

APPENDIX D

Land Use issues

Grafton Bridge Project

Route Selection for additional crossing of the Clarence River at Grafton

LAND USE ISSUES

January 2004



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EXECUTIVE SUMMARY

This report gives a broad view of land uses in the study area, examines land uses along the riverbanks and reviews the seven crossing localities presently under consideration.

Duplication of the existing bridge would have the least impact on land use. It would reinforce existing development patterns and provide certainty for future land use decisions.

Crossing localities located away from the existing bridge would create pressure for changes to existing land use. New intersections with the Pacific Highway would see development pressure for Highway associated activities similar to those located near the Gwydir Highway turnoff. Connection to Locality 4 and 5 in the vicinity of Bacon and Dobie Streets would become similar to the existing Villiers Street and have pressure for a change to commercial activities.

Locality 1 in the vicinity of Prince Street would see the roadside development on the Grafton side change from civic / recreational uses to main road commercial uses.

Locality 2 in the vicinity of Villiers Street would have an impact on current educational and business uses and may not remain compatible with the predicted increased traffic flows. On the southern side of the River there could be change in commercial development to the additional crossing to take advantage of passing trade.

1 INTRODUCTION

The NSW Roads & Traffic Authority (RTA) has commissioned an examination of various bridge crossings for improving traffic flows across the Clarence River at Grafton.

Grafton is a substantial regional city located on the Clarence River. It is at the junction of three important roads, the Pacific Highway (State Highway 10), the Gwydir Highway (State Highway 12) and the Summerland Way (Main Road 83).

These three roads meet at South Grafton; only the Summerland Way crosses the Clarence River via the Grafton Bridge, a combined road and rail bridge opened in 1932. This bridge also carries much local traffic and, whilst roadwork has created 4-lane roads on either approach, the bridge remains as 2-lane, with a difficult alignment.

The bridge is important in both the local sense, as it links Grafton and South Grafton, and in the wider sense, as it gives access from the Pacific Highway to areas north and west of Grafton and provides an alternative route to Casino, Lismore, Kyogle and Brisbane.

A Feasibility Study in 2002 has shown that the most appropriate area for any new crossing is in the stretch of the Clarence River between Elizabeth Island in the north and Susan Island in the west.

This report reviews the present and likely future land uses along this section of the river and identifies the opportunities for and constraints upon, river crossings.

The information presented is not in fine detail but is to a level which will allow localities to be considered in the light of the constraints and opportunities presented by established and potential land uses.

Land use is a factor in consideration of localities for several reasons;

- Land use creates the traffic flows which must be accommodated;
- Changes in land use is triggered by the level of access provided; and
- Land use restricts or, in some cases, creates the opportunity for improvement to traffic flows.

These opportunities and constraints can be of immediate significance, i.e. presented by land uses over which any road/bridge must pass, and of wider significance, i.e. effects on land not so immediately affected.

Both kinds of effects are covered in this report.

2 LANDUSE PATTERN

Grafton is an important regional city; the 2001/02 ABS census gave the population as 17341 persons. As a regional centre its influence spreads wider than the city boundaries, and it is a service centre for the Clarence Valley and a population of nearly 50000 persons.

There was informal settlement in the area in the early 1800's until the original town was surveyed and the first lots sold in 1851.

The majority of the town was located on the north side of the river with a smaller section on the south side. Both sides were laid-out on a grid pattern, aligned approximately NE-SW and SE-NW (although the grids on either side of the river are not exactly aligned).

This alignment of the grid was probably chosen so as to correspond, at least approximately, with the right-angle bend taken by the river at this point.

Roads were wide, even for the time, with most being 30 metres wide; some are 20 metres and some are 40 metres wide. Blocks (the areas bounded by roads) were about 200 metres square, with variations, of course, to fit topography, drainage lines and the river.

There are relatively few lanes, contrasting with most early towns in which each block is provided with a lane or lanes for the convenient removal of nightsoil.

Broadly speaking, the various land uses in Grafton are the same as any other city; it is local factors which determine the location of each type of land use in any particular town.

Grafton, in the areas likely to be directly or indirectly affected by one of the bridge options, has the following generalised land uses;

- Main Business Area

The main retail and commercial business area is centred on Prince and Fitzroy Streets. “Government” businesses have been historically located in the nearby Victoria Street.

The business area is quite compact and displays the usual pattern of high-intensity business at the core and a tapering off of intensity as distance from the core increases.

There is “ribbon development” in Fitzroy Street between the bridge and the main city centre. This is of fairly typical character, motels, service stations and fast food outlets, plus businesses which cannot sustain city centre rents.

These kinds of businesses are also apparent at the northern end of Prince Street.

- Fringe Business Areas

At South Grafton, Bent Street (the Summerland Way), from the southern end of the bridge to the roundabout, has developed as a classic fringe business area. Car-oriented businesses are located here. The only “retail” business is the new “BiLo” supermarket and its associated small shops.

South Grafton, around Spring and Skinner Streets, provides another fringe business area. The area is home to car-oriented businesses and businesses which cannot sustain city-centre rents and can operate without high exposure.

- Residential Areas

Residential areas (the term here encompasses other uses such as recreation) occupy much of the area likely to be affected, directly or indirectly, by any change to traffic patterns which might be caused by a new bridge.

Almost all these residential areas are part of the original town, with very wide roads (30 metres usually) with wide grass verges which provide informal drainage systems and useful recreation spaces.

There are many street trees, mainly jacarandas and figs, and many streets contain very beautiful avenues of these trees.

Houses are often of an elevated style. There are some very fine houses in these areas, and even more “ordinary” houses display a great deal of character.

The overall impression of these areas is one of great and stately beauty.

3 LAND USES IN THE STUDY AREA

3.1 Grafton

- **Business Areas**

The main business area is centred on Fitzroy and Prince Streets, from the bridge or eastern end of Fitzroy Street to a point north of the railway along Prince Street. These two streets also form part of the Summerland Way.

The business area has developed in a fairly standard way, driven by economic forces. There is a central core along Prince Street, the “shopping strip”. Most businesses have conventional shopfronts to the street, but there are a few arcades.

Just east of Prince Street there is a “hardtop” centre with Woolworths and Big W as its anchor tenants; just west of Prince Street is a smaller “hardtop” which hosts Coles.

In Fitzroy Street, between the bridge and Prince Street, there is a typical main-road-oriented development strip, motels, service stations and businesses which can operate a little outside the main business area.

There is a similar area to the north in Prince Street around the railway underpass.

East and west of Prince Street there is the normal “tapering-off” with distance from the main centre, with motor-oriented and service-type business which require more land area, lower rent/land value or both.

Overall the business area appears to be operating successfully. There are few vacancies, mostly in the fringe areas; that is a normal situation.

Street works in Prince Street, now completed, add to the general attractiveness of the business area.

The “government” precinct in Victoria Street complements the adjoining business area very well. Grafton has historically been the location of a large number of regionally-oriented government offices and several of these are established in Victoria Street.

The post office, courthouse, police station and sheriff’s office are located here.

Associated with the “government” area is a riverbank precinct containing church and school developments. This area is of remarkable beauty and atmosphere.

- **Residential Areas**

As is usual, the greater part of the land area of the city is taken-up by residential development. Most is in the form of single houses on large lots; flats/units do exist but in relatively small numbers.

The housing stock is generally of good quality and well maintained. The southern section (“Dovedale”) clearly developed first, and many older houses have been retained. The most handsome of these are identified as heritage items. A high proportion of those not so identified are still of considerable aesthetic value.

Many houses are of the “high-set” form, giving the dual benefits of protection from flooding and provision of cooling in summer.

Streets are wide, 30 metres being usual. Most streets do not have kerb and gutter, but rely for drainage on wide grass verges formed into gently-graded drainage swales.

Most streets are tree-lined. The trees are generally mature and three species, lacebark, fig and

jacaranda are recognised as heritage items. Traffic movement is aided by the permeable nature of the street grid, and traffic is not unduly concentrated in any particular street or streets. The overall impression of the older residential areas is one of dignity and great charm.

The north western areas of Grafton (“Westlawn”) clearly developed later. Houses in these areas do not, of course, have the heritage value and appearance of earlier housing but are nonetheless of generally very good design and quality.

As in the older areas, the general streetscape and appearance of these areas is greatly enhanced by the grid pattern, the wide streets and the mature street trees.

Most of the Westlawn area is west of the Summerland Way and would not be affected by any new river crossings in the study area.

Development in the north-eastern section (“Northmeadow”) has been by way of new houses built on the old street pattern and, very recently and continuing, by way of new subdivision. Some land here has been rezoned and is now being development; further rezoning is in progress. About 20ha (gross) of urban land would ultimately be available for development.

This new development is modern in both subdivision layout and building design. Both are of a high standard, but very different to the traditional style of “old” Grafton.

- **Recreation Land and Open space**

There are 3 main parks north of the river; See Park/ West Ward Park, Fisher Park and Corcoran Park.

The first two parks are urban open spaces, whilst Corcoran Park, at the northern end of the study area, is an extensive riverside park with excellent picnic and boat launching/landing facilities.

There are many other parks and open spaces. It is important for the purposes of this report to note that public roads run all the way to the river’s edge. In the southern and eastern sections of the study area the public accesses to the river thus formed are zoned as recreation to emphasise their special function as public areas rather than as roads.

This public access to the river is important; titles to privately owned land generally extend to the water’s edge, so that there is no public access legally available along the river bank for much of its length.

In the river itself there are two islands, Elizabeth Island and Susan Island. The northwest end of Susan Island is a nature reserve administered by the National Parks and Wildlife Service.

The reserve encompasses remnant sub-tropical rainforest, which is also a summer roosting area for flocks of flying foxes.

The remainder of Susan Island and the whole of Elizabeth Island are open space land administered by a trust. Public access is available by boat.

- **Special Uses**

Alumy Creek runs (very approximately) southwards from the north of Grafton to meet the Clarence River. The creek is really a very wide drainage swale and is unsuitable for development.

The creek may be a constraint to any river crossing locality which results in traffic being directed east-west to connect with the Summerland Way.

Several land uses have established near the creek and utilised the flood-labile area for non-building purposes. These developments include the gaol, the hospital, aged persons’ units, education and parkland.

3.2 South Grafton

- **Business Area**

The area zoned for business at South Grafton is greater than the area so zoned at Grafton, but development is not nearly as intense at South Grafton.

There are several reasons for this, the main ones probably being the location of the “government” buildings at Grafton, the absence (until recent years) of a surrounding residential area, the lack of passing traffic and the greater susceptibility of South Grafton to flooding.

This last problem was only finally addressed in 1997 when works designed to give South Grafton the same protection as Grafton were completed by the Clarence Valley County Council.

The South Grafton business zone, west of the bridge, provides opportunities for service type businesses such as are usually found on the fringes of a retail business area. These businesses are intermixed with residential development and the end result is an interesting area with an air of raffish charm.

The southern end of Bent Street is a typical motor-oriented strip; it is, in fact, the extension of the motor-oriented strip along Fitzroy Street on the Grafton side, interrupted by the bridge.

The southern end of this strip, as it approaches the Pacific Highway, assumes the character of a highway service centre, with petrol and fast-food.

- **Residential Areas**

As described earlier in this report, much of South Grafton contains a mixture of business and residential land uses. There are two discrete residential areas relevant to the study area, one along and west of Bent Street and the other west of the business area and extending as a long ribbon westwards along the Gwydir Highway.

The Bent Street area contains houses of very good quality; a large nursing home is located at the northern end close to the bridge.

The western area contains housing of average quality.

Southwards from the Gwydir Highway and therefore not directly relevant to this report is a substantial residential area. This area has been the main area for residential expansion of Grafton in recent years.

This residential expansion has placed considerable pressure on the bridge, since all commuting and shopping trips between this area and Grafton must, by necessity, include the bridge.

- **Industrial Areas**

The railway line, to the east of Bent Street, sets the industrial character of development here. South Grafton station is now the main passenger station, supplanting the less-accessible station at Grafton.

State Rail’s own repair and refuelling areas are here, with industries, some railway oriented and others less so.

The railway development and the industrial development around Iolanthe Street would be a considerable obstacle to any road/bridge alteration at this point.

There is an industrial zone in Cowan Street, west of the South Grafton shopping centre. This is probably historical, in recognition of some riverbank industry. The last occupant appears to have been a joinery works, but the buildings are now derelict.

- **Open Space**

Some of the riverfront land west of the present bridge is public reserve. Close to the bridge there is a park which runs southward from the riverbank to the nursing home. The land is steep and the chief values of this park are for a viewing area over the river and for “green relief”.

Further west there is a park from the river and along Christophers Creek. This is developed as a passive recreation/picnic area and is a valuable open space asset.

3.3 Rural Areas

3.3.1 Clarenza

The most substantial rural area in the study area is east of the river in the locality of Clarenza.

The part of this area between the river and the highway is used for cattle grazing and sugar cane cultivation. The pasture land is sometimes improved.

The land is broadly classified in the NSW Agriculture system as class 2 close to the river and class 3 further eastward to the highway.

NSW Agriculture's summary description of these two agricultural suitability classes is;

Class 2 Arable land suitable for regular cultivation for crops but not suited to continuous cultivation. It has a moderate to high suitability for agriculture but edaphic (soil factors) or environmental constraints reduce the overall level of production and may limit the cropping phase to a rotation with sown pastures.

Class 3 Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture. The overall production level is moderate because of edaphic or environmental constraints. Erosion hazard, soil structural breakdown or other factors including climate may limit the capacity for cultivation and soil conservation or drainage works may be required.

This alluvial soil is intensively used for cultivation and grazing.

East of the highway the land rises from the river floodplain. This land is generally class 4 in the agricultural suitability classification.

Class 4 Land suitable for grazing but not for cultivation. Agriculture is based on native pastures or improved pastures established using minimum tillage techniques. Production may be seasonally high but the overall production level is low as a result of major environmental constraints.

This area has assumed high local importance in the past as it has been used as a refuge for stock in times of flood.

3.3.2 South Grafton

West of South Grafton, along the Gwydir Highway, there is a long strip of house-lots fronting the road. Between the rear of these lots and the river there is a strip of agricultural land.

This land is classified by NSW Agriculture as Class 2 (see description in the "Clarenza" section above).

The land is flood-prone, and is dissected by Cowans Creek, a broad swale rather than an incised creek.

Uses are similar to those along the river at Clarenza; grazing and cultivation.

3.4 The North Coast Railway

The North Coast Railway which passes through Grafton is a component of the land use of the study area. The area occupied by the track and its embankments is generally about 30-40 metres wide, but there are considerable variations to this where there are stations, sidings and railway-related land uses.

The railway enters the study area from the northwest and passes along the edge of Westlawn to Grafton Railway Station, about 2 kilometres west of the Grafton Business area. Grafton station has declined in importance, and the large area of railway land around it is now little used.

The next section of the railway line runs from here through Grafton, becoming generally more elevated as it approaches the bridge. Roads from Mary Street to the bridge have access under the railway. The height above the road varies; 5 metres is available in Duke Street to accommodate large trucks.

The line crosses the bridge to South Grafton. South Grafton station is now the main station for Grafton. Good car/bus access and parking have been built and the station building has been modernised. There is a large area around the station used for railway oriented purposes, including works and fuel depots.

The line then runs south over the South Grafton high-level bridge towards Glenreagh.

4 FUTURE DEVELOPMENT

Opportunities for expansion of urban development in Grafton have and are still been limited by two major factors, the boundaries of the local government area and flooding.

The northern edge of the Crown subdivision of Grafton coincides closely with the northern boundary of the Grafton local government area; land across this boundary is in another local government area (Copmanhurst).

Irrespective of other constraints (eg agriculture and flooding) which may have affected urban development in this northern area there has been no opportunity for Grafton to consider expansion of its urban area to the north. Junction Hill has developed about 3 km to the north (in Copmanhurst Shire) as a “satellite” of Grafton.

The old Crown subdivision of Grafton has provided a reservoir for residential development in the past. Housing has crept northwards and vacant lots in the Crown subdivision are now few in numbers.

Grafton Council has rezoned an area south of Corcoran Park for residential development and subdivision and housing has proceeded. More land to the south is to be rezoned and a total of about 20ha (gross) would ultimately be available. A total of approximately 200 lots may be achievable in this area.

The other major constraint has been, and also still is, flooding. The main location of flood-free “greenfields” land is in the area south of South Grafton, where the suburbs of Bellevue Heights, Balwarra Heights and Hawthorneville have developed.

The rural area east of Grafton/South Grafton is known as Clarenza. Grafton Council is developing a masterplan for land in this area, generally between the highway and Centenary Drive, with a view to rezoning for urban purposes. It is thought that about 500 dwelling lots could be developed in this area.

In the longer term this urban area could extend eastwards across Centenary Drive. About 250 dwelling lots could be available in this area.

There are two schools already in this locality and a third (Catholic) is under construction. There is also a rural-residential subdivision east of Centenary Drive near its southern intersection with the highway.

5 LAND USES ALONG THE RIVER BANK

5.1 Grafton

This survey of land uses along the river bank begins at the northeast corner of the study area at Corcoran Park and moves south and west along the river bank to the south western end at Turf Street.

5.1.1 Corcoran Park Area

This is a popular riverside recreation area with good boat-launching facilities. The park is at a fairly low level, with high ground behind it. This high ground is occupied by a cemetery, a sewage treatment works and a council parks depot which are all constraints on crossing sites.

The topography is such that any bridge would be elevated and have little physical effect on the park. If the bridge were at the extreme north end there would be an opportunity to connect via North Street locality directly to the Summerland Way. This would minimise interference with the cemetery, the parks depot and the treatment works at Corcoran Park area.

5.1.2 Corcoran Park to Powell Street

There is low flood-labile land about 100 metres wide along the river bank in this section.

Behind and protected by the levee is an area of rural land which is now beginning to be rezoned and developed for housing,

Crossing this section would only be feasible by using one of the existing residential streets which extend to the Summerland Way. Considerable construction could be required in some cases to cross the major north-south drainage swale (Alumy Creek) which crosses this path.

5.1.3 Powell Street to the Grafton Bridge

Residential land extends to the river in this area; this must be considered a significant constraint.

Existing road reserves run to the river and provide opportunities for a bridge. The short ends of these reserves provide useful parks and public access to the river, and any bridge design should aim to continue this land use.

Some of these road reserves provide a direct path to Villiers Street, which is the eastern bypass that takes Summerland Way traffic out of the city centre.

5.1.4 West of the Grafton Bridge

Adjoining the bridge to the west is the Grafton Sailing Club building and surrounds ("Salty Seller Reserve"). The club buildings are close to river level and the levee behind is high, affording an opportunity to connect a new bridge at this location.

Further west the school/church/government precinct extends along Fitzroy Street. Like the riverfront residential development described in the previous section, the intense development of this strip forms a major constraint to river crossing, increased greatly by its heritage value.

There are opportunities at the end of each street between Clarence Street and Queen Street. Most of these are within the historic area; only Prince Street (40 metres wide) and Queen Street are outside that area.

In the short section westwards from Queen Street to Alumy Creek there is residential development which affords no opportunity for a crossing.

5.2 South Grafton

5.2.1 Grafton Bridge West

The State Rail development at South Grafton is substantial. South Grafton station, the sugar terminal, the goods yards and the refuelling facility occupy a considerable area east of Bent Street. There is also an industrial area along Iolanthe Street.

West of Bent Street along the river, there is residential development, open space and a substantial bowling/ex-services club. South of this area there is residential development and, further west, the South Grafton Business area.

West of the business area there is some scattered residential development on land which is possibly floodprone. An isolated, somewhat rundown industrial area is also located here.

5.2.2 Grafton Bridge East

Land between the riverbank and the Pacific Highway is low-lying, protected from flooding by a levee.

There are a few houses, mostly associated with agriculture on the land, which consists of grazing (on improved pasture) and cropping.

5.3 Rural

There is a strip of largely-residential development along both sides of the Gwydir Highway west of South Grafton; the strip on the northern side ends sooner than that on the southern side due to flood-prone riverside land.

There is a hotel and a service station on the southern side of the Gwydir Highway in this area.

Land on the northern side, up to the levee bank along the river, is used for grazing and cropping. There are a few houses related to this use.

6 LAND USES AND TRAFFIC PATTERNS

Many land uses historically came into being because of traffic patterns; for instance, traditional shopping centres usually had their beginnings on major roads.

The present arrangement of land uses in the study area came about, to some extent, because of the road and traffic pattern. The Grafton business area is a prime example; it is located on a road which is busy enough to bring life and business but not so overwhelmingly busy as to degrade the business area.

This situation is assisted by the permeability of the street system. Through traffic “leaks” along several roads, notably Villiers Street, but is not so heavy as to seriously threaten amenity.

Conversely the residential areas of Grafton are what they are because of the low traffic flows from external areas.

Much of the differences in character and use between Grafton and South Grafton stem from the pattern of traffic flows. The South Grafton business area may have threatened Grafton a century or more ago, but the opening of the bridge gave Grafton the commercial advantage of easy access and passing trade and left South Grafton in a business backwater.

Any river crossing which substantially changes traffic flow in and around the business centre of Grafton would have some effect on the land uses of the city. All localities should be considered for their wider effect on the functionality of the city and their likely future effect, either positive or negative, on the pattern of land uses which exists and functions well today. Crossing localities away from the

existing bridge would create development pressures that may eventually change land use patterns.

7 LOCALITIES

Preliminary work has produced a number of river crossing localities for examination. Refer to the attached locality plan. These localities are;

1. Prince Street Locality
2. Villiers Street Locality
3. At the existing bridge
4. Bacon Street Locality
5. Dobie Street Locality
6. Arthur Street Locality
7. North Street Locality

The following part of this report looks at land uses on and along these possible localities. It does not do this on a lot-by-lot, use-by-use basis but in a generalised sense, sufficiently detailed to guide the decision-making process through the present broadly-based stage to the next, more detailed, stage.

Note: Typical streets in each locality are used in this report for analysis purposes only for the assessment of each locality.

Many of the localities would have both direct and indirect effects on land uses.

Direct effects are generally effects arising from the construction of a new bridge; indirect effects can arise in areas away from the immediate bridge site and are caused by a substantial change in the present pattern of traffic.

Some assumptions are necessary, since detailed engineering design of each locality is not available

Assumptions made in respect of each locality are listed in the discussion of those localities. A general assumption that applies to all localities, is that the new bridge would be approximately at the level of the present bridge to maintain river clearances.

7.1 Locality 1

This locality would involve a bridge from the southern end of Prince Street to the Gwydir Highway at South Grafton. In order to gauge the impact of a bridge in this locality Prince Street is used as an example connecting street. The following assumptions are made:

- The road level of Prince Street may be raised substantially above the existing road level near the Crown Hotel before grading down to existing levels towards Fitzroy Street.
- Retaining walls may be required to facilitate the change in grade into Prince Street.
- Property acquisition in Prince Street would not be required.
- The bridge would cross Susan Island.
- The bridge would pass through private land between the southern riverbank and the Gwydir Highway.

7.1.1 Grafton

Prince Street is the main shopping street in Grafton. The section of Prince Street between Fitzroy Street and Dobie Street is the Summerland Way. The road reserve of Prince Street is 40 metres wide. Work has recently been completed to improve the streetscape of Prince Street through the shopping centre.

The section of Prince Street between Victoria Street and the riverbank would be most immediately affected by a bridge. On the riverbank itself, several metres below road level, there is a landing stage used by private and tourist boats. There is a parking area, and the nearby riverbank is grassed and used for passive recreation.

A bridge would pass over this low area. Subject to bridge design, it may be possible to continue car access to the area and retain recreation use of this area.

At Prince Street level there is, on the eastern side, a riverside park then civic buildings to the corner of Victoria Street. On the western side there is the Crown Hotel, then some low-key, almost “fringe” commercial uses to Victoria Street. This section of Prince Street is a quiet “backwater” and the land uses reflect this. Bridge traffic would change this substantially.

Changes on the eastern side would be unlikely, as the public park and the civic buildings would not change. On the western side, it would be difficult to maintain the present ambience of the Crown Hotel, as much of this ambience comes from the large deck overlooking the river. Increased traffic volumes that generate noise intrusion and reduced visual quality may result in reduced activity at the Hotel and potential changes to main road related uses on the section to Fitzroy Street.

The “fringe” uses on this side of the street would probably change to uses that would benefit from exposure to passing traffic. Uses of this kind, such as fast-food, automotive and low-rent are presently found north, east and west of the shopping centre where major traffic feeds-in.

In the main shopping section of Prince Street the streetscape works now completed would not be compatible with the injection of traffic from a bridge. Bridge traffic, including trucks, would be forced to use Prince Street, decreasing the amenity of the street.

As described earlier in this report the amenity of the shopping centre is very good. There is sufficient traffic in the street to provide a sense of “busyness”, but not so much traffic as to reduce amenity; it is still possible to cross the street easily and safely.

7.1.2 South Grafton

On the South Grafton side the crossing would be generally above the level of the top of the levee bank and the approach would slope downwards to meet the Gwydir Highway between Minden and Ardent Streets. Ardent Street as such does not exist; its reserve is occupied by the Ardent Street Drain.

The land to be traversed is flood-prone rural land, used for grazing and cultivation.

An elevated road with minimal supports would not adversely affect this area. There might be some micro-change caused by shadow but such changes might easily be positive by providing shade, shelter and feed points for cattle.

7.1.3 Susan Island

The bridge would cross the eastern tip of Susan Island. The island is close to river level at this point and there would be some metres of clearance. A physical support on the island is assumed.

There are no trees at this end of the island. Much of the island, including this section, has been used for grazing and for public recreation and a bridge elevated on supports would not affect these land uses.

7.1.4 Strategic

There is obviously little traffic at present travelling from the west along the Gwydir Highway to Grafton;

the majority of traffic is from South Grafton and the Pacific Highway towards Grafton. About half of this substantial traffic would use Ryan Street (the Gwydir Highway) to travel from the Bent Street/Ryan Street roundabout to (or from) a new bridge at locality.

A substantial part of the land fronting this route is zoned Business in Grafton LEP 1988. There is little commercial development in this area now, but the presence of major traffic flows would make this land more attractive.

This effect would be felt, perhaps to a lesser extent, throughout the South Grafton business zone, which is large in area but not intensely developed.

7.2 Locality 2

This locality is generally similar to Locality 1 and would attract slightly more traffic. A bridge would begin at the southern end of Villiers Street and connect to the Gwydir Highway. Assumptions made are;

- The road level of Villiers Street would change substantially to land the elevated bridge.
- There would be no property acquisition on the Grafton side.
- The bridge would meet in the vicinity of Abbott Street on the south side, perhaps with some acquisition of private land near the river bank.

7.2.1 Grafton

As in Prince Street, access to the lower riverbank area is available from the higher part of Villiers Street. The access is an informal gravel track. The riverbank area is popular for passive recreation.

Again as with Prince Street it seems possible to design a bridge which would not affect this recreation use, and may well provide opportunities for improvement.

The end of Villiers Street, from the riverbank to Victoria Street, runs between St Mary's Primary School on the west side and Catherine McAuley College and a convent/parish office on the east side.

Introduction of traffic to this end of Villiers Street would have a considerable effect on these land uses and on others up to Fitzroy Street within the identified Grafton Conservation Area.

Villiers Street north from Fitzroy Street is already used as a bypass of the business centre. A new bridge feeding into this point would not change the present land uses along this section of Villiers Street.

7.2.2 South Grafton

In South Grafton, Abbot Street aligns fairly well with Villiers Street across the river. The road reserve of Abbot Street is 30 metres wide.

At the riverbank end of Abbot Street, on the western side, there is a small enclave of good quality houses. The aesthetics of this enclave may be affected, and road traffic noise would be a consideration. East of Abbot Street there is an industrial area, with run down buildings.

A new bridge would increase development opportunities for this industrial land, which would become valuable because of good exposure to passing traffic.

Housing in the vicinity of Abbot Street is of average quality. The locality is at present a quiet one, and amenity would be affected by the introduction of a crossing. There would, however, be an opportunity for residential development in this locality with direct pedestrian/cycle access across the bridge to

Grafton.

7.2.3 Strategic

The issues relating to Locality 2 are essentially the same as those relating to Locality 1.

7.3 Locality 3

Assumptions made are;

- On the Grafton side, Fitzroy Street or Craig Street could be used as the road approach.
- This locality would include a locality directly upstream and a locality directly downstream of the existing bridge.

The general assumption that the bridge would be level is important in respect of this locality, as the difference in level between the north and south riverbanks is substantial.

The existing road bridge is at approximate natural ground level on the south side (Wilsons Hill) and uses a ramp structure to reach natural ground level on the north (Grafton) side.

7.3.1 Grafton

Salty Seller Reserve occupies the lower riverbank on the west side of the existing bridge. The Grafton Sailing Club has its premises here, with vehicle access from the end of Fitzroy Street/Kent Street.

The park and the club development are some metres below the level of Fitzroy Street and any new bridge would be well above them. Provided access were maintained the use of the park would not be affected.

There is a house in Kent Street close to the present bridge and it is in good condition.

The section of Fitzroy Street west from Salty Seller Park has houses on the northern and southern sides.

Catherine McAuley College is on the corner of Fitzroy and Clarence Streets. Although new buildings for the college are being constructed at Clarenza this report assumes that the Fitzroy/Clarence Street development will continue to operate for some time because the Catholic Church has indicated that the North Grafton primary school students may be relocated to this site..

Fitzroy Street at the river end is fairly quiet, used by local traffic to and from Salty Seller Reserve and by traffic between Dovedale and the Grafton Business centre. A new bridge in this location would considerably alter this character. This effect might be reduced if the new bridge approach could be located immediately adjoining (south of) the existing approach at Craig Street. Acquisition of residential properties may be required to provide a crossing in this locality.

The section of Fitzroy Street south of KFC is at present a cul-de-sac and there are two motels in this section would benefit from the introduction of through traffic.

Further west, where the present bridge approach meets Fitzroy Street, the character is more fringe commercial, with KFC and some commercial buildings. Access to KFC would need to be maintained.

7.3.2 South Grafton

The land on the southern end of the existing bridge is at a much higher level than the land described above. The sharp promontory at this point is known as Wilsons Hill.

There is a public reserve beside (west of) the existing bridge approach (Bent Street) from the South Grafton Nursing Home to the riverbank. The reserve slopes steeply down to the river and provides viewing areas for the river and the bridge. Because of its steepness the reserve is not of great recreation value.

It is assumed that bridge and approach design would avoid the nursing home development itself.

The railway occupies a large area east of Bent Street and the existing bridge approach. A considerable structure would be required to clear the main North Coast line and the adjoining goods yard. The sugar terminal would be a constraint for this locality.

7.3.3 Strategic View

This locality would retain existing traffic on Fitzroy Street and on Bent Street and would accordingly have correspondingly minimal strategic effect on land use.

7.4 Locality 4

Assumptions made are;

- The South Grafton approach road would meet the Pacific Highway north of Alipou Street.

7.4.1 Grafton

The river end of this locality has the typical characteristic of a low section along the riverbank and a higher section inland behind the levee bank.

The lower area gives public access to the river; because private residential land runs to the water in this area, the public areas provided by the ends of road reserves in this locality are of considerable value. There are no structures in this park area at present. Any bridge design should maintain public (foot) areas to the riverbank and maximise recreational opportunities.

Streets in this locality are generally are a 30m wide reserve for about 1.4km between the river bank and Prince Street (the Summerland Way). There are approximately 85-90 houses along this locality, with a small commercial section at the Prince Street end.

A crossing in this locality would have an impact on the land use in the residential streets. The streets would likely be gradually transformed with development pressure resulting from main road traffic usage.

Of all the localities examined, it was noted that the streets in this locality have the most extensive and mature street trees.

7.4.2 Clarenza

From the east bank of the river to the Pacific Highway, bridge approaches would cross low-lying rural land. This land is used for grazing and cropping.

Without the benefit of specialist agricultural advice it appears that agriculture use or the houses associated with it would not prevent bridge approach works for this locality.

7.4.3 Strategic View

The strategic effects of this locality would be felt on both sides of the river. Should this locality be pursued a detailed study into the effects on the land use structure of the Grafton area would be needed.

7.5 Locality 5

Assumptions made are;

- From the east bank of the river to the Pacific Highway the approach way would be elevated for reasons of flooding.

7.5.1 Grafton

There is a long (about 120m) section of the river bank in this locality designated as a riverside park. The higher section is named Jayee Park, and has a children's playground. The lower section is a pleasant informal park, with a tree and plaques commemorating Margaret and T.C. (Clem) Dawson.

Dobie Street is the longest street in this locality. It is about 2.4km from the riverbank to Turf Street, the Summerland Way, with a 30m reserve width.

There are 152 houses along this section of Dobie Street. Some small sections support market gardening, grazing and some commercial development west of Villiers Street. The Grafton Showground is about halfway along to Turf Street. The houses are of average to good quality.

7.5.2 Clarenza

As in the case of locality 4 there is flood-labile agricultural land between the riverbank and the Pacific Highway. An elevated bridge approach with minimal footprint would likely have little effect on this land.

The locality provides a good access to Clarenza and would help facilitate its development.

7.5.3 Strategic View

As for locality 4.

7.6 Locality 6

Assumptions made are;

- From the eastern riverbank the bridge approach road would be elevated because of flooding.
- The eastern access point would be on the Pacific Highway south of the Centenary Drive Intersection.

7.6.1 Grafton

The levee bank is set well back (about 120m) from the riverbank at this locality and is zoned public recreation, but access from residential streets is not available. The land on either side is flood-labile and is zoned rural; it does not present any great impediment from a land use viewpoint, to the construction of a bridge.

Inside the levee bank, formerly rural land has been rezoned to residential but is not yet developed. Further rezoning and development is expected south of Arthur Street.

There are at present 21 dwellings at the river end of Arthur Street. Further west, past an area zoned and used for rural purposes, there is a mixed use area which includes 33 houses and a block of 5 units.

Grafton Gaol and Grafton Base Hospital are in this locality, south and north respectively of Arthur Street. There is also a hotel and a service station.

Residential streets in this locality have been constructed with angle parking on each side. Arthur Street in this locality runs from the river to the Summerland Way and is about 2.1km in length; the road reserve is 30m wide.

Between Alamy Creek and Turf Street there are substantial developments providing housing and care for aged person.

7.6.2 Clarenza

The bridge approach from the Pacific Highway end would cross flood-labile rural land subject to detailed study. The present use of this land would be little affected by an elevated bridge structure with minimal footprint. The locality provides a good access to Clarenza and would help facilitate its development.

7.6.3 Strategic View

As for locality 4.

7.7 Locality 7

Assumptions made are;

- The bridge would have one or more supports on Elizabeth Island and would be elevated over the island.
- The eastern approaches would be elevated between the southern riverbank and the Pacific Highway because of flooding.

7.7.1 Grafton

North Street in this locality runs for about 1.6km from the river to Turf Street (the Summerland Way); the road reserve width is 40 metres.

There is a levee at the river end and two houses, one on the north side and one on the south. The house on the north is associated with farming. The house on the south is associated with the Council development, which includes a sewage treatment works, a parks depot, a waste transfer station and a recycling depot. None of those uses have access from North Street.

The road is a rough track, through land used for farming, between Duke Street and nearly to Morrison Street. From there to Turf Street (and beyond) it is a good bitumen road with wide drainage swales and numerous street trees.

From Morrison Street to Turf Street, on the south side, North Street is residential. There are 26 houses, mostly in average to good condition, in this section. On the north side there are 6 houses from just west of Challinor Street to Southgate Road; these houses are also in average to good

condition.

Between Southgate Road and Alummy Creek on the north side there are aged persons' units, St Marys and St Catherines. West of Alummy Creek there is Toohey's Brewery. Parts of this development are used for other purposes including warehousing and a section of TAFE. There is one house on the Copmanhurst Road corner.

7.7.2 Clarenza

As for Locality 4.

7.7.3 Elizabeth Island

Elizabeth Island is rural in character, with open forest. Access has been available by boat for many years. There would be no adverse effects from a land use viewpoint, arising from the construction of an elevated bridge, with support(s), over the island.