



**STRATEGIC GROWTH FRAMEWORK
TRANSPORT INVESTIGATIONS
WATERLOO CORNER & BOLIVAR**

CITY OF SALISBURY



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1. EXECUTIVE SUMMARY

CIRQA has been engaged by the City of Salisbury (through Holmes Dyer) to provide transportation advice for the development of a Strategic Growth Framework (herein referred to as the “Framework”) for the Waterloo Corner and Bolivar areas. The intention of the Framework is to provide Council and key Stakeholders with a suite of documentation to assist with the future release of land supply (via rezoning and redevelopment) within the Waterloo Corner and Bolivar suburban areas.

The study area is entirely located within the City of Salisbury’s Local Government Area (LGA), and comprises some 1,085 hectares of land, predominantly bound between Port Wakefield Road and the North-South Motorway, with additional land extending to the east and west at the study area’s northern end.

The study area’s current zoning predominantly facilitates low-intensity development, with localised pockets of higher- intensity development scattered throughout. However, key north-south roadways running adjacent and through the study area place restrictions on how current and future development is accessed from the wider transport network.

Liaison with key stakeholders (Department for Infrastructure and Transport and City of Salisbury) has identified the strategic importance of key roads within the study area, with desire expressed to preserve their current function and hierarchy. This is particularly relevant to Port Wakefield Road, which despite the recent construction and opening of the North-South Motorway to provide a higher order non-stop roadway, remains a route of strategic importance.

Taking into account feedback received, consideration was given to the study area, its existing road network and associated intersections to develop a desired infrastructure framework for the continued management of road assets. The framework seeks to provide direct allotment access via a combination of local and collector roads, with connectivity then provided via intersections with higher-order roads. Such intersection treatments should be managed appropriately with treatment to minimise impact on the operation of strategic roads, taking into consideration both existing and future traffic volumes, as well as geometric and operational characteristics (such as speed limit).

The framework also present opportunity to provide regional benefits to areas outside of the study area within both the City of Salisbury’s LGA as well as the City of Playford’s LGA. As such, continued liaison between both parties (as well as DIT) is considered crucial to ensure that appropriate infrastructure is provided to service the needs and demands associated with ‘unlocking’ future land supply.

Plans have been developed by Holmes Dyer in conjunction with the Project Team and City of Salisbury, to assist in providing guidance with regard to infrastructure requirements deemed appropriate to satisfactorily manage traffic volumes anticipated to be associated with future development.

On going liaison with DIT is also being undertaken concurrently (at the time of writing) in relation to the use of their Tactical Adelaide Model (TAM). The use of TAM will assist in ensuring the appropriate intersection arrangements are adopted within the study area without detrimentally impacting upon the operation of the existing road network.

Investigation of crash data has also identified existing crash issues at several key intersections adjacent the study area. Upgrades to such intersections may be required in order to ameliorate crash risks evident with existing traffic volumes as well as potential risks associated with increased development volumes.

In addition, development of the study area may also increase demands for public transport services. Further investigation into the potential for new and increased services are recommended.

Investigations into existing active transport networks have identified that key open space and north-south transport corridors within and adjacent the development have been provided within and adjacent the study area. It is recommended that future development includes connections to these corridors to ensure pedestrian and cyclist connectivity between the study area and the wider network.

2. BACKGROUND

The City of Salisbury's "*City Plan 2035*" identifies an action to develop a Structure Plan for a large portion of land (approximately 1,085 ha) located approximately 20 km north of Adelaide Central Business District. The land is generally bound between Port Wakefield Road and the North-South Motorway (the Study Area).

The intention of the Structure Plan is to enable its future rezoning to increase the supply of employment land within the outer northwest region of Adelaide. The proposal aligns with "*The 30 Year Plan for Greater Adelaide*", which identifies a portion of the study area as 'New Strategic Employment Lands'.

A significant factor relating to the need for a Structure Plan is the recent South Australian and Federal Government investments in the construction of the North-South Motorway (which was opened to traffic in 2020). The construction of the Motorway has dissected a number of local and collector roads with the City of Salisbury's Local Government Area (LGA), resulting in a redistribution of existing vehicle movements.

The Motorway also poses issues relating to the future development of land within the Study Area, given the newly introduced limitations associated with direct vehicle access and lack of connectivity with the remnants of the local road network (i.e. a number of roads are now cul-de-sacs).

Through preliminary investigations, the City of Salisbury has therefore identified the need for a 'Structure Plan' to define a suitable strategy for development staging and infrastructure improvements to support the viable and sustainable development of the Study Area. A plan illustrating the Study Area is attached to this report in Appendix A.

The land within the Study Area comprises the following zones as identified by the Planning and Design Code:

- Rural Zone;
- Deferred Urban Zone;
- Open Space Zone;
- Infrastructure Zone;
- Caravan and Tourist Park Zone; and
- Rural Horticulture Zone.

As noted above, portions of the study area are identified to be 'New Strategic Employment Lands' by "*The 30 Year Plan for Greater Adelaide*". Government,

Council and privately initiated Code Amendments are therefore anticipated to facilitate 'manufacturing', 'service', 'store', 'office' and 'retail' type activities. For the purposes of this report, the following total development yields are envisaged within the study area:

- **Manufacturing** - 183,000 m² of total floor area;
- **Service** - 254,850 m² of total floor area;
- **Store** - 405,300 m² of total floor area;
- **Office** - 35,925 m² of total floor area; and
- **Retail** - 35,925 m² of total floor area.

3. EXISTING TRANSPORT NETWORK

3.1 ROAD NETWORK

The existing road network within the study area comprises motorway, arterial, collector and local roadways. The roadways vary with regard to road authority, function, geometry and posted speed limit along with a range of other construction characteristics (i.e. seal type, drainage, roadside vegetation and environment etc.).

3.1.1 KEY ROADS

The study area includes the following key roads:

- The **North-South Motorway** is identified as a freeway under the care and control of the Department for Infrastructure and Transport (DIT). Adjacent the study area, the North-South Motorway comprises three traffic lanes in each direction, with sealed shoulders on each side. Traffic data obtained from DIT indicates that this section of the North-South Motorway has an Annual Average Daily Traffic (AADT) volume in the order of 51,600 vehicles per day (vpd), of which approximately 15% are commercial vehicles. A 110 km/h speed limit applies on this section of the North-South Motorway.
- **Port Wakefield Road** is identified as a highway under the care and control of DIT. Adjacent the study area, Port Wakefield Road comprises two traffic lanes and a bicycle lane in each direction, with sealed/unsealed shoulders on each side. Traffic data obtained from DIT indicates that this section of the Port Wakefield Road has an AADT volume in the order of 19,900 vpd, of which approximately 15% are commercial vehicles. A 90 km/h speed limit applies on this section of Port Wakefield Road.
- **Waterloo Corner Road** is identified as an arterial road under the care and control of DIT. Adjacent the study area, Waterloo Corner Road comprises a mixture of one to two traffic lanes in each direction, with sealed/unsealed shoulders on each side. Traffic data obtained from DIT indicates that this section of Waterloo Corner Road has an AADT volume in the order of 18,400 vpd, of which approximately 17.5% are commercial vehicles. A 70 km/h speed limit applies on this section of Waterloo Corner Road.
- **Heaslip Road** is identified as an arterial road under the care and control of DIT. Adjacent the study area, Heaslip Road comprises a single traffic lane in each direction, with sealed shoulders on each side. Traffic data obtained from DIT indicates that this section of Heaslip Road has an AADT volume in the order of 15,600 vpd, of which approximately 16.5% are commercial vehicles. A 70 km/h speed limit applies on this section of Heaslip Road.

- **St Kilda Road** is identified as a sub-arterial road under the care and control of the City of Salisbury. St Kilda Road comprises a single travel lane in each direction. An 80 km/h speed limit applies on St Kilda Road

It should be noted that, under the Integrated Transport and Land Use Plan for SA, the North-South Motorway is one of Adelaide's most important transport corridors. Recent investment by DIT has been focused on reinforcing and expanding the route as a non-stop corridor. Accordingly, no new intersections or interchanges along the North-South Motorway are envisaged (nor likely to be permitted) by DIT.

The North-South Motorway through the study area replaces Port Wakefield Road as the priority north-south corridor in this area. However, Port Wakefield Road remains an important arterial road and will remain listed as a 'controlled access road'. Such roads have implications for new site access arrangements, with intersection treatments requiring higher order treatments than typical lower order roads (particularly noting the current speed limit).

The new section of North-South Motorway through the study area has also severed a number of the existing east-west roads through the study area (including St Kilda Road), which further impacts upon permeability between the study area and the wider transport network.

Relevant to the study area, Table 1 illustrates the existing function of the key roads identified above, their respective theoretical capacity, existing daily traffic volumes and respective commercial vehicle percentages.

Table 1 – Designated function and capacity of key roads within the study area

Road Name	Designated Function	Theoretical Capacity	Existing Daily Traffic Volume	Commercial Vehicle %
North-South Motorway (South of Bolivar Int.)	Motorway	50,000+	53,900 (2020)	14%
North-South Motorway (Bolivar Int.)	Motorway	50,000+	46,200 (2020)	15%
North-South Motorway (Bolivar Int. to Waterloo Int.)	Motorway	50,000+	51,600 (2020)	15%
North-South Motorway (Waterloo Int.)	Motorway	50,000+	46,400 (2020)	14%
North-South Motorway (North of Waterloo Int.)	Motorway	50,000+	45,400 (2020)	14%
Port Wakefield Road (South of Bolivar Rd)	Highway	35,000+	25,800 (2020)	12.5%
Port Wakefield Road (Bolivar Rd to Burton Rd)	Highway	35,000+	19,900 (2020)	15%

Road Name	Designated Function	Theoretical Capacity	Existing Daily Traffic Volume	Commercial Vehicle %
Port Wakefield Road (Burton Rd to Waterloo Cnr. Rd)	Highway	35,000+	15,800 (2020)	15%
Port Wakefield Road (North of Waterloo Cnr. Rd)	Highway	35,000+	13,400 (2020)	14.5%
Bolivar Road (East of Pt Wakefield. Rd)	Arterial	20,000+	21,200 (2020)	3%
Bolivar Road (West of Pt Wakefield. Rd)	Major Collector	6,000 to 10,000	14,400 (2020)	6.5%
Waterloo Corner Road (East of Heaslip Rd)	Sub-Arterial	10,000 to 20,000	11,600 (2020)	8%
Waterloo Corner Road (Heaslip Rd to Pt Wakefield Rd)	Sub-Arterial	10,000 to 20,000	18,400 (2020)	17.5%
Waterloo Corner Road (West of Pt Wakefield Rd)	Major Collector	6,000 to 10,000	9,600 (2020)	19%
Heaslip Road (North of Waterloo Cnr. Rd)	Sub-Arterial	10,000 to 20,000	15,600 (2019)	16.5%
St Kilda Road	Collector	<6,000	N/A	N/A
Dunn Road	Collector	<6,000	N/A	N/A
Summer Road	Collector	<6,000	N/A	N/A
Robinson Road	Collector	<6,000	N/A	N/A
Anjanto Road	Local	<2,000	N/A	N/A

As illustrated in Table 1, key roads within the study area (for which traffic data is available and has been obtained) are generally operating within their respective capacities, relative to listed road function.

However, it is noted that Bolivar Road (west of Port Wakefield Road) is identified as a collector road, albeit has an existing daily traffic volumes of 14,400 vehicles per day (vpd). The general configuration of this section of Bolivar Road is akin to that of a sub-arterial road and therefore, the road is considered to currently operate satisfactorily.

Given the impacts of the North-South Motorway on the study area (dissecting a number of Council-owned roads), traffic data provided by Council is now largely out of date (collected pre North-South Motorway construction) and considered unsuitable.

It should also be noted that due to the location of the study area and the existing development composition (generally agricultural/horticultural and light industrial/commercial), key arterial roads generally comprise large percentages

of commercial vehicles (illustrated in Table 1). Above-average commercial vehicle percentages typically impede a road's ability to accommodate standardised traffic volumes (i.e. a road is unable to operate as satisfactorily as a road with a lower commercial vehicle percentage).

3.1.2 KEY INTERSECTIONS

The study area includes the following key intersections:

- The intersection of Port Wakefield Road, Bolivar Road and the Bolivar Interchange Connector Road is a four-way signalised intersection;
- The Bolivar Interchange facilitates both northbound and southbound entry and exit movements via the North-South Motorway, with appropriate acceleration and deceleration (on and off) ramps;
- The intersection of Port Wakefield Road and Summer Road is a standard T-junction in which Summer Road terminates. Movements into and out of Summer Road are restricted to left-in left-out and are treated with acceleration and deceleration lanes on Port Wakefield Road. Prior to the upgrade of Port Wakefield Road in 2009, this intersection operated as a priority-controlled five-way intersection between Port Wakefield Road, Summer Road, Jobson Road and Deuter Road in which Port Wakefield Road was assigned traffic priority;
- The intersection of Port Wakefield Road and Undo Road is a standard T-intersection in which Undo Road terminates. Movements into and out of Undo Road are restricted to left-in and left-out. Prior to the upgrade of Port Wakefield Road, all movements were permitted into and out of Undo Road (i.e. right turns were permitted);
- The intersection of Port Wakefield Road, Waterloo Corner Road and the Waterloo Corner Interchange Connector Road is a four-way signalised intersection;
- The Waterloo Corner Interchange facilitate exit and entry movements to and from (respectively) the northbound carriageway of the North -South Motorway, whilst only southbound entry (on) movements are permitted (i.e. no provision has been made at the interchange for exit movements from the southbound carriageway);
- The intersection of Port Wakefield Road and Dunn Road is a standard T-intersection in which Dunn Road terminates. All movements are permitted into and out of Dunn Road (including right turn movements);
- The intersection of Port Wakefield Road and Anjanto Road is a standard T-junction in which Anjanto Road terminates. Movements into and out of Anjanto Road are restricted to left-in, left-out and right-in;

- The intersection of Robinson Road and St Kilda Road is controlled by a single lane roundabout. This was installed as part of the North-South Motorway project;
- The intersection of Robinson Road and Barker Road is a standard T-intersection in which Barker Road terminates. All movements are permitted into and out of Barker Road;
- The intersection of Robinson Road and Anjanto Road is a standard T-intersection in which Anjanto Road terminates. All movements are permitted into and out of Anjanto Road. This intersection is located approximately 16 m north (centre to centre) of the intersection of Robinson Road and Barker Road; and
- The intersection of St Kilda Road and Coleman Road is a standard T-intersection in which Coleman Road terminates. All movements were permitted into and out of Coleman Road.

3.1.3 CRASH DATA (2016 TO 2020)

Crash data has been obtained from DIT for the five-year period from 2016 to 2020 (inclusive). The data indicates numerous crashes through the study area, with the far majority occurring on Port Wakefield Road. Notably, the data indicates that the following locations had the highest reported number of crashes of all key locations within the study area:

- Bolivar Road and Port Wakefield Road intersection (75 crashes);
- Waterloo Corner Road and Port Wakefield Road intersection (50 crashes); and
- Heaslip Road and Waterloo Corner Road roundabout (21 crashes).

Due to the recent opening of the North-South Motorway redistributing a high number of vehicle movements from Port Wakefield Road, it is anticipated that a large portion of these crashes would have occurred prior to the Motorway's opening in 2020. Notwithstanding, the redistribution of traffic is considered to only reduce the number of crashes (which have since occurred annually), but not impact upon the types of crashes relative to traffic scenario. Specifically, further review of available crash data found that:

- 'right angle' crashes were predominantly reported at locations where uncontrolled (i.e. priority controlled) right turns are permitted;
- a large number 'rear end' crashes were observed to be reported on approaches to signalised intersections and or roundabouts (where the major traffic movements are required to slow or stop); and

- 'side swipe' and 'hit fixed object' crashes were the predominant crash type reported at midblock locations between intersections and access points.

The predominant cause of all crashes is anticipated to be 'inattention', particularly due to the relatively simple nature of the existing road network throughout the study area.

3.2 PUBLIC TRANSPORT NETWORK

The following bus routes operate within or adjacent the study area (within 400 m):

- Route 900 - (Elizabeth Interchange to Salisbury);
- Route 411 - Salisbury to Mawson Interchange; and
- Route 411U -Salisbury to UniSA Mawson Lakes Campus.

The anticipated patronage along these routes is anticipated to be relatively low due to low density development and limited connections along the routes.

The nearest rail services are the Mawson Lakes, Greenfields and Parafield Gardens stations along the Gawler Rail Line (approximately 2-3 kilometres from the study area).

No (public) light rail services operate in the vicinity of the study area. The Adelaide Tram Museum operates historic tram carriages along 2 km of track at St Kilda on Sundays.

3.3 ACTIVE TRANSPORT NETWORK

Minimal footpath infrastructure is provided throughout the study area, with most roads having no pedestrian infrastructure at all. This is reflective of existing land uses within the study area, which generate relatively low levels of pedestrian activity.

Off-road shared use pedestrian and cyclist paths are provided along the Little Para River Trail (alongside Little Para River) and the Tapa Martinthi Yala path alongside the North-South Motorway.

Bicycle lanes are provided on both sides of Port Wakefield Road, Waterloo Corner Road and Robinson Road. No other on-street bicycle infrastructure is provided within the study area.

Strava heat mapping for all activities (including running and cycling) shows that the Little Para River Trail, Tapa Martinthi Yala path and Waterloo Corner Road-

Robinson Road-St Kilda Road link to St Kilda are the most utilised pedestrian and cyclist routes within the study area. The Strava heat map is included in Figure 1.

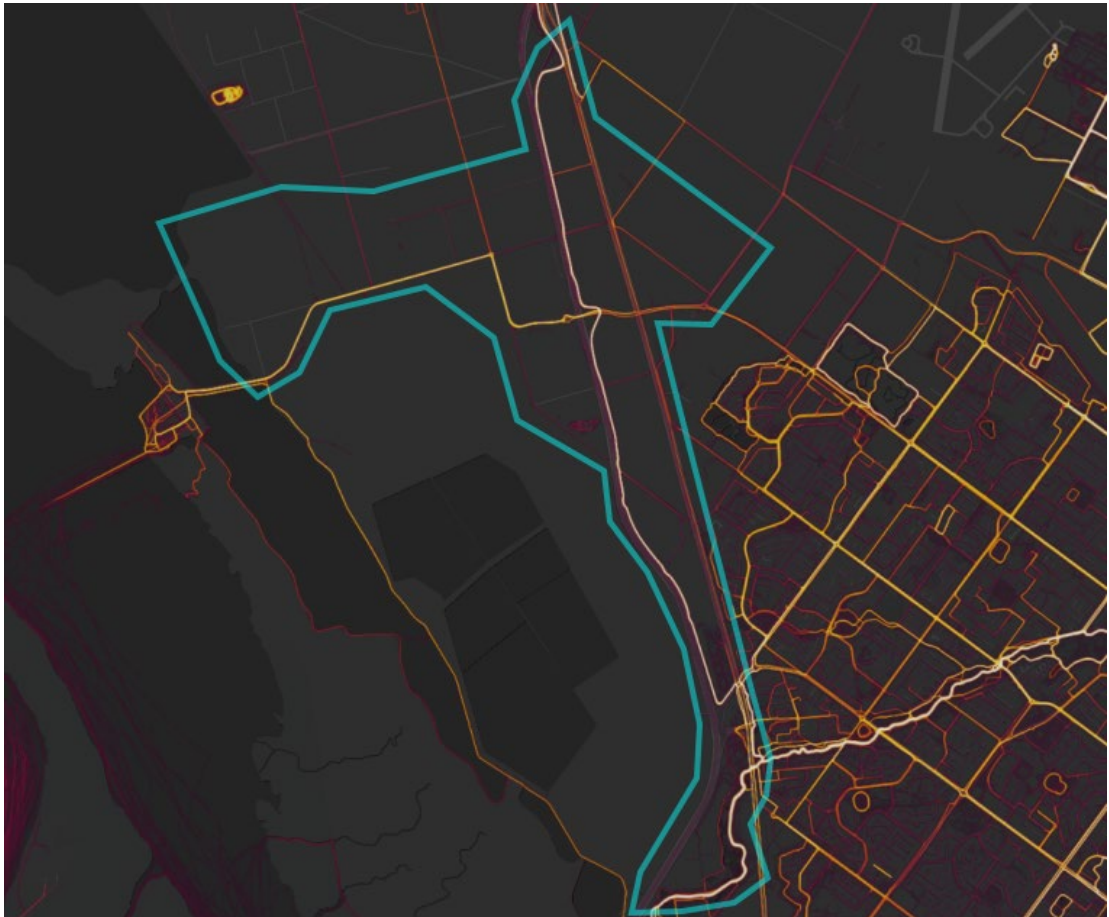


Figure 1 – Strava (all activities) heat map for the study area (outlined in blue) (Source: Strava Inc.)

4. FUTURE STUDY AREA DEVELOPMENT

4.1 ANTICIPATED DEVELOPMENT YIELD

For the purposes of the Strategic Growth Framework, the study area has been broken into four (4) precincts. Based upon information provided by Holmes Dyer, the precincts and their respective development catchment areas are as follows:

- **Precinct 1** (*southern*) – 26.6 ha development catchment area;
- **Precinct 2** (*central*) – 150.4 ha development catchment area;
- **Precinct 3** (*north-eastern*) – 113.3 ha development catchment area; and
- **Precinct 4** (*north-western*) – 218.3 ha development catchment area.

A plan illustrating the four key precinct areas (prepared by Holmes Dyer) is attached in Appendix A.

In order to facilitate future development, allowance had been made within each precinct for ancillary/supportive service such as road and stormwater infrastructure (both upgraded and new infrastructure). The allowance within each precinct has been determined to equate to approximately 40% of the total precinct development catchment area (based upon information provided by Holmes Dyer).

In addition, it is recognised that the remaining 'developable area' cannot be developed entirely as floor area as each site will require associated vehicle access, circulation, parking, and loading/service area. For the purposes of this assessment, the developable floor area has been assumed to be 30% of the developable site area.

As highlighted in Section 2, the study area is anticipated to be rezoned to primarily facilitate 'manufacturing', 'service', 'store', 'office' and 'retail' type activities. In order to enable high-level analyses of potential future traffic impacts and associated infrastructure requirements, anticipated land use floor areas have been divided between precincts.

Table 2 illustrates the breakdown of future development land uses between each of the four (4) key precincts.

Table 2 – Anticipated future development floor area relative to development precinct

Land Use	Precinct 1 (m ²)	Precinct 2 (m ²)	Precinct 3 (m ²)	Precinct 4 (m ²)	Total (m ²)
Manufacturing	9,600	54,000	40,800	78,600	183,000
Service	14,400	81,000	61,200	98,250	254,850
Store	19,200	108,000	81,600	196,500	405,300
Office	2,400	13,500	10,200	9,825	35,925
Retail	2,400	13,500	10,200	9,825	35,925
Total (m²)	48,000	270,000	204,000	393,000	915,000

Further information has also been provided by Holmes Dyer in regard to envisaged timeframes associated with the development of each precinct. Development precinct timeframes are as follows:

- **Precinct 1** (*southern*) – 1 to 5 years (2023 to 2028);
- **Precinct 2** (*central*) – 1 to 15 years (2023 to 2038);
- **Precinct 3** (*north-eastern*) – 10 to 20 years (2033 to 2043); and
- **Precinct 4** (*north-western*) – 20 to 35 years (2043 to 2058).

The above development timeframes are particularly important in relation to the upgrade of existing and installation of new infrastructure. The staggering of development by precincts will allow funds to be allocated to infrastructure appropriately as required, rather than a large quantity of infrastructure requirements simultaneously.

4.2 POTENTIAL TRAFFIC GENERATION & DISTRIBUTION

Using the development yields identifies in Table 2, potential traffic generation forecasts have been derived for each precinct. The traffic forecasts have been developed based upon the following traffic generation rates:

- **Manufacturing** (*factory*) – 5 daily trips per 100 m² of developable floor area;
- **Service** (*bulky goods*) – 17 daily trips per 100 m² of developable floor area;
- **Store** (*warehouse*) – 4 daily trips per 100 m² of developable floor area;
- **Office** (*office*) – 11 daily trips per 100 m² of developable floor area; and
- **Retail** (*retail*) – 67.4 daily trips per 100 m² of developable floor area;

It should be noted that the daily traffic generation rates applied to manufacturing, service, store and office activities have been adopted from the NSW Roads and Maritime Services' "Guide to Traffic Generating Developments" (and its subsequent updates). The retail daily traffic generation rate applied has been adopted based upon am and pm peak hour traffic generation data obtained from sites within South Australia, and assuming that a typical peak hour equates to 10% of the daily traffic generation.

Based upon the above, the following daily traffic generations are forecast for each precinct within the study area:

- **Precinct 1** (*southern*) – 5,580 daily vehicle movements;
- **Precinct 2** (*central*) – 31,388 daily vehicle movements;
- **Precinct 3** (*north-eastern*) – 23,715 daily vehicle movements; and
- **Precinct 4** (*north-western*) – 36,205 daily vehicle movements.

In total, complete development and occupation of the study area as envisaged above (Section 4.1) is forecast to generate in the order of 97,000 daily vehicle movements.

However, it should be noted that not all vehicle movements will utilise the existing external (arterial) road network. In reality, a portion of vehicles movements will be 'internal trips' within a precinct (i.e. from one local development site to another development site within the same precinct) and therefore will not result in an increase in movements on the external road network. For the purposes of this assessment, this has been referred to as a 'shared trip' factor.

Similarly, where a precinct has alternate access via means of a local and/or collector road (instead of the external arterial road network), vehicle movements may be redistributed. For the purposes of this assessment, this has been referred to as a 'local trip' factor.

As the land use mix and local road network connectivity varies by precinct, the shared and local trip factors will also vary by precinct. The degree of variation is however dependent on a number of precinct-specific variables including (but not limited to):

- the size of the precinct and potential development yield, considering composition and variety of land uses, both existing and future;
- existing frontage roads surrounding and dissecting the precinct;
- road network connectivity beyond the precinct, external to the study area;

- existing land uses and development sites captured within the various precincts; and
- location of the precinct relative to residential areas.

Based upon these variables, 'shared trip' and 'local trip' factors have been developed and applied to each precinct in order to forecast likely daily traffic volumes anticipated to utilise the external arterial road network. The varying factors applicable and result daily vehicle movements forecast relative to each precinct are illustrated in Table 3.

Table 3 – Daily vehicle movements taking into account 'shared trip' and 'local trip' factors.

Precinct	Shared Trip Factor	Local Trip Factor	Daily Vehicle Movements
Precinct 1	5%	0%	5,300
Precinct 2	15%	0%	26,675
Precinct 3	15%	20%	16,125
Precinct 4	15%	10%	27,700
Total			75,800

Due to the location of the study area and the adjacent road network, vehicle movements generated by the study area's redevelopment are forecast to be distributed largely to the existing arterial road network. While a piece of local road network will be utilised (whether new or existing within each precinct) during a vehicle trip, vehicle movements will ultimately utilise the existing arterial network for some portion of a trip.

Primarily due to the nature of the envisaged land uses and the location of the study area in relation to Adelaide's CBD and broader metropolitan Adelaide (i.e. located to the north of the CBD), vehicle movements are expected to generally occur in a north-south direction, utilising either Port Wakefield Road and/or the North-South Motorway. Appropriate vehicle access to and from these roads is therefore considered crucial to enable the study area's successful redevelopment.

To further assist with analyses of each precinct, for the purposes of a high-level traffic assessment, each precinct has been broken down into sub-precincts. The sub-precinct boundaries have generally been adopted based upon existing road alignments and newly developed sites (providing further dissection of the

precincts). A plan illustrating the sub-precincts adopted is attached in Appendix B.

Based upon approximate areas of each sub-precinct, traffic generated by a given (whole) precinct has been further refined and 'allocated' to sub-precinct development parcels (based upon sub-precinct area percentages). Consideration has also been given to the likely type of land use within each sub-precinct, based upon indicative zoning identified by Holmes Dyer. Traffic forecasts associated with each sub-precinct are illustrated in Table 4.

Table 4 – Sub-precinct traffic generation.

Precinct	Sub-Precinct	Daily Vehicle Movements
Precinct 1	1.1	1,925
	1.2	2,065
	1.3	1,310
Precinct 2	2.1	5,085
	2.2	5,025
	2.3	3,145
	2.4	3,200
	2.5	3,390
	2.6	1,635
	2.7	1,600
	2.8	1,895
	2.9	1,700
Precinct 3	3.1	5,210
	3.2	4,460
	3.3	6,455
Precinct 4	4.1	600
	4.2	4,680
	4.3	4,715
	4.4	4,385
	4.5	1,510
	4.6	2,900
	4.7	2,070
	4.8	615
	4.9	5,055
	4.10	1,170
Total		75,800

4.3 STAKEHOLDER DISCUSSIONS

4.3.1 DEPARTMENT FOR INFRASTRUCTURE AND TRANSPORT

The Department for Infrastructure and Transport (DIT) has care and control of a number of roads within the study area. As such, DIT has been identified as a key stakeholder in relation to the subject Strategic Growth Framework.

As identified in Section 4.2, redevelopment of the study area is forecast to generate in the order of 75,800 new daily vehicle movements on the existing road network. These movements will predominantly occur on DIT roads and, in particular, Port Wakefield Road due to acting as a 'spine' through the study area.

Discussions with DIT staff were held on Thursday 12 May 2022, where a number of factors relating to the long-term vision of key DIT roads were discussed. Of note, a number of key outcomes were determined from the meeting including:

- that despite the recent construction and opening of the North-South Motorway, Port Wakefield Road remains a critical piece of DIT's road network for both general vehicle access as well as freight connectivity. As such, it is understood that DIT has no intention to downgrade its current status as a 'highway' or 'controlled access road';
- Port Wakefield Road is currently subject to a speed limit ranging from 80 km/h to 90 km/h. Due to the current status of Port Wakefield Road and its current function as a 'highway', speed limit reductions below 80 km/h will not be considered;
- vehicle access to individual allotments should be sought by service, local and/or collector roads independent of Port Wakefield Road where possible. It is understood that new intersections with Port Wakefield Road will be considered where providing access to multiple allotments (i.e. not for the sole purpose of serving single allotments) and where appropriate traffic control is provided (relative to traffic volume and speed limit) in line with relevant Australian Standards and Guidelines;
- right turn movements at new and existing uncontrolled intersections should be limited/restricted in order to maximise safety of both the intersection and arterial road in which it intercepts. Such movements will typically only be considered where appropriate traffic control is provided (i.e. traffic signals, roundabout etc.) relative to traffic volume and vehicle fleet composition;
- direct access to/from the North-South Motorway will not be permitted in any form (including a new interchange); and
- the changing of road ownership (i.e. from a Council-owned road to a DIT-owned road) will be considered on a case by case basis. However,

traffic volumes should not form the sole basis of justification for the transfer of ownership and other factors (such as function and connectivity within DIT's network) should also be considered. Current transfer of ownership processes should also be adopted and followed should such an outcome be sought.

Due to the size of the study area and potential traffic implications which could be created from its redevelopment, DIT staff also recommended use of their newly developed Tactical Adelaide Model (TAM) to assist with the development of the Strategic Growth Framework. The use of TAM aims to test development and access scenarios in conjunction with the operation of the existing road network. However, due to the limited timeframe available, TAM was unable to be utilised to assist with development of the Framework at the time of writing.

Notwithstanding, due to the potential benefits in which TAM may provide, the City of Salisbury has agreed to continue investigations using TAM concurrently with development of this Framework report. A supplementary report outlining the TAM findings will be provided at a later date once analyses have been completed.

4.3.2 CITY OF SALISBURY

The City of Salisbury recognise the need to develop a strategy to manage road infrastructure upgrade requirements arising from development of the study area (and hence the engagement of CIRQA to assist in the development of the subject Strategic Growth Framework). This is predominantly driven by the complexities associated with the numerous land titles throughout the study area as well as the strategic importance of State infrastructure assets (such as the North-South Motorway and Port Wakefield Road).

Throughout numerous meetings with City of Salisbury staff, concerns were raised in regard to the suitability of the existing Council-owned road network and its ability to sufficiently service future development within the study area. Similarly, a site visit to the study area was also undertaken to highlight key areas of concern as well as commonalities of road infrastructure.

Discussions held with Council have identified the preference to rehabilitate and reuse existing road infrastructure where possible, rather than construct entirely new infrastructure (in particular, in relation to large infrastructure items such as intersections with DIT's road network and stormwater infrastructure). Consideration has therefore been given to this preference in the preparation of the Strategic Growth Framework.

Council also recognises the importance of maintaining the functionality and hierarchy of the arterial road network dissecting the study area. Where possible, it has therefore been sought to provide access to the arterial road network via

the use of local and/or collector road intersections (predominantly existing intersections) with access to allotments consolidated to such roads.

4.3.3 CITY OF PLAYFORD

The City of Playford border to the northern boundary and north-eastern corner of the study area (Precinct 3). Of particular relevance to this project is the potential for the future rezoning and development of land within the City of Playford LGA, to which vehicle access is also restricted. It is understood that this land comprises part of the area known as 'Greater Edinburgh Parks'.

The key Playford land is located within the suburb of Waterloo Corner and is bound by the Northern Expressway to the north, the Adelaide-Port Augusta Rail Line to the northeast, Heaslip Road to the southeast and Precinct 3 to the southwest. Should this rezoning of this land be undertaken, traffic generated by its future redevelopment would likely be distributed to Heaslip Road (via either Huxtable Road or Mill Road, the latter of which bounds the north-eastern edge of Precinct 3), and through Precinct 3 via Greyhound Road.

It is understood that the City of Playford was contacted for comment in relation to the intention and timeframe for future development of this portion of land ('Greater Edinburgh Parks'). However, it is also understood that the City of Playford is (at the time of writing) still undertaking investigative works in relation to potential development yields. As such, comment in relation to traffic generated by the land's potential redevelopment could not be made, nor could discussion with respect to potential road and intersection upgrades be undertaken. On this basis, it is recommended that future liaison be undertaken with the City of Playford be undertaken once further vision for the land has been developed.

4.4 GENERAL DISCUSSION

Following liaison with key stakeholders, CIRQA and Holmes Dyer (in conjunction with Greenhill Engineers) met to develop a series of road and stormwater infrastructure concept plans to form the basis of Strategic Growth Framework and guide development of the study area. The plans prepared by Holmes Dyer (attached in Appendix C) illustrate various intersection arrangements with key DIT road infrastructure as well as new and upgraded internal service roads (within the various precincts) to provide direct access to development allotments.

Commentary in relation to the development of the concept plans relative to each precinct is outlined in Sections 4.4.1 to 4.4.4 below. Further discussion regarding the DIT's arterial road network and potential public and active transport opportunities has also been provided.

4.4.1 PRECINCT 1

As illustrated in Appendix C, Precinct 1 is bound by Port Wakefield Road to the east, Globe Derby Park and the Little Para River to the south, the North-South Motorway to the west and Precinct 2/Jobson Road to the north. Both Bolivar Road and Hodgson Road dissect through the centre of Precinct 1, with existing development (such as the Bolivar OTR and Highway 1 Caravan & Tourist Park) creating further segregation and limiting the ability to consolidate access along site frontages.

Precinct 1 is also generally narrow, with allotments ranging from 170 m to 200 m (approximate) in depth. The shallow allotment depth creates further implications with achieving access via lower order roads (i.e. lower than Port Wakefield Road, such as Hodgson Road) due to the proximity of intersections and their associated treatments (i.e. the separation distance between existing intersections is inadequate to facilitate large intersections associated with new development parcels).

Due to the combination of factors above, vehicle access to Precinct 1 will largely be required to be provided directly via Port Wakefield Road. Where possible and appropriate, access should be consolidated between development sites (both existing and new development).

Vehicle access to Precinct 1 (via Port Wakefield Road) will also need to consider its interaction with existing intersections on the eastern side of Port Wakefield Road. While there is expected to be a strong demand for vehicle movements to/from the south, new access/intersections should generally be restricted to left-in and left-out only in order to minimise their impact on the operation of Port Wakefield Road.

Associated commercial movement demands for movements to/from the south are expected to be low from development located within Precinct 1. As such, the formalisation of movements directly from the precinct to the south (i.e. right turn movements onto Port Wakefield Road) can be accommodated via the use of the existing road network's permeability (i.e. a driver exiting from the southern portion of Precinct 1 could utilise the Bolivar Interchange roundabout to undertake a U-Turn to head south on Port Wakefield Road or, alternatively, use the North-South Motorway).

Of particular note, sub-precinct 1.2 and 1.3 should be access via a sole access point on Port Wakefield Road (with connectivity to sub-precinct 1.2 provided across 1.3 and a future connection across Little Para River). This is due to the location of the 'heavy vehicle checking station' on Port Wakefield Road direction adjacent sub-precinct 1.3 and DIT's desire to retain this land for its continued use.

The location of the nearby OTR deceleration lane, Little Para River culvert (beneath Port Wakefield Road) and Globe Derby Park acceleration lane further restrict available access opportunities.

With regard to sub-precinct 1.1, access may be achieved via the existing left-in/left-out on Port Wakefield Road (with retention of existing turning restrictions), currently providing access to the adjacent parking bay. Further access may also be provided via connectivity to Jobson Road (north of sub-precinct 1.1), particularly with reference to right turn movements for southbound traffic (generated within sub-precinct 1.1).

4.4.2 PRECINCT 2

Similarly to Precinct 1, Precinct 2 is bound by Port Wakefield Road to the east and the North-South Motorway to the west. At its southern end, Precinct 2 borders with Jobson Road (and Precinct 1 beyond), while its northern end is defined by the City of Salisbury's LGA boundary with the City of Playford.

It should be noted that the City of Playford's land immediately north of Precinct 2 is also 'land locked' by Port Wakefield Road and the North-South Motorway, albeit also to the north. As such, access is only possible via the east (Port Wakefield Road) or the south (Precinct 2).

As above in Section 4.2, for the purpose of this assessment, Precinct 2 has been divided into sub-precincts, with associated boundaries predominantly defined by existing roads dissecting the parcel. However, unlike Precinct 1, vehicle access to multiple sub-precinct areas is able to be consolidated in several locations in order to minimise impacts upon the operation of Port Wakefield Road. This is due to sub-precincts only being dissected by local ('No Through') roads as opposed to major arterial roads.

The consolidation of vehicle access between sub-precincts will however rely upon interconnectivity being created in a general north-south direction, providing localised access to individual allotments. This is proposed to be achieved via the creation of a new local collector road parallel to the North-South Motorway, directly adjacent (and potentially utilising a portion of) its road reserve (i.e. a new local collector road will act as a 'service road'). The concept of a new local collector road is predominantly applicable to interconnectivity between sub-precincts 2.1, 2.2 and 2.3, and 2.5 and 2.6 whereby existing local road connections facilitate access to/from Port Wakefield Road.

With regard to the sub-precinct 2.1, 2.2 and 2.3 'bundle', vehicle access would be provided via the intersection of Anjanto Road with Port Wakefield Road in its current form (priority-controlled intersection, facilitating left and right turn

movements into Anjanto Road, and left turn movements onto Port Wakefield Road).

Vehicle access would also be provided via the intersection of Dunn Road with Port Wakefield Road. This intersection is currently priority-controlled, at which all turning movements are permitted. However, with further development within Precinct 3 on the eastern side of Port Wakefield Road (further discussion below), opportunity would exist to install a signalised four-way intersection in this location (connecting with Greyhound Road east of Port Wakefield Road).

The installation of a signalised intersection would provide for the safe accommodation of right turn movements from sub-precincts 2.1, 2.2 and 2.3, and the Playford LGA land to the north of Precinct 2, as well as to and from Precinct 3. In addition, whilst detailed information is unknown, the installation of a signal in this location would provide opportunity for connectivity between the Playford LGA land northeast of Precinct 3 (which otherwise would be accessed via Heaslip Road) and a major arterial road (to which access is ultimately desired).

Further adding emphasis for the benefit of a signalised intersection is the ability for land to be developed (as intended) for commercial/light industrial uses, where higher commercial vehicle volumes are expected. The installation of a signalised intersection would readily increase the ability to access the broader road network directly (particularly in relation to right turn movements), without reliance upon its permeability which would otherwise be relied upon (i.e. without redistributing traffic via adjacent intersections and, potentially, creating additional traffic impacts).

The installation of this infrastructure would also allow right turn movements at the Anjanto Road intersection to be removed at a future point in time, in the event that the movement became oversaturated by development. The signalised intersection would therefore 'future proof' access to this area of the study area.

With regard to sub-precincts 2.5 and 2.6, a similar (new) local collector road (adjacent the North-South Motorway) would provide connectivity between individual allotments and existing local roads connecting to Port Wakefield Road (such as Undo Road and Summer Road).

Subject to the new local collector road being created, the intersection of Undo Road with Port Wakefield Road would be proposed to be retained in its current left-in/left-out only form, albeit supplemented with a U-turn facility (for northbound traffic to undertake a U-turn to travel south). Further access to sub-precincts 2.5 and 2.6, as well as 2.7, 2.8, 2.9 and 1.1 would then be provided via the installation of a second signalised intersection at Summer Road (with Port Wakefield Road).

While the installation of an additional signalised intersection would have less regional benefit than the proposed signalised intersection of Dunn Road and Greyhound Road (due to the limitation of developed land on the eastern side of Port Wakefield Road, and boundaries between Strategic Employment and General Neighbourhood zones where vehicle permeability is not considered appropriate), the signal would facilitate right-turn movements to and from the subject land enabling its successful redevelopment. This is again particularly relevant to commercial vehicle movements which would otherwise be unable to successfully (and safely) undertake right turn movements to/from Port Wakefield Road.

With regard to sub-precincts 2.4 and 2.5, it is recognised that such areas may be developed with higher-intensity land uses (such as retail and bulky goods uses). In order to further facilitate vehicle movement (and reduce dependency on Port Wakefield Road intersections), additional left-in and left-out access points could be considered on Waterloo Corner Road (noting an average allotment depth of 400 m to 480 m within Precinct 2). However, due to the proximity of Waterloo Corner Interchange and the Waterloo Corner Road/Port Wakefield Road intersection, additional vehicle movements (i.e. right turns) in this location should not be permitted.

4.4.3 PRECINCT 3

The study area also incorporates a portion of land located on the eastern side of Port Wakefield Road, referred to as Precinct 3. The land is bound by the City of Salisbury's northern LGA boundary (with the City of Playford), Heaslip Road to the southeast, Waterloo Corner Road to the south and Port Wakefield Road to the west.

The land is generally undeveloped (used for horticultural purposes) and is dissected by Mumford Road and Greyhound Road (creating sub-precincts 3.1, 3.2 and 3.3). Allotments located within Precinct 3 are generally substantially larger than all other precincts within the study area, thereby enabling the consolidated access with the existing road network.

As noted above in Section 4.4.2, development of the subject area would significantly benefit from the installation of a signalised intersection with Port Wakefield Road where Dunn Road and Greyhound Road intersect. This would also result in broader regional benefit to development within the City of Salisbury (particularly Precinct 2) and the City of Playford.

Via the use of Mumford Road and/or Mill Road (or potential internal road connections within Precinct 3 allotments), the signalised intersection may also assist to alleviate existing traffic pressures at surrounding arterial road

intersections. Of note, the Heaslip Road/Waterloo Corner Road roundabout is understood to currently be operating at capacity (or very close to), with an above average percentage of commercial vehicles traversing through on a daily basis. An additional signalised intersection on Port Wakefield Road (with appropriate connectivity to Heaslip Road) may therefore assist in improving its operation.

Similar to sub-precinct 2.4 and 2.5, sub-precinct 3.3 is also expected to comprise higher intensity land uses (such as retail, office and bulky goods), resulting in the potential generation of large traffic volumes. Vehicle access to this sub-precinct should also be supplemented via additional connectivity to Waterloo Corner Road. This could be either in the form of a service road (with ingress at the western end and egress at the eastern end) or a new controlled four-way intersection with Angle Vale Crescent on the southern side of Waterloo Corner Road (either an additional roundabout or signalised intersection).

With regard to the former option, utilisation of a service road access arrangement would likely place increased reliance upon the Heaslip Road/Waterloo Corner Road roundabout in the form of U-turn movements (i.e. eastbound movements on Waterloo Corner Road undertaking a U-turn in order to access Port Wakefield Road). Such an arrangement may therefore not be desirable from a capacity perspective, with further modelling analyses required.

While the proposal to construct a controlled four-way intersection on Waterloo Corner Road would require further liaison with DIT (due to proximity between the intersections with Port Wakefield Road and Heaslip Road), the intersection would provide benefit to sub-precinct 3.2 and 3.3, whilst also decreasing reliance upon the Heaslip Road/Waterloo Corner Road roundabout. A four-way intersection would also assist in providing additional access opportunities for existing allotments south of Waterloo Corner Road, and increasing safety at the intersection with Angle Vale Crescent (as opposed to the current priority-controlled T-Intersection).

It is however understood that additional access (particularly ingress) may be desired directly from Port Wakefield Road for development within sub-precinct 3.3 (due to the higher intensity land uses envisaged). Additional access provisions directly via Port Wakefield Road should be considered on a case-by-case basis, with access points consolidated where possible.

4.4.4 PRECINCT 4

Precinct 4 comprises land located on the western site of the North-South Motorway, which would have previously been accessed via local roads connecting to Port Wakefield Road prior to the Motorway's construction. The precinct is bound by the City of Salisbury's northern LGA boundary, the

North-South Motorway to the east, land use by SA water to the southwest, and defence land to the west (with St Kilda beyond).

The land with Precinct 4 is predominantly used for agricultural and horticultural purposes, resulting in comparatively low levels of existing traffic generation relative to land sizes.

Of particular note, vehicle access to and within Precinct 4 is predominantly provided via a 'spine' road network comprising of Robinson Road (north-south) and St Kilda Road (east-west). The two roads intersect at a four-way roundabout constructed as part of the North-South Motorway project.

Due to the alignment of the North-South Motorway, connectivity to Precinct 4 is limited with major access provided only via the Waterloo Corner Interchange. Minor (local) vehicle access is also provided via Robinson Road, Colemand Road and Brooks Road to the north of Precinct 4, however provides minimal connectivity to major arterial roads (particularly for southbound vehicles). Use of access options to the north of Precinct 4 is considered circuitous and illogical to support development envisaged.

Due to the size of Precinct 4 and the anticipated generation of 27,700 daily vehicle movements, detailed traffic modelling analyses will be required to be undertaken for the Waterloo Corner Interchange to ensure its continued satisfactory operation. This is particularly relevant to the roundabout on the western side of the motorway and the T-intersection on the eastern side of the motorway.

The addition of such volumes forecast would be expected to trigger upgrade of Waterloo Corner Road (across the North-South Motorway) beyond its current single-lane (in each direction) configuration.

The 'spine' road network within Precinct 4 is generally considered appropriate to facilitate vehicle access to the various allotments throughout. However, both Robinson Road and St Kilda Road will also likely require upgrade from a 'collector road' classification to a 'sub-arterial road' or 'arterial road' (dependant on final development traffic volume outcomes). This will involve widening of the existing carriageways to provide additional trafficable width in line with the City of Salisbury's standard road cross-section.

The intersection of Robinson Road and St Kilda Road will also likely require upgrade to increase its operational capacity. Give that property boundaries are currently located within very close proximity to the roundabout, compulsory land acquisition will be required (detail on the extent of acquisition will be required to be determined with further detailed traffic modelling analyses).

4.4.5 EXTERNAL ROAD NETWORK

Through continual development and intensification of land uses within the various precincts, continually increased traffic volumes will be realised on the existing 'spine' road network dissecting the study area. In particular, Port Wakefield Road will likely experience a large increase in traffic volumes upon full development of the study area as envisaged by the Strategic Growth Framework. However, Port Wakefield Road is a major arterial road (classified as a 'highway') with adequate capacity to accommodate additional volumes (taking into account the likely dissipation of volumes via the permeability of the network).

Lower order roads such as Waterloo Corner Road, Heaslip Road and Bolivar Roads are expected to be more heavily impacted with regard to percentage growth of traffic volumes, despite their location relative to the study area being at the extremities. This may result in the need for road carriageway upgrades (i.e. additional lanes) to accommodate the future growth.

Of key importance are the various intersections on the external road network, via which direct access to/from the study area is not provided albeit related vehicles will utilise. Such intersections include:

- Waterloo Corner Road Interchange;
- Bolivar Interchange;
- Port Wakefield Road/Waterloo Corner Road;
- Port Wakefield Road/Bolivar Road;
- Port Wakefield Road/Hodgson Road;
- Waterloo Corner Road/Heaslip Road; and
- St Kilda Road/Robinson Road.

In the event that the capacity of any of the above intersections is exceeded (particularly the interchanges and those with Port Wakefield Road), the road network will likely 'throttle' vehicle movements. This will not only impact upon study area-related vehicles, but also regional (external) movements passing through the study area. Given the importance of the strategic routes within the study area, detailed analyses of external intersections will be required to be undertaken in addition to directly impacted intersections as development of the various precincts occurs.

Due to time constraints associated with the delivery of the Strategic Growth Framework, detailed intersection analyses have not been undertaken by CIRQA. However, as noted in Section 4.3.1, the City of Salisbury has agreed to use DIT's newly created TAM to determine potential traffic impacts and possible external

(arterial) road upgrade requirements arising from the realisation of development within the study area.

It is reiterated that DIT's 'TAM' is being utilised concurrently with the preparation of this report, however modelling output is not yet available. An iterative process between CIRQA and DIT will be undertaken to ensure that key objectives of the Strategic Growth Framework are achieved (i.e. unlocking future development land supply) whilst maintaining the satisfactory operation of DIT's road network. A supplementary report outlining the findings and outcomes of the TAM analyses will be provided at a later date once complete.

Notwithstanding the need for analyses, direct access to the study area has been determined with the intention to minimise impact upon the operation of the strategic road corridors and arterial roads based upon the best available data and knowledge at the time of writing.

4.4.6 PUBLIC TRANSPORT OPPORTUNITIES

There is currently low demand for public transport services due to low density of development within the study area. Future demand may increase as development intensifies, however the expected increase in demand is relatively low because the land uses proposed within the study area are not typically associated with high public transport patronage.

It is recommended that public transport services are reviewed as development progresses to minimise private vehicle dependence, particularly for employees and customers of commercial sites. Further to this, it is recommended that these services focus on arterial corridors to maximise patronage.

4.4.7 ACTIVE TRANSPORT OPPORTUNITIES

Similar to the above discussion on public transport, there is currently low demand for active transport facilities due to low density of development within the study area. Future demand for walking and cycling infrastructure will likely increase as development intensifies, however demand may be limited as land uses proposed for the study area are not associated with high levels of walking and cycling activity.

There are a number of corridors within the study area that cater for pedestrian and cycling demand from outside the study area (i.e., St Kilda Road) and it is recommended that improvements to walking and cycling infrastructure along these routes are undertaken as development progresses. It is also recommended that localised bicycle treatments (i.e., bike lanes) be provided on arterial roads within the study area to strengthen cycling connections for recreational, commuter and customer use.

New walking and cycling paths through the study area should follow linear open space (i.e., waterways) and motor vehicle corridors to provide continuous connections.

5. TRANSPORT NETWORK PRINCIPLES & PLANNING POLICY CONTROLS

The general principles for access between the study area and the existing road network are as follows:

- New connections to the North-South Motorway, as an established non-stop transport corridor, are not supported.
- Access between development precincts and arterial roads such as Port Wakefield Road and Waterloo Corner Road should be facilitated via service roads and not direct access to those arterial roads.
- Service roads should be left-in/left-out only and equipped with acceleration/deceleration lanes (designed in accordance with relevant Austroads' criteria, relative to the posted speed limit).
- Consideration by DIT of a reduction of the Port Wakefield Road speed limit would assist in reducing the level of infrastructure improvement required on Port Wakefield Road, as well as assisting in achieving better safety outcomes (i.e., for uncontrolled right turns from side/service roads).
- U-turn lanes may be used to facilitate turning in Port Wakefield Road where right turns are not supported at intersections.
- The typical road hierarchy within the study area will provide Sub-arterial or Collector Road access to Port Wakefield Road and Waterloo Corner Road. Collector Roads would then link to Local Roads.
- Shared Use Pedestrian/Cyclist network should align with stormwater and open space corridors and adjacent arterial corridors in order to maximise the efficiency of the space.
- Collector Roads should be designed with facilities for pedestrians and cyclists and for future public transport provision.
- Port Wakefield Road is gazetted for road trains, so consideration should be given to extending road train access to designated precincts of land with Strategic Employment zoning. The precinct bounded by Heaslip Road, Waterloo Corner Road and the North-South Motorway may be most suitable for provision of new roads for gazettal.
- Consideration should be given to the increase in public transport services throughout the study area, noting existing services are limited. Alternate transport offering (to motor vehicle) are likely to assist in reducing associated traffic volumes on the surrounding road network.

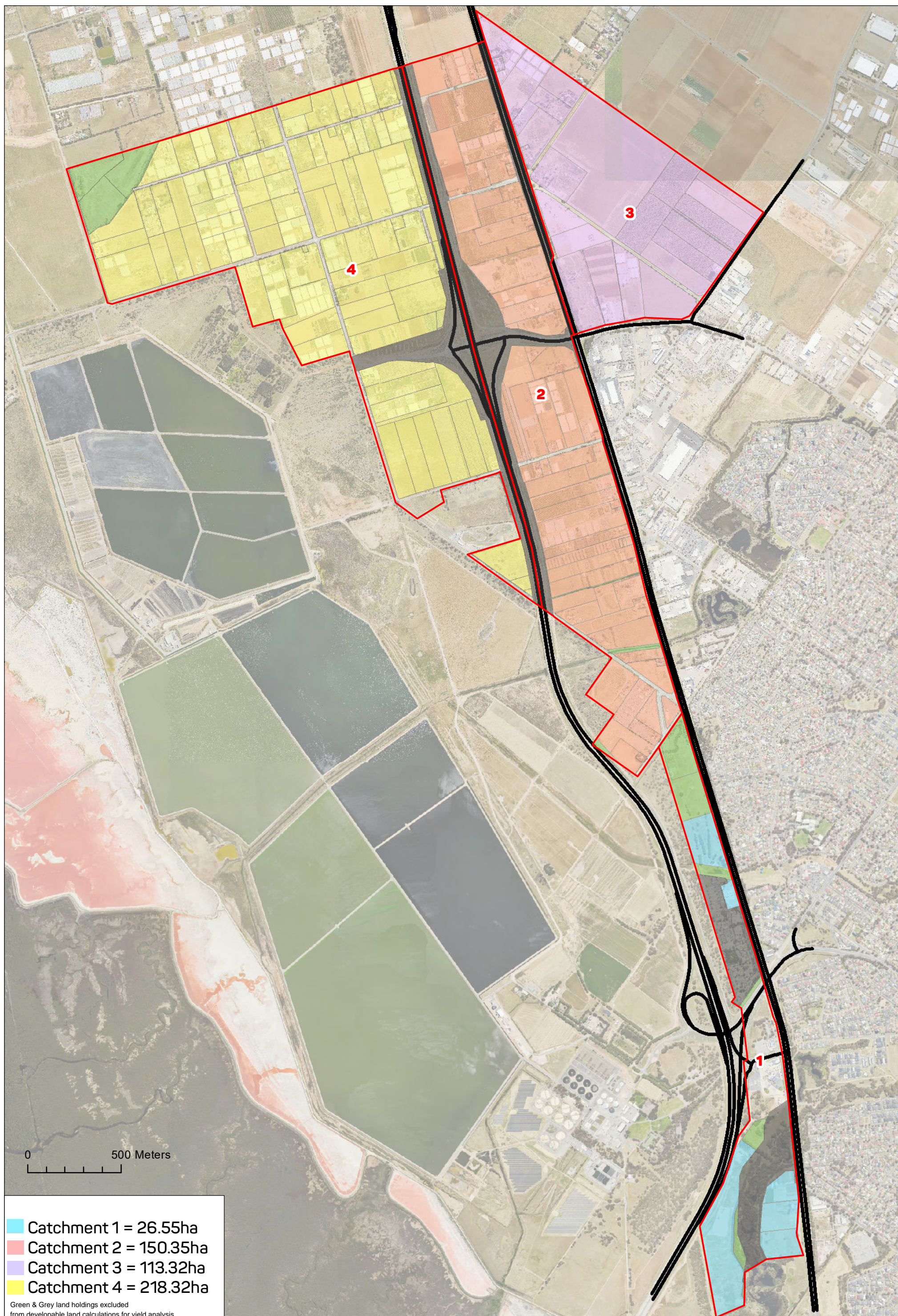
The planning policy controls to facilitate implementation of the general principles above are as follows:

- Future Local Road Widening Overlay (applicable to Council-owned roads);
- Future Road Widening Overlay (applicable to DIT-owned roads);
- Major Urban Transport Routes;
- Non-stop Corridor Overlay;
- Traffic generating development overlay; and
- Major urban transport routes.

Additional legislative requirements may also be applied as needed to ensure adequate land is available. This includes the Metropolitan Road Widening Plan (MARWP) which is typically reflected on land titles.

APPENDIX A

STUDY AREA & PRECINCT PLAN



APPENDIX B

SUB-PRECINCTS ADOPTED FOR TRAFFIC ANALYSES



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DRAWING AMENDMENTS

REV	DATE	DESCRIPTION	DWN	CHK
A	15/06/2022	FOR DISCUSSION	ABH	TAW

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STRATEGIC GROWTH FRAMEWORK
WATERLOO CORNER & BOLIVAR
SUB-AREA LOCATIONS

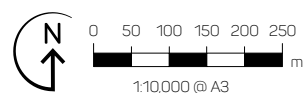
PROJECT # 21611 SHEET # 01_SH01

APPENDIX C

STRATEGIC GROWTH FRAMEWORK INFRASTRUCTURE PLANS

DETAIL AREA - NORTH

Strategic Growth Framework - Bolivar/Waterloo



HOLMES DYER

Employment Zones

Strategic Employment

Infrastructure Zones

Infrastructure

Natural Resources and Environment Zones

Recreation

Rural Zones

Rural Horticulture

Rural

Legend

Stormwater Detention Basin

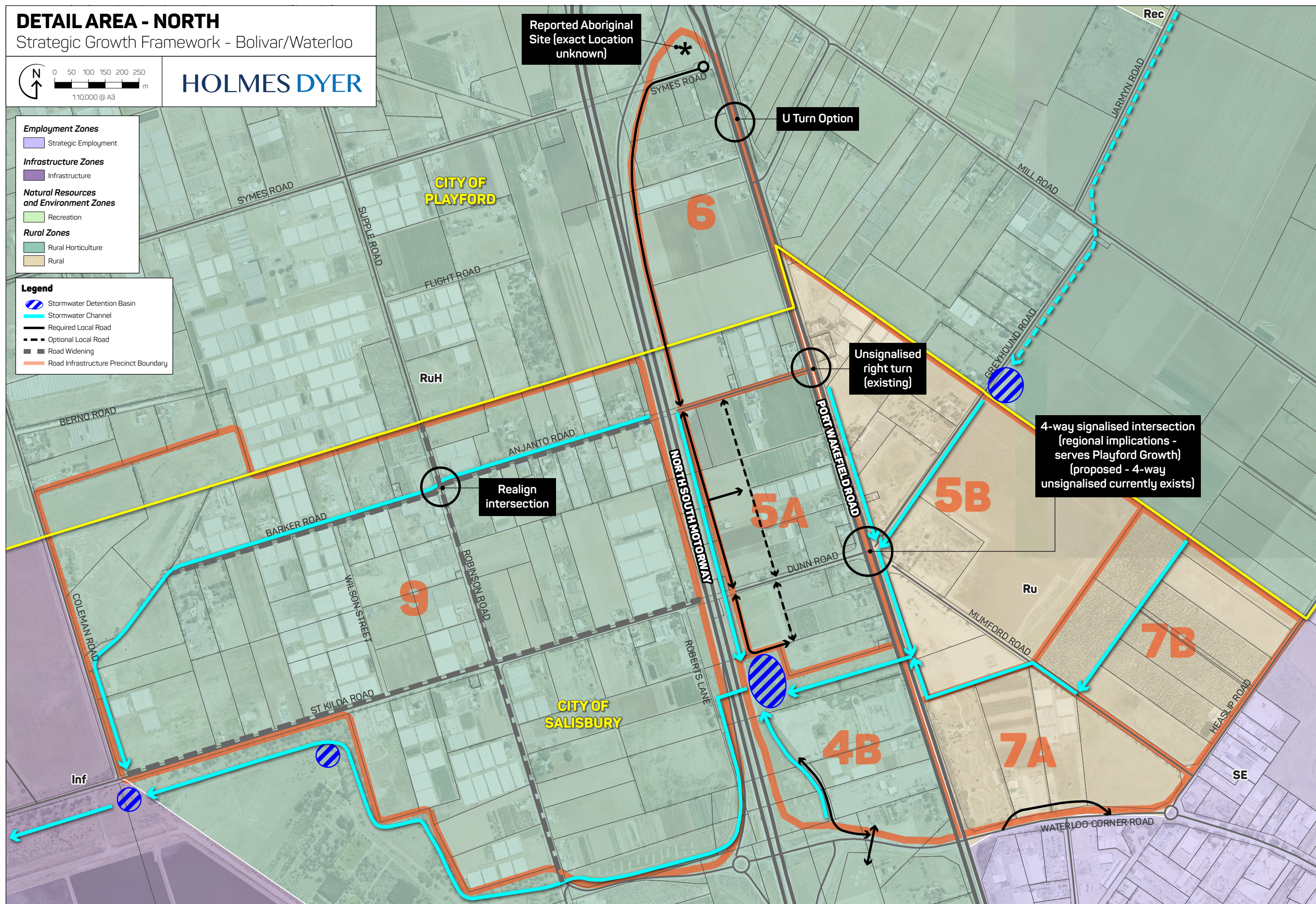
Stormwater Channel

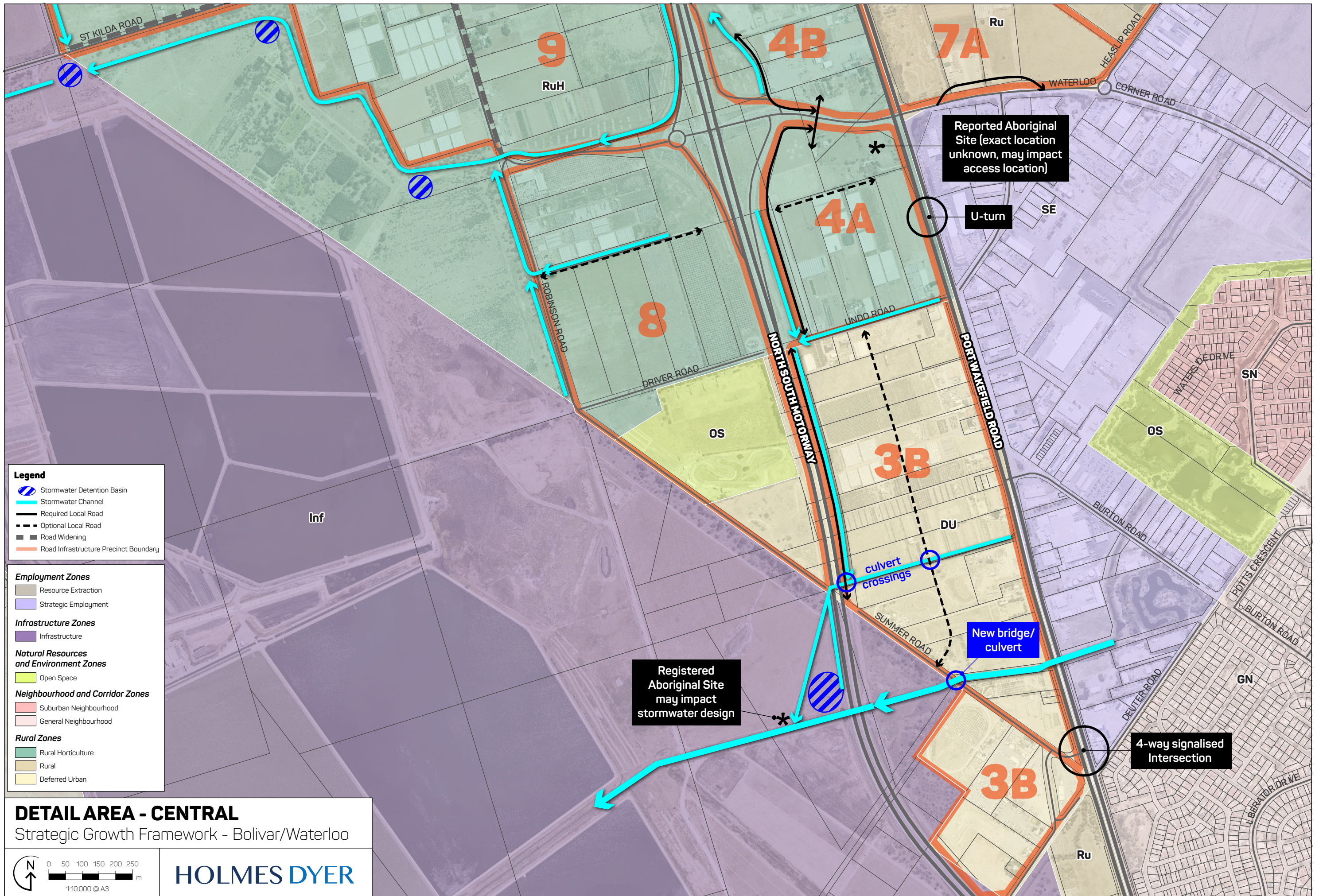
Required Local Road

Optional Local Road

Road Widening

Road Infrastructure Precinct Boundary





Legend

- Stormwater Detention Basin
- Stormwater Channel
- Required Local Road
- Optional Local Road
- Road Widening
- Road Infrastructure Precinct Boundary

Employment Zones

- Resource Extraction
- Strategic Employment

Infrastructure Zones

- Infrastructure

Natural Resources and Environment Zones

- Open Space

Neighbourhood and Corridor Zones

- Suburban Neighbourhood
- General Neighbourhood

Rural Zones

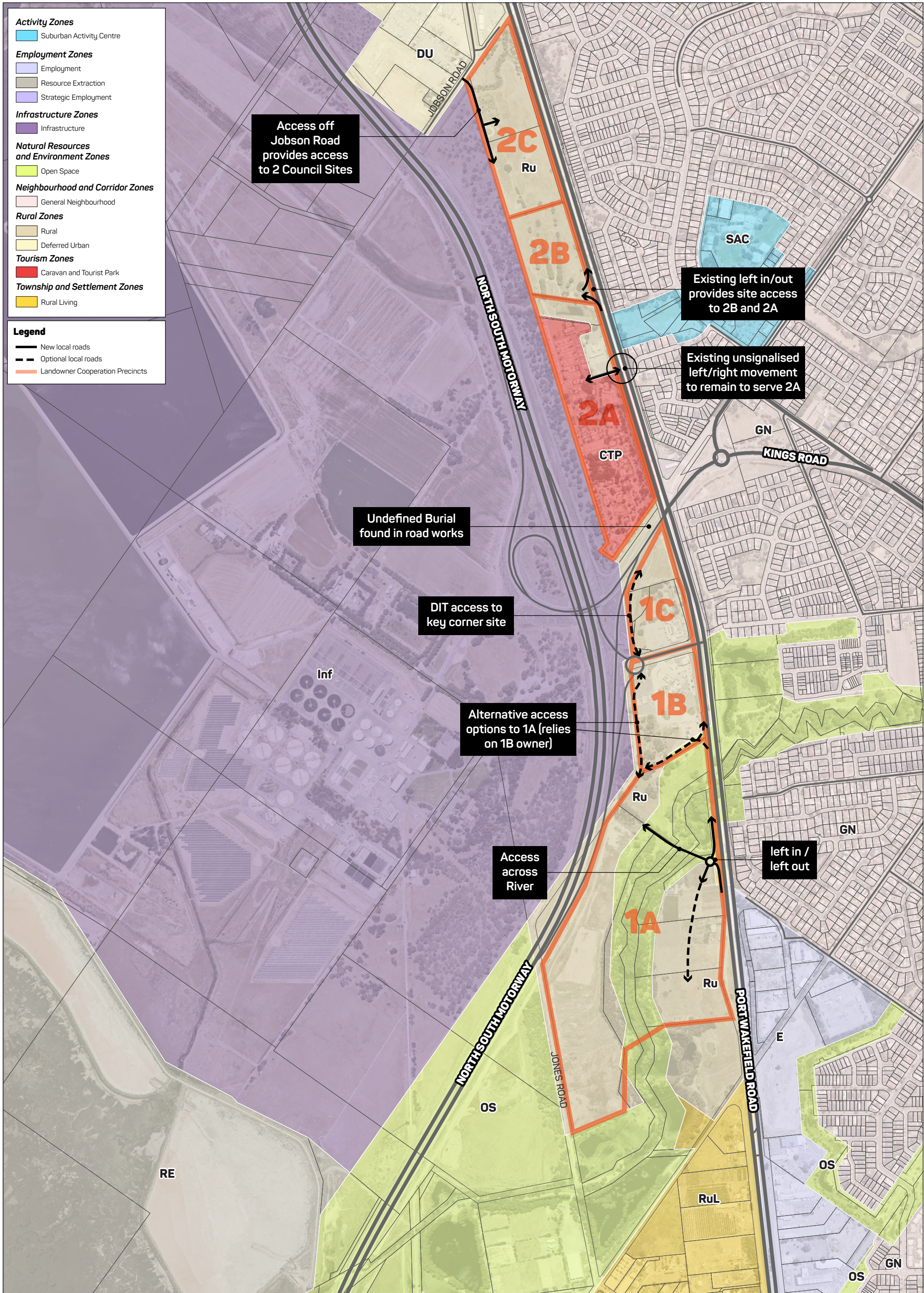
- Rural Horticulture
- Rural
- Deferred Urban

DETAIL AREA - CENTRAL
Strategic Growth Framework - Bolivar/Waterloo

HOLMES DYER

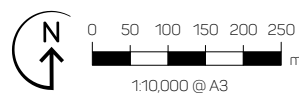
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DETAIL AREA - SOUTH

Strategic Growth Framework - Bolivar/Waterloo



HOLMES DYER