2.2 HISTORICAL CONTEXT

European settlement of the Grafton area dates from the 1830s, with the arrival of timber-getters attracted by the plenitude of valuable timber, particularly cedar, in the region. Subsequently, the land was used for predominantly agricultural and pastoral purposes, including farming (particularly sugarcane), dairying and grazing.

The establishment of a village in Grafton in the 1850s was initially facilitated by the development of wharves in the area to transport goods from the rural hinterland to the coast. Wharves and a shipyard had been established in what is now the Grafton riverfront by the early 1840s. Shipbuilding continued to be the major local industry until the end of the century, when the railways became the primary means of internal goods transport.

Grafton expanded rapidly in the 1860s and 1870s, aided by its strategic location on the main coastal road, the break-up of large pastoral properties and the discovery of gold nearby. The town soon became the major urban settlement on the Clarence River and the commercial focus for an extensive agricultural and pastoral district. Grafton was proclaimed a city in 1885, and in 1897 South Grafton became a separate municipality. The two towns were not amalgamated until 1957.

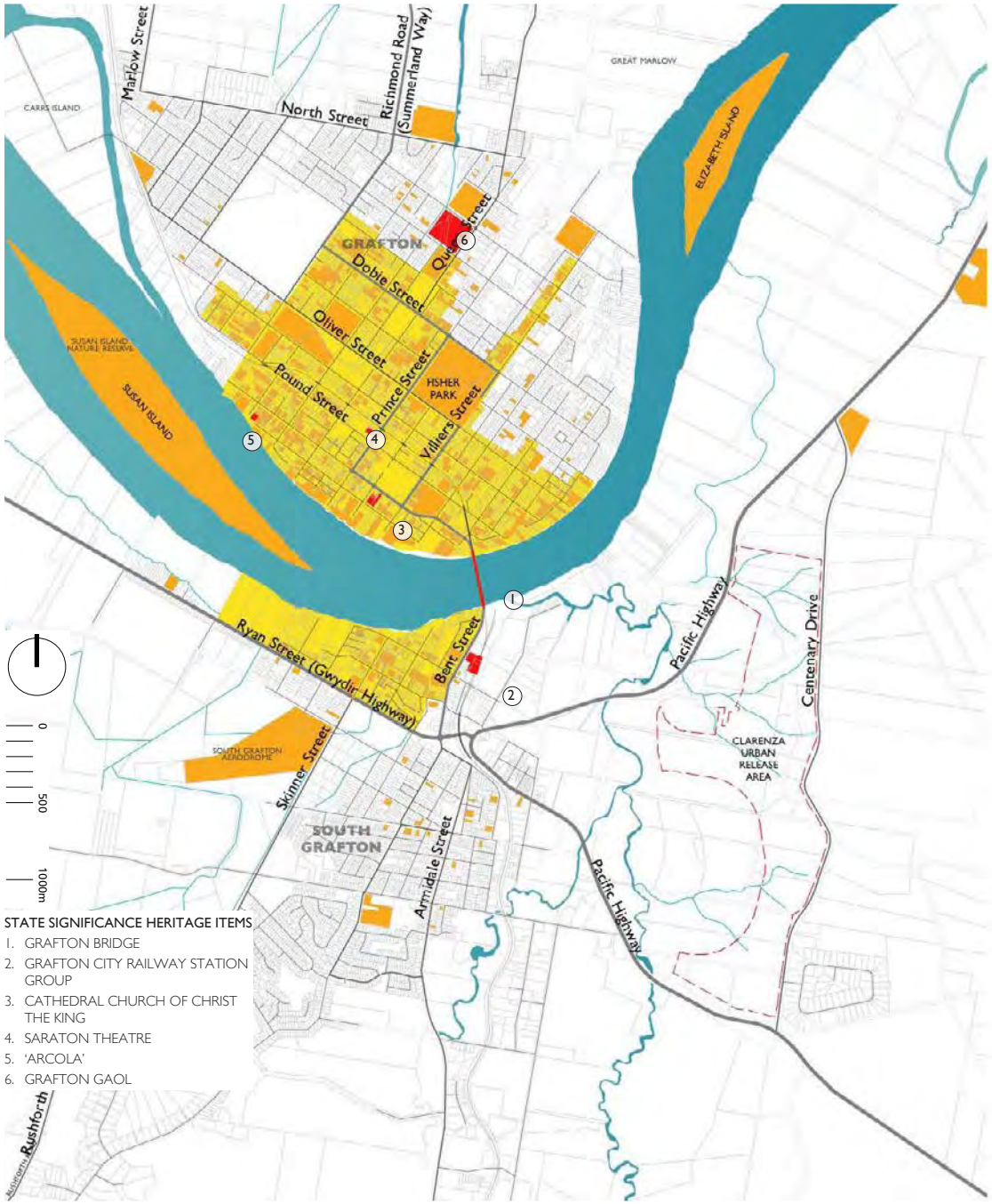
The existing Grafton Bridge was completed and opened to traffic in 1932. Prior to this, Grafton and South Grafton were connected by a punt service across the Clarence River.

Top left: Punt service on the Clarence River at Grafton
(photo: John Henry Harvey; image held at State Library of Victoria)

Left: View along Prince Street to the Clarence River, c.1940
(source: Clarence River Historical Society, published in: Clarence Valley Council 2007, *A thematic History of the City of Grafton*)

Top: View of Grafton Bridge with the bascule span open.
(source: Clarence Valley Council 2007,
A thematic History of the City of Grafton)

Above: Aerial view of Grafton, 1946
(source: National Archives of Australia: A1200, L6168)



2.3 HERITAGE LISTED ITEMS

The *Grafton Local Environment Plan 1988* lists a number of heritage items within Grafton and South Grafton, including all heritage items listed on the State Heritage Register, (SHR) a number of items that are listed on the *North Coast Regional Environmental Plan* (REP), and the majority of items proposed for listing by the *Community Based Heritage Study* (Gardiner 2010). On the recommendation of the *Community Based Heritage Study*, the heritage conservation area listed in the LEP (1988) was substantially modified in June 2011. It is now divided into the Grafton and South Grafton Urban Conservation Areas, and its boundaries have been considerably expanded in Grafton and less so in South Grafton. The *Draft Clarence Valley LEP 2010* remains in draft; it is likely that when it is gazetted, the heritage schedule of the LEP 1988 will be adopted.

The adjacent map shows the heritage items and heritage conservation areas listed under the current *Grafton Local Environment Plan 1988*, including those listed on the State Heritage Register. Grafton Bridge is one of the items listed on the SHR. It is a steel truss structure with a bascule span that would lift to allow river traffic to pass below. The bascule span is no longer in use. The double-deck road/rail design of Grafton Bridge is one of its key distinguishing characteristics, and it is the only one of its type in NSW.

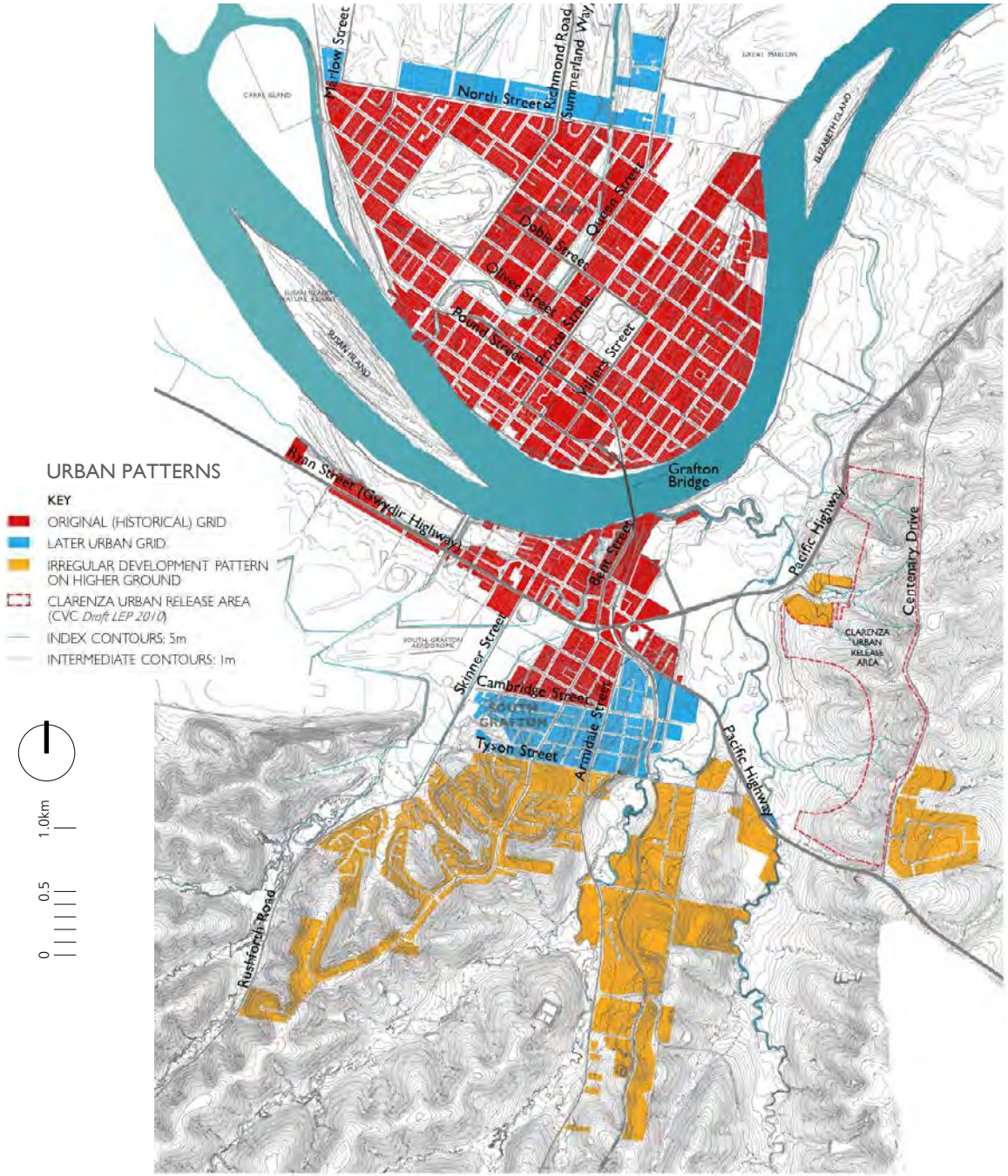
Detailed discussion of the heritage issues is provided in the separate specialist *Non-Aboriginal Heritage Technical Paper* (Biosis 2011) that forms part of the *Preliminary Route Options Report* for this project.

1954 AERIAL PHOTOGRAPH
(source: NSW Land & Property Information)

URBAN GROWTH OF GRAFTON

1978 AERIAL PHOTOGRAPH
(source: NSW Land & Property Information)

2010 AERIAL PHOTOGRAPH
(source: NSW Land & Property Information)



2.4 URBAN FORM

The two original urban settlements of Grafton and South Grafton are located on either side of the Clarence River, on the floodplain immediately adjacent to the river. The two towns were laid out with a regular square grid pattern of streets. However, although the proportions of the Grafton and South Grafton grids are essentially identical, their orientations are differ slightly.

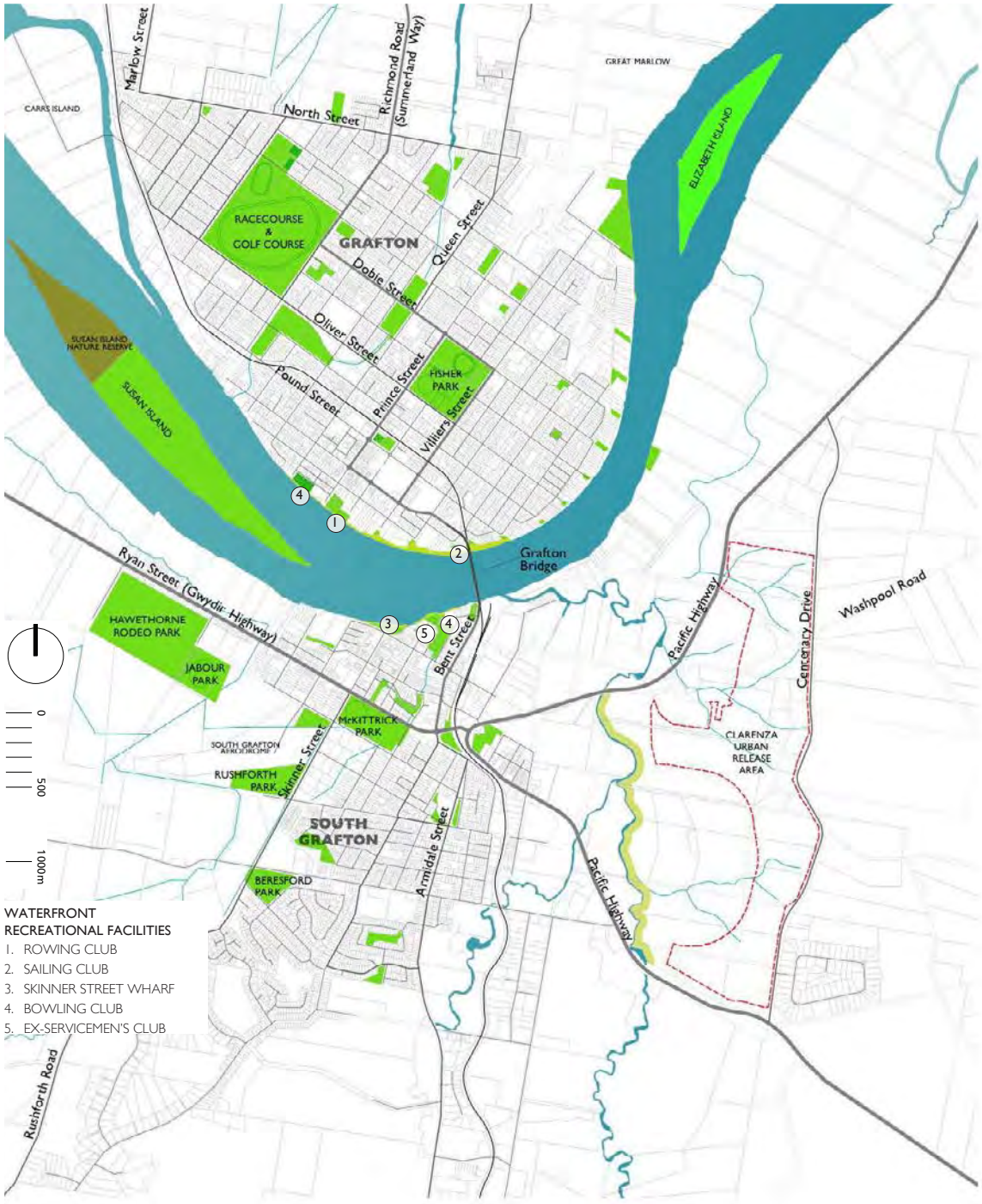
North of the river, the grid is a defining characteristic of the urban experience. With few exceptions, the urban area of Grafton conforms to the historical grid. Where the geometry of the grid is interrupted, for example at the road and rail viaduct approaches to the bridge, the effect is immediately apparent and is perceived in dramatic contrast to the uniform regularity of the grid.

South of the river, the historical grid is much less prevalent. Only the older parts of South Grafton, those areas closest to the river, are laid out on the original grid. The historical grid terminates at Cambridge Street, which cuts across the old grid and establishes a new, less regular, street grid to its south. South of Tyson Street, the grid geometry disappears altogether as the newer areas of South Grafton extend onto higher ground and an irregular street pattern of looping roads and cul-de-sacs prevails. While the Gwydir Highway conforms to the local urban patterns, being aligned with the historical grid, the other regional infrastructural elements in south Grafton—the railway line, the Pacific Highway and Bent Street (Summerland Way)—have their own individual geometries that cut across the local grain.

2.5 TWO TOWN CENTRES

North of the river, Grafton has a clearly defined urban core with the primary commercial activities centred along the traditional main street of Prince Street. Running perpendicular to Prince Street, Victoria Street is Grafton's civic street, where much of the town's administrative and institutional activities are concentrated. Highway-related businesses are located along Fitzroy Street, which also runs perpendicular to Prince Street to bring traffic (and hence passing trade) off the bridge in to the main commercial street. While the recently developed Grafton Shopping World, located on Fitzroy Street, has shifted some of the commercial and retail focus away from the 'main street' environment (Prince Street) to an internalised shopping mall, its close proximity to Prince Street has helped to keep the town centre intact.

South of the river, South Grafton also has a historical main street—Skinner Street. Like Prince Street north of the river, Skinner Street provides a strong, direct, connection to the river and public open spaces along the foreshore. However, in contrast to the cohesive town centre north of the river, South Grafton's town centre has been fractured by successive developments that have eroded the commercial—and hence to a certain extent, civic—relevance of the historical main street. The siting of the current bridge crossing outside of town had the effect of disconnecting South Grafton's main street from the regional transport network. This is likely to have contributed, at least in part, to the gradual decline of South Grafton's town centre. While Fitzroy Street brings traffic off the bridge directly into Prince Street in Grafton, its counterpart in South Grafton—Bent Street—parallels Skinner Street and allows potential passing trade to bypass the main street. The subsequent development of highway commercial and retail businesses—as well as light industrial activities—along Bent Street and the Pacific Highway has shifted South Grafton's commercial focus from the historical main street to the highway environment.



2.6 OPEN SPACE AND RECREATION

Both Grafton and South Grafton are well served by recreational public open spaces. In addition to their public parks, both town centres are directly connected to the Clarence River and the recreational opportunities it affords. The primary public riverfront spaces on both sides of the river are located between the existing bridge and Susan Island, and this section of the river is highly valued as the focus of water-based recreational activities and public events.

The public waterfront on the southern side of the river includes the wharf at Skinner Street, and the bowling club and Ex-Servicemen's Club at Wharf Street. The public waterfront on the northern side of the river incorporates a number of recreational facilities, including a jetty, boat ramp and rowing club at Prince Street and the sailing club at Fitzroy Street. This part of the riverfront also includes a substantial amount of privately-owned land, situated between residential and church properties along Victoria Street and the river. Council's *Draft Grafton Waterfront Precinct Masterplan* (Jan 2011) aims to develop continuous public access along the foreshore between Clarence Street and Queen Street, to improve the public recreational amenity of this stretch of the river.

OPEN SPACE AND RECREATION

KEY

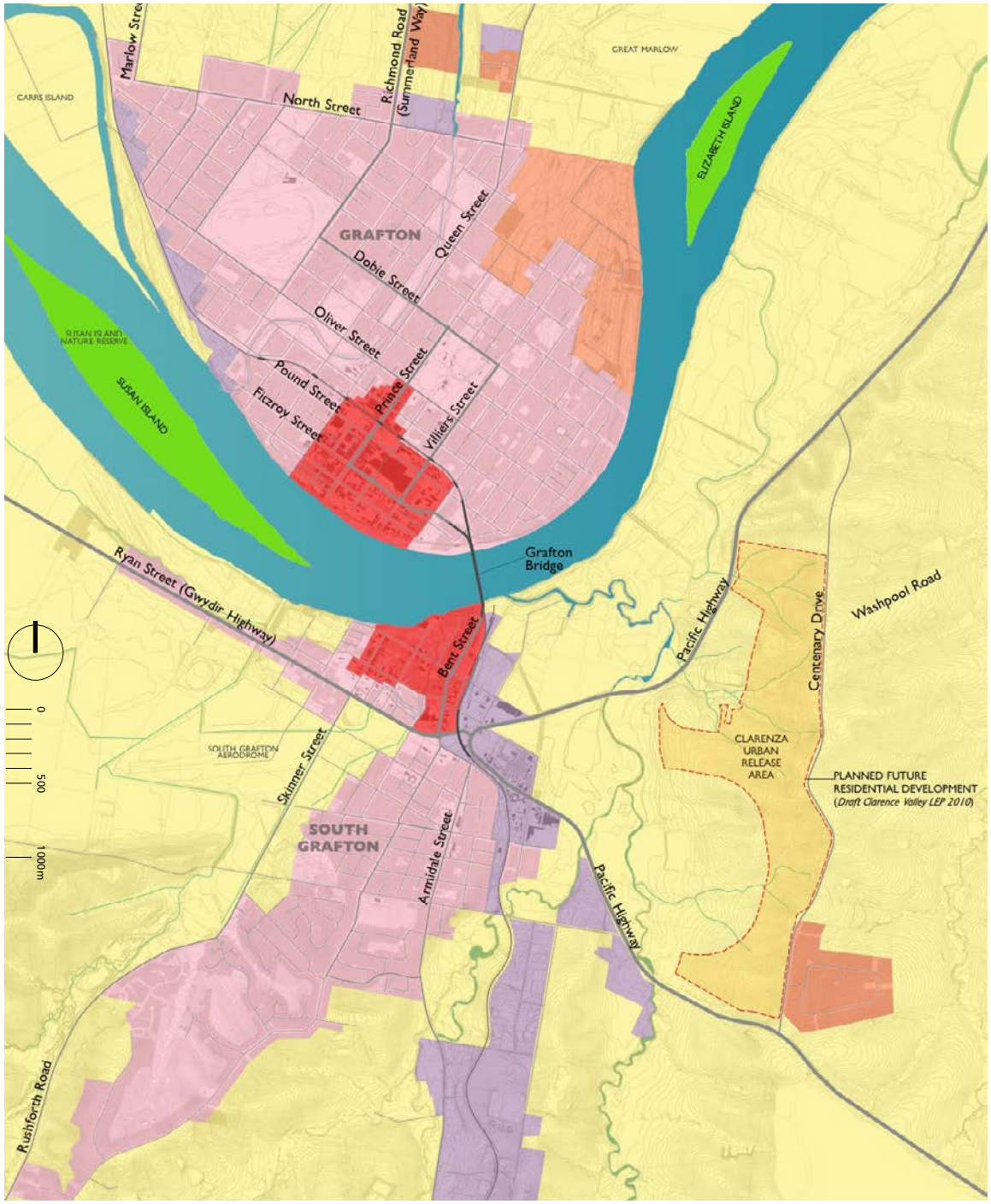
RIVERFRONT OPEN SPACE

ZONED PUBLIC OPEN SPACE
(Draft Clarence Valley LEP 2010):

- RE1 PUBLIC RECREATION
- RE2 PRIVATE RECREATION
- E1 NATIONAL PARKS & NATURE RESERVES
- E2 ENVIRONMENTAL CONSERVATION
- E3 ENVIRONMENTAL MANAGEMENT

Public boat launch, Grafton.

3 LANDSCAPE AND URBAN VALUES



3.1 EXISTING LANDSCAPE CHARACTER

The are a number of distinct landscape character types in Grafton, each distinguished by its particular combination of landuse, topography and built form. The relationship between these landscape character types is an important aspect of the urban experience of the town.

Based on site assessment and desktop review, the primary landscape character types in Grafton are:

- The two town centres of Grafton and South Grafton, which form the civic and commercial urban cores on either side of the river.
- The established residential areas immediately connected to the town centres, with housing stock of varying ages.
- Newly developing residential areas on the outskirts of town, and the Clarenza Urban Release Area (as defined by CVC's *2010 Draft LEP*).
- Industrial areas, generally situated along primary regional transport routes and on the outskirts of town.
- The rural hinterland, consisting of low-lying river floodplain and rolling hills, with intermittent buildings in the landscape.
- Elizabeth Island and Susan Island, two large undeveloped islands in the river, which are significant landmarks for the town.
- The Clarence River itself.

LANDSCAPE CHARACTER

KEY

- TOWN CENTRE
- ESTABLISHED RESIDENTIAL
- NEWLY DEVELOPING RESIDENTIAL
- INDUSTRIAL
- RURAL HINTERLAND
- RIVER ISLANDS
- CLARENCE RIVER

3.2 TOWN CENTRE CHARACTER

A defining characteristic of the two town centres of Grafton and South Grafton is their physical separation by the Clarence River. As previously discussed, both town centres were originally laid out on a square grid, with strong connections between the main commercial streets and the river itself. The relationships between Clarence River, the urban form created by the grid and the transport infrastructure of highway and railway have established the key distinguishing features of the urban landscape character of the town centres. These are:

- The experience of infrastructure in the town centres.
- The wide gracious streets in the town centres.
- The town centres' connection to the Clarence River.

Top images: Grafton town centre.

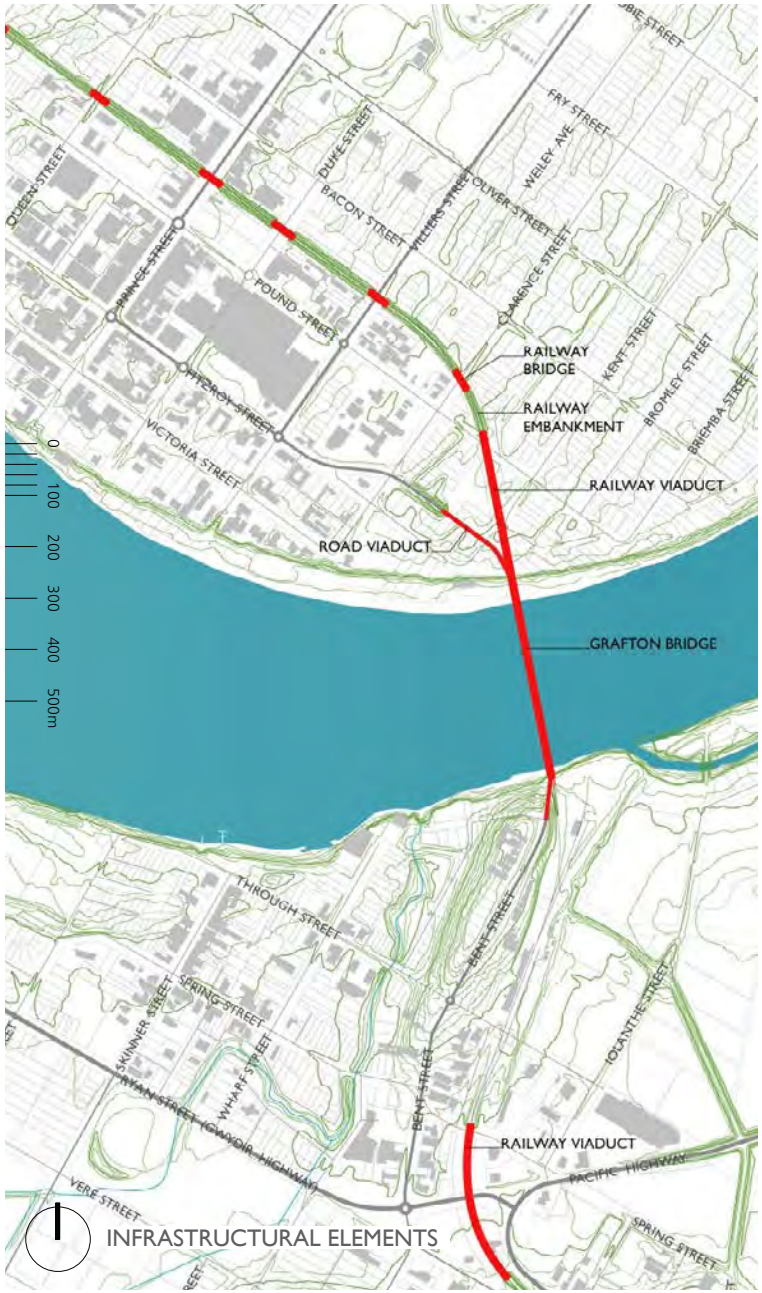
Above and right: South Grafton town centre.

Road viaduct, Grafton.

Railway viaduct, Grafton
with road viaduct & Grafton Bridge beyond.

Railway bridge over local road, Grafton.

Railway embankment, Grafton.



Railway viaduct, South Grafton.

THE EXPERIENCE OF INFRASTRUCTURE

The prevalence of transport infrastructure elements in the urban landscape is a defining aspect of the city's urban character. This is particularly the case north of the river in Grafton, where the low-lying land at the river's edge has necessitated the use of viaduct (bridge) structures to elevate both the road and railway approaches to Grafton Bridge. The long viaduct structures at the river's edge are a distinctive and memorable part of Grafton's urban landscape.

The corridor of elevated railway between Bacon Street and Pound Street is also a distinctive characteristic of Grafton's urban landscape. The railway line is elevated on a high embankment that parallels the street grid, forming a physical barrier that generally defines the extent of Grafton's commercial core. Where the railway embankment intersects the local street grid, railway bridges provide permeability for vehicular and pedestrian movement below. These railway bridges are a distinctive component of the experience of Grafton's local streets, creating memorable thresholds between the town centre and the outlying residential areas.

While the visual and physical presence of transport infrastructure is a dominant quality of Grafton's urban character north of the river, it is not a defining characteristic of South Grafton. This is because, unlike the area north of the river, the topography in South Grafton has enabled both Bent Street and the railway line to remain on natural ground as they approach the bridge crossing. The only piece of elevated infrastructure in South Grafton is the curving railway viaduct over the Gwydir Highway, which creates a memorable landmark at the highway entry to town.

KEY
VIADUCTS & BRIDGES

WIDE, GRACIOUS STREETS

The two town centres at Grafton and South Grafton have a distinctive character that has been directly influenced by the proportions of the historical urban grid. The historical grid has created the wide, generously scaled, light-filled streets and the long avenue vistas that characterise the urban experience of the town centres. Extensive avenue tree plantings enhance the landscape character of the streets and are highly valued aspects of the town centres' urban character.

Integral to Grafton's identity as a genteel provincial centre are its wide, gracious tree-lined streets. Grafton's Jacaranda Festival, held annually in late spring, centres on the visual spectacle provided by hundreds of jacaranda street trees (*Jacaranda mimosifolia*) in full bloom. Inaugurated in 1935, Grafton's festival is the country's longest-running floral festival, and is a source of great civic pride for the city. Although Grafton is renowned as the 'Jacaranda City', the jacarandas are primarily concentrated along Pound Street, Turf Street, Dobie Street and a short section of Prince Street. Grafton's other streets are lined with many other types of trees, predominantly tropical or sub-tropical species, that make a significant contribution to the stately character of the city's streets. Of particular note are the large fig trees found in and around the civic centre (Victoria Street), and the fig avenue in Briemba Street.

While the character of South Grafton's streets does not figure as prominently in the popular perception of the city, the streets in the town centre nonetheless possess a genteel character, lined with trees and Victorian buildings, that is similar to that of Grafton's streets.


Victoria Street, Grafton


Skinner Street, South Grafton


Fig-lined avenue at Briemba Street, Grafton

WIDE, GRACIOUS STREETS AT THE TWO TOWN CENTRES

KEY
STREET TREES
PUBLIC PARKS
RIVERFRONT PUBLIC SPACE

'MAIN STREET' CONNECTIONS TO THE CLARENCE RIVER

KEY

- MAIN (COMMERCIAL) STREET
- CONNECTION TO RIVER
- PUBLIC PARKS
- RIVERFRONT PUBLIC SPACE
- STREET TREES

Clarence riverfront at Prince Street, Grafton.

CONNECTION TO THE CLARENCE RIVER

The strong connection between the main streets and the riverfront is a distinguishing characteristic of both Grafton and South Grafton's town centres. Both Prince Street and Skinner Street lead directly to the primary riverfront public spaces on either side of the Clarence River. Skinner Street also leads directly to the section of the river between Susan Island and Grafton Bridge, which is the primary recreational and special event space for the city.

East (downstream) of Grafton Bridge, the relationship between the city and the river has a much less public focus. Residential properties occupy much of the river's northern frontage and public access is limited to the ends of the streets that lead down to the river. On the southern side of the river, the area east of the bridge is occupied by private agricultural land.

Clarence riverfront at Skinner Street, South Grafton.

3.3 ESTABLISHED RESIDENTIAL AREAS

The established urban residential areas of Grafton and South Grafton are directly connected to the two town centres. The urban and landscape character of these areas is defined by the pattern of the street layouts and the combination of building types, planting and road formation that make up the streetscapes.

As previously discussed in section 2.4 – Urban form, the residential areas of Grafton are laid out according to the historical grid, while the established residential areas of South Grafton were laid out in three clearly distinguishable patterns: the older areas closer to the town centre conform to the original grid, a second grid defines the area south of Cambridge Street, while the newer areas south of Tyson Street have an irregular street pattern of looping roads and cul-de-sacs.

The housing stock in the established residential areas vary in age, with the older homes generally located closest to the town centres, and the post-war and later homes generally located further north and south of the two town centres. The established residential areas are also generally characterised by established gardens, with front gardens visible to the street. The streets themselves generally have sealed roads with unformed edges (no kerbs) and wide grassy verges. Many are lined with mature street trees.

The overriding character of this landscape type is that of informal streets with established houses and gardens, which is in keeping with the urban character of a genteel provincial town.

Images right:
Representative streetscapes in established residential areas in Grafton and South Grafton

Images below:
Representative residential buildings in established residential areas in Grafton and South Grafton

3.4 NEWLY DEVELOPING RESIDENTIAL AREAS

This page:
Newly developing residential areas in Grafton

On the outer edges of the established residential areas, more recent residential developments can be found. These newly developing residential areas are currently primarily concentrated in the north-east of Grafton. The Clarenza Urban Release Area, as described in Council's *Draft LEP 2010*, will bring a substantial amount of new residential development to the east of South Grafton.

The character of the newly developing residential areas is distinguished by large houses that occupy much of their residential blocks, with small gardens that are often surrounded by high fences. The streets are typically laid out in looping patterns with cul-de-sacs, and the roads are sealed and typically edged with roll-top kerbs. The streetscapes are often dominated by the high, solid front fences to the houses, which creates a strong sense of separation between the houses and the street. This character is markedly different to the more informal character found in the established residential areas of Grafton and South Grafton, and is more typical of the more anonymous suburban areas found in other regional towns and cities.

3.5 INDUSTRIAL AREAS

The primary areas of industrial activity in Grafton and South Grafton are generally concentrated around the regional road and rail corridors. The character of these areas is distinguished by large industrial buildings, often surrounded by large open yards. The large scale of the buildings and their associated yards is in marked contrast to the surrounding smaller-scaled residential and commercial areas of Grafton and South Grafton.

The character of the industrial buildings vary, with the newer industrial buildings typically being "big box" warehouse developments that are designed to be flexible and accommodate a range of different uses. As such, they tend to be visually homogeneous and somewhat anonymous. The older industrial buildings tend to be use-specific. As such, they tend to have a more distinctive architecture that in some cases, for example the sugar mill at South Grafton, have become prominent landmarks for the town.

Left: Sugar mill, South Grafton
Images below: Representative examples of industrial developments in Grafton and South Grafton.

3.6 THE RURAL HINTERLAND

View from elevated land along Centenary Drive, across the agricultural floodplain to the newly developing residential areas along Grafton's riverfront.

The urban areas of Grafton and South Grafton are surrounded by agricultural areas that comprise the city's rural hinterland. This landscape type has two distinctive characters—the flat open country on the floodplain south of the Clarence River, which is visually exposed and connected to the river; and rolling hills as the land rises to the south of South Grafton, which have a more enclosed character with long-range views to the river and town.

The rural hinterland is distinguished by the geometric layout of the agricultural fields, which establishes a regular pattern across the landscape irrespective of topography. The geometry of the property boundaries is clearly visible in the landscape through the long straight roads, the fence lines and lines of trees that follow the patterns of land division.

View from elevated land along Centenary Drive, across the agricultural floodplain to Grafton Bridge.

3.7 THE RIVER ISLANDS

Susan Island and Elizabeth Island are two large, elongated lozenge shaped islands in the Clarence River. Both islands generally have an open, undeveloped, character with scattered trees in grass. The western end of Susan Island is differentiated by dense tree cover and is a designated nature reserve under Council's *Draft 2010 LEP*.

The two islands are not generally perceived as distinct islands due to their large size and their location at either side of a sharp curve in the Clarence River. Due the geometry of the river, views to the islands from the surrounding river banks are generally oblique and are dominated by the backdrop of the wider landscape, which the islands tend to visually merge into. Similarly, the view from Grafton Bridge to Susan Island is oblique and the island visually merges with the surrounding landscape. Elizabeth Island is not visible from Grafton Bridge due to the geometry of the river.

Nonetheless, the two river islands are important components of the landscape setting for the city, and figure prominently in the popular perception of the character of the river. Due to its proximity to the two town centres, Susan Island provides a distinctive landmark at the towns' riverfronts. It forms the western boundary of the primary river recreation space for the two towns, while also being a popular public recreation space itself.

The key views of Susan Island are from the public riverfront at South Grafton, where the island can be clearly seen to be distinct from the surrounding riverbanks. The views to Susan Island from the public waterfront in Grafton are primarily perpendicular from the shore, or at an acute angle from the shore. As such the island tends to visually merge with the wider landscape background, and appears to be a part of the opposite shore.

Above:
View to Susan Island from South Grafton's public waterfront. The island is clearly distinct from the surrounding river banks.

Left:
View to Susan Island from the public waterfront near Queen Street, Grafton. The island appears to visually merge with the wider landscape.

3.8 THE CLARENCE RIVER

Right: Private residential properties front the northern riverfront east of Grafton Bridge.

Below: The open landscape character of the agricultural floodplain is clearly visible along the southern riverfront east of Grafton Bridge.

The public riverfront at Grafton, west of Grafton Bridge.

The public riverfront at South Grafton, west of Grafton Bridge.

The Clarence River is the defining landscape feature for the city and, as previously discussed in section 2.2 – Historical context, it was the fundamental reason for the establishment of the city in this location.

The river is the dominant visual element in the local landscape. It has a distinctive character that is defined by its wide sweeping form as it winds across the flat river plain. The flat, open, topography of the local area reinforces the visual prominence of the river and its important role as the visual focus and landscape point of reference for the locality. As the only structure that crosses the river in the locality, the landmark quality of Grafton Bridge is accentuated by the exposed visual character of the river and its setting.

The river's edge is defined by the high levee banks that protect Grafton and South Grafton from periodic flooding of the river. The character of the river's edge varies throughout the study area. Between Grafton Bridge and Susan Island, boat sheds, launches, wharves and pontoons have been developed along the riverfront at both Grafton and South Grafton, which support the public recreation focus along this stretch of the river. Future implementation of Council's *Draft Grafton Waterfront Precinct Masterplan* (Jan 2011) will see further development of this riverfront area for public recreation. East of Grafton Bridge, the riverfront has two distinct characters. The southern riverfront is defined by the open character of the agricultural floodplain, which consists of fields and scattered trees. The northern riverfront has a more developed character, with houses and gardens built along the top of the levee bank, and private moorings on the river.

3.9 THE VISUAL SETTING OF THE EXISTING BRIDGE

VIEWS TO GRAFTON BRIDGE

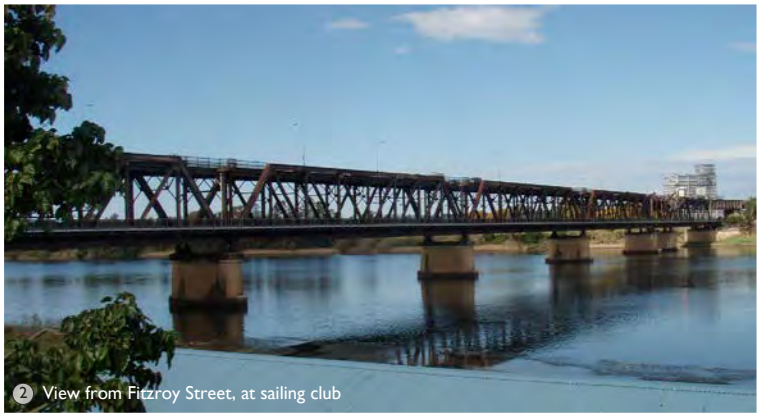
The visual relationship between Grafton and the Clarence River is fundamental to the urban experience of the town. As the dominant visual feature on the river, Grafton Bridge is a key urban landmark that contributes significantly to the identity of the town. There are two primary types of views to the bridge: proximate views from the riverfront public spaces at Grafton and South Grafton, and long range views from elevated vantage points throughout the district, primarily south of the river.

VIEWS FROM GRAFTON BRIDGE

The views of the town from the bridge are also an important component of the urban experience of Grafton, providing a strong visual sense of the relationship between the town and the river. The best views from the bridge are from the two pedestrian and cyclist paths, located at the rail deck level on either side of the bridge. The views from the train are partially screened by the bridge's steel truss, and the motorists' views from the road deck level are partially obscured by the bridge parapet.

View eastward along the Clarence River from Grafton Bridge

1 View from Grafton levee



2 View from Fitzroy Street, at sailing club

3 View from Girl Guide Park

4 View from end of Skinner Street

5 View from Through Street

6 View from Centenary Drive, Clarenza

4 LANDSCAPE AND URBAN DESIGN ISSUES

4.1 LANDSCAPE AND URBAN DESIGN ISSUES

A new crossing of the Clarence River would need to include approach roads to the new bridge from Grafton and South Grafton, as well as the design of the bridge itself. The location of the new bridge over the river would affect the possible routes for the approach roads and their relationship to the existing urban fabric—the physical structure and experience of the local streets.

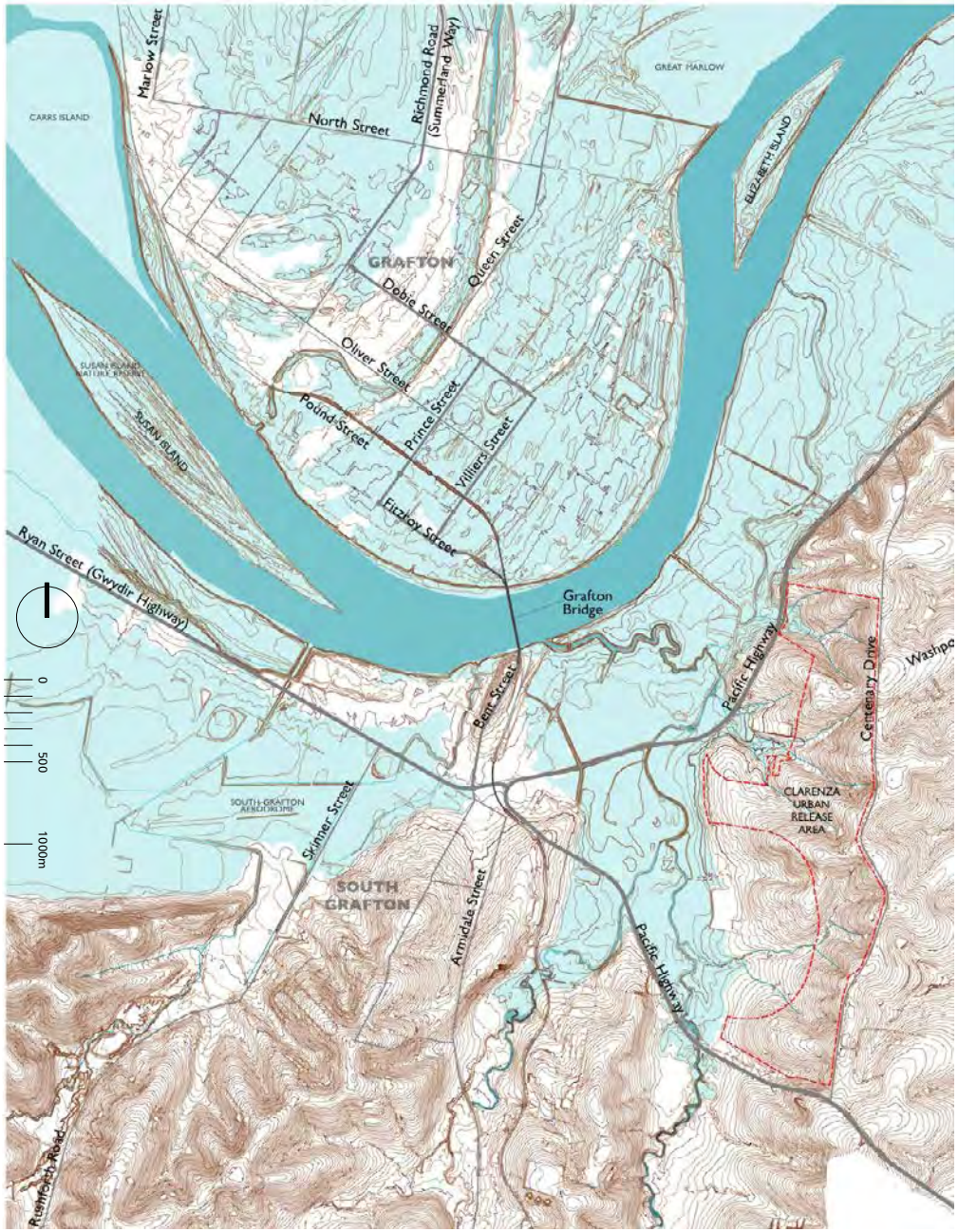
This section discusses the key landscape and urban design factors that are likely to affect, or be affected by, the location of a new crossing and its approach roads in Grafton and South Grafton. The urban structure of Grafton, bisected by the Clarence River, is clearly comprised of three distinct precincts—Grafton, South Grafton and the river itself. The precincts will be discussed separately, as each presents particular landscape and urban issues in addition to those that affect the city as a whole.

The key issues discussed in this chapter are:

- City–wide issues
  - ¬ Topography and flood.
  - ¬ Dispersed activity generators.
  - ¬ Pedestrian and cyclist connectivity.
  - ¬ Historical urban fabric
- The Clarence River
  - ¬ Visual relationship between the new bridge and the existing bridge.
  - ¬ Position of the new bridge in relation to the existing bridge.
  - ¬ Potential impact on the recreational amenity of the Clarence River.
- Grafton
  - ¬ The need for elevated infrastructure.
  - ¬ Relationship between the new approach road and the local street grid.
- South Grafton
  - ¬ Location of the approach road.
  - ¬ Utilising Bent Street.
  - ¬ Approach road to the east of Bent Street.
  - ¬ Approach road to the west of Bent Street.

Aerial view from Grafton, across the Clarence River to South Grafton (source: Arup 2010).

4.2 CITY–WIDE ISSUES



Flood sign, South Grafton

FLOOD AFFECTED AREAS

KEY

- CLARENCE RIVER
- EXTENT OF 100 YEAR ARI FLOOD (*Lower Clarence River Flood Study Review*, Clarence Valley Council 2004)
- CLARENZA URBAN RELEASE AREA (*Clarence Valley Draft LEP 2010*)
- INDEX CONTOURS: 5m
- INTERMEDIATE CONTOURS: 1m

TOPOGRAPHY AND FLOOD

The interrelationship between the flood regime of the Clarence River and the existing topography on either side of the river is a key landscape constraint that will determine the physical outcomes for a new bridge and its approach roads.

The design of a new bridge would need to address both maritime navigational requirements and provide immunity from 1 in 100 year flood levels. As such, the soffit (underside) level of any new bridge is to be above the 1 in 100 year ARI flood event to ensure that it would be trafficable during major flood events. The highest recorded flood level in Grafton was 7.834m AHD in 1890, and the most recent flood in January 2011 reached 7.61m AHD. During the 2001 flood, the Clarence River reached 7.70m AHD in Grafton.

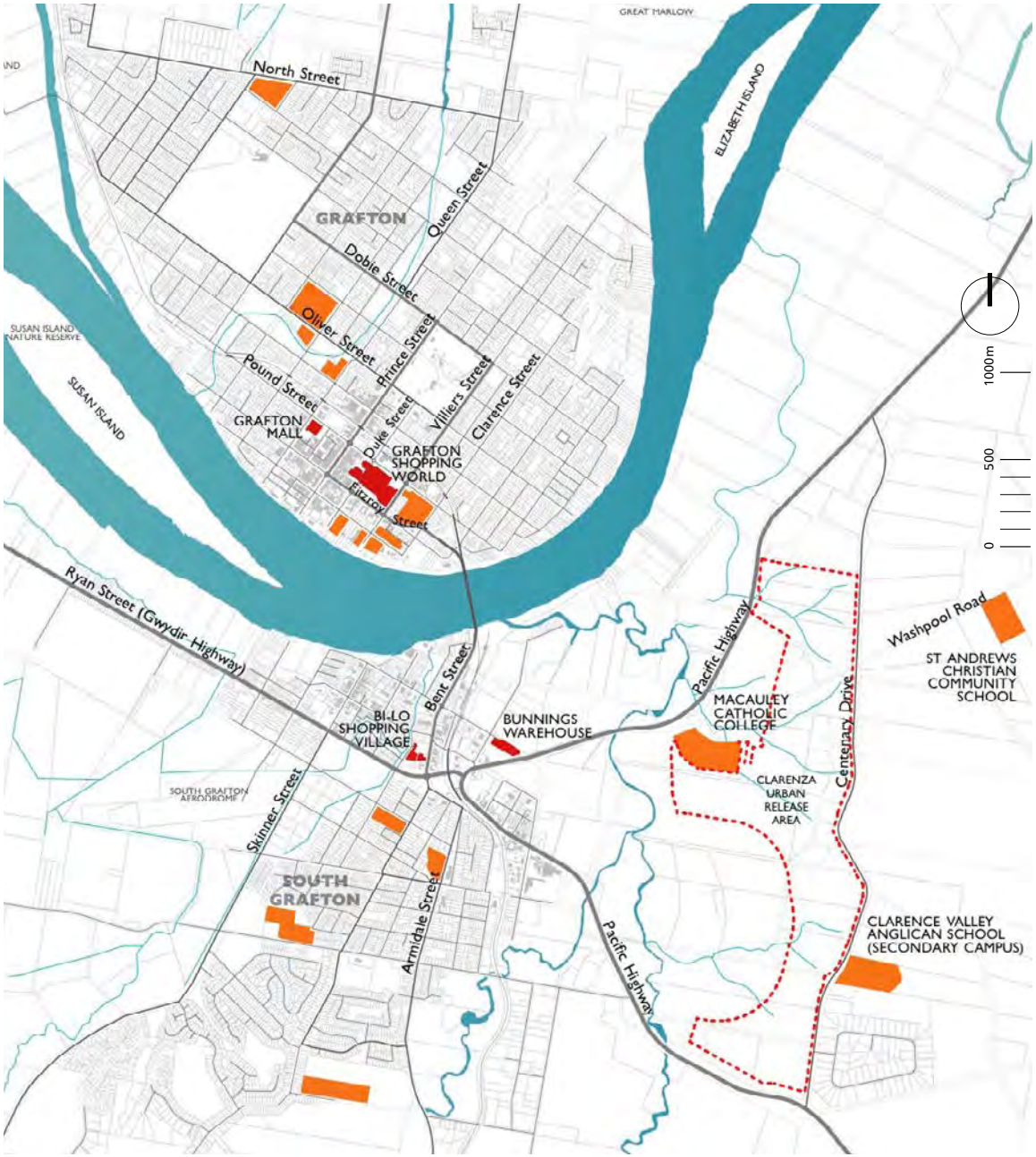
The generally low-lying topography on either side of the river means that any approach roads to a new bridge would most likely need to be elevated above the existing ground in order to connect with the new bridge's road level. The likely issues arising from this requirement are discussed in more detail in relation to each precinct.

DISPERSED ACTIVITY GENERATORS

The location of major commercial activity attractors on both sides of the river—particularly Grafton Shopping World to the north of the river, and bulky goods retailers such as Bunnings Hardware to the south of the river—has resulted in dispersed urban activity and generation of significant vehicular traffic across the existing Grafton Bridge. Additionally, the development of large school campuses at the newly developing urban release area at Clarenza also generates substantial vehicular traffic across the bridge on school days.

The RTA's 2011 *Heavy Vehicle Study* found that 97% of the traffic currently using Grafton Bridge is local traffic, with an origin and/or destination in Grafton or South Grafton. The other 3% of vehicles comprises regional traffic passing through to other destinations.

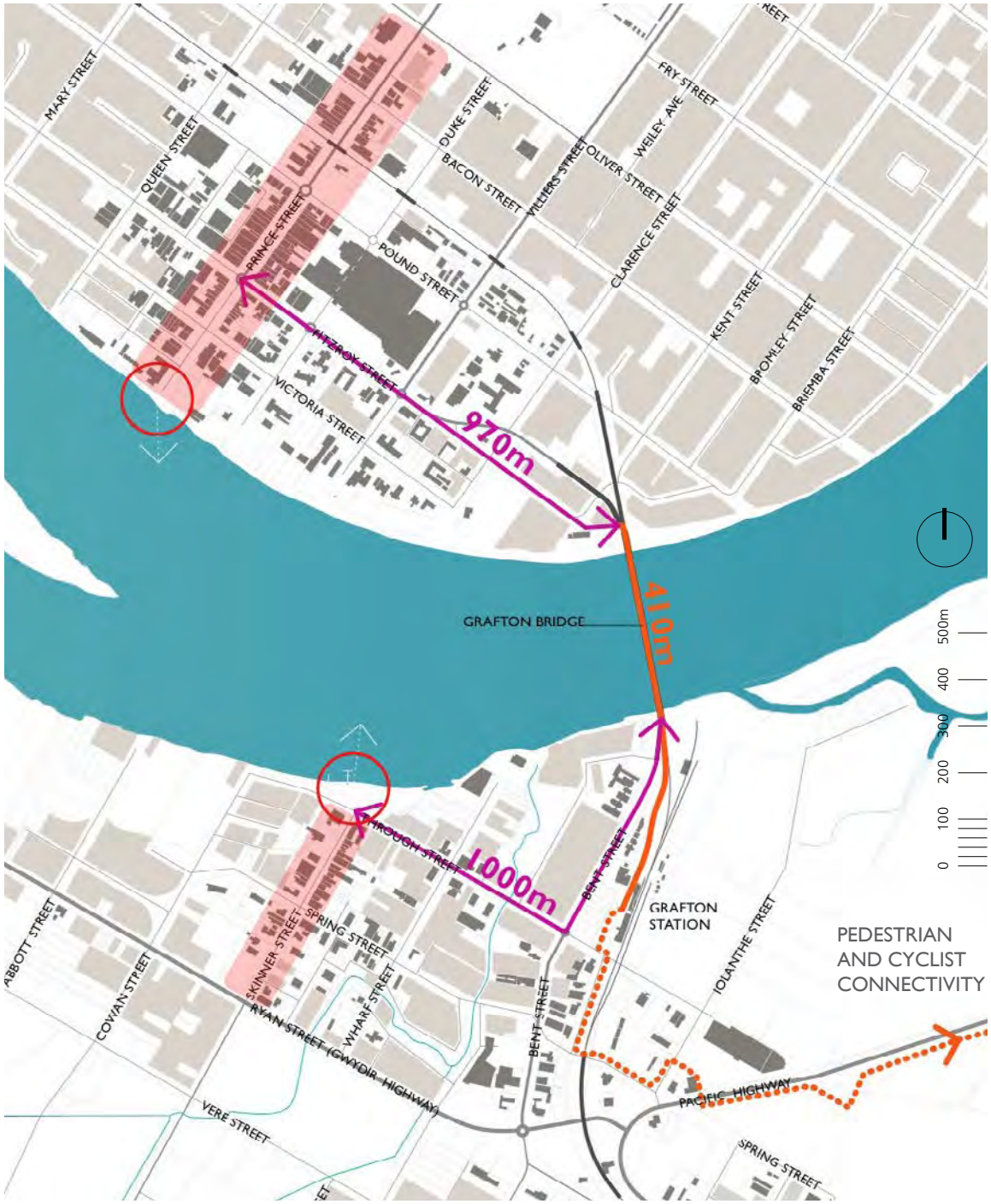
The predominantly local nature of the traffic using the current bridge, and presumably any future bridge, should be taken into account when determining the route of the new river crossing. Particular consideration should be given to the new route's relationship to the town centres and network of local streets in both Grafton and South Grafton.



ACTIVITY GENERATORS

KEY

- MAJOR RETAIL
- EDUCATION
- CLARENZA URBAN RELEASE AREA



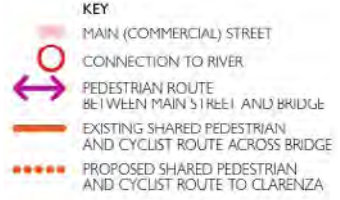

Shared path on Grafton Bridge

PEDESTRIAN AND CYCLIST CONNECTIVITY

The existing Grafton Bridge currently provides the only pedestrian and cyclist connection between Grafton and South Grafton. The location of the bridge outside of the town centres reinforces the sense of separation between Grafton and South Grafton's town centres, particularly for pedestrians and cyclists.

The most direct route between Skinner Street, South Grafton's main street, and the bridge is approximately 1000m. Based on an average pedestrian walking speed of 4km per hour, this would be about a15 minute walk. In Grafton, the most direct route between Prince Street and the bridge is approximately 970m—close to 15 minutes' walk. Including the bridge, the most direct route between the main streets is about 2.3km, about a 35 minute walk.

Pedestrian and cyclist access across the Clarence River is currently provided by the shared paths on either side of Grafton Bridge. In South Grafton, a shared pedestrian and cyclist path continues along the western side of the railway corridor and terminates at the railway station. There are currently no formal provisions for pedestrians and cyclists between South Grafton and Clarenza. The *Clarenza Cycleways Option Study* (CVC 2010) recommends the development of a new shared pedestrian and cyclist path between South Grafton and Clarenza. The recommended route would start at the end of the existing shared path at the railway station, travel to the Pacific Highway via Crisp Avenue and Spring Street, cross the Highway and South Grafton levee and then continue on to Hennessey Drive in Clarenza along the southern side of the Highway.



4.3 THE CLARENCE RIVER

VISUAL RELATIONSHIP BETWEEN A NEW BRIDGE AND THE EXISTING BRIDGE

The visual dominance of the existing bridge on the wide, flat, river floodplain—especially when viewed from key vantage points in Grafton and South Grafton—is an essential component of the city's urban identity. As such, a key consideration for the design of a new bridge would be its visual relationship to the existing bridge, and this relationship would be governed by the two bridges' physical proximity to one another.

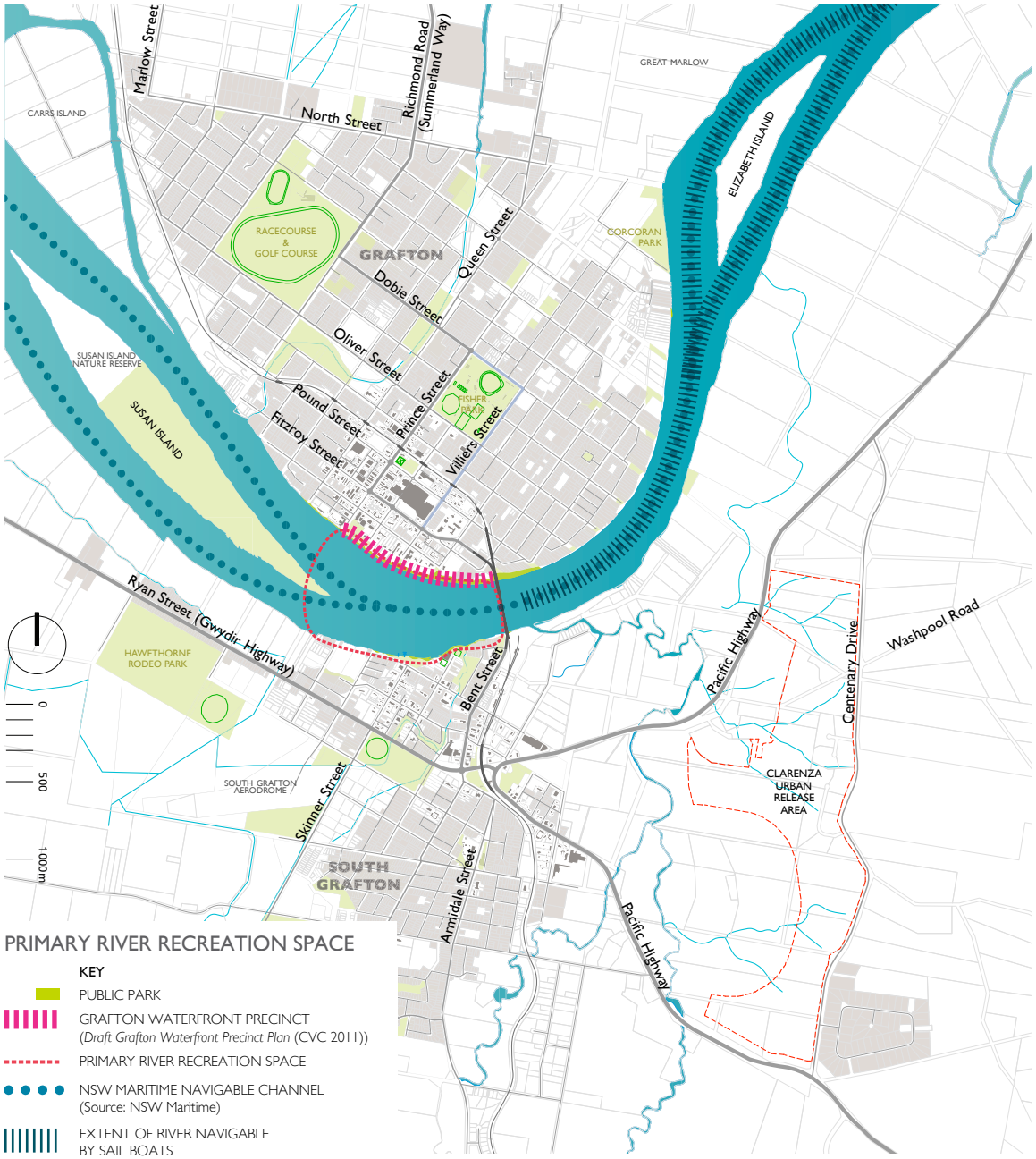
The closer a new bridge is located to the existing bridge, the more closely related the two bridges should be in terms of scale and proportion, in order to ensure that the new bridge does not adversely affect the character of the existing bridge in its setting. If a new bridge is located further away from the existing bridge, it would be perceived as its own separate entity and, as such, could potentially have its own distinct visual expression.

POSITION OF A NEW BRIDGE IN RELATION TO THE EXISTING BRIDGE

The primary public viewing points to the existing bridge are from the public riverfront spaces to its west. As such, the western elevation of the bridge is more sensitive to visual changes than its eastern elevation, which is viewed primarily from private residences and agricultural land.

Top right:
View of Grafton Bridge from the east, at Girl Guide Park.

Right:
View of Grafton Bridge from the west, at Skinner Street wharf.



PRIMARY RIVER RECREATION SPACE

KEY

- PUBLIC PARK
- GRAFTON WATERFRONT PRECINCT (*Draft Grafton Waterfront Precinct Plan* (CVC 2011))
- PRIMARY RIVER RECREATION SPACE
- NSW MARITIME NAVIGABLE CHANNEL (Source: NSW Maritime)
- EXTENT OF RIVER NAVIGABLE BY SAIL BOATS

POTENTIAL IMPACT ON THE RECREATIONAL AMENITY OF THE CLARENCE RIVER

The development of a new bridge could potentially affect the recreational amenity of the river, regardless of which side of the existing bridge it is to be located.

To the west of the existing bridge, the stretch of river up to Susan Island is the primary location for river-related town festivals and sporting events. Activities include: water skiing, including the famous Bridge to Bridge Ski Race held annually in October; rowing, including the Clarence Schools Head of the River Regatta; wakeboarding; dragon boat racing; sailing; and fishing. Furthermore, Council's *Draft Grafton Waterfront Precinct Masterplan* (Jan 2011) aims to further develop the public recreational amenity of the riverfront between the existing bridge and Susan Island.

The recreational amenity of the river to the east of the existing bridge has a more private focus, with the residential properties fronting the river having moorings along the northern banks. Currently, sail boats are limited to the stretch of river east of the existing bridge, due to the navigational clearance on the bridge. If the current recreational amenity of this stretch of the river is to be maintained, the height of the new bridge would need to allow for the passage of sail boats, which NSW Maritime indicate is 15m above Mean High Water Springs.

4.4 GRAFTON

THE NEED FOR ELEVATED INFRASTRUCTURE

Topographic constraints are a major physical factor in the selection of a preferred route alignment north of the river. This is because the existing landform adjacent to the river is uniformly low-lying. As such, the level difference between the required bridge height (due to flooding and navigational requirements) and the existing ground would necessitate any approach road to an additional bridge to be elevated.

The likely options for elevating an approach road would be bridge structure (viaduct), retaining wall or embankment. Elevating an approach road on viaduct creates the potential for a complementary relationship with the existing language of infrastructure elements in Grafton—in particular the road and rail viaduct approaches to the existing bridge. However, depending on the length of elevated road required, the viaduct option may be cost-prohibitive. Retaining walls and embankments would be more cost-effective than viaducts, but would form large solid structures that would have a significant visual and physical impact on the urban character of Grafton. In particular, retaining walls would introduce a new language of major structures in the town. Both retaining walls and embankments are visually and physically less permeable than viaducts, creating visually divisive elements in the town's urban fabric.

Furthermore, depending on their location, any new elevated roads in Grafton would most likely be on viaduct due to flooding impacts and the need to allow for the dispersal of flood water.

Aerial view of Grafton, showing existing road and rail viaducts over low-lying land (source: Arup 2010).

RELATIONSHIP BETWEEN THE NEW APPROACH ROAD AND THE LOCAL STREET GRID

Depending on the location of a new bridge crossing, the approach road may need to cut across the local street grid in order to connect back into Grafton's road network. The potential consequences of cutting across the grid include: impact on existing properties, which may need to be resumed; the creation of awkwardly shaped remnant blocks; and the introduction of larger-scaled intersections where the new road meets the grid at an angle. These types of changes would have a direct impact on the character of the neighbourhoods immediately adjacent to the river that are likely to be affected by a new approach road. The extent of the disruption to the street grid would depend on the location of an additional bridge crossing, and where the approach road can connect back into the existing road network.

Left: Relationship of the existing approach road viaduct and railway viaduct to the local street grid in Grafton (source: Arup 2010)..

4.5 SOUTH GRAFTON

LOCATION OF THE APPROACH ROAD

The location of an approach road to an additional bridge crossing has the potential to have a significant impact on the civic and commercial functions of South Grafton's town centre. Currently, the approach to Grafton Bridge is along Bent Street. Running parallel to Skinner Street, Bent Street allows traffic and passing trade to very effectively bypass South Grafton's traditional centre. This has contributed to the declining commercial relevance and civic profile of South Grafton's town centre in relation to Grafton's town centre. Depending on the location of an additional bridge crossing, there are three likely scenarios for the location of the approach road through South Grafton: utilising the existing approach route of Bent Street; or utilising a new approach route either to the east or west of Bent Street.

UTILISING BENT STREET

The advantage of Bent Street as the approach road to any bridge crossing is that it follows a natural ridge of elevated land, which eliminates the need to artificially elevate the approach road to meet the required level of the bridge crossing. However, this option would need to consider the impact of placing additional traffic onto Bent Street, which already experiences problems with traffic congestion. Furthermore, utilising Bent Street as the approach road for both bridges would only reinforce the isolated, 'offline', nature of Skinner Street and South Grafton's town centre.

Above: View south along Bent Street.

Left: Approach to existing bridge along Bent Street, South Grafton (source: Arup 2010).

Above: Aerial photograph showing agricultural floodplain and light industry to the east of Bent Street, South Grafton. The town centre west of Bent Street is in the background. (Source: Arup 2010)

APPROACH ROAD TO THE EAST OF BENT STREET

If an additional bridge were to be located to the east of the existing bridge, there is an opportunity to provide a separate new approach road to the east of the railway line.

An advantage of this option is that it would provide an alternative route in South Grafton for traffic wishing to cross the river, thereby relieving some of the existing pressures on Bent Street. Furthermore, the route of the new approach road would be through a light industrial area (immediately east of Bent Street), or the agricultural floodplain, which stretches east from the industrial area to downstream of Elizabeth Island. The landscape and urban character of these areas is less likely to be adversely affected by the introduction of new through traffic than the areas in and around South Grafton's town centre. Any new approach road and bridge to the east of the existing bridge would also provide a more direct river crossing for the future constituents of the Clarenza Urban Release Area, located to the east of South Grafton.

One disadvantage of an approach road to the east of the railway line is that it would be located on the low-lying river floodplain, which would require it to be elevated to both meet the required bridge level and ensure that it is trafficable during flood periods. The bridge may also need to be further elevated to ensure minimum maritime navigational clearance is maintained along this stretch of the river.

Significantly, any new approach road located to the east of Bent Street would divert passing traffic and trade even further away from South Grafton's town centre, and this would most likely exacerbate the current problem of the town centre's low commercial and civic profile.

APPROACH ROAD TO THE WEST OF BENT STREET

Conversely, providing a separate new approach road to the west of Bent Street could assist in revitalising South Grafton's town centre, as it would bring passing traffic closer to Skinner Street. This could potentially increase Skinner Street's commercial exposure and consequently, its civic relevance. This option would also relieve some of the existing pressures on Bent Street by providing an alternative route in South Grafton for traffic wishing to cross the river.

The potential benefits for South Grafton's civic and commercial profile would be greater if the new approach road were located close to the existing town centre. The potential benefit would be less if the approach road were situated further west of the town centre (toward Susan Island), as passing traffic would bypass the town centre.

As the land to the west of Bent Street is low-lying, any approach road would need to be elevated above existing ground in order to meet the required bridge crossing level. An elevated road would introduce a significant change to South Grafton's urban character, as there are presently no such elevated structures in the vicinity of the town centre and riverfront in South Grafton.

Above: Aerial photograph showing South Grafton's town centre to the west of Bent Street.
The light industrial area and agricultural floodplain east of Bent Street is in the background. (Source: Arup 2010)

Aerial view from South Grafton across the Clarence River to Grafton (source: Arup 2010).

5 A UNIQUE OPPORTUNITY

The provision of an additional bridge crossing at Grafton has the potential to do more than just improve the flow of vehicular traffic across the river. A new bridge crossing of the Clarence River presents a unique opportunity to direct the future urban growth of the city of Grafton.

The location of the existing bridge has caused the Summerland Way to bypass South Grafton, which has contributed, at least in part, to a decline in South Grafton's civic and commercial prominence in relation to Grafton, which remains connected to the regional route. This problem could potentially be redressed through the strategic siting of the additional crossing and its approach road closer to South Grafton's town centre.

Furthermore, the long distances from the current bridge to the two town centres has resulted in long, indirect, pedestrian and cyclist connections between South Grafton and Grafton, which reinforces the sense of separation between the two towns. Here again, the location of an additional crossing and its approaches has the potential to significantly improve the physical, visual and experiential connection between the two town centres.

6 LANDSCAPE AND URBAN DESIGN GOALS

6.1 LANDSCAPE AND URBAN DESIGN GOALS

A set of key landscape and urban design goals, and related design principles, has been identified to guide the identification of a preferred location for a new bridge and its approach roads. These goals are based on an understanding of the key existing landscape and urban values of the area, the likely landscape and urban design issues that could affect, or be affected by, a new bridge crossing, and the unique opportunity that a new bridge crossing presents in shaping the urban future of Grafton.

Goal: To maintain the visual integrity of the existing bridge in its setting.

Design principles:

- If a new bridge is to be located adjacent to the existing bridge, its scale and form should complement the existing bridge and allow it to take precedence visually. Strategies include:
  - ¬ Aligning the new bridge deck with the lower (railway) deck of the existing bridge.
  - ¬ Minimising the visual depth of the superstructure on the new bridge, to allow the steel truss structure of the existing bridge to maintain its visual dominance.
  - ¬ Aligning any piers on the new bridge with the piers of the existing bridge.
- If a new bridge is to be located at a distance from the existing bridge, its visual expression (form and scale) can be independent of the existing bridge and could potentially become a landmark in its own right.

Goal: To maintain the integrity of the existing urban fabric, particularly the physical and visual experience of the historical street grid.

Design principles:

- Minimise scale of approach roads.
- Minimise the scale of new intersections between the approach roads and the existing local roads.
- Maintain existing urban patterns and integrate the geometry of any new approach roads with the existing road layout.

Goal: To maintain the integrity of the existing urban and landscape character of the local area.

Design principles:

- Minimise scale of approach roads.
- Minimise the elevation of the approach roads above the existing ground.
- Retain as much existing vegetation as possible.
- Maintain existing urban patterns and integrate the geometry of any new approach roads with the existing road layout.

Goal: **To establish a complementary relationship with the existing infrastructural elements in Grafton and South Grafton.**

Design principles:

- Where approach roads need to be elevated above the existing ground, use viaducts wherever possible and practicable.
- If retaining walls or embankments are employed, minimise their height and extent.

Goal: **To maximise accessibility for local traffic and pedestrians.**

Design principles:

- Utilise the existing topography and landforms wherever possible to reduce the need to artificially elevate the approach roads.
- Minimise the potential visual and physical barrier effect of the approach roads by maintaining through connections for local traffic and pedestrians wherever possible.

Goal: **To improve connectivity for pedestrians and cyclists between Grafton and South Grafton.**

Design principles:

- Make more direct connections between the town centres and the new bridge crossing.
- Make connections into existing pedestrian and cycle networks.
- Make connections to the existing riverfront public recreation spaces.

Goal: **To improve the civic and commercial integrity of South Grafton's town centre.**

Design principles:

- Make clearer and more direct connections between the river crossing and South Grafton's town centre, particularly Skinner Street.