

4 Project development and alternatives

A number of options were investigated in order to identify a preferred Project. This chapter provides an overview of the options considered, including options identified by the community, and the justification for the preferred Project.

4.1 Planning for Redfern Station

Redfern Station has been subject to several accessibility and user experience upgrades in recent years. Recent projects undertaken at Redfern Station include:

- Redfern Station Lift Project (2014)
 - involved various works as part of the TAP, including improved accessibility at Lawson Street (station entrance and new access ramps to Redfern station concourse level), a new lift connecting Redfern Station concourse to Platforms 6 and 7, extension of Platforms 6 and 7, and reconfiguration of the pedestrian crossing and footpath at Lawson Street station entrance.
- Redfern Station improvement works (2018)
 - involved a new station entrance on the corner of Gibbons Street and Lawson Street and a bike storage facility, replacing the old Gibbons Street entrance
 - provided improved customer movement through Redfern Station and better interchange with Platforms 11 and 12
 - increased capacity to handle ongoing growth of patronage.
- Platform 6 and 7 reconstruction (ongoing)
 - involves the reconstruction of the Platforms 6 and 7 retaining face to meet Sydney Trains safety requirements and standards, and to mitigate hazards associated with the platform surface and structure.

Ongoing accessibility and capacity constraints, together with future demand requirements, remain key justifications for proceeding with a new upgrade to Redfern Station. The development of the Project and alternatives considered are outlined further below.

4.2 Project planning and design process

Development of the preferred option for the Project has been a result of the ongoing planning and design process, including consultation with customers, the community and key stakeholders. The Project alternatives discussed in **Section 4.3** below build on previously considered concept designs, refined to consider both revised constructability and environmental constraints. Four of the designs were shortlisted through a multi criteria analysis (MCA) and then presented to the community for consultation, to inform the ongoing design development. Two community proposed designed options were also considered.

4.2.1 Principles in project development

Preliminary design principles have been developed to guide the design of the Project, so that appropriate design quality is achieved for internal spaces and the public domain. The design principles include:

- functionality, accessibility and circulation – ensure that access between platforms and surrounding destinations is safe, quick, efficient and available to all members of the community, including those with accessibility issues such as people with a disability, limited mobility and parents/carers with prams
- customer information and wayfinding – ensure that movement around Redfern Station is made easy with clear signage, and that information about train services are readily available
- safety – ensure the safety of all customers and staff

- customer comfort and amenity – reduce overcrowding and provide for customer amenities
- urban design – an outcome that not only fulfils transport customer needs, but benefits the local area and its community by improving precinct connectivity and amenity
- heritage – sensitive integration with and response to the heritage values of the station and surrounding precinct
- social and community values – consideration of the associations of the local Aboriginal community with the place and involvement of the community in the design process and outcome
- constructability – safe delivery of the Project in a live operating rail environment while minimising disruptions
- community feedback – on-going evolution of the Project in response to community feedback
- environment and sustainability – consideration of the principles of ecologically sustainable development outlined in Section 7 of the EP&A Regulation (refer **Chapter 24** of this EIS for further information). The Project also aims to meet certain requirements outlined by the Infrastructure Sustainability Council of Australia (ISCA), with the aim of receiving an ‘excellent’ ISCA rating. This has been considered throughout the design and the preparation of this EIS. Sustainability is considered further in **Chapter 20** of this EIS.

4.2.2 Integration with other development

The Project has been designed to integrate with other approved and planned projects within the vicinity of Redfern Station. The Project would serve to improve connectivity to these precincts and provide an efficient transport solution for workers and visitors to these employment centres. The strategic context of the Project in relation to government plans guiding development in surrounding precincts is described in **Chapter 2** of this EIS. Developments in the vicinity of the Project include (refer to **Figure 1-1**):

- South Eveleigh (formerly known as Australian Technology Park) (DPIE application reference number SSD 7317)
 - a business and technology hub
 - approval was obtained in 2016 for the construction of three large buildings comprising of parking, retail, commercial, childcare, gym and community office uses along with extensive landscaping and public domain improvements throughout the precinct and extension and augmentation of physical infrastructure/utilities as required
 - works are currently continuing with Modification 18 to SSD 7317
 - when complete, this development will result in an additional 10,000 workers within the South Eveleigh precinct.
- Carriageworks
 - currently the largest multi-arts centre in Australia following redevelopment in 2007, which houses numerous cultural and arts institutions and companies. It is expected that the patronage to Carriageworks would increase given the number of events and programs hosted at this location
 - regularly hosts large events bringing in visitors from across Sydney and internationally
- Sydney Metro City and Southwest: Waterloo Over Station Development (DPIE application reference number SSI 15 7400)
 - a new metro underground station, located in Waterloo between Botany Road and Cope Street, Raglan Street and Wellington Street with an integrated mixed use development above (Waterloo Metro Quarter) that is subject to a Critical State Significant Infrastructure planning process
 - approval for Sydney Metro was obtained in January 2017 and construction is currently underway

- the new Sydney Metro Waterloo Station is expected to open to the public in 2024
- University of Sydney - Campus Improvement Program
 - involves a 68 per cent increase to its Camperdown-Darlington campus floor space by the end of 2020, and is expected to accommodate a 21 per cent increase in students on the campus as well as 4,000 units of student accommodation
- Royal Prince Alfred Hospital
 - includes a proposed increase in patient and research facilities.
- City of Sydney active transport improvements
 - Lawson Street separated cycleway and footpath improvements
 - Burren Street/Wilson Street separated cycleway and footpath improvements
- various other residential and commercial developments:
 - 1 Lawson Square mixed use redevelopment
 - 60-78 Regent Street redevelopment
 - 80-88 Regent Street redevelopment
 - 90-102 Regent Street, Redfern
 - 11 Gibbons Street, Redfern development
 - The Regent Hotel, 56-58 Regent Street, Redfern
 - Pemulwuy Student Accommodation Project
 - North Eveleigh Precinct.

4.3 Project options considered

4.3.1 Do nothing

A 'do nothing' option was considered where platforms at Redfern Station would continue to be accessed by the existing stairways. This option would not cater for the forecasted customer growth predicted for Redfern Station or address the current accessibility issue. This option was therefore discounted as it does not fulfil the other Project objectives outlined in **Section 1.4**.

4.3.2 Original design options

Throughout the design development phase, various options were developed with consideration to the following design characteristics:

- cross corridor connection or connection to eastern side of the Station only, in order to:
 - cater for the short-term patronage increase arising from the South Eveleigh precinct, and provide access to Redfern Station from the eastern side via Marian Street, or
 - cater for precinct growth and extend the concourse from Marian Street to Little Eveleigh Street or Wilson Street.
- various concourse widths:
 - a four-metre-wide concourse that would cater for the year 2036 patronage demand, and would be replaced as part of future development at Redfern Station and North Eveleigh, or
 - a six-metre-wide concourse that would cater for patronage demand up to 2036, have a higher aesthetic quality and would not preclude future development opportunities at Redfern Station and North Eveleigh.
- various concourse entrances/exits:
 - an entrance at Little Eveleigh Street to the north west

- an entrance at Wilson Street to the north west
- an entrance at Marian Street to the south east
- an entrance at Cornwallis Street to the south east.

Engagement with the community and stakeholders has been ongoing for a number of years regarding potential opportunities for cross-corridor access and improvements in and around Redfern Station. The Redfern Station Upgrade – New Southern Concourse was announced in February 2019. In May and June 2019, consultation began with the local community and stakeholders. Transport customers, key stakeholder groups and community members were initially asked to provide feedback on an early concept, that connects Marian Street with Little Eveleigh Street.

In July and August 2019, the community was presented with four different options, including the original concept. The original concept was referred to as Option 1 in this consultation phase. Options 2 and 3 connected Marian Street with Wilson Street via a ground level pathway and aerial walkway respectively, and Option 4 connected Cornwallis Street with Marian Street via either a ground level, or aerial walkway. These options are further described in **Table 4-1**.

Heritage considerations were also key in the development and assessment of options, including opportunities and constraints associated with existing heritage elements. TfNSW engaged heritage experts to work closely with the design team during the design process, to prepare advice and provide input into the options analysis.

Overall 12 options were developed for consideration (including the two options developed by community groups). These options are described in **Table 4-1**. Figures are provided for the shortlisted options (refer to **Section 4.3.5**) and the local community group designs (refer to **Section 4.3.3**).

Table 4-1 Options considered

Option	Description
Option 1 (refer to Figure 4-1)	<ul style="list-style-type: none"> • six metre wide long concourse between Marian Street and Little Eveleigh Street and upgrade of Little Eveleigh Street* • new entrance at Little Eveleigh Street • new entrance at Marian Street via stairs and lift • inclusion of a Family Accessible Toilet and toilet cubicles at Little Eveleigh Street • lifts to all platforms at the new southern concourse.
Option 2 (refer to Figure 4-2)	<ul style="list-style-type: none"> • six metre wide long concourse between Marian Street and Platform 1 • new entrance at Wilson Street including stairs and accessible connecting pathway to Platform 1 • new entrance at Marian Street via stairs and lift • lifts to all platforms at the new southern concourse.
Option 3 (refer to Figure 4-3)	<ul style="list-style-type: none"> • six metre wide long concourse* between Marian Street and Platform 1 with a three metre aerial walkway to Wilson Street which runs parallel to the Railcorp boundary adjoining residential properties • new entrance at Wilson Street via an elevated walkway adjacent to residential properties • new entrance at Marian Street via stairs and lift • lifts to all platforms at the new southern concourse.
Option 4 (refer to Figure 4-4)	<ul style="list-style-type: none"> • six metre wide long concourse* between Cornwallis Street and Platform 1 with a three metre aerial walkway to Wilson Street • secondary bridge linking Platform 8-9 and Platform 10 • new entrance at Wilson Street via an elevated walkway adjacent to residential properties • new entrance at South Eveleigh via Cornwallis Street stairs • lifts to Platforms 1, 2-3, 4-5, 6-7 at the new southern concourse • lifts to Platforms 8-9 and 10 at the secondary pedestrian bridge.

Option	Description
Option 5 (refer to Figure 4-5) (Community group design)	<ul style="list-style-type: none"> community group design three way concourse between North and South Eveleigh via two entrances on the station's south-eastern side each adjoining Marian Street and Cornwallis Street connecting to Wilson Street via a ground level pathway to the north-west.
Option 6 (refer to Figure 4-6) (Community group design - also known as 'H design')	<ul style="list-style-type: none"> community group design concourse connecting to Platforms 1 to 10 (similar to Option 1 concourse) an ungated cross corridor footbridge positioned further south, placing the station entrances in South Eveleigh and connecting directly straight across to Wilson Street a linking unpaid concourse would then extend off the footbridge along the rail corridor connecting to the gated concourse.
Option 7	<ul style="list-style-type: none"> four metre wide short concourse** between Marian Street and Platform 2-3 one new entrance with a four metre wide stairway at Marian Street lifts to Platforms 2-3, 4-5 and 6-7 at the new southern concourse lift to Platform 8-9 at the existing northern concourse no lift access to Platforms 1 or 10.
Option 8	<ul style="list-style-type: none"> four metre wide short concourse** between Marian Street and Platform 2-3 one new entrance with a four metre wide stairway at Marian Street one new entrance adjacent the existing northern concourse at the corner of Lawson Street and Little Eveleigh Street lifts to Platforms 2-3, 4-5, 6-7 and 10 at the new southern concourse lifts to Platforms 1 and 8-9 at the existing northern concourse.
Option 9	<ul style="list-style-type: none"> four metre wide long concourse** between Marian Street and Platform 1 new entrance at Wilson Street including stairs and accessible path to Platform 1 new entrance at Marian Street via stairs and lift lifts to Platforms 1, 2-3, 4-5, 6-7, and 10 at the new southern concourse lift to Platform 8-9 at the existing northern concourse.
Option 10	<ul style="list-style-type: none"> six metre wide short concourse between Marian Street and Platforms 2-3 one new entrance with a four metre wide stairway at Marian Street customer facilities at the entrance one new entrance adjacent the existing northern concourse at the corner of Lawson Street and Little Eveleigh Street lifts to Platforms 2-3, 4-5, 6-7, 8-9, and 10 at the new southern concourse lift to Platform 1 at the existing northern concourse.
Option 11	<ul style="list-style-type: none"> modification to a version of Option 2 with a straightened bridge alignment on the Platform 1 end six metre wide long concourse between Marian Street and Platform 1 new entrance at Wilson Street including stairs and accessible path to Platform 1 new entrance at Marian Street via stairs and lift lifts to all platforms at the new southern concourse.
Option 12	<ul style="list-style-type: none"> six metre wide long concourse* between Cornwallis Street (South Eveleigh) and Little Eveleigh Street secondary pedestrian bridge linking Platform 8-9 and Platform 10 new entrance at Little Eveleigh Street new entrance at South Eveleigh via stairs lifts to Platforms 1, 2-3, 4-5, 6-7 at the new southern concourse lifts to Platforms 8-9 and 10 at the secondary pedestrian bridge.

Notes:

* provides for full access between the eastern and western sides of the rail corridor.

** provides for station platform access/egress from the eastern side of the rail corridor via Marian Street only.

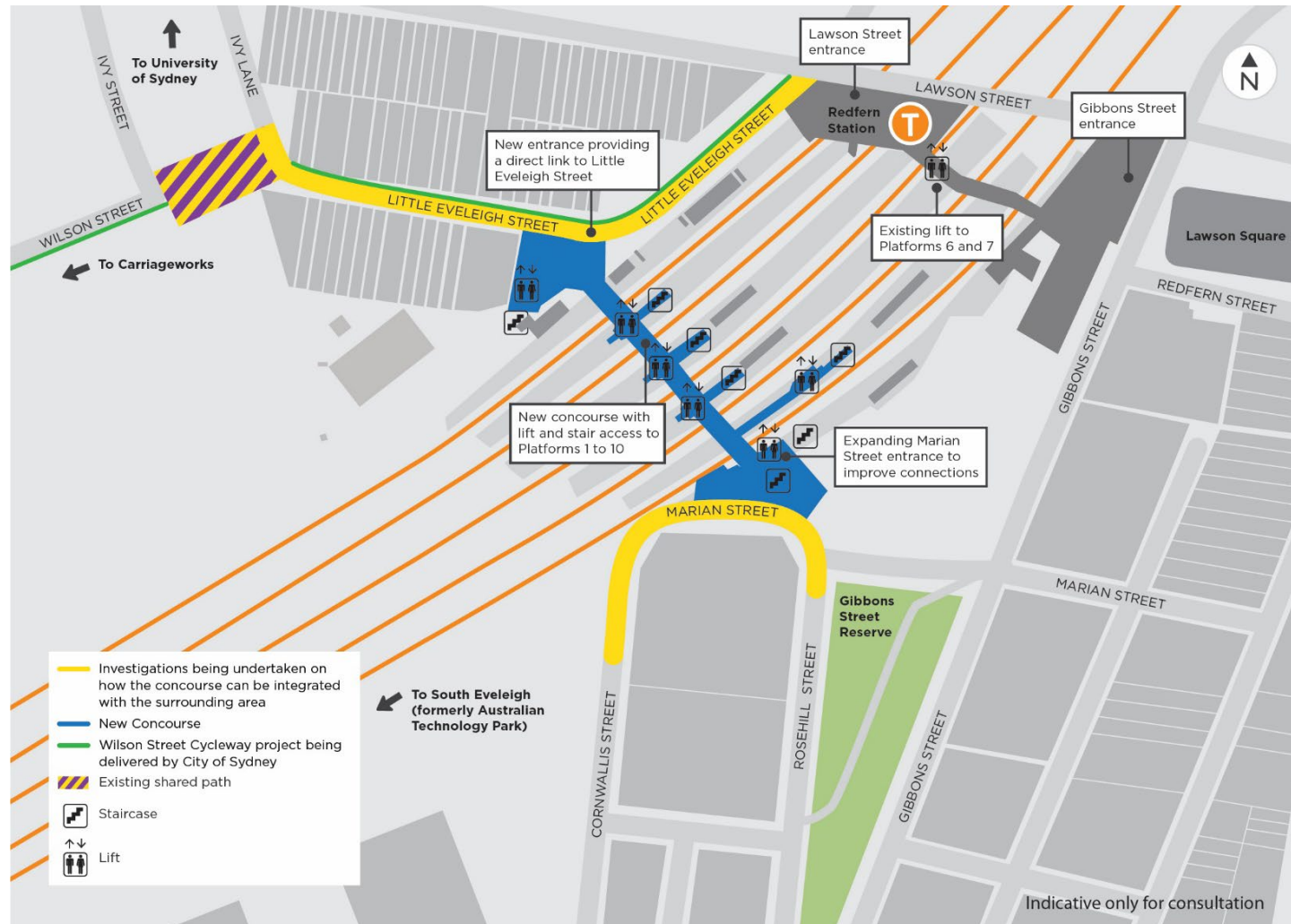


Figure 4-1 Option 1

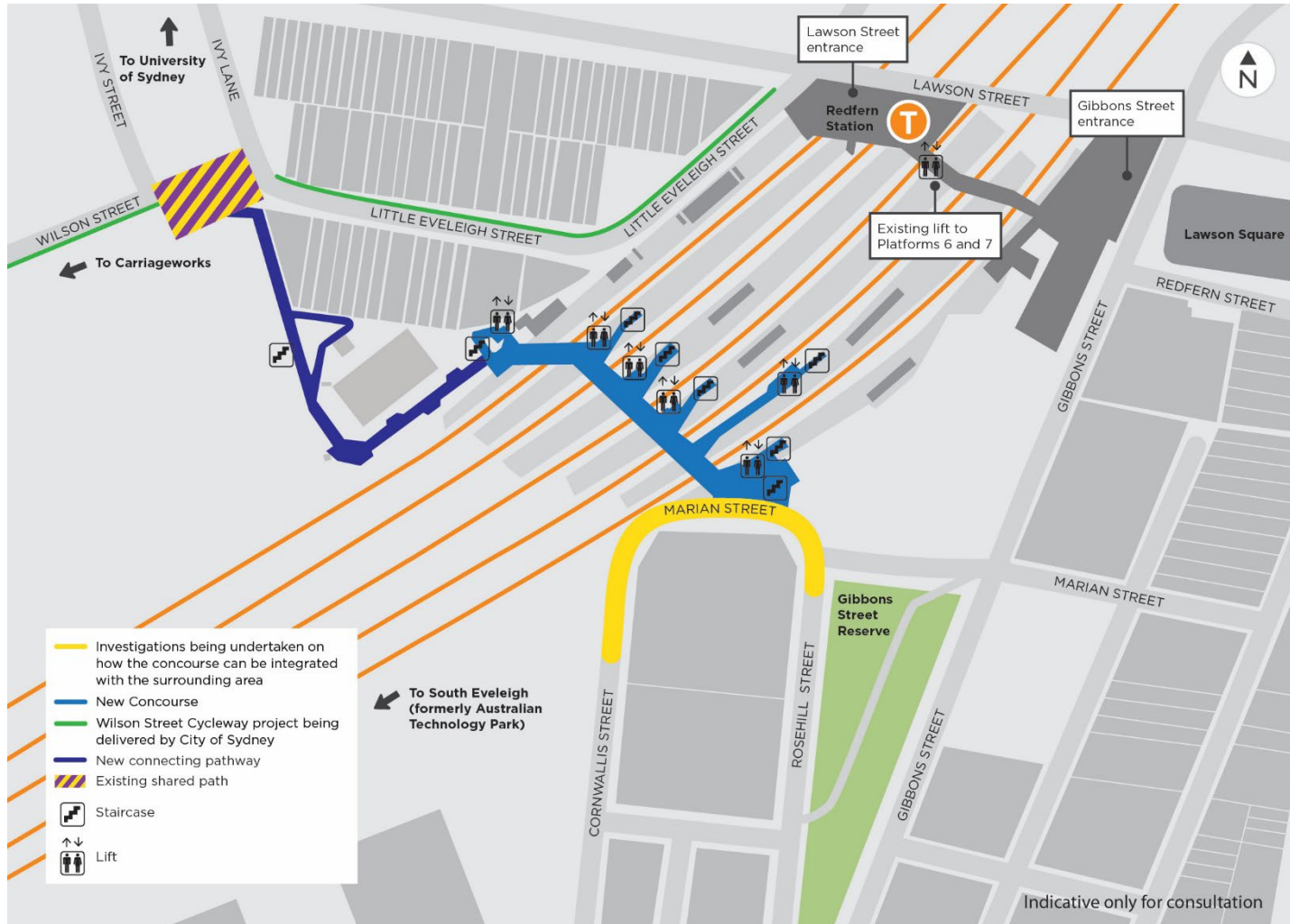


Figure 4-2 Option 2

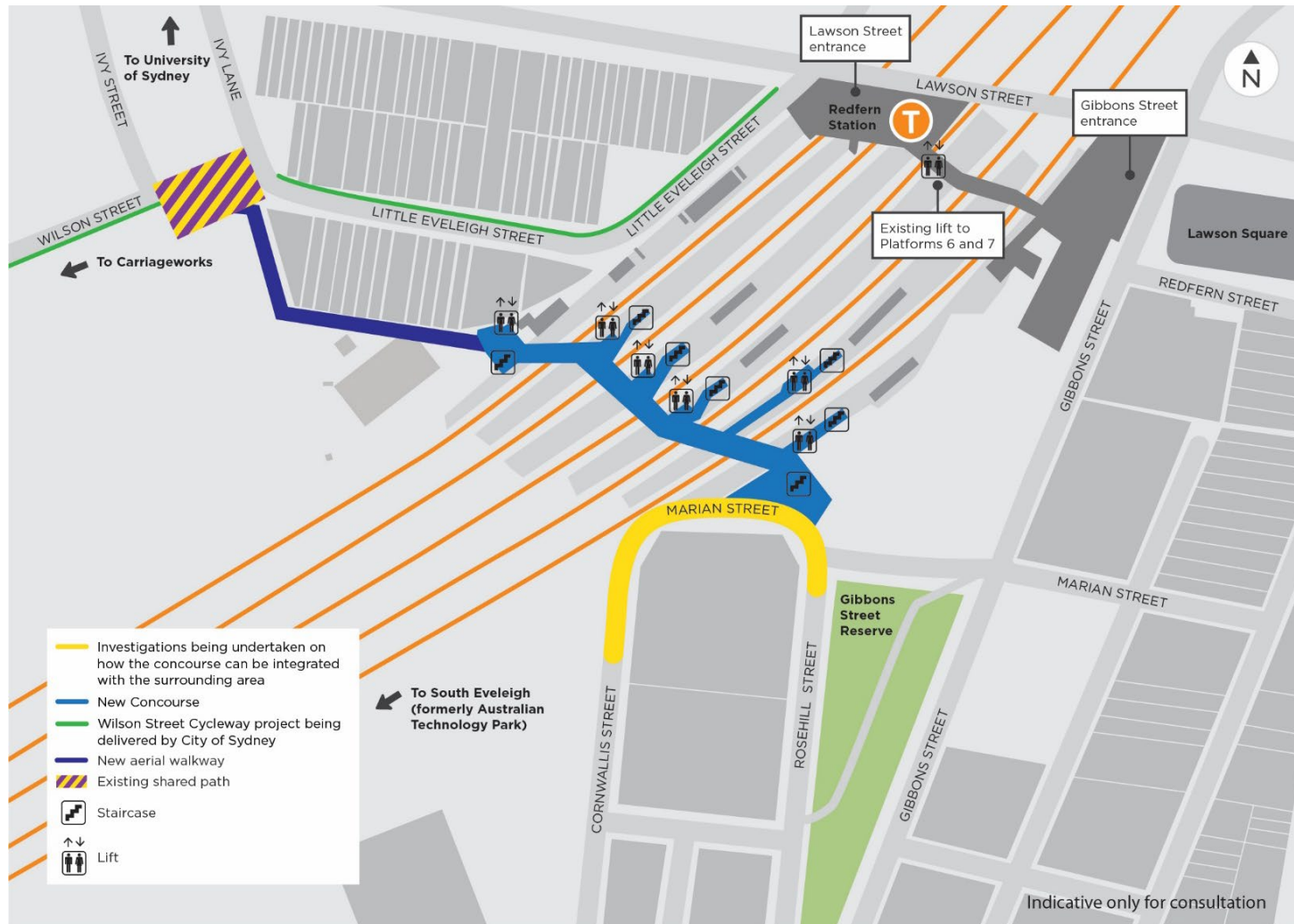


Figure 4-3 Option 3

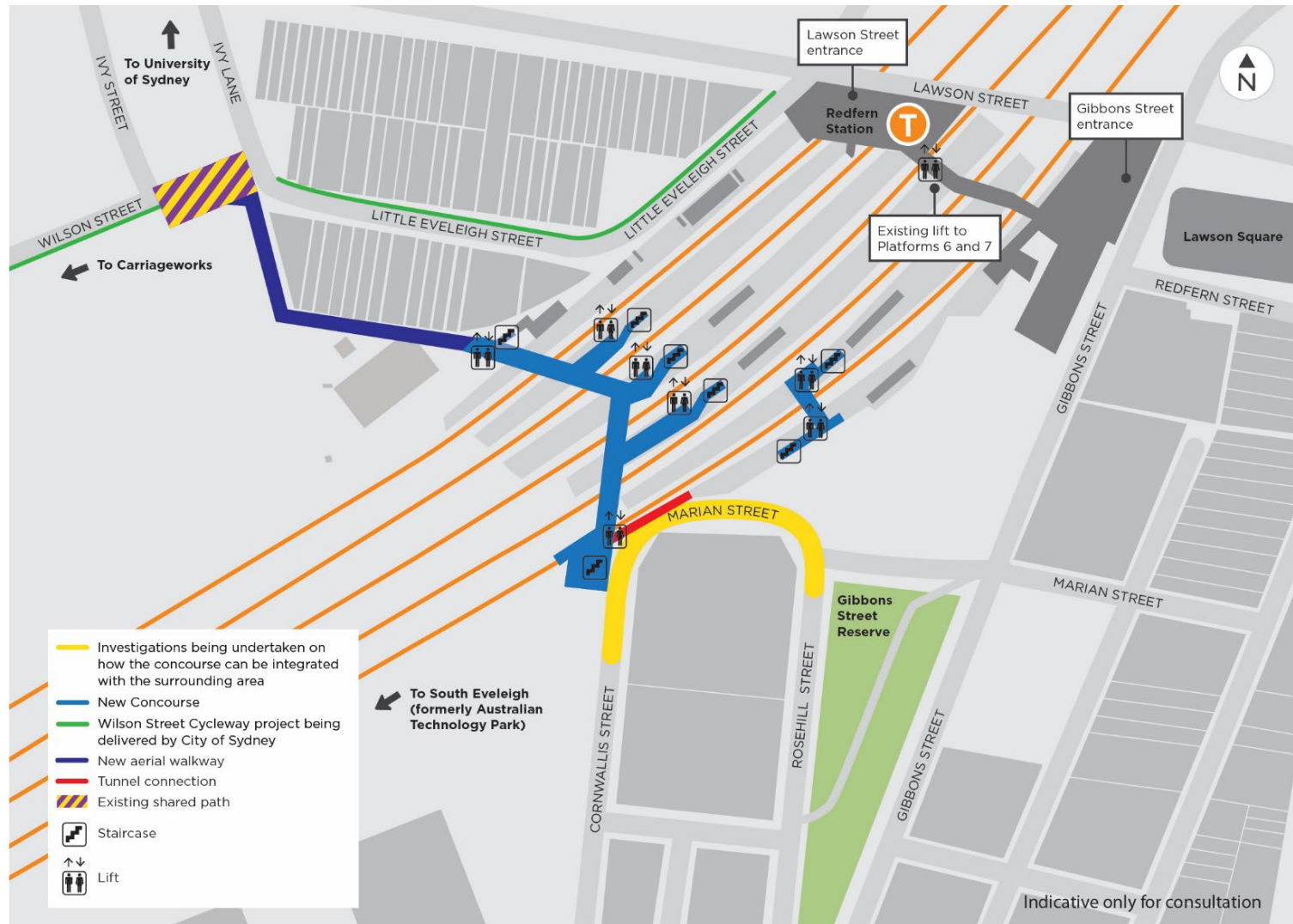


Figure 4-4 Option 4

4.3.3 Community group options

Two alternative designs were also submitted by a local community group and were considered by TfNSW alongside the other four options. These designs were referred to as 'Option 5' (refer **Figure 4-5**) and Option 6 (also called 'H-design') (refer **Figure 4-6**). Both designs include an entrance on Cornwallis Street closer to South Eveleigh and on Wilson Street, as well as a concourse with separated paid and unpaid pathways. Whilst these two designs would provide cross-corridor connections, they were not progressed due to the following issues and challenges:

Option 5

- visual impacts to residents of the nearby 'Watertower' building due to the concourse shape wrapping the corner-line of the building, effectively creating a wall to the rail corridor
- the bulk of the larger concourse and bridge structure would create a comparatively greater visual impact
- challenges to constructability, such as limited space available to place the larger cranes that would be required to lift the extended concourse spans
- a cycleway ramp structure is illustrated in some of the plans provided between the concourse and the pathway connection to Wilson Street. To achieve compliant gradients, a significant ramp structure would be required, and would reach around 90 metres in length and approximately 4.5 metres in height. To complete a cycle route along the concourse, a second ramp would also be required on the concourse's other side. This cycleway configuration would be complex, and the changing gradients and additional ramps would also be unsuitable for those with accessibility needs
- more complex wayfinding with increased number of decision points and areas of pedestrian-cyclist cross-flow on the concourse could lead to congestion or collisions.

Option 6/H-design

- significantly increased customer journey distance from street to platforms, which could impact ease of access for customers with limited mobility or other accessibility requirements
- increased construction time and complexity, including the need to realign tracks and relocate elements of the existing rail infrastructure
- challenges to constructability such as limited space available to place the larger cranes that would be required to lift the extended concourse spans
- the bulk of the larger concourse would create a significantly greater visual impact to station heritage
- increased distance to bus connections on Gibbons Street
- increased distance for connection to Platforms 11 and 12.

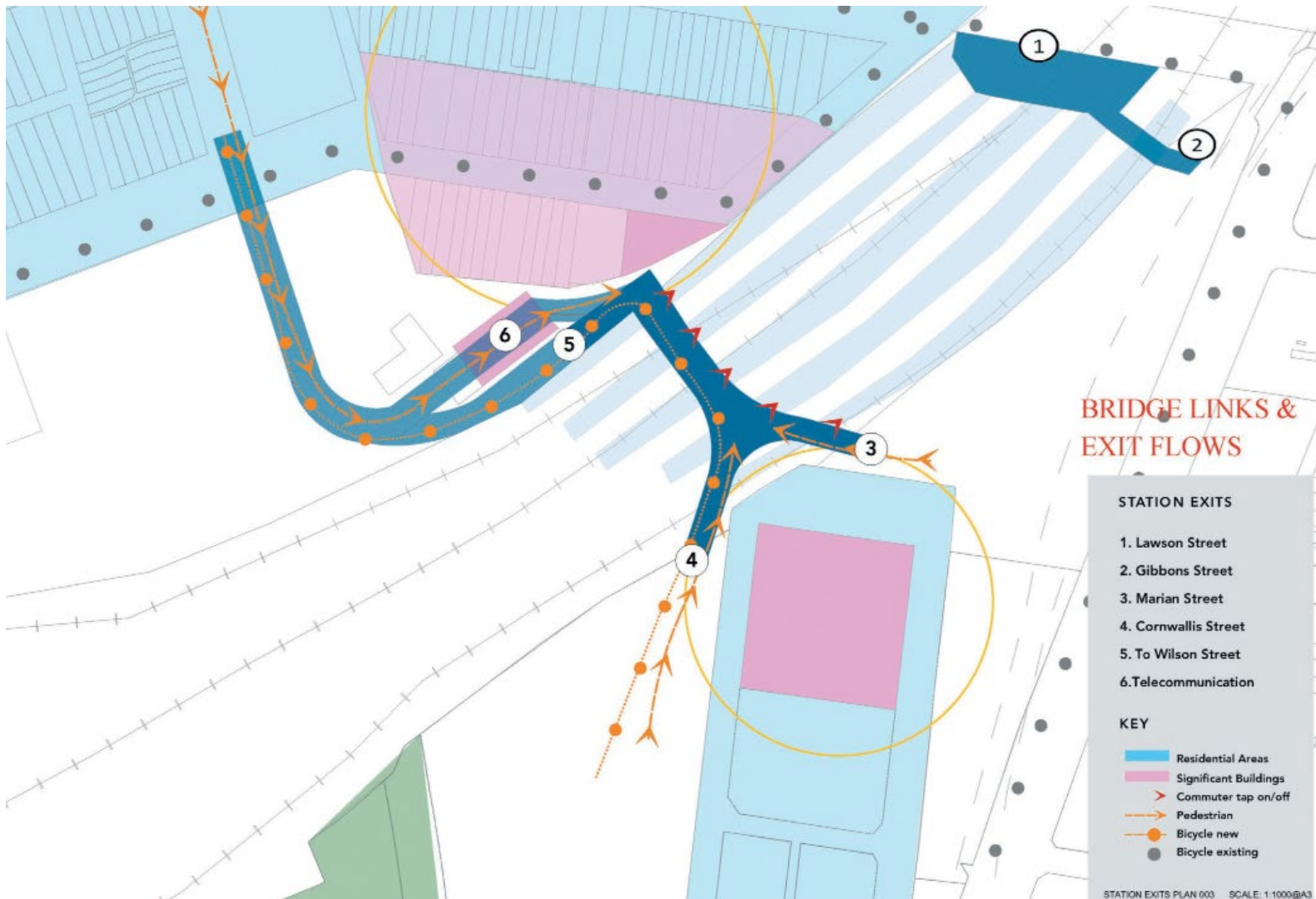


Figure 4-5 'Option 5' received as feedback during community consultation for the Project

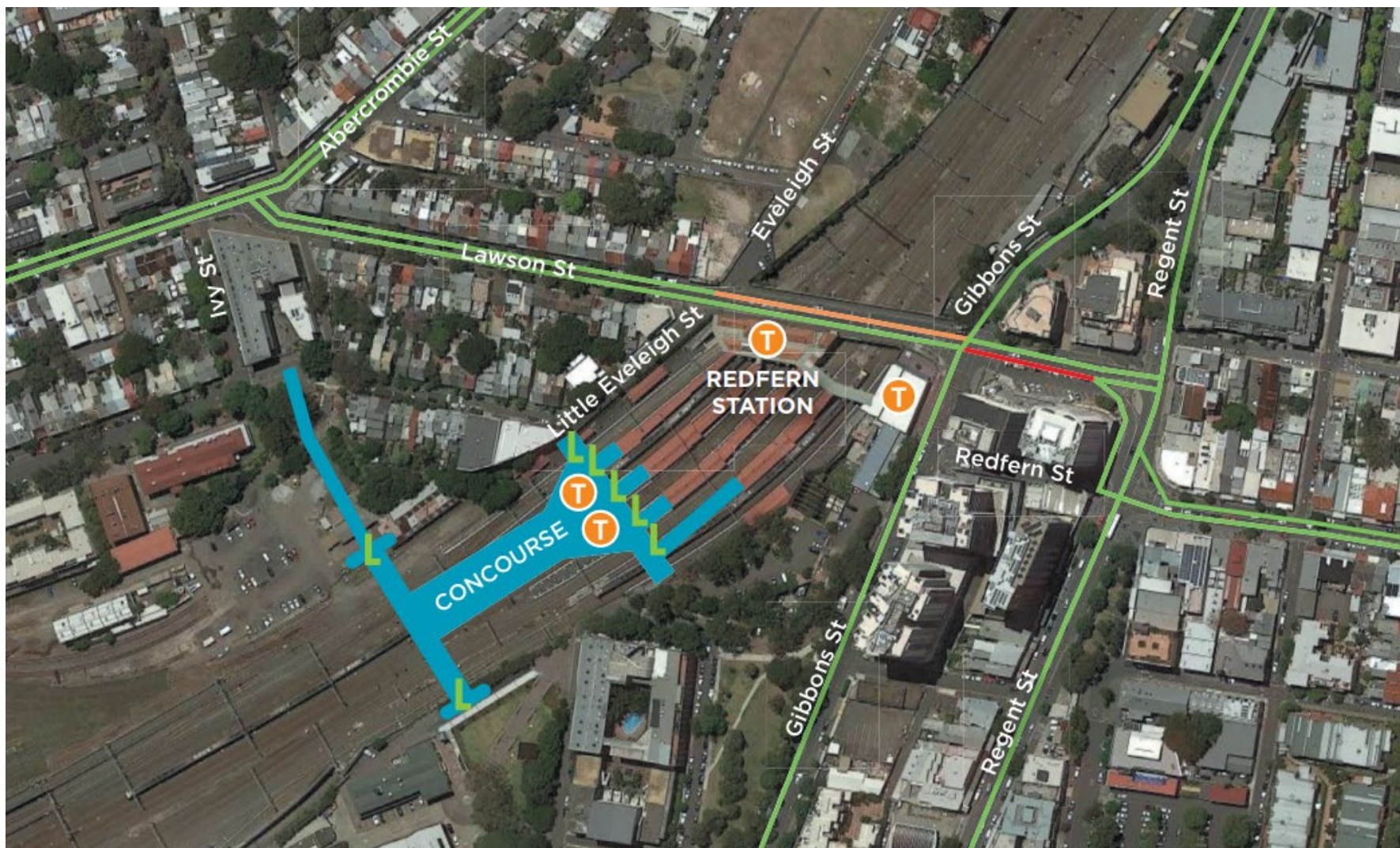


Figure 4-6 Option 6/'H-design' received as feedback during community consultation for the Project

4.3.4 Other options considered

The following suggestions put forward by Heritage NSW, Department of Premier and Cabinet were also considered:

- widening the northern concourse
- underground concourse (tunnelling beneath station)
- reinstatement of a footbridge at the same location as the former footbridge (1914-1996).

Whilst these three designs would alleviate some of the constraints at the current Redfern Station, they were not progressed due to the following issues and challenges:

- widening the northern concourse
 - involves the widening of the existing northern concourse
 - this option was not preferred as there is not enough space to expand the concourse taking into consideration:
 - projected growth in future patronage
 - lack of available floorspace to widen the existing stairs to improve platform clearance times.
- underground concourse (tunnelling beneath station)
 - involves the tunnelling of an underground concourse
 - this option would not include new elements above ground. This option was not proceeded with due to technically challenging and cost-prohibitive reasons including:
 - potential conflicts with the existing Engine Dive track running beneath the platforms and rail corridor
 - tunnel depth would trigger the requirement for escalators to access platforms.
- reinstatement of a footbridge at the same location as the former footbridge (1914-1996)
 - the former footbridge was located on the southern end of the platforms. This option would involve the construction of a 6 metre wide footbridge between Wilson Street and Cornwallis Street
 - this option was not considered viable as in this location the platforms are at their narrowest width and hence would not comply with current rail safety standards.

4.3.5 Shortlisting of options

Multi criteria analysis

The options as described in **Table 4-1** were evaluated using a MCA process (except for the community options), which assisted in the identification of the preferred option. The process involved scoring each option against a set of weighted criteria in a MCA workshop. The criteria are outlined in **Table 4-2**.

Table 4-2 Multi-criteria analysis weighting summary

Criteria	Description	Weighting
Infrastructure	Accommodates supporting infrastructure (including station systems) and removes redundant and/or end of life assets.	10.0%
Facility Operations and Maintenance	Maximises opportunity for safe and efficient operation and maintenance (including cleaning).	15.0%
Deliverability	Innovation in construction, continuity of service, minimised impact on local community and deliverable in program timeframe.	15.0%

Criteria	Description	Weighting
Customer Experience	Ease of accessing the station and customer facilities, personal safety and security, convenience and comfort.	20.0%
Transport Integration	Connectivity to the transport interchange.	10.0%
Urban Design and Precinct Planning	Integrates into surroundings and does not preclude future development at the station.	10.0%
Environment, Sustainability and Heritage	Complies with environmental legislation, protects and enhances heritage items and significant trees, and supports opportunities for sustainability initiatives.	20.0%

The outcomes of the MCA showed that Options 1, 2, 3, 4 and 11 were preferred. Option 11 is a modification of Option 2 and wasn't considered as it did not provide improvements to the Option 2 design. Options 1, 2, 3 and 4 are shown in **Figure 4-1** to **Figure 4-4**. These options were considered to be feasible and would meet the following criteria:

- improve Redfern Station accessibility (in accordance with *Disability Standards for Accessible Public Transport 2002*)
- improve pedestrian flow and reduce congestion to 2036 and beyond 2036
- enhance pedestrian connectivity to key local destinations
- protect and promote heritage and local culture.

Generally, designs that connected Platforms 1 to 10 in the southern portion of the station to Marian Street only were not progressed, as it was considered that they would not provide adequate access to locations north and west of the station, including areas where future precinct growth would likely occur. Design options with a narrower (four metre) concourse were also not progressed, as it was considered that they would not cater for levels of patronage demand expected by 2036.

4.3.6 Community consultation

As discussed in **Section 4.3.2** of this EIS, consultation began with the local community and stakeholders in May and June 2019. Transport customers, key stakeholder groups and community members were asked to provide feedback on an early concept, that connects Marian Street with Little Eveleigh Street. Options 1, 2, 3 and 4 were then presented to the community and key stakeholders in July and August 2019. More than 400 responses were received from a range of stakeholders, including station customers and community members, community groups, residents and landowners, local organisations and City of Sydney Council. The responses helped the Project team understand what was important to the community as well as their views on the four different design options presented. Community consultation undertaken for the Project is described further in **Chapter 6** of this EIS.

Overall Option 1 garnered the most positive feedback and is the preferred option. It provides the easiest, most accessible and connective journey, while also providing good sightlines throughout the concourse and entrances in comparatively activated areas. When discussing Option 1, a number of local respondents acknowledged the value of Little Eveleigh Street's character to the local area, with around 10% of responses indicating a preference to retain the building at 125-127 Little Eveleigh Street.

One challenge that respondents perceived for Option 1 was the narrowness of Little Eveleigh Street and whether the street could cater for additional pedestrians alongside cars and cyclists. Resident amenity was also identified as a challenge to be considered for this option, particularly regarding noise, privacy and parking. These potential issues are addressed **Chapter 8**, **Chapter 9**, and **Chapter 14** of this EIS.

The outcomes of consultation undertaken was included in a Consultation Report that has influenced the design and development of the Project. Further details of the community consultation undertaken for the Project are described in **Chapter 6** of this EIS.

4.4 Justification for the preferred option

Option 1 was selected as the preferred option for the Project for the following reasons:

- it was the preferred option selected by customers during the consultation periods in May and June 2019 and in July and August 2019 (refer **Section 4.3.2** and **4.3.6** of this EIS)
- it has the shortest and most direct journey from station platforms to nearby streets
- the straight walkway design with clear wayfinding makes it easy for customers to navigate and is preferred by customers with accessibility needs
- customers perceived that this option provides comparatively better personal safety
- the design can be future-proofed to integrate with potential developments in the future
- it provides separation of lifts, stairs and ticket gates on the concourse which reduces congestion and improves safety.

The preferred option has been further developed into the Project the subject of this EIS (refer **Chapter 5** of this EIS for the Project description).

4.4.1 Heritage considerations

Consistent with the design principles identified in **Section 4.2.1**, the heritage and the heritage significance of the Project area were a key consideration when selecting the preferred option for the Project. From a heritage perspective, Option 1 was identified as the preferred option for the following reasons:

- advantages:
 - separation of stair and lift locations would reduce the bulk of built form
 - straight and symmetrical concourse alignment would reduce the visual impact of the new structure in a heritage precinct
 - there would be opportunities for adaptive re-use of 125-127 Little Eveleigh Street and the ability to retain characteristics that contribute to the Darlington Heritage Conservation Area.
- disadvantages:
 - impact on a Platform 1 building and 125-127 Little Eveleigh Street which is a contributory item in Darlington Heritage Conservation Area
 - visual impacts on heritage listed items (i.e. a new footbridge would have a visual impact on the presentation of the heritage listed Redfern Railway Station Group, and views to the heritage listed Eveleigh Railway Workshops from the station would also be impacted)
 - new stairs would be near existing platform buildings
 - relocation of overhead wiring structures would require the demolition of privacy screens to platform buildings
 - stairs to Platform 8/9 would increase the bulk and complexity of the concourse structure and would be near to the platform building.

Option 1 was considered in a number of heritage workshops, with key heritage considerations including:

- the form and materiality of the design
- the specific impacts to the Platform 1 building and 125-127 Little Eveleigh Street.

This is discussed further in **Chapter 10** of this EIS.