ATTACHMENT BOOKLET

ORDINARY COUNCIL MEETING

31 MARCH 2021

LIVERPOOL CITY COUNCIL

LIVERPOOL THE GREAT SOUTH WEST

FRANCIS GREENWAY CENTRE,
170 GEORGE STREET,
LIVERPOOL

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Planning Proposal

Liverpool LEP 2008 Amendment 75 – Rezoning and amended development standards for certain lands in the Austral and Leppington North Precincts

July 2020 (Post-Exhibition)

LIVERPOOL CITY COUNCIL

LIVERPOOL THE GREAT SOUTH WEST

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Background

Following an extensive precinct planning exercise, the Austral and Leppington North Precincts were rezoned by the Department of Planning and Environment in March 2013, and the East Leppington Precinct was rezoned in August 2014. The rezoning of the precincts were accompanied by new land-use zoning maps under the State Environmental Planning Policy (Sydney Region Growth Centres) 2006, the Liverpool Growth Centres Precincts Development Control Plan (including Schedules 1-3), and the respective precinct Indicative Layout Plans (ILPs).

The planning package put forth the statutory planning controls and guidelines to facilitate the development of the precincts for residential development, along with the establishment of: the Leppington major centre, lower order centres, new schools, open space and community facilities, a storm water drainage network, and improved road and public transport infrastructure.

Since the precincts were rezoned, a number of issues have arisen which will impact upon the implementation of the vision for the precicnts. It was decided that Council would prepare a single amendment to address all of these concerns in a single package. A brief summary of these issues are given below:

1. The ILP/DCP road layout does not result in optimal development outcomes for some land-holdings. This will create a poorer design outcome, or may limit the development of some lands;

2. The SEPP/ILP zoned land for stormwater and drainage purposes. Upon more detailed engineering design and modelling, some of these lands were found to be surplus to requirements and are proposed to be rezoned for other purposes;

3. The Contributions Plan identified several bio-retention basins to improve stormwater quality prior to entering the creek system. Upon further engineering investigations, the stormwater quality management devices need to be augmented;

4. DCP controls for the provision of traffic safety measures are not clear, and cannot be adequately implemented. Given that this issue only deals DCP controls, it is not considered further in this planning proposal;

5. The DCP provided for several local street to cross creeks. Some of these crossings were at obtuse angles, which makes the construction of bridges significantly more expensive. Given that the local street network does not perform a higher order traffic circulation function, some crossings have been removed entirely, or replaced by pedestrian only bridges, to retain permeability. This amendment only applies to the DCP and Contributions Plan and is not considered further in this planning proposal; and

6. Minor housekeeping amendments, and other matters addressed by the conditions of Gateway.

An amendment to the SEPP seeks, in part, to rectify the first, second and sixth issues by rezoning some lands (particularly drainage lands), amending clauses in Appendix 8 of the SEPP, and repealing application of the Liverpool LEP 2008 maps to the East Leppington Precinct.

Site Identification

Council's detailed stormwater and drainage strategy which identifies surplus lands also applies to the Austral and Leppington North Precincts. A list of lots subject to zoning and development standard changes is provided in Table 1 below. The broader planning proposal (including changes to written clauses) applies more broadly to all land within the Austral and Leppington North precincts, as per Figure 1.

Table 1: Lots subject to rezoning and changes to development standards

Street Address	Lot	DP	Street Address	Lot	DP
542 Bringelly Road	2	1203674	135 Gurner Avenue	2	233174
Lot 148 Bolac Road	148	1238762	145 Gurner Avenue	1	233174
52 Boyd Street	121	738282	155 Gurner Avenue	15	3403
126 Boyd Street	83	740973	160 Gurner Avenue	29	3403
1382 Camden Valley Way	10	27877	165 Gurner Avenue	16	3403
1384 Camden Valley Way	9	27877	170 Gurner Avenue	28	3403
21 Cortina Avenue	163	1237400	174 Gurner Avenue	261	804734
19 Cortina Avenue	162	1237400	175 Gurner Avenue	17	3403
17 Cortina Avenue	161	1237400	180 Gurner Avenue	262	804734
15 Cortina Avenue	160	1237400	184 Gurner Avenue	263	804734
13 Cortina Avenue	159	1237400	18 Kelly Street	15	2756
11 Cortina Avenue	158	1237400	22 Kelly Street	11	519909
9 Cortina Avenue	157	1237400	24 Kelly Street	12	519909
7 Cortina Avenue	156	1237400	26 Kelly Street	131	879822
5 Cortina Avenue	155	1237400	28 Kelly Street	132	879822
3 Cortina Avenue	154	1237400	30 Kelly Street	1	598602
140 Edmondson Avenue	5	236726	62 Kelly Street	3	2756
365 Edmondson Avenue	637	2475	14 King Rock Road	141	1237400
485 Edmondson Avenue	A	414563	7 Oslo Street	153	1237400
91 Eighteenth Avenue	183	1237400	75 Thirteenth Avenue	633	2475
Lot 1 Eighteenth Avenue	1	1237399	85 Thirteenth Avenue	634	2475
Lot 182 Eighteenth Avenue	182	1237400	95 Thirteenth Avenue	635	2475
246 Fourteenth Avenue	22	1196508	105 Thirteenth Avenue	636	2475
255 Fifteenth Avenue	350	2475	54 Tokyo Road	10	1238766
265 Fifteenth Avenue	351	2475	56 Tokyo Road	11	1238766
275 Fifteenth Avenue	352	2475	58 Tokyo Road	12	1238766
285 Fifteenth Avenue	353	2475	60 Tokyo Road	13	1238766
295 Fifteenth Avenue	354	2475	62 Tokyo Road	14	1238766
480 Fifteenth Avenue	6	1117859	64 Tokyo Road	15	1238766
510 Fifteenth Avenue	3	510228	66 Tokyo Road	8	1241676
404 Fourth Avenue	1	510228	68 Tokyo Road	9	1241676
470 Fourth Avenue	2	574738	70 Tokyo Road	10	1241676
490 Fourth Avenue	1	574738	72 Tokyo Road	11	1241676
494-500 Fourth Avenue	2	562807	74 Tokyo Road	28	1241676
510 Fourth Avenue	1	562807	76 Tokyo Road	145	1237400
29 Gurner Avenue	22	791237	78 Tokyo Road	144	1237400
Lot 99 Gurner Avenue	99	1243071	80 Tokyo Road	143	1237400
Lot 184 Gurner Avenue	184	1237400	82 Tokyo Road	142	1237400
All land within the East Leppington (Liverpool) Precinct					

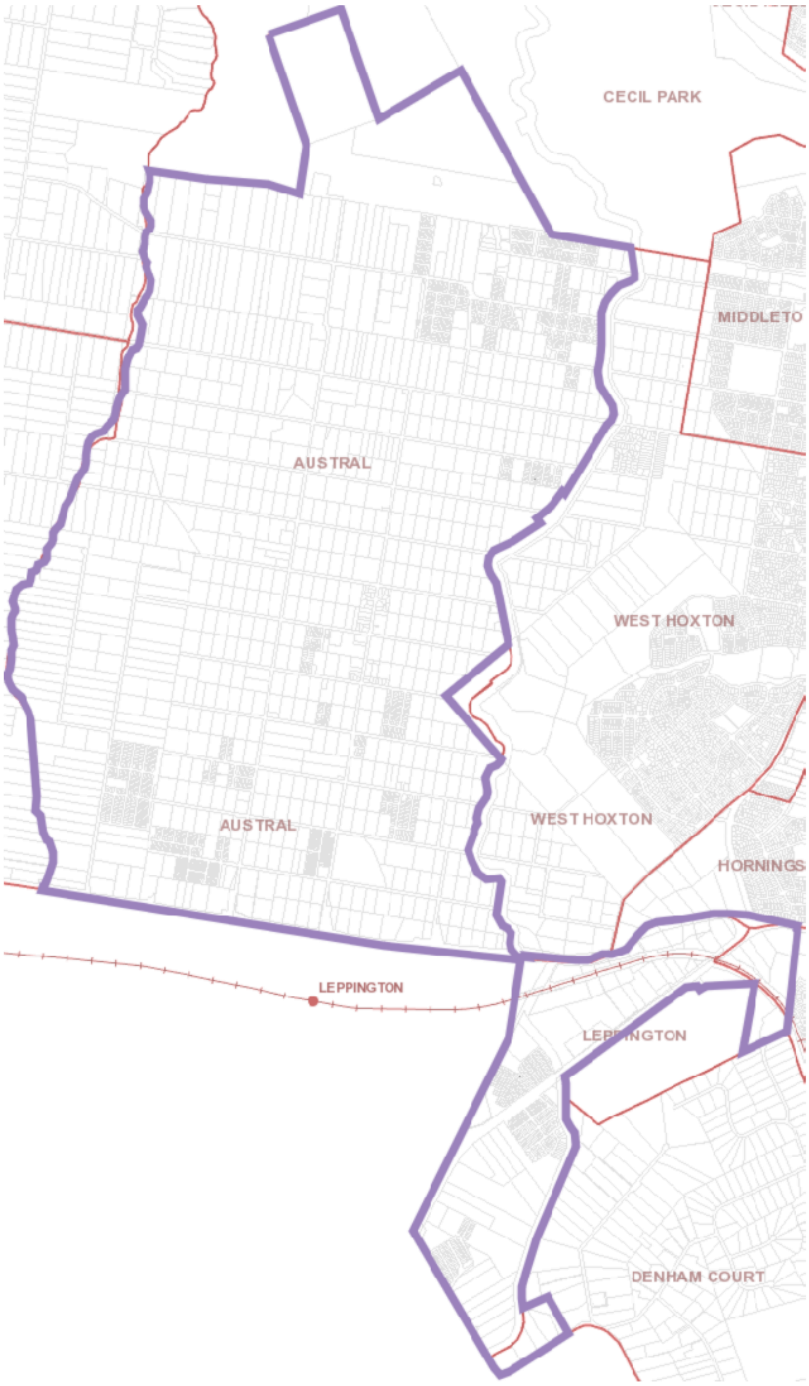


Figure 1: The Austral, Leppington North and East Leppington Precincts.

Delegation of plan making functions

Council was not granted plan making functions pursuant to Section 3.36 of the *Environmental Planning and Assessment Act 1979* ("EP&A Act").

Part 1 – Objectives

The objectives of this planning proposal is to better facilitate the development of lands within the Liverpool Growth Centre Precincts as per the vision for the area. The planning proposal seeks to enable development of certain lands zoned for drainage purposes which are surplus to requirements and to improve development feasibility for other lots within the Austral and Leppington North precincts by optimising the extent of certain zones and development standards. The planning proposal also seeks to correct zoning anomalies and provide for an electricity distribution facility. The precincts are unlikely to be able to develop to their full potential without this amendment.

Part 2 – Explanation of provisions

The objectives of the planning proposal will be achieved through changes to the planning controls listed in Table 2. Due to numerous amendments being sought, changes are described in further detail in the headings below this section. Draft maps are provided in Part 4.

Table 2: Current and proposed controls for sites subject to the SEPP

Control	Current	Proposed
Zoning (LZN)	SP2 Infrastructure, RE1 Public Recreation, R2 Low Density Residential and R3 Medium Density Residential	SP2 Infrastructure, SP2 Local Road, SP2 Electricity Distribution, RE1 Public Recreation, R2 Low Density Residential, R3 Medium density Residential, E2 Environmental Conservation, and E4 Environmental Living.
Maximum height of buildings (HOB)	9m, 12m or no standard	9m, 12m or no standard
Residential Density (RDN)	15, 25, or no standard	15, 25, or no standard
Land Reservation Acquisition (LRA)	SP2 Local Drainage, SP2 Local Road or no standard	SP2 Local Drainage, SP2 Local Road, SP2 Electricity Distribution, or no standard

To facilitate the above changes, the following SEPP maps will be amended:

Zoning

- SEPP_SRGC_SW_LZN_007_020_20160222
- SEPP_SRGC_SW_LZN_012_020_20130122
- SEPP_SRGC_SW_LZN_013_020_20131128

Maximum Height of Buildings

- SEPP_SRGC_SW_HOB_007_020_20130201
- SEPP_SRGC_SW_HOB_012_020_20130111
- SEPP_SRGC_SW_HOB_013_020_20131128

Residential Density

- SEPP_SRGC_SW_RDN_007_020_20130201
- SEPP_SRGC_SW_RDN_012_020_20130131
- SEPP_SRGC_SW_RDN_013_020_20131128

Land Reservation Acquisition:

- SEPP_SRGC_SW_LRA_007_020_20130201
- SEPP_SRGC_SW_LRA_012_020_20130201
- SEPP_SRGC_SW_LRA_013_020_20131128

Changes are also proposed to the Liverpool LEP 2008, to repeal zones and other development standards from applying to areas in East Leppington zoned as per the SEPP (Sydney Region Growth Centres) 2006. To facilitate the above changes, the following LLEP 2008 maps will be amended:

- Land-use Zoning map: 4900_COM_LZN_009_020_20200318
- Minimum Lot Size map: 4900_COM_LSZ_009_020_20200318
- Maximum Floor Space Ratio map: 4900_COM_FSR_009_020_20200318
- Maximum Height of Buildings map: 4900_COM_HOB_009_020_20200318
- Heritage map: 4900_COM_HER_009_020_20140716
- Key Sites map: 4900_COM_KYS_009_020_20140716
- Environmentally Significant Land map: 4900_COM_ESL_009_020_20140716

Council is also seeking to make amendments to three written clauses of the SEPP (Sydney Region Growth Centres) 2006. It is intended to amend Clauses 4.1AD, 4.1AE, and 4.1AF of appendix 8, with the addition of text shown **bold and underlined**. Changes to these clauses will allow for an applicant to lodge a DA which provided for the subdivision of one lot into two lots, with the dwelling plans for both child lots. At present, the wording of the current clause only allows for Council to consider the dwelling plans for one dwelling if a DA is lodged pursuant to clauses 4.1AD, 4.1AE, or 4.1AF. The applicant must wait for the lots to be registered prior to submitting a second development application for the second lot. This is seen as an unintended outcome of the wording of the clauses, and does not result in orderly development.

4.1AD Exceptions to minimum lot sizes for dwelling houses

(1) This clause applies to the following—

(a) a lot in Zone R2 Low Density Residential that has an area less than 300m^2 (but not less than 250m^2) if the dwelling density (per hectare) shown on the Residential Density Map in relation to the land is 15,

(b) a lot in Zone R2 Low Density Residential that has an area less than 300m^2 (but not less than 225m^2) if the dwelling density (per hectare) shown on the Residential Density Map in relation to the land is not less than 20,

(c) a lot in Zone R3 Medium Density Residential that has an area less than 300m^2 (but not less than 225m^2).

(2) Despite clause 4.1AB(3), development consent may be granted to the erection of a dwelling house on a lot to which this clause applies if—

(a) the lot results from a subdivision to which development consent has been granted in accordance with clause 4.1AA and, in determining the development application for the erection of the dwelling house, the consent authority considers any information that it considered for the purposes of that clause in determining the development application for that subdivision, or

(b) the development application is a single development application for development consisting of both of the following—

(i) the subdivision of land into 2 or more lots,

*(ii) the erection of the dwelling house on **at least** one of the lots resulting from the subdivision.*

4.1AE Exceptions to minimum lot sizes for dwelling houses on other lots in Zone R2 Low Density Residential

(1) This clause applies to a lot in Zone R2 Low Density Residential that has an area less than 250m^2 (but not less than 225m^2) if the dwelling density (per hectare) shown on the Residential Density Map in relation to the land is 15.

(2) Despite clause 4.1AB(3), development consent may be granted to the erection of a dwelling house on a lot to which this clause applies if the lot meets the requirements of subclause (3) and—

(a) the lot results from a subdivision to which development consent has been granted in accordance with clause 4.1AA and, in determining the development application for the erection of the dwelling house, the consent authority considers any information that it considered for the purposes of that clause in determining the development application for that subdivision, or

(b) the development application is a single development application for development consisting of both of the following—

(i) the subdivision of land into 2 or more lots,

*(ii) the erection of the dwelling house on **at least** one of the lots resulting from the subdivision.*

4.1AF Exceptions to minimum lot sizes for dwelling houses on small lots

(1) This clause applies to the following—

(a) a lot in Zone R2 Low Density Residential that has an area less than 225m2 (but not less than 200m2 but) if the dwelling density (per hectare) shown on the Residential Density Map in relation to the land is 20,

(b) a lot in Zone R2 Low Density Residential that has an area of less than 225m2 (but not less than 125m2) if the dwelling density (per hectare) shown on the Residential Density Map in relation to the land is 25,

(c) a lot in Zone R3 Medium Density Residential that has an area less than 225m2 (but not less than 125m2).

(2) Despite clause 4.1AB, development consent may be granted to the erection of a dwelling house on a small lot if the development application is a single development application for development that is both of the following—

(a) the subdivision of land into 2 or more lots,

*(b) the erection of the dwelling house on **at least** one of the lots resulting from the subdivision.*

135-175 Gurners Avenue

Legally known as Lots 1-2 DP 233174 and Lots 15-17 DP 3403, most of the land is zoned R2, with a 10m wide SP2 – Infrastructure (Local Drainage) zone traversing the site, as seen in Figure 2 below (affected sites highlighted with red boundaries).

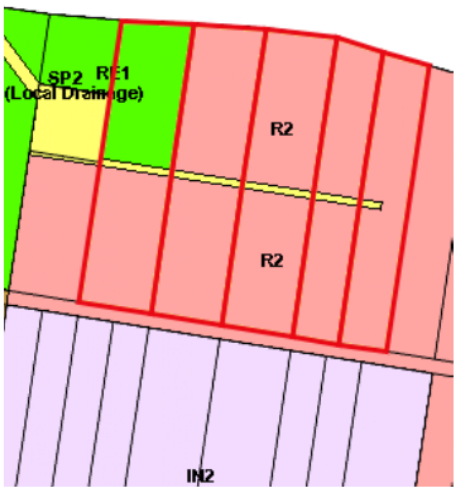


Figure 2: Current land use zoning for land at 135-175 Gurners Avenue

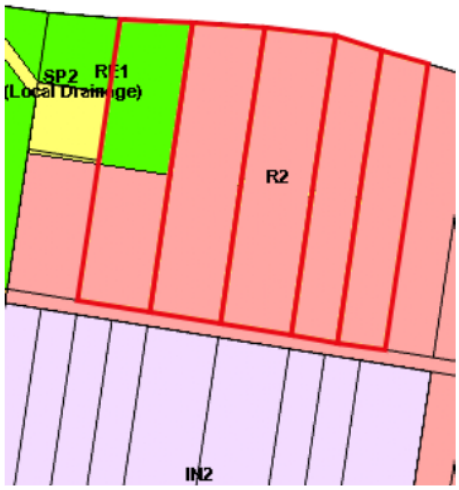


Figure 3: Proposed land use for land at 135-175 Gurners Avenue

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed roads, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that the extent of the drainage channel, which severs R2 land, currently zoned SP2 would be rezoned to R2 – Low Density Residential, with other mapped development standards being carried over as per land adjacent. This would include a maximum building height of 9m, a minimum dwelling density of 15dw/ha, and removal of the land from the land reservation acquisition map.

The drainage channel adjacent to the RE1 land will be rezoned to RE1.

29 Gurners Avenue

Legally known as Lot 22 DP 791237, most of the land is zoned R2, with a 10m wide SP2 – Infrastructure (Local Drainage) zone traversing Lot 22, as seen in Figure 4 below (affected sites highlighted with red boundaries).

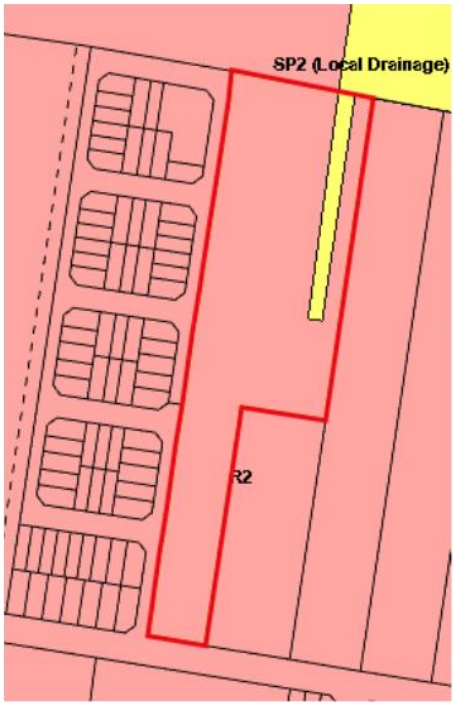


Figure 4: Current land use zoning for land at 29 Gurners Avenue

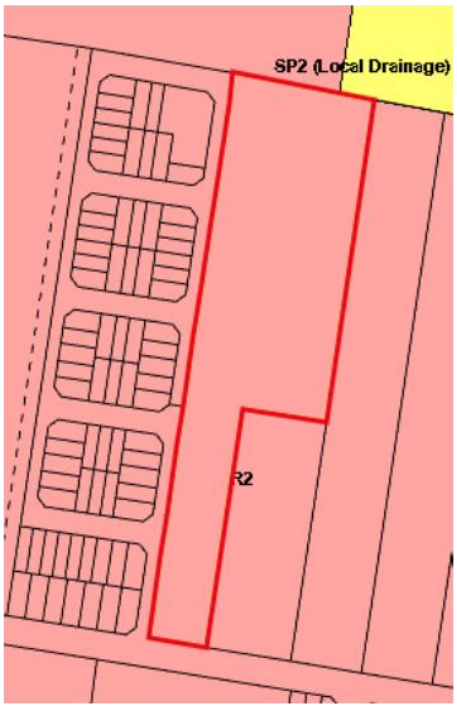


Figure 5: Proposed land use zoning for land at 29 Gurners Avenue

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed road, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that the extent of the drainage channel currently zoned SP2 would be rezoned to R2 – Low Density Residential, with other mapped development standards being carried over as per land adjacent. This would include a maximum building height of 9m, a minimum dwelling density of 15dw/ha, and removal of the land from the land reservation acquisition map.

75 Gurners Avenue

Legally known as Lot 100 DP 1243071 the land is zoned a mix of SP2 Infrastructure (Local Drainage), RE1 Public Recreation, RU6 Rural Transition, E4 Environmental Living, R2 Low Density Residential, R3 Medium Density Residential, and E2 Environmental Conservation, as seen in Figure 6.

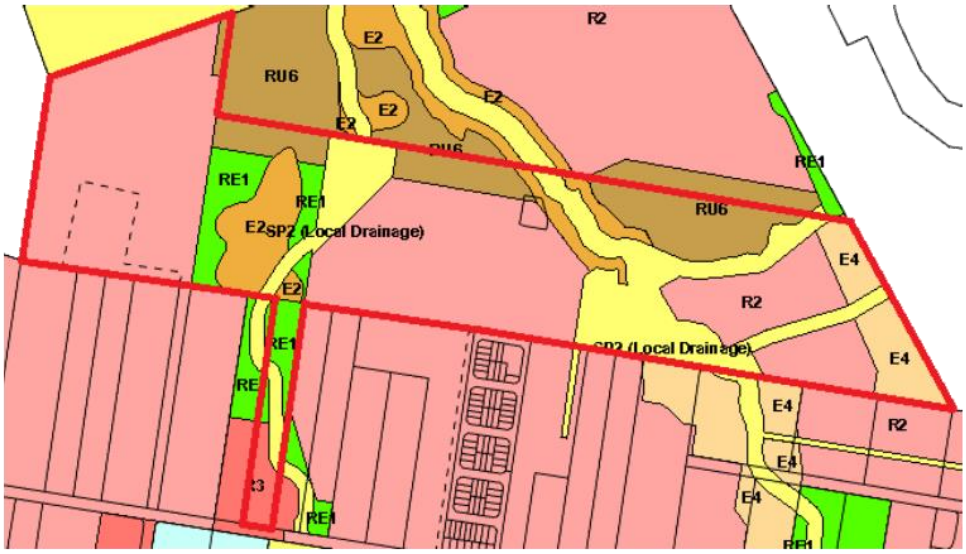


Figure 6: Current land use zoning for land at 75 Gurners Avenue

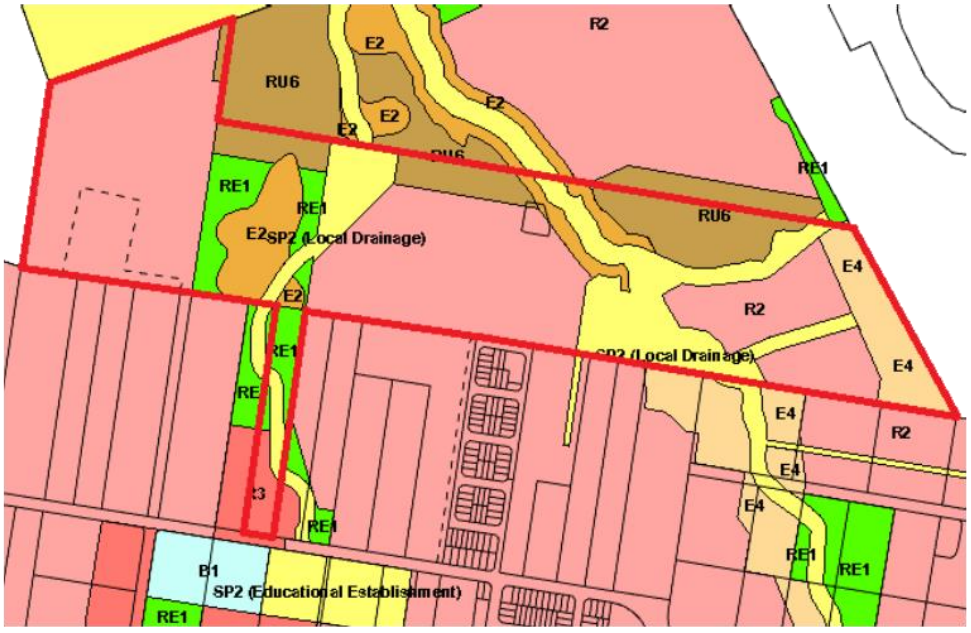


Figure 7: Proposed land use zoning for land at 75 Gurners Avenue

Council's detailed concept design for the stormwater and drainage network concluded that some of the zoned drainage land towards the eastern edge of the site is surplus to requirements. The stormwater can be carried via pipes under the proposed roads, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that part of the extent of the drainage channel currently zoned SP2 would be rezoned to E4 Environmental Living, with other mapped development standards being carried over as per land adjacent. This is consistent with the land-use zoning for the surrounding land, and would likely have been the underlying zone had the drainage infrastructure not been identified. The development standards would include a maximum building height of 9m, and removal of the land from the land reservation acquisition map.

470 – 510 Fourth Avenue

Legally known as Lots 1-2 DP 562807 and Lots 1-2 574738, most of the land is zoned R2 Low Density Residential or R3 Medium Density Residential, as seen in Figure 8 below (affected sites highlighted with red boundaries)

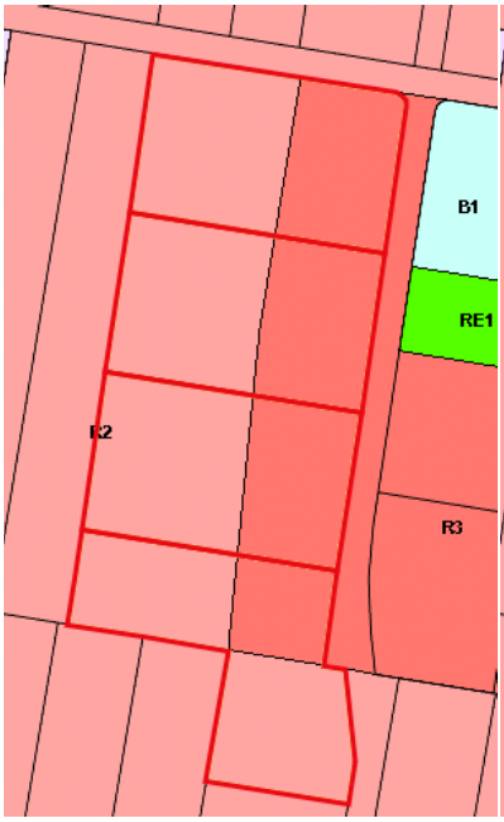


Figure 8: Current land use zoning for land at 470 – 510 Fourth Avenue

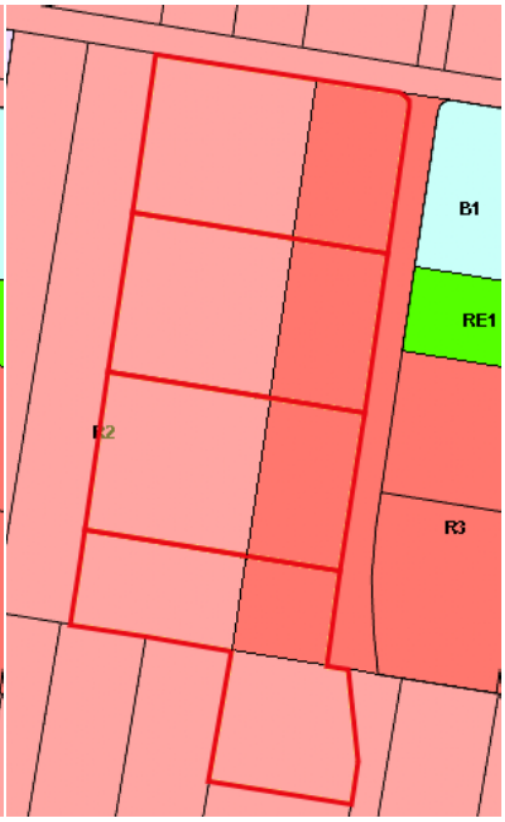


Figure 9: Proposed land use zoning for land at 470 – 510 Fourth Avenue

As part of Council's review of the ILP road network which seeks to maximise the development potential of properties and minimise the need for variations, it was identified that the proposed layout on these properties resulted in blocks which were too deep for regular subdivision. A realignment of a proposed ILP road in a position closer to Fourth Avenue means that the underlying zone no longer matches the road position. The zone boundary has been shifted to match the new road position, ensuring that one side is zoned wholly R3 and the other side is wholly R2.

The development standards of the land zoned from R3 to R2 will be carried over from the R2 land, being a 9m maximum building height, and a minimum dwelling density of 15 dwellings per hectare.

160 – 184 Gurner Avenue

Legally known as Lots 28-29 DP 3403 and Lots 261-263 DP 804734, most of the land is zoned IN2 – Light Industrial, as seen in Figure 10 below (affected sites highlighted with red boundaries)

Figure 10: Current land use zoning for land at 160 – 184 Gurner Avenue

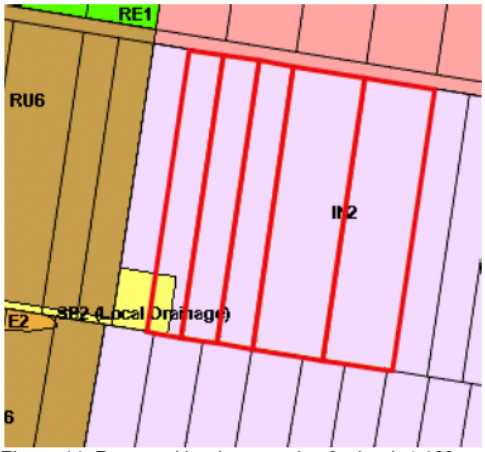


Figure 11: Proposed land use zoning for land at 160 – 184 Gurner Avenue

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed road, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that the extent of the drainage channel currently zoned SP2 would be rezoned to IN2 – Light Industrial, with other mapped development standards being carried over as per land adjacent. This would include a maximum building height of 13m, a maximum FSR of 1.0:1, and removal of the land from the land reservation acquisition map.

255-295 Fifteenth Avenue

Legally known as Lots 350-354 DP2475, most of the land is zoned R2, with various width SP2 – Infrastructure (Local Drainage) zones traversing the sites, as seen in Figure 12 below (affected sites highlighted with red boundaries).

Figure 12: Current land use zoning for land at 295 Fifteenth Avenue

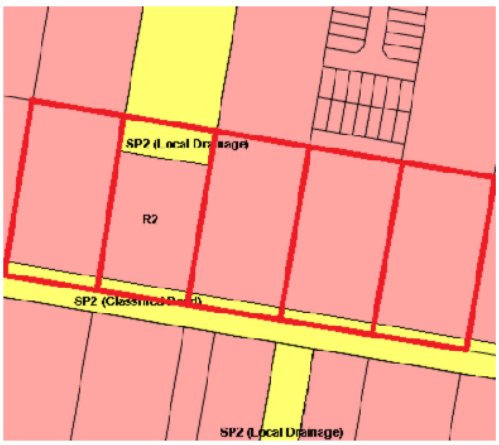


Figure 13: Proposed land use zoning for land at 295 Fifteenth Avenue

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land on lot 354 (number 295) at this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed road, and the road itself can form part of an overland flow path in extreme events.

During the exhibition period, it was identified that development at 265 and 275 Fifteenth Avenue would substantially interfere with the delivery of trunk drainage paths as provided by the land-use zoning / ILP. Land at 265 Fifteenth Avenue is characterised by a large Centre-Based Childcare Facility and has a DA consent for an indoor recreation facility; areas of car parking are located within the drainage land, and acquisition would result in the development not having adequate on-site parking. Similarly, land at 275 Fifteenth Avenue is occupied by an existing Place of Public Worship, in which the construction of the drainage channel would remove almost all of the site's on-site parking. The resulting impacts would be that both developments would not be able to operate in accordance with their DA consents, namely as a result of a loss of car parking. This would result in Council being liable to acquire the entirety of the property, including the value of improvements.

Council's contributions plan does not have adequate funds to acquire the full cost for these properties, and given that Austral is largely a greenfield release area, with little established social infrastructure, it is recognised that these sites provide spaces for social cohesion, and essential services. A loss of these spaces would have detrimental impacts on the residents of Austral and surrounding suburbs. As such, Council staff have been working with the landowners of numbers 255-285 to provide the drainage function via a box culvert, or pipes, located within an easement, as opposed to acquiring land for an open drain. This will ensure that the trunk drainage function can be retained, whist also allowing the land above the culvert to be used for minimal impact activities, such as car parking. The DCP ILP is also being amended to ensure that such culverts will be located under future roads, should the land ever re-develop.

It is proposed that the extent of the drainage channels currently zoned SP2 would be rezoned to R2 – Low Density Residential, with other mapped development standards being carried over as per land adjacent.

This would include a maximum building height of 9m, a minimum dwelling density of 15dw/ha, and removal of the land from the land reservation acquisition map.

75-105 Thirteenth Avenue and 365 Edmondson Avenue

Legally known as Lots 633-637 DP2475, most of the land is zoned R2, RE1 or R3, with a 10m wide and variable SP2 – Infrastructure (Local Drainage) zone traversing all lots, as seen in Figure 14 below (affected sites highlighted with red boundaries).

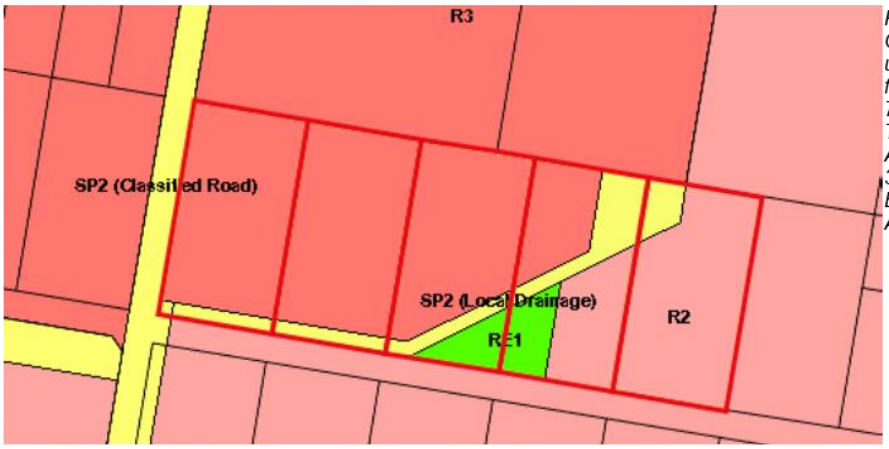


Figure 14: Current land use zoning for land at 75-105 Thirteenth Avenue and 365 Edmondson Avenue

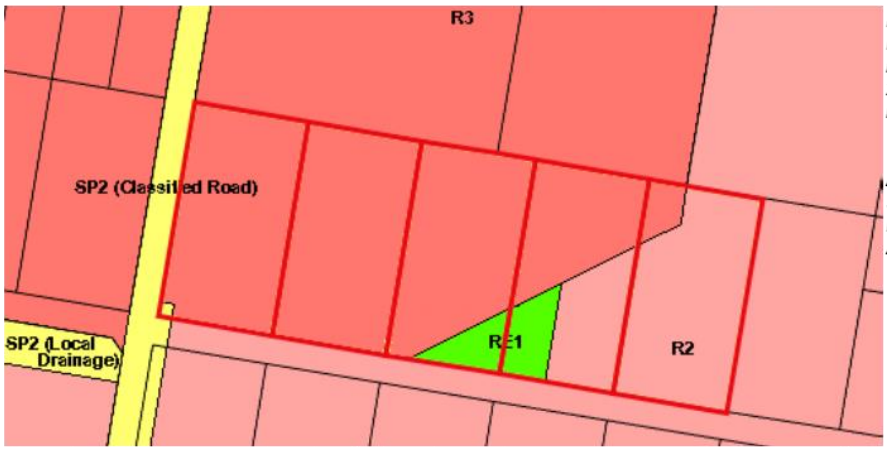


Figure 15: Proposed land use zoning for land at 75-105 Thirteenth Avenue and 365 Edmondson Avenue

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed roads, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that the extent of the drainage channel currently zoned SP2 would be rezoned to R3 – Medium Density Residential, with other mapped development standards being carried over as per land adjacent. This would include a maximum building height of 12m, a minimum dwelling density of 25dw/ha, and removal of the land from the land reservation acquisition map.

Note that additional changes are proposed on land at 365 Edmondson Avenue as detailed further in this report,

480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

Legally known as corner Lot 1 and Lot 3 DP 510228, Lot 6 DP 1117859 and Lot 22 DP 1196508, most of the land is zoned R2, with a 30m wide drainage corridor and an area of RE1 Public recreation, as seen in Figure 16.

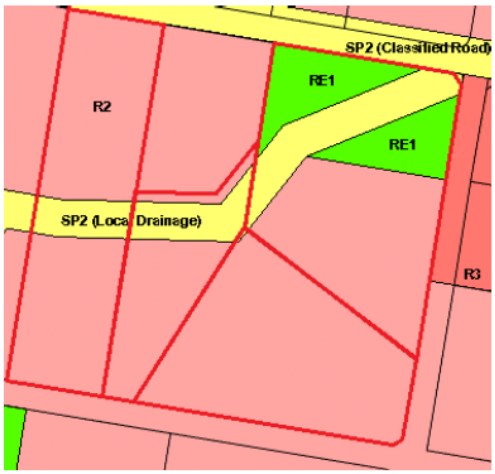


Figure 16: Current land use zoning for land at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

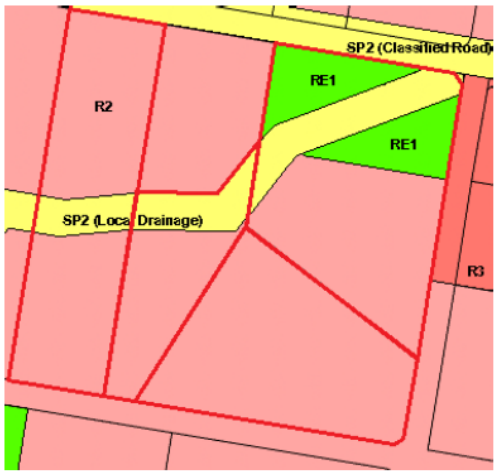


Figure 17: Proposed land use zoning for land at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

The position of the drainage channel on 246 Fourteenth Avenue is such that an 8m wide R2 zoned parcel would be residue after Council acquires land for drainage purposes at the rear of the property. The costs of amalgamating this land into surrounding properties would be such that it makes development of this land unfeasible. It is proposed to realign the drainage corridor such that it abuts the property boundary. This subsequently involves realigning the drainage corridor on adjoining lots to match the new position.

It is proposed that part of the extent of the drainage channel currently zoned SP2 would be rezoned to R2 – Low Density Residential, with other mapped development standards being carried over as per land adjacent. This would include a maximum building height of 9m, a minimum dwelling density of 15dw/ha, and removal of the land from the land reservation acquisition map. It is proposed that some of the R2– Low Density Residential land will be rezoned to SP2 Infrastructure (Local Drainage), with other development standards being expunged and the land being identified as land reserved for acquisition. The drainage corridor will remain at 30m wide.

18-30 Kelly Street

Legally known as Lot 1 DP 598602, Lots 11-12 DP 519909, Lot 15 DP 2756, and Lots 131-132 DP 879822 the land is zoned a mix of R2 – Low Density Residential, R3 – Medium Density Residential, SP2 – Infrastructure (Educational Establishment), RE1 – Public Recreation, and SP2 – Infrastructure (Local Drainage), as seen in Figure 18.

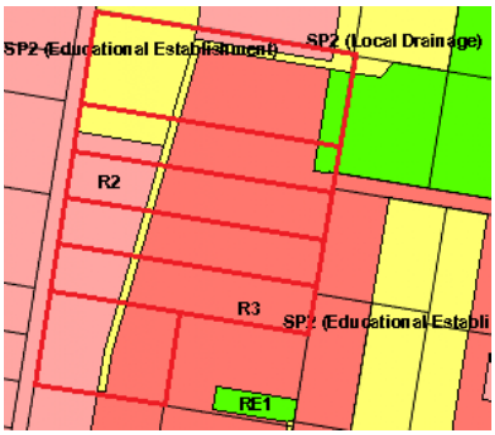


Figure 18: Current land use zoning for land at 18-30 Kelly Street

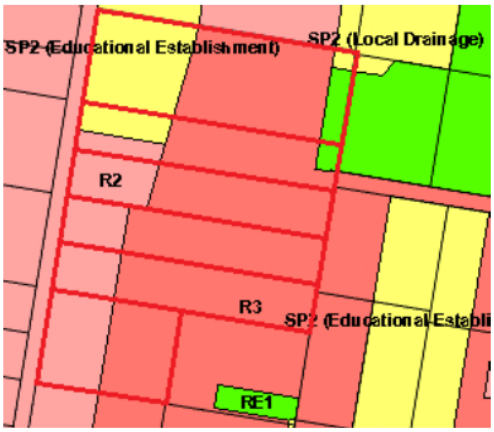


Figure 19: Proposed land use zoning for land at 18-30 Kelly Street

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed roads, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that the extent of the drainage channel currently zoned SP2 would be rezoned to R3 –Medium Density Residential, with other mapped development standards being carried over as per land adjacent. A small portion of land on the northern boundary of 18 Kelly Street, and a larger extent of land on 22-30 Kelly Street would also be rezoned to R3 – Medium Density Residential to align the zone boundary with relocated ILP roads. The development standards would include a maximum building height of 12m, a minimum dwelling density of 25dw/ha, and removal of the land from the land reservation acquisition map.

140 Edmondson Avenue

Legally known as Lot 5 DP 236726, the land is zoned a mix of R2 - Low Density Residential, RE1 – Public Recreation, and SP2 – Infrastructure (Local Drainage), as seen in Figure 20.

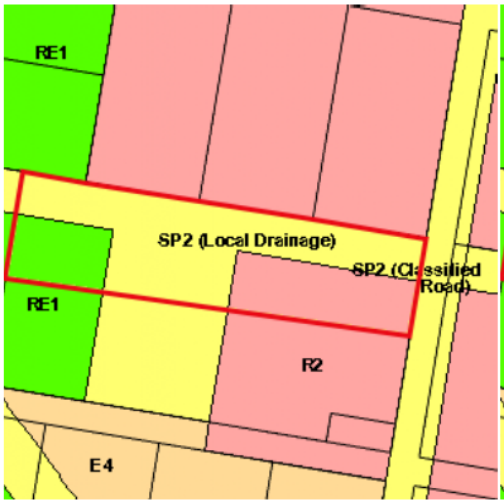


Figure 20: Current land use zoning for land at 140 Edmondson Avenue

Figure 21: Proposed land use zoning for land at 140 Edmondson Avenue

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. Any stormwater can be carried via pipes under the proposed roads, and the road itself can form part of an overland flow path in extreme events. Utilising roads as overland flow paths in extreme events is standard practice.

It is proposed that the extent of the drainage channel currently zoned SP2 would be rezoned to R2 –Low Density Residential, with other mapped development standards being carried over as per land adjacent. The development standards would include a maximum building height of 9m, a minimum dwelling density of 15dw/ha, and removal of the land from the land reservation acquisition map.

62 Kelly Street and 542 Bringelly Road

Legally known as Lot 3 DP 2756, and Lot 2 DP 1203674 the land is zoned a mix of R3 – Medium Density Residential, and RE1 Public Recreation, as seen in Figure 22.

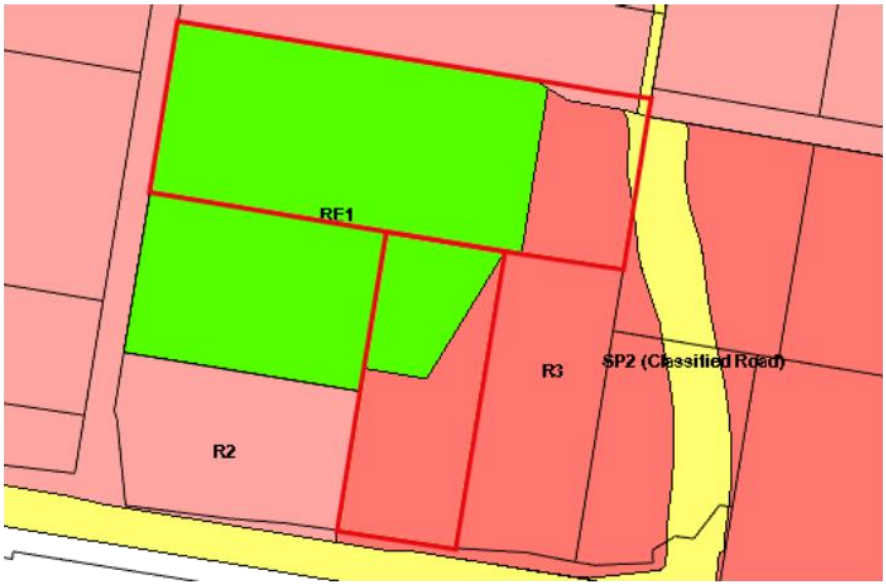


Figure 22: Current land use zoning for land at 62 Kelly Street and 542 Bringelly Road

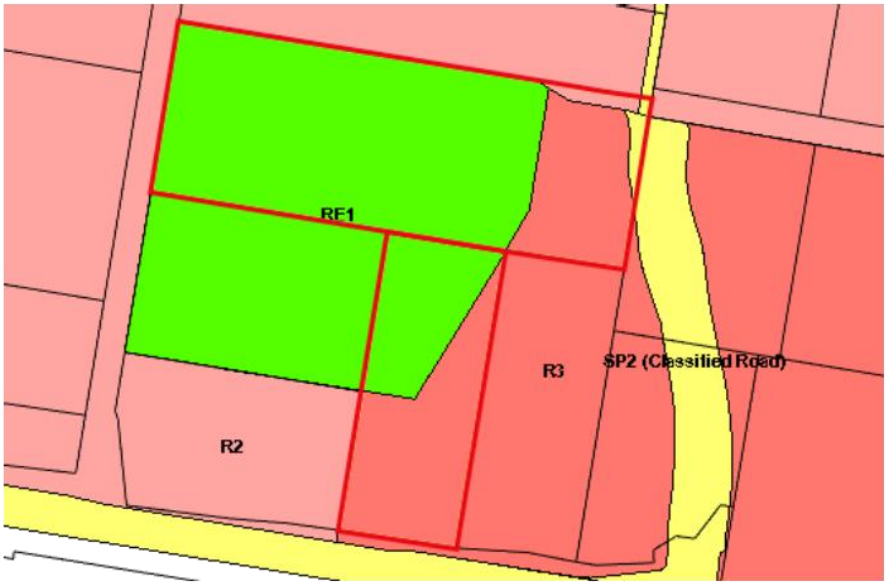


Figure 23: Proposed land use zoning for land at 62 Kelly Street and 542 Bringelly Road

The zone boundaries of this open space do not align with the proposed road network, nor does the zoning allow for the efficient development of surrounding lands. A proposed local road has been shifted out of the open space zone and onto a property to the south, which did not contain any roads to facilitate development. Shifting this road results in a small parcel of R3 zoned land being isolated between the road and the open space on land at 542 Bringelly Road. It is proposed that this land is zoned RE1 – Public Recreation and will be agglomerated into the greater extent of the park flagged for active open space. Development standards applicable to this land will be expunged and it will be identified in the land reservation acquisition map

A small area of land zoned RE1 – Public Recreation is proposed to be rezoned to R3 – Medium Density Residential on 62 Kelly Street as the result of a new road being proposed adjacent to the park, separating the open space from residential development. As this new road follows the edge of a transmission easement, it is proposed that the land for the road is all zoned for residential purposes, as per all other local roads which will be delivered at a time when the land is developed. The land being rezoned to R3 will carry development standards from land adjacent, being a maximum building height of 12m, a minimum dwelling density of 25dw/ha, and removal of the land from the land reservation acquisition map.

Development of this area is affected by an Endeavour Energy transmission easement running in a north south orientation through the site. Council acknowledges that Endeavour Energy should be consulted as part of the Gateway determination for amending the instrument in this area.

52 Boyd Street

Legally known as Lot 121 DP 738282 the land is zoned a mix of SP2 Infrastructure (Local Drainage), and RE1 (Public Recreation), as seen in Figure 24.

Figure 24: Current land use zoning for land 52 Boyd Street

Figure 25: Proposed land use zoning for land 52 Boyd Street

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. A basin is not required here to prevent upstream or downstream flooding.

It is proposed that the extent of the drainage channel and basin currently zoned SP2 would be rezoned to RE2 – Public Recreation, This is consistent with the land-use zoning for the remainder of the property, and would likely have been the underlying zone had the drainage infrastructure not been identified. Much of the land is burdened by power transmission lines and/or impacted by flooding, making it generally unsuitable for residential development.

126 Boyd Street

Legally known as Lot 83 DP 740973 the land is zoned a mix of SP2 Infrastructure (Local Drainage), E4 Environmental Living, and E2 Environmental Conservation, as seen in Figure 26.

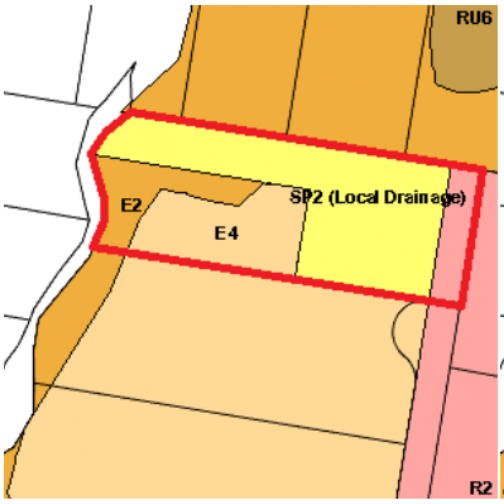


Figure 26: Current land use zoning for land at 126 Boyd Street

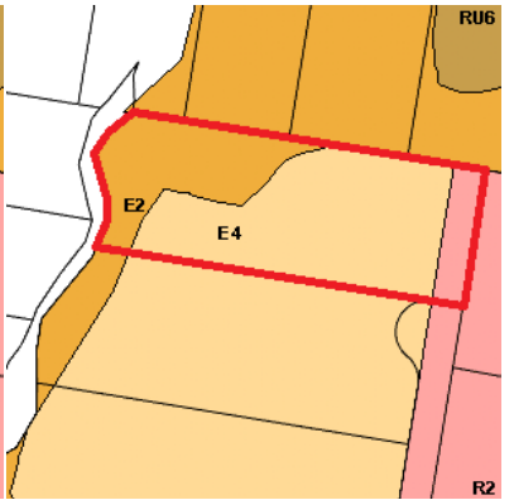


Figure 27: Proposed land use zoning for land at 126 Boyd Street

Council's detailed concept design for the stormwater and drainage network concluded that the zoned drainage land in this location is surplus to requirements. A basin is not required here to prevent upstream or downstream flooding.

It is proposed that the extent of the drainage channel and basin currently zoned SP2 would be rezoned to a mix of E2 and E4. This is consistent with the land-use zoning for the remainder of the property, and would likely have been the underlying zone had the drainage infrastructure not been identified. The northern boundary of the site is more heavily impacted by flooding and existing native vegetation, hence the extent of the more stringent E2 zone.

Lot 99 Gurner Avenue

Legally known as Lot 99 DP 1243071 the land is zoned R2 Low density residential, as seen in Figure 28.

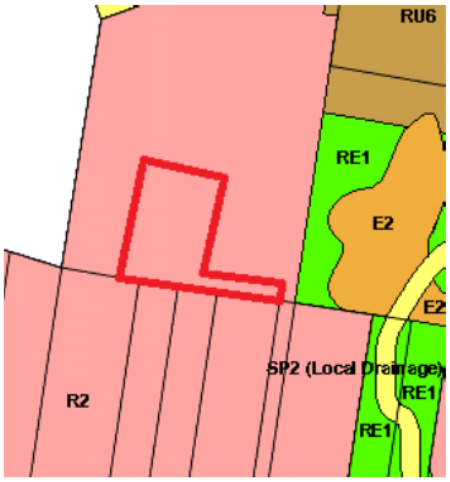


Figure 28: Current land use zoning for land at Lot 99 Gurner Avenue

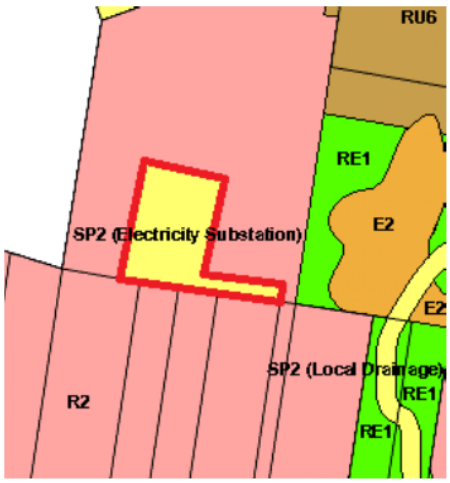


Figure 29: Proposed land use zoning for land at Lot 99 Gurner Avenue

In the gateway determination (reference PP_2019_LPOOL_002_00) Council was directed to rezone land at Lot 99 DP 1243071 from R2 Low Density Residential to SP2 (Infrastructure – Electricity Distribution) for the purpose of supporting the construction and development of an electrical substation. Council has not been instructed to carry out further investigations as to the impacts of rezoning land for such a use in a residential area.

Amendments to development standards would including removing the minimum dwelling density standard of 15dw/ha. Given that the land is owned by the proponent, the land will not be identified in the land reservation acquisition map.

365 & 485 Edmondson Avenue

Legally known as Lot 637 DP 2475 and Lot A DP 414563 the land is zoned R3 Medium density residential, and a portion is currently zoned SP2 (Infrastructure) local drainage (noting this portion is proposed to be rezoned as per previously), as seen in Figure 30.

Figure 30: Current land use zoning for land at 365 and 485 Edmondson Avenue

Figure 31: Proposed land use zoning for land at 365 and 485 Edmondson Avenue

In the gateway determination (reference PP_2019_LPOOL_002_00) Council was directed to rezone land at Lot 637 DP 2475 and Lot A DP 414563 from R3 Medium Density Residential to SP2 (Infrastructure – Classified Road) for the purpose of road widening of Edmondson Avenue, as is consistent with the applicable DCP and other properties in the area. This rezoning is considered as an anomaly, as it was the Department's intent for the land to be zoned for the purpose of the road at the time that the precinct plan was made

Amendments to development standards would including removing the maximum building height and the minimum dwelling density standard of 15dw/ha. The land will be identified in the land reservation acquisition map.

Note that additional changes are proposed on land at 365 Edmondson Avenue as detailed previously in this report,

1382-1384 & 1402 Camden Valley Way, East Leppington

Legally known as Lots 9-10 DP 27877 the land is zoned a combination of R3 Medium density residential, SP2 (Infrastructure) local drainage, SP2 (Infrastructure) Local Road, and RE1 Public Recreation, as per Figure 32.

Figure 32: Current land use zoning for land at 365 and 485 Edmondson Avenue

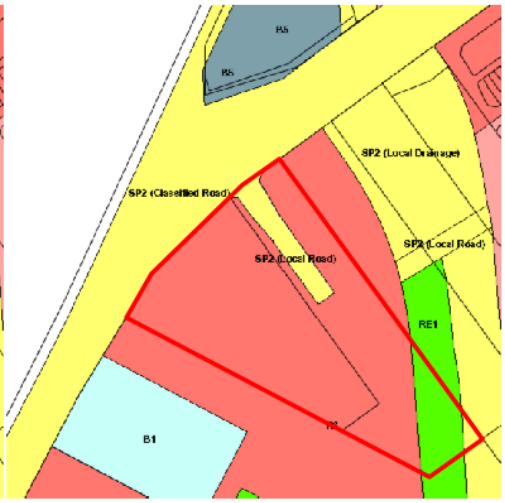


Figure 33: Proposed land use zoning for land at 365 and 485 Edmondson Avenue

In the gateway determination (reference PP_2019_LPOOL_002_00, dated 5 December 2019) Council was directed to rezone land at Lots 9-10 DP 27877 from R3 Medium Density Residential and SP2 (Infrastructure) Local Road to R3 Medium Density Residential and SP2 (Infrastructure) Local Road for the purpose of aligning the road zoning with the location of a future collector road. This rezoning is considered as an anomaly, as it was the Department's intent for the road to intersect with Camden Valley Way as a 4 way intersection, being in alignment with Cowpasture Road. Upon the upgrade of Camden Valley Way, this intersection was moved several metres from its indicative position, resulting in the zoning mismatching the future location of the link road.

The land reservation acquisition map will be changed to align with the land zoning map. No changes will be made to the dwelling density or building height maps as they both applied to the entirety of the SP2 Infrastructure zoned area.

Lots fronting Tokyo Road and Cortina Avenue, Austral

The land is zoned a combination of R2 Low density residential, E4 Environmental Living, and SP2 (Infrastructure) local drainage, as per Figure 34. The lots affected are legally described as: Lot 148 DP 1238762, lots 9-15 DP 1238766, Lots 8-1, 28 and 30 DP 1241676, lots 141-145, 153-163 and 182-183 DP 1237400, and lot 1 DP 1237399.

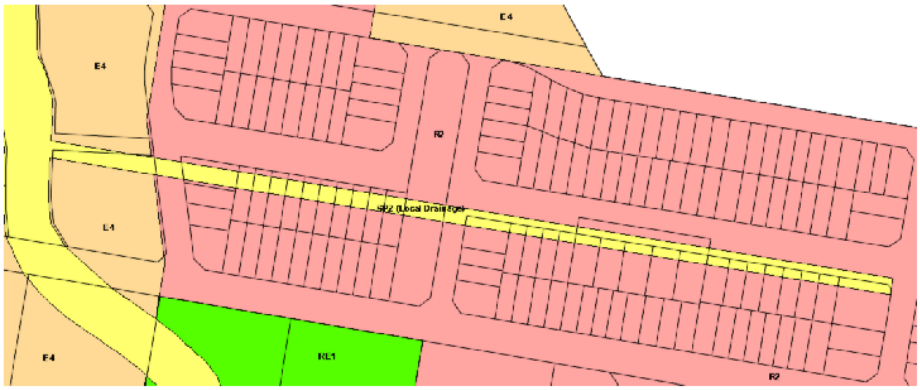


Figure 34: Current land use zoning for land at Tokyo Road and Cortina Avenue

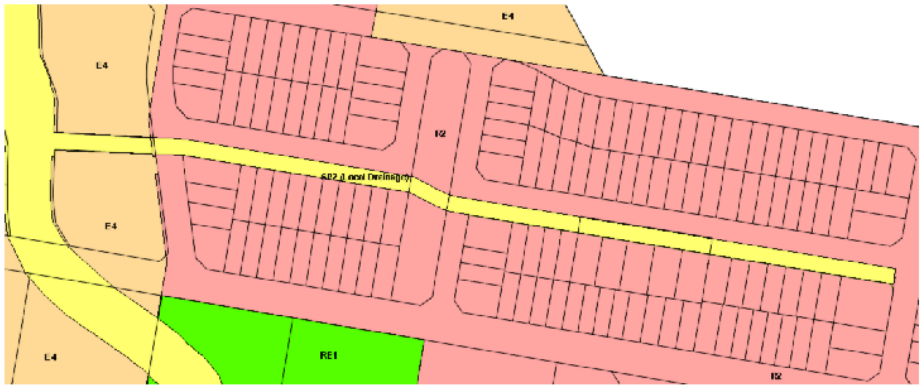


Figure 35: Proposed land use zoning for land at Tokyo Road and Cortina Avenue

An east-west drainage channel was zoned in a location adjacent to roads known as Tokyo Road and Cortina Avenue. The land reservation acquisition map will be changed to align with the land zoning map. No changes will be made to the dwelling density or building height maps as they both applied to the entirety of the SP2 Infrastructure zoned area. To provide for more regularly sized lots, whist avoiding the creation of hatchet lots, subdivision designs incorporated the drainage land as a swale beside an east-west local street, in which driveways would cross over the swale to provide ordinary lots. To provide for regularly sized lots, this required constructing the drainage swale approximately 5-15m north of the location for which land was zoned. The drainage swale has been provided, as per the intent of the zone, but the land-use mapping does not reflect the swale's position. This results in several residential lots having an SP2 zoning, which does not reflect the intended use of the land and prevents code assessed development. This is considered unorderly, and it is proposed that the extent of the SP2 zone be moved to match the extent of the drainage swale.

It is proposed that the extent of the drainage channel currently zoned SP2 would be rezoned, in part, to R2 – Low Density Residential, with other mapped development standards being carried over as per land adjacent as per Figure 35. The development standards would include a maximum building height of 9m, a minimum dwelling density of 15dw/ha, and removal of the land from the land reservation acquisition map. Similarly, some land mapped as R2 – Low Density Residential will be rezoned to SP2 – Infrastructure (Local Drainage), with the Maximum Height of Building and Minimum Dwelling Density standards abolished, and lands identified in the Land Reservation Acquisition map.

Lot 2 Gurner Avenue

Legally known as Lot 2 DP 1223501 the land is zoned a combination of R2 Low density residential, RU6 Rural transition and E2 Environmental conservation as seen in Figure 28.

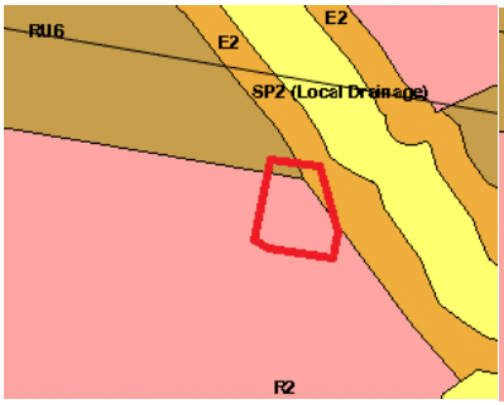


Figure 36: Current land use zoning for land at Lot 2 Gurner Avenue

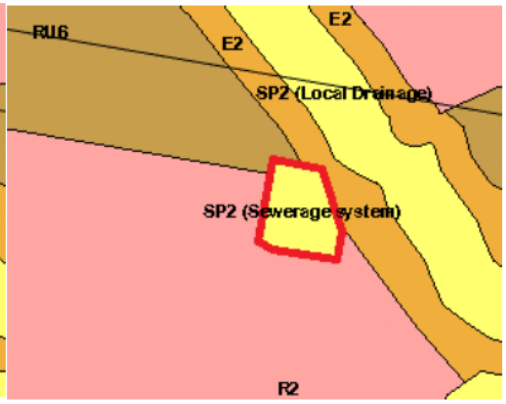


Figure 37: Proposed land use zoning for land at Lot 2 Gurner Avenue

As per a submission to Liverpool's LEP review, Sydney Water requested several sites of sewerage pumping station be zoned SP2 Infrastructure (Sewerage system), one of which is in the Austral precinct. This is to enable the land-use zoning to reflect the operational uses.

Amendments to development standards would including removing the minimum dwelling density standard of 15dw/ha and amending the maximum building height to match the site boundaries. Given that the land is owned by the proponent, the land will not be identified in the land reservation acquisition map.

Liverpool Local Environmental Plan 2008 maps at East Leppington

The East Leppington Precinct was rezoned under the SEPP (Sydney Region Growth Centres) 2006 on 8 August 2014. The land-use zoning and development standard maps as per the Liverpool LEP 2008 for land within the East Leppington Precincts were not amended or repealed. Given clause 6 of the Growth Centres SEPP, in which the SEPP prevails to the extent of any inconsistency with another EPI (the Liverpool LEP 2008) the LEP maps are redundant and have no effect.

To reduce confusion and the potential for development to be lodged or assessed against LEP planning controls, it is proposed that the Liverpool LEP 2008 maps are amended. Zoning and development standard maps will be blank in the East Leppington Precinct, and replaced by text which refers the reviewer to the Growth Centres SEPP. Figure 38 Figure 38: Current land use zoning under LLEP 2008 for land at East Leppingtonprovides the current land-use zoning as per the Liverpool LEP 2008, and Figure 39 provides for the amended zoning map. The Minimum Lot Size map, Maximum Floor Space Ratio map, Maximum Height of Buildings map, Heritage map, Key Sites map, and Environmentally Significant Land map are to be

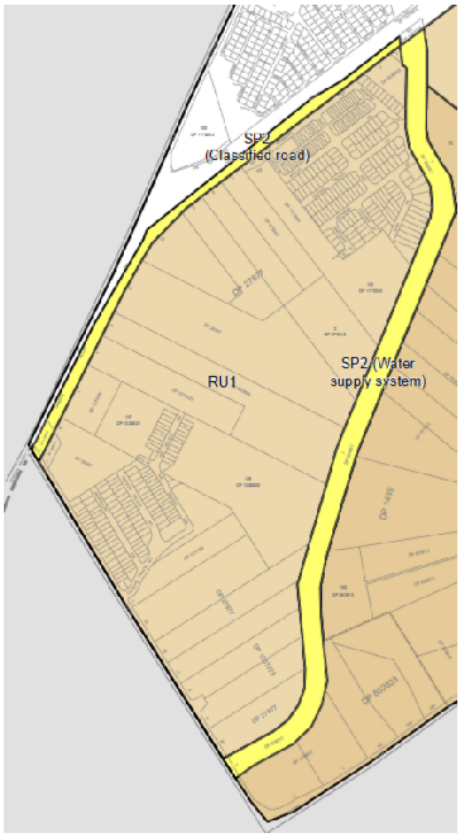


Figure 38: Current land use zoning under LLEP 2008 for land at East Leppington

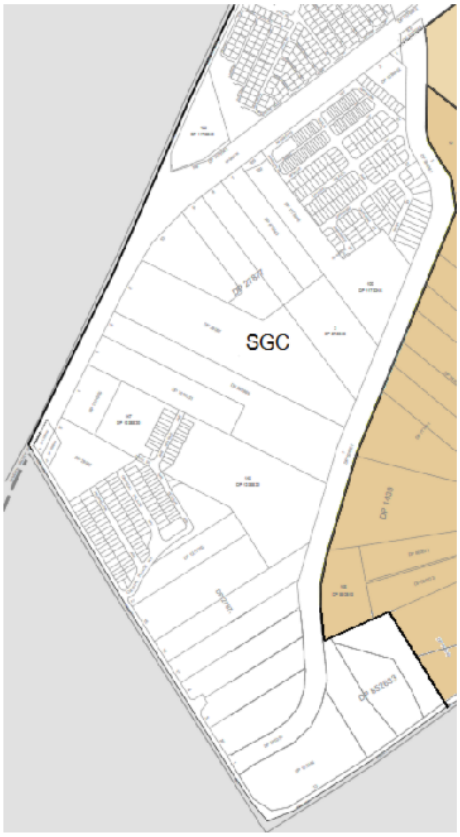


Figure 39: Proposed land use zoning under LLEP 2008 for land at East Leppington

similarly amended.

Part 3 – Justification

Section A – Need for the planning proposal

3.1 Is the planning proposal a result of any strategic study or report?

The rezoning of certain drainage lands is the result of Council's detailed concept stormwater strategy. This strategy identified that several of the 10m wide drainage corridors were over-designed, and that in the event of heavy rain, waters could be carried by sufficiently sized pipes under the road, and as overland flow on streets which follow the path of the drainage corridor.

The rezoning of other sites, repeal of Liverpool LEP maps, and changes to written clauses are to provide for better development feasibility or to address anomalies or infrastructure requirements were not the result of a strategic study or report. These other amendments are a combination of anomalies and minor changes to zones and development standards which will not substantially modify the precincts vision, but will instead provide for more orderly and/or efficient development outcomes.

3.2 Is the planning proposal the best means of achieving the objectives or intended outcomes, or is there a better way?

Yes. Changing the land-use zone for the excess drainage lands means Council no longer needs to acquire land for drainage purposes where that land is no longer required for that purpose. This also allows the land to be utilised for higher order uses. This is the only way of achieving the objectives and intended outcomes of the proposal.

Changing the zoning and development standards for other lands will enable such lands to be utilised for their intended purposes, or to enable more orderly development. Repeal of LLEP 2008 maps in the east Leppington Precinct and amendments to clauses 6AD and 6AE of Appendix 8 of the SEPP will enable more streamlined Development Assessment.

Section B – Relationship to strategic planning framework.

3.3 Is the planning proposal consistent with the objectives and actions of the applicable regional, sub-regional or district plan or strategy (including any exhibited draft plans or strategies)?

a. Strategic Merit

The planning proposal is considered to be not inconsistent with any regional, sub-regional or district plan or strategy. The objective of the planning proposal is not to increase residential, commercial or industrial development, rather it is to alter the planning framework to ensure that the Austral, Leppington North and East Leppington Precincts are able to develop in a manner consistent with the respective precinct visions.

Greater Sydney Region Plan - A Metropolis of Three Cities

The planning proposal is broadly consistent with Objective 2 (Infrastructure aligns with forecast growth – growth infrastructure compact). Rezoning surplus drainage lands will release Council of the financial burden to acquire the land, with a subsequent amended to the Contributions Plan. Correcting a zoning anomaly on Edmondson Avenue and near Camden Valley Way will provide for the orderly delivery of road infrastructure when required.

The planning proposal is broadly consistent with Objective 4 (Infrastructure use is optimised). The existing SP2 zoned land which is proposed to be rezoned for other purposes is not required, therefore the optimal use of the land is for non-infrastructure purposes. Rezoning of Lot 99 Gurner Avenue will provide for the construction of electricity infrastructure.

The planning proposal is not inconsistent with Objective 10 (Greater housing supply). Realignment of some zone boundaries is not likely to have a net increase or decrease in the supply of dwellings. However, the planning proposal is expected to increase development viability of some sites, which may have a marginal increase in supply and efficiency of development. Changes to clauses 6AD and 6AE will enable more efficient development assessment, by reducing the burden of lodging two separate DAs, whilst also potentially improving built from outcomes to allow dwelling design to be considered concurrently with the subdivision.

The planning proposal is broadly consistent with Objective 27 (Biodiversity is protected, urban bushland and remnant vegetation is enhanced). An area of land proposed to be rezoned from SP2 Local Infrastructure at 126 Boyd Street is noted as having existing native vegetation. This vegetation would have been cleared and off-set as per the original drainage strategy, but can now be maintained under an environmental zoning..

The planning proposal is broadly consistent with Objective 31 (Public open space is accessible, protected and enhanced). Some areas of SP2 drainage may have separated open spaces from the broader road network. Truncating this drainage function in pipes under the road will improve accessibility into green space. Further, some of the SP2 local drainage land is proposed to be rezoned for public open space, increasing the supply and availability of useable open space.

Western City District Plan

The planning proposal is not inconsistent with W18 Delivering high quality open space. Some areas of SP2 drainage may have separated open spaces from the broader road network. Truncating this drainage function in pipes under the road will improve accessibility into green space. Further, some of the SP2 local drainage land is proposed to be rezoned for public open space, increasing the supply and availability of useable open space.

Local Strategy

Assessment of the proposal with regards to Council's Community Strategic Plan is detailed in Section 3.4.

Changing circumstances

The planning proposal is not the result of a demographic shift or new infrastructure in the area. The planning proposal does partially result from the detailed concept design of stormwater infrastructure, which indicates items that are surplus to requirements.

b. Site Specific Merit

Natural Environment

The planning proposal does not impact the natural environment. As detailed further in section 3.6 any rezonings which are proposed will likely improve environmental outcomes.

The planning proposal has not investigated any mineral or other resources, as the lands were already zoned for urban purposes.

A hazard review has not been undertaken, as the land has already been zoned for urban purposes. Land at 126 Boyd Street is subject to flooding, and will be rezoned to enable residential development. The DCP provides controls to ensure that life and property will be protected in the event of a flood. This land contains sufficient flood free area to permit the construction of residential dwellings on flood free land, or with minimal

cut and fill. All other lands were already zoned for urban purposes and the resultant land-use changes will not impact flood potential. Risks from other hazards such as bushfire and salinity are adequately addressed by the DCP or other relevant guidelines.

Existing, approved and likely future uses of the land

The existing uses are largely reflective of the precinct's historic zoning, and the character of the area will likely change dramatically as the area urbanises. A change to lot 99 Gurner Avenue to SP2 Electrical Distribution will specifically allow for the development of a substation on land owned by an electricity authority. Changes at 275-285 Fifteenth Avenue are proposed to ensure that the construction of stormwater infrastructure does not come at the expense of private social infrastructure.

Other changes will are aimed at ensuring that the land can be utilised in a manner that is consistent with the precinct vision. Repeal of the LLEP 2008 maps in the East Leppington precinct will ensure that residents are not confused by the rural zoning as per the LEP, but urban zoning as per the SEPP, as it applies to the same land.

Services and infrastructure are available or can be made available to support any development

The primary objective of the planning proposal is not to seek uplift on any land. Some land will be up zoned to align with a new ILP road network, or where surplus drainage lands are being rezoned for residential uses, however the impact of this proposal on the greater ALN precincts is minimal. Given that a contributions plan is in place for the precinct, any additional yield will result in additional contributions for infrastructure and services being collected. Rezoning of land owned by an electricity authority will provide for increased servicing to support development of the precincts.

3.4 Is the planning proposal consistent with a council's local strategy or other local strategic plan?

The Planning Proposal is not inconsistent with Council's Community Strategic Plan: *Our Home, Liverpool 2027*. Council's strategy adopts a quadruple bottom line approach, being Creating Connection (Social), Strengthening and Protecting Our Environment (Environment), Generating Opportunity (Economic), and Leading through Collaboration (Civic Leadership).

The Planning proposal is consistent with the following desires of the community:

- Creation of more green spaces.
    - This is achieved as some lands will be rezoned for public open space.
- Well-managed development.
    - This planning proposal's primary objective is to facilitate the development of Austral as per the precinct vision by correcting a number of minor anomalies, and reviewing Council's drainage network in accordance with detailed concept design plans.
- Creation of well-planned, attractive and people-friendly urban environments
    - As above, the planning proposal seeks to provide for more orderly development, and when combined with the rain-garden strategy, will provide a more attractive urban environment which will provide a more people friendly environment.

The Planning proposal is consistent with the following actions for Council:

- Protect and enhance bushland, rivers and the visual landscape.
    - The proposed rezoning of certain properties for open space or environmental zones will increase opportunities to retain existing vegetation, which may have otherwise been disturbed to engineer drainage infrastructure.
- Exercise planning controls to create high-quality, inclusive, urban environments.
    - The planning proposal seeks to rationalise planning controls in the Austral and Leppington North Precincts in a manner which is consistent with the precinct vision.

3.5 Is the planning proposal consistent with applicable State Environmental Planning Policies?

The planning proposal seeks an amendment to the State Environmental Planning Policy (Sydney Region Growth Centres) 2006. Compliance with any SEPP which applies to the land is given in Table 3 below. Note: any SEPP which does not apply to the land, or for which the planning proposal will not preclude the operation of is not listed.

Table 3: Compliance with SEPPs

SEPP	Complies?	Justification
No 19 Bushland in Urban Areas	Yes	The planning proposal is not inconsistent with the SEPP. Allowing some lands to be rezoned from drainage to open space functions may preserve vegetation which would otherwise have been removed. Council's DCP and the vegetation SEPP provides for the removal of any vegetation. No vegetation is required to be removed to fulfil this Planning Proposal.
State Environmental Planning Policy (Koala Habitat Protection) 2019	Yes	The lands are already zoned for urban purposes. This planning proposal will not undermine any Koala Habitats.
No 55 Remediation of Land	Yes	The lands are already zoned for urban purposes, and a precinct wide contamination assessment was conducted prior to the Austral and Leppington North precincts being rezoned. This planning proposal will not undermine the need for any development to undergo a phase 1 Contamination Assessment.
Exempt and Complying Development Codes 2008	Yes	It is proposed that the land reservation acquisition maps are amended in accordance with the revised land-use zoning maps to ensure exempt and complying development can be carried out in accordance with the zone objectives.
Infrastructure 2007	Yes	The planning proposal does not seek to intensify or enable further development which would interfere with operation of, or delivery of infrastructure. Council expects a condition of gateway would be to consult with public utility providers.
Sydney Region Growth Centres 2006	Yes	The intent of the planning proposal is to rezone certain land within the Austral and Leppington North Precincts to ensure that land is able to be developed in accordance with the precinct vision and to promote orderly development.
Vegetation in Non-Rural Areas 2017	Yes	The planning proposal is not inconsistent with the SEPP. Allowing some lands to be rezoned from drainage to open space functions may preserve vegetation which would otherwise have been removed.

3.6 Is the planning proposal consistent with applicable Ministerial Directions (s.9.1 directions)?

The planning proposal seeks an amendment to the State Environmental Planning Policy (Sydney Region Growth Centres) 2006. Compliance with the ministerial directions is provided in Table 4 below. Note: any direction which does not apply to the planning proposal is not listed.

Table 4: Compliance with s.9.1 Directions

S.9.1 Directions	Complies	Justification
Employment and Resources		
1.1 Business and Industrial Zones	Yes	No land zoned for business or industrial use is to be rezoned under this proposal. A small amount of land zoned for drainage purposes is to be zoned IN2 Light Industrial as the drainage lands are surplus to requirements.
1.2 Rural Zones	Yes	Much of the East Leppington Precinct is zoned for rural purposes under the Liverpool LEP 2008. The Liverpool LEP 2008 maps have been superseded by the Growth Centres SEPP and serve no purpose. There repeal of the maps in this area will have no tangible impacts.
Environment and Heritage		
2.1 Environment Protection Zones	Yes	The planning proposal seeks, broadly, to rezone some lands from one urban use to another urban use. Most of the lands are proposed to be rezoned from SP2 Infrastructure (Local Drainage) to other uses. All of the drainage corridors proposed to be rezoned do not form part of any recognised riparian corridor or tributary, most are overland flow paths. The rezoning of land at 52 and 126 Boyd Streets will involve the rezoning of land within a riparian zone, and land which is non-biodiversity certified. Rezoning of these land from SP2 infrastructure (for the purpose of construction of stormwater detention basins) to a mix of RE1 Public Recreation, E2 Environmental Conservation, and E4 Environmental Living will better enable any existing native vegetation and habitat to be retained. As per the existing zone, Council would have been obliged to of-set this vegetation to enable clearing to construct detention basins. These basins are no longer to be constructed. Any clearing will now be subject to a DA assessment as part of future development.
Housing, Infrastructure and Urban Development		
3.1 Residential Zones	Yes	The planning proposal seeks to ensure that the Liverpool Growth Centre precincts can facilitate orderly residential development. The planning proposal will have a minimal net increase in dwelling yield across the precincts due to many of the surplus drainage corridors being rezoned for residential purposes, and a small amount of land being up zoned from low to medium density residential to align with an amended ILP. An exception is land at 470-510 Fourth Avenue, Austral. These land are proposed to have a small area of land zoned R3 Medium Density amended to R2 Low Density Residential. This results from a concurrent amendment being drafted to the DCP. In the DCP a proposed road is being straightened to produce a more rectangular street block which will facilitate more orderly development. In an effort to ensure that

		subdivided properties do not contain a mix of zoning it is proposed the zone boundary follows the edge of the proposed road. The other exception is land at Lot 99 Gurners Avenue, which is proposed to be rezoned from R2 Low Density Residential to SP2 Infrastructure (Electricity Distribution). It is considered that the provision of electrical infrastructure is critical to allowing rural lands to be transformed for urban purposes as per the planning framework, including residential development; therefore, it is considered that the proposal is consistent with this direction. Changes to Clauses 4.1AD, 4.1AE, and 4.1AF are considered to streamline the development assessment process, whilst potentially enabling better built form outcomes.
3.4 Integrating Land-Use and Transport	Yes	This planning proposal amends some zone boundaries to assist in rationalising the Austral and Leppington North ILP. Rationalising the ILP will assist with orderly development, with one of the objectives of the proposal being to further facilitate pedestrian permeability throughout the precincts. As a result of the proposed amendment to the DCP, some boundaries in the SEPP require amending to ensure that the zone boundaries align with the position of realigned proposed roads
Hazard and Risk		
4.3 Flood Prone Land	Yes	Part of the subject lands are identified as flood prone land and within the flood planning areas. Some land at 175 Gurners Avenue and 295 Fifteenth Avenue is proposed to be rezoned from SP2 (Local Drainage) to R2 Low Density Residential. This land is affected by the outer extent of the floodplain (PMF) as per Council's flood model, but is not flood prone land as per the SEPP maps. The land for any dwellings can be made flood free as part of any residential development, and may involve compensatory cut and fill. Land at 404 Fourth Avenue, 75-105 Thirteenth Avenue, 246 Fourteenth Avenue, 480 & 510 Fifteenth Avenue, 365 Edmondson Avenue, and 18-30 Kelly Street is currently mapped as flood prone land in Council's flood mapping, including high risk lands. These lands, however, are not marked as flood prone land as per the SEPP mapping. As part of developing these land, construction of a piped drainage system, and filling of some of the lands will alleviate the flood potential of the land. Land at 52 Boyd Street is subject to high risk flooding, as per Council's flood risk maps, and is also flood prone land as per the SEPP mapping. It is proposed to be rezoned from SP2 (Local Drainage) to RE1 Public Recreation. This land, in addition to a larger area of RE1 land to the south will be utilised for active open space. Land at 126 Boyd Street is proposed to be rezoned from SP2 (Local Drainage) to a mix of E2 and E4. The Liverpool Growth Centres Precincts DCP contains stringent provisions to ensure

		that any development in these zones has a 500mm freeboard above flood level, and that any filling of the land is compensated with cut. The minimum lot size associated with the E4 zone ensures that the development of dwellings can be located closer to the street, which is flood free, whilst the flood prone land will be located in backyards, and having fencing suitable so as to not impede flood waters. In summary, the planning proposal will: • Not permit any additional development in a floodway (as per the construction of stormwater infrastructure when the land is developed, or via development controls in the precinct DCP), • Not permit any development which will have an impact on downstream properties, as any fill will need to be compensated with cut as per the requirements of developing the land in accordance with the DCP. • Not significantly increase the development of the land. • Not increase government spending on flood mitigation infrastructure. • Not seek to provide for any additional land uses to be permitted without consent, other than those already prescribed in the relevant land-use zone as per the SEPP
4.4 Planning for Bushfire Protection	Yes	Part of the subject sites are identified as bushfire prone land in accordance with Section 10.3 of the *Environmental Planning and Assessment Act 1979*. Land which is currently mapped as bushfire prone includes: • 126 Boyd Street, • Lot 99 Gurner Avenue, • 29 Gurner Avenue, • 75 Gurner Avenue, • 135 Gurner Avenue, • 145 Gurner Avenue, • 155 Gurner Avenue, • 165 Gurner Avenue, and • 175 Gurner Avenue. No development is proposed as part of the planning proposal; rather the planning proposal will enable the development of certain lands in accordance with the precinct vision. It is anticipated that in most instances any subdivision of the land will likely involve a degree of vegetation clearing and removal of the fire threat. In instances where vegetation is retained and/or protected any new dwelling houses, or other development, will be constructed of materials which are able to withstand a heat load indicated by the BAL value of the property. Council requires a bushfire assessment to be provided for subdivision of any land that is within a bushfire prone area. The planning proposal does not seek to undermine access to any heavily vegetated areas, nor amend any controls relating to Asset Protection Zones.

		It is anticipated that the gateway determination will require consultation with the Commissioner of the NSW Rural Fire Service.
Regional Planning		
5.10 Implementation of Regional Plans	Yes	The regional plan for Metropolitan Sydney is *A Plan for Growing Sydney*. Consistency with *A Plan for Growing Sydney* is demonstrated in section 3.3 of this report.
Local Plan Making		
6.1 Approval and Referral Requirements	Yes	The planning proposal does not contain provisions requiring additional concurrence, consultation, or referral to a Minister or public authorities.
6.2 Reserving Land for Public Purposes	Yes	The planning proposal seeks to remove the acquisition of certain lands in the sites identified. The planning proposal also seeks to remove the lands from the land reservation acquisition maps. The planning proposal also seeks to include some additional lands as land reserved for acquisition. This is associated with: • A small area of land proposed to be rezoned from R3 Medium Density Residential to RE1 Public Recreation at 542 Bringelly Road; • Amending the area of land zone SP2 (Local Drainage) affecting properties at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue, • Rezoning Lnad from R2 Low Density Residential to SP2 Infrastructure (Electricity Distribution) at Lot 99 Gurner Avenue, at the request of Endeavour Energy; • Land reserved for the purpose of road widening at 365 and 485 Edmondson Avenue; and • Land reserved for the purposes of a new local road at 1402 Camden Valley Way, Leppington. The land acquisition maps are proposed to be amended to match the zoning extent. Council, TfNSW, Endeavour Energy are nominated as the acquisition authorities for any additional lands to be acquired as per the SEPP. Councils Development Contributions Plan is to be amended to reflect these changes where relevant, and to provide funding for the land to be acquired under Division 3 of Part 2 of the Land Acquisition (Just Terms Compensation) Act 1991.
Metropolitan Planning		
7.1 Implementation of A Plan for Growing Sydney	Yes	Consistency with *A Plan for Growing Sydney* is demonstrated in section 3.3 of this report.

Section C – Environmental, social, and economic impact

3.7 Is there any likelihood that critical habitat or threatened species, populations or ecological communities, or their habitats, will be adversely affected as a result of the proposal?

No. The planning proposal only seeks to rezone land that has already been zoned for urban purposes. Much of the land has been biodiversity certified.

Some land which is noted as containing existing native vegetation, has been identified as being suited to be zoned RE1 Public Recreation, E2 Environmental Conservation or E4 Environmental Living. The objectives of these zones aims to protect, and enhance the natural environment.

3.8 Are there any other likely environmental effects as a result of the planning proposal and how are they proposed to be managed?

No. The rezoning of certain lands, and alteration to development standards is not likely to have any discernible environmental impacts that wouldn't have otherwise been permitted under the existing zone. The rezoning of some sites to recreation and environmental zones will likely decrease any impacts on existing vegetation/habitats. Some of the lands are subject to bushfire, flood, and salinity hazards, which are addressed by the precinct DCP.

3.9 Has the planning proposal adequately addressed any social and economic effects?

The most likely social/economic impacts of the planning proposal would be the impact on property values as a result of some properties being partially rezoned. The objectives of the planning proposal are not to uplift or downzone any lands, rather the planning proposal seeks to better facilitate the development of lands within the Austral and Leppington North Precincts as per the vision for the area. For land at 470 – 510 Fourth Avenue this involves rezoning some of the land from R3 Medium Density Residential to R2 Low Density Residential. This is in response to the position of some ILP roads being straightened and moved closer together to provide for more orderly development. As such, the amendment to the zone boundary is likely to improved development feasibility, whist not impacting upon any development yield.

Some land at 542 Bringelly Road is proposed to be rezoned from R3 Medium Density Residential to RE1 Public Recreation. This land is proposed to be rezoned to ensure that the zoning boundary matches that of adjoining properties and to avoid the construction of an unsafe road intersection. Due to the development potential of this land being extinguished, Council would acquire this land utilising development contributions. Council's acquisition of this land is subject to the Land Acquisition (Just Terms Compensation) Act 1991.

Land at 365 and 485 Edmondson Avenue is to be acquired for the purpose of widening of Edmondson Avenue. This amendment is considered to be correcting an anomaly, as Council's DCP already shows road widening on the land, and it is Council's assumption that the zoning should have reflected the road widening when the precinct was rezoned.

A proposed local road that is to be provided on land at 1382-1402 Camden Valley Way, Leppington currently impacts two existing properties. The new road will create a fourth leg of the Camden Valley Way/Cowpasture Road intersection. Due to the intersection being in a different location as envisaged by the ILP, the zoned land for the road no longer aligns with intersection, and the road must now be constructed wholly on land at 1402 Camden Valley Way (releasing burden on land at 1382-1384 Camden Valley Way). It is Council's understanding that the land-owner will be compensated in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991 No 22*.

The other notable economic impacts associated with the planning proposal (and related amendments to the DCP and Contributions Plan) relate to Council's stormwater strategy. As per the planning proposal, several 10m wide drainage channels, which are often flanked by 16m wide local streets on both sides (for

a total width of 42m) are proposed to be rezoned for other purposes and removed from the contributions plan. However, a stormwater pipe or box culvert will still be necessary in the proximate location to convey stormwater. It is considered that rezoning the land for other uses, in addition to the requirement of only having to provide a single road in most circumstances negates the additional cost of providing larger stormwater pipes. Despite funds for the acquisition and construction of an open channel being removed from the contributions plan, the additional developable area and costs of only providing one road in place of two are more than likely to off-set the loses of providing higher capacity piped stormwater infrastructure.

No negative social impacts are envisaged a result of the planning proposal. Rezoning of land at 265-275 Fifteenth Avenue will facilitate the retention of existing private social infrastructure, being a centre based childcare facility and a place of worship. The rezoning of some lands from SP2 (local Drainage) or R3 Medium Density Residential to RE1 Public Open Space is concluded to be a net social benefit.

The property owners of each property which was to be affected by a rezoning in the precinct was notified via a letter. Most property owners did not comment or supported the amendments. Further discussion of submissions is discussed in the submissions evaluation table carried out as part of this planning proposal.

Section D – State and Commonwealth interests

3.10 Is there adequate public infrastructure for the planning proposal?

The planning proposal is not considered to demand any additional public infrastructure. Whilst the planning proposal may result in a marginal increase in development yield, due to some drainage lands being rezoned for primarily, residential uses, it is considered that the resultant uplift in the context of the broader Austral and Leppington North precincts is inconsequential.

3.11 What are the views of state and Commonwealth public authorities consulted in accordance with the Gateway determination?

The views of State and Commonwealth public authorities were considered following Gateway determination. The view and opinions of each agency identified in the gateway determination are provided below:

Agency	Support/Comment/Object and additional Comments
Sydney Water	Comment. Provided details about ownership and proximity of easements around a sewer pumping station at Lot 2 DP 1223501, and separately requested rezoning to SP2 Sewerage System. Requested on-going discussions regarding stormwater quality strategy.
Office of Environment and Heritage	Objection. <u>Biodiversity Certification</u> An objection was received from the Environment, Energy and Science Group (EES). EES objected on the grounds that the planning proposal did not address its consistency with the conditions of biodiversity certification. Certification of lands subject to this planning proposal were conferred under the *Order to confer biodiversity certification on the State Environmental Planning Policy (Sydney Region Growth Centres) 2006* on 11 December 2007. The order contains multiple provisions, many of which relate to matters such as the administration of the order, funding for conservation efforts, land application, and additional considerations for key species. Provisions which are pertinent to this planning proposal include: • Condition 6 (area of existing native vegetation to be retained in the Growth Centres),

	• Condition 7 (the planning authority may determine some areas of existing native vegetation within non-certified areas available for development), • Condition 8 (Off-setting of vegetation subject to provision 7) • Condition 9 (restoration works which can satisfy provision 6) Council responded to these concerns by iterating that all lands subject to the planning proposal were already biodiversity certified, with the exception of lands at 52 and 126 Boyd Street. The impact of the planning proposal on these two properties is to rezone lands from SP2 Infrastructure (Local Drainage) to a mix of RE1 Public Open Space, E2 Environmental Conservation, and E4 Environmental Living (as per lands adjacent). The SP2 zone (which would have facilitated the development of a drainage basin) would have guaranteed the disruption of native flora and fauna on the sites. The RE1, E2 and E4 zones, conversely, promote the retention of existing native vegetation. Existing native vegetation on land to be rezoned wholly RE1 at 52 Boyd Street could be retained, or subject to off-sets, as per the certification order, at a later date upon design and construction of the open space facility. Plans for this open space have not yet been prepared, and as such, no commitments or further comments about the need to offset an be provided. Land at 126 Boyd Street, which is non-certified and contains existing native vegetation is proposed to be zoned E2 Environmental Conservation (which prohibits residential development). The relative sparsity of trees on the land, protection of existing trees via the E2 zone, and minimum lot size of 2,500sqm is sufficient so as to ensure that the clearing of any vegetation to support residential dwelling construction can be avoided. Regardless, the planning proposal, and proposed zones, will not interfere with the order in an instance where clearing of vegetation is subject to a DA. In summary, the planning proposal does not seek to certify any non-certified land, and will not undermine the order with regards to the clearing of land which is non-certified. The existing land-uses at 52 and 126 Boyd Street would see the disturbance of vegetation on these sites to facilitate the construction of flood detention basins. The planning proposal will facilitate the retention of a greater quantity of vegetation in the certified and non-certified areas of these sites by permitting lesser impact development. It is Council staff's opinion that the planning proposal is consistent with the biodiversity certification order. <u>Flooding:</u> The EES group identified that the flood conditions for land to be rezoned at 52 and 126 Boyd Street will require development of a flood evacuation plan in consultation with the SES to mitigate any potential risks of isolation. The lands to be rezoned on Boyd Street are to be rezoned as per the lands adjacent, and the extent of flood risk does not envelope all of the subject properties (only the portion closest to the creek). It is recognised that Boyd Street may become isolated in a flood event; this is due to it being a cul-de-sac road, and a small portion of the road closest to the intersection with Little Street being subject to flood. However, future development as per the ILP will provide for a series of east-west streets connecting Boyd Street to other streets outside of the floodplain at intervals of approximately 300m, negating reliance on Little Street once any of these roads are constructed. Should any of the east-west streets between Kelly Street and Boyd Street be constructed prior to 52 or 126

	Boyd Street being constructed, then these lands will not be isolated under flood conditions. It is considered that preparation of a flood evacuation plan could be provided as part of a future DA for these lots, should a flood free evacuation route not be available. As such, preparation of a flood evacuation plan as part of this planning proposal is considered unreasonable, as the existing planning framework (indicative layout plan, and flood planning controls) provide an appropriate mechanism for the consideration of flood risk on these properties.
NSW Rural Fire Service	No objections, provided development of lands is generally carried out in accordance with *Planning for Bushfire Protection*.
NSW Department of Industries (Water)	No response
Transgrid	Transgrid commented on the planning proposal with regards to considerations of development within proximity of easements. It is noted that Council is rezoning land from SP2 to E4 that is within a Transgrid easement at 126 Boyd Street. The E4 zone enables large lot residential development (minimum lot size 2,500sqm. The easement lies at the front of the property. The minimum lot size control would enable residential development to be provided outside of the easement. The E4 zoning of this section of the Transgrid easement is consistent with several other properties on Boyd Street.
Endeavour Energy	Endeavour Energy commented on the planning proposal with regards to considerations of development within proximity of easements, and acknowledged that Council is proposing to rezone the site at Lot 99 Gurner Avenue as SP2 Infrastructure (Electrical Distribution). Comments were also made with regards to access to substations and easements. Further changes were made to the DCP ILP (road network) to avoid DCP roads running through the substation. This did not impact the planning proposal.

Part 4 – Mapping

Extracts of the changes to the land-use zoning maps are presented in Figure 2 to Figure 31 in Part 2 of the planning proposal. Other proposed changes to SEPP maps are shown below.

135-175 Gurners Avenue Zoning Maps

Figure 40: Existing Zoning at 135-175 Gurners Avenue

Figure 41: Proposed zoning at 135-175 Gurners Avenue

135-175 Gurners Avenue Maximum Height of Buildings Maps

Figure 42: Existing Maximum Building Height at 135-175 Gurners Avenue

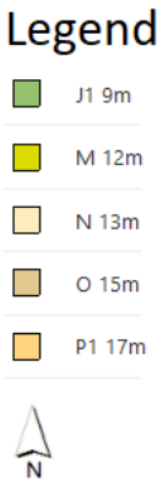


Figure 43: Proposed Maximum Building Height at 135-175 Gurners Avenue

135-175 Gurners Avenue Minimum Dwelling Density Maps

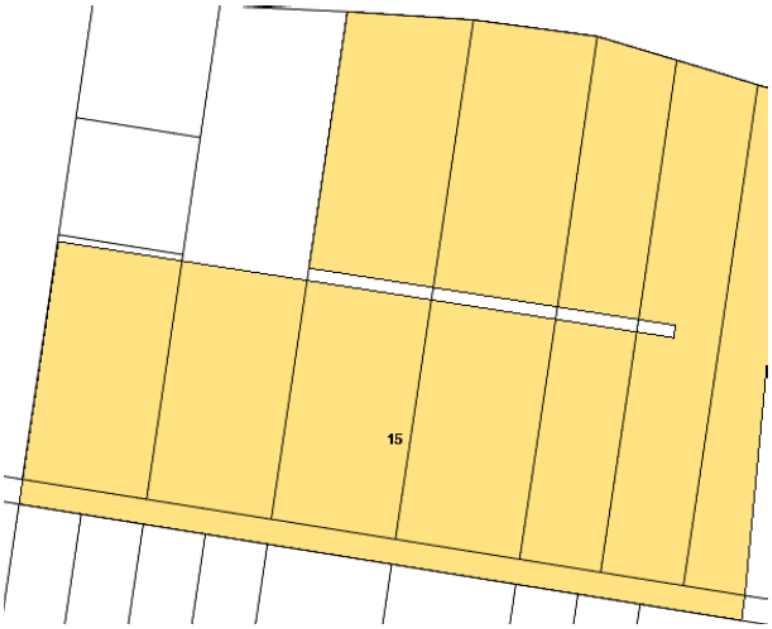
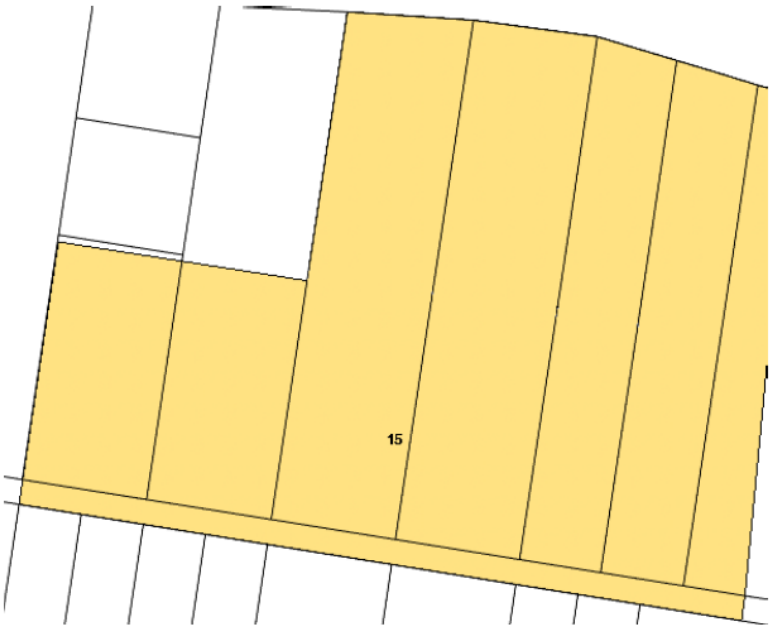


Figure 44: Existing Minimum Dwelling Density at 135-175 Gurners Avenue



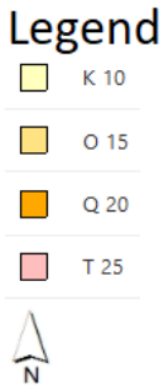


Figure 45: Proposed Minimum Dwelling Density at 135-175 Gurners Avenue

135-175 Gurners Avenue Land Acquisition Maps

Figure 46: Existing Land Reservation Acquisition at 135-175 Gurners Avenue

Figure 47: Proposed Land Reservation Acquisition at 135-175 Gurners Avenue

29 Gurners Avenue Zoning Maps

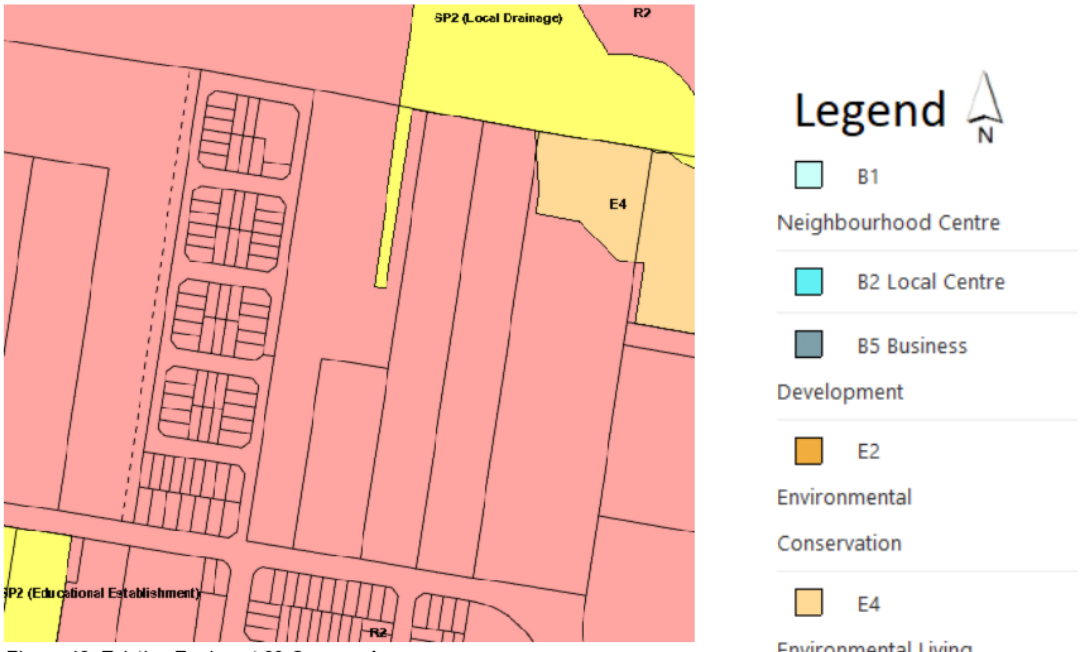


Figure 48: Existing Zoning at 29 Gurners Avenue

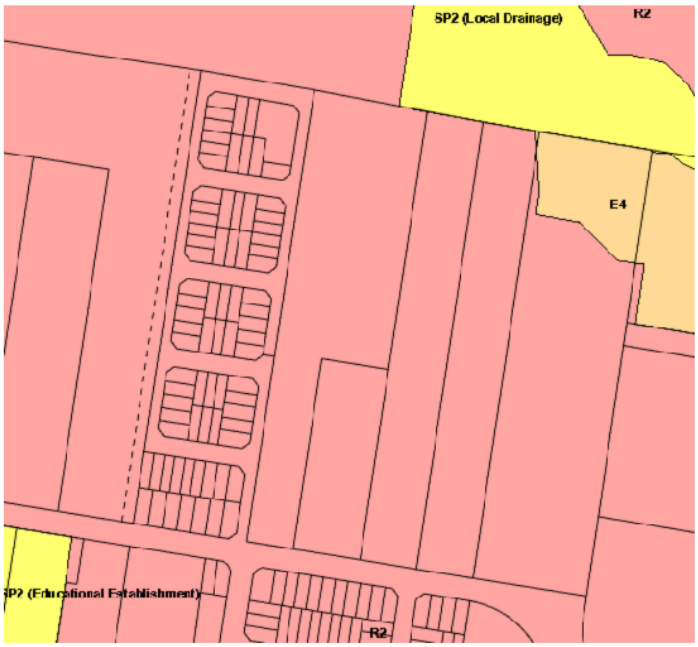
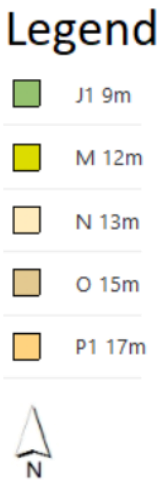


Figure 49: Proposed zoning at 29 Gurners Avenue

29 Gurners Avenue Maximum Height of Buildings Maps

Figure 50: Existing Maximum Building Height at 29 Gurners Avenue

Figure 51: Proposed Maximum Building Height at 29 Gurners Avenue



29 Gurners Avenue Minimum Dwelling Density Maps

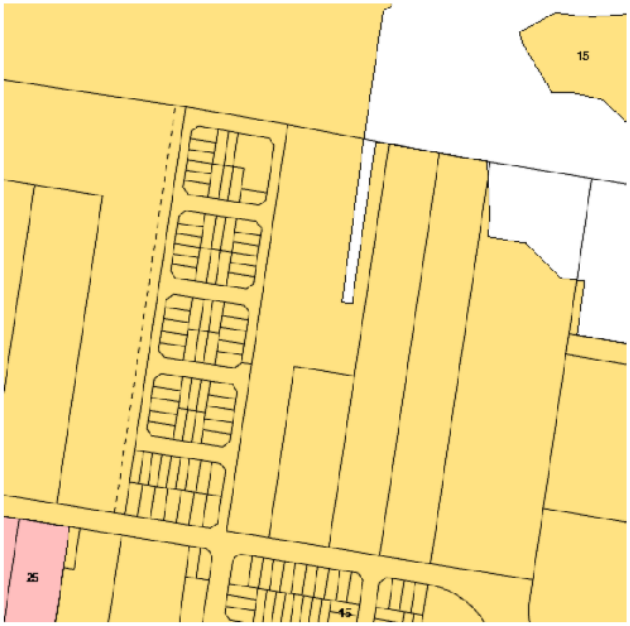


Figure 52: Existing Minimum Dwelling Density at 29 Gurners Avenue

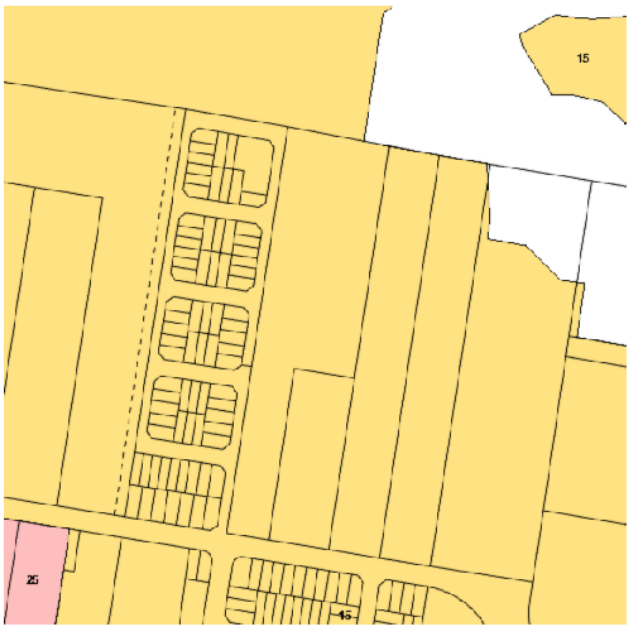
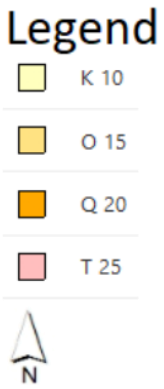


Figure 53: Proposed Minimum Dwelling Density at 29 Gurners Avenue



29 Gurners Avenue Land Acquisition Maps

Figure 54: Existing Land Reservation Acquisition at 29 Gurners Avenue

Figure 55: Proposed Land Reservation Acquisition at 29 Gurners Avenue

Legend
LAND RESERVATION ACQUISITION
N

75 Gurners Avenue Zoning Maps

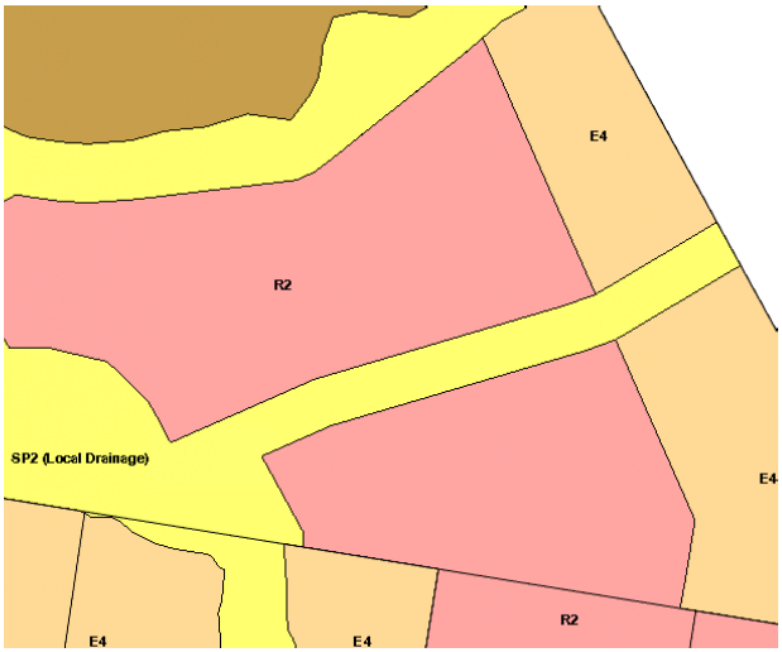


Figure 56: Existing Zoning at 75 Gurners Avenue

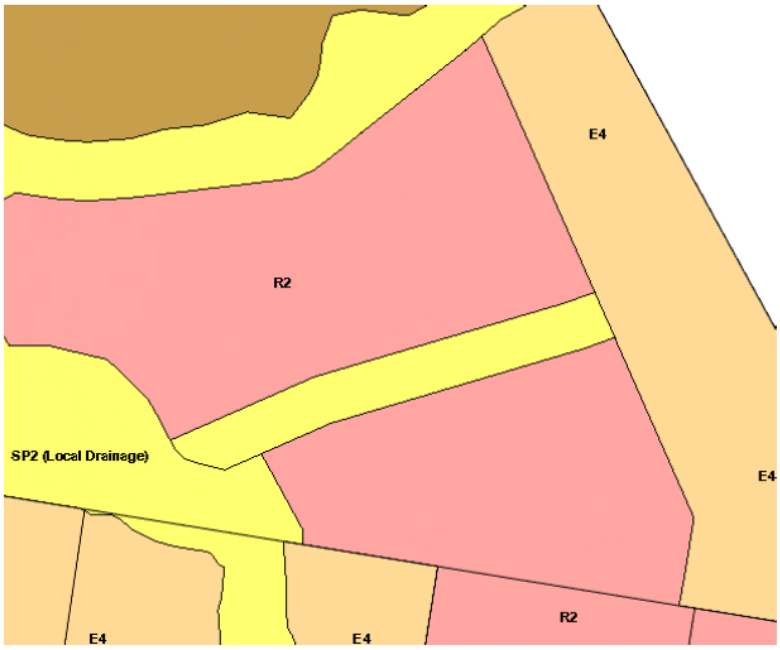


Figure 57: Proposed Zoning at 75 Gurners Avenue

75 Gurners Avenue Maximum Height of Buildings Maps

Figure 58: Existing Maximum Building Height at 75 Gurners Avenue

Figure 59: Proposed Maximum Building Height at 75 Gurners Avenue

75 Gurners Avenue Land Acquisition Maps

Figure 60: Existing Land Reservation Acquisition at 75 Gurners Avenue

Figure 61: Proposed Land Reservation Acquisition at 75 Gurners Avenue

470-510 Fourth Avenue Zoning Maps

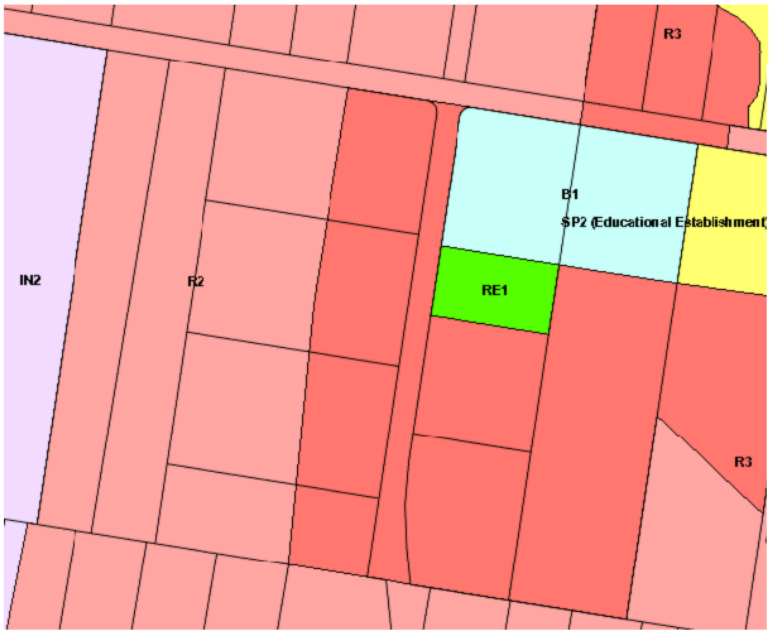


Figure 62: Existing Zoning at 470-510 Fourth Avenue

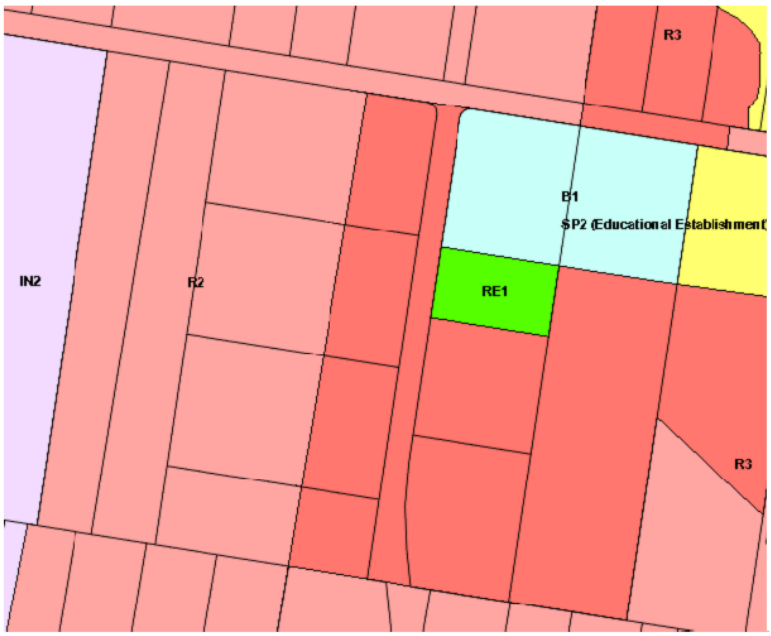


Figure 63: Proposed zoning at 470-510 Fourth Avenue

470-510 Fourth Maximum Height of Buildings Maps

Figure 64: Existing Maximum Building Height at 470-510 Fourth Avenue

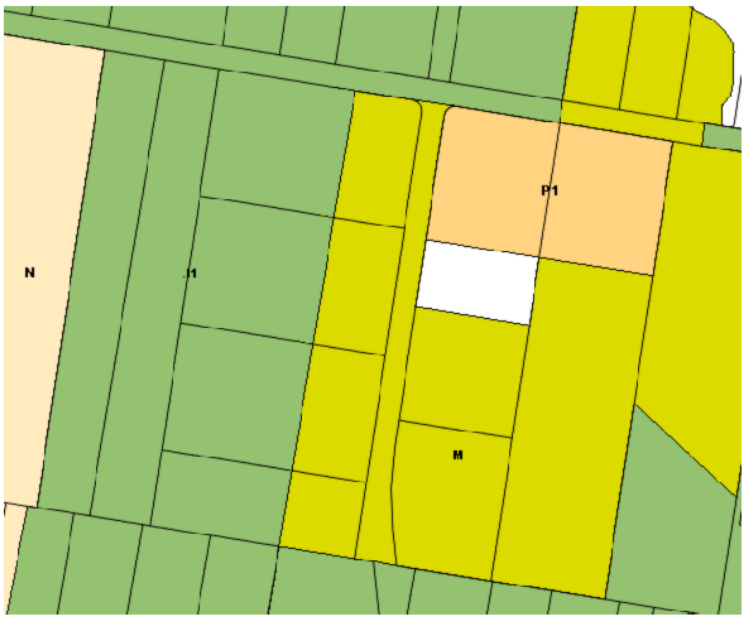


Figure 65: Proposed Maximum Building Height at 470-510 Fourth Avenue

470-510 Fourth Minimum Dwelling Density Maps

Figure 66: Existing Minimum Dwelling Density at 470-510 Fourth Avenue

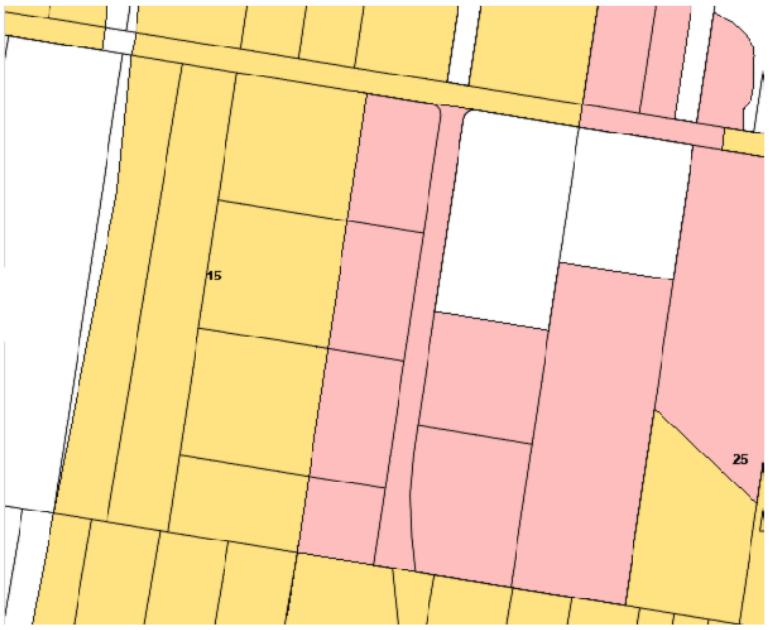


Figure 67: Proposed Minimum Dwelling Density at 470-510 Fourth Avenue

160 – 184 Gurner Avenue Zoning Maps

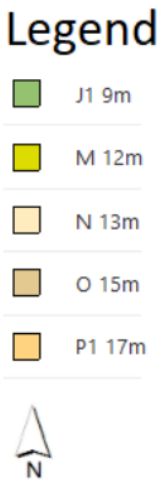
Figure 68: Existing Zoning at 160 – 184 Gurner Avenue

Figure 69: Proposed zoning at 160 – 184 Gurner Avenue

160 – 184 Gurner Avenue Maximum Height of Buildings Maps

Figure 70: Existing Maximum Building Height at 160 – 184 Gurner Avenue

Figure 71: Proposed Maximum Building Height at 160 – 184 Gurner Avenue



160 – 184 Gurner Avenue Maximum Floor Space Ratio Maps

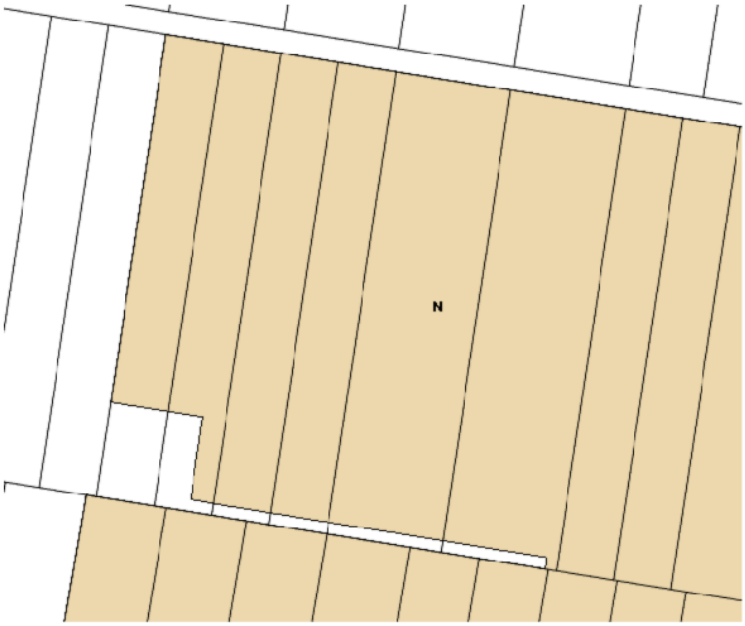
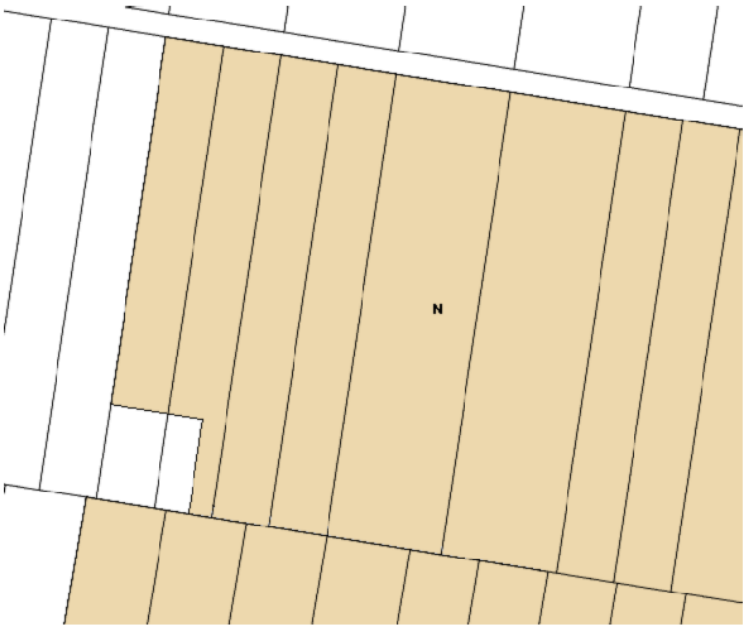


Figure 72: Existing Maximum Floor Space Ratio at 160 – 184 Gurner Avenue



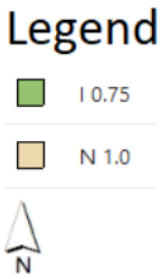


Figure 73: Proposed Maximum Floor Space Ratio at 160 – 184 Gurner Avenue

160 – 184 Gurner Avenue Land Acquisition Maps

Figure 74: Existing Land Reservation Acquisition at 160 – 184 Gurner Avenue

Figure 75: Proposed Land Reservation Acquisition at 160 – 184 Gurner Avenue

295Fifteenth Avenue Zoning Maps

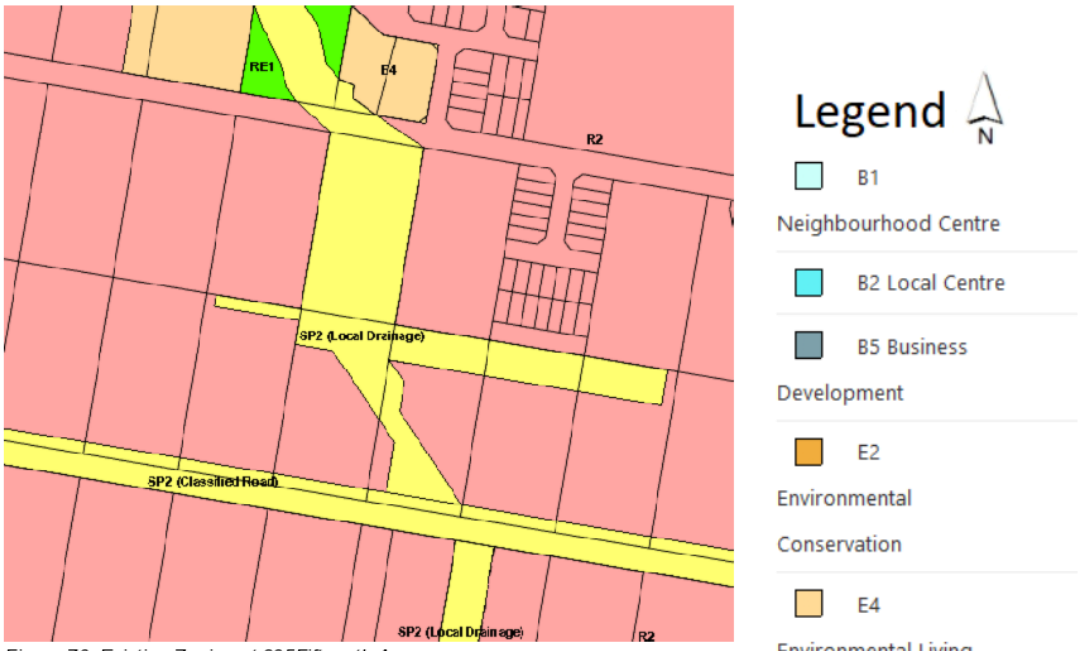


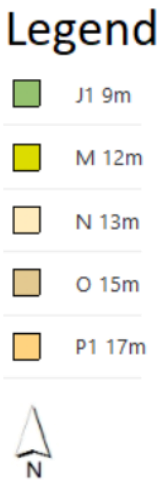
Figure 76: Existing Zoning at 295Fifteenth Avenue

Figure 77: Proposed zoning at 295Fifteenth Avenue

295Fifteenth Avenue Maximum Height of Buildings Maps

Figure 78: Existing Maximum Building Height at 295Fifteenth Avenue

Figure 79: Proposed Maximum Building Height at 295Fifteenth Avenue



295Fifteenth Avenue Minimum Dwelling Density Maps

Figure 80: Existing Minimum Dwelling Density at 295Fifteenth Avenue

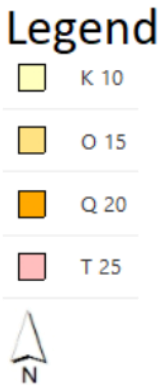


Figure 81: Proposed Minimum Dwelling Density at 295Fifteenth Avenue

295Fifteenth Avenue Land Acquisition Maps

Figure 82: Existing Land Reservation Acquisition at 295Fifteenth Avenue

Figure 83: Proposed Land Reservation Acquisition at 295Fifteenth Avenue

75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue Zoning Maps

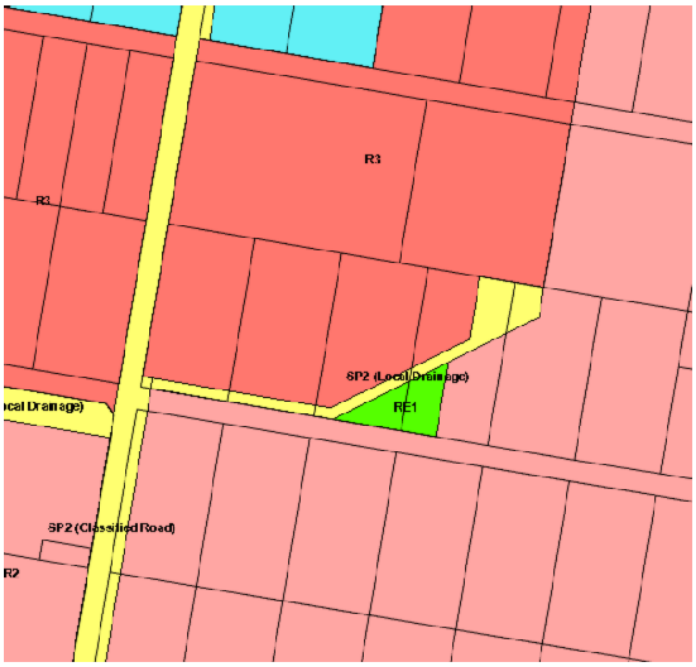


Figure 84: Existing Zoning at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue

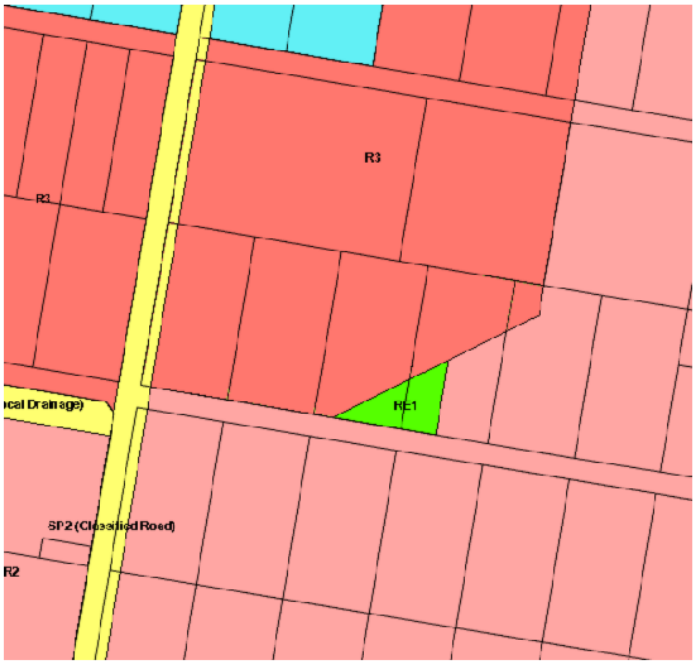


Figure 85: Proposed Zoning at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue

75-105 Thirteenth Avenue and 365 Edmondson Avenue Maximum Height of Buildings Maps

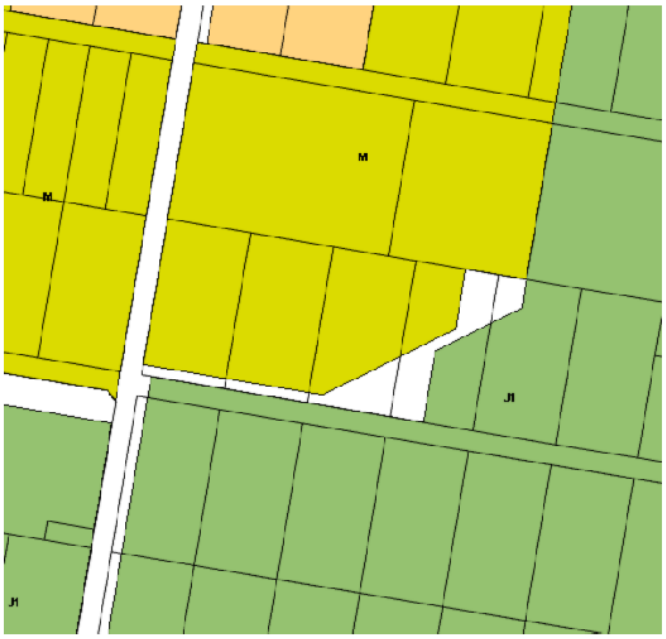
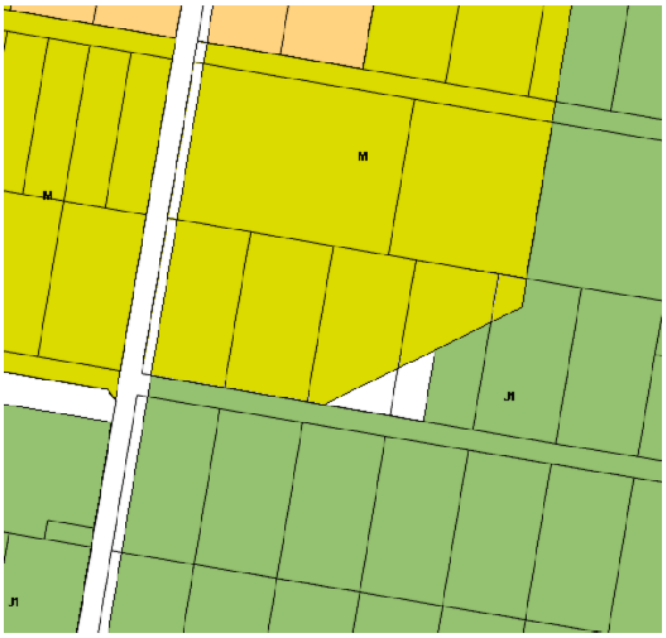


Figure 86: Existing Maximum Building Height at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue



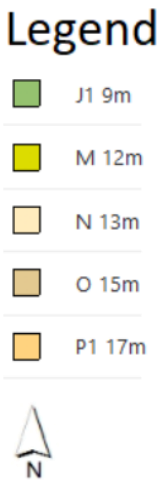


Figure 87: Proposed Maximum Building Height at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue

75-105 Thirteenth Avenue and 365 Edmondson Avenue Minimum Dwelling Density Maps

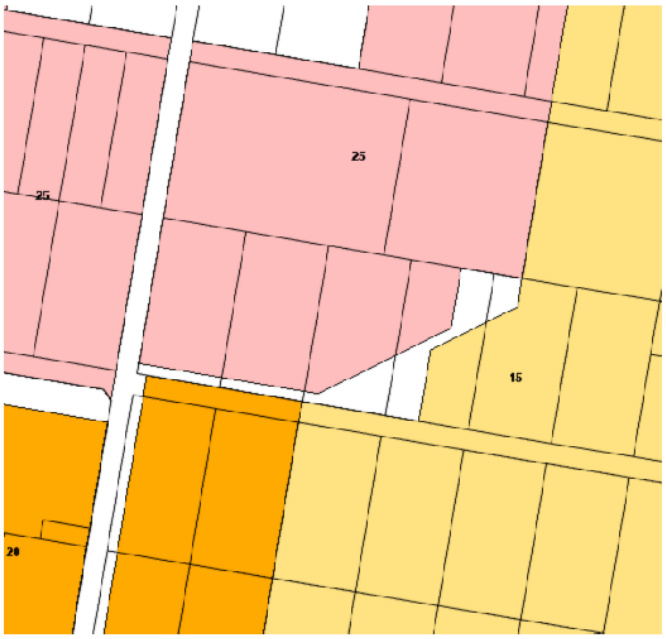
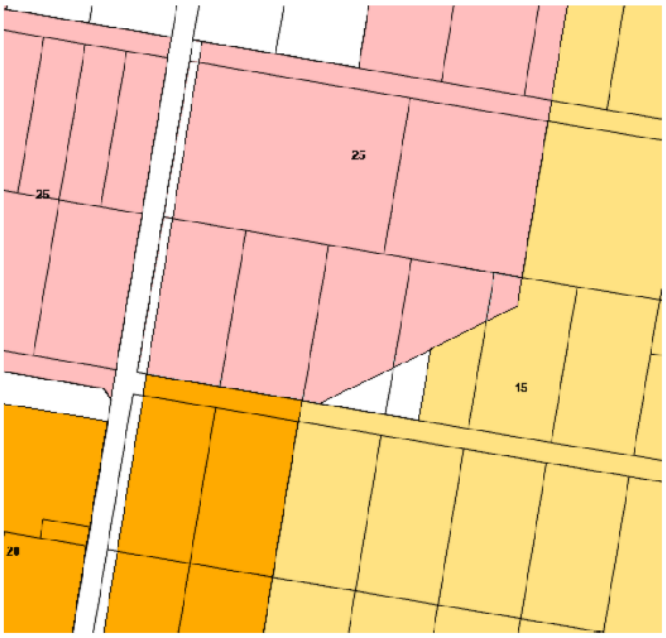


Figure 88: Existing Minimum Dwelling Density at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue



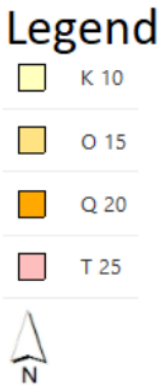


Figure 89: Proposed Minimum Dwelling Density at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue

75-105 Thirteenth Avenue and 365 Edmondson Avenue Land Acquisition Maps

Figure 90: Existing Land Reservation Acquisition at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue

Legend
LAND RESERVATION ACQUISITION
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Figure 91: Proposed Land Reservation Acquisition at 75-105 Thirteenth Avenue, 365 and 485 Edmondson Avenue

480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue Zoning Maps

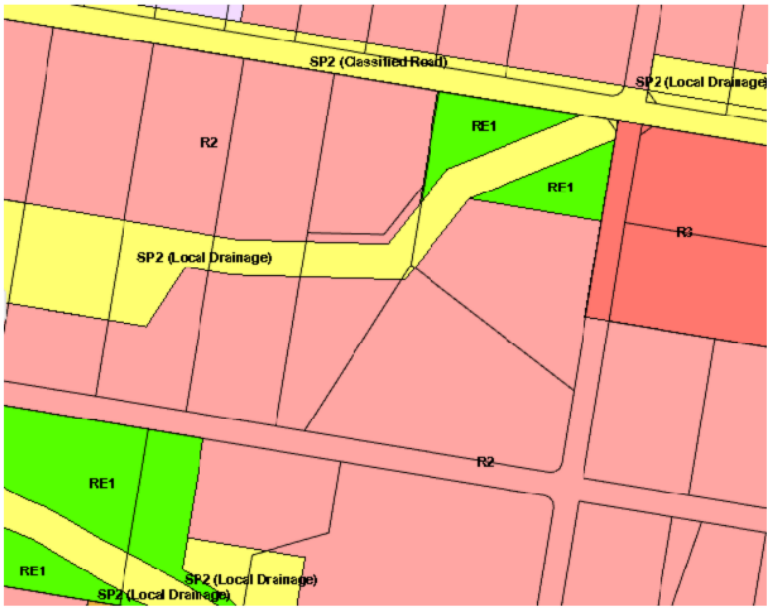


Figure 92: Existing Zoning at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

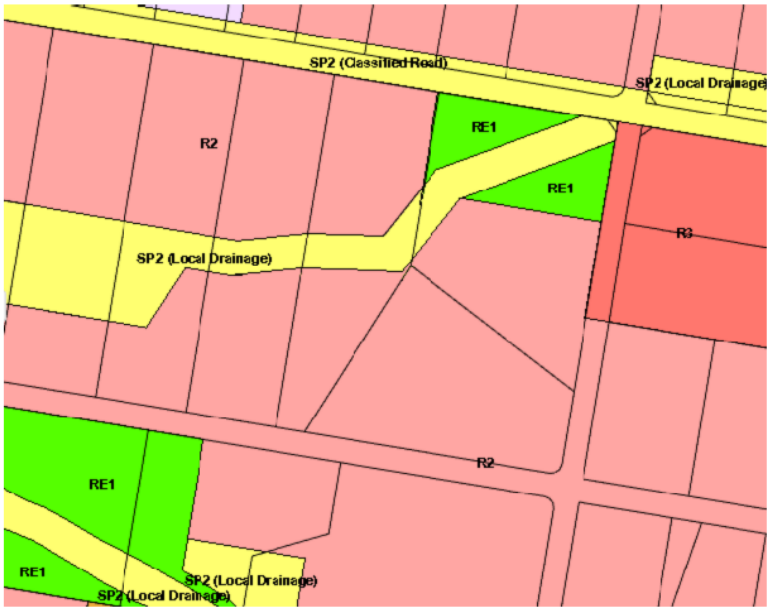


Figure 93: Proposed zoning at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue Maximum Height of Buildings Maps

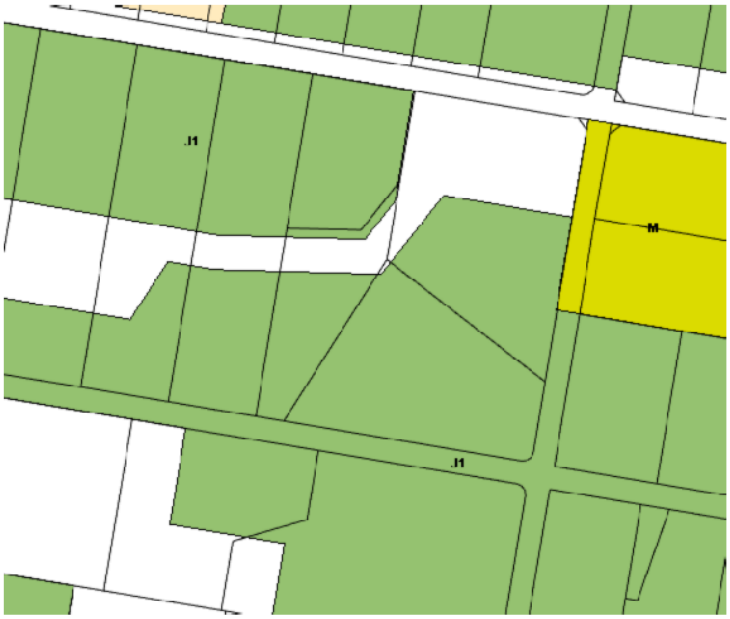
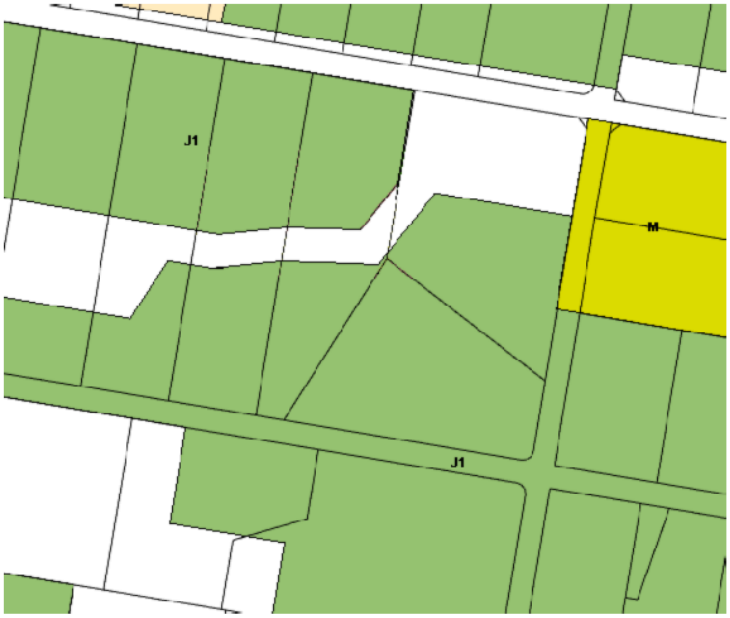


Figure 94: Existing Maximum Building Height at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue



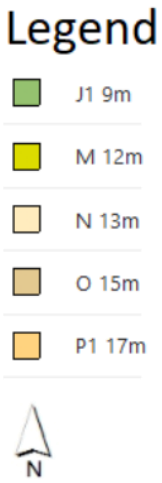


Figure 95: Proposed Maximum Building Height at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue Minimum Dwelling Density Maps

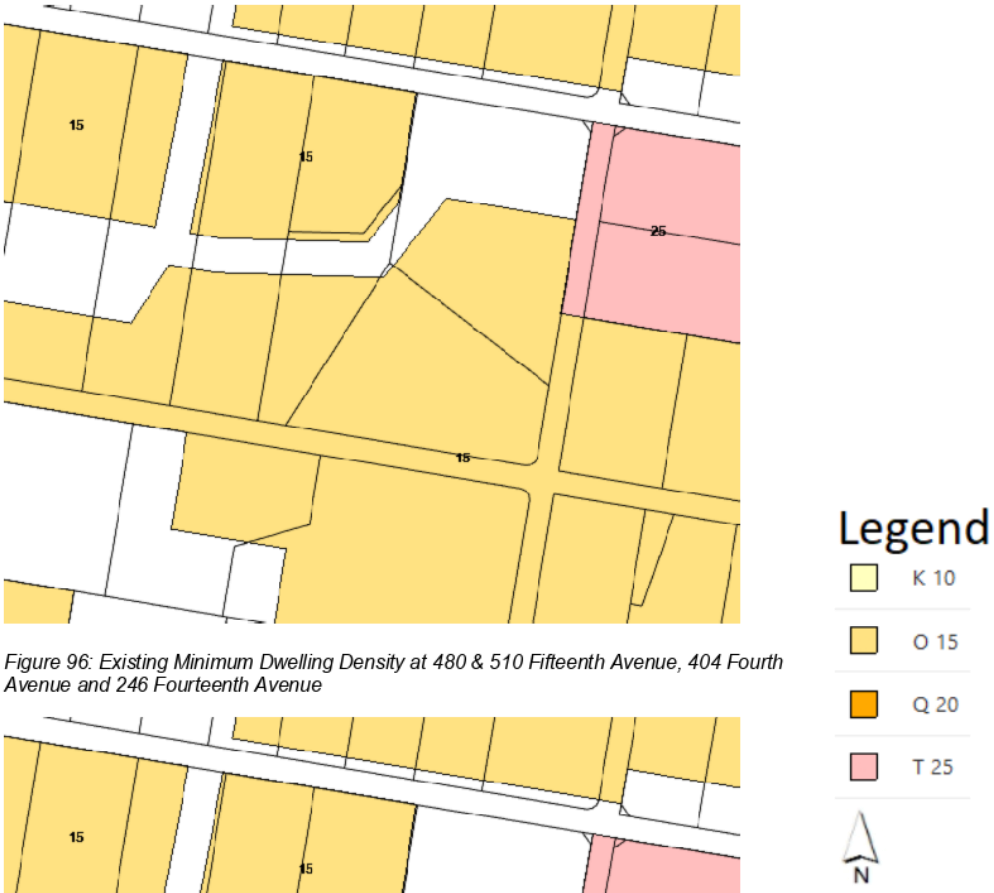


Figure 96: Existing Minimum Dwelling Density at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

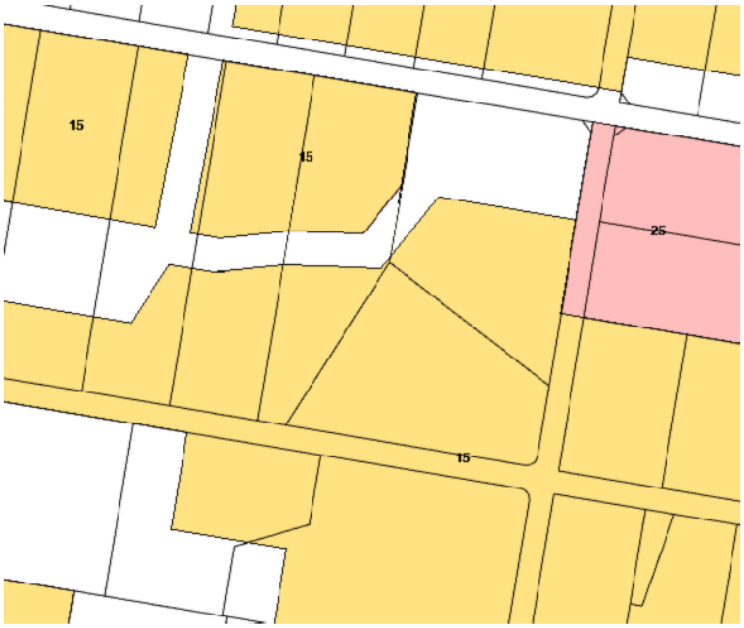


Figure 97: Proposed Minimum Dwelling Density at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue Land Acquisition Maps

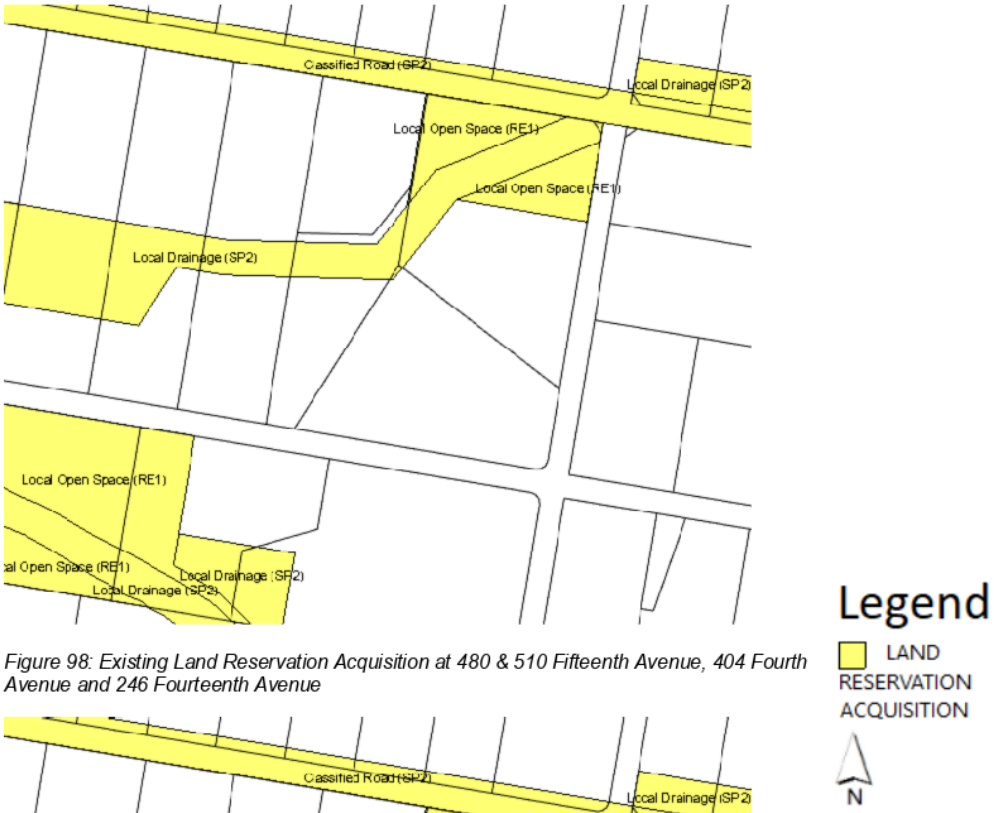


Figure 98: Existing Land Reservation Acquisition at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

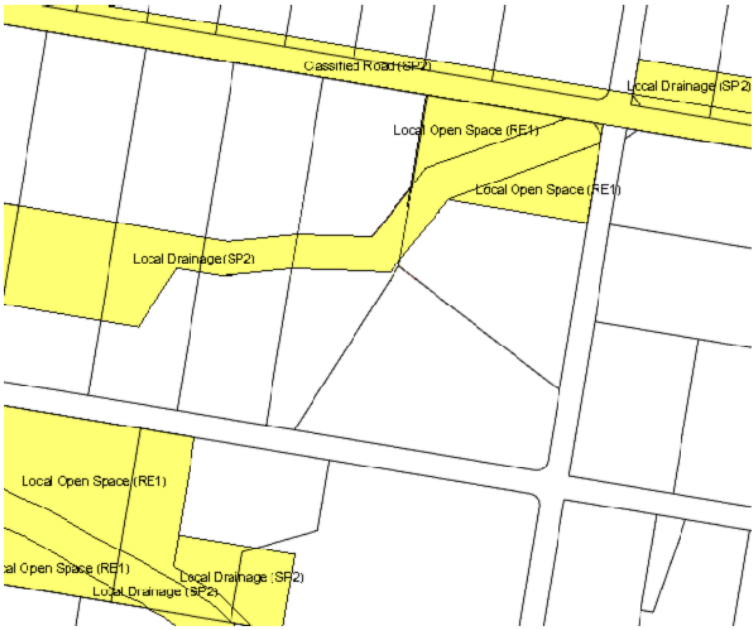


Figure 99: Proposed Land Reservation Acquisition at 480 & 510 Fifteenth Avenue, 404 Fourth Avenue and 246 Fourteenth Avenue

18-30 Kelly Street Zoning Maps

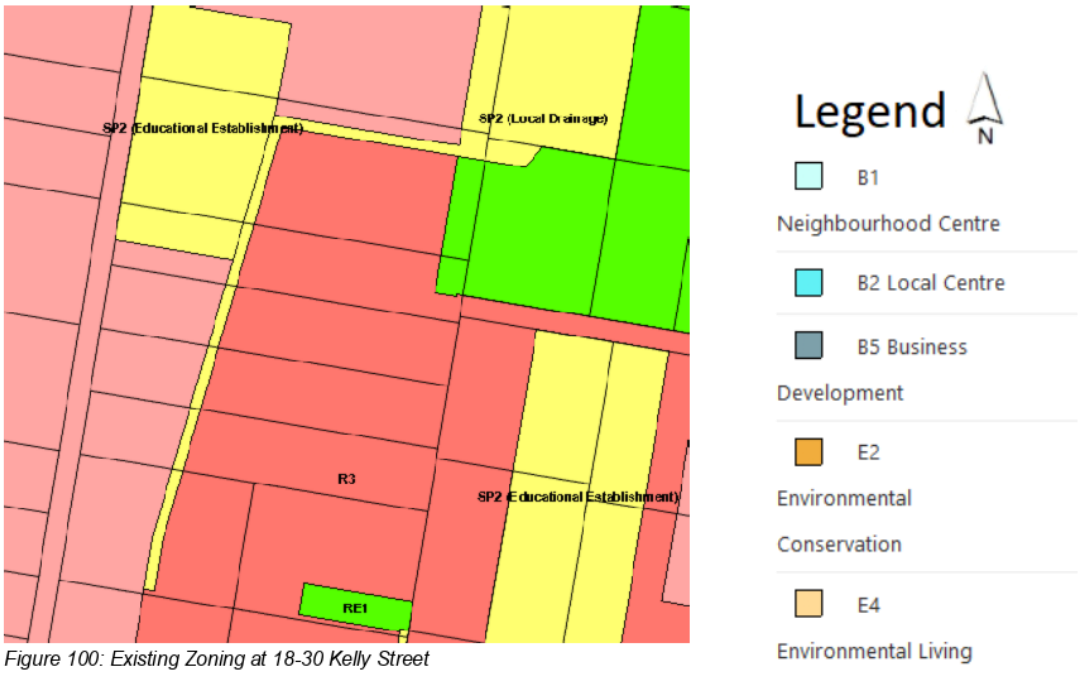


Figure 100: Existing Zoning at 18-30 Kelly Street

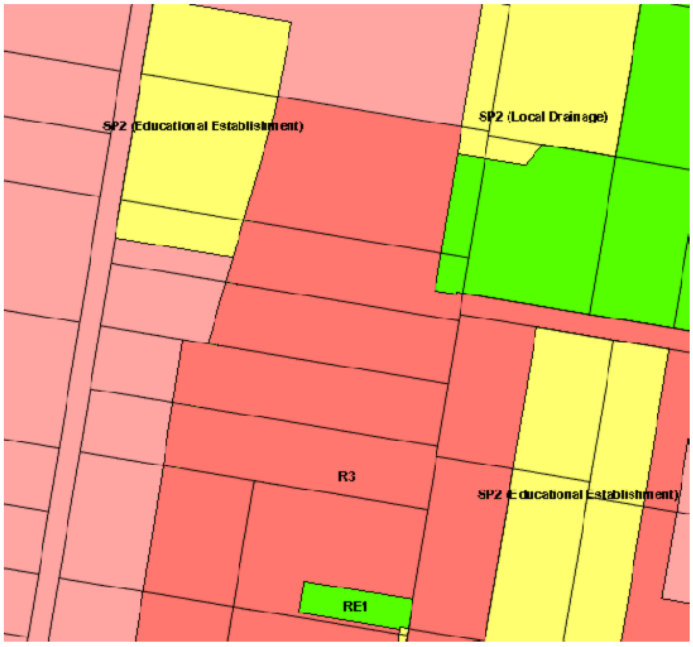


Figure 101: Proposed zoning at 18-30 Kelly Street

18-30 Kelly Street Maximum Height of Buildings Maps

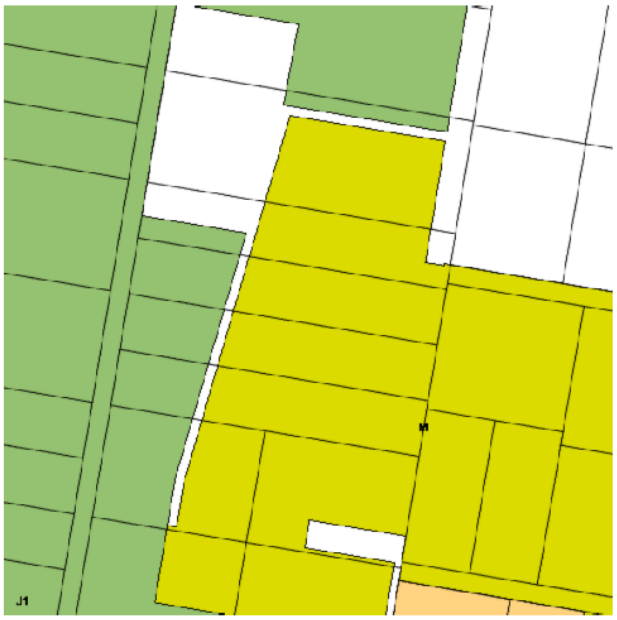


Figure 102: Existing Maximum Building Height at 18-30 Kelly Street

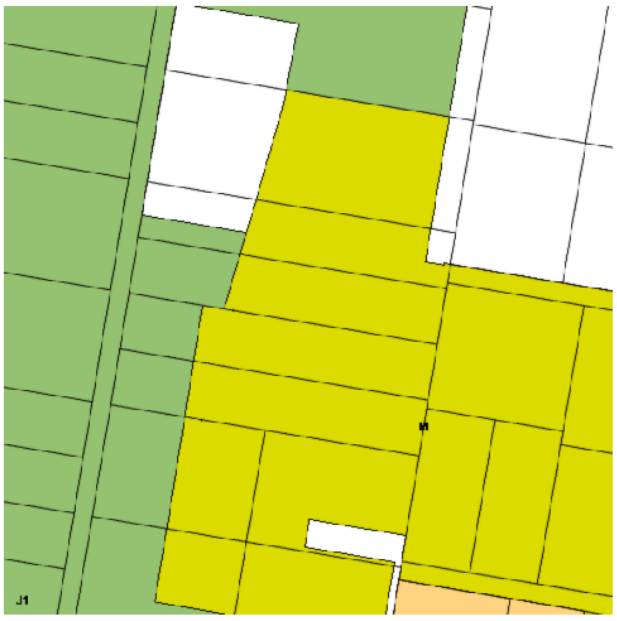
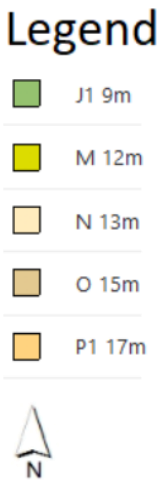


Figure 103: Proposed Maximum Building Height at 18-30 Kelly Street



18-30 Kelly Street Minimum Dwelling Density Maps

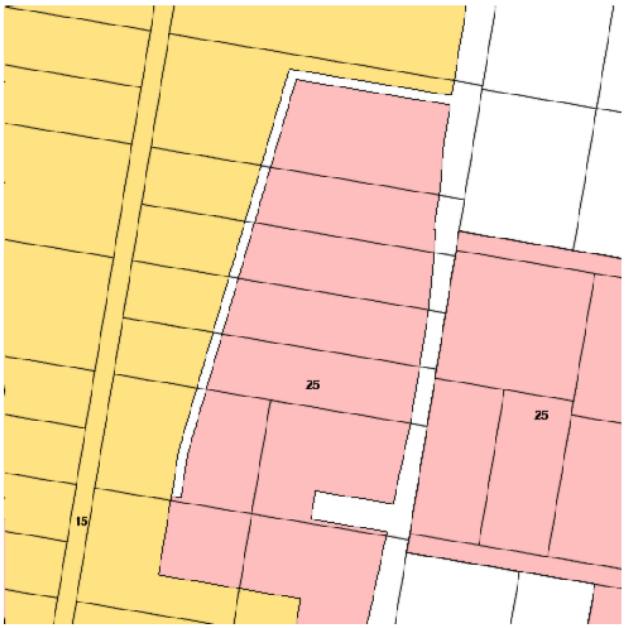


Figure 104: Existing Minimum Dwelling Density at 18-30 Kelly Street

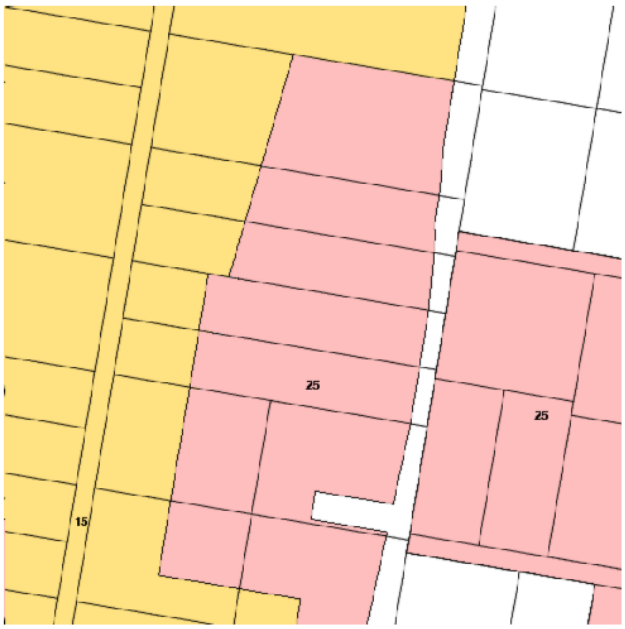
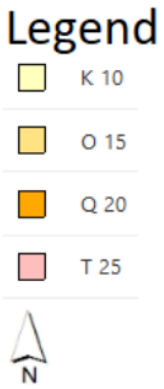


Figure 105: Proposed Minimum Dwelling Density at 18-30 Kelly Street



18-30 Kelly Street Land Acquisition Maps

Figure 106: Existing Land Reservation Acquisition at 18-30 Kelly Street

Figure 107: Proposed Land Reservation Acquisition at 18-30 Kelly Street

140 Edmondson Avenue Zoning Maps

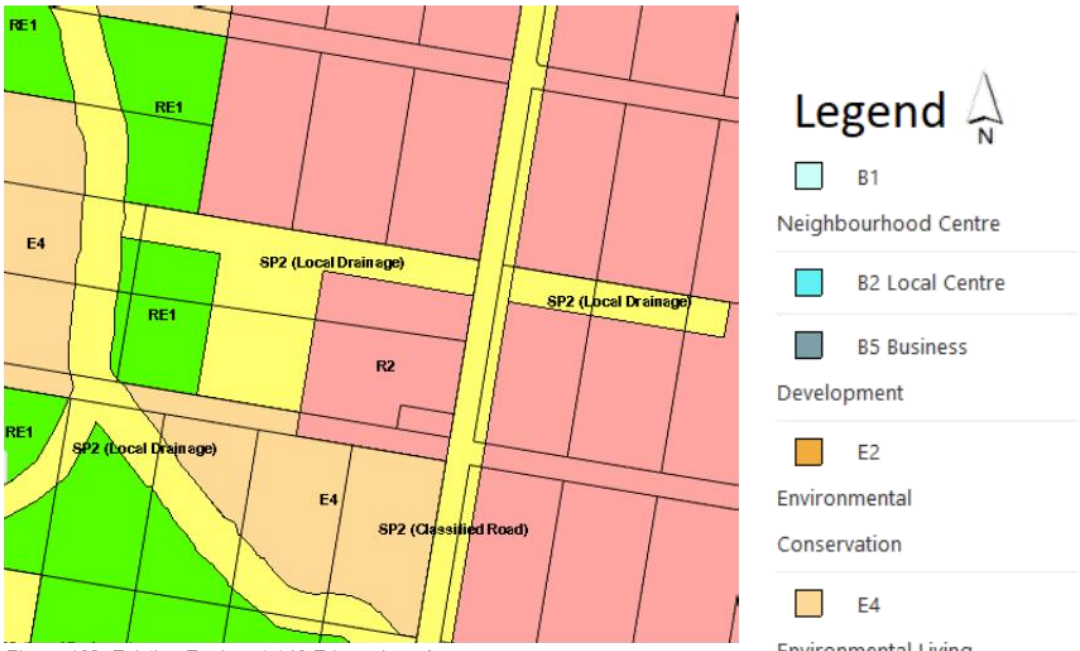


Figure 108: Existing Zoning at 140 Edmondson Avenue

Figure 109: Proposed zoning at 140 Edmondson Avenue

135-175 Gurners Avenue Maximum Height of Buildings Maps

Figure 110: Existing Maximum Building Height at 140 Edmondson Avenue

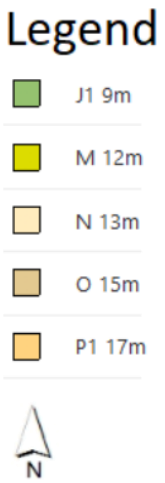
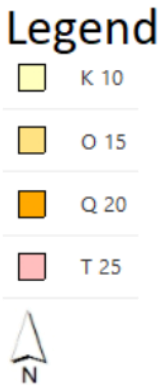


Figure 111: Proposed Maximum Building Height at 140 Edmondson Avenue

140 Edmondson Avenue Minimum Dwelling Density Maps

Figure 112: Existing Minimum Dwelling Density at 140 Edmondson Avenue

Figure 113: Proposed Minimum Dwelling Density at 140 Edmondson Avenue



140 Edmondson Avenue Land Acquisition Maps

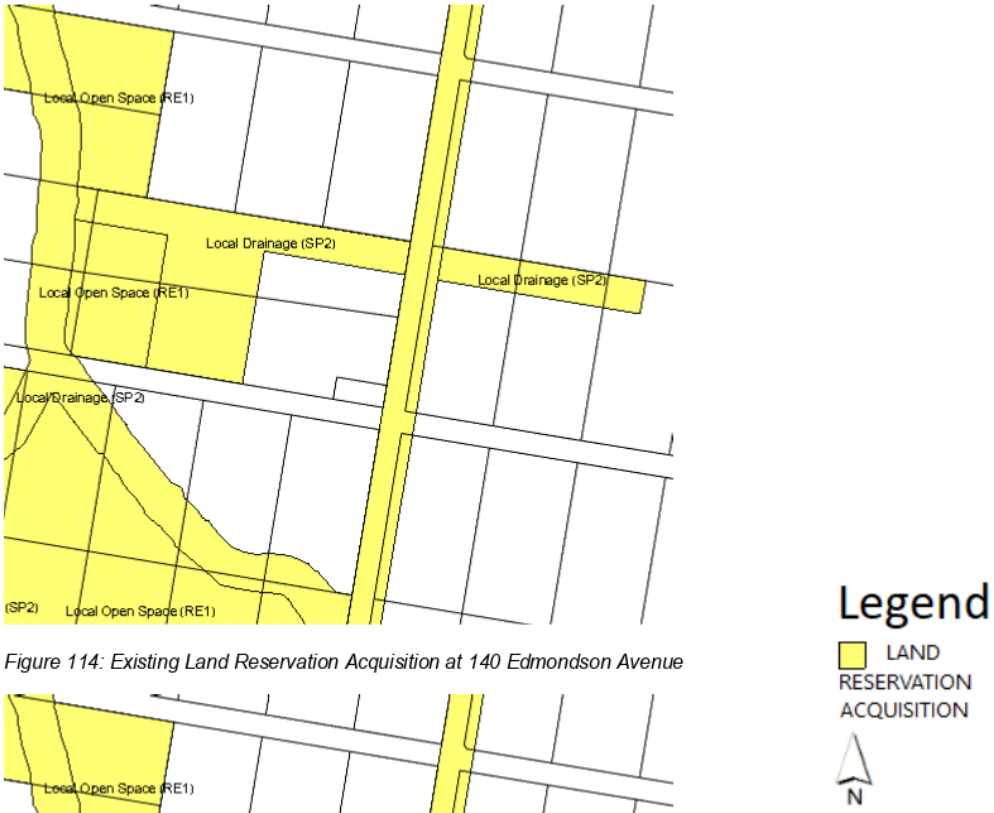


Figure 114: Existing Land Reservation Acquisition at 140 Edmondson Avenue

Figure 115: Proposed Land Reservation Acquisition at 140 Edmondson Avenue

62 Kelly Street and 542 Bringelly Road Zoning Maps

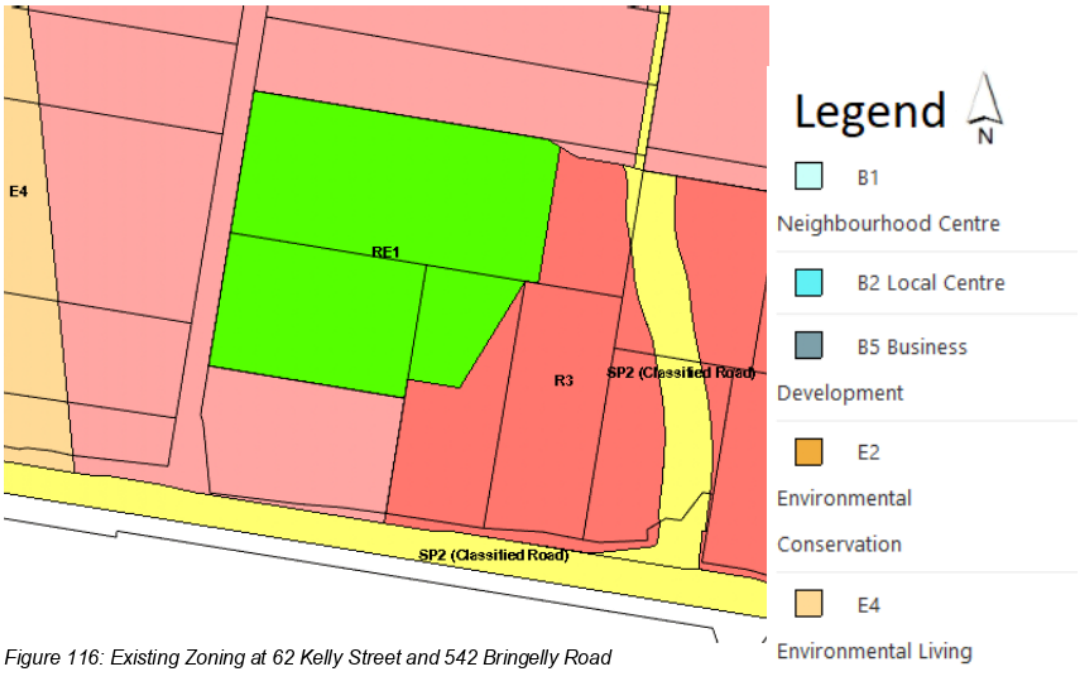


Figure 116: Existing Zoning at 62 Kelly Street and 542 Bringelly Road

Figure 117: Proposed zoning at 62 Kelly Street and 542 Bringelly Road

62 Kelly Street and 542 Bringelly Road Maximum Height of Buildings Maps

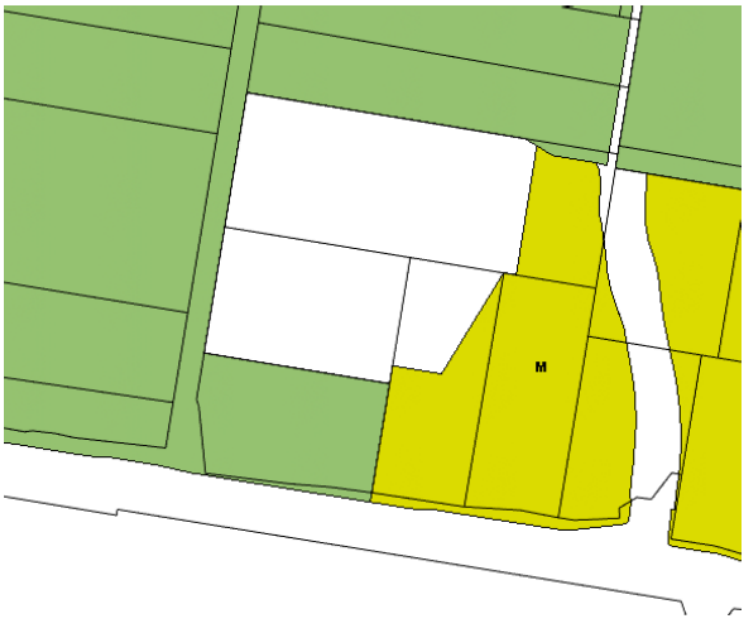


Figure 118: Existing Maximum Building Height at 62 Kelly Street and 542 Bringelly Road

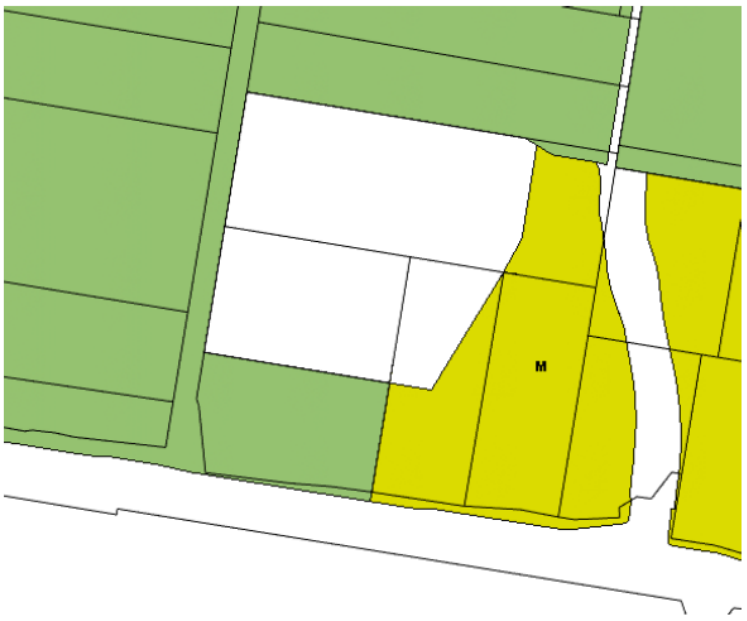


Figure 119: Proposed Maximum Building Height at 62 Kelly Street and 542 Bringelly Road

62 Kelly Street and 542 Bringelly Road Minimum Dwelling Density Maps

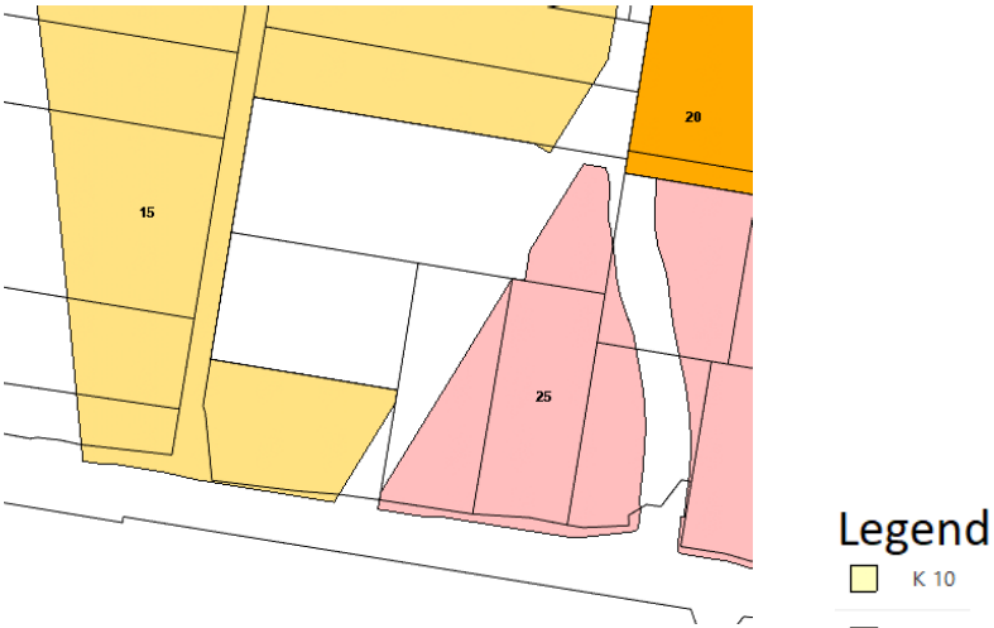


Figure 120: Existing Minimum Dwelling Density at 62 Kelly Street and 542 Bringelly Road

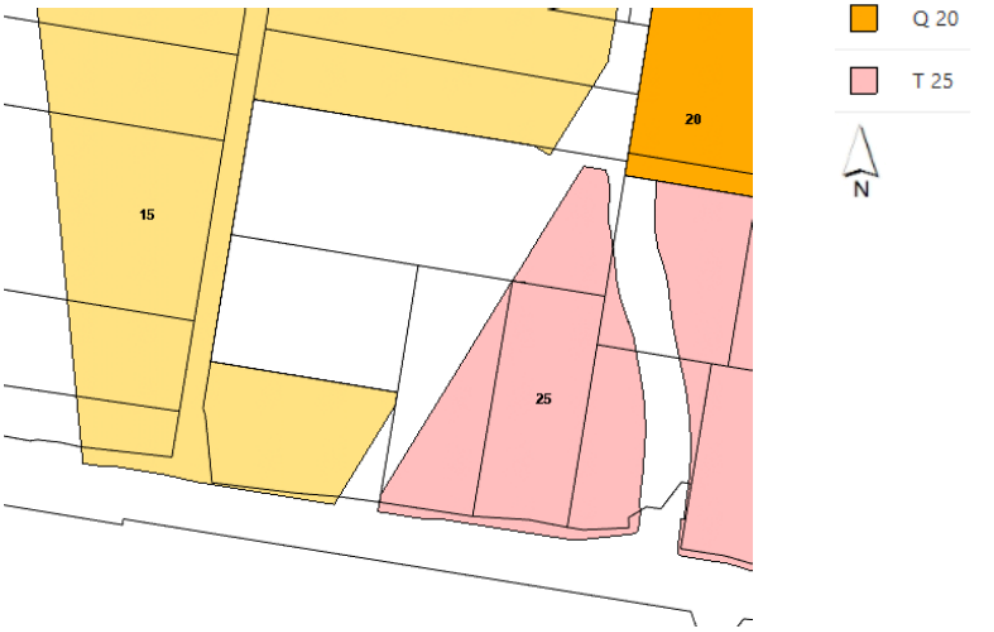


Figure 121: Proposed Minimum Dwelling Density at 62 Kelly Street and 542 Bringelly Road

62 Kelly Street and 542 Bringelly Road Land Acquisition Maps

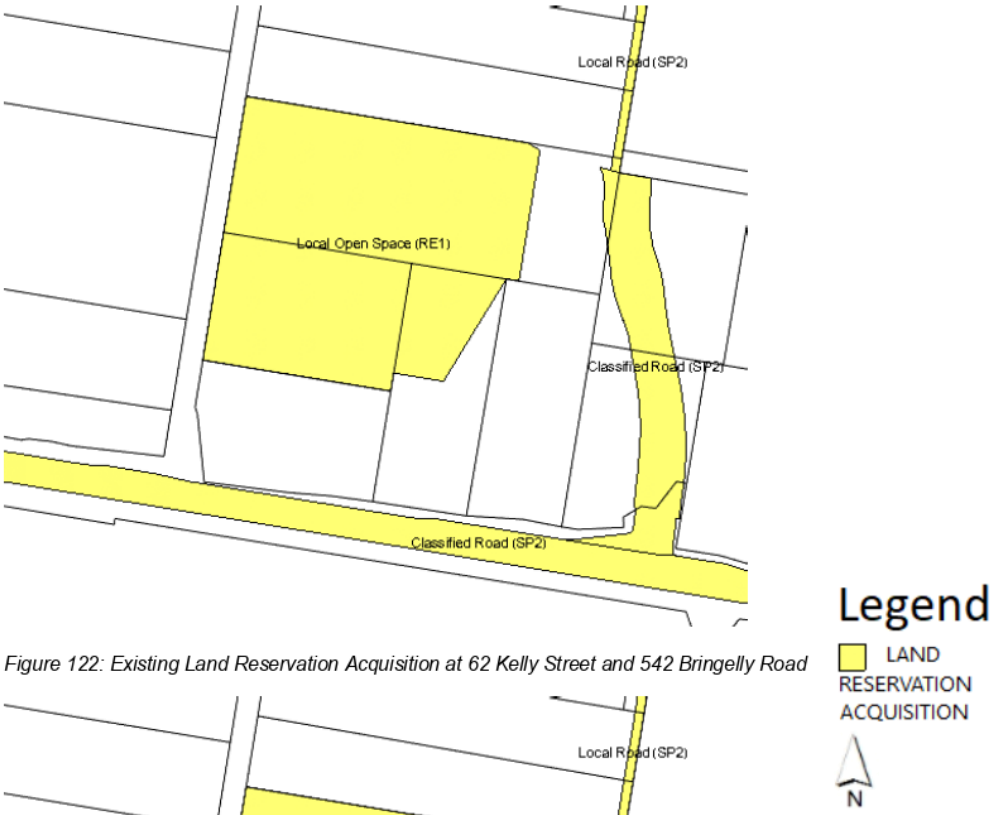


Figure 122: Existing Land Reservation Acquisition at 62 Kelly Street and 542 Bringelly Road

Figure 123: Proposed Land Reservation Acquisition at 62 Kelly Street and 542 Bringelly Road

52 Boyd Street Zoning Maps

Figure 124: Existing Zoning at 52 Boyd Street

Figure 125: Proposed Zoning at 52 Boyd Street

52 Boyd Street Land Acquisition Maps

Figure 126: Existing Land Reservation Acquisition at 52 Boyd Street

Figure 127: Proposed Land Reservation Acquisition at 52 Boyd Street

126 Boyd Street Zoning Maps

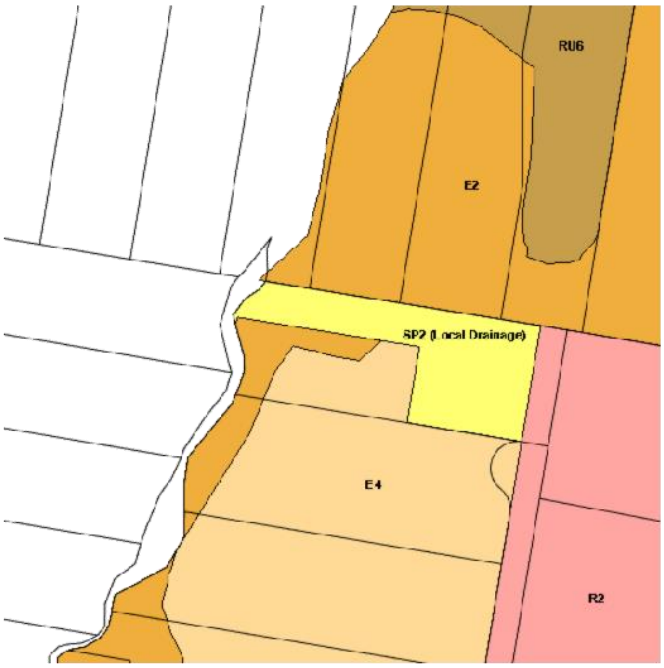


Figure 128: Existing Zoning at 126 Boyd Street

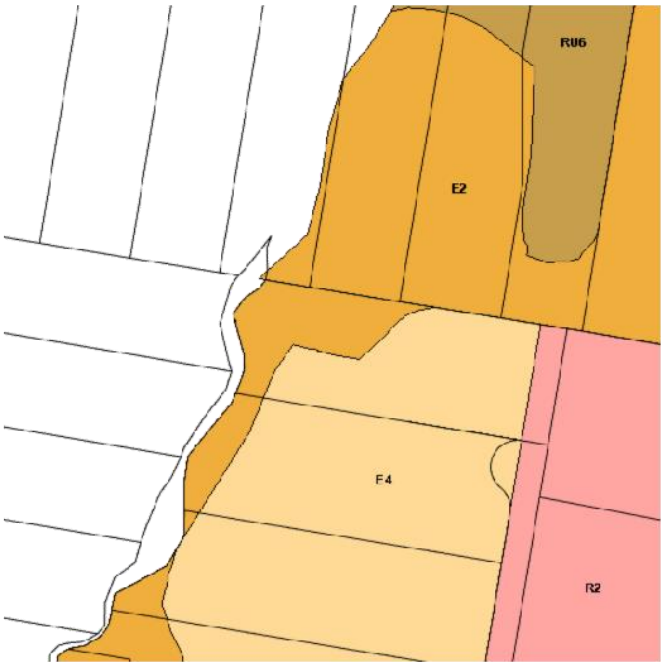


Figure 129: Proposed Zoning at 126 Boyd Street

126 Boyd Street Maximum Height of Buildings Maps

Figure 130: Existing Maximum Building Height at 126 Boyd Street

Figure 131: Proposed Maximum Building Height at 126 Boyd Street

126 Boyd Street Land Acquisition Maps

Figure 132: Existing Land Reservation Acquisition at 126 Boyd Street

Legend
LAND RESERVATION ACQUISITION
N

Figure 133: Proposed Land Reservation Acquisition at 126 Boyd Street

Lot 99 Gurner Avenue Zoning Maps

Figure 134: Existing Zoning at Lot 99 Gurner Avenue

Figure 135: Proposed Zoning at Lot 99 Gurner Avenue

Lot 99 Gurner Avenue Minimum Dwelling Density Maps

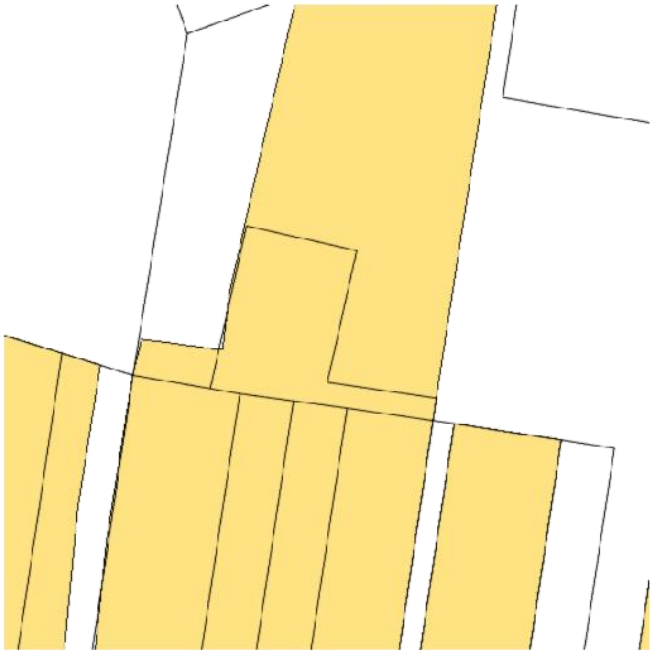


Figure 136: Existing Minimum Dwelling Density at Lot 99 Gurner Avenue

Figure 137: Proposed Minimum Dwelling Density at Lot 99 Gurner Avenue

365 & 485 Edmondson Avenue Zoning Maps

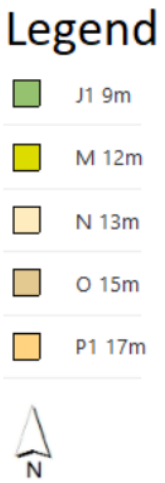
Figure 138: Existing Zoning at 365 & 485 Edmondson Avenue

Figure 139: Proposed Zoning at 365 & 485 Edmondson Avenue

365 & 485 Edmondson Avenue Height of Buildings Maps

Figure 140: Existing Maximum Building Height at 365 & 485 Edmondson Avenue

Figure 141: Proposed Maximum Building Height at 365 & 485 Edmondson Avenue



365 & 485 Edmondson Avenue Minimum Dwelling Density Maps

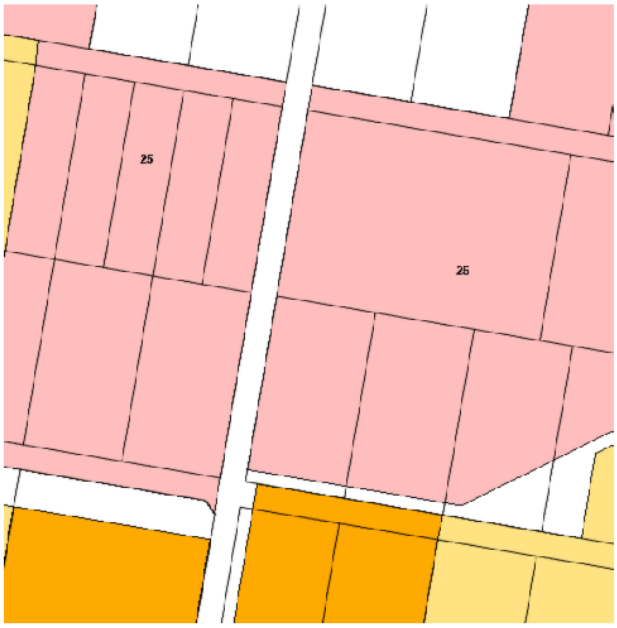
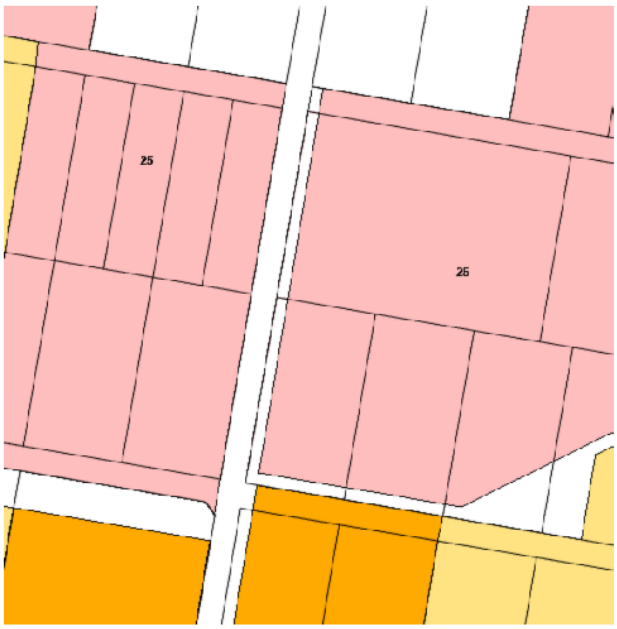


Figure 142: Existing Minimum Dwelling Density at 365 & 485 Edmondson Avenue



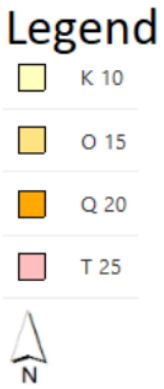


Figure 143: Proposed Minimum Dwelling Density at 365 & 485 Edmondson Avenue

365 & 485 Edmondson Avenue Land Acquisition Maps

Figure 144: Existing Land Reservation Acquisition at 365 & 485 Edmondson Avenue

Figure 145: Proposed Land Reservation Acquisition at 365 & 485 Edmondson Avenue

Legend
LAND RESERVATION ACQUISITION
N

1382-1402 Camden Valley Way, Leppington Zoning Maps

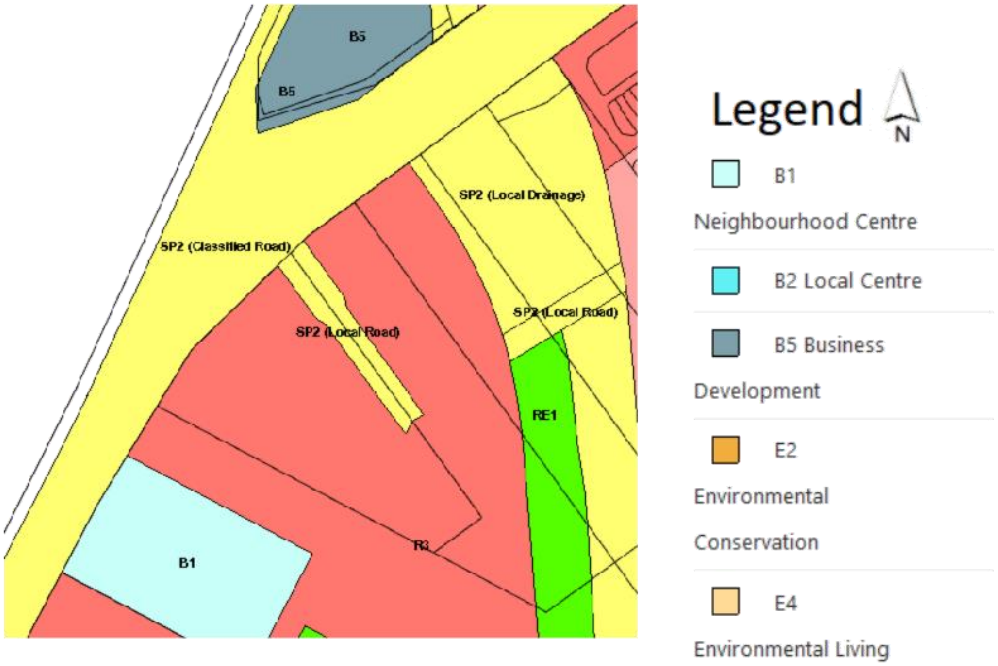


Figure 146: Existing Zoning at 1382-1402 Camden Valley Way, Leppington

Figure 147: Proposed Zoning at 1382-1402 Camden Valley Way, Leppington

1382-1402 Camden Valley Way, Leppington Land Acquisition Maps

Figure 148: Existing Land Reservation Acquisition at 1382-1402 Camden Valley Way, Leppington

Figure 149: Proposed Land Reservation Acquisition at 1382-1402 Camden Valley Way, Leppington

Lots fronting Tokyo Road and Cortina Avenue Zoning Maps

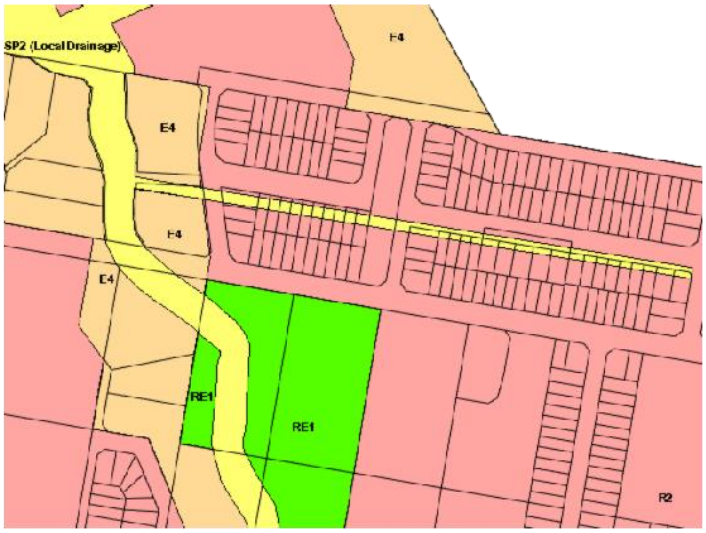


Figure 150: Existing Zoning at Lots fronting Tokyo Road and Cortina Avenue

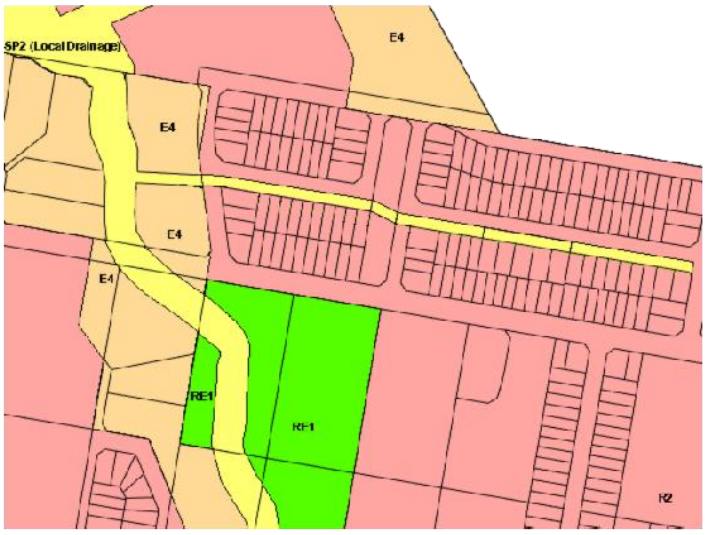


Figure 151: Proposed Zoning at Lots fronting Tokyo Road and Cortina Avenue

Lots fronting Tokyo Road and Cortina Avenue Height of Buildings Maps

Figure 152: Existing Maximum Building Height at Lots fronting Tokyo Road and Cortina Avenue

Figure 153: Proposed Maximum Building Height at Lots fronting Tokyo Road and Cortina Avenue

Lots fronting Tokyo Road and Cortina Avenue Minimum Dwelling Density Maps

Figure 154: Existing Minimum Dwelling Density at Lots fronting Tokyo Road and Cortina Avenue

Figure 155: Proposed Minimum Dwelling Density at Lots fronting Tokyo Road and Cortina Avenue

Lots fronting Tokyo Road and Cortina Avenue Land Acquisition Maps

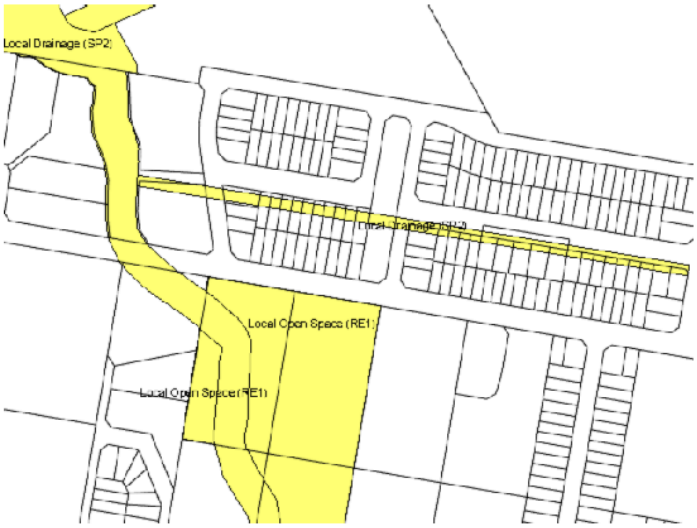


Figure 156: Existing Land Reservation Acquisition at Lots fronting Tokyo Road and Cortina Avenue

Figure 157: Proposed Land Reservation Acquisition at Lots fronting Tokyo Road and Cortina Avenue

Lot 2 Gurner Avenue Zoning Maps

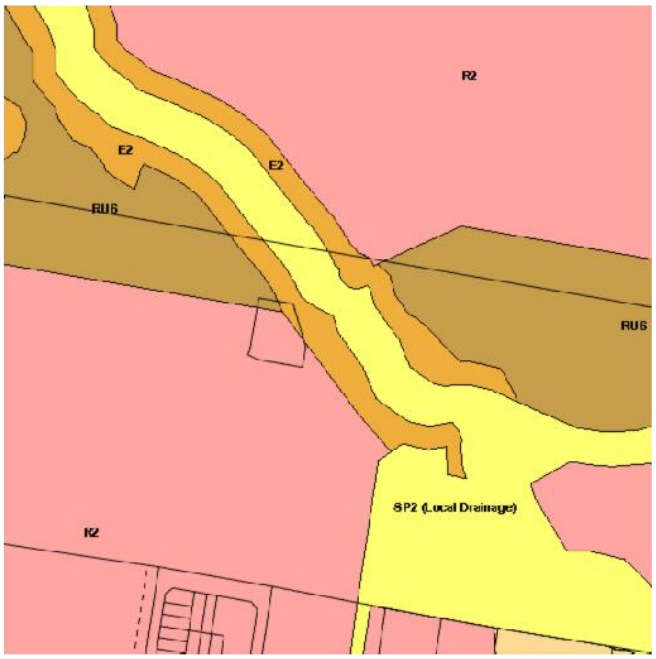


Figure 158: Existing Zoning at Lot 2 Gurner Avenue

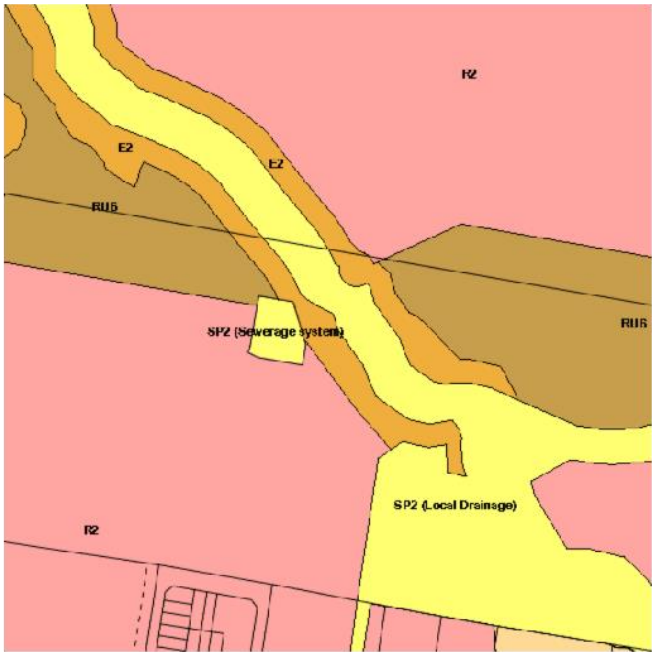


Figure 159: Proposed Zoning at Lot 2 Gurner Avenue

Lot 2 Gurner Avenue Height of Buildings Maps

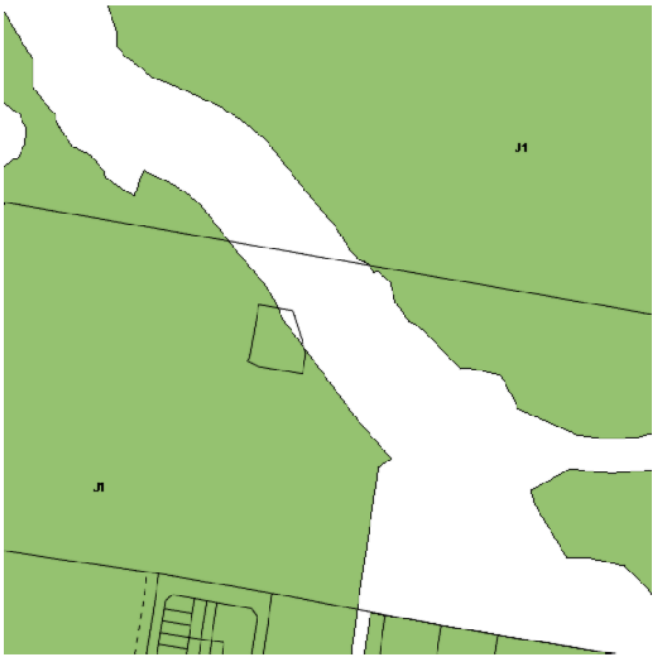


Figure 160: Existing Maximum Building Height at Lot 2 Gurner Avenue

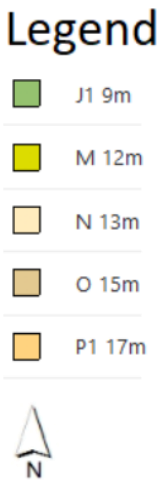


Figure 161: Proposed Maximum Building Height at Lot 2 Gurner Avenue

Lot 2 Gurner Avenue Minimum Dwelling Density Maps

Figure 162: Existing Minimum Dwelling Density at Lot 2 Gurner Avenue

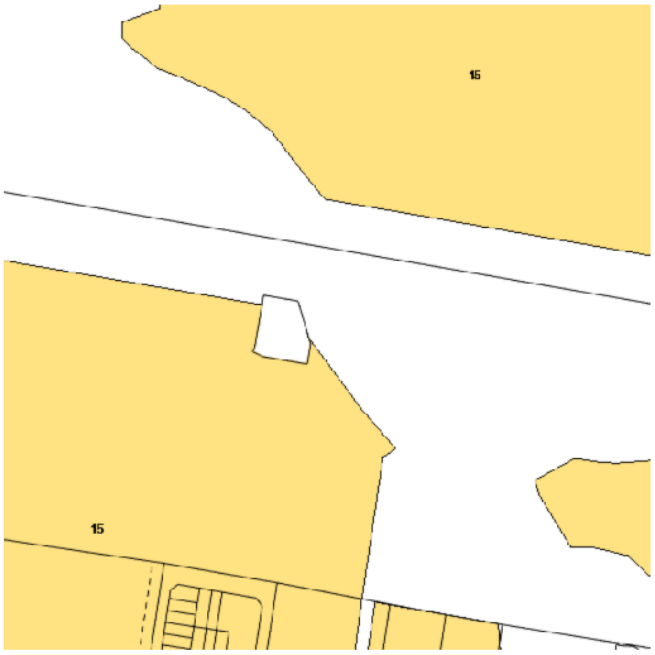


Figure 163: Proposed Minimum Dwelling Density at Lot 2 Gurner Avenue

East Leppington LLEP 2008 Zoning Maps

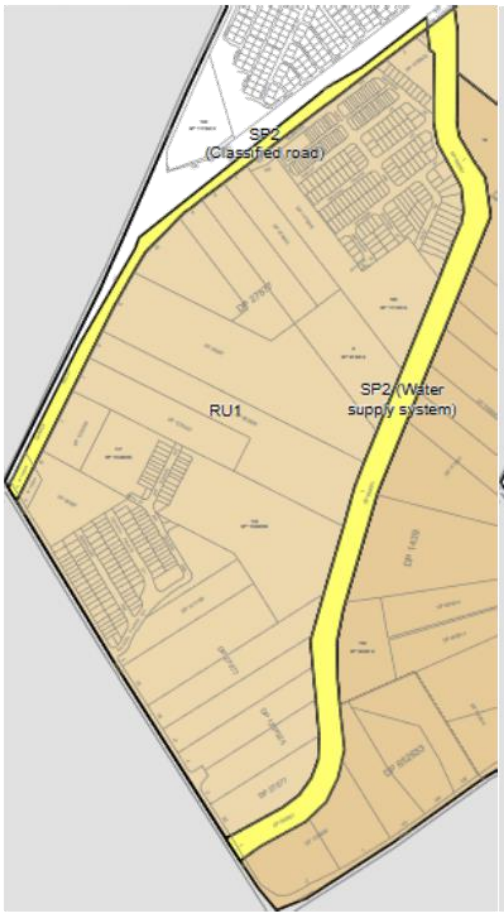


Figure 164: Existing Zoning of East Leppington as per Liverpool LEP 2008

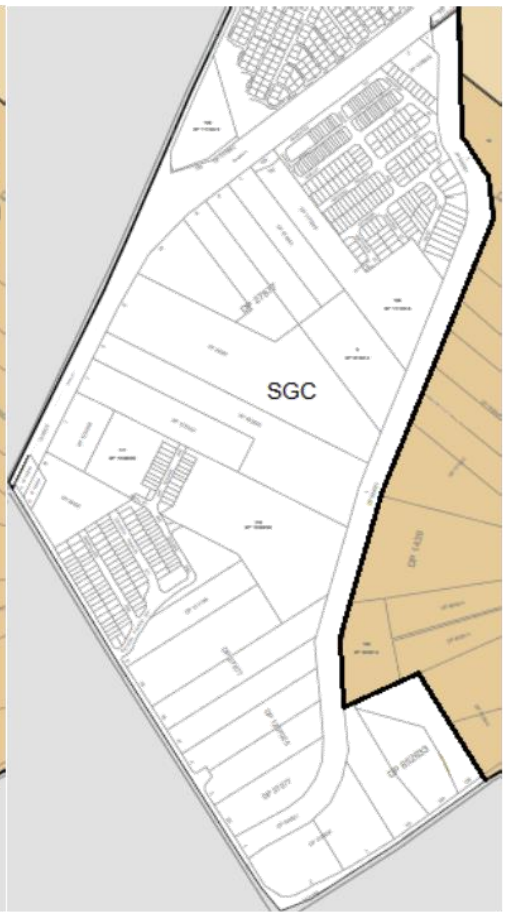


Figure 165: Proposed Zoning of East Leppington as per Liverpool LEP 2008

East Leppington LLEP 2008 Minimum Lot Size Maps

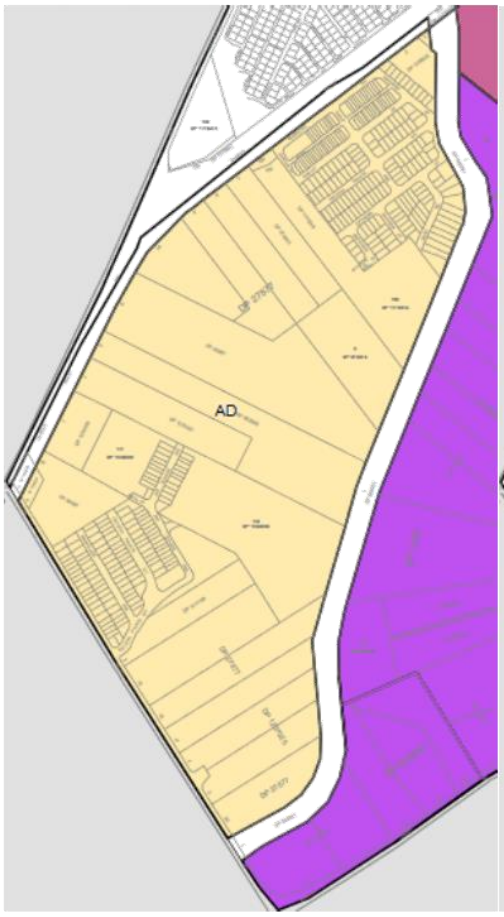


Figure 166: Existing Minimum Lot Size of East Leppington as per Liverpool LEP 2008

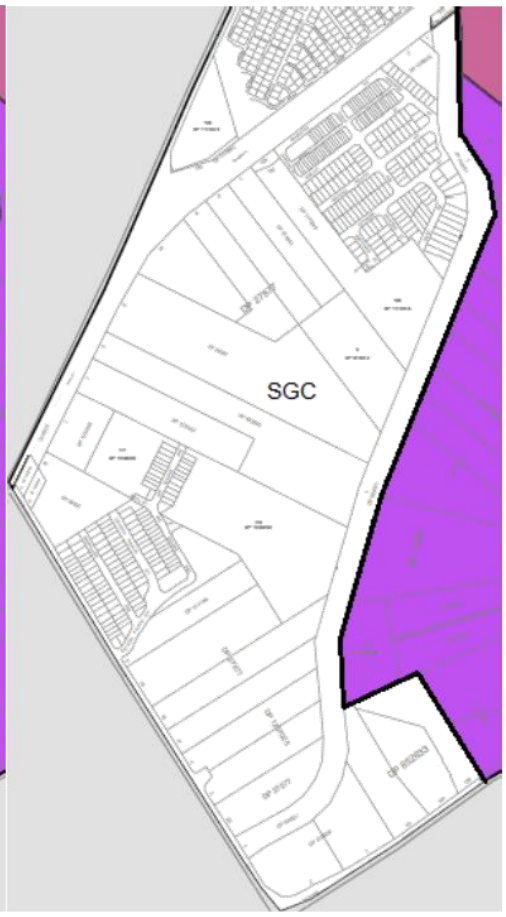


Figure 167: Proposed Minimum Lot Size of East Leppington as per Liverpool LEP 2008

East Leppington LLEP 2008 Maximum Floorspace Ratio Maps

Figure 168: Existing Maximum Floorspace Ratio map of East Leppington as per Liverpool LEP 2008

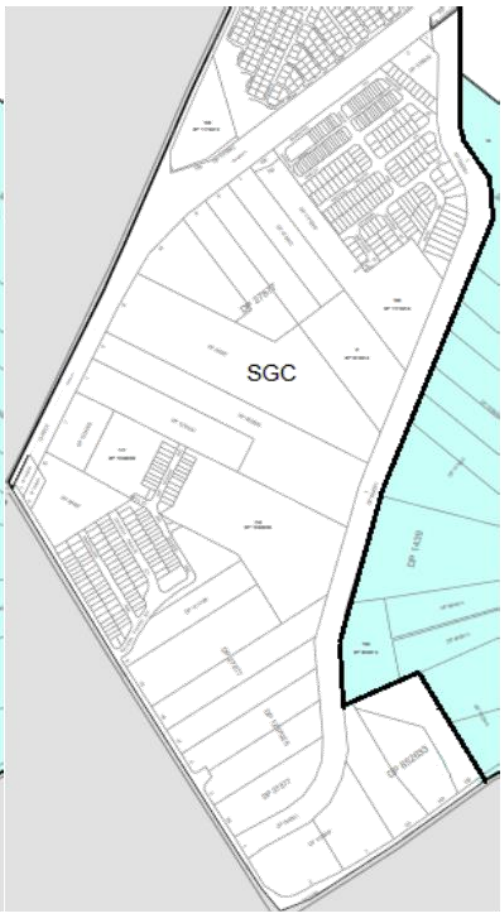
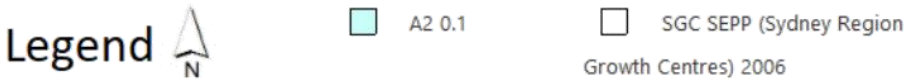


Figure 169: Proposed Maximum Floorspace Ratio map of East Leppington as per Liverpool LEP 2008



East Leppington LLEP 2008 Maximum Height of Buildings Maps

Figure 170: Existing Maximum Height of Buildings map of East Leppington as per Liverpool LEP 2008

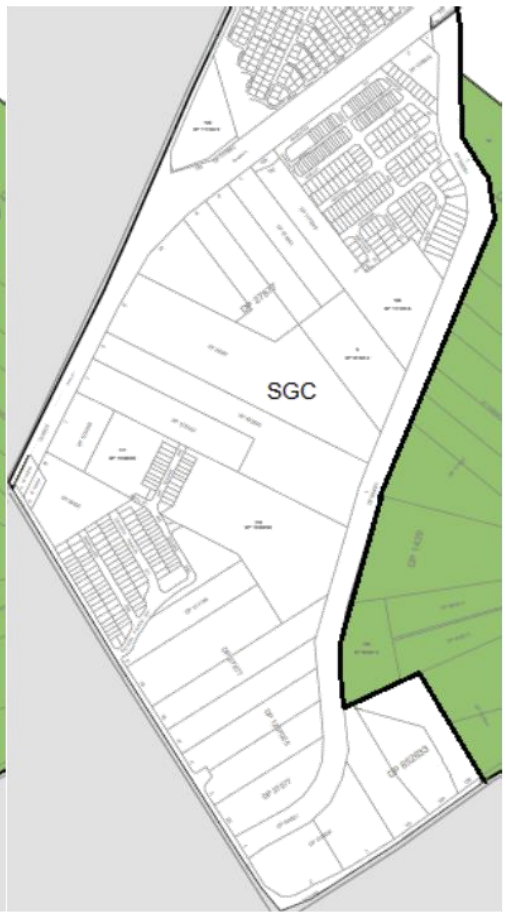
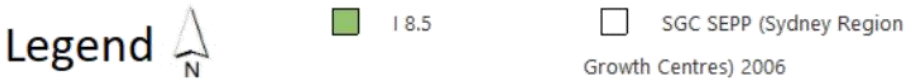


Figure 171: Proposed Maximum Height of Buildings map of East Leppington as per Liverpool LEP 2008



East Leppington LLEP 2008 Heritage Maps

Figure 172: Existing Heritage map of East Leppington as per Liverpool LEP 2008

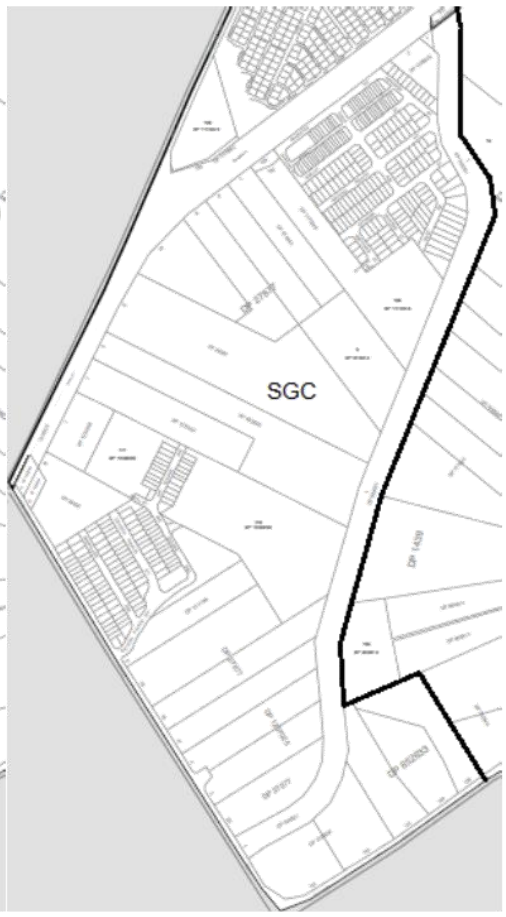
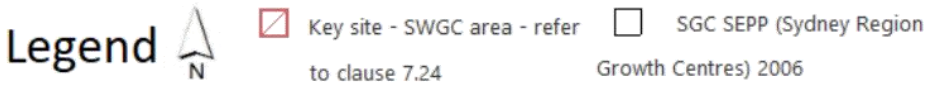


Figure 173: Proposed Heritage map of East Leppington as per Liverpool LEP 2008

East Leppington LLEP 2008 Key Sites Maps

Figure 174: Existing Key Sites map of East Leppington as per Liverpool LEP 2008

Figure 175: Proposed Key Sites map of East Leppington as per Liverpool LEP 2008



East Leppington LLEP 2008 Environmentally Significant Land Maps

Figure 176: Existing Environmentally Significant Land map of East Leppington as per Liverpool LEP 2008

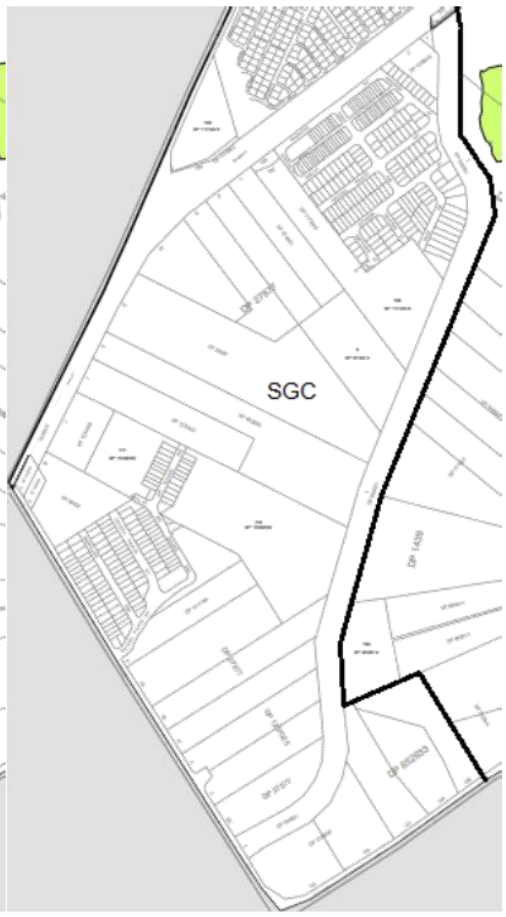
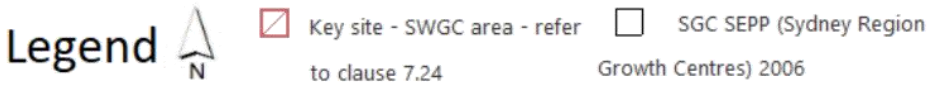


Figure 177: Proposed Environmentally Significant Land map of East Leppington as per Liverpool LEP 2008



Part 5 – Community Consultation

Community consultation was undertaken in accordance with the Gateway Determination, Clause 18 of the *Environmental Planning and Assessment Regulation 2000*, and Council's Community Participation Plan. The planning proposal was exhibited from 18th March until 28th April 2020. A notice was placed on Council's website and a notice was distributed into the locally circulating newspaper on the 18 March, 25 March, 1 April, and 8 April editions. Local newspapers ceased printing for the 15 April period onwards due to Covid 19. Letters were sent to all landowners in which properties were identified for rezoning or a change in the DCP road network (as per the exhibited plans).

Council received submissions from 14 different members of the community. Some of these submissions were received prior to and after the formal exhibition period, and some submitters provided follow up comments or information for Council to consider upon further consultation. Most of the submissions focussed on changes to the Development Control Plan and the Contributions Plan, particularly as a result of Council's stormwater strategy. A few submissions related to matters for consideration to the planning proposal. These submissions are summarised below.

- A land-owner on Seventh Avenue, Austral requested that Council consider rezoning a drainage path on their site from SP2 to R2. Additional details as to how stormwater would be conveyed through the site, and impacts on up-stream and down-stream properties was not received, and therefore Council did not further consider this change.

- A developer who, has constructed new lots in the vicinity of Tokyo Road and Cortina Avenue, suggested that Council amend the extent of land zoned SP2 Infrastructure (local drainage). In responding to site characteristics, and providing regular sized lots, the drainage channel was built to an alternative alignment compared to the alignment proposed by the zoning. Council staff agree that the land-use zoning map should be amended to reflect the position of the drainage channel, so as to facilitate orderly development.

- A developer representing landowners at Thirteenth Avenue suggested an alternate ILP street layout to provide for a modified layout. The affected lands are characterised as having streets traversing the lots which run diagonally compared to other streets. This would involve rezoning the extent of land zoned RE1, R2 and R3 to ensure that the zone boundaries align with the street network. Whilst providing a more regular lot layout, upon consideration of the proposal in terms of responding to the existing topography, and safely conveying stormwater flows, the proposal could not be supported. The diagonal streets on these lands respond to the topography of the site, in which one of the streets is located in a valley. This street can carry stormwater via pipes under the road and can convey flows to the broader drainage network via overland flow in flash flood or events in which the pipe system is blocked. Regularising the street network into a grid layout would introduce several 90 degree bends in the stormwater network, which could lead to surging and damage to property associated with stormwater flows. Fast moving and/or heavy stormwater loads do not move easily through sharp 90 degree bends.

- A land-owner requested additional land to be rezoned from R2 to R3 on Kelly Street due to changes to the ILP road network. The intent of the planning proposal was to ensure that the DCP road network and land-use zoning could enable the land to be developed in accordance with the precinct vision for 17,350 homes in the Austral and Leppington North precinct. Up zoning of any land and increasing residential density (which is not the result of a boundary adjustment) is outside the scope of the planning proposal.

- Several developers objected to Council rezoning sites for end-of-pipe bioretention basins. The sites identified for end-of-pipe bioretention basins are not zoned SP2 Infrastructure; they are only identified via Council's contributions plan. Further consideration of this matter is beyond the scope of the planning proposal, and is addressed in Council's submissions summary and response document.

- A number of land-owners and developers provided support for rezoning land from SP2 Infrastructure to other uses, where they were not required for stormwater drainage functions.

Part 6 – Project Timeline

An anticipated project timeline is shown in Table 5.

Table 5: Anticipated project timeline

Timeframe	Action
March 2019	Submission of Planning Proposal to DPI&E
August 2019	Gateway Determination issued
November 2019	Completion of required technical information
February-March 2020	State agency consultation
March-April 2020	Community consultation
April – January 2021	Consideration of submissions and post-exhibition changes
July – January 2021	Further technical changes to precinct stormwater strategy
March 2021	Post-exhibition report to Council and submission to DPIE
June 2021	Drafting and making of the plan

Liverpool Growth Centre Precincts

Amending Development Control Plan

(Austral ILP Amendment)

(Post-Exhibition) February 2021

NSW GOVERNMENT Planning & Environment

Note this draft DCP omits text which are not intended to be amended. Several sections objectives and controls have not been reproduced in this document, only sections of relevance have been displayed. Text which is to be inserted is shown in green and underlined, text which is to be deleted is shown in ~~red with strikethrough~~, explanatory notes, which will not form part of the DCP, are shown in *blue italics*.

Figure, clause, section, and table numbers, including in-text references to such items, will be updated to reflect the insertion of new items. Table of contents will also be updated to reflect changes. These changes are generally not annotated.

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2.0

Precinct Planning Outcomes

2.3 Site analysis

The following clauses contain matters to be addressed in relation to existing site characteristics, when planning new developments.

2.3.2 Water cycle management

Objectives

a. – d. *No change.*

e. To provide an integrated streetscape approach in which landscape elements can improve stormwater quality run-off from urban areas to near pollutant free levels. *This objective is to ensure that water quality measures within the streetscape can be implemented, and that other alternative approaches can be assessed.*

Controls

1. – 7. *No Change.*

8. Trunk drainage channels are to be designed and constructed as naturalised channels where possible.

9. - 11. *No Change.*

12. In-street raingardens are required in some precincts as supplementary water quality treatment devices to ensure that water quality targets are met. Whilst Council will deliver the raingarden (upon completion of most surrounding lots), the land-developer will be responsible for delivering an interim silt trap device in accordance with Figure 2 1. Interim silt trap devices are required at locations marked as "Proposed Raingarden Locations" as per the figure labelled Proposed Water Quality Control Strategy in the relevant precinct schedule. *The controls regarding water cycle management have been substantially re-written compared to the DCP which was publicly exhibited. Whilst it is still intended that in-street raingardens will provide for water quality improvement, the means of their delivery has changed. This has resulted from discussions with the development community on the practical implementation of the previous approach. Land developers will often move on to other projects once the initial subdivision has taken place and had concerns about having to come back in 2-3 years' time to construct a raingarden; there were also equity concerns given that some lots would have to construct more raingardens than others (given that they were required on intersections), whilst potentially not increasing nutrient loads.*

Developers will now be required to construct an interim silt trap device in areas identified by the DCP as a future raingarden. These devices will capture silt, soils and other pollutants from entering waterways during the time that dwellings are constructed. There is typically far more silt discharged from residential lots when dwellings are in the construction phase, as there is typically no grass/vegetation to stop soil washing away.

Once 80-95% of dwellings upstream of the silt trap have been completed, Council will reconstruct the silt traps as vegetated raingardens. The raingardens will be constructed via s7.11 funding, which also ensures that lots with a higher share of raingarden area are not burdened by higher construction costs. The position and cost of each raingarden has been captured by the Austral and Leppington North Contributions Plan.

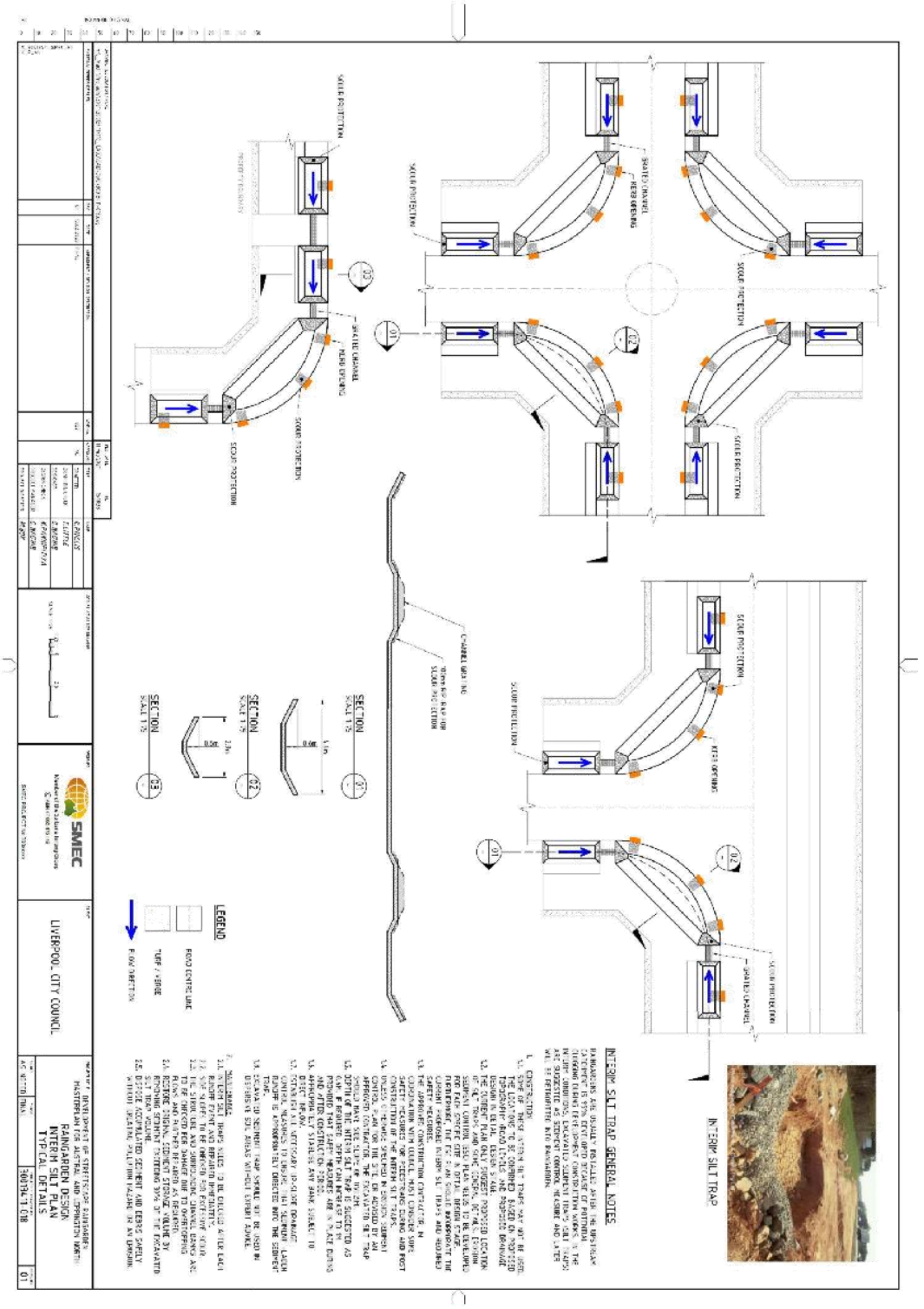


Figure 2-1: Interim silt trap device construction details

3.0

Neighbourhood and subdivision design

3.1 Residential Density and Subdivision

No change to introductory statement.

3.1.2 Block and Lot Layout

Objectives

a. – g. No Change.

Controls

Blocks

1. – 4. No change.

Lots

5 - 10. No Change.

Table 3-1: Minimum lot size by density bands

	R2 Low Density Residential				R3 Medium Density Residential	
Minimum Residential Target (dwellings / ha)	**10**	**15**	**20**	**25**	**20**	**25**
Dwelling House (base control)	360	300	300	300	300	300
With BEP	360	250	225	225	225	225
As Integrated DA	360	250	200	125	200	125
Locational Criteria* (BEP or Integrated DA)	N/A	225	N/A	N/A	N/A	N/A
Studio Dwelling	No minimum lot size as strata development not subject to minimum lot size controls					
Secondary Dwelling	450	450	450	450	In principal lot	
Dual Occupancy	600	500	500	400	500	400
Semi Detached Dwelling	300	200	150	125	150	125
Attached Dwelling	Not permissible	1500*	375	375	375	375
Multi Dwelling Housing	Not permissible	1500*	1500	375	1500	375
Manor Homes	Not permissible	Not permissible	600	600	600	600
Residential Flat Buildings	Not permissible	Not permissible	Not permissible	Not permissible	2000	2000

Typo corrected on the R2 10dw/ha minimum lot size for a dwelling house with a BEP to read 360, rather than 60.

11. Where residential development adjoins land zoned RE1 Public Recreation or SP2 Drainage, subdivision is to create lots for the dwelling and main residential entry to front the ~~open space or drainage land~~ public space. *As per below there are other circumstances where dwellings should overlook public spaces to provide a sense of passive surveillance, reducing opportunities for crime.*

12. In instances where an ILP identifies a public footpath adjacent to one lot boundary and a public laneway as adjacent to an opposite boundary, the dwelling and lot configuration is to orient dwellings to face the public path, with vehicular access being provided via the laneway. A s.88b instrument shall reinforce dwellings to be oriented to the public path/easement. See **Figure 3-4** below. *As per the proposed ILP, there are a few instances where there is a desire for dwellings to face areas of open space, such as parks , drainage lands or easements, providing passive surveillance. In these instances the road frontage, being a laneway, are desired to be the back of the lot. A s.88b*

insturment is a legal document attached to land parcels, which specifies matters such as easments and special conditions. Given that these lots will have an unusual back-to-front arrangment, and given that dwellings can be constructed as complying development, not assessed by Council, it is important that a lot restriction be placed on these lots to ensure that dwellings will face the public space, providing for surveillance. Without the S.88b control dwellings may face the laneway (undesirable) and a back fence could screen the frontage to the public space, thereby increasing opportunties for crime as per the image below

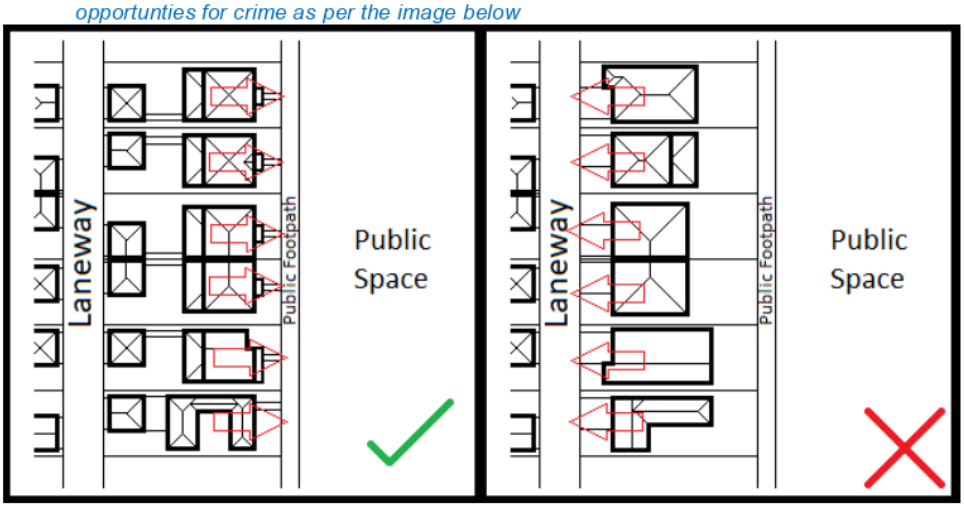


Figure 3-4: Dwellings are to be oriented to face public open spaces

13. – 24. *Controls 12-23 renumbered to 13-24 due to insertion of new control 12. No changes to these controls.*

3.3 Movement network

3.3.1 Street network layout and design

Objectives

a. – e. *No change.*

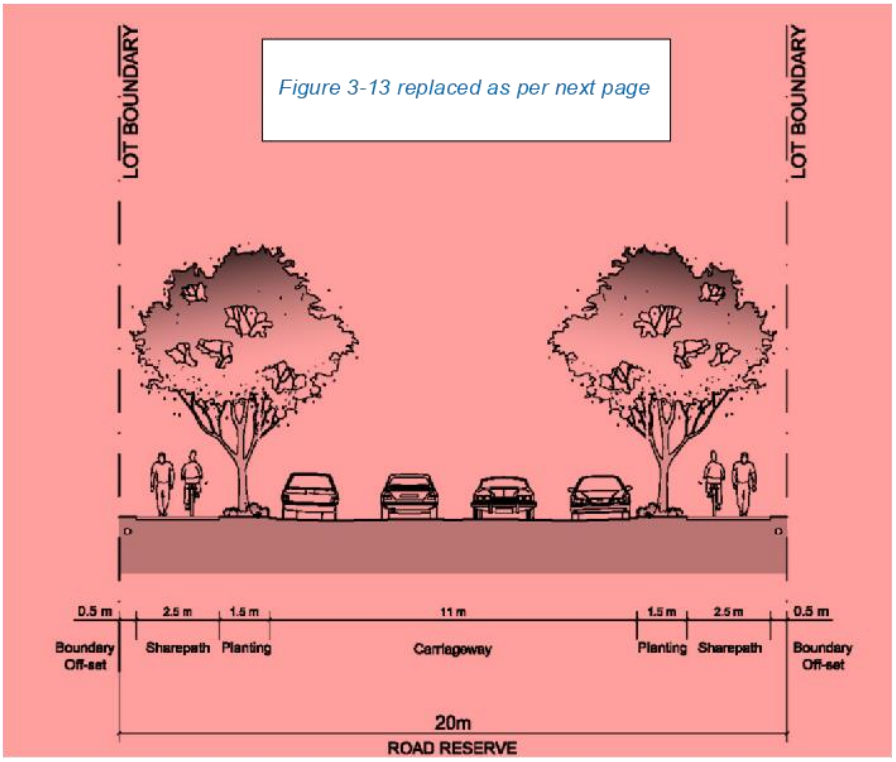
Controls

1. The design and construction of streets is to be consistent with the relevant typical designs in ~~**Figure 3-10**~~**Figure 3-11** to ~~**Figure 3-14**~~ **Figure 3.18**, Council's Engineering Specifications and Austroads. *New cross-sections have been included as per below for guidance.*

2. The typical designs in ~~**Figure 3-10**~~**Figure 3-11** to ~~**Figure 3-14**~~ **Figure 3.18** are based on minimum dimensions and the design of streets may need to be modified to incorporate water sensitive urban design measures and to ensure appropriate site drainage.

3. All Collector Roads, Sub-arterial Roads, Arterial Roads and Transit Boulevards, and local streets which form part of a bus route identified by the Transport for NSW, are to have at least one travel lane in each direction with a minimum width of 3.5 metres, suitable for buses. Lanes which are not adjacent to a kerb may be 3.2m wide. Intersections on bus routes are to be designed to accommodate bus manoeuvrability. *Guidelines published by Transport for NSW allow narrower lanes away from the kerb.*

4. – 7. *No Change.*



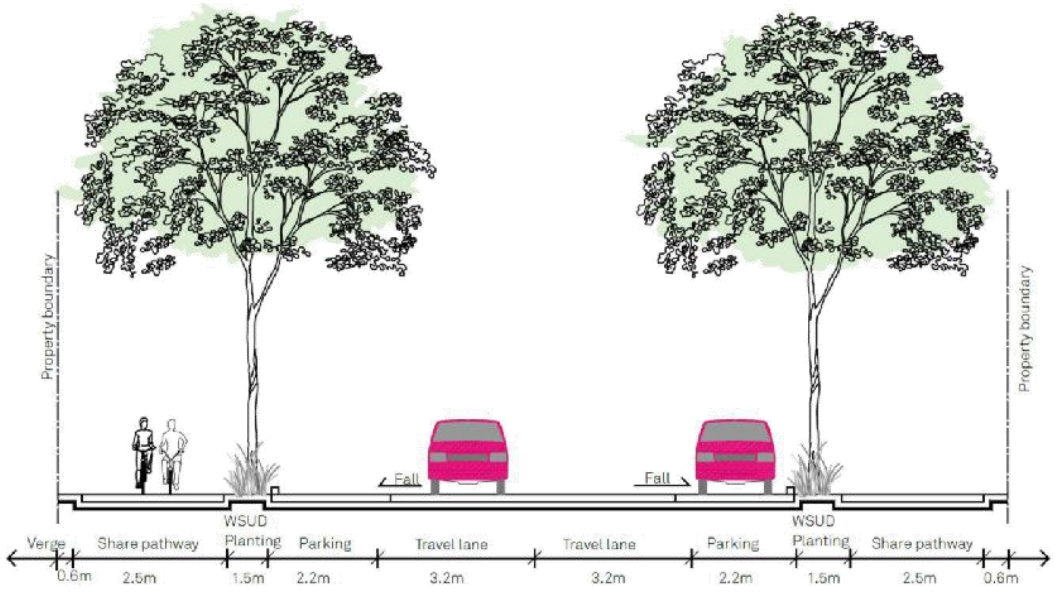


Figure 3-123: Typical collector road *New section incorporates clearer distinction between travel lanes and parking bays. Shared path was revised from 3.0m in the publicly exhibited version to 2.5m due to concerns about inadequate width for tree survival in a 1.0m wide verge.*

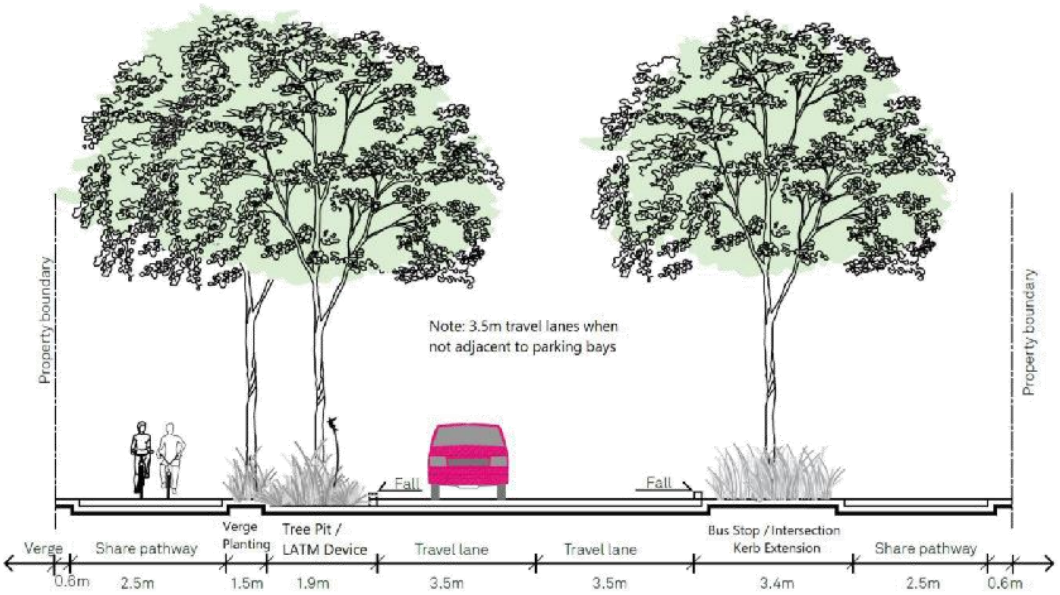


Figure 2-1: Collector Road LATM, Tree Pit, Bus Stop or Kerb Extension Details *A second collector road cross section has been provided to provide clarity on the configuration of the collector road cross section when incorporating a LATM device, a tree pit, bus stop, or intersection kerb extension. In accordance with TfNSW bus Guidelines, travel lanes need to be increased from 3.2m to at least 3.5m wide when adjacent to the kerb.*

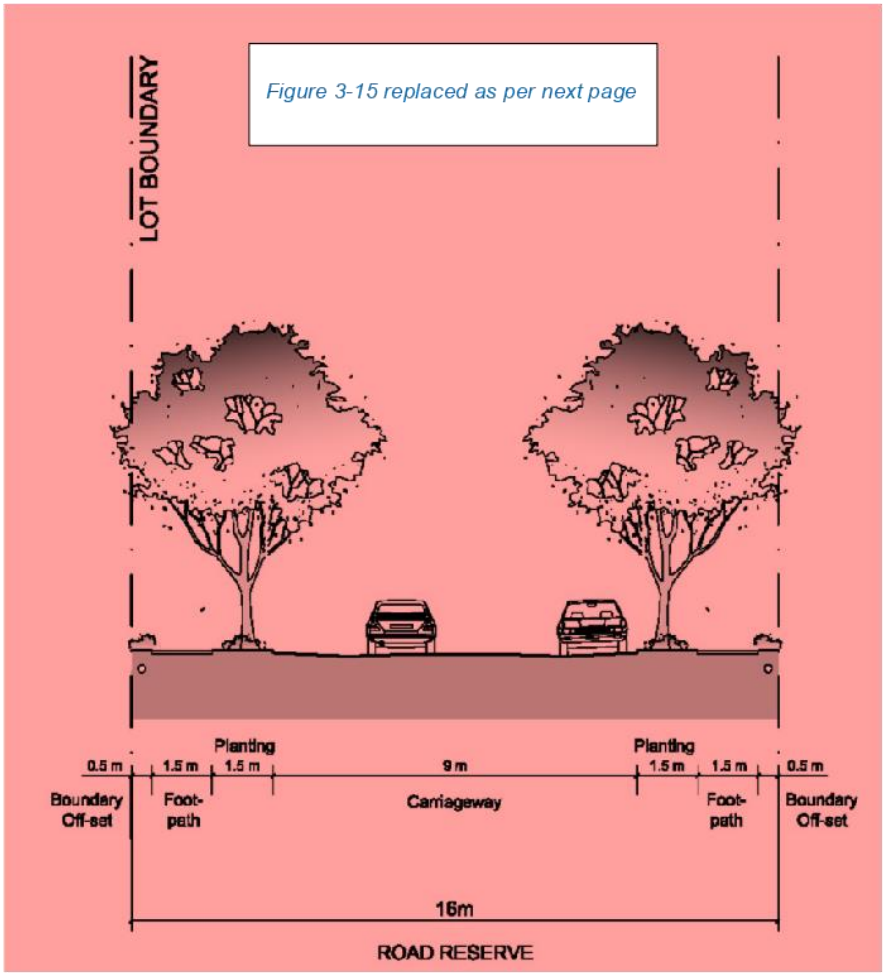


Figure 3-15 replaced as per next page
LOT BOUNDARY
Planting
Planting
0.5 m
1.5 m
1.5 m
9 m
1.5 m
1.5 m
0.5 m
Boundary Off-set
Foot-path
Carriageway
Foot-path
Boundary Off-set
16m
ROAD RESERVE

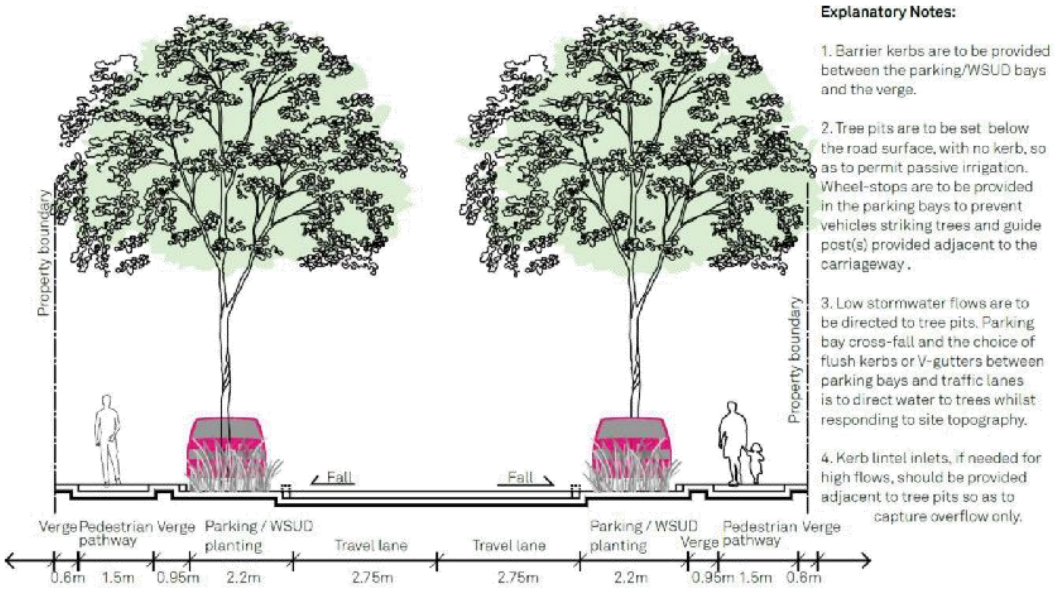


Figure 3-135: Typical local street *Travel lanes have been slightly narrowed (3.0m to 2.75m) compared to previously exhibited version to provide sufficient space in the verge for utility allocations (requires 3.0m on each side of the street). Travel lane widths still provide sufficient space for two cars, or a car and a truck to pass unimpeded. Explanatory notes for design considerations have also been provided.*

8. – 11. *No Change*

12. Where local roads are located as per control 11 above or are within or on the boundary of land zoned Environmental Living, the ~~carriageway width may be reduced to 6.5 metres~~ parking bays, or parking lanes may be provided on one side only, providing the applicant can demonstrate to Council's satisfaction that the road will operate safely and effectively. Street trees are still to be provided. *The current control does not align with the new cross sections provided.*

13. *No change.*

14. Except where otherwise provided for in this DCP, all streets and roundabouts are to be designed and constructed in accordance with the minimum requirements set out in Council's Engineering Specifications, *This controls was proposed to be amended in the publicly exhibited document. The exhibited copy included text to indicate that at least 250sqm of bioretention area was to be provided on every 4 way intersection. The new strategy identifies the location of raingardens (not all intersections are identified) and the developer no longer has the responsibility of providing raingardens, and as such this control is no longer proposed to be amended*

~~15. Council may require traffic calming measures to be incorporated into four-way intersections where traffic volumes necessitate controls other than signage, in addition to the intersection treatments specified in the **Precinct road hierarchy** figure in the relevant Precinct Schedule. Measures may include roundabouts, carriageway narrowing or re-alignment, pedestrian islands or raised platforms, banned turns or differently textured materials.~~ *A new section has been proposed which deals with traffic calming measures. This control becomes redundant.*

15. Local streets which are located within an existing road reserve are to be designed and constructed in accordance with **Figure 3-16**. *There was no cross section as to how local roads (16m) were to be re-constructed in several of the existing road reserves (20m). This new figure will clarify Council's position*

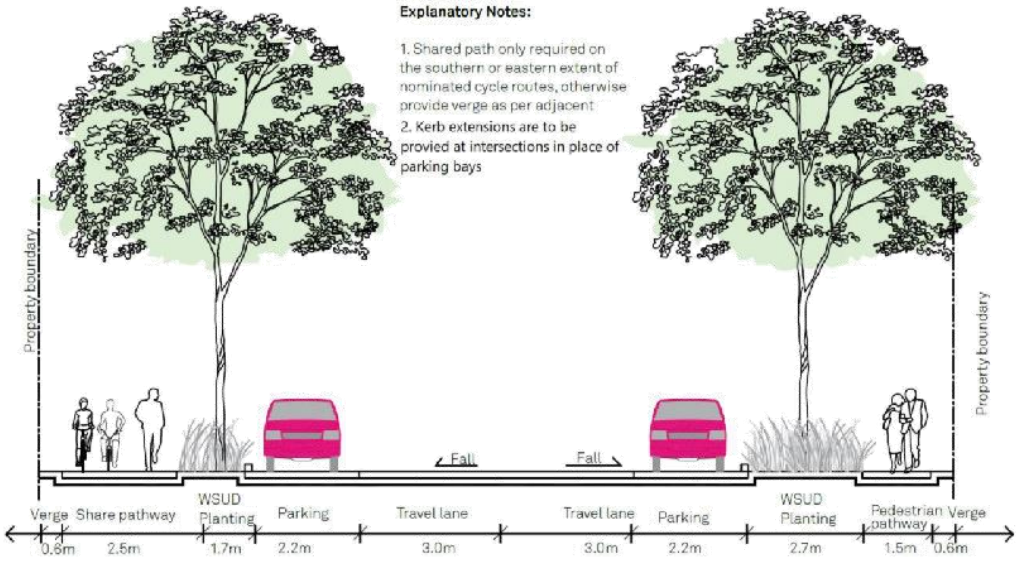


Figure 3-16: Typical Local street (existing 20m reserve) *Figure has been updated to provide explanatory note and width of the shared path has reduced from 3.0m to 2.5m*

16. No change to control:

~~17.~~ ~~Residential roads, i.e. collector roads, local streets, access road/places, and shareways shall be designed for and sign posted at a maximum of 50kph (i.e. traffic management must be considered at the subdivision application, with either road layout or speed reducing devices used to produce a traffic environment which reduces traffic speed).~~ *As per the old control number 15. above, a new section will deal with traffic calming.*

~~18.~~ ~~Where four way intersections are proposed, traffic is to be controlled, where appropriate and as specified by Council, by traffic lights, roundabouts, median strips or signage, or differently textured materials.~~ As per above, a new section will deal with traffic calming

~~19.~~17. *Control 19 renumbered to 17. No change to control.*

~~20. 28.~~ *Control 20 relates to street trees and has been moved to a new section titled street furniture.*

~~21.~~ ~~Street trees are to be provided with a minimum spacing of one tree for each residential lot, or one tree per 10 metres of road, whichever spacing is the greater.~~ This is inconsistent with the street tree strategy in the new section 3.3.2, as different street typologies require a different approach

~~22.~~ ~~Street trees may be permitted within the road carriageway subject to the findings of a Road Safety Audit.~~ *Control 22 is inconsistent with the Western Sydney Street Design Guide and Council's cross-sections. Trees are permitted in local streets which are a low speed environment.*

~~23.~~ *Control 23 moved to section 3.3.2*

~~24.~~ ~~For medians less than 4m width (e.g. at intersections), no planting is permitted and hard surfaces are to be provided.~~ *Control 24 is inconsistent with the Western Sydney Street Design Guide*

25-28. Controls 25-28 moved to section 3.3.2

~~29.~~18. Access streets (refer to Figure 3.147) may be used where:

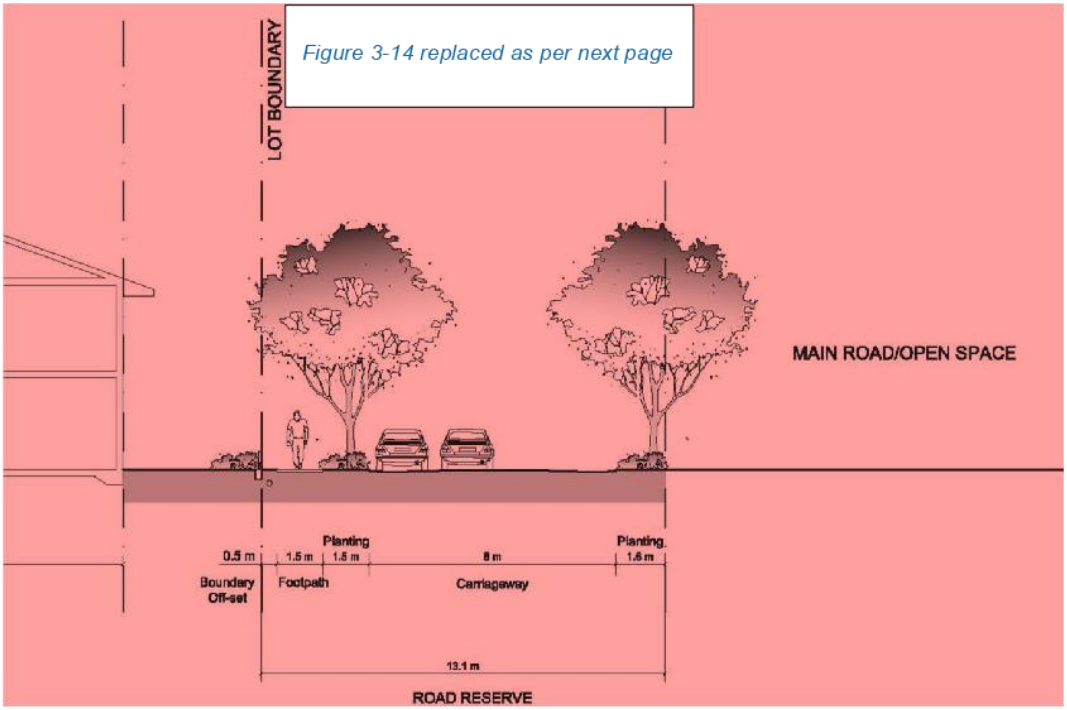
- The access street separates residential land from open space or drainage land or is adjacent to an arterial road, sub-arterial road or transit boulevard.
- The road is not a through traffic route (ie it provides access only to residences on it).

- A maximum of 10 dwellings, between each intersection with another public road, have a frontage and vehicular access to the access street.

~~30.~~19. Access streets are to intersect with local roads only.

~~31.~~20. Access streets may also be used where the street is entirely within land zoned E4 Environmental Living, ~~or~~ separates land that is zoned E4 Environmental Living from another zone~~,~~ (including land zoned R2 Low Density Residential), or in residential zoned land as per an ILP. In these situations the Boundary Off-set, Footpath and Planting areas in the verge (as shown in Figure 3.14~~7~~) must be constructed on both sides of the road as part of the development:

Figure 3-14 replaced as per next page



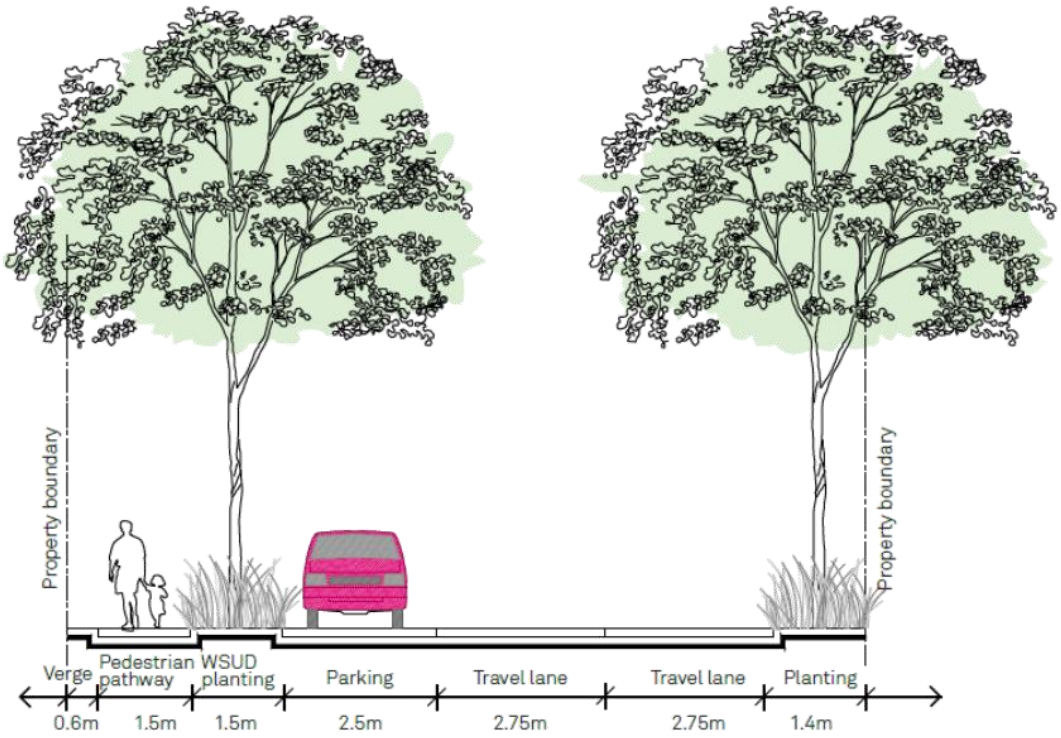


Figure ~~3-14~~ 3-17: Typical access street *The new section is consistent with others, in that the parking bay will be visually distinct from the travel lanes, providing greater clarity and avoiding driver confusion.*

***Note**: ~~As specified in Control 32, the carriageway width specified above may be reduced to 6.5m in some circumstances.~~ This is inconsistent with the new cross sections. Parking bays will be required on one side to ensure vehicles can pass one another when passing a parked vehicle*

21. In some areas, box culverts will be required under the pavement of a local street. In instances where the culvert is greater than 5.5m in width, but less than 9.0m in width, the street shall be constructed in accordance with Figure 3-18. *Whilst investigating the design of culverts for areas where zoned drainage paths have been removed, it was apparent that the new local street cross sections could not accommodate a wide (7.0m typical) culvert under the road pavement. The new 16m local street section has a carriageway width of 5.5m, with parking bays and street tree bays located in a 2.2m zone beside the travel lanes. The street tree pits would directly interfere with culverts which were wider than the 5.5m combined width of the travel lanes. Instead, the former local street cross-section can be used which features a 9.0m kerb-to-kerb carriageway. This would accommodate culverts up to 9.0m wide. Culverts >9.0m wide are not envisaged, but would require a tailored solution.*

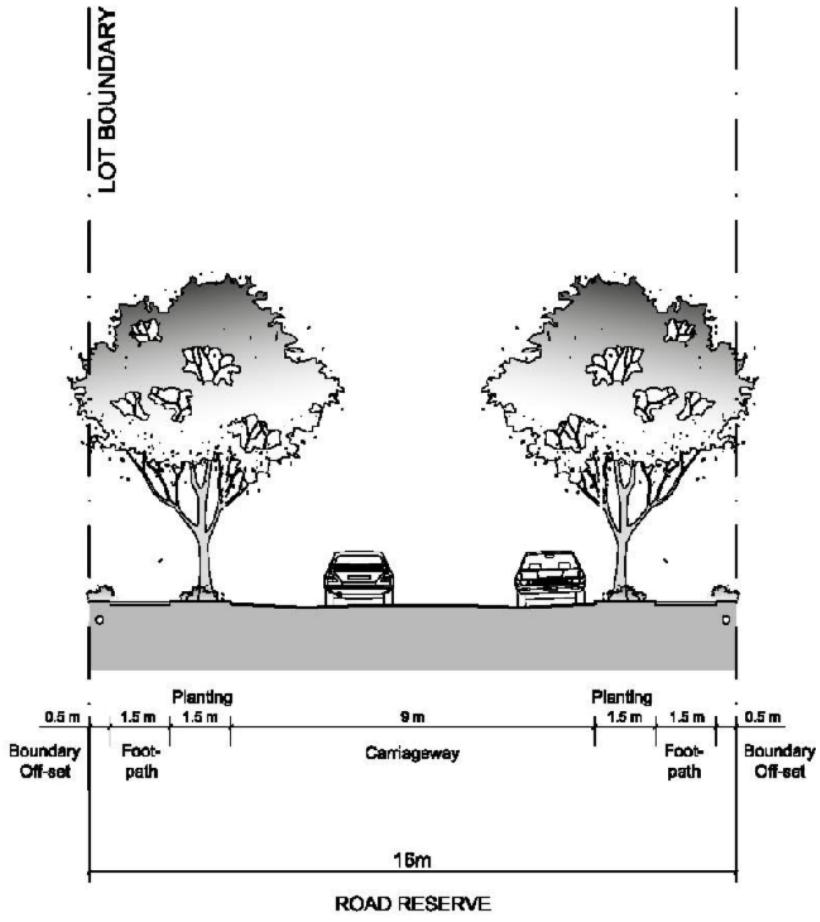


Figure 2-2: Typical local street when combined with a culvert of 5.5-9.0m in width.

3.3.2 Street Furniture

Due to some street cross-sections using tree pits and others using verge planting, the details regarding planting rates had to be updated. These controls were not particularly related to movement, so it seems fitting that a section on street furniture is created in which similar controls can be grouped and consolidated.

Objectives

a. To assist in managing the environmental impacts of urban development including soil salinity, WSUD, micro-climate effects, urban heat and stormwater;

b. To create an interesting and attractive streetscape which enriches visual and physical amenity; and

c. Ensure that the street, pedestrian and cycleway infrastructure is safe, prioritised, well-lit and free of obstructions for all users of the public domain.

Controls

~~20~~ 1. Street trees are required for all streets. Street planting is to: *control 20 moved from section 3.3.1. no change to control, except as provided below.*

- use the preferred species listed in **Appendix C**,
- be consistently used to distinguish between public and private spaces and between different classes of street within the street hierarchy,
- minimise risk to utilities and services,
- be durable and suited to the street environment and, wherever appropriate, include endemic species,
- maintain adequate lines of sight for vehicles and pedestrians, especially around driveways and street corners by providing species with clear trunks below 2m. *This is to clarify how to achieve this control.*
- be located near the centre of lots to minimise conflicts between trees, utility crossings, and driveways,
- provide appropriate shade in summer and solar access in winter including shading of road carriageways and other hard paved areas to minimise heat retention in summer, ~~and~~
- provide an attractive and interesting landscape character and clearly define public and private areas, without limiting passive surveillance of the street.
- consider items of environmental heritage, heritage conservation areas, historic road alignments and significant view lines, and-
- Maximise the potential to utilise simple passive irrigation techniques where possible. *Some of the new streets require trees to be planted in the carriageway, in which trees can be watered by road run-off which would otherwise be directed to the stormwater system.*

2. Passively irrigated street trees should be provided for any streets in which trees are located in tree pits (such as local streets as per **Figure 3.15**). The tree pit should incorporate the following into the design: *Some guidance as to the design of passively irrigated tree pits is considered appropriate as several developers were concerned that Council was requiring more complex (expensive) bio-retention pits.*

- The surrounds of the pit should include saw-cut kerbs, wheel stops, or similar, which offers protection to and from errant vehicles, and which is low maintenance,
- The pit detention depth should be determined to capture rainfall up to the 3 month event, whilst allowing excess water to drain into the stormwater network.
- Lintel inlets are favoured near tree pits to avoid conflict with driveways, blockages associated with cars parking adjacent, and to prevent water logging of tree pits.
- Mulching of tree pits should include materials that are not easily transported by surface water flows.

3. The spacing of street trees will relate to the subdivision lot widths, and street type, and shall be provided in accordance with Table 3-5. *A table format has been used in place of bullet points (as per the exhibited plan), as a table is clearer and easier to use. Note, the current DCP provides for 1 tree per lot or per 10m of road, whichever spacing is the greater. This presents issues with industrial, or large mixed use / consolidated residential developments as only 1 tree may be required for several 10s-100s of metres of a large lot frontage.*

Table 3-5: Street tree requirements

Street Typology	Lot widths	Street tree rate	Preferred approach
Typical Local Street 16m or other streets with tree pit planting	Lots ≤9m front loaded	1 tree per lot, spaced 4-18m apart	The tree planting rate can be achieved in areas characterised by abutting narrow lots by providing alternating double tree bays and parking bays between driveways. This provides two trees and one on-street parking space per two lots, maximising canopy cover, whilst providing for on-street parking. This preferred arrangement is shown in **Figure 3-18**.
	Lots >9-13m front loaded	1 tree per lot	Street trees are to be generally planted next to the edge of the driveway crossing, to ensure that a single street tree and single on-street car space can be provided at the front of each lot. The street trees should be planted on the mid-lot side of the driveway, rather than the lot boundary side, to avoid conflict with utilities A typical configuration can be seen in **Figure 3-21**.
	Lots >13m front loaded	1 tree per Torrens Title lot, or 1 per 15m on each side, whichever spacing is the lesser	The spacing of street trees in front of wide lots should provide opportunities for occasional double parking bays, whilst still maximising tree canopy cover. Staggering larger canopied tree species in larger tree pits can assist in creating a closed canopy where there are larger gaps.
	Any lot width, Rear loaded, or shared driveway lots	Typically 1 tree per 7-12.5m on each side, but no less than 1 tree per 15m on each side.	The street tree and parking arrangement should typically include double parking bay with a street tree at both ends. Single parking bays are preferred to resolve residual space to increase tree canopy cover rather than the use of triple bays.
All other streets with verge planting, or pedestrian access paths	All lot widths	1 tree per Torrens Title lot or 15m of length, whichever spacing is the lesser.	Trees should be planted in the verge and centred on the lot so as to permit driveway crossings on either side. Trees can also be planted in LATM facilities (e.g. kerb extensions) where present.
Median Planting	Medians >1.5m in width	Planting rates should be contextually sensitive, but should aim to maximise the extent of canopy covering the road surface.	The design speed and posted speed limit should be set to enable median tree planting without the need for barriers. Opportunities for inversed road grades should be investigated in which the road surface drains to the median to provide for passive irrigation.
LATM Facilities	Medians or verges >1.5m in width	Street trees and shrubs to be integrated as essential elements of the design	Street trees and mass planting should re-enforce the LATM device by disrupting long uninterrupted sight-lines and providing a sense that the roadway narrows.

Figure 2-19: Preferred street tree and parking arrangement for local streets in subdivisions with narrow front-loaded lots

4. To minimise the loss of street trees and prevent the reconstruction of road related infrastructure, any lots facing a street which includes trees planted in tree pits, shall have a s.88b restriction which specifies the location of the driveway crossing as "in accordance with the approved subdivision plan", This restriction is only to be released by authority of Council. *a s.88b instrument is a legal document attached to a land title which specifies controls/restrictions on the development of that lot. This control will ensure that private certifiers check the location of the proposed driveway prior to approving a building plan. The location of a garage should correspond to the location of the driveway which is approved as part of the subdivision plan. Some other streets may also include tree pits, in which similar restrictions will be required.*

~~23.~~ 5. While acknowledging the amenity benefit from trees within the carriageway, applications that propose carriageway trees will be assessed by Council with consideration given to: *This was control 23 moved from section 3.3.1*

- access and manoeuvrability of garbage trucks, street sweepers and cars,
- the impact of the root system on the carriageway;
- ongoing maintenance of the tree and carriageway;
- the relationship with future driveway access points; and
- Traffic safety.

~~25.~~ 6. Signage, street furniture and lighting is to be: *This was control 25 moved from section 3.3.1*

- designed to reinforce the distinct identity of the development;
- coordinated in design and style;
- located so as to minimise visual clutter and obstruction of the public domain; and
- consistent with any landscaping and public domain guidelines or policies specified by Council.

~~26.~~7. Locating entry signage and the like within a public road reserve is subject to Council agreement. *This was control 26 moved from section 3.3.1*

~~27.~~8. The location and design of signage and street furniture is to be indicated on the Landscape Plan and on engineering construction drawings. *This was control 27 moved from section 3.3.1*

~~28.~~9. Street lighting is to be designed to meet the current Australian Standards AS/NZS 1158 series, and Council's specifications regarding poles and luminaries. *The black text was control 28 moved from section 3.3.1. Council already requires LED lighting as per specifications which are beyond AS1158. Smart poles and poles with banners could be investigated for town centre public domain plans*

10. Street lighting is required for all pedestrian only access paths, refer to **Figure 3-27**. *Figure 3-27 requires lighting. This control was not exhibited, but aligns with community expectations, and CPTED principles.*

11. Street lighting is recommended on pedestrian paths through public open spaces and is essential on off-street routes shown in a precinct walking and cycling infrastructure map. *Again, this was not publicly exhibited, but is consistent with the desire to facilitate safe active transport/recreation use, and for those accessing public transport stops.*

12. Ensure that large street furniture avoids the creation of pinch-points and caters for pedestrians to pass one-another with at least 1.5m of separation. *Not exhibited. However, as highlighted by the recent pandemic, some pedestrian infrastructure does not adequately cater to physical distancing requirements, by forcing pedestrians too close to each other when passing street furniture or crossing narrow bridges.*

13. Avoid the clustering of bus-shelters, utility infrastructure and the like which may prevent physical distancing.

14. Ensure pedestrian bridges, or other barriers which confine pedestrian spaces, provide a width of at least 3.5m.

3.3.3 Local Area Traffic Management

This is a new section and provides better guidance than those controls in section 3.3.1 which are proposed to be removed.

Objectives

a. Provide a safe and legible network of local roads across the precincts which prioritise pedestrians and cyclists, encouraging street activity, whilst maintaining vehicular access to properties.

b. Increase road safety by maintaining a low-speed traffic environment (40-50km/h) on local streets and collector roads by influencing driver behaviour, through both visual and physical cues.

c. Improve public amenity and the local streetscapes by encouraging the use of LATM facilities which soften the streetscape and do not add visual clutter.

d. Provide traffic calming devices which minimise costs of construction and maintenance.

e. Discourage traffic calming devices which induce noise, cause damage to vehicles, discomfort for public transport users, and decrease pedestrian and cyclist prioritisation and safety.

f. Reinforce the road hierarchy by discouraging through traffic and high vehicle speeds on lower order roads.

Controls

1. A Local Area Traffic Management (LATM) plan shall be submitted with any development which involves the opening of a new road(s), or modifications to existing roads. Design solutions shall conform to Austroads *Guide to Traffic Management Part 8 (Local Area Traffic Management).*

2. New local streets and collector roads should be designed to encourage a low speed *(40-50km/h)* environment. Traffic calming facilities will generally need to be located every 80-120m. The choice of treatment should consider the operation of the street as a whole, including the interface with surrounding development (lot boundaries, existing vegetation, driveways and demand for on-street parking), and factors such as sight-lines and road geometry.

   Note: The design exercise should not concentrate on providing a series of stop points and isolated devices, rather it should maintain an appropriate vehicle speed through passage of the street(s). *This is to avoid a situation where a series of stop-signs or speed bumps would result in lots of vehicle breaking and acceleration, which results in vehicle wear and additional noise.*

3. Council's preferred traffic calming devices are landscaped kerb extensions with a visually distinctive road surface. Kerb extensions incorporating landscaping, raingardens and/or street trees should be located frequently on local streets so as to provide a sense of enclosure. An example is provided in **Figure 3-**.

4. Intersections between busier local streets and collector roads, collector roads with other higher order roads, or intersection legs with a stop sign shall generally be fitted with pedestrian refuges, to facilitate non-vehicular crossing and to provide a visual reinforcement of the intersection.

5. All other intersections between intersecting local streets, and local streets with collector roads, shall have a textured surface treatment. An example is provided in **Figure 3-**. *The term "threshold treatment" was changed to "surface treatment" as a result of confusion which was noted in the public exhibition. This control only requires a textured surface as per Australian Model Code of Residential Development (AMCORD). These are evident in many residential areas constructed in the 1990s, and are effective in signalling a change in road environment to road users.*

6. To reinforce the road hierarchy and to reduce the ability for vehicles to attain high speeds, local streets should not be given priority for a distance of greater than 400m, Local streets which connect to higher order routes should be given a higher degree of priority to encourage motorists to use the higher order routes. *This is to discourage rat-running and to encourage vehicles to use collector/arterial roads rather than local streets to travel longer distances. The second sentence was changed as a result of public exhibition to clarify that intersection priority should guide motorists towards higher order routes (e.g. long local streets which run parallel to a collector road should have regular stop/give way signs at intersections to discourage rat-running).*

7. Laneways, where there are straight segments exceeding 80m in length, shall be fitted with landscaping blisters or tree pits and textured material bands at intervals of no more than 40m, to ensure that a very low speed environment can be maintained.
   Note: The location of blisters must permit garbage truck and firetruck manoeuvrability, particularly at corners.

8. Devices which considerably reduce vehicle speeds (e.g. humps or one-way passing points on busy roads) are to be avoided, unless such a reduction in speed is required for safe passage. The road design is to avoid vehicle noise generated from repeated acceleration and deceleration.

9. Despite control 8 above, wombat crossings are generally appropriate when combined with a pedestrian crossing close to an intersection, in a commercial area, medium density residential areas, or near a school, where there is a need to alert road users to higher pedestrian activity.

10. Due to the priority given to vehicular traffic over other modes, roundabouts are to be avoided on intersecting local streets, unless otherwise specified.

11. Areas for parking on local streets and collector streets (which includes parking lanes) are to be visually distinguished from travel lanes, by utilising elements such as tree bays, footpath extensions, v-gutters, and/or a pavement which is visually different to the road pavement and has

a tactile surface. This may include pavers, cobbles, or other suitable low maintenance surfaces. Painted surfaces, such as stencilled concrete or stamped asphalt are to be avoided.
Stamped/painted surfaces typically wear out or degrade in appearance quickly and would be expensive to maintain, or detract from the streetscape.

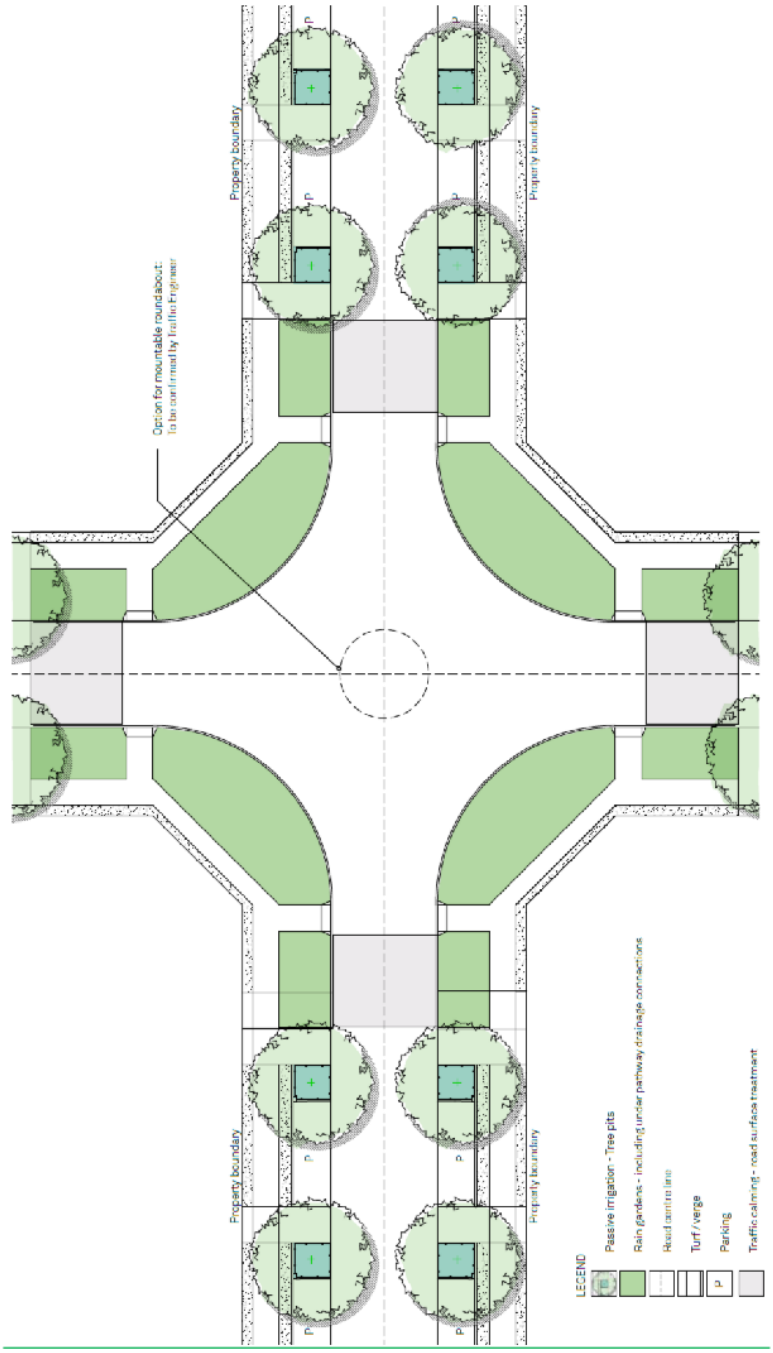


Figure 3-21: Typical local street intersection profile including Rain Garden and textured thresholds

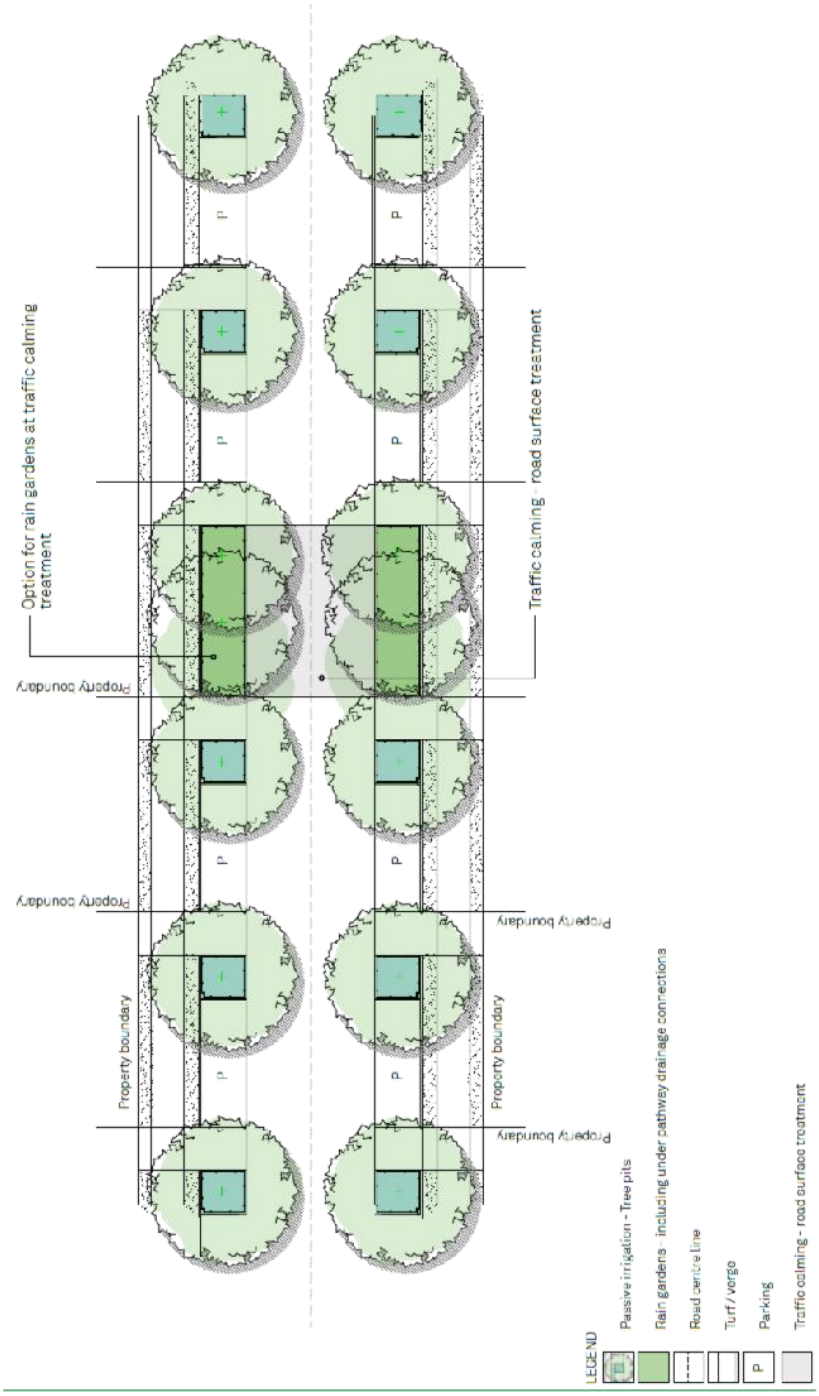


Figure 3-22: Typical Local Area Traffic Management Facility on a local street

~~3.3.5~~ 3.3.7 Pedestrian and Cycle Network

Objectives

a. – c. No changes.

Controls

1. No change.

2. The design of footpaths and cycleways located within the road reserve is to be in accordance with ~~Figure 3-10~~ **Figure 3-11** to ~~Figure 3-14~~ **Figure 3-22**.

3. – 9. No change..

10. Any through site links that continue the desire line of a road corridor should be the same width of that corridor. All other through site links, pedestrian access paths, or overland flow paths which include a pedestrian connection should be designed in accordance with **Figure 3-24**. *There is a desire to have pedestrian connections at the same width as the adjacent street to maximise surveillance, and decrease opportunities of entrapment.*

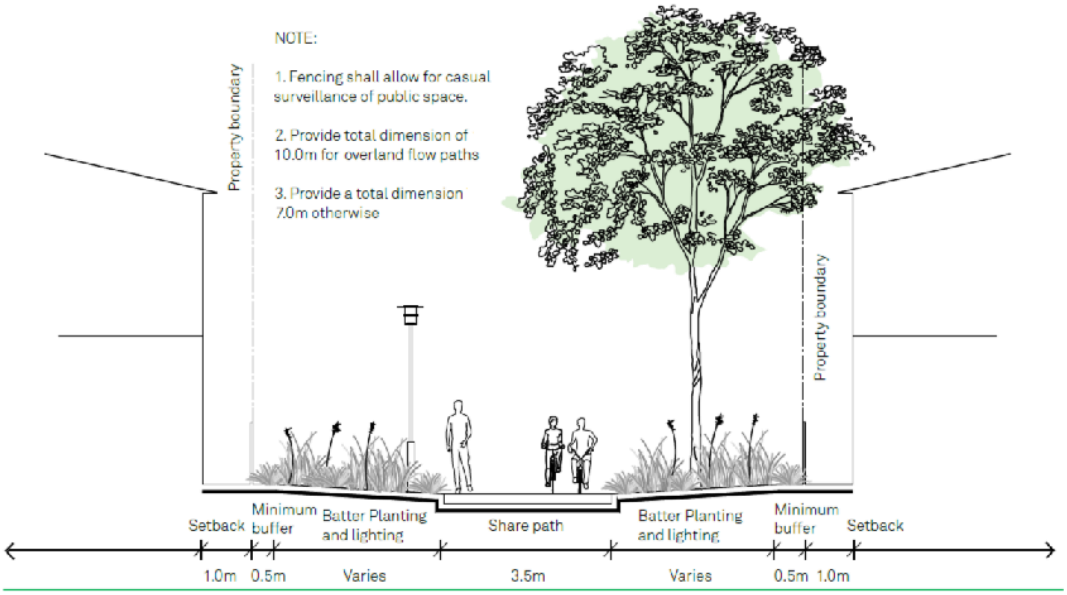


Figure 3-24: 10.0m Typical Pedestrian Access Path *The amended ILP introduces a limited number of pedestrian only paths. Assessment of stormwater drainage for each DA also necessitates overland flow paths in some instances to resolve localised flooding issues. This standard cross section should allow for overland flow, and is sufficiently wide so as to prevent opportunities for concealment and other crime related activities.*

~~3.3.6~~ 3.3.8 Temporary vehicular access

Objectives

a. – c. No change.

Controls

1. No change.

2. Temporary access arrangements must comply with Council's Engineering Specifications and specified provisions of this DCP. Any provisions of this DCP prevail to the extent of any inconsistency. *Council's current engineering standards for road widths did not anticipate the typical cross-section proposed in this DCP.*

3. – 5. . No change.

6. A half road is required where a street, as indicated by the precinct Indicative Layout Plan or as otherwise required, is located on the boundary of the property being developed, and where the adjacent lot is not being developed. The type of half road construction will depend upon the road hierarchy and anticipated traffic volume on the street. The applicant will cover all costs associated with the design of the full road width and construction of half the full width pavement, including temporary and permanent drainage infrastructure, and adequate transitions to full width cross sections. *Half road construction is regularly required in the ALN precincts, and the current controls do not relate to the new cross-sections, nor do they apply to any road other than local streets.*

7. Half width Industrial Streets are to be provided as half of the typical section of **Figure 6-2**. *A half industrial road contains 5.5m of carriageway, which is sufficient for two-way movement, but will likely require localised widening or complex manoeuvres for large vehicles entering/exiting sites.*

8. Half width collector roads must be constructed in a manner which provides a carriageway of 5.5m. This can be achieved by providing 0.1m of widening on the adjacent property (with owners consent) or by reducing the landscaped verge on the developed side by 0.1m. The opposite side shall be designed with a wider planting verge. *Half of a standard collector road has a carriageway of only 5.4m wide which is 0.1m too narrow for efficient two-way traffic.*

9. A local road may be constructed as one side of **Figure 3-14** in instances where the half road will operate in a single direction of travel. Another carriageway must accommodate the opposing direction of travel to ensure each dwelling is provided access to and from the broader road network. This can be satisfied with another opposing half road, a two way road, or a temporary access road. Intersection(s) may require localised widening on adjacent properties (with consent) to ensure garbage and firetrucks can safely manoeuvre. *Providing half of a local street, where the other direction of trave can be catered for elsewhere on site, presents the most efficient outcome, as the other half of the road can be constructed at a later date with minimal disruption. Whilst some residents may find one-way circulation confusing, this method permits raingardens, street trees and on-street parking without the need for widening on adjoining undeveloped properties. Widening on adjoining properties can cause significant delays to development and in some instances no development potential where an adjoining owner does not consent to widening. This solution is not possible in instances where a large development only provides for a single half road in and out of the development as vehicles can only either enter or exit.*

10. In circumstances where local streets will directly serve less than 10 lots, with traffic volumes of less than 300vpd, lengths of no more than 80m, and subject to the findings of a traffic safety audit, Council may consider a half road to be delivered as one half of **Figure 3.14**. The areas designated for parking bays are to be signposted as no stopping zones, and will function as passing points until full width is constructed. Street trees are still to be planted. Upon construction of the full width, parking bays are to be re-instated by removing the no stopping signs. *This is similar to the above, yet both directions of travel share the traffic lane. 2.75m is insufficient for two vehicles to pass one another, so one vehicle will have to wait in the area designated for parking bays (signposted as no stopping to prevent parking) whilst the other vehicle passes. This solution is only suitable in areas with very little traffic and where there are no blind spots, as two-way traffic will be sharing the same traffic lane.*

~~6.~~ 11. In all other circumstances a ~~H~~half-width local road~~s~~ must~~ay~~ be constructed to provide temporary access to residential development, in accordance with ~~**Figure 3-19**~~ **Figure 3.25**.*Due to the need for significant adjacent property widening, this is now the last-resort solution, in which roads must be constructed in this manner if not utilising any of the methods above* ~~The applicant will cover all costs associated with the design of the full road width and construction of half the full width pavement, including temporary and permanent drainage infrastructure, adequate transitions to full width cross sections, plus a two way traffic configuration ensuring operational effectiveness and safety to relevant standards.~~ *This text has been moved to control 6.* The 2.75m of additional widening on the adjacent property(ies) will require adjoining owner(s) consent. Council will generally

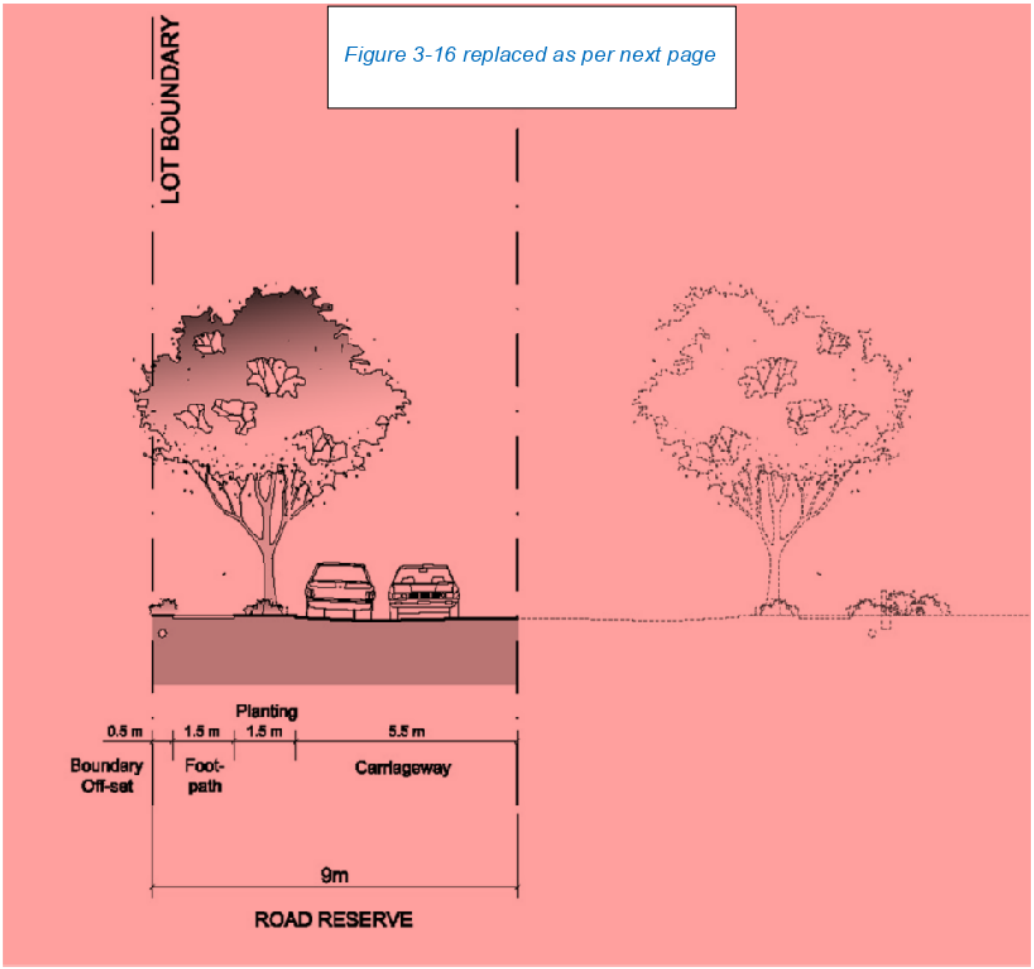
not consider moving the road centreline. *Consent is required for any land in which development is being carried out, including land which only includes the construction of roads. Moving the centreline will have knock on effects on other properties and could lead to a more disconnected road network.*

12. - 13. No change. Controls 7-8 renumbered to 12-13.

~~9.~~ 14. The half-width road design is to ensure that runoff from the road pavement is directed ~~to the kerb~~ away from the adjoining undeveloped property. *Some of the new road cross-sections do not have a standard kerb. The aim of this control is to ensure stormwater does not run-off onto adjoining lots.*

15. . No change. Renumbered from 10 to 15.

~~11. A minimum carriageway width of 5.5 metres is required for all half-width roads.~~ *This contradicts control 10.*



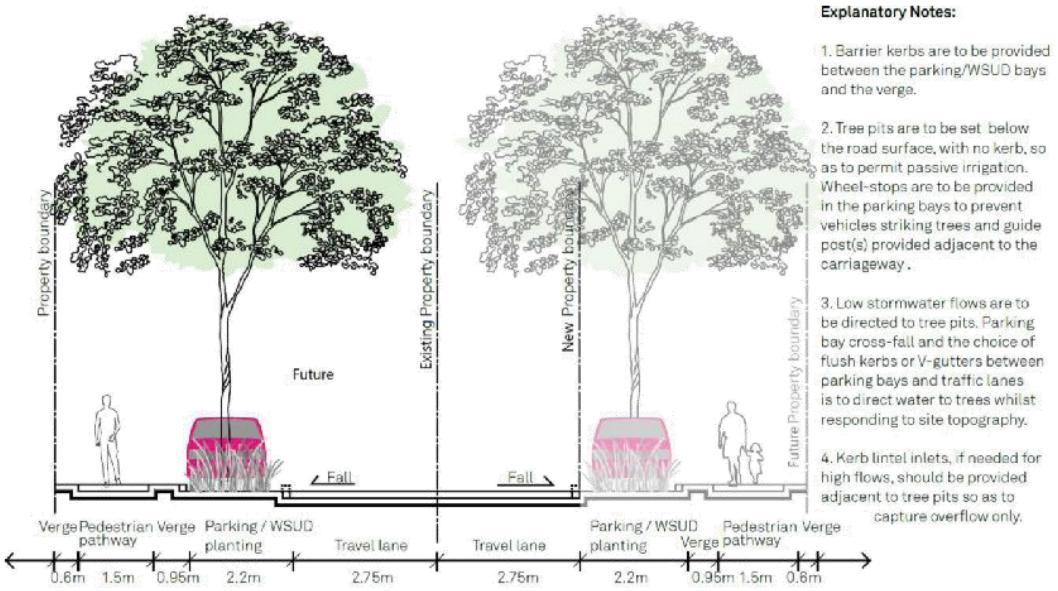


Figure ~~3-19~~ 3-25: Temporary half road width construction

Cross section updated as a result of public exhibition. Due to the provision of utilities needing at least 3.0m from the property boundary, the verge had to be widened, which results in travel lanes being narrowed from 3.0m to 2.75m.

The result is that 2.75m will be required on an adjoining property, rather than 2.5m as per the exhibited plan, as the total width for vehicles must be at least 5.5m.

4.0

Residential Development

4. Residential Development

4.2.8. Garages, Storage, Site Access and Parking

Objectives

No changes to objectives

Controls

1 – 11. *No change*

12. ~~Single garage doors should be a maximum of 3m wide and double garage doors should be a maximum of 6m wide.~~ The external wall, which includes the garage door, associated with a dwelling is to have a maximum width of:

- 3m for a single car space (including those in a tandem arrangement), or
- 6m for a two car wide space.

The intent of this control is to ensure that a habitable room can be positioned on the ground floor at the front of the dwelling to overlook the street. This is consistent with CPTED principles by ensuring passive surveillance of the street. Once taking into account building setbacks and the width of external and internal walls, double width garages cannot be provided on narrow lots, as the left-over space is not wide enough to provide a functional room (e.g. 2m in width, only suited to a hallway/corridor).

Some builders were arguing that the control only related to door widths and were proposing double wide garages with a single garage door (where it is assumed that the door would be replaced by a double width door post-construction). The control has been clarified to make it clear that the width relates to the entire garage façade facing the street, not just the width of the opening.

6.0

Employment Lands Subdivision and Development Controls

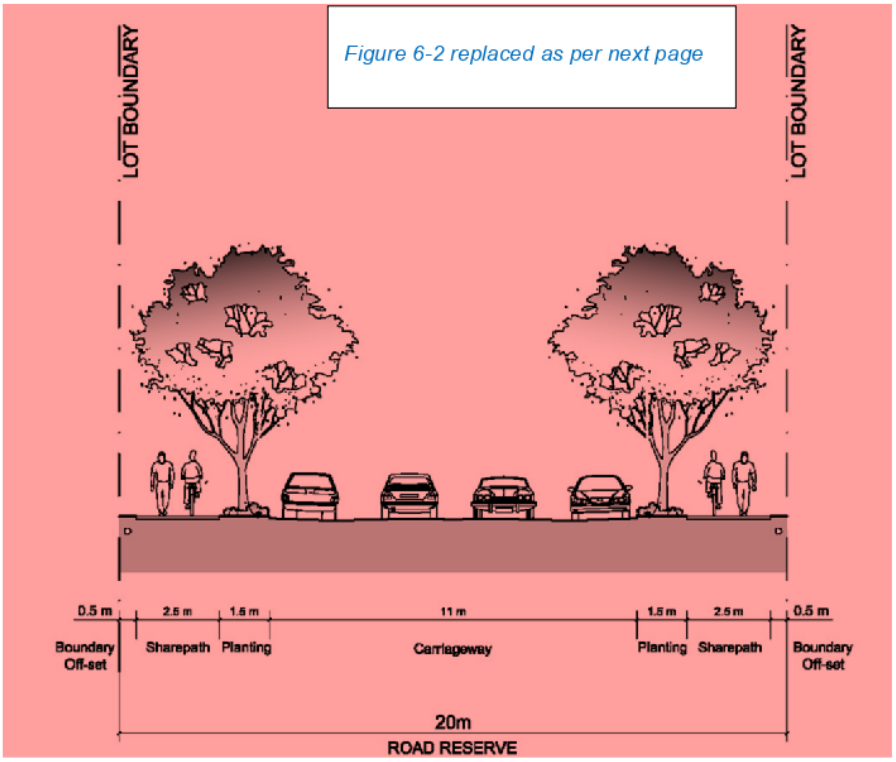
8 Employment Lands Subdivision and Development Controls

8.3.1 Streetscape and Allotment Frontages

1. Streets in industrial zones are to be designed and constructed in accordance with the typical cross section at **Figure 8-2**.

2. – 5. No change.

Figure 6-2 replaced as per next page



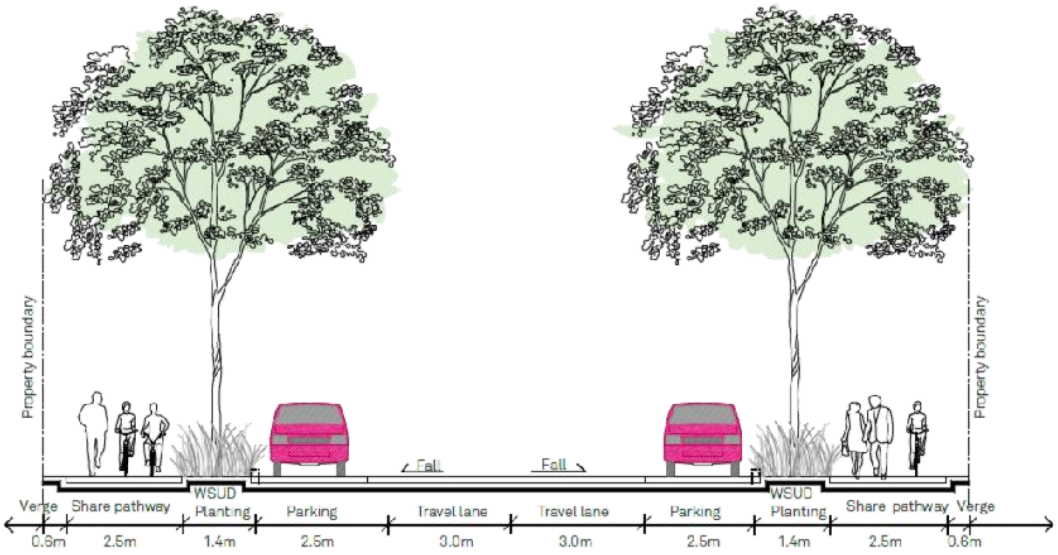


Figure 8-2: Typical industrial street

Amending Development Control Plan (Austral ILP Amendment)

(Post-Exhibition) February 2021

Schedule 1

Austral & Leppington North Precincts

Note this draft DCP omits text and figures which are not intended to be amended. Several sections objectives and controls have not been reproduced in this document, only sections of relevance have been displayed. Text which is to be inserted is shown in green and underlined, text which is to be deleted is shown in ~~red with strikethrough~~, explanatory notes are shown in *blue italics*.

Contents

2 Development planning and design 1
2.2 Referenced Figures 1

2 Development planning and design

2.2 Referenced Figures

The figures included in this section are those referenced in **Part 2 Precinct Planning Outcomes**, and **Part 3 Neighbourhood and Subdivision Design**, of the main body of the DCP. For some figures, more detailed information relating to the Leppington Major Centre is contained in **Schedule 2**, and should also be referenced for developments in the Major Centre.


Kemps Creek
Western Sydney Parklands
Western Sydney Parklands
Western Sydney Parklands
North Rossmore
Rossmore
Catherine Fields North
Leppington
East Leppington
NSW Planning & Infrastructure
AUSTRAL & LEPPINGTON NORTH PRECINCTS
Figure replaced as per next page

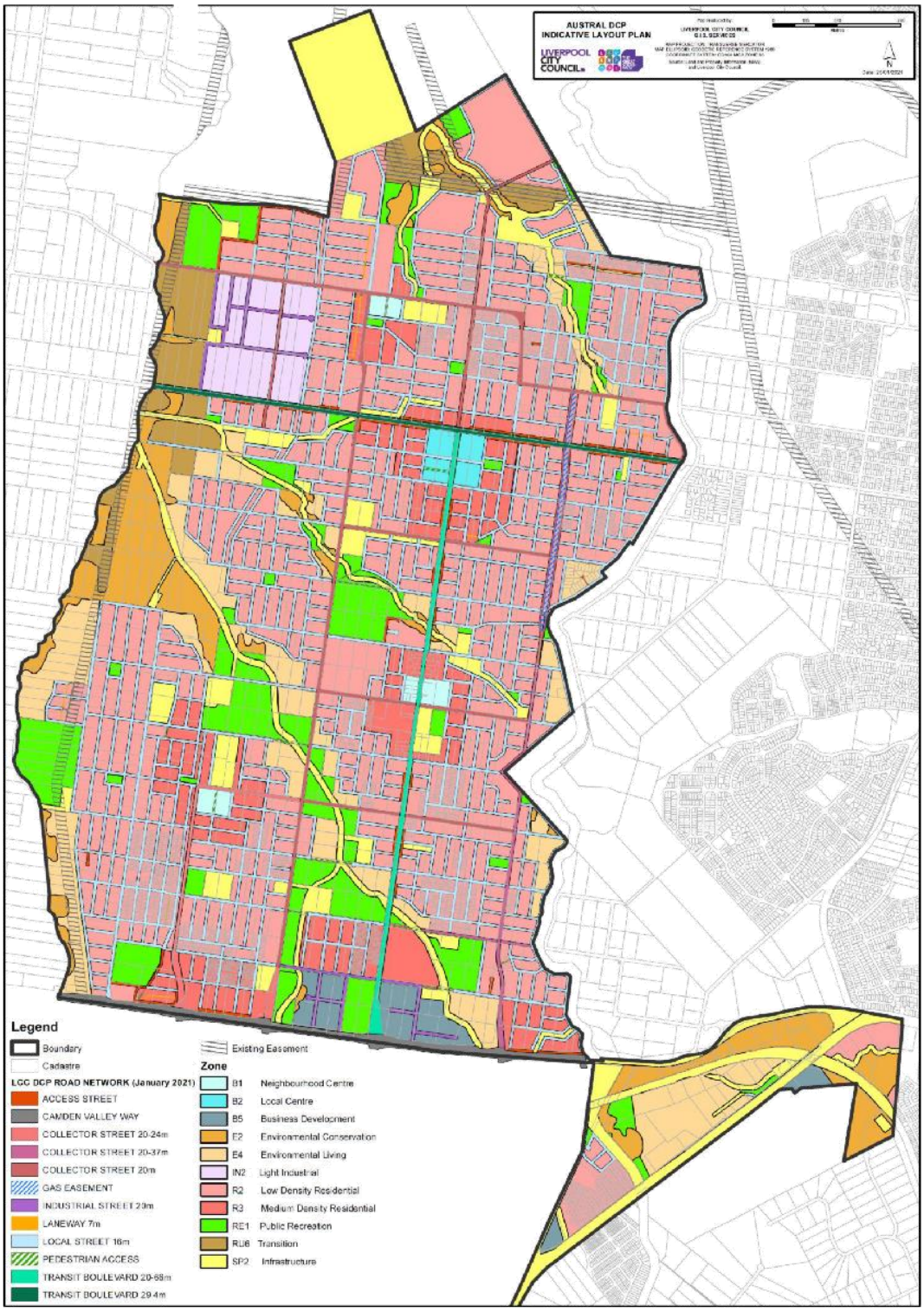
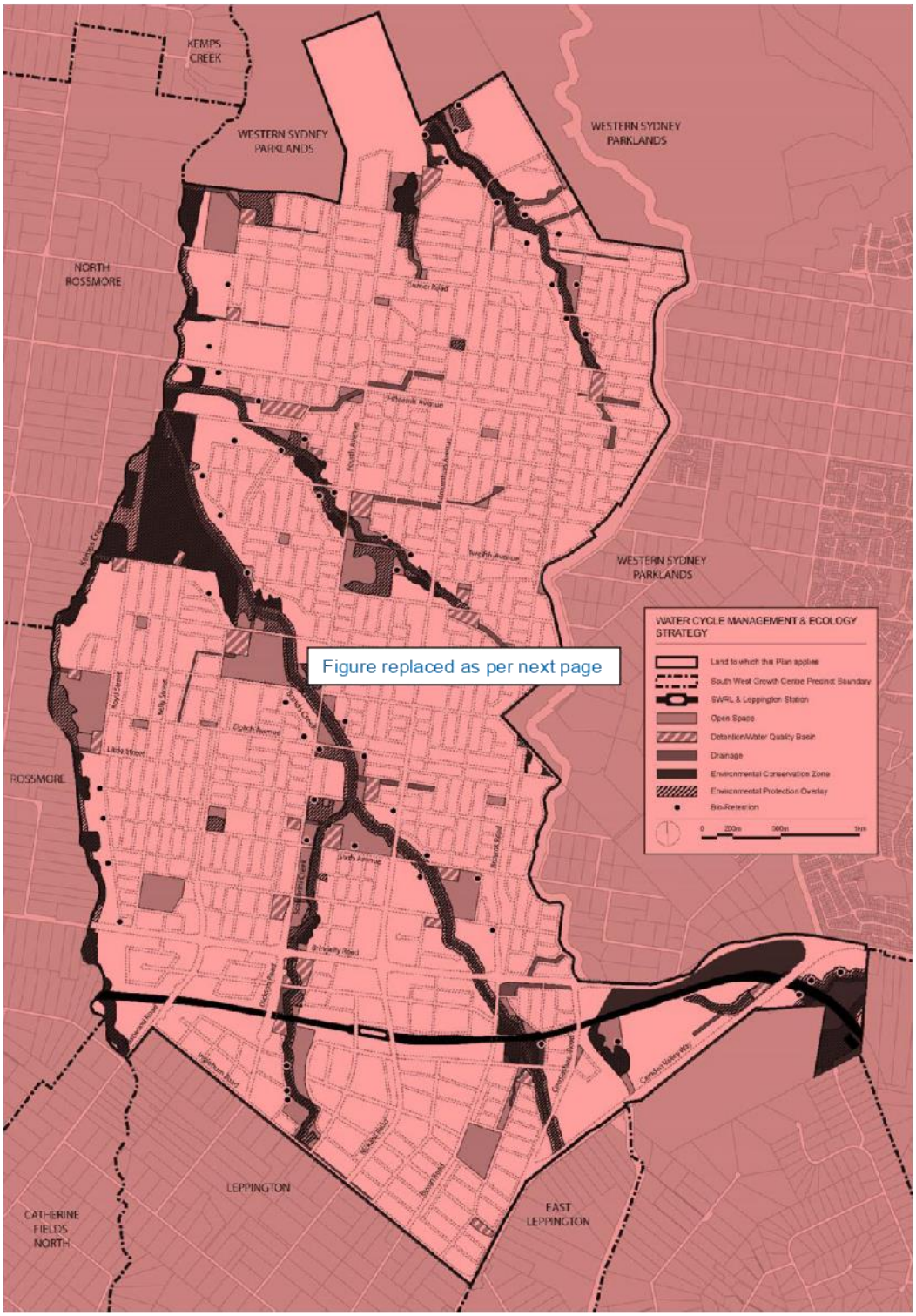


Figure 2-1: Indicative Layout Plan


KEMPS CREEK
WESTERN SYDNEY PARKLANDS
WESTERN SYDNEY PARKLANDS
NORTH ROSSMORE
WESTERN SYDNEY PARKLANDS
Figure replaced as per next page
WATER CYCLE MANAGEMENT & ECOLOGY STRATEGY
Land to which this Plan applies
South West Growth Centre Precinct Boundary
SWRL & Leppington Station
Open Space
Detention/Water Quality Basin
Drainage
Environmental Conservation Zone
Environmental Protection Overlay
Bio-Retention
ROSSMORE
LEPPINGTON
CATHERINE FIELDS NORTH
EAST LEPPINGTON

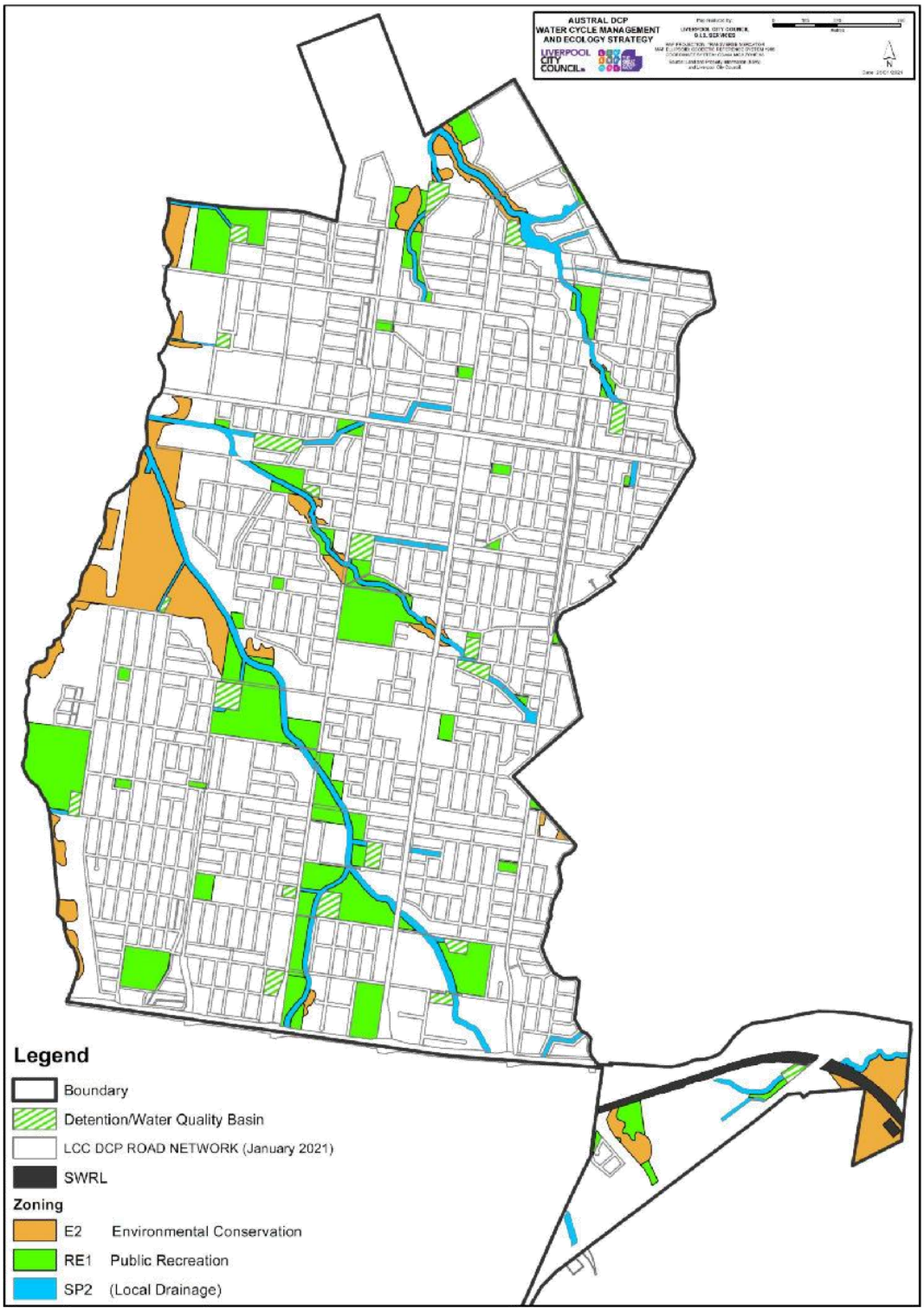


Figure 2-2: Key elements of the water cycle management and ecology strategy

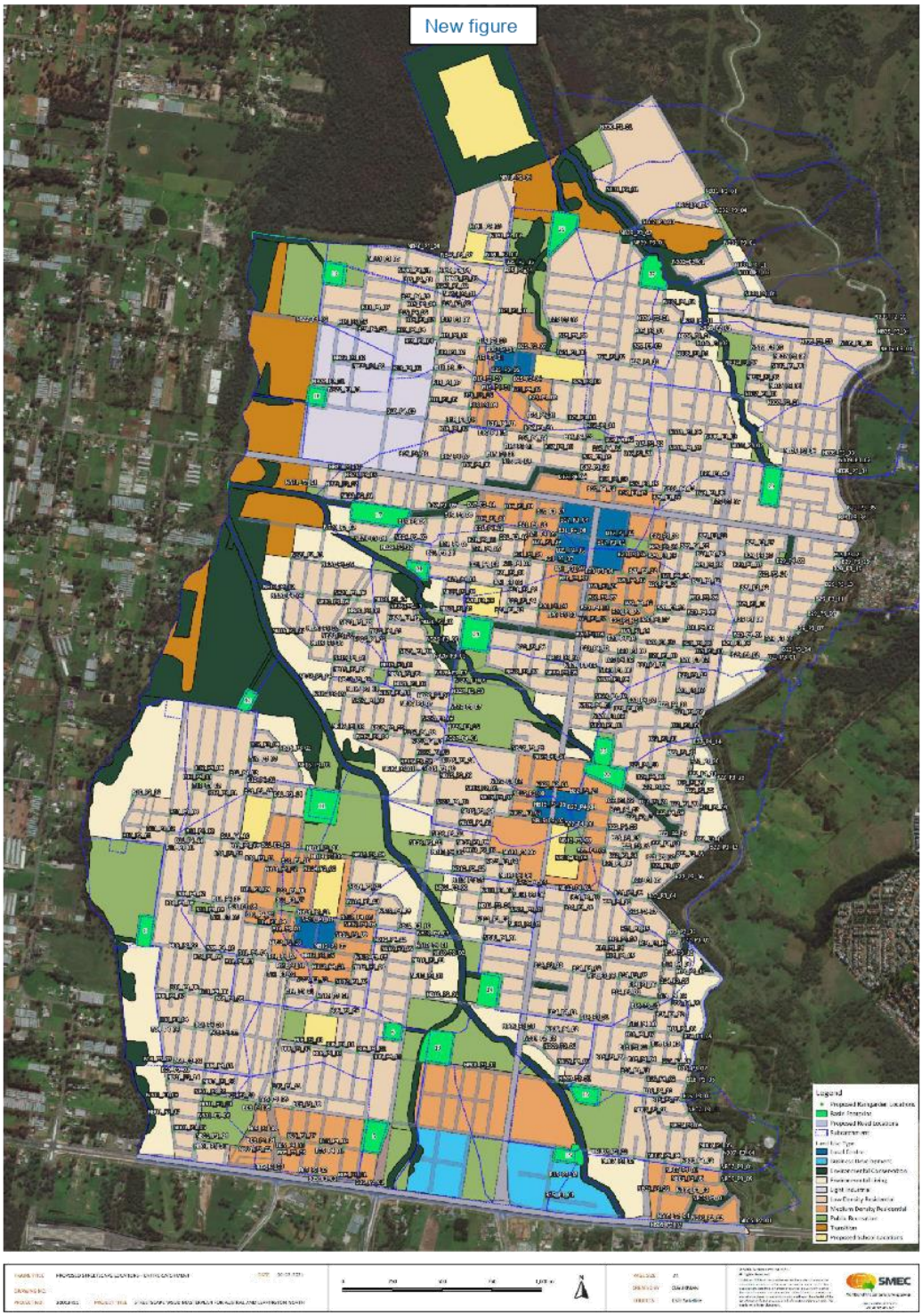
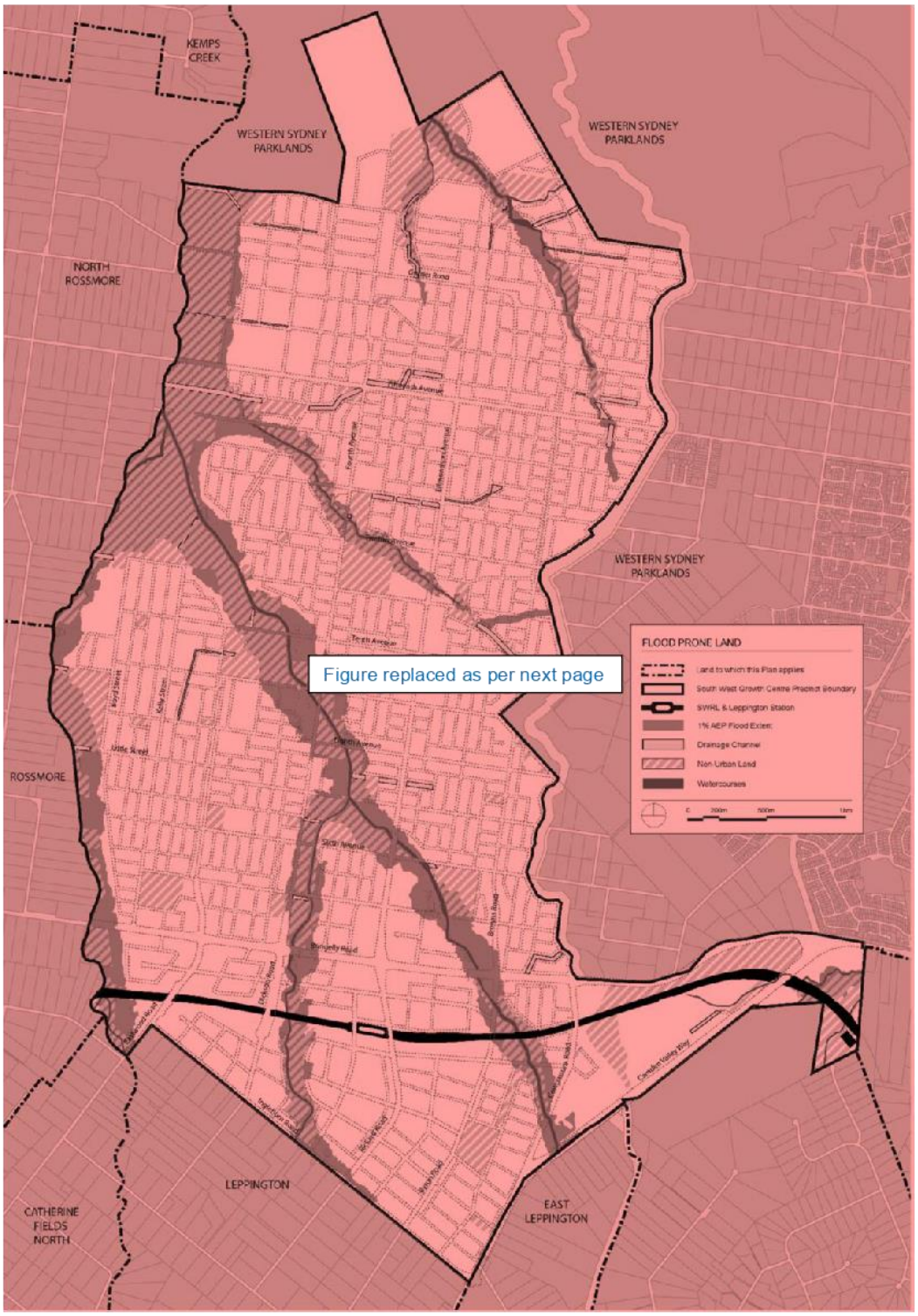


Figure 2-3: Proposed Water Quality Control Strategy


KEMPS CREEK
WESTERN SYDNEY PARKLANDS
WESTERN SYDNEY PARKLANDS
NORTH ROSSMORE
WESTERN SYDNEY PARKLANDS
Figure replaced as per next page
FLOOD PRONE LAND
Land to which this Plan applies
South West Growth Centre Precinct Boundary
SWRL & Leppington Station
1% AEP Flood Extent
Drainage Channel
Non Urban Land
Watercourses
ROSSMORE
LEPPINGTON
CATHERINE FIELDS NORTH
EAST LEPPINGTON

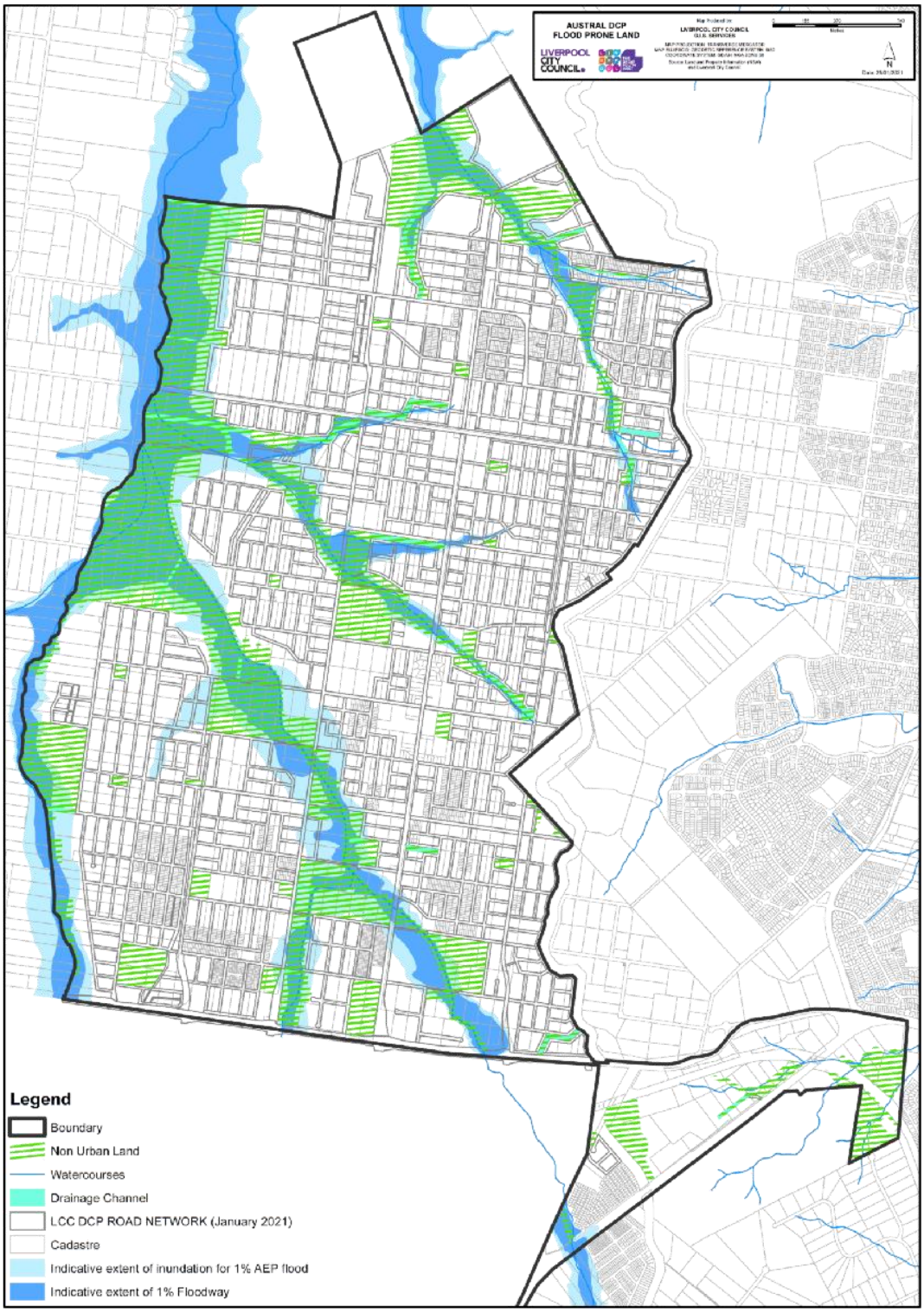
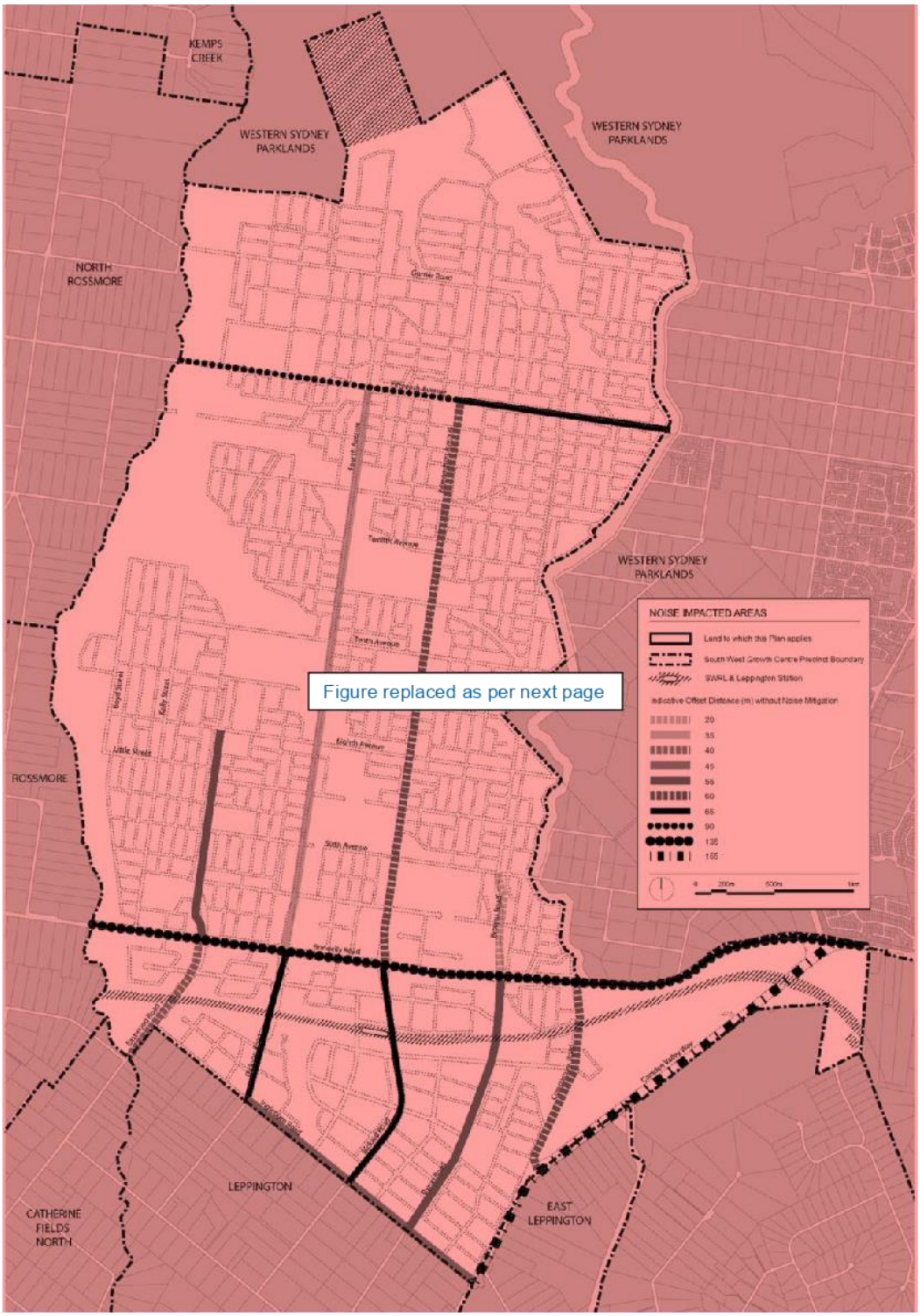


Figure ~~2-3~~ 2-4: Flood prone land

Figures 2-4 to 2-8 renumbered to 2-5 to 2-9. No changes to salinity map, Aboriginal cultural heritage site map, European cultural heritage map, bushfire risk and asset protection zone requirements map, and potential contamination risk ranking map.


KEMPS CREEK
WESTERN SYDNEY PARKLANDS
WESTERN SYDNEY PARKLANDS
NORTH ROSSMORE
WESTERN SYDNEY PARKLANDS
NOISE IMPACTED AREAS
Land to which this Plan applies
South West Growth Centre Precinct Boundary
SWRL & Leppington Station
Indicative Offset Distance (m) without Noise Mitigation
20
35
40
45
55
60
65
90
135
165
Figure replaced as per next page
ROSSMORE
LEPPINGTON
EAST LEPPINGTON
CATHERINE FIELDS NORTH

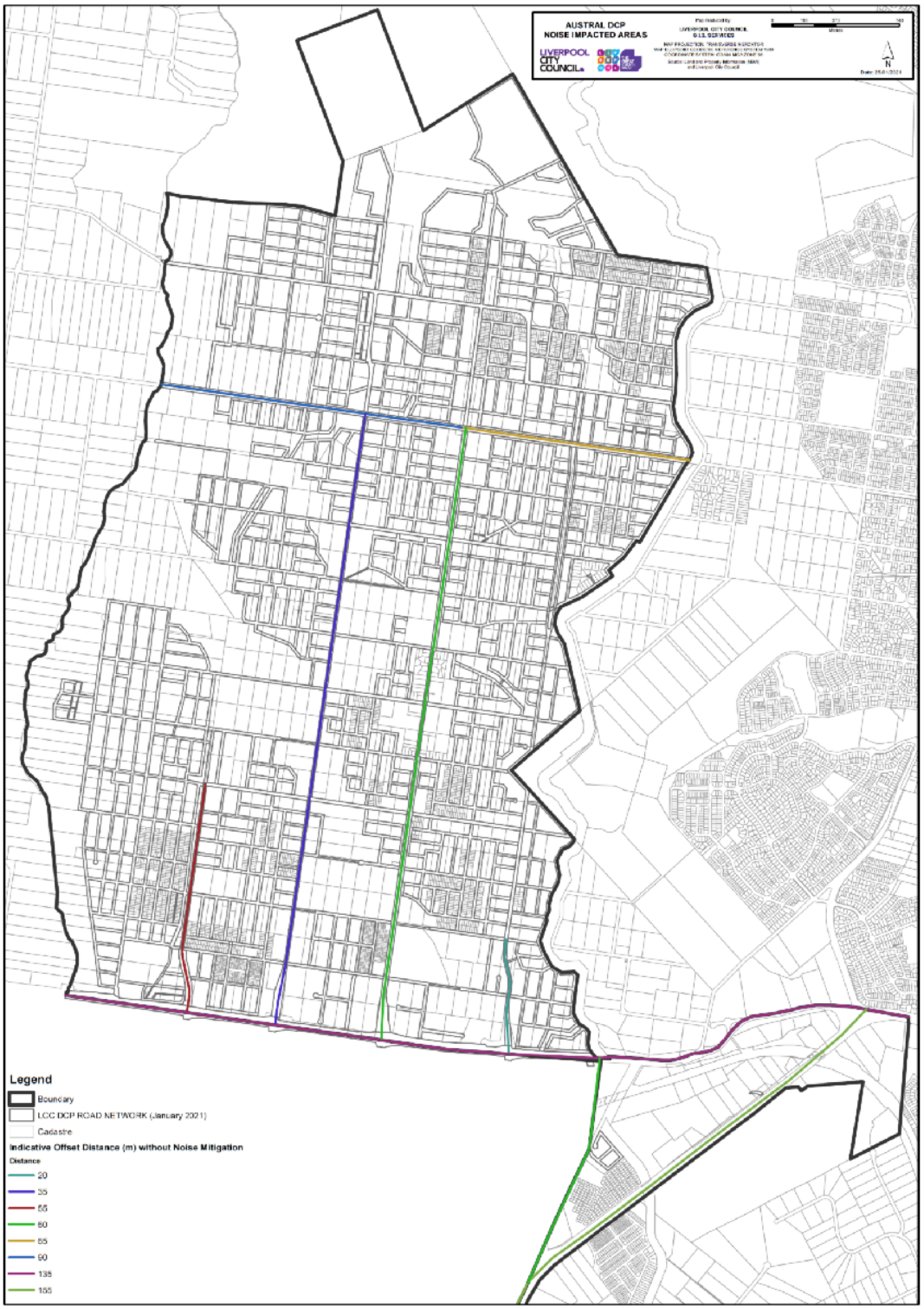
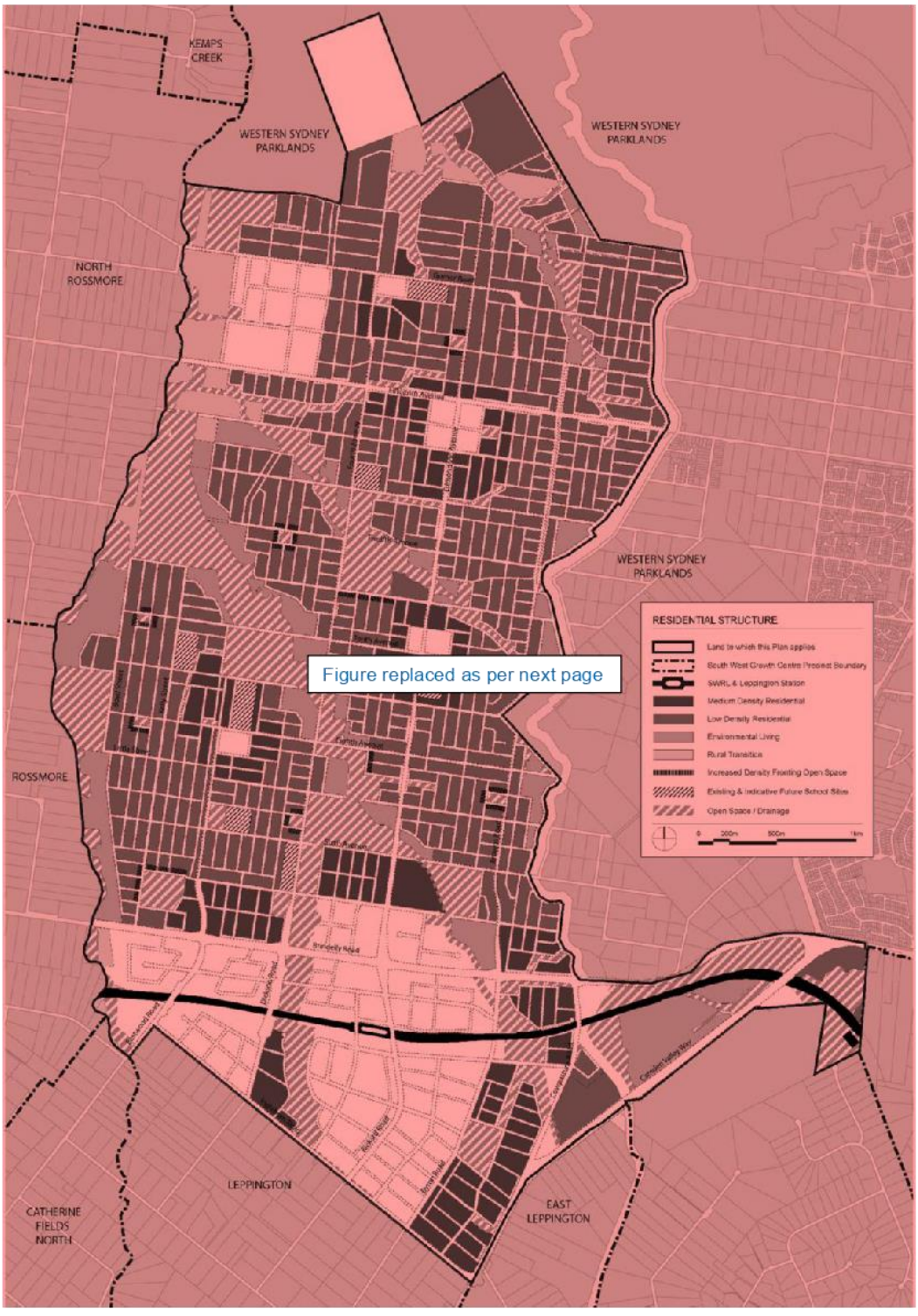


Figure ~~2-9~~ 2-10: Potential noise attenuation measures

Figure 2-10 renumbered to 2-11 (Location of easements)


KEMPS CREEK
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WESTERN SYDNEY PARKLANDS
NORTH ROSSMORE
WESTERN SYDNEY PARKLANDS
Figure replaced as per next page
RESIDENTIAL STRUCTURE
Land to which this Plan applies
South West Growth Centre Precinct Boundary
SWRL & Leppington Station
Medium Density Residential
Low Density Residential
Environmental Living
Rural Transition
Increased Density Fronting Open Space
Existing & Indicative Future School Sites
Open Space / Drainage
ROSSMORE
LEPPINGTON
CATHERINE FIELDS NORTH
EAST LEPPINGTON

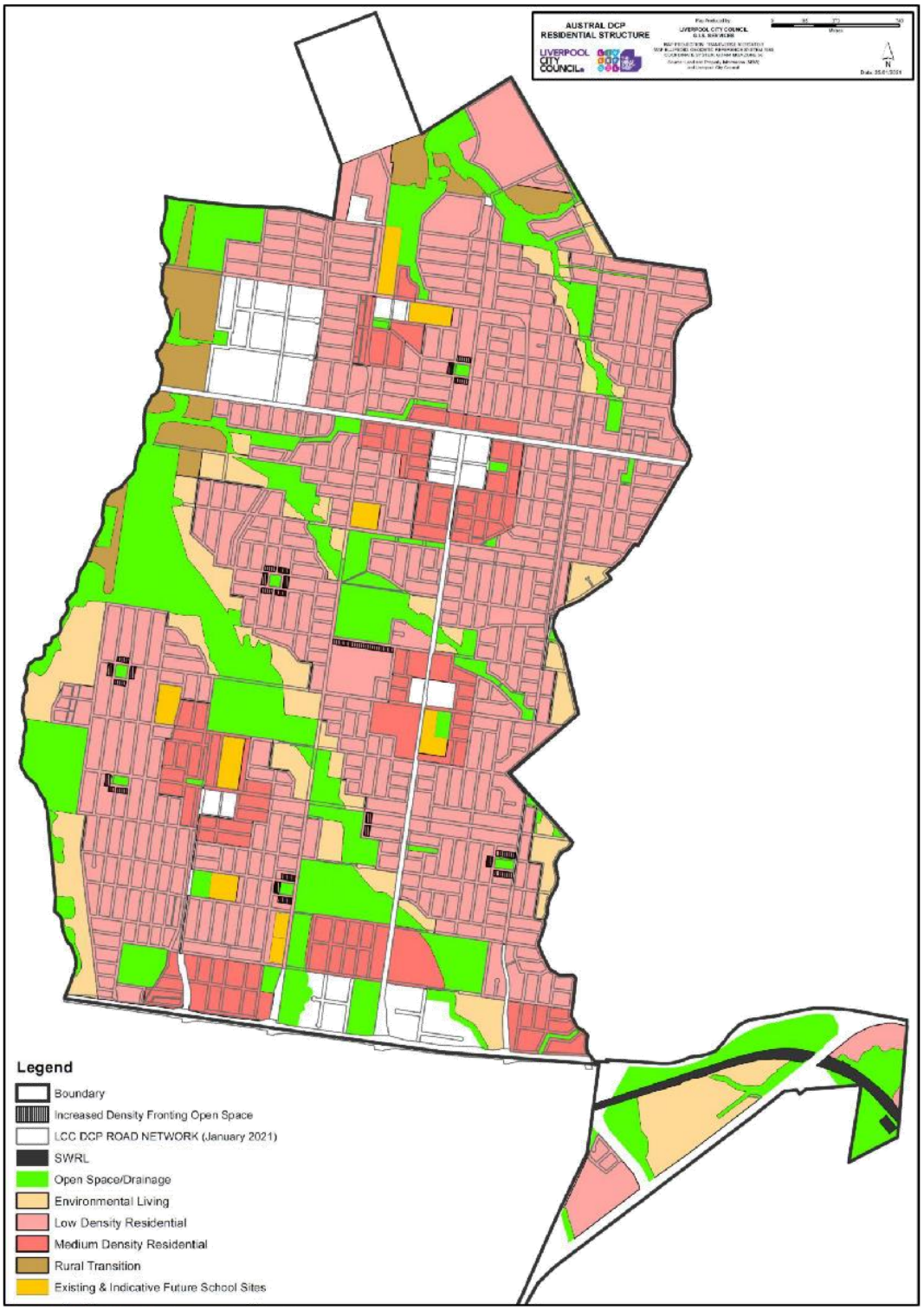
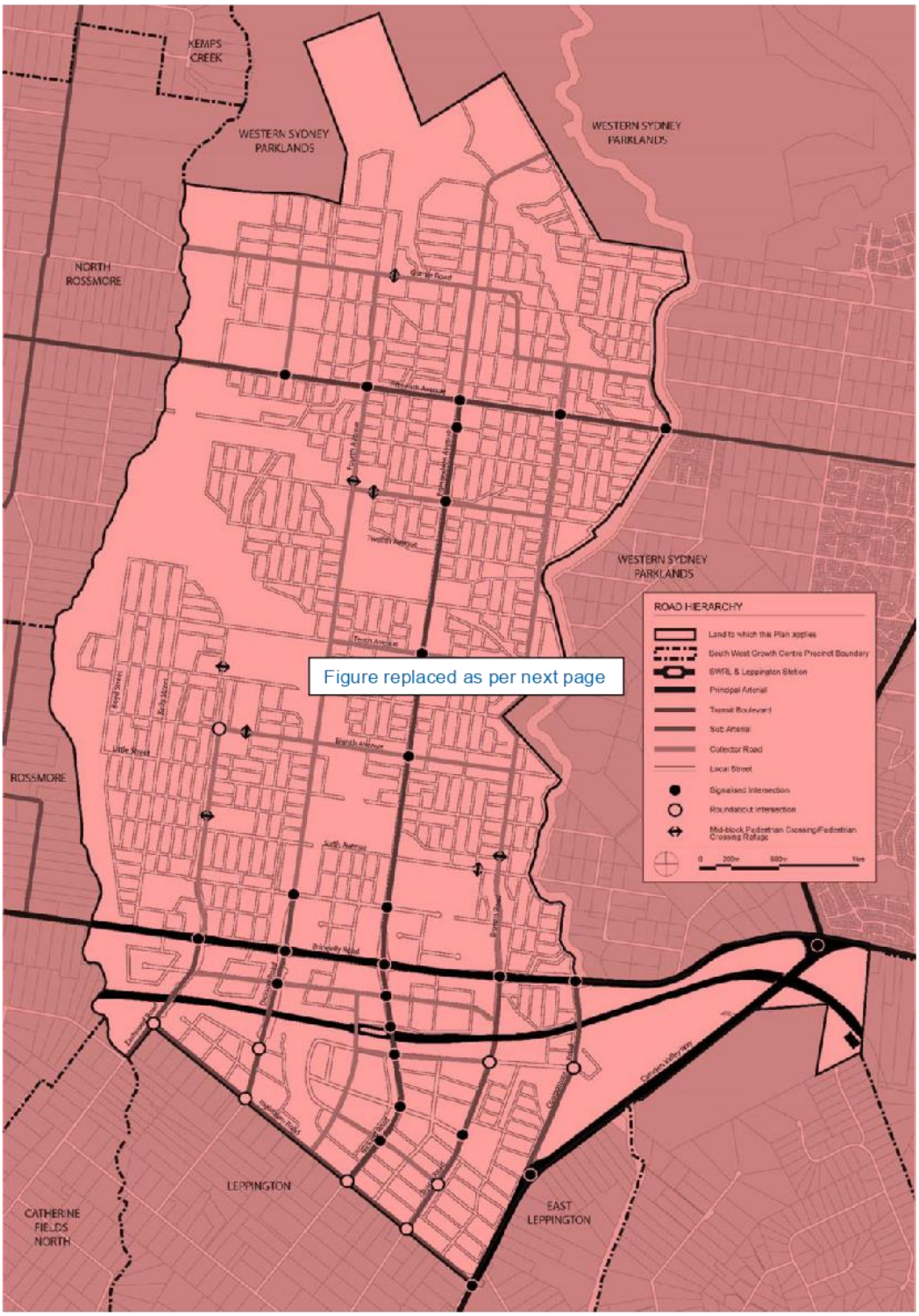


Figure ~~2-11~~ 2-12: Residential structure


KEMPS CREEK
WESTERN SYDNEY PARKLANDS
WESTERN SYDNEY PARKLANDS
NORTH ROSSMORE
WESTERN SYDNEY PARKLANDS
Figure replaced as per next page
ROAD HIERARCHY
Land to which this Plan applies
South West Growth Centre Precinct Boundary
SWRL & Leppington Station
Principal Arterial
Transit Boulevard
Sub Arterial
Collector Road
Local Street
Signalised Intersection
Roundabout Intersection
Mid-block Pedestrian Crossing/Pedestrian Crossing Refuge
ROSSMORE
LEPPINGTON
CATHERINE FIELDS NORTH
EAST LEPPINGTON

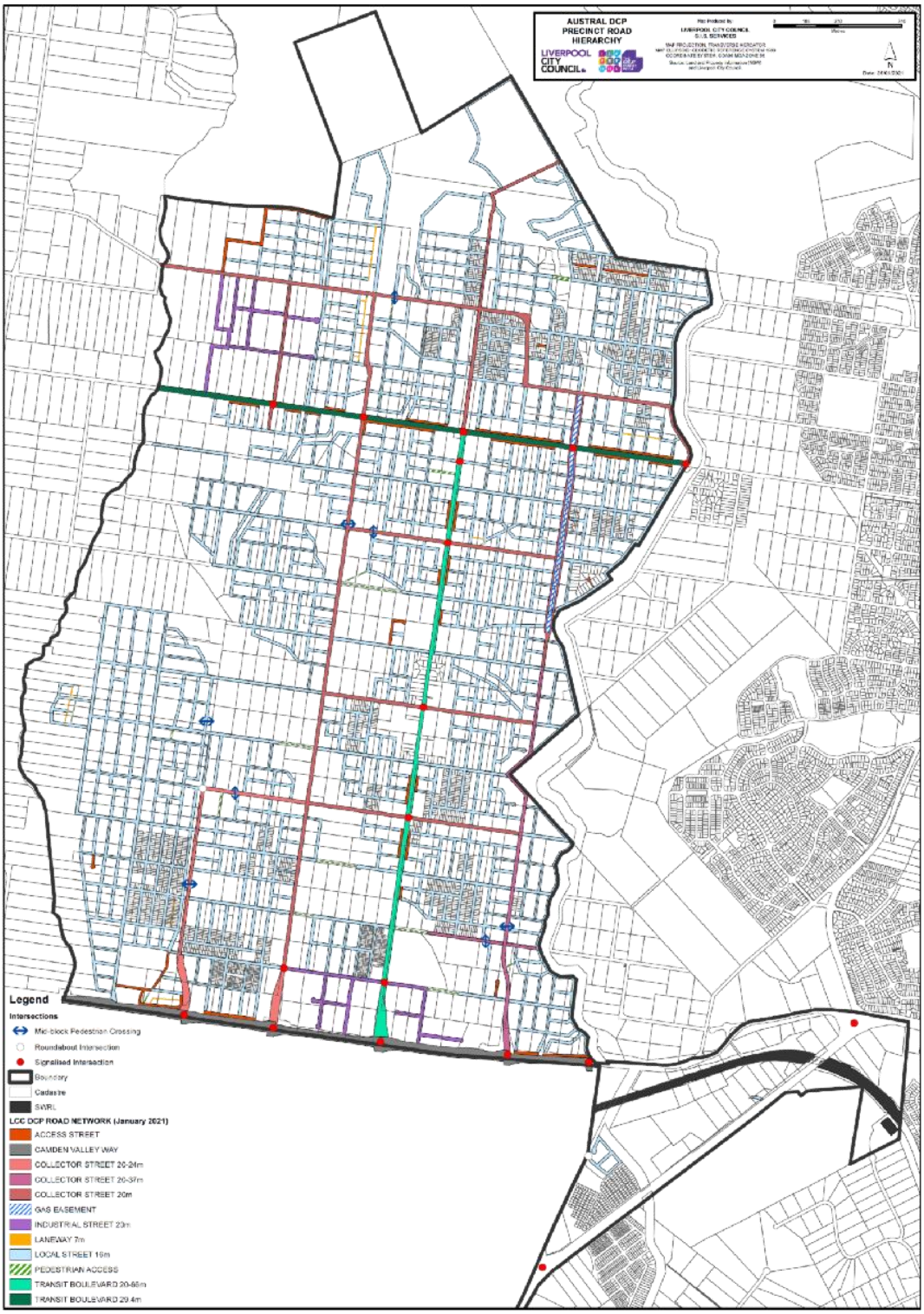
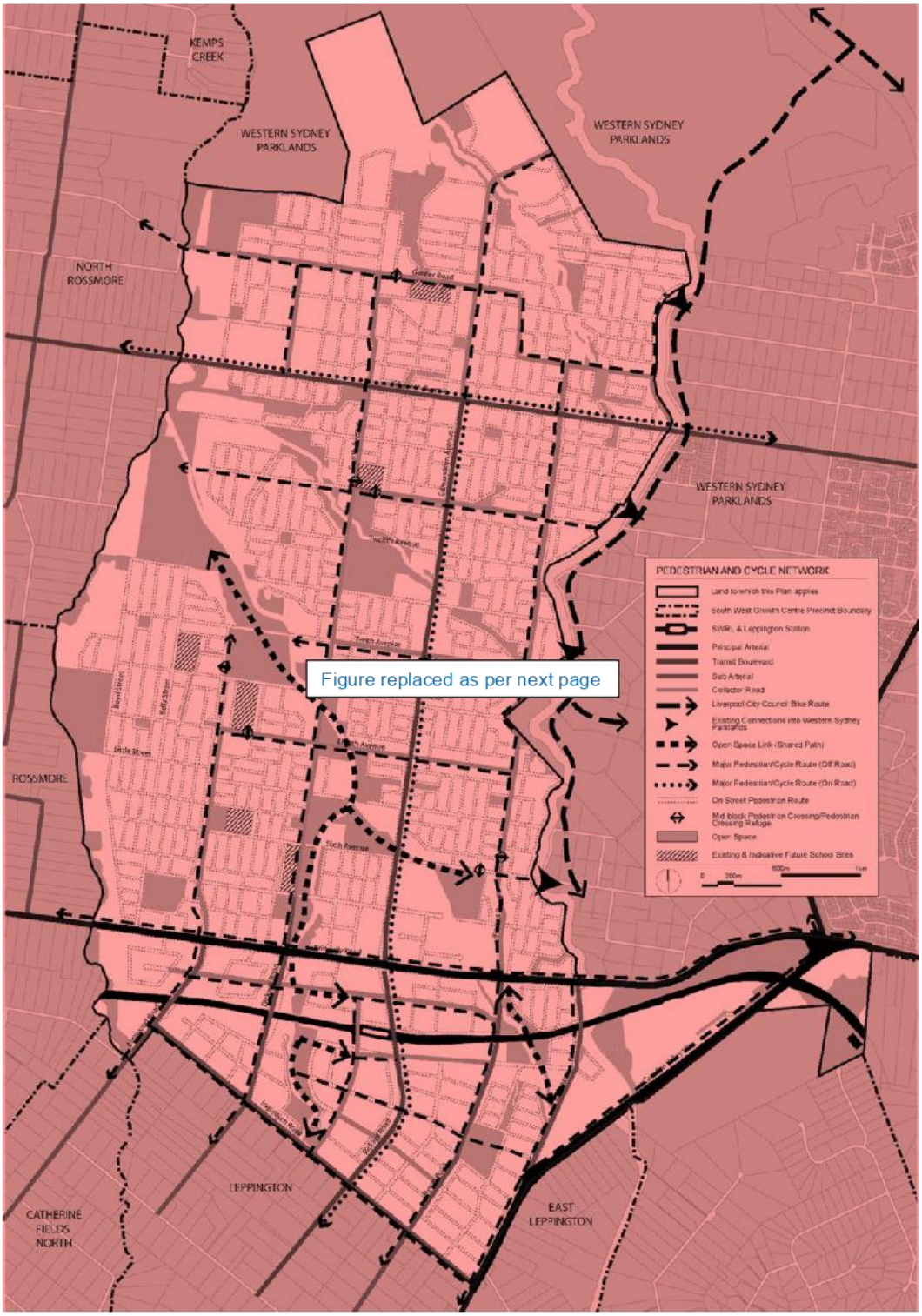

AUSTRAL DCP
PRECINCT ROAD
HIERARCHY
LIVERPOOL CITY COUNCIL
Legend
Intersections
Mid-block Pedestrian Crossing
Roundabout Intersection
Signalised Intersection
Boundary
Cadastre
SWRL
LCC DCP ROAD NETWORK (January 2021)
ACCESS STREET
CAMDEN VALLEY WAY
COLLECTOR STREET 20-24m
COLLECTOR STREET 20-37m
COLLECTOR STREET 20m
GAS EASEMENT
INDUSTRIAL STREET 23m
LANEWAY 7m
LOCAL STREET 16m
PEDESTRIAN ACCESS
TRANSIT BOULEVARD 20-46m
TRANSIT BOULEVARD 29.4m

Figure ~~2-12~~ 2-13: Precinct road hierarchy



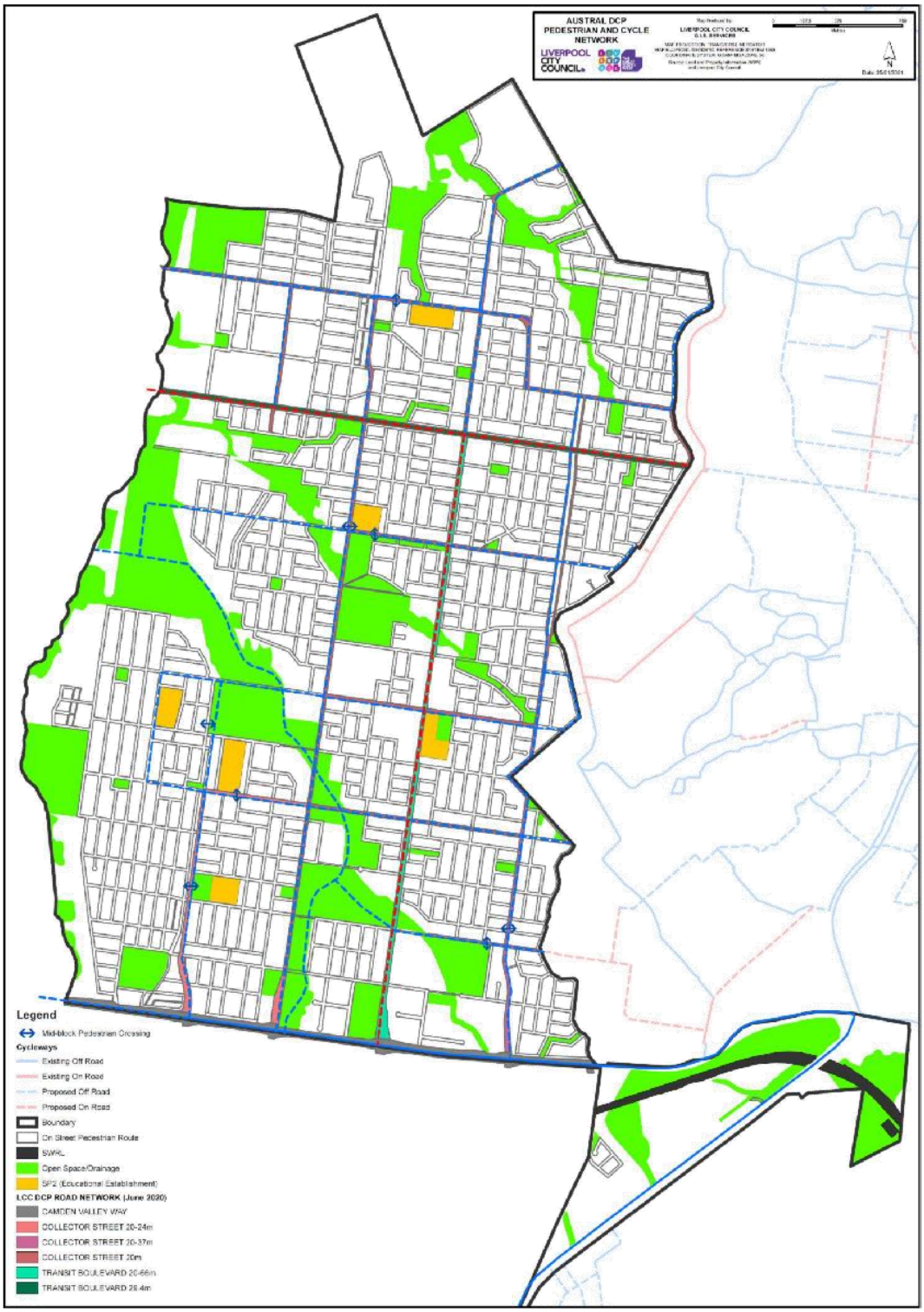


Figure ~~2-13~~ 2-14: Pedestrian and cycle network

LIVERPOOL CITY COUNCIL

DRAFT

LIVERPOOL CONTRIBUTIONS PLAN 2021 - AUSTRAL AND LEPPINGTON NORTH

Adopted: TBC

Content Manager: 063557.2021

LIVERPOOL THE GREAT SOUTH WEST

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1 Summary of Plan

1.1 Preamble

The Austral and Leppington North Precincts are urban release areas in Sydney's South West Growth Area. Although the Austral Precinct is solely within the Liverpool LGA, the Leppington North Precinct straddles the Liverpool and Camden LGAs.

A range of new and augmented infrastructure needs to be planned, programmed, funded and delivered in order to support this planned development.

The infrastructure will be delivered or coordinated by a number of parties including State Government public authorities, State-owned corporations, councils, developers and private providers.

Councils typically fund the provision of local infrastructure through a combination of general revenue (from rates and other charges), development contributions under *the Environmental Planning and Assessment Act 1979*, and grants from the State or Commonwealth government. Much of the capital cost of local infrastructure in new urban areas is funded by development ('section 7.11') contributions as there is often a clear relationship between the need for new or upgraded infrastructure and population growth attributable to the new development.

This Plan addresses the provision in the Precincts of those public amenities and public services - or local infrastructure - to be delivered by or on behalf of Liverpool City Council. The provision of local infrastructure in the Plan is estimated to cost approximately $1 billion and includes:

- open space and recreation facilities, such as sports fields, sports courts, playgrounds, walking trails and bike paths;
- community and cultural facilities, such as multi-purpose community centres;
- water cycle management facilities, such as detention basins stormwater channels and streetscape raingardens; and
- traffic and transport management facilities, such as upgrades to existing roads, new roads and intersections.

This Plan amends the original version of the contributions plan that was adopted by Council in November 2014. The most recent updates to the Plan account for changes to State Government policy and legislation and other necessary adjustments which ensure that the proposed infrastructure provision is efficient and appropriate for the needs of the development, the contributions are cost reflective and an appropriate COVID response was in place regarding payment timing.

1.2 Summary of contribution rates and local infrastructure costs

The tables on the following pages show the contribution rates for essential infrastructure applicable to development (which is the subject of this Plan) and the total value of works required to cater for the needs of the new development, including non-essential infrastructure. All costs in this Plan are expressed in December quarter 2020 dollars. Contributions for non-essential infrastructure do not apply under this Plan.

Contributions as land areas are only shown below to indicate the shares of land represented by the monetary contributions, and are not additional to monetary contributions.

Example contribution rate calculations are also shown for residential and non-residential development scenarios.

1.2.1 Monetary Contribution Rates

ESSENTIAL INFRASTRUCTURE		RESIDENTIAL DEVELOPMENT*				NON RESIDENTIAL DEVELOPMENT**
Item	Item Cost apportioned to Austral and Leppington North Development	$ per additional person	$ per residential lot for a dwelling house	$ per attached dwelling, semi-attached dwellings and multi-dwelling housing	$ per dwelling in all other residential accommodation	$ per hectare of equivalent NDA
Open Space						
Land	$314,141,561 ~~$316,315,593~~	$5,704 ~~$5,743~~	$19,392 ~~$19,526~~	$14,829 ~~$14,932~~	$14,829 ~~$14,932~~	
Works	$128,559,170 ~~$129,965,767~~	$2,334 ~~$2,360~~	$7,936 ~~$8,023~~	$6,069 ~~$6,135~~	$6,069 ~~$6,135~~	
Subtotal	$442,700,731 ~~$446,281,359~~	$8,038 ~~$8,103~~	$27,328 ~~$27,549~~	$20,898 ~~$21,067~~	$20,898 ~~$21,067~~	
Community Facilities						
Land	$7,359,828 ~~$7,359,828~~	$134 ~~$134~~	$454 ~~$454~~	$347 ~~$347~~	$347 ~~$347~~	
Subtotal	$7,359,828 ~~$7,359,828~~	$134 ~~$134~~	$454 ~~$454~~	$347 ~~$347~~	$347 ~~$347~~	
Roads						
Land	$26,394,265 ~~$26,792,099~~	$446 ~~$453~~	$1,516 ~~$1,539~~	$1,160 ~~$1,177~~	$1,160 ~~$1,177~~	$21,697 ~~$22,024~~
Works	$87,641,540 ~~$81,784,560~~	$1,481 ~~$1,382~~	$5,035 ~~$4,698~~	$3,850 ~~$3,593~~	$3,850 ~~$3,593~~	$72,043 ~~$67,229~~
Subtotal	$114,035,805 ~~$108,576,659~~	$1,927 ~~$1,835~~	$6,551 ~~$6,237~~	$5,010 ~~$4,770~~	$5,010 ~~$4,770~~	$93,740 ~~$89,253~~
Drainage						
Land	$144,195,081 ~~$144,195,081~~					$118,532 ~~$118,532~~
Works	$290,496,427 ~~$286,144,315~~					$238,795 ~~$235,217~~
Subtotal	$434,691,508 ~~$430,339,396~~					$357,327 ~~$353,749~~
Plan Administration						
Allowance	$7,600,457 ~~$7,468,420~~					$6,248 ~~$6,139~~
Subtotal	$7,600,457 ~~$7,468,420~~					$6,248 ~~$6,139~~
TOTAL	$1,006,388,329 ~~$1,000,025,662~~	$10,098 ~~$10,071~~	$34,334 ~~$34,241~~	$26,255 ~~$26,184~~	$26,255 ~~$26,184~~	$457,315 ~~$449,141~~

*Residential development also pays drainage and plan administration contributions (calculated on an NDA basis).
** NDA rates for roads apply to non-residential development only.

NON ESSENTIAL INFRASTRUCTURE		RESIDENTIAL DEVELOPMENT			
Item	Item Cost apportioned to Austral and Leppington North Development	$ per additional person	$ per residential lot for a dwelling house	$ per attached dwelling, semi-attached dwellings and multi-dwelling housing	$ per dwelling in all other residential accommodation
Community Facilities					
Local Facilities Works	$20,104,171	$365	$1,241	$949	$949
Regional Facility Works	$39,838,087	$723	$2,459	$1,881	$1,881
TOTAL	$59,942,258	$1,088	$3,700	$2,830	$2,830

1.2.2 Land contribution rates

ESSENTIAL INFRASTRUCTURE		RESIDENTIAL DEVELOPMENT*				ALL DEVELOPMENT""
Item	Item Total Area apportioned to Austral and Leppington North Development (m2)	m^2 per additional person	m^2 per dwelling house	m^2 per attached dwelling, semi-attached dwellings and multi-dwelling housing	m^2 per dwelling in all other residential accommodation	m^2 per hectare of equivalent NDA
Open Space						
Land	1,066,399 ~~1,068,519~~	19.36 ~~19.40~~	65.83 ~~65.96~~	50.34 ~~50.44~~	50.34 ~~50.44~~	
Community Facilities						
Land	14,341 ~~14,341~~	0.26 ~~0.26~~	0.89 ~~0.89~~	0.68 ~~0.68~~	0.68 ~~0.68~~	
Roads						
Land	56,568 ~~57,480~~	0.96 ~~0.97~~	3.25 ~~3.30~~	2.49 ~~2.53~~	2.49 ~~2.53~~	46.50 ~~47.25~~
Drainage						
Land	726,049 ~~726,049~~					596.83 ~~596.83~~
TOTAL	1,863,357 ~~1,866,389~~	20.58 ~~20.63~~	69.96 ~~70.15~~	53.50 ~~53.64~~	53.50 ~~53.64~~	643.33 ~~644.08~~

*Residential development also pays drainage (calculated on an NDA basis).
** NDA rates for roads apply to non-residential development only.

1.2.3 Example contribution calculations

The **residential contribution** (for essential infrastructure) equals the sum of:

- The open space contribution per dwelling,
- The community facilities contribution per dwelling,
- The transport contribution per dwelling,
- The stormwater infrastructure contribution per hectare of NDA, and
- The plan preparation and administration contribution per hectare of NDA.

Contributions for open space, community facilities and transport infrastructure are levied based on the number of people expected to reside in the new dwelling, while contributions for stormwater infrastructure and plan administration are levied by the area (NDA) of the development.

This approach best aligns the contribution payable by a development to its estimated share of the demand for the different kinds of infrastructure in the Plan.

Below is an example of how to calculate the contribution payable by development.

Consider a scenario where a developer has 0.3 hectares (NDA) and applies to develop 5 low density dwelling houses on this land.

The total contribution under this Plan = (27328 x 5) + (454 x 5) + (6551 x 5) + (357327 x 0.3) + (6248 x 0.3)

= $280,737

This equals a contribution of $56,147 per dwelling, on average, for this development.

The non-residential contribution equals the sum of:

- The transport contribution per NDA,
- The stormwater infrastructure contribution per NDA, and
- The plan preparation and administration contribution per NDA.

Below is an example of how to calculate the contribution payable by development.

Consider a scenario where a developer applies to develop a 0.5 hectare (NDA) site for commercial offices.

The total contribution under this Plan =

($93,740 x 0.5) + ($357,327 x 0.5) + (6,248 x 0.5) = ($457,315 x 0.5) = $228,658

1.3 Overview and structure of Plan

Section 7.11 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) allows a consent authority responsible for determining a development application to grant consent to the proposed development subject to a condition requiring the payment of a monetary contribution, or the dedication of land free of cost, or a combination of them, towards the provision of public amenities and public services to meet the development.

Where the consent authority is a council or an accredited certifier, such a contribution may be imposed on a development only if it is of a kind allowed by and determined in accordance with a contributions plan, such as this Plan.

This Plan has been prepared to authorise the imposition of development contributions on development expected to occur in the Austral Precinct and that part of the Leppington North Precinct that is situated in the Liverpool LGA.

This Plan has been prepared:

- in accordance with the EP&A Act and Environmental Planning and Assessment Regulation 2000 (EP&A Regulation); and
- having regard to the latest Practice Notes issued by the NSW Department of Planning, Industry and Environment (DPIE).

There are minimum requirements for development contributions plans set out in the EP&A Regulation. Each requirement, and reference to the clause or Part of this document that deals with that requirement, are listed below:

The purpose of the plan	Clause 2.4
The land to which the plan applies	Clause 2.3
The relationship or nexus between the expected development in the area and the community infrastructure that is required to meet the demands of that development	Part 3
The formulas to be used for determining the reasonable contributions required from expected development for different types of community infrastructure;	Clauses 4.2.2, 4.3.2, 4.4.2, 4.5.2, 4.6.2

The contribution rates for the anticipated types of development in the area;	Clause 1.2
The council's policy concerning the timing of the payment of monetary development contributions, and the imposition of development conditions that allow deferred or periodic payment,	Clause 2.9
Maps showing the specific public amenities and services proposed to be provided by the council, supported by a works schedule that contains an estimate of their cost and staging (whether by reference to dates or thresholds)	Part 5
If the plan authorizes monetary development contributions or section 7.12 levies paid for different purposes to be pooled and applied progressively for those purposes, the priorities for the expenditure of the contributions or levies, particularised by reference to the works schedule.	Part 5

2 Administration and operation of the Plan

2.1 Definitions used in this Plan

Except where indicated in this clause, the definitions of terms used in this Plan are the definitions included in the EP&A Act, EP&A Regulation and the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*, are adopted by this Plan.

In this clause, 'existing' means at the date on which this Plan came into effect.

In this Plan, the following words and phrases have the following meanings:

Bank Guarantee means an irrevocable and unconditional undertaking without any expiry or end date in favour of the Council to pay an amount or amounts of money to the Council on demand issued by an Australian bank, non-bank financial institution, or insurance company subject to prudential supervision by the Australian Prudential Regulatory Authority and has a credit rating of 'A' or above (as assessed by Standard and Poors) or 'A2' or above (as assessed by Moody's Investors Service) or 'A' or above (as assessed by FitchRatings).

Council means Liverpool City Council.

CPI means the *Consumer Price Index (All Groups - Sydney)* published by the Australian Bureau of Statistics.

EP&A Act means the Environmental Planning and Assessment Act 1979.

EP&A Regulation means the Environmental Planning and Assessment Regulation 2000.

ILP means the Austral and Leppington North Precincts Indicative Layout Plan.

LGA means local government area.

Precincts means the area of land shown in Figure 2.1 of this Plan.

Net Developable Area means the area of land to which a development application relates and includes the area of any land that the development consent authorises, or requires, to be used as a road, or reserved or dedicated as a public road but excludes:

(a) existing roads to be used as part of the proposed road network;

(b) existing educational establishments (as defined in the Standard Instrument);

(c) any part of the land that is below the level of a 1:100 ARI flood event, if that part of the land is unsuitable for development by virtue of it being at or below that level;

(d) any land that the development consent authorizes, or requires, to be reserved, dedicated or otherwise set aside as, or for the purpose of, any of the following:

(i) a government school (within the meaning of the *Education Act 1990*);

(ii) a tertiary institution, including a university or TAFE establishment, that provides formal education and is constituted by or under an Act.

(iii) an emergency services facility;

(iv) a health services facility owned and operated by a public authority;

(v) a golf course;

(vi) a passenger transport facility;

(vii) a public reserve or a drainage reserve (within the meaning of the *Local Government Act 1993*);

(viii) a public transport corridor (other than a road corridor);

(ix) a public utility undertaking;

(x) roads or other public amenities or public services, in connection with which development contributions have been imposed under section 7.11 or section 7.12 of the Act or may be imposed in accordance with a contributions plan approved under section 7.18 of the EP&A Act;

(xi) roads or other infrastructure in connection with which Special Infrastructure Contributions have been, or may be, imposed in accordance with section 7.24 of the EP&A Act.

Planning Agreement means a Voluntary Planning Agreement referred to in section 7.4 of the EP&A Act.

Residential Accommodation has the same meaning as in the *State Environmental Planning Policy (Sydney Region Growth Centres) 2006*.

Social Infrastructure Assessment means the report titled, *Austral and Leppington North Precincts - Demographic and Social Infrastructure Assessment*, prepared by Elton Consulting, July 2011.

Special Infrastructure Contribution means a contribution referred to in section 7.24 of the EP&A Act.

State Environmental Planning Policy (Sydney Region Growth Centres) 2006 means the State Environmental Planning Policy amended from time to time.

Transport Assessment means the Austral and Leppington North (ALN) Precincts Transport Assessment prepared by AECOM, July 2011.

Works In Kind means the undertaking of a work or provision of a facility by an applicant which is already nominated in the works schedule of a contributions plan as a means of either fully or partly satisfying a condition of consent requiring development contributions to be made.

Works Schedule means the schedule of the specific public amenities and public services for which contributions may be required as set out in Part 5 of this Plan.

2.2 Name of Plan

This Plan is called Liverpool Contributions Plan 2021 - Austral and Leppington North Precincts (the Plan).

2.3 Land to which Plan applies

This Plan applies to the Austral and Leppington North Precincts within the Liverpool LGA (i.e., the Precincts), as illustrated in Figure 2.1 over page.

Figure 2.1 Land to which this Plan applies

2.4 Purposes of Plan

The purposes of the Plan are to:

- Provide an administrative framework under which specific public amenities and services strategies to serve the Precincts may be implemented and coordinated.
- Ensure that adequate public amenities and services are provided for as part of any new development in the Precincts.
- To authorise the Council or accredited certifiers to impose conditions under section 7.11 of the EP&A Act when granting consent to development on land to which this Plan applies.
- Provide a comprehensive strategy for the assessment, collection, expenditure accounting and review of development contributions relating to the Precincts on an equitable basis.
- Ensure that the existing community is not burdened by the provision of public amenities and services required as a result of future development in the Precincts.
- Enable the Council to be both publicly and financially accountable in its assessment and administration of the Plan.

2.5 Adoption of Plan

This Plan was adopted by Council on x and came into effect on x.

The previous version of the Plan was first adopted by Council on 26 November 2014. Amended versions were adopted on 26 May 2015 and 10 June 2020 (the latter amendments to implement the COVID-19 response for the Plan).

This Plan applies to development applications determined after the date on which the Plan came into effect.

2.6 Relationship to other plans

This Plan repeals *Liverpool Contributions Plan 2014 - Austral and Leppington North Precincts*.

The land to which this Plan applies is not otherwise subject to any contributions plans made under Subdivision 3 of Division 7.1 of Part 7 of the EP&A Act.

This Plan does not limit or otherwise affect any requirements for the payment of Special Infrastructure Contributions pursuant to Subdivision 4 of Division 7.1 of Part 7 of the EP&A Act.

The original version of the Plan was prepared in conjunction with the *Camden Growth Areas Contributions Plan* as it applies to the Leppington North Precinct (Camden). The Precincts, which comprise land situated in both the Camden and Liverpool LGAs, were released concurrently and their combined infrastructure needs were established through the initial precinct planning process. This Plan addresses development contributions in respect to development expected to take place in the Liverpool LGA component of the Precincts.

2.7 Types of development to be levied

Except as provided for by this clause, this Plan applies to:

- Residential Accommodation development, insofar as the Plan authorises the imposition of a requirement for a development contribution for the types of public amenities and public services described in clauses 4.2 to 4.6 of this Plan; and

- All other development, insofar as the Plan authorises the imposition of a requirement for a development contribution for the types of public amenities and public services described in clauses 4.4 to 4.6 of this Plan.

This Plan does not apply to development:

- for the sole purpose of affordable housing;
- for the sole purpose of the adaptive reuse of an item of environmental heritage;
- for the purposes of public infrastructure provided by or on behalf of State Government or the Council;
- for the purposes of public amenities or public services under this Plan or another contributions plan prepared under section 7.13 of the EP&A Act;
- for works to be carried out by Sydney Water, Endeavour Energy or equivalent water, sewer or energy provider; or
- that in the opinion of Council does not increase the demand for the categories of public amenities or public services addressed by this Plan.

2.8 Authority to require contributions

2.8.1 Monetary contributions

This Plan authorises the Council, when granting consent to an application to carry out development to which this Plan applies, to impose a condition under section 7.11 of the EP&A Act requiring the payment of a monetary contribution to the Council towards:

- the provision of public amenities and public services as specified in the Works Schedule to meet the demands of the development; and / or
- the recoupment of the cost of public amenities and public services previously provided in advance of development within the area.

This Plan requires the Council or an accredited certifier, when determining an application for a complying development certificate relating to development to which this Plan applies, to impose a condition under section 7.11 of the EP&A Act requiring the payment of a monetary contribution towards:

- the provision of public amenities and public services as specified in the Works Schedule to meet the demands of the development; and / or
- the recoupment of the cost of public amenities and public services previously provided in advance of development within the area.

2.8.2 Land contributions

This Plan authorises the Council, by imposition of a condition of development consent, to require in connection with any development on land to which this Plan applies (and in addition to any monetary contribution that may be sought) the dedication free of cost to the Council of any part of the development site that is land that is to be acquired under this Plan.

The extent of land that may be required in the consent shall not exceed the amount of land the value of which does not exceed the monetary contribution otherwise authorised by this Plan.

The monetary development contribution otherwise authorised by this Plan shall be reduced by an amount corresponding to the value of the land required to be dedicated.

Where the value of the land exceeds the monetary development contribution otherwise authorised, the developer may offer to enter into a Planning Agreement dealing with an appropriate settle-up in exchange for the dedication of the remainder.

Further information on land contributions is included in clauses 2.9.5 and 2.11 of this Plan.

2.8.3 Cap on monetary contributions for residential development without an IPART review

In 2012, the Minister for Planning issued a Direction (the *Environmental Planning and Assessment (Local Infrastructure Contributions) Direction 2012)* that requires councils to submit contributions plans to IPART for assessment if they wish to levy residential contributions above the prevailing maximum amount.

Consistent with this Direction (and the latest amended version), consent authorities (including accredited certifiers) shall not issue a DA consent or a CDC in Austral Leppington North Precincts that requires the applicant to pay a total monetary contribution amount that exceeds $30,000 for each dwelling or lot, unless the contribution plan is IPART-assessed and contains the associated amendments requested by the Minister or nominee.

IPART has now reviewed this Plan and it is consistent with the Ministerial nominee's associated advice. Therefore, the contribution rates in Section 1.2 apply to residential development (for essential infrastructure only). Note this paragraph will be active once IPART have finished review of the Plan and is provided for completeness.

2.8.4 Obligations of accredited certifiers

In relation to an application made to an accredited certifier for a complying development certificate:

- the accredited certifier must, if a complying development certificate is issued, impose a condition requiring a development contribution, if such a contribution is authorised by this Plan; and
- any such contribution may only be a monetary contribution required under this Plan; and
- the amount of the monetary contribution that the accredited certifier must so impose is the amount determined in accordance with this Plan in respect of the development.

It is the responsibility of the principal certifying authority to accurately calculate and apply the local infrastructure contribution conditions to complying development certificates. Deferred payments of contributions required by a condition of a complying development certificate will not be accepted.

2.8.5 Variation to contributions authorised by this Plan and contributions for unanticipated development

Council retains the right to reduce the development contribution otherwise calculated in accordance with the provisions of this Plan.

A developer's request for variation to a contribution calculated in accordance with this Plan must be supported by written justification included with the development application. Such request will be considered as part of the assessment of the application.

There may be circumstances when development is proposed that was not anticipated when this Plan was made and that is not specifically identified to be levied under this Plan, but which would if carried out, result in the provision of, or increase the demand for, the public amenities and services included in this Plan. In these circumstances, Council will calculate a reasonable contribution proportionate to the demand for amenities and services generated by the unanticipated development, and impose that contribution on the consent for that development.

This clause does not apply to accredited certifiers other than the Council. Accredited certifiers other than the Council must not:

- vary, waive or modify a development contribution calculated in accordance with this Plan, or
- impose any contribution other than a monetary contribution specifically authorised by this Plan.

2.9 Payment of contributions

2.9.1 Timing of payment

Council requires contributions to be satisfied in full, as follows:

Development applications involving subdivision only

Monetary contributions are required to be paid prior to the release of the subdivision certificate whether by Council or an accredited certifier (in the case of strata subdivision). Any dedication of land to Council, in lieu of a monetary contribution, shall be shown on the plan of subdivision.

Development applications involving building work only

Monetary contributions are required to be paid to Council prior to the issuing of the construction certificate, whether by Council or an accredited certifier. Dedication of land to Council, in lieu of monetary contribution, shall be shown on a plan of subdivision, to be registered prior to the issue of an occupation certificate.

Development applications involving subdivision and building work (for example, dual occupancy and integrated housing)

Monetary contributions are required to be paid to Council prior to the release of the construction certificate or subdivision certificate, whichever occurs first, whether by Council or an accredited certifier. Any dedication of land to Council, in lieu of monetary contribution, shall be shown on a plan of subdivision, to be registered prior to issue of an occupation certificate.

Development applications where no building works are proposed

Monetary contributions are required to be paid to Council prior to occupation / commencement of the development. Any dedication of land to Council, in lieu of monetary contribution, shall be shown on a plan of subdivision to be registered prior to issue of an occupation certificate.

COVID-19 response

For Development Applications lodged or approved between 16 April 2020 and 31 December 2020 and for Section 4.55 modifications lodged in the same period which sought to modify the relevant contributions condition of a development consent for which any contributions have not yet been paid, 50% of the contribution can be paid prior to the issue of a construction certificate with the remaining 50% payable prior to the issue of the first occupation certificate. Any applications during this period that included subdivision must have all contributions paid prior to the issue of the Subdivision Certificate.

For such applications, Council will waive the requirement to have an unconditional bank guarantee in place for the duration of the deferral.

2.9.2 Obligations of accredited certifiers

It is the responsibility of an accredited certifier issuing a construction certificate to certify that the contributions have been paid to Council prior to the issue of the certificate. The accredited certifier must ensure that the applicant provides a receipt (or receipts) confirming that contributions have been fully paid and copies of such receipts must be included with copies of the certified plans provided to the Council in accordance with clause 142(2) of the EP&A Regulation. Failure to follow this procedure may render such a certificate invalid and expose the certifier to legal action.

Prior to the commencement of works for a complying development, the certifier must ensure that any contributions required in accordance with clause 136L of the EP&A Regulation have been fully paid and copies of such receipts must be included with copies of the certified plans provided to the Council.

The only exceptions to the requirement are where Works In Kind, material public benefit, dedication of land and/or deferred payment arrangement has been agreed by the Council. In such cases the Council will issue a letter confirming that an alternative payment method has been agreed with the applicant.

2.9.3 Deferred payments

Council will allow payment of contributions to be deferred in the following cases only:

- where the applicant has the intention and ability to dedicate land or provide a material public benefit in part or to full satisfaction of a condition imposed by development consent, and that offer of land or material public benefit is acceptable to the Council; or
- in other circumstances, to be outlined in writing by the applicant and determined formally by Council on the merits of the case.

In the circumstances where deferred payments are accepted, the debtor must lodge with Council an unconditional bank guarantee for the amount to be deferred. Bank guarantees will be accepted on the following conditions:

- The guarantee must carry specific wording outlining the purpose for which those contributions were due, for example, "drainage contributions for Stage 3".
- The guarantee will be for the contribution amount plus the estimated amount of compound interest foregone by Council for the anticipated period of deferral (Refer to formula in clause 2.9.4 below).

Council may call up the guarantee at any time without reference to the applicant, however, the guarantee will generally be called up only when cash payment has not been received, and land is not dedicated or material public benefit not provided by the end of the period of deferral.

The period of deferral must be for a limited time only as agreed where land is to be dedicated or a material public benefit is to be provided. The period of deferral may be extended subject to providing a further bank guarantee for the extended period in accordance with the above terms.

Council will discharge the bank guarantee when payment is made in full by cash payment, land transfer or by completion of Works In Kind.

For Development Applications lodged or approved between 16 April 2020 and 31 December 2020 and for Section 4.55 modifications lodged in the same period which seek to modify the relevant contributions condition of a development consent for which any contributions have not yet been paid, a bank guarantee for the deferred amount is not required.

2.9.4 Formula for bank guarantee amounts

The following formula to be applied to all bank guarantees for contributions is:

Guarantee Amount = P + P (CI x Y)

Where

P = Contribution due;

CI = Compound interest rate comprised of Council's estimate over the period plus 3 percent allowance for fluctuations); and

Y = Period of deferral (years).

2.9.5 Methods of settling contribution requirements

Contributions may be made by one or a combination of the methods described below.

Monetary contribution

A monetary contribution is the most common method of settling contribution requirements. However, Council may consider the transfer of land to Council or providing Works In Kind, but only where the offered land and or works are included in this Plan's Works Schedule (Part 5 of this Plan).

Transfer of land

An applicant may transfer land to Council in part or in full satisfaction of a contribution requirement. The land may be for open space, community facilities, drainage or roads and must be land, which is included in this Plan's Works Schedule (Part 5 of this Plan). The value of the land will be determined by an independent valuer appointed by Council.

Where land which is the subject of a development application contains land identified for acquisition under this Plan, Council may as a condition of consent require that land to be dedicated free of charge to Council. Monetary contributions will be adjusted accordingly to reflect the value of the land to be dedicated in lieu of payment of cash.

Works In Kind

Applicants are encouraged to provide Works In Kind in part or full satisfaction of a contribution. The works must be included in this Plan's Works Schedule (Part 5 of this Plan). The value of contingency for individual works will be paid where it can be proven to Council's satisfaction that unforeseen circumstances have given rise to additional costs.

Prior to proceeding with the works, applicants will be required to provide details of the works to be undertaken (including a development application), financial guarantees, bank guarantees and administration.

Applicants may provide land or works included in Part 5 of this Plan in excess of that required for the development. The value of the works will be determined in accordance with Council's Works in Kind Procedure, available from Council's administration office.

2.9.6 Goods and Services Tax

No Goods and Services Tax (GST) is applicable to the payment of contributions made under section 7.11 of the EP&A Act. This exemption applies to both cash contributions and land or works in lieu of contributions.

2.10 Contributions demand credits for existing development

Monetary contributions determined under this Plan will be calculated according to the estimated net increase in demand for the particular public amenities and public services that are included in this Plan and that a particular development is projected to generate.

The Plan addresses the provision of:

- roads, transport, and drainage facilities (being 'economic infrastructure'); and
- open space, recreation, community and cultural facilities (being 'social infrastructure'),

that have been designed to meet the needs of the urban development of the Precincts.

The planned economic infrastructure is to facilitate the conversion of the area from semi-rural development context to an urban development context. It is the wholesale re-development of the land for urban purposes (particularly through land subdivisions) that necessitates the provision of the economic infrastructure. The economic infrastructure currently available does not meet the needs of the planned urban development and whole new road and drainage networks have to be designed and built to meet those needs. No credit will therefore be given in the calculation of contributions for the demand for economic infrastructure attributable to development that existed at the time this Plan was prepared.

The planned social infrastructure is also to facilitate that same conversion, however there are people already living in the area that demand and use social infrastructure. It is also likely that current populations will, to some extent, demand the recreation and community facilities that will be provided under this Plan.

Consistent with the above, in calculating contributions under this Plan a credit will be given in the calculation of contributions only for the demand for social infrastructure attributable to development that existed at the time this Plan was prepared. That is, a contribution for social infrastructure will only be due to any net increase in population relating to the proposed development.

To determine the net increase in demand for social infrastructure requires that an assessment be made of:

- in the case of the first urban development of the land - the existing residential population on the site when the first version of the Plan came in to effect in 2014, or
- in the case of any subsequent urban development on the land - the assumed residential population on the site at the date of lodgement of the application,

whichever is relevant.

The information included in Appendix A of this Plan will be used to calculate the estimated net increase in residential population in the case of the first urban development of the land.

A precise population attributable to each existing residential development is not available. Instead, this Plan assesses existing population on the basis of average dwelling occupancy figures for the Austral and Leppington North Precincts.

The assumed household occupancy rate for the purpose of determining net increase in demand for social infrastructure and the calculation of open space and recreation, and community and cultural facilities contributions under this Plan is 3.4 persons per dwelling.

2.11 Adjustment to contribution rates and contribution amounts

2.11.1 Overview

The purpose of this clause is to ensure that the monetary contribution rates imposed at the time of development consent reflect the current costs of provision of the facilities included in this Plan.

To convert the cost of facilities included in the Plan to a current cost, the monetary contribution rates shown in Part 1 of this Plan are to be adjusted in accordance with the provisions set out below:

- at the time of imposing a condition on a development consent requiring payment of the monetary contribution; and again
- at the time that the monetary contribution is to be paid pursuant to the condition imposed on that same development consent.

The adjusted contribution rates will also be published quarterly on the Council's website *www.liverpool.nsw.gov.au*.

This process is distinct and separate from clause 2.12, which deals with future reviews of this Plan. Future reviews will not affect any consent granted in accordance with this Plan and such reviews are required to be publicly exhibited.

2.11.2 Adjustment methods

The Consumer Price Index (CPI) is the most commonly used index for adjusting contribution rates, and for simplicity, is applied to contribution rates levied on development under this Plan. However, it is not the most suitable index for escalating capital works costs nor contributions relating to land that is yet to be acquired.

Capital works costs in the schedule of works are escalated to the base date of this Plan by ABS producer price indexes (PPIs):

- PPI - Building Construction NSW (cat no. 30) for community facilities
- PPI – Non-Residential Building Construction NSW (cat no. 3020) for open space facilities; and
- PPI - Road and Bridge Construction NSW (cat no. 3101) for roads and stormwater facilities.

Land prices do not correlate with movements in the prices of goods and services, especially in urban release areas. As a result, Council prepares and regularly publishes a customised Land Value Index (LVI), generally consistent with in the contributions management arrangements it applies to other land release areas within the Liverpool LGA.

In accordance with the provisions of clause 32(3) of the EP&A Regulation, Council, without the necessity of preparing a new or amending contributions plan, will adjust the monetary development contribution rates set out in this Plan to reflect quarterly changes to both:

- the CPI (for all Works Schedule items identified in this Plan apart from the items comprising land yet to be acquired); and
- the customised LVI (for Works Schedule items identified in this Plan involving land yet to be acquired).

2.11.3 Works Schedule items other than land

The monetary contributions rates for Works Schedule items as set out in Part 5 of this Plan will be adjusted to reflect quarterly variations in the Consumer Price Index (All Groups - Sydney) from the date that the Plan came into effect.

The adjustments shall be made at the time of granting development consent so as to determine the appropriate contribution to be included on any relevant consent. A further adjustment will be made at the time of payment to reflect any further changes between the date of consent and payment of contribution.

Contribution at time of development consent

$$C_2 = \frac{C_1 \times CPI_2}{CPI_1}$$

Contribution at time of payment

$$C_3 = \frac{C_2 \times CPI_3}{CPI_2}$$

Where:

C_1 = Contribution of rate for works as shown in this Plan

C_2 = Contribution rate for works as included or to be included in the conditions imposed on the development consent

C_3 = Contribution rate for works at the time that the contribution is to be paid

CPI_1 = *Consumer Price Index (All Groups - Sydney)* result at the time that the Plan was prepared - i.e. December quarter 2020

CPI_2 = *Consumer Price Index (All Groups - Sydney)* result for the quarter immediately prior to the date of granting the relevant development consent

CPI_3 = *Consumer Price Index (All Groups - Sydney)* result for the quarter immediately prior to the date that the contribution is to be paid

2.11.4 Land

The monetary contributions rates for Works Schedule items that relate to land as set out in Part 5 of this Plan will be adjusted in accordance to reflect quarterly variations in the Land Value Index (published on the Liverpool City Council website) from the date that the Plan came into effect.

The adjustments shall be made at the time of granting development consent so as to determine the appropriate contribution to be included on any relevant consent. A further adjustment will be made at the time of payment to reflect any further changes between the date of consent and payment of contribution.

Contribution at time of development consent

$$C_2 = \frac{C_1 \times LVI_2}{LVI_1}$$

Contribution at time of payment

$$C_3 = \frac{C_2 \times LVI_3}{LVI_2}$$

Where:

C_1	=	Land component of contributions as shown in this Plan
C_2	=	Land component of contributions subject of the conditions imposed on the development consent
C_3	=	Land component of contributions at the time that the contribution is to be paid
LVI_1	=	Land Value Index at the time that the Plan was prepared - i.e. December quarter 2020 = 100
LVI_2	=	Land Value Index at the time of granting the relevant development consent
LVI_3	=	The latest Land Value Index at time that the contribution is to be paid

2.11.5 Calculation of Land Value Index

The Land Value Index is a measure to reflect the changes in land values during the life of the Plan from the date of the adoption of the Plan.

The land costs included in the Works Schedule in Part 5 of this Plan are based on estimates provided in the report prepared by CivicMJD (1 July 2019), and then indexed by the prevailing LVI. The valuation report provided an update to the valuations by CivicMJD in its report dated 2018.

The values are shown in Table 2.1.

Table 2.1 Assumed land values for various classifications

Land classification	Base assumed land cost (per sqm)	Land cost (per sqm)
Riparian corridors (constrained land and land below the 20-year Annual Recurrence Interval (ARI) event)	$35	$40
Residential land between the 20-year and 100-year ARI events	$135	$155
Low density residential prime land (R2) above the 100-year ARI event	$340	$389
Medium density residential prime land (R3) above the 100-year ARI event	$430	$493
Commercial/ Neighbourhood Business (B1) prime land within the town centre and above the 100 -year ARI event	$400	$458
Commercial/ Business Development prime land (B5) within the town centre and above the 100-year ARI event	$450	$515
Employment lands/ Industrial	$370	$424

Notes:

Refer to section 5.0 of the original MJ Davis Valuations report (undated) for Leppington and Leppington North but may include Special Land Value at date of acquisition, Severance, Solatium and Disturbance as required to be paid pursuant to the Land Acquisition (Just Terms Compensation) Act 1991.

A 12% Land Contingency has also been applied to these rates in the Plan, based on MJ David Valuations original advice.

The derivation of the Land Value Index, its quarterly updates and accompanying contributions rates for Austral Leppington North, are published on Council's website.

2.12 Review of Plan and contribution rates

Council will review this Plan on a regular basis.

The review process will canvass, as a minimum, the following issues (where data is available):

- development activity in terms of latest information on net additional dwellings and populations;
- likely total development activity to be experienced during the remainder of the Precincts development;
- progress in the delivery of public amenities and services identified in Part 5 of this Plan;
- modification of facility concepts, changes in anticipated facility costs, facility timing and land values;
- annual contributions received and expenditure information; and
- any other factors likely to affect the delivery of works identified in this Plan.

Pursuant to clause 32(3) of the EP&A Regulation, Council may make only minor adjustments or amendments to the Plan without prior public exhibition and adoption by Council. Minor adjustments could include minor typographical corrections and amendments to rates resulting from changes in the indexes adopted by this Plan.

Amendments beyond those authorised under clause 32 of the EP&A Regulation require the preparation of a new draft plan which in turn must meet the requirements of the EP&A Act and EP&A Regulation (including public exhibition of the draft plan for a period of at least 28 days). The nature of the proposed amendments and reasons for same would be clearly outlined as part of the exhibition.

Amendments requiring public exhibition would include adjustments to contribution rates taking account of more recent information and, where relevant, the following:

- actual costs of completed works;
- reviewed costs of yet to be completed works and land acquisition;
- adjustment in projected project management and contingency costs associated with works; and
- plan management and administration costs.

Plan reviews of the type described above will not affect any development contributions obligation required under any consent that is granted under this Plan.

2.13 Pooling of funds

Council's ability to forward fund services and amenities identified in this Plan is very limited. Consequently their provision is largely contingent upon the availability of contributions funds.

To provide a strategy for the orderly delivery of the public services and amenities, this Plan authorises monetary contributions paid for different purposes in accordance with the conditions of various development consents authorised by this Plan and any other contributions plan approved by the Council to be pooled and applied progressively for those purposes.

The priorities for the expenditure of pooled monetary contributions under this Plan are the priorities for works as set out in the Works Schedule in Part 5.

In any case of the Council deciding whether to pool and progressively apply contributions funds, the Council will have to first be satisfied that such action will not unreasonably prejudice the carrying into effect, within a reasonable time, of the purposes for which the money was originally paid.

3 Demand for public amenities and public services

3.1 Summary of this Part

The Austral and Leppington North Precincts are part of the South West Growth Area, as planned by the State Government.

The Austral Precinct and a portion of the Leppington North Precinct are in the Liverpool LGA and so Liverpool City Council will serve as a consent authority for much of the development. Council will also be the manager of most of the new public infrastructure that will be required to be delivered in its jurisdiction.

Planning for housing and other development requires the parallel planning for public infrastructure to support the development and the incoming population.

The incoming population is directly related to the expected number and type of residential dwellings and extent of non-residential development floor space in an area.

The extent of public amenities and services required for the future development of an area is usually based on standards or benchmarks rates (e.g. per capita provision).

The application of the provision standards to the estimate of expected development enables a list of infrastructure requirements to meet that development to be compiled.

This connection between expected development, infrastructure standards, and the resultant infrastructure list directly informs the contribution requirements in this Plan.

A range of infrastructure studies have been prepared to inform the infrastructure list (or Works Schedule). Part 4 of this Plan provides more detail on the servicing requirements expressed in these studies.

3.2 Development and infrastructure planning context

3.2.1 Growth Areas Structure Planning

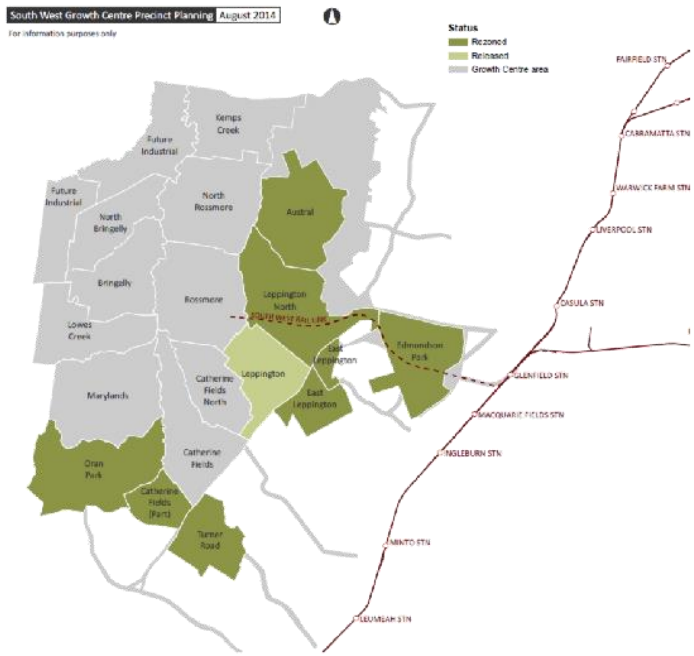
The land affected by this Plan is within the Austral and Leppington North Precincts in Sydney's South West Growth Area.

To facilitate planning and orderly development of the South West Growth Area, this area has been divided into seventeen precincts. The locations of the early release precincts, including Austral and Leppington North Precincts, are shown in Figure 3.1 over page.

The Austral and Leppington North Precincts were released for precinct planning purposes by the Minister for Planning in October 2009. The Austral Precinct is wholly located in the Liverpool LGA, while the Leppington North Precinct is located partly in the Liverpool LGA and partly in the Camden LGA. This contributions plan relates to the Austral Precinct and that part of the Leppington North Precincts that is within the Liverpool LGA.

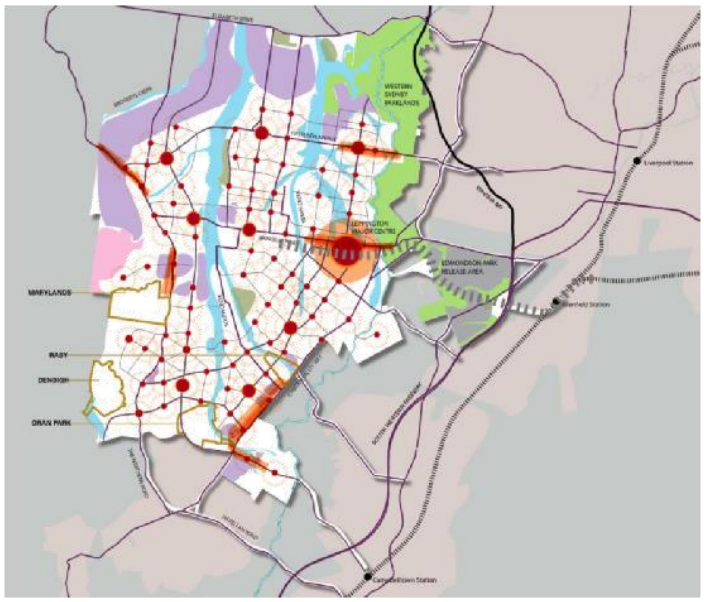
A structure plan has been prepared for the Growth Area (formerly referred to as the Growth Centre), a copy of which is included as Figure 3.2 over page. Apart from local neighbourhood centres, the structure plan proposes ten (10) new town or village centres. The largest of these is the planned Major Town Centre at Leppington that will be located in the Leppington North Precinct in the adjoining Camden LGA, immediately adjacent to the southern boundary of the land affected by this Plan. The Western Sydney Parkland forms the northern and eastern boundaries of the Precincts.

The Leppington Major Centre will be a major service provider for properties in the Precincts and some of the regional facilities of the centre will be located within the land affected by this Plan. Other infrastructure investment is underway to support the future Leppington Major Centre, including a new rail line from Glenfield via Edmondson Park.



Source: Department of Planning and Environment, 2014 (now ~~Department of Planning, Industry and Environment~~DPIE).

Figure 3.1 South West Growth Area early release precincts



Source: South West Growth Centres Structure Plan Edition 3, prepared by Department of Planning and Environment (now ~~Department of Planning, Industry and Environment~~DPIE).

Figure 3.2 South West Growth Area Structure Plan

Table 3.1 provides a context for the area the subject of this Plan in terms of the planned dwellings and population illustrating that the majority of housing and population in the Austral and Leppington North Precincts will be located in the Liverpool LGA.

Table 3.1 Estimated dwelling and populations

District	Area (ha)	Projected dwellings	Projected population
South West Growth Area (17 Precincts)	17,000	110,000	300,000
Austral and Leppington North Precincts		16,981*	57,737*

Sources: Growth Centres Commission (Structure Plan Explanatory Note); ~~Department of Planning, Industry and Environment~~DPIE and Liverpool City Council

*Gross estimated dwellings and population (existing development (782 dwellings) results in 16,199 net additional dwellings and 55,078 net additional people included in this Plan)

3.2.2 Precinct Planning

A package of information on anticipated development and required infrastructure has been prepared for the Austral and Leppington North Precincts, including:

- Indicative Layout Plan (ILP) to guide planning and assessment of the precincts.
- An amendment to *State Environmental Planning Policy (Sydney Growth Centres) 2006* to facilitate the formal rezoning of the land to enable urban development.
- Development Control Plan.
- Contributions plans prepared by Camden Council and Liverpool City Council (this Plan).
- Infrastructure Delivery Plan (IDP).

Key information sources that have underpinned infrastructure planning and costing in this Plan are listed included in Table 3.2.

Table 3.2 Studies supporting infrastructure planning and costing

Public amenity or service	Studies informing infrastructure need and cost
Land acquisition for public amenities or services	MJ Davis Valuations Pty Ltd, Austral and Leppington North Precincts, 2014
	CivicMJD, Valuation Report - Various Residential and Industrial Release Areas (in Liverpool LGA), June 2018
	CivicMJD, Land Valuations for the Austral Precinct, July 2019
Stormwater drainage and stormwater quality management works	Cardno (NSW/ACT) Pty Ltd, *Austral & Leppington North Precincts Water Cycle Management WSUD Report*, prepared for NSW Department of Planning and Infrastructure, April 2011, plus *Responses to Exhibition Submissions*, December 2012
	SMEC, *Austral and Leppington North Design of Water Management Infrastructure Detailed Concept Design Report* and its associated input studies, prepared for Liverpool City Council, March 2019
	SMEC, *Final Design Report – Development of Streetscape Raingarden Master Plan for Austral and Leppington North*, prepared for Liverpool City Council, February 2020
Roads and transport works	AECOM Australia Pty Ltd, *Austral and Leppington North (ALN) Precincts Transport Assessment*, prepared for NSW Department of Planning and Infrastructure, July 2012

Public amenity or service	Studies informing infrastructure need and cost
Open space and recreation, community and cultural facilities works	Elton Consulting, *Austral and Leppington North Precincts - Demographic and Social Infrastructure Assessment*, August 2011, plus Addendum, July 2012

More detail on the Precincts' infrastructure requirements is included in the Parts 4 and 5 of this Plan.

3.2.3 Infrastructure Delivery Plan

The Infrastructure Delivery Plan (IDP) provided an overview of the urban infrastructure requirements for the Austral and Leppington North Precincts, and how those requirements would be met.

The IDP has provided, amongst other things, a basis for ongoing discussion between planning and infrastructure agencies to guide, inform and improve the delivery of infrastructure. It has also served the purpose of acquainting owners and developers of land in the Precincts with how and when infrastructure is likely to be provided.

Coordination in infrastructure delivery will be critical to the timely roll-out of urban development of the Precincts. Coordination is even more critical in an environment where the land is comprised of relatively small parcels held by a large number of land owners. This is the case in in the Precincts.

The IDP provided initial direction for the delivery of local infrastructure to the land to which this Plan applies:

- Identified the need to prepare contributions plans for local infrastructure. This Plan addresses this requirement.
- Required staging plans for local infrastructure to accord with the indicative priority development areas identified in the IDP. The staging outcomes in this Plan reflect the IDP, with refinement as necessary.
- Identified that total local infrastructure costs are likely to be higher than the likely contribution receipts, given the contributions caps that are in place. The funding of higher order recreation and community facilities is particularly uncertain. Council, in partnership with the State Government, will therefore need to explore other sources of funding or other delivery options.
- Provided that councils have prepared, or are required to prepare, Community Strategic Plans as the key documents guiding councils' activities in the coming decades. This is now the mandated way for councils in NSW to undertake and report their resource planning and the delivery of services and facilities to their communities. Supporting the implementation of the strategic plans will be the resourcing strategies (including long-term financial plans, workforce management plans and asset management plans), delivery plans and operational plans. Councils' Community Strategic Plans must be prepared with due consideration of the various strategies and policies that impact on the local area from both the State (including the Metropolitan Strategy and the State Plan) and Federal Government levels.
- Provided that the effective management of development growth will require a significant ongoing commitment from State Government, particularly in the delivery of infrastructure and services. State Government's role will span a range of agencies and joint commitment and action through the Metropolitan and Sub-regional Strategy will be required to ensure consistent, timely and quality delivery of infrastructure and services to this part of the South West Growth Area.
- Provided that funding constraints mean that there should be an even greater emphasis placed on partnering with developers to provide the necessary local infrastructure (through, for example, Planning Agreements and Works in Kind agreements).

3.3 Expected development outcomes

3.3.1 Existing development

Existing development in the area is characterised by recent urban development with significant remaining rural and rural residential land uses.

When the land was rezoned for urban development, the majority of land in the Precincts was used for either small scale agricultural purposes such as market gardens or rural residences. Rural residencies are often used as a place of business. This may include ownership of trucks, horses or running construction businesses.

At the time of rezoning, some of the land in the Precincts was developed for purposes that might be characterised as urban uses – for example, private schools and retirement living establishments.

3.3.2 Net Developable Area

The capacity for development of land is restricted by a number of factors, including:

- natural constraints such as riparian and flood prone lands;
- man-made constraints such as existing infrastructure, easements and other legal restrictions, and existing infrastructure such as gas and transmission lines.

In addition to the constraints, there are future constraints. For example, certain land is needed to be set aside or reserved for public purposes such as roads, government buildings, education and health facilities, and so on.

Taking these matters into consideration allows a calculation of the amount of 'economic' land that is available for development. The planned development of this 'Net Developable Area' (or NDA) is the development that will generate the demand for the urban infrastructure such as roads and drains that are required to sustain it. Net Developable Area is therefore one of the bases used to determine contributions under this Plan.

The Precincts together have an estimated total Net Developable Area of approximately 1,175 hectares.[1]

3.3.3 Overview of expected development

The Precinct Plan for both Austral and Leppington North Precincts has been prepared with reference to the Structure Plan and the indicative dwelling and town centre targets, and achieves the following outcomes:

- Leppington Major Centre and nearby employment land, with capacity for up to 13,000 jobs in retailing, light industrial, business park, human services and entertainment sectors.
- Approximately 16,199 new dwellings and a net increase in population of approximately 55,078.
- A Town Centre in Austral with retail floor space in the order of 42,000 square metres.
- Three neighbourhood centres each with retail floor space of at least 10,000 square metres.
- 4 primary schools and 2 high schools.
- 66 hectares of light industrial and bulky goods land for local jobs and local services.
- A new TAFE college and Regional Integrated Primary Health Care centre located in Leppington Major Centre.
- Regional level community and cultural facilities in Leppington Major Centre.

Expected development in the Precincts will be characterised by the following:

- A part of the Leppington Major Centre civic precinct and bulky goods retailing located immediately to the north of Bringelly Road.

[1] Total NDA is 1,175 hectares. 'Equivalent NDA' (that is, total NDA adjusted to reflect the lower residential development potential of Environment zoned lands and higher potential of some areas) is used to calculate contributions under this Plan. Equivalent NDA for the Precincts is approximately 1,217 hectares.

- Four (4) neighbourhood retail shopping centres and up to eight (6) schools.
- A range of lower density residential areas, including medium density around the various retail centres, infill low density urban residential and lower density Environmental Living zones just beyond the creek corridors and rural transition along the western boundary.
- A light Industrial area to the north of Fifteenth Avenue.
- Open space and drainage facilities along the Bonds Kemps and Scalabrini Creek corridors as well as adjacent to the Western Sydney Parklands and along other minor, unnamed creeks that pass through the Austral Precinct.
- Areas reserved for environmental conservation and environmental protection, principally along the Kemps Creek corridor and in the north of the Austral Precinct, as well as a corridor for the South West Rail Line.

The extent of development is reflected in the final Indicative Layout Plan adopted by the Department of Planning and Infrastructure (now ~~Department of Planning, Industry and Environment~~DPIE), as amended, primarily for consolidated stormwater management infrastructure needs, in 2019/20.

Table 3.3 outlines the expected extent of development in the Liverpool LGA portion of the Austral and Leppington North Precinct based on the final Indicative Layout Plan. The Equivalent NDA makes allowance for higher and lesser densities.

The proposed arrangement of these component land uses is shown in Figure 3.3.

Table 3.3 Expected Net Developable Area

Land Use	NDA (ha)	Equivalent NDA assuming 15dw/ha
Environmental Living (4 dwellings/ha)	95.21	25.39
Environmental Living (10 dwellings/ha)	45.31	30.21
Very Low Density Residential (10 dw/ha)	9.97	6.65
Lower Density Residential (15 dw/ha)	702.36	702.36
Low Density Residential (20 dw/ha)	85.74	114.32
Medium Density Residential (25 dw/ha)	151.90	253.17
Sub Total Residential	**1,090**	**1,132**
Neighbourhood Centre	9.02	9.02
Local Centre	9.44	9.44
Bulky Goods	25.70	25.70
Light Industrial	40.26	40.26
Sub Total Employment	**84.42**	**84.42**
TOTAL	1,175	1,217

Source: ~~Department of Planning, Industry and Environment~~DPIE, 2020.

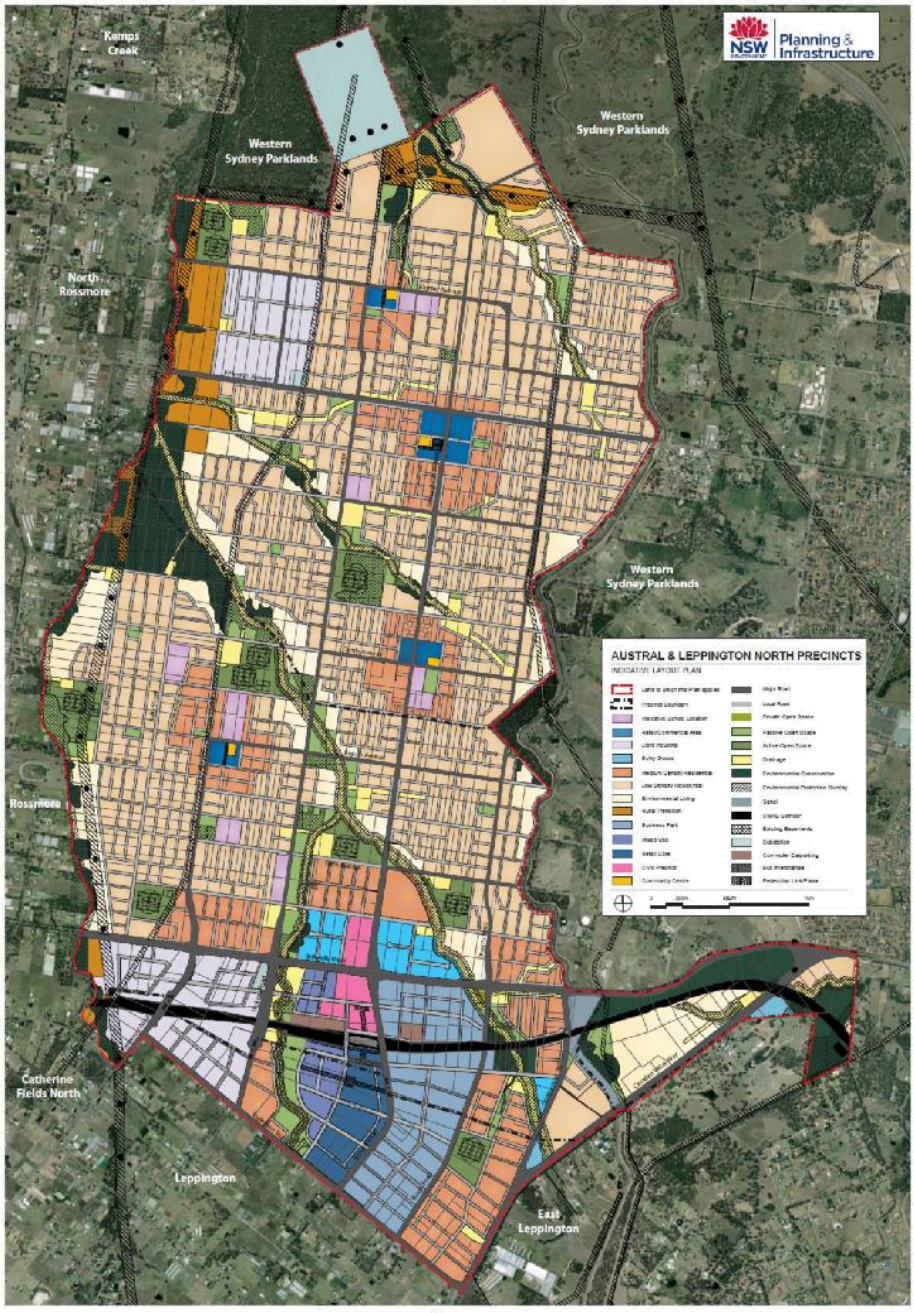


Figure 3.3 Expected land use in the Precincts

3.3.4 Demographic characteristics

The likely demographic characteristics of a development area are important for understanding and planning for the future social infrastructure needs of that area.

The demographic characteristics of the existing rural population do not provide a robust indicator of the future demography of the Precincts.

The report *Austral and Leppington North Precincts - Demographic and Social Infrastructure Assessment* (the 'Social Infrastructure Assessment') prepared by Elton Consulting analyses the demographics and housing market conditions in the Camden, Liverpool and Campbelltown LGAs.

The Social Infrastructure Assessment makes the following conclusions about the anticipated demography of the future release area:

- There will initially be a comparable proportion of young couples and families with children to other release areas in the region, but a greater range of family types, reflecting the wider range of housing types and price markets to be provided.
- Proportions of empty nesters and older people will be initially similar to that usually experienced in new release areas, but, given the differing housing stock, will rapidly increase to approximate those in the wider district once services and public transport become well established.
- Over time, the population will become more diverse. Increasing proportions of young adults and older people will be attracted to the area once Leppington Major Centre is established. The proportion of the population who are young children and young adults will decline as the population ages and the proportion of older children with older parents grows. The proportion of the population aged 55+ years will also increase considerably as the area matures.
- Owner occupiers are likely to provide a stable group that will age in place through the life cycle stages, while tenant households will experience greater turnover, thereby maintaining a similar age profile as in the initial stages.
- Over time the population profile is likely to come to more closely approximate that of an established area with a variety of age and household characteristics, rather than a traditional new release area with particular age concentrations.
- Changing demographic, cultural and lifestyle patterns that will occur through the life of the development; and the relative uncertainty about the future composition of the population and its precise needs, gives rise to a need to plan for flexibility in social infrastructure facilities to enable them to respond and adapt as the particular requirements and lifestyle preferences of the population are ascertained.

3.3.5 Dwelling occupancy rates

The amount and mix of the types of expected residential development will inform estimate of the future population of an area. The need for social infrastructure is usually based on per capita benchmarks. As development contributions are levied on a development-by-development basis, in order for the contribution to be reasonable there needs to be an assumption of how many people are likely to live in the proposed development.

This Plan therefore assumes standard dwelling occupancy rates for the purpose of determining the estimated occupancy of development that is approved during the life of the Plan.

The occupancy rates used to calculate contributions under this Plan are those determined by the Social Infrastructure Assessment. They are shown in Table 3.4.

Table 3.4 Dwelling occupancy rates assumed in this Plan

Development type	Occupancy rate
Subdivided lots	3.4 persons per lot
Detached dwelling, detached dual occupancy (each dwelling)	3.4 persons per dwelling
Semi-detached, town house, terrace, attached dual occupancy (each dwelling)	2.6 persons per dwelling
Flat, unit, apartment, secondary dwellings	1.8 persons per dwelling
Seniors living dwellings	1.5 persons per dwelling

3.3.6 Anticipated resident population

The anticipated population in the Austral and Leppington North Precincts has been determined on the basis of the Net Developable Area for various types of residential development, the minimum density of dwellings in those areas (specified in the draft SEPP amendment), and the assumed average occupancy rates for those dwellings.

The anticipated population is shown in Table 3.5.

Table 3.5 Calculation of anticipated resident population

Dwelling type	Projected dwellings	Assumed dwelling occupancy rate	Population
Low density and environmental living (detached dwellings)	13,184	3.4	44,825
Medium density residential (semi-detached etc.)	3,798	2.6	12,912
Less assumed existing population (see Appendix A)			-2,659
Expected net additional population			55,078

3.3.7 Anticipated non-residential floor space

The predominant economic land use in the Precincts will be residential development. There will also be some non-residential development including neighbourhood retail centres, a light industrial area; and a bulky goods retailing area adjoining the neighbouring Leppington Major Centre in Camden LGA.

The anticipated extent of these non-residential developments is shown in Table 3.6.

Table 3.6 Anticipated non-residential development potential

Land use category	Net Developable Area (ha)	Projected gross floor area (m^2)*
Neighbourhood Centre	9.02	40,590
Local Centre	9.44	42,480
Bulky goods	25.70	115,650
Light Industrial	40.26	181,170
Total	84.42	379,890

* based on an assumed average floor space ratio of 0.45:1

Source: Department of Planning and Infrastructure (now ~~Department of Planning, Industry and Environment~~DPIE)

3.4 Infrastructure demand arising from the expected development

Future development in the South West Growth Area will result in an additional population of up to 300,000 people.

Existing public amenities and services in the Precincts have been essentially designed to accommodate the existing predominantly rural living environment. A change in the development profile from rural to urban development is now planned. More particularly, the Precincts are planned to have a low density suburban character. The projected influx of an estimated 55,078 new residents demands a significant investment in new and augmented public amenities and services.

Research on infrastructure needs for the impending urban development has identified the following impacts on public services and public amenities:

- increased demand for active and passive recreation facilities, such as recreation centres, sports fields, sports courts, playgrounds, walking trails and bike paths;
- increased demand for spaces that will foster community life and the development of social capital in the Precincts, such as multi-purpose community centres and libraries;
- increased demand for facilities that will support safe and convenient travel between land uses both within the Precincts and to and from destinations outside of the area, such as upgrades to existing roads, new roads, intersections and public transport facilities; and
- increased demand for stormwater drainage facilities as a result of the extra stormwater runoff generated by impervious surfaces associated with urban (as distinct from rural) development, as well as water quality treatment facilities consistent with Water Sensitivity Urban Design (WSUD) principles.

A range of public facilities and public amenities have been identified as being required to address the impacts of the expected development, including:

- open space and recreation facilities;
- community and cultural facilities;
- water cycle management facilities; and
- traffic and transport management facilities.

More detail on the demand for public services and amenities, the relationship with the expected development, and the strategies for the delivery of required infrastructure is included in Part 4 of this Plan.

The costs, indicative timing, and proposed location of individual items for the public amenities and public services included in this Plan are shown in Part 5 of this Plan.

4 Strategy plans

4.1 Infrastructure costs and delivery generally

4.1.1 Apportionment of the infrastructure costs to expected development

The costs for public services and amenities were informed by the studies that support the infrastructure planning of the area (refer Table 3.2).

The development monetary contribution for each of the facilities identified in this Plan is determined by dividing the total cost of the facility by the contribution catchment (which is expressed in persons or NDA). This process ensures that fair apportionment of facility costs is calculated for development expected to occur under this Plan.

The contribution catchments for each infrastructure type are:

- in the case of open space and recreation facilities land and works, the expected additional resident population of the Precincts;
- in the case of community and cultural facilities land and works, the number of people (or future residents) the respective facility has been designed for;
- in the case of road and transport land and works, the expected additional resident population of the Precincts for residential development and the estimated equivalent Net Developable Area of the Precincts for non-residential development; and
- in the case of stormwater drainage land and works and plan administration, the estimated equivalent Net Developable Area of the Precincts for all development.

The infrastructure included in this Plan has generally been sized to reflect the demand generated by the expected development under this Plan. Some facilities, such as the proposed aquatic and indoor recreation centre, have been designed to serve a wider catchment (although the capital works for this facility are not 'essential works' under this Plan). Council will need to make arrangements to ensure that the cost attributable to the demand sources external to the Precincts is met (for example, by subsequent contributions plans, joint contributions plans, special rates, grants).

More details on this apportionment are discussed in the remainder of Part 4 of this Plan.

4.1.2 Delivery of the infrastructure

Council will require contributions from developers under this Plan toward provision of the public amenities and public services identified in this Plan. These contributions may be in the form of monetary contributions, dedications of land free of cost, or a combination of these.

Developers may choose to provide, subject to the agreement of the Council, one or more infrastructure items identified in this Plan as Works In Kind or provide another type of material public benefit as means of satisfying development contributions required under the Plan (refer clause 2.9.5 of this Plan). A Works In Kind Agreement must be in place prior to commencing the works in accordance with the Council's Works In Kind Agreements Policy.

Substantial research has been applied to the derivation of the Plan's Works Schedule and the planning for the location of all facilities has been completed but detailed design will be carried out in the development phase. The facilities will be developed in a manner that allows them to effectively serve the demand attributable to development envisaged under this Plan.

The facilities strategies included in Part 4 of this Plan are based on strategic information. It is likely that, as the planning process for the different development areas proceeds, modified and more cost effective solutions that still meet the strategy objectives will be developed.

Council will prepare design concepts for the facilities so that specification and costing of the facilities can be more accurately defined as implementation of this Plan proceeds. This may result in amendment of this Plan.

Where alternatives to the Works Schedule are proposed in conjunction with the development of areas and the alternatives are approved by the Council, the development contribution applicable to a development the subject of a development application may be reviewed, or the Works Schedule in this Plan updated, or both.

4.1.3 Infrastructure staging and priority

The overarching strategy that initially guided the staging and priority of infrastructure was the Infrastructure Delivery Plan. The staging and priorities of infrastructure will continue to be refined in accordance with the anticipated development program for the Austral and Leppington North Precincts.

The initial development areas, as discussed in the Infrastructure Delivery Plan and clause 3.2.3, include:

- Land in and around the Leppington Major Centre.
- Land located north and south of Fifteenth Avenue on the eastern edge of the Austral Precinct.

The second of these areas is within the Liverpool LGA, while the Leppington Major Centre is just south of the border with Camden Council and so the land around this centre may include land in the Liverpool LGA.

Ideally, development will proceed outward from the railway station and retail core. The existing land ownership pattern and other influences (such as the demand for different land use types) however means that this order of development is unlikely to occur. The Infrastructure Delivery Plan strategies reflect this:

There should not be any assumption that services are 'reserved' for particular areas in the early stages. If owners and developers of land located outside the initial development areas consult and work cooperatively with infrastructure providers and owners of adjacent land, there is no reason why those lands could not also be developed.[2]

With these uncertainties, the facility staging and priorities details that are shown in Part 5 of this Plan are general in their scope, and will be subject to regular review.

[2] *Austral and Leppington North Precincts Infrastructure Delivery Plan*, Draft Report for Exhibition, prepared by Newplan, August 2011, Section 4.2.

4.2 Open space and recreation facilities

4.2.1 Relationship between the expected types of development and the demand for additional public facilities

The requirements for local, district and regional scale open space and recreation facilities as a result of the expected development of the Precincts are documented in the report Austral and Leppington North Precincts – Demographic and Social Infrastructure Assessment, prepared by Elton Consulting in August 2011. This is supplemented by an Addendum, prepared by Elton Consulting in July 2012.

The information below comprises a summary of sections of that report that describe the demand for new and upgraded public amenities and services.

Existing provision

There are limited open space and recreation facilities accessible to the current residents of the Precincts. However the extent of provision is consistent with the area's small population and semi-rural character.[3]

There are three identified local public open space areas located within the Liverpool LGA part of the Austral and Leppington North Precincts. These are:

- Craik Park (includes children's playground, sports field and tennis courts);
- WV Scott Memorial Park (includes children's playground, sports fields, cricket practice nets, netball courts and bushland); and
- Starr Park (bushland).

In addition there is a significant area of district and regional parks and bushlands on the periphery of the Austral Precinct, including:

- Western Sydney Regional Parklands;
- Grimson Park (in West Hoxton); and
- Kemps Creek Nature Reserve (high conservation value bushland – no public access).

The level of open space provision reflects the rural residential lifestyle of the area. That is, the demand for public open space (particular local and passive open space) is significantly reduced in locations where residents live on their own substantial parcel of land.

With the proposed development of the area to an urban environment and its associated influx of new residents, the area will require significantly more land for open space and recreation purposes.

Trends in facility provision

Current and emerging trends and factors that have been considered in the planning and specification of Austral and Leppington North Precincts recreation infrastructure included the following:

- Significant and ongoing popularity of ~~informal~~ recreation activities (e.g. walking), while~~and~~ activities requiring fixed commitments are declining in favour of more informal and ~~more~~ flexible activities.
- Facilities that are flexible in their service provision.

[3] Social Infrastructure Assessment, page 16

- Growing awareness and interest in health and fitness as part of a balanced lifestyle rather than an emphasis solely on leisure.
- Increasing demand for outdoor recreation.
- Growing awareness of the importance of incidental exercise within employment and residential areas, increasing the demand for walking and cycling paths.
- An increasing emphasis on quality as well as quantity.
- An increasing demand for access for young people and improved accessibility more generally.
- An increased demand for natural areas and adventure-based activities.
- The increased duration of playing seasons requiring consideration of alternative playing surfaces.

Planning principles for open space and recreation

Principles for the provision of sustainable open space and recreation infrastructure that have guided the selection of infrastructure items included in this Plan include the following:

- Open space should be largely publicly provided.
- Facilities should mMeet a diverse range of open space and recreation needs and opportunities.
- Level of facility provision should aAvoid exerting pressure on other open space and recreation facilities in surrounding areas.
- The qQuality of open space is more important than the quantity.
- Facilities should form aA physically and visually connected network; and represent a non-vehicular system that connects major activities and open spaces by walking and cycling.
- Facilities should cComprise a local, district and regional hierarchy of spaces.
- Facilities should rReflect and complement the natural, ecological, waterway and visual features of the area; and incorporate natural areas and riparian corridors into the open space system where possible.
- There should be an integratedIntegrate a network of open space with stormwater management and water-sensitive urban design where possible.[4]

Recreation demand assessment based on forecast demographics

The size and characteristics of the population in the Precincts is discussed in Part 3 of this Plan.

Implications for recreation demand as a result of the expected mix of residents is discussed in detail in Table 9.1 of the Social Infrastructure Assessment.

In summary:

- Future developments will initially contain a predominance of families with children, adolescents and young people, and only over time will there be a balance of more middle aged and older people.
- The major target groups for recreation planning in new release areas are children aged 0-14 years, and adults aged 25-40 years.

[4] Social Infrastructure Assessment, Section 3.1

- Local open space is important in encouraging informal interaction and creating opportunities for new and existing residents to come together, as well as for encouraging extended family activity, for walking and cycling as well as family gatherings.
- The level of local open space will in part be informed by prevailing council standards of provision.

In relation to the last point, the following plans and strategies provide guidance:

- Liverpool City-Wide Recreation Strategy 2020 (2003); and
- Liverpool City Council Provision Rates Indicative Draft 21 September 2010.

The following is a summary of Liverpool City Council's standards relating to open space:

- The provision of open space in new release areas is based on a standard of 2.83 hectares per 1,000 people;
- Local parks (minimum 2,000 square metres) to be provided within a five-minute walk of most dwellings;
- 1 key suburb park (district park) with a minimum size of 3 hectares per 5,000 – 10,000 people;
- 1 double playing field of minimum 4 hectares per 10,000 people (local sporting field);
- 1 district sporting field per 60,000 people approximately;
- District sporting fields to be a minimum 6 hectares and, where possible, co-located with other commercial, community and recreation space in larger neighbourhood activity hubs;
- The sSplit between active and passive open space shouldto reflect quality considerations, rather than a firm 50:50 split; and
- High use recreation facilities and quality open public spaces should be provided away from electricity transmission lines, wherever practicable.[5]

The above considerations have informed the open space and recreation requirements for the future development of the Precincts.

Local and district open space requirements

The total area of local and district open space land required was calculated in the Social Infrastructure Assessment on the basis of meeting the combined needs of the Austral and Leppington North Precincts' developments.

The planning of open space areas was undertaken as part of the Precinct planning phase in an iterative manner. Earlier versions of the ILP identified more extensive passive open space areas aligning with the numerous drainage lines traversing the Austral and Leppington North Precincts. The size of the open space areas was reduced in acknowledgment of the very high cost of acquiring the substantial areas required for meeting open space demands.

The benchmark figure in the original assessment report proposed an overall rate of 2.9 hectares per 1,000 population for Austral and Leppington North Precincts, including both Liverpool City and Camden Council areas of Leppington North. However, the Addendum Report noted that the final ILP provision of approximately 135.44 hectares of open space was below the standard benchmark of 2.83 hectares per 1,000 people (at that time, for an estimated 54,361 people). The report further noted how the shortage is concentrated more in the Liverpool City areas of the Precincts rather than Camden LGA.For a forecast population of 57,737 people in the Precincts (including the existing population), application of this benchmark would result in a requirement of approximately 163.4 hectares of district and local open space.

[5] Social Infrastructure Assessment, p76

This Plan proposes to provide around 120 ha of open space which for a proposed population of 57,737 residents, equates to a rate of provision of ~~less than the total Austral and Leppington North Precincts benchmark rate for open space (instead a rate of 2.13 hectares~~ 2.08 hectares per 1,000 residents~~)~~. The rate of provision is based on the final Indicative Layout Plan prepared by the NSW Department of Planning and Infrastructure (now DPIE). It is considered a reasonable level of provision since residents can also access a range of other open space areas, including ~~based on other~~ regional open space facilities and ~~the~~ significant bushland areas, concentrated largely around the riparian corridors. These facilities are described in more detail in subsequent sections below.

For the Precincts, Table 4.1 sets out the proposed provision of open space~~how the required amount of open space land was achieved.~~. This table shows that some of the land is already owned by Council such that only 106.6 hectares of land needs to be acquired under the Plan. Council-owned land includes Craik Park (9.7 hectares of which will be partially embellished under this Plan) and WV Scott Memorial Park and surrounding areas (3.75 hectares upon which the Regional Indoor Sports and Aquatic Centre is likely to be located). It is acknowledged that the land area estimates have been reviewed and updated since the previous version of this Plan. ~~has been obtained free of cost so that the incoming population (55,078 residents) is required to provide only 103.6 hectares. The proposed total inclusion of 122.77 hectares of land in this Plan for open space purposes is based on the final Indicative Layout Plan prepared by the NSW Department of Planning, Industry and Environment.~~

Table 4.1 Proposed provision of district and local open space

Open space	Area (ha)
	106.6
Land to be acquired	~~103.6~~
~~Land dedicated from the NSW Government (Office of Strategic Lands)~~	~~5.67~~
Land currently owned or managed by Liverpool City Council	13.5
	120.1
Total open space to be provided in Precincts	~~122.77~~
Total population in Precincts (persons)	57,737
	2.08
Open space provision rate (ha/1,000 persons)	~~2.13~~

Source: Department of Planning and Infrastructure (now ~~Department of Planning, Industry and Environment).~~ DPIE

Table 4.2 provides a breakdown of this open space according to type.

Table 4.2 Proposed provision of district and local open space

Open space type	Acquisition land area (ha)	Dedication land area (ha)	Total open space (ha)
Local passive open space	36.51 ~~37.53~~	3.75 (WV Scott Memorial Park/ Council-owned land)	40.26 ~~36.16~~
Local sporting fields (active recreation)	26.37 ~~26.87~~	9.70 (Craik Park)	36.07 ~~36.57~~
District passive open space	34.70 ~~33.38~~	~~5.67 (NSW Govt. dedication)~~ ~~3.80 (Council land)~~	34.70 ~~42.85~~
District sporting fields (active recreation)	9.07		9.07
Total open space	106.64 ~~106.85~~	13.52 ~~19.17~~	120.10 ~~126.02~~

Source: Department of Planning and Infrastructure (now DPIE~~Department of Planning, Industry and Environment~~).

The data in Table 4.1 show a weighting toward the provision of passive rather than active open space. The high percentage of passive open space arises in part because of the extensive creek networks that traverse the Precincts.

The above land also does not include:

- Regional active open space available in Western Sydney Parklands;
- Riparian and other conservation land such as bushland;
- Open space under transmission lines; and
- Playing fields within school sites.

The costs associated with open space land and works will be apportioned solely to new residential development. No contributions for Precincts open space facilities will be required of non-residential development as the need for the facilities has been based on the anticipated residential development only.

Recreation facilities requirements

The facilities described in Table 4.3 (on the following pages) have been determined in the Social Infrastructure Assessment as being required to meet the needs of expected development in the Austral and Leppington North Precincts, and in some cases the wider Growth Area catchment. Some of the facilities are located in the Camden LGA portion of the Leppington North Precinct and are therefore not included in the Works Schedules that comprise Part 5 of this Plan. The full list of Austral and Leppington North Precincts' requirements is shown for completeness.

Table 4.3 Recreation facilities requirements

Facility	Size	Description	Provision	Provision in the Precincts
Local passive parks	Min. 0.2ha up to 0.5ha	Local parks should have a range of play spaces and opportunities and cater to older children and young people as well as the traditional playground for young children. Grassed area for ball games, seats, shelter. May contain practice wall, fitness equipment, other elements.	Within 400-500m walking distance of 90% of dwellings	Many dispersed throughout the Precinct mainly focused along the riparian corridors but generally well distributed around the area
District (key suburb) parks	Min. 3ha	'Something for everyone', family parks. Includes a combination of outdoor courts (basketball, netball), skate park, BMX track, shared pathways, children's play equipment, outdoor fitness equipment, performance space, specialised recreation facilities, water feature, picnic / barbecue facilities, unleashed dog exercise area.	6-7 parks	7 concentrations of district passive recreation facilities sized between 3 and 11 hectares
Children's playgrounds (0-4years)	Min. 0.3ha for standalone playgrounds	Co-located with parks, sportsgrounds, courts, schools, community facilities, conservation areas. Regional, district, local hierarchy in terms of play equipment and range of experiences. Each play area should offer a different experience. Include road safety bike track at regional playground. Include children's bike paths in district and regional playgrounds. Can be co-located with play spaces for 5 to 12-year olds – within sight distance for carers but physically separated. Fencing if adjacent to water, road, steep slope. Seating, shade, water provided.	11 playgrounds	18 playgrounds or play spaces to be provided on local and district passive parks
Play spaces (5 to 12-year olds)	Min. 0.3ha for standalone playgrounds. Where co-located the space may be reduced.	Allows for more independent play, skill development and cognitive development. However, they still require adult supervision. More challenging equipment These may include bouldering features, climbing areas, 'learn to' cycleways through to cycle obstacle course, skate facility, BMX/mountain bike jumps and tracks. These areas could be co-located with children's playgrounds, school or community facilities for supervision and convenience of use by carers.	13 play spaces	See above

Facility	Size	Description	Provision	Provision in the Precincts
Local sportsground	Min. 4ha (ideally 5ha)	1 double field per 5,000 people. To accommodate demand for local sport and recreation training and competition. Rather than a series of single fields facilities are grouped to provide economies of scale for infrastructure. To be located close to schools. Inclusions : – 2 multi-purpose rectangular fields or 1-2 full-sized cricket/AFL ovals (plus practice nets) – 2 tennis / netball courts – 2 half-court basketball courts, or 2 multi-purpose courts – Lights for training – Amenities with change rooms, canteen, meeting room – Parking co-located with a playground, school, community facility, play space.	8 double playing fields or 20 single fields.	4 6 additional local sportsgrounds to complement an existing sportsground at Craik Park
District sportsground	Min. 6ha up to 10ha	The local sports park identified above may be expanded to incorporate one of the proposed district grounds dependent on location and access. Requirements – To be located near public transport routes, no further than 2 km from all dwellings – To be co-located, where possible, with other commercial, community and recreation space in neighbourhood activity hub – Provide for district standard adult competitions and training or junior regional or state school championships. – Amenity buildings, parking, storage core inclusions – Located on land without flooding or transmission line constraints. Given the timeframe before the population threshold warrants a district standard facility. The final mix of courts and fields will require community consultation and council input based on most recent open space planning principles and research. Inclusions: – 4 multi-purpose rectangular fields, parking and landscaped buffer – No flooding or transmission line restrictions – Higher quality fields than local – Maybe combined with playground, netball training courts or multi-purpose tennis/basketball/netball courts. Add practice nets if cricket wickets – May include lawn bowling club or similar.	1 complex of four playing fields	1 complex of four playing fields on a new 9.1ha park located between Ninth and Tenth Avenues

Source: Social Infrastructure Assessment, pages 79-84.

Regional open space and recreation facilities requirements

The Leppington railway station will be located just outside the southern boundary of the Precincts in the surrounding Major Centre. Leppington Major Centre is the only major centre to be developed in the entire South West Growth Area, and will include some of the land at the southern edge of the Precincts. This centre is being designed to serve a user catchment of around 300,000 residents.

Associated with this centre and located within the Liverpool LGA, the Regional Indoor Sports and Aquatic Centre is proposed to service the population of the Precincts and beyond. Details of this facility are included in clause 4.3 Community and Cultural Facilities.

Other regional open space demands are expected to be met by the Western Sydney Parklands, which adjoin the Austral and Leppington North Precincts to the east. It is expected that the embellishment of the Parklands will be carried out in the manner of other regional parks in the Sydney region (e.g. Centennial Park in the Sydney City LGA).

The Growth Area catchment, equivalent in scale to Canberra, will require substantial recreation facilities to meet the regional demand. Apart from the Aquatic Centre, the planning for regional facilities also includes a regional stadium. The Western Sydney Parklands Trust has prepared an options paper in relation to the stadium and envisages that it will be located in the Western Sydney Parklands.[6]

This Plan does not require contributions toward a stadium or any embellishments in the Western Sydney Parklands.

4.2.2 How are the contributions calculated?

Contributions will be collected only from residential development toward open space and recreation facilities identified under this Plan.

Monetary contributions are calculated on a per person or per resident basis, then factored up to a per lot or per dwelling amount.

The monetary contribution per person in a development containing residential dwellings or lots (whether or not that development also comprises non-residential floor space) is calculated as follows:

$$\text{Contribution per resident (\$)} = \sum \frac{(\$INF)}{P}$$

Where:

$INF = the estimated $ cost - or if the facility is existing, the indexed, completed cost - of providing each of the open space and recreation facilities (refer Part 5 – Works Schedule).

P = the estimated resident population (in persons) that will demand each facility - that is, the expected net additional population of the Precincts (refer Table 3.5)

The monetary contribution for different residential development types is determined by multiplying the contribution per person by the estimated increase in population as a result of the development and using the assumed occupancy rates included in clause 3.3.5 of this Plan.

For convenience, these rates are reproduced in Table 4.4.

[6] The *Western Sydney Parklands Trust Plan of Management* identifies a proposal for a regional sporting hub in the southern end of the Western Sydney Parklands, in the vicinity of the Austral and Leppington North Precincts, subject to funding.

Table 4.4 Assumed residential development occupancy rates

Development type	Occupancy rate
Subdivided lots	3.4 persons per lot
Detached dwelling, detached dual occupancy (each dwelling)	3.4 persons per dwelling
Semi-detached, town house, terrace, attached dual occupancy (each dwelling)	2.6 persons per dwelling
Flat, unit, apartment, secondary dwellings	1.8 persons per dwelling
Seniors living dwellings	1.5 persons per dwelling

4.3 Community and cultural facilities

4.3.1 What is the relationship between the expected types of development and the demand for additional public facilities?

The requirements for community and cultural facilities as a result of the expected development of the Precincts are documented in the Social Infrastructure Assessment.

The following is summary of the information and approach used to arrive at the community and cultural facilities requirements of the Precinct.

Existing provision

There ~~was are~~ very limited community and cultural facilities accessible to the current residents of the Precincts at the time of rezoning. They included two (2) schools and three (3) child care centres, three (3) places of worship and two (2) seniors living developments.

Other facilities are located further afield, including in the Camden LGA and surrounding suburbs of Liverpool LGA. District level facilities are located in the newer suburbs further east around Horningsea Park and further south in Camden LGA, and have been designed to meet the needs of incremental urban growth in those locations, rather than any growth envisaged in the Austral and Leppington North Precincts.

The limited extent of provision is consistent with the area's small population and semi-rural character [7].

Principles for sustainable community infrastructure

Principles for the provision of sustainable community facilities infrastructure described in the Social Infrastructure Assessment and that have guided the selection of infrastructure items included in this Plan include the following:

- Facilities should be provided in an efficient, timely and co-ordinated way to support the pattern of development; ensuring that services are available to residents as early as possible and they are not disadvantaged through delays in delivery.
- Efficient use of limited resources by designing facilities to be multipurpose, co-located with other facilities and able to accommodate shared and multiple use arrangements.
- Cluster related facilities and services to promote civic identity, safety and focal points for the community.
- Ensure that facilities, services and open space are accessible by public transport and located to maximise access for pedestrians and cyclists.
- Ensure flexibility in the design and use of facilities, so they can respond and adapt as needs change. Avoid arrangements for single uses or specific target groups that may quickly become outdated.
- Promote equitable access for all sections of the population, through the distribution, design and management (including cost) of facilities.
- Provide environmentally and economically sustainable buildings.
- Ensure viable levels of resourcing of facilities and services, both capital and recurrent funding.
- Promote innovation and creativity between agencies in services delivery and integration
- Develop sustainable ownership, governance, management and maintenance arrangements for facilities.

[7] Social Infrastructure Assessment, page 18

Community facilities demand assessment based on forecast demographics

The anticipated size and characteristics of the resident population in the Precincts is discussed in Part 3 of this Plan.

Various standards of provision for local and district community facilities have been adopted by the Department of Planning and Infrastructure (now ~~Department of Planning, Industry and Environment~~DPIE), Camden Council and Liverpool City Council. The standards have been used as a basis for determining facility needs in the Austral and Leppington North Precincts as a whole.

A summary of these standards is included in Table 4.5.

Table 4.5 Comparison of community facility provision standards

Facility type	Former Department of Planning & Infrastructure & Growth Centres Commission standard	Camden Council standard	Liverpool City Council standard
Libraries - Branch - District	1 branch facility for each 33,000 persons 1 district facility for each 40,000 persons	39 square metres per 1,000 persons + 20% circulation space	42 square metres per 1,000 persons
Multi-purpose community centre in smaller activity centre	1 centre for each 6,000 persons Each centre with a size of 2,000-2,500 square metres	42 square metres per 1,000 persons 2.5 x floor area for land component	Indicative 1 centre for each 10,000 people, with an average size of 600 square metres for each centre To be located in activity centres with shops, schools etc. Facilities are to provide flexible multipurpose spaces and spaces for outreach services. Smaller 600m² facilities contribute to the overall level of provision of 60-85m² per 1,000 people
Multipurpose community centres in larger activity centre	1 centre for each 20,000 persons 1 community service centre for each 60,000 persons	22 square metres per 1,000 persons 2.5 x floor area for land component	Indicative 1 centre for each 60,000 persons, with a built area of about 1,500 square metres To be located in larger activity centres and commercial and transport hubs to provide flexible multipurpose spaces and provide a base for organisations and the delivery of services Larger 1,500m² facilities contribute to the overall level of provision of 60-85m² per 1,000 people
Youth Centre	1 centre for each 20,000 persons	89 square metres per 1,000 persons + outdoor space	No longer provided by Council as a stand-alone purpose-built facility. The size and layout of multipurpose community facilities now provide appropriate and designated spaces for delivering youth services, programs and activities. Outdoor spaces, like half-court basketball courts and skate parks, are now provided as standard for informal activities and programs for young people.

Sources: Social Infrastructure Assessment Table 8.1

Community and cultural facility requirements

This Plan proposes to provide primarily for a residential population in a suburban setting. Regional level facilities are proposed to be provided in the Leppington Major Centre in Camden LGA. The community and cultural facilities proposed in the Precincts have either a local or district service catchment. This Plan nevertheless proposes that development contribute towards regional facilities that are located in Liverpool LGA, by providing its reasonable share towards the Regional Aquatic Centre including associated public art.

One of the four (4) proposed multi-purpose community centres has been scaled-up to service a district scale population of approximately 40,000 residents, which approximates the catchment of the Precincts. The other three (3) centres will provide for a neighbourhood catchment of approximately 10,000 residents each. The cost of these four facilities are shared equally across the entire Precincts incoming residential population.

Proposed community and cultural facility provision

Regional infrastructure required on the northern fringe of the Leppington Major Centre and provided in the Precincts, and serving a surrounding population of around 120,000, includes the Regional Indoor Sports and Aquatic Centre. This centre is to be located on a 5 hectare site, including a 3 hectare facility and outdoor elements and 2 hectares for parking and landscaping. Building components include the following:

- Aquatic facilities include an indoor 50 metre x 10 lane Olympic pool, training pool, 25 metre leisure pool, heated teaching pool; children's play pool / wave pool / whirl pool / water slides, diving pool.
- Indoor Sports to include 4 indoor sports courts each large enough for netball
- Fitness centre incorporating weights, aerobics/Dance/Yoga/Pilates activity room with wooden floor, spin cycle room,
- Wellness / health services – physiotherapy, nutrition etc.
- Spa, sauna, steam room
- Retractable seating for 1,500 this would increase to 3,500 in stage 2.
- General amenity, kiosk and café, equipment sales, change, lockers, toilets, crèche facilities for users
- Outdoor elements - may include water play park, BMX, skate, sports oval and netball, tennis, basketball courts. May be integrated with a youth recreation facility.

Local and district level infrastructure includes the following:

- A multi-purpose community centre in Austral of 1,500 square metres floor area, including a variety of flexible multi-purpose spaces suited to a range of community activities and programs. Also, the building is proposed to include office and service delivery areas for human services and spaces suitable for young people and older people.
- Three (3) multi-purpose community centres in other neighbourhood centres in the Precincts, each with an approximate building area of 750 square metres.

This Plan includes provision for the land and works associated with the multi-purpose facilities and capital works for the Regional Sports and Aquatic Centre, but acknowledges that only the land component for the community facilities is considered 'essential works'.

With respect to the Regional Sports and Aquatic Centre, the demand would be spread over a large catchment (120,000 residents). However, the centre is likely to be located on land majority owned by Council (including WV Scott Memorial Park) such that shared cost apportionment is not required under this Plan. ~~Therefore, any inclusion of the cost of the land or works in this Plan, would need to be commensurate with the Precincts' level of demand for the regional facilities, i.e.:~~

~~49,686 persons / 120,000 persons = 41.4%, or an apportionment factor of 0.42.~~

~~Once the location of the Centre is determined, Council can amend the Plan to include only the apportioned share of the cost of this land in the Plan.~~

Council will seek funding from other sources to meet the balance of the cost of the capital works for the facility (as non-essential works).

Location and staging matters

Facilities should generally be co-located with or adjacent to open space in activity centres. There are multiple ways to arrange the spaces and further planning should concentrate on combination and co-location options.

A number of sites have been identified in the ILP for these purposes but there is a significant amount of planning and acquisition of land required even before preliminary designs can be prepared.

The design of facilities will depend upon a variety of factors, including the availability of funds, the aspirations of the responsible council, and evolving best practice. Detailed needs and feasibility assessments need to be undertaken as the population of the area grows.

Existing higher order facilities in the surrounding region (including those in both the Liverpool and Camden LGAs) offer some opportunity to meet interim needs either in their current form or through expansion (for example, the Casula Powerhouse).

The general principle will be that the local and district community facilities will not be built until the surrounding population that each services has reached a threshold of 5,000 residents for the local centres and 30,000 for the larger district centre. Should the demand for two facilities require the facility to be constructed within a similar time-frame, Council must necessarily prioritise these so to manage the delivery as efficiently as possible within the constraints of funding and resources.

4.3.2 How are the contributions calculated?

Contributions will be collected from residential development toward community and cultural facilities identified under this Plan.

Monetary contributions are calculated on a per person or per resident basis, then factored up to a per lot or per dwelling amount.

The monetary contribution per person in a development containing residential dwellings or lots (whether or not that development also comprises non-residential floor space) is calculated as follows:

$$\text{Contribution per resident (\$)} = \sum \frac{(\$INF)}{P}$$

Where:

$INF = the estimated $ cost - or if the facility is existing, the indexed, completed cost - of providing each of the community and cultural facilities (refer Part 5 – Works Schedule)[8]

P = the estimated resident population (in persons) that will demand each facility - that is, the expected net additional population of the Precincts (refer Table 3.5)

The monetary contribution for different residential development types is determined by multiplying the contribution per person by the estimated increase in population as a result of the development and using the assumed occupancy rates included in clause 3.3.5 of this Plan.

For convenience, these rates are reproduced in Table 4.6.

[8] In the case of the regional facility, the cost is the cost fairly apportioned to the Precincts' expected population - that is, 41% of the total cost (see section on 'Community and cultural facility requirements' above).

Table 4.6 Assumed residential development occupancy rates

Development type	Occupancy rate
Subdivided lots	3.4 persons per lot
Detached dwelling, detached dual occupancy (each dwelling)	3.4 persons per dwelling
Semi-detached, town house, terrace, attached dual occupancy (each dwelling)	2.6 persons per dwelling
Flat, unit, apartment, secondary dwellings	1.8 persons per dwelling
Seniors living dwellings	1.5 persons per dwelling

4.4 Water cycle management facilities

4.4.1 What is the relationship between the expected types of development and the demand for additional public facilities?

Stormwater runoff in the Austral and Leppington North Precincts was proposed in precinct planning to be managed through a comprehensive Water Sensitive Urban Design (WSUD) approach.

Informed by a range of studies, the report *Austral and Leppington North Precincts Water Cycle Management WSUD Report* (the WSUD Strategy) prepared by Cardno Pty Ltd established the preliminary framework for the management of stormwater quantity and quality related to the expected urban development of the Precincts. This report was informed by other assessments and guiding standards, including:

- Cardno (2011), *Biodiversity Conservation Assessment*, Draft Final Report, prepared for the Department of Planning (now DPIE), January.
- Cardno (2011), *Riparian Corridor and Flooding Assessment*, Draft Final Report, prepared for the Department of Planning, February.
- GeoEnviro Consulting (2010), *Geotechnical, Salinity and Acid Sulfate Soil Investigation*, prepared for the Department of Planning, December.
- JBS Environmental (2010), *Preliminary Environmental Site Assessment*, Final report, prepared for the Department of Planning, December.
- Growth Centres Commission (2006), *Growth Centres Development Code*, November.

The main water management infrastructure was proposed to manage flooding within the project area and to minimise downstream impacts includes detention basins, trunk drainage pipes, overland flow paths/constructed channel systems, and culvert crossings. A series of bioretention systems and gross pollutant traps (GPTs) were also proposed to manage stormwater quality within the project area.

The WSUD Strategy acknowledged that development of an area:

- generates demand for water supply;
- requires management of wastewater as well as stormwater; and
- increases the area of impermeable surfaces and so exacerbates potential flooding issues, impacts on the quality of stormwater and potentially affects riparian corridors.

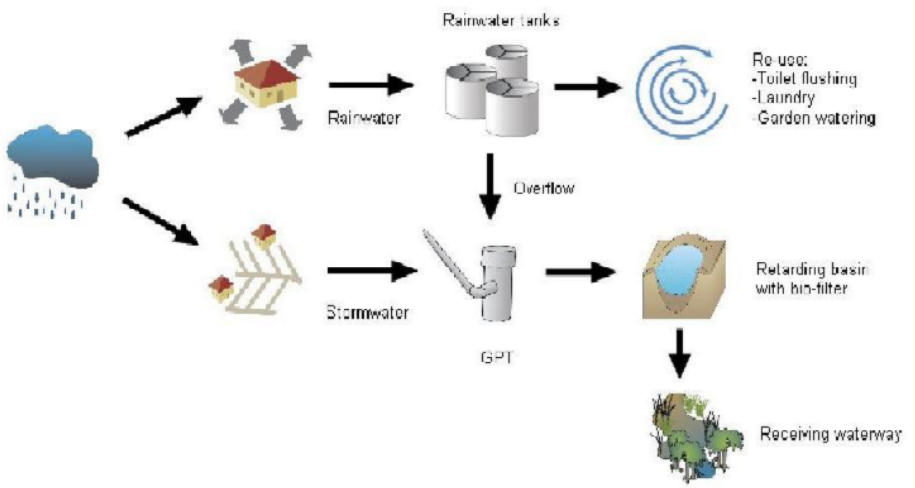
These water related issues are locality based and caused directly and solely by the development activity and so should be ameliorated by that same development activity.

To minimise the potential cost of the stormwater management scheme, the WSUD Strategy investigated the following:

- harvesting of rainwater for toilet, laundry and garden use in residential lots; and
- treatment measures to improve stormwater quality, promote infiltration and attenuate run-off to emulate a more natural rainfall/ runoff regime.

Figure 4.1 (over page) is a schematic describing the approach recommended with the WSUD strategy.

The schematic illustrates that 'rainwater' works will be required in conjunction with development consents for individual dwellings, while other ('stormwater') works relate to the broader catchment and so will be funded through development contributions obtained under this Plan.



Source: Austral and Leppington North Precincts Water Cycle Management WSUD Report, page 17

Figure 4.1 Concept Stormwater Treatment Train

Refinements to the water cycle management strategy

SMEC Australia Pty Ltd (SMEC) was engaged by Council in 2018/19 to refine the water cycle management strategy and undertake investigation and detailed concept design of proposed flood mitigation, water quality control structures and other stormwater infrastructure within the Precincts. This resulted in certain changes to the originally proposed stormwater facilities as explained below.[9]

The concept design of the proposed stormwater management infrastructure was carried out by SMEC in two distinct phases.

The first phase involved a data review, preliminary ecological and environmental assessment, hydrologic and hydraulic modelling and the optimisation of the detention basin layout.

The second phase involved the preliminary concept design and the final detailed concept design of the water management facilities, as well as flood mapping, dam break assessment, additional topographic survey, investigation of utility conflicts, geotechnical assessment and the preparation of a more detailed Review of Environmental Factors (REF).

The basin optimisation and the concept design were carried out in accordance with the Australian Rainfall and Runoff (ARR2016) procedures. The basin optimisation study resulted in a reduced number of detention basins from the earlier WSUD Strategy, and some basins only being designed to control the 50% AEP flows. Another two basins were subsequently removed based on the results of further modelling during the concept design.

As a result of SMEC's findings, the Plan includes:

- eight detention basins designed to control the 50% and 1% AEP flows, and
- eleven basins designed to control only the 50% AEP flow.

[9] SMEC Australia (2019), Detailed Concept Design Report - Austral and Leppington North Design of Water Management Infrastructure, prepared for Liverpool City Council, March (SMEC Concept Design Report).

The remaining flood mitigation infrastructure such as trunk drainage pipes, channels, and culverts are designed to convey flows up to the 1% AEP event.

Adopting a systems-based approach to infrastructure design

SMEC adopted a systems-based or integrated approach for the design of the water management infrastructure. There are 62 drainage systems and these were grouped into three categories as follows:

- Drainage systems with 1% AEP basins
- Drainage systems with 50% AEP basins
- Drainage systems without basins.

A typical drainage system with a basin includes trunk drainage pipes and channels, a detention basin and water quality controls such as GPT/sedimentation pond, biofilters and raingardens. The need for culverts along the major creeks and creek enhancement works have also been identified (see the sections below).

Only eight of the non-basin drainage systems include trunk infrastructure works (either pipe or channel). Streetscape raingardens will be implemented throughout these drainage systems to manage stormwater quality. The drainage and water quality control systems and general locations of proposed trunk infrastructure and streetscape raingardens, are shown in Figures 4.2, 4.3, 4.4 and 4.5 on the following pages.

Supplementary streetscape raingardens

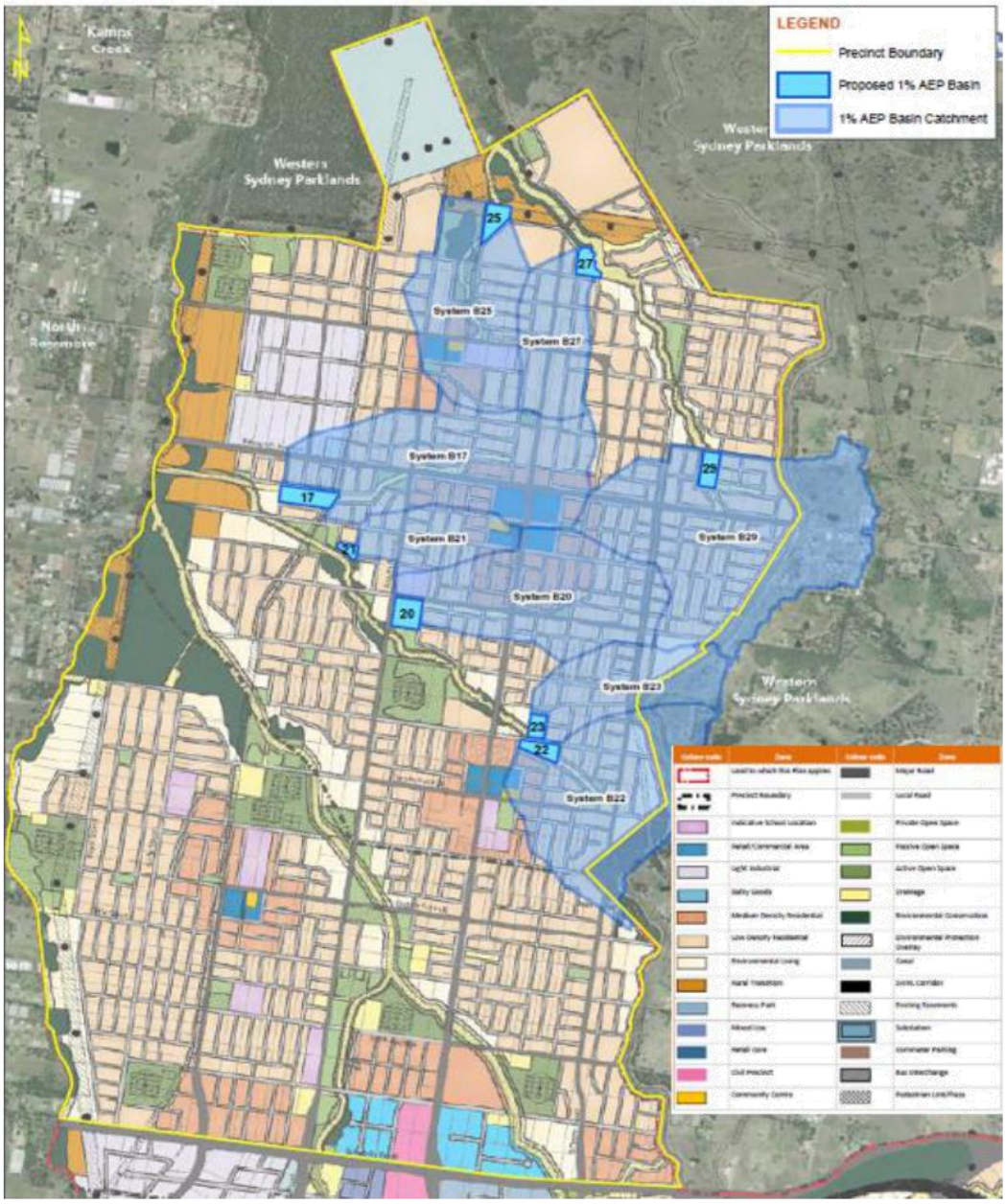
The earlier WSUD Strategy recommended an end-of-pipe approach to managing stormwater quality, by either co-locating bioretention and detention basins or providing stand-alone end-of-pipe biofilters. Although a treatment train approach was advocated, most of the water quality improvement was to be achieved by the end-of-pipe bioretention basins. However, it is not possible to operate a biofilter in some basins due to hydraulic constraints.

Additionally, due to the limited footprint area, the majority of the co-located biofilters were undersized relative to their catchments. Therefore, supplementary streetscape controls (i.e. raingardens) are proposed to meet the water quality treatment targets and replace the stand-alone end-of-pipe biofilters.

For drainage systems with biofilters co-located within detention basins, the required supplementary streetscape raingarden area is defined as a percentage of the total catchment. For drainage systems without co-located biofilters, a minimum raingarden area is defined as a percentage of the development area, based on land use.

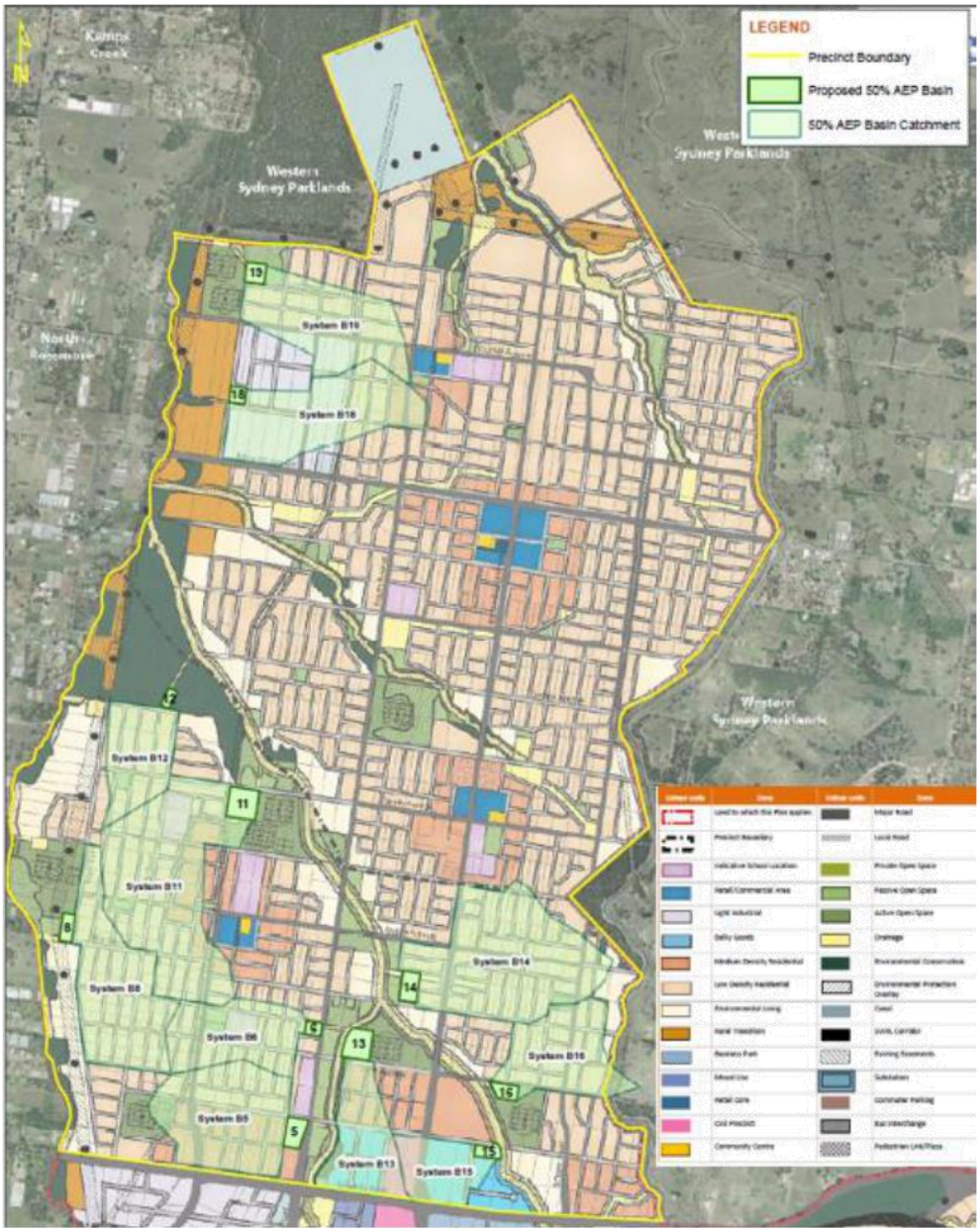
SMEC developed a water quality control strategy as shown in Figure 4.5. Its subsequent report (*Final Design Report – Development of Streetscape Raingarden Master Plan for Austral and Leppington North*, February 2021) provided the design procedures and considerations adopted for the development of the Precincts' streetscape raingarden master plan.

Consistent with this master plan, the Plan includes streetscape raingarden works at 181 intersections, 383 T-junctions and 29 road bends.



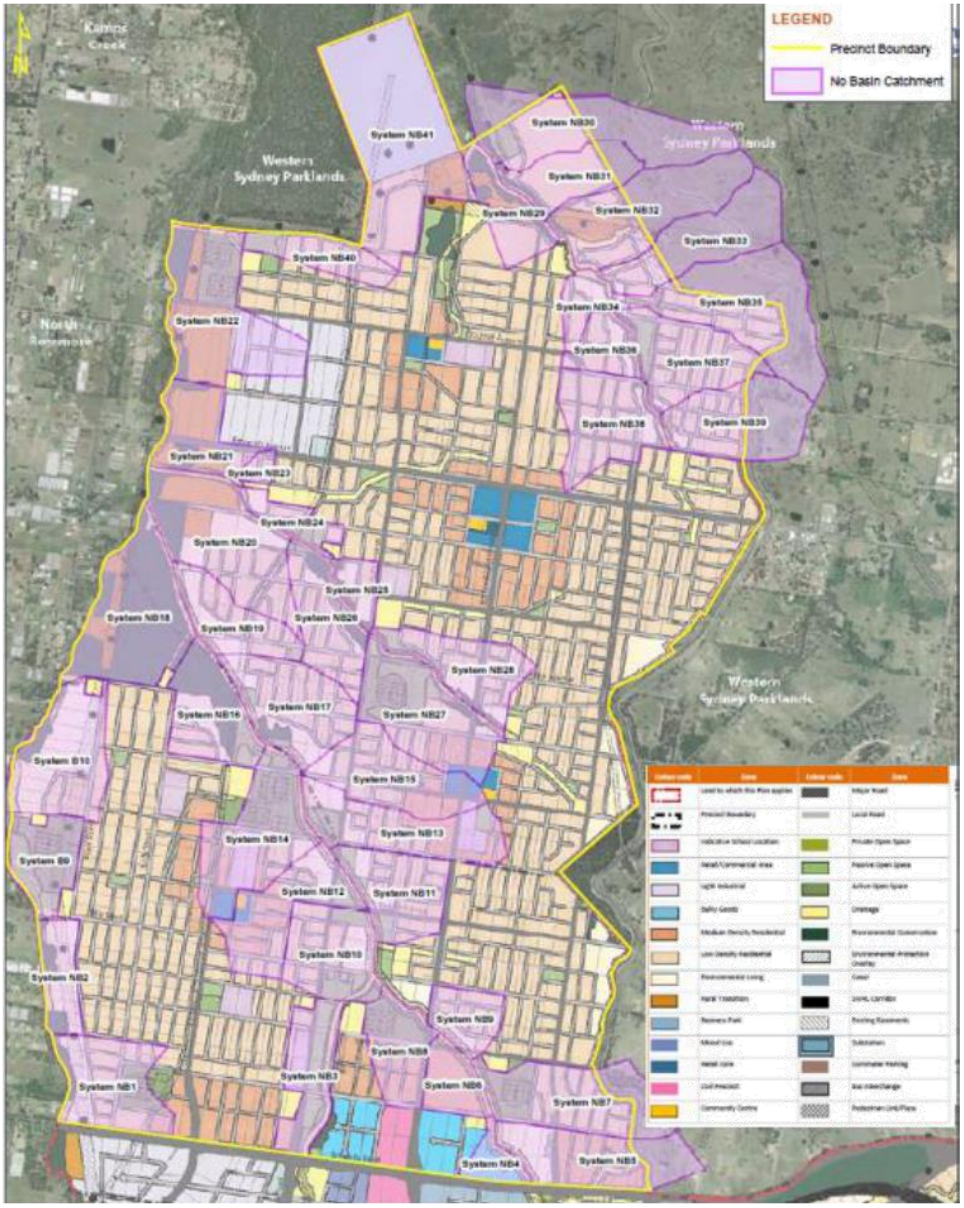
Source: SMEC Concept Design Report, page 58.

Figure 4.2 Drainage catchments with 1% AEP basins



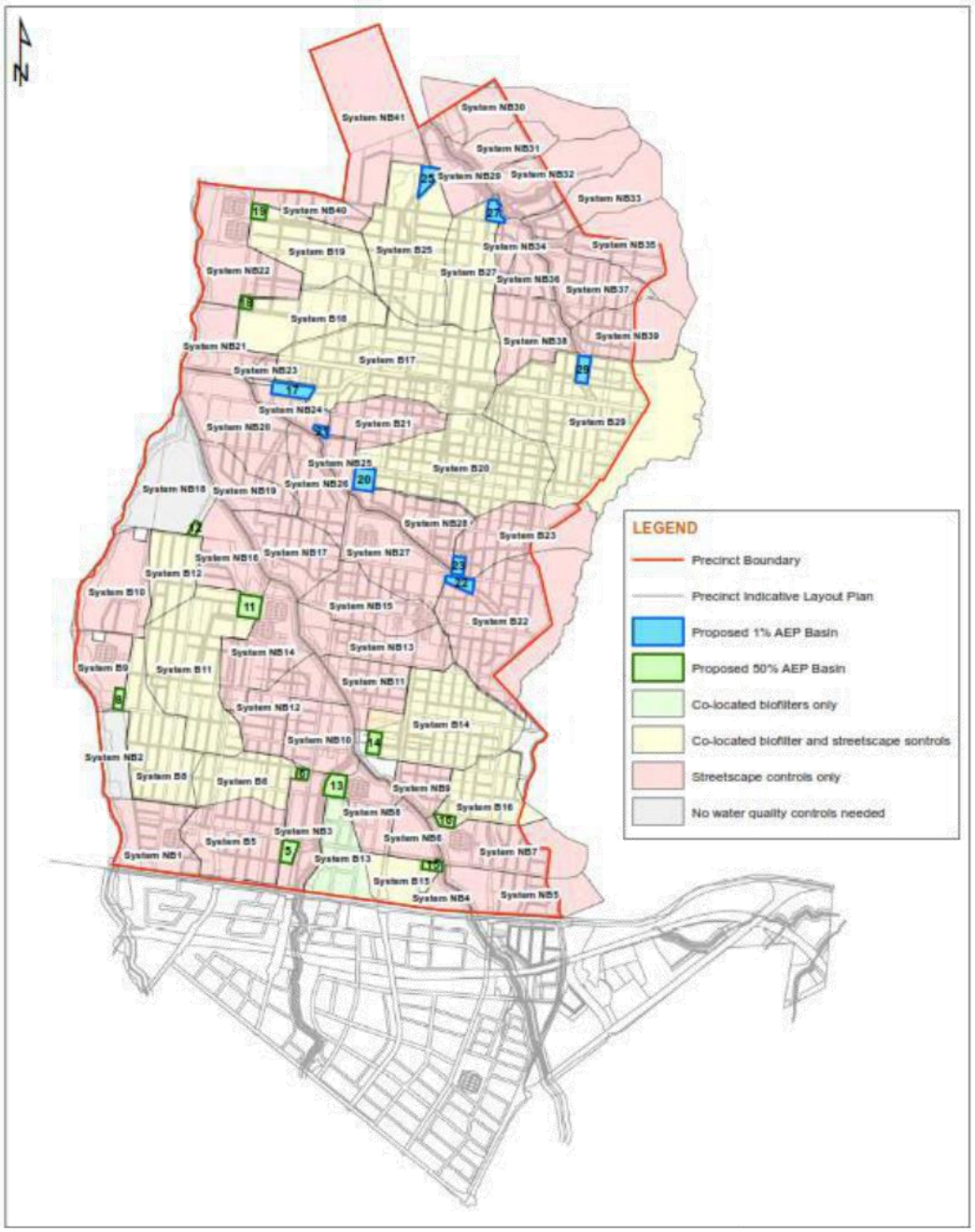
Source: SMEC Concept Design Report, page 98.

Figure 4.3 Drainage catchments with 50% AEP basins



Source: SMEC Concept Design Report, page 151.

Figure 4.4 Drainage systems without basins



Source: SMEC, *Final Design Report – Development of Streetscape Raingarden Master Plan for Austral and Leppington North*, prepared for Liverpool City Council, 10 February 2021, page 5.

Note: the actual locations of streetscape raingardens are to be in accordance with the Streetscape Raingarden Master Plan Map in Appendix B of SMEC's Streetscape Raingarden Master Plan.

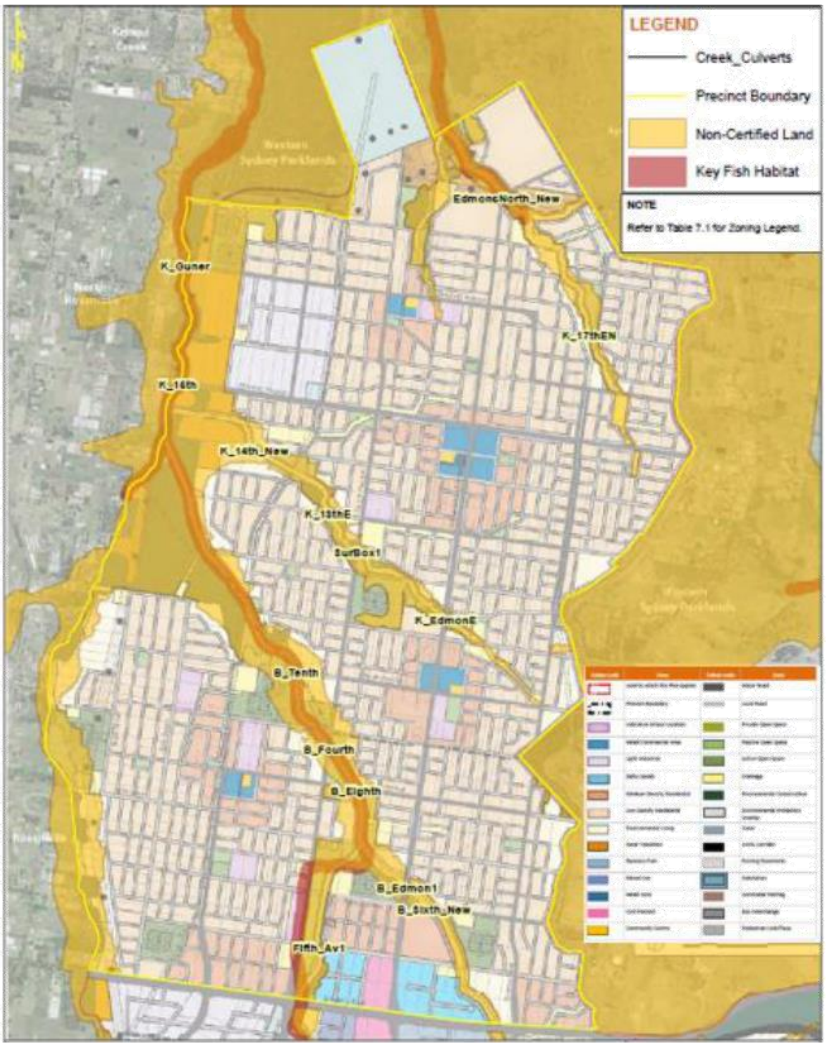
Figure 4.5 Water quality control strategy

Creek enhancement works

In addition to the design of the drainage and water quality infrastructure, creek enhancement works (i.e. filling of flood fringe areas up to the post development 1% AEP flood level), were proposed to maximise development potential. SMEC's modelling results indicated that the 1% AEP flood levels were increased in some locations because of the filling, but the increases were not significant. Therefore, for future development the post development 1% AEP flood levels (with filling) should be adopted as the flood planning level.

Creek culverts

This Plan also includes 8 12 creek culverts based on SMEC's recommendations to remove 14 existing culverts, redesign nine existing culverts and add three new culverts compared with the earlier WSUD Strategy. The 12 creek culvert locations are shown in Figure 4.6.



Source: SMEC Concept Design Report, page 179.

Figure 4.6 Creek culverts

SMEC Australia provided Council with updated cost estimates for each of the stormwater infrastructure facilities[10] and Council has adopted these estimates with some revisions, mainly to reflect a lower allowance for contaminated soil disposal but also to ensure consistency of costing assumptions and that culverts are not double counted with the road costings. A contingency is still retained in the cost estimates to account for the major risks in delivering the infrastructure which were identified by SMEC. These risks include the possible variations to the finished design surface levels, conflicts with other utility infrastructure, the need to dispose of contaminated soil offsite and soft soil conditions [11] .

More detail on all of the drainage systems and infrastructure items and their costs (for which contributions are collected under this Plan) are included in the maps and schedules included in Part 5. Council will encourage the provision of water cycle management facilities as Works In Kind in conjunction with the civil works undertaken as part of land subdivision.

A range of 'non-trunk' reticulation works not addressed by this Plan will also be required to be undertaken directly by the developer as conditions of consent under section 4.17(1)(f) of the EP&A Act. The facilities may include lot-scale on-site detention (OSD) basins, rainwater tanks, construction of kerb, gutter and piping in local roads, installation of drainage pits and grates, and pipe connections to the trunk drainage network.

4.4.2 How are the contributions calculated?

Contributions are determined on a Net Developable Area basis.

The monetary contribution per hectare is calculated as follows:

$$\text{Contribution per hectare of equivalent net developable land (\$)} = \sum \frac{(\$INF)}{NDA}$$

Where:

$INF = the estimated cost, or if the facility has been completed, the indexed actual cost, of providing each of the water cycle management infrastructure items in the area to which this Plan applies (refer Part 5 – Works Schedule)

NDA = the total area of equivalent net developable land (in hectares) that will generate demand for facilities – refer to Table 3.3 of this Plan

To determine the total contribution that would apply to a proposed development, multiply the contribution rate by the amount of net developable land (in hectares) on the site the subject of the proposed development.

[10] SMEC Concept Design Report, pp 210-211 and SMEC, *Final Design Report – Development of Streetscape Raingarden Master Plan for Austral and Leppington North*, prepared for Liverpool City Council, 10 February 2021, Appendix D.
[11] SMEC Concept Design Report, pp x-xi.

4.5 Transport management facilities

4.5.1 What is the relationship between the expected types of development and the demand for additional public facilities?

Occupants of expected development in the Precincts will utilise a transport network comprising:

- facilities for private vehicles, including roads and intersections;
- facilities for public transport, including rail and bus facilities focused on the planned Leppington railway station; and
- facilities for walking and cycling.

The existing transport network, including the network for pedestrians and cyclists, has been planned to serve existing and approved developments (that is, predominantly rural residential developments) in the area, and not the future development envisaged for the area.

The ILP for the Austral and Leppington North Precincts and the *Austral and Leppington North (ALN) Precincts Transport Assessment* prepared by AECOM (the 'Transport Assessment') together identify a range of transport infrastructure works that will be required to mitigate the impacts and otherwise accommodate the expected development.

Details of:

- the assumptions of expected land use and development;
- the methodology used to determine the need for transport facilities attributable to the expected development in the Austral and Leppington North Precincts; and
- the scope and specification of those facilities,

are contained in the Transport Assessment.

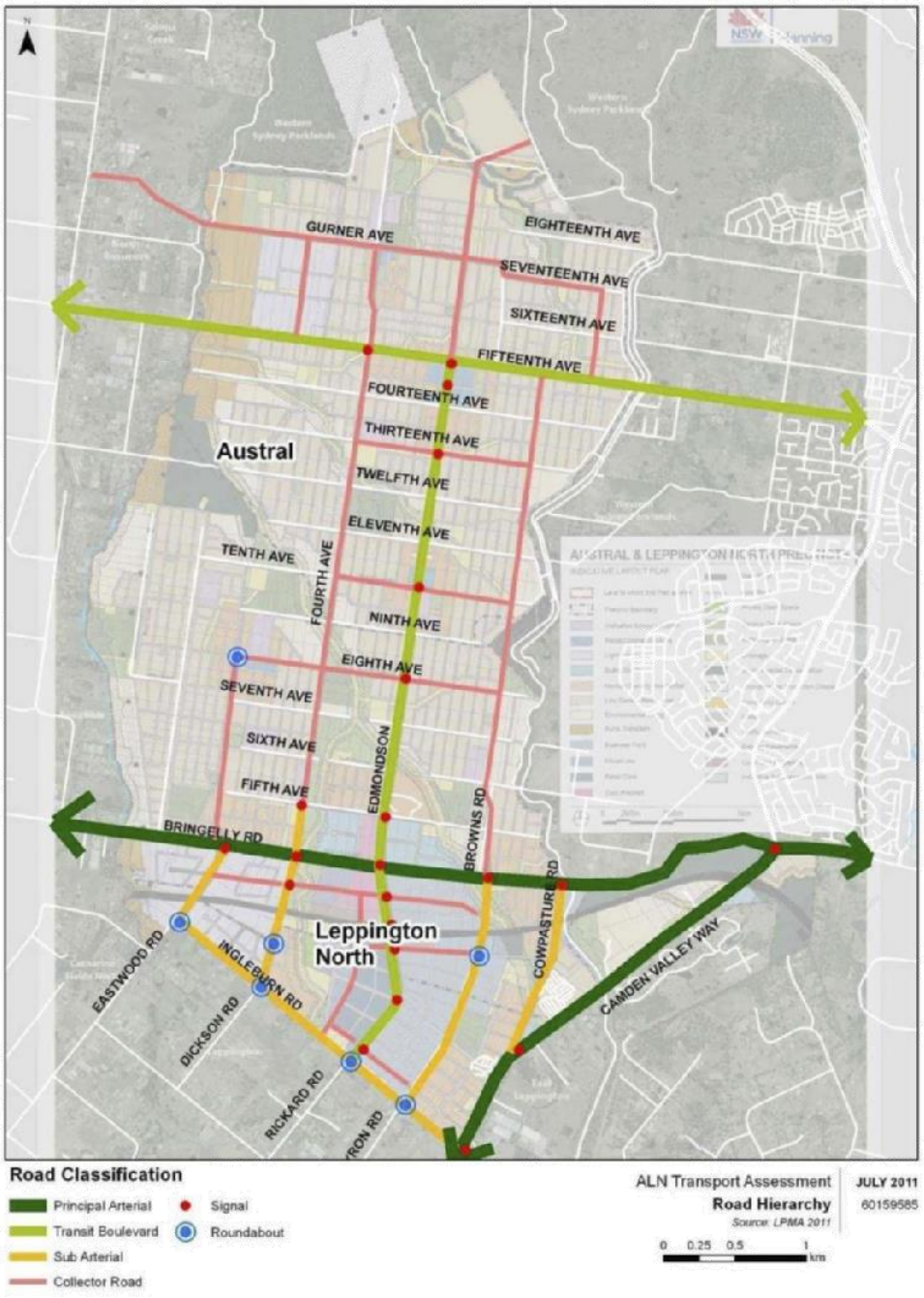
The following is a summary of the approach utilised in the Transport Assessment for planning for the transport needs in the Precincts.

Proposed road and intersection hierarchy

The proposed road network complements a broader hierarchy envisaged for the South West Growth Area.

The proposed hierarchy comprises 'principal arterial', 'transit boulevard', 'sub arterial' and 'collector' roads. These will connect to a network of existing and new roads in adjoining Growth Area Precincts. Following finalisation of the ILP a road safety assessment of the proposed street network was undertaken by Council. As a result additional roundabouts were found necessary and are included in the contributions plan.

The proposed road hierarchy and intersection treatments for the future development of the Austral and Leppington North Precincts are shown in Figure 4.7.



Source: Transport Assessment, Figure 13

Figure 4.7 **Proposed road hierarchy and intersection treatments – Austral and Leppington North Precincts**

Proposed walking and cycling facilities

Providing viable alternatives to the private car for journeys with destinations both within and outside the development area is viewed as essential to encouraging sustainable development. A comprehensive bicycle network is proposed for both the Austral and Leppington North Precincts, which will link the centres, schools, transport nodes and various residential neighbourhoods with key strategic routes and onward destinations.

The proposed network will include a mixture of dedicated bicycle facilities that will take the form of:

- Off-Road (Shared Path);
- On-Road (Cycle Lane); and
- On-Road (Signed Route).

All proposed roads throughout the Austral and Leppington North Precincts will have dedicated pedestrian footpaths. Footpaths will be provided in conjunction with the adjacent road project with an increased width of footway allowed for – i.e. 1.2 to 2.5m.

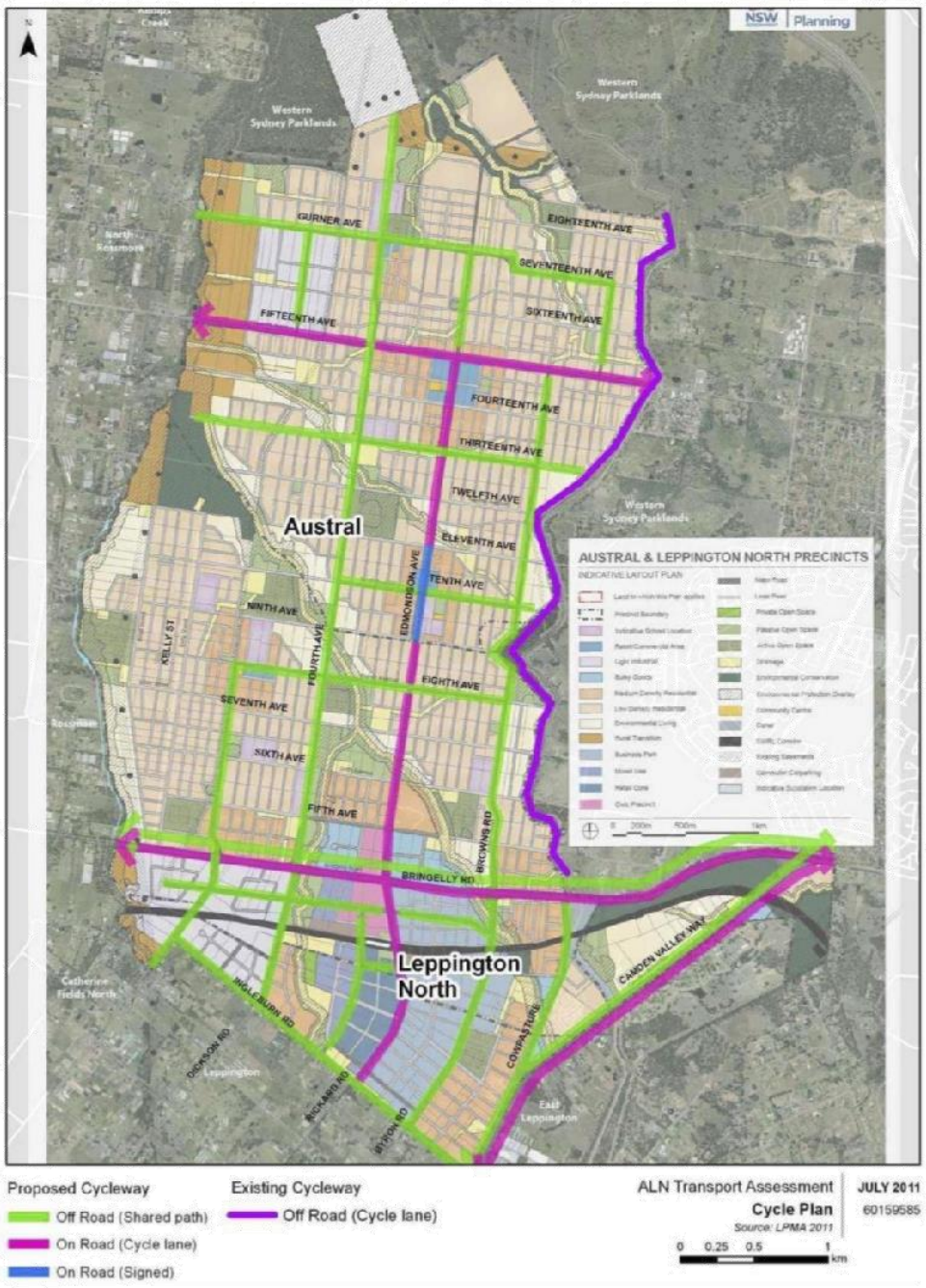
Leppington North Precinct will be a focus for walking and cycling trips because of the location of the Leppington Major Centre but there is proposed to be a similar level of provision in the Austral Precinct. In addition, an off-road cycleway is proposed to be provided along the edge of the Western Sydney Parklands. This facility to be funded from sources apart from development contributions.

Figure 4.8 over page shows the proposed walking and cycle network for Leppington North Precinct.

Public transport facilities

The Austral and Leppington North Precincts are proposed to benefit from good public transport accessibility through the South West Rail Line and a comprehensive proposed bus network and bus servicing strategy linking key centres, transport nodes, schools, employment opportunities and residential areas.

The only public transport work addressed by this Plan is the proposed provision of bus shelters to serve bus routes throughout the Precincts. All other public transport works, apart from the roads and intersections that will cater for buses and other general traffic and bus shelters, are not addressed by this Plan and will be delivered using funding and delivery mechanisms apart from development contributions.



Source: Transport Assessment, Figure 25

Figure 4.8 Proposed walkways and cycleways

Funding and delivery dependent on road hierarchy

Some of the required transport works are to meet a regional demand that extends beyond the Precincts boundary to the remainder of the South West Growth Area.

The State Government has identified a number of works in the Precincts that are intended to be provided through the State budget or through Special Infrastructure Contributions under the EP&A Act (refer to *Environmental Planning and Assessment (Special Infrastructure Contribution - Western Sydney Growth Areas) Determination 2011*). The works include arterial road and public transport links as well as rail and bus passenger transport facilities (such as interchanges and bus shelters on roads to be funded via Special Infrastructure Contributions).

Figure 4.9 over page shows the major road infrastructure planned to be provided across both the Austral and Leppington North Precincts, including delineation of those roads that are intended to be funded via Special Infrastructure Contributions.

Special Infrastructure Contributions will be imposed via conditions of consent on developments in the Precinct. More details on the applicability of Special Infrastructure Contributions can be found by accessing the ~~Department of Planning, Industry and~~ DPIE's ~~Environment's~~ website.

Planned higher order roads for the Precinct not covered by State Government funding are to be provided by councils. They are usually funded through land or monetary development contributions but are often constructed as Works In Kind by the developer (that is, works carried out instead of, or as payment towards, a development contribution). Such roads can be constructed by the developer through a Works In Kind agreement at the time of subdivision and dedicated to the local council as public roads once constructed.

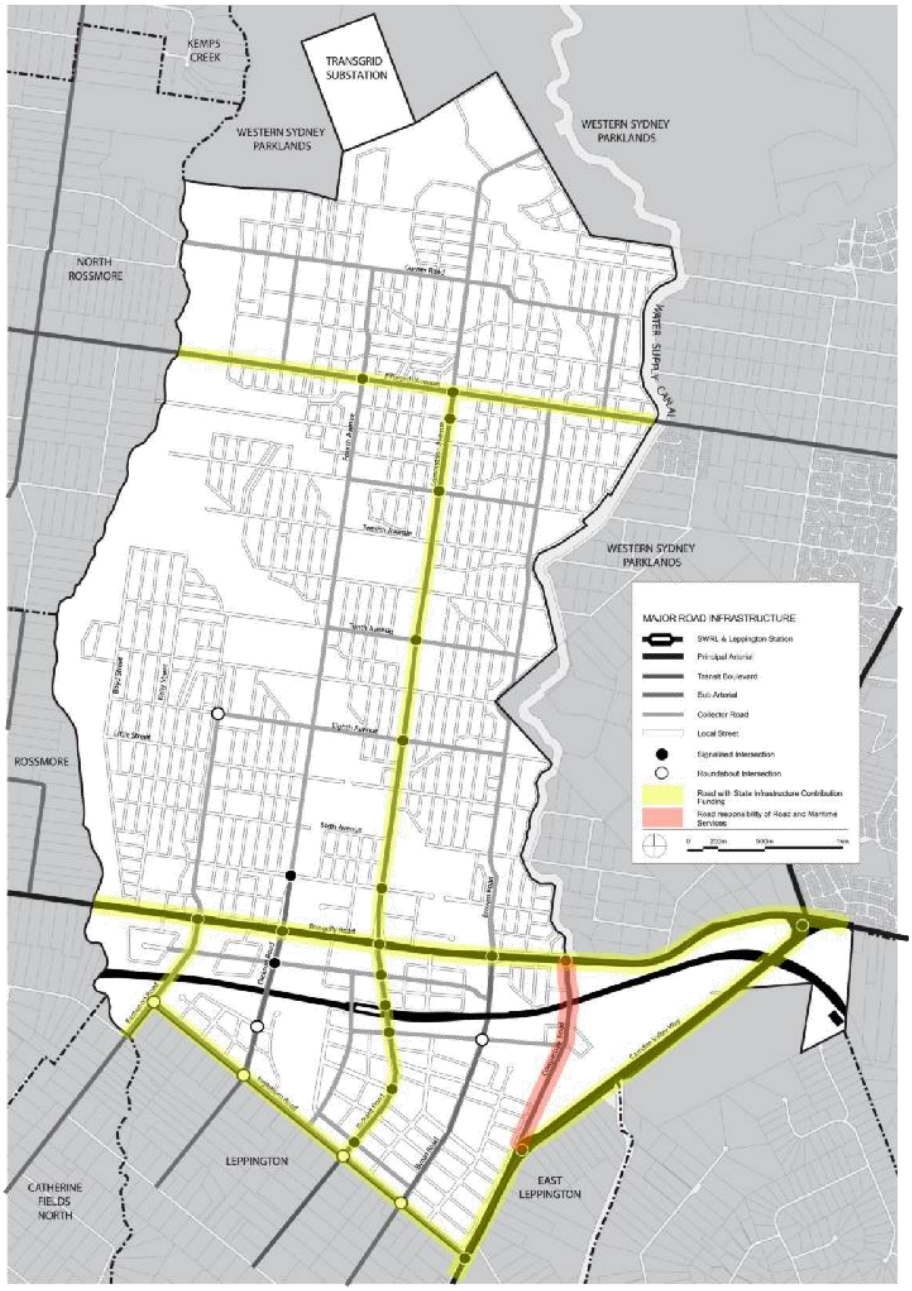
Collector roads may be delivered by a combination of development contributions and direct provision by developers as a condition of development consent. Usually, where private development lots front onto a collector road then that road is usually provided by the developer as part of the subdivision works. On existing streets, half frontages to open space and drainage will be funded by contributions.

New local roads are also usually provided by developers as, in most cases, they have private lots fronting onto them and are needed for the development to function safely. In this Plan there are a number of works defined as 'new road half-width' and 'upgrade road half-width'. These works relate to circumstances where the 'half-road' does not adjoin private land and is therefore not able to be provided by that development. Roads in front of public parks fall into this category.

Roads that do not or will not have development fronting them - such as bridges and crossings of open space - are often funded through development contributions. In some cases, development will front a road that is half on the adjoining property and in turn fronts open space. In this situation it would be difficult to construct the road without contributions.

For public schools only two frontages are expected to be funded by the school. In some cases frontages to a school site on an existing street will be funded by contributions.

The selection of some facilities for inclusion in this Plan has also been based on the land ownership arrangement given that there may be difficulty in developers providing key transport links through parts of the Precincts where the ownership is fragmented. The integrated use of the different implementation mechanisms cited above will result in the transport infrastructure that is required as a consequence of the expected development in the Precincts being provided.



Source: Department of Planning and Infrastructure (now DPIE)

Figure 4.9 Planned major road infrastructure - Austral and Leppington North Precincts

Infrastructure works identified in this Plan

Works the subject of a development contribution condition that are addressed under this Plan include the following and a detailed list is included in the Works Schedules in Part 5 of this Plan:

- Approximately 12.5 ~~15~~ kilometres of new roads or road upgrades for full or half road widths as required;
- 11 ~~9~~ pedestrian crossings (plus road sections over creek culverts and crossings otherwise in drainage costs)
- Fifty (50) pedestrian refuge crossings or thresholds;
- 10 intersections (9 new roundabouts and one new signalized intersection); and
- Forty-two (42) bus shelters.

4.5.2 How are the contributions calculated?

The determination of reasonable contribution rates for transport facilities in development contributions plans is often based on the number of vehicle trips generated by development. Apportionment to the different classes of development (that is, residential, commercial, employment, etc.) of the costs of facilities that are determined on a per trip basis is then derived by calculating the degree to which the traffic generated by each land use class will use the different road links and intersections included in the contributions plan.

However, at the time of preparing this Plan, there has been limited knowledge of likely trip origins and destinations by different development classes available to inform this method of apportionment.

This Plan instead determines contributions for traffic and transport facilities by first splitting the costs between residential and non-residential development based on the relative net developable areas of each class of development. It then levies residential development its share of the costs on a per person basis and non-residential development its share of costs on a net developable land basis.

The per resident approach for residential development is considered to best reflect the demand for traffic and transport facilities by the additional population. The net developable land area approach for determining contributions for non-residential development is considered reasonable because the land use mix and employment numbers attributable to the different non-residential land uses expected in the Precinct have been assessed only at a strategic network level at the time of preparing this Plan.

Formula for Residential Development

Contributions will be collected from residential development toward road and transport facilities identified under this Plan.

Monetary contributions are calculated on a per person or per resident basis, then factored up to a per lot or per dwelling amount.

The monetary contribution per person in a development containing residential dwellings or lots (whether or not that development also comprises non-residential floor space) is calculated as follows:

$$\text{Contribution per resident (\$)} = \sum \frac{(\$INF)}{P}$$

Where:

$INF = apportioned share to residential development (93.06%) of the estimated $ cost - or if the facility is existing, the indexed, completed cost - of providing each of the road and transport facilities (refer Part 5 – Works Schedule).

P = the estimated resident population (in persons) that will demand each facility - that is, the expected net additional population of the Precincts (refer Table 3.5)

The monetary contribution for different residential development types is determined by multiplying the contribution per person by the estimated increase in population as a result of the development and using the assumed occupancy rates included in clause 3.3.5 of this Plan.

For convenience, these rates are reproduced in Table 4.7.

Table 4.7 Assumed residential development occupancy rates

Development type	Occupancy rate
Subdivided lots	3.4 persons per lot
Detached dwelling, detached dual occupancy (each dwelling)	3.4 persons per dwelling
Semi-detached, town house, terrace, attached dual occupancy (each dwelling)	2.6 persons per dwelling
Flat, unit, apartment, secondary dwellings	1.8 persons per dwelling
Seniors living dwellings	1.5 persons per dwelling

Formula for Non-Residential Development

Contributions for non-residential development are determined on a Net Developable Area basis.

The monetary contribution per hectare is calculated as follows:

$$\text{Contribution per ha of equivalent net developable land (\$)} = \sum \frac{(\$INF)}{NDA}$$

Where:

$INF = the apportioned share to non-residential development (6.94%) of the estimated cost, or if the facility has been completed, the indexed actual cost, of providing each of the transport management infrastructure items in the area to which this Plan applies (refer Part 5 – Works Schedule).

NDA = the total area of equivalent net developable land (in hectares) that will generate demand for each facility by non-residential development – refer to Table 3.3 of this Plan.

To determine the total contribution that would apply to a proposed non-residential development, multiply the contribution rate by the amount of equivalent net developable land (in hectares) on the site the subject of the proposed development.

4.6 Plan management and administration

4.6.1 What is the relationship between the expected types of development and the demand for additional public facilities?

Councils incur significant costs in the preparation and administration of contributions plans.

Council staff are deployed to:

- prepare and review contributions plans;
- account for contributions receipts and expenditure; and
- co-ordinate the implementation of contributions plans and works, including involvement in negotiating Works in Kind and material public benefit agreements.

Consultant studies are also commissioned by Council from time to time in order to determine the value of land to be acquired, the design and cost of works, as well as to review the development and demand assumptions of the contributions plan. Council is also required to engage the services of legal professionals from time to time to assist it in the administration of this Plan.

As these costs arise directly as a result of the development in the Plan area, it is reasonable that the costs associated with preparing and administering this Plan be recouped through contributions from development.

Costs associated with the ongoing administration and management of the Plan will be levied on all applications that are required to pay a development contribution.

Costs included in this Plan for these purposes are determined are based on the recommended rate by IPART, being 1.5% of the cost of works.

4.6.2 Calculation of contributions

Contributions will be collected from development toward Plan preparation and administration activities.

The monetary contribution per hectare of net developable land is calculated as follows:

$$\text{Contribution per ha of equivalent net developable land (\$)} = \sum \frac{(\$INF)}{NDA}$$

Where:

$Admin = 1.5% of capital works costs in accordance with IPART's benchmark (refer Part 5 – Works Schedule)

NDA = the total area of equivalent net developable land (in hectares) of the area to which this Plan applies as shown in Table 3.3 of this Plan.

To determine the total contribution that would apply to a proposed development, multiply the contribution rate by the amount of equivalent net developable land (in hectares) on the site the subject of the proposed development.

5 Works Schedules and Map

Works Schedules

The schedules contained in this section are extracted from the following MS Excel spread sheet:

Liverpool S7.11 Schedules March 2021.xlsx

The spread sheet also contains details on the components of each facility, as well as the assumptions informing the calculation of costs included in this Part. Refer to the source spread sheet file for more information on works and land items included in this Plan.

Infrastructure Map

The infrastructure referred to in the contributions plan is shown on the Austral Leppington North Infrastructure Map, which is a separate document. This map can be viewed at a large scale and shows all the infrastructure items on the one map in relation to property boundaries and the proposed local streets under the ILP.

The map can also be viewed using council's online mapping service at www.eplanning.liverpool.nsw.gov.au.

5.1 Open space and recreation facilities

Land

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LALP	Local passive open space facilities	36.50537.5339	$98,662,549$104,198,103
LALS	Local sporting field facilities	26.36526.8682	$75,654,487$77,040,070
LADP	District passive open space facilities	34.69933.3807	$78,489,715$73,509,678
LADS	District sporting field facilities	9.069190691	$27,676,785$27,676,785
	Subtotal	106.6399106.8519	$280,483,536$282,424,636
	Land Acquisition Contingency		$33,658,024$33,890,956
	TOTAL ESSENTIAL OPEN SPACE INFRASTRUCTURE LAND ACQUISITION COSTS	106.6399106.8519	$314,141,561$316,315,593

Staging / Priority of infrastructure - when surrounding development proceeds.

LALP - Local Passive Open Space

Item	Area (ha)	Acquisition Cost
LP2	1.61461.6146	$6,288,602$6,288,602
LP4	0.46610.0972	$1,815,356$378,578
LP5	1.80311.8031	$2,104,541$2,104,541
LP6	0.50360.5036	$1,961,384$1,961,384
LP7	0.67570.8372	$3,328,196$4,123,716
LP8	2.31622.3162	$2,910,269$2,910,269
LP10	1.33201.3320	$1,327,910$1,327,910
LP11	1.43991.4399	$2,077,918$2,077,918
LP12	1.21731.2173	$1,341,376$1,341,376
LP13	0.95720.9572	$1,038,684$1,038,684
LP16	0.65320.6532	$2,361,725$2,361,725
LP17	0.67130.6713	$2,614,603$2,614,603
LP22	1.21391.2139	$5,909,926$5,909,926
LP25	0.90980.9098	$1,406,986$1,406,986
LP26	0.17080.1708	$264,139$264,139
LP27	0.43520.4352	$1,695,032$1,695,032
LP28	0.63370.6337	$700,034$700,034
LP29	1.35381.3538	$3,246,563$3,246,563
LP30	0.43330.4333	$578,853$578,853
LP31	0.55200.5520	$704,822$704,822
LP32	2.15752.1575	$3,314,017$3,314,017
LP33	0.50720.5072	$883,458$883,458
LP34	0.33540.3354	$938,776$938,776
LP35	0.88130.8813	$3,453,239$3,453,239
LP39	0.59640.5964	$2,322,767$2,322,767
LP40	0.58790.5879	$2,896,073$2,896,073
LP44	0.49850.5196	$1,674,377$1,682,819
LP45	2.16572.1657	$8,013,006$8,013,006
LP46	0.24260.2426	$251,240$251,240
LP49	0.56790.5679	$1,177,967$1,177,967

Item	Area (ha)	Acquisition Cost
LP50	0.4252~~0.4252~~	$265,700~~$265,700~~
LP51	0.3487~~0.3487~~	$870,182~~$870,182~~
LP52	0.1733~~0.1733~~	$425,862~~$425,862~~
LP53	0.3139~~0.3139~~	$1,546,340~~$1,546,340~~
LP55	0.5859~~0.5859~~	$2,886,151~~$2,886,151~~
LP56	0.3316~~0.3316~~	$1,405,380~~$1,405,380~~
LP57	0.1351~~0.1351~~	$58,446~~$58,446~~
LP58	0.1913~~0.1913~~	$744,890~~$744,890~~
LP59	0.2575~~0.2575~~	$1,003,026~~$1,003,026~~
LP60	0.3275~~0.3275~~	$1,275,588~~$1,275,588~~
LP61	0.2725~~0.2725~~	$1,061,201~~$1,061,201~~
LP62	1.2146~~2.4292~~	$4,730,628~~$10,898,997~~
LP63	0.0325~~0.0325~~	$126,753~~$126,753~~
LP64	2.3271~~2.3271~~	$9,063,651~~$9,063,651~~
LP65	0.2558~~0.2558~~	$996,262~~$996,262~~
LP66	1.4202~~1.4202~~	$3,600,650~~$3,600,650~~

LADP - District Passive Open Space

Item	Area (ha)	Acquisition Cost
DP2	3.6531~~3.6531~~	$4,016,423~~$4,016,423~~
DP3	3.9971~~3.9971~~	$10,184,600~~$10,184,600~~
DP4	2.2378~~2.2378~~	$3,587,716~~$3,587,716~~
DP5	2.0380~~2.2284~~	$3,359,464~~$3,435,801~~
DP6	6.1467~~6.1467~~	$18,241,572~~$18,241,572~~
DP7	0.3658~~0.3658~~	$246,555~~$246,555~~
DP8	0.5594~~0.5594~~	$2,178,771~~$2,178,771~~
DP9	0.3295~~0.3295~~	$1,283,348~~$1,283,348~~
DP10	10.433010.4438	$20,729,299~~$20,257,963~~
DP11	4.1797~~2.6598~~	$12,608,618~~$8,023,580~~
DP12	0.7593~~0.7593~~	$2,053,349~~$2,053,349~~

LALS - Local Sporting Fields

Item	Area (ha)	Acquisition Cost
LS1	5.7054~~5.7696~~	$23,692,025~~$23,958,676~~
LS4	6.0676~~6.1658~~	$17,899,504~~$18,189,281~~
LS8	2.6640~~2.6640~~	$4,970,420~~$4,970,420~~
LS9	11.9288~~12.2688~~	$29,092,539~~$29,921,692~~

LADS - District Sporting Fields

Item	Area (ha)	Acquisition Cost
DS1	9.0691	$27,676,785

Works

Item	Area (ha)	Cost	Project On Costs	Demolition Allowance	Total Cost
Local Passive Open Space embellishment					
LP2	1.6146~~1.6146~~	$1,277,577~~$1,277,577~~	$348,778~~$348,778~~	$57,514~~$57,514~~	$1,683,869~~$1,683,869~~
LP4	0.4661~~0.0972~~	$357,037~~$93,424~~	$97,471~~$25,505~~	$0~~$0~~	$454,508~~$118,928~~
LP5	1.8031~~1.8031~~	$1,420,539~~$1,420,539~~	$387,807~~$387,807~~	$28,757~~$28,757~~	$1,837,103~~$1,837,103~~
LP6	0.5036~~0.5036~~	$383,829~~$383,829~~	$104,785~~$104,785~~	$0~~$0~~	$488,615~~$488,615~~
LP7	0.6757~~0.8372~~	$506,796~~$622,205~~	$138,355~~$169,862~~	In DC15~~In DC15~~	$645,152~~$792,067~~
LP8	2.3162~~2.3162~~	$1,767,393~~$1,767,393~~	$482,498~~$482,498~~	$0~~$0~~	$2,249,891~~$2,249,891~~
LP10	1.3320~~1.3320~~	$963,262~~$963,262~~	$262,970~~$262,970~~	$57,514~~$57,514~~	$1,283,746~~$1,283,746~~
LP11	1.4399~~1.4399~~	$1,040,900~~$1,040,900~~	$284,166~~$284,166~~	$0~~$0~~	$1,325,066~~$1,325,066~~
LP12	1.2173~~1.2173~~	$984,381~~$984,381~~	$268,736~~$268,736~~	$0~~$0~~	$1,253,117~~$1,253,117~~
LP13	0.9572~~0.9572~~	$700,409~~$700,409~~	$191,212~~$191,212~~	$0~~$0~~	$891,621~~$891,621~~
LP16	0.6532~~0.6532~~	$489,718~~$489,718~~	$133,693~~$133,693~~	$0~~$0~~	$623,412~~$623,412~~
LP17	0.6713~~0.6713~~	$503,679~~$503,679~~	$137,504~~$137,504~~	$0~~$0~~	$641,183~~$641,183~~
LP22	1.2139~~1.2139~~	$991,234~~$991,234~~	$270,607~~$270,607~~	$86,270~~$86,270~~	$1,348,112~~$1,348,112~~
LP25	0.9098~~0.9098~~	$674,112~~$674,112~~	$184,033~~$184,033~~	$28,757~~$28,757~~	$886,901~~$886,901~~
LP26	0.1708~~0.1708~~	$122,055~~$122,055~~	$33,321~~$33,321~~	$0~~$0~~	$155,376~~$155,376~~
LP27	0.4352~~0.4352~~	$334,960~~$334,960~~	$91,444~~$91,444~~	$57,514~~$57,514~~	$483,918~~$483,918~~
LP28	0.6337~~0.6337~~	$472,007~~$472,007~~	$128,858~~$128,858~~	$57,514~~$57,514~~	$658,378~~$658,378~~
LP29	1.3538~~1.3538~~	$1,084,430~~$1,084,430~~	$296,049~~$296,049~~	$57,514~~$57,514~~	$1,437,993~~$1,437,993~~
LP30	0.4333~~0.4333~~	$330,140~~$330,140~~	$90,128~~$90,128~~	In DC25~~In DC25~~	$420,268~~$420,268~~
LP31	0.5520~~0.5520~~	$414,443~~$414,443~~	$113,143~~$113,143~~	In DC25~~In DC25~~	$527,586~~$527,586~~
LP32	2.1575~~2.1575~~	$1,658,141~~$1,658,141~~	$452,672~~$452,672~~	$28,757~~$28,757~~	$2,139,570~~$2,139,570~~
LP33	0.5072~~0.5072~~	$359,527~~$359,527~~	$98,151~~$98,151~~		$457,677~~$457,677~~
LP34	0.3354~~0.3354~~	$236,762~~$236,762~~	$64,636~~$64,636~~	$0~~$0~~	$301,398~~$301,398~~
LP35	0.8813~~0.8813~~	$752,226~~$752,226~~	$205,358~~$205,358~~	$0~~$0~~	$957,584~~$957,584~~
LP39	0.5964~~0.5964~~	$450,134~~$450,134~~	$122,887~~$122,887~~	$0~~$0~~	$573,020~~$573,020~~
LP40	0.5879~~0.5879~~	$444,107~~$444,107~~	$121,241~~$121,241~~	$28,757~~$28,757~~	$594,105~~$594,105~~
LP44	0.4985~~0.5196~~	$380,210~~$395,257~~	$103,797~~$107,905~~	$0~~$0~~	$484,008~~$503,162~~
LP45	2.1657~~2.1657~~	$1,570,562~~$1,570,562~~	$428,763~~$428,763~~	$0~~$0~~	$1,999,326~~$1,999,326~~
LP46	0.2426~~0.2426~~	$171,261~~$171,261~~	$46,754~~$46,754~~	$0~~$0~~	$218,015~~$218,015~~
LP49	0.5679~~0.5679~~	$424,668~~$424,668~~	$115,934~~$115,934~~	$28,757~~$28,757~~	$569,359~~$569,359~~
LP50	0.4252~~0.4252~~	$297,099~~$297,099~~	$81,108~~$81,108~~	$0~~$0~~	$378,207~~$378,207~~
LP51	0.3487~~0.3487~~	$270,754~~$270,754~~	$73,916~~$73,916~~	$28,757~~$28,757~~	$373,427~~$373,427~~
LP52	0.1733~~0.1733~~	$122,462~~$122,462~~	$33,432~~$33,432~~	$0~~$0~~	$155,894~~$155,894~~
LP53	0.3139~~0.3139~~	$248,297~~$248,297~~	$67,785~~$67,785~~	$0~~$0~~	$316,082~~$316,082~~
LP55	0.5859~~0.5859~~	$542,478~~$542,478~~	$148,097~~$148,097~~	$0~~$0~~	$690,575~~$690,575~~
LP56	0.3316~~0.3316~~	$260,909~~$260,909~~	$71,228~~$71,228~~	$0~~$0~~	$332,138~~$332,138~~
LP57	0.1351~~0.1351~~	$93,861~~$93,861~~	$25,624~~$25,624~~	$0~~$0~~	$119,485~~$119,485~~
LP58	0.1913~~0.1913~~	$160,633~~$160,633~~	$43,853~~$43,853~~	$0~~$0~~	$204,485~~$204,485~~
LP59	0.2575~~0.2575~~	$207,994~~$207,994~~	$56,782~~$56,782~~	$0~~$0~~	$264,777~~$264,777~~
LP60	0.3275~~0.3275~~	$258,003~~$258,003~~	$70,435~~$70,435~~	$0~~$0~~	$328,437~~$328,437~~
LP61	0.2725~~0.2725~~	$218,668~~$218,668~~	$59,696~~$59,696~~	$0~~$0~~	$278,364~~$278,364~~
LP62	1.2146~~2.4292~~	$891,916~~$1,759,869~~	$243,493~~$480,444~~	$0~~$0~~	$1,135,410~~$2,240,313~~
LP63	0.0325~~0.0325~~	$47,220~~$47,220~~	$12,891~~$12,891~~	$0~~$0~~	$60,111~~$60,111~~
LP64	2.3271~~2.3271~~	$1,686,918~~$1,686,918~~	$460,529~~$460,529~~	$0~~$0~~	$2,147,447~~$2,147,447~~
LP65	0.2558~~0.2558~~	$206,753~~$206,753~~	$56,444~~$56,444~~	$0~~$0~~	$263,197~~$263,197~~

Item	Area (ha)	Cost	Project On Costs	Demolition Allowance	Total Cost
LP66	1.42021.4202	$1,034,533$1,034,533	$282,427$282,427	$0$0	$1,316,960$1,316,960
Subtotal	36.50563 7.5339	$27,814,998$28,549,792	$7,593,494$7,794,093	$546,378$546,378	$35,954,870$36,890,264
District Passive Open Space embellishment					
DP2	3.65313.6531	$2,969,562$2,969,562	$810,691$810,691	$115,027$115,027	$3,895,280$3,895,280
DP3	3.99713.9971	$2,818,729$2,818,729	$769,513$769,513	$86,270$86,270	$3,674,512$3,674,512
DP4	2.23782.2378	$1,517,198$1,517,198	$414,195$414,195	$86,270$86,270	$2,017,664$2,017,664
DP5	2.03802.2284	$1,814,308$1,946,624	$495,306$531,428	$115,027$115,027	$2,424,641$2,593,080
DP6	6.14676.1467	$4,591,267$4,591,267	$1,253,416$1,253,416	$115,027$115,027	$5,959,710$5,959,710
DP7	0.36580.3658	$254,215$254,215	$69,401$69,401	$0$0	$323,615$323,615
DP8	3.75433.7543	$2,962,782$2,962,782	$808,840$808,840	$0$0	$3,771,622$3,771,622
DP9	0.32950.3295	$917,902$917,902	$250,587$250,587	$57,514$57,514	$1,226,003$1,226,003
DP10	10.433010.4438	$7,496,497$7,307,125	$2,046,544$1,994,845	$57,514$57,514	$9,600,554$9,359,484
DP11	6.43266.4326	$4,702,158$4,702,158	$1,283,689$1,283,689	$0$0	$5,985,847$5,985,847
DP12	0.75930.7593	$509,499$509,499	$139,093$139,093	$57,514$57,514	$706,105$706,105
Subtotal	40.147240.3484	$30,554,117$30,497,062	$8,341,274$8,325,698	$690,162$690,162	$39,585,553$39,512,922
Local Sporting Fields embellishment					
LS1	5.70545.7696	$5,053,856$5,101,444	$1,379,703$1,392,694	$115,027$115,027	$6,548,586$6,609,165
LS4	6.06766.1658	$5,282,347$5,354,497	$1,442,081$1,461,778	$172,541$172,541	$6,896,969$6,988,815
LS5	4.32500.0000	$5,339,003$5,339,003	$1,457,548$1,457,548	$0$0	$6,796,551$6,796,551
LS8	2.66402.6640	$3,419,857$3,419,857	$933,621$933,621	$115,027$115,027	$4,468,505$4,468,505
LS9	11.928812.2688	$9,593,149$9,843,027	$2,618,930$2,687,146	$115,027$115,027	$12,327,106$12,645,200
Subtotal	30.690826.8682	$28,688,213$29,057,828	$7,831,882$7,932,787	$517,622$517,622	$37,037,717$37,508,236
District Sporting Fields embellishment					
DS1	9.0691	$7,064,258	$1,928,542	$258,811	$9,251,611
Subtotal	9.0691	$7,064,258	$1,928,542	$258,811	$9,251,611
Total Construction Costs		$94,121,585$95,168,940	$25,695,193$25,981,121	$2,012,973$2,012,973	$121,829,751$123,163,033
Construction Contingency					$6,729,419 $6,802,734
TOTAL ESSENTIAL OPEN SPACE CONSTRUCTION COSTS					$129,965,767$128,559,170

Staging / Priority of infrastructure - as and when surrounding development proceeds.

Project On Costs excludes construction and contingency

5.2 Community and cultural facilities

Land

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LACF	Land for Local Community Facilities	1.4341	$6,571,275
	Subtotal	1.4341	$6,571,275
	Land Acquisition Contingency		$788,553
TOTAL ESSENTIAL COMMUNITY FACILITY INFRASTRUCTURE LAND ACQUISITION COSTS		1.4341	$7,359,828

LACF - Local Community Facilities

Item	Total Area	Acquisition Cost
CF2	0.3412	$1,563,433
CF3	0.2867	$1,313,705
CF4	0.5339	$2,446,415
CF5	0.2723	$1,247,722

Works

Item	Facility	Area (ha)	Cost to Plan	Project On Costs	Demolition Allowance	Total Cost to Plan	Priority / Staging
	Regional Community Facility						
LS1	Aquatic and Indoor Recreation Centre construction	5.2141	$26,292,267	$7,177,789	$25,241	$33,495,297	1
	Subtotal	5.2141	$26,292,267	$7,177,789	$25,241	$33,495,297	
	Local Community Facilities						
CF2	Local Community Facility construction	0.3412	$2,965,605	$809,610	$30,096	$3,805,311	2
CF3	Local Community Facility construction	0.2867	$2,901,755	$792,179	$30,096	$3,724,031	2
CF4	Local Community Facility construction	0.5339	$5,711,507	$1,559,241	$30,096	$7,300,844	3
CF5	Local Community Facility construction	0.2723	$2,884,885	$787,574	$0	$3,672,459	2
	Subtotal	1.4341	$14,463,752	$3,948,604	$90,288	$18,502,644	
	Public Art						
PA1	Regional Community Facility	$863,344	$235,693	$0	$1,099,038	$863,344	4
PA2	Local Community Facilities	$433,913	$118,458	$0	$552,371	$433,913	5
	Subtotal	$1,297,257	$354,151	$0	$1,651,408	$1,297,257	
	Total Construction Costs	$44,539,158	$12,159,190	$117,915	$56,816,263	$44,539,158	
	Construction Contingency				$3,125,995		
TOTAL NON ESSENTIAL COMMUNITY FACILITY CONSTRUCTION COSTS						$59,942,258	

Note Cost of Regional Community Facility LS5 has been adjusted to reflect residential catchment within the Precincts that will contribute to facility (41.4%) as facility will serve population of 120,000 people.
Project On Costs excludes construction and contingency

Priority / Staging

1 As residential catchments in adjoining Precincts establish, facility to serve 120,000 population.
2 As population in catchment area reaches 10,000.
3 At completion of residential development within the Precincts, facility to serve population of 40,000.
4 To be delivered with Aquatic and Indoor Recreation Centre.
5 To be delivered with Local Community Facilities.

5.3 Water cycle management facilities

Land

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LAC	Land for Trunk Drainage Channels	48.4657	$45,904,344
LAB	Land for Trunk Drainage Basins	24.1392	$82,841,265
	Subtotal	72.6049	$128,745,608
	Land Acquisition Contingency		$15,449,473
TOTAL ESSENTIAL DRAINAGE INFRASTRUCTURE LAND ACQUISITION COSTS		72.6049	$144,195,081

LAC - Trunk Drainage Channels

Item	Total Area	Acquisition Cost
Chn B19	0.9455	$1,343,341
Chn B18	0.2824	$413,215
Chn B17.4	1.8932	$2,175,511
DC6	0.4735	$189,845
DC7A	1.8283	$733,055
DC9	1.8287	$733,181
Chn B8	0.2857	$314,160
Chn B11	0.2343	$280,649
DC18	1.1021	$441,879
DC19A	1.1322	$453,934
DC20	3.1912	$1,279,478
Chn B6	0.2135	$391,897
Chn B14.2	0.2563	$301,434
DC23	0.4119	$165,132
DC24	2.2938	$919,666
DC25	0.8323	$333,704
CHN B17.2-3	1.1949	$1,368,392
CHN B17.1-2	1.6094	$6,271,142
Chn B25	1.4446	$579,205
DC32	3.1592	$1,266,638
DC33	4.6023	$2,710,845
Chn NB33	0.5620	$317,589
DC38	0.5157	$1,180,590
DC40	1.0908	$437,351
DC41	1.2289	$502,504
Chn B29C	0.6988	$2,244,155
Chn 29b.2	0.4357	$975,602
Chn 29b.1	0.4715	$491,368
Chn B20.1-3	1.2827	$4,756,274
DC53	1.0245	$410,769
Chn B20.5	0.0481	$53,293
DC54	0.8779	$354,327
DC55	0.5351	$230,441
Chn B22	1.3585	$3,153,149
Chn B14.1	0.5553	$1,221,951
DC61	0.6753	$270,754
Chn B16	0.1352	$163,382
DC63	3.0978	$1,242,024
Chn NB5	0.8075	$3,008,673
DC65	0.4990	$200,063
DC66	1.2761	$848,120
DC67	1.4295	$917,136
SP2*	0.6448	$258,525

* LCC identified acquisition need for this Bonds Creek portion of land located between Camden Valley Way and Cow Pasture Road (formerly an easement) in early 2021.

LAB - Trunk Drainage Basins

Item	Total Area	Acquisition Cost
B5	1.4259	$6,656,149
B6	0.5423	$2,112,182
B8	0.8821	$3,435,499
B11	2.2508	$7,614,409
B13	1.8546	$8,239,558
B14	1.3321	$4,523,399
B15	0.8328	$3,068,564
B16	0.9374	$3,650,934
B17	2.2928	$8,930,016
B18	0.6628	$2,581,548
B19	1.0110	$2,530,775
B20	2.0244	$6,580,733
B21	0.5808	$1,541,153
B22	1.3260	$5,185,754
B23	0.9568	$2,392,797
B25	1.6643	$4,541,540
B27	1.2901	$4,250,434
B29	1.4567	$3,085,031
B32	0.8157	$1,920,791

Staging / Priority of infrastructure - As land affected by acquisition is developed or as required to service development.

Works

System	Detention Basin	Trunk Drainage Works	Water Quality Works	Construction Cost	Project On Costs	Contingency	Total Cost
Drainage Systems with 1% AEP Basins							
Drainage System B17	Basin 17	Chn B17.1, Chn B17.2, Chn B17.3 and Chn B17.4 (open channel)	Bioretention B17, GPT B17	$24,724,953~~$24,249,473~~	$3,708,743~~$3,637,421~~	$4,578,218~~$4,490,175~~	$33,011,913~~$32,377,069~~
Drainage System B20	Basin 20	Chn B20.1, Chn B20.2 and Chn B20.3 (open channels), B20 pipe (Pipe B20.1, Pipe B20.2, Pipe B20.3, Pipe B20.4, Pipe B20.5, Pipe B20.6 and Pipe B20.7	Bioretention B20, GPT B20	$10,660,639~~$10,455,627~~	$1,599,096~~$1,568,344~~	$1,873,346~~$1,837,320~~	$14,133,081~~$13,861,291~~
Drainage System B21	Basin 21	Pipe B21.1, Pipe B21.2 and Pipe B21.3	GPT B21	$2,096,786~~$2,056,463~~	$314,518~~$308,469~~	$377,275~~$370,020~~	$2,788,579~~$2,734,952~~
Drainage System B22	Basin 22	Chn B22 (open channel)	GPT B22	$8,852,312~~$8,682,075~~	$1,327,847~~$1,302,311~~	$1,642,256~~$1,610,674~~	$11,822,414~~$11,595,060~~
Drainage System B23	Basin 23	Pipe B23.1, Pipe B23.2 and Pipe B23.3	GPT B23	$3,392,519~~$3,327,278~~	$508,878~~$499,092~~	$606,350~~$594,689~~	$4,507,746~~$4,421,059~~
Drainage System B25	Basin 25	Pipe B25.1, Pipe B25.2 and Pipe B25.3, Chn 25 (open channel)	Bioretention B25, GPT B25	$10,813,302~~$10,605,354~~	$1,621,995~~$1,590,803~~	$1,973,563~~$1,935,610~~	$14,408,861~~$14,131,767~~
Drainage System B27	Basin 27	Pipe B27.1, Pipe B27.2 and Pipe B27.3	Bioretention B27, GPT B27	$5,109,919~~$5,011,651~~	$766,488~~$751,748~~	$879,589~~$862,674~~	$6,755,996~~$6,626,073~~
Drainage System B29	Basin 29	Chn B29b.1, Chn B29b.2, Chn B29c (open channels), Pipe B29a.1, Pipe B29a.2, Pipe B29a.3, Pipe	GPT B29a, GPT B29b and GPT B29c, Sedimentation pond B29,	$11,889,508~~$11,660,864~~	$1,783,426~~$1,749,130~~	$2,097,108~~$2,056,779~~	$15,770,043~~$15,466,773~~

		B29a.4, Pipe B29a.5 and Pipe B29a.6, Pipe B29b.1, Pipe B29b.2, Pipe B29b.3 and Pipe B29b.4	Bioretention – B29				
	Subtotal			$77,539,938~~$76,048,785~~	$11,630,991~~$11,407,318~~	$14,027,705~~$13,757,941~~	$103,198,633~~$101,214,044~~
Drainage Systems with 50% AEP Basins							
Drainage System B5	Basin 5	Pipe B5.1, Pipe B5.2, Pipe B5.3 and Pipe B5.4	GPT B5	$6,959,806~~$6,825,964~~	$1,043,971~~$1,023,895~~	$1,219,440~~$1,195,989~~	$9,223,217~~$9,045,848~~
Drainage System B6	Basin 6	Pipe B6.1, Pipe B6.2, Pipe B6.3, Pipe B6.4 and Pipe B6.5, Chn B6	Bioretention B6, GPT B6	$4,306,547~~$4,223,729~~	$645,982~~$633,559~~	$735,787~~$721,637~~	$5,688,316~~$5,578,925~~
Drainage System B8	Basin 8	Pipe B8.1, Pipe B8.2, Pipe B8.3, Pipe B8.4 and Pipe B8.5, Chn B8	Bioretention B8, GPT B8	$5,253,102~~$5,152,081~~	$787,965~~$772,812~~	$927,638~~$909,799~~	$6,968,706~~$6,834,692~~
Drainage System B11	Basin 11	Pipe B11.1, Pipe B11.2, Pipe B11.3, Pipe B11.4, Pipe B11.5, Pipe B11.6, Pipe B11.7, B11.8, B11.9, and Pipe B11.10, Chn B11	Bioretention B11, GPT B11	$12,031,371~~$11,799,998~~	$1,804,706~~$1,770,000~~	$2,022,057~~$1,983,171~~	$15,858,133~~$15,553,169~~
Drainage System B12	Basin 12	Chn B12	Bioretention B12, GPT B12	$2,829,668~~$2,775,251~~	$424,450~~$416,288~~	$514,398~~$504,506~~	$3,768,516~~$3,696,045~~
Drainage System B13	Basin 13	Pipe B13.1, Pipe B13.2 and Pipe B13.3	Bioretention B13, GPT B13	$7,136,079~~$6,998,847~~	$1,070,412~~$1,049,827~~	$1,303,495~~$1,278,428~~	$9,509,986~~$9,327,102~~
Drainage System B14	Basin 14	Pipe B14.1, Pipe B14.2, Pipe B14.3, Pipe B14.4, Pipe B14.5, Pipe B14.6, Pipe B14.7, Pipe B14.8, Pipe B14.9, Pipe B14.10, and Pipe B14.11, Chn B14.1 and Chn B14.2	Bioretention B14, GPT B14	$10,375,468~~$10,175,940~~	$1,556,320~~$1,526,391~~	$1,749,610~~$1,715,964~~	$13,681,399~~$13,418,295~~
Drainage System B15	Basin 15		Bioretention B15, GPT B15	$2,428,356~~$2,381,657~~	$364,253~~$357,249~~	$435,511~~$427,136~~	$3,228,121~~$3,166,042~~
Drainage System B16	Basin 16	Pipe B16.1, Pipe B16.2, Pipe B16.3 and Pipe B16.4, CHN B16	Bioretention B16, GPT B16	$5,212,161~~$5,111,927~~	$781,824~~$766,789~~	$892,184~~$875,027~~	$6,886,169~~$6,753,743~~
Drainage System B18	Basin 18	Pipe B18.1, Pipe B18.2, Pipe B18.3, Pipe B18.4, Pipe B18.5, Pipe18.6 and Pipe 18.7	Bioretention B18, GPT B18	$5,519,305~~$5,413,165~~	$827,896~~$811,975~~	$799,112~~$783,744~~	$7,146,313~~$7,008,884~~
Drainage System B19	Basin 19	Pipe B19.1, Pipe B19.2, Pipe B19.3, Pipe B19.4, Pipe B19.5, Pipe B19.6, Pipe B19.7 and Pipe B19.8, Chn B19	Bioretention B19, GPT B19	$8,113,111~~$7,957,090~~	$1,216,967~~$1,193,564~~	$1,373,972~~$1,347,549~~	$10,704,050~~$10,498,203~~
B32*	Basin 32	DC65, DC66		$4,401,683~~$4,317,035~~	$660,252~~$647,555~~	$748,286~~$733,896~~	$5,810,221~~$5,698,486~~
Sub Total				$74,566,658~~$73,132,684~~	$11,184,999~~$10,969,903~~	$12,721,490~~$12,476,846~~	$98,473,147~~$96,579,432~~
Drainage Systems without Basins							
Drainage System NB5				$3,697,360~~$3,626,257~~	$554,604~~$543,939~~	$417,352~~$409,326~~	$4,669,316~~$4,579,522~~

Drainage System NB13	$1,115,154~~$1,093,709~~	$167,273~~$164,056~~	$152,598~~$149,663~~	$1,435,025~~$1,407,428~~
Drainage System NB14	$791,343~~$776,125~~	$118,701~~$116,419~~	$109,175~~$107,075~~	$1,019,219~~$999,619~~
Drainage System NB15	$1,443,961~~$1,416,193~~	$216,594~~$212,429~~	$199,371~~$195,537~~	$1,859,927~~$1,824,159~~
Drainage System NB33	$1,030,538~~$1,010,720~~	$154,581~~$151,608~~	$130,178~~$127,675~~	$1,315,297~~$1,290,003~~
Drainage System NB35	$1,715,888~~$1,682,890~~	$257,383~~$252,434~~	$230,042~~$225,618~~	$2,203,313~~$2,160,942~~
Drainage System NB37	$1,025,499~~$1,005,778~~	$153,825~~$150,867~~	$140,706~~$138,000~~	$1,320,030~~$1,294,645~~
Drainage System NB38	$453,475~~$444,754~~	$68,021~~$66,713~~	$63,860~~$62,632~~	$585,356~~$574,099~~
Sub Total	$11,273,219~~$11,056,426~~	$1,690,983~~$1,658,464~~	$1,443,281~~$1,415,526~~	$14,407,483~~$14,130,416~~
Creek Culverts (stormwater works only)				
B_Eighth	$1,125,124~~$1,103,487~~	$168,769~~$165,523~~	$154,822~~$151,845~~	$1,448,715~~$1,420,855~~
B_Fourth	$1,257,128~~$1,232,952~~	$188,569~~$184,943~~	$176,429~~$173,036~~	$1,622,126~~$1,590,931~~
B_Tenth	$1,372,165~~$1,345,777~~	$205,825~~$201,867~~	$190,011~~$186,357~~	$1,768,001~~$1,734,001~~
EdmonsNorth_New	$1,040,079~~$1,020,077~~	$156,012~~$153,012~~	$153,691~~$150,735~~	$1,349,781~~$1,323,824~~
Fifth_Av1	$1,513,952~~$1,484,838~~	$227,093~~$222,726~~	$210,615~~$206,565~~	$1,951,661~~$1,914,129~~
K_13thE	$244,961~~$240,250~~	$36,744~~$36,038~~	$34,038~~$33,383~~	$315,742~~$309,671~~
K_17thEN	$775,540~~$760,626~~	$116,331~~$114,094~~	$106,976~~$104,919~~	$998,848~~$979,639~~
Surbox1	$602,126~~$590,547~~	$90,319~~$88,582~~	$83,274~~$81,673~~	$775,720~~$760,802~~
Sub Total	$7,931,075~~$7,778,554~~	$1,189,661~~$1,166,783~~	$1,109,856~~$1,088,513~~	$10,230,592~~$10,033,850~~
Streetscape Raingardens				
Intersection raingardens	$21,081,237	$3,162,185	$4,216,247	$28,459,669
T-junction raingardens	$25,225,491	$3,783,824	$5,045,098	$34,054,412
Road bend raingardens	$1,238,882	$185,832	$247,776	$1,672,491
Sub Total	$47,545,609	$7,131,841	$9,509,122	$64,186,572
TOTAL ESSENTIAL STORMWATER INFRASTRUCTURE	$218,856,498~~$215,562,058~~	$32,828,475~~$32,334,309~~	$38,811,454~~$38,247,948~~	$290,496,427~~$286,144,315~~

*Basin 32 (B32) was outside the scope area of the SMEC study

Staging / Priority of infrastructure - when surrounding development proceeds.

Project On Costs excludes construction and contingency

5.4 Transport management facilities

Land

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LACR	Land for new Collector Roads	4.36144.3614	$18,309,448~~$18,309,448~~
LALR	Land for new Local Roads	1.29541.3866	$5,256,860~~$5,612,0696~~
	Subtotal	5.656855.7480	$23,566,308~~$23,921,517~~
	Land Acquisition Contingency		$2,827,957~~$2,870,582~~
TOTAL ESSENTIAL ROAD INFRASTRUCTURE LAND ACQUISITION COSTS		5.656855.7480	$26,394,265~~$26,792,099~~

LACR - Collector Roads

Item	Total Area	Acquisition Cost
CR1	0.44700.4470	$1,740,992~~$1,740,992~~
CR14	0.51500.5150	$2,359,812~~$2,359,812~~
CR15	0.30100.3010	$1,172,346~~$1,172,346~~
CR16	0.32700.3270	$1,273,611~~$1,273,611~~
CR17	1.28001.2800	$6,305,052~~$6,305,052~~
CR18	0.47330.4733	$1,603,744~~$1,603,744~~
CR1A	0.46100.4610	$1,795,519~~$1,795,519~~
CR21	0.07480.0748	$289,455~~$289,455~~
CR22	0.40320.4032	$1,460,836~~$1,460,836~~
CR35	0.07910.0791	$308,082~~$308,082~~

LALR - Local Roads

Item	Total Area	Acquisition Cost
LR28	0.02540.0254	$125,116~~$125,116~~
LR33	0.09120.1824	$355,209~~$710,418~~
LR39A	0.06280.0628	$244,596~~$244,596~~
LR39B	0.04800.0480	$186,952~~$186,952~~
LR39C	0.06800.0680	$264,849~~$264,849~~
LR39D	0.08990.0899	$350,146~~$350,146~~
LR48	0.12540.1254	$321,679~~$321,679~~
LR59A	0.08860.0886	$345,082~~$345,082~~
LR59B	0.05220.0522	$137,201~~$137,201~~
LR61	0.04590.0459	$223,466~~$223,466~~
LR64	0.14400.1440	$560,856~~$560,856~~
LR67	0.26410.2641	$681,069~~$681,069~~
LR68	0.02380.0238	$92,697~~$92,697~~
LR69A	0.07160.0716	$278,870~~$278,870~~
LR70	0.06500.0650	$297,840~~$297,840~~
LR72	0.04020.0402	$198,018~~$198,018~~
LR73	0.11500.1150	$447,906~~$447,906~~
LR74	0.02190.0219	$85,297~~$85,297~~
LR76	0.08080.0808	$60,009~~$60,009~~

Works

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority
	Local Roads						
LR3	Upgrade road half width	160~~160~~	$320,589~~$320,589~~	$79,506~~$79,506~~	$0~~$0~~	$400,095~~$400,095~~	*1~~*1~~
LR5	Upgrade road half width	140~~140~~	$280,516~~$280,516~~	$69,568~~$69,568~~	$0~~$0~~	$350,083~~$350,083~~	*1~~*1~~
LR6	Upgrade road half width	225~~225~~	$450,828~~$450,828~~	$111,805~~$111,805~~	$0~~$0~~	$562,634~~$562,634~~	*1~~*1~~
LR11	Upgrade road half width	90~~90~~	$180,331~~$180,331~~	$44,722~~$44,722~~	$0~~$0~~	$225,054~~$225,054~~	*1~~*1~~
LR13	Upgrade road half width	455~~455~~	$911,675~~$911,675~~	$226,095~~$226,095~~	$0~~$0~~	$1,137,771~~$1,137,771~~	*1~~*1~~
LR13A	Upgrade road half width	240~~240~~	$480,884~~$480,884~~	$119,259~~$119,259~~	$0~~$0~~	$600,143~~$600,143~~	*1~~*1~~
LR16	Upgrade road half width	105~~105~~	$210,387~~$210,387~~	$52,176~~$52,176~~	$0~~$0~~	$262,563~~$262,563~~	*1~~*1~~
LR18	Upgrade road half width	120~~120~~	$240,442~~$240,442~~	$59,630~~$59,630~~	$0~~$0~~	$300,071~~$300,071~~	*1~~*1~~
LR22	Upgrade road half width	235~~235~~	$470,865~~$470,865~~	$116,775~~$116,775~~	$0~~$0~~	$587,640~~$587,640~~	*1~~*1~~
LR24	Upgrade road half width	80~~80~~	$160,295~~$160,295~~	$39,753~~$39,753~~	$0~~$0~~	$200,048~~$200,048~~	*1~~*1~~
LR26	Upgrade road half width	280~~280~~	$561,031~~$561,031~~	$139,136~~$139,136~~	$0~~$0~~	$700,167~~$700,167~~	*1~~*1~~
LR27	Upgrade road full width	150~~150~~	$464,394~~$464,394~~	$115,170~~$115,170~~	$0~~$0~~	$579,563~~$579,563~~	*1~~*1~~
LR28	Upgrade road half width	85~~85~~	$170,313~~$170,313~~	$42,238~~$42,238~~	$0~~$0~~	$212,551~~$212,551~~	*1~~*1~~
LR33	New road full width	90~~90~~	$262,760~~$262,760~~	$65,165~~$65,165~~	$0~~$0~~	$327,925~~$327,925~~	*1~~*1~~
LR35	Upgrade road half width	510~~510~~	$1,021,878~~$1,021,878~~	$253,426~~$253,426~~	$0~~$0~~	$1,275,304~~$1,275,304~~	*1~~*1~~
LR36	Upgrade road full width	330~~330~~	$1,021,666~~$1,021,666~~	$253,373~~$253,373~~	$0~~$0~~	$1,275,039~~$1,275,039~~	*1~~*1~~
LR37	Upgrade road half width	325~~325~~	$651,197~~$651,197~~	$161,497~~$161,497~~	$0~~$0~~	$812,694~~$812,694~~	*1~~*1~~
LR39	Upgrade road half width	80~~80~~	$160,295~~$160,295~~	$39,753~~$39,753~~	$0~~$0~~	$200,048~~$200,048~~	*1~~*1~~
LR39A	New road half width	80~~80~~	$129,954~~$129,954~~	$32,228~~$32,228~~	$0~~$0~~	$162,182~~$162,182~~	*1~~*1~~
LR39B	New road half width	60~~60~~	$97,465~~$97,465~~	$24,171~~$24,171~~	$0~~$0~~	$121,637~~$121,637~~	*1~~*1~~
LR39C	New road half width	85~~85~~	$138,076~~$138,076~~	$34,243~~$34,243~~	$0~~$0~~	$172,318~~$172,318~~	*1~~*1~~
LR39D	New road half width	115~~115~~	$186,808~~$186,808~~	$46,328~~$46,328~~	$0~~$0~~	$233,137~~$233,137~~	*1~~*1~~
LR46	Upgrade road half width	65~~65~~	$130,239~~$130,239~~	$32,299~~$32,299~~	$0~~$0~~	$162,539~~$162,539~~	*1~~*1~~
LR46B	Upgrade road half width	50~~50~~	$100,184~~$100,184~~	$24,846~~$24,846~~	$0~~$0~~	$125,030~~$125,030~~	*1~~*1~~
LR46C	Upgrade road half width	55~~55~~	$110,203~~$110,203~~	$27,330~~$27,330~~	$0~~$0~~	$137,533~~$137,533~~	*1~~*1~~
LR48	Upgrade road half width	144~~144~~	$288,530~~$288,530~~	$71,555~~$71,555~~	$0~~$0~~	$360,086~~$360,086~~	*1~~*1~~
LR57	Upgrade road full width	320~~320~~	$990,707~~$990,707~~	$245,695~~$245,695~~	$0~~$0~~	$1,236,402~~$1,236,402~~	*1~~*1~~
LR59A	New road half width	60~~60~~	$97,465~~$97,465~~	$24,171~~$24,171~~	In DC47~~In DC47~~	$121,637~~$121,637~~	*1~~*1~~
LR59B	New road half width	35~~35~~	$56,855~~$56,855~~	$14,100~~$14,100~~	$28,224~~$28,224~~	$99,179~~$99,179~~	*1~~*1~~
LR61	New road half width	100~~100~~	$162,442~~$162,442~~	$40,286~~$40,286~~	$0~~$0~~	$202,728~~$202,728~~	*1~~*1~~

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority
LR64	New road full width	9090	$262,760$262,760	$65,165$65,165	$0$0	$327,925$327,925	*1*1
LR67	New road half width	300300	$487,326$487,326	$120,857$120,857	In LS7 and LP42In LS7 and LP42	$608,183$608,183	*1*1
LR69	Upgrade road half width	9090	$180,331$180,331	$44,722$44,722	$0$0	$225,054$225,054	*1*1
LR69A	New road full width	9090	$262,760$262,760	$65,165$65,165	$0$0	$327,925$327,925	*1*1
LR70	New road half width	6565	$105,587$105,587	$26,186$26,186	$0$0	$131,773$131,773	*1*1
LR72	New road half width	100100	$162,442$162,442	$40,286$40,286	$0$0	$202,728$202,728	*1*1
LR73	New road half width	100100	$162,442$162,442	$40,286$40,286	$28,224$28,224	$230,952$230,952	*1*1
LR74	New road half width	3030	$48,733$48,733	$12,086$12,086	$0$0	$60,818$60,818	*1*1
LR7665	New road half width	160160	$259,907$259,907	$64,457$64,457	$28,224$28,224	$352,588$352,588	*1*1
	Subtotal	5,8945,894	$12,441,561$12,441,561	$3,085,507$3,085,507	$84,673$84,673	$15,611,741$15,611,741	
	Collector Roads						
CR1	Upgrade road half width	475475	$1,116,537$1,116,537	$276,901$276,901	$0$0	$1,393,438$1,393,438	*1*1
CR1A	New road full width	225225	$774,648$774,648	$192,113$192,113	$56,448$56,448	$1,023,209$1,023,209	*1*1
CR7	Upgrade road half width	115115	$270,320$270,320	$67,039$67,039	$0$0	$337,359$337,359	*1*1
CR7A	Upgrade road full width	105105	$404,103$404,103	$100,218$100,218	$0$0	$504,321$504,321	*1*1
CR8	Upgrade road half width	240240	$564,145$564,145	$139,908$139,908	$0$0	$704,053$704,053	*1*1
CR9	Upgrade road full width	7070	$269,402$269,402	$66,812$66,812	$0$0	$336,214$336,214	*1*1
CR10	Upgrade road half width	8585	$199,801$199,801	$49,551$49,551	$0$0	$249,352$249,352	*1*1
CR11	Upgrade road full width	345345	$1,327,768$1,327,768	$329,287$329,287	$0$0	$1,657,055$1,657,055	*1*1
CR12	Upgrade road half width	130130	$305,579$305,579	$75,783$75,783	$0$0	$381,362$381,362	*1*1
CR14	New road half width	495495	$958,351$958,351	$237,671$237,671	$112,897$112,897	$1,308,918$1,308,918	*1*1
CR15	New road full width	155155	$533,646$533,646	$132,344$132,344	$28,224$28,224	$694,215$694,215	*1*1
CR16	New road half width	340340	$658,261$658,261	$163,249$163,249	$112,897$112,897	$934,406$934,406	*1*1
CR17	New road full width	320320	$1,101,722$1,101,722	$273,227$273,227	$56,448$56,448	$1,431,397$1,431,397	*1*1
CR18	New road half width	420420	$813,146$813,146	$201,660$201,660	$28,224$28,224	$1,043,030$1,043,030	*1*1
CR19	Upgrade road full width	8080	$307,888$307,888	$76,356$76,356	$0$0	$384,245$384,245	*1*1
CR19A	Upgrade road half width	8080	$188,048$188,048	$46,636$46,636	$0$0	$234,684$234,684	*1*1
CR21	New road half width	7070	$135,524$135,524	$33,610$33,610	$0$0	$169,134$169,134	*1*1
CR21A	Upgrade road half width	7070	$164,542$164,542	$40,806$40,806	$0$0	$205,349$205,349	*1*1
CR22	New road half width	325325	$629,220$629,220	$156,047$156,047	$225,794$225,794	$1,011,060$1,011,060	*1*1
CR24	Upgrade road half width	115115	$270,320$270,320	$67,039$67,039	$0$0	$337,359$337,359	*1*1

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority
CR25	Upgrade road full width	215~~215~~	$827,450~~$827,450~~	$205,208~~$205,208~~	$0~~$0~~	$1,032,657~~$1,032,657~~	*1~~*1~~
CR26	Upgrade road full width	150~~150~~	$577,291~~$577,291~~	$143,168~~$143,168~~	$0~~$0~~	$720,459~~$720,459~~	*1~~*1~~
CR27	Upgrade road full width	155~~155~~	$596,534~~$596,534~~	$147,940~~$147,940~~	$0~~$0~~	$744,474~~$744,474~~	*1~~*1~~
CR27A	Upgrade road full width	140~~140~~	$538,804~~$538,804~~	$133,624~~$133,624~~	$0~~$0~~	$672,428~~$672,428~~	*1~~*1~~
CR28	Upgrade road half width	150~~150~~	$352,591~~$352,591~~	$87,442~~$87,442~~	$0~~$0~~	$440,033~~$440,033~~	*1~~*1~~
CR29	Upgrade road half width	400~~400~~	$940,242~~$940,242~~	$233,180~~$233,180~~	$0~~$0~~	$1,173,422~~$1,173,422~~	*1~~*1~~
CR29A	Upgrade road full width	160~~160~~	$615,777~~$615,777~~	$152,713~~$152,713~~	$0~~$0~~	$768,489~~$768,489~~	*1~~*1~~
CR30	Upgrade road half width	95~~95~~	$223,307~~$223,307~~	$55,380~~$55,380~~	$0~~$0~~	$278,688~~$278,688~~	*1~~*1~~
CR31	Upgrade road half width	90~~90~~	$211,554~~$211,554~~	$52,465~~$52,465~~	$0~~$0~~	$264,020~~$264,020~~	*1~~*1~~
CR35	New road half width	70~~70~~	$135,524~~$135,524~~	$33,610~~$33,610~~	$0~~$0~~	$169,134~~$169,134~~	*1~~*1~~
CR38	Upgrade road half width	80~~80~~	$188,048~~$188,048~~	$46,636~~$46,636~~	$0~~$0~~	$234,684~~$234,684~~	*1~~*1~~
CR39	Upgrade road half width	60~~60~~	$141,036~~$141,036~~	$34,977~~$34,977~~	$0~~$0~~	$176,013~~$176,013~~	*1~~*1~~
CR40	Upgrade road half width	30~~30~~	$70,518~~$70,518~~	$17,488~~$17,488~~	$0~~$0~~	$88,007~~$88,007~~	*1~~*1~~
CR42	Upgrade road full width	285~~285~~	$1,096,852~~$1,096,852~~	$272,019~~$272,019~~	$0~~$0~~	$1,368,871~~$1,368,871~~	*1~~*1~~
CR43	Upgrade road half width	50~~50~~	$117,530~~$117,530~~	$29,147~~$29,147~~	$0~~$0~~	$146,678~~$146,678~~	*1~~*1~~
CR44	Upgrade road half width	50~~50~~	$117,530~~$117,530~~	$29,147~~$29,147~~	$0~~$0~~	$146,678~~$146,678~~	*1~~*1~~
CR45	Upgrade road half width	240~~240~~	$564,145~~$564,145~~	$139,908~~$139,908~~	$0~~$0~~	$704,053~~$704,053~~	*1~~*1~~
D1	Design of Collector Road upgrade of Fourth Avenue	Item~~Item~~	$1,385,497~~$1,385,497~~	$0~~$0~~	$0~~$0~~	$1,385,497~~$1,385,497~~	*7~~*7~~
D2	Design of Collector Road of Browns Road Extension	Item~~Item~~	$521,596~~$521,596~~	$0~~$0~~	$0~~$0~~	$521,596~~$521,596~~	*8~~*8~~
	Centre line design of existing roads	3435~~343~~50	$687,000~~$687,000~~	$0~~$0~~	$0~~$0~~	$687,000~~$687,000~~	*9~~*9~~
	Subtotal		$20,901,800~~$20,901,800~~	$4,540,311~~$4,540,311~~	$620,932~~$620,932~~	$26,063,043~~$26,063,043~~	
	Street Tree Planting to Roads delivered by Council						
	Planting to Local Roads half widths	4434	$69,143	$0	$0	$69,143	*1
	Planting to Local Roads full widths	1070	$33,371	$0	$0	$33,371	*1
	Planting to Collector Roads half widths	4275	$66,664	$0	$0	$66,664	*1
	Planting to Collector Roads full widths	2405	$75,006	$0	$0	$75,006	*1
	Subtotal	12,184	$244,184	$0	$0	$244,184	
	Pedestrian/Bridge Crossings						
PB1	Pedestrian crossing of DC20	Item	$108,463~~$108,463~~	$26,899~~$26,899~~	$0~~$0~~	$135,362~~$135,362~~	*4~~*4~~
PB2	Pedestrian crossing of DC19A	Item	$108,463~~$108,463~~	$26,899~~$26,899~~	$0~~$0~~	$135,362~~$135,362~~	*5~~*5~~

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority
PB4	Pedestrian crossing of DC14	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*3*3
PB5	Pedestrian crossing of DC53	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*3*3
PB6	Pedestrian crossing of DC26	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*3*3
PB7	Pedestrian crossing of DC33	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*3*3
PB8	Pedestrian crossing of DC30	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*3*3
PB10	Pedestrian crossing of DC63	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*1*1
PB11	Pedestrian crossing of DC61 at Sixth Ave	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*1*1
PB13	Pedestrian crossing - Creek Twelfth Avenue	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*1*1
PB14	Pedestrian crossing - Creek Fourteenth Avenue	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*2*1
PB15	Pedestrian crossing - Bonds Creek Ninth Avenue	Item	$108,463$108,463	$26,899$26,899	$0$0	$135,362$135,362	*4*2
BR12	Crossing upgrade - Kemps Creek Gurner Road (upgrade crossing to 100 ARI)	120	$3,880,826	$962,445	$17,361	$4,860,632	*6
	Subtotal		$1,193,095$5,182,384	$295,888$1,285,231	$0	$1,488,983$6,484,977	
	Road segments over culverts						
Clv B29.b.2Clv B29.b.2	Channel Crossing Type 2Channel Crossing Type 2	5050	$854,251$854,251	$211,854$211,854	$0$0	$1,066,105$1,066,105	*3
Chn NB5Chn NB5	Channel Crossing Type 1Channel Crossing Type 1	2525	$427,126$427,126	$105,927$105,927	$0$0	$533,053$533,053	*3
Clv B20.2Clv B20.2	Channel Crossing Type 2Channel Crossing Type 2	3030	$512,551$512,551	$127,113$127,113	$0$0	$639,663$639,663	*3
Clv B20.3Clv B20.3	Channel Crossing Type 2Channel Crossing Type 2	3030	$512,551$512,551	$127,113$127,113	$0$0	$639,663$639,663	*3
Clv B17.3Clv B17.3	Channel Crossing Type 2Channel Crossing Type 2	3030	$512,551$512,551	$127,113$127,113	$0$0	$639,663$639,663	*3
Clv B17.1Clv B17.1	Channel Crossing Type 2Channel Crossing Type 2	3030	$512,551$512,551	$127,113$127,113	$0$0	$639,663$639,663	*3
BR1Fifth Av1	Scalabrini Creek Fifth Avenue (replace collector road pavement)Scalabrini Creek Fifth Avenue (replace collector road pavement)	6060	$185,757$1,320,206	$46,068$327,411	$0$0	$231,825$1,647,618	*2
BR2B_Eighth	Bonds Creek Eighth Avenue (upgrade crossing to 100 ARI) (Collector Street)Bonds Creek Eighth Avenue (upgrade crossing to 100 ARI) (Collector Street)	110110	$5,183,520$2,420,378	$1,285,513$600,254	$31,579$0	$6,500,613$3,020,632	*1

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority
BR3~~BR4~~	Bonds Creek Ninth Avenue (replace local road pavement)~~Bonds Creek Tenth Avenue (replace local road pavement)~~	130~~80~~	$402,475~~$2 47,677~~	$99,814~~$61,42 4~~	$0~~$0~~	$502,288~~$309,1 00~~	*1
BR4~~B_F ourth~~	Bonds Creek Tenth Avenue (replace local road pavement)~~Bonds Creek Fourth Avenue (upgrade crossing to 100 ARI) (Collector Street)~~	80~~175~~	$247,677~~$3, 850,602~~	$61,424~~$954,9 49~~	$0~~$0~~	$309,100~~$4,805 ,551~~	*2
BR5~~Surb ox1~~	Unnamed Creek Twelfth Avenue (replace local road pavement)~~Unnamed Creek Fourth Avenue (upgrade crossing to 100 ARI) (Collector Street)~~	130~~100~~	$402,475~~$2, 200,344~~	$99,814~~$545,6 85~~	$0~~$0~~	$502,288~~$2,746 ,029~~	*2
BR6~~BR8~~	Bonds Creek Fourth Avenue (upgrade crossing to 100 ARI) (Collector Street)~~Unnamed Creek Thirteenth Avenue (upgrade crossing to 100 ARI)~~	175~~95~~	$5,183,520~~$ 294,116~~	$1,285,513~~$72, 941~~	$31,579~~$0~~	$6,500,613~~$367 ,057~~	*1
BR7~~K_17 thEN~~	Unnamed Creek Fourth Avenue (upgrade crossing to 100 ARI) (Collector Street)~~Unnamed Creek Seventeenth Avenue (replace collector road pavement)~~	100~~105~~	$3,210,859~~$ 2,310,361~~	$796,293~~$572, 970~~	$31,579~~$0~~	$4,038,731~~$2,8 83,331~~	*1
BR8~~K_11 thE~~	Unnamed Creek Thirteenth Avenue (upgrade crossing to 100 ARI)~~Unnamed Creek Eleventh Avenue (replace local road pavement)~~	95~~110~~	$3,221,722~~$ 1,879,353~~	$798,987~~$466, 079~~	$31,579~~$0~~	$4,052,288~~$2,3 45,432~~	*1
BR9~~Edm onsNorth _New~~	Unnamed Creek Fourteenth Avenue (replace local road pavement)~~Unnamed Creek extension of Edmondson Avenue (new crossing)~~	150~~35~~	$577,291~~$5 97,976~~	$143,168~~$148, 298~~	$0~~$0~~	$720,459~~$746,2 74~~	*3
BR10	Unnamed Creek Seventeenth Avenue (replace collector road pavement)	105	$404,103	$100,218	$0	$504,321	
BR11	Unnamed Creek Sixteenth Avenue (replace local road pavement)	70	$216,717	$53,746	$0	$270,463	
BR12	Crossing upgrade - Kemps Creek Gurner Road (upgrade crossing to 100 ARI)	120	$3,880,826	$962,445	$18,421	$4,861,692	
BR13	Unnamed Creek Eleventh Avenue (replace local road pavement)	110	$340,555	$84,458	$0	$425,013	
	Subtotal		$26,789,077 ~~$18,452,593~~	$6,643,691~~$4,5 76,243~~		$33,577,506~~$23 ,028,836~~	
	Intersections						
IN2	Roundabout Eighth Avenue/Western N-S Collector	Item	$174,708	$43,328	$0	$218,035	*1
IN3	Traffic Signals Fourth Avenue / Fifth Avenue	Item	$833,800	$206,782	$0	$1,040,582	*1
IN4	Roundabout Fourth Avenue / Eighth Avenue	Item	$174,708	$43,328	$0	$218,035	*1
IN5	Roundabout Gurners Ave / Fourth Ave	Item	$174,708	$43,328	$0	$218,035	*1
IN6	Roundabout Gurners Ave / Extension of Edmondson Ave	Item	$174,708	$43,328	$0	$218,035	*1

Liverpool Contributions Plan 2021 - Austral and Leppington North Precincts

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority
IN7	Roundabout Sixteenth Ave / North South Collector Street	Item	$174,708	$43,328	$0	$218,035	*1
IN8	Roundabout Fourth Ave / Thirteenth Ave	Item	$174,708	$43,328	$0	$218,035	*1
IN9	Roundabout Thirteenth Ave / North South Collector Street	Item	$174,708	$43,328	$0	$218,035	*1
IN10	Roundabout Fourth Ave / Eleventh Ave	Item	$174,708	$43,328	$0	$218,035	*1
IN11	Roundabout Fourth Ave / Tenth Ave	Item	$174,708	$43,328	$0	$218,035	*1
	Subtotal		$2,406,170	$596,730	$0	$3,002,900	
	Pedestrian Crossings						
PC1	Allowance for 50 Pedestrian Crossing/Refuge Works locations TBD	50	$1,383,533	$343,116	$0	$1,726,649	*2
	Subtotal		$1,383,533	$343,116	$0	$1,726,649	
	Public Transport Facilities						
PT1	Allowance for 42 bus shelters locations TBD	42	$987,847	$244,986	$0	$1,232,833	*1
	Subtotal	42	$987,847	$244,986	$0	$1,232,833	
	Total Construction Costs		$66,347,266 ~~$62,000,072~~	$15,750,229~~$14,672,125~~	$705,605~~$705,605~~	$82,947,839~~$77,395,162~~	
	Construction Contingency					~~$4,389,397~~$4,693,701	
	TOTAL ESSENTIAL ROAD INFRASTRUCTURE COSTS					$87,641,540~~$81,784,560~~	

Note cost of BR12 has been apportioned 50% to the Austral and Leppington North Precincts and 50% to the Rossmore Precinct.

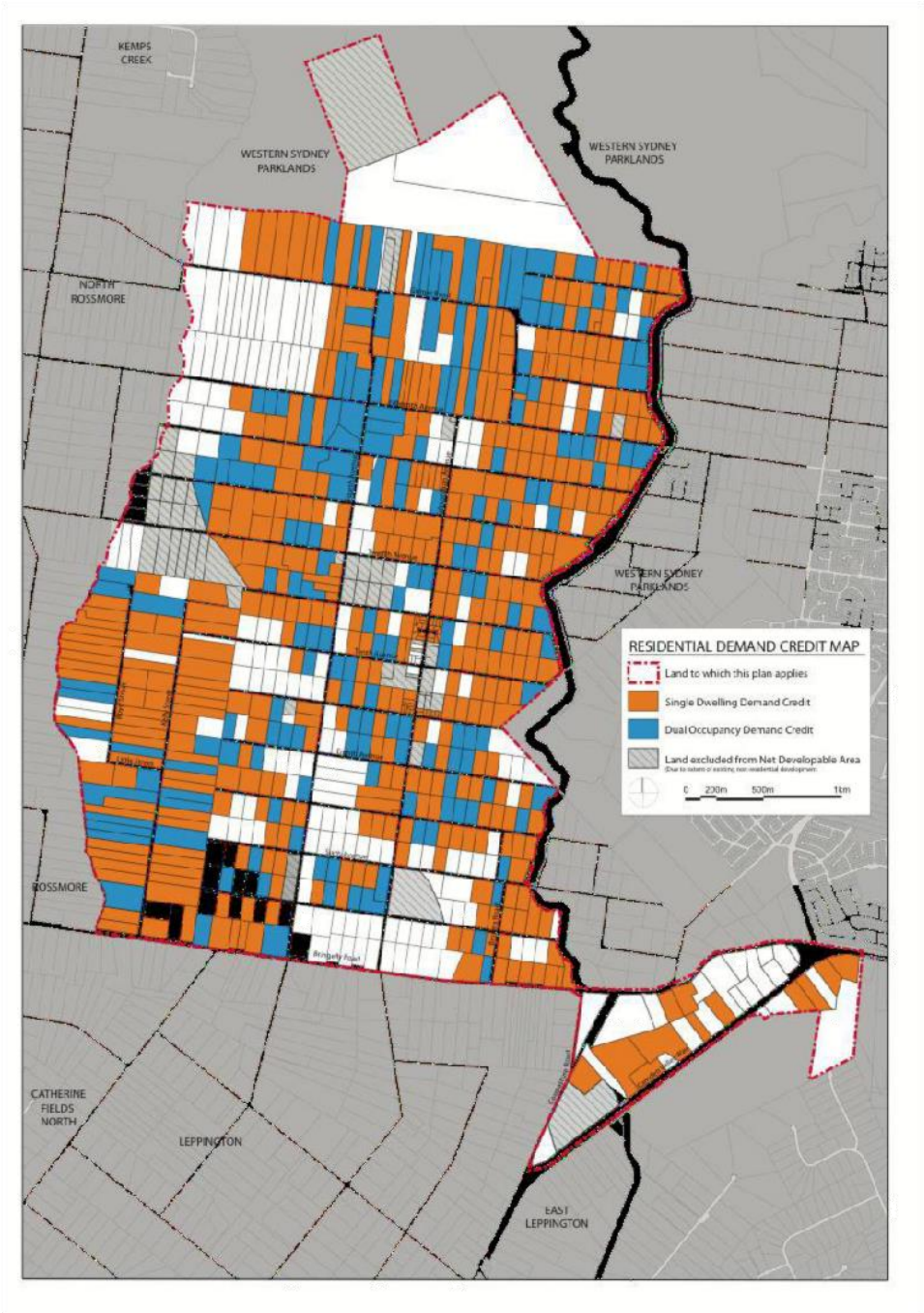
Priority / Staging

*1	When surrounding development proceeds.
*2	As adjoining road upgrades are carried out.
*3	When the drainage channel is constructed.
*4	When Open Space DP4 is constructed
*5	When Open Space LP13 is constructed.
*6	As and when surrounding development proceeds and after Rossmore Precinct rezoned.
*7	Prior to construction of Fourth Avenue upgrade works.
*8	Prior to construction of Browns Road Extension works.
*9	Prior to development taking place

Appendix A

Demand Credit Analysis for Precincts

Allowances for existing development in the calculation of open space and recreation, and community and cultural facilities contributions



Appendix A

Demand credits

Land Use	Single Dwelling Demand Credits	Dual Occupancy Demand Credits	Population Demand Credit
Environmental Living (4 Dwellings/ha)	33	14	207.4
Environmental Living (6 Dwellings/ha)	20	6	108.8
Low Density Residential	300	133	1,924.4
Medium Density Residential	89	26	479.4
Total	442	179	2,720

Assumed occupancy

Single dwelling	3.4
Dual occupancy	6.8
Special use	1.5

Land Use Coding

Environmental Living (4 dwellings / ha)	EL
Environmental Living (6 dwellings / ha)	LL
Low density residential	LD
Medium density residential	MD

Lots with Single Dwelling Demand Credit

Lot No.	DP	Land Type
19	3403	LD
18	3403	LD
17	3403	LD
16	3403	LD
15	3403	LD
1	233174	LD
2	233174	LD
12	3403	LD
111	1010191	LD
14	831988	LD
1	519215	LD
22	791237	LD
21	791237	LD
A	416820	LD
2	201865	LD
144	2475	LD
143	2475	LD
142	2475	LD
140	2475	LD
139	2475	LD
138	2475	LD
160	2475	LD
2	512264	LD
1	512264	LD
156	2475	LD
154	2475	LD
153	2475	LD
152	2475	LD
151	2475	EL
218	2475	LD
A	373652	LD
B	373652	LD
215	2475	LD
229	2475	LD
228	2475	LD
2	615379	LD

Lot No.	DP	Land Type
226	2475	LD
225	2475	LD
224	2475	LD
223	2475	LD
291	2475	LD
2	34883	LD
1	331146	LD
289	2475	LD
288	2475	EL
1	619379	LD
B	417374	LD
303	2475	LD
302	2475	LD
301	2475	LD
300	2475	LD
298	2475	LD
296	2475	LD
295	2475	LD
B	369323	LD
358	2475	LD
357	2475	LD
356	2475	LD
354	2475	LD
352	2475	LD
350	2475	LD
349	2475	LD
348	2475	LD
3600	1000185	MD
363	2475	MD
365	2475	MD
368	2475	MD
369	2475	MD
370	2475	MD
B	413204	LD
A	413204	LD
B	414227	LD
11	1103748	MD
36	3403	MD
B	411087	LD
2	395169	LD
1	619739	LD
2	619739	LD
2	631289	LD
1	631289	LD
431	6222608	LD
3601	1000185	LD
321	778465	LD
320	778465	LD
1	562807	MD
1	574738	LD
2	574738	LD
379	2475	LD
380	2475	LD
431	2475	LD
B	339407	LD
A	339407	LD
426	2475	LD
425	2475	LD
424	2475	LD
423	2475	LD
422	2475	MD
421	2475	MD

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Lot No.	DP	Land Type
490	2475	MD
488	2475	LD
487	2475	LD
486	2475	LD
485	2475	LD
484	2475	LD
483	2475	LD
482	2475	LD
480	2475	LD
479	2475	LD
478	2475	LD
416	2475	MD
415	2475	MD
D	406540	MD
3	510228	LD
5	510228	LD
4	30409	LD
6	30409	EL
5	30409	EL
15	30409	EL
16	30409	EL
17	30409	EL
647	2475	EL
21	30409	EL
22	30409	LD
532	2475	LD
10	874699	LD
1	938137	LD
2	938137	LD
3	938137	LD
4	938137	LD
5	938137	MD
6	938137	MD
640	2475	LD
A	414563	MD
B	414563	MD
C	414563	LD
547	2475	LD
548	2475	LD
549	2475	LD
550	2475	LD
551	2475	LD
552	2475	LD
626	2475	LD
628	2475	LD
631	2475	LD
632	2475	LD
634	2475	LD
636	2475	MD
637	2475	MD
100	1022124	LD
2	201514	LD
3	201514	LD
671	2475	LD
672	2475	LD
673	2475	LD
674	2475	LD
676	2475	EL
721	2475	EL
722	2475	LD
726	2475	LD
4	201514	LD

Lot No.	DP	Land Type
101	1022124	LD
2	503020	LD
3	503020	LD
4	503020	LD
A	386133	LD
714	2475	LD
715	2475	LD
716	2475	LD
717	2475	LD
718	2475	LD
684	2475	LD
685	2475	LD
686	2475	LD
688	2475	LD
689	2475	LD
690	2475	LD
691	2475	LD
11	1044691	LL
2	548700	LL
12	1044691	LL
706	2475	LD
709	2475	LD
710	2475	LD
712	2475	LD
713	2475	LD
769	2475	LD
768	2475	LD
767	2475	LD
766	2475	LD
763	2475	LD
762	2475	LD
787	2475	LD
784	2475	LD
783	2475	LD
782	2475	LD
780	2475	LD
2	555992	LD
752	2475	LD
2	570646	LD
1	570646	LD
A	370483	LD
11	776297	LD
12	776297	EL
799	2475	LD
101	591853	LD
102	591853	LD
A	363000	LD
802	2475	EL
803	2475	EL
804	2475	LD
85	2475	LD
806	2475	LD
807	2475	LD
808	2475	LD
847	2475	LD
810	2475	LD
812	2475	LD
814	2475	MD
1	238636	MD
2	238636	MD
3	238636	MD
4	238636	MD

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Lot No.	DP	Land Type
5	238636	MD
6	238636	MD
7	560787	MD
8	560787	MD
9	560787	MD
B	40482	MD
A	40482	MD
841	2475	LD
842	2475	LD
819	2475	LD
820	2475	LD
822	2475	LD
823	2475	LD
824	2475	LL
827	2475	LL
828	2475	LL
829	2475	LD
830	2475	LD
831	2475	LD
832	2475	LD
833	2475	LD
834	2475	MD
872	2475	LD
871	2475	LD
870	2475	LD
869	2475	LD
867	2475	MD
874	2475	LD
875	2475	LD
876	2475	LD
877	2475	LD
878	2475	MD
213	813479	MD
212	813479	MD
211	813479	MD
20	708107	MD
31	632173	MD
32	632173	MD
101	790560	MD
100	790560	MD
1	31151	MD
2	31151	MD
3	31151	MD
4	31151	MD
5	31151	MD
6	538235	MD
71	627424	MD
72	627424	MD
882	2475	MD
883	2475	LD
885	2475	LD
887	2475	LD
861	2475	LD
860	2475	LD
855	2475	LD
85	740973	EL
86	740973	EL
87	740973	EL
88	740973	EL
89	740973	EL
141	707894	LD
142	707894	LD

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Lot No.	DP	Land Type
131	732036	LD
132	732036	LD
101	712544	LD
101	854174	LD
82	740973	LD
81	740893	LD
7	2756	LD
61	596624	LD
1	802655	LD
2	802655	LD
42	791236	LD
41	791236	LD
D	411796	LD
C	411796	LD
B	411796	LD
A	411796	LD
B	391036	LD
19	2756	LD
18	2756	LD
A	385901	LD
16	2756	LD
15	2756	LD
11	519909	MD
12	519909	MD
131	879822	MD
132	879822	MD
1	598602	MD
111	591857	MD
B	378927	MD
2	567541	MD
3	538092	MD
2	538092	MD
941	2475	MD
11	571579	MD
10	571579	MD
899	2475	EL
1900	614637	EL
1901	614637	EL
933	2475	EL
903	2475	EL
906	2475	LD
927	2475	LD
928	2475	LD
909	2475	LD
911	2475	LD
919	2475	LD
920	2475	LD
923	2475	LD
42	623270	LD
20	565535	LD
2	557622	LD
5	563539	LD
4	563539	LD
1	211782	LD
2	211782	LD
B	405649	LD
1	795818	LD
A	386802	LD
B	386802	LD
4	615872	LD
3	615872	LD
51	610394	LD
52	610394	LD
A	417196	LD

Lot No.	DP	Land Type
B	417196	LD
3	2756	MD
11	1007049	MD
B	408221	MD
1	581050	MD
2	581050	MD
D	408221	MD
1130	2475	MD
1128	2475	MD
1126	2475	MD
1119	2475	LD
1060	2475	LD
1059	2475	LD
1057	2475	LD
1049	2475	LD
1050	2475	LD
999	2475	LD
998	2475	LD
996	2475	LD
993	2475	LD
988	2475	LD
989	2475	LD
952	2475	LD
953	2475	LD
5	236726	LD
6	236726	LD
1004	2475	EL
1005	2475	EL
1006	2475	EL
1065	2475	MD
1066	2475	MD
1067	2475	MD
1114	2475	MD
1116	2475	MD
14	533382	EL
4	126820	EL
1145	2475	EL
1144	2475	EL
1102	2475	LD
1103	2475	LD
2	201643	LD
1013	2475	LD
1012	2475	LD
1011	2475	LD
1010	2475	LD
1007	2475	LD
1040	2475	EL
971	2475	LD
972	2475	LD
976	2475	LD
977	2475	LD
954	2475	LD
955	2475	LD
956	2475	LD
958	2475	LD
959	2475	LD
961	2475	LD
963	2475	LL
968	2475	LL
970	2475	LL
101	789832	LL
102	789832	LL
1017	2475	LL
1031	2475	LL
1078	2475	LD

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Lot No.	DP	Land Type
1079	2475	LD
1101	2475	LD
1100	2475	LD
1099	2475	LD
1098	2475	LD
1148	2475	MD
1163	2475	MD
1161	2475	MD
1160	2475	MD
1	126822	MD
10	1124205	MD
A	355182	MD
1159	2475	MD
11	1124205	MD
C	337828	LD
2	501499	LL
1	501499	LL
14	19406	LL
2	513043	LL
C	389531	LL
D	389531	LL
2	531654	LL
2	205472	LD
3	205472	LD
5	205472	LD
6	205472	LD
1037	2475	LD
20	730327	LD
41	623270	EL
362	2475	

Lots with Dual Occupancy Demand Credit

Lot No.	DP	Land Type
3	233174	LD
112	1010191	LD
2	606317	LD
100	634734	LD
100	634734	LD
2	519215	LD
4	3403	LD
B	416820	LD
1	3403	LD
1	201865	LD
3	201865	LD
141	2475	LD
157	2475	LD
155	2475	LD
150	2475	LD
221	2475	LD
220	2475	LD
219	2475	LD
217	2475	LD
212	2475	LD
231	2475	LD
230	2475	LD
1	34883	LD
C	417374	LD
294	2475	LD
A	369323	LD
359	2475	LD
353	2475	LD
364	2475	MD
366	2475	MD
367	2475	MD
372	2475	LD
4	1117859	LD
12	1103748	MD
2	749642	LD
1	395169	LD
3	395169	LD
2	562807	MD
3	574738	LD
377	2475	LD
378	2475	LD
433	2475	LD
432	2475	LD
429	2475	LD
428	2475	LD
427	2475	LD
489	2475	MD
481	2475	LD
479	2475	LD
5	1117859	MD
B	389089	MD
C	406540	LD
495	2475	MD
6	1117859	LD
2	510228	LD
1	510228	LD
4	510228	LD
405	2475	LD
404	2475	LD
403	2475	LD
14	30409	EL

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Lot No.	DP	Land Type
118	575004	LD
119	575004	LD
20	30409	LD
23	30409	LD
24	30409	LD
655	2475	LD
25	30409	EL
2	204217	LD
535	2475	LD
638	2475	MD
641	2475	LD
545	2475	LD
546	2475	LD
629	2475	LD
633	2475	LD
635	2475	MD
13	776298	EL
723	2475	LD
724	2475	LD
687	2475	LD
711	2475	LD
765	2475	LD
779	2475	LL
781	2475	LD
761	2475	EL
760	2475	EL
790	2475	LD
32	878676	LD
10	776297	LD
798	2475	LD
103	591853	LD
846	2475	EL
845	2475	EL
844	2475	LD
811	2475	LD
840	2475	LD
839	2475	LD
817	2475	MD
821	2475	LD
825	2475	LL
835	2475	MD
873	2475	LL
859	2475	LD
858	2475	LD
886	2475	LD
884	2475	LD
856	2475	EL
83	740973	EL
84	740973	EL
9	2756	LD
121	738282	LD
122	738282	LD
102	712544	LD
A	391036	LD
112	591857	MD
A	378927	MD
940	2475	MD
942	2475	MD
102	621868	MD
898	2475	EL
936	2475	LD
935	2475	LD

Lot No.	DP	Land Type
934	2475	EL
904	2475	LD
905	2475	LD
907	2475	LD
908	2475	LD
926	2475	LD
929	2475	LD
930	2475	LD
912	2475	LD
913	2475	LD
914	2475	LD
921	2475	LD
922	2475	LD
924	2475	LD
43	623270	LD
21	565535	LD
1	557622	LD
A	388784	LD
B	388784	LD
2	2756	LD
2	596773	LD
1	596773	LD
6	2756	LD
A	408221	MD
1	581189	MD
1123	2475	LD
1120	2475	LD
1058	2475	LD
1048	2475	LD
997	2475	LD
986	2475	LD
951	2475	LD
1063	2475	MD
1064	2475	MD
1115	2475	MD
1113	2475	MD
A	416093	MD
B	416093	MD
1164	2475	EL
1146	2475	EL
1077	2475	LD
1008	2475	LD
1009	2475	LD
978	2475	LD
975	2475	LD
974	2475	LD
973	2475	LD
1	126820	LL
969	2475	LL
964	2475	LL
960	2475	LD
957	2475	LD
3	519215	LD
725	2475	LD
786	2475	LD
764	2475	LD

Lots with No Demand Credit

Lot No.	DP	Land Type
1	606317	LD
91	1050385	LD
15	831988	LD
158	2475	LD
214	2475	LD
213	2475	LD
222	650859	LD
297	2475	LD
299	2475	LD
355	2475	LD
37	3403	LD
1	749642	LD
1	204217	LD
627	2475	MD
630	2475	MD
639	2475	MD
707	2475	LD
708	2475	LD
809	2475	LD
813	2475	LD
843	2475	LD
818	2475	MD
857	2475	EL
868	2475	LD
111	875377	LD
112	875377	LD
9	2756	LD
62	596624	LD
102	854174	LD
C	385901	LD
2	598602	MD
910	2475	LD
915	2475	LD
917	2475	LD
918	2475	LD
12	1007049	MD
1125	2475	MD
1127	2475	MD
1129	2475	MD
1122	2475	LD
1056	2475	LD
1055	2475	LD
994	2475	LD
995	2475	LD
987	2475	LD
946	2475	LD
945	2475	LD
944	2475	LD
943	2475	LD
1	236726	EL
962	2475	LL
1014	2475	LD
1035	2475	LD

Appendix B

Background Information

Background Information

AECOM Australia Pty Ltd (2011), *Austral and Leppington North (ALN) Precincts Transport Assessment*, prepared for NSW Department of Planning and Infrastructure, July

Cardno (NSW/ACT) Pty Ltd (2011), *Austral & Leppington North Precincts Water Cycle Management WSUD Report*, prepared for NSW Department of Planning and Infrastructure, April

CivicMJD (2018), Valuation Report – Various Residential and Industrial Release Areas (in Liverpool LGA), June

CivicMJD (2019), Land Valuations for the Austral Precinct, 1 July

Department of Planning and Infrastructure (2011), Precinct Planning Package

Elton Consulting (2011), Austral and Leppington North Precincts - Demographic and Social Infrastructure Assessment, July

Environmental Planning and Assessment (Special Infrastructure Contribution - Western Sydney Growth Areas) Determination 2011

MJ Davis Valuations Pty Ltd (2011), Section 94 Contributions and Infrastructure Delivery Plan - Austral and Leppington North Precincts

Newplan (2011), *Austral and Leppington North Precincts Infrastructure Delivery Plan*, Draft Report for Exhibition, prepared by Newplan, August

NSW Department of Planning and Environment (2019), Local Infrastructure Contributions Practice Note – January 2019

NSW Department of Infrastructure, Planning and Natural Resources (2005), *Development Contributions Practice Notes – July 2005*

SMEC Australia (2019), Detailed Concept Design Report - Austral and Leppington North Design of Water Management Infrastructure, prepared for Liverpool City Council, March

SMEC, *Final Design Report – Development of Streetscape Raingarden Master Plan for Austral and Leppington North*, prepared for Liverpool City Council, February 2020

LIVERPOOL COUNCIL - AUSTRAL & LEPPINGTON NORTH CONTRIBUTIONS PLAN

Schedule updated: 15-Mar-21

MONETARY CONTRIBUTION RATES

ESSENTIAL INFRASTRUCTURE		RESIDENTIAL DEVELOPMENT					NON-RESIDENTIAL DEVELOPMENT
Item	Item Cost apportioned to Austral and Leppington North Development	$ per additional person	$ per residential lot for a dwelling house	$ per attached dwelling, semi-attached dwellings and multi-dwelling housing	$ per dwelling in all other residential accommodation	$ per hectare of equivalent NDA	$ per hectare of equivalent NDA
Open Space							
Land	$314,141,561	$5,704	$19,392	$14,829	$14,829		
Works	$128,559,170	$2,334	$7,936	$6,069	$6,069		
Subtotal	**$442,700,731**	**$8,038**	**$27,328**	**$20,898**	**$20,898**		
Community Facilities							
Land	$7,359,828	$134	$454	$347	$347		
Subtotal	**$7,359,828**	**$134**	**$454**	**$347**	**$347**		
Roads							
Land	$26,394,265	$446	$1,516	$1,160	$1,160		$21,697
Works	$87,641,540	$1,481	$5,035	$3,850	$3,850		$72,043
Subtotal	**$114,035,805**	**$1,927**	**$6,551**	**$5,010**	**$5,010**		**$93,740**
Drainage							
Land	$144,195,081					$118,532	$118,532
Works	$290,496,427					$238,795	$238,795
Subtotal	**$434,691,508**					**$357,327**	**$357,327**
Plan Administration							
Allowance	$7,600,457					$6,248	$6,248
Subtotal	**$7,600,457**					**$6,248**	**$6,248**
TOTAL	**$1,006,388,329**	**$10,098**	**$34,334**	**$26,255**	**$26,255**	**$363,574**	**$457,315**

Average total low density lot rate (15dw/ha) =	**$58,572**

NON ESSENTIAL INFRASTRUCTURE		RESIDENTIAL DEVELOPMENT			
Item	Item Cost apportioned to Austral and Leppington North Development	$ per additional person	$ per detached dwelling	$ per villa, town house and attached dwelling	$ per apartment
Community Facilities					
Local Facilities Works	$20,104,171	$365	$1,241	$949	$949
Regional Facility Works	$39,838,087	$723	$2,459	$1,881	$1,881
Subtotal	**$59,942,258**	**$1,088**	**$3,700**	**$2,830**	**$2,830**
TOTAL	**$59,942,258**	**$1,088**	**$3,700**	**$2,830**	**$2,830**

LAND CONTRIBUTION RATES

ESSENTIAL INFRASTRUCTURE		RESIDENTIAL DEVELOPMENT					NON-RESIDENTIAL DEVELOPMENT
Item	Item Total Area apportioned to Austral and Leppington North Development (m^2)	m2 per additional person	m2 per dwelling house	m2 per attached dwelling, semi-attached dwellings and multi-dwelling housing	m2 per dwelling in all other residential accommodation	m2 per hectare of equivalent NDA	m2 per hectare of equivalent NDA
Open Space							
Land	1,066,399	19.36	65.83	50.34	50.34		
Community Facilities							
Land	14,341	0.26	0.89	0.68	0.68		
Roads							
Land	56,568	0.96	3.25	2.49	2.49		46.50
Drainage							
Land	726,049					596.83	596.83
TOTAL	**1,863,357**	**20.58**	**69.96**	**53.50**	**53.50**	**596.83**	**643.33**

AUSTRAL & LEPPINGTON NORTH ESSENTIAL ROAD INFRASTRUCTURE LAND COSTS

Updated 15-Mar-21

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LACR	Land for new Collector Roads	4.3614	$18,309,448
LALR	Land for new Local Roads	1.2954	$5,256,860
	Subtotal	**5.6568**	**$23,566,308**
	Land Acquisition Contingency		**$2,827,957**
	INFRASTRUCTURE LAND ACQUISITION COSTS	**5.6568**	**$26,394,265**

Staging / Priority of infrastructure - when surrounding development proceeds.

LACR - Collector Roads Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	0.0686	$27,504
Total <100 ARI Land for Acquisition	0.0475	$73,458
Total Residential Land (R2) for Acquisition	2.6220	$10,212,236
Total Residential Land (R3) for Acquisition	1.6233	$7,996,250
Total Commercial Land for Acquisition	0.0000	$0
Total Industrial Land for Acquisition	0.0000	$0
Collector Road Total	**4.3614**	**$18,309,448**

LALR - Local Road Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	0.0855	$34,280
Total Residential Land (R2) for Acquisition	1.0334	$4,024,923
Total Residential Land (R3) for Acquisition	0.1039	$511,547
Total Commercial Land for Acquisition	0.0727	$332,894
Total Industrial Land for Acquisition	0.0000	$0
Local Road Total	**1.2954**	**$5,256,860**

LACR - Collector Roads

Item	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land - R2	Residential Land - R3	Commercial Land - B1	Industrial Land	Notes	
CR1	0.4470	$1,740,992	0.0000	0.0000	0.4470	0.0000	0.0000	0.0000		y
CR14	0.5150	$2,359,812	0.0000	0.0000	0.1717	0.3433	0.0000	0.0000	R2:R3, 1:2	y
CR15	0.3010	$1,172,346	0.0000	0.0000	0.3010	0.0000	0.0000	0.0000		
CR16	0.3270	$1,273,611	0.0000	0.0000	0.3270	0.0000	0.0000	0.0000		y
CR17	1.2800	$6,305,052	0.0000	0.0000	0.0000	1.2800	0.0000	0.0000		y
CR18	0.4733	$1,603,744	0.0686	0.0000	0.4047	0.0000	0.0000	0.0000		y
CR1A	0.4610	$1,795,519	0.0000	0.0000	0.4610	0.0000	0.0000	0.0000		
CR21	0.0748	$289,455	0.0000	0.0008	0.0740	0.0000	0.0000	0.0000		y
CR22	0.4032	$1,460,836	0	0.0467	0.3565	0.0000	0.0000	0.0000		y
CR35	0.0791	$308,082	0.0000	0.0000	0.0791	0.0000	0.0000	0.0000		y

LALR - Local Roads

Item	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land - R2	Residential Land - R3	Commercial Land	Industrial Land	Notes	
LR28	0.0254	$125,116	0.0000	0.0000	0.0000	0.0254	0.0000	0.0000		y
LR33	0.0912	$355,209	0.0000	0.0000	0.0912	0.0000	0.0000	0.0000		Full width of road
LR39A	0.0628	$244,596	0.0000	0.0000	0.0628	0.0000	0.0000	0.0000		y
LR39B	0.0480	$186,952	0.0000	0.0000	0.0480	0.0000	0.0000	0.0000		y
LR39C	0.0680	$264,849	0.0000	0.0000	0.0680	0.0000	0.0000	0.0000		y
LR39D	0.0899	$350,146	0.0000	0.0000	0.0899	0.0000	0.0000	0.0000		y
LR48	0.1254	$321,679	0.0000	0.0710	0.0544	0.0000	0.0000	0.0000		y
LR59A	0.0886	$345,082	0.0000	0.0000	0.0886	0.0000	0.0000	0.0000	Note: LR53 needs to come out of the map	y
LR59B	0.0522	$137,201	0.0163	0.0039	0.0320	0.0000	0.0000	0.0000		y
LR61	0.0459	$223,466	0.0000	0.0000	0.0000	0.0383	0.0077	0.0000	R3:B2, 5:1	y
LR64	0.1440	$560,856	0.0000	0.0000	0.1440	0.0000	0.0000	0.0000		
LR67	0.2641	$681,069	0.0000	0.1480	0.1161	0.0000	0.0000	0.0000		y
LR68	0.0238	$92,697	0.0000	0.0000	0.0238	0.0000	0.0000	0.0000		y
LR69A	0.0716	$278,870	0.0000	0.0000	0.0716	0.0000	0.0000	0.0000		y
LR70	0.0650	$297,840	0.0000	0.0000	0.0000	0.0000	0.0650	0.0000		y
LR72	0.0402	$198,018	0.0000	0.0000	0.0000	0.0402	0.0000	0.0000		y
LR73	0.1150	$447,906	0.0000	0.0000	0.1150	0.0000	0.0000	0.0000		y
LR74	0.0219	$85,297	0.0000	0.0000	0.0219	0.0000	0.0000	0.0000		y
LR76	0.0808	$60,009	0.0692	0.0055	0.0061	0.0000	0.0000	0.0000		y

AUSTRAL & LEPPINGTON NORTH ESSENTIAL ROAD INFRASTRUCTURE CAPITAL WORKS COSTS

Updated 15-Mar-21

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority	Notes
	Local Roads							
LR3	Upgrade road half width	160	$320,589	$79,506	$0	$400,095	*1	
LR5	Upgrade road half width	140	$280,516	$69,568	$0	$350,083	*1	
LR6	Upgrade road half width	225	$450,828	$111,805	$0	$562,634	*1	
LR11	Upgrade road half width	90	$180,331	$44,722	$0	$225,054	*1	
LR13	Upgrade road half width	455	$911,675	$226,095	$0	$1,137,771	*1	
LR13A	Upgrade road half width	240	$480,884	$119,259	$0	$600,143	*1	
LR16	Upgrade road half width	105	$210,387	$52,176	$0	$262,563	*1	
LR18	Upgrade road half width	120	$240,442	$59,630	$0	$300,071	*1	
LR22	Upgrade road half width	235	$470,865	$116,775	$0	$587,640	*1	
LR24	Upgrade road half width	80	$160,295	$39,753	$0	$200,048	*1	
LR26	Upgrade road half width	280	$561,031	$139,136	$0	$700,167	*1	
LR27	Upgrade road full width	150	$464,394	$115,170	$0	$579,563	*1	
LR28	Upgrade road half width	85	$170,313	$42,238	$0	$212,551	*1	
LR33	New road full width	90	$262,760	$65,165	$0	$327,925	*1	
LR35	Upgrade road half width	510	$1,021,878	$253,426	$0	$1,275,304	*1	
LR36	Upgrade road full width	330	$1,021,666	$253,373	$0	$1,275,039	*1	
LR37	Upgrade road half width	325	$651,197	$161,497	$0	$812,694	*1	
LR39	Upgrade road half width	80	$160,295	$39,753	$0	$200,048	*1	
LR39A	New road half width	80	$129,954	$32,228	$0	$162,182	*1	
LR39B	New road half width	60	$97,465	$24,171	$0	$121,637	*1	
LR39C	New road half width	85	$138,076	$34,243	$0	$172,318	*1	
LR39D	New road half width	115	$186,808	$46,328	$0	$233,137	*1	
LR46	Upgrade road half width	65	$130,239	$32,299	$0	$162,539	*1	
LR46B	Upgrade road half width	50	$100,184	$24,846	$0	$125,030	*1	
LR46C	Upgrade road half width	55	$110,203	$27,330	$0	$137,533	*1	
LR48	Upgrade road half width	144	$288,530	$71,555	$0	$360,086	*1	
LR57	Upgrade road full width	320	$990,707	$245,695	$0	$1,236,402	*1	
LR59A	New road half width	60	$97,465	$24,171	In DC47	$121,637	*1	
LR59B	New road half width	35	$56,855	$14,100	$28,224	$99,179	*1	
LR61	New road half width	100	$162,442	$40,286	$0	$202,728	*1	
LR64	New road full width	90	$262,760	$65,165	$0	$327,925	*1	
LR67	New road half width	300	$487,326	$120,857	In LS7 and LP42	$608,183	*1	
LR69	Upgrade road half width	90	$180,331	$44,722	$0	$225,054	*1	
LR69A	New road full width	90	$262,760	$65,165	$0	$327,925	*1	
LR70	New road half width	65	$105,587	$26,186	$0	$131,773	*1	
LR72	New road half width	100	$162,442	$40,286	$0	$202,728	*1	
LR73	New road half width	100	$162,442	$40,286	$28,224	$230,952	*1	
LR74	New road half width	30	$48,733	$12,086	$0	$60,818	*1	
LR75	New road half width	160	$259,907	$64,457	$28,224	$352,588	*1	
	Subtotal	**5,894**	**$12,441,561**	**$3,085,507**	**$84,673**	**$15,611,741**		

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority	
	Collector Roads							
CR1	Upgrade road half width	475	$1,116,537	$276,901	$0	$1,393,438	*1	
CR1A	New road full width	225	$774,648	$192,113	$56,448	$1,023,209	*1	
CR7	Upgrade road half width	115	$270,320	$67,039	$0	$337,359	*1	
CR7A	Upgrade road full width	105	$404,103	$100,218	$0	$504,321	*1	
CR8	Upgrade road half width	240	$564,145	$139,908	$0	$704,053	*1	
CR9	Upgrade road full width	70	$269,402	$66,812	$0	$336,214	*1	
CR10	Upgrade road half width	85	$199,801	$49,551	$0	$249,352	*1	
CR11	Upgrade road full width	345	$1,327,768	$329,287	$0	$1,657,055	*1	
CR12	Upgrade road half width	130	$305,579	$75,783	$0	$381,362	*1	
CR14	New road half width	495	$958,351	$237,671	$112,897	$1,308,918	*1	
CR15	New road full width	155	$533,646	$132,344	$28,224	$694,215	*1	
CR16	New road half width	340	$658,261	$163,249	$112,897	$934,406	*1	
CR17	New road full width	320	$1,101,722	$273,227	$56,448	$1,431,397	*1	
CR18	New road half width	420	$813,146	$201,660	$28,224	$1,043,030	*1	
CR19	Upgrade road full width	80	$307,888	$76,356	$0	$384,245	*1	
CR19A	Upgrade road half width	80	$188,048	$46,636	$0	$234,684	*1	
CR21	New road half width	70	$135,524	$33,610	$0	$169,134	*1	
CR21A	Upgrade road half width	70	$164,542	$40,806	$0	$205,349	*1	
CR22	New road half width	325	$629,220	$156,047	$225,794	$1,011,060	*1	
CR24	Upgrade road half width	115	$270,320	$67,039	$0	$337,359	*1	
CR25	Upgrade road full width	215	$827,450	$205,208	$0	$1,032,657	*1	
CR26	Upgrade road full width	150	$577,291	$143,168	$0	$720,459	*1	
CR27	Upgrade road full width	155	$596,534	$147,940	$0	$744,474	*1	
CR27A	Upgrade road full width	140	$538,804	$133,624	$0	$672,428	*1	
CR28	Upgrade road half width	150	$352,591	$87,442	$0	$440,033	*1	
CR29	Upgrade road half width	400	$940,242	$233,180	$0	$1,173,422	*1	
CR29A	Upgrade road full width	160	$615,777	$152,713	$0	$768,489	*1	
CR30	Upgrade road half width	95	$223,307	$55,380	$0	$278,688	*1	
CR31	Upgrade road half width	90	$211,554	$52,465	$0	$264,020	*1	
CR35	New road half width	70	$135,524	$33,610	$0	$169,134	*1	
CR38	Upgrade road half width	80	$188,048	$46,636	$0	$234,684	*1	
CR39	Upgrade road half width	60	$141,036	$34,977	$0	$176,013	*1	
CR40	Upgrade road half width	30	$70,518	$17,488	$0	$88,007	*1	
CR42	Upgrade road full width	285	$1,096,852	$272,019	$0	$1,368,871	*1	
CR43	Upgrade road half width	50	$117,530	$29,147	$0	$146,678	*1	
CR44	Upgrade road half width	50	$117,530	$29,147	$0	$146,678	*1	
CR45	Upgrade road half width	240	$564,145	$139,908	$0	$704,053	*1	
D1	of Fourth Avenue	Item	$1,385,497	$0	$0	$1,385,497	*7	
D2	Road Extension	Item	$521,596	$0	$0	$521,596	*8	
	Centre line design of existing roads	34350	$687,000	$0	$0	$687,000	*9	
	Subtotal		**$20,901,800**	**$4,540,311**	**$620,932**	**$26,063,043**		

Collector Road Detailed Design Cost Summary (costs based on 10% of total road construction cost)

Collector Road Section	Length (m)	Cost	Design Cost	Notes
Design of Collector Road upgrade of Fourth Avenue	3,600	$13,854,972	$1,385,497	Full width Upgrade new road cost
Design of Collector Road of Browns Road Extension	1,515	$5,215,964	$521,596	Full width New road cost

Collector Road Pedestrian Crossing Allowance Summary

Collector Road Section	Length (m)	No. of Crossings	Notes
Fourth Avenue	4,280	11	At 400m spacings
Browns Road Extension	3,600	9	At 400m spacings
Eastwood Road North Extension	1,340	3	At 400m spacings
Fifth Avenue	940	2	At 400m spacings
Eighth Avenue	1,850	5	At 400m spacings
Tenth Avenue	1,220	3	At 400m spacings
Thirteenth Avenue	1,220	3	At 400m spacings
Seventeenth Avenue	840	2	At 400m spacings, excludes rural land length
Gurner Road	1,800	5	At 400m spacings
Edmondson Avenue North Extension	1,790	4	At 400m spacings
Fifteenth Avenue to Gurner Avenue Link	680	2	At 400m spacings
Fifteenth Avenue to Seventeenth Avenue Link	610	2	At 400m spacings
TOTAL	**20,170**	**50**	

Austral Leppington North Existing Streets

Street Name	Length (m)
Fifth Ave (East)	700
Fifth Ave (West)	1,560
Sixth Ave (East)	1,310
Sixth Ave (West)	610
Seventh Ave (East)	1,140
Seventh Ave (West)	710
Eighth Ave	2,150
Ninth Ave	1,760
Tenth Ave	2,300
Eleventh Ave	1,900
Twelfth Ave (East)	840
Twelfth Ave (West)	760
Thirteenth Ave (East)	990
Thirteenth Ave (West)	970
Fourteenth Ave	2,920
Sixteenth Ave	870
Seventeenth	860
Eighteenth Ave	1,010
Gurner Ave	2,160
Twentyeighth Ave (N of 15th)	1,090
Twenty Eighth Ave (13th-15th)	740
Twenty Eighth Ave (12th-13th)	480
Twenty Ninth Ave	380
Thirty First Ave	170
Fouth Ave (15th-Gurner)	730
Browns Ave/Rd	670
Kelly St	2,190
Little St	360
Boyd St	1,230
Craik Ave	730
Total	**34,310**

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority	
	Street Tree Planting to Roads delivered by Council							
	Planting to Local Roads half widths	4434	$69,143	$0	$0	$69,143	*1	
	Planting to Local Roads full widths	1070	$33,371	$0	$0	$33,371	*1	
	widths	4275	$66,664	$0	$0	$66,664	*1	
	widths	2405	$75,006	$0	$0	$75,006	*1	
	Subtotal	**12,184**	**$244,184**	**$0**	**$0**	**$244,184**		

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority	Notes
	Pedestrian crossings							
PB1	Pedestrian crossing of DC20	Item	$108,463	$26,899	$0	$135,362	*4	
PB2	Pedestrian crossing of DC19A	Item	$108,463	$26,899	$0	$135,362	*5	
PB4	Pedestrian crossing of DC14	Item	$108,463	$26,899	$0	$135,362	*3	
PB5	Pedestrian crossing of DC53	Item	$108,463	$26,899	$0	$135,362	*3	
PB6	Pedestrian crossing of DC26	Item	$108,463	$26,899	$0	$135,362	*3	
PB7	Pedestrian crossing of DC33	Item	$108,463	$26,899	$0	$135,362	*3	
PB8	CHN25	Item	$108,463	$26,899	$0	$135,362	*3	
PB11	Sixth Ave	Item	$108,463	$26,899	$0	$135,362	*1	
PB13	Avenue	Item	$108,463	$26,899	$0	$135,362	*1	
PB14	Fourteenth Avenue	Item	$108,463	$26,899	$0	$135,362	*1	
PB15	Ninth Avenue	Item	$108,463	$26,899	$0	$135,362	*2	
	Subtotal		**$1,193,095**	**$295,888**	**$0**	**$1,488,983**		
	Road segments over culverts							
Ov B29.b.2	Channel Crossing Type 2	50	$854,251	$211,854	$0	$1,066,105	*3	
Ovn NB5	Channel Crossing Type 1	25	$427,126	$105,927	$0	$533,053	*3	
Ov B20.2	Channel Crossing Type 2	30	$512,551	$127,113	$0	$639,663	*3	
Ov B20.3	Channel Crossing Type 2	30	$512,551	$127,113	$0	$639,663	*3	
Ov B17.3	Channel Crossing Type 2	30	$512,551	$127,113	$0	$639,663	*3	
Ov B17.1	Channel Crossing Type 2	30	$512,551	$127,113	$0	$639,663	*3	
BR1	Scalabrini Creek Fifth Avenue (replace collector road pavement)	60	$185,757	$46,068	$0	$231,825	*2	
BR2	(upgrade crossing to 100 ARI) (Collector Street)	110	$5,183,520	$1,285,513	$31,579	$6,500,613	*1	
BR3	Bonds Creek Ninth Avenue (replace local road pavement)	130	$402,475	$99,814	$0	$502,288	*1	
BR4	Bonds Creek Tenth Avenue (replace local road pavement)	80	$247,677	$61,424	$0	$309,100	*1	
BR5	Unnamed Creek Twelfth Avenue (replace local road pavement)	130	$402,475	$99,814	$0	$502,288	*2	
BR6	(upgrade crossing to 100 ARI) (Collector Street)	175	$5,183,520	$1,285,513	$31,579	$6,500,613	*2	
BR7	(upgrade crossing to 100 ARI) (Collector Street)	100	$3,210,859	$796,293	$31,579	$4,038,731	*2	
BR8	Unnamed Creek Thirteenth Avenue (upgrade crossing to 100 ARI)	95	$3,221,722	$798,987	$31,579	$4,052,288	*1	
BR9	Unnamed Creek Fourteenth Avenue (replace local road pavement)	150	$577,291	$143,168	$0	$720,459	*1	
BR10	Avenue (replace collector road pavement)	105	$404,103	$100,218	$0	$504,321	*1	
BR11	Unnamed Creek Sixteenth Avenue (replace local road pavement)	70	$216,717	$53,746	$0	$270,463	*1	
BR12	Gurner Road (upgrade crossing to 100 ARI)	120	$3,880,826	$962,445	$18,421	$4,861,692	*6	
BR13	Unnamed Creek Eleventh Avenue (replace local road pavement)	110	$340,555	$84,458	$0	$425,013	*1	
	Subtotal		**$26,789,877**	**$6,643,691**		**$33,577,506**		

Item	Facility	Length (m)	Cost	Project On Costs	Demolition Allowance	Total Cost	Staging / Priority	
	Intersections							
IN2	Roundabout Eighth	Item	$174,708	$43,328	$0	$218,035	*1	
IN3	Traffic Signals Fourth Avenue / Fifth	Item	$833,800	$206,782	$0	$1,040,582	*1	
IN4	Roundabout Fourth Avenue / Eighth	Item	$174,708	$43,328	$0	$218,035	*1	
IN5	Roundabout Gurners Ave / Fourth	Item	$174,708	$43,328	$0	$218,035	*1	
IN6	Roundabout Gurners Ave / Extension of Edmondson Ave	Item	$174,708	$43,328	$0	$218,035	*1	
IN7	Roundabout Sixteenth Ave / North South Collector Street	Item	$174,708	$43,328	$0	$218,035	*1	
IN8	Roundabout Fourth Ave / Thirteenth	Item	$174,708	$43,328	$0	$218,035	*1	
IN9	Roundabout Thirteenth Ave / North South Collector Street	Item	$174,708	$43,328	$0	$218,035	*1	
IN10	Roundabout Fourth Ave / Eleventh	Item	$174,708	$43,328	$0	$218,035	*1	
IN11	Roundabout Fourth Ave / Tenth Ave	Item	$174,708	$43,328	$0	$218,035	*1	
	Subtotal		**$2,406,170**	**$596,730**	**$0**	**$3,002,900**		
	Pedestrian Refuge Crossings							
PC1	Allowance for 50 Pedestrian Refuge Works locations TBD	50	$1,383,533	$343,116	$0	$1,726,649	*2	
	Subtotal		**$1,383,533**	**$343,116**	**$0**	**$1,726,649**		
	Public Transport Facilities							
PT1	Allowance for 42 bus shelters	42	$987,847	$244,986	$0	$1,232,833	*1	
	Subtotal	**42**	**$987,847**	**$244,986**	**$0**	**$1,232,833**		
	Total Construction Costs		**$66,347,266**	**$15,750,229**	**$705,605**	**$82,947,839**		
	Construction Contingency					**$4,693,701**		
	TOTAL ESSENTIAL ROAD INFRASTRUCTURE COSTS					**$87,641,540**		

Note cost of BR12 has been apportioned 50% to the Austral and Leppington North Precincts and 50% to the Rossmore Precinct.

Priority / Staging

*1 proceeds.
*2 As adjoining road upgrades are carried out.
*3 When the drainage channel is constructed.
*4 When Open Space DP4 is constructed
*5 When Open Space LP13 is constructed.
*6 development proceeds and after Rossmore Precinct rezoned.
*7 Prior to construction of Fourth Avenue upgrade works.
*8 Prior to construction of Browns Road Extension works.
*9 Prior to development taking place

Unit Construction Rates - adjusted for PPI from original costings

Item	Measure	Rate	Notes	Link to Consultant reports
Local Roads				
Upgrade existing half road width	Linear m	$2,004	*Refer below for original construction rates*	*Refer below for comments*
Construct new half road width	Linear m	$1,624	*Refer below for original construction rates*	*Refer below for comments*
Upgrade existing full road width	Linear m	$3,096	*Refer below for original construction rates*	*Refer below for comments*
Construct new full road width	Linear m	$2,920	*Refer below for original construction rates*	*Refer below for comments*
Collector Roads				
Upgrade existing half road width	Linear m	$2,351	*Refer below for original construction rates*	*Refer below for comments*
Construct new half road width	Linear m	$1,936	*Refer below for original construction rates*	*Refer below for comments*
Upgrade existing full road width	Linear m	$3,849	*Refer below for original construction rates*	*Refer below for comments*
Construct new full road width	Linear m	$3,443	*Refer below for original construction rates*	*Refer below for comments*
Sub Arterial Roads				
Upgrade existing full road width	Linear m	$5,596	*Refer below for original construction rates*	*Refer below for comments*
Construct new full road width	Linear m	$4,863	*Refer below for original construction rates*	*Refer below for comments*
Creek Crossings				
New crossing culverts	m2	$4,116	*Refer below for original construction rates*	*Refer below for comments*
New crossing bridge	m2	$5,174	*Refer below for original construction rates*	*Refer below for comments*
Pedestrian Crossing	Item	$108,463	*Refer below for original construction rates*	*Refer below for comments*
New Road Culvert Crossing Type 1 (	Item	$310,150	*Refer below for original construction rates*	*Refer below for comments*
New Road Culvert Crossing Type 2 (	Item	$396,198	*Refer below for original construction rates*	*Refer below for comments*
Intersections				
Roundabout	Item	$174,708	*Refer below for original construction rates*	*Refer below for comments*
Traffic Signals	Item	Specific	*Refer below for original construction rates*	*Refer below for comments*
Public Transport Facilities				
Bus Shelters	Item	$23,520	*Refer below for original construction rates*	*Refer below for comments*
Demolition				
Dwelling and outbuilding demolition	Item	$28,224	*Refer below for original construction rates*	*Refer below for comments*
Demolition of existing creek crossing	m2	$165	*Refer below for original construction rates*	*Refer below for comments*
Pedestrian Crossings				
Crossing/Refuge Works	Item	$27,437	*Refer below for original construction rates*	*Refer below for comments*
Collector Road Design				
Collector Road detailed design	%	10%	*Refer below for original construction rates*	*Refer below for comments*
Street Tree Planting				
Street Tree Planting along Roads	Item	$155.94	*Refer below for original construction rates*	*Refer below for comments*
Project On Costs				
Project on costs	%	25%	*Refer below for original construction rates*	*Refer below for comments*
Construction Contingency	%	7%	*Refer below for original construction rates*	*Refer below for comments*

Original construction rates in consultants reports

Item	Measure	Rate	Notes	Link to Consultant reports
Local Roads				
Upgrade existing half road width	Linear m	$1,704	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $75/m for street lighting (at 40m spacing one side only), $50/m for Low Voltage conduits (one side only) and $120/m (at $15/m3 for 8m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Traffic Management at $82.50/m and Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 1.
Construct new half road width	Linear m	$1,381	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $75/m for street lighting (at 40m spacing one side only), $50/m for Low Voltage conduits (one side only) and $120/m (at $15/m3 for 8m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 2.
Upgrade existing full road width	Linear m	$2,633	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $150/m for street lighting (at 40m spacing), $100/m for Low Voltage conduits and $240/m (at $15/m3 for 16m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Traffic Management at $135/m and Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 3.
Construct new full road width	Linear m	$2,483	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $150/m for street lighting (at 40m spacing), $100/m for Low Voltage conduits and $240/m (at $15/m3 for 16m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 4.
Collector Roads				

Upgrade existing half road width	Linear m	$1,999	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $75/m for street lighting (at 40m spacing one side only), $50/m for Low Voltage conduits (one side only) and $150/m (at $15/m3 for 10m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Traffic Management at $82.50/m and Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 5.
Construct new half road width	Linear m	$1,648	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $75/m for street lighting (at 40m spacing one side only), $50/m for Low Voltage conduits (one side only) and $150/m (at $15/m3 for 10m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 7.
Upgrade existing full road width	Linear m	$3,273	Based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $150/m for street lighting (at 40m spacing), $100/m for Low Voltage conduits and $300/m (at $15/m3 for 20m3 for road cross	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 6.
Construct new full road width	Linear m	$2,928	Based on AECOM costs, as reported by WTP with additional allowances. Additional allowance of $15/m for intersection signage, $150/m for street lighting (at 40m spacing), $100/m for Low Voltage conduits and $300/m (at $15/m3 for 20m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for Planting at $132.60/m (also excluded from base costing - see source below).	Refer to the "Rates" column for the sum of the consultant costings & the "Notes" column for the explanation. The initial cost is shown on Page 3 of the AECOM (Davis Langdon) report - item 8.

Sub Arterial Roads						
Upgrade existing full road width	Linear m	$4,750	Previously based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $150/m for street lighting (at 40m spacing), $100/m for Low Voltage conduits and $399/m (at $15/m3 for 26.6m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for traffic management at $232.50/m. Final rate based on WT Partnerships revised rates (adjusted accordingly to allow for wider road cross section as a result of exhibition and further design work - 26.6 - 29.1m - included necessary additional items not previously allowed for in AECOM rates as well as additional items suggested by WTP) and to include traffic management as specified by Council ($232.50 based on			Page 6 of WT Partnerships report
Construct new full road width	Linear m	$4,136	Previously based on AECOM costs. Plus additional allowance of $15/m for intersection signage, $150/m for street lighting (at 40m spacing), $100/m for Low Voltage conduits and $399/m (at $15/m3 for 26.6m3 for road cross section) for earthworks. These costs are based on Oran Park CP and adjusted. Additional allowance for traffic management at $232.50/m. Final rate based on WT			Page 6 of WT Partnerships report

Creek Crossings				
New crossing culverts	m2	$3,500	Cardno Costs adjusted for guard rail allowance based on $91/m2	
New crossing bridge	m2	$4,400	Based on LCC advice.	
Pedestrian Crossing	Item	$92,230	Based on Camden CP cost for 21m span in Eldersie ($69,815 supply and install bridge, $9,000 for additional hand rail, $5,000 for soil works and additional 10% for escalation over 5 years- costs in 2006)	
New Road Culvert Crossing Type 1	Item	$263,731	Cardno costs. Adjusted to include concrete slab for culvert base area of 169m2 as foolows - Allowance of 25MPa concrete in ground slab including F72 fabric reinforcement, formwork to edges and joints to 150mm thickness. Inclusion of Polythene underlay. Unadjusted cost of $62.20/m2 (Rawlinsons 2010), adjusted price by additional 2% as per rawlinsons published BPI, final rate at $63.44. Cardno cost adjusted for guard rail allowance based on $91/m2.	
New Road Culvert Crossing Type 2 (30m width)	Item	$336,901	Cardno costs. Adjusted to include concrete slab for culvert base area of 225m2 as follows - Allowance of 25MPa concrete in ground slab including F72 fabric reinforcement, formwork to edges and joints to 150mm thickness. Inclusion of Polythene underlay. Unadjusted cost of $62.20/m2 (Rawlinsons 2010), adjusted price by additional 2% as per rawlinsons published BPI, final rate at $63.44. Cardno cost adjusted for guard rail allowance based on $91/m2.	
Intersections				
Roundabout	Item	$148,560	Based on AECOM rates	The RBA cost is shown on Page 2 of the AECOM (Doyle Lawton) report
Traffic Signals	Item	Specific	Based on AECOM rates and additional $25,000 per set of traffic lights allowed for to match Camden Council advice.	
Public Transport Facilities				
Bus Shelters	Item	$20,000	Rate based on Oran Park CP and adjusted.	

Demolition				
Dwelling and outbuilding demolition	Item	$24,000	Rate based on LCC advice.	
Demolition of existing creek crossings	m2	$140.60	Rate based on Rawlinsons 2010 unadjusted rate of $3.10/m2 for break up and remove bitumen paving with base course under and $137.50/m2 for cut away reinforced suspended concrete slab 250mm thick. Price adjusted by 2% as per Rawlinsons published BPI, final rate of $140.60/m2. Existing crossing width of 20m assumed for rate calculation.	
Pedestrian Crossings				
Crossing/Refuge Works	Item	$23,331	Based on LCC rate of pedestrian crossings at $202/m2. Crossing width of 10.5m and length of 11m (collector road pavement width). Crossing provided to Collector Roads (Fourth Avenue, Gurner Road at 400m intervals.	
Collector Road Design				
Collector Road detailed design	%	10%	Based on Camden Council advice received 25/10/2011. Design costs to be based on 10% of road construction costs.	
Street Tree Planting				
Street Tree Planting along Roads	Item	$132.60	Rate based on Rawlinsons 2010 unadjusted rate of $130 for supply and planting of Average Size Tree (45 Litre), adjusted by 2% as per Rawlinsons published BPI to $132.60. Applied as one tree every ten metres for length of roads and both sides of road.	
Project On Costs				
Project on costs	%	25%	Based on LCC advice, includes prelims (6%), margin (5%), LSL (0.3%), approvals (1%), professional fees (10%) and project management costs (2.5%)	
Construction Contingency	%	7%	Based on LCC advice.	

Road over culverts based on Pacific Palm Circuit creek crossing		$1,294.32	Per sqm

AUSTRAL & LEPPINGTON NORTH ESSENTIAL DRAINAGE INFRASTRUCTURE LAND COSTS

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LAC	Land for Trunk Drainage Channels	48.4657	$45,904,344
LAB	Land for Trunk Drainage Basins	24.1392	$82,841,265
	Subtotal	**72.6049**	**$128,745,608**
	Land Acquisition Contingency		**$15,449,473**
	TOTAL ESSENTIAL DRAINAGE INFRASTRUCTURE LAND ACQUISITION COSTS	**72.6049**	**$144,195,081**

Staging / Priority of infrastructure - As land affected by acquisition is developed or as required to service development.

LAC - Trunk Drainage Channels Land for Acquisition

Land Type	Area Ha	Cost
Total Riparian Land for Acquisition	39.9601	$16,021,551
Total <100 ARI Land for Acquisition	2.0745	$3,208,099
Total Residential Land (R2) for Acquisition	4.8535	$18,903,587
Total Residential Land (R3) for Acquisition	1.5776	$7,771,106
Total Commercial Land for Acquisition	0.0000	$0
Total Industrial Land for Acquisition	0.0000	$0
Trunk Drainage Channels Total	**48.4657**	**$45,904,344**

LAB - Trunk Drainage Basins Land for Acquisition

Land Type	Area Ha	Cost
Total Riparian Land for Acquisition	3.4888	$1,398,800
Total <100 ARI Land for Acquisition	1.2937	$2,000,622
Total Residential Land (R2) for Acquisition	15.5117	$60,415,650
Total Residential Land (R3) for Acquisition	3.4677	$17,081,481
Total Commercial Land for Acquisition	0.0000	$0
Total Commercial Land for Acquisition	0.3773	$1,944,711
Total Industrial Land for Acquisition	0.0000	$0
Trunk Drainage Basins Total	**24.1392**	**$82,841,265**

LAC - Trunk Drainage Channels

Item (with SMEC updates)	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land - R2	Residential Land - R3	Commercial Land - B1	Commercial Land - B5	Industrial Land	Notes
Chn B19	0.9455	$1,343,341	0.1343	0.7962	0.0149	0.0000	0.0000	0.0000	0.0000	
Chn B18	0.2824	$413,215	0.0409	0.2316	0.0099	0.0000	0.0000	0.0000	0.0000	
Chn B17.4	1.8932	$2,175,511	1.4743	0.0201	0.3988	0.0000	0.0000	0.0000	0.0000	
DC6	0.4735	$189,845	0.4735	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC7A	1.8283	$733,055	1.8283	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC9	1.8287	$733,181	1.8287	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Chn B8	0.2857	$314,160	0.1115	0.1743	0.0000	0.0000	0.0000	0.0000	0.0000	
Chn B11	0.2343	$280,649	0.0713	0.1630	0.0000	0.0000	0.0000	0.0000	0.0000	
DC18	1.1021	$441,879	1.1021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC19A	1.1322	$453,934	1.1322	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC20	3.1912	$1,279,478	3.1912	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Chn B6	0.2135	$391,897	0.0332	0.1378	0.0425	0.0000	0.0000	0.0000	0.0000	
Chn B14.2	0.2563	$301,434	0.1566	0.0637	0.0360	0.0000	0.0000	0.0000	0.0000	
DC23	0.4119	$165,132	0.4119	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC24	2.2938	$919,666	2.2938	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC25	0.8323	$333,704	0.8323	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
ChN B17.3-4	1.1949	$1,368,392	0.9403	0.0000	0.2545	0.0000	0.0000	0.0000	0.0000	
CHN B17.1-2	1.6094	$6,271,142	0.2062	0.0000	0.7016	0.7016	0.0000	0.0000	0.0000	
Chn B25	1.4446	$579,205	1.4446	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC32	3.1592	$1,266,638	3.1592	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC33	4.6023	$2,710,845	4.3545	0.0000	0.2478	0.0000	0.0000	0.0000	0.0000	
Chn NB33	0.5620	$317,589	0.5356	0.0000	0.0264	0.0000	0.0000	0.0000	0.0000	
DC38	0.5157	$1,180,590	0.2370	0.0000	0.2787	0.0000	0.0000	0.0000	0.0000	
DC40	1.0908	$437,351	1.0908	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC41	1.2289	$502,504	1.2247	0.0020	0.0022	0.0000	0.0000	0.0000	0.0000	
Chn B29C	0.6988	$2,244,155	0.1366	0.0000	0.5621	0.0000	0.0000	0.0000	0.0000	
Chn 29b.2	0.4357	$975,602	0.0683	0.2055	0.1619	0.0000	0.0000	0.0000	0.0000	
Chn 29b.1	0.4715	$491,368	0.2863	0.1469	0.0384	0.0000	0.0000	0.0000	0.0000	
Chn B20.1-3	1.2827	$4,756,274	0.1520	0.0000	0.8480	0.2827	0.0000	0.0000	0.0000	
DC53	1.0245	$410,769	1.0245	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Chn B20.5	0.0481	$53,293	0.0184	0.0297	0.0000	0.0000	0.0000	0.0000	0.0000	
DC54	0.8779	$354,327	0.8758	0.0021	0.0000	0.0000	0.0000	0.0000	0.0000	
DC55	0.5351	$230,441	0.5306	0.0000	0.0045	0.0000	0.0000	0.0000	0.0000	
Chn B22	1.3585	$3,153,149	0.5980	0.0206	0.7398	0.0000	0.0000	0.0000	0.0000	
Chn B14.1	0.5553	$1,221,951	0.2693	0.0000	0.2860	0.0000	0.0000	0.0000	0.0000	
DC61	0.6753	$270,754	0.6753	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Chn B16	0.1352	$163,382	0.1039	0.0000	0.0312	0.0000	0.0000	0.0000	0.0000	
DC63	3.0978	$1,242,024	3.0978	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Chn NB5	0.8075	$3,008,673	0.2142	0.0000	0.0000	0.5934	0.0000	0.0000	0.0000	
DC65	0.4990	$200,063	0.4990	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
DC66	1.2761	$848,120	1.1798	0.0000	0.0963	0.0000	0.0000	0.0000	0.0000	
DC67	1.4295	$917,136	1.2765	0.0811	0.0719	0.0000	0.0000	0.0000	0.0000	
DC100	0.6448	$258,525	0.6448	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

LAB - Trunk Drainage Basins Land for Acquisition

Item	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land - R2	Residential Land - R3	Commercial Land - B1	Commercial Land - B5	Industrial Land	Notes
B5	1.4259	$6,656,149	0.0000	0.0000	0.3565	1.0694	0.0000	0.0000	0.0000	
B6	0.5423	$2,112,182	0.0000	0.0000	0.5423	0.0000	0.0000	0.0000	0.0000	
B8	0.8821	$3,435,499	0.0000	0.0000	0.8821	0.0000	0.0000	0.0000	0.0000	
B11	2.2508	$7,614,409	0.3298	0.0000	1.9211	0.0000	0.0000	0.0000	0.0000	
B13	1.8546	$8,239,558	0.1979	0.0000	0.0000	1.6566	0.0000	0.0000	0.0000	
B14	1.3321	$4,523,399	0.0000	0.2831	1.0490	0.0000	0.0000	0.0000	0.0000	
B15	0.8328	$3,068,564	0.2072	0.0540	0.0000	0.1943	0.0000	0.3773	0.0000	
B16	0.9374	$3,650,934	0.0000	0.0000	0.9374	0.0000	0.0000	0.0000	0.0000	
B17	2.2928	$8,930,016	0.0000	0.0000	2.2928	0.0000	0.0000	0.0000	0.0000	
B18	0.6628	$2,581,548	0.0000	0.0000	0.6628	0.0000	0.0000	0.0000	0.0000	
B19	1.0110	$2,530,775	0.3785	0.0360	0.5965	0.0000	0.0000	0.0000	0.0000	
B20	2.0244	$6,580,733	0.3664	0.0100	1.6479	0.0000	0.0000	0.0000	0.0000	
B21	0.5808	$1,541,153	0.0742	0.1967	0.3100	0.0000	0.0000	0.0000	0.0000	
B22	1.3260	$5,185,754	0.0000	0.2312	0.5474	0.5474	0.0000	0.0000	0.0000	
B23	0.9568	$2,392,797	0.3241	0.0857	0.5469	0.0000	0.0000	0.0000	0.0000	
B25	1.6643	$4,541,540	0.5555	0.0000	1.1089	0.0000	0.0000	0.0000	0.0000	
B27	1.2901	$4,250,434	0.1660	0.0827	1.0414	0.0000	0.0000	0.0000	0.0000	
B29	1.4567	$3,085,031	0.5297	0.3142	0.6128	0.0000	0.0000	0.0000	0.0000	
B32	0.8157	$1,920,791	0.3596	0.0000	0.4561	0.0000	0.0000	0.0000	0.0000	

Drainage Land

AUSTRAL & LEPPINGTON NORTH ESSENTIAL STORMWATER INFRASTRUCTURE CAPITAL WORKS COSTS

Item / Code	Detention Basin	Trunk drainage channel / pipe	Water quality	Construction cost	Contingency (item specific		Project on costs @ 15% of Construction Cost	Total Works Cost	Total Works Cost (indexed to latest period)	Notes	Indexed directly & column order change - for plan presentation			
Drainage Systems with 1% AEP Basins														
Drainage System B17	Basin 17	Chn B17.1, Chn B17.2, Chn B17.3 and Chn B17.4 (open channel)	Bioretention B17, GPT B17	$24,249,473	$4,490,175		$3,637,421	$32,377,069	$33,011,913		$24,724,953	$3,708,743	$4,578,218	$33,011,913
Drainage System B20	Basin 20	Chn B20.1, Chn B20.2 and Chn B20.3 (open channels), B20 pipe (Pipe B20.1, Pipe B20.2, Pipe B20.3, Pipe B20.4, Pipe B20.5, Pipe B20.6 and Pipe B20.7)	Bioretention B20, GPT B20	$10,455,627	$1,837,320		$1,568,344	$13,861,291	$14,133,081		$10,660,639	$1,599,096	$1,873,346	$14,133,081
Drainage System B21	Basin 21	Pipe B21.1, Pipe B21.2 and Pipe B21.3	GPT B21	$2,056,463	$370,020		$308,469	$2,734,952	$2,788,579		$2,096,786	$314,518	$377,275	$2,788,579
Drainage System B22	Basin 22	Chn B22 (open channel)	GPT B22	$8,682,075	$1,610,674		$1,302,311	$11,595,060	$11,822,414		$8,852,312	$1,327,847	$1,642,256	$11,822,414
Drainage System B23	Basin 23	Pipe B23.1, Pipe B23.2 and Pipe B23.3	GPT B23	$3,327,278	$594,689		$499,092	$4,421,059	$4,507,746		$3,392,519	$508,878	$606,350	$4,507,746
Drainage System B25	Basin 25	Pipe B25.1, Pipe B25.2 and Pipe B25.3, Chn 25 (open channel)	Bioretention B25, GPT B25	$10,605,354	$1,935,610		$1,590,803	$14,131,767	$14,408,861		$10,813,302	$1,621,995	$1,973,563	$14,408,861
Drainage System B27	Basin 27	Pipe B27.1, Pipe B27.2 and Pipe B27.3	Bioretention B27, GPT B27	$5,011,651	$862,674		$751,748	$6,626,073	$6,755,996		$5,109,919	$766,488	$879,589	$6,755,996
Drainage System B29	Basin 29	Chn B29b.1, Chn B29b.2, Chn B29c (open channels), Pipe B29a.1, Pipe B29a.2, Pipe B29a.3, Pipe B29a.4, Pipe B29a.5 and Pipe B29a.6, Pipe B29b.1, Pipe B29b.2, Pipe B29b.3 and Pipe B29b.4	GPT B29a, GPT B29b and GPT B29c, Sedimentation pond B29, Bioretention – B29	$11,660,864	$2,056,779		$1,749,130	$15,466,773	$15,770,043		$11,889,508	$1,783,426	$2,097,108	$15,770,043
Sub Total				**$76,048,785**	**$13,757,941**		**$11,407,318**	**$101,214,044**	**$103,198,633**		$77,539,938	$11,630,991	$14,027,705	$103,198,633
Drainage Systems with 50% AEP Basins														
Drainage System B5	Basin 5	Pipe B5.1, Pipe B5.2, Pipe B5.3 and Pipe B5.4	GPT B5	$6,825,964	$1,195,989		$1,023,895	$9,045,848	$9,223,217		$6,959,806	$1,043,971	$1,219,440	$9,223,217
Drainage System B6	Basin 6	Pipe B6.1, Pipe B6.2, Pipe B6.3, Pipe B6.4 and Pipe B6.5, Chn B6	Bioretention B6, GPT B6	$4,223,729	$721,637		$633,559	$5,578,925	$5,688,316		$4,306,547	$645,982	$735,787	$5,688,316
Drainage System B8	Basin 8	Pipe B8.1, Pipe B8.2, Pipe B8.3, Pipe B8.4 and Pipe B8.5, Chn B8	Bioretention B8, GPT B8	$5,152,081	$909,799		$772,812	$6,834,692	$6,968,706		$5,253,102	$787,965	$927,638	$6,968,706
Drainage System B11	Basin 11	Pipe B11.1, Pipe B11.2, Pipe B11.3, Pipe B11.4, Pipe B11.5, Pipe B11.6, Pipe B11.7, B11.8, B11.9, and Pipe B11.10, Chn B11	Bioretention B11, GPT B11	$11,799,998	$1,983,171		$1,770,000	$15,553,169	$15,858,133		$12,031,371	$1,804,706	$2,022,057	$15,858,133
Drainage System B12	Basin 12	Chn B12	Bioretention B12, GPT B12	$2,775,251	$504,506		$416,288	$3,696,045	$3,768,516		$2,829,668	$424,450	$514,398	$3,768,516
Drainage System B13	Basin 13	Pipe B13.1, Pipe B13.2 and Pipe B13.3	Bioretention B13, GPT B13	$6,998,847	$1,278,428		$1,049,827	$9,327,102	$9,509,986		$7,136,079	$1,070,412	$1,303,495	$9,509,986
Drainage System B14	Basin 14	Pipe B14.1, Pipe B14.2, Pipe B14.3, Pipe B14.4, Pipe B14.5, Pipe B14.6, Pipe B14.7, Pipe B14.8, Pipe B14.9, Pipe B14.10, and Pipe B14.11, Chn B14.1 and Chn B14.2	Bioretention B14, GPT B14	$10,175,940	$1,715,964		$1,526,391	$13,418,295	$13,681,399		$10,375,468	$1,556,320	$1,749,610	$13,681,399
Drainage System B15	Basin 15		Bioretention B15, GPT B15	$2,381,657	$427,136		$357,249	$3,166,042	$3,228,121		$2,428,356	$364,253	$435,511	$3,228,121
Drainage System B16	Basin 16	Pipe B16.1, Pipe B16.2, Pipe B16.3 and Pipe B16.4, CHN B16	Bioretention B16, GPT B16	$5,111,927	$875,027		$766,789	$6,753,743	$6,886,169		$5,212,161	$781,824	$892,184	$6,886,169
Drainage System B18	Basin 18	Pipe B18.1, Pipe B18.2, Pipe B18.3, Pipe B18.4, Pipe B18.5, Pipe18.6 and Pipe 18.7	Bioretention B18, GPT B18	$5,413,165	$783,744		$811,975	$7,008,884	$7,146,313		$5,519,305	$827,896	$799,112	$7,146,313
Drainage System B19	Basin 19	Pipe B19.1, Pipe B19.2, Pipe B19.3, Pipe B19.4, Pipe B19.5, Pipe B19.6, Pipe B19.7 and Pipe B19.8, Chn B19	Bioretention B19, GPT B19	$7,957,090	$1,347,549		$1,193,564	$10,498,203	$10,704,050		$8,113,111	$1,216,967	$1,373,972	$10,704,050
B32 (outside scope border of SMEC study)	Basin 32	DC65, DC66		$4,317,035	$733,896		$647,555	$5,698,486	$5,810,221		$4,401,683	$660,252	$748,286	$5,810,221
Sub Total				**$73,132,684**	**$12,476,846**		**$10,969,903**	**$96,579,432**	**$98,473,147**		$74,566,658	$11,184,999	$12,721,490	$98,473,147
Drainage Systems without Basins														
Drainage System NB5				$3,626,257	$409,326		$543,939	$4,579,522	$4,669,316		$3,697,360	$554,604	$417,352	$4,669,316
Drainage System NB13				$1,093,709	$149,663		$164,056	$1,407,428	$1,435,025		$1,115,154	$167,273	$152,598	$1,435,025
Drainage System NB14				$776,125	$107,075		$116,419	$999,619	$1,019,219		$791,343	$118,701	$109,175	$1,019,219
Drainage System NB15				$1,416,193	$195,537		$212,429	$1,824,159	$1,859,927		$1,443,961	$216,594	$199,371	$1,859,927
Drainage System NB33				$1,010,720	$127,675		$151,608	$1,290,003	$1,315,297		$1,030,538	$154,581	$130,178	$1,315,297
Drainage System NB35				$1,682,890	$225,618		$252,434	$2,160,942	$2,203,313		$1,715,888	$257,383	$230,042	$2,203,313
Drainage System NB37				$1,005,778	$138,000		$150,867	$1,294,645	$1,320,030		$1,025,499	$153,825	$140,706	$1,320,030
Drainage System NB38				$444,754	$62,632		$66,713	$574,099	$585,356		$453,475	$68,021	$63,860	$585,356
Sub Total				**$11,056,426**	**$1,415,526**		**$1,658,464**	**$14,130,416**	**$14,407,483**		$11,273,219	$1,690,983	$1,443,281	$14,407,483
Creek Culverts (stormwater works only)														
B_Eighth				$1,103,487	$151,845		$165,523	$1,420,855	$1,448,715		$1,125,124	$168,769	$154,822	$1,448,715
B_Fourth				$1,232,952	$173,036		$184,943	$1,590,931	$1,622,126		$1,257,128	$188,569	$176,429	$1,622,126
B_Tenth				$1,345,777	$186,357		$201,867	$1,734,001	$1,768,001		$1,372,165	$205,825	$190,011	$1,768,001
EdmondsNorth_New				$1,020,077	$150,735		$153,012	$1,323,824	$1,349,781		$1,040,079	$156,012	$153,691	$1,349,781
Fifth_Av1				$1,484,838	$206,565		$222,726	$1,914,129	$1,951,661		$1,513,952	$227,093	$210,615	$1,951,661
K_13thE				$240,250	$33,383		$36,038	$309,671	$315,742		$244,961	$36,744	$34,038	$315,742
K_17thEN				$760,626	$104,919		$114,094	$979,639	$998,848		$775,540	$116,331	$106,976	$998,848
Surbox1				$590,547	$81,673		$88,582	$760,802	$775,720		$602,126	$90,319	$83,274	$775,720
Sub Total				**$7,778,554**	**$1,088,513**		**$1,166,783**	**$10,033,850**	**$10,230,592**		$7,931,075	$1,189,661	$1,109,856	$10,230,592
Streetscape raingardens														
Intersection raingardens				$21,081,237	$4,216,247		$3,162,185	$28,459,669	$28,459,669		$21,081,237	$3,162,185	$4,216,247	$28,459,669
T-junction raingardens				$25,225,491	$5,045,098		$3,783,824	$34,054,412	$34,054,412		$25,225,491	$3,783,824	$5,045,098	$34,054,412
Road bend raingardens				$1,238,882	$247,776		$185,832	$1,672,491	$1,672,491		$1,238,882	$185,832	$247,776	$1,672,491
Sub Total				**$47,545,609**	**$9,509,122**		**$7,131,841**	**$64,186,572**	**$64,186,572**		$47,545,609	$7,131,841	$9,509,122	$64,186,572
TOTAL ESSENTIAL STORMWATER WORKS COSTS				**$215,562,058**	**$38,247,948**		**$32,334,309**	**$286,144,315**	**$290,496,427**		$218,856,498	$32,828,475	$38,811,454	$290,496,427

AUSTRAL & LEPPINGTON NORTH ESSENTIAL OPEN SPACE LAND COSTS

Updated 15-Mar-21

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LALP	Local passive open space facilities	36.5056	$98,662,549
LALS	Local sporting field facilities	26.3658	$75,654,487
LADP	District passive open space facilities	34.6994	$78,489,715
LADS	District sporting field facilities	9.0691	$27,676,785
	Subtotal	106.6399	$280,483,536
	Land Acquisition Contingency		$33,658,024
	TOTAL ESSENTIAL OPEN SPACE INFRASTRUCTURE LAND ACQUISITION COSTS	**106.6399**	**$314,141,561**

Staging / Priority of infrastructure - when surrounding development proceeds.

LALP - Local Passive Open Space Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	6.3220	$2,534,723
Total <100 ARI Land for Acquisition	10.6901	$16,532,036
Total Residential Land (R2) for Acquisition	15.8847	$61,790,433
Total Residential Land (R3) for Acquisition	3.4265	$16,878,310
Total Commercial Land for Acquisition	0.2023	$927,047
Total Commercial Land for Acquisition	0.0000	$0
Total Industrial Land for Acquisition	0.0000	$0
Local Passive Open Space Total	**36.5056**	**$98,662,549**

LALS - Local Sporting Field Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	2.7712	$1,111,092
Total <100 ARI Land for Acquisition	8.0159	$12,396,372
Total Residential Land (R2) for Acquisition	14.1524	$55,121,113
Total Residential Land (R3) for Acquisition	1.4263	$7,025,911
Total Commercial Land for Acquisition	0.0000	$0
Total Industrial Land for Acquisition	0.0000	$0
Local Sporting Field Total	**26.3658**	**$75,654,487**

LADP - District Passive Open Space Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	5.7559	$2,307,770
Total <100 ARI Land for Acquisition	17.3667	$26,857,187
Total Residential Land (R2) for Acquisition	7.5352	$29,348,479
Total Residential Land (R3) for Acquisition	3.7452	$18,448,100
Total Commercial Land for Acquisition	0.0000	$0
Total Commercial Land for Acquisition	0.2965	$1,528,179
Total Industrial Land for Acquisition	0.0000	$0
District Passive Open Space Total	**34.6994**	**$78,489,715**

LADS - District Sporting Field Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	1.0034	$402,302
Total <100 ARI Land for Acquisition	3.3242	$5,140,805
Total Residential Land (R2) for Acquisition	1.1854	$4,616,841
Total Residential Land (R3) for Acquisition	3.5561	$17,516,837
Total Commercial Land for Acquisition	0.0000	$0
Total Industrial Land for Acquisition	0.0000	$0
District Sporting Field Total	**9.0691**	**$27,676,785**

LALP - Local Passive Open Space

Item	Area (ha)	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land (R2)	Residential Land (R3)	Commercial Land - B1	Commercial Land - B5	Industrial Land	Notes
LP2	1.6146	$6,288,602	0.0000	0.0000	1.6146	0.0000	0.0000		0.0000	
LP4	0.4661	$1,815,356	0.0000	0.0000	0.4661	0.0000	0.0000		0.0000	
LP5	1.8031	$2,104,541	0.5970	1.2061	0.0000	0.0000	0.0000	0.0000	0.0000	
LP6	0.5036	$1,961,384	0.0000	0.0000	0.5036	0.0000	0.0000	0.0000	0.0000	
LP7	0.6757	$3,328,196	0.0000	0.0000	0.0000	0.6757	0.0000	0.0000	0.0000	
LP8	2.3162	$2,910,269	0.5863	1.7299	0.0000	0.0000	0.0000	0.0000	0.0000	
LP10	1.3320	$1,327,910	0.6390	0.6930	0.0000	0.0000	0.0000	0.0000	0.0000	
LP11	1.4399	$2,077,918	0.6119	0.5929	0.2351	0.0000	0.0000	0.0000	0.0000	
LP12	1.2173	$1,341,376	0.4724	0.7449	0.0000	0.0000	0.0000	0.0000	0.0000	
LP13	0.9572	$1,038,684	0.3855	0.5717	0.0000	0.0000	0.0000	0.0000	0.0000	
LP16	0.6532	$2,361,725	0.0522	0.0000	0.6010	0.0000	0.0000	0.0000	0.0000	
LP17	0.6713	$2,614,603	0.0000	0.0000	0.6713	0.0000	0.0000	0.0000	0.0000	
LP22	1.2139	$5,909,926	0.0000	0.0000	0.0000	1.0116	0.2023	0.0000	0.0000	
LP25	0.9098	$1,406,986	0.0000	0.9098	0.0000	0.0000	0.0000	0.0000	0.0000	
LP26	0.1708	$264,139	0.0000	0.1708	0.0000	0.0000	0.0000	0.0000	0.0000	
LP27	0.4352	$1,695,032	0.0000	0.0000	0.4352	0.0000	0.0000	0.0000	0.0000	
LP28	0.6337	$700,034	0.2444	0.3893	0.0000	0.0000	0.0000	0.0000	0.0000	
LP29	1.3538	$3,246,563	0.3449	0.3497	0.6592	0.0000	0.0000	0.0000	0.0000	
LP30	0.4333	$578,853	0.1762	0.2100	0.0471	0.0000	0.0000	0.0000	0.0000	
LP31	0.5520	$704,822	0.2027	0.3138	0.0355	0.0000	0.0000	0.0000	0.0000	
LP32	2.1575	$3,314,017	0.3759	1.6078	0.1738	0.0000	0.0000	0.0000	0.0000	
LP33	0.5072	$883,458	0.1479	0.2449	0.1144	0.0000	0.0000	0.0000	0.0000	
LP34	0.3354	$938,776	0.0687	0.0543	0.2124	0.0000	0.0000	0.0000	0.0000	
LP35	0.8813	$3,453,239	0.0357	0.0000	0.7047	0.1409	0.0000	0.0000	0.0000	
LP39	0.5964	$2,322,767	0.0000	0.0000	0.5964	0.0000	0.0000	0.0000	0.0000	
LP40	0.5879	$2,896,073	0.0000	0.0000	0.0000	0.5879	0.0000	0.0000	0.0000	
LP44	0.4985	$1,674,377	0.0765	0.0000	0.4220	0.0000	0.0000	0.0000	0.0000	
LP45	2.1657	$8,013,006	0.0513	0.1033	2.0110	0.0000	0.0000	0.0000	0.0000	
LP46	0.2426	$251,240	0.1082	0.1344	0.0000	0.0000	0.0000	0.0000	0.0000	
LP49	0.5679	$1,177,967	0.2610	0.0520	0.2549	0.0000	0.0000	0.0000	0.0000	
LP50	0.4252	$265,700	0.3420	0.0831	0.0000	0.0000	0.0000	0.0000	0.0000	
LP51	0.3487	$870,182	0.1214	0.0272	0.2001	0.0000	0.0000	0.0000	0.0000	
LP52	0.1733	$425,862	0.0713	0.0000	0.1020	0.0000	0.0000	0.0000	0.0000	
LP53	0.3139	$1,546,340	0.0000	0.0000	0.0000	0.3139	0.0000	0.0000	0.0000	
LP55	0.5859	$2,886,151	0.0000	0.0000	0.0000	0.5859	0.0000	0.0000	0.0000	
LP56	0.3316	$1,405,380	0.0000	0.0000	0.2211	0.1105	0.0000	0.0000	0.0000	
LP57	0.1351	$58,446	0.1313	0.0037	0.0000	0.0000	0.0000	0.0000	0.0000	
LP58	0.1913	$744,890	0.0000	0.0000	0.1913	0.0000	0.0000	0.0000	0.0000	
LP59	0.2575	$1,003,026	0.0000	0.0000	0.2575	0.0000	0.0000	0.0000	0.0000	
LP60	0.3275	$1,275,588	0.0000	0.0000	0.3275	0.0000	0.0000	0.0000	0.0000	
LP61	0.2725	$1,061,201	0.0000	0.0000	0.2725	0.0000	0.0000	0.0000	0.0000	
LP62	1.2146	$4,730,628	0.0000	0.0000	1.2146	0.0000	0.0000	0.0000	0.0000	
LP63	0.0325	$126,753	0.0000	0.0000	0.0325	0.0000	0.0000	0.0000	0.0000	
LP64	2.3271	$9,063,651	0.0000	0.0000	2.3271	0.0000	0.0000	0.0000	0.0000	
LP65	0.2558	$996,262	0.0000	0.0000	0.2558	0.0000	0.0000	0.0000	0.0000	
LP66	1.4202	$3,600,650	0.2182	0.4974	0.7045	0.0000	0.0000	0.0000	0.0000	

LADP - District Passive Open Space

Item	Area (ha)	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land (R2)	Residential Land (R3)	Commercial Land	Commercial Land	Industrial Land	Notes
DP2	3.6531	$4,016,423	1.5918	1.9802	0.0811	0.0000	0.0000	0.0000	0.0000	
DP3	3.9971	$10,184,600	0.4115	1.6802	1.9054	0.0000	0.0000	0.0000	0.0000	
DP4	2.2378	$3,587,716	0.3512	1.6612	0.2254	0.0000	0.0000	0.0000	0.0000	
DP5	2.0380	$3,359,464	0.4768	1.3381	0.0000	0.2231	0.0000	0.0000	0.0000	
DP6	6.1467	$18,241,572	1.3450	1.7607	0.0000	3.0410	0.0000	0.0000	0.0000	
DP7	0.3658	$246,555	0.2786	0.0872	0.0000	0.0000	0.0000	0.0000	0.0000	
DP8	0.5594	$2,178,771	0.0000	0.0000	0.5594	0.0000	0.0000	0.0000	0.0000	
DP9	0.3295	$1,283,348	0.0000	0.0000	0.3295	0.0000	0.0000	0.0000	0.0000	
DP10	10.4330	$20,729,299	1.1346	6.7883	2.5101	0.0000	0.0000	0.0000	0.0000	
DP11	4.1797	$12,608,618	0.0000	1.7743	1.9243	0.4811	0.0000	0.0000	0.0000	
DP12	0.7593	$2,053,349	0.1664	0.2966	0.0000	0.0000	0.0000	0.2965	0.0000	

LALS - Local Sporting Fields

Item	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land (R2)	Residential Land (R3)	Commercial Land - B1	Commercial Land - B5	Industrial Land	Notes
LS1	5.7054	$23,692,025	0.0000	0.0000	4.2790	1.4263	0.0000	0.0000	0.0000	
LS4	6.0676	$17,899,504	0.8661	1.1526	4.0489	0.0000	0.0000	0.0000	0.0000	
LS8	2.6640	$4,970,420	0.3274	1.8148	0.5219	0.0000	0.0000	0.0000	0.0000	
LS9	11.9288	$29,092,539	1.5777	5.0485	5.3026	0.0000	0.0000	0.0000	0.0000	

LADS - District Sporting Fields

Item	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land (R2)	Residential Land (R3)	Commercial Land - B1	Commercial Land - B5	Industrial Land	Notes
DS1	9.0691	$27,676,785	1.0034	3.3242	1.1854	3.5561	0.0000	0.0000	0.0000	

AUSTRAL & LEPPINGTON NORTH ESSENTIAL OPEN SPACE EMBELLISHMENT COSTS

Updated 15-Mar-21

Item	Area (ha)	Cost	Project On Costs	Demolition Allowance	Total Cost	Notes
Local Passive Open Space embellishment						
LP2	5.0740	$4,277,377	$246,776	$27,014	$4,550,669	
LP4	5.4661	$3371,007	$97,471	$0	$439,598	
LP5	7.9931	$1,429,539	$387,887	$28,757	$1,837,183	
LP6	5.5936	$380,829	$109,785	$0	$490,615	
LP7	5.6757	$324,706	$138,352	In EDC's	$645,152	
LP8	2.3162	$1,767,393	$482,458	$0	$2,249,851	
LP10	7.3220	$962,262	$282,970	$27,014	$1,252,246	
LP11	1.4399	$1,040,909	$284,166	$0	$1,325,066	
LP12	7.2173	$884,381	$268,736	$0	$1,253,117	
LP13	5.9572	$706,459	$191,252	$0	$897,620	
LP16	5.4552	$489,716	$132,456	$0	$622,412	
LP17	5.6713	$533,679	$127,324	$0	$661,163	
LP22	7.2139	$991,234	$270,607	$86,270	$1,348,112	
LP23	5.9896	$874,110	$194,450	$28,757	$1097,317	
LP26	5.1706	$422,650	$50,321	$0	$472,976	
LP27	5.4352	$324,960	$91,444	$27,014	$443,418	
LP28	5.6327	$472,067	$128,458	$27,014	$632,278	
LP29	7.3526	$1,084,439	$296,469	$27,014	$1,437,950	
LP30	5.4233	$339,140	$90,129	In EDC's	$429,268	
LP31	5.5520	$414,443	$113,143	In EDC's	$527,586	
LP32	2.1570	$1,658,141	$452,672	$28,757	$2,139,570	
LP33	5.5872	$359,527	$98,151		$457,677	
LP34	5.3354	$294,782	$84,426	$0	$391,208	
LP35	5.6813	$752,226	$205,358	$0	$957,584	
LP36	5.5964	$430,104	$122,667	$0	$573,023	
LP40	5.5870	$444,167	$125,241	$28,757	$598,165	
LP41	5.4985	$380,219	$103,797	$0	$488,008	
LP42	7.1457	$1,070,562	$429,760	$0	$1,500,326	
LP46	5.2426	$471,261	$46,764	$0	$518,025	
LP49	5.5879	$424,688	$115,924	$28,757	$569,369	
LP50	5.4252	$297,099	$81,155	$0	$378,257	
LP51	5.0497	$270,704	$73,916	$28,757	$373,427	
LP52	5.1733	$122,482	$33,432	$0	$155,914	
LP53	5.0139	$240,297	$67,785	$0	$316,082	
LP54	5.5833	$342,475	$148,097	$0	$600,575	
LP56	5.3076	$293,909	$71,226	$0	$332,136	
LP57	5.1524	$90,681	$25,024	$0	$115,705	
LP58	5.1913	$160,533	$43,952	$0	$204,485	
LP59	5.2570	$201,994	$56,782	$0	$258,777	
LP60	5.1275	$259,955	$70,405	$0	$330,427	
LP61	5.2725	$216,688	$59,096	$0	$275,784	
LP62	7.2146	$891,910	$243,450	$0	$1,135,410	
LP63	5.0325	$47,220	$12,891	$0	$60,111	
LP64	7.2271	$1,686,910	$460,529	$0	$2,147,447	
LP65	5.2558	$266,753	$66,494	$0	$333,197	
LP66	5.4252	$1,024,533	$282,427	$0	$1,310,960	
Subtotal	**36.5936**	**$27,014,998**	**$7,283,494**	**$346,378**	**$33,644,870**	
District Passive Open Space embellishment						
DP2	3.6531	$2,963,582	$810,691	$110,027	$3,884,280	
DP3	3.9871	$2,915,720	$769,910	$88,270	$3,674,512	
DP4	2.2579	$1,017,166	$414,165	$86,270	$1,517,604	
DP5	2.0380	$1,914,338	$496,396	$110,027	$2,424,641	
DP6	6.1467	$4,091,267	$1,252,416	$110,027	$5,453,710	
DP7	0.3632	$254,215	$69,401	$0	$323,615	
DP8	3.7543	$2,962,782	$808,960	$0	$3,771,622	
DP9	9.1295	$911,962	$250,087	$27,014	$1,226,063	
DP10	10.4230	$7,456,497	$2,046,044	$27,014	$9,529,554	
DP11	5.4326	$4,702,108	$1,282,489	$0	$5,985,047	
DP12	5.7350	$559,439	$139,189	$27,014	$726,143	
Subtotal	**60.1472**	**$30,554,117**	**$8,241,374**	**$686,162**	**$39,085,553**	
Local Sporting Fields embellishment						
LS1	5.7654	$5,650,604	$1,279,760	$115,027	$6,649,586	
LS4	6.0676	$5,282,347	$1,442,081	$172,541	$6,896,969	
LS5	4.3252	$3,329,369	$1,457,340	$0	$4,786,501	
LS6	2.6840	$3,419,927	$903,421	$115,027	$4,468,595	
LS9	11.9288	$9,580,149	$2,918,930	$115,027	$12,627,106	
Subtotal	**30.8809**	**$25,685,213**	**$7,001,582**	**$517,622**	**$37,657,757**	
District Sporting Fields embellishment						
DS1	5.0691	$7,064,259	$1,026,042	$258,911	$9,231,411	
Subtotal	**5.0691**	**$7,064,259**	**$1,026,042**	**$258,911**	**$9,231,411**	
Total Construction Costs		**$90,121,583**	**$23,680,193**	**$2,012,073**	**$121,825,755**	
Construction Contingency					**$6,739,419**	
TOTAL ESSENTIAL OPEN SPACE CONSTRUCTION COSTS					**$128,559,170**	

Staging = Priority of infrastructure - as and when funding/development proceeds.
Project On-Costs: excludes construction and contingency

Specific Park Costs

LP2

Item	Area (m2)	Cost
Local Open Space Embellishment	15,899	$1,133,700
Local Park Furniture	Item	$23,064
Local Park Playground	280	$119,620
LP2 Essential Infrastructure Cost	**16,146**	**$1,277,277**

LP4

Item	Area (m2)	Cost
Local Open Space Embellishment	4,661	$333,073
Local Park Furniture	Item	$23,064
LP4 Essential Infrastructure Cost	**4,661**	**$357,037**

LP5

Item	Area (m2)	Cost
Riparian Open Space Embellishment	5,970	$414,880
Local Open Space Embellishment	12,061	$861,670
Local Park Furniture	Item	$23,064
Local Park Playground	280	$119,620
LP5 Essential Infrastructure Cost	**18,311**	**$1,420,235**

LP6

Item	Area (m2)	Cost
Local Open Space Embellishment	5,036	$359,805
Local Park Furniture	Item	$23,064
LP6 Essential Infrastructure Cost	**5,036**	**$382,870**

LP7

Item	Area (m2)	Cost
Local Open Space Embellishment	6,757	$482,832
Local Park Furniture	Item	$23,064
LP7 Essential Infrastructure Cost	**6,757**	**$506,796**

LP8

Item	Area (m2)	Cost
Riparian Open Space Embellishment	5,883	$407,445
Local Open Space Embellishment	17,019	$1,216,163
Local Park Furniture	Item	$23,064
Local Park Playground	280	$119,620
LP8 Essential Infrastructure Cost	**23,182**	**$1,767,293**

LP10

Item	Area (m2)	Cost
Riparian Open Space Embellishment	6,390	$444,076
Local Open Space Embellishment	6,930	$495,202
Local Park Furniture	Item	$23,064
LP10 Essential Infrastructure Cost	**13,320**	**$962,262**

LP11

Item	Area (m2)	Cost
Riparian Open Space Embellishment	6,118	$425,240
Local Open Space Embellishment	8,280	$591,605
Local Park Furniture	Item	$23,064
LP11 Essential Infrastructure Cost	**14,398**	**$1,040,909**

LP12

Item	Area (m2)	Cost
Riparian Open Space Embellishment	4,704	$326,297
Local Open Space Embellishment	7,168	$512,301
Local Park Furniture	Item	$23,064
Local Park Playground	280	$119,620
LP12 Essential Infrastructure Cost	**12,172**	**$884,381**

LP13

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,855	$267,909
Local Open Space Embellishment	5,717	$408,540
Local Park Furniture	Item	$23,064
LP13 Essential Infrastructure Cost	**9,572**	**$700,409**

LP16

Item	Area (m2)	Cost
Riparian Open Space Embellishment	522	$36,277
Local Open Space Embellishment	6,010	$429,478
Local Park Furniture	Item	$23,064
LP16 Essential Infrastructure Cost	**6,532**	**$489,719**

DP2

Item	Area (m2)	Cost
Riparian Open Space Embellishment	15,918	$1,136,225
District Open Space Embellishment	17,252	$1,120,450
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Outdoor Courts	1,500	$83,874
District Park Playground	600	$359,450
District Park Parking	1,260	$130,973
DP2 Essential Infrastructure Cost	**36,531**	**$3,005,162**

DP3

Item	Area (m2)	Cost
Riparian Open Space Embellishment	4,115	$293,974
District Open Space Embellishment	33,096	$2,149,332
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Outdoor Courts	1,500	$83,874
District Park Parking	1,260	$130,973
DP3 Essential Infrastructure Cost	**39,971**	**$2,810,726**

DP4

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,512	$244,068
District Open Space Embellishment	19,666	$1,205,354
District Park Furniture	Item	$47,928
DP4 Essential Infrastructure Cost	**23,178**	**$1,517,190**

DP5

Item	Area (m2)	Cost
Riparian Open Space Embellishment	4,768	$331,358
District Open Space Embellishment	15,012	$974,914
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Playground	600	$359,450
DP5 Essential Infrastructure Cost	**20,380**	**$1,814,300**

DP6

Item	Area (m2)	Cost
Riparian Open Space Embellishment	13,450	$934,714
District Open Space Embellishment	46,157	$2,997,044
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Playground	600	$359,450
District Park Parking	1,260	$130,973
DP6 Essential Infrastructure Cost	**61,467**	**$4,591,267**

DP7

Item	Area (m2)	Cost
Riparian Open Space Embellishment	2,786	$193,614
District Open Space Embellishment	872	$60,690
DP7 Essential Infrastructure Cost	**3,658**	**$254,313**

DP8

Item	Area (m2)	Cost
Riparian Open Space Embellishment	34,183	$2,219,898
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Outdoor Courts	1,500	$83,874
District Park Playground	600	$359,450
District Park Parking	1,260	$130,973
DP8 Essential Infrastructure Cost	**37,543**	**$2,962,782**

DP9

Item	Area (m2)	Cost
District Open Space Embellishment	2,666	$175,725
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Outdoor Courts		$83,874
District Park Playground	600	$359,450
District Park Parking		$130,973
DP9 Essential Infrastructure Cost	**3,266**	**$917,962**

DP10

Item	Area (m2)	Cost
District Open Space Embellishment	103,994	$6,753,614
District Park Furniture	Item	$47,928
District Park Picnic Facilities	Item	$100,649
District Park Outdoor Courts	1,500	$83,874
District Park Playground	600	$359,450
District Park Parking	1,260	$130,973
DP10 Essential Infrastructure Cost	**107,354**	**$7,476,487**

LS1

Item	Area (m2)	Cost
Local Sports Ground Works	57,054	$879,509
Local Sports Embellishment	19,804	$1,127,829
Local Sports Furniture	Item	$47,928
Local Sports Picnic Facilities	Item	$50,324
Local Sports Exercise Equipment	Item	$35,946
Local Multipurpose Playing Field in irrigation	32,500	$1,306,755
Playing Field Lighting	Item	$143,784
Cricket Practice Nets	250	$39,541
Formal Courts	1,500	$191,712
Formal Court Lighting	Item	$62,304
Amenities Building	500	$599,059
Local Sports Parking	1,250	$301,949
LS1 Essential Infrastructure Cost	**57,054**	**$5,053,836**

LS4

Item	Area (m2)	Cost
Riparian Open Space Embellishment	9,661	$651,886
Local Sports Ground Works	52,015	$892,457
Local Sports Embellishment	14,765	$840,884
Local Sports Furniture	Item	$47,928
Local Sports Picnic Facilities	Item	$50,324
Local Sports Exercise Equipment	Item	$35,946
Local Multipurpose Playing Field in irrigation	32,500	$1,306,755
Playing Field Lighting	Item	$143,784
Cricket Practice Nets	250	$39,541
Informal Courts	1,250	$167,748
Formal Courts	1,500	$191,712
Formal Court Lighting	Item	$62,304
Amenities Building	500	$599,059
Local Sports Parking	1,250	$301,949
LS4 Essential Infrastructure Cost	**60,676**	**$5,282,347**

LS5

Item	Area (m2)	Cost
Local Sports Ground Works		
Local Sports Embellishment	42,000	$2,991,915
Local Sports Furniture	Item	$47,928
Local Sports Picnic Facilities	Item	$50,324
Local Sports Exercise Equipment	Item	$35,946
Local Multipurpose Playing Field in irrigation		$1,306,755
Playing Field Lighting		$143,784
Cricket Practice Nets		$39,541
Informal Courts		$167,748
Formal Courts		$191,712
Formal Court Lighting		$62,304
Amenities Building		$599,059
Local Sports Parking	1,250	$301,949
LS5 Essential Infrastructure Cost		**$6,039,965**

LS6

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,274	$221,526
Local Sports Ground Works	23,388	$400,767
Local Sports Embellishment	5,366	$305,823
Local Sports Furniture	Item	$47,928
Local Sports Picnic Facilities	Item	$50,324
Local Sports Exercise Equipment	Item	$35,946
Local Multipurpose Playing Field in irrigation	16,250	$1,306,755
Playing Field Lighting	Item	$143,784
Amenities Building	500	$599,059
Local Sports Parking	1,250	$301,949
LS6 Essential Infrastructure Cost	**29,640**	**$3,415,857**

LS9

Item	Area (m2)	Cost
Riparian Open Space Embellishment	13,777	$1,096,463
Local Sports Ground Works	103,510	$1,776,050
Local Sports Embellishment	66,260	$3,773,549
Local Sports Furniture	Item	$47,928
Local Sports Picnic Facilities	Item	$50,324
Local Sports Exercise Equipment	Item	$35,946
Local Multipurpose Playing Field in irrigation	32,500	$1,306,755
Playing Field Lighting	Item	$143,784
Cricket Practice Nets	250	$39,541
Informal Courts	1,250	$167,748
Formal Courts	1,500	$191,712
Formal Court Lighting	Item	$62,304
Amenities Building	500	$599,059
Local Sports Parking	1,250	$301,949
LS9 Essential Infrastructure Cost	**119,288**	**$9,293,109**

DS1

Item	Area (m2)	Cost
Riparian Open Space Embellishment	10,334	$697,318
District Sports Ground Works	80,837	$1,363,926
District Sporting Field Embellishment	10,532	$579,102
District Sports Furniture	Item	$71,892
District Sports Picnic Facilities	Item	$75,486
District Sports Fitness Equipment	Item	$35,946
District Multipurpose Playing Field and its irrigation	63,750	$2,306,700
Playing Field Lighting	Item	$287,568
Cricket Practice Nets	250	$39,541
Informal Courts	1,875	$95,856
Formal Courts	2,250	$145,704
Formal Court Lighting	Item	$124,608
District Amenities Building	750	$898,588
District Sports Parking	1,250	$301,949
DS1 Essential Infrastructure Cost	**90,591**	**$7,964,208**

Unit Construction Rates - adjusted for PPI from original costings

Item	Measure	Rate	Notes
Local Parks			
Local Park Construction	Sqm	$71.44	See below
Local Park Furniture	Item	$20,964	See below
Local Park Playground	Item	$119,820	See below
Local Park Plaza Paving	Sqm	$240	See below
Walkways/Cycleway	Sqm	$57.49	See below
District Parks			
District Park Construction	Sqm	$64.94	See below
District Park Furniture	Item	$47,926	See below
District Park Picnic Facilities	Item	$100,646	See below
District Park Outdoor Courts	Item	$83,874	See below
District Park Car Parking	Item	$150,973	See below
District Park Playground	Item	$359,459	See below
Local Sporting Fields			
Local Sporting Field Groundworks	Sqm	$17.16	See below
Local Sporting Field Embellishment +Shs	Sqm	$56.96	See below
Local Sports Furniture	Item	$47,926	See below
Local Sports Picnic Facilities	Item	$50,324	See below
Local Sports Exercise Equipment	Item	$35,946	See below
Local Multipurpose Playing Field INC Irrigation	Item	$1,306,755	See below
Cricket Practice Nets	Item	$39,541	See below
Informal Courts	Item	$167,746	See below
Formal Courts	Item	$191,712	See below
Amenities Building	Item	$599,099	See below
Formal Court Lighting	Item	$62,306	See below
Playing Field Lighting	Item	$143,758	See below
Local Sports Parking	Item	$301,949	See below
District Sporting Fields			
District Sporting Field Construction	Sqm	$17.16	See below
District Sporting Field Embellishment	Sqm	$54.96	See below
District Sports Furniture	Item	$71,889	See below
District Sports Picnic Facilities	Item	$75,486	See below
District Sports Fitness Equipment	Item	$35,946	See below
District Multipurpose Playing Field INC Irrigation	Item	$2,326,709	See below
Cricket Practice Nets	Item	$23,964	See below
Informal Courts	Item	$95,858	See below
Formal Courts	Item	$145,757	See below
District Amenities Building	Item	$898,648	See below
Formal Court Lighting	Item	$124,613	See below
Playing Field Lighting	Item	$287,566	See below
District Sports Car Parking	Item	$301,949	See below
Channel Open Space			
Riparian Open Space	m2	$69.00	See below
Shared pedestrian/cycleway	m2	$107.84	See below
Demolition			
Dwelling and outbuilding demolition	Item	$28,757	See below
Additional Costs			
Plan of Management	Item	$479,275	See below
Project On-Costs	%	27%	See below
Contingency	%	7%	See below

Construction Costs - unindexed

Item	Measure	Rate	Notes
Local Parks			
Local Park Construction	Sqm	$59.64	See WTP review report rework of costing in Elton Report Table 1.7 Assumptions and inclusions for open space embellishment - Local Parks (passive): Cost / Area (adopted rather than WTP rate because Elton's costing reasonable & there's marginal difference)
Local Park Furniture	Item	$20,000	Elton and WTP
Local Park Playground	Item	$100,000	Elton and WTP
Local Park Plaza Paving	Sqm	$200	Gerden Gaunt advice
Walkways/Cycleway	Sqm	$47.95	Elton costs
District Parks			
District Park Construction	Sqm	$54.20	See WTP review report rework of costing in Elton Report Table 1.7 Assumptions and inclusions for open space embellishment - L ocal Parks (passive): Cost / Area (adopted rather than WTP rate because Elton's costing reasonable & there's marginal difference)
District Park Furniture	Item	$40,000	As above
District Park Picnic Facilities	Item	$84,000	As above
District Park Outdoor Courts	Item	$70,000	As above
District Park Parking	Item	$126,000	50 spaces @ 1,500m2 WTP cost review
District Park Playground	Item	$300,000	Elton costs as above
Local Sporting Fields			
Local Sporting Field Groundworks	Sqm	$14.32	See Elton advice for inclusions and rate breakdown sheet
Local Sporting Field Embellishment +Shs	Sqm	$47.52	See Elton Report Table 1.7 Assumptions and inclusions for open space embellishment - Local Parks (active) Cost / Area - advice for inclusions and rate breakdown sheet
Local Sports Furniture	Item	$40,000	As above
Local Sports Picnic Facilities	Item	$42,000	As above
Local Sports Exercise Equipment	Item	$30,000	As above
Local Multipurpose Playing Field INC Irrigation	Item	$1,090,000	WTP Cost review
Cricket Practice Nets	Item	$33,000	WTP Cost review
Informal Courts	Item	$140,000	WTP Cost review
Formal Courts	Item	$160,000	WTP Cost review
Amenities Building	Item	$500,000	Elton costs as above
Formal Court Lighting	Item	$52,000	Elton costs as above
Playing Field Lighting	Item	$120,000	WTP Cost review
Local Sports Parking	Item	$252,000	100 spaces @ 3000m2 WTP cost review
District Sporting Fields			
District Sporting Field Construction	Sqm	$14.32	See Elton advice for inclusions and rate breakdown sheet
District Sporting Field Embellishment	Sqm	$45.84	See Elton Report Table 1.7 Assumptions and inclusions for open space embellishment - District Parks (active) Cost / Area - advice for inclusions and rate breakdown sheet
District Sports Furniture	Item	$60,000	Elton costs as above
District Sports Picnic Facilities	Item	$63,000	Elton costs as above
District Sports Fitness Equipment	Item	$30,000	Elton costs as above
District Multipurpose Playing Field INC Irrigation	Item	$1,941,840	Elton costs as above
Cricket Practice Nets	Item	$20,000	Elton costs as above
Informal Courts	Item	$80,000	Elton costs as above
Formal Courts	Item	$121,600	Elton costs as above
District Amenities Building	Item	$750,000	Elton costs as above
Formal Court Lighting	Item	$104,000	Elton costs as above
Playing Field Lighting	Item	$240,000	WTP Cost review
District Sports Parking	Item	$252,000	100 spaces @ 3000m2 WTP cost review
Channel Open Space			
Riparian Open Space	m2	$58.00	As per CC advice
Shared pedestrian/cycleway	m2	$90.00	As per CC advice on current tender for Sprin gFarm and Edmondson Streetscape and Concrete Paving Tender - October 2017. Includes excavation of base, mesh reinforcement and 2.5m width. Path width increased to 3m to comply with Leppington Major Centre Public Domain Strategy
Demolition			
Dwelling and outbuilding demolition	Item	$24,000	Beveton LCC advice.
Additional Costs			
Plan of Management	Item	$400,000	N/A Lump Sum of $400,000 to be allowed for
Project On-Costs	%	27%	Beveton LCC advice, includes prelims (6%), margin (5%), LSL (0.3%), approvals (1%), professional fees (10%) and project management costs (5%)
Contingency	%	7%	Beveton LCC advice

LP17

Item	Area (m2)	Cost
Local Open Space Embellishment	6,713	$479,715
Local Park Furniture	Item	$23,964
LP17 Essential Infrastructure Cost	**6,713**	**$503,679**

LP32

Item	Area (m2)	Cost
Local Open Space Embellishment	11,858	$847,401
Local Park Furniture	Item	$23,964
Local Park Playground	280	$119,820
LP 32 Essential Infrastructure Cost	**12,138**	**$991,185**

LP35

Item	Area (m2)	Cost
Riparian Open Space Embellishment	0	$0
Local Open Space Embellishment	9,096	$650,146
Local Park Furniture	Item	$23,964
LP 35 Essential Infrastructure Cost	**9,096**	**$674,110**

LP26

Item	Area (m2)	Cost
Riparian Open Space Embellishment	0	$0
Local Open Space Embellishment	1,708	$122,055
LP 26 Essential Infrastructure Cost	**1,708**	**$122,055**

LP27

Item	Area (m2)	Cost
Local Open Space Embellishment	4,352	$310,996
Local Park Furniture	Item	$23,964
LP 27 Essential Infrastructure Cost	**4,352**	**$334,960**

LP28

Item	Area (m2)	Cost
Riparian Open Space Embellishment	2,444	$168,647
Local Open Space Embellishment	3,892	$278,196
Local Park Furniture	Item	$23,964
LP 28 Essential Infrastructure Cost	**6,337**	**$472,807**

LP29

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,448	$238,000
Local Open Space Embellishment	9,809	$700,956
Local Park Furniture	Item	$23,964
Local Park Playground	280	$119,820
LP 29 Essential Infrastructure Cost	**13,538**	**$1,084,430**

LP30

Item	Area (m2)	Cost
Riparian Open Space Embellishment	1,782	$122,931
Local Open Space Embellishment	2,571	$183,725
Local Park Furniture	Item	$23,964
LP 30 Essential Infrastructure Cost	**4,353**	**$330,140**

LP31

Item	Area (m2)	Cost
Riparian Open Space Embellishment	2,027	$140,007
Local Open Space Embellishment	3,493	$249,612
Local Park Furniture	Item	$23,964
LP 31 Essential Infrastructure Cost	**5,520**	**$414,643**

LP33

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,756	$261,217
Local Open Space Embellishment	17,036	$1,253,140
Local Park Furniture	Item	$23,964
Local Park Playground	280	$119,820
LP 33 Essential Infrastructure Cost	**21,075**	**$1,658,140**

LP 33

Item	Area (m2)	Cost
Riparian Open Space Embellishment	1,478	$102,760
Local Open Space Embellishment	3,593	$256,743
LP 33 Essential Infrastructure Cost	**5,072**	**$359,527**

LP34

Item	Area (m2)	Cost
Riparian Open Space Embellishment	1,478	$102,760
Local Open Space Embellishment	1,877	$133,979
LP 34 Essential Infrastructure Cost	**3,354**	**$236,762**

LP 35

Item	Area (m2)	Cost
Riparian Open Space Embellishment	667	$47,733
Local Open Space Embellishment	7,846	$560,709
Local Park Furniture	Item	$23,964
Local Park Playground	280	$119,820
LP 35 Essential Infrastructure Cost	**8,813**	**$752,226**

LP36

Item	Area (m2)	Cost
Local Open Space Embellishment	5,964	$426,170
Local Park Furniture	Item	$23,964
LP 36 Essential Infrastructure Cost	**5,964**	**$450,134**

LP40

Item	Area (m2)	Cost
Local Open Space Embellishment	5,878	$420,143
Local Park Furniture	Item	$23,964
LP 40 Essential Infrastructure Cost	**5,878**	**$444,107**

GP01

Item	Area (m2)	Cost
Riparian Open Space Embellishment	0	$0
District Open Space Embellishment	50,966	$ 3,669,277
District Park Furniture	Item	$47,926
District Park Picnic Facilities	Item	$100,646
District Park Outdoor Courts	1,000	$83,874
District Park Playground	800	$359,459
District Park Parking	1,260	$150,973
GP01 Essential Infrastructure Cost	**54,026**	**$ 4,702,155**

GP02

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,600	$250,184
District Open Space Embellishment	3,993	$288,313
GP01 Essential Infrastructure Cost	**7,593**	**$538,499**

LP44

Item	Area (m2)	Cost
Local Open Space Embellishment	4,985	$356,240
Local Park Furniture	Item	$23,964
LP44 Essential Infrastructure Cost	**4,985**	**$380,210**

LP45

Item	Area (m2)	Cost
Riparian Open Space Embellishment	513	$36,676
Local Open Space Embellishment	21,143	$1,510,923
Local Park Furniture	Item	$23,964
LP45 Essential Infrastructure Cost	**21,657**	**$1,570,563**

LP46

Item	Area (m2)	Cost
Riparian Open Space Embellishment	1,062	$75,919
Local Open Space Embellishment	1,344	$96,062
LP46 Essential Infrastructure Cost	**2,406**	**$171,981**

2426.240779

LP48

Item	Area (m2)	Cost
Riparian Open Space Embellishment	2,810	$181,362
Local Open Space Embellishment	3,068	$219,240
Local Park Furniture	Item	$23,964
LP48 Essential Infrastructure Cost	**5,878**	**$424,566**

LP30

Item	Area (m2)	Cost
Riparian Open Space Embellishment	3,430	$237,699
Local Open Space Embellishment	821	$59,410
LP30 Essential Infrastructure Cost	**4,252**	**$297,109**

LP31

Item	Area (m2)	Cost
Riparian Open Space Embellishment	1,214	$84,381
Local Open Space Embellishment	2,273	$162,429
Local Park Furniture	Item	$23,964
LP31 Essential Infrastructure Cost	**3,487**	**$270,774**

LP32

Item	Area (m2)	Cost
Riparian Open Space Embellishment	713	$49,574
Local Open Space Embellishment	1,020	$72,989
LP32 Essential Infrastructure Cost	**1,733**	**$122,562**

LP33

Item	Area (m2)	Cost
Local Open Space Embellishment	3,139	$224,333
Local Park Furniture	Item	$23,964
LP 3 Essential Infrastructure Cost	**3,139**	**$248,297**

LP35

Item	Area (m2)	Cost
Local Open Space Embellishment	5,579	$398,695
Local Park Furniture	Item	$23,964
Local Park Playground	280	$119,820
LP 35 Essential Infrastructure Cost	**5859.2272**	**$542,479**

LP36

Item	Area (m2)	Cost
Riparian Open Space Embellishment	0	$0
Local Open Space Embellishment	3,316	$236,940
Local Park Furniture	Item	$23,964
LP36 Essential Infrastructure Cost	**3,316**	**$260,904**

LP37

Item	Area (m2)	Cost
Riparian Open Space Embellishment	1,331	$93,861
LP3 Essential Infrastructure Cost	**1,331**	**$93,861**

LP38

Item	Area (m2)	Cost
Local Open Space Embellishment	1,913	$136,669
Local Park Furniture	Item	$23,964
LP38 Essential Infrastructure Cost	**1,913**	**$160,633**

LP39

Item	Area (m2)	Cost
Local Open Space Embellishment	2,570	$184,030
Local Park Furniture	Item	$23,964
LP39 Essential Infrastructure Cost	**2,570**	**$207,994**

LP40

Item	Area (m2)	Cost
Local Open Space Embellishment	3,270	$234,035
Local Park Furniture	Item	$23,964
LP40 Essential Infrastructure Cost	**3,270**	**$258,000**

LP41

Item	Area (m2)	Cost
Local Open Space Embellishment	2,720	$194,704
Local Park Furniture	Item	$23,964
LP41 Essential Infrastructure Cost	**2,720**	**$218,668**

LP42 Glenrod

Item	Area (m2)	Cost
Local Open Space Embellishment	$12,146	$867,052
Local Park Furniture	Item	$23,964
LP42 Essential Infrastructure Cost	**12,146**	**$891,016**

LP43

Item	Area (m2)	Cost
Local Open Space Embellishment	325	$23,236
Local Park Furniture	Item	$23,964
LP43 Essential Infrastructure Cost	**325**	**$47,200**

LP44 Essential Infrastructure Cost

Item	Area (m2)	Cost
Local Open Space Embellishment	23,271	$1,662,954
Local Park Furniture	Item	$23,964
LP44 Essential Infrastructure Cost	**23,271**	**$1,686,918**

LP45 Essential Infrastructure Cost

Item	Area (m2)	Cost
Local Open Space Embellishment	2,556	$182,793
Local Park Furniture	Item	$23,964
LP45 Essential Infrastructure Cost	**2,556**	**$206,753**

LP46 Essential Infrastructure Cost

Item	Area (m2)	Cost
Riparian Open Space Embellishment	2,162	$151,667
Local Open Space Embellishment	12,018	$858,903
Local Park Furniture	Item	$23,964
LP46 Essential Infrastructure Cost	**14201.64765**	**$1,034,533**

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AUSTRAL & LEPPINGTON NORTH ESSENTIAL COMMUNITY FACILITY LAND COSTS

Updated 15-Mar-21

Item	Facility	Area (ha)	Cost
	Future Land Acquisition		
LACF	Land for Local Community Facilities	1.4341	$6,571,275
	Subtotal	**1.4341**	**$6,571,275**
	Land Acquisition Contingency		**$788,553**
	TOTAL ESSENTIAL COMMUNITY FACILITY INFRASTRUCTURE LAND ACQUISITION COSTS	**1.4341**	**$7,359,828**

Staging / Priority of infrastructure - As land affected by acquisition is developed or as required to service development.

LACF - Local Community Facility Land for Acquisition

Land Type	Area	Cost
Total Riparian Land for Acquisition	0.0000	$0
Total <100 ARI Land for Acquisition	0.0000	$0
Total Residential Land (R2) for Acquisition	0.0000	$0
Total Residential Land (R3) for Acquisition	0.0000	$0
Total Commercial Land for Acquisition	1.4341	$6,571,275
Total Industrial Land for Acquisition	0.0000	$0
Local Passive Open Space Total	**1.4341**	**$6,571,275**

LACF - Local Community Facilities

Item	Total Area	Acquisition Cost	Riparian Land	<100 ARI Land	Residential Land - R2	Residential Land - R3	Commercial Land - B1	Industrial Land
CF2	0.3412	$1,563,433	0.0000	0.0000	0.0000	0.0000	0.3412	0.0000
CF3	0.2867	$1,313,705	0.0000	0.0000	0.0000	0.0000	0.2867	0.0000
CF4	0.5339	$2,446,415	0.0000	0.0000	0.0000	0.0000	0.5339	0.0000
CF5	0.2723	$1,247,722	0.0000	0.0000	0.0000	0.0000	0.2723	0.0000

AUSTRAL & LEPPINGTON NORTH NON-ESSENTIAL COMMUNITY FACILITY CAPITAL WORKS COSTS

Updated 15-Mar-21

Item	Facility	Area (ha)	Cost to Plan	Project On Costs	Demolition Allowance	Total Cost to Plan	Priority / Staging
	Regional Community Facility						
LS1	Aquatic and Indoor Recreation Centre construction	5.2141	$28,778,149	$7,856,435	$27,627	$36,662,211	1
	Subtotal	**5.2141**	**$28,778,149**	**$7,856,435**	**$27,627**	**$36,662,211**	
	Local Community Facilities						
CF2	Local Community Facility construction	0.3412	$2,965,605	$809,610	$30,096	$3,805,311	2
CF3	Local Community Facility construction	0.2867	$2,901,755	$792,179	$30,096	$3,724,031	2
CF4	Local Community Facility construction	0.5339	$5,711,507	$1,559,241	$30,096	$7,300,844	3
CF5	Local Community Facility construction	0.2723	$2,884,885	$787,574	$0	$3,672,459	2
	Subtotal	**1.4341**	**$14,463,752**	**$3,948,604**	**$90,288**	**$18,502,644**	
	Public Art						
PA1	Regional Community Facility		$863,344	$235,693	$0	$1,099,038	4
PA2	Local Community Facilities		$433,913	$118,458	$0	$552,371	5
	Subtotal		**$1,297,257**	**$354,151**	**$0**	**$1,651,408**	
	Total Construction Costs		**$44,539,158**	**$12,159,190**	**$117,915**	**$56,816,263**	
	Construction Contingency					**$3,125,995**	
TOTAL NON ESSENTIAL COMMUNITY FACILITY CONSTRUCTION COSTS						**$59,942,258**	

Note Cost of Regional Community Facility LS5 has been adjusted to reflect residential catchment within the Precincts that will contribute to facility (41.4%) as facility will serve population of 120,000 people.

Project On Costs excludes construction and contingency

Priority / Staging

1 As residential catchments in adjoining Precincts establish, facility to serve 120,000 population.

2 As population in catchment area reaches 10,000.

3 At completion of residential development within the Precincts, facility to serve population of 40,000.

4 To be delivered with Aquatic and Indoor Recreation Centre.

5 To be delivered with Local Community Facilities.

Construction Costs

Item	Measure	Rate	Notes
Base Building Cost Local Facilities	Sqm	$3,491	See below
Base Building Cost District Facility	Sqm	$4,389	See below
Indicative Aquatic and Indoor Recreation Facility Cost	Item	$62,700,000	See below
Carparking	Sqm	$105	See below
Paving	Sqm	$251	See below
Turfing	Sqm	$31	See below
Planting	Sqm	$82	See below
Furniture	Item	$50,160	See below
Additional Costs			
Demolition Allowance	Item	$30,000	See below
Public Art	%	3%	See below
Project On Costs	%	27%	See below
Contingency	%	7%	See below

CF2 Cost Breakdown

3,412 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	22%	750	$2,618,352
Carparking for 50 cars	37%	1,250	$131,670
Paving	12%	424	$106,239
Turfing	12%	424	$13,147
Planting	17%	585	$46,037
Furniture	Not applicable	Item	$50,160
Total Cost	**100%**	**3,412**	**$2,965,605**

CF3 Cost Breakdown

2,867 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	26%	750	$2,618,352
Carparking for 50 cars	44%	1,250	$131,670
Paving	9%	280	$85,233
Turfing	9%	280	$8,073
Planting	12%	347	$28,268
Furniture	Not applicable	Item	$50,160
Total Cost	**100%**	**2,867**	**$2,901,755**

CF4 Cost Breakdown

5,339 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	28%	1,500	$5,236,704
Carparking for 85 cars	40%	2,125	$223,839
Paving	10%	514	$128,961
Turfing	10%	514	$15,959
Planting	13%	686	$55,883
Furniture	Not applicable	Item	$50,160
Total Cost	**100%**	**5,339**	**$5,711,507**

CF5 Cost Breakdown

2,723 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	28%	750	$2,618,352
Carparking for 50 cars	46%	1,250	$131,870
Paving	8%	217	$54,399
Turfing	8%	217	$6,732
Planting	11%	289	$23,573
Furniture	Not applicable	Item	$50,160
Total Cost	**100%**	**2,723**	**$2,884,885**

Construction Costs

Item	Measure	Rate	Notes
Base Building Cost Local Facilities	Sqm	$2,784	Elton cost with additional 16% for escalation as per Rawlinsons BPI to June 2011.
Base Building Cost District Facility	Sqm	$3,500	Elton cost, requires further detailed costing.
Indicative Aquatic and Indoor Recreation Facility Cost	Item	$50,000,000	Elton cost, requires further detailed costing. Figure is mid range of Elton estimate.
Carparking	Sqm	$84	Elton cost.
Paving	Sqm	$200	CC cost.
Turfing	Sqm	$25	Elton cost.
Planting	Sqm	$85	Elton cost.
Furniture	Item	$40,000	Elton cost for District Park furniture.
Additional Costs			
Demolition Allowance	Item	$24,000	Based on LCC advice.
Public Art	%	3%	Percentage cost on base construction of facility. Based on Camden Council advice.
Project On Costs	%	27%	Based on LCC advice, includes prelims (6%), margin (5%), LSL (0.3%), approvals (1%), professional fees (10%) and project management costs (5%)
Contingency	%	7%	Based on LCC advice.

CF2 Cost Breakdown — 3,412 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	22%	750	$2,088,000
Carparking for 50 cars	37%	1,250	$105,000
Paving	12%	424	$84,720
Turfing	12%	424	$10,484
Planting	17%	565	$36,712
Furniture	Not applicable	Item	$40,000
Total Cost	100%	3,412	$2,364,916

CF3 Cost Breakdown — 2,867 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	26%	750	$2,088,000
Carparking for 50 cars	44%	1,250	$105,000
Paving	9%	260	$52,020
Turfing	9%	280	$6,437
Planting	12%	347	$22,542
Furniture	Not applicable	Item	$40,000
Total Cost	100%	2,867	$2,313,999

CF4 Cost Breakdown — 5,339 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	28%	1,500	$4,176,000
Carparking for 85 cars	40%	2,125	$178,500
Paving	10%	514	$102,840
Turfing	10%	514	$12,726
Planting	13%	686	$44,564
Furniture	Not applicable	Item	$40,000
Total Cost	100%	5,339	$4,554,630

CF5 Cost Breakdown — 2,723 sqm site area

Item	% of Site Area	Area (m2)	Cost
Base Building	28%	750	$2,088,000
Carparking for 50 cars	46%	1,250	$105,000
Paving	8%	217	$43,380
Turfing	8%	217	$5,368
Planting	11%	289	$18,798
Furniture	Not applicable	Item	$40,000
Total Cost	100%	2,723	$2,300,546

AUSTRAL AND LEPPINGTON NORTH PLAN ADMINISTRATION COSTS

Updated 15-Mar-21

Item	Cost of Works
Open Space	$128,559,170
Roads	$87,641,540
Drainage	$290,496,427
Total	**$506,697,137**
Percentage of Costs	1.50%
Administration Costs	$7,600,457.06

Austral and Leppington North Indexation Factors for Cost Escalation

Updated 15-Mar-21

Land value indexation			
Land Classification Values	**$ / sqm**	**$ / ha**	**Source notes**
Riparian (E2)	$35	$400,939	Based on CivicMJD Valuation dated 1/7/19, indexed.
Residential <100 ARI	$135	$1,546,479	Based on CivicMJD Valuation dated 1/7/19, indexed.
Residential - R2	$340	$3,894,836	Based on CivicMJD Valuation dated 1/7/19, indexed.
Residential - R3	$430	$4,925,822	Based on CivicMJD Valuation dated 1/7/19, indexed.
B1 - Neighbourhood Business	$400	$4,582,160	Based on CivicMJD Valuation dated 1/7/19, indexed.
B5 - Business Development	$450	$5,154,930	Based on CivicMJD Valuation dated 1/7/19, indexed.
Industrial	$370	$4,238,498	Based on CivicMJD Valuation dated 1/7/19, indexed.
Land Acquisition Contingency	12%		Based on MJ Davis original valuation advice.
Land values index	**Index factor**	**Period**	
Base period	2.13	June 2019	LCC Land Value Index for ALN (based on good building land)
Latest period	2.44	December 2020	
Capital works indexation			
Transport	**Index factor**	**Period**	**Source notes**
Base period	101.70	June 2012	3101 Road and bridge construction PPI - New South Wales for transport/stormwater works infrastructure
Latest period	119.6	December 2020	
Stormwater (SMEC costings)	**Index factor**	**Period**	**Source notes**
Base period	117.30	March 2019	3101 Road and bridge construction PPI - New South Wales for transport/stormwater works infrastructure
Latest period	119.6	December 2020	
Open space	**Index factor**	**Period**	**Source notes**
Base period	99.90	March 2012	3020 Non-residential building construction PPI - New South Wales for open space embellishment
Latest period	119.7	December 2020	
Community facility works	**Index factor**	**Period**	**Source notes**
Base period	100.00	March 2012	30 Building construction PPI - New South Wales for community facility works
Latest period	125.4	December 2020	

AUSTRAL & LEPPINGTON NORTH NDA AND POPULATION SUMMARY

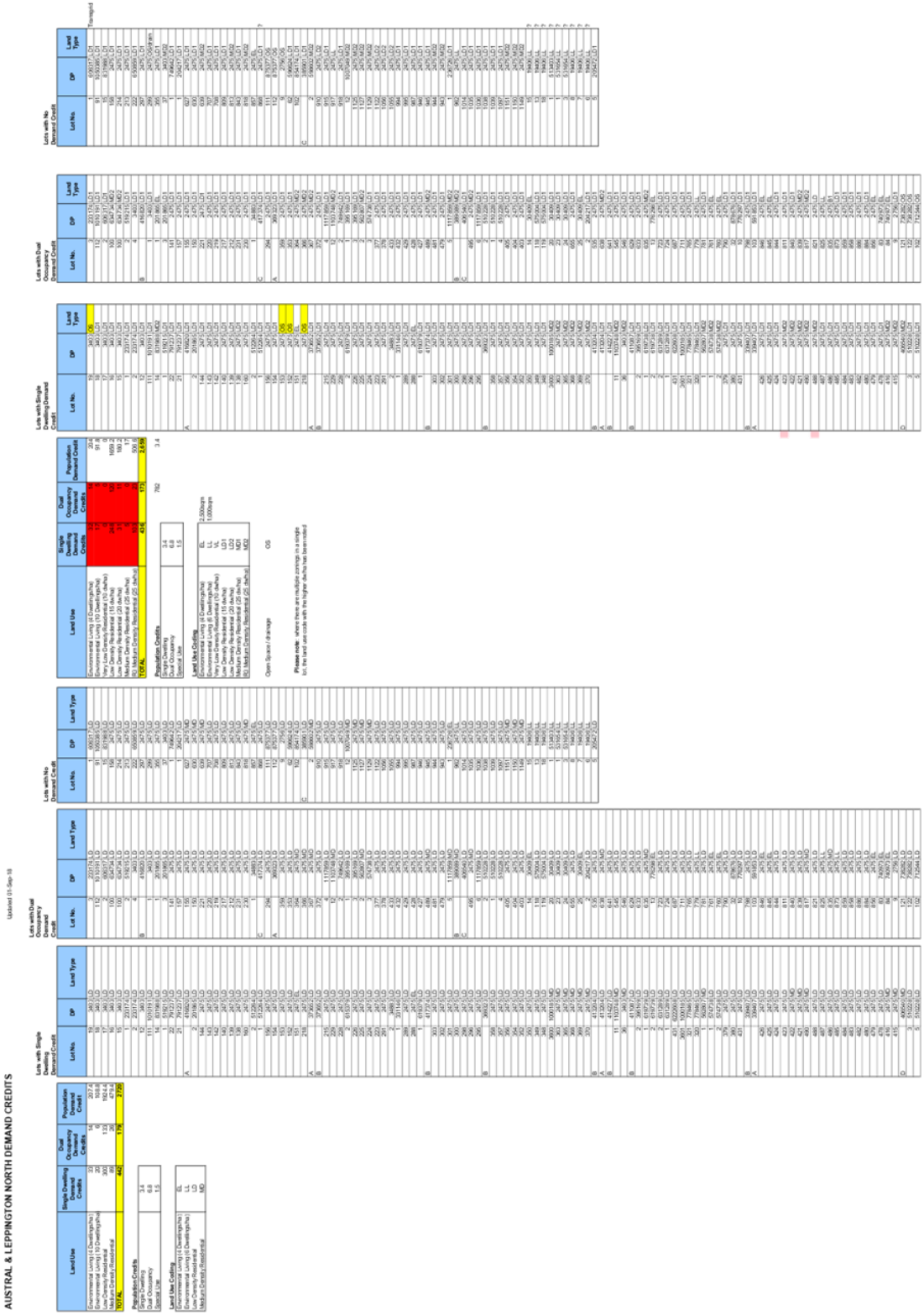
Updated 19/2/2021

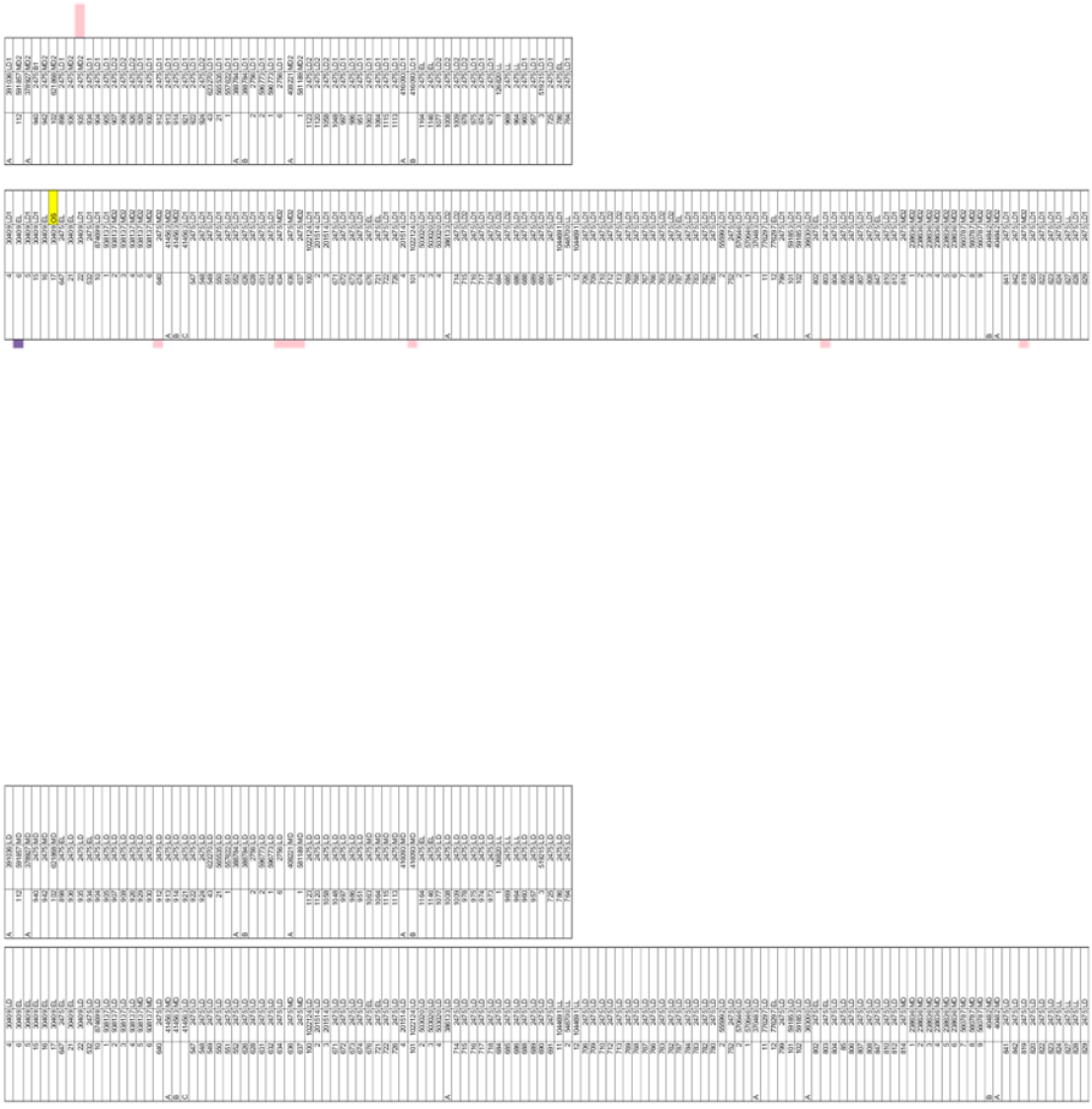
Land Use	NDA (ha)	Equivalent NDA assuming 15dw/ha	Dwellings	Population	Population Demand Credit	Adjusted Population	% of Road and Drainage apportioned to land use
Environmental Living (4 dwellings/ha)	95.21	25.39	381	1,295	204	1,091	2.09%
Environmental Living (10 dwellings/ha)	45.31	30.21	453	1,541	92	1,449	2.48%
Very Low Density Residential (10 dw/ha)	9.97	6.65	100	339	0	339	0.55%
Lower Density Residential (15 dw/ha)	702.36	702.36	10,535	35,820	1,659	34,161	57.74%
Low Density Residential (20 dw/ha)	85.74	114.32	1,715	5,830	180	5,650	9.40%
Medium Density Residential (25 dw/ha)	151.90	253.17	3,798	12,912	524	12,388	20.81%
Sub Total Residential	**1,090**	**1,132**	**16,981**	**57,737**	**2,659**	**55,078**	**93.06%**
Neighbourhood Centre	9.02	9.02					0.74%
Local Centre	9.44	9.44					0.78%
Bulky Goods	25.70	25.70					2.11%
Light Industrial	40.26	40.26					3.31%
Sub Total Employment	**84.42**	**84.42**					**6.94%**
TOTAL	**1,175**	**1,217**	**16,981**	**57,737**	**2,659**	**55,078**	**100.00%**
	18.46	Existing Dwellings	782	Additional dwelling	16,199		

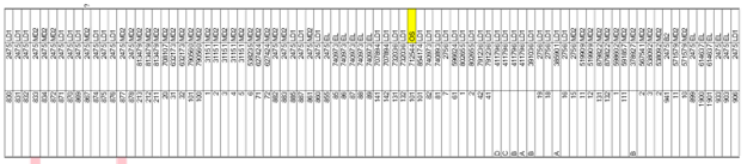
Dwelling Occupancy Rates

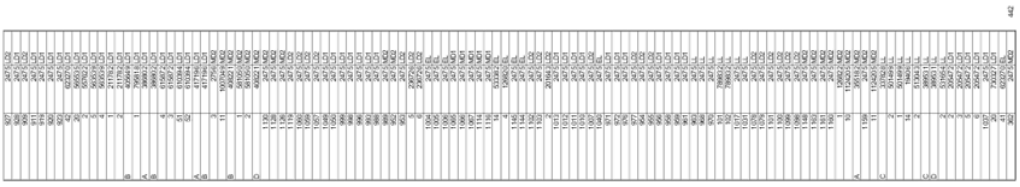
Residential Type	Density (dwellings per ha)	People per dwelling	Dwelling Types
Environmental Living (2,500m2 lots)	4	3.4	Detached dwellings
Environmental Living (1,000m2 lots)	10	3.4	Detached dwellings
Very Low Density Residential (10 dw/ha)	10	3.4	Detached dwellings
Lower Density Residential (15 dw/ha)	15	3.4	Detached dwellings
Low Density Residential (20 dw/ha)	20	3.4	Villas, town houses and attached dwellings
Medium Density Residential (25 dw/ha)	25	2.6	Villas, town houses and attached dwellings

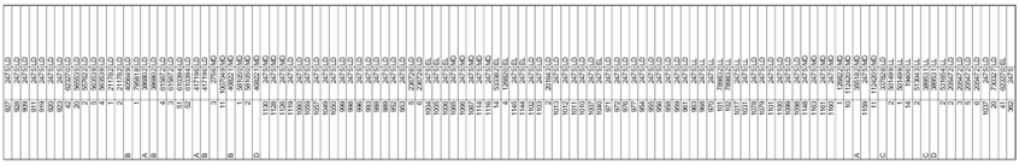
Revised ILP land use areas	Ha	% of total
B1	9.02	0.54
B2	9.44	0.57
B5	25.70	1.55
E2	95.85	5.77
E4	141.81	8.54
IN2	40.26	2.43
R2	9.97	0.60
R2	702.36	42.31
R2	69.52	4.19
R2	16.22	0.98
R3	146.74	8.84
R3	5.16	0.31
RE1	122.77	7.40
RU6	51.31	3.09
SP2 (Classified Road)	54.99	3.31
SP2 (Educational Establishment)	7.75	0.47
SP2 (Educational Establishment)	6.76	0.41
SP2 (Educational Establishment)	2.98	0.18
SP2 (Electricity Substation)	37.51	2.26
SP2 (Local Drainage)	84.33	5.08
SP2 (Local Road)	3.03	0.18
SP2 (Railway)	10.39	0.63
SP2 (Water Supply)	6.08	0.37
TOTAL	**1659.95**	**100.00**


AUSTRAL & LEPPINGTON NORTH DEMAND CREDITS
Updated 05-Sep-18
Land Use
Single Dwelling Demand Credits
Dual Occupancy Demand Credits
Population Demand Credit
Lots with Single Dwelling Demand Credit
Lots with Dual Occupancy Demand Credit
Lots with No Demand Credit
Lot No.
DP
Land Type
Transport









LIVERPOOL AUSTRAL & LEPPINGTON NORTH CONTRIBUTION PLAN
AVERAGE LOT COSTS (IPART ANALYSIS)

Updated 11-Jul-14

Essential Infrastructure

	Residential development scenario		Detached Dwelling in the E4 Zone	Detached Dwelling in the E4 Zone	Detached Dwelling in the R2 Zone	Detached Dwelling in the R3 Zone	Other dwelling in the R3 Zone
	Assumed Dwellings per Hectare of Site Area		4	10	15	20	25
	Dwelling Occupancy Rate (Persons/Dwelling)		3.4	3.4	3.4	3.4	2.6
Item	**Item Total Cost**	**$ per person or hectare of equivalent NDA**					
Open Space							
Land	$314,141,561	$5,704	$19,392	$19,392	$19,392	$19,392	$14,829
Works	$128,559,170	$2,334	$7,936	$7,936	$7,936	$7,936	$6,069
Subtotal	**$442,700,731**	**$8,038**	**$27,328**	**$27,328**	**$27,328**	**$27,328**	**$20,898**
Community Facilities							
Land	$7,359,828	$134	$454	$454	$454	$454	$347
Subtotal	**$7,359,828**	**$134**	**$454**	**$454**	**$454**	**$454**	**$347**
Roads							
Land	$26,394,265	$446	$1,516	$1,516	$1,516	$1,516	$1,160
Works	$87,641,540	$1,481	$5,035	$5,035	$5,035	$5,035	$3,850
Subtotal	**$114,035,805**	**$1,927**	**$6,551**	**$6,551**	**$6,551**	**$6,551**	**$5,010**
Drainage							
Land	$144,195,081	$118,532	$7,902	$7,902	$7,902	$7,902	$7,902
Works	$290,496,427	$238,795	$15,920	$15,920	$15,920	$15,920	$15,920
Subtotal	**$434,691,508**	**$357,327**	**$23,822**	**$23,822**	**$23,822**	**$23,822**	**$23,822**
Plan Administration							
Allowance	$7,600,457	$6,248	$417	$417	$417	$417	$417
Subtotal	**$7,600,457**	**$6,248**	**$417**	**$417**	**$417**	**$417**	**$417**
TOTAL	**$1,006,388,329**		**$58,572**	**$58,572**	**$58,572**	**$58,572**	**$50,493**

Non-Essential Infrastructure

Item	**Item Total Cost**	**$ per person or hectare of NDA**					
Community Facilities							
Local Community Facility Works	$20,104,171	$365	$1,241.05	$1,241.05	$1,241.05	$1,241.05	$949.04
Regional Community Facility Works	$39,838,087	$723	$2,459.24	$2,459.24	$2,459.24	$2,459.24	$1,880.59
Subtotal	**$59,942,258**	**$1,088**	**$3,700**	**$3,700**	**$3,700**	**$3,700**	**$2,830**

Total Contribution

Item	**Item Total Cost**	**$ per person or hectare of NDA**					
Open Space (per person)	$442,700,731	$8,038	$27,328	$27,328	$27,328	$27,328	$20,898
Community Facilities (per person)	$67,302,086	$1,222	$4,155	$4,155	$4,155	$4,155	$3,177
Roads (per ha of NDA)	$114,035,805	$1,927	$6,551	$6,551	$6,551	$6,551	$5,010
Drainage (per ha of NDA)	$434,691,508	$357,327	$23,822	$23,822	$23,822	$23,822	$23,822
Plan Administration (per ha of NDA)	$7,600,457	$6,248	$417	$417	$417	$417	$417
TOTAL CONTRIBUTION	**$1,066,330,588**		**$62,272**	**$62,272**	**$62,272**	**$62,272**	**$53,323**

NOTES AND ASSUMPTIONS

This summary table is representative of contribution rates based on assumptions of likely residential development within the Austral and Leppington North Precincts. Key assumptions include the minimum density controls for the area which were included in the amendment to the Growth Centres SEPP.

Detached Dwelling in the E4 Zone	Detached Dwelling in the E4 Zone	Detached Dwelling in the R2 Zone	Detached Dwelling in the R3 Zone	Other dwelling in the R3 Zone	
4	10	15	20	25	
3.4	3.4	3.4	3.4	0	
Environmental Living (4 dwellings/ha)	107.79	28.74	381		
Environmental Living (10 dwellings/ha)	45.69	30.46	453		
Very Low Density Residential (10 dw/ha)	9.23	6.15	100		
Lower Density Residential (15 dw/ha)	703.00	703.00	10,535		
Low Density Residential (20 dw/ha)	56.35	75.13	1,715		
Medium Density Residential (25 dw/ha)	13.85	23.08	3,798		
R3 Medium Density Residential (25 dw/ha)	125.38	208.97			
Sub Total Residential	**1,061**	**1,076**	16,981		$1,516
Neighbourhood Centre	9.90	9.90			$446
Bulky Goods	24.14	24.14			
Light Industrial	36.01	36.01			
Sub Total Employment	**70.05**	**70.05**			
TOTAL	**1,131**	**1,146**	**16,981**		

ESSENTIAL INFRASTRUCTURE Updated 01-Sep-18

Land Use	People (baseline)	Dwellings (baseline)	People (adjusted for demand credits)	Dwellings (adjusted for demand credits)	Ha of NDA	Open Space $ attributable to land use	Community Facility $ attributable to land use	Road $ attributable to land use	Drainage $ attributable to land use	Plan Admin $ attributable to land use	TOTAL $ TO LAND USE	$94 REVENUE	$94 SHORTFALL	Average Lot Cost w/Cost per Ha	Average Lot Cost Benef Check	Notes
Environmental Living	2,835	854	2,640		66.5980	$20,412,933	$239,260	$1,211,652	$19,866,224	$347,395	$46,177,426	$25,018,966	-$21,158,459	$68,270.26	$99,572	This average cost reflects demand credits applicable for open space and community facilities. Note existing dwellings if retained will still have an applicable contribution for roads, drainage and plan administration.
R2 Low Density Residential	41,992	12,300	40,150		820.3267	$322,717,143	$5,301,130	$17,139,739	$294,190,500	$5,143,940	$704,691,512	$370,487,500	-$334,204,012	$98,270.26	$99,572	This average cost reflects demand credits applicable for open space and community facilities. Note existing dwellings if retained will still have an applicable contribution for roads, drainage and plan administration.
Medium Density Residential	12,912	3,798	12,388		253.1667	$99,570,695	$1,655,346	$20,731,872	$90,463,200	$1,581,720	$217,002,797	$217,002,797	$0	$51,731.17	$50,400	This average cost reflects demand credits applicable for open space and community facilities. Note existing dwellings if retained will still have an applicable contribution for roads, drainage and plan administration.
B1 and B2 Centres	0	0	9,0200	0	9.0200	$0	$0	$645,536	$3,223,696	$56,350	$4,124,977	$4,124,977	$0	$459,314.53		
B5 Business Development	0	0	29,7000	0	29.7000	$0	$0	$2,499,121	$10,792,296	$190,565	$13,792,984	$11,792,984	$0	$459,314.53		
IN2 Light Industria	0	0	40,2000	0	40.2000	$0	$0	$3,383,337	$14,603,328	$257,836	$18,644,501	$18,644,501	$0	$459,314.53		
TOTAL	**57,737**	**16,981**	**55,078**	**0.0**	**1207.0910**	**$442,700,769.93**	**$7,219,628.13**	**$45,113,150,686**	**$423,138,945**	**$7,346,474**	**$1,060,071,248**	**$646,069,807**	**-$155,569,473**			

NON ESSENTIAL INFRASTRUCTURE

Land Use	People (baseline)	Dwellings (baseline)	Dwellings	Dwellings (adjusted for demand credits)	Ha of NDA	Open Space $ attributable to land use	Community Facility $ attributable to land use	Road $ attributable to land use	Drainage $ attributable to land use	Plan Admin $ attributable to land use	TOTAL $ TO LAND USE	$94 REVENUE	$94 SHORTFALL
Environmental Living	2,835	854	2,640		66.5980		$239,260			$0	$2,793,938	$0	-$2,793,938
R2 Low Density Residential	41,992	12,300	40,150	0.0	820.3267		$5,301,130			$0	$43,096,323	$0	-$43,096,323
Medium Density Residential	12,912	3,798	12,388	0.0	253.1667		$1,655,346			$0	$13,481,987	$0	-$13,481,987
B1 and B2 Centres	0	0	9,0200	0.0	9.0200		$0			$0	$0	$0	$0
B5 Business Development	0	0	29,7000	0.0	29.7000		$0			$0	$0	$0	$0
IN2 Light Industria	0	0	40,2000	0.0	40.2000		$0			$0	$0	$0	$0
TOTAL	**57,737**	**16,981**	**55,078**	**0.0**	**1207.0910**	**$0**	**$59,942,234**	**$0**	**$0**	**$0**	**$59,942,234**	**$0**	**-$59,942,234**

NSW GOVERNMENT Planning & Environment

PP_2019_LPOOL_002_00/IRF19/3706

Ms Kiersten Fishburn
Chief Executive Officer
Liverpool City Council
Locked Bag 7064
Liverpool BC NSW 1871

Dear Ms Fishburn

Planning proposal PP_2019_LPOOL_002_00 – Draft Amendment No 75 to Liverpool Local Environmental Plan 2008 to amend State Environmental Planning Policy (Sydney Region Growth Centres) 2006

I am writing in response to Council's request for a Gateway determination under section 3.34(1) of the *Environmental Planning and Assessment Act 1979* in respect of the planning proposal to rezone land and amend development standards applying to 37 individual land parcels within the South West Growth Centre Precincts of Austral and Leppington North.

As delegate of the Minister for Planning and Public Spaces, I have now determined that the planning proposal should proceed subject to the conditions in the enclosed Gateway Determination.

I have also agreed, as delegate of the Secretary, the planning proposal's inconsistencies with section 9.1 Direction 3.1 Residential Zones, 4.3 Flood Prone Land and 6.2 Reserving Land for Public Purposes are of minor significance. No further approval is required in relation to these Directions.

The Department has identified the need to make two minor amendments to the planning proposal to include additional land required to be zoned SP2 Infrastructure respond to road widening of Edmondson Avenue Park, Austral and to facilitate the delivery of Endeavour Electrical Energy Substation on Gurner Avenue, Austral.

As discussed with Council officers it would be appreciated if Council's planning proposal could include these amendments and the Gateway determination has been conditioned accordingly.

I have considered the nature of the planning proposal and have determined not to condition the Gateway for Council to be the local plan-making authority as it seeks to amend the State Environmental Planning Policy (Sydney Region Growth Centres) 2006.

The amending plan is to be finalised within twelve months of the date of the Gateway determination. Council should aim to commence the exhibition of the planning proposal as soon as possible. Council's request for the Department of Planning,

Industry and Environment to draft and finalise the plan should be made eight weeks prior to the projected publication date.

We are committed to reducing the time taken to complete LEPs by tailoring the steps in the process to the complexity of the proposal, and by providing clear and publicly available justification for each plan at an early stage. In order to meet these commitments, the Minister may take action under section 3.32(2)(d) of the Act if the time frames outlined in this determination are not met.

Should you have any further enquiries about this matter, I have arranged for Ms Cho Cho Myint at the Department to assist you. Ms Myint can be contacted on (02) 9860 1507.

Yours sincerely

10/08/2019

Ann-Maree Carruthers
Acting Executive Director
Eastern Harbour City

Encl: Gateway determination

Planning, Industry & Environment

Gateway Determination

***Planning proposal (Department Ref: PP_2019_LPOOL_002_00)**: to amend the State Environmental Planning Policy (Sydney Region Growth Centres) (SEPP) 2006 by amendment to Liverpool Local Environmental Plan 2008 to rezone land and amend development standards applying to 37 individual land parcels within the South West Growth Centre Precincts of Austral and Leppington North*

I, Acting Executive Director, Eastern Harbour City at the Department of Planning and Environment, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(2) of the *Environmental Planning and Assessment Act 1979* (the Act) that an amendment to the Liverpool Local Environmental Plan (LEP) 2008 to rezone land under State Environmental Planning Policy (Sydney Region Growth Centres) (SEPP) 2006 should proceed subject to the following conditions:

1. Prior to community consultation Council is to:
   (a) consult with the Commissioner of NSW Rural Fire Service and obtain a written advice that the NSW Rural Fire Service has no objection to the progression of the planning proposal; and
   (b) amend the planning proposal to include the two sites at Lot A DP 414563 and Lot 637 DP 2475, being 385 Edmondson Ave and 375 Edmondson Ave, Austral and part of existing Lot 1 DP 122350, Gurner Avenue, Austral to be rezoned from R2 Low Density and R3 Medium Density zones to SP2 Special Uses zones for road widening and an Electrical Substation.
2. Public exhibition is required under section 3.34(2)(c) and schedule 1 clause 4 of the *Environmental Planning and Assessment Act 1979* as follows:
   a. the planning proposal must be made publicly available for a minimum of 28 days; and
   b. the planning proposal authority must comply with the notice requirements for public exhibition of planning proposals and the specifications for material that must be made publicly available along with planning proposals as identified in section 5.5.2 of *A guide to preparing local environmental plans*.
3. Consultation is required with the following public authorities/organisations under section 3.34(2)(d) of the Act and/or to comply with the requirements of relevant section 9.1 Directions:
   - Sydney Water;
   - Office of Environment and Heritage;
   - NSW Rural Fire Service;
   - NSW Department of Primary Industries (Water); and

- TransGrid
- Endeavour Energy

Each public authority/organisation is to be provided with a copy of the planning proposal and any relevant supporting material and given at least 21 days to comment on the proposal.

4. A public hearing is not required to be held into the matter by any person or body under section 3.34(2)(e) of the Act. This does not discharge Council from any obligation it may otherwise have to conduct a public hearing (for example, in response to a submission or if reclassifying land).
5. The time frame for completing the LEP is to be **12 months** following the date of the Gateway determination.
6. Given the nature of the planning proposal, Council is not authorised to be the local plan-making authority to make this plan.

Dated 10th day of August 2019.

Ann-Maree Carruthers
Executive Director
Eastern Harbour City
Department of Planning and Environment

Delegate of the Minister for Planning and Public Spaces

PP_2019_LPOOL_002_00 (IRF19/6160)

Ms Kiersten Fishburn
Chief Executive Officer
Liverpool City Council
Locked Bag 7064
Liverpool BC NSW 1871

Attention: David Smith and Ian Stendara

Dear Ms Fishburn

Planning proposal PP_2019_LPOOL_002_00 – Alteration of Gateway Determination

I am writing about the proposed amendment of the zone and development standards for land located at 1382 to 1402 Camden Valley Way, Leppington. This matter has been discussed with council officers and an amendment of these provisions is considered necessary to align intersection works with a local access road.

It has been agreed that the most appropriate manner to resolve this is to include the proposed amendment within planning proposal PP_2019_LPOOL_002_00, which seeks to rezone land and amend development standards applying to 37 individual land parcels within the South West Growth Centre Precincts of Austral and Leppington North.

Consequently, I have determined as the delegate of the Minister, in accordance with section 3.34(7) of the *Environmental Planning and Assessment Act 1979*, to alter the Gateway determination dated 10 August 2019 for PP_2019_LPOOL_002_00. The Alteration of Gateway determination is enclosed.

To ensure that due process is followed, I would ask that Council's consideration be given to the Minister's section 9.1 September 2018 direction: *Local Planning Panels Direction – Planning Proposals*, in terms of item 1.(c) of that direction. Council officers may wish to document this consideration and include within its post exhibition report to Council.

I have also agreed, as delegate of the Secretary, the amended planning proposal's inconsistencies with section 9.1 Directions: 3.1 Residential Zones and 6.2 Reserving Land for Public Purposes, are justified in accordance with the terms of the Direction. No further approval is required in relation to these Directions.

If you have any questions in relation to this matter, I have arranged for Ms Cho Cho Myint to assist you. Ms Myint can be contacted on 9860 1507.

Yours sincerely

Eleanor Robertson
Acting Director Western
Central River City and Western Parkland City

Encl: Alteration of Gateway Determination

Alteration of Gateway Determination

Planning proposal (Department Ref: PP_2019_LPOOL_002_00)

I, Eleanor Robertson, Acting Director, Western at the Department of Planning, Industry and Environment, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(7) of the *Environmental Planning and Assessment Act 1979* to alter the Gateway determination dated 10 August 2019 for the proposed amendment to the Liverpool Local Environmental Plan to amend State Environmental Planning Policy (Sydney Region Growth Centre) 2006 as follows:

1. Change the description of the planning proposal

   from
   to amend the State Environmental Planning Policy (Sydney Region Growth Centres) (SEPP) 2006 by amendment to Liverpool Local Environmental Plan 2008 to rezone land and amend development standards applying to 37 individual land parcels within the South West Growth Centre Precincts of Austral and Leppington North

   to
   to amend the State Environmental Planning Policy (Sydney Region Growth Centres) (SEPP) 2006 by amendment to Liverpool Local Environmental Plan 2008 to rezone land and amend development standards applying to individual land parcels within the South West Growth Centre Precincts of Austral and Leppington North.

2. **Insert:**
   new condition 1(c):

   Prior to exhibiton, amend the planning proposal to include by text and map diagrams, where appropriate in the planning proposal, existing and proposed zones and changes to development controls for the realignment of the proposed northern access road from Camden Valley Way into the East Leppington Precinct at 1402 and 1382-1384 [Parts of Lots 9 and 10 DP 27877] Camden Valley Way, Leppington, as well as, considering relevant section 9.1 directions and consistency with the regional framework, in the proposal. Refer the amended planning proposal to the Department for information, prior to exhibition.

Dated 5th day of December 2019.

Eleanor Robertson
Acting Director, Western
Department of Planning, Industry and Environment

Delegate of the Minister for Planning and Public Spaces

Alteration of Gateway Determination

Planning proposal (Department Ref: PP_2019_LPOOL_002_02)

I, Eleanor Robertson, Acting Director, Western at the Department of Planning, Industry and Environment, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(7) of the *Environmental Planning and Assessment Act 1979* to alter the Gateway determination dated 10 August 2019 (as amended) for the proposed amendment to the Liverpool Local Environmental Plan to amend State Environmental Planning Policy (Sydney Region Growth Centre) 2006 as follows:

1. Delete condition 5 and replace with a new condition 5:

"The time frame for completing the LEP is by 10 February 2021"

Dated 5th day of August 2020.

Eleanor Robertson
Acting Director, Western
Central River City and Western Parkland City
Department of Planning, Industry and Environment

Delegate of the Minister for Planning and Public Spaces

PP_2019_LPOOL_002_00 (IRF20/3157)

Alteration of Gateway Determination

Planning proposal (Department Ref: PP-2020-2665)

I, the Director, Western, at the Department of Planning, Industry and Environment, as delegate of the Minister for Planning and Public Spaces, have determined under section 3.34(7) of the *Environmental Planning and Assessment Act 1979* (the Act) to alter the Gateway determination dated 5 August 2020 (as altered) for the proposed amendment to the Liverpool Local Environmental Plan 2008, as follows:

1. delete condition 5 and replace with a new condition 5:

   The timeframe for completing the LEP is 30 June 2021 and the planning proposal must be submitted to the Department for finalisation by 30 March 2021.

Dated 11 February 2021

Adrian Hohenzollern
Director, Western
Central River City and Western Parkland City
Department of Planning, Industry and Environment

Delegate of the Minister for Planning and Public Spaces

Proposed amendments to Growth Centres SEPP, DCP and Contributions Plans for Austral and Leppington

FACT SHEET

Liverpool City Council is exhibiting a suite of amended planning documents for the Austral, Leppington North, and East Leppington Precincts. This includes Draft Liverpool Local Environmental Plan 2008 (Amendment No. 75) (the LEP), changes to the Liverpool Growth Centres Precinct Development Control Plan (the DCP) and changes to the Liverpool Development Contributions Plan 2014 (Austral and Leppington North Precincts) (the CP).

Council invites members of the public to view the draft amendment and provide feedback.

What are the plans?

The LEP contains key planning controls, which guide development for most of the local government area. This includes land-use zones, land reserved for acquisition maps and other land development standards. In this case, State Environmental Planning Policy (Sydney Region Growth Centres) 2006 zones land in Austral and Leppington and is being amended via LEP Amendment 75.

Detailed planning and design guidelines which affect the form, function, amenity of individual developments are contained in the DCP.

The Contributions Plan sets out the cost of providing local infrastructure in a specific area, and the method which Council will raise funds.

What changes are proposed?

Changes are proposed to the land-use zoning on multiple properties, to reflect Council's detailed drainage design, amendments to the future road layout, and a proposed electrical sub-station to the north of Garner Avenue, Austral.

Council is also amending the DCP to:

- Realign several proposed local roads as per the Indicative Layout Plan (ILP). This is to:
  - Provide streets at 60-70m intervals, which provides for good block depths for residential subdivision. Cross streets have also been added on long blocks to increase future walkability. And,
  - Realign several planned roads near existing property boundaries which would result in left over land or other residue land issues.
- Provide new development controls for storm- water rain gardens to be constructed in the verges of several local streets. These rain gardens will be planted with vegetation which will filter stormwater before it enters into creeks and waterways.
- Provide new road cross-section which incorporates dedicated parking bays on local streets, a new pedestrian access cross-section, and updates to other street cross-sections.
- Introducing clearer guidance for local area traffic management (traffic calming).
- Guidance for the development of new houses which face public open space or a path and only have vehicular access via a laneway. Update maps, figure and table numbering.

The CP is being updated to reflect the new stormwater strategy, including the removal of two drainage basins, several drainage channels, and several bioretention basins. A number of road bridge crossings are also proposed to be changed to pedestrian only crossings. The Plan will also receive updated costings, reflective of increase land and building costs since being adopted in 2014.

Proposed amendments to Growth Centres SEPP, DCP and Contributions Plans for Austral and Leppington

FACT SHEET

What happens next?

Pubic submissions for the draft plans will be considered and reported to Council. If Council decides to proceed with the amendments, then the LEP will be sent to the Parliamentary Counsel Office to be finalised and implemented. The DCP can be become effective once the LEP is gazetted. Following adoption, the CP will be submitted to IPART for review. If this process results in changes to the CP, a subsequent report will be provided to Council for consideration. The updated CP will not be implemented until the commencement of the LEP/DCP.

How can I make a submission?

Written submissions can be made to:

- Locked Bag 7064, Liverpool BC NSW 1871; or lcc@liverpool.nsw.gov.au.

Submissions should be addressed to the CEO and received by 5pm 21 April 2020, quoting 2019/1015.

FAQs

When will Council build the new streets on my land?

Council and/or the state government is only responsible for providing the strategic corridor network. Local streets, and low volume roads will only be built at the time that you wish to develop your land or if your land is sold to a developer.

Why is Council acquiring my property?

Council needs to acquire some land in the area to provide for new stormwater infrastructure, key roads, parks and community facilities. These are all things that new residents will be expecting, and are part of building great communities that people want to live in. Council does not acquire land without properly compensating landowners.

Generally speaking, Council will only seek acquisition of land when that land is required for its intended use. If you are experiencing financial hardship, Council may be able to purchase land for acquisition ahead of schedule.

Can my land be rezoned?

The objective of modifying these planning documents (including rezoning of some properties) is to make sure that Austral and Leppington will be developed in an orderly manner, which is consistent with the precinct vision.

Council is looking to retain the existing zones where possible to ensure that we don't need to make changes to the infrastructure planned for the precinct, or which would impact on community expectations.

Where can I get more information?

Supporting documentation, can be found by searching for RZ-8/2018 in Council's eplanning Portal on

Proposed amendments to Growth Centres SEPP, DCP and Contributions Plans for Austral and Leppington

FACT SHEET

Council's website. A hard copy of exhibition materials are also available at Council's customer service centre at 33 Moore Street, Liverpool.

Enquiries about Draft LEP Amendment 75, and changes to the DCP can be directed to Ian Stendara, Executive Planner, on 8711 7511, or at Stendaral@liverpool.nsw.gov.au.

Enquiries about the draft CP can be directed to Shaun Beckley, Manager Infrastructure Planning, on 8711 7417, or at BeckleyS@liverpool.nsw.gov.au.

Enquiries as to changes to Council's stormwater network which has instigated part of the amendments can be directed to Maruf Hussein, Coordinator Floodplain and Water Management, on 8711 7650 or at HossainM@liverpool.nsw.gov.au.

Condensed Submissions Summary – Liverpool LEP 2008 Amendment 75

Theme	Responder comments	Council Staff response and changes to the planning controls
Rezoning additional drainage corridor lands	Some land-owners / developers identified that drainage channels on their lands can be rezoned for other purposes, or the extent of the zone could be moved. Utility agencies identified lands that they own which should be zoned for infrastructure purposes	Where drainage infrastructure had already been constructed, staff could support moving the zone to reflect the constructed position. One responder did not submit any technical information to show how stormwater could be conveyed, and this proposal could not be supported. Land near Fifteenth Avenue is proposed to be rezoned given impacts on development which is likely to be sustained as the area urbanises. Land owned by utility authorities is proposed to be zoned SP2 as per their request.
Further changing or requesting no changes to ILP roads.	Whilst a handful of responders commented that they supported Council's changes, some proposed additional changes or sought no changes at all. A comment was received with regards to DAs had already been submitted, approved, or houses built on land where new roads were proposed.	Each submission was carefully examined to identify if the proposed solution would result in a better development outcome, without negatively impacting other sites. Further changes could be supported in one instance where moving the position of a local street allowed for a more regular block depth for several sites on the south side of Thirteenth Avenue. Another proposal on Thirteenth Ave which proposed removal of a diagonal road and regularisation with grid roads, but this could not be supported. Whilst this could allow or more regular lots, it would severely disrupt a diagonal overland flow path, and could result in damage to life and property if the stormwater system was overwhelmed. A landowner on Gurner Avenue requested the position of roads to remain as per the current DCP, but the resulting layout would lead to the development of excessively long and narrow lots, or several battle-axe lots, neither of which present good outcomes. Further changes were proposed to remove, alter, and add roads adjacent to a local centre to facilitate the development of a private school. The proposed changes would disrupt pedestrian access to the centre, community facility, would isolate a public open space, and spread a large burden of road construction onto adjoining property owners. The proposal, in its current form, could not be supported. Given the lead-in time to prepare the draft ILP and exhibition, there were some instances where roads were proposed on sites which subsequently had a DA approved. The ILP was reviewed to remove instances where new roads were proposed on areas where construction had already commenced.
Biodiversity Certification, Flooding	Objected to the planning proposal on the grounds that it did not address biodiversity certification. Provided comments on land being rezoned in a floodway.	Council staff have followed up with a biodiversity consistency report, which explains how the proposal is consistent with the biodiversity certification framework. The DCP and SEPP provide for planning controls which will locate residential dwellings outside of the floodplain. No changes required.

Condensed Submissions Summary – Liverpool LEP 2008 Amendment 75

Burden of road construction	One landowner made a submission that the ILP showed the full width of road construction on their property with none on adjacent properties. Wanted the ILP to spread the burden on both properties.	Agreed. The location of the roads were moved with the centreline on the property boundary. This provides shared cost of construction, as well as allowing either lot to develop first. There was hesitation in this response as the adjacent land parcels are considerably narrower, and road construction may affect feasibility of development.
Zoning boundary adjustments.	Some of the changes to the planning controls related to moving the boundary between two zones to align better with local roads or property boundaries. One responder had a DA recently approved to subdivide an area of open space from land zoned RE1. The RE1 zone boundary s proposed to be altered. The responder wanted Council to alter their subdivision plan. Another responder wanted their land zoned R3 due to changes to removal of drainage land and the ILP on the land.	Whilst beyond the scope of the planning proposal, Council can support a modified subdivision based on the new zone boundary. This would require lodgement of a modification DA. Alternatively, the area which has been rezoned to residential uses is also shown as part of a future DCP road. This land could be dedicated as a public road upon subdivision of the residential land. There was no planning justification given to this proposal, and the uplifting of land is not within the scope of the planning proposal. Some properties received a minor uplift only as a result of zoning drainage land for urban purposes.
Water management infrastructure – Alternative options	A handful of developers objected to the proposal to introduce streetscape raingardens. They preferred that Council retain an end-of-pipe solution and investigate alternative options. Suggestions included retaining the existing bioretention basins or using wetlands.	Council staff would also prefer end-of-pipe filtration areas as they are generally easier to deliver and are a consolidated asset to maintain. Unfortunately, due to the flat topography of Austral, particularly near creeks, the water inlet of these systems was not high enough to allow for these basins to function. The amount of basin area was also inadequate to meet the precinct water quality targets. Achieving the water quality target using end-of-pipe bioretention basins would require acquisition of residential/other zoned land. Wetland systems were investigated, but these have higher land requirements (additional acquisition costs), and extended periods of drought would result in stagnant waters, algal blooms, or the use of drinking water to replenish wetlands. Managing pests such as mosquitoes also becomes an issue.

Condensed Submissions Summary – Liverpool LEP 2008 Amendment 75

		Streetscape raingardens at intersections were chosen as a solution which required no additional land-acquisition, allows for point source treatment, minimises loss of parking, driveway conflicts etc. associated with mid-block raingardens, and the ability to provide greater greenspaces and urban cooling throughout the suburb.
Water management infrastructure – Rezoning of water quality devices	Developers objected to the rezoning of water quality management devices, and had a preference for end-of-pipe solutions.	The stand-alone bio-retention basins were never zoned SP2, so no rezoning is taking place. Most of the detention basins will have a secondary function of performing filtration, and this is being retained. Performing water quality improvement in detention basins makes efficient use of this space and will reduce the number of streetscape systems required, when looking at the precinct scale catchment. This will minimise the construction and maintenance costs of delivering raingardens as much as is practical.
Water management infrastructure – Feasibility	Changes to the Contributions Plan (CP) could affect feasibility of developing sites under old CP cost assumptions. Sites with many intersections and a small amount of developable land could be too costly to develop.	The costs of raingardens would be higher on sits with more intersections as per the exhibited controls. Upon discussion with the development community, Council is now proposing to construct the raingardens, to be funded by the CP. This will equitably spread costs, and will provide a viable funding source for construction which is linked to development and does not rely on general revenue or delivery via developers.
Water management infrastructure – Economic considerations	Developers objected to the costs of stormwater quality treatment being shifted from the CP to each individual development. Further, they suggest the construction of raingardens is more expensive than stand-alone bio-retention basins.	As above, after consulting with several developers it is proposed that raingardens will be funded and constructed as per the CP, removing the shift in cost. The end-of-pipe bioretention was under sized and not hydraulically feasible, therefore comparing costs between systems is not a like-for-like comparison. The streetscape approach forgoes land-acquisition costs and has comparative construction costs per square meter of rain-garden area. It is acknowledged that there will be a higher maintenance burden as a result of a larger number of smaller devices.
Water management infrastructure – Maintenance	Developers compared the in-street solution to some constructed in the Blacktown LGA which have failed and have been modified by homeowners, reducing effectiveness. Also pointed to issues such as:	As part of Council's responsibility in delivering raingardens (rather than developers) a standardised design can be created, which also allows for a generic management plan. It is noted that in the Blacktown LGA, homeowners are required to maintain raingardens, and they are much larger than those proposed in the Liverpool LGA. Liverpool's solution will be maintained by Council, and a communication strategy could inform residents of the function of raingardens and who to contact for maintenance between scheduled intervals. In response to the numerated items: 1. Maintenance costs attributable with this solution need to be considered in the context that an end-of-pipe raingarden is not technically feasible. Other solutions, such as

Condensed Submissions Summary – Liverpool LEP 2008 Amendment 75

	1. Higher recurring maintenance costs; 2. Clogging; 3. Weed infestation; 4. Erosion on steep systems; 5. Lack of primary filtration; 6. Water flow near pram ramps; 7. Health of plants in drought; 8. Damage during residential development; 9. Ponding (effects on pavement life); 10. Wheeled vehicles becoming stuck in soft surface.	wetlands, are more sensitive to algal blooms or drought where maintenance costs can vary dramatically; 2. All water quality systems are prone to clogging; 3. As above, all solutions require weed management; 4. Road intersections generally require levelling, however generic plans provide detail for design elements for steep areas; 5. Litter and garbage will need to be periodically collected from raingardens; 6. Liverpool Council's design differs from others in that it re-directs water before pram ramps; 7. As with all public domain vegetation, additional watering may be required; the smaller footprint and location in the street will make visual inspection much easier than isolated basins; 8. The design drawings indicate that raingardens should only be installed when the majority of dwellings in the garden catchment have been constructed, avoiding substantial damage; 9. Impacts are minimal compared to other forces that deteriorate pavements; 10. Can be resolved Council's design. Mass planting will ensure bicycles, wheelchairs, scooters etc. will avoid spaces.
Water management infrastructure – Design	There were concerns that the in-street raingardens would interfere with utility allocations, driveways, parking areas, disrupt bin collection,	Council's design largely focuses on-street intersections, where driveways and car parking are not be located. Bin collection is not impacted by Liverpool's design. This design utilises otherwise un-usable parts of the street allocation. Utilities can remain in allocations, but will require sensitive techniques if augmenting or adapting services near intersections.
Water management infrastructure – Inter-allotment, commercial and industrial treatment.	Developers were concerned that raingardens are required for commercial, industrial development, in addition to on-site treatment. Also questioned how inter-allotment drainage will connect to raingardens.	Commercial and industrial are to utilise on-site treatment as per existing practice. Some raingardens will be provided in these areas to treat stormwater flows on the street or from residential areas upstream. There is no intention of duplicating treatment. Inter-allotment drainage will be connected directly to the stormwater pipe system, by-passing raingardens where applicable. Some catchments are modelled to over-achieve targets, whilst others are not likely to achieve quality targets. The system has been designed to ensure the end-of-precinct stormwater quality target is achieved.
Water management infrastructure – land areas	Some developers were concerned that the required filtration area for residential uses were very similar to commercial	The exhibited plans did indeed have similar rates in industrial/commercial areas compared to residential areas, and this was acknowledging a much smaller number of road intersections in commercial areas where reaching treatment targets (via streetscape devices only) may not have been feasible. Given that raingardens are now proposed to be

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	and industrial areas (usually they are considerably lower).	funded under the CP, and that only flows from the street should be treated in raingardens, matters of financial equity are considered resolved.
Water management infrastructure – Retrospective applicability.	Developers asked whether raingardens would require retro-fitting in existing developments.	Council staff recognise the substantial increase in expense of having to retrofit. As such it is Council's preference that raingardens will only be in new developments, with funding to be provided by the CP (providing equity). Council staff may need to revise the map identifying raingardens as there will be a delay between its drafting and adoption in which DAs could be approved.
Water management infrastructure – Constructability in fragmented areas.	Under the exhibited controls, developers were concerned that raingardens are required to treat the run-off from new subdivisions, but the downstream raingarden area might be located on an adjacent property.	The integration of the raingardens into the CP will resolve this issue. Developers will provide lead-in works for any raingarden on their site, with Council constructing the facility at a later date.
DCP street design cross-sections – NSW Road Opening Guidelines (NSWROG) and utilities	A handful of developers were concerned that changes to the DCP cross-sections would result in conflicts with standard utility allocations (as per the NSWROG) and the carriageway.	The NSWROG are a guideline only, not a statutory control. However, Council staff have further refined all cross-sections to ensure streets have at least 3.0m wide verges on verges next to future lots.
DCP street design cross-sections – path widths	Some developers objected to shared paths being widened from 2.5m to 3.0m and wanted footpaths reduced from 1.5m to 1.2m.	The width of shared paths was reduced back to 2.5m for some cross-sections to provide more space for street tree planting and where overgrown shrubs are not likely to obstruct paths. Footpath widths of 1.2m wide are not supported, as conflicts occur when wheeled vehicles such as wheelchairs or prams pass one-another.
DCP tree planting requirements	Some developers raised concerns with changes to the street tree planting controls being too restrictive, and the potential for street trees to interfere with driveways.	The controls for streets with verge planting are largely similar to existing controls. A different set of controls is required for trees located in tree bays, as this "flexi-space" is also used for on-street parking and driveway crossovers. Rather than providing a control for the number of trees per lot, it is more relevant to provide a rate per length of street, as there is a desire ensure that full sized parking bays are provided, driveways are accommodated and street tree spacing maximises the potential for canopy cover. Leaving the rate at one tree per lot could result in no on-street parking where lots are narrow (as the width of a single driveway and tree per lot wouldn't leave enough space for a 5.5m long

		parking bay) or irregularly sized parking bays (e.g. 1.5 space) in front of wider lots. The controls provide a desirable distance between street trees (minimum and maximum distance) to ensure that a co-ordinated design can respond to different subdivision patterns. The controls were tested on approved DAs to ensure that they achieve the objectives of maximising the availability of on-street parking, whilst ensuring street trees are planted at intervals which maximises canopy cover. It is noted that the number of street trees, when designing developments in accordance with the new controls, is very similar to the old rate of one tree per lot.
DCP street lighting requirements	Developers were concerned that the location of trees in tree pits would interfere with street lighting.	The public lighting plans must be co-ordinated with the public domain / street tree plan, regardless of the road configuration, to ensure that trees and lights do not interfere with one another. The proposed cross-sections would not result in instances where lighting cannot be provided, and as such no further changes are proposed.
DCP road cross sections – parking and tree arrangements	It was suggested that parking bays and street trees be provided behind a mountable kerb, rather than flush with the carriageway.	Whilst this would make construction easier, it would not permit passive irrigation of street trees, and would encourage illegally parking on the verge / footpaths. A barrier kerb should be retained between parking areas and the footpath as per the exhibited plans.
DCP half road requirements	There were concerns that half roads* for local streets were now requiring 2.75m of widening on adjacent properties as opposed to 1.0m in the current figure. (* half roads are roads which are positioned parallel to the property boundary, where the road centreline is on the boundary)	The additional widening is required to enable two-way movement on the reconfigured local street cross-section. The DCP currently requires 1m of localised widening n an adjoining property for all half roads. The new controls will provide for 3 different options, to of which require no widening (and as such no need to seek adjoining owners consent for development). At a meeting with concerned developers it was explained that alternative approaches (such as one-way arrangements, using parking bays as passing bays, or temporary roads) would be preferred before requiring widening on neighbouring land.
DCP traffic calming requirements	Concerns were raised that traffic calming devices would add to the cost of development and are inconvenient to drivers.	It was explained that traffic calming was essential on a grid network as long obstruction free roads allow speeding and local streets to be used as rat runs. The solutions sought are consistent with the Australian Government's *Australian Model Code of Residential Development* and various Austroad publications, and the solutions sought minimise construction/maintenance costs as well as integrating better into the streetscape. The inconvenience to drivers is only in the form of driving to a speed suitable for a residential area; the needs for safe streets for residents, cyclists and pedestrians to enjoy must also be considered in street design.

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DCP Dwelling diversity and density controls	It was identified that there is inconsistency between the minimum dwelling density mapping as per the SEPP, and dwelling density bands and characteristics in the DCP.	Council staff are aware that the dwelling density controls in the DCP are a source of confusion and could be made clearer. Council staff also note the SEPP provides a minimum dwelling density, but no maximum, and that market acceptance of smaller lots and medium density housing is resulting in much greater density than accounted for in precinct planning. This has the potential to overwhelm planned infrastructure, and result in considerable under-provision of open space and community facilities. It is considered that Council staff further review the impacts of increased dwelling density and report back to Council on its findings/next steps for a subsequent meeting.
DCP Odour controls	A responder suggested relaxing of controls in relation to areas to be developed for residential development near odour emitting industries (e.g. chicken farms). Suggested updating DPIEs study which triggers the need for odour assessment.	Odour is one of the most difficult forms of pollution to accurately model (as far as extent of impact) yet is the most likely to upset local residences and be the source of tension between land-uses. Without understanding the impacts of changing controls, Council staff cannot support changing a practice which is similar across all of the growth centres. It is acknowledged that DPIE's study is now out of date, and that a new study which identifies odour emitting industries could facilitate development more easily where there are likely no impacts from odour generating industries.
DCP Bushfire mapping	A developer was concerned that bushfire mapping in the DCP doesn't reflect new development (land clearing). This results in bushfire assessment being carried out on land which has no risk, as vegetation has been cleared.	There are two sets of bushfire maps which apply to growth centre precincts. The first is a set made under the *Rural Fires Act 1997*, which applies to the whole LGA. These maps show existing clusters of vegetation (and buffers around them) and are signed off by the commissioner of the Rural Fire Service. The latest set was approved in January 2021, replacing the previous set prepared in 2014. Council understands that it would be good if these maps are updated more frequently, but the need to receive approval from the RFS to update these maps makes it impossible for these maps to be a "live" source of truth. The maps in the DCP are a projection of future bushfire risk. It shows the need to consider Asset Protection Zones (APZs), notably around Native Vegetation Retention Areas (NVRA). These are areas, typically near creeks or environmental management zones, which may not have dense vegetation at present, but as the precincts develop vegetation would be planted, or naturally regenerate in these zones, presenting a potential bushfire hazard in the future. This map should only be changed if NVRAs are changed.
DAs on unregistered land	A developer sought clarity on Council's position of DAs on unregistered land. Suggested that Liverpool follow some other Councils in allowing DAs for dwellings to be lodged on land	Council accepts FastTrack development on unregistered land where the applicant for the subdivision and dwelling construction is the same applicant. This approach prevents a situation where party A is granted a subdivision approval, party B is granted a dwelling consent on one of those lots, but then party A decides to lodge a modification the subdivision (or a survey made after a lot is subdivided reveals that the lot

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	subject to a DA consent for subdivision.	dimensions are smaller than planned). Council, legally, has to accept party A's modification application, but this would render party B's consent invalid if the lot were to no longer exist.
Contributions Plan – Traffic management infrastructure	A developer questioned why Council's contribution plan has line items for traffic facilities, namely roundabouts and pedestrian crossings, which were not identified by the traffic study in support of the precinct rezoning.	The traffic study identified traffic facilities (e.g. roundabouts and traffic signals), that would be required to ensure that intersections operate at minimum traffic efficiencies as per the traffic model prepared at the precinct planning stage. The study only focussed on the high-order road network, did not account for intersections operating safely, did not identify the need for pedestrian crossings near centres and schools, and did not account for traffic calming near town centres. Council staff identified the need for some additional facilities at the precinct level when the CP was adopted. However, it is understood that traffic models only represent a guess as to how a road network will operate, and in many situations traffic facility intervention may be required on streets where it would not have been predicted that intervention was required. An allowance was made for retrospective facilities that may be required as problems become apparent in the precinct's development.

LIVERPOOL CITY COUNCIL

CIVIC AWARDS POLICY

Adopted: 24 June 2020

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LIVERPOOL THE GREAT SOUTH WEST

CIVIC AWARDS POLICY

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CIVIC AWARDS POLICY

A. AUSTRALIA DAY AWARDS

1. BACKGROUND

1.1 The Australia Day Awards are presented annually to local citizens and groups who have made outstanding contributions to the community.

1.2 The Awards are provided by the National Australia Day Council and are administered by local councils throughout Australia on their behalf.

2. PURPOSE OF AUSTRALIA DAY AWARDS

2.1 To recognise outstanding contributions by local citizens and groups of the City of Liverpool to their community.

2.2 The Australia Day Awards are presented in the following categories:

a) Citizen of the Year
b) Young Citizen of the Year
c) Fraser Environment Award
d) Sports Award
e) Macquarie Award
f) Health Award
g) Senior Citizen Award
h) Small Business Award
i) Cultural and Arts Awards

3. ROLE OF CIVIC ADVISORY COMMITTEE

3.1 The Civic Advisory Committee (the Committee) will assess nominations received by Council for the Australia Day Awards. The Civic Advisory Committee Charter is attached to this Policy (Annexure A).

3.2 The Committee has authority to review and make recommendations to Council for the Australia Day Awards for each category from the nominations received.

4. ELIGIBILITY CRITERIA

4.1 Nominations must be submitted on Council's official nomination form.

4.2 Nominees cannot apply on their own behalf.

4.3 Nominations must be received by the advertised date. (Nominations will not be accepted after this time.)

4.4 Nominations must include the name and contact number of one independent

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referee that can provide supporting evidence for the nomination.

4.5 A nominator is not permitted to nominate a person for more than one category in the same year.

4.6 Nominations must also meet the requirements of the respective award:

a) Citizen of the Year
This award is given to an Australian citizen, 24 years or over on 26 January of the year of the awards ceremony. They must either live, work or study within the City of Liverpool and have either made a noteworthy contribution during the current year and/or given outstanding service to the local community over a number of years.
Note: The Citizen of the Year will be invited to attend major receptions as a guest of Council.

b) Young Citizen of the Year
This award is given to an Australian citizen, 23 years or under on 26 January of the year of the awards ceremony. They must either live, work or study within the City of Liverpool and have either made a noteworthy contribution during the current year and/or given outstanding service to the local community over a number of years.

c) Fraser Environment Award
This award recognises the work of an individual, group or organisation that has devoted time, energy and passion to the City of Liverpool environment. This contribution can occur in the year prior to the award being presented or as recognition of a longstanding commitment or service to the City of Liverpool environment. Large funded organisations are excluded.

d) Sports Award
This award recognises the work of an individual or group that has devoted time, energy and passion to sporting pursuits within the City of Liverpool. This contribution can occur as an athlete, volunteer, supporter or anyone who has links to the various sporting groups and clubs within the City of Liverpool. The individual or group must have made a noteworthy contribution during the current year and/or given outstanding service to the local community over a number of years.

e) Macquarie Award
In addition to the above awards, the Mayor will select no more than two recipients for Macquarie Awards which are given for the purpose of recognising an individual or group who have made a significant contribution to servicing the needs of and/or advancing the City of Liverpool.

f) Health Award
A professional working in the local health industry encompassing the areas of medicine, nursing, allied health or health research who has made a significant achievement during the current year, and/or given outstanding service to the local community over a number of years in the field of health .

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Nominees must:

i. Be an Australian citizen or permanent resident;
ii. Reside or work in the City of Liverpool; and
iii. Demonstrate their achievements to health research in Liverpool and the translation of research into better outcomes for patients and the community.

g) Senior Citizen Award

This award is given to an Australian Citizen, 60 years or over on 26 January of the year of the Awards ceremony. They must either live, work or study within the City of Liverpool and have either made a noteworthy contribution during the current year and/or given outstanding service to the local community over a number of years.

h) Small Business Award

This award is given to a small business (employing 20 people or less) in the Liverpool area that has made a significant contribution to the local economy and community. This could include;

- A local employment initiative
- Driving innovation
- Support for local community development and social enterprises
- Contributing to local economy
- Contributing to city activation
- A pivot* that has demonstrated resilience in the face of adversity

*Our definition of pivot is when a company makes a fundamental change to their business after determining that their existing operating model or product is no longer suitable – this may involve introducing new products or services, beginning to sell online and beginning to offer deliveries. This contribution can occur in the year prior to the award being presented or as recognition of a long-standing commitment to the growth and innovation of the Liverpool economy and community.

i) Cultural and Arts Awards

This award recognises the work of an individual, group or organisation that has devoted time, energy and passion to the arts and culture in the City of Liverpool. This contribution can occur in the year prior to the award being presented or as recognition of a long standing commitment or service to the arts and culture in the City of Liverpool.

5. TIMELINE FOR AWARDS

5.1 **July:**

a) Award nominations open
b) Advertising to invite nominations

5.2 **September**

a) Nominations Close

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b) Civic Advisory Committee meets to discuss nominees and select recipients
c) If no nominations are received for a particular category, this Policy allows for an opportunity to further canvas nominations.

5.3 **December:**
a) Report to Council listing nominees and proposed recipients of Awards.

5.4 **January:**
a) Awards are presented on Australia Day on 26 January each year.

6. SCORING OF RECIPIENTS

6.1 Each Australia Day Award Candidate will be scored according to set criteria.

6.2 These scores are tallied and provide an overall assessment for each candidate.

6.3 The candidate with the highest score for each category is to be the recommended recipient.

6.4 In the event of a tie, a vote will be cast by the panel to determine the recipient.

7. MOVEMENT BETWEEN AWARDS

7.1 Movement within Awards has a three year minimum period. For example, a recipient of an Award for a particular category is not eligible for the award in the same category for three years.

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B. ORDER OF LIVERPOOL AWARDS

8. BACKGROUND HISTORY OF THE ORDER OF LIVERPOOL

8.1 This policy relates to Liverpool City Council's Order of Liverpool Awards, previously known as the Heritage Awards.

8.2 The Mayoral Report (6 February 1979) called for a Special Meeting held on 15 May 1979, which approved and resolved the purpose and aims of the Award Criteria.

8.3 **Name:**
The name "Heritage Award" expresses a tribute to the founders and pioneers of the City of Liverpool. It was proposed and adopted that the recipients of the Heritage Awards be organised into a formal Order to be known as "The Order of Liverpool".

8.4 **Design:**
The insignia of the Order shall be derived from the Arms of the City of Liverpool, being the winged ox (or bull) symbol of St. Luke and the crosslet of Governor Macquarie.

This insignia has reference to:

a) The Liverpool founding by Governor Macquarie;
b) The Church of St. Luke and the fact that part of the City is in the Parish of St. Luke;
c) The sculpture in the grounds of St. Luke's, which is a landmark in the City.

8.5 **Symbol:**
The crosslet from the crest of our City and the arms of Governor Macquarie, representing our founding and historic heritage.

9. PURPOSE OF THE ORDER OF LIVERPOOL AWARDS

9.1 The purpose is to recognise the achievement of excelling in and/or contributions to all forms of human endeavour which have enhanced the quality of life in the City of Liverpool. The following Order of Liverpool Awards are presented annually:

i. Companion of the Order of Liverpool (CLO)
ii. Officer of the Order of Liverpool (OLO)
iii. Member of the Order of Liverpool (MLO)

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10. ELIGIBILITY CRITERIA

10.1 Nominations must be submitted on Council's official nomination form.

10.2 Nominees cannot apply on their own behalf.

10.3 Nominations must be received by the advertised date. Nominations will not be accepted after this time.

10.4 Nominations must include the name and contact number of one referee that can provide supporting evidence for the nomination.

10.5 Persons who reside outside of the Liverpool Local Government Area but contribute to the Liverpool community can be nominated as "honorary members" of the Order of Liverpool.

10.6 Posthumous awards will be considered providing the date of the nominee's death occurred within the 12 months following the previous closing date of the Awards.

10.7 Nominee's contributions to the Liverpool community must be predominantly voluntary and not solely as a result of paid employment.

10.8 Guidelines for expected quality and length of voluntary service to have served in order to be nominated for an award:

The nominee is expected to have the following years of voluntary service before they are considered eligible for consideration, while noting that a nominee may be given consideration for an award should they not meet the timing criteria on account of exceptional circumstances:

i. 5 years' service for consideration for a Member of the Order of Liverpool Award;

ii. 10 years' service for consideration for an Officer of the Order of Liverpool Award; and

iii. 15 years' service for consideration for a Companion of the Order of Liverpool Award.

11. TIMELINE FOR AWARDS

11.1 **May**
Award nominations open

11.2 **August**
Applications close: The Civic Advisory Committee meets to discuss nominees and select recipients.

The Civic Advisory Committee Charter is attached to this Policy (see Annexure A).

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11.3 **September**
First Council meeting in September: Report to Council listing nominees and proposed recipients of Awards

11.4 **November**
Awards are announced on 7 November each year. (This is the date Liverpool was founded by Governor Lachlan Macquarie in 1810.)

12. DATE OF AWARDS

12.1 Awards are presented on Australia Day, 26 January, each year.

13. AWARD NOMINATIONS AND DETERMINATION OF RECIPIENTS

13.1 All nominations received are assessed by the Civic Advisory Committee. A report is then prepared for consideration and resolution by Council.

13.2 The awards recognise outstanding achievements and contributions to the Liverpool community which have enhanced the quality of life in the City of Liverpool.

14. ASSESMENT OF NOMINATIONS

14.1 Nominations will be assessed on:

a) Voluntary community service contribution;
b) Duration of service to the community; the recipient is expected to have at least five years of voluntary service before they are considered eligible for consideration;
c) Involvement and commitment to the Liverpool community;
d) Outstanding achievements.

15. WHAT NOMINATIONS SHOULD INCLUDE

15.1 Nominations should include:

a) Details of voluntary community service (including membership of organisation and positions held etc.)
b) Duration of community service
c) Details of involvement and contribution to the Liverpool community
d) Details of outstanding achievements
e) Reasons for nomination

f) Name and contact details of one additional referee which may be contacted by the Committee to validate the application and to provide further information.

16. SCORING OF RECIPIENTS

16.1 Each Order of Liverpool candidate will be scored according to set criteria.

16.2 These scores are tallied and provide an overall assessment for each candidate. The panel must reach consensus as to who will be awarded each award.

16.3 When the Committee makes recommendations for the appointment of nominees into the Order of Liverpool, they will need to appoint no more than the number allocated under each Award.

16.4 As a guide, the Committee should consider the top three scores for consideration of the Companion of the Order of Liverpool Award; the following six scores for consideration of an Officer of the Order of Liverpool Award; and the remaining scores for the Member of the Order of Liverpool Award.

16.5 In the event of a tie, a vote will be cast by the Committee to determine the recipients.

17. AWARD CATEGORIES

17.1 The following appointments can be made:

a) **Companion of the Order of Liverpool (CLO)**
Appointment as Companions or Honorary Companions for the Order of Liverpool shall be made for extraordinary and pre-eminent achievement of service to the City of Liverpool.

The Committee may appoint no more than three persons in any calendar year. This includes Councillors and Honorary members.

b) **Officer of the Order of Liverpool (OLO)**
Appointment as Officers or Honorary Officers for the Order of Liverpool shall be made for eminent achievement and merit of a high degree of service to the City of Liverpool.

The Committee may appoint no more than six persons in any calendar year. This includes Councillors and Honorary members.

c) **Member of the Order of Liverpool (MLO)**
Appointment as Members or Honorary Members for the Order of Liverpool shall be made for distinguished service of a high degree to the City of Liverpool.

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The Committee may appoint no more than six persons in any calendar year. This includes Councillors and honorary members.

18. MOVEMENT BETWEEN AWARDS

18.1 A new Award recipient can receive a Companion of the Order of Liverpool Award without receiving a Member of the Order of Liverpool Award.

18.2 A previous recipient of the Member of the Order of Liverpool Award can be nominated for an Officer of the Order of Liverpool Award and Companion of the Officer of Liverpool Award.

18.3 A previous recipient of the Officer of the Order of Liverpool Award can only be nominated for a Companion of the Order of Liverpool Award.

19. AWARDS PRESENTATION CEREMONY: 26 JANUARY

19.1 **Location:** Australia Day Ceremony

19.2 **Invitation List:** Previous Award winners from the past two years, current recipients and their families (up to six people), group winners (maximum of 10 attendees, with two people to accept the award on behalf of the group) and the Civic List.

C. CIVIC AND CEREMONIAL FUNCTIONS AND REPRESENTATION

20. PURPOSE OF CIVIC AND CEREMONIAL FUNCTIONS

20.1 Civic and ceremonial functions and events foster relationships with the community and Council, recognise and celebrate individual and community achievements, and promote a proud and harmonious City.

20.2 This policy outlines the civic and ceremonial functions and events that will be hosted by Council and the representation role of the Mayor, Deputy Mayor and elected representatives at these functions and events.

21. LEGAL REQUIREMENTS

21.1 **Civic and ceremonial function** refers to an official event held for celebratory, ritual or commemorative purposes.

21.2 **Mayoral representation** refers to occasions when the Mayor represents or is requested to represent the City of Liverpool as the Mayor at events and functions.

21.3 Section 226 of the *Local Government Act* 1993 provides that the role of the Mayor is to carry out the civic and ceremonial functions of the Mayoral Office.

21.4 Section 231 of the *Local Government Act* 1993 provides that the Deputy Mayor may exercise any function of the Mayor at the request of the Mayor or if the Mayor is prevented by illness, absence or otherwise from exercising the function or if there is a casual vacancy in the Office of Mayor.

22. LIVERPOOL CITY COUNCIL CIVIC AND CEREMONIAL FUNCTION

22.1 To foster relationships with the community and Council, recognise and celebrate individual and community achievements, and promote a proud and harmonious City; Council will host the following civic and ceremonial functions as well as other specific functions and receptions from time to time as the need arises. The Chief Executive Officer (CEO) shall have delegated authority to determine the format and all other arrangements of functions, receptions and ceremonies in liaison with the Mayor or the Mayor's representative.

22.2 **Citizenship Ceremonies**
Citizenship ceremonies will be conducted monthly (or as requested by the Mayor) in accordance with the Australian Citizenship Ceremonies Code. Following each Citizenship Ceremony an alcohol free reception will be held for all candidates and their guests. Other invitees shall include, but is not limited to, all current Councillors and State and Federal Members of Parliament.

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22.3 **Order of Liverpool Awards**
The Order of Liverpool Awards are presented annually by Council to recognise the achievement of excellence in and/or contributions to all forms of human endeavour which have enhanced the quality of life in Liverpool City, or if Council acting as a committee of the whole so decides, to humanity at large.

22.4 **Australia Day Civic Ceremony and Awards**
Council hosts annual Australia Day celebrations and activities for the purpose of developing national pride and spirit. The Australia Day Awards are presented annually to local citizens and groups who have made outstanding contributions to the community. The awards are provided by the National Australia Day Council and are administered by local councils throughout Australia on their behalf.

22.5 **Christmas in the Mall**
A Christmas Tree Lighting ceremony is held in Macquarie Mall in Liverpool central business district at the end of November each year. The ceremony symbolises the beginning of the Christmas festive season.

22.6 **Sister City Delegations**
Council has a Sister City relationship with Toda City in Japan. Sister City relationships promote international exchange and cooperation including economic growth, cultural interests, environmental issues and increased tourism. Council shall be represented at delegations to and from Toda by the Mayor and the CEO and two other delegates as determined by Council.

Council also has a Sister City relationship with Liverpool (United Kingdom), Liverpool (New York) and Calabria (Italy).

22.7 **Inter-Council Delegations and Sister City Relationships**
Council has an inter-council relationship with the Shire of Narromine in rural NSW to share knowledge, skills and resources that achieve improved outcomes for both organisations. Council will be represented at delegations to and from the Shire of Narromine by the Mayor and or the CEO and other delegates as determined by Council or the CEO.

22.8 **Ministerial and other Official Government Delegations and other Community Stakeholders**
Council may host visits to Liverpool by State and Federal Government Ministers and other official government delegations and other community stakeholders, to ensure that the City's profile is enhanced and that appropriate focus is provided to the City's strategic objectives. The Mayor, in consultation with the CEO, may determine to host a Ministerial Visit. The CEO will determine a program that fulfils the objective of the visit and showcases the City of Liverpool.

CIVIC AWARDS POLICY

22.9 **Official Council Openings and Launches**
The Mayor will host receptions with light refreshments to commemorate official openings and launches of Council services, parks, facilities, exhibitions and other events as determined by the CEO. The invitation list shall be at the discretion of the Mayor and CEO, but is to include all current Councillors, and State and Federal Members of Parliament.

22.10 **Mayoral Seniors Concerts**
Two Mayoral Seniors Concerts are usually held every year to recognise and celebrate the contribution that seniors make to the local community.

22.11 **Civic Mayoral Receptions**
The Mayor, in consultation with the CEO, may host receptions with refreshments for visiting dignitaries, local residents who are recipients of awards or prizes from the City, exchange students and visitors from other local authorities from Australia and overseas. The invitation list shall be at the discretion of the Mayor and CEO, but is to include all current Councillors and State and Federal Members of Parliament.

22.12 **Civic functions may also be conducted for:**

a) Community Acknowledgement: Exceptional voluntary service by groups and individuals, over and above Civic Recognition Awards.
b) Commemorative: Events that impact on the local community as well as recipients of awards or prizes from the City.
c) Celebratory: Exceptional achievement in local residents who are recipients of awards such as Australia Day Honours, Queens Honours, Bravery Awards as well as recognising local sporting achievements.
d) Invitations shall include all current Federal and State Members of Parliament.

22.13 **School Visits**
From time to time, Council may facilitate and host tours of the Civic Centre or visit schools to contribute to the education of students and promote awareness and understanding of the role of local government. The Mayor may attend these visits at their discretion.

22.14 **Staff Annual Awards and Recognition**
Council will hold an annual staff awards and recognition ceremony to reward innovation, excellence and progress in service planning and delivery to the local community. The CEO shall preside over the event and determine an appropriate format. The Mayor and Councillors shall be invited to present awards as determined by the CEO.

CIVIC AWARDS POLICY

22.15 **Interfaith Dinners and Leadership in Multiculturalism**
Council acknowledges the strength of our multicultural communities and recommits Liverpool City to activities that strengthen our multicultural community including two interfaith dinners, Christmas celebrations, Australia Day celebrations and other festivities as agreed by the CEO and Mayor, from time to time, that strengthen our community harmony.

22.16 **Liverpool's Birthday**
On 7 November each year, Council holds an annual function to celebrate Liverpool's Birthday. This function is usually in Macquarie Mall or outside venue and it is celebrated with members of the local community. This celebration is usually joined by a Citizenship ceremony to showcase Liverpool with new recipients of Australian Citizenship. Schools are invited to attend this event which includes a birthday cake which is shared with the local community to celebrate.

22.17 **ANZAC Day and Remembrance Day**
ANZAC Day and Remembrance Day each year are supported financially by Council as part of civic support to set up for both events.

22.18 **Mayoral Ball**
An annual Mayoral Charity Ball to be held in August of each year as a highlight of the Liverpool calendar and a showcase of our community's worthy causes and talent.

23. CEREMONIAL REQUESTS TO THE MAYORAL OFFICE

23.1 From time to time, requests are received for the Mayoral Office to preside at or represent the Council at public ceremonial functions and events.

23.2 The following protocols will apply when requests are received:

a) The Mayor will review all requests, in consultation with the CEO, to preside at and represent Council at a public ceremonial function and event.
b) Over the course of a Mayoral term requests should, to the extent that it is possible, be fairly and equitably accepted across a range of representative and interest groups.
c) Mayoral representation is in accordance with clause 4.3 of this policy.

24. MAYORAL REPRESENTATION

24.1 It is the role of the Mayor to carry out the civic and ceremonial functions of the Mayoral Office. The Mayor may choose to wear the Mayoral robe and chains when representing the Office of the Mayor.

24.2 If the Mayor is unavailable, the following protocols apply:

a) In the first instance, the Deputy Mayor is to be requested to undertake the civic and ceremonial functions of the Mayoral office as the Mayor's

CIVIC AWARDS POLICY

representative. This acknowledges the importance for the role of Deputy Mayor in local government and is supported by the legislation. The Deputy Mayor may choose to wear the Deputy Mayor robe when making representations on behalf of the Office of the Mayor;

b) In situations where the Deputy Mayor is also unavailable, the Mayor can request that another Councillor undertake the civic and ceremonial functions of the Mayoral Office as the Mayor's representative;

c) The choice of Councillor must be based on an assessment of which particular Councillor would be best placed to represent Council in view of the nature of the particular request and the respective areas of interest and expertise of individual Councillors.

d) Over the course of a Mayoral term requests should, to the extent that it is possible, be fairly and equitably spread amongst all of the Councillors.

CIVIC AWARDS POLICY

AUTHORISED BY
Council Resolution

EFFECTIVE FROM
20 November 2019

DEPARTMENT RESPONSIBLE
Office of the CEO (Council and Executive Services)

REVIEW DATE
November 2021

Version	Amended by	Date	TRIM Number
1	Council resolution	30 October 2013	182547.2013-001 and 280465.2013
2	Council resolution	29 October 2014	242780.2014 and 237146.2014
3	Council resolution	25 February 2015	004174.2015 and 004089.2015
4	Council resolution	29 April 2015	107541.2015
5	Council resolution	17 June 2015	156045.2015
6	Council resolution	3 February 2016	004433.2016
7	Council resolution	27 April 2016	158436.2016
8	Council resolution	27 July 2016	214048.2016
9	Council resolution	30 August 2017	215697.2017
10	Council resolution	27 February 2019	032996.2019
11	Council resolution	20 November 2019	032996.2019
12	Council resolution	24 June 2020	032996.2019

THIS POLICY HAS BEEN DEVELOPED AFTER CONSULTATION WITH
Mayor and Councillors
Chief Executive Officer
Corporate Services (Governance, Legal and Procurement)

REFERENCES
Liverpool City Council: Civic Advisory Committee Charter
Liverpool City Council: Code of Conduct
Liverpool City Council: Civic and Ceremonial Functions and Representation Policy

CIVIC AWARDS POLICY

D. ANNEXURE A – CIVIC ADVISORY COMMITTEE CHARTER

CIVIC ADVISORY COMMITTEE CHARTER

Adopted: 27 February 2019

CIVIC AWARDS POLICY

1. NAME

Civic Advisory Committee

2. INTERPRETATION

For the purpose of this Charter:

a) "Act" means the *Local Government Act* 1993.
b) "CEO" means Council's Chief Executive Officer.
c) "Committee" means the Civic Advisory Committee.
d) "Council" means the Liverpool City Council.
e) "Member" means a member of the Committee.

3. STATUS OF COMMITTEE

Advisory Committee of Council established by 25 February 2015

4. MISSION

This Committee has been established:

a) To highlight the wonderful work that is being done by members of the Liverpool Local Government Area;
b) To promote mechanisms that serve to acknowledge the contributions of members of the Liverpool Local Government Area to the City of Liverpool and to humanity as a whole.

5. PURPOSE

The purpose of the Committee is to:

a) To provide advice to the Mayor and Council on civic functions;
b) To ensure continuity with Council's civic program beyond electoral or staffing cycles;
c) To be an avenue for continued community representation;
d) To encourage continued involvement from former elected officials in the civic duties of Council
e) To encourage continued involvement from former elected officials in the civic duties of Council.

CIVIC AWARDS POLICY

6 FUNCTIONS

6.1 The functions of the Committee are to:

a) Seek nominations or nominate worthy people and organisations for the:

1) Order of Liverpool Awards;
2) Australia Day Awards;
3) Queen's Honours;
4) Other relevant awards.

b) Score and provide advice to Council on nominees for Council awards.
c) Recommend a calendar of civic events to the Mayor, including:

1) Civic receptions;
2) Mayoral Balls and other fundraising initiatives;
3) School and community engagement;
4) Other activities which lift civic pride within the community.

d) Provide advice to the Mayor when requested;
e) Proactively promote Council's civic awards and functions to the wider community.

7. MEMBERSHIP

7.1 **Councillor representation:**
The Mayor and Councillors

7.2 **Council staff representation:**
The CEO (or the delegate of the CEO)

a) Staff representatives are not permitted to vote on matters arising from this committee.

7.3 **Other Members**
Other members shall include:

a) Former Mayors and Councillors of Council;
b) Current and former civic officers of Council;
c) Five community representatives (appointed by Council for a two year term with an option for Council to extend their terms for a further two years) with two general community representatives and one representative from the three major service clubs (Lions Club, Quota and Rotary International); and
d) A representative from:
   i) the Holsworthy Army Barracks;
   ii) Liverpool Hospital; and
   iii) Liverpool and District Historical Society

CIVIC AWARDS POLICY

7.4 **Support staff**
Administrative support is provided for the preparation of the agenda, recording of the minutes and distribution of the agenda and business papers.

7.5 **Chairperson and Deputy Chairperson**
The Committee will be chaired by the Mayor or the Mayor's representative.

7.6 **Other Office Bearers**
There are no other office bearers on this Committee.

8. COMMITTEE DELEGATIONS

8.1 The Committee is an advisory Committee of Council.

8.2 The Committee can make recommendations to the Council on all relevant business presented before it. Recommendations of the Committee will generally be presented to the Council in written form, accompanied by a report from relevant Council officers. Recommendations made by the Committee may or may not be adopted by Council. It is confirmed that Council will make the final decision on the Order of Liverpool Awards.

8.3 Recommendations made by the Committee which are determined by the CEO to be substantially operational in nature will be dealt with by the relevant senior officer of Council, and any action or decision not to act will be reported to the Committee on a regular basis.

8.4 However, where Council allocates funding for specific tasks associated with the work of the Committee, the Committee can oversee the implementation of the content of the particular Council decision about such expenditure.

9. TERM OF OFFICE

9.1 Community representatives who are members of the Committee will be appointed by Council for a term of two years with the option of Council to appoint any community representative for a further term of two years.

9.2 Appointments of community representatives to the Committee will be made by Council no later than 30 September every two years. However, the term of the initial community representatives will be from March 2015 to September 2016.

9.3 **Non-attendance at meetings**

9.3.1 Ongoing membership of the Committee is subject to regular attendance and reasonable apologies.

9.3.2 A Committee member should notify the Committee Chairperson of their planned absence from a meeting.

CIVIC AWARDS POLICY

9.3.3 Any Committee member knowing that they will be absent for three or more consecutive meetings should notify the Committee Chairperson in writing of the planned absence.

9.3.4 In the event of a member, who is a community representative, being absent for three or more consecutive meetings without an apology and without the approval of the Committee, the Committee can vote on whether to declare the community representative member's position vacant, inform the member of the outcome and fill the position as a casual vacancy.

9.4 **Casual vacancies**
Should a vacancy occur during the term of appointment of a community representative, it will be filled by following the normal process for appointments by Council.

9.5 **Resignation from Committee**
Any Committee member wishing to resign from the Committee shall do so in writing to the Committee Chairperson.

10. QUORUM AND RECOMMENDATIONS

10.1 The quorum for a meeting of the Committee will be a minimum of two Councillors and at least five other Committee members. Staff Representatives cannot be considered to form part of the Quorum.

10.2 In the absence of a quorum 15 minutes after the advertised start of the meeting, the Committee members present may discuss the agenda items, although any recommendations made will not become formalised until they have been ratified at the next Committee meeting with a quorum present.

10.3 Wherever possible, recommendations of the Committee will be made on the basis of consensus, that is, when all members present agree. At the discretion of the Chairperson, a vote may be called to resolve a matter. This may occur when consensus cannot be reached or in relation to a matter that is more significant in nature. In such cases, the matter will be resolved by a simple majority of those at the meeting, provided that there is a quorum present. In the event of a tied vote, the Chairperson will exercise the deciding vote.

11. MEETINGS AND MEMBERS OF THE PUBLIC

11.1 Meetings of the Committee are normally not open to members of the public because meetings may involve the consideration of personal matters concerning particular individuals (other than Councillors). This procedure is in accordance with section 10A(2)(a) of the Act.

11.2 Representatives of organisations or the general community may be invited by the Mayor to address the Committee on matters on the agenda.

CIVIC AWARDS POLICY

11.3 Relevant community members may be invited to participate in meetings from time to time, as determined by the Committee.

12. TIMETABLE FOR MEETINGS

12.1 The Committee shall meet every three months (or as required), at a time and date determined by the Mayor.

12.2 A meeting will be limited to a maximum of two hours' duration, unless the Committee resolves to extend the length of the meeting to a particular time for the completion of business.

12.3 Extraordinary meetings may be called by the Mayor in consultation with the CEO (or delegate).

12.4 The location, date and starting time for meetings will be advised on the agenda.

12.5 Committee meetings can only be held if five ordinary days' notice has been given to all members, including Councillors.

13. MEETING PRACTICE AND PROCEDURES

13.1 Unless otherwise specified in this Charter, Committee meetings must be conducted in accordance with Council's Code of Meeting Practice.

13.2 The Committee must observe the provisions of any other relevant Council policies and procedures.

13.3 Minutes of meetings must be kept in accordance with the procedures set out in Council's Code of Meeting Practice.

13.4 The minutes of each Committee meeting will be submitted to the next available meeting of Council.

14. INSURANCE COVER

14.1 Committee members are covered by Council's personal accident insurance only for attendance at meetings and other activities formally endorsed by the Committee.

CIVIC AWARDS POLICY

15. OBSERVING THE CODE OF CONDUCT AND RELEVANT COUNCIL POLICIES

15.1 All members of the Committee are required to observe the provisions of Council's Code of Conduct and any other relevant Council policy applicable to the proper functioning of the Committee.

15.2 Should a member of the Committee breach Council's Code of Conduct or any other relevant Council policy, the matter will be referred to the CEO to be dealt with in accordance with Council's Code of Conduct Procedures.

15.3 A breach of the Code of Conduct may result in the particular Committee member concerned being excluded from membership of the Committee.

15.4 If a Committee member has a pecuniary interest in any matter with which the Committee is concerned, and is present at a meeting of the Committee at which the matter is being considered, they must disclose the interest to the meeting and must not be present during any discussion or decision making relating to that matter. Leaving the room is necessary because to remain in the presence of the meeting but refrain from voting is taken to be a vote against the motion.

15.5 A member of the Committee who has a non-pecuniary conflict of interest in any matter with which the Committee is concerned and is present at a meeting of the Committee at which the matter is being considered must disclose the interest to the meeting as soon as practicable. If a member of the Committee has declared a non-pecuniary conflict of interest, there exists a range of options for managing the conflict of interest. The option chosen will depend on an assessment of the circumstances of the matter, the nature of the interest and the significance of the issue being dealt with.

15.6 A Committee member will deal with a non-pecuniary conflict of interest in at least one of these ways:

a) Where the potential for conflict is deemed minimal, take no action. However, the Councillor or Committee member should consider providing an explanation as to why it is considered that only a minimal or non-existent conflict exists.

b) Where the potential for conflict is more significant, take no part in the matter by leaving the room in which the meeting is taking place and take no part in any debate or vote on the issue, as per the provisions in Clause 4.29 of the Council's Code of Conduct.

15.7 Committee members declaring a conflict of interest, whether pecuniary or non-pecuniary, should complete a Declaration of Interest Form which is to be signed by the CEO and retained by Council in accordance with Council's Code of Conduct and its Ethical Governance: Conflicts of Interest Policy.

16. CONFIDENTIALITY AND MANAGING PRIVACY

16.1 Committee members, through their involvement on the Committee, may come in contact with confidential or personal information retained by Council. Committee members are required to maintain confidentiality and security in relation to any such information and not access, use or remove that information, unless authorised to do so.

16.2 The *Privacy and Personal Information Protection Act* 1998 and Council's Privacy Management Plan deal with the collection, holding, use, correction, disclosure and transfer of personal information.

16.3 Should a Committee member become aware of any breach of security, or misuse of Council's confidential or personal information, they should inform the CEO immediately.

17. MEDIA PROTOCOL

17.1 The Mayor is the only person permitted to speak to the media on behalf of the Committee.

17.2 No other member of the Committee is permitted to speak to the media in their capacity as a Committee member.

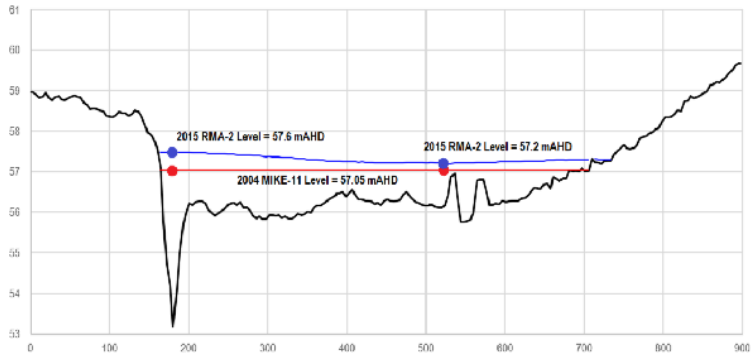
18. REVIEW OF THE COMMITTEE AND THIS CHARTER

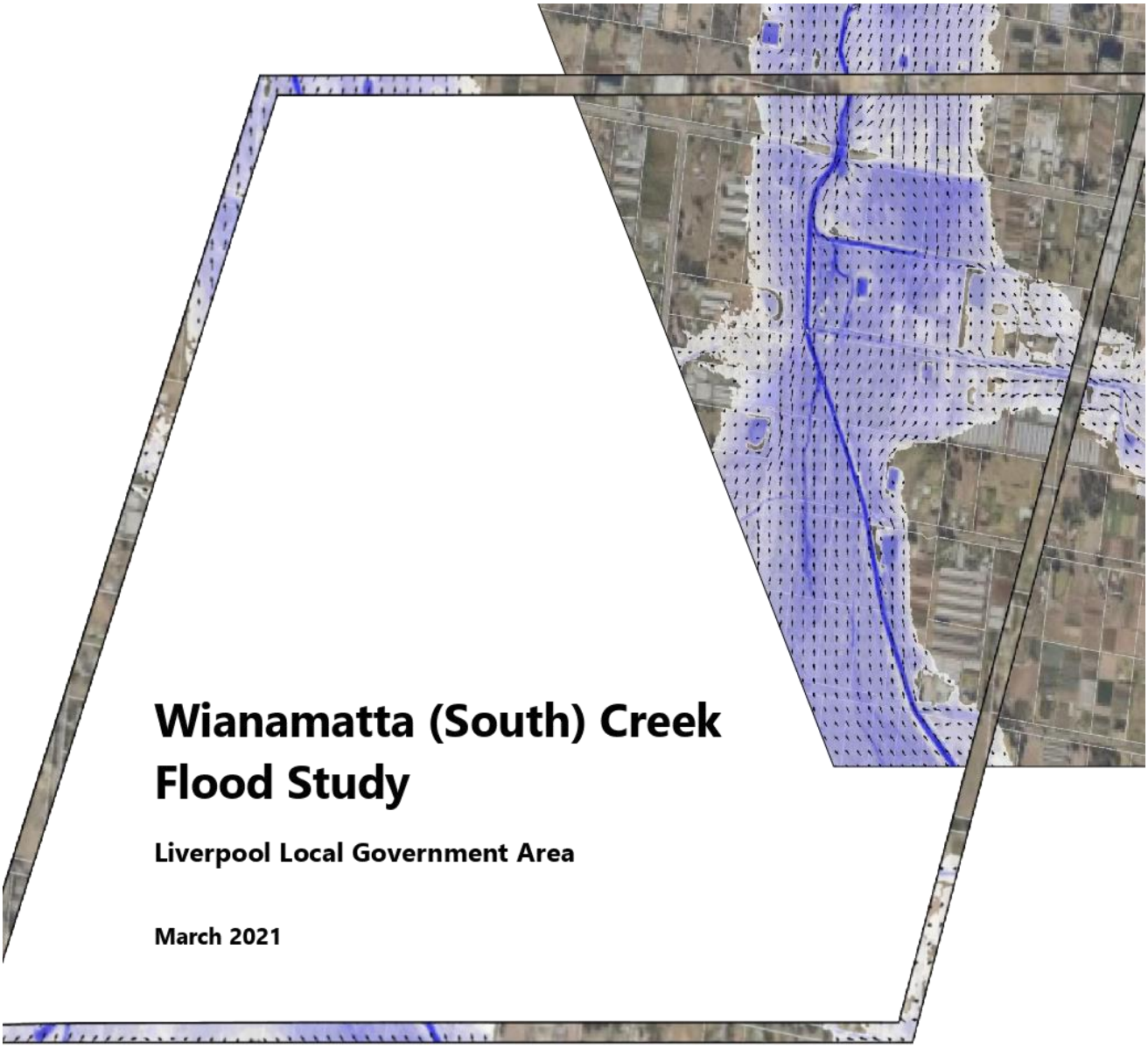
18.1 Council will review the work of the Committee and this charter every two years.

Attachment E

Technical Response Related to Flood Modelling

	Issue Raised		Council Officers Response
1.	There is significant increase in flow in 2015 study in comparison to 2004 study. Peak 1 in 100-year flows is higher than previous studies.	1.	The adopted peak 100 year flow in the updated study is 305 m^3/s, which is very close to the 100 year peak flow of 299 m^3/s adopted in 2004 study. This difference in peak flow magnitudes is negligible (less than 2%) and would have little to no impact on flood behavior downstream of Bringelly Road. The increase is attributed to various improvements in the current modelling such as better delineation of the catchment boundaries, refinement of the sub-catchment, improvement in the reliability of the catchment input data and improved reliability in estimating impervious areas in the catchment.
2.	The flow estimation modelling is based on 1987 Australian Rainfall and Runoff (ARR) methodology rather than the latest ARR 2019 guidelines.	2.	The methodology adopted for estimation of peak flows for application in the flood modelling are in accordance to the ARR 2019 guideline and in consistent to the approach Council has taken for peak flow estimation across the LGA. The ARR2019 guidelines indicate that Flood Frequency Analysis (FFA) is to be considered for flood estimation for all catchments where it is available for a sufficient length of period. Accordingly, the FFA was derived for the gauge at Elizabeth Drive based on 49 years of record. The runoff-routing modelling peak flows based on ARR1987 and ARR2019 were compared with the peak flow derived from FFA. The comparison established that the runoff-routing modelling based on ARR1987 generated a peak flow for the 1% AEP event that matches more closely to the FFA than the peak flow derived from runoff-routing modelling using ARR2019 data and procedures. Hence, the modelling based on ARR1987 data and procedures achieved a better validation to the available FFA which is based on real recorded data. Therefore, it is appropriate to adopt the results derived from application of ARR1987 data and procedures. Further details are provided in the updated flood study report (Attachment F)
3.	The upstream model inflow boundary location is at Bringelly Road, which may have overestimated flood levels at downstream. Flood model setup is not appropriate	3.	The two-dimensional hydraulic model used in the study generally takes care of any potential anomalies in the flow distribution from the upstream boundary conditions. To confirm this, the flood model has been reviewed and updated with boundary condition extended approximately 800 metres upstream of Bringelly Road using the recently acquired topographic data and details of structures such as bridges and culverts which could act as hydraulic controls during major flooding. The extended version of the model has been used to re-simulate the 1% AEP flood for the purpose of establishing whether the proximity of the upstream model boundary to properties result in any material change in predicted peak flood level. The results of the additional simulations using the extended model established that predicted peak 1% AEP flood levels are unchanged.
4.	The flood model is not sufficiently calibrated	4.	The RMA-2 (two dimensional computer simulation model used for hydraulic analysis of flood behavior) flood model used in this study is based on the RMA-2 model that was originally developed as part of the Updated South Creek Flood Study (2015) that has been adopted by Penrirh Council. Validation of the new RMA-2 flood model by

against local historical flood data.	comparison of the 1% AEP flood surface generated from the modelling undertaken in 1990 / 1991 as part of the original flood and floodplain management studies was considered acceptable by all four councils that formed part of the Technical Steering Committee, namely Penrith, Liverpool, Fairfield and Blacktown City Councils, and the Flood Unit of the NSW Office of Environment & Heritage (OEH) (now ESS DPIE).
5. The flood model needs to be validated against previously calibrated model.	6. As explained above, the model has been validated as necessary.
6. The RMA-2 model predicts flood levels that are approximately 0.4 to 0.5m higher than the levels in 2004 study	6. .Flood levels in 2004 flood study were determined by using one dimensional MIKE 11 (one dimensional computer simulation model used in the past for hydraulic analysis of flood behavior) hydraulic model. A comparison of flood levels predicted by one and two-dimensional flood models such as the 2004 MIKE-11 and 2020 RMA-2 models can be misleading and result in differences being overstated. Flood levels predicted using RMA-2 vary along the length of the cross-sections while MIKE-11 levels are constant. For example, the flood level comparison in this particular submission was taken within the creek centerline where the difference in flood levels is greatest. Away from the creek channel along the eastern floodplain the difference in predicted 1% AEP levels are much smaller and within 0.15m, as shown in the cross section below. 



Wianamatta (South) Creek Flood Study

Liverpool Local Government Area

March 2021

Level 17, 141 Walker St
North Sydney NSW 2060
Australia

rp311015-00033rg_crt210310-Wianamatta (South) Ck FS (LCC LGA)_Rev C

Revision C

Advisian
Worley Group

LIVERPOOL CITY COUNCIL

www.advisian.com

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Project: Wianamatta (South) Creek Flood Study
Liverpool Local Government Area – Council Report Version

Rev	Description	Authors	Reviewer	Advisian Approval	Date
A	Issued for Public Exhibition	RG / CRT	Chris Thomas	Chris Thomas	20/07/2020
B	Updated Report incorporating amendments to address public submissions	Roy Golaszewski	Chris Thomas		1/03/2021
C	Final Report (Condensed Version)	Roy Golaszewski	Chris Thomas		11/03/2021

Advisian Worley Group

LIVERPOOL CITY COUNCIL

Wianamatta (South) Creek Flood Study
Liverpool Local Government Area

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1 Introduction

South Creek is a tributary of the Hawkesbury-Nepean River that drains a 640 km2 catchment in Western Sydney. The catchment extends from its headwaters near Narellan in the south, to its confluence with the Hawkesbury River near Windsor.

The flooding of South Creek has the potential to inundate properties across six Local Government Areas (*LGA*) including the LGAs of Penrith, Blacktown, Liverpool, Fairfield, Camden and Hawkesbury City Councils. It is planned that areas within these LGAs will form part of a major employment hub as the population of Western Sydney grows.

The Western Sydney Airport at Badgerys Creek, which is scheduled for completion in 2026, also falls partly within the South Creek catchment. The need for improved transport to and from the airport and surrounding aerotropolis will also require new road and rail lines to be constructed. As a result, development pressure has and will continue to increase within the catchment and along the creek corridors.

In recognition of this, an Agency Working Group (AWG) was established by Infrastructure NSW to oversee a review of flood constraints that could impact on land use planning across the South Creek catchment. The review has resulted in the preparation of a new flood study for South Creek that builds upon existing studies prepared by Advisian for Penrith, Blacktown, Fairfield and Liverpool City Councils in 2015[1], and Penrith City Council in 2020[2]. The study was published in November 2020 and is titled, '*Wianamatta (South) Creek Catchment Flood Study – Existing Conditions*' (*Rev H, 2020*). It documents flood characteristics including flood extent, peak level and flow velocity across 65% (*414 km^2*) of the total catchment area and extends as far downstream as the Richmond Road crossing of South Creek. The Infrastructure NSW study is herein referred to as the *Catchment Wide Flood Study* (*2020*).

The Catchment Wide Flood Study is based on the results of hydrologic and hydraulic modelling that was undertaken to assess the current flood regime including consideration of climate change. The modelling builds on the existing XP-RAFTS and RMA-2 models developed for the '*Updated South Creek Flood Study*' (*Advisian 2015*) and the '*South Creek Floodplain Risk Management Study and Plan*' (*Advisian, 2020*).

During preparation of the Catchment Wide Flood Study, Liverpool City Council commissioned Advisian to prepare a local scale Flood Study focussed on areas that fall within the Liverpool LGA. This covers those areas bounded by Bringelly Road to the south and Elizabeth Drive to the north. Cosgroves, Oaky, Badgerys, Thompsons, Kemps and Bonds Creeks are all tributaries of South Creek that fall within the study area.

The primary objective of the Liverpool City Council study is to update flood characteristics for areas of South Creek within the Liverpool LGA that are based on the following studies:

- *'South Creek Floodplain Risk Management Study and Plan'* (Bewsher Consulting, 2004) (Covering the floodplains of South and Thompsons Creeks that fall within the Liverpool LGA)
- 'Austral Floodplain Risk Management Study and Plan' (Perrens Consultants, 2003) (Covering the floodplains of Kemps and Bonds Creeks that fall within the Liverpool LGA)

Since preparation of these studies in 2003 and 2004 there have been significant advancements in computational capabilities, modelling tools and land surveying methods. The advancements in land survey methods have resulted in an increased capacity to define the topography of the floodplain and the geometry of the channels that drain it. When combined with advancements in computational capabilities, it is possible to more reliably estimate flooding patterns and flood characteristics such as depth, level, flow velocity and hazard.

Accordingly, it is appropriate that Liverpool City Council use this more reliable information to define flood planning areas and for considering the flood risk as part of its responsibility as manager of the floodplain within its LGA.

2 Description of the Catchment and Study Area

2.1 South Creek Catchment

South Creek is a tributary of the Hawkesbury-Nepean River that drains a 640 km^2 catchment in Western Sydney. As shown in **Figure 2.1**, the South Creek catchment extends from its headwaters near Narellan in the south, to its confluence with the Hawkesbury River near Windsor. South Creek generally flows from south to north through the catchment with the Penrith and Blacktown Central Business Districts (CBD) located to the west and east, respectively. Large areas of the catchment have been urbanised including Oran Park, St Clair, Erskine Park, St Marys, Claremont Meadows, Jordan Springs and Ropes Crossing.

The major tributaries of South Creek include Ropes and Kemps Creeks (*refer* **Figure 2.1**). Minor tributaries include Werrington, Claremont, Blaxland, Cosgroves, Badgerys and Thompsons Creeks.

Flooding of South Creek typically occurs as a result of local catchment runoff breaking out of the main channel and spilling across the adjoining floodplain. However, the lower reaches of South Creek downstream of Llandilo, also serve as a large flood storage area during major flooding of the Hawkesbury-Nepean River system. As a result, floodwaters can 'back-up' along South Creek from its confluence with the Hawkesbury River, leading to inundation of areas of the South Creek floodplain to beyond the area that would typically be flooded in local catchment events.

2.2 Study Area

The area of the catchment that is the focus of this study comprises those parts of the Wianamatta (South) Creek catchment that fall within the Liverpool City Council Local Government Area (*LGA*). This generally covers those areas between Bringelly Road to the south (*upstream study boundary*) and Elizabeth Drive to the north (*downstream study limit*). An exception to this is along Thompsons Creek which extends beyond Bringelly Road to Greendale Road (*refer* **Figure 2.2**).

The study area includes the following Wianamatta (*South*) Creek tributaries:

- Cosgroves Creek and its tributary Oaky Creek
- Badgerys Creek
- Thompsons Creek
- Kemps Creek and its tributary Bonds Creek

The topography of the study area has been defined from Light Detection and Ranging (LiDAR) survey that was collected in mid-2019. The topography is presented in **Figure 2.3** as a thematic map of elevation above mean sea level. Minimum and maximum elevations across the study area are shown to vary between 38.0 mAHD along South Creek near Elizabeth Drive, to 122 mAHD at the catchment and study area boundary along Thompsons Creek (*refer* **Figure 2.3**).

3 Review of Available Data

3.1 Topographic Data

3.1.1 Aerial Laser Survey (ALS) and Light Detection and Ranging (LiDAR) Survey

The RMA-2 model that was originally developed as part of the *'South Creek Flood Study'* (*2015*) and used during investigations for the subsequent *Floodplain Risk Management Study* that was completed for Penrith City Council, was developed based on Aerial Laser Survey (*ALS*) that covered the South Creek floodplain downstream from Bringelly Road. The ALS data was obtained between 2003 and 2006 and comprises various data sets across the Penrith, Blacktown, Fairfield and Liverpool Local Government Areas (*LGAs*).

In 2019, newly acquired Light Detection and Ranging (LiDAR) data was collected across the entire study area and processed to define the topography of the catchment. This data was downloaded from the Geosciences Australia ELVIS online portal and is considered to provide the best available representation of the current landform across the catchment, including cut and fill related to the most recent precinct wide developments such as Marsden Park and Jordan Springs.

As part of the process of updating the existing flood model of South Creek, the 2019 LiDAR data has been compared to the ALS data from 2003-2006. Surface level difference mapping has been prepared and is presented in **Figure 3.1**. The mapping does not cover the whole study area due to the limited extents of the 2003-2006 ALS data.

The mapping shows that for the majority of locations the 2019 data is between 100 and 300 mm lower than the previous ALS data sets, particularly across areas downstream from Elizabeth Drive. There are localised exceptions where significant works have been completed to raise terrain levels, such as at the Western Sydney Airport site near Badgerys Creek, the Australian Native Landscapes (ANL) site along South Creek and along Bringelly Road as part of upgrades that have been completed (*refer* **Figure 3.1**).

There are also many localised topographic changes which exceed +/- 1.0 metre. These are attributed to filling that has been undertaken on individual lots as part of Council approved development applications or in some cases, without approval.

The sub-catchment delineation within the existing XP-RAFTS hydrologic model was developed according to sub-catchment boundaries established as part of the original South Creek Flood Study prepared by the NSW Department of Water Resources in 1990 and also via review of surface contours from orthophoto mapping which were generated from photogrammetry gathered in the mid-1980s.

While the photogrammetry would have provided a good representation of the catchment condition at that time, contours derived from it would typically have had a vertical accuracy of ± 0.5 metres at best. The vertical accuracy of LiDAR is typically better that ± 0.15 m. Therefore, the 2019 LiDAR data provides a more reliable and detailed depiction of topography on which to base sub-catchment delineation.

3.1.2 Hydraulic Controls

Hydraulic controls within the study area typically consist of bridge and culvert crossings, elevated roads that can act as impediments to floodwaters and farm dams. Details for many of these hydraulic controls are available via hard copy plans provided by a number of government agencies such as Council and the Roads and Maritime Services (*RMS*). The bridge crossings along Elizabeth Drive, including the relief floodway constructed adjacent to the South Creek crossing, fall in this category.

Digital data sets have also been made available to define many of the culvert crossings. This information was provided by Liverpool City Council as GIS mapping and includes details such as the size and number of culverts, where applicable. This information can be supplemented by the 2019 LiDAR to estimate upstream and downstream invert levels.

A Digital Terrain Map (*DTM*) was provided for the Bringelly Road Upgrades between The Northern Road and Camden Valley Way. The DTM provides surface elevations within the Bringelly Road corridor for post-development conditions. These elevations have been verified against the 2019 LiDAR which compares well along the length of completed upgrades.

High resolution NearMaps imagery combined with the 1 metre grid 2019 LiDAR has been relied upon for locations where the details of hydraulic controls are not available. This approach is considered appropriate for large scale flood modelling where site-specific survey or work-as-executed drawings are not available.

3.2 Hydrographic Survey Data

Hydrographic survey of South Creek and its tributaries has been collected as part of previous studies undertaken between 1990 and 2004 (*refer* **Section 3.3**). Comparison of the surveyed creek bed elevations to the 2019 LiDAR indicates the survey is typically lower by up to 0.5 metres. This is to be expected and could reflect the difficulties that LiDAR has penetrating water surfaces and/or picking-up bed elevations along densely vegetated creek channels.

No additional survey of the creek channels has been collected as part of this study.

3.3 Previous Flood Investigations

A number of previous hydrologic and hydraulic investigations have been undertaken to examine the nature and extent of flooding along South Creek. These include the following reports:

- 'Flood Study Report, South Creek' (Department of Water Resources, 1990)
- 'South Creek Floodplain Management Study' (Willing and Partners Pty Ltd, 1991)
- 'ADI St Mary's Watercycle & Soil Management Study - Final Study Report' (Sinclair Knight Merz, 1998)
- 'Austral Floodplain Risk Management Study and Plan' (Perrens Consultants, 2003)
- 'South Creek Floodplain Risk Management Study and Plan' (Bewsher Consulting, 2004)
- 'Upper South Creek Flood Study' (WMA Water, 2012)

- 'Upper South Creek Floodplain Risk Management Study and Plan' (Cardno, 2014)
- 'Updated South Creek Flood Study' (WorleyParsons, 2015)
- 'South Creek Floodplain Risk Management Study and Plan' (Advisian, 2020)
- 'Wianamatta (South) Creek Catchment Flood Study – Existing Conditions' (Advisian, 2020)

A brief synopsis of the flood investigations most useful to this study are presented in the following sections.

3.3.1 Austral Floodplain Risk Management Study and Plan, Review and Finalisation (*Perrens Consultants, September 2003*)

This study covers the Kemps Creek catchment within the Liverpool LGA and was carried out by Perrens Consultants as part of the *'South Creek Floodplain Risk Management Study and Plan for the Liverpool Local Government Area'* (*Bewsher Consulting Pty Ltd, 2004*)

The study area includes the Austral-Kemps Creek area between Elizabeth Drive and Bringelly Road and a small portion of the Bonds Creek catchment upstream of the Hume Highway which lies within the Liverpool LGA.

A RAFTS model was developed for Kemps and Bonds Creeks and used to estimate flows under existing conditions for the 20%, 5% and 1% Annual Exceedance Probability (AEP) events and the PMF (*based on Bulletin 51*).

A HEC-2 steady-state hydraulic model was developed to define the flood behaviour along Kemps and Bonds Creeks. Cross-sections for the model were extracted from photogrammetric survey of the study area and major hydraulic controls were defined by field survey. The results from the 1990 and 1991 studies were used to define boundary conditions. Peak flood levels from the simulation of the HEC-2 model are shown in **Tables 3.1** and **3.2** for Kemps and Bonds Creeks, respectively.

Table 3.1 Simulated Flood Levels for Kemps Creek from the 'Austral Floodplain Risk Management Study and Plan, Review and Finalisation'

LOCATION	PEAK FLOOD LEVEL (*mAHD*)			
	PMF	1% AEP Event	5% AEP Event	20% AEP Event
Elizabeth Drive	47.5	46.5	46.1	45.9
Gurner Avenue	56.1	55.2	55.0	54.9
Fifteenth Avenue	57.8	56.9	56.7	56.6
Twelfth Avenue	60.6	60.1	60.1	60.1
Bringelly Road	74.3	74.0	73.9	73.9

Table 3.2 Simulated Flood Levels for Bonds Creek from the 'Austral Floodplain Risk Management Study and Plan, Review and Finalisation'

LOCATION	PEAK FLOOD LEVEL (mAHD)			
	PMF	1% AEP Event	5% AEP Event	20% AEP Event
Confluence with Kemps Creek	59.0	58.1	58.0	57.7
Tenth Avenue	63.1	62.4	62.2	61.7
Ninth Avenue	64.6	64.0	63.9	63.7
Fourth Avenue	66.0	65.1	64.4	64.1
Eighth Avenue	66.8	66.1	65.9	65.2
Seventh Avenue	67.9	67.1	66.9	66.5
Confluence with Scalabrini Creek	68.6	67.8	67.7	67.3
Edmondson Avenue	69.1	68.5	68.3	67.7
Sixth Avenue	69.9	69.2	69.0	68.8
Fifth Avenue	72.0	71.3	71.2	71.2
Bringelly Road	74.4	73.8	73.3	73.3
Cowpasture Road	78.7	78.4	78.0	77.5
Hume Highway	79.7	79.4	79.0	78.9
Denham Court Road	86.7	86.2	86.1	86.1

Provisional hydraulic and hazard categories were determined based on the 1 in 100 AEP event. Flood damages were also estimated for the Austral area, with the damage costs resulting from a 1 in 100 AEP flood determined to be $8.37M and the AAD estimated to be $1.8M.

3.3.2 South Creek Floodplain Risk Management Study and Plan for the Liverpool Local Government Area (*Bewsher Consulting Pty Ltd, December 2004*)

This report details the floodplain risk management study and plan undertaken by Bewsher Consulting, in association with Don Fox Planning. The study covers the South Creek and Thompsons Creek floodplains that lie within the Liverpool LGA.

As part of this study, Bewsher Consulting Pty Ltd made modifications to a MIKE 11 sub-model developed in the mid 1990's. This sub-model extends from 2.5 kilometres downstream of Elizabeth Drive to just downstream of Bringelly Road.

The MIKE 11 sub-model was originally developed for a number of studies that were undertaken in 1994 to 1997 to examine the flood mitigation options for the Overett and Victor Avenue areas in more detail. The hydrologic and hydraulic analyses undertaken as part of these studies were based on the RAFTS and MIKE 11 models from the *'South Creek Floodplain Management Study'* (*1991*). The sub-model of South Creek was created from the 1991 MIKE 11 model and incorporates greater topographic detail through the addition of cross-sections in the Overett and Victor Avenue areas.

The flood mitigation works that were completed in the late 1990's in response to the 1986 and 1988 floods, as recommended in *'South Creek Floodplain Management Study'* (*1991*) were also incorporated within the sub-model, including:

- a new bridge under Elizabeth Drive about 150m east of the main South Creek crossing; and,
- about 500m of floodway channel between Overett Avenue and north of Elizabeth Drive.

As part of this study, the model was updated to include the new two-lane road bridge was built by the Roads and Traffic Authority (*RTA*) over the main South Creek crossing of Elizabeth Drive. These works were completed in 1996 as part of the RTA's proposed future upgrade of Elizabeth Drive.

The model was also modified to incorporate Thompsons Creek and extend the upstream extent of the model to about 800 metres upstream of Bringelly Road. The model developed for this floodplain management study is referred to as the *'2003 MIKE 11 model'* and represented the best available information for the South Creek and Thompsons Creek floodplains within the Liverpool LGA.

The *'2003 MIKE 11 model'* was used to simulate the 20%, 5%, 2% and 1% AEP events and the PMF. The simulated flood levels at key locations along South Creek and Thompsons Creek are presented in **Tables 3.3** and **3.4**, respectively.

Table 3.3 Simulated Flood Levels for South Creek from the 'South Creek Floodplain Risk Management Study' (2004)

LOCATION	PEAK FLOOD LEVEL (mAHD)				
	PMF	1% AEP Event	2% AEP Event	5% AEP Event	20% AEP Event
Upstream of Bringelly Road	60.28	59.30	59.01	58.55	57.96
Downstream of Bringelly Road	59.60	58.27	58.18	58.04	57.80
Confluence with Thompsons Creek	54.79	53.31	53.20	53.03	52.75
Upstream of Elizabeth Drive	44.42	42.64	42.49	42.21	41.80
Downstream of Elizabeth Drive	44.16	42.61	42.47	42.20	41.79
South Creek Dam	39.89	38.61	38.51	38.31	37.84

Table 3.4 Simulated Flood levels for Thompsons Creek from the 'South Creek Floodplain Risk Management Study' (2004)

LOCATION	PEAK FLOOD LEVEL (mAHD)				
	PMF	1% AEP Event	2% AEP Event	5% AEP Event	20% AEP Event
Downstream of The Northern Road	70.43	69.77	69.68	69.58	-
Just upstream of The Retreat	59.41	58.9	58.87	58.81	-
250m upstream of Confluence with South Creek	54.25	52.88	52.78	52.65	-

The study involved the definition of flood hazards and hydraulic categories within the study area. The hydraulic floodway limit was determined based on the encroachment approach.

The impacts and the costs of flooding in the study were also determined using the results of the MIKE 11 model. The flood damages resulting from a 1% AEP event in the study area were estimated to be $3.1M and the Average Annual Damages (AAD) were calculated as $420,000 (in 2004 dollars).

4 Hydrologic and Hydraulic Models

Two types of computer models were developed as part of the Flood Study for use in assessing and quantifying flooding characteristics within the South Creek catchment. These are:

- a hydrologic model, covering the entire area of the South Creek catchment and that of its tributaries; and,
- a hydraulic model, extending downstream of Bringelly Road along South Creek, and along its major tributaries Kemps, Ropes, Thompson, Badgerys, Blaxland, Cosgroves, Werrington and Claremont Creeks.

The **hydrologic model** simulates catchment runoff following a particular rainfall event. The main outputs from the hydrologic model are discharge hydrographs which define the quantity of runoff as well as the rate of rise, timing and magnitude of peak discharges resulting from the rainfall event. The discharge hydrographs are utilised as inputs into the hydraulic model.

The **hydraulic model** simulates the passage of floodwater along waterway reaches and across floodplain areas. The hydraulic model calculates key flooding characteristics such as flood levels, flow velocities, floodwater depths and flood hazard at selected points of interest throughout the study area.

4.1 XP-RAFTS Hydrologic Model

4.1.1 2015 XP-RAFTS Model

The XP-RAFTS model that was developed for the *'Updated South Creek Flood Study'* (*2015*) was based on the hydrologic model developed for the original Flood Study in 1990 (*NSW Department of Water Resources*). The sub-catchment layout that was adopted in the 2015 version of this model is shown in **Figure 4.1**.

The 1990 RAFTS hydrologic model was calibrated to the August 1986 and April 1988 floods. A good correlation between the recorded and simulated peak discharge, time of peak, flood volume and hydrograph shape was achieved by adjusting the 'BX' multiplier and the adopted values for initial and continuing losses.

The 2015 model was validated through simulation of the 36 hour duration 1% Annual Exceedance Probability (AEP) storm and comparison of the results with peak flows at several locations along South Creek that were documented in the original 1990 Flood Study. The typical variation in peak flows was about 5%.

Further information regarding the validation process and results for the 2015 XP-RAFTS hydrologic model are available within the '*Updated South Creek Flood Study*' (*WorleyParsons, 2015*).

4.1.2 2020 XP-RAFTS Updates

The updates made to the 2015 XP-RAFTS hydrologic model have largely been driven by the availability of new topographic data and aerial imagery that covers the whole South Creek catchment. An overview of the XP-RAFTS hydrologic model updates are summarised in **Table 4.1** and discussed in further detail below.

Table 4.1 Overview of XP-RAFTS Hydrologic Model Updates

	XP-RAFTS Model Versions	
	2015^	**2020^^**
Catchment delineation and Slopes	1:4,000 and 1:10,000 orthophoto mapping	2019 LiDAR
Percentage Impervious and Catchment Roughness	2007 Aerial Photography	2020 Nearmap Aerial Photography
Initial and Continuing Loss Rates	Values adopted within validated 1990 RAFTS model.	No change
Number of Sub-Catchments	76	284

^ XP-RAFTS hydrologic model adopted for the 'Updated South Creek Flood Study' (WorleyParsons, 2015).

^^ XP-RAFTS hydrologic model updated as part of the 'Wianamatta (South) Creek Catchment Flood Study – Existing Conditions' (Advisian, 2020) and adopted for this study.

Refined Sub-Catchment Delineation

The XP-RAFTS sub-catchment delineation was refined as part of investigations for the '*Wianamatta (South) Creek Catchment Flood Study – Existing Conditions*' (*Advisian, 2020*) using the 2019 LiDAR data and information contained in recent flood modelling reports prepared for Liverpool City Council and the Western Sydney Airport. This resulted in a significant increase in the number of sub-catchments between Bringelly Road and Elizabeth Drive for Kemps Creek, Badgerys Creek, Thompson Creek and Cosgroves Creek, as shown in **Figure 4.2**.

Extensive catchment refinement also occurred along the minor tributaries that feed Kemps Creek at Austral; and along Bonds Creek upstream of Bringelly Road.

The refined sub-catchment delineation allows more reliable representation of current and future developments across the study area including at the Airport, Austral and Leppington. The adjustments also make allowance for additional inflow locations into the RMA-2 hydraulic model where it has been extended at the upstream end of tributaries (see **Section 4.2**).

Catchment boundaries were also reviewed to reflect the 2019 LiDAR. The catchment boundaries previously adopted for the 1990 RAFTS and 2015 XP-RAFTS hydrologic models were found to require localised adjustments that resulted in some transfer of catchment area between tributaries. This improved delineation of catchment boundaries is reflective of the differences in reliability between the 2019 LiDAR and 1:4,000 and 1:10,000 orthophoto mapping.

Changes to catchment extents can be seen in **Figure 4.1** by comparing the original sub-catchment boundaries to the updated coloured catchments.

Adjustment to Sub-Catchment Parameters

The catchment parameters in the XP-RAFTS model were also updated, including refinements to sub-catchment slopes, impervious fractions and catchment roughness.

These adjustments were made to account for the revised sub-catchment delineation (*refer* **Figure 4.2**) and to also account for changes in the extent of industrial and residential developments according to the latest aerial photography. Recent, current and future known developments are labelled in **Figure 4.2**.

Expanded views of those areas of the XP-RAFTS model where the greatest increase in sub-catchment delineation has occurred are provided in **Figures 4.3** to **4.6**. These figures highlight the amount of additional data that has been "built-into" the XP-RAFTS model and the modifications that have been made to allow flood hydrographs to be extracted at a greater range of locations along the upper reaches of South Creek and within a number of the upstream catchments where development has or is projected to occur.

Figure 4.3 shows the increased sub-catchment delineation for the section of South Creek extending upstream from Bringelly Road to the catchment divide. **Figure 4.4** shows the increased sub-catchment delineation between Elizabeth Drive and the Warragamba Dam pipeline. **Figure 4.5** shows the increased sub-catchment delineation across the Kemps, Bonds, Badgerys and Thompsons creeks catchments while **Figure 4.6** and **Figure 4.7** shows the latest XP-RAFTS model structure for areas north of the pipeline.

Sub-catchment parameters adopted as part of the updated XP-RAFTS hydrologic model are listed in **Table A1** in **Appendix A**.

As indicated in **Table 4.1**, the initial and continuing loss rates first adopted within the 1990 RAFTS model and maintained within the 2015 XP-RAFTS model were not changed as part of this study. Accordingly, the loss values shown in **Table A1** in **Appendix A** are the same as those adopted in previous versions of the hydrologic model.

4.1.3 Critical Storm Durations – South Creek and Tributaries

Previous studies have determined that a range of critical durations apply to South Creek and its tributaries. For example, the 1990 Flood Study (*DWR*) and 2004 FPRMS (*Bewsher*) determined that a critical duration of 40 hours applied to South Creek and 9 hours for the tributaries; i.e., Thompsons, Badgerys, Kemps and Bonds Creeks. The 2003 Austral FRMS (*Perrens*) determined critical durations for Kemps Creek of between 9 and 12 hours. A critical duration for Bonds Creek 9 hours was determined.

To assess the critical durations for South Creek and its tributaries the updated XP-RAFTS hydrologic model was used to simulate the 1% AEP event for the 2, 9, 12, 24 and 36 hour duration design storms. A comparison of peak flow rates predicted for key locations throughout the study area is listed in **Table 4.2**.

Table 4.2 Comparison of Peak 1% AEP Discharge (m^3/s) Predicted at Key Locations for a Range of Storm Durations

TRIBUTARY / LOCATION	RAFTS NODE	PEAK FLOW MAGNITUDES (m^3/s) PREDICTED FOR A RANGE OF STORM DURATIONS (hrs)				
		2	9	12	24	36
Upstream of Bringelly Road						
South Creek	1.08	207	289	280	286	305
Kemps Creek	KC00-10	29.8	24.0	29.0	27.0	31.2
Bonds Creek	BC00-9	96.7	64.8	59.0	56.0	51.4
Upstream of The Northern Road						
Thompsons Creek	4.00	51.0	48.0			34.0
Upstream of Elizabeth Drive						
Cosgroves Creek	12.00.1.4	36.6	55.1	53.2	45.6	39.9
Oaky Creek	11.0	19.0	32.6	29.1	28.0	25.6
Badgerys Creek	5.02	78.7	127	113	120	120
South Creek	1.13	341	477	422	466	492
Kemps Creek	KC00-1	182	256	250	250	278
Peak Flows at Tributary Outlet/Mouth						
Thompsons Creek	4.02	85.5	85.2	72.5	72.0	64.6
Bonds Creek	8.02	133	126	109	115	113
Kemps Creek	9.07	189	276	278	288	314
Badgerys Creek	5.04	78.8	152	142	147	156

Table 4.2 confirms that the 36 hour storm duration generates the largest peak flows along South Creek at the upstream (Bringelly Road) and downstream (Elizabeth Drive) boundaries of the study area. Shorter storm durations such as the 2 hour and 9 hour storms generate the largest flows along many of the smaller tributaries such as Thompsons, Bonds, Cosgroves and Badgerys creeks.

4.1.4 2020 XP-RAFTS Model Validation

Comparison to Previous Studies and Hydrologic Models

The updated XP-RAFTS hydrologic model was used to simulate the 1% AEP 2, 9 and 36 hour duration design storms which represent the envelope of critical durations for the study area. Rainfall Intensity Frequency Duration (IFD) data and infiltration losses were adopted from *Australian Rainfall & Runoff 1987* for consistency with previous studies.

The results were compared to the peak flows generated using previous versions of the RAFTS/XP-RAFTS hydrologic model. Comparison to multiple models is necessary given the 2004 FRMS (*Bewsher*) is adopted for the South and Thompsons Creek floodplains and the 2003 Austral study (*Perrens*) is adopted for Kemps Creek and its tributaries.

A comparison of the peak flows predicted using the updated 2020 XP-RAFTS hydrologic model to the 1990/2004 and 2003 hydrologic models is provided in **Table 4.3**. The 2015 hydrologic model is included in the comparison despite not being adopted by Council.

Table 4.3 Comparison of Peak 1% AEP Discharges Across the Study Area Predicted Using the Latest XP-RAFTS Hydrologic Model to Previous Versions

LOCATION	UPDATED RAFTS NODE (*refer* Fig 4.4 & Fig 4.5)	1% AEP Peak Discharge (m^3/s) Note: Storm duration adopted for the simulation is shown as superscript text.				
		2020 XP-RAFTS Model (*This Study*)		2004 FRMS (*Bewsher*) ^^	2003 Austral FRMS (*Perrens Consulting*)	2015 Updated Flood Study (*WorleyParsons*)
		Flow ^	Difference (%)			
SOUTH CREEK						
Upstream Bringelly Road and Study Area	1.08	305 36hr	+ 2%	299 40hr	N.A	312 36hr
Upstream Confluence with Thompsons Creek	1.10	351 36hr	+ 7%	328 40hr	N.A	354 36hr
Upstream Fifteenth Avenue	1.12	445 36hr	+ 17%	381 40hr	N.A	/
Upstream Elizabeth Drive	1.13	492 36hr	+ 14%	433 40hr	N.A	479 36hr
KEMPS CREEK						
Upstream Bringelly Road and Study Area	KC00-10	31 36hr	- 32%	40 9hr	46 9hr	33 36hr
Upstream Fifteenth Avenue	KC00-05	174 36hr	- 21%	193 9hr	221 9hr	168 36hr
Upstream Elizabeth Drive	KC00-01	278 36hr	- 9%	270 9hr	307 9hr	262 36hr
BADGERYS CREEK						
Upstream Badgerys Creek Road	5.00	63 9hr	- 15%	74 9hr	N.A	53 36hr
Upstream Longleys Road	5.01	113 9hr	+ 19%	95 9hr	N.A	92 36hr
Upstream Elizabeth Drive	5.02	127 9hr	+ 14%	112 9hr	N.A	126 36hr
THOMPSONS CREEK						
Upstream The Northern Road	4.00	51 2hr	+ 70%	30 9hr	N.A	38 9hr
Upstream Confluence with South Creek	4.02	85 2hr	+ 22%	67 9hr	N.A	74 9hr
BONDS CREEK						
Upstream Bringelly Road	BC00-8	97 2hr	+ 37%	N.A	71 9hr	56 36hr
Confluence with Kemps Creek	BC00-1	133 2hr	- 5%	N.A	140 9hr	104 9hr

^ The design 1% AEP event was simulated for a 2, 9 and 36 hour duration using the 2020 XP-RAFTS model.

^^ The 2004 FRMS (Bewsher) adopted the RAFTS hydrologic modelling undertaken as part of the 1991 Floodplain

The peak flows comparison presented in **Table 4.3** for the 1% AEP design storm shows that the updated XP-RAFTS model has resulted in changes to peak flows across the study area. This outcome is expected based on:

- The magnitude of changes that have occurred across the catchment between hydrologic model versions; that is, 2020 catchment conditions compared to those in 1991 and 2003.
- Improvements in the reliability of input data relied upon to define catchment and lag characteristics such as catchment slope and channel bed elevations. In that regard, 2019 LiDAR was available for use in updating the 2020 XP-RAFTS model compared to 1:4,000 and 1:10,000 orthophoto mapping.
- Improved delineation of catchment boundaries based on 2019 LiDAR. This has resulted in some transfer of catchment area between tributaries and locations of interest (compare sub-catchment boundaries shown in Figure 4.1 to Figure 4.2).
- Significant refinement of sub-catchments to better take into consideration local impediments to runoff such as road embankments which would otherwise be missed if modelled as larger catchments (compare sub-catchment boundaries shown in Figure 4.1 to Figure 4.2).
- Improved reliability in calculating percentage impervious values based on the availability of high-resolution aerial imagery and improved GIS capabilities.

A summary of the comparison findings for the 1% AEP design storm is provided in the following:

- Peak flows along South Creek are predicted to increase across the study area by between 2% to 17%. At Bringelly Road peak flows are predicted to be 2% higher, compared to 14% higher at Elizabeth Drive. A maximum difference of 17% is predicted upstream of Fifteenth Avenue downstream of the Thompsons Creek confluence.
- Peak flows along Thompsons Creek are predicted to increase by between 22% to 70%. The substantial change in flows is attributed to a significant increase in the total number of sub-catchments used to define the Thompsons Creek catchment; increasing from three (3) in previous hydrologic model versions to twenty-five (25) for the 2020 XP-RAFTS hydrologic model.
- Peak flows along Kemps Creek are predicted to decrease by between 9% and 32%. This change is attributed to improvements in topographic data available to define sub-catchment slopes and lag times rather than the sub-catchment discretisation; which is similar to that adopted for the 2003 Austral FRMS (*Perrens*). Changes to slopes and lags would lead to variances in the relative timing at which tributary flows arrive at Kemps Creek. This includes Bonds Creek along which flows are predicted to decrease by 5% at the Kemps Creek confluence.
- Peak flows along Badgerys Creek are predicted to increase by 14% at Elizabeth Drive. This increase is based on comparison to the 1991 RAFTS hydrologic model which had three sub-catchments covering the Badgerys Creek catchment upstream of Elizabeth Drive compared to thirty-one (31) in the 2020 XP-RAFTS model. The

increase in sub-catchments allows for the more reliable routing of flows between sub-catchments.

The magnitude of change in peak discharges for the 1% AEP design storm are considered reasonable given the extensive updates incorporated into the 2020 XP-RAFTS hydrologic model as a function of catchment changes and increased reliability of available input data.

Further comparison of peak discharges obtained using the 2015 Flood Study is provided in **Figure 4.8** for several locations throughout the South Creek catchment. The timing of the peak flows was also compared and found to be similar at the locations compared.

4.1.5 Australian Rainfall & Runoff 1987 vs 2019

Australian Rainfall & Runoff (ARR) 2019 has been released since completion of the *'Updated South Creek Flood Study'* in 2015. For flood estimation, ARR2019 provides guidelines for approaches relying on rainfall based methods (*runoff-routing modelling*) and At-site Flood Frequency Analysis (FFA).

As per ARR2019 guidelines, FFA is to be considered for flood estimation for all catchments where it is available or a sufficient length of reliable data is available for one to be derived. Design discharges derived through rainfall based methods should therefore be calibrated to the FFA and reflect recorded data. This may involve adjustments to design inputs such as initial and continuing losses, temporal patterns, pre-burst rainfall, IFD and aerial reduction factors.

An FFA is available for the South Creek catchment for the Elizabeth Drive stream gauge (*Station Number 212320*). The FFA was derived for the gauge based on 49 years of records as part of work competed by WMA Water in preparation of the report titled 'Review of ARR Design Inputs for NSW' (*OEH, 2019*). The corresponding FFA curve for the gauge (*note that it is incorrectly referred to as being located at Mulgoa Road*) is included as **Appendix B**.

To assess the fit between runoff-routing modelling based on ARR1987 and ARR2019, to the available FFA, the ARR 2019 IFD data and methodologies were applied to the South Creek XP-RAFTS hydrologic model. This analysis and the findings are discussed in the following sections.

Application of ARR2019 IFD and Methodologies

ARR2019 IFD and methodologies were applied to the South Creek XP-RAFTS hydrologic model. This involved the download of rainfall temporal patterns and other information for South Creek from the ARR 2019 Data Hub. IFD data was sourced from the Bureau of Meteorology (BOM).

Similar to the ARR 1987 approach, multiple sets of IFD data were applied across different parts of the catchment. The total catchment area is greater than 75 km^2 and therefore, the applicable *East Coast South* Areal Temporal Patterns (ATPs) were used. Point Temporal Patterns were used for storm durations less than 12 hours.

Appropriate Areal Reduction Factors were applied to the IFD data to account for the total catchment area of 415 km^2.

An adjusted continuing rainfall loss rate was applied, and Probability Neutral Burst Initial Losses were adopted, as per ARR 2019 guidance for NSW catchments. This led to initial losses ranging between 7.9-17.2 mm/hour being adopted for pervious catchments for the range of storm durations assessed (*i.e., 6-36 hours*). The adopted impervious area rainfall initial and continuing losses were 1 mm and 0 mm/hr, respectively.

It is worth noting that the adopted initial losses for pervious catchments are lower than the losses determined through calibration and validation; typically, in the order of 37.1 mm/hour. Although initial modelling sought to adopt the calibrated losses, later comparisons of the peak flows generated against the FFA at Elizabeth Drive found that it produced a poorer comparison than the ARR2019 Probability Neutral Burst Initial Losses.

As per ARR 2019 methodology, 10 temporal patterns were assessed for each storm duration. The adopted temporal pattern was selected as providing the closest peak flow to the mean on the higher side according to a bias factor of two; i.e., the peak flow from the selected pattern was not further from the mean by more than two times the difference from the mean flow to the closest lower flow.

The critical duration storm under ARR 2019 was found to be 12 hours in the upper part of the catchment and 18 hours in the lower reaches; i.e., downstream of the Ropes Creek confluence.

Findings and Conclusions

The 1% AEP peak flows derived from simulations completed based on the ARR 2019 analysis procedures were compared to peak flows derived at Elizabeth Drive through FFA. A comparison was also made to the corresponding peak flows derived from the ARR 1987 results (*refer* **Table 4.4** *and* **Appendix B**).

Table 4.4 Comparison of Peak 1% AEP Flows at Elizabeth Drive (South Creek) based Various Analysis Procedures

Flood Frequency Analysis	ARR 1987	ARR 2019
538 m^3/s ^	483 m^3/s *- 10%*	381 m^3/s *- 29%*

^ Value extracted from FFA curve provided as Appendix A49 – 'Review of ARR Design Inputs for NSW' (OEH, February 2019) prepared by WMA Water
Download link: https://data.arr-software.org/static/pdf/appendix.pdf

The comparison shows that the runoff-routing modelling based on ARR 1987 generates a peak flow for the 1% AEP event that matches more closely to the FFA than ARR 2019. These findings indicate that unless further calibration is made to the XP-RAFTS model and the adopted parameters (*i.e., initial and continuing losses, temporal patterns, pre-burst rainfall, IFD and aerial reduction factors*), then the modelling based on ARR 1987 provides a better validation to the available FFA.

Based on the above findings, it is recommended that ARR 1987 temporal patterns and IFD data continue to be adopted to define hydrology for the South Creek catchment. This reflects ARR 2019 guidelines which specify that flood hydrology should be based on observed data and FFA where possible and available.

4.2 RMA-2 Hydraulic Model

A two-dimensional (2D) hydrodynamic flood model was developed as part of the 2015 *'Updated South Creek Flood Study'* using the RMA-2 software package. The model was validated through simulation of the 100 year Average Recurrence Interval (ARI) flood and comparison of the results to flood levels documented in the original 1990 Flood Study (*NSW Department of Water Resources*), the 2003 Austral Floodplain Risk Management Study (*Liverpool City Council*) and the 2004 South Creek Floodplain Risk Management Study (*NSW Department of Water Resources*).

The RMA-2 model was developed using the available ALS collected between 2003 and 2006.

It covered the South Creek floodplain between Bringelly Road and the confluence with Eastern Creek at Vineyard. The model included the floodplains of all major tributaries in this area, including Badgerys Creek, Kemps Creek and Ropes Creek.

The extent of the 2015 RMA-2 flood model is shown in **Figure 4.9**. The 2015 model was based on topographic elevations defined at 58,280 nodes and floodplain roughness' defined across 66,970 model elements.

4.2.1 Model Network Extensions

The existing RMA-2 model network was extended in several locations as shown by the blue areas in **Figure 4.9**. This included the following.

- The upper reaches of tributaries at Kemps Creek towards Bringelly Road.
- Extension of Bonds Creek upstream of Bringelly Road to the Liverpool LGA boundary.
- The upper reaches of Thompsons Creek and tributaries towards Bringelly Road.
- The upper reaches of Badgerys Creek and tributaries to beyond the future Western Sydney Airport site.
- The upper reaches of Cosgroves Creek and Oaky Creek to beyond Elizabeth Drive.
- Widening the model extent in the lower reaches of the study area in the vicinity of Marsden Park.

The extensions aim to incorporate all areas of potential future development and account for any potential backwater impacts from flooding along South Creek.

Detailed mapping of the updated RMA-2 model network across the study area is provided as **Figure 4.10**.

4.2.2 Model Network Refinement

In addition to the extensions shown in **Figure 4.9**, the model network was also refined to account for the updated 2019 LiDAR topography and to allow for better representation of recent and future developments. This includes network

modifications to incorporate recent upgrades to Bringelly Road and The Northern Road.

The updated network includes a finer network spacing, particularly in the vicinity of structures that act as hydraulic controls such as roads, impervious fences, buildings and channels.

This has led to an increase in the total number of nodes and elements across the model extent from 58,280 and 66,970 to 174,960 and 213,770, respectively. This represents an increase in the number of elements of more than 200% (*i.e., approximately triple the size*).

The largest increase in model nodes and elements has occurred within the study area where nodes and element numbers have increased from 13,200 and 15,250 to 111,280 and 133,510, respectively. This indicates that approximately 64% of all model nodes and elements within the updated RMA-2 model are located within the study area.

4.2.3 Model Roughness

Roughness values adopted in the RMA-2 flood model were reviewed and updated according to the extent of developments shown in the aerial photographs and provided in the recent flood reports by WSA and Liverpool City Council.

This was completed in conjunction with refinements to the model network in order to capture the variation in hydraulic roughness across the floodplain in sufficient detail.

The adopted element types and associated roughness parameter values are listed in **Table 4.5**. The element types and roughness values are consistent with those adopted for the 2015 RMA-2 flood model.

Table 4.5 Adopted RMA-2 Element Roughness Values

ELEMENT ROUGHNESS TYPE	DESCRIPTION	ROUGHNESS PARAMETER VALUE
1	Clear creek channel or watercourse	0.035
2	Lightly vegetated creek channel	0.055
3	Moderately vegetated creek channel	0.100
4	Heavily vegetated creek channel	0.120
5	Grassed floodplain and sparse trees	0.050
6	Floodplain with moderate coverage of trees	0.080
7	Floodplain with dense trees	0.120
8	Urban Floodplain	0.040
9	Industrial Development	0.090
10	Roadways	0.015

4.2.4 Boundary Conditions

The upstream inflow boundaries of the RMA-2 model were adjusted to accommodate the extensions to the model at the tributaries near Bringelly Road. For the updated RMA-2 model the upstream boundary conditions are:

- Boundary Condition 1 (BC1) – Werrington Creek
- BC2 – Claremont Creek
- BC3 – Blaxland Creek
- BC4 – Cosgroves Creek
- BC5 – Oaky Creek
- BC6 & 7 – Badgerys Creek & Tributary
- BC8 – Moores Gully
- BC9 & 10 – Thompsons Creek & Tributary
- BC11 – South Creek
- BC12 to 15 – Minor Unnamed Tributaries of Kemps Creek
- BC16 – Kemps Creek
- BC17 – Minor Unnamed Tributaries of Bonds Creek
- BC18 – Scalabrini Creek
- BC19 – Bonds Creek
- BC20 to 29 – Minor Unnamed Tributaries of Kemps Creek
- BC30 – Ropes Creek

Boundary Conditions BC4 to BC29 fall within the study area. The locations of each of these boundary conditions is shown in **Figure 4.10**.

The local inflow points down through the floodplain were also updated to reflect the increased sub-catchment delineation in the XP-RAFTS model. The updated 2020 RMA-2 model has 192 total element inflow locations, 144 of which are located within the study area. The locations of all local element inflow points within the study area are shown on **Figure 4.10**.

The alignment of the downstream model boundary has not been altered from that adopted for the 2015 Updated South Creek Flood Study.

4.2.5 RMA-2 Model Validation

4.2.6 Comparison of Predicted Flood Levels to Previous Studies

The updated RMA-2 hydraulic model was used to simulate the 1% AEP 2, 9 and 36 hour duration design storms. This range of storm durations represent the envelope of critical durations for the study area.

Peak 1% AEP flood levels predicted using the updated RMA-2 model were compared to levels documented in the 1990 South Creek Flood Study (*DWR*), 2003 Austral FRMS

(*Perrens*), 2004 South Creek FRMS (*Bewsher*) and the 2015 Updated South Creek Flood Study (*WorleyParsons*). The comparison is shown in **Table 4.6** for critical locations throughout the study area. The coloured cells indicate those flood levels that are currently adopted by Council.

A summary of the comparison findings for the 1% AEP design flood is provided in the following:

- Predicted 1% AEP flood levels along South Creek are typically within 200 and 500 mm of those determined for the 2004 South Creek FRMS (*Bewsher*). Peak 1% AEP flood levels predicted by the 2015 and 2020 RMA-2 models are in closer agreement with differences of between 0 to 100 mm predicted (*refer* **Table 4.6**).
- Predicted 1% AEP flood levels along Kemps Creek are typically within 200 mm of those determined for the 2003 Austral FRMS (*Perrens*).
- Predicted 1% AEP flood levels along Badgerys Creek are typically higher based on the updated RMA-2 model when compared to the 1990 Flood Study (*DWR*). As shown in **Table 4.6**, the RMA-2 model is typically higher by between 50 to 250 mm. This is to be expected given the updated XP-RAFTS model predicts peak 1% AEP flows along Badgerys Creek that are up to 19% higher (*refer* **Table 4.6**).
- Predicted 1% AEP flood levels along Thompsons Creek are typically higher than the 2004 South Creek FRMS (*Bewsher*) by up to 400 mm.

Flood level difference mapping has been prepared as **Figure 4.6** for the study area to compare peak 1% AEP flood levels predicted using the 2015 and 2020 RMA-2 models.

The flood level difference mapping provides a visual representation of the predicted flood level changes at all locations within the floodplain.

Comparison of peak flood levels predicted using one-dimensional models such as HEC-RAS and HEC-2 (*1990, 2003 and 2004 studies*) to two-dimensional models such as RMA-2 (*2015 and 2020*) can lead to inconsistencies that result in differences in predicted flood levels being overstated. An example of this occurs at the comparison location 'Bellfield Avenue' along South Creek where RMA-2 predicts a peak 1% AEP flood level of
57.55 mAHD compared to 57.05 mAHD using the 2004 HEC-2 model (*refer* **Table 4.6**).

As shown in **Plate 4.1** below, the difference in flood levels is overstated due to the variation in flood levels predicted by RMA-2 along the HEC-2 cross-section. This inconsistency is relevant to the flood level comparison presented in **Table 4.6**.

Table 4.6 Comparison of Peak 1% AEP Flood Levels Across the Study Area Predicted Using the Updated RMA-2 Hydraulic Model to Previous Studies

LOCATION	Predicted 1% AEP Peak Flood Levels (*mAHD*)				
	2020 RMA-2 Model ^ (*This Study*)	1990 Flood Study (*DWR*)	2004 FRMS (*Bewsher*)	2003 Austral FRMS (*Perrens*)	2015 Updated Flood Study (*WorleyParsons*)
SOUTH CREEK					
Downstream Bringelly Road	58.75	58.3 (+0.45m)	58.27 (+0.48m)	N.A	58.8 (-0.05m)
Bellfield Avenue	57.55	57.1 (+0.40m)	57.05 (+0.50m)	N.A	57.6 (-0.05m)
Confluence with Thompsons Creek	53.35	/	53.31 (+0.04m)	N.A	53.3 (+0.05m)
Fifteenth Avenue	51.40	51.5 (-0.10m)	51.46 (-0.06m)	N.A	51.3 (+0.10m)
Watts Road	49.80	49.9 (-0.10m)	49.87 (-0.07m)	N.A	49.8 (-0.00m)
Victor Avenue	48.85	48.9 (-0.05m)	49.11 (-0.26m)	N.A	48.9 (-0.05m)
Overett Avenue	43.55	43.9 (-0.35m)	43.36 (+0.19m)	N.A	43.6 (-0.05m)
Upstream Elizabeth Drive	43.10	43.2 (-0.10m)	42.64 (+0.46m)	N.A	43.1 (-0.00m)
KEMPS CREEK					
Downstream Bringelly Road	73.95	74.0 (-0.05m)	N.A	74.00 (+0.05m)	74.30 (-0.35m)
Twelfth Avenue	60.55	59.6 (+0.95m)	N.A	60.10 (-0.45m)	60.20 (+0.35m)
Fourteenth Avenue	58.50	58.0 (+0.50m)	N.A	58.10 (+0.40m)	58.40 (+0.10m)
Upstream Fifteenth Avenue	57.50	57.4 (+0.10m)	N.A	57.50 (-0.00m)	57.40 (+0.10m)
Downstream Fifteenth Avenue	57.10	57.3 (-0.20m)	N.A	56.90 (+0.20m)	57.20 (-0.10m)
Upstream Gurner Avenue	55.50	55.4 (-0.10m)	N.A	55.30 (+0.20m)	55.40 (+0.10m)
Upstream Elizabeth Drive	47.90	47.6 (-0.30m)	N.A	47.70 (+0.20m)	47.70 (+0.20m)
BADGERYS CREEK					
Downstream Badgerys Creek Road	58.45	58.2 (+0.25m)	N.A	N.A	58.9 (-0.45m)
East of Leggo Street	53.90	53.9 (-0.00m)	N.A	N.A	53.6 (+0.30m)
Upstream Pitt Street	50.85	50.8 (+0.05m)	N.A	N.A	50.6 (+0.25m)
Downstream Pitt Street	50.85	50.8 (+0.05m)	N.A	N.A	50.5 (+0.35m)
Upstream Elizabeth Drive	46.75	46.6 (+0.15m)	N.A	N.A	46.5 (+0.25m)
THOMPSONS CREEK					
Downstream The Northern Road	69.70	69.8 (-0.10m)	69.77 (-0.07m)	N.A	69.5 (+0.20m)
Kelvin Park Drive	64.45	N.A	64.46 (-0.01m)	N.A	64.4 (+0.05m)
Upstream Retreat Road	59.30	58.9 (+0.40m)	58.90 (+0.40m)	N.A	59.2 (+0.10m)
250m Upstream South Creek	53.45	53.0 (+0.45m)	53.10 (+0.35m)	N.A	53.4 (+0.05m)
Confluence with South Creek	53.35	/	53.31 (+0.04m)	N.A	53.3 (+0.05m)

^ The design 1% AEP event was simulated for a 2, 9 and 36 hour storm durations using the updated RMA-2 model.

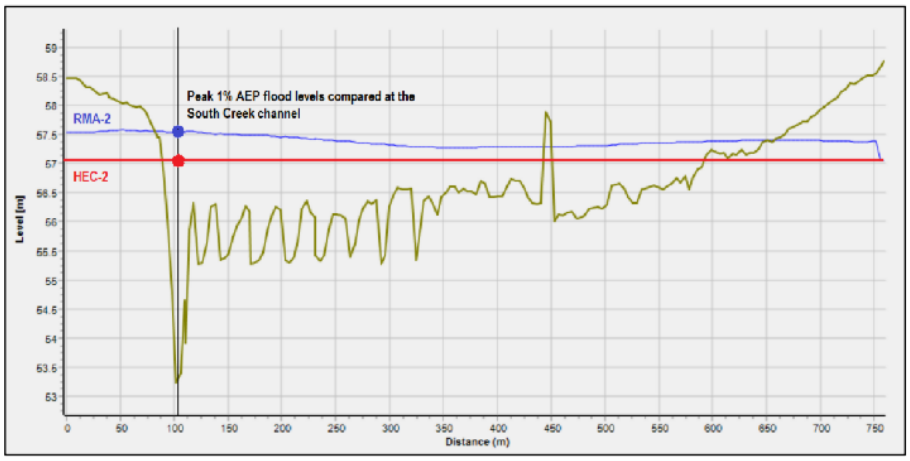

Plate 4.1 Comparison of Predicted Peak 1% AEP Flood Levels along the entire HEC-2 Cross-Section Length [2020 RMA-2 Model Compared to 2004 HEC-2 Model]

In summary, the differences observed between the previously adopted hydraulic model results and the 2020 RMA-2 flood model results are largely to be expected given the catchment and floodplain changes associated with recent development and the incorporation of more detailed topographic data. The updated flood models are considered to suitably represent the contemporary conditions across the South Creek floodplain across the study area and no further modification was made to the parameters adopted in the XP-RAFTS and RMA-2 models for the purpose of validation.

4.2.7 Comparison of Predicted 1% AEP Flood Levels to 1988 Historic Flood Marks

Work undertaken for the 1990 Flood Study determined that the 1988 flood was approximately equivalent to the design 1% AEP flood event. That is, the predicted peak 1% AEP flood levels generated from the MIKE-11 modelling undertaken for the 1990 study were similar to those recorded along South Creek during the 1988 flood.

Between Bringelly Road and Elizabeth Drive there were six (6) flood marks recorded along South Creek for the 1988 historic flood. A comparison between predicted 1% AEP flood levels using the updated RMA-2 model to recorded 1988 flood levels is included within **Table 4.7**. The descriptions of flood mark locations have been extracted from Table 2.1 of the 2004 South Creek FRMS (*Bewsher*).

The results indicate that the peak 1% AEP flood levels predicted using the updated RMA-2 model are on average (*absolute*) within 0.39 metres to those recorded in 1988. This magnitude of difference is considered reasonable given the significant changes that have occurred across the catchment since 1988 including increased urbanisation and construction of the relief floodway crossing along Elizabeth Drive . There is also considerable uncertainty regarding the locations of the flood marks which reduces their reliability for use in any further model calibration.

Table 4.7 Comparison between Recorded 1988 Flood Levels to Simulated 1% AEP Flood Levels

FLOOD MARK LOCATION (*Based on 2004 FRMS Report*)	**APRIL 1988 RECORDED FLOOD LEVEL** (*mAHD*)	**SIMULATED RMA-2 1% AEP FLOOD LEVEL** (*mAHD*)
Just downstream of Bringelly Road Bridge	57.59	58.3 (+0.71m)
May Avenue, Rossmore (200m-1,200m downstream Bringelly Road)	56.09	56.30 (+0.21m)
Wishart Road, Kemps Creek (about 3,500m upstream of Elizabeth Drive)	51.47	50.70 (-0.77m)
Victor Avenue, Kemps Creek (about 2,800m upstream of Elizabeth Drive)	49.10	48.85 (-0.25m)
Overett Avenue, Kemps Creek (about 300m upstream of Elizabeth Drive)	43.41	43.56 (+0.15m)
Just upstream of Elizabeth Drive bridge	43.33	43.10 (-0.23m)
	Average Difference (Absolute) -	**0.39m**

5 Design Event Modelling

5.1 General

Design floods are hypothetical floods that are commonly used for planning and floodplain risk management investigations. Design floods are based on statistical analysis of rainfall and flood records and are defined by their probability of occurrence. For example, a 1% Annual Exceedance Probability (*AEP*) flood is the best estimate of a flood that will have one chance in 100 of occurring in any given year.

It should be noted that there is no guarantee that the design 1% AEP flood will occur just once in a one hundred year period. It may occur more than once, or at no time at all in the one hundred year period. This is because the design floods are based upon a statistical '*average*'.

5.2 Hydrologic Modelling

5.2.1 Design Simulations

The updated XP-RAFTS flood model was used to simulate the catchment hydrology for the following design events:

- 5% AEP:
- 1% AEP;
- 0.2% AEP; and
- Probable Maximum Flood (*PMF*).

A 36 hour critical storm duration was adopted for all events except the PMF, which was simulated with a 6 hour duration according to the approach adopted for the *'Updated South Creek Flood Study'* in 2015.

A 2 hour and 9 hour storm duration were also adopted for the 1% AEP events in order to simulate the critical duration along many of the smaller tributaries such as Thompsons, Cosgroves, Badgerys, Kemps and Oaky Creeks (*refer* **Table 4.2**).

5.2.2 Hydrologic Modelling Results

Flow hydrographs were extracted from the XP-RAFTS model results for each event at the upstream inflow boundary and local inflow points in the RMA-2 flood model (*refer* **Figure 4.10**).

Peak discharges have been extracted from the XP-RAFTS model at key locations for the 5% and 1% AEP events for the 2, 9 and 36 hour storm durations and are presented in **Table 5.1**. Peak discharges for the 6 hour PMF event have also been extracted and are listed.

Table 5.1 Peak Discharges Predicted for Design Storms Across the Study Area Predicted Using the Latest XP-RAFTS Hydrologic Model

LOCATION	RAFTS NODE (refer Fig 4.4 & Fig 4.5)	Predicted Peak Discharge (m^3/s)						
		5% AEP Event			1% AEP Event			PMF
		2hr	9hr	36hr	2hr	9hr	36hr	6hr
SOUTH CREEK								
Upstream Bringelly Road	1.08	132	192	227	207	289	305	1,079
Upstream Thompsons Creek Confluence	1.10	203	284	306	317	416	351	1,216
Upstream Fifteenth Avenue	1.12	209	303	332	329	444	445	1,541
Upstream Elizabeth Drive	1.13	215	325	367	341	477	492	1,666
KEMPS CREEK								
Upstream Bringelly Road	KC00-10	24	15	23	29.8	24.0	31.2	105
Upstream Fifteenth Avenue	KC00-05	108	126	131	158	179	174	584
Upstream Elizabeth Drive	KC00-01	125	179	211	182	256	278	871
BADGERYS CREEK								
Upstream Badgerys Creek Road	5.00	32	42	43	46	63	58	195
Upstream Longleys Road	5.01	46	78	79	73	113	103	351
Upstream Elizabeth Drive	5.02	48	87	91	78.7	127	120	408
THOMPSONS CREEK								
Upstream The Northern Road	4.00	35	38	27	51	48	34.1	122
Upstream Confluence with South Creek	4.02	58	66	51	85.5	85.2	64.6	236
BONDS CREEK								
Upstream Bringelly Road	BC00-8	74	48	40	96.7	64.8	51.4	174
Confluence with Kemps Creek	BC00-1	94	89	86	133	126	113	386
COSGROVES CREEK								
Upstream Elizabeth Drive	12.00.1.4	19	43	32	36.6	55.1	39.9	135
OAKY CREEK								
Upstream Elizabeth Drive	11.0	10	23	20	19.0	32.6	25.6	87

5.3 Hydrodynamic Modelling

5.3.1 Design Simulations

The updated RMA-2 flood model was used to simulate flooding across the floodplain extent shown in **Figure 4.10** for the range of design events and storm durations shown in **Table 5.2**.

Table 5.2 Adopted Tailwater Conditions for Design Event Simulations

Design Event	Storm Durations	Hawkesbury River Tailwater Condition ^
5% AEP	2, 9 and 36 hours	20% AEP – 9.85 mAHD
1% AEP	2, 9 and 36 hours	20% AEP – 9.85 mAHD
		1% AEP – 17.30 mAHD
0.2% AEP (Doubles as the Climate Change Scenario)	36 hours	20% AEP – 9.85 mAHD
		0.2% AEP – 19.63 mAHD
PMF	6 hours	PMF – 26.72 mAHD

^ Peak flood levels extracted from 'Hawkesbury-Nepean Valley Regional Flood Study' (Infrastructure NSW, 2019) prepared by WMA Water

The adopted tailwater conditions have no impact on flooding within the study area given the limit of tailwater influence occurs near the Western Motorway (*M4*); a significant distance downstream of Elizabeth Drive and the study area.

5.3.2 Inflow Hydrographs

Hydrographs from XP-RAFTS corresponding to sub-catchments located at the upstream boundaries of the RMA-2 model were extracted and incorporated as the upstream boundary condition to the model (*refer* **Section 4.2.4** *and* **Figure 4.10**).

More than 190 local inflow points were also incorporated into the model down through the floodplain to account for the sub-catchment delineation shown in **Figure 4.2**.

5.3.3 Hawkesbury River Tailwater Levels

The adopted tailwater levels at the downstream boundary of the RMA-2 model vary according to the design event (*refer* **Table 5.2**). Peak flood levels for Hawkesbury River design events have been extracted from modelling completed as part of the '*Hawkesbury-Nepean Valley Regional Flood Study*' (*Infrastructure NSW, 2019*) prepared by WMA Water.

The study area is located upstream of the extent of tailwater influence and is therefore not impacted by the adopted tailwater levels.

5.4 Design Flood Modelling Results

All mapping for the 1% AEP event is based on a 'peak-of-peaks' flood surface generated from simulations of the 2, 9 and 36 hour storm durations. The locations where each duration is critical within the 'peak-of-peaks' flood surface is included on **Table 4.2**.

Mapping for the PMF is based on a 6 hour duration event.

Peak flood level estimates were extracted from the modelling results and were used to generate flood extent and flood level plots for each design event. The plots show the variation in flood levels across the floodplain at contour intervals of 0.2 metres.

Mapping for the 1% AEP event is presented in **Figures 5.1** to **5.13** and PMF is presented in **Figures 5.14** to **5.26**.

6 Potential Impact of Climate Change

The potential impacts of climate change are currently predicted to manifest as a rise in sea level and as an increase in rainfall intensities during major storms. Sea level rise is not expected to impact on the South Creek floodplain as it is elevated above the tidal limit of the Hawkesbury River.

Although current climate models show significant uncertainty in quantifying the effect of climate change on rainfall intensity, the *Climate Change in Australia Technical Report* from CSIRO and BoM (*2015*) projects increased intensity of extreme rainfall events for the east coast with a high confidence.

Scenarios of between 10% and 30% increase in rainfall intensity, as recommended in Practical Consideration of Climate Change (*DECC, 2007*), remain comparable to ranges projected by more recent research (*e.g. CSIRO and BOM, 2015*) and are considered appropriate for providing an informed assessment of the range of potential impacts and hence the sensitivity to climate change.

The potential impacts of increased rainfall intensity associated with climate change can be assessed by comparing model results for the 1% AEP design flood with those for the 0.5% AEP (*about a 15% increase in rainfall intensity*) and 0.2% AEP (*about a 35% increase in rainfall intensity*) events.

These relationships for the increase in rainfall intensity are reflective of the original ARR 2016 guidance which indicates that the IFD curves for the 0.5% and 0.2% AEP events are to be scaled from the 1% AEP event using 'growth factors' of 1.140 and 1.344, respectively.

For the South Creek floodplain, 1% AEP flood levels have been compared to 0.2% AEP flood levels to provide an indication of the potential impact of increased rainfall intensities due to climate change, representing an approximately 35% increase in rainfall intensity.

The results show that sensitivity to change in the 1% AEP flood levels along South Creek and its tributaries, such as would result from climate change impacts on flood producing rainfall events, tested using the 0.2% AEP event vary from:

- Up to 320mm for areas along South Creek upstream of Elizabeth Drive. Increases are typically less however, and nearer to 200 mm.
- Up to 380mm along Badgerys Creek for areas upstream of Elizabeth Drive. The impacts are predicted to be greatest near Badgerys Creek Road.
- Up to 250mm along Thompsons Creek upstream of the Northern Road and up to 450mm downstream. The maximum increase of up to 450mm is predicted to occur within a narrowing in the floodplain approximately 1,500m downstream of the Northern Road crossing. Downstream of the Resort Road crossing changes in peak flood levels are predicted to be less than 150mm.
- Up to 160mm along Bonds Creek and up to 220mm along Kemps Creek upstream of Elizabeth Drive.

7 Conclusions

The hydrologic and hydraulic flood models developed for the *'Upper South Creek Flood Study'* (2015) have been updated to account for the latest available LiDAR data, information from other recent flood investigations and recent industrial and urban developments that have occurred in parts of the catchment. This has included extensions to the RMA-2 flood model in the upper reaches of the study area, particularly in the vicinity of Bringelly Road.

The updated XP-RAFTS hydrologic modelling generates similar flows throughout the catchment for the 1% AEP 36 hour critical duration compared to the previous studies including the original '*South Creek Flood Study*' (*DWR, 1990*), '*South Creek Floodplain Risk Management Study*' (*Bewsher, 2004*) and '*Austral Floodplain Risk Management Study*' (*Perrens Consultants, 2003*)., Perrens Consultants). 2015 modelling.

A summary of the comparison findings for the 1% AEP design storm is provided in the following:

- Peak flows along South Creek are predicted to increase across the study area by between 2% to 17%.
- Peak flows along Thompsons Creek are predicted to increase by between 22% to 70%.
- Peak flows along Kemps Creek are predicted to decrease by between 9% and 32%.
- Peak flows along Badgerys Creek are predicted to increase by 14% at Elizabeth Drive.

The magnitude of change in peak discharges for the 1% AEP design storm are considered reasonable given the extensive updates incorporated into the 2020 XP-RAFTS hydrologic model as a function of catchment changes and increased reliability of available input data.

The 36 hour storm duration has been confirmed to be critical for the study area generating the largest peak flows along South Creek between Bringelly Road and Elizabeth Drive. Although shorter storm durations such as the 2 and 9 hour storms generate the largest flows along many of the smaller tributaries.

The updated XP-RAFTS hydrologic model was also used to simulate the 1% AEP flood based on ARR 2019 inputs and procedures. Peak flows at the Elizabeth Drive crossing derived based on ARR 1987 and ARR 2019 simulations were compared to peak flows derived at Elizabeth Drive through Flood Frequency Analysis (FFA).

The comparison shows that the modelling based on ARR 1987 generated a peak flow for the 1% AEP event that matched more closely (*10% lower*) to the FFA than ARR 2019 (*29% lower*). Based on this, it is recommended that the hydrology continue to be based on ARR 1987 temporal patterns and Intensity-Frequency-Duration (IFD) data.

The updated flood models are considered to suitably represent the contemporary conditions across the South Creek catchment and floodplain. The models are therefore proposed for adoption by Council in order to replace the 2004 South Creek Floodplain Risk Management Study (*Bewsher*) and 2003 Austral Floodplain Risk Management Study (*Perrens Consultants*) which are currently adopted by Council.

8 References

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LIVERPOOL CITY COUNCIL

Wianamatta (South) Creek Flood Study
Liverpool Local Government Area

REPORT FIGURES

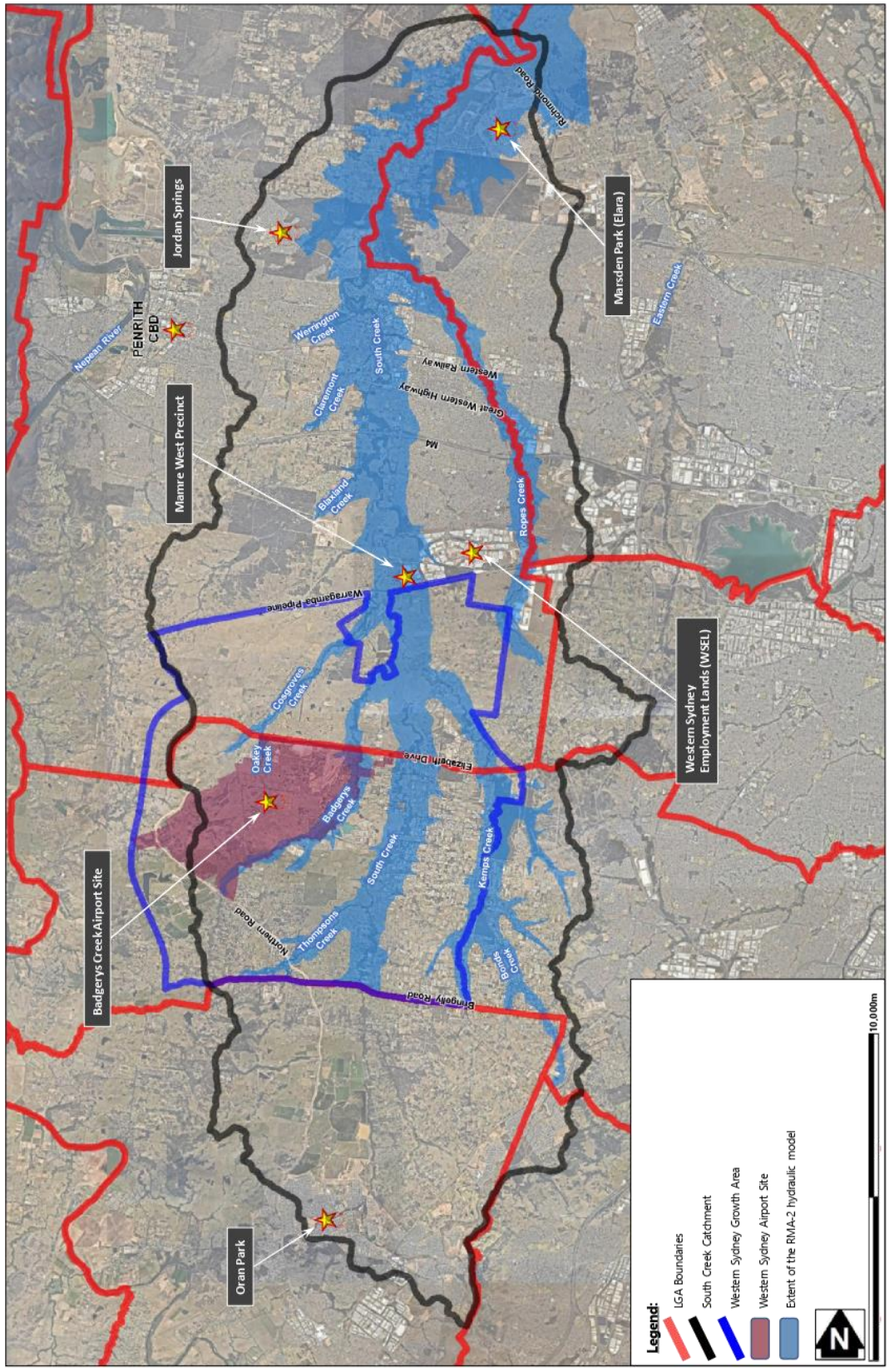

FIGURE 2.1

EXTENT OF THE WIANAMATTA (SOUTH) CREEK CATCHMENT AREA

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FIGURE 2.2 **EXTENT OF THE STUDY AREA**

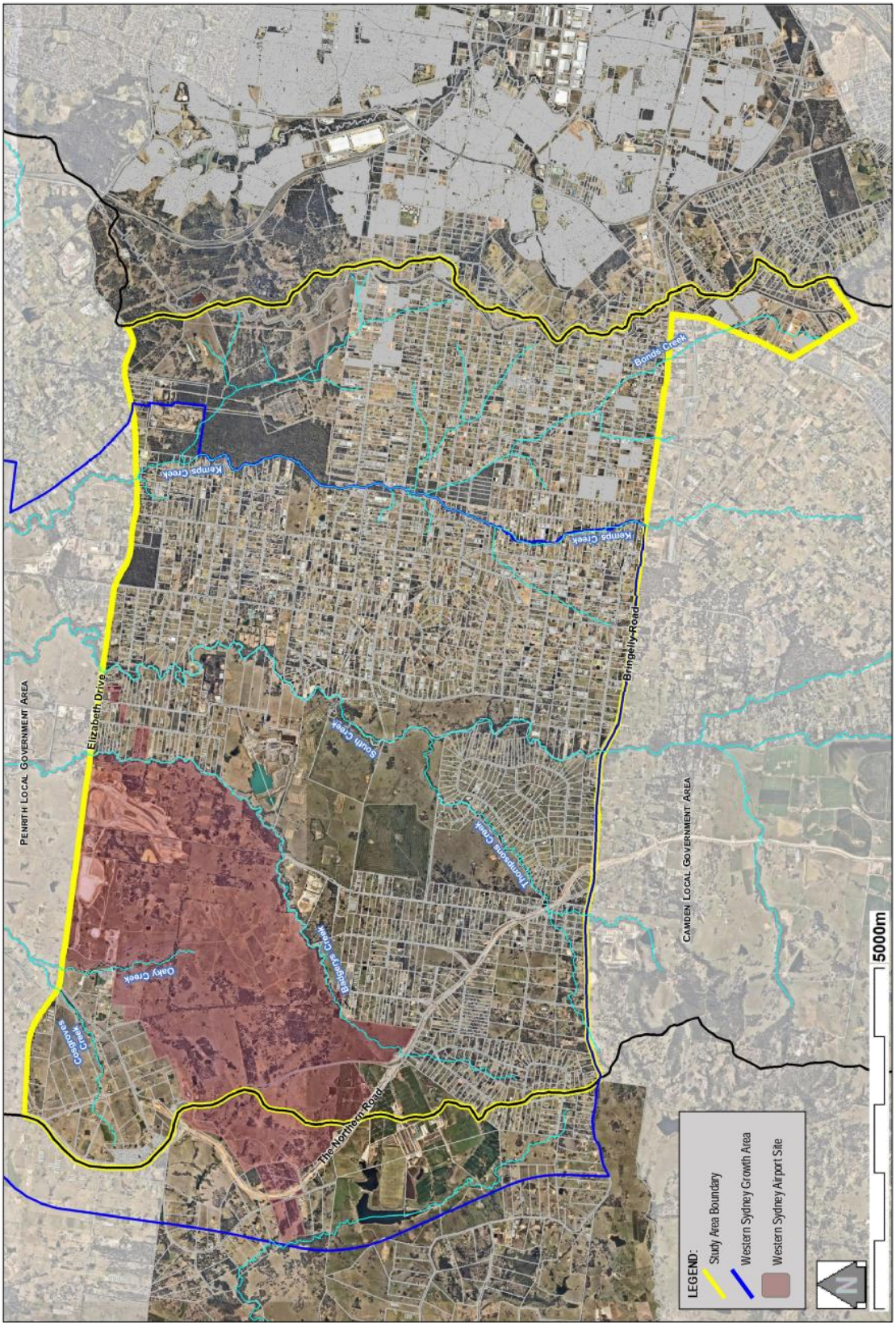
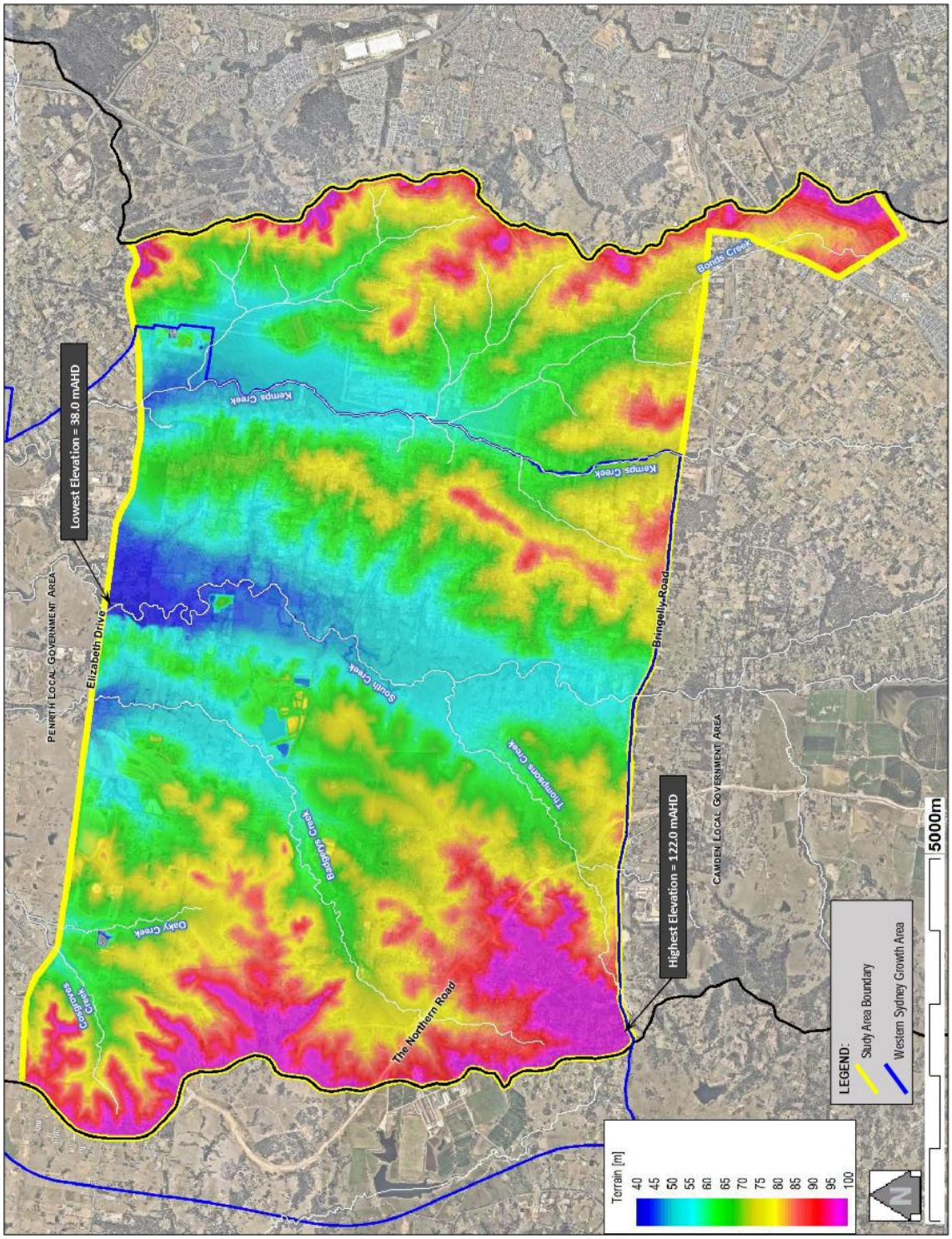
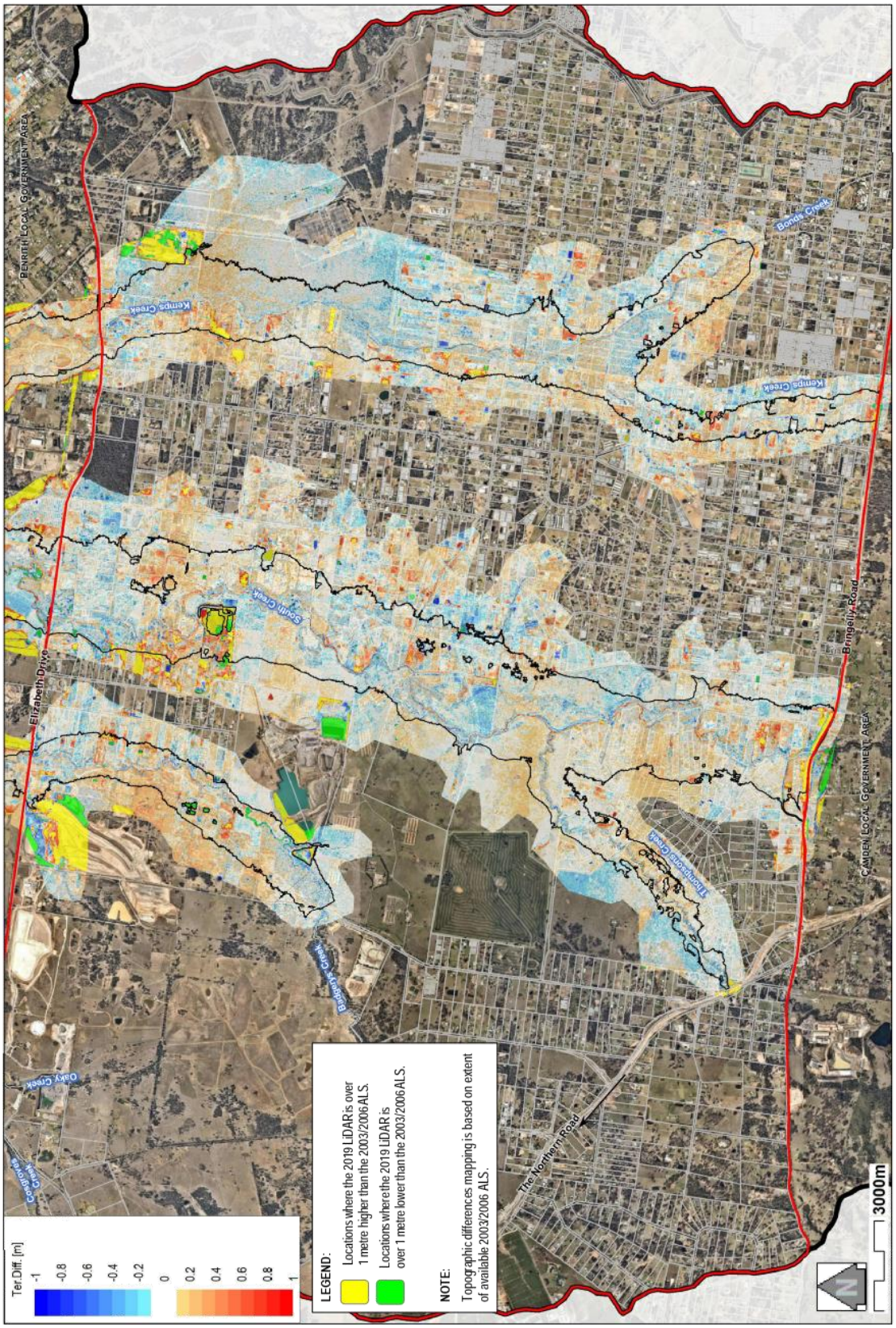


FIGURE 2.3



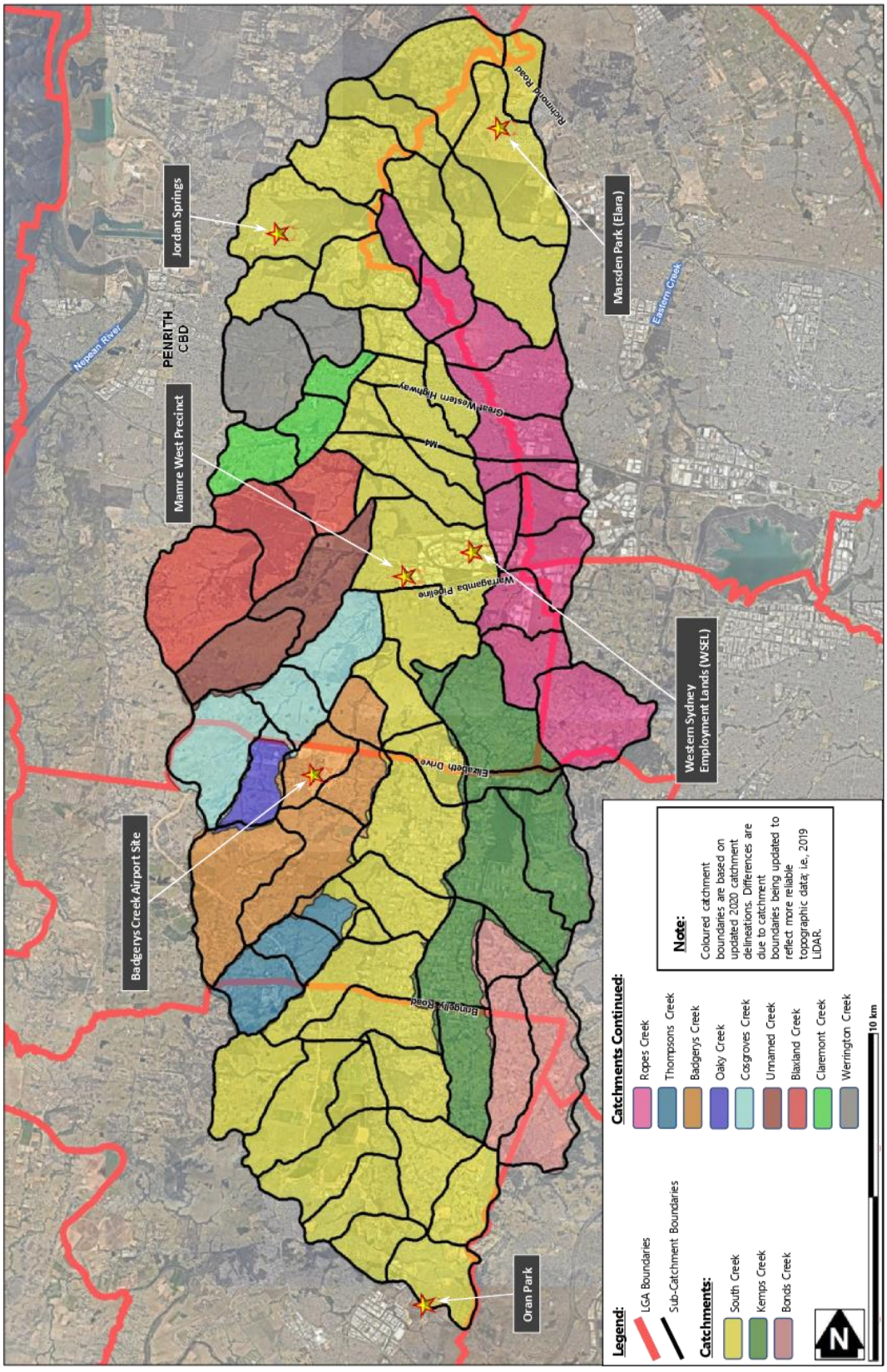
TOPOGRAPHY ACROSS THE STUDY AREA BASED ON 2019 LiDAR

FIGURE 3.1



COMPARISON OF 2019 LiDAR TO 2003/2006 ALS SURFACE ELEVATIONS

FIGURE 4.1



SOUTH CREEK SUB-CATCHMENT BOUNDARIES BASED ON THE 'UPDATED SOUTH CREEK FLOOD STUDY' (2015)

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311012-00242 – Wianamatta (South) Creek FS Liverpool
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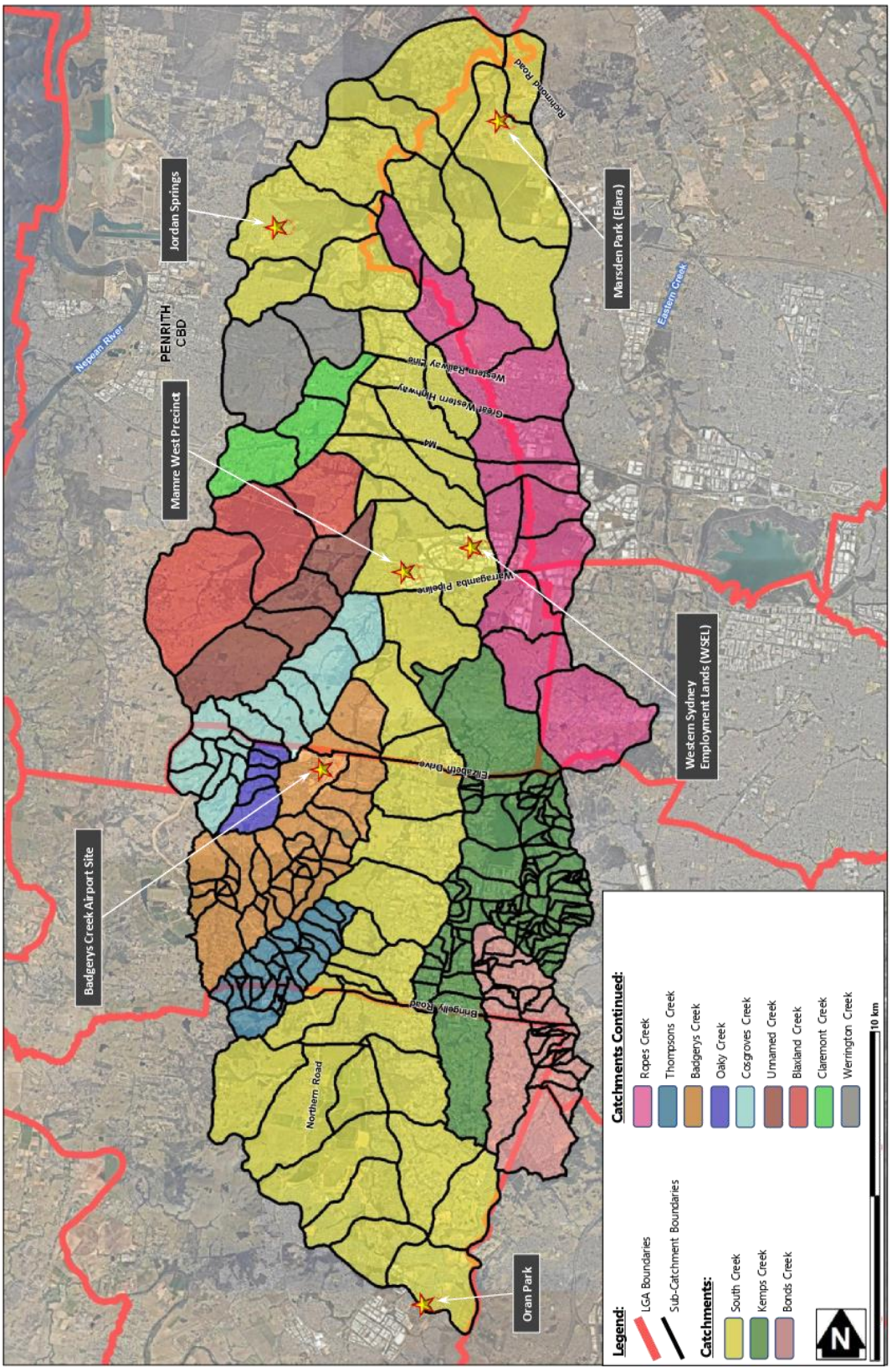
FIGURE 4.2



SOUTH CREEK SUB-CATCHMENT BOUNDARIES
UPDATED AS PART OF WIANAMATTA (SOUTH) CREEK
CATCHMENT FLOOD STUDY (2020)

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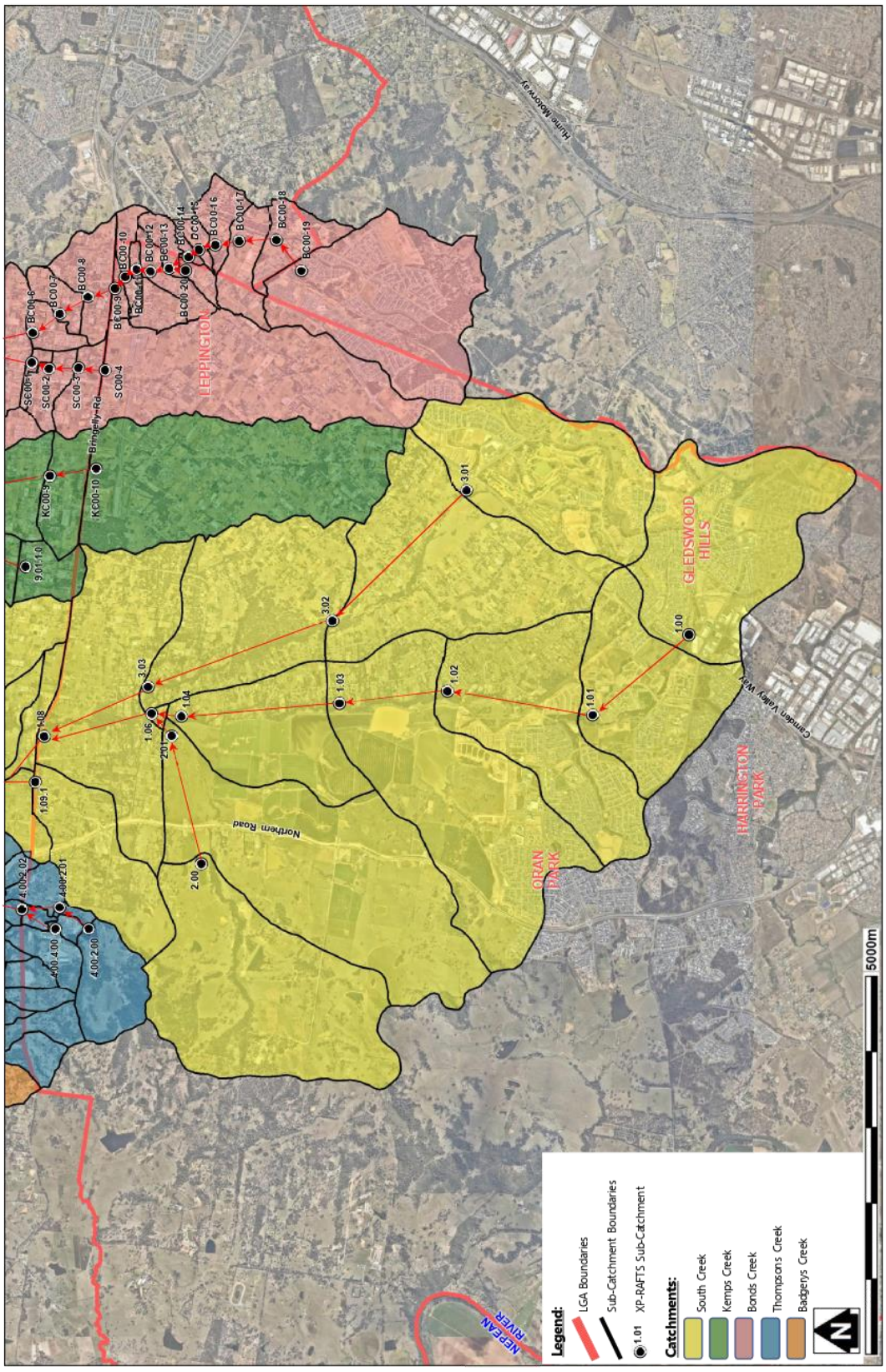
FIGURE 4.3



SOUTH CREEK SUB-CATCHMENT BOUNDARIES UPDATED AS PART OF WIANAMATTA (SOUTH) CREEK CATCHMENT FLOOD STUDY (2020)

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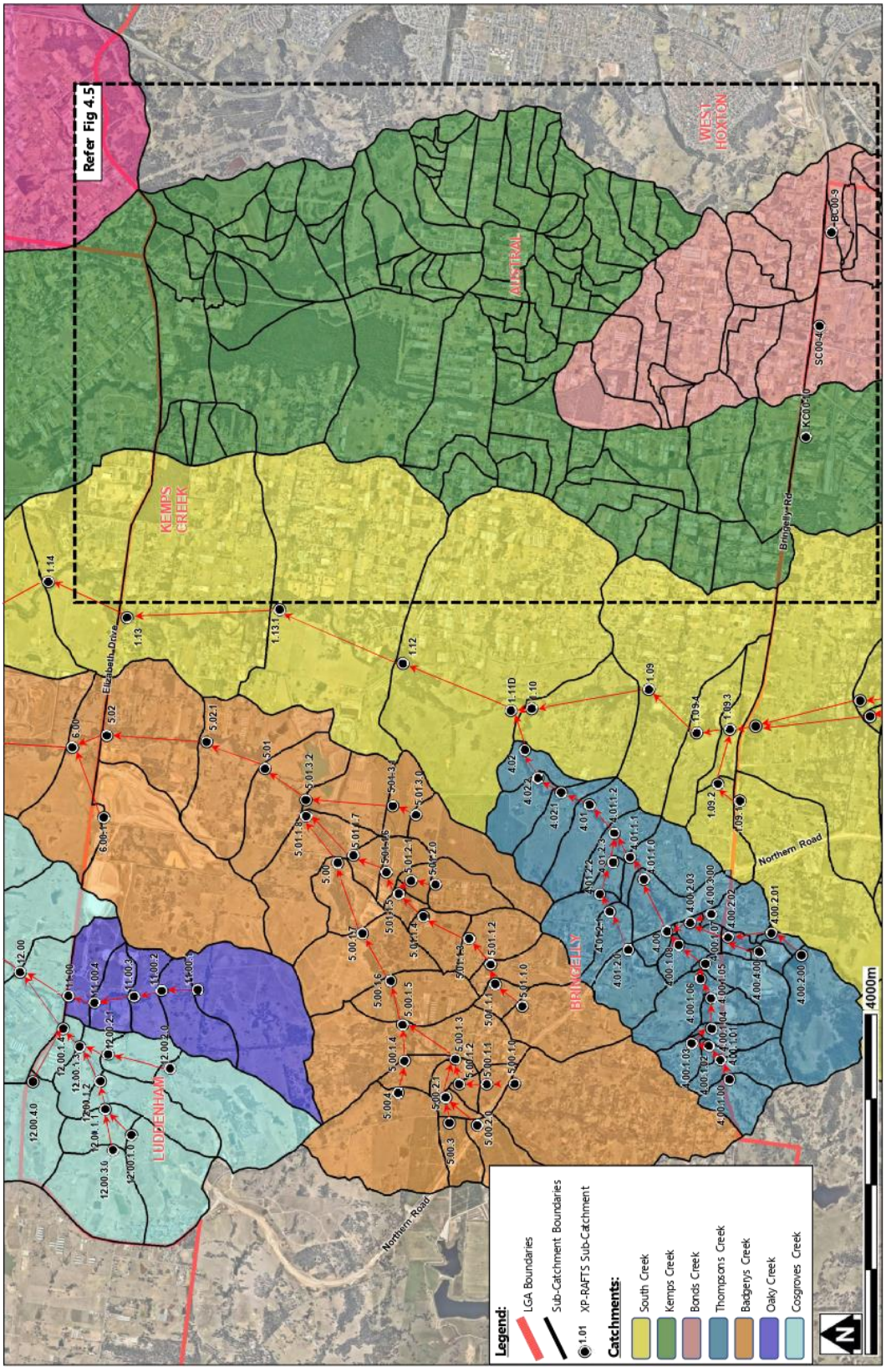
FIGURE 4.4



SOUTH CREEK SUB-CATCHMENT BOUNDARIES
UPDATED AS PART OF WIANAMATTA (SOUTH) CREEK
CATCHMENT FLOOD STUDY (2020)

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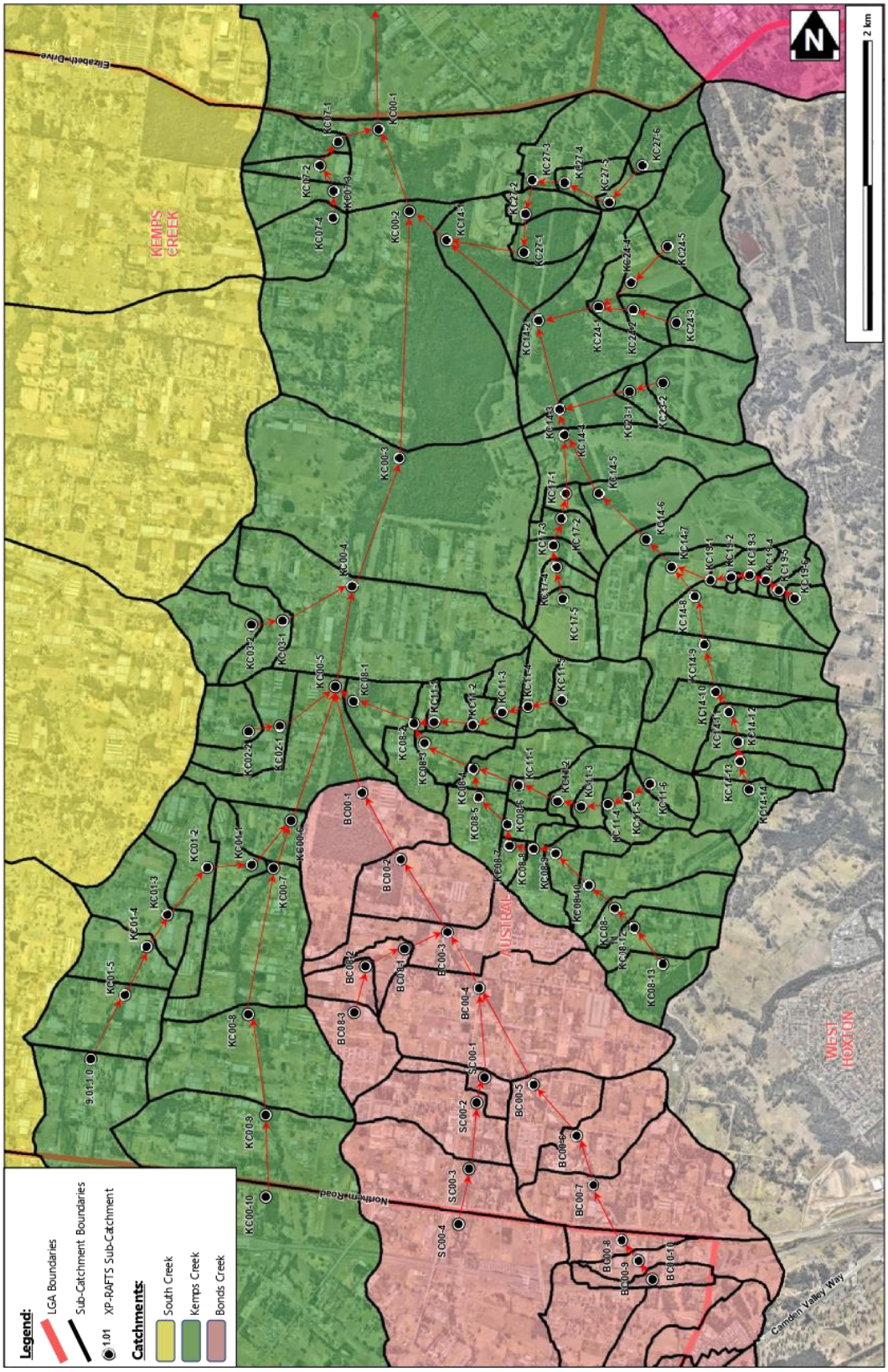
FIGURE 4.5



SOUTH CREEK SUB-CATCHMENT BOUNDARIES
UPDATED AS PART OF WIANAMATTA (SOUTH) CREEK
CATCHMENT FLOOD STUDY (2020)

Advisian
Worley Group
311012-00242 – Wianamatta (South) Creek FS_Liverpool
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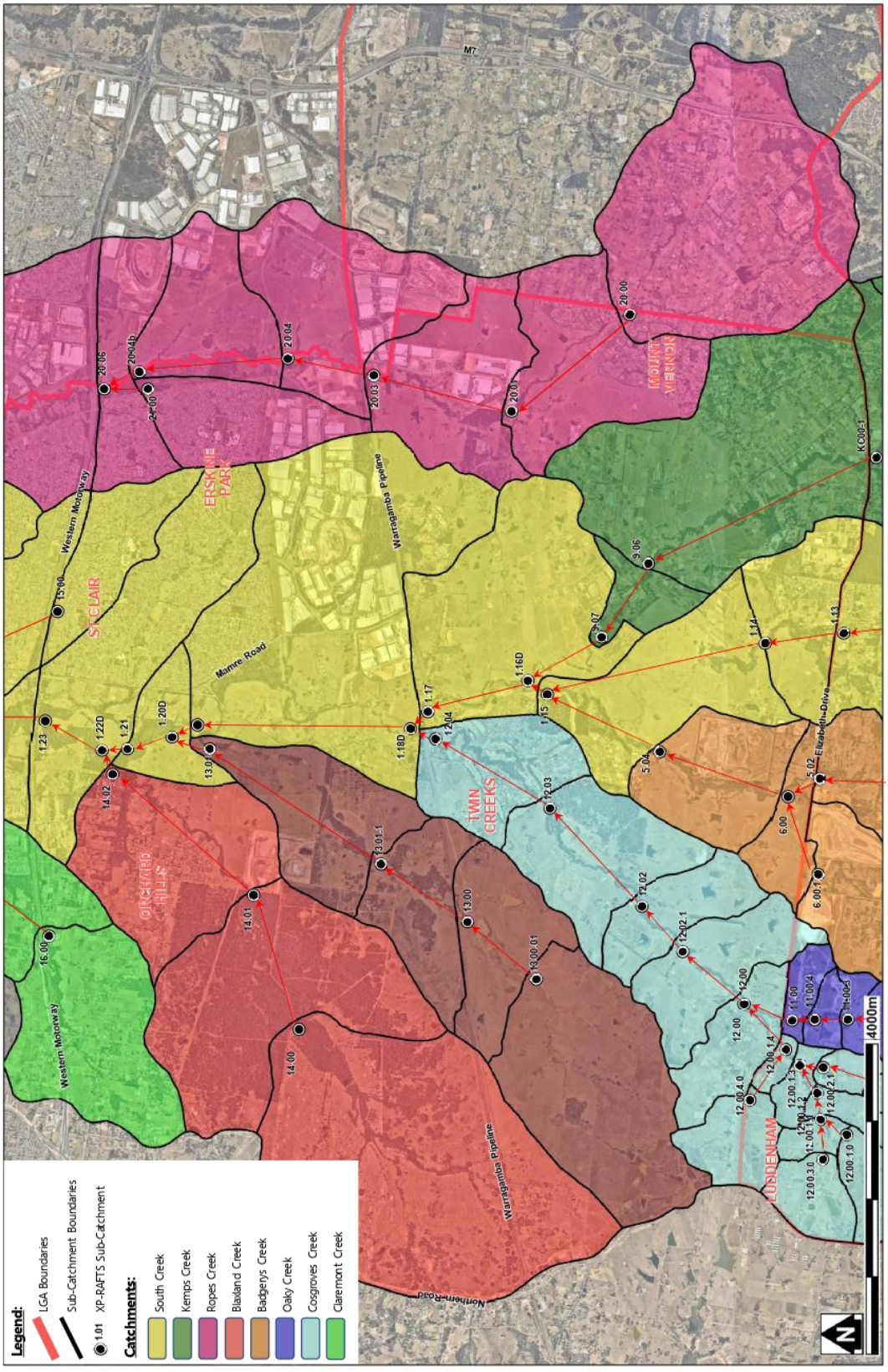
FIGURE 4.6



SOUTH CREEK SUB-CATCHMENT BOUNDARIES
UPDATED AS PART OF WIANAMATTA (SOUTH) CREEK
CATCHMENT FLOOD STUDY (2020)

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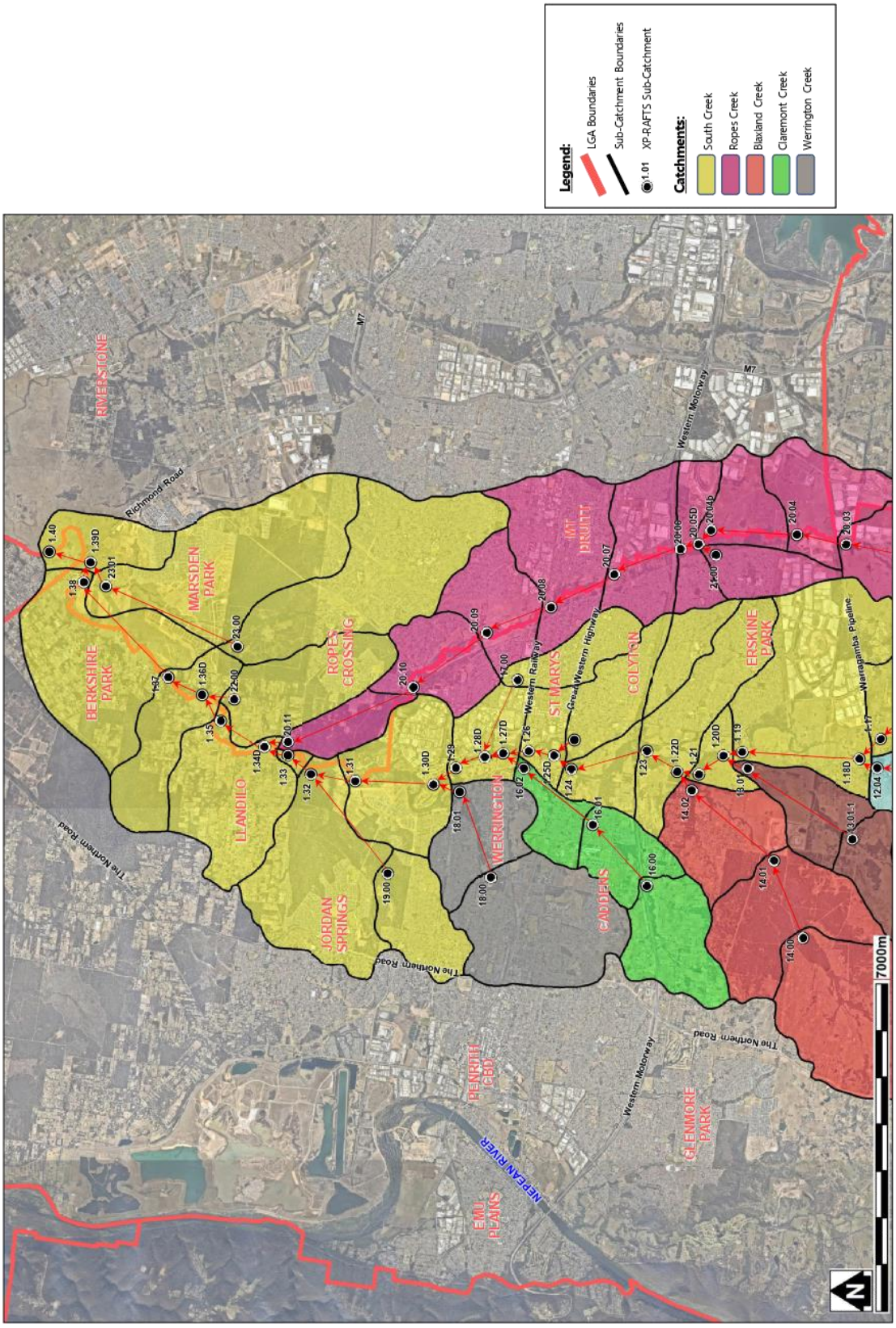
FIGURE 4.7



SOUTH CREEK SUB-CATCHMENT BOUNDARIES
UPDATED AS PART OF WIANAMATTA (SOUTH) CREEK
CATCHMENT FLOOD STUDY (2020)

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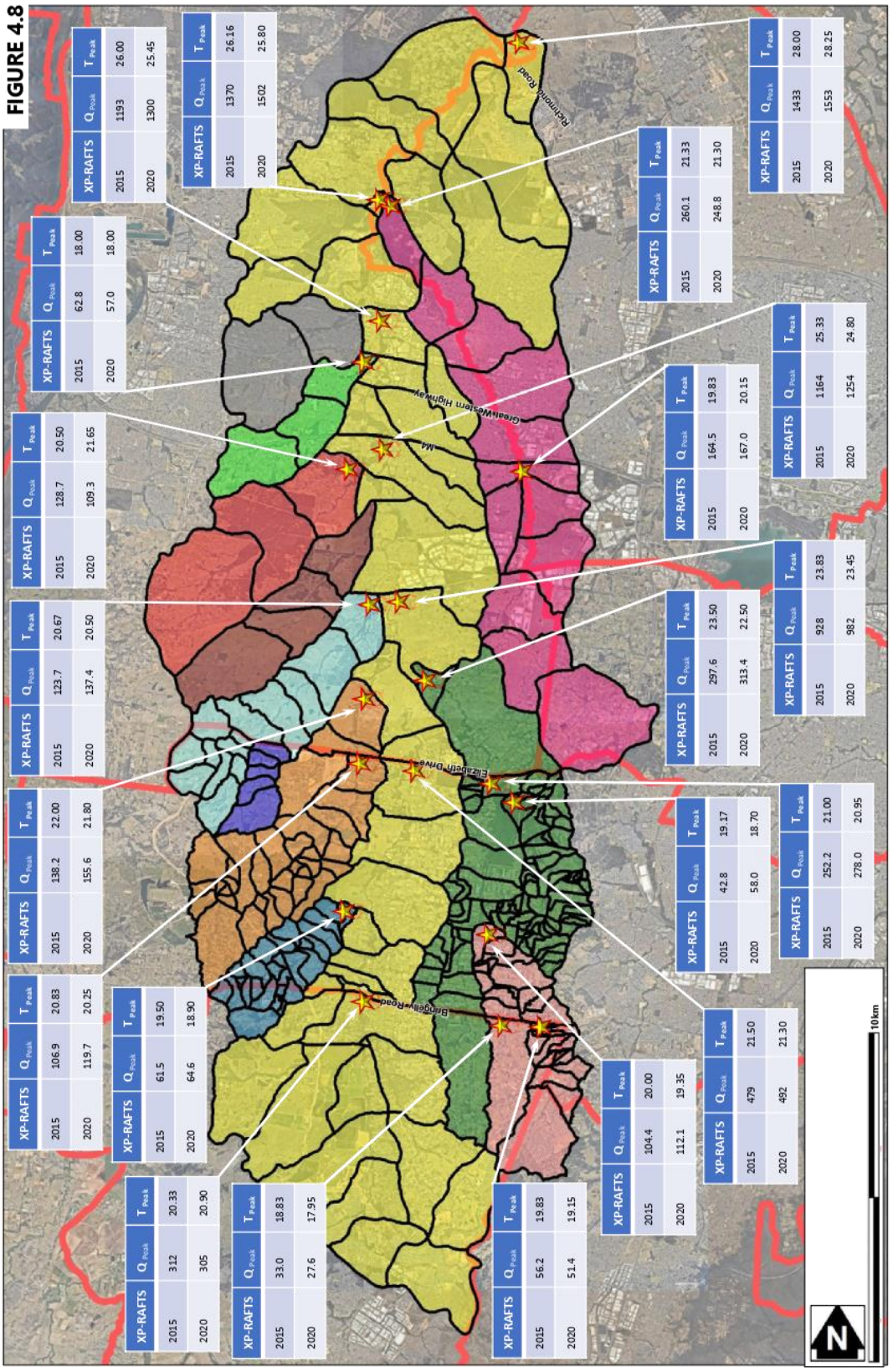
FIGURE 4.8
COMPARISON OF PEAK 1% AEP FLOWS AND TRAVEL TIMES BETWEEN 2015 AND 2020 XP-RAFTS HYDROLOGIC MODELLING (36 HOUR DURATION)
Richmond Road
Great Western Highway
M4
Elizabeth Drive
Bringelly Road
10km
Advisian
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fig311012-00242rpt110228_LCC Flood Study Report Figures.pptx

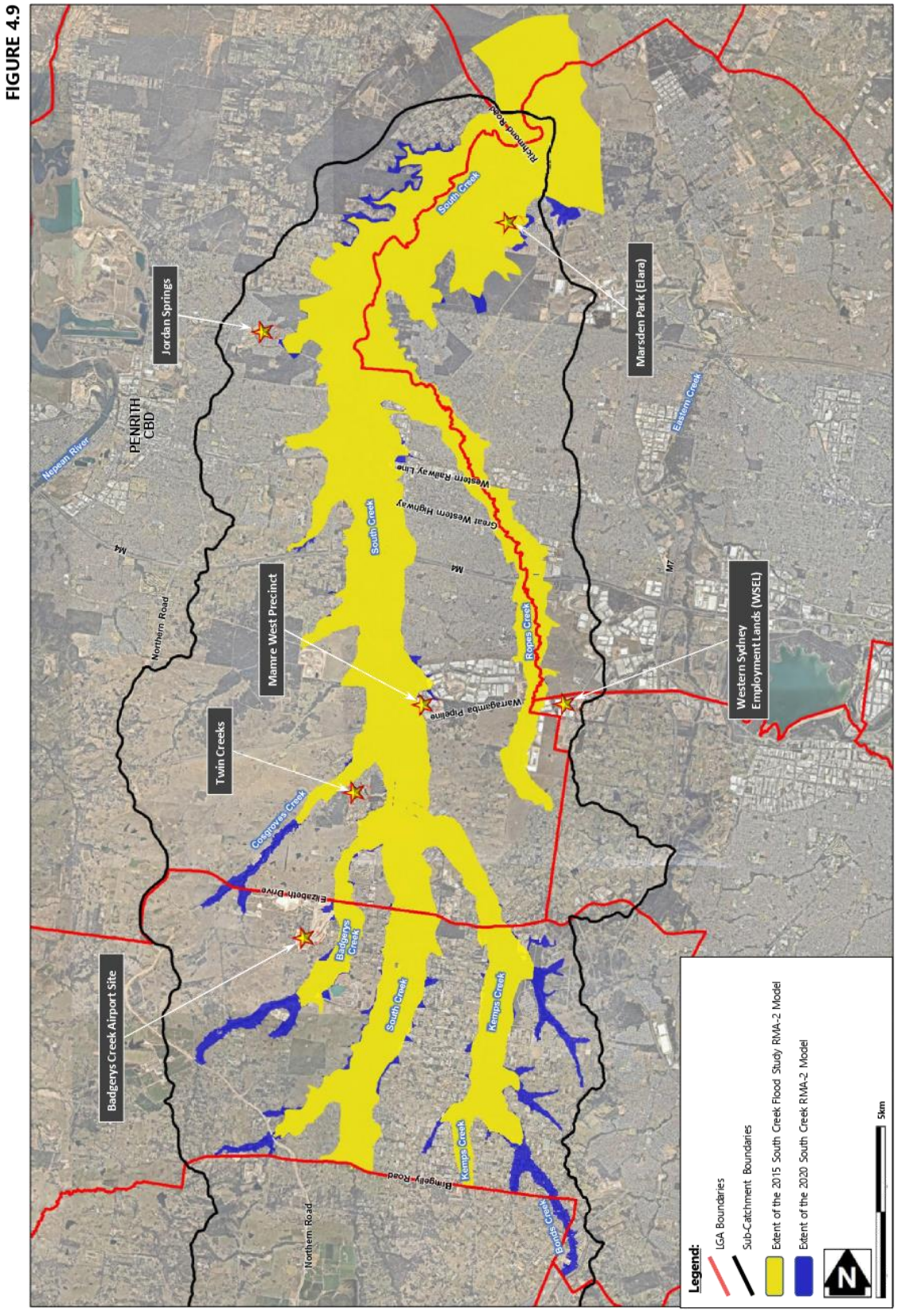

FIGURE 4.9

2015 AND 2020 RMA-2 HYDRAULIC MODEL EXTENTS

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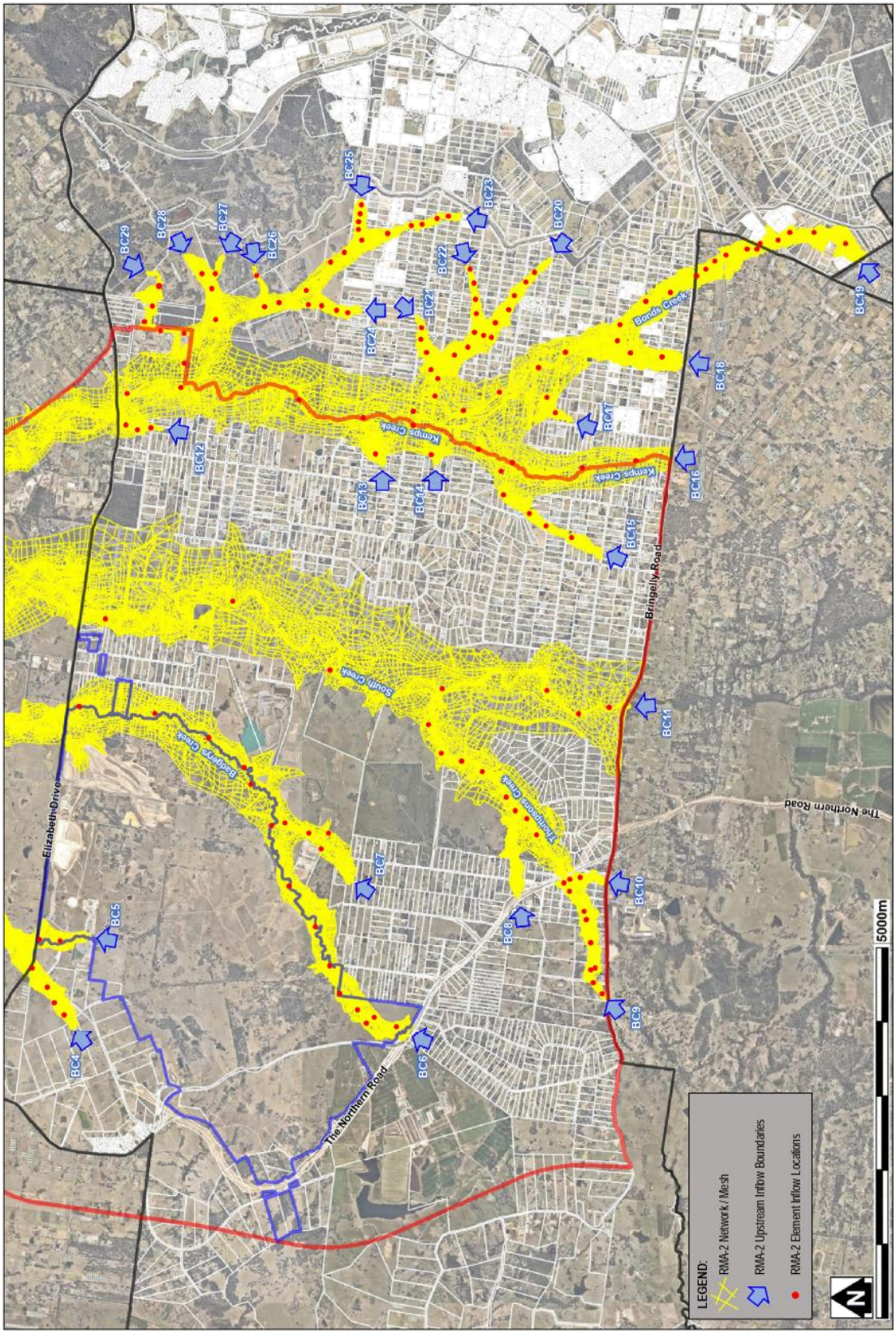
fig311012-00242rpt110228_LCC Flood Study Report Figures.pptx

FIGURE 4.10



UPDATED RMA-2 MODEL NETWORK AND INFLOW LOCATIONS [Study Area]

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fig311012-00242rpt 10228_LCC Flood Study Report Figures.pptx

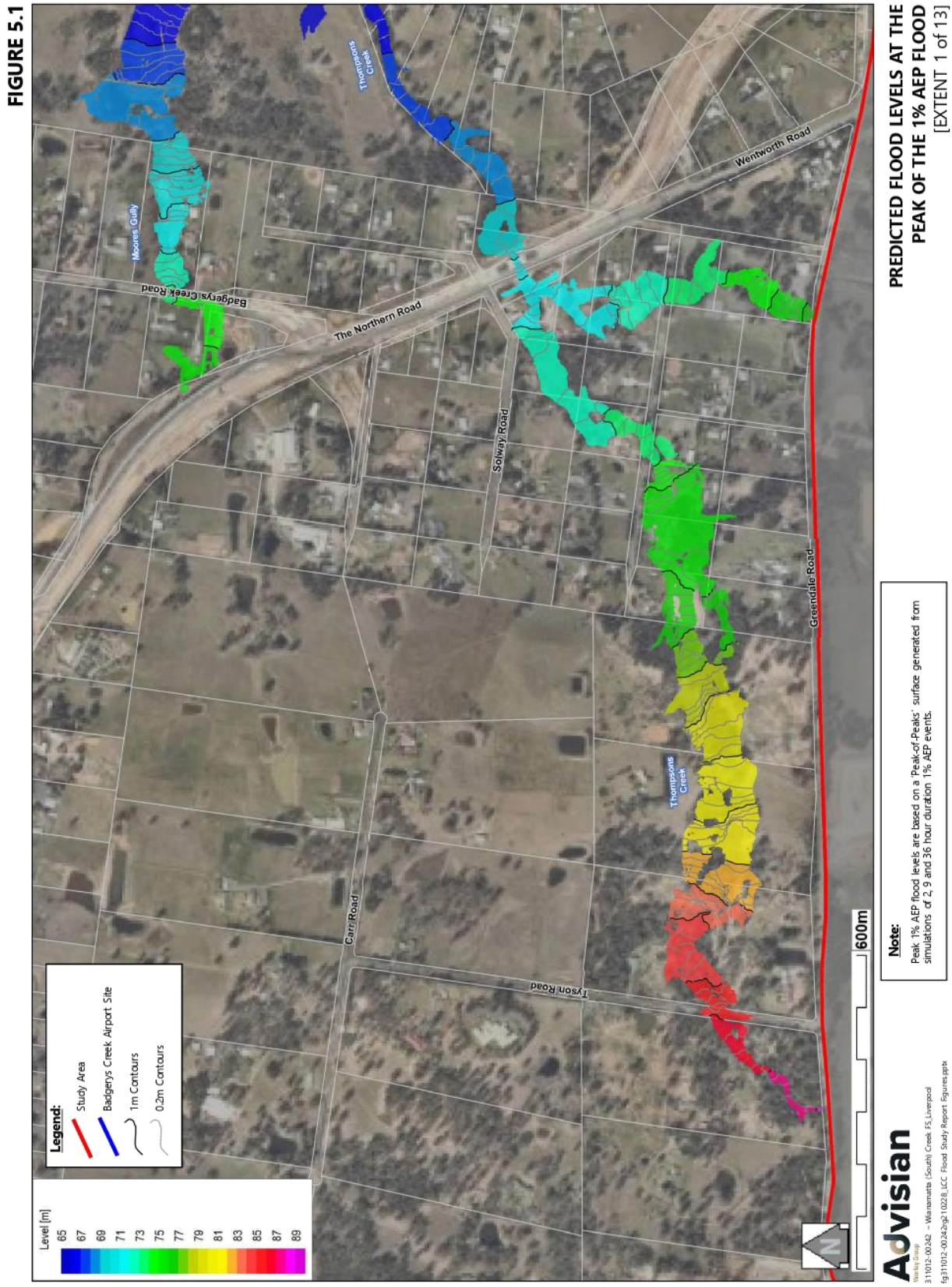
FIGURE 5.1
PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 1 of 13]
Thompsons Creek
Wentworth Road
Moores Gully
Badgerys Creek Road
The Northern Road
Solway Road
Greendale Road
Thompsons Creek
Carr Road
Tyson Road
Legend:
Study Area
Badgerys Creek Airport Site
1m Contours
0.2m Contours
Level [m]
65 67 69 71 73 75 77 79 81 83 85 87 89
600m
N
Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.
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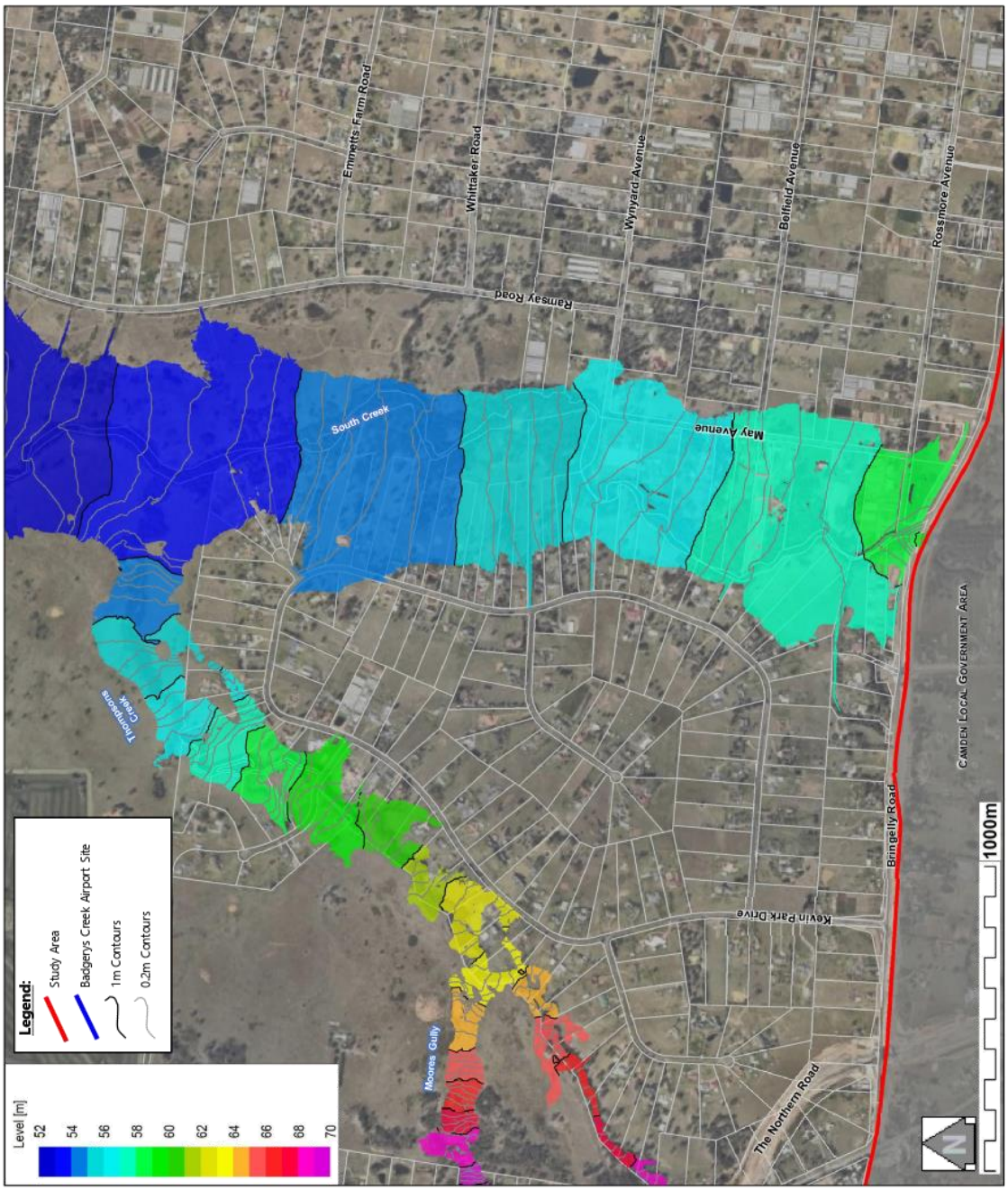
fig311012-00242rpt10228_LCC Flood Study Report Figures.pptx

FIGURE 5.2

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 2 of 13]



Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.

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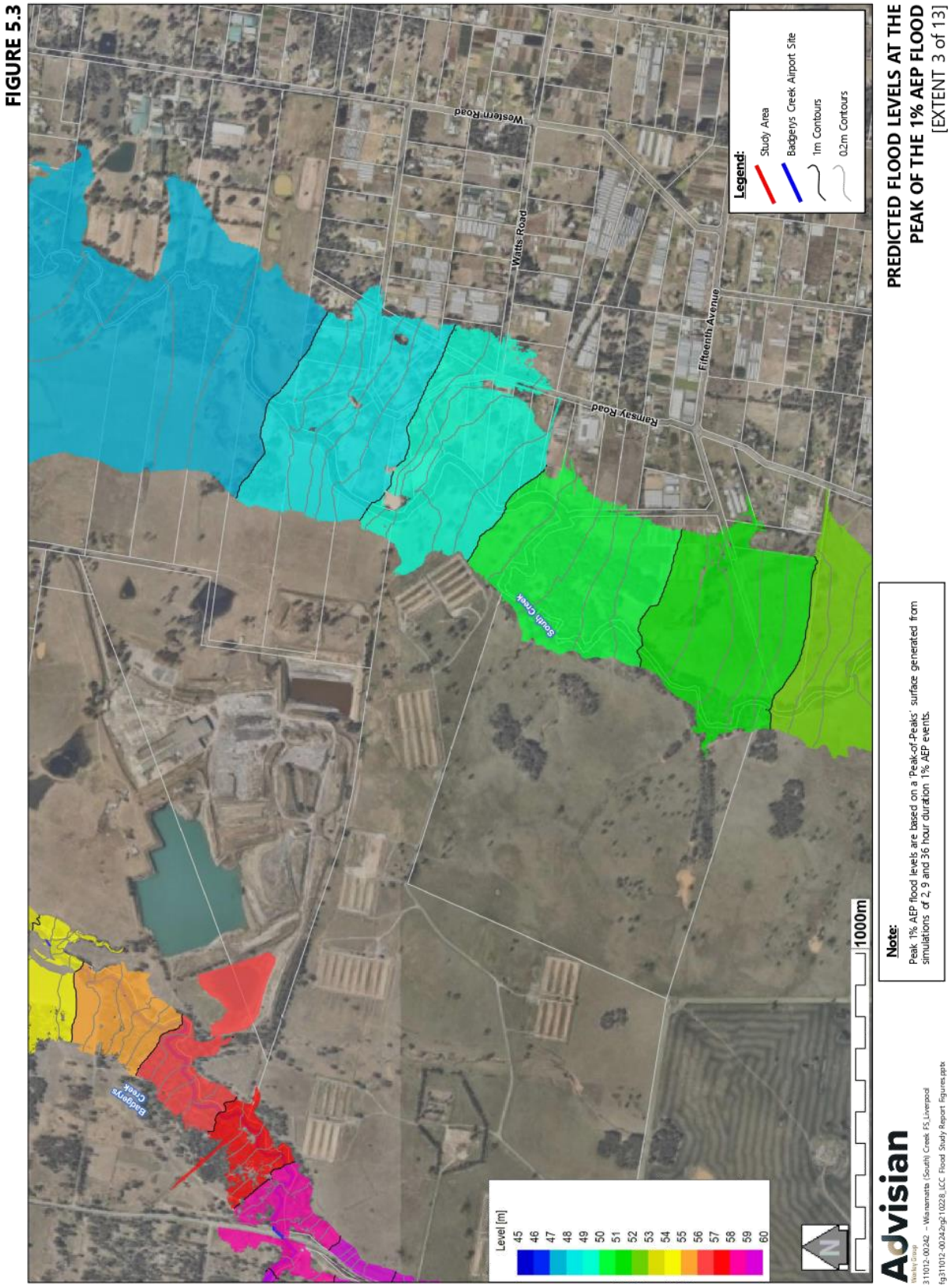


FIGURE 5.3
PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 3 of 13]
Legend:
Study Area
Badgerys Creek Airport Site
1m Contours
0.2m Contours
Western Road
Watts Road
Ramsay Road
Fifteenth Avenue
South Creek
Badgerys Creek
Level [m]
45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60
1000m
N
Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.
Advisian
311012-00242 – Wianamatta (South) Creek FS_Liverpool
fig311012-00242rp210228_LCC Flood Study Report Figures.pptx

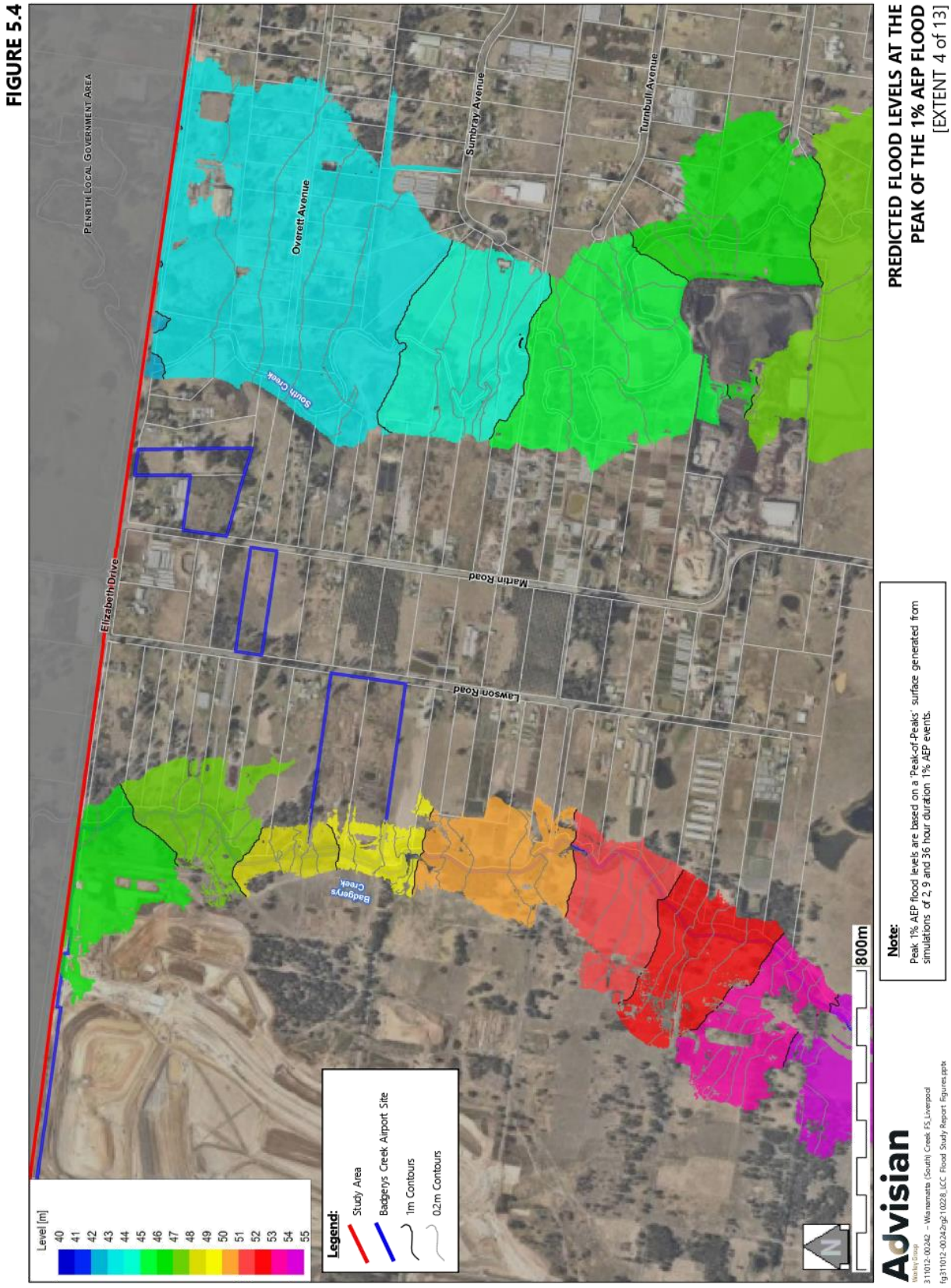


FIGURE 5.4
PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 4 of 13]
PENRITH LOCAL GOVERNMENT AREA
Overett Avenue
Sumpray Avenue
Turnbull Avenue
South Creek
Elizabeth Drive
Martin Road
Lawson Road
Badgerys Creek
Level [m]
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
Legend:
Study Area
Badgerys Creek Airport Site
1m Contours
0.2m Contours
N
800m
Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.
Advisian
311012-00242 – Wianamatta (South) Creek FS_Liverpool
fig311012-00242rpt10228_LCC Flood Study Report Figures.pptx

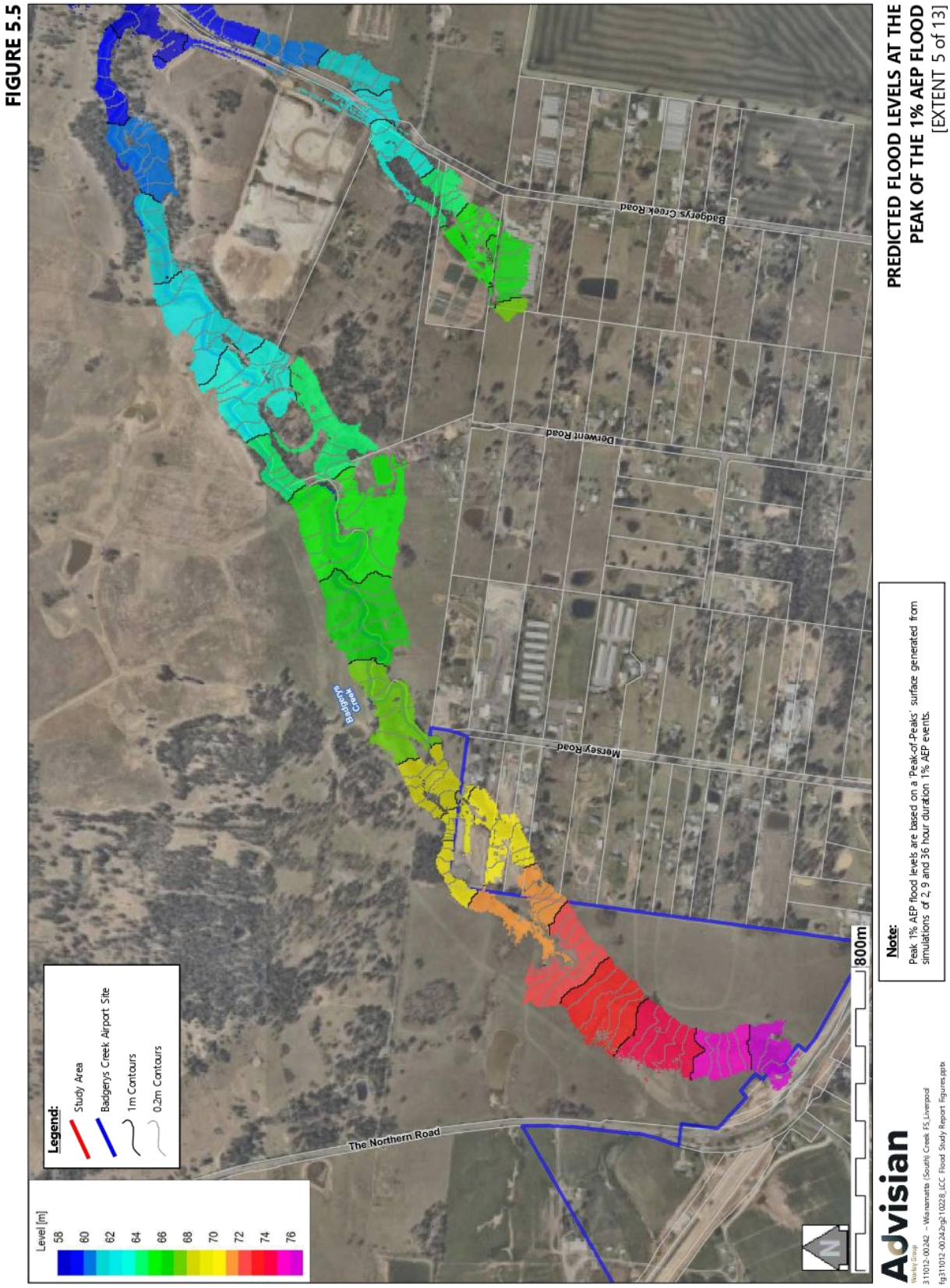


FIGURE 5.5

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 5 of 13]

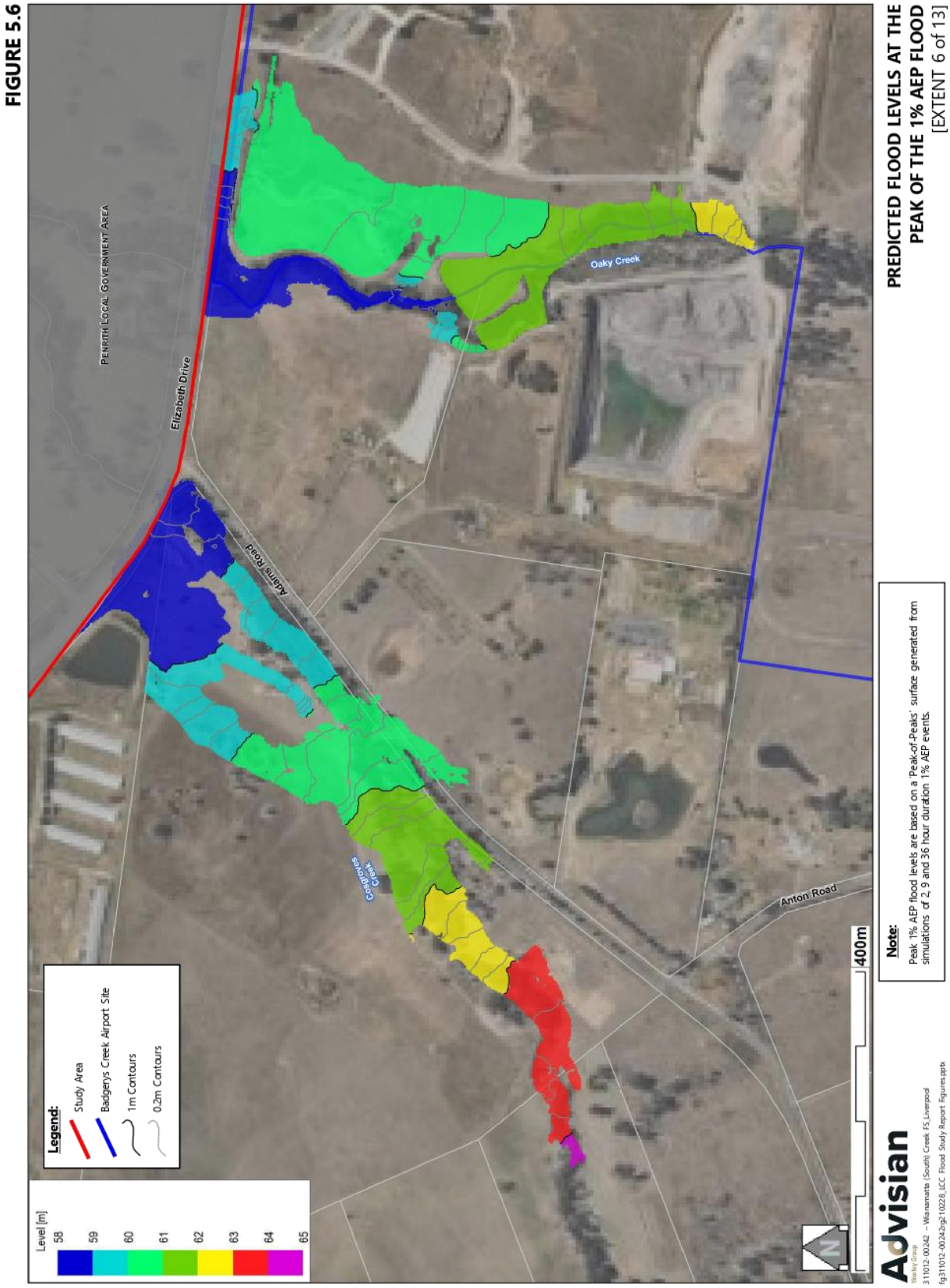
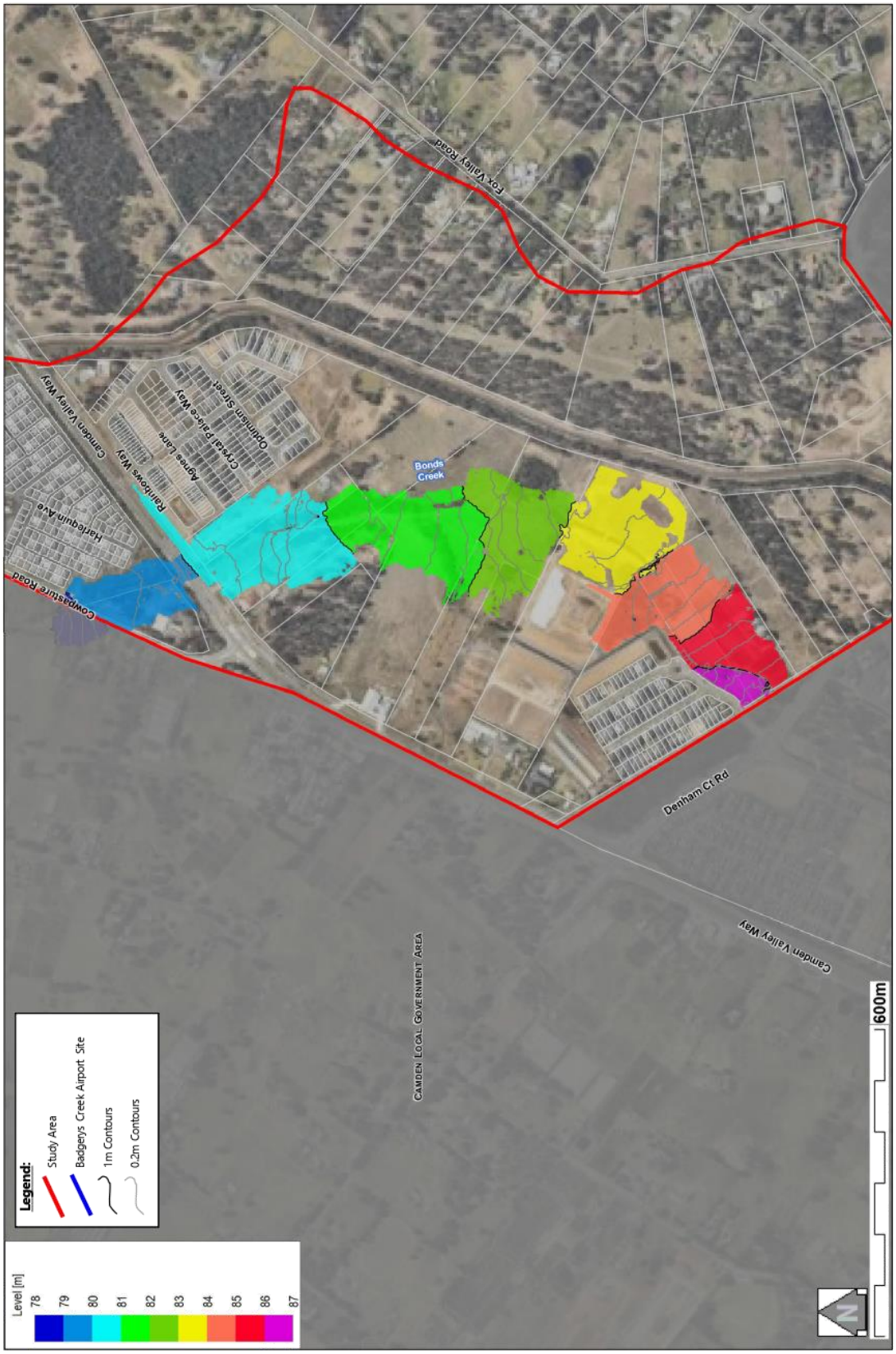


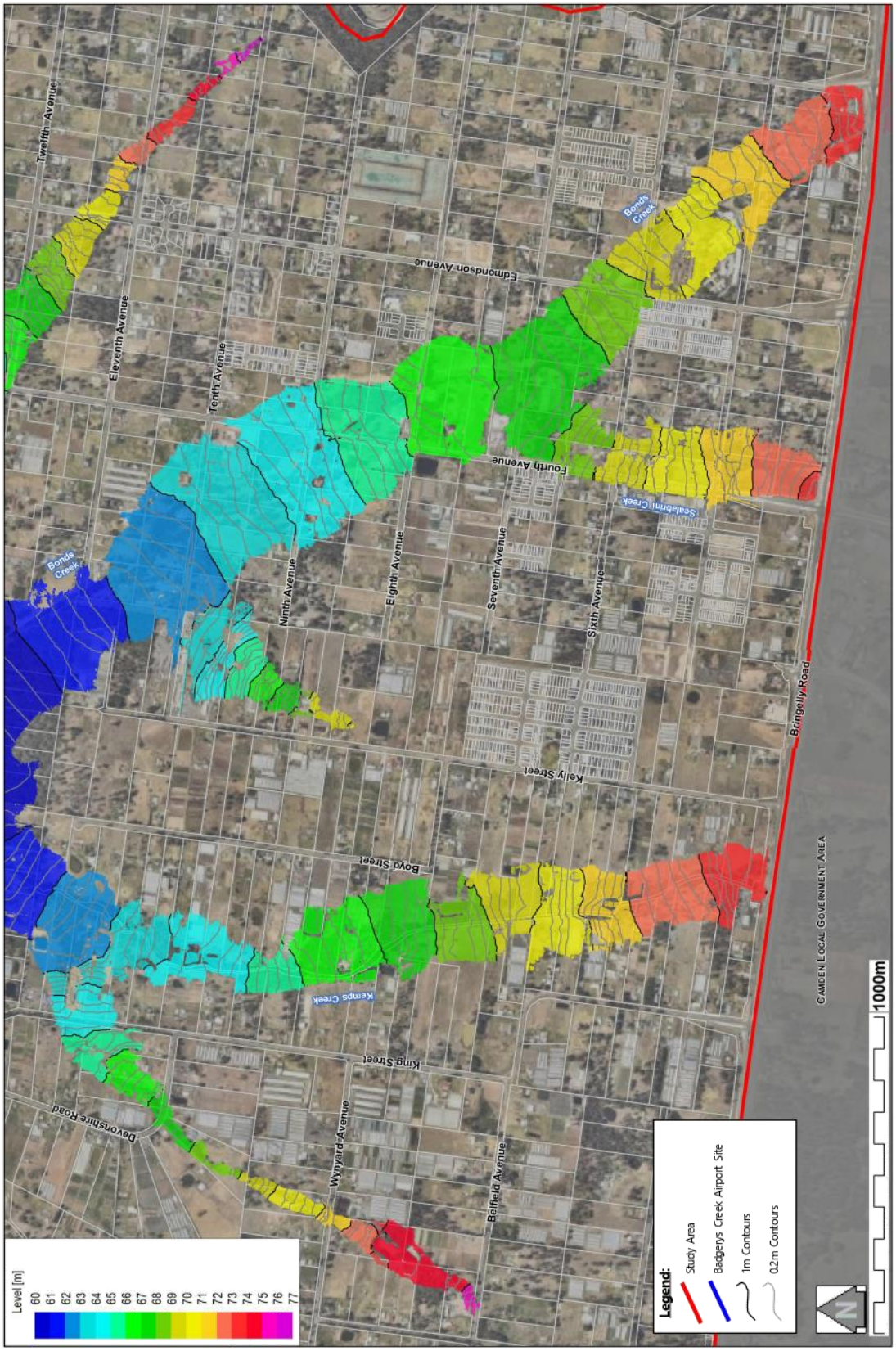
FIGURE 5.6
PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 6 of 13]
PENRITH LOCAL GOVERNMENT AREA
Elizabeth Drive
Adams Road
Oaky Creek
Anton Road
Legend:
Study Area
Badgerys Creek Airport Site
1m Contours
0.2m Contours
Level [m]
58
59
60
61
62
63
64
65
400m
Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.
Advisian
311012-00242 – Wianamatta (South) Creek FS_Liverpool
fig311012-00242rp210228_LCC Flood Study Report Figures.pptx

FIGURE 5.7



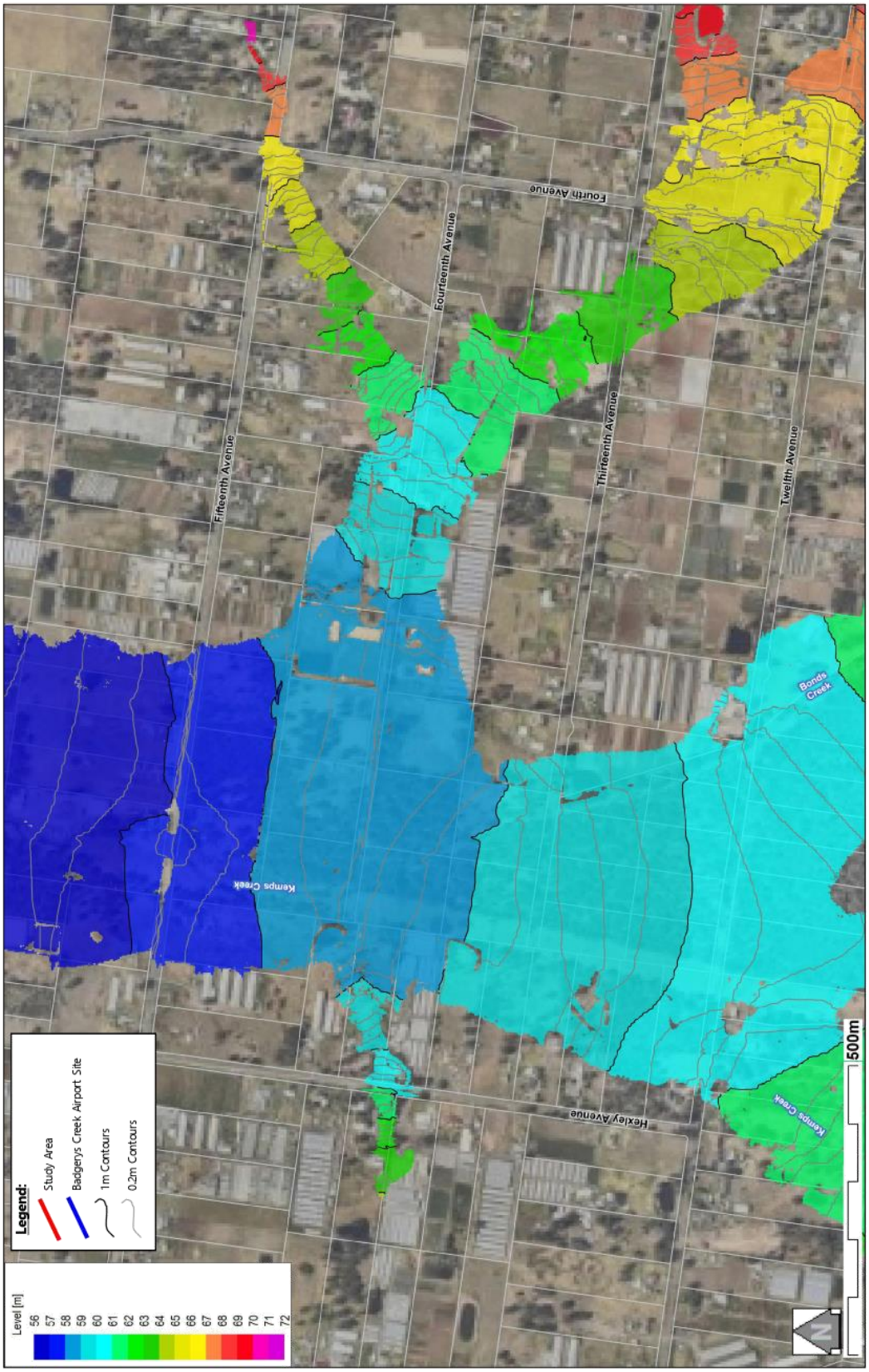
PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 7 of 13]

FIGURE 5.8



PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 8 of 13]

FIGURE 5.9



PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 9 of 13]

Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.

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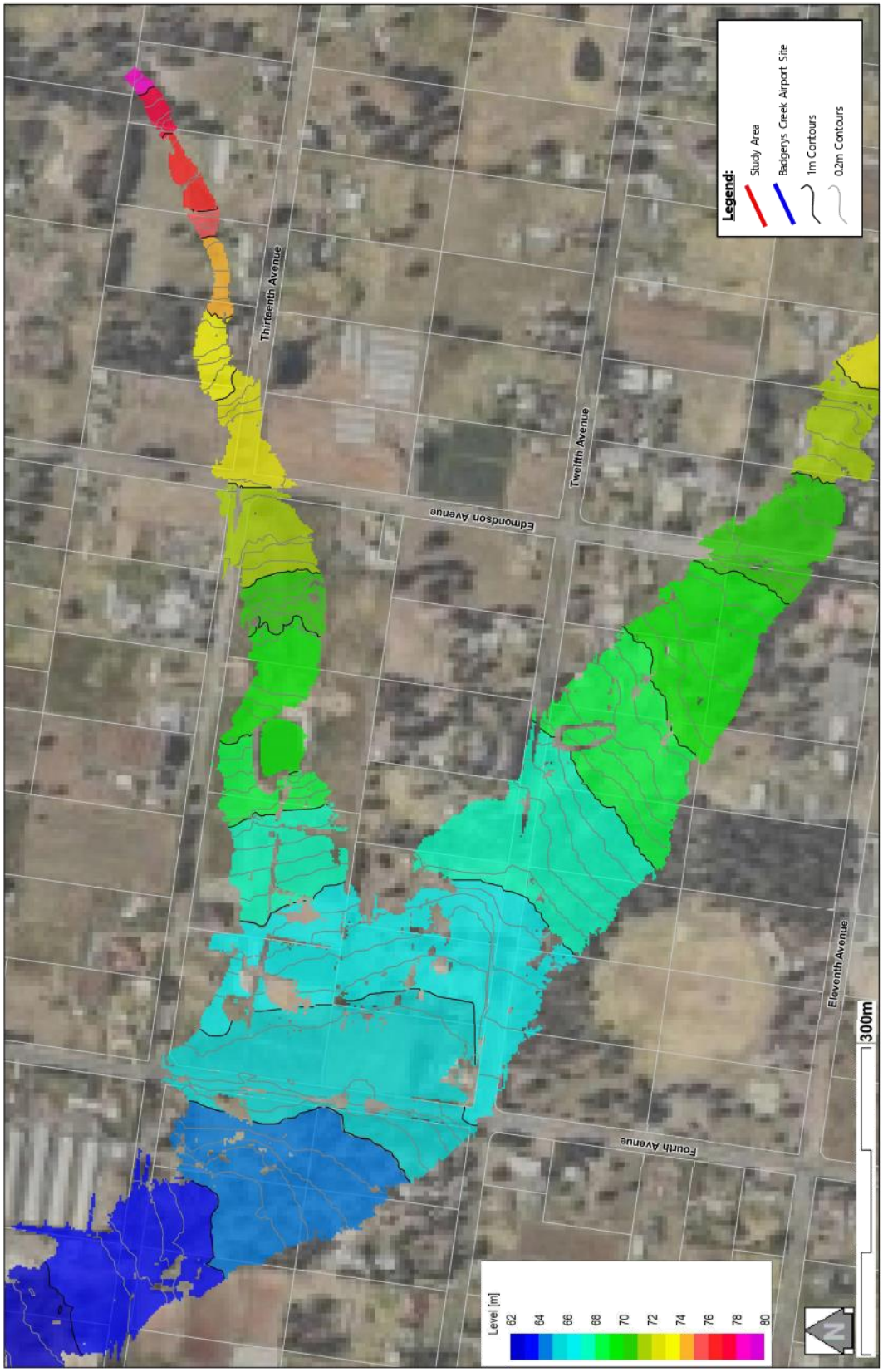
fig311012-00242rp210228_LCC Flood Study Report Figures.pptx

FIGURE 5.10



PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 10 of 13]

Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.

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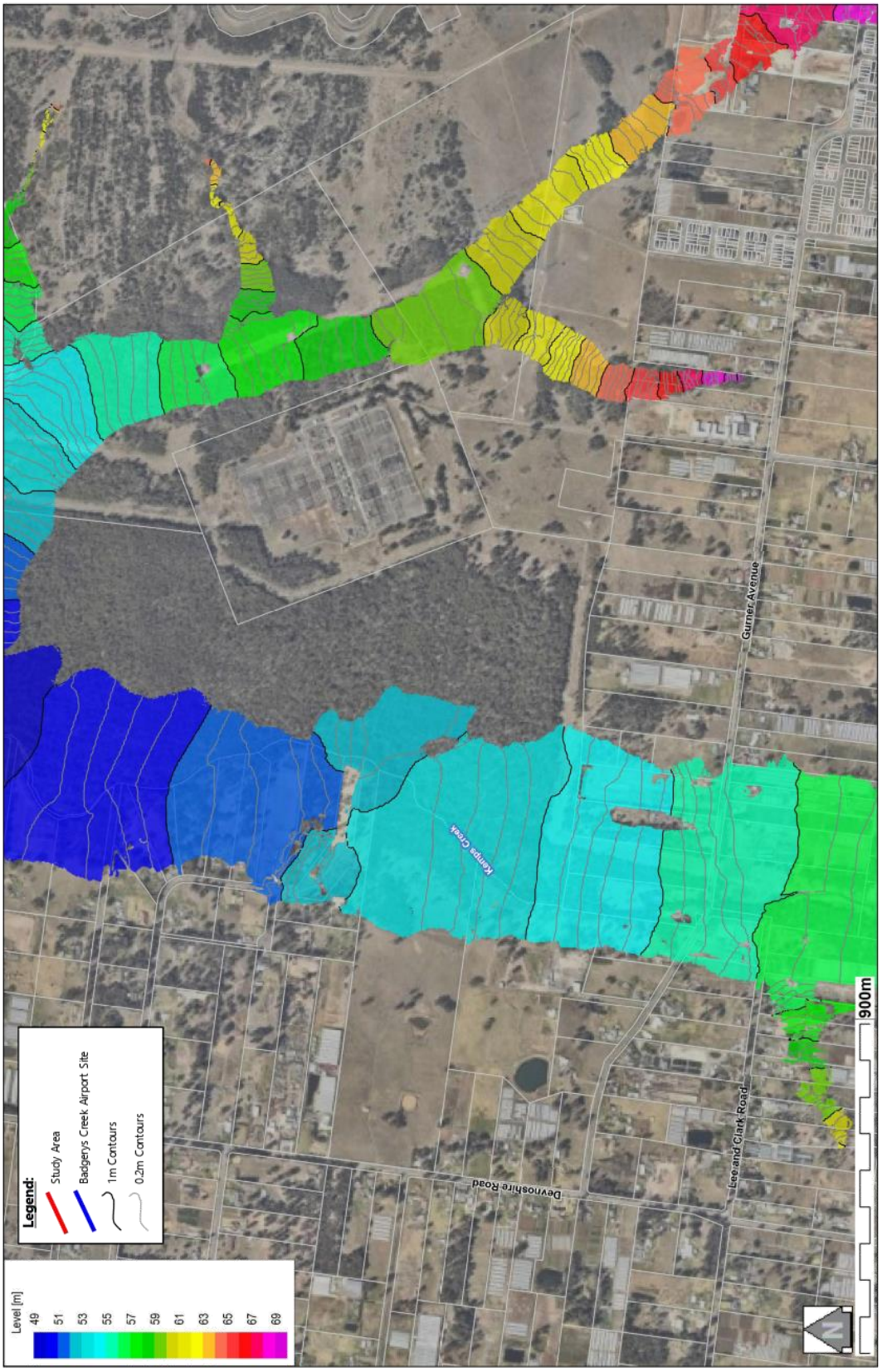
FIGURE 5.11



PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 11 of 13]

Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.

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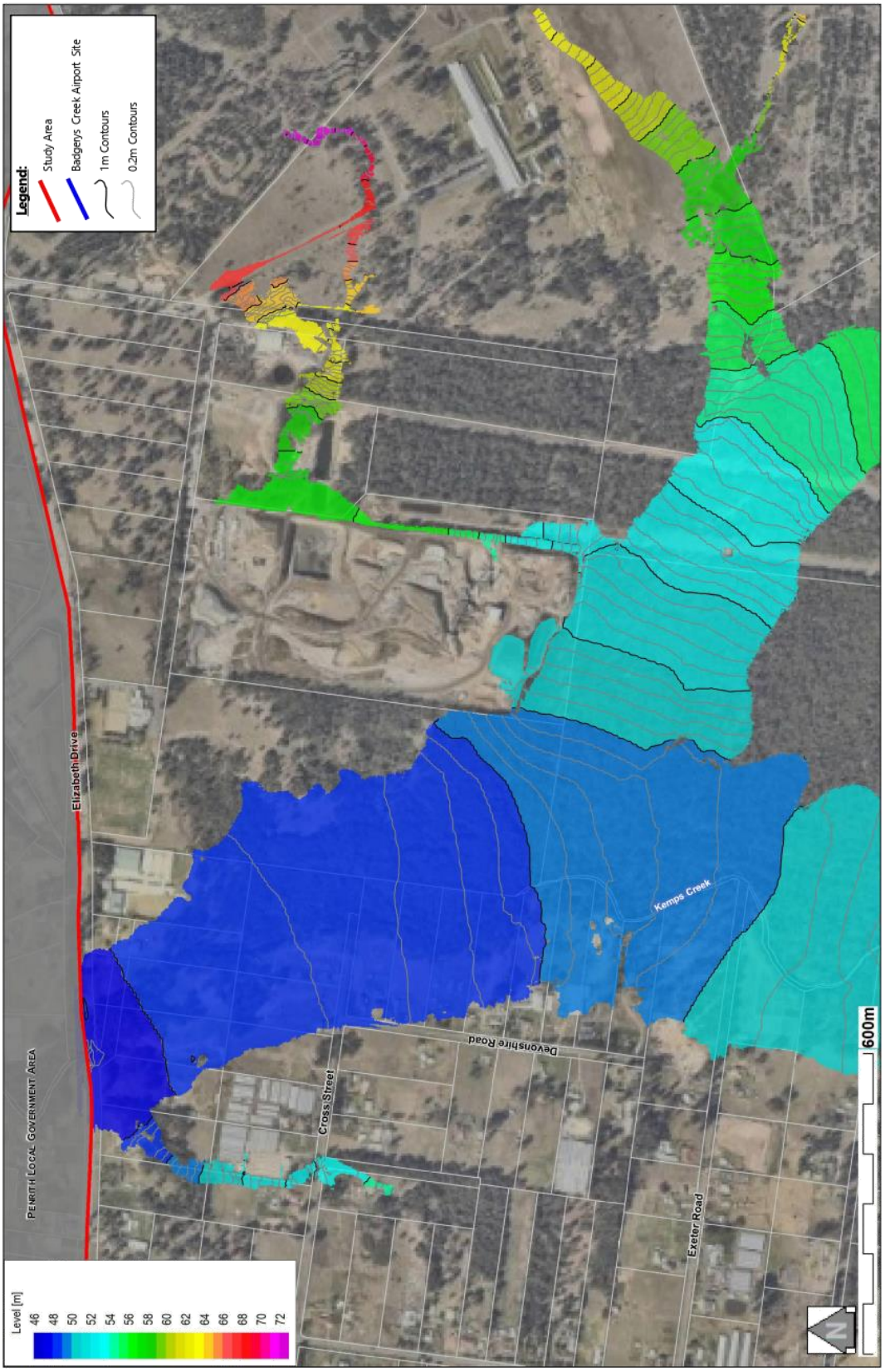
FIGURE 5.12



PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 12 of 13]

Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.

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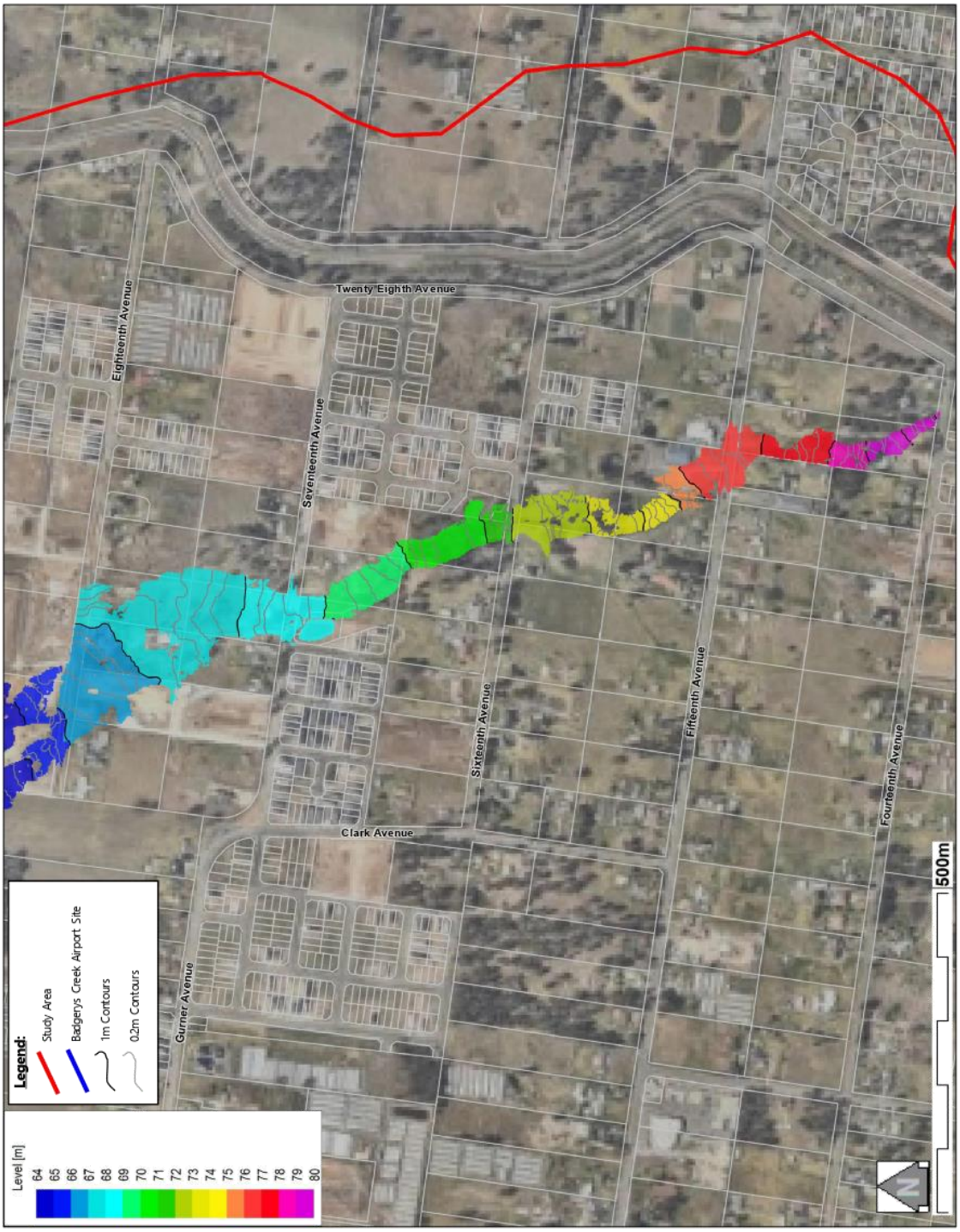
FIGURE 5.13

PREDICTED FLOOD LEVELS AT THE PEAK OF THE 1% AEP FLOOD
[EXTENT 13 of 13]



Note:
Peak 1% AEP flood levels are based on a 'Peak-of-Peaks' surface generated from simulations of 2, 9 and 36 hour duration 1% AEP events.

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311012-00242 – Wianamatta (South) Creek FS_Liverpool
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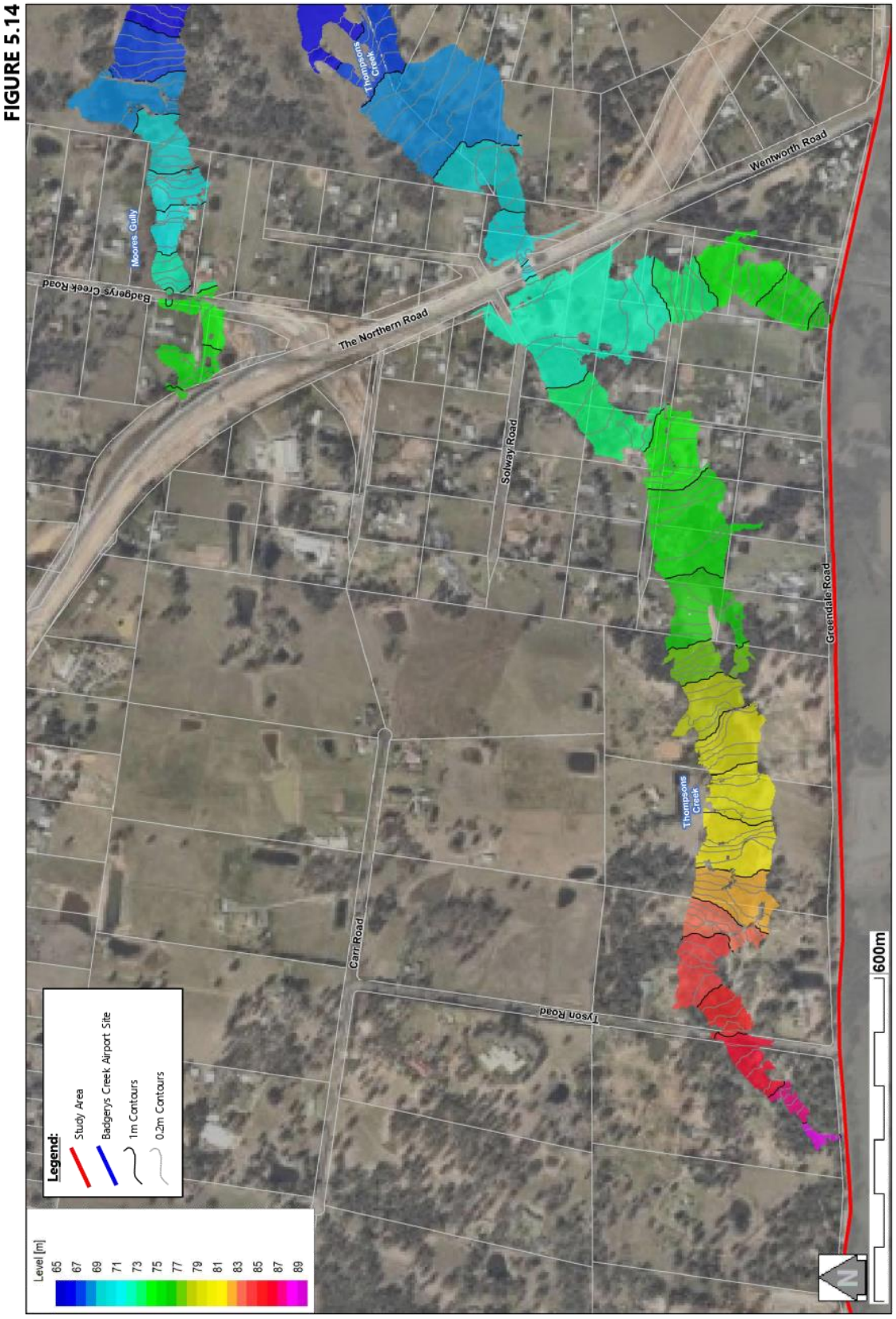
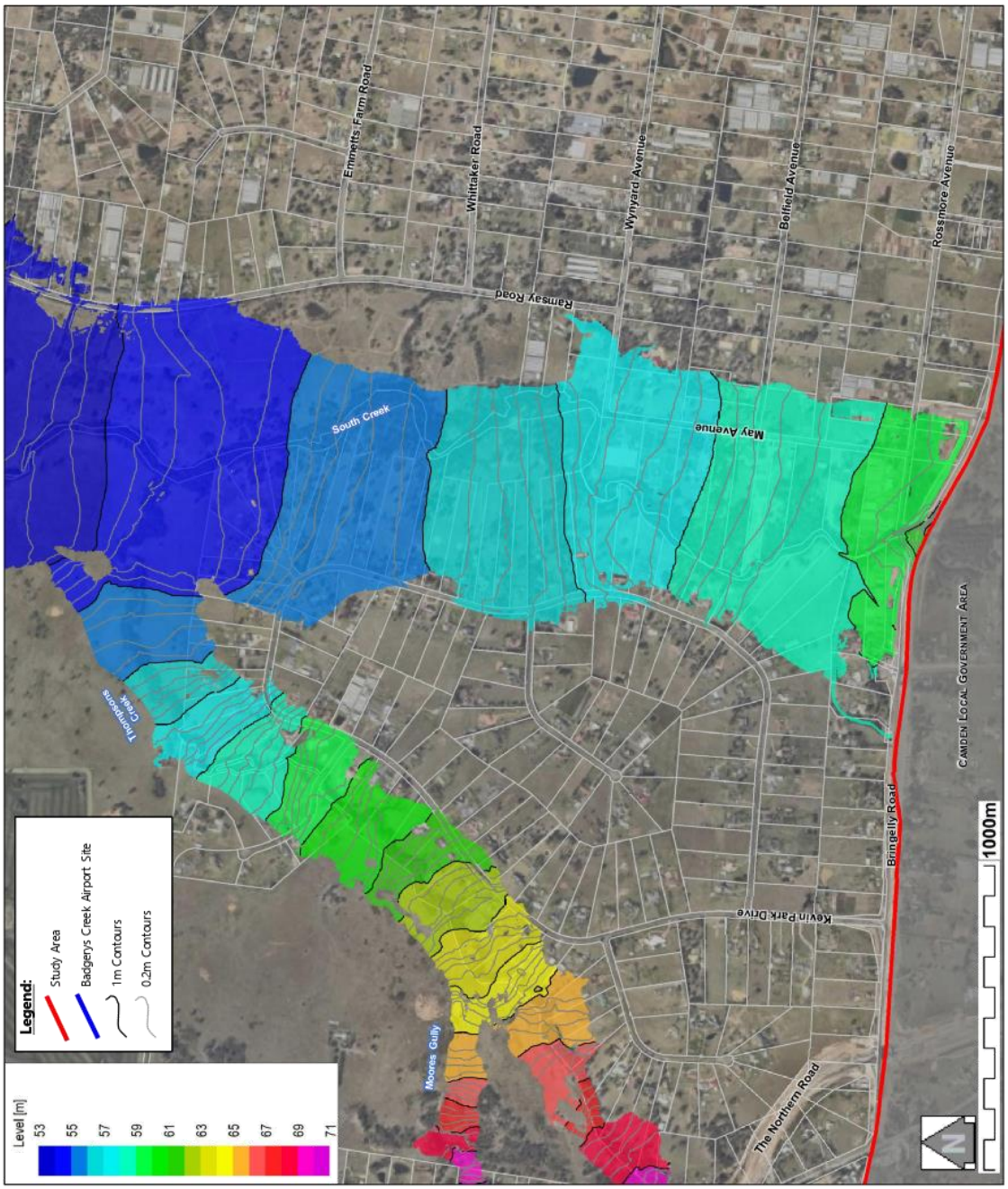


FIGURE 5.14

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 1 of 13]

FIGURE 5.15



PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 2 of 13]

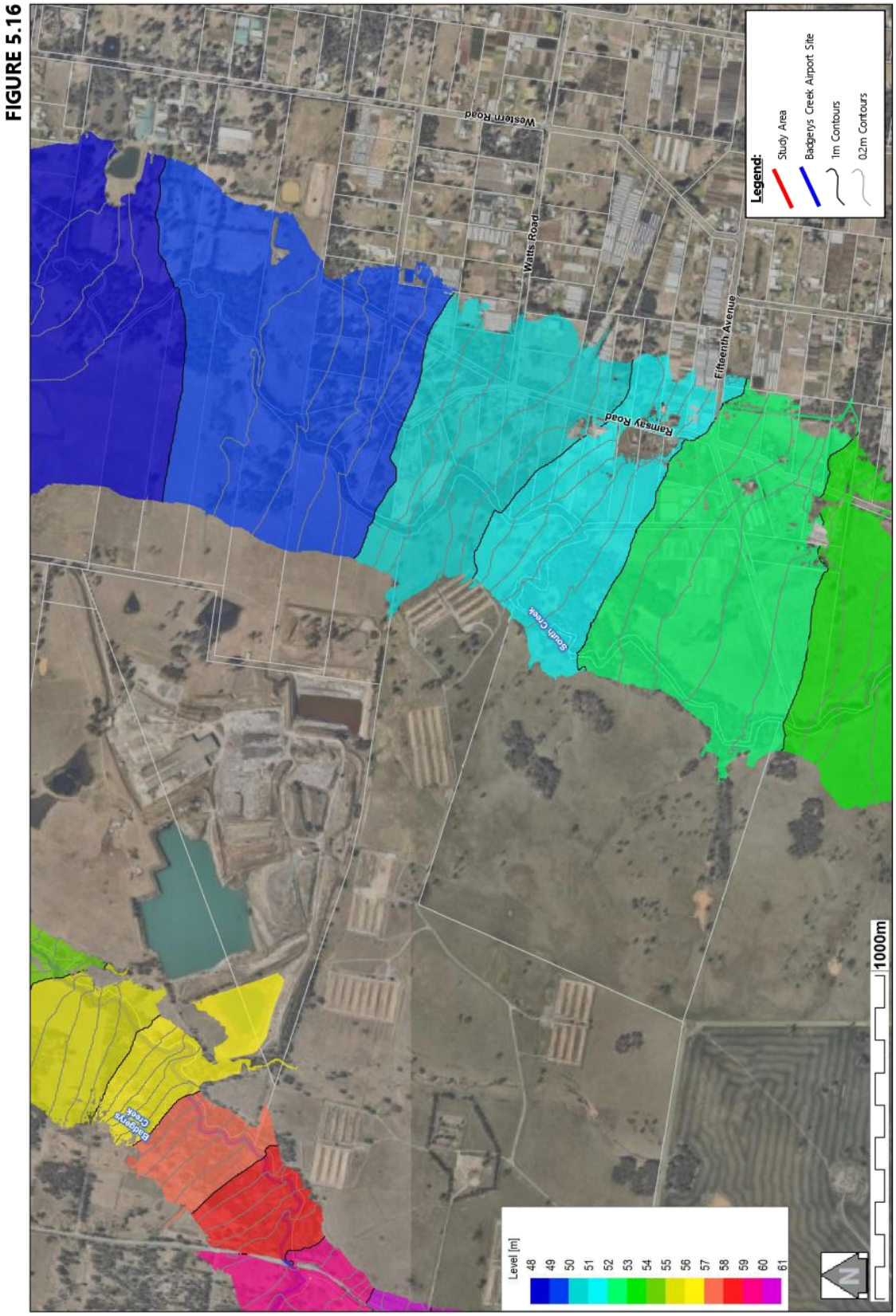


FIGURE 5.16

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 3 of 13]

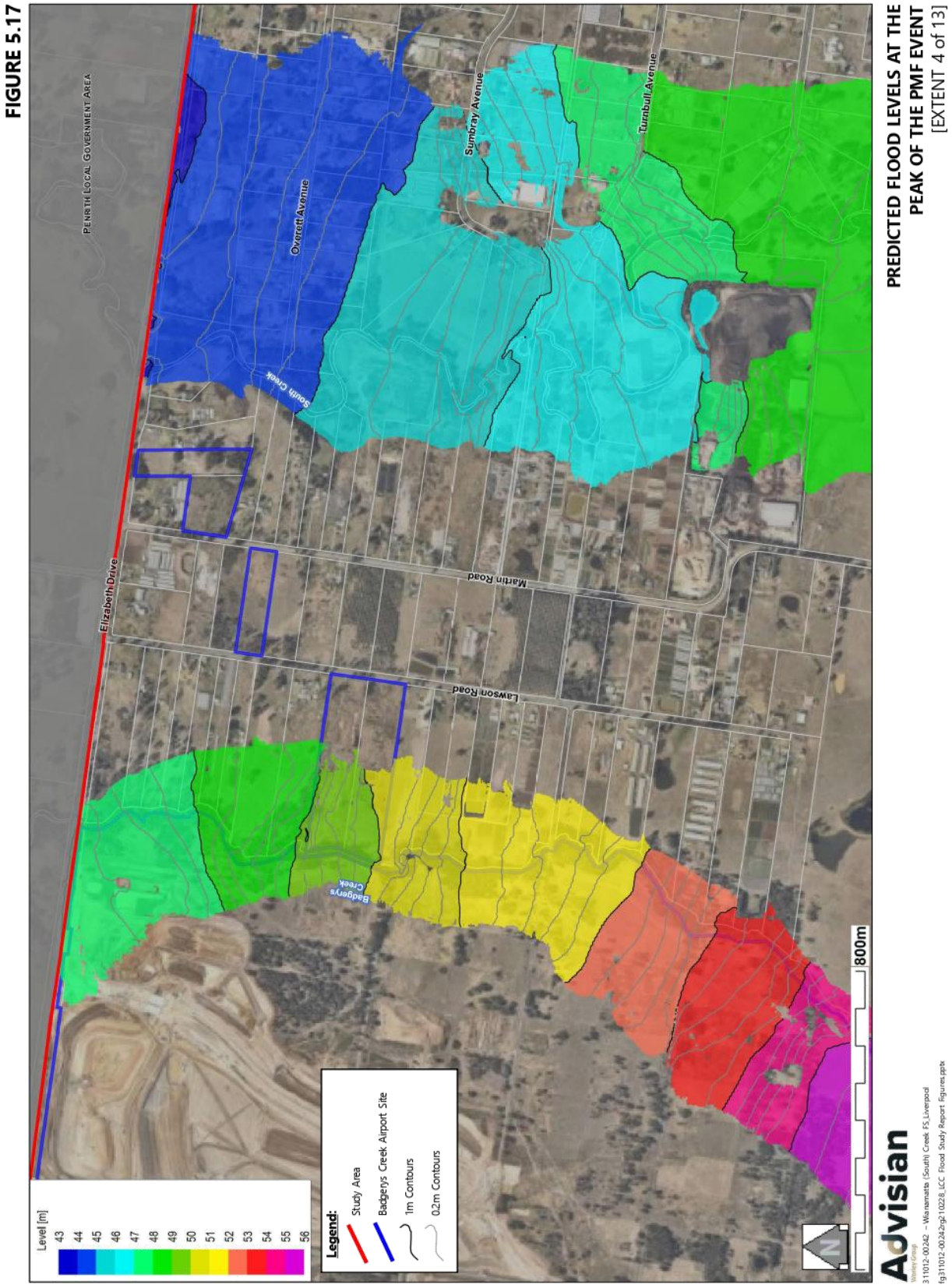
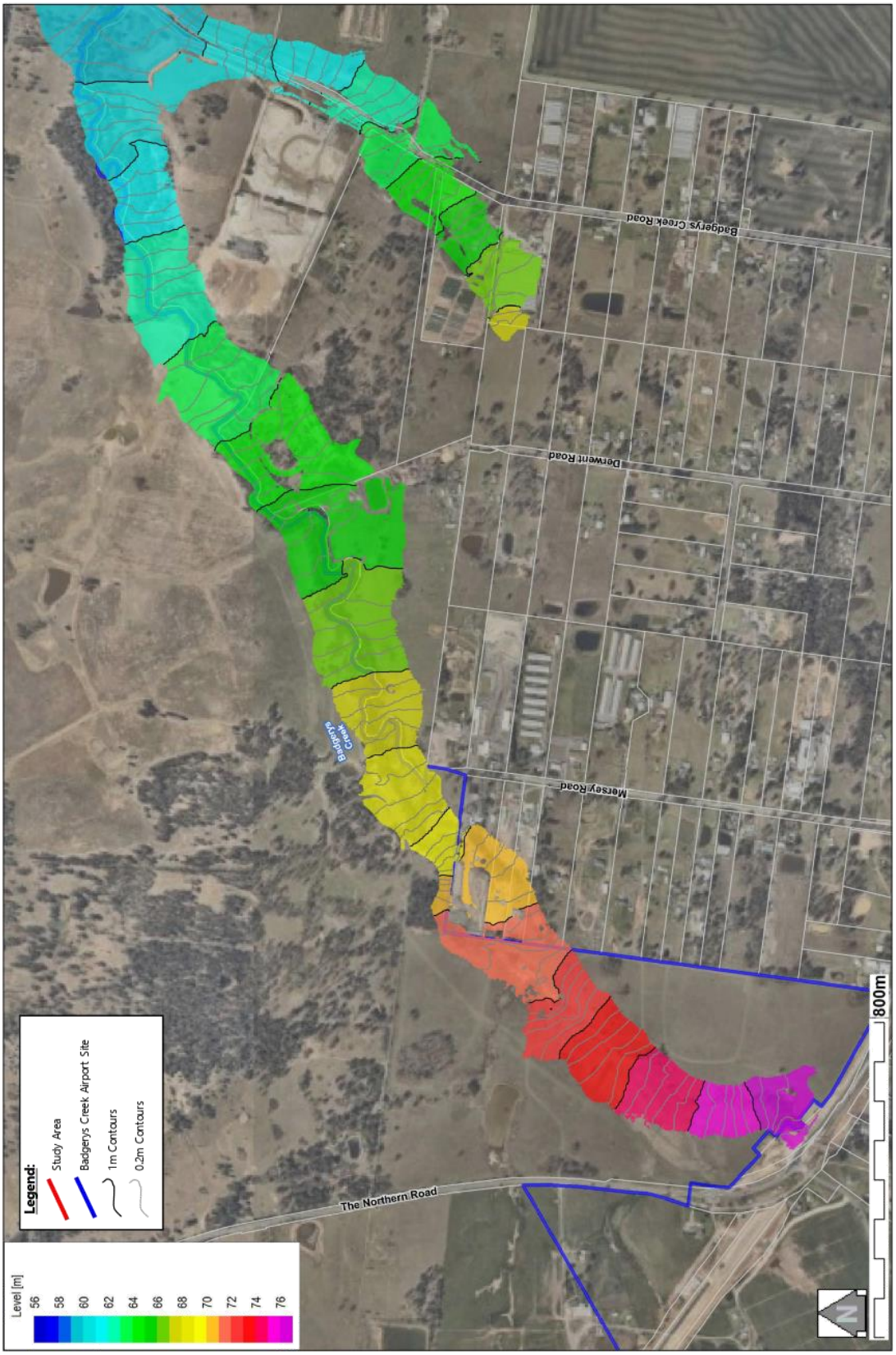


FIGURE 5.17

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 4 of 13]

FIGURE 5.18 **PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT** [EXTENT 5 of 13]



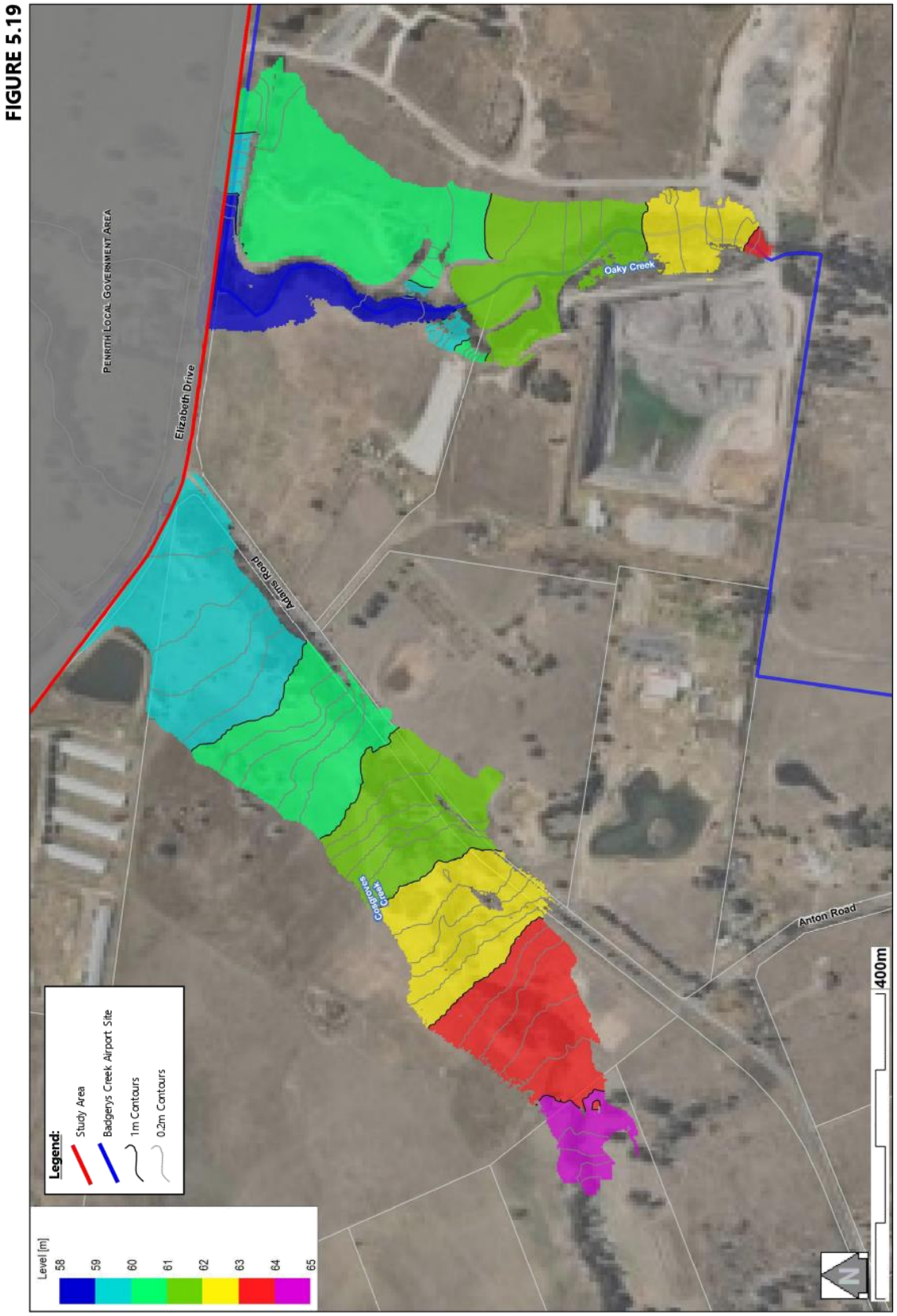
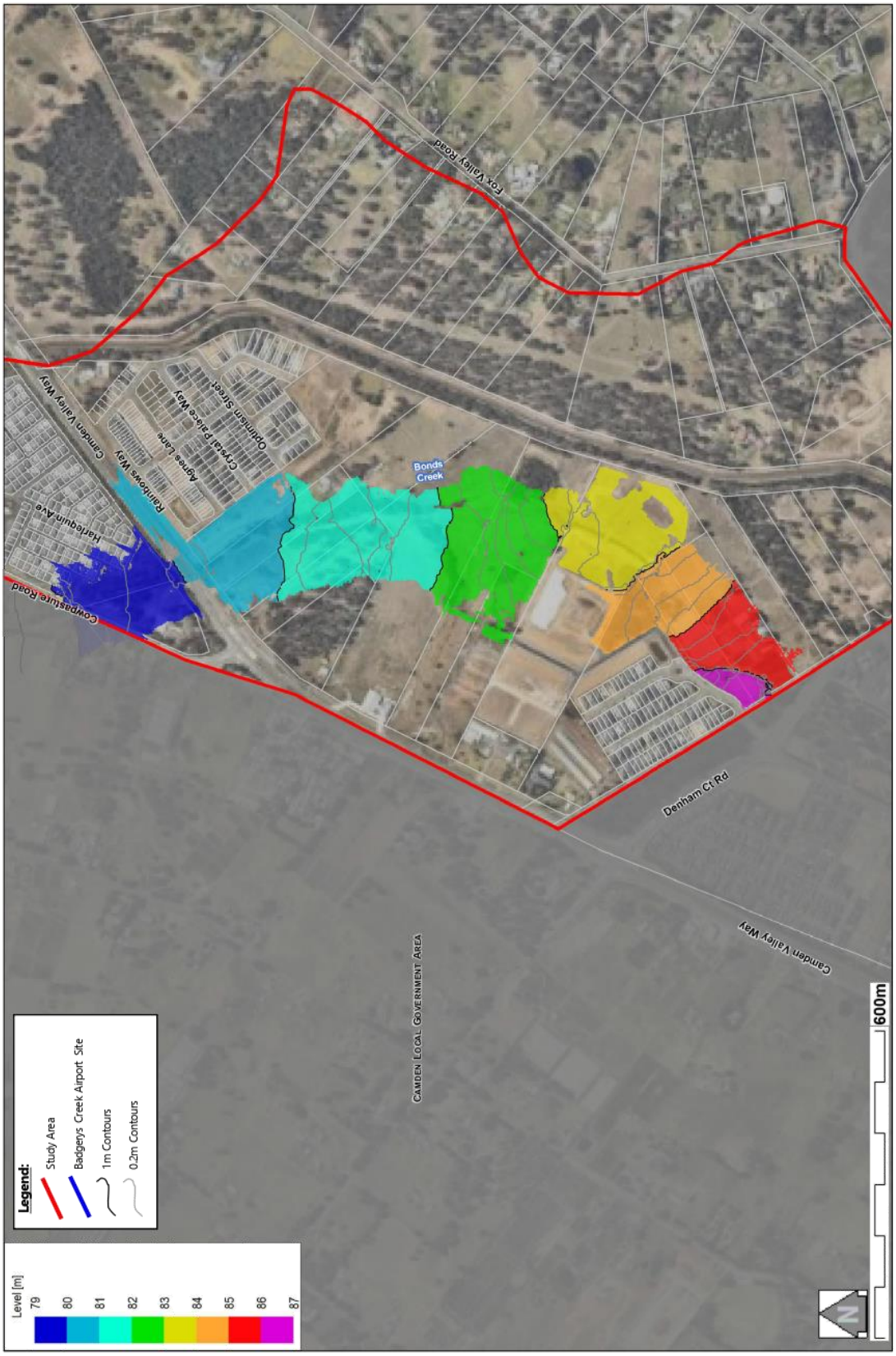


FIGURE 5.19 **PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT** [EXTENT 6 of 13]

FIGURE 5.20



PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 7 of 13]

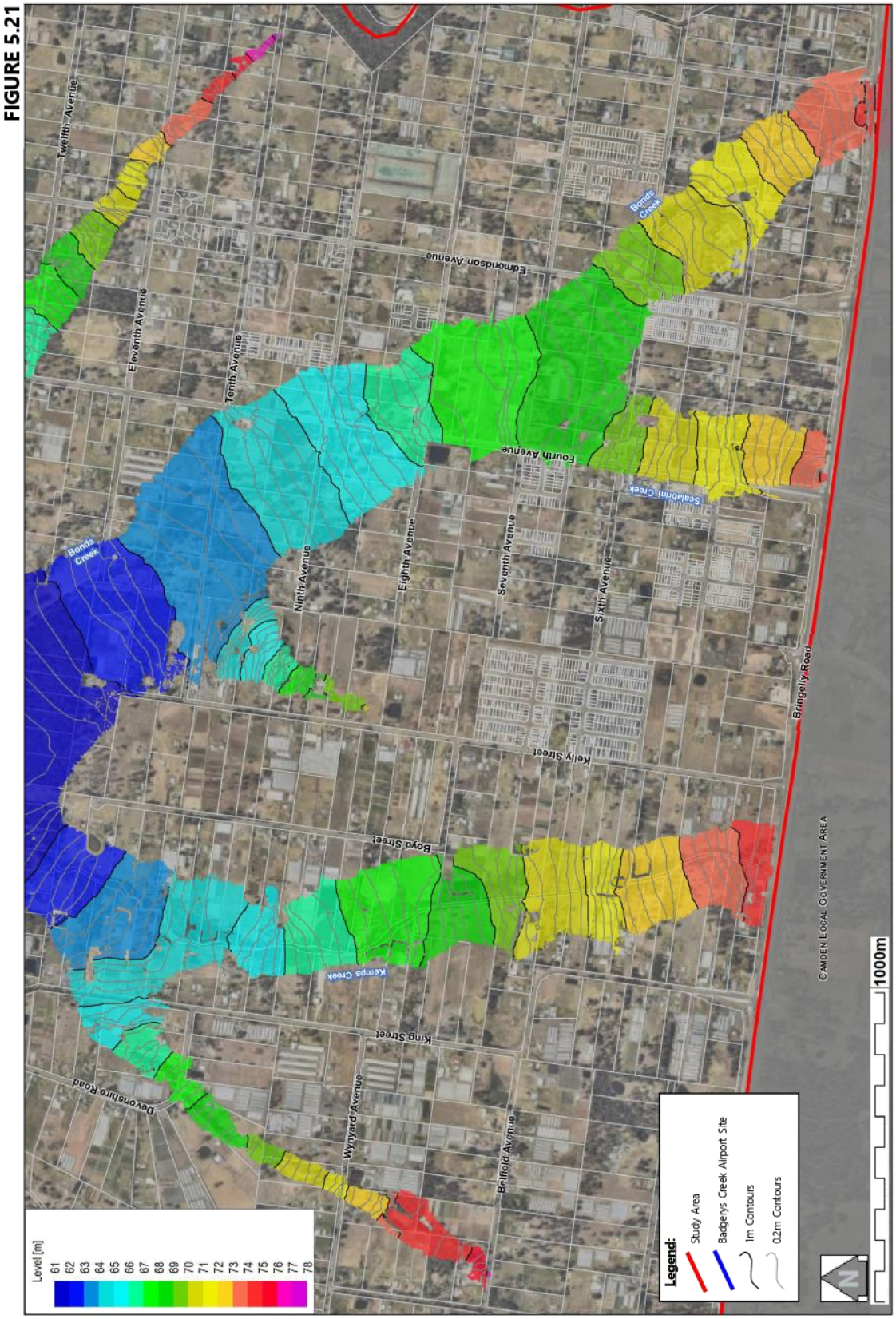
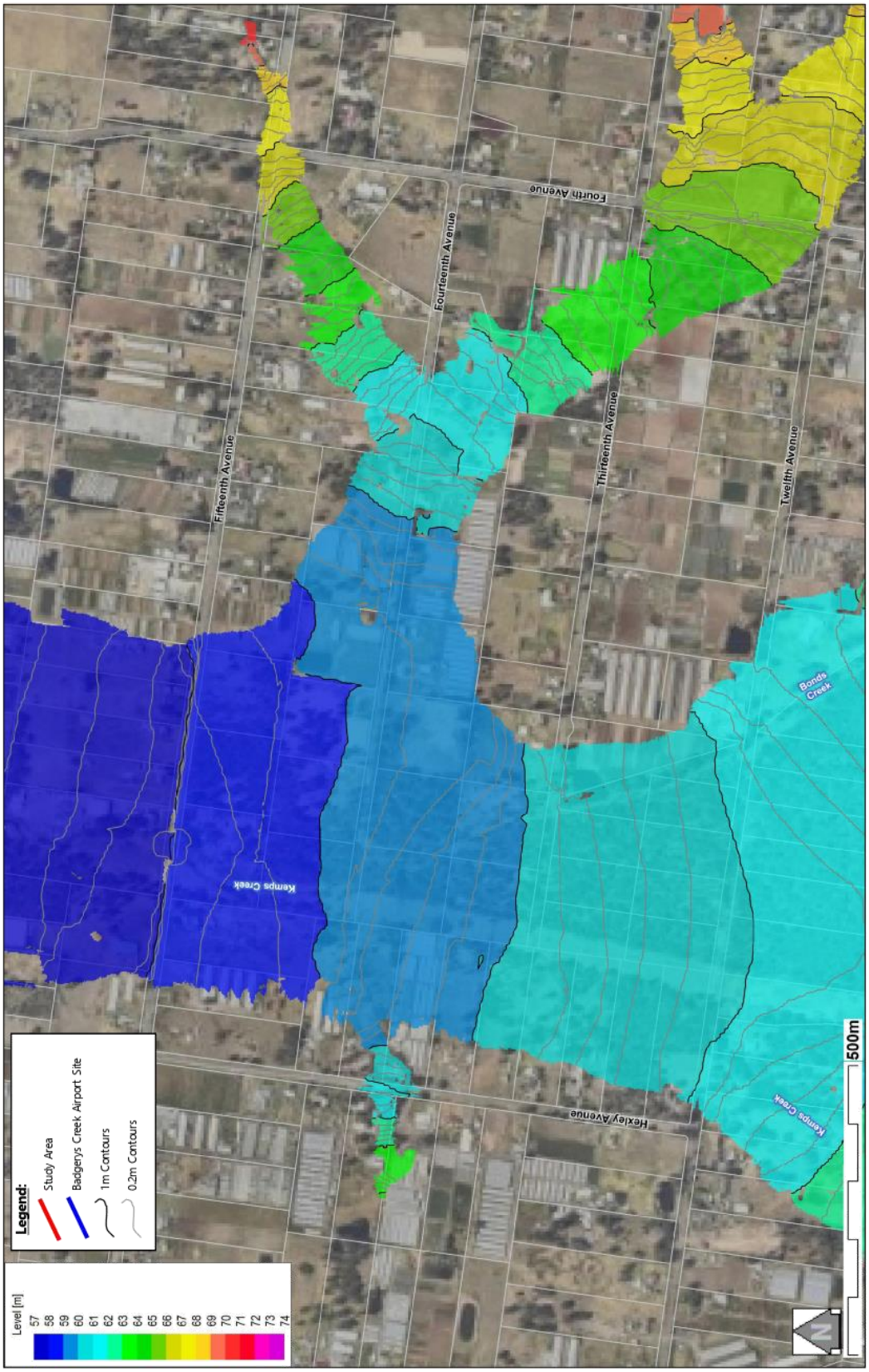


FIGURE 5.21

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 8 of 13]

FIGURE 5.22



PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 9 of 13]

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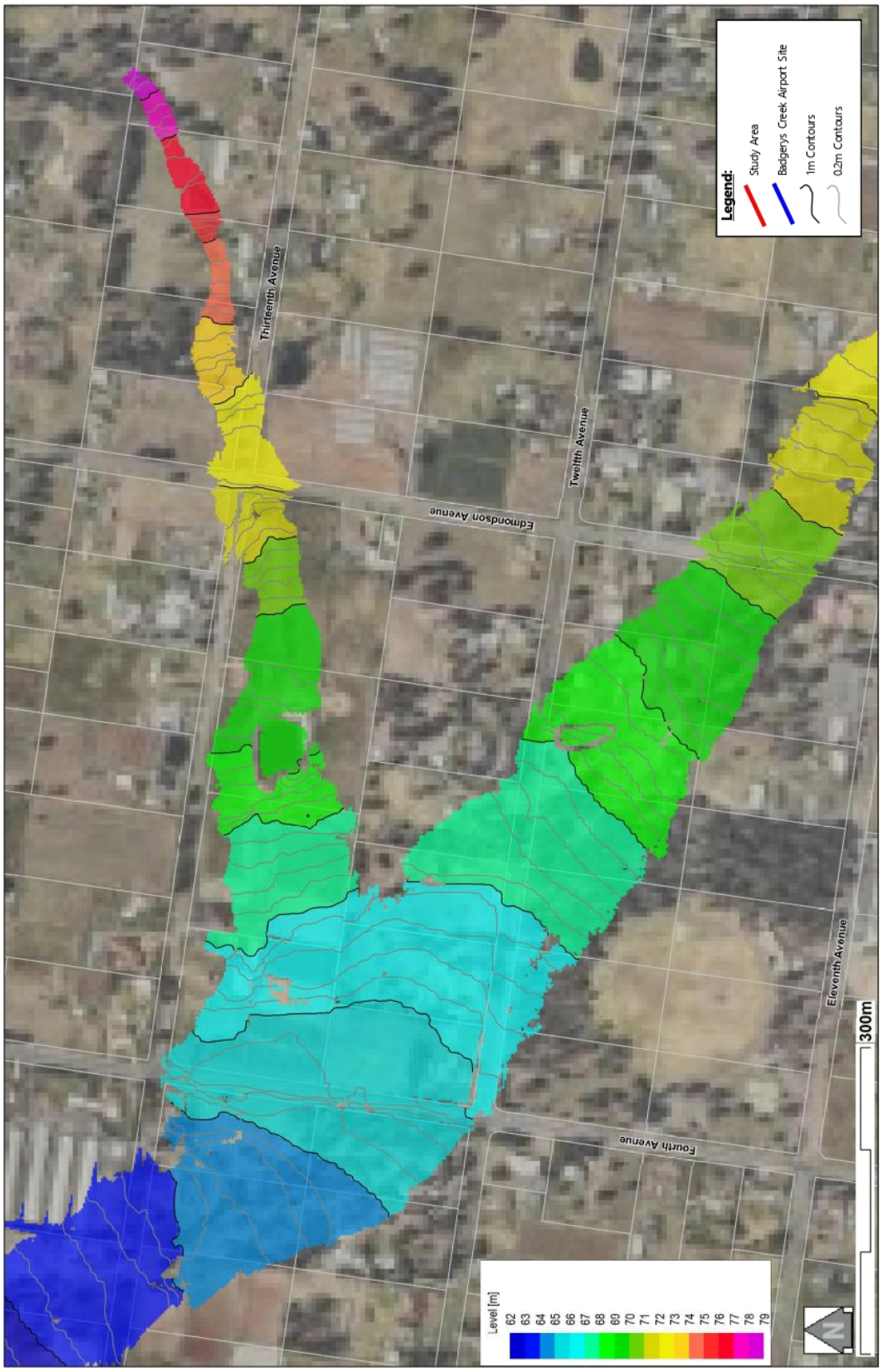
fig311012-00242rp210228_LCC Flood Study Report Figures.pptx

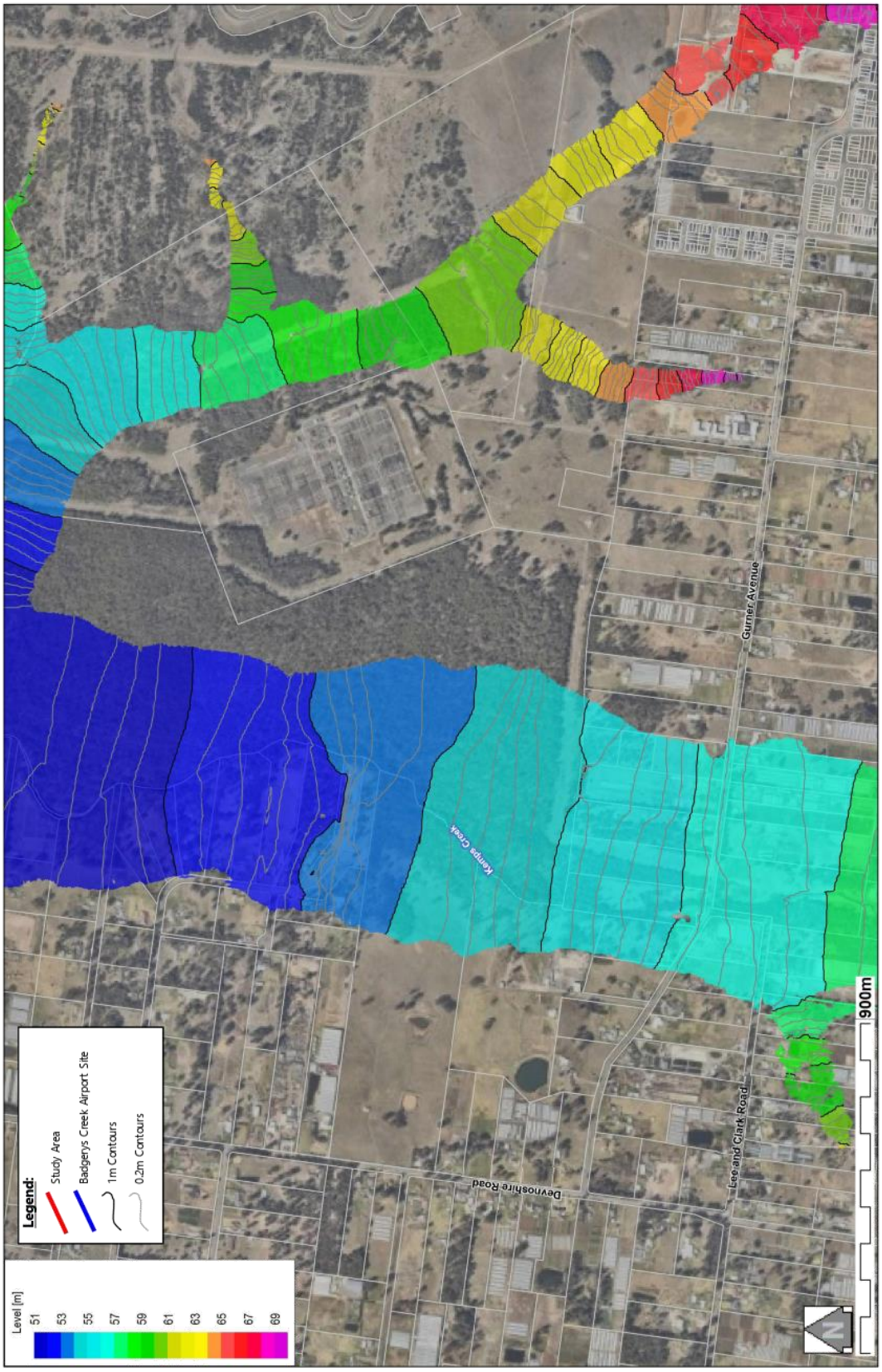
FIGURE 5.23



PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 10 of 13]

Advisian
311012-00242 – Wianamatta (South) Creek FS_Liverpool
fig311012-00242rp210228_LCC Flood Study Report Figures.pptx

FIGURE 5.24



PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 11 of 13]

Advisian
311012-00242 – Wianamatta (South) Creek FS_Liverpool
fg311012-00242-rg210228_LCC Flood Study Report Figures.pptx

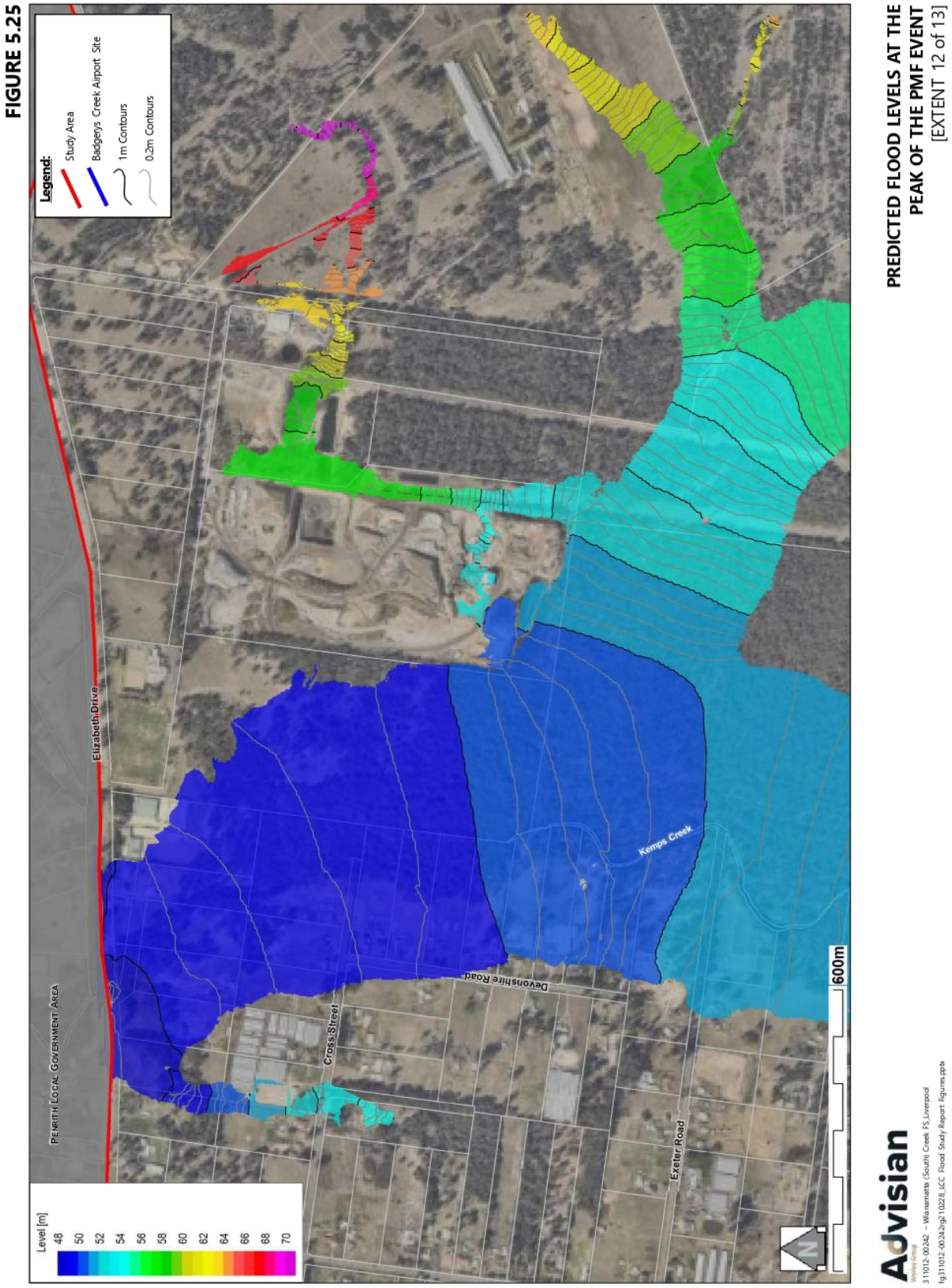


FIGURE 5.25

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 12 of 13]

Advisian
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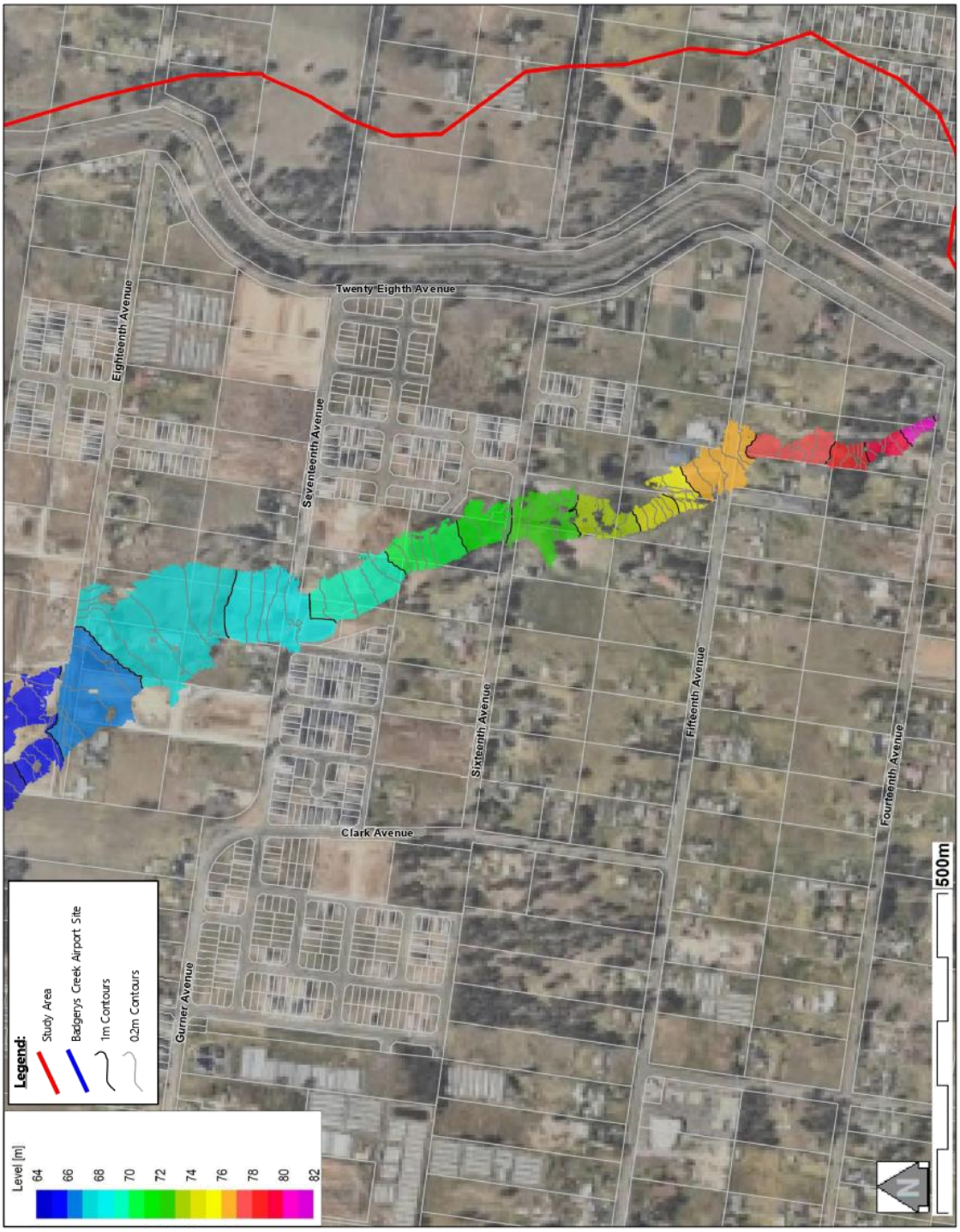
fg311012-00242-rg210228_LCC Flood Study Report Figures.pptx

FIGURE 5.26

PREDICTED FLOOD LEVELS AT THE PEAK OF THE PMF EVENT
[EXTENT 13 of 13]



Advisian

311012-00242 - Wianamatta (South) Creek FS_Liverpool
fig311012-00242-rg210228_LCC Flood Study Report Figures.pptx

Appendix A: XP-RAFTS Hydrologic Model Parameters

Table A1 Updated XP-RAFTS Sub-Catchment Parameters

(Refer **Figures 4.3** to **4.7** for Schematic of the XP-RAFTS Hydrologic Model)

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
1.00	1	300	1.9	0	0.055	35.9	0.94
	2	200	1.9	100	0.02	1	0
1.01	1	223.2	1.1	0	0.055	35.9	0.94
	2	148.8	1.1	100	0.02	1	0
1.02	1	252.6	1.25	0	0.055	35.9	0.94
	2	168.4	1.25	100	0.02	1	0
1.03	1	519.75	0.73	0	0.045	35.9	0.94
	2	173.25	0.73	100	0.02	1	0
1.04	1	307	0.95	8	0.045	35.9	0.94
1.05D	1	0.1	0.1	0	0.045	0	0
2.00	1	625	1.3	7	0.045	35.9	0.94
2.01	1	726	1	5	0.045	35.9	0.94
1.06	1	13	0.31	5	0.025	35.9	0.94
1.07D	1	0.1	0.1	0	0.02	0	0
3.00	1	376.6	1.6	0	0.045	35.9	0.94
	2	66.4	1.6	100	0.02	1	0
3.01	1	522	1.05	0	0.045	35.9	0.94
	2	58	1.05	100	0.02	1	0
3.02	1	425.7	0.96	0	0.045	35.9	0.94
	2	47.3	0.96	100	0.02	1	0
1.08	1	446	1.75	0	0.045	35.9	0.94
	2	49.5	1.75	100	0.02	1	0
1.09	1	275.1	0.9	0	0.045	35.9	0.94
	2	30.6	0.9	100	0.02	1	0
1.1.0	1	124.7	0.65	0	0.045	35.9	0.94
	2	13.9	0.65	100	0.02	1	0
1.11D	1	0.1	0.1	0	0.02	0	0
4.00	1	12.971	1.5	5	0.045	15	0.94
4.01	1	63.1	1.2	5	0.045	15	0.94
1.12	1	529.6	1.35	0	0.045	35.9	0.94
	2	132.4	1.35	100	0.02	1	0
1.13	1	337.8	0.8	0	0.045	35.9	0.94
	2	84.4	0.8	100	0.02	1	0
1.14	1	210.9	1.45	0	0.045	37.1	0.94
	2	23.4	1.45	100	0.02	1	0
1.15	1	332.1	0.15	0	0.045	37.1	0.94
	2	36.9	0.15	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
5.00	1	46.5	5.8	5	0.055	37.1	0.94
5.01	1	91	0.9	0	0.055	37.1	0.94
	2	16.1	0.9	100	0.02	1	0
5.02	1	134.3	0.75	0	0.055	37.1	0.94
	2	14.9	0.75	100	0.02	1	0
5.03D	1	0.1	0.1	0	0.02	0	0
6.00	1	116.9	1.1	5	0.045	37.1	0.94
5.04	1	303	0.41	5	0.045	37.1	0.94
1.16D	1	0.1	0.1	0	0.02	0	0
KC00-1	1	72.51	1.2	0	0.065	33.9	0.94
	2	8.06	1.3	100	0.02	1	0
9.06	1	727	1.35	0	0.045	33.9	0.94
	2	181.8	1.35	100	0.02	1	0
9.07	1	71.4	0.65	0	0.045	33.9	0.94
	2	30.6	0.65	100	0.02	1	0
9.08D	1	0.1	0.1	0	0.02	0	0
1.17	1	548.1	0.53	0	0.045	37.1	0.94
	2	60.9	0.53	100	0.02	1	0
1.18D	1	0.1	0.1	0	0.02	0	0
11.00	1	48	0.95	5	0.045	37.1	0.94
12.02	1	154.3	0.85	0	0.045	37.1	0.94
	2	13.4	0.85	100	0.02	1	0
12.00	1	143.6	1.45	0	0.045	37.1	0.94
	2	16	1.45	100	0.02	1	0
12.03	1	314.9	0.5	5	0.06	37.1	0.94
1.19	1	577	0.31	0	0.045	37.1	0.94
	2	498	0.31	100	0.02	1	0
1.20D	1	0.1	0.1	0	0.02	0	0
13.00	1	244.8	1.2	5	0.045	37.1	0.94
13.01	1	316.7	0.95	5	0.045	37.1	0.94
1.21	1	122	0.78	0	0.045	37.1	0.94
	2	21	0.78	100	0.02	1	0
1.22D	1	0.1	0.1	0	0.02	0	0
14.00	1	1150	0.62	5	0.035	37.1	0.94
14.02	1	450	0.52	0	0.045	37.1	0.94
	2	50	0.52	100	0.02	1	0
1.23	1	337.2	0.73	0	0.045	37.1	0.94
	2	224.8	0.73	100	0.02	1	0
14.02	1	450	0.52	0	0.045	37.1	0.94
	2	50	0.52	100	0.02	1	0

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LIVERPOOL CITY COUNCIL

Wianamatta (South) Creek Flood Study
Liverpool Local Government Area

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
1.23	1	337.2	0.73	0	0.045	37.1	0.94
	2	224.8	0.73	100	0.02	1	0
1.24	1	164	0.56	0	0.045	37.1	0.94
	2	41	0.56	100	0.02	1	0
1.25D	1	0.1	0.1	0	0.02	0	0
15.00	1	78	0.93	0	0.035	37.1	0.94
	2	117	0.93	100	0.02	1	0
15.01	1	125.2	0.74	0	0.035	37.1	0.94
	2	187.8	0.74	100	0.02	1	0
1.26	1	96.8	0.7	0	0.045	36.6	0.94
	2	79.2	0.7	100	0.02	1	0
1.27D	1	0.1	0.1	0	0.02	0	0
16.00	1	356	0.74	0	0.035	36.6	0.94
	2	89	0.075	100	0.02	1	0
16.01	1	145.2	0.68	0	0.045	15	0.94
	2	96.8	0.68	100	0.025	1	0
1.28D	1	0.1	0.1	0	0.02	0	0
17	1	103	0.72	0	0.035	36.6	0.94
	2	155	0.72	100	0.02	1	0
1.29	1	134.5	0.39	0	0.045	36.6	0.94
	2	134.5	0.39	100	0.02	1	0
1.30D	1	0.1	0.1	0	0.02	Zero	
18.01	1	196	0.71	0	0.035	15	0.94
	2	196	0.71	100	0.02	1	0
1.31	1	384.2	0.66	0	0.055	36.6	0.94
	2	206.9	0.66	100	0.02	1	0
1.32	1	369.2	0.65	0	0.06	36.6	0.94
	2	198.8	0.65	100	0.02	1	0
19.00	1	193.1	0.76	0	0.045	36.6	0.94
	2	158	0.76	100	0.02	1	0
1.33	1	20	0.42	5	0.045	36.6	0.94
1.34D	1	0.1	0.1	0	0.02	0	0
20.00	1	712.8	0.67	3	0.04	32.6	0.94
	2	178.2	0.67	100	0.02	1	0
20.03	1	259	0.56	0	0.045	32.6	0.94
	2	73.1	0.56	100	0.02	32.6	0.94
20.04	1	264.6	0.47	0	0.045	32.6	0.94
	2	176.4	0.45	100	0.02	32.6	0.94
20.05D	1	0.1	0.1	0	0.02	0	0

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LIVERPOOL CITY COUNCIL

Wianamatta (South) Creek Flood Study
Liverpool Local Government Area

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
21.00	1	59	0.67	0	0.045	32.6	0.94
	2	177	0.67	100	0.02	1	0
20.06	1	146.9	1.26	0	0.045	32.6	0.94
	2	69.1	1.26	100	0.02	1	0
20.07	1	220.5	0.82	0	0.045	32.6	0.94
	2	220.5	0.82	100	0.02	1	0
20.08	1	235.2	0.88	0	0.045	32.6	0.94
	2	352.8	0.88	100	0.02	1	0
20.09	1	269.3	1.25	0	0.045	32.6	0.94
	2	126.7	1.25	100	0.02	1	0
20.10	1	237.3	0.75	0	0.055	36.6	0.94
	2	127.8	0.75	100	0.02	1	0
20.11	1	140.8	0.6	0	0.08	36.6	0.94
	2	66.2	0.6	100	0.02	1	0
1.35	1	588.2	0.46	0	0.045	36.6	0.94
	2	103.8	0.46	100	0.02	1	0
1.36D	1	0.1	0.1	0	0.02	0	0
22.00	1	355.6	0.68	0	0.06	36.6	0.94
	2	191.5	0.68	100	0.02	1	0
1.37	1	429.3	0.76	0	0.06	36.6	0.94
	2	47.7	0.76	100	0.02	1	0
1.38	1	684.8	0.36	0	0.045	36.6	0.94
	2	171.2	0.36	100	0.02	1	0
1.39D	1	0.1	0.1	0	0.025	0	0
23.00	1	577	0.48	0	0.045	36.6	0.94
	2	472.1	0.48	100	0.02	1	0
23.01	1	666.3	0.41	0	0.06	36.6	0.94
	2	358.8	0.41	100	0.02	1	0
1.40	1	178	0.53	5	0.025	36.6	0.94
	2	114	0.53	100	0.025	1	0
20.01	1	413.9	0.44	0	0.04	32.6	0.94
	2	46	0.42	100	0.02	1	0
20.02D	1	0.001	0.002	0	0.025	0	0
12.01D	1	0.1	0.1	0	0.02	0	0
14.01	1	660	0.52	2	0.08	37.1	0.94
18.00	1	378	0.71	0	0.035	5	0.94
	2	402	0.71	100	0.025	1	0
16.02	1	146.9	0.68	9	0.035	15	0.94
	2	79.1	0.68	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
20.04b	1	252.1	0.47	0	0.045	32.6	0.94
	2	21.9	0.47	100	0.02	1	0
4.02	1	28.7	1.2	5	0.045	15	0.94
1.09.1	1	233.8	2.05	3	0.045	35.9	0.94
1.09.2	1	55.6	2.15	5	0.045	35.9	0.94
1.09.3	1	45.4	0.85	5	0.045	35.9	0.94
1.09.4	1	66.1	0.85	0	0.045	35.9	0.94
	2	7.3	0.85	100	0.045	1	0
1.13.1	1	427.3	0.8	0	0.045	35.9	0.94
	2	106.8	0.8	100	0.02	1	0
11.00.1	1	177.9	2.2	5	0.045	37.1	0.94
11.00.2	1	59.8	1.25	5	0.045	37.1	0.94
11.00.3	1	38.9	1.35	5	0.045	37.1	0.94
11.00.4	1	38.6	1.55	5	0.045	37.1	0.94
12.00.1.0	1	79	3.85	0	0.045	37.1	0.94
	2	19.7	3.85	100	0.02	1	0
12.00.1.1	1	37.6	2.9	5	0.045	37.1	0.94
12.00.1.2	1	62.2	2	5	0.045	37.1	0.94
12.00.1.3	1	41.2	2.7	5	0.045	37.1	0.94
12.00.1.4	1	19	1.15	0	0.045	37.1	0.94
	2	4.7	1.15	100	0.02	1	0
12.00.2.0	1	140.8	4.55	5	0.045	37.1	0.94
12.00.2.1	1	33.6	1.85	0	0.045	37.1	0.94
	2	3.7	1.85	100	0.02	1	0
12.00.3.0	1	82.3	4.1	0	0.045	37.1	0.94
	2	14.5	4.1	100	0.02	1	0
12.00.4.0	1	102.7	4.3	0	0.045	37.1	0.94
	2	18.1	4.3	100	0.02	1	0
12.02.1	1	211.7	1.65	0	0.045	37.1	0.94
	2	23.5	1.65	100	0.02	1	0
13.00.1	1	592.6	1.6	2	0.045	37.1	0.94
13.01.1	1	229.2	2.4	2	0.045	37.1	0.94
4.01.1.0	1	51.8	1.05	5	0.045	15	0.94
4.01.1.1	1	62.3	0.95	5	0.045	15	0.94
4.01.1.2	1	33.8	1.15	5	0.045	15	0.94
4.01.2.0	1	51.5	2.05	5	0.045	15	0.94
4.01.2.1	1	27.9	1.65	5	0.045	15	0.94
4.01.2.2	1	46.5	1.5	5	0.045	15	0.94
4.01.2.3	1	12.7	1.45	5	0.045	15	0.94

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
4.02.1	1	50	1.05	5	0.045	15	0.94
4.02.2	1	43.9	1.2	5	0.045	15	0.94
5.00.1.0	1	230.3	0.8	0	0.055	37.1	0.94
	2	76.8	0.8	100	0.02	1	0
5.00.1.1	1	17.9	1	5	0.045	37.1	0.94
5.00.1.2	1	9.5	1.4	5	0.045	37.1	0.94
5.00.1.3	1	15.9	1.2	5	0.045	37.1	0.94
5.00.1.4	1	22.2	1.6	5	0.045	37.1	0.94
5.00.1.5	1	152.4	0.8	0	0.055	37.1	0.94
	2	16.9	0.8	100	0.02	1	0
5.00.1.6	1	59.5	1.2	0	0.045	37.1	0.94
	2	10.5	1.2	100	0.02	1	0
5.00.1.7	1	109.1	1.4	5	0.045	37.1	0.94
5.00.2.0	1	47.2	1	5	0.045	37.1	0.94
5.00.3	1	30.5	1.1	5	0.045	37.1	0.94
5.00.4	1	154.8	1.3	5	0.045	37.1	0.94
5.00.2.1	1	10.4	1	5	0.045	37.1	0.94
5.01.1.0	1	77.6	1.05	0	0.055	37.1	0.94
	2	13.7	1.05	100	0.02	1	0
5.01.1.1	1	17.2	1.4	5	0.055	37.1	0.94
5.01.1.2	1	41.6	2.55	0	0.045	37.1	0.94
	2	4.6	2.55	100	0.02	1	0
5.01.1.3	1	45.3	1.2	0	0.045	37.1	0.94
	2	5	1.2	100	0.02	1	0
5.01.1.4	1	29.7	2.15	0	0.045	37.1	0.94
	2	5.2	2.15	100	0.02	1	0
5.01.1.5	1	13.2	2.25	5	0.045	37.1	0.94
5.01.1.6	1	25.4	1.1	5	0.045	37.1	0.94
5.01.1.7	1	19.9	1.6	5	0.045	37.1	0.94
5.01.1.8	1	120.4	0.85	5	0.055	37.1	0.94
5.01.2.0	1	36.2	0.85	0	0.045	37.1	0.94
	2	6.4	0.85	100	0.02	1	0
5.01.2.1	1	13	1.45	5	0.045	37.1	0.94
5.01.3.0	1	81.5	1.2	5	0.045	37.1	0.94
5.01.3.1	1	30.9	1	0	0.045	37.1	0.94
	2	3.4	1	100	0.02	1	0
5.01.3.2	1	61.2	1.05	5	0.045	37.1	0.94
5.02.1	1	143.3	1.2	0	0.055	37.1	0.94
	2	12.5	1.2	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
6.00.1	1	268	1.05	0	0.045	37.1	0.94
	2	23.3	1.05	100	0.02	1	0
9.01.1.0	1	47.3	1.3	0	0.045	33.9	0.94
	2	11.8	1.3	100	0.02	1	0
9.01.1.1	1	33.3	1.4	0	0.045	33.9	0.94
	2	11.8	1.4	100	0.02	1	0
4.00.1.00	1	36.7	3.3	5	0.045	15	0.94
4.00.1.01	1	40.3	4.7	5	0.045	15	0.94
4.00.1.02	1	6.8	3.2	5	0.045	15	0.94
4.00.1.03	1	19.9	2.4	5	0.045	15	0.94
4.00.1.04	1	24.2	4.1	5	0.045	15	0.94
4.00.1.05	1	23.4	3.2	5	0.045	15	0.94
4.00.1.08	1	19.2	4.1	5	0.045	15	0.94
4.00.2.00	1	118.5	2.8	5	0.045	15	0.94
4.00.2.01	1	8.0	1.5	5	0.045	15	0.94
4.00 D	1	0.1	0.1	0	0.025	0	0
4.00.2.0.2	1	10.	2.1	5	0.045	15	0.94
4.00.2.03	1	16.12	0.3	5	0.045	15	0.94
4.00.3.00	1	34.2	2.3	5	0.045	15	0.94
4.00.4.00	1	7.8	1.5	0	0.045	15	0.94
	2	3.4	1.5	100	0.02	1	0
4.00.1.06	1	54.0	2.5	5	0.045	15	0.94
4.00.1.07	1	41.9	1.3	0	0.045	15	0.94
	2	4.7	1.3	100	0.02	1	0
19.01D	1	0.1	0.1	0	0.02	0	0
1.29D	1	0.1	0.1	0	0.02	0	0
12.04	1	196	0.5	0	0.045	37.1	0.94
	2	84	0.5	100	0.02	1	0
BC00-19	1	272	2.2	0	0.06	35.9	0.94
	2	181.3	2.2	100	0.02	1	0
BC00-18	1	60.2	2.41	0	0.055	35.9	0.94
	2	10.6	2.41	100	0.02	1	0
BC00-17	1	61.4	2.4	0	0.045	35.9	0.94
	2	10.8	2.4	100	0.02	1	0
BC00-16	1	39.1	2.3	0	0.045	35.9	0.94
	2	6.9	2.3	100	0.02	1	0
BC00-15	1	10.3	2.22	0	0.045	35.9	0.94
	2	5.6	2.22	100	0.02	1	0
BC00-14	1	3.9	4.21	0	0.045	35.9	0.94
	2	3.1	4.21	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
BC00-12	1	16.4	3.25	0	0.045	35.9	0.94
	2	8.9	3.25	100	0.02	1	0
BC00-11	1	36.4	2.19	0	0.045	35.9	0.94
	2	1.9	2.19	100	0.02	1	0
BC00-10	1	10.3	2.05	0	0.045	35.9	0.94
	2	1.1	2.05	100	0.02	1	0
BC00-9	1	20.4	1.87	0	0.045	35.9	0.94
	2	6.8	1.87	100	0.02	1	0
BC00-8	1	10.4	4.18	0	0.045	35.9	0.94
	2	2.6	4.18	100	0.02	1	0
BC00-7	1	70.3	1.93	0	0.055	35.9	0.94
	2	12.4	1.93	100	0.02	1	0
BC00-6	1	24.9	2.59	0	0.045	35.9	0.94
	2	10.7	2.59	100	0.02	1	0
BC00-5	1	23.0	1.88	0	0.045	35.9	0.94
	2	9.9	1.88	100	0.02	1	0
BC00-4	1	104.5	2	0	0.05	35.9	0.94
	2	26.1	2	100	0.02	1	0
BC00-3	1	44.2	2.5	0	0.045	35.9	0.94
	2	4.9	2.5	100	0.02	1	0
BC00-2	1	41.1	1.81	0	0.045	35.9	0.94
	2	4.6	1.81	100	0.02	1	0
BC00-1	1	53.1	1.4	0	0.065	35.9	0.94
	2	13.3	1.4	100	0.02	1	0
KC00-5	1	48.3	1.67	0	0.055	35.9	0.94
	2	7.2	1.67	100	0.02	1	0
KC00-4	1	80.8	1.94	0	0.06	35.9	0.94
	2	43.5	1.94	100	0.02	1	0
KC00-3	1	160.9	1.5	0	0.065	35.9	0.94
	2	40.2	1.5	100	0.02	1	0
KC00-2	1	170.1	1.15	0	0.065	35.9	0.94
	2	39.6	1.15	100	0.02	1	0
BC00-20	1	28.9	2	0	0.065	35.9	0.94
	2	3.2	2	100	0.02	1	0
BC00-13	1	11.2	2.5	0	0.045	35.9	0.94
	2	4.8	2.5	100	0.02	1	0
BC08-2	1	9.7	2.6	0	0.045	35.9	0.94
	2	2.4	2.6	100	0.02	1	0
BC08-1	1	8.3	1.88	0	0.045	35.9	0.94
	2	0.6	1.88	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
KC13-5	1	25.7	2.06	0	0.055	35.9	0.94
	2	8.6	2.06	100	0.02	1	0
KC13-4	1	13.9	3.26	0	0.055	35.9	0.94
	2	1.0	3.26	100	0.02	1	0
KC13-3	1	9.8	2.93	0	0.045	35.9	0.94
	2	0.5	2.93	100	0.02	1	0
KC13-2	1	5.9	1.6	0	0.045	35.9	0.94
	2	0.3	1.6	100	0.02	1	0
KC13-1	1	10.1	4.09	0	0.045	35.9	0.94
	2	1.1	4.09	100	0.02	1	0
KC14-14	1	14.4	3.5	0	0.05	35.9	0.94
	2	6.2	3.5	100	0.02	1	0
KC14-13	1	9.0	3.5	0	0.04	35.9	0.94
	2	4.8	3.5	100	0.02	1	0
KC14-12	1	11.1	3.5	0	0.05	35.9	0.94
	2	6.0	3.5	100	0.02	1	0
KC14-11	1	16.2	2.27	0	0.045	35.9	0.94
	2	6.9	2.27	100	0.02	1	0
KC14-10	1	24.7	3.07	0	0.045	35.9	0.94
	2	4.4	3.07	100	0.02	1	0
KC14-9	1	20.8	3.8	0	0.055	35.9	0.94
	2	25.5	3.8	100	0.02	1	0
KC14-8	1	18.9	2.66	0	0.05	35.9	0.94
	2	12.6	2.66	100	0.02	1	0
KC14-7	1	11.4	2.9	0	0.055	35.9	0.94
	2	7.6	2.9	100	0.02	1	0
KC14-6	1	55.5	2.13	0	0.055	35.9	0.94
	2	18.5	2.13	100	0.02	1	0
KC14-5	1	28.9	3.02	0	0.055	35.9	0.94
	2	1.5	3.02	100	0.02	1	0
KC14-4	1	48.0	2.75	0	0.065	35.9	0.94
	2	2.5	2.75	100	0.02	1	0
KC14-3	1	17.6	1.93	0	0.065	35.9	0.94
	2	0.9	1.93	100	0.02	1	0
KC14-2	1	60.7	1.72	0	0.065	35.9	0.94
	2	3.2	1.72	100	0.02	1	0
KC14-1	1	40.8	1.06	0	0.065	35.9	0.94
	2	10.2	1.06	100	0.02	1	0
KC27-2	1	7.7	2.31	0	0.065	35.9	0.94
	2	1.4	2.31	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
KC27-1	1	16.6	2.11	0	0.065	35.9	0.94
	2	0.9	2.11	100	0.02	1	0
KC27-5	1	8.4	3.23	0	0.055	35.9	0.94
	2	0.4	3.23	100	0.02	1	0
KC27-4	1	9.4	1.62	0	0.055	35.9	0.94
	2	1.0	1.62	100	0.02	1	0
KC27-3	1	28.5	1.95	0	0.065	35.9	0.94
	2	7.1	1.95	100	0.02	1	0
KC27-6	1	14.6	6.7	0	0.065	35.9	0.94
	2	0.8	6.7	100	0.02	1	0
KC24-5	1	47.2	4.26	0	0.055	35.9	0.94
	2	2.5	4.26	100	0.02	1	0
KC24-4	1	16.1	2.55	0	0.055	35.9	0.94
	2	1.8	2.55	100	0.02	1	0
KC24-1	1	8.2	2.34	0	0.055	35.9	0.94
	2	0.4	2.34	100	0.02	1	0
KC24-3	1	19.0	5.18	0	0.055	35.9	0.94
	2	1.0	5.18	100	0.02	1	0
KC24-2	1	8.6	3.1	0	0.065	35.9	0.94
	2	0.5	3.1	100	0.02	1	0
KC23-2	1	35.7	6.39	0	0.065	35.9	0.94
	2	1.9	6.39	100	0.02	1	0
KC23-1	1	7.5	2.71	0	0.065	35.9	0.94
	2	0.4	2.71	100	0.02	1	0
KC17-5	1	13.4	4.5	0	0.045	35.9	0.94
	2	5.7	4.5	100	0.02	1	0
KC17-4	1	4.1	3.04	0	0.045	35.9	0.94
	2	2.7	3.04	100	0.02	1	0
KC17-3	1	8.2	3.5	0	0.055	35.9	0.94
	2	4.4	3.5	100	0.02	1	0
KC17-2	1	10.6	2.24	0	0.055	35.9	0.94
	2	0.6	2.24	100	0.02	1	0
KC17-1	1	5.2	6.54	0	0.055	35.9	0.94
	2	0.3	6.54	100	0.02	1	0
KC19-7	1	9.9	6.39	0	0.045	35.9	0.94
	2	1.1	6.39	100	0.02	1	0
KC19-6	1	4.5	2.87	0	0.045	35.9	0.94
	2	1.5	2.87	100	0.02	1	0
KC19-4	1	5.0	5	0	0.045	35.9	0.94
	2	2.2	5	100	0.02	1	0

Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
KC19-3	1	1.2	3.61	0	0.045	35.9	0.94
	2	0.5	3.61	100	0.02	1	0
KC19-2	1	1.1	3.15	0	0.065	35.9	0.94
	2	0.1	3.15	100	0.02	1	0
KC19-1	1	6.1	2.31	0	0.065	35.9	0.94
	2	0.7	2.31	100	0.02	1	0
KC11-6	1	11.3	3.32	0	0.055	35.9	0.94
	2	1.3	3.32	100	0.02	1	0
KC11-5	1	7.5	4.48	0	0.055	35.9	0.94
	2	1.3	4.48	100	0.02	1	0
KC11-4	1	8.4	2.99	0	0.045	35.9	0.94
	2	1.5	2.99	100	0.02	1	0
KC11-3	1	5.8	2.87	0	0.045	35.9	0.94
	2	0.4	2.87	100	0.02	1	0
KC11-2	1	11.4	3.1	0	0.045	35.9	0.94
	2	2.0	3.1	100	0.02	1	0
KC11-1	1	7.0	2.14	0	0.045	35.9	0.94
	2	0.4	2.14	100	0.02	1	0
SC00-4	1	376.3	1.55	0	0.045	35.9	0.94
	2	94.1	1.55	100	0.02	1	0
SC00-3	1	33.1	2.85	0	0.045	35.9	0.94
	2	22.0	2.85	100	0.02	1	0
SC00-2	1	29.4	2.43	0	0.045	35.9	0.94
	2	12.6	2.43	100	0.02	1	0
SC00-1	1	6.3	3.04	0	0.045	35.9	0.94
	2	4.2	3.04	100	0.02	1	0
KC00-10	1	512.7	1.08	0	0.055	35.9	0.94
	2	69.9	1.08	100	0.02	1	0
KC00-9	1	437.0	1.79	0	0.045	35.9	0.94
	2	145.7	1.79	100	0.02	1	0
KC00-8	1	64.4	1.96	0	0.045	35.9	0.94
	2	16.1	1.96	100	0.02	1	0
KC00-7	1	52.9	1.35	0	0.055	35.9	0.94
	2	13.2	1.35	100	0.02	1	0
KC00-6	1	15.3	1.56	0	0.055	35.9	0.94
	2	1.7	1.56	100	0.02	1	0
KC01-4	1	18.0	2.09	0	0.055	35.9	0.94
	2	6.0	2.09	100	0.02	1	0
KC01-3	1	25.8	3	0	0.045	35.9	0.94
	2	8.6	3	100	0.02	1	0

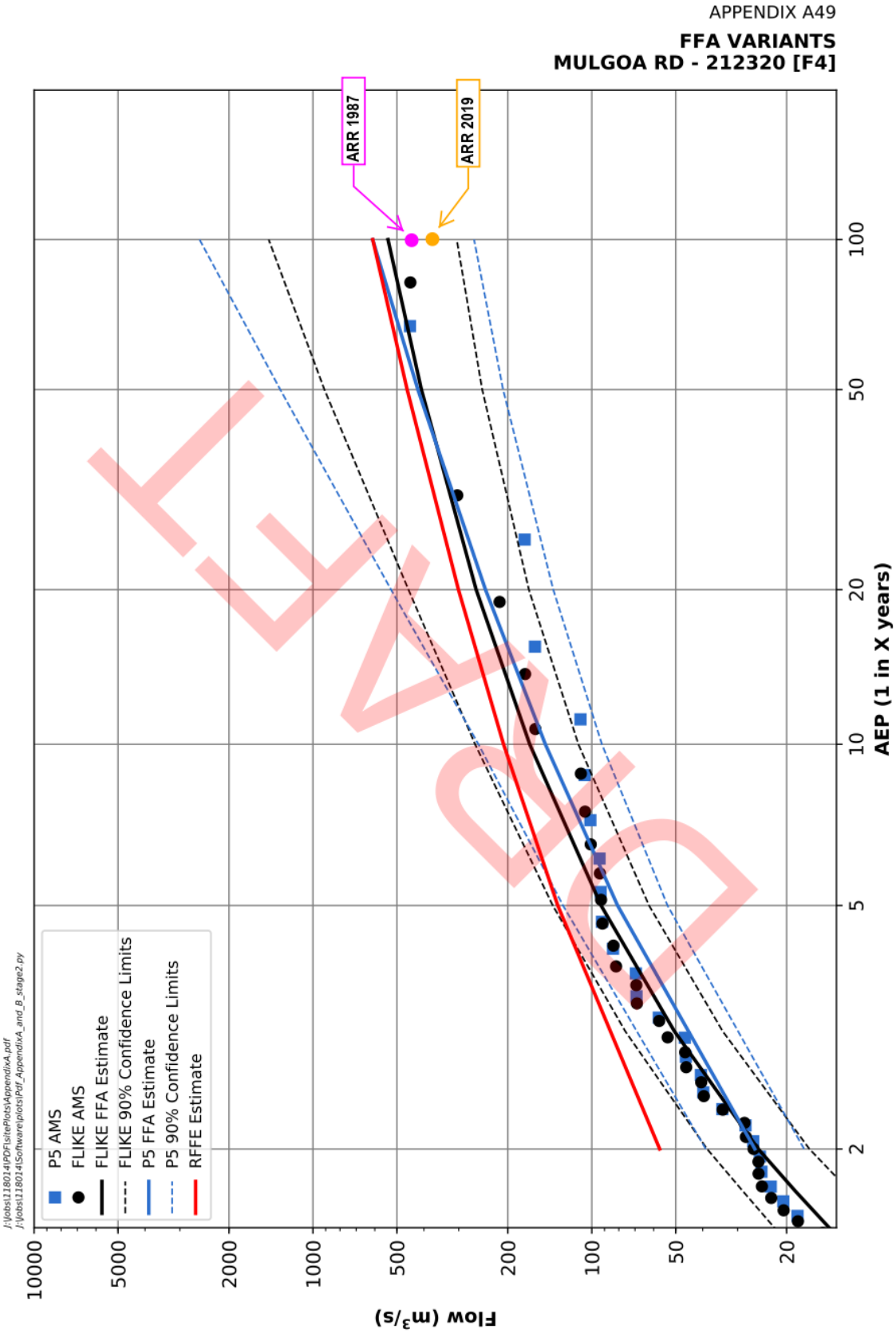
Catchment ID	Sub-Catchment No	Area (ha)	Vectored Slope	% Impervious	Roughness (Manning's n)	Initial Loss (mm)	Continuing Loss (mm)
KC01-2	1	32.9	1.06	0	0.045	35.9	0.94
	2	8.2	1.06	100	0.02	1	0
KC01-1	1	12.8	1.9	0	0.045	35.9	0.94
	2	3.2	1.9	100	0.02	1	0
KC02-2	1	8.4	4.95	0	0.055	35.9	0.94
	2	8.4	4.95	100	0.02	1	0
KC02-1	1	16.3	3.43	0	0.055	35.9	0.94
	2	8.8	3.43	100	0.02	1	0
KC03-2	1	20.3	2.58	0	0.055	35.9	0.94
	2	5.1	2.58	100	0.02	1	0
KC03-1	1	23.9	2.5	0	0.055	35.9	0.94
	2	4.2	2.5	100	0.02	1	0
KC07-4	1	23.5	2.27	0	0.065	35.9	0.94
	2	2.6	2.27	100	0.02	1	0
KC07-3	1	16.6	2.54	0	0.045	35.9	0.94
	2	0.9	2.54	100	0.02	1	0
KC07-2	1	8.3	2.42	0	0.045	35.9	0.94
	2	2.1	2.42	100	0.02	1	0
KC07-1	1	16.1	2.68	0	0.055	35.9	0.94
	2	0.8	2.68	100	0.02	1	0

Advisian
Worley Group

LIVERPOOL CITY COUNCIL

Wianamatta (South) Creek Flood Study
Liverpool Local Government Area

Appendix B: Comparison of Computed Discharges to Elizabeth Drive FFA


APPENDIX A49
FFA VARIANTS
MULGOA RD - 212320 [F4]
ARR 1987
ARR 2019
P5 AMS
FLIKE AMS
FLIKE FFA Estimate
FLIKE 90% Confidence Limits
P5 FFA Estimate
P5 90% Confidence Limits
RFFE Estimate
Flow (m³/s)
AEP (1 in X years)
10000
5000
2000
1000
500
200
100
50
20
100
50
20
10
5
2
J:\Jobs\11801#\PDF\sitePlots\AppendixA.pdf
J:\Jobs\11801#\Software\plots\Pdf_AppendixA_and_B_stage2.py

LIVERPOOL CITY COUNCIL

MINUTES
This meeting was held via MS Teams

MINUTES OF LIVERPOOL PEDESTRIAN, ACTIVE TRANSPORT & TRAFFIC COMMITTEE MEETING
3 February 2021

COMMITTEE FORMAL MEMBERS

Councillor Nathan Hagarty	Liverpool City Council (LCC) (Chairperson)
Damien Leemon Police	Local Area Command
Clayton Hopper	Office of Melanie Gibbons MP
Bikram Singh	Transport for NSW

COMMITTEE TECHNICAL ADVISORS & INFORMAL MEMBERS

Councillor Karress Rhodes	LCC (left at 10:15)
Councillor Peter Harle	LCC (joined after item 11)
Charles Wiafe **(CW)**	Service Manager, Traffic & Transport, LCC
Mahavir Arya	Traffic & Transport Engineer, LCC
Toula Athanasiou	Road Safety Officer, LCC
Rachel Palermo	Road Safety Officer, LCC

COUNCIL ADMINISTRATIVE SUPPORT

Christopher Jattan	LCC
Rose Koch	LCC (Minutes)

COUNCIL TECHNICAL OBSERVER

Anup Bajracharya	Senior Civil Designer Engineer, LCC
Parth Tiwari	Graduate Civil Design Engineer, LCC

APOLOGIES

Betty Green	Representative for MP for Liverpool

WELCOME, ATTENDANCE, APOLOGIES AND OPENING

Councillor Hagarty opened the meeting at 9:35 and welcomed the Committee. The traditional custodians of the lands were acknowledged. Apologies were noted.

DECLARATIONS OF INTEREST

Nil

CONFIRMATION OF PREVIOUS MINUTES

The Committee was informed that the minutes from the previous meeting held on 18 November 2020 was endorsed at the Council ordinary meeting of 16 December 2020.

AGENDA ITEMS

Item	Subject
1	Manning Street, Priddle Street and Scrivener Street, Warwick Farm – Review of parking restrictions
2	The Northern Road, (realigned road section), Bringelly - Request for Parking Restrictions
3	Strzlecki Drive and Singleton Street, Carnes Hill – Proposed Traffic Facilities
4	Nuwarra Road and Marshall Avenue Intersection, Moorebank - Request for Intersection Treatment
5	Brickmakers Drive/Christiansen Boulevard/Greenview Drive, Moorebank – Request for a Pedestrian Crossing Facility
6	Mannow Avenue, West Hoxton – Proposed Linemarking Scheme
7	Fourth Avenue/Tenth Avenue, Road upgrade, Austral – Proposed signs and linemarking scheme
8	New Subdivisions – Proposed signs and linemarking schemes
9	Hume Highway – Proposed Cycleway
10	Northumberland Street, Liverpool – Proposed Parking restrictions
11	Items Approved Under Delegated Authority

TECHNICAL DISCUSSION ITEMS

Item	Subject
TD1	Regentville Drive, Elizabeth Hills
TD2	Hume Highway, Casula – Arrangements for improved pedestrian safety
TD3	Traffic Counts - December 2020

GENERAL BUSINESS ITEMS

Item	Subject
GB1	Rossmore Avenue (West) – Proposed No Stopping Parking Restrictions
GB2	Hammondville Shops – Request for pedestrian crossing facility across Norman Avenue, Hammondville
GB3	Bardia Parade, Holsworthy - Speeding concern
GB4	3-5 & 7-9 Atkinson Street, Liverpool - Request for no stopping signs opposite their driveways
GB5	Boundary Road - Request for change to bus route 866 and stop
GB6	Road work on Camden Valley Way and Ash Road, Prestons
GB7	Disability Access to Wattle Grove Lakeside Park
GB8	Decommission bus stop, San Marino Drive, Prestons
GB9	Traffic, Saint Mark's Coptic Orthodox College, Australis Ave, Wattle Grove

GB10	Hoxton Park Road and First Avenue – Consideration of linemarking on the First Avenue approach
GB11	Riley Street, Lurnea – Request for parking restriction
GB12	Wilson Road, Green Valley – Request for bus stop relocation

CLOSE – Meeting closed at 11:10am

ITEM 1	Manning Street, Priddle Street and Scrivener Street, Warwick Farm – Review of parking restrictions

INTRODUCTION

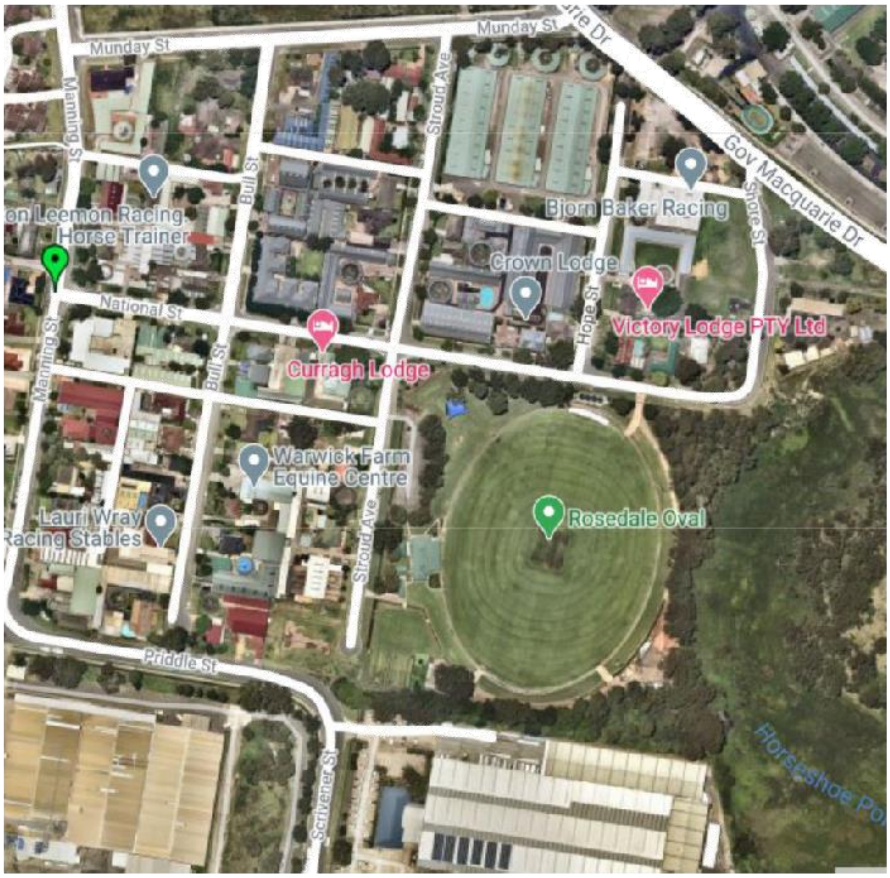
At its November meeting, the Committee discussed concerns about heavy vehicle parking along sections of Manning Street, Priddle Street and Scrivener Street with a request for a report to be submitted for further consideration.

A review of the existing parking arrangement has been carried out with a recommendation for edgelinemarking to democate traffic movements.

ASSESSMENT

Council has received representations about truck parking along sections of the collector roads providing access to the Warwick Farm industrial area. The concerns include heavy vehicle parking which affects residential amenity and traffic flow.

The collector roads providing access to the Warwick Farm industrial area is made up of Manning Street, Priddle Street and Scrivener Street as shown below.



The Warwick Farm precinct has the horse stabling yards along the sections of Munday and Manning Street close to Governor Macquarie Drive (GMD), whilst the southern portion along Priddle Street and Scrivener Street contains an industrial precinct. Scrivener Street provides alternate access for staff to the rear of the Liverpool Hospital. The streets all have the default 50km/h residential speed limit.

Due to this mix of land use, traffic conflicts arise due to traffic movements through the horse precinct as horse trainers have to walk their horses across sections of Manning Street.

The horse stabling yard and industrial precinct both generate heavy vehicle movements and therefore the above-mentioned collector roads attract heavy vehicle movements including B-doubles. The relevant developments are supposed to have off-street parking and for deliveries to be carried out within the development site, however, it has been brought to Council's attention that some heavy vehicles park along Priddle Street and Scrivener Street.

The three roads have the carriageway widths and traffic arrangement:

Street	Carriageway Width	Linemarking/Comments
Manning Street	12.1m	Edge lines and double barrier lines and can accommodate on-street parking.
Priddle Street	12.5m	Currently curved sections linemarked. Straight section not linemarked. Linemarking of the straight section is recommended.
Scrivener Street	12m	Currently curved sections linemarked. Straight section not linemarked. Linemarking of the straight section is recommended.

Under the NSW road rules heavy vehicles are not permitted to park in built-up areas for more than one hour unless engaging in loading and/or unloading. Similarly, all deliveries in the area needs to comply with relevant consent conditions. Where loading and unloading are occurring in the early mornings, requests can be made to Council's community standards for appropriate investigation.

To demarcate locations for on-street parking, edgelinemarking and centre linemarking as indicated above is recommended. In addition, existing faded linemarking along sections of Manning and Munday Streets would be re-linemarked.

RECOMMENDATION

That:

The Committee supports edge and centre linemarking along sections of Priddle Street and Scrivener Street to provide 3.2m traffic lanes in each direction.

COMMITTEE DISCUSSION

CW advised that in accordance with the road rules, heavy vehicles are only permitted to park and unload for less than one hour. If parking is longer than the one-hour duration, enforcement can be carried out. Most developments in the area have development consent conditions which specify times for loading and unloading activities.

Councilor Rhodes outlined that the concern she has received on this issue includes heavy vehicles parking close to driveways and obstructing sight lines of oncoming vehicles, associated safety concerns and loading/off-loading in early mornings.

To address this concern, Councillor Rhodes continued that consideration should be given to parking permits for the local residents.

CW outlined that the existing parking permit policy only covers predominantly the Liverpool City Centre. In addition, the policy indicates that if a development has off street parking, the occupants are not eligible for permit parking. Hence, a permit parking scheme would be cumbersome to administer in Warwick Farm.

To ensure driveways are not obstructed, transverse lines can be linemarked approximately 2m-7m either side to demarcate major driveways where parking is not permitted. After the linemarking, if required enforcement can be carried out.

The Police representative outlined that trucks are parking and waiting to deliver to the adjoining factory units. It is likely that this is due to COVID restrictions within the factory units including Direct Freight. It was discussed and agreed that Council can write to the major factory units to request that on-street truck parking should be minimised.

The Committee also endorsed the proposed centre and edgeline marking along sections of Manning Street, Priddle Street and Scrivener Street as shown in Attachment 1.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Transverse linemarking between 2m and 7m on either side of major driveways along Manning Street, to accommodate safe turning movements.

- Centre and edgeline marking along sections of Manning Street, Priddle Street and Scrivener Street.

ITEM 2	The Northern Road, (realigned road section), Bringelly - Request for Parking Restrictions

INTRODUCTION

As part of Transport for New South Wales (TfNSW) upgrade of The Northern Road, the section close to its intersection with Bringelly Road/Greendale Rd has been realigned (approximately 800m to the east).

This has created a road section along the eastern boundary of the Bringelly Public Primary School that has become a No Through Road. Therefore, the School has requested timed No Parking restrictions along the school to increase parking provision for the pickup and set down of students.

The requested timed No Parking restriction can be accommodated. The Committee is requested to support a layout of the timed No Parking and associated signs and line marking scheme, as shown in Attachment 1.

ASSESSMENT

Transport for New South Wales (TfNSW) is upgrading the section of The Northern Road between The Old Northern Road, Narellan and Jamison Road, South Penrith in stages. The road upgrade is funded under the Federal and NSW Governments Western Sydney Infrastructure Program.

As indicated above, as part of the road upgrade, the road section closes to The Northern Road/Bringelly Road/Greendale Rd, through Bringelly Village has been realigned (approximately 800m to the east). This has resulted in a No Through Road, along the along the eastern boundary of the Bringelly Public School.

The realigned road and remaining road sections are as shown in the figure below.

The No Through Road would be declassified, from a classified state road to a local road, to be transferred to Council to manage and rename. Camden Council has renamed the old section of The Northern Road, south of Bringelly Road, in the Camden Local Government Area, to Wentworth Road. A report will be submitted to Council for the northern portion in the Liverpool LGA to also be named as Wentworth Road to maintain the continuity.

The Bringelly Public School Principal has requested 'No Parking' restrictions along the school's Northern Rd frontage to increase parking provision for the pickup and set down of students.

The existing road includes a signalised intersection at The Northern Road/Bringelly Road/Greendale Rd, and two-lane road, line marked with double barrier separation line (BB) lines and edge lines.

The road section fronting the school is approximately 330m long with approximately 145m with kerb and guttering from the existing traffic signals at The Northern Road/Bringelly Road/Greendale Rd intersection. The road section contains an existing bus zone approximately 40m long.

With the realignment, the 'No Through Road' would provide access to less than 10 rural properties and daily traffic volume would be expected to be less than 10 veh/day.

The following changes are proposed in consultation with Interline Bus Service which operates school bus services.

Existing	Proposed
25m of 'No Stopping' from the traffic signals	25m of 'No Stopping' from the traffic signals to be retained
'No Stopping' 85m long	'No Parking' 80m long
40m of Bus zone	65m of Bus Zone

The carriageway can accommodate the requested No Parking signs, existing bus zone to be extended, and associated signs and line marking scheme, as shown in Attachment 1.

RECOMMENDATION

That:

The Committee supports the proposed timed No Parking, bus stop and associated signs and line marking scheme, is as shown in Attachment 1.

COMMITTEE DISCUSSION

The Committee discussed and supported the linemarking scheme as presented. The request from the school for parking restrictions on the eastern side of the road (opposite the school) was not supported, as parents will need to cross this portion of the road and would not be safe.

If kerb and guttering is extended along the western side of the road is installed in future, additional on-street parking can be accommodated. This issue is being discussed with TfNSW. In response to a question from the TfNSW representative, the Committee noted that U-turn movements for buses can be accommodated at the cul-de-sac at the end of the road.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Proposed timed 'No Parking', bus stop and associated signs and line marking scheme, as shown in Attachment 2.

ITEM 3	Strzlecki Drive and Singleton Street, Carnes Hill – Proposed Traffic Facilities

INTRODUCTION

At its November meeting, the committee considered concept designs for traffic facilities along sections of Strzlecki Drive and recommended that detailed designs be submitted for further consideration.

Detailed design of these facilities included two speed humps (in front of 15A and 17A and west of Rosedale Circuit), pedestrian refuge across Strzlecki Drive east of Schoffel Grove, centre linemarking and a concrete median island in Strzlecki Drive close to its intersection with Rosedale Circuit intersection.

Singleton Street intersection designs have been carried out and are as shown in Attachment 2.1-2.6. The committee is requested to consider and support these facilities.

ASSESSMENT

Council is upgrading Schoeffel Park into a multi-purpose recreational facility and open space. Recent upgrade works include a paved footpath within the park. This improvement has increased traffic movements around the park. In addition, late last year Council received representations for traffic facilities including intersection treatments to be installed across sections of Strzlecki Drive close to the park. In response, at the November Committee Meeting, concept designs involving the following treatments were discussed and agreed to in principle.

A proposed pedestrian refuge across Strzlecki Drive east of its intersection with Schoeffel Grove

Minor intersection treatments at Strzlecki Drive and Singleton Street and Strzlecki Drive and Rosedale Circuit.

Detailed design of these facilities be prepared and submitted for further consideration at the February meeting.

In addition, the November report identified the need for traffic calming devices in the form of speed humps to address the speeding concern (speeding concern and recent crash along Strzlecki Drive).

As part of detailed design for the above facilities, the location of two speed humps has now been identified. Detailed design of these facilities has been carried out taking into consideration the comments raised at the November Committee Meeting. The designs have been carried out in accordance with TfNSW Road Design Guide and are as shown in Attachment 2.1-2.6.

RECOMMENDATION

That:

The Committee supports the proposed pedestrian refuge at the intersection of Strzlecki Drive and Schoeffel Grove, two speed humps across Strzlecki Drive as well as minor intersection treatments at Strzlecki Drive-Singleton Street and Strzlecki Drive-Rosedale Circuit intersections as shown in Attachment 2.1-2.6.

COMMITTEE DISCUSSION

CW advised the pedestrian refuge could have been provided across the western side of Strzlecki Drive as presented at the November committee meeting. However, during detailed design, constraints have been identified and adequate sight distance can be achieved on the eastern side. Hence, the pedestrian refuge is now proposed on the eastern side as shown int the attachment.

The TfNSW representative recommended that pram ramps should be provided on both sides (of Strzlecki Drive) to encourage pedestrians to cross at the pedestrian refuge. The design is to be modified to include this change.

The Committee endorsed the facilities with a recommendation that the modified design be presented to TfNSW for comments and that affected residents be consulted prior to construction.

COMMITTEE RECOMMENDATION

That the Committee supports:

- The Committee supports the proposed pedestrian refuge at the intersection of Strzlecki Drive and Schoeffel Grove, two speed humps across Strzlecki Drive as well as minor intersection treatments at Strzlecki Drive-Singleton Street and Strzlecki Drive-Rosedale Circuit intersections as shown in Attachment 2.1-2.6.

- Detailed design of the facilities be submitted to TfNSW for comments, prior to construction.

- Community consultation to be carried out with the affected residents prior to construction.

ITEM 4	Nuwarra Road and Marshall Avenue Intersection, Moorebank - Request for Intersection Treatment

INTRODUCTION

At its meeting of 25 September 2019, the Committee considered a report regarding upgrading of the existing seagull island to a roundabout at the Nuwarra Road and Marshall Avenue intersection, Moorebank.

The Committee noted that significant delays are experienced by right turn movements into and out of Marshall Avenue at this intersection due to high traffic flow along Nuwarra Road and supported a proposed roundabout. However, at the subsequent Council meeting, installation of the roundabout was not endorsed.

Since then, Council has been receiving representations, including from the Local Member for Holsworthy, for intersection treatments to be implemented to reduce the significant delays at the intersection for existing movements from Marshall Avenue.

The Committee is requested to re-consider and endorse the proposed roundabout at the intersection.

ASSESSMENT

As indicated above, Council has been receiving representations including from the Local Member for Holsworthy, for intersection treatments to be implemented to reduce the significant delays at the intersection for existing movements from Marshall Avenue.

The layout of the existing intersection is as shown below.

As indicated above, the existing intersection has a seagull island and the appropriate intersection treatment involves the following:

Modification of the existing traffic signals at the Nuwarra Road/Brickmakers Drive intersection to provide gaps in the southbound traffic to reduce the right turn delays at the Nuwarra Road/Marshall Street intersection.

TfNSW Traffic Signals Coordinator has advised amendment to the existing traffic signals at the Nuwarra Road and Brickmakers Drive intersection will significantly increase traffic delays along Brickmakers Drive.

Such delays will make the Nuwarra Road and Brickmakers Drive road network inefficient and lead to longer delays particularly along Brickmakers Drive during the evening peak periods.

Therefore, TfNSW will not modify the existing traffic signals and an alternate treatment should be considered.

Installation of 'Keep Clear' pavement marking – The TfNSW Delineation Guidelines outlines that 'Keep Clear' marking can be installed across a carriageway or traffic lane, when a traffic queue obstructs other traffic wishing to cross the carriageway or lane (i.e. right turning traffic).

The Guideline indicates the marking should only be installed where right turning vehicles are prevented from entering or exiting the side street and subsequently cause traffic to queue back through the signalised intersection. That is not the case at the subject intersection.

The intersection currently has the alternate "Do Not Queue Across Intersection" sign. However, the sign has not reduced the significant delays experienced by right movements into and out of Marshall Avenue.

Roundabout – Following the discussions with the TfNSW officers and the above investigation, alternate intersection treatments involving traffic signal or roundabout has been investigated.

A summary of the assessment are as follows:

Assessment of a Signalised Nuwarra Road/Marshall Avenue intersection

The Nuwarra Road/Marshall Avenue intersection is approximately 200m south off the existing Nuwarra Road/Brickmakers Drive signalised intersection.

Marshall Avenue provides access to approximately 145 detached residential properties in the residential catchment. Traffic counts carried out over the last two years indicates that traffic volume does not meet the TfNSW traffic signals warrant of 900veh/hr and 100 veh/hr; or 600 vehicles and 200 veh/hr along Nuwarra Road and Marshall Avenue respectively for four hours a day. Therefore, TfNSW has again recently advised that it does not support traffic signals at this intersection.

Roundabout at the Nuwarra Road/Marshall Avenue intersection

Considering the intersection does not meet the TfNSW traffic signals warrant, and that modification cannot be made to the existing Nuwarra Road/Brickmakers Drive signalised intersection, the only remaining appropriate intersection treatment is a roundabout.

SIDRA intersection performance analysis carried out for the intersection has identified that with the proposed roundabout the Level of Service (LoS) is forecasted to improve to LoS A and C during the morning and afternoon peak periods respectively.

A design of the roundabout including swept path analysis has been carried out taking into consideration heavy vehicle movements (including B-double along Nuwarra Road). At the September 2019 meeting it was discussed and agreed that the detailed design of the

roundabout is to includes a speed hump on the southbound approach to the intersection to ensure that heavy vehicles would slow down and permit exit movements from Marshall Avenue. The design is also to include appropriate provision for pedestrian crossing facilities across Nuwarra Road and Marshall Avenue, Moorebank.

The design is as shown in Attachment 3.1-3.6. Should the roundabout be supported, the modified detailed design will be presented to the technical members prior to construction.

Council acknowledges an imbalance in traffic flow which makes the existing intersection treatment ineffective. Due to its location, the roundabout in the morning peak period when northbound traffic is high would provide opportunity for exit movements from Marshall Avenue. During the afternoon peak period right turn movements will have priority over the southbound traffic in Nuwarra Road.

Therefore, it is considered that a roundabout at the Nuwarra Road and Marshall Avenue intersection is an appropriate treatment. The TfNSW representatives have previously reviewed the design of the roundabout and has advised that the agency has no objection to the facility as long as it does not cause delays to the Nuwarra Road/Brickmakers Drive signalised intersection.

The observations are that the traffic queue along Nuwarra Road, northbound approach to the Nuwarra Road/Brickmakers Drive signalised intersection, does not extend past the Marshall Street intersection.

Alternate Access Arrangement

An assessment has been carried out on whether it is possible for traffic from the Marshall Avenue and Clyde Avenue precinct to exit the precinct via a connecting road to Greenway Drive or through the Sydney Water reservoir to Hennessy Avenue. Such configurations are shown in Attachment 3.1-3.6.

These arrangements would require significant land acquisitions and are not considered feasible at this stage.

Related Issue – Clyde Avenue/Marshall Avenue intersection

Council has received representations that the intersection of Marshall Avenue and Clyde Avenue (east of the Nuwarra Road/Marshall Avenue intersection requires additional parking restriction to permit efficient traffic flow). The road rules prohibit parking within 10m of an intersection. To highlight this requirement, C3 yellow linemarking is proposed on the northern side of the intersection, along Clyde Avenue.

RECOMMENDATION

That:

The Committee supports the proposed installation of a mountable roundabout at the Nuwarra Road and Marshall Avenue intersection, Moorebank, as shown in Attachment 3.1-3.2.

Detailed design of the roundabout is to consider tree planting in the central island.

The Committee supports C3 yellow linemarking is proposed on the northern side of the intersection, along Clyde Avenue.

Council to undertake community consultation prior to installations.

COMMITTEE DISCUSSION

CW advised that the nearby childcare centre development has been approved by the Land & Environment Court, without a requirement for contribution toward the intersection treatment.

Residents in the area are requesting for treatment of this intersection due to traffic delays. The possibility of traffic signals at the intersection was discussed. The intersection is close to the existing traffic signals at Nuwarra Road/Brickmakers Drive intersection. Traffic volumes during off peak times do not meet the warrant for traffic signals.

In addition, the current crash history does not warrant installation of traffic signals. Council has written to TfNSW for review based on its location, traffic volume and crash history but to date the agency has not supported traffic signals.

Two options to provide alternate road links to other parts of Moorebank as outlined in the report were briefly considered. These will require land acquisition and discussions with Sydney Water and are not considered feasible.

The Committee supported the presented roundabout and noted that minor design modifications including speed humps at the northern approach is required.

On a related subject, Clr Hagarty enquired if Council is looking to restrict heavy vehicle movements along Nuwarra Road. CW advised that major freight companies that apply through the national heavy vehicle regulator has been advised that Nuwarra Road is no longer a heavy vehicle route.

CW continued that heavy vehicle movements could be restricted but would require a load limit restriction. This will need to be discussed with TfNSW to identify alternative heavy vehicle routes. The Committee agreed that discussions on potential load limit should begin now due to the number of residential complaints and the increasing traffic volume.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Proposed installation of a mountable roundabout at the Nuwarra Road and Marshall Avenue intersection, Moorebank, as shown in Attachment 3.1-3.2.
- Detailed design of the roundabout is to consider tree planting in the central island.
- The Committee supports C3 yellow linemarking on the northern side of the intersection, along Clyde Avenue.
- Council to undertake community consultation prior to installations.
- Council to investigate options for imposing a load limit along Nuwarra Road, in consultation with TfNSW.

ITEM 5	Brickmakers Drive/Christiansen Boulevard/Greenview Drive, Moorebank – Request for a Pedestrian Crossing Facility

INTRODUCTION

Council has been receiving representations for safe crossing facilities across Brickmakers Drive close to the existing roundabout at its intersection with Christiansen Boulevard and Greenview Drive.

The existing roundabout was constructed before a subdivision south of Brickmakers Drive was developed. Therefore, the roundabout does not have gaps in the existing central island on its approaches to be used as pedestrian refuges.

Safe pedestrian crossing facilities are required and can be provided by a gap in the eastern splitter island allowing for a pedestrian refuge and constructing two pram ramps to connect footpaths on both sides, as shown in Attachment 4.1.

The Committee is requested to support the by a gap in the eastern splitter island allowing for a pedestrian refuge and constructing two pram ramps to connect footpaths on both sides, as shown in Attachment 4.1.

ASSESSMENT

The Brickmakers Drive/Christiansen Boulevard and Greenview Drive intersection has an existing roundabout which was constructed approximately 8 years ago as part of the adjoining subdivision. A layout of the existing intersection is as shown below.

The three intersecting roads are all collector roads and have the default urban speed limit of 50km/h.

As indicated above, the roundabout has splitter islands with gaps which acts as pedestrian refuges across three of its four approaches. The request is for a pedestrian crossing facility to be provided across the fourth approach, that is the eastern approach along Brickmakers Drive.

The requested pedestrian crossing facility would not meet the warrant for a marked pedestrian crossing (which requires 500 vehicles and 30 pedestrian movements over three hours). The appropriate facility that can be provided is for a gap to be provided across this road section.

Such a facility can be provided, and a design has been carried out, in accordance with TfNSW Road Design Guide as shown in Attachment 4.1 and is recommended.

RECCOMENDATION

That:

The Committee supports the proposed construction of a gap through the eastern splitter island at the Brickmakers Drive/Christiansen Boulevard/Greenview Drive roundabout, to act as a pedestrian refuge as shown in Attachment 4.1.

COMMITTEE DISCUSSION

The Committee endorsed the construction of a gap through the eastern splitter island at the Brickmakers Drive/Christiansen Boulevard/Greenview Drive roundabout, to act as a pedestrian refuge as shown in Attachment 4.1.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Proposed construction of a gap through the eastern splitter island at the Brickmakers Drive/Christiansen Boulevard/Greenview Drive roundabout, to act as a pedestrian refuge as shown in Attachment 4.1.

ITEM 6	Mannow Avenue, West Hoxton – Proposed Line Marking

INTRODUCTION

Council has received representations for the section of Mannow Avenue, west of Carmichael Drive to be line marked to demarcate opposing traffic movements and improve traffic lane discipline and road safety.

Mannow Avenue is a residential collector road approximately 760m long. The eastern road section, as an approach to its intersection with Cowpasture Road, has been line marked, whilst the remaining 620m is not line marked. The unmarked road section has carriageway width of between approximately 7.2-7.4m.

In accordance with its road function and carriageway width, the unmarked section is proposed to be marked with separation lines to demarcate opposing traffic movements. A layout is the proposed line marking is shown in as shown in Attachment 5.1-5.5.

The Committee is requested to support the separation signs and line marking scheme as shown in Attachment 5.1-5.5.

ASSESSMENT

As indicated above, Mannow Avenue is a collector road providing direct access to adjoining residential properties and side streets. Council has received concerns about lane discipline and the need for line marking to separate and demarcate opposing traffic movements, along its section west of Carmichael Drive.

The road section is as shown below:

The road section has two existing two roundabouts and two central islands. In accordance with its road function and carriageway width, to address the about lane discipline, the unmarked road section is proposed to be line marked with separation lines, including double barrier lines close to the existing roundabouts and central islands, to demarcate opposing traffic movements.

These arrangements would restrict on street parking in front properties very close to the roundabouts and central islands. The affected property owners would be notified before the line marking. A layout is the proposed line marking is shown in as shown in Attachment 5.1-5.5.

The line marking would demarcate opposing traffic movements, improve traffic lane discipline and road safety, and is recommended.

RECOMMENDATION

That:

The Committee supports the proposed separation signs and line marking scheme along the section of Mannow Avenue, west of Carmichael Drive, as shown in Attachment 5.1-5.5.

COMMITTEE DISCUSSION

The Committee endorsed the proposed separation signs and line marking scheme along the section of Mannow Avenue, west of Carmichael Drive, as shown in Attachment 5.1-5.5.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Proposed separation signs and line marking scheme along the section of Mannow Avenue, west of Carmichael Drive, as shown in Attachment 5.1-5.5.

ITEM 7	Fourth Avenue/Tenth Avenue, Road upgrade Austral – Proposed signs and linemarking scheme

INTRODUCTION

Development consent conditions for the expansion of St Anthony of Padua Catholic School includes road upgrades of the road sections of Eleventh Avenue, Fourth and Tenth Avenue fronting the school site, to accommodate the expected increased traffic volume, on-street parking and provide safe access to the school.

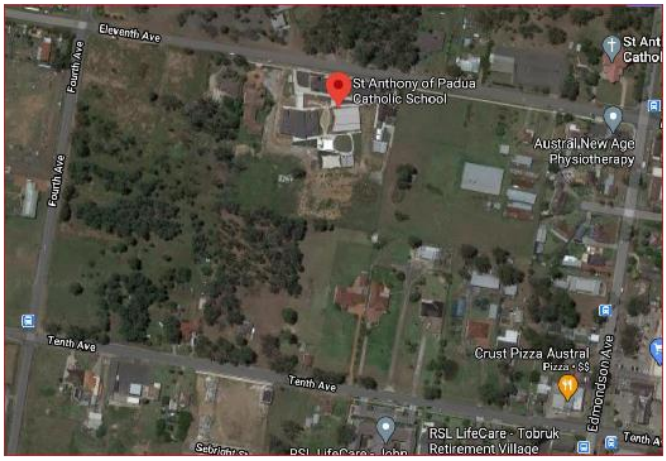
The required upgrade of Eleventh Avenue is underway. The School has submitted detailed designs of the required road upgrades including two roundabouts at the Fourth Avenue/Tenth Avenue and Fourth Avenue/ Eleventh Avenue intersections and associated signs and line marking scheme.

The Committee is requested to support the proposed road upgrades including two roundabouts at the Fourth Avenue/Tenth Avenue and Fourth Avenue/Eleventh Avenue intersections and associated signs and line marking scheme, as shown in Attachment 6.1-6.5.

ASSESSMENT

Department of Planning, Industry & Environment, (DPIE) has approved significant expansion of the St Anthony of Padua Catholic school to accommodate a future student population of approximately 2,400 primary and high school students.

As part of the development consent conditions (Ref. SSD-8865 check to No.), the school is required to upgrade and widen the road sections of Eleventh Avenue, Fourth Avenue and Tenth Avenue fronting the school site, to a 4-lane road. The school locality is as shown below.



The required road upgrade along Eleventh Avenue is currently underway.

The required road upgrades along Fourth Avenue and Tenth Avenue includes the following:

Fourth Avenue between Tenth Avenue and Eleventh Avenue to a 4-lane road and construction of a bus bay.

Road widening of the section of Tenth Avenue in front of the school.

Installation of two roundabouts at Fourth Avenue/Tenth Avenue and Fourth Avenue/ Eleventh Avenue intersections.

Fourth Avenue is a north-south collector road between Bringelly Road and Fifteenth Avenue. Whilst Tenth Avenue is an east-west collector road between Twenty Ninth Avenue and Kelly Street. Both roads are currently rural two-lane roads, under Council's care and control.

Detailed Designs

The school's project managers have submitted design drawings for the above required road works along Fourth Avenue and Tenth Avenue, the two roundabouts and associated signs and line marking scheme.

Design of the road upgrades, two roundabouts and associated signs and line marking scheme and swept path analysis have been carried out in accordance with Austroads and TfNSW Road Design Guide. The swept path analysis will be emailed to TfNSW for review.

RECOMMENDATION

That:

The Committee supports the proposed road upgrades along sections of Fourth Avenue and Tenth Avenue, two roundabouts at Fourth Avenue/Tenth Avenue and Fourth Avenue/ Eleventh Avenue intersections and associated signs and line marking scheme as shown in Attachment 6.1-6.5.

COMMITTEE DISCUSSION

The Committee discussed and endorsed the proposed road upgrades along sections of Fourth Avenue and Tenth Avenue, two roundabouts at Fourth Avenue/Tenth Avenue and Fourth Avenue/ Eleventh Avenue intersections and associated signs and line marking scheme as shown in Attachment 6.1-6.5.

On a related subject, CW advised that due to poor weather construction works along Eleventh Avenue has been delayed for about 4 weeks. Traffic controllers are being used in front of the school to minimise traffic delays. There is adequate consultation with the school community on the progress of the construction works.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Road upgrades along sections of Fourth Avenue and Tenth Avenue, two roundabouts at Fourth Avenue/Tenth Avenue and Fourth Avenue/ Eleventh Avenue intersections and associated signs and line marking scheme as shown in Attachment 6.1-6.5.

ITEM 8	New Subdivisions – Proposed signs and linemarking schemes

INTRODUCTION

The development consent for the following two subdivisions into residential lots requires construction of new roads, along with associated signs and line marking scheme.

225-235 Eighth Avenue, Austral and 240 Sixth Avenue, Austral.

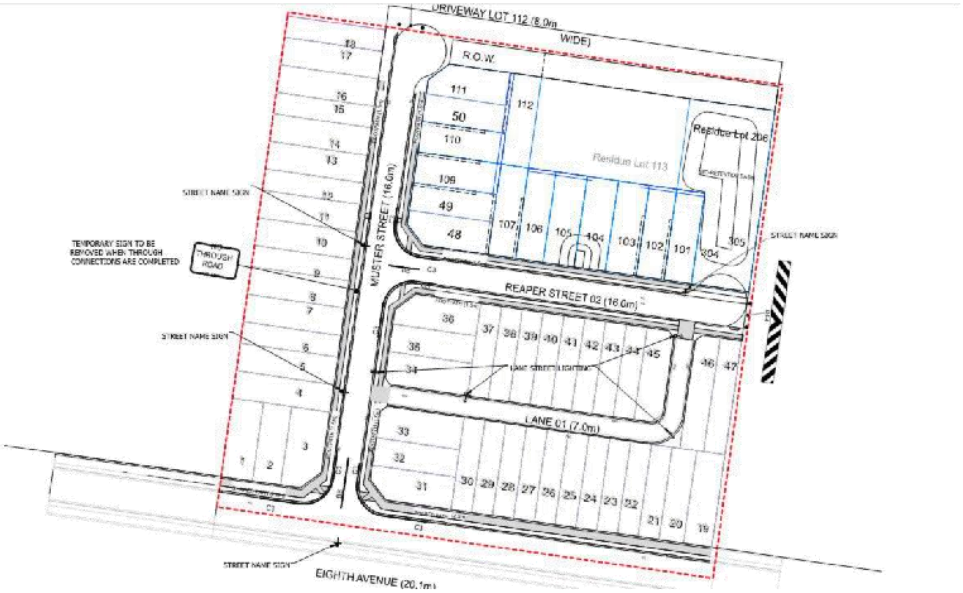
The developers have submitted design drawings of the new roads and associated signs and linemarking schemes as shown in Attachment 7.1-7.2. The Committee is requested to support the proposed signs and linemarking schemes.

ASSESSMENT

The subdivision of the above-mentioned development sites requires construction of the following roads:

CCE-9/2020 - 225-235 Eighth Avenue, Austral - DA 72/2018 & DA 304/2018

The subdivision of this development site requires the construction of two new roads and a laneway as shown below.

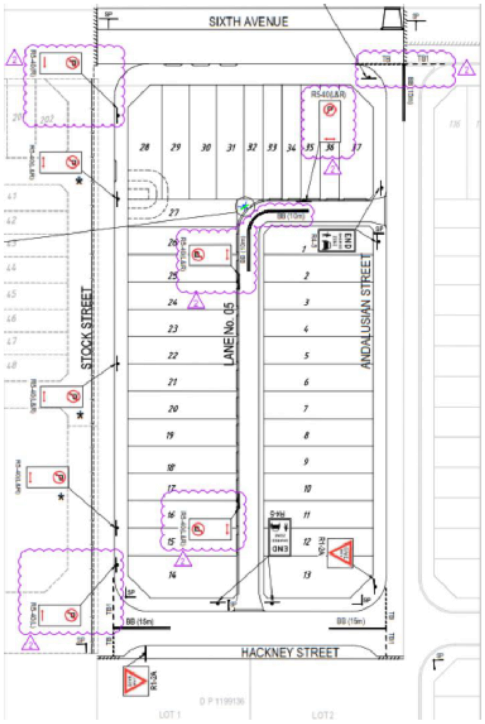


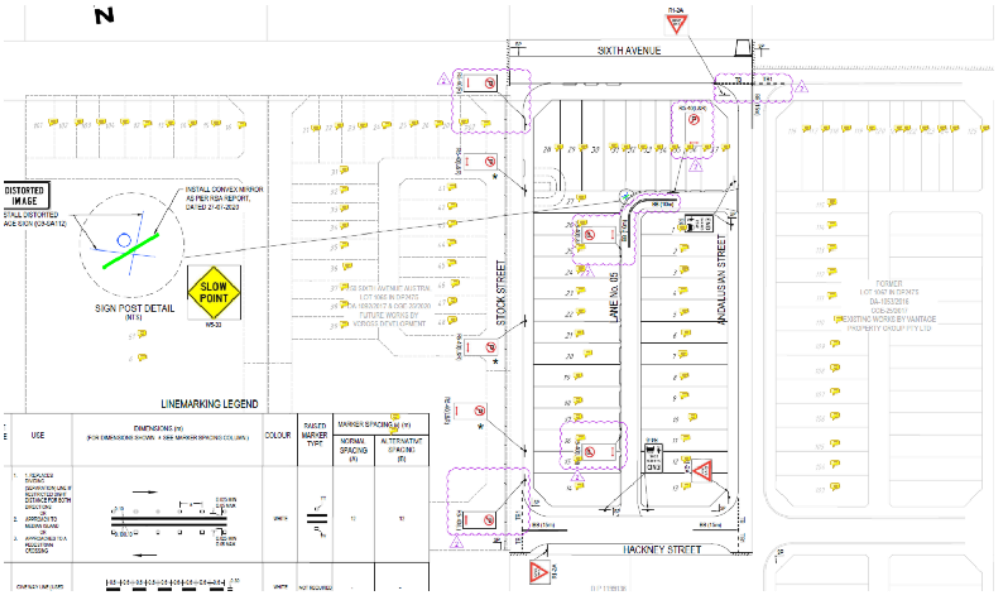
As indicated above, the new roads would create two T-intersections and a cul-de-sac. The two T-intersections are proposed to be linemarked with the required T-intersection treatments involving BB-linemarking and C3 yellow linemarking.

To prevent parking and permit U-turn movements the end of the cul-de-sac needs 'No Stopping' signs. In addition, to permit traffic flow including garbage collection, 'No Stopping' signs are proposed on both sides of the laneway.

CCE-32/2020 - 240 Sixth Avenue, Austral

The subdivision of this development site requires the construction of two new roads and a laneway as shown below.





As indicated above, the subdivision would construct the following new roads: Stock Street (half-road), Hackney Street and an unnamed laneway. The road layout would result in the following intersections:

Hackney Street/Andalusian Street - Four-way intersection.
Hackney Street/Stock Street - Four-way intersection.
Stock Street/Sixth Avenue – T-intersection.
Laneway intersections to Hackney Street and Andalusian Street.

The four-way intersection approaches within the subdivision are proposed to be linemarked with double-barrier lines and the required 'Give-Way' signs. The T-intersection is also proposed to be linemarked with BB line and C3 yellow linemarking.

RECOMMENDATION

That:

The Committee supports the signs and linemarking at the intersection of Eighth Avenue and Muster Street as shown in Attachment 7.1.

The Committee supports the signs and linemarking at the intersections of Stock Street (half-road), Hackney Street and an unnamed laneway as shown in Attachment 7.2.

COMMITTEE DISCUSSION

The Committee discussed and endorsed the signs and linemarking scheme as shown in the Attachments 7.1-7.2.

On a related subject, Clr Hagarty advised that he liaised with City Presentation in relation to the arrangement of the bins at the residential properties.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Signs and linemarking at the intersection of Eighth Avenue and Muster Street as shown in Attachment 7.1.
- Signs and linemarking at the intersections of Stock Street (half-road), Hackney Street and an unnamed laneway as shown in Attachment 7.2.

ITEM 9	Hume Highway, Liverpool – Proposed Shared Path

INTRODUCTION

As part of Council's Bike Plan, Council is proposing to construct shared path lanes along sections of Hume Highway, between Casula Road and Liverpool CBD.

Council has prepared design drawing of the shared paths, in accordance with TfNSW design Guide, as shown in Attachment 8.1 to 8.2.

The Committee is requested to consider and support the proposed signs and line marking scheme for the proposed shared paths as shown in the attachment.

ASSESSMENT

Council's Bike Plan includes construction of shared path lanes along sections of Hume Highway, and this is to provide a safer alternative to cycling on adjacent roads and improve access for cyclists, pedestrians and other road users.

To date, shared paths have been constructed along the following road sections:

Stage	Road Section	Financial Year
1	Myall Road to Kurrajong Road, 615m long	16/17
2	Kurrajong Road to Old Kurrajong Rd, 365m long	17/18
3	Old Kurrajong Road to De Meyrick Ave, 600m long	18/19
4	De Meyrick Ave to M5 Motorway, 635m long	19/20

For this financial year, construction of a 2.5m shared path between the M5 Motorway and Reilly Street, approximately 455m is proposed.

Council has prepared design drawings of the shared path, in accordance with TfNSW Design Guide, as shown in Attachment 8.1 to 8.2.

As a related project, Council has prepared modifications to the signalised intersections at the Hume Highway, at its intersection with Riley Street, Old Kurrajong Road, Kurrajong Road, and the M5 Motorway. Council will submit these traffic signal modifications to TfNSW for review and approval. Council will also seek funding from TfNSW for approved modifications to be implemented.

RECOMMENDATION

That:

Committee supports proposed sign and line marking scheme for the proposed shared path as shown in Attachment 8.1 to 8.2.

COMMITTEE DISCUSSION

CW advised that Council has received funding from TfNSW under its active transport program for construction of the shared path. The Committee discussed and endorsed the construction of the shared path and the associated signs and linemarking scheme.

On a related subject, Clr Hagarty expressed concern about a recent pedestrian fatality and pedestrian safety along sections of the Hume Highway. He inquired whether there are arrangements to improve pedestrian safety such as installation of guard rails.

Council staff advised that the recent fatality occurred approximately 25m south of Casula Road. The Police is investigating the crash. TfNSW representative advised that the fatality will be discussed at an upcoming TfNSW fatal review meeting and Council will be advised of the outcome.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Sign and line marking scheme for the proposed shared path as shown in Attachment 8.1 to 8.2.

ITEM 10	Northumberland Street, Liverpool - Proposed Parking Restriction

INTRODUCTION

Council has received representations from Karimbla Constructions Services for installation of the following temporary traffic management scheme for 12 months to permit construction, of a high-rise development at 167 Northumberland Street, within the Liverpool CBD. The development assessment is currently underway, but consent has been issued for demolition of the existing structure.

The temporary traffic management involves the following:

Works Zone along the road section fronting the development site and at the rear along Laurantus Service Way.

Removal of existing 1P metered parking along the road section of Northumberland Street, installation of temporary No Stopping along the northern side of Laurantus Service Way.

The requested temporary traffic management scheme is considered appropriate and can be accommodated. Revised sign and marking for the temporary traffic management scheme is as shown in Attachment 9.1 to 9.2.

The Committee is requested to support the temporary traffic management scheme.

ASSESSMENT

Development consent has been issued for demolition of existing structures at a development site at 167 Northumberland Street and subsequent construction of a mixed-use development. Karimbla Constructions Services has been engaged to carry out demolition and subsequent construction. To permit safe construction vehicles movement, the Company has requested the above-mentioned temporary traffic management changes.

The two streets have the following configuration:

Northumberland Street: A north-south, northbound one-way street. The section between Moore Street and Elizabeth Street, close to the development site is approximately 260m long and has 11.80m carriageway width.

The road section has two traffic lanes and kerb-side metered 1P parking spaces on both sides. It attracts relatively high use of on-street parking.

Laurantus Service Way: One-way northbound local street, approximately 220m long and has variable carriageway width between 5m and 8.50m.

The requested temporary traffic management changes are necessary to permit construction including safe construction vehicle movements, of the approved high-rise development.

The proposed temporary traffic management changes would reduce on-street parking along sections of Northumberland Street and Laurantus Service Way adjacent to the development site. The local area has on street parking along other road sections and off-street parking in the nearby Bathurst Street and Liverpool Plaza car parks. The impact on available car parking would therefore not be significant.

However, adjoining affected property owners will be consulted and notified before implementation of the changes.

Similar temporary changes have been approved under delegated authority by the Police and TfNSW representatives, implemented and Council has not received objection to the changes.

RECOMMENDATION

That:

The Committee supports the proposed Works Zone along the section of Northumberland Street and No Stopping restrictions along Laurantus Service Way between 7am-6pm, MON-FRI, 8am-1pm SAT as shown in Attachment 9.1.

Advise all stake holders of Council's resolution.

COMMITTEE DISCUSSION

CW advised that parking spaces would need to be removed on both the eastern and western sides of the property, to accommodate the construction works and requested work zone for 12 months. The relevant fees for the work zone and loss of revenue for paid parking would apply.

The Committee endorsed the proposed work zone as shown in Attachment 9.1

COMMITTEE RECOMMENDATION

That the Committee supports:

- Works Zone along the section of Northumberland Street and No Stopping restrictions along Laurantus Service Way between 7am-6pm, MON-FRI, 8am-1pm SAT as shown in Attachment 9.1.
- Advise all stake holders of Council's resolution.

ITEM 11	ITEMS APPROVED UNDER DELEGATED AUTHORITY

INTRODUCTION

This item provides a summary of minor traffic facilities that have been approved under the Liverpool Pedestrian, Active Transport and Traffic Committee Delegated Authority by the RMS and Police representatives over the period, between 19 November 2020 and 3 February 2021.

Delegated Authority No.	Location	Description of Proposal
2020.036	Phillip Street and Kennedy Street and Kennedy and McLean Street, Liverpool	Installation of C3 No Stopping lines
2020.037	College Street, Liverpool	Swap car parking spaces with motorcycle spaces
2020.039	Laurantas Serviceway, Liverpool	Installation of 'No Stopping' signs
2020.040	Bigge Street, Liverpool	Installation of Works Zone
2020.041	George Laneway, Liverpool	Relocation of No Stopping
2021.001	Rocco Place, Green Valley	Installation Double White Barrier Lines
2021.002	Myall Road, Casula	Installation of No Parking

RECOMMENDATION

That:

The Committee considered and noted the above Delegated Authority applications approved by the NSW Police Force and RMS representatives over the period between 19 November 2020 and 3 February 2021.

COMMITTEE DISCUSSION

The Committee considered this item.

COMMITTEE RECOMMENDATION

That the Committee supports:

- Delegated Authority applications approved by the NSW Police Force and RMS representatives over the period between 19 November 2020 and 3 February 2021.

TECHNICAL DISCUSSION ITEMS

ITEM	LOCATION/ISSUE	REMARK
TD1	Regentville Drive, Elizabeth Hills	A Regentville Drive resident is organising for a petition to be presented to Council for traffic management changes along the street to improve road safety and reduce through traffic. Council is yet to receive the petition, but the previous issues raised includes: Request for Installation of traffic calming devices Minimise traffic and noise in the area by removing speed cushions Investigate heavy vehicles accessing residential areas Re-diversion of traffic from the residential area by consideration of: a. Making Regentville Drive a one-way street b. Closing entry to Elizabeth Hills from Aviation Drive c. Widening Cowpasture Road to avoid drivers using the back streets of Elizabeth Hills as a shortcut. Council is carrying out additional speed classification (after the school holidays) to provide indication of current traffic and speed profile. Once the petition is received, the traffic count information will be used to assess whether changes needs to be made to the existing traffic arrangements and reported to a future committee meeting. Once the petition is received, a report will be presented to a future committee meeting on possible traffic management changes in the local area. It was noted that construction activities in the local area could increase traffic flow/speeding along Regentville Drive.

TD2	Hume Highway, Casula – Arrangements for improved pedestrian safety	On 7 January 2021, a fatal crash involving a single vehicle running into a pedestrian on the footpath It has been reported that a teenager was struck at about 12.30pm on the Hume Highway at Casula. The driver was uninjured and has been charged following mandatory testing. The Committee is requested to discuss possible arrangements/treatments to improve pedestrian safety along the Hume Highway. This item was discussed earlier in the meeting under item 9.
TD3	Traffic Counts - December 2020	Traffic counts that were undertaken in December 2020 Where the 85 percentile speeds are close to or higher than 60km/h, traffic calming devices will be considered and reported the committee for further discussion. Alternatively, the Police will be requested to carry out enforcement.

Traffic Count Summaries – Conducted December 2020

Street Name	**50th Percentile Speed**	**85th Percentile**	**7 Day AADT and % Heavy Vehicles (7-day average)**	**Comments/Recommendations**
Christiansen Boulevarde, Moorebank - Midblock between Maddecks Ave & Sims St (outside house #66)	51	59	2964 Med 5.7%	With the speed profile less than 60km/h, the police is requested to continue with speed enforcement rather than installation of a physical device at this stage.
Christiansen Boulevarde, Moorebank - Midblock between Bradbury St & Brickmakers Dr (outside house #31)	53	61	2793 Med 4.7%	With the speed profile greater than 60km/h, appropriate location to be identified for the installation of a speed hump. The investigation is to be presented to the committee at a future meeting.
Ardennes Drive, Edmondson Park - Midblock between Moscow Rd & Okinawa Rd (outside house #57)	52	60	2403 Med 3.4%	With the speed profile of 60km/h, the police is requested to continue with speed enforcement rather than installation of a physical device at this stage.
Talana Hill Drive, Edmondson Park - Midblock between Jardine Dr & Kimberley Dr (outside house #40)	48	58	1889 Med 3.0%	With the speed profile less than 60km/h, the police is requested to continue with speed enforcement rather than installation of a physical device at this stage.

Webster Rd, Lurnea - Midblock between Hoxton Park Rd & Reilly St (outside house #47)	47	56	6282 Med 2.1%	With the speed profile less than 60km/h, the police is requested to continue with speed enforcement rather than installation of a physical device at this stage.
Webster Rd, Lurnea - Midblock between Wonga Rd & Graham Ave (outside house #103)	47	57	5136 Med 2.4%	With the speed profile less than 60km/h, the police is requested to continue with speed enforcement rather than installation of a physical device at this stage.

GENERAL BUSINESS ITEMS

ITEM	LOCATION/ISSUE	REMARK
GB1	Rossmore Avenue (West) – Proposed No Stopping Restrictions	A property owner close to Bellfield college has raised concern about on-street parking close to the property driveway. The property is a construction depot and therefore needs to permit heavy vehicle movements. The property owner has therefore requested parking restrictions for 14m of "No stopping" signs to be installed across both driveways and also "No stopping" signs opposite their driveways, outside Bellfield College. Council has investigated the driveway access issues and is recommending "No Stopping" restrictions, approximately 7m on either side of both existing driveways. Application has been submitted under delegated authority for approval. The school has been informed about this matter. The resident had requested for the removal of parking opposite the school and was advised by Council that this is unfavourable. Heavy vehicle movements should be considered, however, not during school peak hours.
GB2	Hammondville Shops – Request for pedestrian crossing facility across Norman Avenue, Hammondville	Council has received representation from the Member of Holsworthy concerning pedestrian safety across the section of Norman Avenue near its intersection with Walder Road with a request for a pedestrian crossing close to the Hammondville shops carpark entry.

		The local member has been advised that Council will investigate whether a crossing facility can be installed on Norman Avenue. The investigation is expected to be completed for presentation to the March traffic committee meeting. The Committee noted this item.
GB3	Bardia Parade, Holsworthy - Speeding concern	Council has received representation from the Member of Holsworthy concerning traffic speed along Bardia Parade with a request for traffic calming measures to address this concern. Council is investigating whether the existing road reserve can accommodate a raised threshold to be installed towards the roundabout approach on Bardia Parade between Huon Crescent and Mivo Street. The investigation is expected to be completed for presentation to the March traffic committee meeting. Council carry out required investigation during the school term.
GB4	3-5 & 7-9 Atkinson Street, Liverpool - Request for no stopping signs opposite their driveways to cater for safe exit and entry movements.	The request for parking restriction is being investigated in consultation with the Strata Manager. If the parking restriction can be accommodated, an application will be submitted to the Police and Transport for NSW (TfNSW) under delegated authority for the requested parking restrictions to be supported. The Committee noted this item.
GB5	Boundary Road - Request for change to bus route 866 and stop	Council has received representation from the Member of Holsworthy requesting that bus route 866 be changed and for the bus stop at the corner of Boundary Road to be relocated. Interline Bus Services operates bus route 866. The requested bus route change and bus stop relocation has been referred to the bus company for consideration. Interline to advise whether the requested change can be implemented. The Committee noted this item.

GB6	Road work on Camden Valley Way and Ash Road, Prestons	Transport for NSW has a project to extend the current right turn lane on Camden Valley Way, into Ash Road from 50 metres to 170 metres. Works are proposed between Sunday 17 January and Friday 12 March. Submitted for information. Information on the project is attached. The Committee noted this item.
GB7	Disability Access to Wattle Grove Lakeside Park	Accessibility concerns were raised by a resident in Wattle Grove, regarding the lack of accessible parking to provide access to the footpath at Wattle Grove Lakeside Park. Currently, people in wheelchairs are required to cross the lawn and gutter to reach the footpath. Application will be submitted under delegated authority for approval of the requested mobility parking space. Design sketches will be prepared for Police and TfNSW to review. If supported, the parking restriction will be installed.
GB8	Decommission bus stop, San Marino Drive, Prestons	The Committee was advised that a request was received from Interline to decommission a bus stop that is located approximately 150 meters east of San Marino Drive. An existing bus stop in front of the college has been relocated and now the distance between the two stops is 118 meters. It was requested that the one further away from the school be decommissioned. The Committee supported the bus stop to be decommissioned.

GB9	Traffic, Saint Mark's Coptic Orthodox College, Australis Ave, Wattle Grove	The Local Member of Parliament for Holsworthy representative outlined a concern about traffic delays around St Marks College and requested arrangements to improve traffic flow. CW advised that the traffic delay was due to an arrangement implemented by the school at the first week of school re-opening that required parents to pick up their school children close to the school gates. This arrangement has since stopped, and traffic flow has improved. Council rangers and the Police have monitored traffic flow and enforced illegal parking where required. Council is talking to the school to ensure that the road occupation is completed, and that the College can talk to parents to have alternative locations for parking, rather than have all attendees park close to the school. Temporary measures will be put in place. The Police representative recommended traffic management changes near the shopping centre on village way to improve traffic flow.
GB10	Hoxton Park Road and First Avenue – Consideration of linemarking on the First Avenue approach	Clr Hagarty raised a concern that the two lanes approach along first avenue to the intersection needs to be demarcated to clarify the permissible turning movements. There is concern that some motorists are making right turn from the kerbside lane use which may lead to crashes. CW advised that advisory signs of "left lane must turn left" and "right lane must turn right" cannot be placed due to one of the lanes that allows motorists to drive straight. Pavement markings for the left lane to go straight and left will be considered, with the right turn reserved for the right lane in consultation with TfNSW.

GB11	Riley Street, Lurnea - Parking restriction request	Clr Hagarty on behalf of the Director of the childcare centre along Riley Street raised concern about safe entry and exit movements to and from the childcare centre and requested the need for parking restrictions to be investigated. CW advised that the issue will be investigated.
GB12	Wilson Road, Green Valley – Bus stop not moved	Clr Hagarty advised that the bus stop on Wilson Road near the Islamic College has not been moved. CW advised that the relocation will be carried out in the coming weeks.