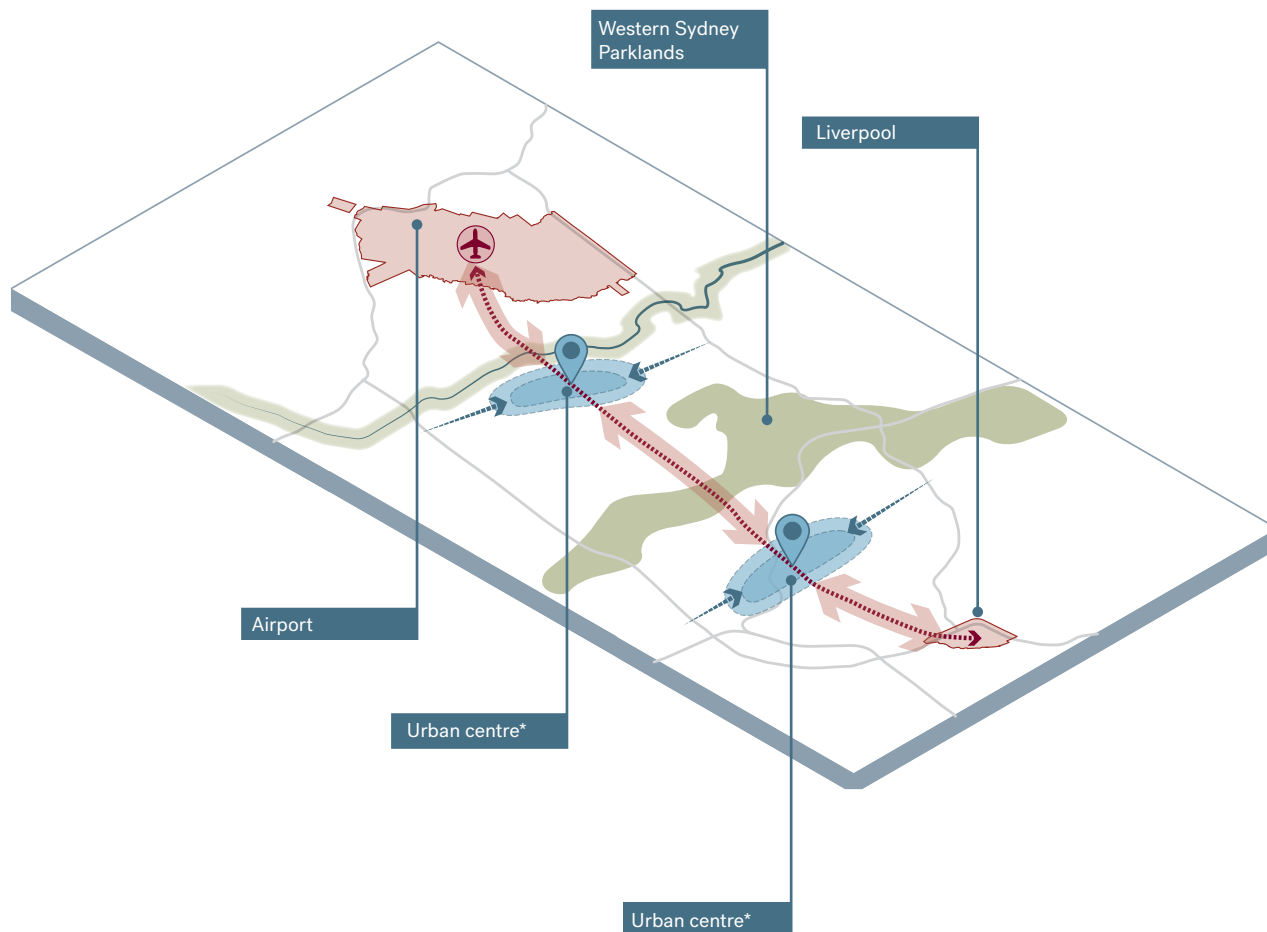
High quality streets and public open spaces for people

High quality open spaces and shady pedestrian-priority streets will make new centres along the FAST Corridor distinctive and appealing places to live and work.



Site specific design

Each new centre needs to consider the specific site constraints and opportunities. Development must integrate with the local place and where possible urban form should be orientated towards the green grid and natural landscape.



8.2 Existing urban considerations

- The urban condition flanking Hoxton Park Road and Fifteenth Avenue is generally comprised of single detached dwellings. This low-density growth is the prevailing type of housing on offer in the region and is expanding at a rapid rate.
- The expanding low-density urban form is removing biodiversity, canopy cover and notably the peri-urban market gardens that have characterised parts of the South West for generations.
- Retail centres and community facilities are not thriving in the suburban context beyond Liverpool CBD. Higher density centres would support retail and commercial activity beyond the existing city centre.
- WSIA is currently not supported by a significant local resident populace or urban centre within 30 minutes by public or active transport. At its opening, WSIA risks being heavily reliant on personal vehicles from key population centres. The aspiration for a 30 minute city will not be a reality without high quality rapid transit and housing in closer proximity to the airport.
- Housing across Sydney is increasingly unaffordable and inaccessible to low income and key workers, with limited housing diversity.

8.3 Opportunities for urban areas

- Urban centres will be located at strategic intervals along the FAST Corridor to ensure effective access to employment in Liverpool and the WSIA.*
- The built form outcomes will offer a range of housing types to support the diverse population in Liverpool.
- Built form density will be in the centres supported by retail, commercial and community infrastructure.
- Urban centres will integrate with surrounding landscape, complementing the suburban and peri-urban context. Height transition, clear development boundaries and a place-led approach will ensure that the existing fabric of the site is expressed within the new development.
- Transit-oriented development will minimise future suburban sprawl by creating higher density centres with walkable catchments from future stations.
- Employment land uses within walking distance of future stations will ensure that the future urban centres are both origins and destinations.
- Sustainable and active transport will be prioritised. Walking and cycling will be supported through quality infrastructure and design such as cycle lanes, wide pedestrian paths, lower speed limits and shared streets.

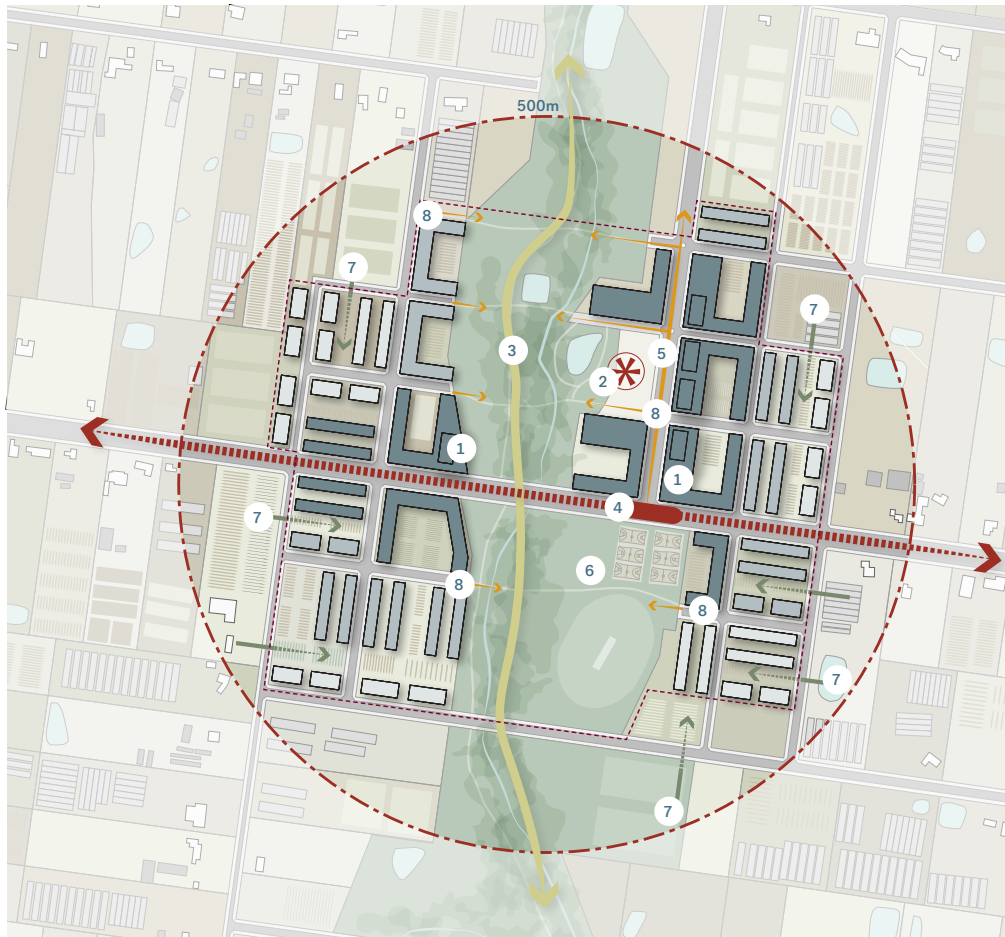
*The number and location of these centres is yet to be determined. Locations shown are indicative and hypothetical – shown for illustration purposes only.

8.4 Urban design strategy

8.4.1 Peri-urban and market garden context

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Indicative layout plan

Key elements of place-led approach

- Defined density around transit stop which does not bleed into surrounding landscape
- Buildings frame river front bushland
- Public domain is integrated with existing topography and vegetation
- Transition building height down at edges and sensitive ecological interfaces
- Capture views of surrounding landscape
- Walkable neighbourhoods
- Protect solar access to key spaces

1. Landmark developments denoting arrival into the urban centre
2. Local centre plaza surrounded by mixed use development with active retail ground plane and integrated edge with the green network
3. Green link that connects north-south along the riparian zone
4. Transit stop on Fifteenth Avenue
5. Main retail/civic street running perpendicular to Fifteenth Avenue
6. Active recreation facilities
7. Market garden/peri-urban condition enters into the urban environment
8. Connectivity into and across the riparian zone and public open space

8.4.2 Suburban context



Indicative layout plan

Key elements of place-led approach

- Centre anchors transit stop
 - Buildings strung along river corridors therefore clustering density with amenity
 - Bushland should flow into centre
 - Public domain could cross river and is integrated with existing topography and vegetation
 - Building heights transition from buildings fronting bushland to vegetation integrated through streets types
 - Celebrated views of surrounding landscape
 - Walkable neighbourhoods
 - Protect solar access to key spaces
 - Range of land uses and building typologies
1. Landmark development denoting arrival into the urban centre
 2. Local centre plaza surrounded by mixed use development with active retail ground plane and integrated edge with the green network
 3. Green link that connects north-south along the riparian zone
 4. Transit stop on Fifteenth Avenue
 5. Main retail/civic street running perpendicular to Fifteenth Avenue
 6. Active recreation facilities
 7. Height transition into existing suburban condition
 8. Connectivity into and across the riparian zone and public open space
 9. Accessible local school facilities
 10. Access to new urban centres and transport stop from existing suburban areas
 11. Secondary perpendicular transit route with interchange at plaza

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Transit corridor

This section explores the characteristics of the transit corridor and the functional outcomes it should deliver. In the future these characteristics should inform the alignment and design of the route, the timing and number of stops and hierarchy of transport modes. Case studies offer other reference points to explore as opportunities for the transit corridor.

9.1 Guiding transport principles



Prioritise sustainable and active transport

The corridor will prioritise public transport modes, low emissions modes, separated bicycle lanes and pedestrian walkability.



Create an efficient connection

The corridor will efficiently and reliably connect Liverpool to WSIA, stopping only at key centres of growth along the corridor (balancing journey time with place-making opportunities).



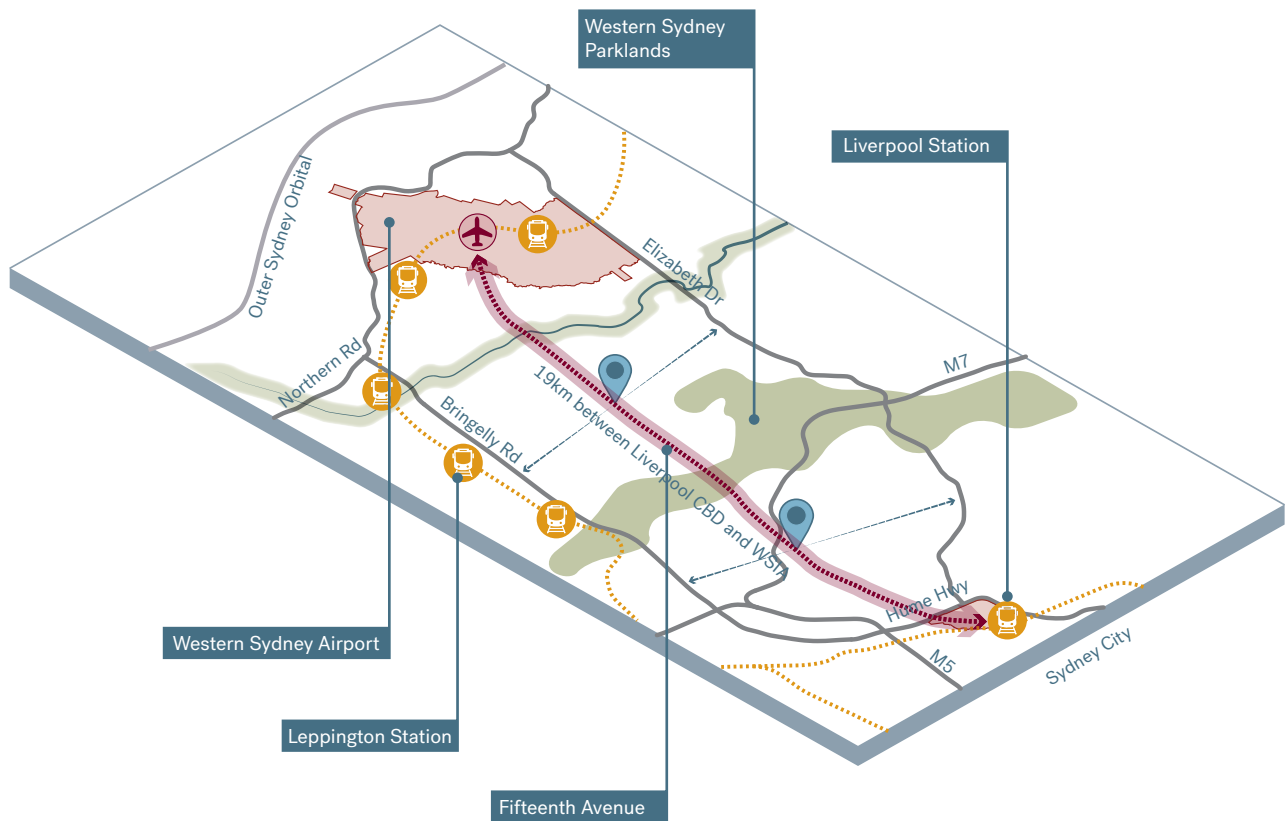
Place-led infrastructure design

The existing and future place will guide the design of stations and the corridor, which should be green, heavily vegetated, attractive, functionally cool and walkable.



Provide multi-modal connectivity and rich experience

The corridor will integrate with existing and future public transport networks with a variety of modes and create a positive experience for residents and travellers to South West Sydney.



9.2 Existing transport context

- The FAST Corridor route starts at the major Hoxton Park Road traffic corridor. This transitions into Fifteenth Avenue at the intersection of Cowpasture Road and then continues west as a smaller regional road passing through the peri-urban landscape and Western Sydney Parklands. Fifteenth Avenue terminates just before South Creek (i.e. the FAST Corridor does not yet reach the WSIA site). A range of bus routes service Western Sydney, including the T-Way that follows part of the potential FAST Corridor route.
- Some recently built roads in the area have relatively low amenity, often without pedestrian pavements, integrated water sensitive swales, significant tree canopy or planting.
- Local strategies currently prioritise major highways to the north and south of Fifteenth Avenue and the proposed metro extension to WSIA. However, there is significant opportunity for an intermediate place-led public transport link between Liverpool and WSIA.
- With the employment opportunities that WSIA brings, there is currently no significant workforce that live within a 30 minute commute by public transport. Improved links between WSIA and Liverpool will help deliver on the targets established in the Western Sydney City Deal and the GSC Strategic Plans.
- Western Sydney is currently congested by traffic with most people commuting to work by car. To improve on sustainability outcomes and reduce congestion, better public transport links are required.

9.3 Transport opportunities

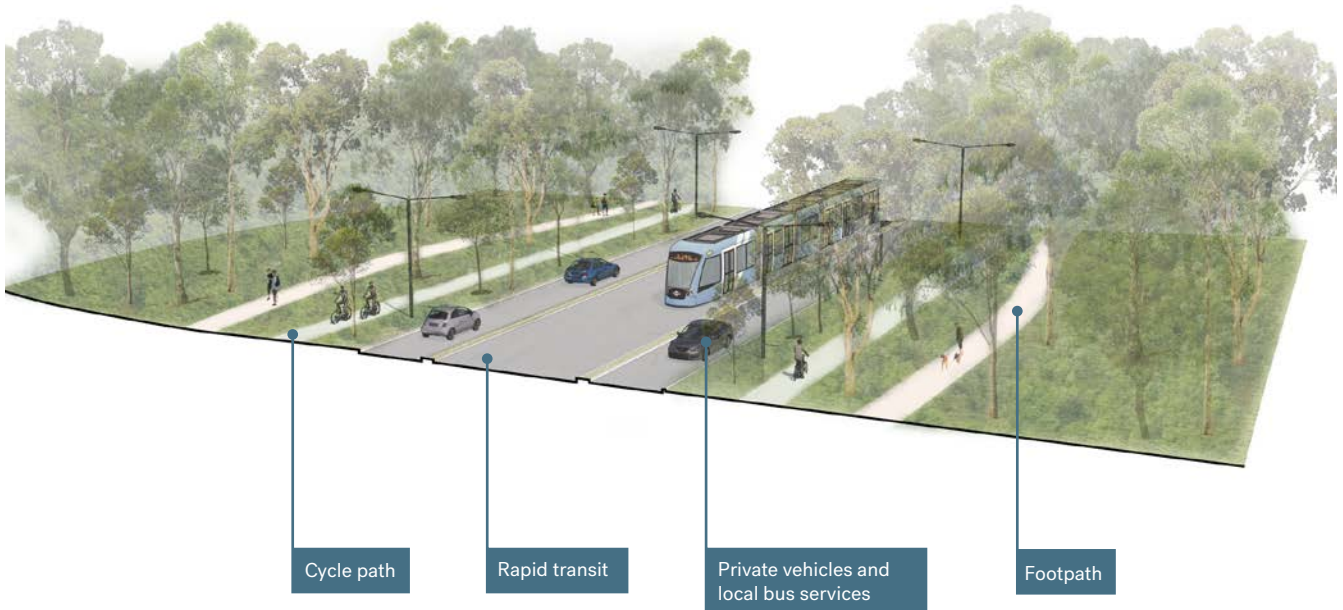
- The 19km corridor along Fifteenth Avenue is the most direct route between Liverpool and the Airport and could be prioritised for fast and efficient public transport such as zero-emissions rapid buses, trackless trams, or light rail.
- The corridor would accommodate high speed public transport in a landscaped boulevard with low speed urban 'super stops' at centres.
- The corridor and stations would prioritise walking, cycling and micro-mobility with off-street cycle paths and promotion of alternative modes of transport such as carsharing.
- The corridor must balance speed with the number of stops, low speed areas and loading time at stations.
- The public transit corridor would improve Western Sydney's capacity to create a 30 minute city, with accessible jobs in Liverpool city and the Aerotropolis for future residents living along the corridor.
- The transit corridor will be low noise and significantly landscaped to cool the area, provide shade for people and strengthen the local ecology.
- A significant outcome of the corridor is the place-led approach. The corridor will adopt unique characteristics of the landscape and land uses in the local area. Stations will also serve a double purpose where placemaking opportunities will also be leveraged to create vibrant and community-focused town centres.

9.4 Corridor sections

Indicative corridor section through peri-urban landscape

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9.4.1 Modes of transport



Walking

All modes of transport are improved when walking is prioritised. By making walkable environments the new urban centres along Fifteenth Avenue Corridor can prosper. Walking leads to vibrant and socially inclusive neighbourhoods, improves physical health of residents and employees and boosts the local business activity. Walking allows for more open space and a greener public domain, and minimises congestion as well as carbon dioxide emissions.



Cycling and micro mobility

Cycling is an extremely efficient mode of transport for short and medium distances and commuting to transport hubs. A cycle path network that connects key destinations along Fifteenth Avenue corridor to Liverpool and the WSIA will increase the effectiveness of public transport and reduce car dependence. By including adequate cycling infrastructure from the outset, urban centres are better placed to create flourishing neighbourhoods, with healthy residents and employees. Cycle infrastructure could potentially also support future micro-mobility trends (e.g. e-scooters).

Indicative corridor section through future centre



Rapid transit

Bus rapid transport (BRT), autonomous rapid rail transport (e.g. trackless trams) and light rail are potential rapid transit options for the FAST Corridor. A combination of these modes could be staged using different infrastructure depending on the demand. BRT and ART include permanent infrastructure with dedicated lanes and ‘stations’ at key locations. Rapid transit along the corridor should be supported with local buses and on-demand shuttles to improve efficiency of the network and connect to a broader region.



Private vehicles

While the Fifteenth Avenue Corridor aims to prioritise sustainable and active modes of transport, private vehicles will continue to serve an important function for travel in Western Sydney. Ensuring that local residents and employees have access to personal vehicles when required, but in a manner that doesn’t induce demand when effective alternatives are also available, will be important.

9.5 Case studies

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Cities across the globe are employing transit-oriented design principles. In many circumstances, there is a correlation between the significance of investment in public transport and scope of growth after construction such as increased dwelling densities and new employment opportunities.



Gold Coast Lightrail, Australia

The Gold Coast Lightrail transported 9.5 million passengers this year, up from its 2014 inception of 6.3 million. The \$2 billion project currently consists of 19 stops stretching 20 km and has served as a catalyst for urban renewal throughout the area. The orientation, design and materiality of the stations have been carefully considered in response to their surrounding context. Two stages of the project have been completed, with stage three currently underway to extend the lightrail to Coolangatta and the Airport.

Alongside steady growth in patronage, researchers at Griffith University have found that property prices near proposed stations started to increase in value during the early planning phases. The effects of the lightrail were to push up property values within 800 metres of the stations by more than 30 per cent in total from 1996 to 2016.



Rieslfeld, Germany

Rieslfeld was developed as a transit-oriented extension to Freiburg in Breisgau in the 1990s on brownfield land. Rieslfeld is exemplary in its collaborative government and community led design process and the focus on provision of community and transport infrastructure which underpinned the residential growth. Medium density development abuts farmland and parkland akin to that currently found in Western Sydney.

The place is oriented around a central town plaza with a tram stop and community buildings. Pedestrians and cyclists have priority over cars and vehicular traffic is limited to 30kph throughout the area. Shared underground carparking is located below each block and streets have integrated water sensitive urban design systems. Buildings are mostly between four and six storeys set amongst generous street tree canopy.



Curitiba Bus Rapid Transit, Brazil

Curitiba implemented the first Bus Rapid Transit (BRT) network in the world. In the early 1970s, the city was in economic decline and could not afford typical mass transit projects such as metro and light rail. This forced the cities planners to find innovative cost effective solutions while still delivering an efficient transport system.

Since its inception in 1974, BRT has been the model duplicated in cities all over the world. Key components of the system include bus terminals and dedicated lanes, which allow for greater speed and efficiency. The associated model of urban development focuses density along transit served corridors which decreases in height proportional to the distance away from the station.



Portland MAX Orange Line, USA

The MAX Light Rail in Portland, USA, is an exemplary model of transit-oriented development which clusters density and services around transit corridor stops. By 2040 Portland plans for 40 per cent of households and nearly 70 per cent of jobs to be located in or near centres or corridors served by public transport. The network consists of five routes over a 96 km network serving 97 stations which connect the North, Northeast, and Southeast sections of Portland.

In September 2015, the MAX Orange Line opened, servicing Portland to Milwaukie. It consists of 12 kilometres of tracks with 10 new stations and two park and ride sites. The total cost of the project was \$1.49B USD. There are 400,000 new residents projected for the Portland metropolitan area by 2035. The Portland-Milwaukie corridor is expected to experience significant proportion of this growth.

Community involvement and intentional partnerships were leveraged throughout the planning and construction of the project, resulting in a range of benefits such as redevelopment, sustainability initiatives, active transportation improvements, public art and more.

Sustainability measures integrated into the project include:

- Vegetated tracks that capture stormwater runoff and also help reduce train noise and vibration
- A wayside supercapacitor – technology that allows for energy created during braking to be stored and then reused
- 286 bioswales to capture and filter 167,000 sqm of stormwater
- Twenty-eight solar installation sites to offset power usage
- Eight structures with eco-roofs, a layer of vegetation and soil on top of a building, help divert stormwater, improve building insulation, and absorb CO²
- Active transportation improvements were made with more than \$65 million invested in bicycle and pedestrian links to create active and sustainable access to the new stations.

Protect natural environment



Integrate Aboriginal perspectives



Strengthen local habitat



Celebrate the beauty of the Western Sydney landscape



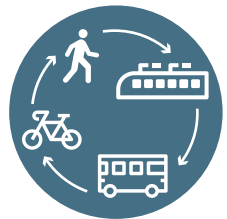
Prioritise sustainable and active transport



Place-led infrastructure design



Create an efficient connection



Provide multi-modal connectivity and rich experience

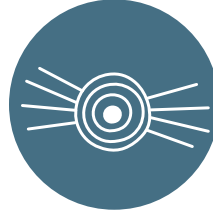
Create a sense of transition through the landscape



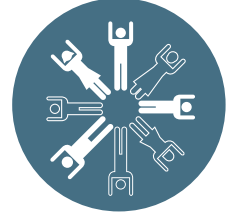
Strengthen and integrate with existing character



Reference to history



Made for community



High quality streets and public open spaces for people



Encourage density, amenity and fine grain built form around transport nodes



Diversity of housing



Site specific design

9.6 Process and timing

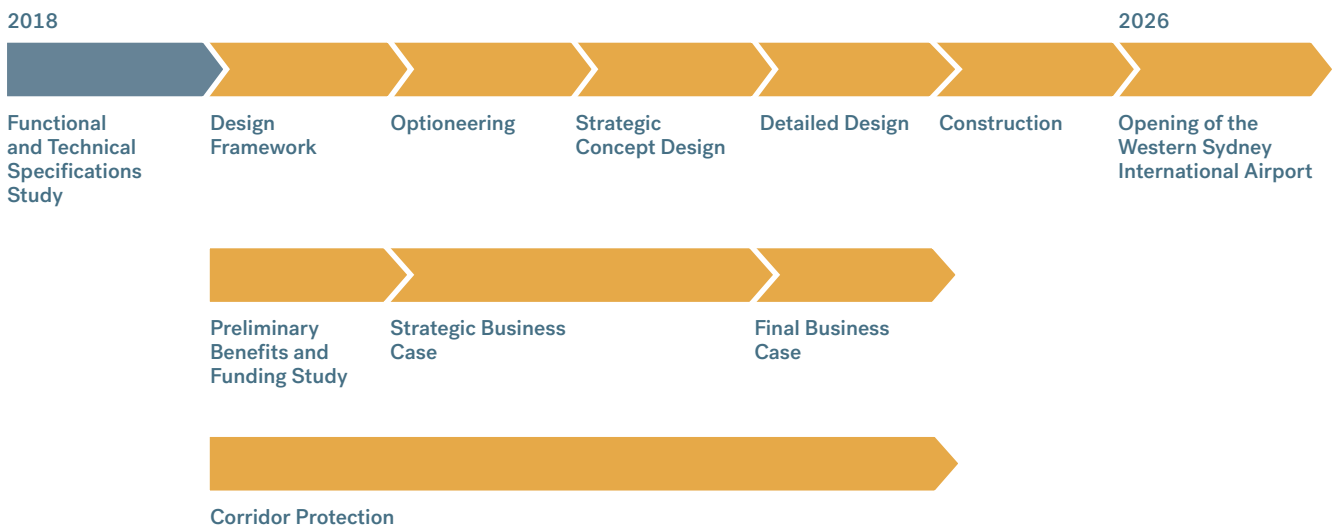
This diagram illustrates the broad sequence of stages for the project to be completed in time for WSIA's opening in 2026.

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It is intended that this Design Framework will continue to be an important reference document throughout the FAST Corridor's development (including related land-use planning decision-making for the region). This will include as a key input into both design and business case processes (consistent with NSW infrastructure project management best-practice).

For more information on the FAST Corridor project and the latest on the implementation of this Design Framework please visit www.liverpool.nsw.gov.au.

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