NSW GOVERNMENT Planning & Infrastructure

PITTWATER COUNCIL

Warriewood Valley Strategic Review Report

Adopted 12 June 2013

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AMENDMENTS TO WARRIEWOOD VALLEY STRATEGIC REVIEW REPORT

Amendment no.	Date	Description	Status
1	17.11.2011	Draft Warriewood Valley Strategic Review Report provided to Steve Evans and Lindsay Dyce for review. Minor changes incorporated.	Draft – not adopted by Council
2	23.12.2011	Draft Warriewood Valley Strategic Review Report circulated to PCG. Minor changes incorporated.	Draft – not adopted by Council
3	9.3.2012	Draft Warriewood Valley Strategic Review Report amended to reflect issues regarding NSW flood evacuation policy. Publicly exhibited version (exhibited March - May 2012).	Publicly exhibited draft – not adopted by Council
4	21.11.2012	Final Draft Warriewood Valley Strategic Review Report amended as a result of submissions received during public exhibition.	Final draft – provided to General Manager and Director General to endorse
5	9.04.2013	Minor grammatical changes to improve readability.	Final draft
6	1.05.2013	Final Draft Warriewood Valley Strategic Review endorsed by Director General, Department of Planning & Infrastructure on 1 May 2013.	Final draft – endorsed by General Manager and Director General
7	12.06.2013	Warriewood Valley Strategic Review Report adopted by Council at meeting held 12 June 2013.	Adopted by Council

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Executive Summary

Photo by: Tija Stagni 2012

Chapter 1

1.0 Executive Summary

The Department of Planning and Infrastructure (the Department) and Pittwater Council (Council) have jointly prepared the Draft Warriewood Valley Strategic Review Report (the Strategic Review Report) for public consultation.

1.1 Background

The catalyst for this review was the Planning Assessment Commission's determination of the development at 14-18 Boondah Road under Part 3a of the *Environmental Planning and Assessment Act 1979*.

The PAC report called for "a comprehensive strategic study for all undeveloped land in the (Warriewood) Valley".

The Review covered Council's dwelling density and height control for Warriewood Valley, the current transport network and infrastructure demands. It also explores development opportunities for the Southern Buffer, including the potential for a mixed-use centre.

The Review relies on comprehensive environmental, social and economic data to ensure its outcomes provide for sustainable development. It also considered opportunities to provide additional and varied housing and an expanded centre in Warriewood Valley to respond to the directions of the *Draft North East Subregional Strategy*.

The Review re-examines the planning for Warriewood Valley expressed in the *Warriewood Valley Planning Framework 2010* (2010 Planning Framework).

1.2 The Review Process

1.2.1 Step 1 – Preliminary Review

A preliminary review of land parcels within Warriewood Valley, including 120 Mona Vale Road, identified undeveloped lands that should be investigated for their development potential.

The preliminary review found the following sectors did **not** warrant further investigation:

Sector ID	Property Address	Reason
102	185 Warriewood Road	Industrial land use designation - Already zoned 4(b)
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	Industrial land use designation - Already zoned 4(b)
104	3 Harris Street & 16 Apollo Street	Industrial land use designation - Already zoned 4(b)
105	15 Jubilee Avenue	Industrial land use designation - Already zoned 4(b)

201	4 Walana Crescent	Not identified as undeveloped in 2010 Planning Framework
202	14 Walana Crescent	Not identified as undeveloped in 2010 Planning Framework
203	3 Harrier Place	Not identified as undeveloped in 2010 Planning Framework
204	79 Cabbage Tree Road (*Aveo Peninsular Gardens Retirement Village*)	Not identified as undeveloped in 2010 Planning Framework
702	10 Jubilee Avenue	Portion of site designated Industrial as part of Sector 7 however majority of site not in 2010 Planning Framework. Still zoned 1(b) – not zoned with majority of Sector 7 lands now under development.
802	5 Forest Road (Mater Maria School)	Not identified as undeveloped in 2010 Planning Framework
10C	194 Garden Street (Seaview Assisted Living Apartments)	Not identified as undeveloped in 2010 Planning Framework

These sectors will retain their current zoning and land use prescription under the 2010 Planning Framework. The onus will be on individual landowners to lodge a rezoning application to Council if they wish to change the current land use prescription.

1.2.2 Step 2 – Land Capability Assessment

A land capability assessment identified land with potential for intensification of development. This land would be subject to a dwelling density review based on the medium density range (25 dwellings per hectare to 60 dwellings per hectare) under *The Metropolitan Plan for Sydney 2036* (the Metropolitan Plan).

The land capability assessment considered environmental, economic and social characteristics that influence land use allocation decisions, such as biodiversity; topography; proximity to water courses, ridgelines, foreshores and waterbodies; cultural heritage; bushfire risks; geotechnical issues; coastal and estuarine processes; acid sulphate soils; reticulated sewer and water availability.

A Composite Capability Map identified the following residential sectors as having potential for intensification of development:

Sector ID	Property Address	Current Density
101	165-167 Warriewood Road (residue lot Sector 1)	15/Ha
301	20 Macpherson Street	25/Ha
302	18 Macpherson Street	25/Ha
303	16 Macpherson Street	25/Ha
501	4-8 Forest Road	25/Ha

801	23B Macpherson Street	25/Ha
901A to F	11,12 and 13 (Sector 8); 1,2,4,5,9 & 10 Fern Creek Road; 2,4,6,12 & 14 Orchard Street, 204 & 206 Garden Street, and Orchard St road reserve (2A, 4A, 6A & 8 Orchard Street)	25/Ha
10A.1	115 Orchard Street	15/Ha
10A.2	111, 111a & 113 Orchard Street	15/Ha
10B	109 Orchard Street	15/Ha
Buffer 1a	*Formally known as 61 Warriewood Road*	25/Ha (15m street frontage @10/Ha)
Buffer 1b	53 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1c	53a Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1d	53b Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1e	53c Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1f	49 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1g	45 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1h	43 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1i	41 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1j	31 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1k	29 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1l	23,25 & 27 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1m	2 Macpherson Street	0 (No allocation)
Buffer 2a	4 Macpherson Street	Design specific (max 20 dwellings)
Buffer 3b	5 & 7 Macpherson Street	25/Ha

The Southern Buffer was also identified for further investigation.

As the land capability assessment showed that the following sector has significant environmental constraints, it was precluded from further consideration under this Review:

Sector ID	Property Address	Reason
120 MV	120 Mona Vale Road	Significant environmental constraints.

1.2.3 Step 3 – Detailed Investigation

Further detailed investigation then determined appropriate levels of development for the sectors identified at Step 2.

Independent consultant studies on hydrology, urban design, strategic transport and economic feasibility were commissioned to provide sufficient information to determine the recommended density applied to specific residential sectors. The studies also informed the development opportunities and constraints that produced the Concept Plan and design principles for the Southern Buffer.

Hydrology Study Outcomes

The Warriewood Valley Strategic Review Hydrology Study detailed the extent of flooding over Warriewood Valley in both the 1% AEP and the Probable Maximum Flood (PMF) event. The Hydrology Study categorised land as follows:

- Sectors unaffected by flooding
- Sectors affected by flooding only to an extent that could be addressed through onsite works as part of future development and which are provided with flood free access during both the 1% AEP and PMF event
- Sectors affected by flooding only to an extent that could be addressed through onsite works as part of future development and which are not currently or planned to be provided with flood free access up to the PMF event
- Sectors so affected by flooding they are not suitable for intensified development.

The Hydrology Study also determined the level of development potential in the Southern Buffer area.

The Hydrology Study identified the following sectors as unsuitable for intensified development due to the flood depth and flow characteristics.

Sector ID	Property Address	Reason
Buffer 1M	2 Macpherson Street	Significant flood constraints

The outcomes of the Hydrology Study are incorporated into Table A and B.

Urban Design Study Outcomes

The Warriewood Valley Urban Design Study took into account each individual residential sector's environmental attributes and locational context and proposes a built form for each sector. Options for development of a mixed-use centre and design principles were also prepared for the Southern Buffer.

The outcomes of the Urban Design Study are incorporated into Table A and Table B.

Transport Study Outcomes

The Warriewood Valley Strategic Transport Study detailed the traffic impacts of various development scenarios for the undeveloped residential land and the Southern Buffer. The Strategic Transport Study found most key intersections would continue to operate at acceptable levels of service in the am and the pm peaks. Mitigation works would be required at certain intersections for some development scenarios.

The outcomes of the Transport Study are incorporated into Table A and B.

Economic Feasibility Study Outcomes

The Warriewood Valley Strategic Review Economic Feasibility Study tested the feasibility of several residential development scenarios. The Economic Feasibility Study found small-lot housing and townhouses can be viable when the minimum density is set at 30-35 dwellings per hectare. While it found that apartment buildings would only be economically viable at minimum densities of 60 dwellings per hectare, this level and form of development is generally much greater than that recommended in the Warriewood Valley Urban Design Study.

The Economic Feasibility Study considered the feasibility of various development scenarios based on Hydrology Study outcomes for a mixed-use centre in the Southern Buffer. It found that a single level subregional shopping centre would be the most economically viable option.

The outcomes of the Economic Feasibility Study are incorporated into Table A and B.

1.3 Public exhibition of Draft Warriewood Valley Strategic Review Report

The Draft Warriewood Valley Strategic Review Report and consultant studies were exhibited for a period of 8 weeks between 24 March 2012 and 18 May 2012. During this time a community briefing session was held.

In additional to the community briefing session, members of the PCG met with specific landowner groups during the exhibition period. After the exhibition the PCG members met with the Local Member and the Warriewood Residents Association.

Submissions were received through a number of formats, including formal written submissions, written and online comment forms, an online mapping tool and other various social media forums. During the exhibition period over 350 submissions were received. Opportunity was given for information supporting original submissions to be provided until 1 June 2012.

A report entitled “Analysis of Submissions to Warriewood Valley Strategic Review” was prepared in response to submissions received and accompanies the final Strategic Review Report. The submissions received during the exhibition period have been taken into account in finalising the Warriewood Valley Strategic Review Report.

1.4 Recommendations for Residential Densities

- That the residential densities proposed in Tables A and B, resulting in additional 193 dwellings, be adopted.

- That Sectors 901D, 901E, 901G, 901H, 10A.1 and 10A.2 have been identified with no significant capacity for development. Landowners may seek to bring forward a rezoning application, supported by the necessary studies, demonstrating how sustainable development is to be achieved.

Tables A and B below summarise the recommendations made for individual sectors, and compare the recommended density and yield to that prescribed under the Warriewood Valley Planning Framework 2010. The tables below also identify the sectors determined to have safe access for evacuation in a PMF event, and a recommend a forward path for each sector.

Table A: Recommendation for sectors identified for increased density subject to resolution of flood emergency response policy issue

Sector ID	Property Address	2010 Density	New Density*	2010 Yield	New Yield	Additional Dwellings	Ability to evacuate in PMF + climate change	Recommended Forward Path
101	165-167 Warriewood Rd	15/Ha+	26/Ha	1	4	3	YES	Progress rezoning
301	20 Macpherson St	25/Ha	32/Ha	42	53	11	NO	Progress rezoning++
302	18 Macpherson St	25/Ha	32/Ha	66	84	18	NO	Progress rezoning ++
303	16 Macpherson St	25/Ha	32/Ha	23	29	6	NO	Progress rezoning ++
501	4 & 8 Forest Rd	25/Ha+	32/Ha	75	94**	19	NO	Progress rezoning ++
801	23B Macpherson St	25/Ha	32/Ha	19	38***	19	NO	Progress rezoning ++ May commence construction based on development consent***
901	***See Separate Table***+++	25/Ha+	*Various*	245	264	19	NO	***See Separate Table***+++
10A.1	115 Orchard Street	15/Ha+	*No density allocated***	8	*0*	*-8*	NO	Landowner may seek rezoning. Await outcome of determination++
10A.2	111,111a & 113 Orchard St	15/Ha+	*No density allocated***	6	*0*	*-6*	NO	Landowner may seek rezoning. Await outcome of determination++

**Density calculated on the developable area (site area minus are as identified environmentally sensitive*
+Density achieved across the whole sector rather than on individual land parcels
***Incorrect total (99 dwellings) shown in Exhibited Report and Urban Design Study. Correct total 94 dwellings.*
++ Subject to State Government resolution of flood emergency response policy.
****Construction may be commenced under current Development Consent for 46 dwellings and Focal Neighbourhood Centre (approved under SEPP (Affordable Rental Housing))*
+++ Sector 901 – divided into sub-sectors as a result of environmental attributes.
*****No significant capacity for development.*

Table A: *Continued*

Sector ID	Property Address	2010 Density	New Density*	2010 Yield	New Yield	Additional Dwellings	Ability to evacuate in PMF + climate change	Recommended Forward Path
10B	109 Orchard St	15/Ha+	20/Ha	28	45	17	NO	Progress rezoning***
Buffer 1a	*Previously known as 61 Warriewood Rd*	25/Ha+	*No longer considered undeveloped***	17	*15 dwellings under construction*	*-2*	YES	No change to current density as construction commenced
Buffer 1b	53 Warriewood Rd	25/Ha+	32/Ha	17	24	7	YES	Progress rezoning
Buffer 1c	53a Warriewood Rd	25/Ha+	32/Ha	13	18	5	YES	Progress rezoning
Buffer 1d	53b Warriewood Rd	25/Ha+	32/Ha	1	1	0	YES	Progress rezoning
Buffer 1e	53c Warriewood Rd	25/Ha+	32/Ha	11	15	4	YES	Progress rezoning
Buffer 1f	49 Warriewood Rd	25/Ha+	32/Ha	14	21	7	YES	Progress rezoning
Buffer 1g	45 Warriewood Rd	25/Ha+	32/Ha	17	23	6	YES	Progress rezoning
Buffer 1h	43 Warriewood Rd	25/Ha+	32/Ha	1	1	0	YES	Progress rezoning
Buffer 1i	41 Warriewood Rd	25/Ha+	32/Ha	27	39	12	YES	Progress rezoning
Buffer 1j	31 Warriewood Rd	25/Ha+	32/Ha	26	40	14	YES	Progress rezoning
Buffer 1k	29 Warriewood Rd	25/Ha+	32/Ha	14	21	7	YES	Progress rezoning
Buffer 1l	23,25 & 27 Warriewood Rd	25/Ha+	32/Ha	43	67	24	YES	Progress rezoning
Buffer 2a	4 Macpherson St	*Site specific design*	22/Ha	20	29	9	NO	Progress rezoning***
Buffer 3b	5 & 7 Macpherson St	25/Ha++	32/Ha	7	9	2	NO	Progress rezoning***
					TOTAL ADDITIONAL DWELLINGS	**193**		

**Density calculated on the developable area (site area minus are as identified environmentally sensitive*
+Density calculated on individual parcel basis, with the first 15m fronting the street at 10/Ha and remainder at 25/Ha.
***Sector no longer considered undeveloped. Development substantially commenced onsite in 2011/2012.*
++Density achieved across the whole sector rather than on individual land parcels
**** Subject to State Government resolution of flood emergency response policy.*

Table B: Recommended Density for Sector 901 (as divided into sub-sectors) subject to resolution of flood emergency response policy issue

Sector ID	Property Address	2010 Density*	New Density	2010 Yield*	New Yield	Additional Dwellings	Ability to evacuate in PMF + climate change	Recommended Forward Path
901A	10 Fern Creek Rd, 2,4,6 Orchard St, Orchard St road reserve, Eastern side of Fern Creek Road, Lot 13 DP1092788	25/Ha	32/Ha	156 *(no yield on 9 Fern Creek Road)*	192 *(no yield on 9 Fern Creek Road)*	36	NO	Progress rezoning+
901B	2 Fern Creek Road	25/Ha	32/Ha	12	36	24	NO	Progress rezoning+
901C	Lot 12 Dp1092788 (Sector 8) west side of Fern Creek Road	25/Ha	32/Ha	17	22	5	NO	Progress rezoning+
901D	1 Fern Creek Rd	25/Ha	-	14	*0*	*-14*	NO	Landowner may seek rezoning+
901E	12 Orchard St (battleaxe portion only)	25/Ha	-	2	*0*	*-2*	NO	Landowner may seek rezoning+
901F	14 Orchard St (southern portion only)	25/Ha	10/Ha	14	14	0	NO	Progress rezoning+

**Density achieved across the whole sector rather than individual land parcels, with a 15m street frontage. Council staff have recognised that 25/ha is the maximum density able to be achieved; some subsectors can only achieve 10/ha while others can achieve 25/ha. The 2010 Framework total yield for Sector 9 was calculated on various parts of sector achieving densities between 10/Ha and 25/Ha.*

+Any rezoning application for these sectors subject to State Government resolution of flood emergency response policy.

Table B: *Continued*

Sector ID	Property Address	2010 Density*	New Density	2010 Yield*	New Yield	Additional Dwellings	Ability to evacuate in PMF + climate change	Recommended Forward Path
901G	Lot 11 DP1092788 (Sector 8) west side of Fern Creek Rd	25/Ha	-	16	*0*	*-16*	NO	Landowner may seek rezoning[+]
901H	4 & 5 Fern Creek Rd (northern portion only)	25/Ha	-	14	*0*	*-14*	NO	Landowner may seek rezoning[+]
			SECTOR 901 TOTAL	**245**	**264**	**19**		

**Density achieved across the whole sector rather than individual land parcels, with a 15m street frontage. Council staff have recognised that 25/ha is the maximum density able to be achieved; some subsectors can only achieve 10/ha while others can achieve 25/ha. The 2010 Framework total yield for Sector 9 was calculated on various parts of sector achieving densities between 10/Ha and 25/Ha.*

[+]Any rezoning application for these sectors subject to State Government resolution of flood emergency response policy.

1.5 Recommendations for Resolution of Flood Emergency Response Policy Issues

The Hydrology Study raised the issue of flood evacuation of Warriewood Valley in the event of a 1% AEP and PMF event. The NSW State Emergency Service (NSWSES) has indicated that it does not support development where a flood free evacuation route up to the PMF event is not available.

As a result of the NSWSES position, the Department is undertaking an intra-government study of flood evacuation management in NSW. These investigations are exploring the potential for a consistent approach with regard to flood evacuation in flash flood events, with respect to urban development in NSW.

The results of this study may be forthcoming in 2013. However, it should be noted that the timing and outcomes of these investigations will not delay the progress of any future planning proposals in the Warriewood Valley.

1.6 Recommendations for the Southern Buffer

It is recommended that the exhibited Concept Plan for a mixed-use centre not proceed.

Future planning investigation by landowners, either working individually or as a group must address the constraints and opportunities highlighted by this review, including the impact of any proposed development on the environmental, other centres, recreational lands and community expectations.

1.7 Recommendations for Provision of Infrastructure and Services

That any increase in dwelling yield across the Valley requiring additional infrastructure and facilities be supported by a new Section 94 Contributions Plan.

That any future review of infrastructure and service provision takes into consideration the recommendation of the Economic Feasibility Study that developer contribution rate should be set at $50,000 (indexed) per dwelling.

That any future development of the Southern Buffer require an infrastructure planning strategy and plan prepared concurrent with any rezoning.

1.8 Conclusion

The Strategic Review provided any opportunity to re-evaluate dwelling densities, infrastructure requirements and services/facilities in Warriewood Valley, and to examine the opportunities and constraints of the Southern Buffer.

The recommended dwelling densities of up to 32 dwellings per developable hectare is contingent on appropriate design criteria and infrastructure provision strategies.

The findings of the Review to reduce the Section 94 Contribution rate to accommodate development could impact infrastructure provision.

This Strategic Review Report, supported by the background land capability assessment approach and consultants' reports will ensure continuity for the Council, Department and the community.

A clear flood emergency response that is acceptable to the State government must be agreed prior to future rezoning of land that does not have evacuation routes clear of the PMF event. .

Warriewood Valley In Context

An award winning land release project, demonstrating an accessible and liveable community that values its ecologically significant setting

Photo by: Rod Smith 2009

Chapter 2

2.0 Warriewood Valley in Context

2.1 Locality

The Pittwater Local Government Area (LGA) is located on the northern fringe of the Sydney Metropolitan Area within the Warringah Peninsula. It encompasses around 109 square kilometres, including a large part of Ku-ring-gai Chase National Park, 18 square kilometres of waterways and 18 kilometres of ocean coastline including nine beaches.

Warriewood Valley, located in the southern portion of the Pittwater LGA, is bordered by the Pittwater escarpment in the west, Warriewood Wetlands to the south, Warriewood Sewerage Treatment Plant (STP) and Warriewood itself to the east, and Mona Vale to the north. The Valley is dissected by Narrabeen Creek and Fern Creek, running from the Warriewood escarpment in the north-west to the Warriewood Wetlands and Narrabeen Lagoon in the south-east.

The Warriewood Valley Release Area (the Release Area) is around 190 hectares. Founded mainly on Hawkesbury sandstone with alluvial soil on the valley floor, the Release Area was previously used for agricultural purposes and contained a diversity of vegetation. It has since been cleared; remnant areas of vegetation and regrowth sit along the watercourses and flood areas, particularly adjacent to the Wetlands.

The Release Area, (not including the Southern Buffer), has delivered urban housing of densities up to 25 dwellings per hectare, including attached and detached dwelling houses, terraces and townhouses, and multi-unit housing incorporating Torrens, Strata and Community titles. The Southern Buffer has been fully investigated for the first time as part of this review.

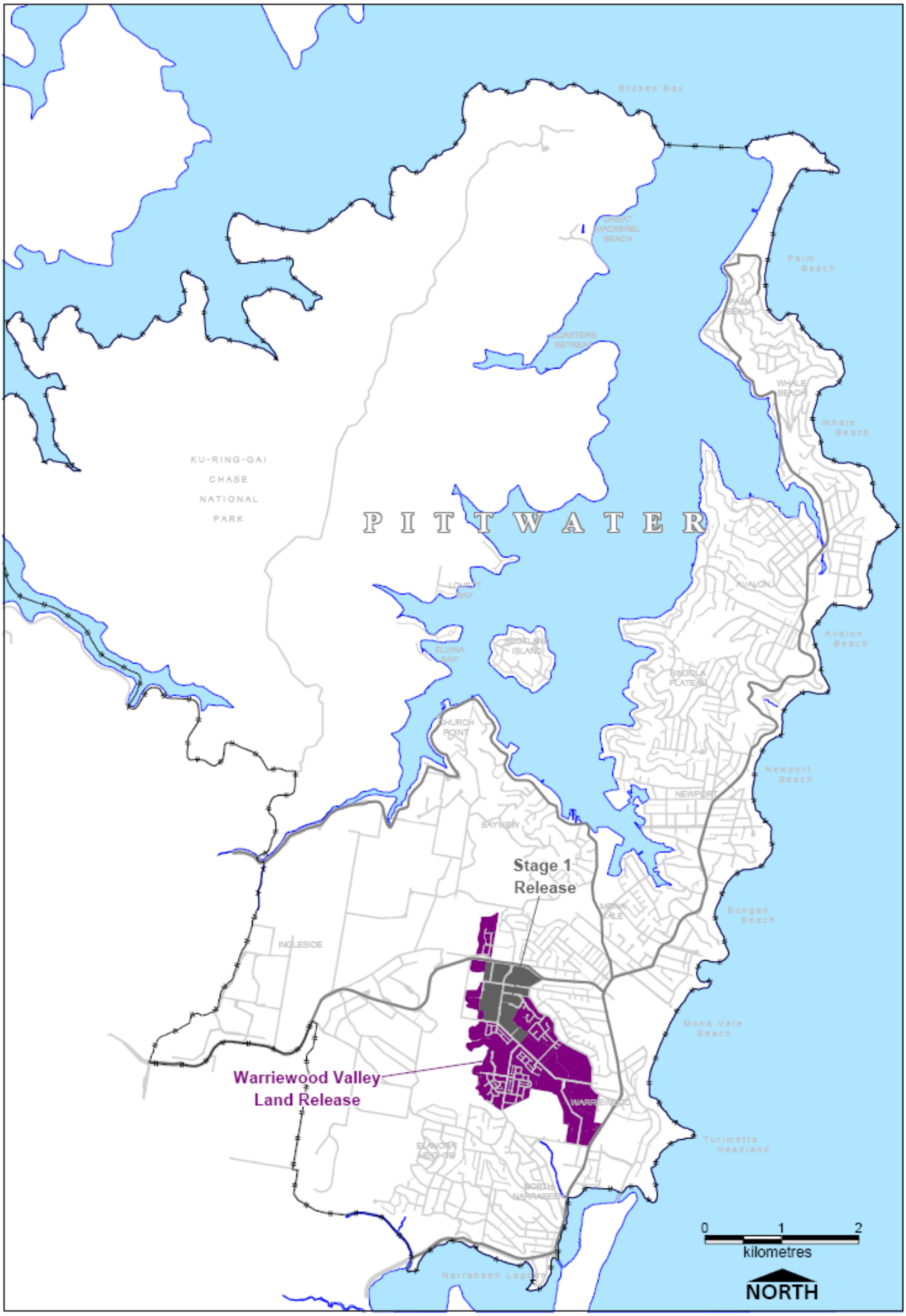
The Release Area includes 27 hectares of industrial/commercial land and associated community facilities and infrastructure. Industrial and commercial developments adjoin the existing light industrial and office business area of Warriewood.

A Focal Neighbourhood Centre has recently been approved on 23B Macpherson Street.

High quality buildings, designed and built at a scale and density complementary to the natural environment, preserve district and local views and enhance the bushland vista of Pittwater. Native canopy trees, vegetation and the natural creekline corridors merge the built form with the landform. Landscaping reinstates elements of the natural environment and contributes to the sense of place, creating an amenable, environmentally responsible and highly desirable place to live.

A history of development in Warriewood Valley is contained in Appendix 1.

Map 1: Warriewood Valley Land Release Location Map



2.2 The Community

In 2011 the population of the Pittwater local government area was 57,155. Pittwater's population has grown significantly over with last 10 years, primarily due to Pittwater's relatively high fertility rate (compared to the NSW average). Between 2001 and 2006 the population grew 3.4%, and between 2006 and 2011 grew 5.5%.[1]

Pittwater is more likely to attract families of older parents with children, rather than young couples with/without children or young singles. Most people moving to the area are 'up-graders', rather than first home buyers or renters. An increasing percentage of the population is over 60 years old, reflecting ageing in place of the long term residents. Housing is predominately family-sized detached dwellings. The proportion of medium and high density housing is at about half the rate of the Sydney average.

Warriewood Valley is identified as a moderate to high socio-economic area. Housing is more affordable than other areas of Pittwater. Comparatively, the Warriewood-Ingleside population comprises a greater proportion of children under 17 than the rest of Pittwater. The proportion of mature adults aged 65-85 is slightly lower than the rest of Pittwater, though the proportion of adults aged over 85 is the same.

[1] Australian Bureau of Statistics Census data, 2001-2011.

Why are we undertaking the Warriewood Valley Strategic Review?

Ensure the original aspirations are achieved through equitable, logical and sustainably sound planning decisions

Photo by: Amanda Clarke 2011

Chapter 3

3.0 Why are we undertaking the Warriewood Valley Strategic Review?

3.1 Decision of the Planning Assessment Commission (PAC)

In January 2011, the PAC approved a development at 14-18 Boondah Road under Part 3A of the *Environmental Planning and Assessment Act 1979* (the EP&A Act).

The PAC determination recommended Council and the Department review dwelling densities, height controls, the current transport network and necessary improvement works, and infrastructure demands in Warriewood Valley and surrounding area. The PAC recommended the review clarify the subregional role of Warriewood Square, how it relates to the rest of Warriewood Valley, the potential for higher density residential development and the opportunity for employment-generating developments adjacent to Warriewood Square.

The review was agreed in March 2011 between Council and the Department, with Council passing a resolution to commence the Strategic Review in collaboration with the Department in May 2011.

The review took into account existing planning strategies for the LGA and for Warriewood Valley itself.

3.2 *Pittwater Local Planning Strategy – Planning for Pittwater towards 2031*

Pittwater Local Planning Strategy – Planning for Pittwater towards 2031, adopted by Council in August 2011, is Council's primary land use planning document. The Local Planning Strategy:

a. Identifies Warriewood Valley as crucial to meet delivery of 4,600 new dwellings as required by the *Draft North East Subregional Strategy* and 5,740 new jobs as set out in the *SHOROC Regional Employment Study* within the LGA by 2031.

b. Identifies Warriewood Valley as the area with the most potential to provide affordable rental housing in Pittwater.

c. Recognises Warriewood Square as a 'stand-alone shopping centre', as defined under the *Metropolitan Plan for Sydney 2036* (the Metropolitan Plan).

   The Metropolitan Plan identifies the potential for existing stand-alone shopping centres to be converted to more traditional town centres over time. The Local Planning Strategy proposes the expansion of Warriewood Square and development of the Southern Buffer area into a larger retail and town centre, enabling a mix of commercial, retail and possibly residential development.

d. Reiterates that development of the Southern Buffer help meet Pittwater's employment target, especially with employment land in Warriewood Valley nearing capacity.

   The Southern Buffer is identified in the *Draft North East Subregional Strategy* and the *SHOROC Employment Study* as potential key employment land for Pittwater. The Local Planning Strategy supports investigation into a new retail

centre in the Southern Buffer adjoining Warriewood Square to meet Pittwater's employment targets.

The Local Planning Strategy recommends the outcomes of the Strategic Review be incorporated into Council's Standard Instrument Local Environmental Plan (LEP).

3.3 Moving from the Warriewood Valley Planning Framework 2010 to the Warriewood Valley Strategic Review 2012

The planning and development of Warriewood Valley will help deliver a sustainable residential community, the timely provision of infrastructure and services and the conservation and rehabilitation of significant environments. Both the 2010 Planning Framework and the 2012 Strategic Review establish a forward path for all undeveloped land in Warriewood Valley.

Specifically, the Strategic Review:

- Identified undeveloped land capable of potential increases in dwelling density and land unable to be developed beyond existing uses and densities due to existing environmental or development constraints
- Assessed the impact of increased density in terms of a new centre, the potential change in urban form of the area, the environmental constraints, including the Narrabeen Creek Sea Level Rise Investigation Area,[2] and the resultant needs of the local and wider population
- Assessed the scope of opportunity for a new mixed-use precinct in the Southern Buffer, comprising commercial, retail, civic and residential uses whilst enhancing a connected, open-space recreational precinct that complements adjoining land uses
- Identified issues relating to evacuation in major flood events.

Council had previously resolved to seek the provision of 10% of any increased density in Warriewood Valley be 'affordable rental housing'.[3]

The outcomes of the Strategic Review will inform provision of new or improved infrastructure and any consequent local development contributions plan or other funding arrangements.

Any undeveloped land excluded by the 2012 Strategic Review will be informed by the future resolution of Council.

[2] Council resolution of 7 February 2011 identified the Investigation Area.
[3] Council resolution of 21 February 2011.

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Strategic Framework

Meeting expectations and targets that integrate sustainability in future land use planning decisions in Pittwater

Photo by: Amanda Clarke 2011

Chapter 4

4.0 Strategic Framework

4.1 *NSW 2021: A plan to make NSW number one*

NSW 2021: A plan to make NSW number one is the government's strategic business plan, which sets the priorities for action by the government. One of the principal goals of the plan is to place downward pressure on the cost of living.

The government intends to work towards this goal by increasing the supply of land for housing and by providing incentives to help make housing in NSW more affordable and housing stock more appropriate for people's needs.

As well, the government intends to continue to set dwelling targets for local councils and partner with local councils to ensure that targets for housing and growth are reflected in relevant planning proposals and in local planning instruments.

4.2 *The Metropolitan Plan for Sydney 2036*

The Metropolitan Plan aims to integrate land use planning and transport planning across the city to provide a framework for sustainable growth and development.

The Metropolitan Plan was prepared with the vision that, by 2036, Sydney will be a more compact, networked city with improved accessibility, capable of supporting more jobs, homes and lifestyle opportunities within the existing urban footprint.

By 2036, the population of Sydney is expected to grow by 1.7 million people to almost 6 million people. During this time, it is also expected that the average household size in Sydney will fall from 2.6 to 2.5 people. As a result, Sydney will need an additional 770,000 homes by 2036.

In response to this expected population growth, the housing related actions in the Metropolitan Plan seek to deliver well-located housing that will meet the needs of the growing, aging population and that will assist in addressing the issue of housing affordability across the city.

A key action of the Metropolitan Plan is to locate 80% of new housing within walking distance of existing or planned centres. Focusing new housing in and around centres can increase the diversity of housing supply, encourages more trips to be made by public transport or by foot and bicycle and can increase the customer base for local businesses.

Another key action of the Metropolitan Plan is to plan for centres to grow and change over time. According to the Metropolitan Plan, the main criteria for identifying such centres should be:

- Current and proposed level of public transport capacity and access
- Economic feasibility of development
- Land ownership patterns
- Proximity of services and facilities.

A new metropolitan strategy is currently being development for Sydney. It will provide a framework for Sydney's growth to help plan for housing, employment, transport, infrastructure, the environment and open space.

The strategy will update the current Metropolitan Plan for Sydney and link it to the government's other long term plans – the Long Term Transport Masterplan and the State Infrastructure Strategy.

4.3 Subregional Dwelling and Employment Targets

The *Draft North East Subregional Strategy* was prepared by the Department of Planning in 2007. It contains targets for housing and employment to 2031 in response to the forecast growth of Sydney contained in the *Sydney Metropolitan Strategy 2031 - City of Cities – A Plan for Sydney's Future*.

Under the *Draft North East Subregional Strategy*, the Pittwater LGA has a dwelling target of 4600 new homes and an employment target of 6000 new jobs.

Including the long term potential of the Ingleside Release Area and the capacity in existing urban areas, it is expected Council will be able to meet its current dwelling targets into the future. However, there is currently a lack of housing diversity in the Pittwater LGA compared to both the subregion and Sydney in general.

The breakdown of existing dwelling stock in the LGA is:

- Detached dwellings (80.4%)
- Villa/townhouse/dual occupancy (13.9%)
- Unit/apartment (5.7%).

By way of comparison, about 60% of dwellings are detached across Sydney.

Warriewood Valley immediately adjoins Warriewood Square, the strategic bus route along Pittwater Road and existing community facilities. In the context of the LGA, where land around existing centres is relatively constrained, Warriewood Valley offers one of a limited number of areas in the LGA where higher density, at an appropriate level, could be accommodated.

The key directions for housing in the *Draft North East Subregional Strategy* are to:

- Increase housing choice as part of the housing target
- Concentrate development and strengthen major centres, towns, villages, small villages and neighbourhoods
- Enable communities to 'age in place'.

By looking at the opportunity to provide additional and varied housing and an expanded centre in Warriewood Valley, the Strategic Review responds to the directions of the *Draft North East Subregional Strategy*.

4.4 Pittwater Council's Strategic Planning Documents

4.4.1 *Pittwater Local Planning Strategy – Planning for Pittwater towards 2031*

The Local Planning Strategy was adopted by Council on 15 August 2011 and will guide its land use planning and decision making into the future.

The Local Planning Strategy translates the aims and objectives of the government's current Metropolitan Plan and its earlier *Metropolitan Strategy*

for Sydney to 2031 into a range of local actions and targets relevant to Pittwater, including those for housing and employment. It forms the basis for the preparation of a new Standard Instrument LEP.

The Local Planning Strategy confirms that the housing targets designated for Pittwater can be accommodated primarily within Pittwater's established residential areas, including Warriewood Valley.

It recognises the limited housing stock available to meet the needs of Pittwater's ageing population and encourages the provision of new dwellings in a range of sizes, adaptable to universal design standards, including medium density housing and secondary dwellings.

It also recommends the provision of medium density dwellings in appropriately zoned locations, in close proximity to centres, transport options and services to assist in making housing available that is more affordable to local workers.

4.4.2 *Warriewood Valley Planning Framework 2010* (Adopted May 2010)

Warriewood Valley has been a significant source of new dwellings for the LGA for the past two decades. About half of the 2,000 dwellings expected for Warriewood Valley have been built. As envisaged by Council's planning frameworks, the residential sectors of Warriewood Valley have been developed predominantly with two-storey dwelling houses and attached townhouses, with some multi-unit housing.

In December 2009, Council reviewed the two planning frameworks that apply to Warriewood Valley and prepared the *Warriewood Valley Planning Framework 2010* (the 2010 Framework) that provides for a total of 2,012 dwellings in Warriewood Valley as well as setting aside approximately 27 hectares of land for industrial/commercial development. The maximum density allowed under the 2010 Framework is 25 dwellings per developable hectare.

This is the Council's current planning strategy document for the Warriewood Valley Release Area.

The Strategic Review Process

Photo by: Amanda Clarke 2011

Chapter 5

5.0 The Strategic Review Process

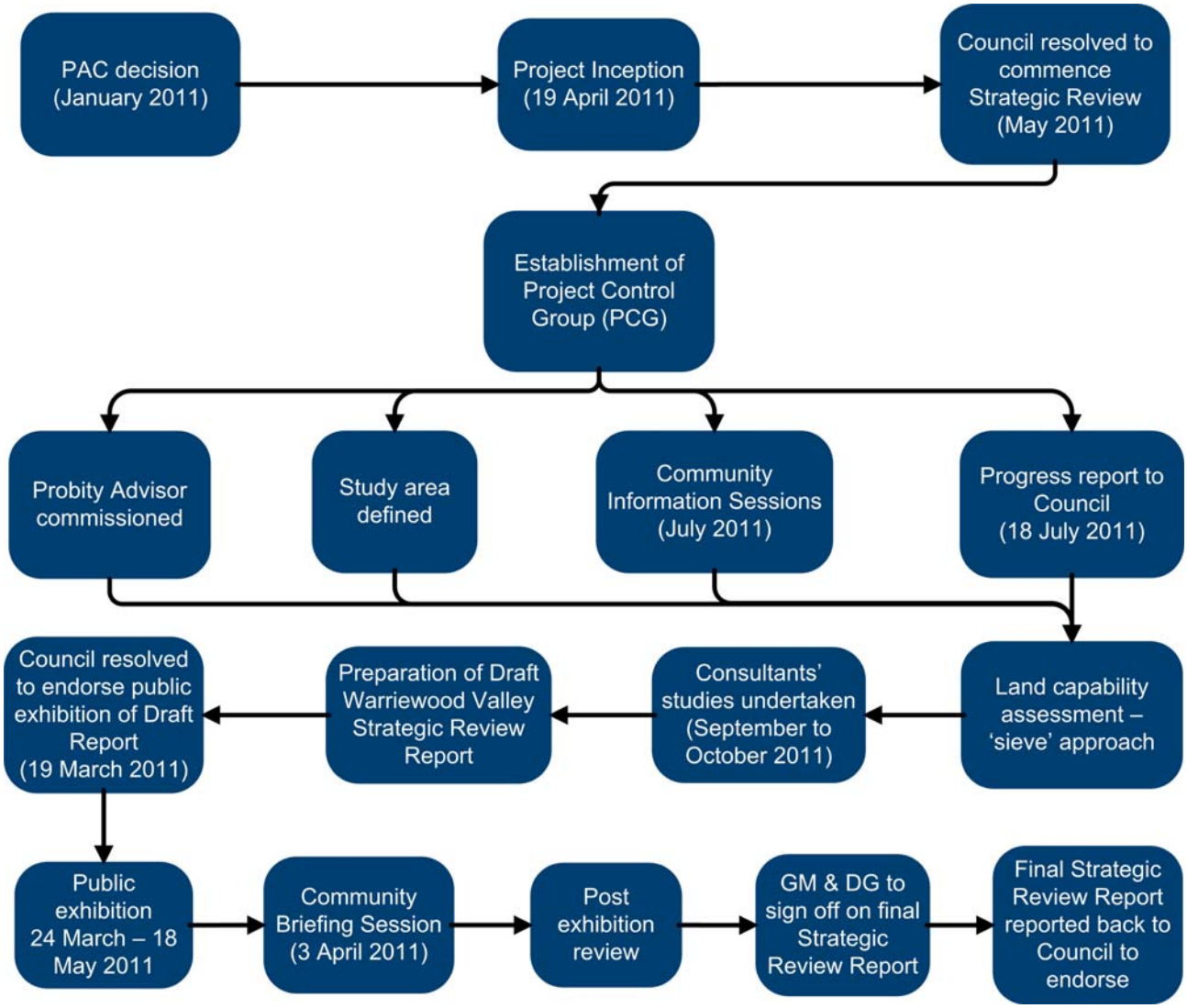
5.1 The Strategic Review Process

A Project Control Group (PCG) oversaw the Strategic Review.

Comprising senior officers from the Department (Sydney Region East and Project Delivery Unit) and Council, an independent probity advisor was also engaged to advise the PCG on probity issues relevant to undertaking the Strategic Review.

An overview of the key steps taken as part of the Strategic Review is depicted in Figure 1.

Figure 1: Warriewood Valley Strategic Review Process



5.2 Probity Issues

The PCG identified probity issues arising from the mixed ownership of land – Crown, Council and private – within the Warriewood Valley Release Area. The functions of the probity advisor were to ensure the integrity of the Strategic Review and prevent real and perceived conflicts of interest.

The role of the probity advisor included the following:

- Reviewing and providing advice on:
  - The proposed arrangements for commissioning the independent consultant studies.
  - The governance structure, protocols and approach to interacting with stakeholders.
- Preparing a Probity Plan which:
  - Identified any potential conflicts of interest and probity risks associated with the scope of the Strategic Review.
  - Clearly detailed the processes to be followed by Department and Council personnel and PCG members to avoid those identified conflicts of interest and probity risks.
  - Identified and articulated the roles and responsibilities for each PCG member.
- Attending certain PCG meetings and community information sessions, and reviewing and providing advice on key decisions and meeting minutes.

The probity advisor has audited the Strategic Review process, including preparation of the Strategic Review Report. The outcomes of the audit are in the Interim Probity Report, prepared to accompany the exhibition of the Draft Strategic Review Report. A final Probity Report has been prepared following the close of the exhibition period to accompany the final Strategic Review Report.

Both of the probity auditor's reports will outline the level of compliance with the Probity Plan and provide probity advice on implementing the outcomes of the Strategic Review.

5.3 Community Engagement

A Community Engagement Plan and Strategy was produced by Council and the Department for the Strategic Review, based on Council's Community Engagement Procedures.

The Community Engagement Strategy provided the PCG with the tools to:

- Adequately inform the community and stakeholders of the Strategic Review process, emphasising the collaborative nature of the partnership between Council and the Department.
- Ensure consistent information was provided to the community and stakeholders by Council and the Department through a joint approval process.
- Provide the community with balanced and objective information to assist them in understanding the reason for undertaking the Strategic Review and how the process was to be undertaken.
- Promote the independence and transparency of the Strategic Review.
- Provide stakeholders with readily accessible opportunities to provide comment during the Strategic Review.
- Ensure stakeholders were aware of the final outcomes of the Strategic Review.

The Community Engagement Plan and Strategy aimed to ensure that all stakeholders in the community were adequately informed and provided with opportunities to voice their opinions, whether affected directly or indirectly.

The Draft Warriewood Valley Strategic Review Report and consultant studies were exhibited for a period of 8 weeks between 24 March 2012 and 18 May 2012. During this time a community briefing session was held.

In addition to the community briefing session, members of the PCG met with specific landowner groups during the exhibition period. After the exhibition the PCG members met with the Local Member and the Warriewood Residents Association.

Submissions were received through a number of formats, including formal written submissions, written and online comment forms, an online mapping tool and other various social media forums. During the exhibition period over 350 submissions were received. Opportunity was given for information supporting original submissions to be provided until 1 June 2012.

Each submission was reviewed, collated and subsequently addressed in the Analysis of Submissions to the Warriewood Valley Strategic Review Report, which was prepared to accompany the final Strategic Review Report. The submissions received during the exhibition period have been taken into account in finalising the Warriewood Valley Strategic Review Report.

5.4 Identifying the land to be reviewed

The PAC's determination report advocated for a *'…comprehensive study of all undeveloped sites in the Valley including the future role of Warriewood Centre and the development potential around the centre…'*.

A desktop review of the land within Warriewood Valley has been conducted to identify 'undeveloped' land, based on:

- Land identified in the *Warriewood Valley Urban Land Release Revised Sectors Map* at Figure 5 of the 2010 Planning Framework; and
- Land within the original sectors of Warriewood Valley that had not been rezoned under Clause 30B of the Pittwater LEP 1993 in line with the 1997 and 2001 frameworks.

In line with a Council resolution on 18 September 2006, 120 Mona Vale Road was also included as 'undeveloped' for the purpose of the Strategic Review.

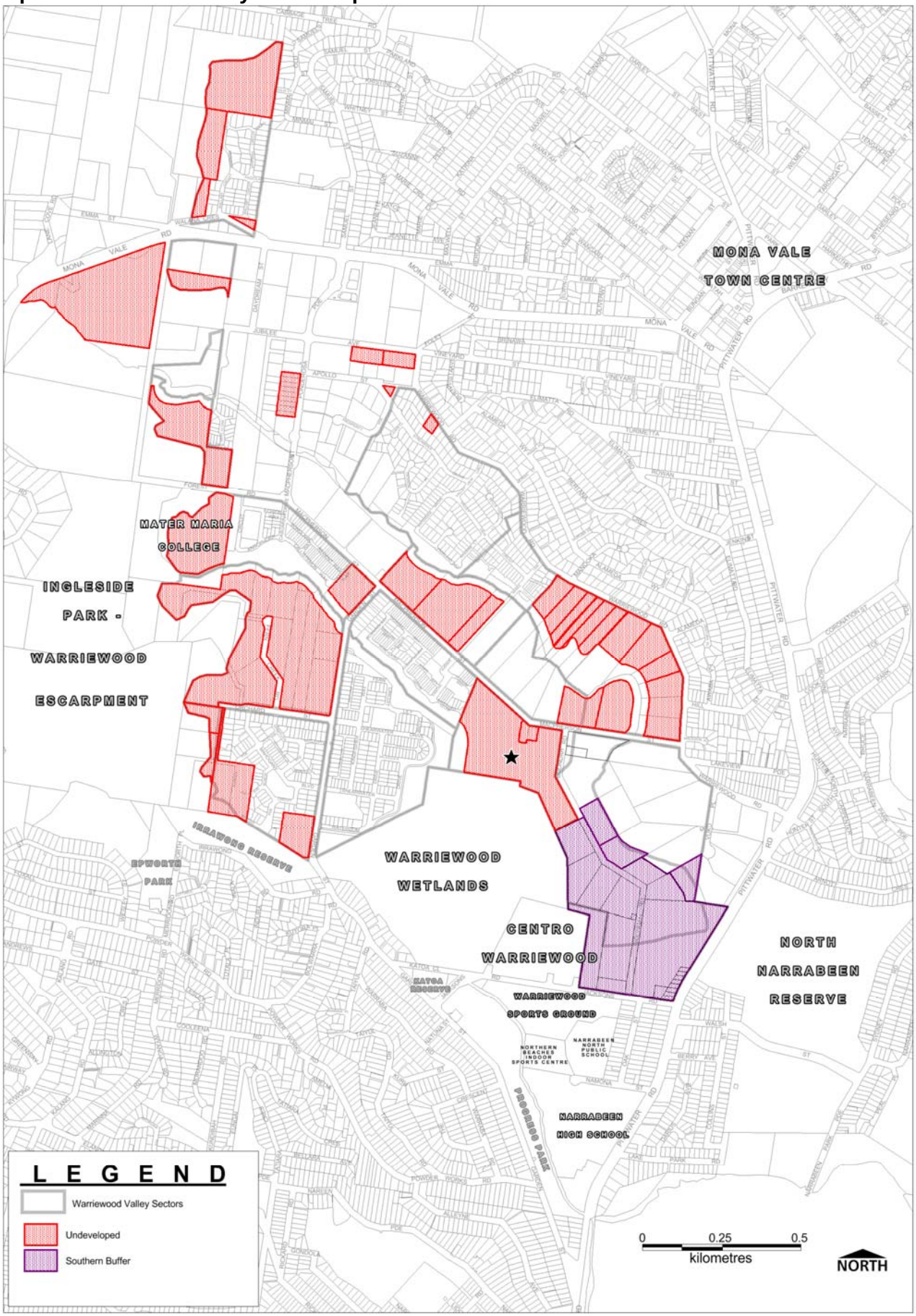
The Southern Buffer was also identified for review.

The land forming the study area for the Strategic Review and identified for review is depicted in Map 2.

Buffer 3a (known as 14-18 Boondah Road) was subsequently removed from the lands to be reviewed following the Land and Environment Court's judgment on 12 September 2011.

It should be noted that whilst the study area is defined as per Map 2, the impacts on areas beyond must also be considered. Likewise, infrastructure provision for development within the Valley is not necessarily required to be provided within the study area.

Map 2: Warriewood Valley Undeveloped Lands



★Buffer 3a (known as 14-18 Boondah Road) subsequently removed following Land & Environment Court's judgment on 12 September 2011

5.5 Determination of land capability

5.5.1 Testing land for potential dwelling increase

For potential density increase, the first step in identifying land parcels capable of accommodating a potential density increase was a land capability assessment.

This exercise identified the land to be tested at the medium density range (i.e. 25 - 60 dwellings per hectare as defined by the Metropolitan Plan) in accordance with the PAC's determination.

The land capability assessment was a three step 'sieve' process based on Council's capability mapping (see Chapter 6 and Appendix 2) and the outcomes of the independent Hydrology Study. The undeveloped land to be the subject of the sieve process is shown in Map 2.

Step 1

A preliminary review of land parcels was undertaken. Only those sectors identified as 'Designated Residential Sectors' pursuant to Table 17 and Figure 5 of the 2010 Planning Framework were identified for further investigation.

Step 2

The second step of the sieve exercise involved a land capability assessment. Any sector with significant environmental constraints (50% or more of the sector contained land classified 4 or 5) based on the capability mapping undertaken for the Local Planning Strategy (this is discussed in more detail in Chapter 6) was then excluded from further investigation.

The outcomes of Step 2 of the sieve exercise are depicted in Map 4 and detailed in Chapter 6 and Appendix 3.

Step 3

The outcomes of the Hydrology Study were then applied to the sectors identified at Step 2. The outcome of Step 3 is depicted in Map 7.

The final outcome of sieve process, after Step 1, 2 and 3 had been applied, is detailed in Map 8.

5.5.2 Testing land in the Southern Buffer

A land capability assessment was also carried out for lands in the Southern Buffer, utilising Council's capability mapping (See Map 3) overlaid by the outcomes of the Hydrology Study (see Chapter 7.1).

5.6 Independent Consultant Studies

Independent studies on hydrology, urban design, strategic transport and economic feasibility were commissioned to inform the Strategic Review.

As discussed above, the Hydrology Study assessed the flood regime applicable to Warriewood Valley to ascertain land capability and suitability for future development in terms of flooding, water management, and impacts imposed by climate change and

sea level rise. The Hydrology Study also estimated cut/fill balance, the likely impact and management of the flood regime and recommended land uses consistent with a developable land classification which, in turn, informed the Urban Design Study. The outcomes of the Hydrology Study were used in Step 3 of the land capability assessment process.

The Urban Design Study identified the parcels of land suitable for an increased dwelling density by analysing the potential building height and scale of the urban form that may result from any increase in density.

A concept plan and design principles were also developed for a new mixed-use precinct in the Southern Buffer.

The Strategic Transport Study assessed the transport implications of the potential increase in dwelling density and undertook a high level analysis of the likely transport implications of a new mixed-use precinct in the Southern Buffer.

The Economic Feasibility Study assessed the economic viability of a range of residential densities within Warriewood Valley and undertook a high level economic feasibility analysis of a new mixed-use precinct in the Southern Buffer; providing advice on the likely financial viability of these development opportunities in Warriewood Valley.

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Assessing Land Capability

Making wise land use planning decisions by mapping the area's environmental characteristics

Photo by: Amanda Clarke 2011

Chapter 6

6.0 Assessing Land Capability

Land capability mapping used geo-spatial tools to identify opportunities and constraints of an area for the Strategic Review.

6.1 Process for Assessing Land Capability

The process builds geographical layers to produce a visual representation of areas with lower or higher levels of capability.

Seventeen individual base map layers have been prepared for the Pittwater LGA for the following characteristics:

- Biodiversity
- Slope
- Proximity to watercourses
- Proximity to ridgelines
- Foreshores and waterbodies
- Cultural (heritage value)
- Climate change including sea level rise
- Bushfire
- Flooding
- Geotechnical
- Coastal processes
- Estuarine processes
- Acid sulphate soils
- Proximity to centres
- Proximity to public transport links and road network capacity
- Sewer availability
- Water availability

Climate change and sea level rise, and flooding, were not considered during Step 2 of the sieve process as these were separately given detailed consideration in the Hydrology Study. Further, Step 2 did not consider proximity to centres and to public transport links as these issues will not significantly affect the capability of the land.

Each layer represents an environmental, economic or social characteristic that influences land use allocation decisions. The map layers also identify issues that should be addressed in the future management of the land.

The map layers have been divided into 3 classes. More detail on the classifications for each base map is included in Appendix 2:

- **Class A: Low restriction to intensification of development.**
  Existing development may require generic management prescriptions to achieve sustainable land use. Intensification of development must be confined to defined targets to maintain sustainability.

- **Class B: Moderate restriction to intensification of development.** Existing development forms require generic management prescriptions to achieve sustainable land use. Any intensification needs site specific investigation and must address constraints.

- **Class C: Significant restriction to intensification of land use.** Existing development forms require site specific and detailed management prescription to achieve sustainable land use. Any intensification must fully address each specific constraint.

As an example, the slope base map is made up of the following classes:

A	Land with slope less than 15% - suitable for development/intensification
B	Land with slope between 15% and 25% - moderate constraint to development intensification
C	Land with slope greater than 25% - restricted potential for development/intensification

The map layers were combined into a single layer to form a composite capability map, which categorised the land as follows:

Table 1: Land Capability Classifications

Map Classification	Level of Capability	Categories from composite maps
1	Most	All As: areas of land that were mapped as suitable for development or intensification
2	More	All A and B: areas of land that were mapped as having at least one moderate constraint to development or intensification
3	Moderate	Only have one instance of C: areas of land that were mapped as having one severe constraint to development or intensification
4	Less	Two instances of C: areas of land that were mapped as having two instances of severe constraint to development or intensification
5	Least	Three or more instances of C: areas of land that were mapped as having three or more severe constraints to development or intensification

The composite capability map produced for the Strategic Review is at Map 3.

Map 3: Composite Capability Map

(excluding Climate Change and Sea Level Rise; Flooding; Proximity to Centres; and Proximity to Public Transport map layers)

6.2 Process of Assessing Land Capability

The land capability assessment was a three step 'sieve' process based on Council's capability mapping (for further detail see and Appendix 2) and the outcomes of the independent Hydrology Study. The undeveloped land to be the subject of the sieve process is shown in Map 2.

Step 1

A preliminary review of land parcels was undertaken. Only those sectors identified as 'Designated Residential Sectors' pursuant to Table 17 and Figure 5 of the 2010 Planning Framework were identified for further investigation.

Step 2

The second step of the sieve exercise involved a land capability assessment.

A composite capability map (See Map 3) was utilised to determine the development/intensification capability of the land considered 'undeveloped' and land within the Southern Buffer. Any sector with significant environmental constraints (50% or more of the sector contained land classified 4 or 5) was then excluded from further investigation.

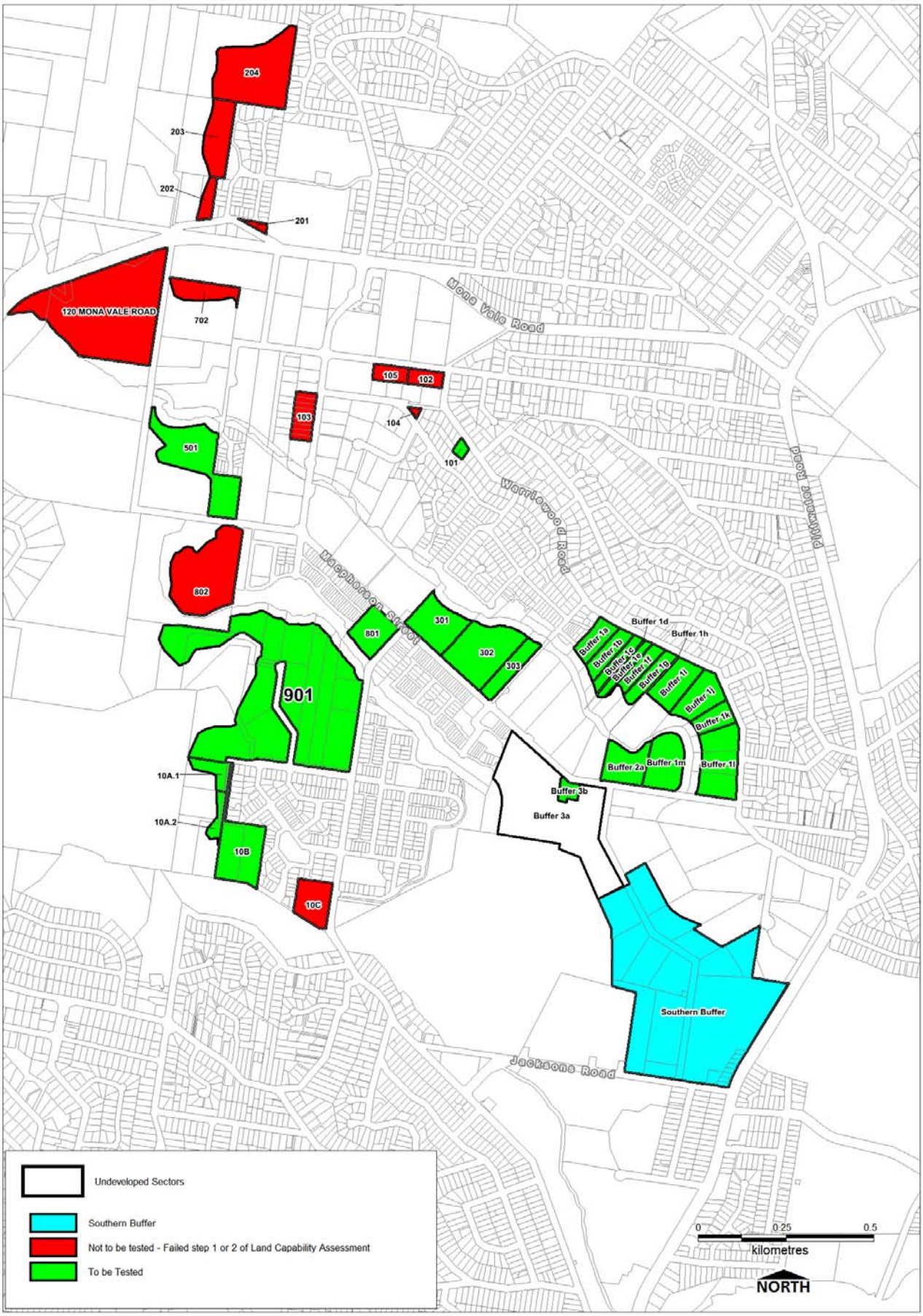
The outcome of Step 1 and 2 of the 'sieve' process is depicted in Map 4 and detailed in Appendix 3.

Step 3

Step 3 of the 'sieve' process involved applying the Developable Land Classification, derived from the Hydrology Study (detailed in Chapter 7), to the outcomes of Step 1 and 2 of the 'sieve'.

The final outcome of sieve process, after Step 1, 2 and 3 had been applied, is depicted in Map 8.

Map 4: Outcome of Step 1 & 2 of the 'Sieve Process' - Land Capability Map
(excluding Climate Change and Sea Level Rise; Flooding; Proximity to Centres; and Proximity to Public Transport map layers)



6.3 Sectors not considered further following Step 1 and 2 of the 'sieve' process

Step 1 and 2 of the sieve process identified sectors not required to be considered for development beyond their current classification due to:

1. Existing environmental constraints applying the sector.
2. Not being a designated residential sector under the 2010 Planning Framework, including Sector B and Sector 15 (now known as the Southern Buffer).
3. Not being identified as undeveloped under the 2010 Framework.

120 Mona Vale Road was the only sector not identified for further testing due to the existing environmental constraints. Opportunities for development on this site are limited due to bushfire, geotechnical and biodiversity constraints.

The Anglican Retirement Village at 6-14 Macpherson Street requested inclusion in the study area. However this site was not considered undeveloped under the *2010 Planning Framework* given that development has substantially commenced on this site, with Stages 1 and 2 of the retirement village complex already completed. It was therefore excluded from the Strategic Review.

The sectors not considered for increased development are identified in red in Map 4. Landowners in these sectors will need to lodge a separate rezoning application accompanied by environmental studies if they wish to rezone.

Key Outcomes

Residential

- As a result of Step 1 and 2 of the sieve process, the following sectors were identified for testing potential increase in dwelling density:

Sector ID	Property Address	Current Density
101	165-167 Warriewood Road	15/Ha
301	20 Macpherson Street	25/Ha
302	18 Macpherson Street	25/Ha
303	16 Macpherson Street	25/Ha
501	4-8 Forest Road	25/Ha
801	23B Macpherson Street	25/Ha
901	11,12 and 13 (Sector 8); 1,2,4,5,9 & 10 Fern Creek Road; 2,4,6,12 & 14 Orchard Street, 204 & 206 Garden Street, and Orchard St road reserve (2A, 4A, 6A & 8 Orchard Street)	25/Ha
10A.1	115 Orchard Street	15/Ha
10A.2	111, 111a & 113 Orchard Street	15/Ha
10B	109 Orchard Street	15/Ha
Buffer 1a	61 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1b	53 Warriewood Road	25/Ha (15m street frontage @10/Ha)

Key Outcomes

***Residential* (Continued)**

Sector ID	Property Address	Current Density
Buffer 1c	53a Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1d	53b Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1e	53c Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1f	49 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1g	45 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1h	43 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1i	41 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1j	31 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1k	29 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1l	23, 25 & 27 Warriewood Road	25/Ha (15m street frontage @10/Ha)
Buffer 1m	2 Macpherson Street	0 (No allocation)
Buffer 2a	4 Macpherson Street	Design specific (max 20 dwellings)
Buffer 3b	5 & 7 Macpherson Street	25/Ha

These sectors are shown in green, in Map 4.

- The sectors listed in the following Table will not be tested as these sectors failed to satisfy Step 1 or 2 of the sieve process (and shown in red in Map 4):

Sector ID	Property Address	Reason for exclusion
102	185 Warriewood Road	Industrial land use designation - Already zoned 4(b)
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	Industrial land use designation - Already zoned 4(b)
104	3 Harris Street & 16 Apollo Street	Industrial land use designation - Already zoned 4(b)
105	15 Jubilee Avenue	Industrial land use designation - Already zoned 4(b)
201	4 Walana Crescent	Not identified as undeveloped in 2010 Planning Framework

Key Outcomes

***Residential* (Continued)**

Sector ID	Property Address	Reason for exclusion
202	14 Walana Crescent	Not identified as undeveloped in 2010 Planning Framework
203	3 Harrier Place	Not identified as undeveloped in 2010 Planning Framework
204	79 Cabbage Tree Road (Aveo Peninsular Gardens Retirement Village)	Not identified as undeveloped in 2010 Planning Framework
702	10 Jubilee Avenue	Portion of site designated Industrial as part of Sector 7 however majority of site not in 2010 Planning Framework. Still zoned 1(b) – not zoned with majority of Sector 7 lands (now under development).
802	5 Forest Road (Mater Maria School)	Not identified as undeveloped in 2010 Planning Framework
10C	194 Garden Street (Seaview Assisted Living Apartments)	Not identified as undeveloped in 2010 Planning Framework
120 MV	120 Mona Vale Road	Significant environmental constraints

- The sectors above will retain their current zoning.
- The onus is on landowners of these sectors to seek individual rezoning applications, accompanied by supporting documentation. Landowners will need to demonstrate how sustainable development can be achieved given the circumstances/constraints relevant to their land.

Southern Buffer Area

- Sectors shown in blue in Map 4 represent the Southern Buffer. A land capability assessment was applied to this land prior to examining potential scope of development as a mixed-use precinct.

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Outcomes of Consultants' Studies

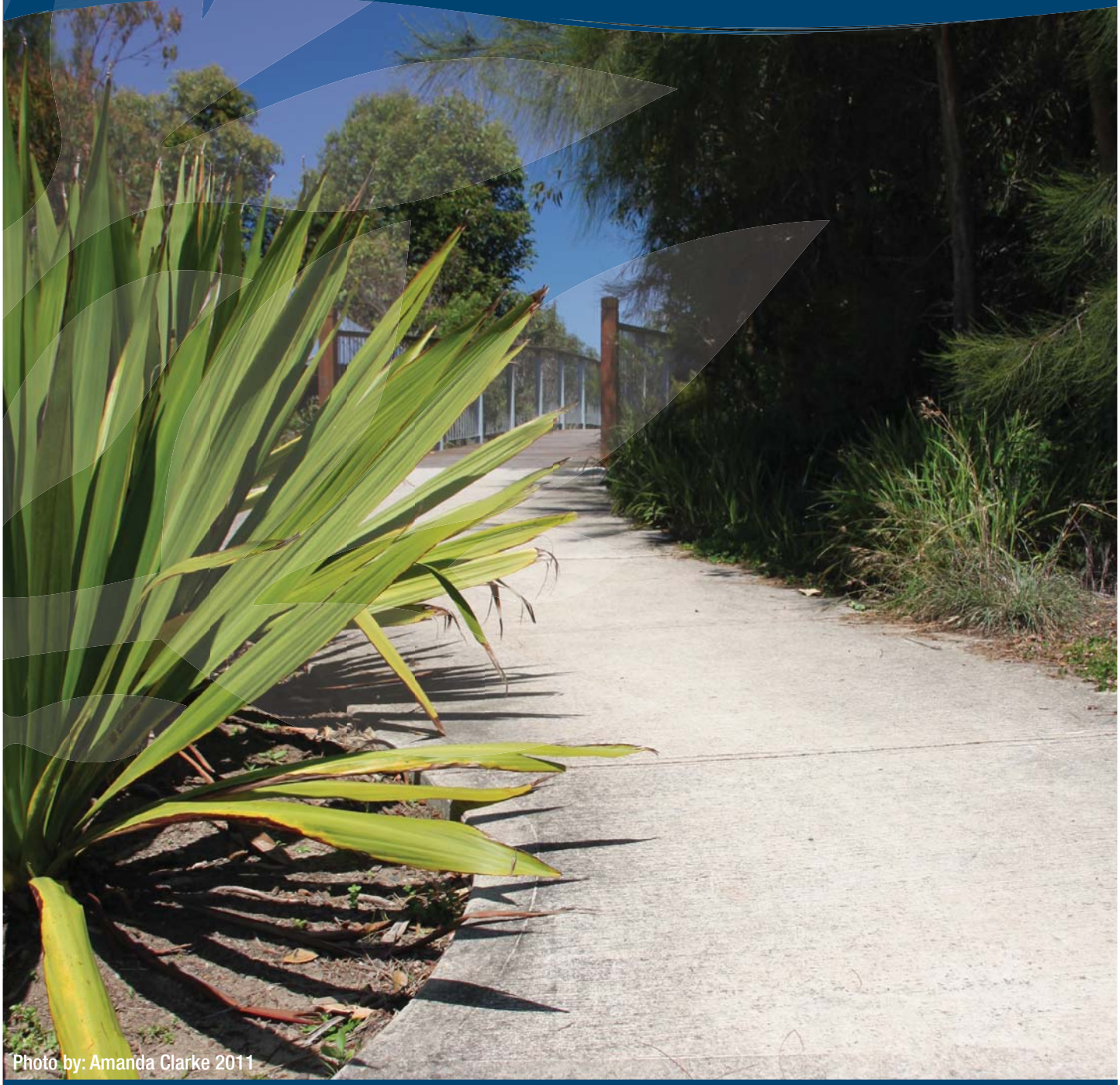


Photo by: Amanda Clarke 2011

Chapter 7

7.0 Outcomes of Consultants' Studies

7.1 Hydrology Study

The Hydrology Study was undertaken by Cardno (NSW/ACT) Pty Ltd (Cardno). The outcomes of Cardno's report must be read in conjunction with the other three consultants' studies.

The Hydrology Study needed to:

- Analyse and detail the extent of flooding across Warriewood Valley
- Outline options for flood evacuation
- Recommend an approach to cutting and filling various land parcels to provide a building platform above the flood planning level and to assist in the conveyance of flood water.

The Hydrology Study provided preliminary recommendations for on-site detention on various sites and recommendations for water quality treatment. It provides a high level assessment of flooding in Warriewood Valley; further assessment is needed, particularly once the revised Narrabeen Lagoon Flooding Study is complete.

A desktop study of existing published information focused on the *Warriewood Valley Flood Study*,[4] the *Warriewood Valley Flood Study Addendum*,[5] and the *Narrabeen Lagoon Flood Study*.[6] Cardno reviewed and updated these documents to reflect the impacts of climate change and new survey data.

In line with NSW Government guidelines,[7] the Hydrology Study adopts the following sea level rise assumptions when assessing the impacts of climate change:

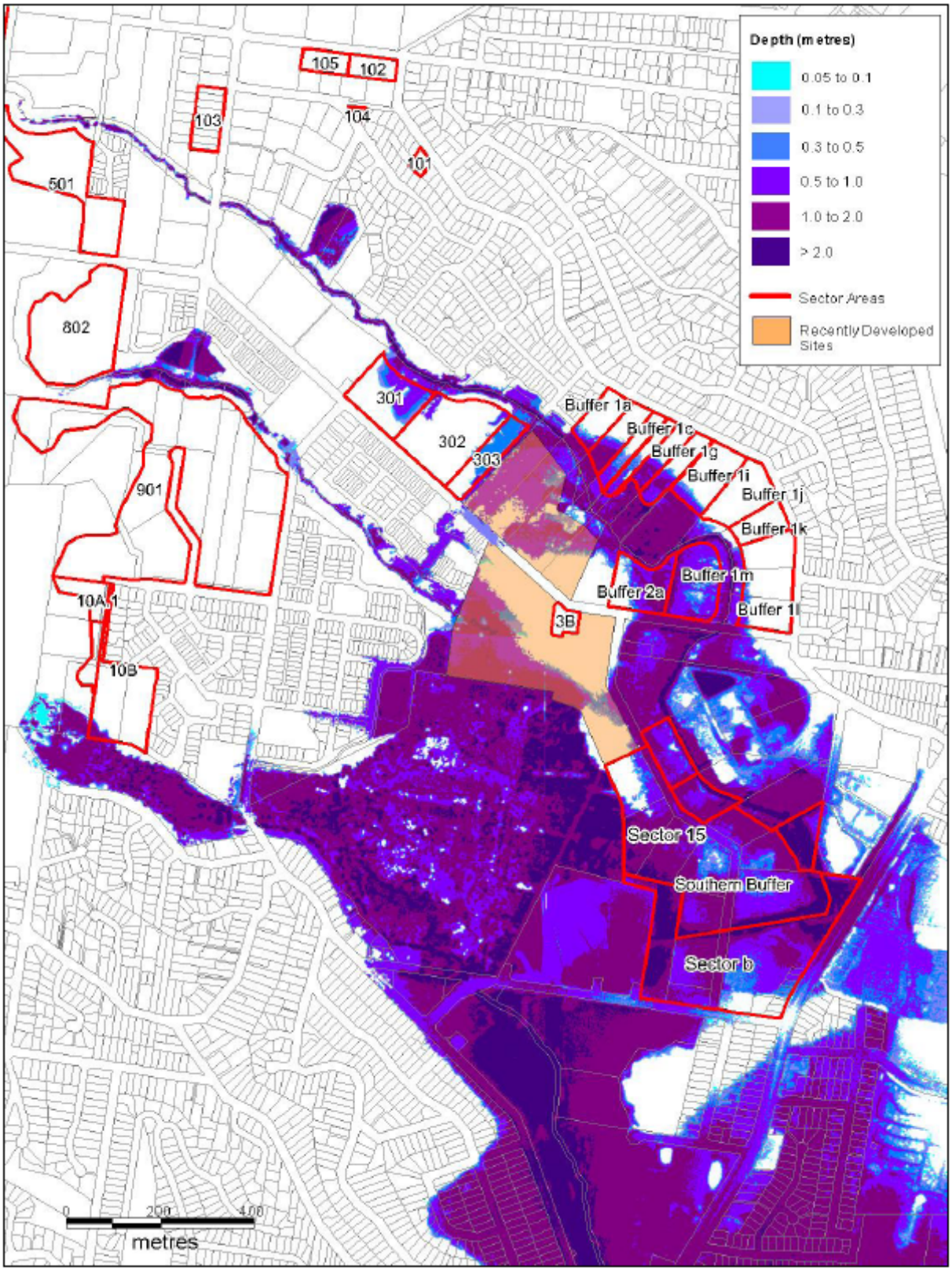
- Sea level rise of 0.4m by 2050
- Sea level rise of 0.9m by 2100.

Also in line with government policy,[8] the Hydrology Study assumes a 30% increase in rainfall intensity as an impact of climate change when considering the impacts of the 1% Annual Exceedance Probability event (AEP). Only sea level rise is considered for the probable maximum flood event (PMF) as there is insufficient evidence to assume increased rainfall intensity with regard to such a rare event.

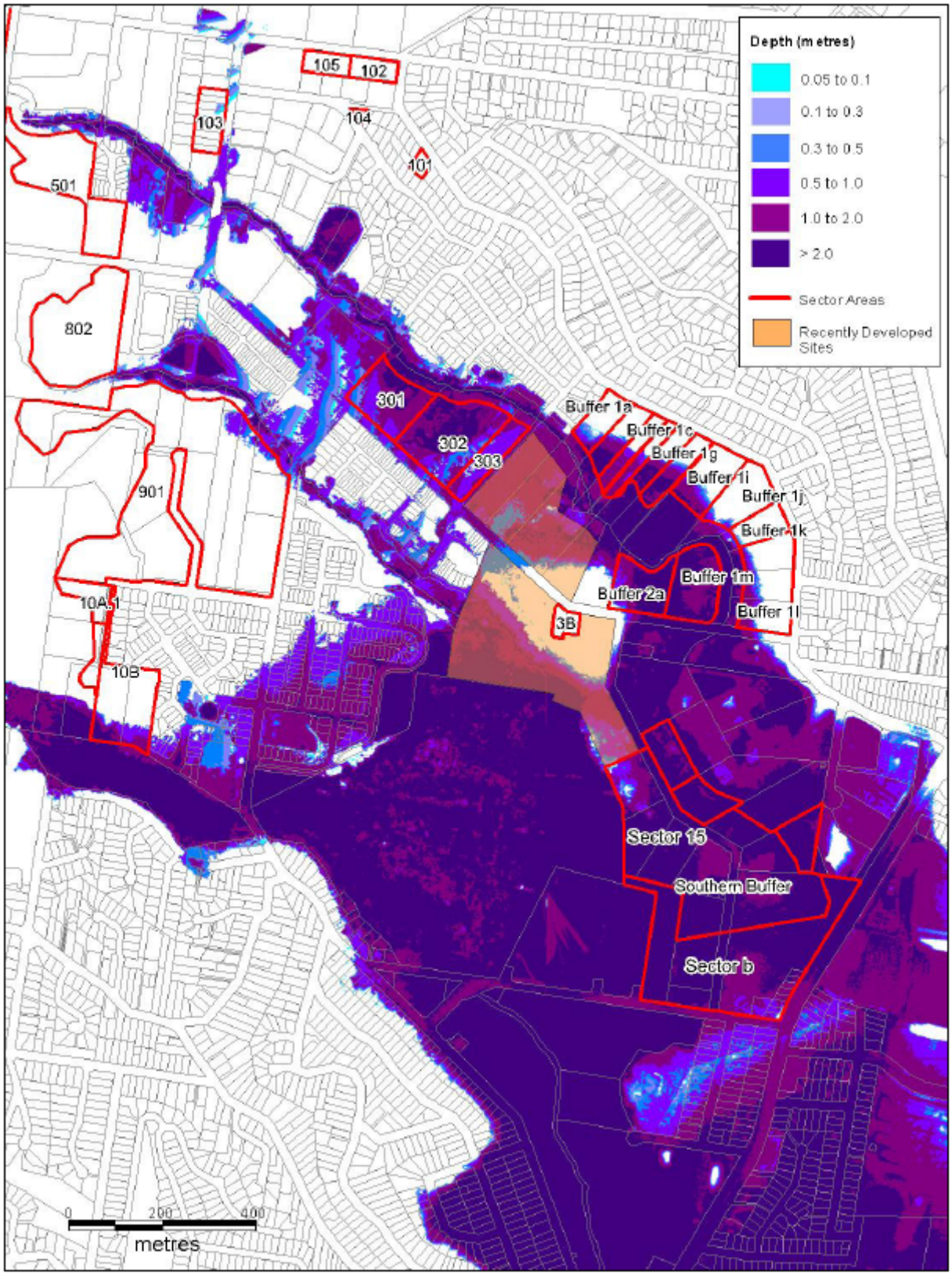
The Hydrology Study produced two maps showing the depth of the 1% AEP event (plus climate change) and the PMF flood event (plus climate change).

[4] Cardno Lawson Treloar (2005) *Warriewood Valley Flood Study,* prepared for Pittwater Council, Sydney.
[5] Cardno Lawson Treloar (2005) *Warriewood Valley Flood Study – Addendum 1,* prepared for Pittwater Council, Sydney.
[6] Public Works Department (1990) *Narrabeen Lagoon Flood Study,* Public Works Department, Sydney.
[7] Department of Planning (2010) *NSW Coastal Planning Guideline: Adapting to Sea Level Rise,* NSW Government.
[8] Department of Environment and Climate Change (2007) *Practical Considerations of Climate Change,* NSW Government.

Map 5: 1% AEP Event Plus Climate Change Peak Depth
Source: Cardno (NSW/ACT) (2011) *Warriewood Valley Strategic Review Hydrology Study*



Map 6: PMF Plus Climate Change Peak Depth
Source: Cardno (NSW/ACT (2011) *Warriewood Valley Strategic Review Hydrology Study*



7.1.1 Residential Development

A developable land classification was applied to each sector identified in Table 2 and Map 7 and recommended land uses for categories A-F. Residential sites, including those in the Southern Buffer land, were assessed for:

- Expected flood behaviour
- Cut and fill required to provide a building area above the 1% AEP plus climate change level
- Emergency evacuation routes.

The Hydrology Study mapped the extent of flooding based on a 1% AEP and PMF event for each residential area affected by flooding; the developable land area above the flood planning level; and the area that would need to be cut to provide the fill for the developable land area. The Study noted that most development in Pittwater requires a flood planning level of the 1% AEP level plus a freeboard of 500mm.

7.1.2 Development of the Southern Buffer

Flooding in the low lying Southern Buffer depends on backwater flooding from the Warriewood Wetlands and the Narrabeen Lagoon. Under existing conditions, flood depths exceed 1 metre across most of the Southern Buffer in a 1% AEP event and flood events more prolonged.

Consequently, the Hydrology Study recommended a significant amount of cut and fill to create two developable areas, noting that the central areas are not suitable for development due to flood depth and flow path requirements. The developable areas are:

- 3.66 hectares in the southern portion of the sector at the corner of Pittwater Road and Jacksons Road
- 0.87 hectares in the northern portion of the sector adjoining Boondah Road

To address the issue of long duration flooding the Study recommended that, should development proceed in the Southern Buffer:

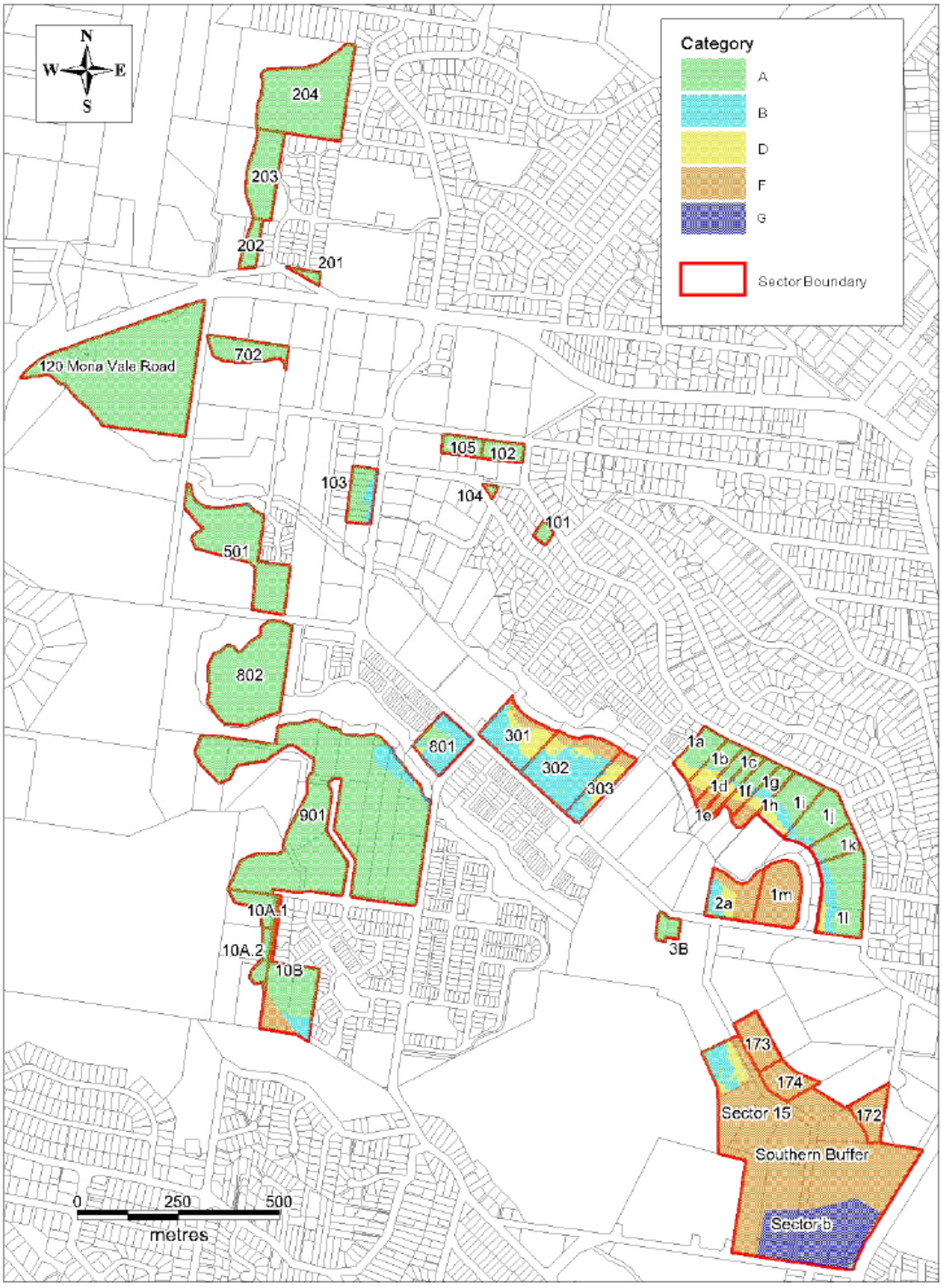
- Pittwater Road and Jacksons Road be raised to a suitable level to provide sufficient evacuation time
- A flood warning system be installed
- Only commercial and industrial land uses be permitted in the southern portion of the sector
- Residential uses may be possible in the northern portion of the sector.

Table 2: Developable Land Categories (to be read in conjunction with Map 7)

Category A	• Land above the PMF plus Climate Change • May be subject to overland flow • Additional criteria incorporated during this assessment: land allows for flood evacuation with minimum risk to life, and no creation of flood entrapment or flood isolation
Category B	• Land between the Flood Planning Level plus Climate Change, and PMF plus Climate Change • No increase to peak flows/levels upstream and downstream of site • Floor levels above Flood Planning Level • Additional criteria incorporated during this assessment: land allows for flood evacuation with minimum risk to life, and no creation of flood entrapment or flood isolation
Category C	• Land between the Flood Planning Level plus Climate Change, and PMF plus Climate Change • No increase to peak flows/levels upstream and downstream of site • Floor levels above Flood Planning Level • Additional criteria incorporated during this assessment: land allows for flood evacuation with minimum risk to life, and no creation of flood entrapment or flood isolation • Where the *Warriewood Valley Water Management Specification* does not apply
Category D	• Land below the Flood Planning Level plus Climate Change • No increase to peak flows/levels upstream and downstream of site • Floor levels above Flood Planning Level • Additional criteria incorporated during this assessment: land allows for flood evacuation with minimum risk to life, and no creation of flood entrapment or flood isolation
Category E	• Land below the Flood Planning Level plus Climate Change • No increase to peak flows/levels upstream and downstream of site • Floor levels above Flood Planning Level • Additional criteria incorporated during this assessment: land allows for flood evacuation with minimum risk to life, and no creation of flood entrapment or flood isolation • Applies where the *Warriewood Valley Water Management Specification* does not apply
Category F	• Land below the PMF plus Climate Change • Additional criteria incorporated during this assessment: Risk to life as a result of flood risk including unsafe flood evacuation, no flood warning is available, flood isolation/entrapment (beyond short durations) or vertical refuge is created, or • Flood impacts off-site
Category G	• Land below the Flood Planning Level plus Climate Change • No increase to peak flows/levels upstream and downstream of site • Floor levels above Flood Planning Level • Additional criteria incorporated during this assessment: land allows for minimum risk to life through flood evacuation, or implementation of a flood warning system

Note: The entire Study Area is within the Warriewood Valley Water Management Specification area therefore none of the Study Area is classified Category C or E.

Map 7: Developable Land Classification (to be read in conjunction with Table 2)
Source: Cardno (NSW/ACT) (2011) *Warriewood Valley Strategic Review Hydrology Study*



7.1.3 Final Step of Land Capability Assessment

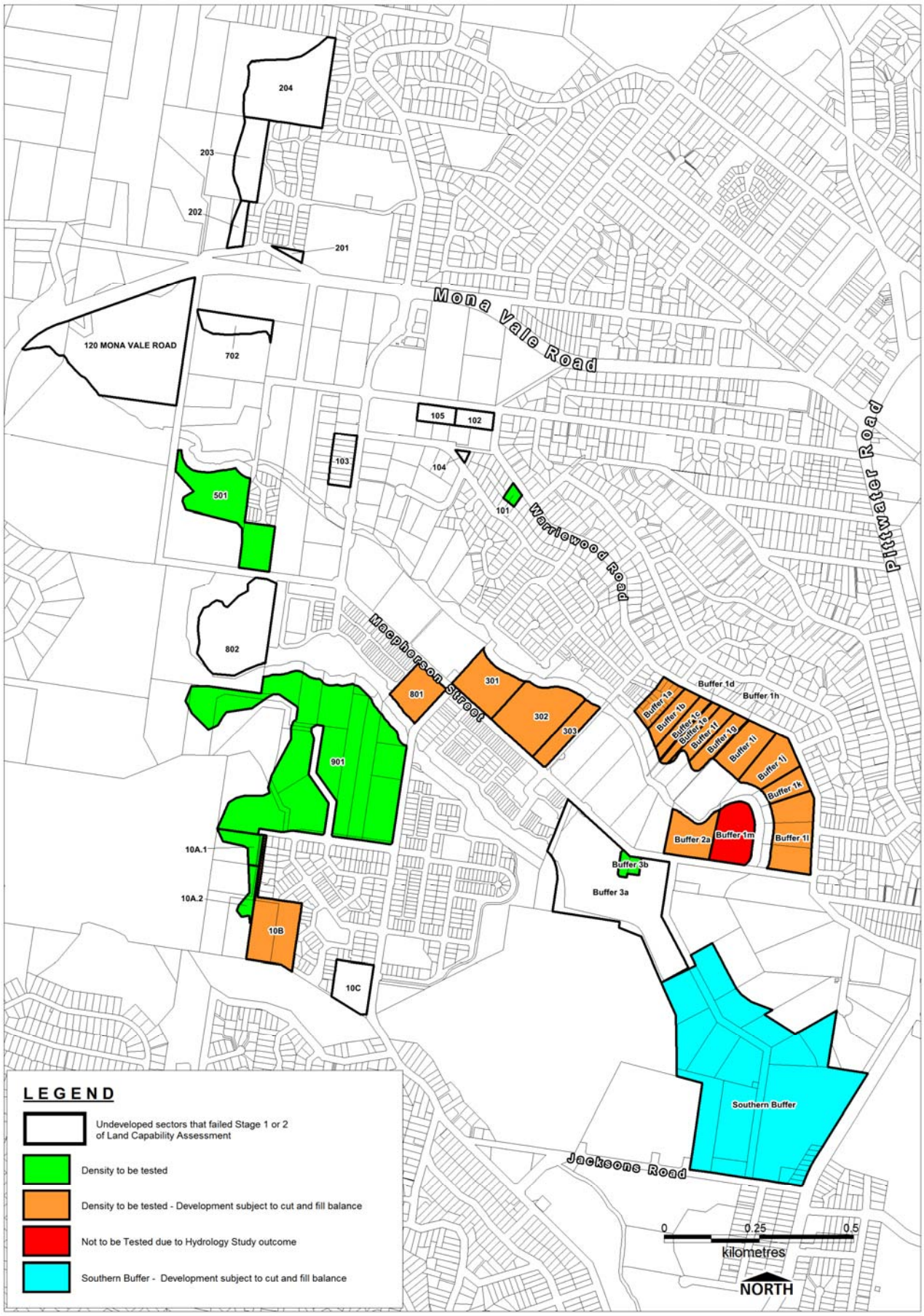
The Developable Land Classification Map (see Map 7) reflected land capability in terms of flooding, water management, and impacts imposed by climate change and sea level rise and should be read in conjunction with Table 2: Developable Land Categories.

The outcome of the Developable Land Classification combined with the outcomes of the Step 1 and 2 of the sieve process (see Map 4) is depicted in Map 8, which identifies sites to be tested for potential density increase.

The Developable Land Classification identifies significant flood constraints which affect the whole of Buffer 1M. Buffer 1M is not capable of development on its own and therefore is not subject to testing for potential density increase.

In regard to the Southern Buffer, with the exception of a small island in the north-west and a larger island in the south-west, the Developable Land Classification identifies large portions of the sector as significantly flood affected and not capable of development.

Map 8: Final Outcome of Land Capability Mapping and Hydrology Study



7.1.4 Flood Emergency Response Planning

The Hydrology Study identified two options for emergency response during extreme flooding events:

- 'Shelter-in-Place' - residents shelter on their property in areas above the PMF
- 'Evacuation' - residents are evacuated using private transport or emergency services.

The assessment of these options considered the acceptable period of time for people to remain isolated on their property during an extreme flood event.

The Hydrology Study recommended flood events up to the level of a PMF event should not allow 'shelter-in-place' if the isolation occurs for longer than six hours. However, there are no standards available to define a suitable time for 'shelter in place for flash flooding or otherwise in NSW.

The Hydrology Study mapped evacuation routes and noted that most of Warriewood Valley would be able to evacuate along Ponderosa Parade in a ARI flood event, as shown in Map 9. Map 9 also indicates that, apart from sectors fronting Warriewood Road, PMF events would not allow for flood free evacuation for all other sectors under consideration.

The existing population within Warriewood Valley would also be affected by a PMF event and could use Macpherson Street East as an alternate flood evacuation route.

The Hydrology Study recommends that Jacksons Road and Pittwater Road (between the intersection of Jacksons Road and Warriewood Road) be raised to a suitable level to provide sufficient evacuation time for the southern portion of the Southern Buffer in a PMF event. Alternatively, a flood warning system could allow evacuation of the site prior to the access roads being inundated, though some raising of Pittwater Road is still likely to be required.

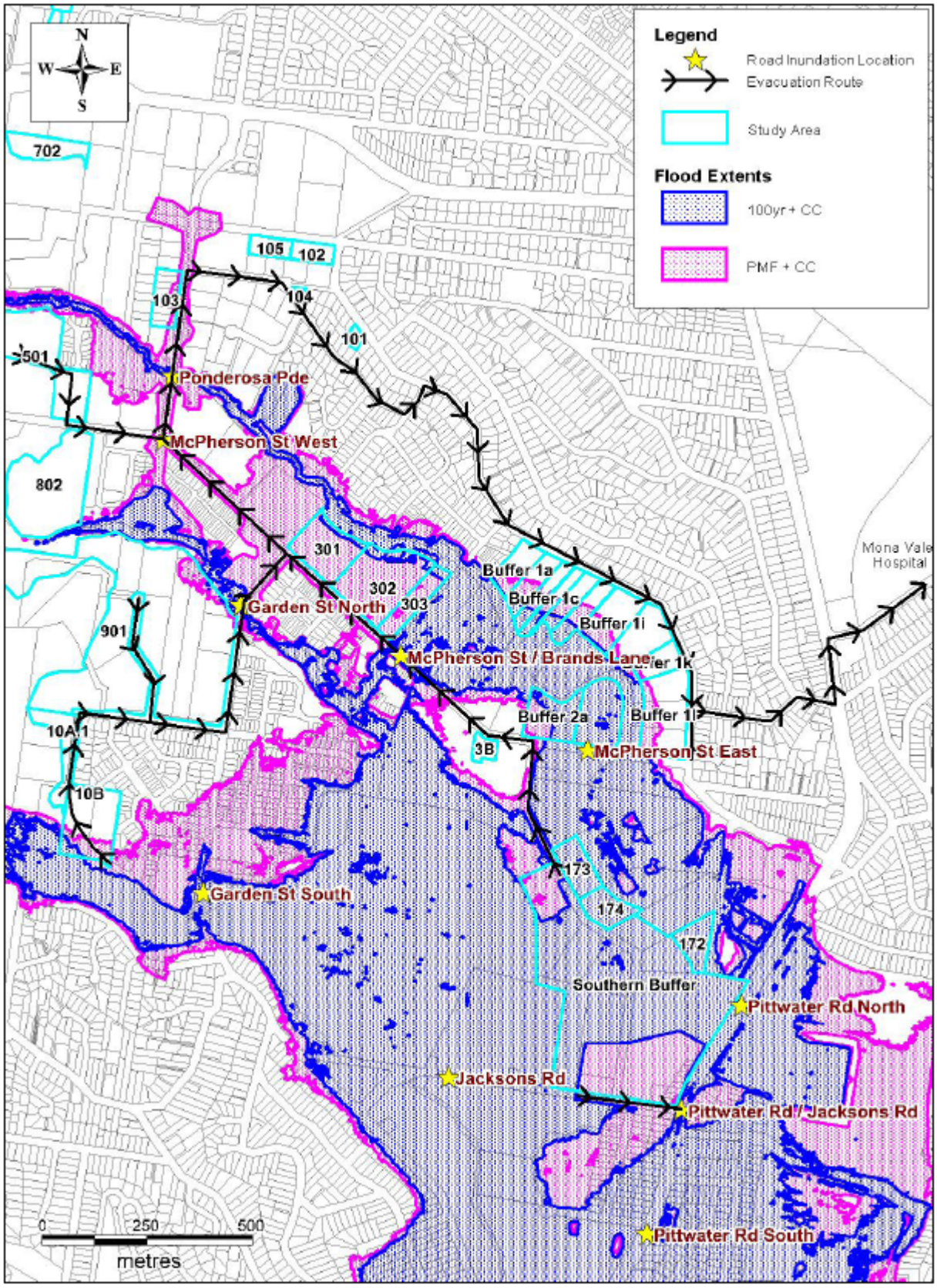
An upgrade of Pittwater Road and Macpherson Street East would also provide evacuation options to benefits to a significant portion of the Pittwater LGA.

The Hydrology Study recommends any flood evacuation response approach be developed in conjunction with the NSW State Emergency Service (NSWSES), stating:

> "It would be recommended that this approach [evacuation and planned flood isolation responses] be discussed in consultation with the SES, as it will be important to gain their acceptance of the approach as the lead combat agency for floods."[9]

[9] Cardno (NSW/ACT) Pty Ltd (2011) *Warriewood Valley Strategic Review Hydrology Study* 29.

Map 9: Existing Evacuation Routes to Mona Vale Hospital
Source: Cardno (NSW/ACT) (2011) *Warriewood Valley Strategic Review Hydrology Study*



Note: CC refers to Climate Change

7.1.5 NSW State Emergency Service Emergency Flood Evacuation Policy

NSWSES recommends evacuation as the only flood emergency response method, acknowledging this may not be practical in a flash flood event.

Strategic planning investigations of an area, that particularly examine future development options, take into account flood events up to the 1% AEP event. Conversely, flood emergency response planning considers flood events up to the PMF event, above the 1% AEP event.

As a result of the NSWSES position, the Department is undertaking an intra-government study of flood evacuation management. These investigations are exploring the potential for a consistent approach with regard to flood evacuation in flash flood events, with respect to urban development in NSW.

The results of this study may be forthcoming in 2013. However, it should be noted that the timing and outcomes of these investigations will not delay the progress of any future planning proposals in the Warriewood Valley.

Key Outcomes

Residential

- The Hydrology Study determined the following sectors to have no development potential (shown in red on Map 8):

Sector ID	Property Address	Reason
Buffer 1m	2 Macpherson Street	Category F in Developable Land Category

- The following sectors are flood affected, have no safe access for evacuation and failed to satisfy Step 1 of the sieve process.

Sector ID	Property Address	Reason for Failure (in Step 1)
10C	194 Garden Street (Seaview Assisted Living Apartments)	Not identified as undeveloped in 2010 Planning Framework

- The following sectors are determined to have no flood affectation, may be subject to cut and fill requirements, and safe access for evacuation in the 1% AEP plus climate change event. These sectors however, failed to satisfy Step 1 or 2 of the sieve process:

Sector ID	Property Address	Reason for Exclusion
102	185 Warriewood Road	Industrial land use designation - Already zoned 4(b)
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c & 16a Ponderosa Parade	Industrial land use designation - Already zoned 4(b)
104	3 Harris Street and 16 Apollo Street	Industrial land use designation - Already zoned 4(b)
105	15 Jubilee Avenue	Industrial land use designation - Already zoned 4(b)

Key Outcomes (Continued)

***Residential* (Continued)**

Sector ID	Property Address	Reason for Exclusion
201	4 Walana Crescent	Not identified as undeveloped in 2010 Planning Framework
202	14 Walana Crescent	Not identified as undeveloped in 2010 Planning Framework
203	3 Harrier Place	Not identified as undeveloped in 2010 Planning Framework
204	79 Cabbage Tree Road (Aveo Peninsular Gardens Retirement Village)	Not identified as undeveloped in 2010 Planning Framework
702	10 Jubilee Avenue	Portion of site designated Industrial as part of Sector 7 however majority of site not in 2010 Planning Framework. Still zoned 1(b) – not zoned with majority of Sector 7 lands (now under construction).
802	5 Forest Road (Mater Maria School)	Not identified as undeveloped in 2010 Planning Framework
120MV	120 Mona Vale Road	Significant environmental constraints

- The sectors listed below are determined to have no flood affectation and have safe access for evacuation in a PMF plus climate change event.

Sector ID	Property Address	Safe Evacuation Route
101	165-167 Warriewood Road (residue lot in Sector 1)	Warriewood Rd (East) – Hill Rd

- The sectors listed below have flood affectation that may be resolved by cut and fill requirements, and has safe access for evacuation in a PMF plus climate change event.

Sector ID	Property Address	Safe Evacuation Route
Buffer 1a	61 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1b	53 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1c	53b Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1d	53b Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1e	53c Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1f	49 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1g	45 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1h	43 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1i	41 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1j	31 Warriewood Road	Warriewood Rd (East) – Hill Rd

Key Outcomes (Continued)

***Residential* (Continued)**

Sector ID	Property Address	Safe Evacuation Route
Buffer 1k	29 Warriewood Road	Warriewood Rd (East) – Hill Rd
Buffer 1l	23, 25 & 27 Warriewood Road	Hill Road

- The sectors listed in the following Table are flood affected, require cut and fill and has no safe access for evacuation in PMF plus climate change (in long duration flood).

Sector ID	Property Address	Required Access for Evacuation
301	20 Macpherson Street	Upgrade of Macpherson Street to satisfactory level
302	18 Macpherson Street	Upgrade of Macpherson Street to satisfactory level
303	16 Macpherson Street	Upgrade of Macpherson Street to satisfactory level
501	4-8 Forest Road	Upgrade of Ponderosa Parade to satisfactory level
801	23B Macpherson Street	Upgrade of Macpherson Street to satisfactory level
901 A to F	11,12 and 13 (Sector 8); 1,2,4,5,9 & 10 Fern Creek Road; 2,4,6,12 & 14 Orchard Street, 204 & 206 Garden Street, and Orchard St road reserve (2A, 4A, 6A & 8 Orchard Street)	Upgrade of Garden St (North) to satisfactory level
10A.1	115 Orchard Street	Upgrade of Garden St (North) to satisfactory level
10A.2	111, 111a & 113 Orchard Street	Upgrade of Garden St (North) to satisfactory level
10B	109 Orchard Street	Upgrade of Garden St (North) to satisfactory level
Buffer 2a	4 Macpherson Street	Upgrade of Macpherson Street (East)
Buffer 3b	5 & 7 Macpherson Street	Upgrade of Macpherson Street (East)

Southern Buffer Area

- For development to occur in the Southern Buffer, the Hydrology Study recommends significant cut and fill to create two developable sites: one in the northern portion and the other in the southern portion of the sector. The Hydrology Study recommends any development be confined to these two sites. Flood evacuation will need to be further considered.

Key Outcomes (Continued)

***Southern Buffer Area* (Continued)**

- The Hydrology Study recommends that residential development in the northern site may be possible, while development in the southern site should be restricted to commercial and industrial land uses. Active and passive open space are the only land uses recommended by the Study for the remainder of the Southern Buffer.

- To allow development in the Southern Buffer to occur, the Study recommends Pittwater Road and Jacksons Road should be raised to a suitable level to provide sufficient evacuation time.

- To provide safe access for evacuation Boondah Road (north) will need to be raised to a suitable level.

Flood Emergency Response

- The Hydrology Study has recommended that planned flood isolation (i.e. 'shelter-in-place') not be allowed in situations where isolation occurs for longer than six hours.

- NSWSES have advised that evacuation is the only primary flood emergency response method. This raises concerns regarding planned flood isolation as an emergency response method.

- The Department is currently undertaking an intra-government review of its flood evacuation policy position. This study and any revised policy are expected to be forthcoming in 2013.

7.2 Urban Design Study

The Warriewood Valley Urban Design Study was prepared by HBO+EMTB Urban and Landscape Design Pty Ltd (HBO+EMTB).

The Urban Design Study aimed to determine the best urban design outcome for the undeveloped residential land throughout Warriewood Valley and the Southern Buffer.

Methodology involved an initial examination of the constraints and opportunities to development, including scale and form of existing development, topography, natural features, biodiversity, flooding and bushfire and the visual impact of taller buildings.

7.2.1 Residential Development

A concept diagram was prepared for each identified residential site, showing the preferred built form and road layouts. Site amalgamations have been assumed.

Sub-sectors 901D and Buffer 10A.1 and 10A.2 were not recommended for residential development due to existing environmental constraints affecting the land. Sub-sector 901E was also not recommended for residential development, instead to be retained as a battle-axe entry access.

Table 3 summarises the findings for each site or amalgamated site (as shaded). For those sectors shaded in Table 3, the density is contingent upon the amalgamation of the specified sites.

Table 3: Summary of Urban Design Study Outcomes for Residential Sectors

Sector ID	Property Address	Recommended Density (dwellings per hectare)*	Storeys	Dwellings	Additional to 2010 Framework
101	165-167 Warriewood Road	26	2	4	3
301	20-22 Macpherson Street	38	2-3	63	21
302 & 303	Lot 18 & Lot 19 Macpherson Street	37+	2-3	130**	41
501A	4 Forest Road	4	2	4	19
501B	8 Forest Rd	42	2-4	90	
801	23B Macpherson Street	51	2-3	61	42
901A	East of Fern Creek Road	36+	2-3	263	175
901B	West of Fern Creek Road	39	3	43	
901C & G	West of Fern Creek Road	77+	4-5	102	
901D	1 Fern Creek Road	*Proposed parkland*			
901E	12 Orchard Street	*Retain as battle-axe entry*			
901F	14 Orchard Street	8	2	11	
901H	4 & 5 Fern Creek Road	1	2	1	
10A.1	115 Orchard Street	*No development potential due to APZ requirements*			-14
10A.2	111, 111a & 113 Orchard Street				
10B	109 Orchard Street	20	2-3	45	17
Buffer 1a	*Previously known as 61 Warriewood Road*	*Not tested - 15 dwellings under construction*++			
Buffer 1b, 1c, 1d & 1e	53, 53a, 53b & 53c Warriewood Road	36+	2-3	66	24
Buffer 1f, 1g & 1h	49, 45, 43 Warriewood Road	55+	2-3	75	43
Buffer 1i, 1j & 1k	41, 31 & 29 Warriewood Road	53+	2-3	165	98
Buffer 1l	23, 25 & 27 Warriewood Road	32	2-3	67	24
Buffer 2a (Option 1 & 2)	4 Macpherson Street *(Option 2 utilises additional flood storage at 2 Macpherson Street [Buffer 1m])*	22/33+	3	29/43	9/23
Buffer 3b	5 & 7 Macpherson Street	*Not tested- Anomaly*			0
				TOTAL ADDITIONAL DWELLINGS	498/512

** Density calculated on the developable area (site area minus are as identified environmentally sensitive)*
+Density contingent upon amalgamation of specified sectors
*** Incorrect total shown in Urban Design Study (129 dwellings)*
++Sector no longer considered undeveloped. Development substantially commenced onsite in 2011/20121.

7.2.2 Development of the Southern Buffer

Large areas of the Southern Buffer are flood prone and some lands have high biodiversity value. The Urban Design Study proposed earthworks to create two flood-free development sites in the north east and south west corners of the Southern Buffer.

In the north west corner, residential development of a similar scale and form to the adjacent and approved 14-18 Boondah Road development has been proposed for 3-4 storey residential buildings containing 66 dwellings. A new mixed-use centre on the corner of Pittwater Road and Jacksons Road has been proposed in the south west corner.

When considering the most appropriate scale and form of the mixed-use centre, the Urban Design Study considered:

- The perceived need for large floor plate retail in the area
- The perceived need for an urban square/town centre in Warriewood Valley
- The adjacent Warriewood Square and the opportunity to consolidate similar uses in the same area
- The public transport route along Pittwater Road
- The opportunity to provide prime retail frontage to Pittwater Road
- The good vehicular access to Pittwater Road and the opportunity to separate service vehicle access from local traffic
- The ability to locate taller development to the north of the area so as to provide casual surveillance of the proposed open space and also to limit overshadowing to the south.

The Urban Design Study proposed the mixed-use centre could include:

- A mix of land uses such as retail, large floor-plate retail, commercial office space, residential development and community facilities
- Commercial/retail buildings up to 4 storeys with visually active frontages and pedestrian entries on Pittwater Road and Jacksons Road
- Residential buildings up to 6 storeys overlooking the recreation areas to the north
- A public square on the northern side of the centre, lined with small scale retail outlets, restaurants and cafes, which could provide for public gatherings
- A direct pedestrian link to Warriewood Square
- A realignment of Boondah Road
- Integration of pedestrian and bicycle networks around the mixed-use centre into existing networks.

The Urban Design Study included design principles for the future development of a mixed-use centre in the Southern Buffer. These principles have been considered in conjunction with the findings of the other studies and have informed the principles contained in Chapter 8.

Key Outcomes

Residential

- The Urban Design Study recommended a dwelling density range from 1 to 77 dwellings per hectare for amalgamated sectors, and maximum building heights between 2 and 5 storeys.

- The following *individual* sectors were recommended for a higher density:

Sector ID	Property Address	2010 Density	Urban Design Density
101	165-167 Warriewood Road	15/Ha*	26/Ha
301	20 Macpherson Street	25/Ha	38/Ha
501B	8 Forest Road	25/Ha*	42/Ha
801	23B Macpherson Street	25/Ha	51/Ha
10B	109 Orchard Street	15/Ha*	20/Ha
Buffer 1l	23, 25 & 27 Warriewood Road (considered as single parcel in 2010 Planning Framework)	25/Ha**	32/Ha
Buffer 2a (Option 1)	4 Macpherson Street	Design specific (max 20 dwellings)	22/Ha

**Density achieved across the whole sector rather than calculated on individual land parcels*
***Density calculated with the first 15m fronting the street at 10/Ha and remainder at 25/Ha*

- The following *amalgamated* sectors were recommended for a higher density:

Sector ID	Property Address	2010 Density	Urban Design Density
302 & 303	Lot 18 & Lot 19 Macpherson Street	25/Ha	37
901A	East of Fern Creek Road	25/Ha*	36
901C&G	West of Fern Creek Road	25/Ha*	77
Buffer 1b, 1c, 1d & 1e	53, 53a, 53b & 53c Warriewood Road	25/Ha*	36
Buffer 1f, 1g & 1h	49, 45, 43 Warriewood Road	25/Ha**	55
Buffer 1l, 1j & 1k	41, 31 & 29 Warriewood Road	25/Ha**	53
Buffer 2a (Option 2)	4 Macpherson Street (with additional flood storage utilised at Buffer 1m (2 Macpherson Street))	Design specific (max 20 dwellings)	33

**Density achieved across the whole sector rather than calculated on individual land parcels*
***Density calculated with the first 15m fronting the street at 10/Ha and remainder at 25/Ha*

Key Outcomes (Continued)

- The Urban Design Study recommended a reduced density for the sectors listed in the following table (compared to the 2010 Planning Framework):

Sector ID	Property Address	2010 Density	Urban Design Density
501A	4 Forest Road (formerly as part of Sector 5)	25/Ha*	4/Ha
901D	1 Fern Creek Road (formerly as part of Sector 901)	25/Ha*	*No density recommended***
901E	12 Orchard Street (formerly as part of Sector 901)	25/Ha*	*No density recommended****
901F	14 Orchard Street (formerly as part of Sector 901)	25/Ha*	8/Ha
901H	4 & 5 Fern Creek Road (formerly as part of Sector 901)	25/Ha*	1/Ha
10A.1	115 Orchard Street	15/Ha*	*No density recommended***
10A.2	111, 111a & 113 Orchard Street	15/Ha*	*No density recommended***

** Density achieved across the whole sector rather than calculated on individual land parcels*
*** No density recommended due to existing environmental constraints*
****No density recommended. To be retained as battle-axe entry access*

Southern Buffer Area

- Two sites in the north-east and south-west corners of the Southern Buffer were identified as having some limited development potential, given the flood prone nature of the land and the required cut and fill.

- Residential development was identified for the north-west corner and a mixed-use centre was identified for the south-east corner.

- Design principles should guide future development of the Southern Buffer area.

7.3 Strategic Transport Study

The Strategic Transport Study was prepared by AECOM Australia Pty Ltd (AECOM).

The Strategic Transport Study determined traffic impacts of future development scenarios of the undeveloped residential land throughout Warriewood Valley and the Southern Buffer.

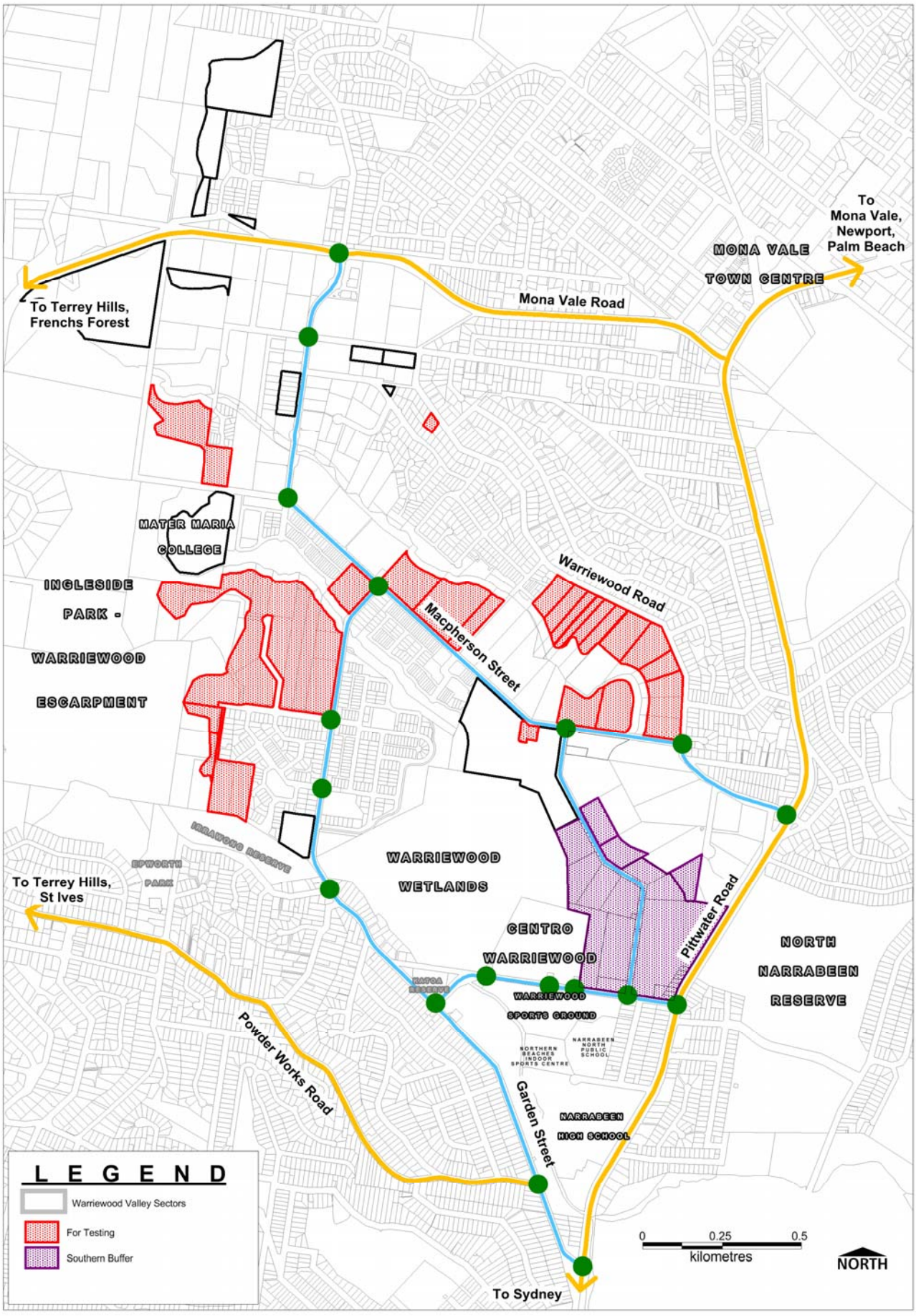
The Strategic Transport Study also identified the works required to mitigate any identified impact of development on the road network.

The Study looked at four land use scenarios:

- Scenario 1 – the baseline case which represents the traffic impact of the 2,224 existing, committed and expected dwellings in Warriewood Valley under current controls
- Scenario 2 – a future residential scenario which models the impact of 2,739 dwellings in Warriewood Valley based on existing and committed development and a density of approximately 40 dwellings per hectare on the undeveloped residential land
- Scenario 3 – 2,739 dwellings plus development of the Southern Buffer with a 20,000m^2 mixed-use centre and 80 additional dwellings
- Scenario 4 – 2,739 dwellings per Scenario 2 plus development of the Southern Buffer with a 60,000m^2 mixed-use centre and 160 additional dwellings.

The Study details assumptions regarding existing traffic volumes, patterns of travel, proposed road and intersection upgrades and the additional traffic generated by each scenario. It assessed the likely traffic impact of the four scenarios on the local road network and key intersections, shown in Map 10.

Map 10: Intersection Count Locations
Source: AECOM (2011) *Warriewood Valley Strategic Review Transport Study*



7.3.1 Scenario 1

All key intersections operate within capacity and are at an acceptable level of service in the am and the pm peaks. Scenario 1 assumes that the intersection upgrades identified in the *Warriewood Valley Roads Masterplan* (2006) are completed.

7.3.2 Scenario 2

All key intersections (with the exception of the Powder Works Road/Garden Street intersection) operate within capacity and are at acceptable levels of service in the am and pm peaks. The additional 370 peak hour trips generated by Scenario 2 would have a minimal impact on the intersection performance of the arterial and collector road network.

A dedicated right turn bay on the Garden Street northern approach with a clearway operating on the through lane, and the lengthening of the left turn lane on the Garden Street southern approach could address issues with the Powder Works Road/Garden Street intersection. However, this would necessitate the removal of approximately 100 metres of existing parking on both sides of Garden Street approaching the intersection.

7.3.3 Scenario 3

All key intersections (with the exception of the Pittwater Road/Jacksons Road intersection) operate within capacity and are at acceptable levels of service in the am and pm peaks (assuming the mitigation measure proposed for Scenario 2 has been carried out).

High capacity on the right hand turn from Pittwater Road into Jacksons Road in the southbound direction could be mitigated by lengthening the dedicated right hand turn from Pittwater Road from 50 metres to 200 metres.

7.3.4 Scenario 4

All key intersections (with the exception of the Pittwater Road/Jacksons Road intersection) operate within capacity and are at acceptable levels of service in the am and pm peaks (modeling assumes mitigation measures in Scenario 2 and Scenario 3 have been carried out).

Further mitigation measures to the Pittwater Road/Jacksons Road intersection would be required to improve the capacity and performance of the intersection. This includes:

- Addition of a new right turn lane from the Pittwater Road northern approach of approximately 140 metres
- An additional lane on Jacksons Road creating two exit lanes westbound heading from the intersection
- Re-marking the existing eastbound land configuration of Jacksons Road to create a double right turn lane.

Modeling and diagrams of proposed mitigation measures are contained in the Strategic Transport Study.

The Strategic Transport Study concludes that for each development scenario, assuming proposed upgrades and mitigation measures are undertaken, there are no major traffic constraints to development in Warriewood Valley.

Key Outcomes

- All key intersections (with the exception of the Powder Works Road/Garden Street and Pittwater Road/Jacksons Road intersection) operate within capacity and are at acceptable levels of service in am and pm peaks.

- Mitigation measures are recommended for these intersections to accommodate the proposed increased residential development in Warriewood Valley and proposed development in the Southern Buffer sector.

7.4 Economic Feasibility Study

The Economic Feasibility Study was prepared by Hill PDA Pty Limited (Hill PDA). The objectives of the Economic Feasibility Study were to:

- Provide an economic assessment of the feasibility of several residential density scenarios
- Provide an economic assessment of development scenarios for a mixed-use centre in the Southern Buffer.

7.4.1 Residential Development

Four representative sites across Warriewood Valley were tested at the current permissible densities as well as at the densities proposed by the Urban Design Study.

- Sector 301 (20 Macpherson Street) – current density 26 dwellings per hectare and proposed density 38 dwellings per hectare
- Buffers 1F, 1G and 1H (49, 45, 43 Warriewood Road) – current density 23 dwellings per hectare and proposed density 54 dwellings per hectare
- Sectors 10B (109 Orchard Street) – current density 12.5 dwellings per hectare and proposed density 20 dwellings per hectare
- Sub-sector 901A (Garden Street) – current density 13.5 dwellings per hectare and proposed density 33.5 dwellings per hectare

Using the internal rate of return (IRR) as the primary indicator of feasibility (and assuming state and local developer contributions of $50,000 per dwelling), the Economic Feasibility Study found the development of only one of the four sites tested (sub-sector 901A) was economically feasible at the current density.

At the densities achievable based on the preferred urban design outcome outlined in the Urban Design Study, the economic feasibility of the four sites generally worsened, primarily due to the higher cost of construction associated with building apartment blocks and basement car parking.

A third hypothetical scenario of higher densities (up to 60 dwellings per hectare) over the four sites improved the viability of development; however, this scenario generally conflicts with the Urban Design Study outcomes.

Dwelling densities must be set at a level that ensures economic viability of development. Assuming state and local contributions of $50,000 per dwelling, the Study recommended the following minimum density thresholds:

- Apartment buildings: 60 dwellings per hectare
- Small lot housing and townhouse development: 30 dwellings per hectare.

If basement parking is to be provided in these developments, the density threshold should be increased.

The Economic Feasibility Study notes the lack of residential development site sales in recent times, indicative of a lack of developer confidence and other external factors.

7.4.2 Development of the Southern Buffer

The Study also assessed the feasibility of a mixed-use centre in the Southern Buffer, considering:

- The existing centres hierarchy within the Pittwater LGA
- Demographics, population and household growth forecasts
- The role of Warriewood Square.

The retail market within the broader North East Subregion is dominated by the Brookvale-Dee Why major centre. However, population growth and rising household incomes has driven demand for additional retail floor space within the Subregion.

The Economic Feasibility Study found:

- Existing retail undersupply in the Pittwater LGA,
- Significant underlying growth in retail demand in Warriewood Valley and Pittwater LGA
- Growth in demand for commercial uses
- Many of the existing centres in the Pittwater LGA are constrained from expanding by the established surrounding land uses.

The Economic Feasibility Study supported the principle of expansion of the Warriewood Valley retail area to potentially address Pittwater Road, to create a focal point for the Warriewood Valley community and to help stem the escape of retail expenditure from the Pittwater LGA.

Three notional development schemes for a mixed-use centre in the Southern Buffer considered the expected trade area, the economic viability and impact on the centres hierarchy of each option.

- Option 1 – a mixed-use development over 4 storeys (with a gross lettable area of 20,000m^2 of general retail space, 27,000m^2 of bulky goods space, around 4,500m^2 of commercial floor space and around 7,500m^2 of residential development).
- Option 2 – a homemaker (bulky goods) centre over a single level with a gross lettable area of approximately 23,700m^2.
- Option 3 – a subregional shopping centre with discount department store over a single level with approximately 20,100m^2 of lettable floor space.

The Economic Feasibility Study found that:

- Option 1 is not economically viable, principally due to its multi-storey format and layout.
- Option 2 appears attractive from a market demand perspective. It would capture the current levels of escape expenditure experienced by the Pittwater LGA and would complement the stand-alone Warriewood Square. However, it may not meet the needs of the local community or contribute to creating a lively town centre in Warriewood Valley. Its economic viability is marginal. Viability could be enhanced by a higher proportion of at-grade car parking.
- Option 3 is the most economically viable option, although it may result in a missed opportunity to retain expenditure on bulky goods currently escaping the Pittwater LGA and it may not be as desirable

from a centres hierarchy perspective. It does create a town centre opportunity which will benefit the local community.

Considering the above analysis, the Economic Feasibility Study recommends a subregional shopping centre (Option 3) without a discount department store. Without a discount department store, the centre would in be the order of 10,000m^2 to 12,000m^2, which would complement the existing retail hierarchy and help create a town centre for Warriewood Valley.

Key Outcomes

Residential

- Small lot housing and townhouse developments needs to achieve a minimum 30 dwellings per hectare to be economically feasible.
- Apartment building developments need to achieve a minimum 60 dwellings per hectare to be economically feasible.
- The recommended minimum density thresholds were based on potential earthworks, lot amalgamation, infrastructure requirements, and assumed a developer contribution of up to $50,000 per dwelling (State and Local contribution).
- Basement car parking increases the density threshold.
- Residential development projects are unlikely to be feasible if developer contributions are above the $50,000 per dwelling.

Southern Buffer Area

- A single level subregional shopping centre in the Southern Buffer that complements Warriewood Square and fosters the creation of a town centre in Warriewood Valley is the most economically viable option.

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Recommendations for Residential Densities

Continue to encourage diversity in housing choice to create a liveable and sustainable community

Photo by: Amanda Clarke 2011

Chapter 8

8.0 Recommendations for Residential Densities

8.1 Introduction

The Strategic Review looked for opportunities to provide additional housing and a greater range of housing types to meet changing needs of the population.

It makes sense to increase residential density in parts of Pittwater close to existing and planned facilities and services. However, this must be balanced with environmental protection, economic feasibility for both developers and Council and retaining amenity for existing residents.

8.2 Flood Evacuation Issues

The recommendations of the Urban Design Study, Economic Feasibility Study and Strategic Transport Study are based on advice provided through the Hydrology Study regarding flood constraints, cut and fill requirements and the likely impact and management of the flood regime in the Release Area.

During the investigative stage of the Strategic Review AECOM, the Hydrology consultant, and the NSWSES raised issues relating to the evacuation of residents from Warriewood Valley needing to be at the PMF level and that 'shelter in place' was not a satisfactory response to flooding. From an operational perspective the NSWSES has endorsed this as the appropriate position.

As a result of the NSW SES position, the Department is undertaking an intra-government study of its flood evacuation policy position to resolve a consistent approach to land release development and flood evacuation. The results of this study may be forthcoming in 2013. However, it should be noted that this will not delay the progress of any future planning proposals in the Warriewood Valley.

8.3 Recommendations for Residential Densities

The PCG considered opportunities for landowners of individual land parcels to develop on their own and ways to ensure the viability of development opportunities by increasing density to 32 dwellings per hectare, where appropriate. To enable development to proceed in a timely manner, the Strategic Review recommends that with the exception of Sector 501,[10] the 'sector-based' approach (previously required for the development of land in the release area) be relinquished to allow the remaining undeveloped sectors to be developed as separate land parcels rather than as a sector.

Generally, the densities recommended will result in an urban form and scale similar to that already existing in Warriewood Valley, as illustrated in Figure 2. Future development will be constrained by a requirement for building heights to be limited to 2 storeys at the street frontage and 3 storeys at the rear.

In recognition of unsuccessful landowner efforts to progress a masterplan and rezoning application for Sector 901 and the various environmental attributes that differentiate

[10] Sector 501 consists of two properties that have completed masterplanning process and established water management, road and built form arrangements and therefore should be developed as a sector. .

parts of the sector, the Strategic Review recommends that sector 901 be broken up into various subsectors to allow development to proceed in a timely manner.

Given the fewer environmental constraints affecting the eastern portion of Sector 901, the exhibited report recommended that the properties within sub-sector 901A amalgamate and develop as a sector at 36 dwellings per hectare, based on the opportunity to achieve 3 storey apartment buildings. This will provide diversity in housing stock within the release area, consistent with the determinations of the PAC.[11]

Since exhibition however, a landowner within sub-sector 901A has confirmed their intention not to accommodate any residential form. As such, the opportunity for sub-sector 901A to amalgamate and develop at 36 dwellings per hectare is lost. Consistent with the proviso contained in the exhibited document; where sub-sector 901A does not amalgamate, the maximum density able to be achieved for individual properties in sub-sector 901A is reduced to 32 dwellings per hectare.

Some of the western sub-sectors of Sector 901 (901D, E, G and H), as well as Sectors 10A.1 and 10A.2 and 120 Mona Vale Road, were identified as being affected by significant constraints and would only have limited, if any, capacity for development, considerably less than 25 dwellings per hectare. The onus would be on the landowner to seek rezoning, supported by necessary environmental studies.

In addition, Buffer 1a was not tested by the Urban Design Consultant, in recognition of the development currently underway on the site.

A summary of the recommended density for each sector with identified potential for density increase is in Table 4.

[11] Planning Assessment Commission Determination Report on Concept Plan and Stage 1 Project Application for 14-18 Boondah Road Warriewood (18 January 2010).

Figure 2: Net Residential Density and Typical Housing Types
Source: Landcom (2011) *Reference Chart Net Residential Density*

Table 4: Recommended Residential Densities and Yields

Sector	2010 Framework Yield	Recommended Density	Recommended Yield	Additional to 2010 Framework
101	1	26/Ha	4	3
301	42	32/Ha	53	11
302	66	32/Ha	84	18
303	23	32/Ha	29	6
501	75	32/Ha	94[+]	19
801	19	32/Ha	38**	19
901A & road reserve *(excluding 9 Fern Creek Road)*	*156[++]*	32/Ha	192	36
901B	*12[++]*	32/Ha	36	24
901C	*17[++]*	32/Ha	22	5
901D & road reserve	*14[++]*	*No density allocated****	*0*	*-14*
901E	*2[++]*	*No density allocated****	*0*	*-2*
901F	*14[++]*	10/Ha	14	0
901G	*16[++]*	*No density allocated****	*0*	*-16*
901H	*14[++]*	*No density allocated****	*0*	*-14*
10A.1	8	*No density allocated****	*0*	*-8*
10A.2	6	*No density allocated****	*0*	*-6*
10B	28	20/Ha	45	17
Buffer 1a	17	*15 dwellings under construction*	*15*	*-2*
Buffer 1b	17	32/Ha	24	7
Buffer 1c	13	32/Ha	18	5
Buffer 1d	1	32/Ha	1	0
Buffer 1e	11	32/Ha	15	4
Buffer 1f	14	32/Ha	21	7
Buffer 1g	17	32/Ha	23	6
Buffer 1h	1	32/Ha	1	0
Buffer 1i	27	32/Ha	39	12
Buffer 1j	26	32/Ha	40	14
Buffer 1k	14	32/Ha	21	7
Buffer 1l	43	32/Ha	67	24
Buffer 2a	20	22/Ha	29	9
Buffer 3b	7	32/Ha	9	2
120 Mona Vale Road	*Not included in 2010 Planning Framework*	*No density allocated****	*0*	*0*
			TOTAL ADDITIONAL DWGS	**193**

[+]Incorrect total (99 dwellings) shown in Exhibited Report and Urban Design Study. Correct total 94 dwellings.
***Construction may be commenced under current Development Consent for 46 dwellings and Focal Neighbourhood Centre (approved under SEPP (Affordable Rental Housing)).*
[++]Proportional yields based on 2010 Planning Framework allocation. 2010 Planning Framework allocated a total yield of 245 for whole of Sector 9, based on densities between 10 and 25/Ha achieved in various parts of sector.
**** Strategic Review does not recommend a density for these sectors. Limited capacity for development, significantly less than 25 dwellings per hectare. Landowner may seek rezoning.*

8.4 Site Amalgamations

While a mix of dwelling forms represents a more desirable urban outcome, this is difficult to achieve on smaller sites throughout the Valley. There may be opportunities for a greater mix of housing types, including low-rise apartment buildings, through sector amalgamations. Landowners may wish to consolidate sites as a means of achieving better quality outcomes at a density of 32 dwellings per hectare. For example, properties fronting Orchard Street may take advantage of the available closed Orchard Street road reserve (and amalgamate) for its future development.

In addition to the sectors recommended for amalgamation in the Urban Design Study, there may be opportunities for other sectors within the release area to amalgamate to maximise development opportunities.

8.5 Total additional dwellings

The net increase in dwellings, as a result of the Strategic Review's density recommendations for specified sectors, is an additional 193 dwellings above the 2010 Planning Framework's yield allocation. A summary of the additional dwellings recommended for these sectors is outlined in Table 4.

8.6 Sustainability Assessment

For those sites identified with capacity for increased density, the recommended density of 32 dwellings per developable hectare (up from 25 dwellings per developable hectare) should provide financially viable, sustainable development outcomes enabling completion of the Warriewood Valley land release project.

The Release Area's environmental and hydrological attributes continue to be valued and in some cases, reaffirmed that land be set aside for preservation of natural habitats.

The Strategic Review concludes that there will be little or negligible environmental impact from the additional dwellings. An amenable residential environment will be delivered with opportunities to rehabilitate existing creekline corridors and enhance existing open space areas with connected pedestrian and cycle links.

Map 11: Recommended Residential Densities (to be read in conjunction with Table 4)

Key Outcomes

- The maximum density recommended for the majority of undeveloped land in Warriewood Valley is 32 dwellings per hectare, resulting in an additional 193 dwellings.
- Sub-sectors 901D, E, G and H and Sectors 10A.1 and 10A.2 have not been identified as having significant capacity for development.
- The table below lists those sectors tested for increased density, and compares the density attributed under the 2010 Planning Framework against the Strategic Review's recommended density:

Sector ID	Property Address	2010 Density	New Density	2010 Yield	New Yield	Additional Dwellings
101	165-167 Warriewood Rd	15/Ha*	26/Ha	1	4	3
301	20 Macpherson St	25/Ha*	32/Ha	42	53	11
302	18 Macpherson St	25/Ha*	32/Ha	66	84	18
303	16 Macpherson St	25/Ha*	32/Ha	23	29	6
501	4 & 8 Forest Rd	25/Ha*	32/Ha	75	94	19
801	23B Macpherson St	25/Ha*	32/Ha	19	38	19
901	*See Separate Table*[+]	25/Ha**	*Various*	245**	264	19
10A.1	115 Orchard Street	15/Ha*	-	8	0	*-8*
10A.2	111,111a & 113 Orchard St	15/Ha*	-	6	0	*-6*
10B	109 Orchard St	15/Ha*	20/Ha	28	45	17
Buffer 1a	*Formally known as 61 Warriewood Rd*	25/Ha[++]	*No change – development substantially commenced*	17	*15 dwgs under construction*	*-2*
Buffer 1b	53 Warriewood Rd	25/Ha[++]	32/Ha	17	24	7
Buffer 1c	53a Warriewood Rd	25/Ha[++]	32/Ha	13	18	5
Buffer 1d	53b Warriewood Rd	25/Ha[++]	32/Ha	1	1	0
Buffer 1e	53c Warriewood Rd	25/Ha[++]	32/Ha	11	15	4

** Density achieved across the whole sector rather than on individual land parcels*
[+]Sector 901 – divided into sub-sectors as a result of environmental attributes
********While the 2010 Planning Framework allocated 25/Ha for the former Sector 9, it recognised that some parts of the sector would only achieve 10/Ha. The 2010 Framework total yield for Sector 9 was calculated on densities between 10/Ha and 25/Ha across various land parcels.*
[++]Density calculated with the first 15m fronting the street at 10/Ha and remainder at 25/Ha

Key Outcomes (Continued)

Sector ID	Property Address	2010 Density	New Density	2010 Yield	New Yield	Additional Dwellings
Buffer 1f	49 Warriewood Rd	25/Ha*	32/Ha	14	21	7
Buffer 1g	45 Warriewood Rd	25/Ha*	32/Ha	17	23	6
Buffer 1h	43 Warriewood Rd	25/Ha*	32/Ha	1	1	0
Buffer 1i	41 Warriewood Rd	25/Ha*	32/Ha	27	39	12
Buffer 1j	31 Warriewood Rd	25/Ha*	32/Ha	26	40	14
Buffer 1k	29 Warriewood Rd	25/Ha*	32/Ha	14	21	7
Buffer 1l	23,25 & 27 Warriewood Rd	25/Ha*	32/Ha	43	67	24
Buffer 2a	4 Macpherson St	*Max 20 dwgs*	22/Ha	20	29	9
Buffer 3b	5 & 7 Macpherson St	25/Ha*	32/Ha	7	9	2
					TOTAL ADDITIONAL DWELLINGS	**193**

** Density calculated with the first 15m fronting the street at 10/Ha and remainder at 25/Ha*

- Sector 901 should be divided into sub-sectors based on various environmental attributes.
- Sub-sectors 901D, 901E, 901G and 901H have limited capacity for development and have not been allocated a density/yield.
- The density and yield suggested for sub-sectors of Sector 901 are tabled below:

Sector 901 sub-sectors	Property Address	2010 Density	New Density	2010 Yield	New Yield	Additional Dwellings
901A	Lot 13 DP1092788, 10 Fern Creek Rd, 2, 4 & 6 Orchard St & Orchard St Road Reserve (eastern side Fern Creek Rd)	25/Ha*	32/Ha	156*	192	36
901B	2 Fern Creek Rd		32/Ha	12*	36	24
901C	Lot 12 Dp1092788		32/Ha	17*	22	5
901D	1 Fern Creek Rd & Orchard St Road Reserve (western side Fern Creek Rd)		-	14*	*0*	*-14*
901E	12 Orchard St (battleaxe portion only)		-	2*	*0*	*-2*
901F	14 Orchard St (southern portion only)		10/Ha	14*	14	0
901G	Lot 11 DP1092788		-	16*	*0*	*-16*
901H	4 & 5 Fern Creek Rd (northern portion only)		-	14*	*0*	*-14*
					SECTOR 901 TOTAL ADDITIONAL DWELLINGS	**19**

***While the 2010 Planning Framework allocated 25/Ha for the former Sector 9, it recognised that some parts of the sector would only achieve 10/Ha. The 2010 Framework total yield for Sector 9 was calculated on various parts of sector achieving densities between 10/Ha and 25/Ha.*

Key Outcomes (Continued)

- The following sectors have capacity for increased density and have a safe evacuation route in PMF events:
  - Sector 101
  - Buffer 1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l

- The following sectors do not have evacuation routes clear of the PMF event. A clear flood emergency response acceptable to the State Government must be established as part of the rezoning of these sectors:
  - Sector 301, 302, 303
  - Sector 501
  - Sector 801
  - Sub-sector 901A, 901B, 901C, 901F
  - Sector 10B
  - Buffer 2a
  - Buffer 3b

Recommendations for the Southern Buffer

A vision for the area that inspires the community and stakeholders

Photo by: Amanda Clarke 2011

Chapter 9

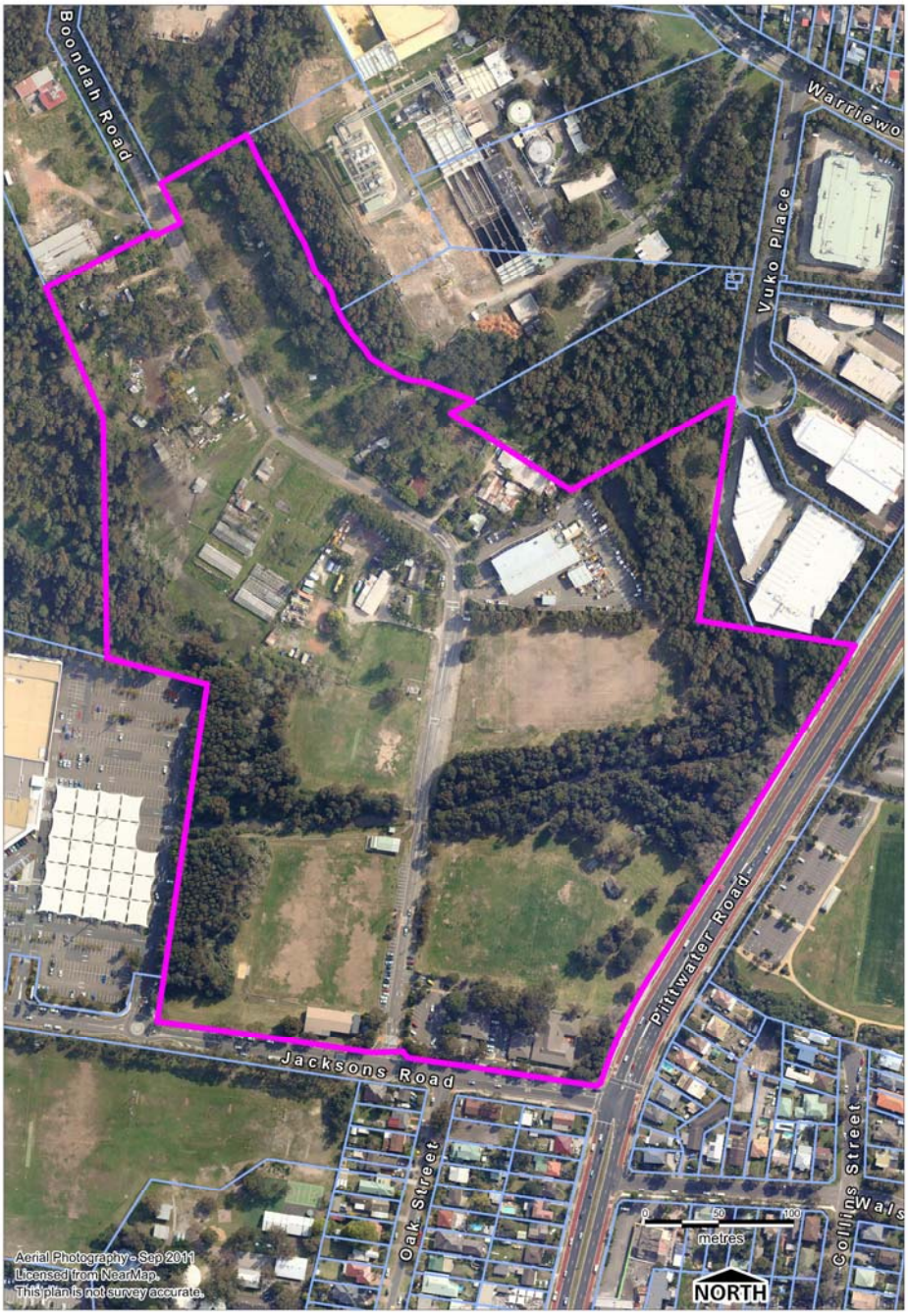
9.0 Recommendations for the Southern Buffer

9.1 Southern Buffer Extent

The Southern Buffer, formerly known as Sector 15, Sector B and part of Sector 17, is located at the junction of Pittwater Road and Jacksons Road. This area is around 29 hectares and immediately adjoins Warriewood Square.

Prior to the Strategic Review, this was the only area remaining in Warriewood Valley to be fully investigated.

Figure 3: Southern Buffer Sector Extent



9.2 Outcome of Hydrology Study

The Hydrology Study determined that compensatory cut and fill across significant portions of the sector was required for development to occur in two developable 'islands' of the Southern Buffer: one in the north western corner adjoining Boondah Road and the other in the southern portion along Jacksons Road. Based on the cut and fill solution proposed, the Hydrology Study recommended suitable land uses for the Southern Buffer. It was determined that, for flood engineering reasons, no building footprint could be located in the central area of the sector.

The areas within the Southern Buffer with development capacity are on separate land parcels and under separate ownership. As the areas to be 'cut' are essential to those areas to be 'filled' and developed, development will require negotiation and agreement between landowners.

9.3 The Role of the Centre in the Centres Hierarchy

Any new centre in the Southern Buffer must address its role and position in the established centres hierarchy, especially given its proximity to Warriewood Square.

Warriewood Square is described in the *Draft North East Subregional Strategy* as a stand-alone centre - that is:

> *'Internalised, privately owned centres located away from other commercial centres, containing many of the attributes of a Town Centre but without housing or public open space - may have potential to become a traditional town centre in the long term.'*

Warriewood Square aligns the western boundary of the Southern Buffer, with direct access off Jacksons Road. The Southern Buffer can accommodate any future expansion of this centre provided there are clear, direct linkages between Warriewood Square and the southern developable 'island'.

The expanded centre (including Warriewood Square) will need to become a 'town centre' in its own right. This will require it to provide different retail and services offerings so that it does not impact on the economic viability of the Mona Vale Town Centre or North Narrabeen village centre.

9.4 Exhibited Draft Vision and Concept Plan for the Southern Buffer Precinct

9.4.1 Vision for the Southern Buffer

The overarching vision for the Southern Buffer precinct is:

'A sustainable, created space...to work, play and interact.
Where people come to meet and engage.
Connected with its community, in its setting.'

9.4.2 Southern Buffer Concept Plan Elements

The exhibited draft concept plan for the Southern Buffer is based on a mix of land uses and services that help to establish the area as a vibrant hub of leisure and lifestyle activities.

Residential development has been envisaged in the north-western developable portion of the sector, similar in scale and form to the adjacent,

approved 14-18 Boondah Road development (which will result in 3-4 storey residential buildings containing 67 dwellings).

The draft concept plan also envisages a new mixed-use centre in the southern developable portion, including retail uses, civic uses (current levels of civic floor space will need to be maintained), cafes, restaurants and an active public square, with opportunities for residential. This mixed-used centre will complement Warriewood Square.

The concept plan proposes the realignment of Boondah Road to maximise the area set aside for open space and to reduce vehicular-pedestrian conflicts.

Existing open space areas would be enhanced by pedestrian and cycling links.

9.4.3 Southern Buffer Precinct Design Principles

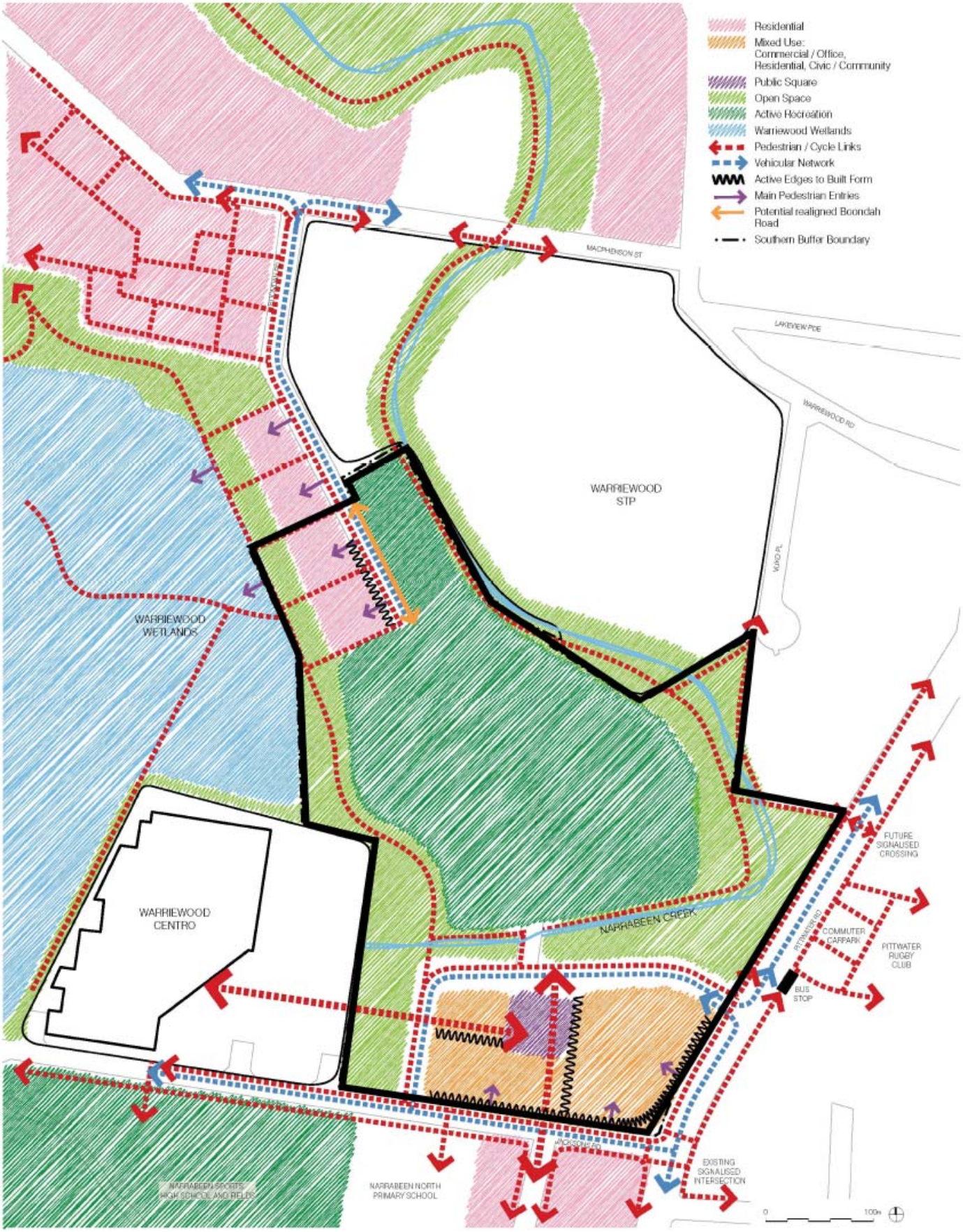
The following design principles have been developed for the Southern Buffer:

1. **Respond to the environmental constraints of the locality:**
   - Undertake earthworks to create flood-free development sites at the southeast and northwest corners of the Southern Buffer
   - Re-engineer Boondah Road to meet flood requirements
   - Adapt to the impacts of climate change
2. **Improve vehicular circulation in the Southern Buffer Precinct:**
   - Investigate a new local road around the new mixed-use centre
   - Put traffic calming measures in place in pedestrian areas
3. **Enhance pedestrian and bicycle links:**
   - Implement a fine grain pedestrian and cycle network around the active recreation space and mixed-use centre, with connections to existing and proposed paths
   - Provide a direct pedestrian links between the new public square, Warriewood Square and Jacksons Road
   - Provide canopies at all main pedestrian entries to provide weather protection
4. **Improve public open space and protect biodiversity:**
   - Realign Boondah Road to ensure that it does not dissect active recreation areas
   - Retain and enhance active recreation uses
   - Preserve and rehabilitate ecologically sensitive zones, especially the western ecological corridor extending north from Jacksons Road and adjoining Warriewood Square and Warriewood Wetlands.
   - Maintain a 25 metre inner corridor along each side of the creek line.
5. **Encourage the development of a vibrant, active mixed-use centre that will function as a focal point for the community:**
   - Create an exciting hub of leisure and lifestyle uses
   - Create a north-facing public square that looks out over the Narrabeen Creek corridor
   - Activate pedestrian links uses such as small scale retail outlets, cafes and restaurants

- Align buildings and entrances to street frontages and the new public square.
- Activate any future built form at the corner of Pittwater Road and Jacksons Road.

6. **Ensure a sustainable and attractive built form:**
   - Incorporate sustainability best practice
   - Encourage design excellence
   - Provide visually attractive building edges and pedestrian entries
   - Incorporate appropriate landscape treatments
   - Maintain clear view corridors between the new public square, Warriewood Square and Jacksons Road
   - Locate all utilities underground
   - Locate parking underground where possible or, if above ground, away from active edges.

Map 12: Exhibited Draft Concept Plan



9.5 Recommended Direction for the Southern Buffer

The exhibited Draft Concept Plan for the Southern Buffer is just one of a number of ways a mixed-use centre could be developed in the Southern Buffer. The decision to locate the proposed centre on the corner of Pittwater Road and Jacksons Road takes advantage of the major public transport corridor (with Pittwater Road nominated as the strategic bus corridor). Other well-established planning and urban design principles include the creation of an active hub for the community by concentrating uses in one location and synergies with the retail offering at Centro Warriewood. Environmental constraints, such as the riparian corridors and flooding, also influenced the location of the proposed centre.

The opportunity to include all landowners (both private and public) in the planning for the Southern Buffer was considered to offer the best opportunity to respond to the environmental constraints and provide the optimum development potential of the land.

Following the public exhibition of the Draft Strategic Review Report, it is clear that the community is generally opposed to the proposal. At this time, landowners also are reluctant to pursue a collaborative approach in developing the area.

It is recommended that the Draft Concept Plan for the Southern Buffer not proceed at this time.

Should landowners wish to pursue other development opportunities for their land, either individually or in partnership, they should do so through the preparation of a rezoning application, fully supported by the necessary studies including those matters highlighted by the Strategic Review (such as flood extent and potential impacts as a result of developing the land including cut and fill to provide building platforms above the flood level and low lying roads in the area would have to be raised if evacuation in the event of a major flood is to be achieved).

9.6 Sustainability Assessment

Any future development proposal for the Southern Buffer must incorporate sustainability best practice, taking into account the opportunities and constraints which have been identified through the Strategic Review.

Key Outcomes

- The Draft Concept Plan for the Southern Buffer will not be progressed.
- Development opportunities may however be pursued by landowners, individually or through a collaborative approach.
- Analysis of opportunities and constraints identified through the Strategic Review should inform, but not limit the future considerations for development in this precinct.
- The onus is on landowners, acting independently or in partnership, to investigate future opportunities and seek individual rezoning applications, accompanied by supporting documentation. Landowners will need to demonstrate how sustainable development can be achieved given the circumstances relevant to their land.

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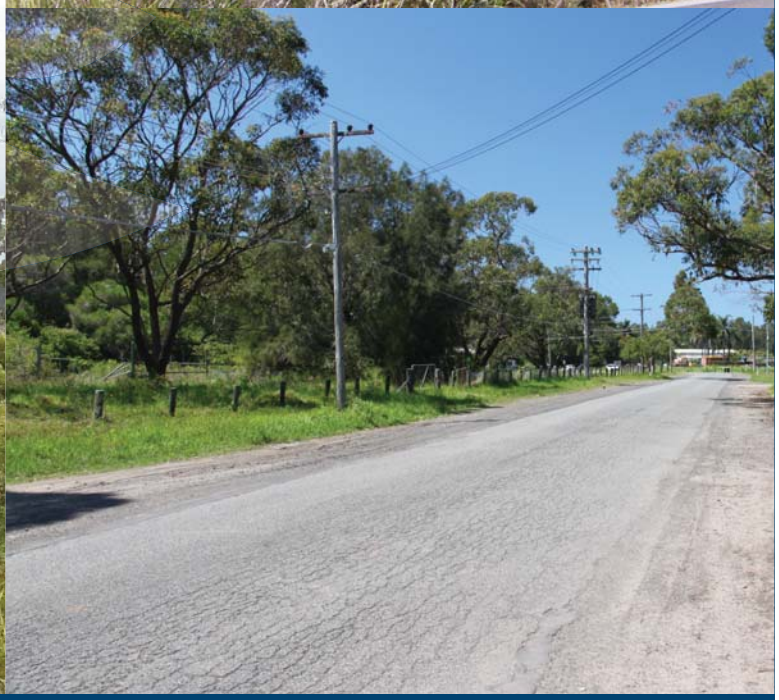
Provision of Infrastructure & Services

Planning and delivering infrastructure & services will create better places to live and work

Photo by: Amanda Clarke 2011



Chapter 10

10.0 Provision of Infrastructure & Services

10.1 Principles for the Provision of Infrastructure and Community Services

Infrastructure and services delivery has matched development in the Release Area. This coordinated approach ensures a safe and amenable development outcome, achieved via:

- Direct provision by developers.
- Section 94 Contributions to provide facilities and infrastructure.

Council has relied on direct provision of facilities and infrastructure by developers to achieve early delivery of facilities and infrastructure. This can be through conditions of the development consent or through utilisation of a Material Public Benefit rather than relying on Section 94 contributions that provide for facilities at a later date.

A key principle to the development of Warriewood Valley has been a sector-based approach (more in response to the fragmented ownership in the release area), whereby facilities and infrastructure directly related to the development of a sector is provided by the development process.

Infrastructure and facilities common to the overall Release Area are part of 'shared' system and, as they are considered to be beyond direct provision by the developer, they are incorporated into a Section 94 Contributions Plan. It should be noted that any change in flood evacuation policy has an impact on infrastructure costs that will need to be identified as part of a contributions plan.

Infrastructure, facilities and services need to address the requirements of the overall development of Warriewood Valley. A summary of existing infrastructure, facilities and services identified to address the needs of the Release Area is in Table 5.

Table 5: Existing Infrastructure & Services

Existing Identified Infrastructure & Facilities	Any additional requirements from outcomes of review	Recommendation
Stormwater management facilities	No additional requirements, still needs to be provided in accordance with adopted Water Management Specifications	Strategy for provision – retain & include in Section 94 Contributions Plan
Continued use of land (30%) for stormwater mgt credited to open space	Dual-use of land assists in delivering the quantum of open space required for total dwellings	Strategy for provision – retain & include in Section 94 Contributions Plan
Traffic and Transport	Increase in dwelling yield will require improvements to traffic and transport, as identified in AECOM Report and can be incorporated	Strategy for provision – retain & include in Section 94 Contributions Plan

Open Space and Recreation	Increase in dwelling yield will require additional quantum of open space and recreational areas, especially for sports fields. An initial analysis indicates future opportunity available to meet the required quantum of land.	Strategy for provision – retain & include in Section 94 Contributions Plan
Pedestrian and Cycleway Network	No additional requirements, still needs to be provided to ensure connected network within Valley and immediate surrounds.	Strategy for provision – retain & include in Section 94 Contributions Plan
Community Services & Library Resources	No additional community facility required as increase in dwelling yield can be accommodated in planned floorspace. Increase in dwelling yield will require additional library resources.	Strategy for provision – retain & include in Section 94 Contributions Plan

Each category of infrastructure and facilities identified above is still required in the development of Warriewood Valley. The strategies developed for each category of infrastructure and facilities, as expressed in the 2010 Planning Framework, will be retained and, where required, be amended accordingly (see Appendix 4) and will inform the preparation of a Section 94 Contributions Plan addressing the requirements of the resultant development anticipated for Warriewood Valley.

10.2 Services

Servicing capacity, such as utility services, must be identified and scheduled for delivery by servicing agencies. Utility service agencies and state agencies such as, Education and Training and Health have confirmed their ability to accommodate any increase in demand resulting from the Strategic Review.

10.3 Affordable Housing Provision

Affordable housing means '*housing that is appropriate for the needs of a range of very low, low and moderate income households, priced to ensure households are able to meet other essential basic living costs*'[12] and encompasses a range of housing options.

An emerging housing trend affecting Pittwater LGA and the Sydney Metropolitan Area has been the decline in housing affordability.

At its meeting of 21 February 2011, Council resolved:

> 6. *That Council support that in any future strategic review of Warriewood Valley that results in higher densities, that Council will seek to require 10% of any additional housing density be provided as 'affordable rental housing', managed by an appropriate Community Housing Provider in perpetuity.*

The cost of housing in Pittwater (and the wider Sydney metropolitan region) has increased faster than income in both the owner/occupier and rental markets. This is quite evident in Pittwater LGA, where house prices are higher than most of Sydney.

[12] Human Services Housing NSW (July 2010) *NSW Affordable Housing Guidelines*, 1.

When the cost of housing exceeds 30% of household income (for households earning less than 120% of the median income) this is referred to as 'housing stress'. Those most affected by housing affordability and housing stress are low and medium waged workers who provide essential community services[13] such as health, police, education, child and aged care.

If housing is not affordable for key workers this has the potential to distort the economies of an area by increasing the cost of business. The time and effort invested in commuting and the increased pollution and congestion have negative effects on quality of life and the environment. Increasing affordable housing is a key social and economic imperative.[14]

Demand for Affordable Housing

Tables 6 and 7 below indicate a significant number of very low and low income households in Pittwater are in housing stress

Table 6: Percentage of Affordable Rental Housing Stock Affordable to Very Low, Low and Moderate Income Households in Pittwater and the Sydney Statistical Division
Source: Valuers General (VG) & Rental Bond Board (RBB) Data

	% of Affordable Rental Housing Stock					
	Very Low Income Households		Low Income Households		Moderate Income Households	
	Pittwater	Sydney SD	Pittwater	Sydney SD	Pittwater	Sydney SD
Dec 2010	3	5	9	16	31	54

Table 7: Number of Very Low, Low and Moderate Income Households in Rental Stress in Pittwater and the Sydney Statistical Division in 2006
Source: ABS Census 2006

	Number of Households in Rental Stress in 2006					
	Very Low Income Households		Low Income Households		Moderate Income Households	
	Pittwater	Sydney SD	Pittwater	Sydney SD	Pittwater	Sydney SD
No in Rental Stress	388	65,475	436	36,611	421	22,500
% in Rental Stress	97	93	88	61	56	32
Total Renters	398	70,708	497	60,192	746	71,229

Council, in introducing this social initiative through its resolution of 21 February 2011 and reiterating it in the Local Planning Strategy, recognised the need to facilitate affordable rental housing to help alleviate housing stress. This requires housing to be priced well below private market rental and made available to local residents and/or local employees on low to moderate weekly incomes (who meet eligibility criteria set

[13] Epic Dot Gov & Glazebrook Associates (2004) 'Northern Beaches Key Worker Study', *Final Report to the NSW Departments of Housing and Infrastructure, Planning and Natural Resources, and Manly Warringah Council,* Sydney.
[14] Regional Development Australia (2010) *Regional Development Plan for Sydney,* an initiative by the Australian Federal Government and NSW State Government.

out in the *NSW Affordable Housing Guidelines*, July 2010), and managed by a Community Housing Provider.

Planning Mechanisms for Affordable Housing Provision

The recent review of the State Environmental Planning Policy (Affordable Rental Housing) 2009 identified the need to develop a new Affordable Housing Choice SEPP and the requirement for local government to develop LGA-specific Affordable Housing Choice Strategies that enable exemption from the Affordable Housing Choice SEPP. Preparation of this new SEPP has commenced.

Currently, the only mechanism to generate or produce affordable housing stock is limited under Section 94F of the EP&A Act or through direct provision via a Voluntary Planning Agreement.

The outcome of the Strategic Review results in an additional 193 dwellings. Any increase in dwelling yield will attract a need to provide affordable rental housing units, based on a 10% target. Any future residential development in the Southern Buffer will need to provide affordable housing at 10% of the total housing stock.

Council's resolution of 21 February 2011 set a 10% target for the provision of affordable rental housing in Warriewood Valley. The Section 94 Contributions Plan will need to consider opportunities to provide affordable rental housing.

Key Outcomes

- A Section 94 Plan will need to be prepared to account for the increase in dwelling yield and the infrastructure and service requirements of the total development, and future development in the Southern Buffer.
- The Economic Feasibility Study has advised that the feasibility of residential development relies on limiting the developer contribution rate (State and local) to approximately $50,000 per dwellings, less than the current $62,100 local levy.

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Conclusion

Warriewood Valley achieves "...very high quality outcomes for the urban fabric and public domain with strong FSD principles and triple bottom line reporting" 2008 UDIA - Public Sector Leadership Award

Photo by: Amanda Clarke 2011

Chapter 11

11.0 Conclusion

The Strategic Review provided opportunities to re-evaluate the dwelling densities applicable in Warriewood Valley as well as the requirements for infrastructure and services/facilities. It was also allowed an examination of the opportunities and constraints of the Southern Buffer.

The recommended dwelling density up to 32 dwellings per developable hectare should provide financially viable, sustainable development outcomes enabling completion of the Warriewood Valley Release Area.

The Strategic Review provides for an additional 193 dwellings above that anticipated by the 2010 Planning Framework for those sectors.

The exhibited concept plan developed for the Southern Buffer responds to its environmental constraints and values and embeds in it the vision for the Southern Buffer area, namely:

'A sustainable, created space...to work, play and interact.
Where people come to meet and engage
Connected with its community, in its setting.'

The exhibited concept plan is one option for this area and at this stage will not be progressed further. The onus is on landowners, acting independently or in partnership, to explore and further investigate opportunities for the future development of the sector.

This Strategic Review Report, supported by the background land capability assessment approach, Hydrology Study, Strategic Transport Study, Urban Design Study and Economic Feasibility Study will allow the environmentally, socially and economically sustainable use of land in the Release Area, as first expressed in the precursor planning documents for Warriewood Valley.

The resolution of flooding matters, in particular flood emergency response policy, that is acceptable to the relevant State Government departments must be developed prior to the rezoning of land that is not able to be evacuated in the event of a PMF event.

Appendices

Photo by: Amanda Clarke 2011

Appendix 1 to 5

Appendix 1: Chronology to the Development of Warriewood Valley

1991

In 1991 land at Warriewood and Ingleside was included in the State Government's Urban Development Program (now known as the Metropolitan Development Program). The then Minister for Planning appointed Pittwater Council as the authority responsible for the feasibility investigations and planning for a land release at Ingleside and Warriewood.

Pittwater Council initiated the planning process and formed a Land Release Advisory Committee to discuss issues related to the investigation, planning and implementation of the land release process.

1995

In 1995 Council produced a draft planning strategy for Warriewood and Ingleside – the *Ingleside/Warriewood Urban Land Release Draft Planning Strategy* (1995 Strategy), drawn from outcomes of a range of environmental and demographic studies to provide future development options (low to medium dwelling density scenarios), population projections and land use allocation.

The 1995 Strategy anticipated up to 6,400 dwellings could be provided through the development of 700 hectares of land. Land surrounding the Warriewood Sewerage Treatment Plant (STP) (40 hectares) was excluded due to the uncertainty regarding the effect of the odours from the STP on surrounding land uses.

In May 1995 the Council accepted the *Ingleside/Warriewood Urban Land Release Draft Planning Strategy* for the purpose of public exhibition and referral to the State Government. Consultation with the public and State Government authorities highlighted the infrastructure difficulties associated with a land release at Ingleside and the potential regional environmental impacts.

May 1997

The then Minister for Urban Affairs and Planning announced a restricted release of land for urban development within Warriewood only.

The Minister specifically deferred consideration of land within a 400 metre 'buffer area' surrounding the Warriewood STP.

The *Draft Warriewood Valley Urban Land Release Planning Framework 1997* (1997 Framework), became the planning strategy that guided the development of Warriewood Valley. Taking its lead from the projections contained in the 1995 Strategy, the 1997 Framework anticipated 1,510 dwellings being provided within 110 hectares, including five hectares of industrial/commercial land and associated community facilities and infrastructure. The initial land release excluded 40 hectares of land surrounding the STP.

A critical feature of the 1997 Framework was the establishment of a 'sector by sector' approach to ensure the coordinated and orderly planning and development of Warriewood Valley.

2001

Following Sydney Water's decision to mitigate the odours associated with the Warriewood STP, Council produced and adopted the STP Buffer Sector Draft Planning Framework 2001 (2001 Framework) specifically for the area within 400m of the STP. This enabled Buffer Areas 1, 2 and 3 (an area of 40 hectares) to be rezoned for residential purposes, anticipating a yield of approximately 410 dwellings.

Including the Buffer Areas, up to 1,920 new dwellings are anticipated to be accommodated in Warriewood Valley, within a density range of 8 to 25 dwellings per hectare.

May 2010

Council adopted the Warriewood Valley Planning Framework 2010 ('the 2010 Planning Framework') as the comprehensive planning strategy for Warriewood Valley. The 2010 Planning Framework consolidated the Draft Warriewood Valley Urban Land Release Planning Framework 1997 and STP Buffer Sector Draft Planning Framework 2001 into a single document.

Principally, the 2010 Planning Framework retained the approach and recommendations of the 1997 and the 2001 Frameworks, consistent with the results of the environmental studies undertaken in the 1990s, to ensure the original goals and objectives of these earlier Frameworks were carried forward into the planning and future management of the Valley, until such time that further detailed studies were undertaken.

The 2010 Planning Framework reviewed the land identified for residential development and not yet developed or not yet rezoned for residential purposes to ascertain opportunities and the appropriateness of increasing dwelling yields. The dwelling potential at certain locations was revised to achieve the maximum dwelling density of 25 dwellings per developable hectare, where it was deemed consistent with the outcomes of the original environmental studies and the 1997 and 2001 Frameworks, while some land retained its existing dwelling yield due to the development constraints identified in the original studies.

It retained the collaborative, sector based approach initially established in 1997.

The 2010 Planning Framework however, did not address the development potential of non-residential sectors within Warriewood Valley. In particular, no change was made to the development capability of the Southern Buffer area as determined in the 2010 Planning Framework. In recognition of Council's resolution on 21 December 2009 that this area would be subject to a future review by the Department and Council, it was considered more appropriate to flag the Southern Buffer area as subject to a future review process.

A total of 2,012 dwellings were now anticipated in a total area of 150 hectares, resulting in an additional 127 dwellings being accommodated in Warriewood Valley.

January 2011

The Planning Assessment Commission (PAC) approved development at 14-18 Boondah Road, Warriewood under Part 3A of the Environmental Planning and Assessment Act 1979. The PAC approved a density of 60 dwellings per developable hectare and 3 storeys. A number of buildings could be built to 4 storeys.

Appendix 2: Land Capability Mapping

This document establishes the classification criteria for each of the sustainability characteristic map layers that contribute to the Warriewood Valley Strategic Review Report.

As well as forming the basis for land use allocation decisions, those criteria (as they apply to sections of land individually and collectively) will form a basis for related development controls and land management prescriptions which can be applied to future development and use of the land to ensure that adverse impact is minimised and sustainability achieved.

Each sustainability characteristic map layer represents an 'environmental, economic or social' characteristic that influences land use allocation decision and identifies issues that need to be addressed in the future management of the land.

Each of the individual map layers has been divided into 3 classes:

- **Class A: Low restriction to intensification of development.**
  Existing development may require generic management prescriptions to achieve sustainable land use. Intensification of development must be confined to defined targets to maintain sustainability.

- **Class B: Moderate restriction to intensification of development.**
  Existing development forms require generic management prescriptions to achieve sustainable land use. Any intensification of land use needs site specific investigation and must address constraints that apply to land.

- **Class C: Significant restriction to intensification of land use.**
  Existing development forms require site specific and detailed management prescription to achieve sustainable land use. No intensification of development unless specific constraint can be fully addressed.

The following tables set out the individual sustainability characteristic map layers that contribute to the Composite Capability Map (Map 3 in Chapter 6) and specify their respective classification criteria.

Composite Environmental (Biodiversity, Slope) Capability Map

Map Layer	Objective	Sustainability Link	Layer	Criteria
Biodiversity	Preserve Biodiversity	Environmental	A	Other Land
			B	Category 2 Bushland; Wildlife Corridors (category 2)' Seabed Areas
			C	Includes endangered ecological communities (Littoral Rainforest areas, Pittwater Spotted Gum, Freshwater Wetlands, Swamp Forest, Duffy's Forest , Salt Marsh, and Themeda Grassland); Category 1 Bushland > 400 sqm; Wildlife Corridors (Category 1); Seagrass Beds; Mangroves; Tidal Flats; National Parks.
Slope	Restrict Development on unsuitable sites	Environmental Economic	A	Land with Slope less than 15% (determined by a 10m grid)
			B	Land with Slope between 15% - 25% (determined by a 10m grid)
			C	Land with Slope more than 25% (determined by a 10m grid)
Proximity to Watercourses		Environmental	A	Other Land
			B	Within 40m of Major Watercourses and 20m of Minor Watercourse
			C	Nil

Composite Visual and Cultural Significance (Foreshores and Waterbodies, Heritage, Ridgelines) Map

Map Layer	Objective	Sustainability Link	Layer	Criteria
Ridgelines	Preserve the visual character of the current vegetated ridge lines and escarpment edges	Social	A	Other land.
			B	Within 50m of a secondary ridgeline or between 50-100m of major ridgeline or escarpment edge
			C	Within 50m of major ridgeline or escarpment edge.
Foreshores and Waterbodies	Maintain Character of Foreshore Areas	Environmental Social	A	Other Land
			B	Land between 25 and 50 metres of any tidal foreshore or Narrabeen Lagoon
			C	All of the Pittwater waterways and land within 25 metres of any tidal foreshore or Narrabeen Lagoon
Cultural	Protect Heritage Areas and Items from Unsympathetic Development	Social	A	Other land
			B	Within 50 metres of a Heritage item, Heritage area or National Park
			C	Heritage items, within a Heritage area or National Park

Composite Hazard (Bushfire, Climate Change, Coastal Estuarine, Flooding and Geotechnical) Map

Map Layer	Objective	Sustainability Link	Layer	Criteria
Bushfire	Protect Development from Bushfire Hazard	Social Economic	A	Other land
			B	Buffer Area
			C	Flame Zone
Flooding	Protect Development from Flood Hazard	Social Economic	A	Other land
			B	Land affected by PMF flood level only
			C	Land affected by 1% AEP flood level
Geotechnical	Protect Development from Geotechnical Hazard	Social Economic	A	Other land
			B	Areas of medium Geotechnical Hazard Area 2
			C	Areas of high Geotechnical Hazard Area 1
Acid Sulphate Soils	Restrict Development on Unsuitable Land	Environmental Economic	A	Land potentially affected by acid sulphate soils Classes 4 and 5
			B	Land potentially affected by acid sulphate soils Classes 2 and 3
			C	Land potentially affected by acid sulphate soils Class 1

Map Layer	Objective	Sustainability Link	Layer	Criteria
Climate Change Impact	Restrict Development in areas subject to Sea Level Rise and Increased Flood Risk due to Climate Change	Environmental	A	Land unaffected by Ocean/Estuarine/Flooding/Bushfire Processes
			B	Land partly affect by Flooding (PMF Only)/ Bushfire (Buffer Zone) Processes
			C	Land below the 4.0m AHD.
Coastal Processes	Protect Development from Ocean Processes Hazard	Social Economic	A	Properties unaffected by Coastal Hazard
			B	Nil
			C	Properties affected by Coastal Processes
Estuarine Processes	Protect Development from Estuarine Process Hazard	Social Economic	A	Properties unaffected by Estuarine Process Hazard
			B	Nil
			C	Properties affected by Estuarine Process Hazard

Composite Infrastructure (Centres, Public transport, sewer water) Map

Map Layer	Objective	Sustainability Link	Layer	Criteria
Proximity to Centres	Locate more Intensive Development forms near recognised Centres	Social Economic	A	Land within 400 metres of a town or village centre or within 200 metres of a neighbourhood centre
			B	Land between 400 and 800 metres distance from a town or village centre or between 200 and 400 metres of a neighbourhood centre
			C	Land more than 800 metres from a town or village centre or more than 400 metres from a neighbourhood centre
Proximity to Public Transport Links	Local more intensive forms of Development near to Public Transport Links	Social Economic	A	Land within 400 metres of a bus stop on a Public Transport Route
			B	Land between 800 and 400 metres from a bus stop on a Public Transport Route
			C	Land more than 800 metres from a bus stop on a Public Transport Route.
Sewer	Ensure availability of Services to Development	Social Economic Environmental	A	Land serviced by a Reticulated Sewage System
			B	Land NOT serviced by a Reticulated Sewage System
			C	Nil
Water availability	Ensure availability of Services to Development	Social Economic Environmental	A	Land serviced by a Reticulated Water System
			B	Land NOT serviced by a Reticulated Water System
			C	Nil
Road Network (Includes all development north of Bungan Beach)	Ensure availability of Services to Development	Social Economic Environmental	A	Land where the Arterial Road Network is upgradable
			C	Land where the Arterial Road Network is NOT upgradable

Source Data for Constraints Mapping

Biodiversity	A	Other Land	
	B	Category 2 Bushland	Pittwater Council - Natural Resources Unit
		Wildlife Corridors (Category 2)	Ecotone September 2009 - Pittwater Habitat Corridor Mapping
		Bed of Pittwater	Derived by Pittwater Council GIS Staff from NSW Dept of Lands Mean High Water Mark Cadastral Determinations
	C	Endangered Ecological Communities:	
		- Littoral Rainforest	Pittwater Council - Natural Resources Unit
		- Pittwater Spotted Gum	Pittwater Council - Natural Resources Unit
		- Freshwater Wetlands	Pittwater Council - Natural Resources Unit
		- Swamp Forest	Pittwater Council - Natural Resources Unit
		- Duffy's Forest	Pittwater Council - Natural Resources Unit
		- Salt Marsh	Pittwater Council - Natural Resources Unit
		- Themeda Grassland	Pittwater Council - Natural Resources Unit
		Category 1 Bushland > 400 sqm	Pittwater Council - Natural Resources Unit
		Wildlife Corridors (Category 1)	Habitat & Wildlife Corridors - Pittwater Council - December 1995 Pre July 2011 used Ecotone September 2009 - Pittwater Habitat Corridor Mapping - Not to be adopted.
		Seagrass Beds	NSW Fisheries August 2000
		Mangroves	Pittwater Council - Natural Resources Unit
		Tidal Flats	Pittwater Council - Natural Resources Unit
		National Parks	DECCW - National Park Estate
Slope	A	Land with Slope less than 15%	Derived by Pittwater Council GIS Staff via analysis of Digital Terrain Model provided by AAM Hatch Airborne Laser Scanning 2007
	B	Land with Slope between 15% - 25%	
	C	Land with Slope > 25%	
Proximity to Watercourses	A	Other Land	
	B	Within 40m of Major Watercourses and 20m of Minor Watercourse	Derived by Pittwater Council GIS Staff from NSW Dept of Lands Topographic Mapping
	C	Nil	
Ridgelines	A	Other land.	
	B	Within 50m of a secondary ridgeline or between 50-100m of major ridgeline or escarpment edge	Derived by Pittwater Council GIS Staff via analysis of Contours provided by AAM Hatch Airborne Laser Scanning 2007
	C	Within 50m of major ridgeline or escarpment edge.	
Foreshores and Waterbodies	A	Other Land	
	B	Land between 25 and 50 metres of any tidal foreshore or Narrabeen Lagoon	Derived by Pittwater Council GIS Staff from NSW Dept of Lands Topographic Mapping

	C	All of the Pittwater waterways and land within 25 metres of any tidal foreshore or Narrabeen Lagoon	
Cultural	A	Other land	
	B	Within 50 metres of a heritage item, heritage area or National Park	Heritage Items & Heritage Areas from Pittwater LEP 1993 as Amended. National Park from DECCW - Natioanl Park Estate
	C	Heritage items, within a Heritage area or National Park	
Bushfire	A	Other land	
	B	Buffer Area	Certified Bushfire Prone Land Map - Rural Fire Service July 2004
	C	Flame Zone	
Flooding	A	Other land	
	B	Land affected by PMF flood level only	Adopted Floodplain Studies conducted by various consultants 1990 - Present
	C	Land affected by 1% AEP flood level	
Geotechnical	A	Other Land	
	B	Areas of medium geotechnical hazard Area 2	GHD Longmac - Geotechnical Hazard Mapping of Pittwater - 2007
	C	Areas of high geotechnical hazard area 1	
Acid Sulphate Soils	A	Land potentially affected by acid sulphate soils Classes 4 and 5	Acid Sulphate Soils Planning Map - Dept of Planning 1997
	B	Land potentially affected by acid sulphate soils Classes 2 and 3	
	C	Land potentially affected by acid sulphate soils Class 1	
Climate Change Impact	A	Land unaffected by Ocean/Estuarine/Flooding/Bushfire Processes	
	B	Land partly affect by Flooding (PMF Only)/ Bushfire (Buffer Zone) Processes	As per Bushfire & Flooding
	C	Land affected by 1% AEP flood level	As per Flooding, Coastal Processes, Estuarine Processes & Bushfire
		Properties affected by coastal processes	
		Properties Affected by estuarine process hazard	
		Bushfire Flame Zone	
		Land below the 4.0m AHD.	Derived by Pittwater Council GIS Staff via analysis of Contours provided by AAM Hatch Airborne Laser Scanning 2007
Coastal Processes	A	Properties unaffected by coastal hazard	
	B	Nil	
	C	Properties affected by coastal processes	Pittwater Coastal Zone Management Area Map 97-003 - Adopted 1997
Estuarine Processes	A	Properties unaffected by estuarine process hazard	
	B	Nil	
	C	Properties Affected by estuarine process hazard	Lawson & Treloar - Estuarine Hazard Map 2002-20 - Adopted 2002

Proximity to Centres	A	Land within 400 metres of a town or village centre or within 200 metres of a neighbourhood centre	Derived by Pittwater Council GIS Staff based on the Centres defined in the SHOROC Metro Strategy
	B	Land between 400 and 800 metres distance from a town or village centre or between 200 and 400 metres of a neighbourhood centre	
	C	Land more than 800 metres from a town or village centre or more than 400 metres from a neighbourhood centre	
Proximity to Public Transport Links	A	Land within 400 metres of a bus stop on a public transport route	Derived by Pittwater Council GIS Staff based on Bus Route data available from STA & Forest Coach Lines websites. Bus Stop data from Council's Urban Infrastructure Asset Management System.
	B	Land between 800 and 400 metres from a bus stop on a public transport route	
	C	Land more than 800 metres from a bus stop on a public transport route.	
Sewer	A	Land serviced by a reticulated sewage system	Derived by Pittwater Council GIS Staff based on land within 75m of Sewer Network Data - Sydney Water 2008
	B	Land NOT serviced by a reticulated sewage system	
	C	Nil	
Water availability	A	Land serviced by a reticulated water system	Derived by Pittwater Council GIS Staff based on land within 225m of Watermain Data - Sydney Water 2008
	B	Land NOT serviced by a reticulated water system	
	C	Nil	
Road Network	A	Land where the arterial road network is upgradable.	RTA Advice - 2010
	C	Land where the arterial road network is not upgradable.	
Sea Level Rise	A	Land above 4.0m AHD	Derived by Pittwater Council GIS Staff via analysis of Contours provided by AAM Hatch Airborne Laser Scanning 2007
	C	Land below 4.0m AHD	

Appendix 3: Outcome of Land Capability Assessment

Sector ID	Address	AREA (m²)	Composite Classification	Applicable Map Layers	Detailed Environmental Constraints	To be tested	Reason	Comments
101	165-167 Warriewood Road	1566.5				YES		To be tested.
102	185 Warriewood Road	4560.7				NO	Criteria 1	Already zoned 4(b) - not designated residential sector under Planning Framework. Not to be tested.
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c, 16a Ponderosa Parade	8199.4				NO	Criteria 1	Already zoned 4(b) - not designated residential sector under 2010 Planning Framework. Not to be tested.
104	3 Harris Street & 16 Apollo Street	594.6				NO	Criteria 1	Designated as industrial/employment sector under 2010 Planning Framework. Not to be tested.
105	15 Jubilee Avenue	4561.8				NO	Criteria 1	Already zoned 4(b) - not designated residential sector under 2010 Planning Framework. Not to be tested.
201	4 Walana Crescent	1302.7	Class 2	Biodiversity & Cultural	Biodiversity - Cat B; 50m heritage (MV Cemetery).	NO	Criteria 1	Originally in Sector 20 however was not rezoned as part of Sector 20. Not included in 2010 Planning Framework. Site's isolation would be a concern. Not to be tested. Landowner may seek to lodge rezoning application.

202	14 Walana Crescent	4155.1	Eastern portion - Class 2 (Majority of site); Minor portion is Class 3; NW corner - Class 4	Biodiversity, Certified Bushfire Map, Ridgeline, Geotech, Slope, Hydrographic	Whole of the site is affected by Biodiversity B, Bushfire buffer area, 50-100m of major ridgeline or escarpment edge; Western portion is also affected by High Geotech Hazard Area 1, Slope 15-25%; NW corner of the Site is affected by Biodiversity C (highest order), Bushfire buffer area, High Geotech Hazard Area 1, within 40m watercourse (Fern Creek or tributary), Slope 15-25%.	NO	Criteria 1	Already zoned 2(f) as part of Sector 20 & was not included in 2010 Planning Framework as it was considered to be developed by way of the subdivision of Sector 20. Not to be tested.
203	3 Harrier Place	14678.6	Approx 50% is Class 3 (in 2 halves) dissected by Class 4 & 5	Biodiversity, Certified Bushfire Map, Sewer, Slope, Geotech, Slope, Water	Whole of the site is Biodiversity B, Bushfire buffer area, Not serviced by reticulated sewage system, Slope 15-25%, Not serviced by reticulated water system. Western portion (minor part of site) is also affected by Biodiversity C (Highest Order), High Geotech Hazard Area 1, secondary ridgeline (partially affected), Slope >25%.	NO	Criteria 1	Already zoned 2(f) as part of Sector 20 & was not included in 2010 Planning Framework as it was considered to be developed by way of the subdivision of Sector 20. Not to be tested.
204	79 Cabbage Tree Road	38642.9	Majority in Class 2, western portion in Class 3 (NB. Abuts Classes 4 & 5 immediately west)	Biodiversity, Geotech, Slope, Certified Bushfire Map, Ridgeline	Majority of site is Biodiversity B, Medium Geotech Hazard 2, Slope 15-25% (minor part of site Slope >25%); Western portion is Biodiversity C (Highest Order), Bushfire buffer area & partially in Bushfire Flame Area, Medium Geotech Hazard 2, 50-100m of Escarpment Edge & secondary ridgeline (western half)	NO	Criteria 1	Originally in Sector 20 however was not rezoned as part of Sector 20. Not included in 2010 Planning Framework. Bayview Retirement Village on this site. Not to be tested. Landowner may seek to lodge rezoning application.
301	20 Macpherson Street	16657.1				YES		To be tested.
302	18 Macpherson Street	26225.7				YES		To be tested.
303	16 Macpherson Street	9078.6				YES		To be tested.

501	4 Forest Road	31049.6	Approx 85% in Class 3, Remainder in Class 2 (NE corner) & Class 4 (SW corner)	Biodiversity, Certified Bushfire Map, Ridgeline, Geotech, Slope,	Whole of site is in Bushfire buffer area & High Geotech Hazard 1. Majority of site is also Biodiversity B, Slope 15-25%; SW corner of site (minor component) also affected by Biodiversity C along southern boundary (Highest Order); 50-100m Escarpment Edge & secondary ridgeline (partially along southern boundary), Slope >25%.	YES		To be tested.
	8 Forest Road		Approx 90% in Class 2, Remainder in Class 3 & 4 (western boundary)	Biodiversity, Certified Bushfire Map, Ridgeline, Geotech, Slope, Hydrographic	Whole site is Biodiversity B, Bushfire buffer area, Minor part of site (west) also affected by High Geotech Hazard 1; Slope 15-25%. The Western & Southern boundaries also abut Biodiversity Cat C (highest order).	YES		To be tested.
702	10 Jubilee Street	9214.6				NO	Criteria 1	Designated industrial/employment under 2010 Planning Framework. Not to be tested.
801	23B Macpherson Street	11858.0				YES		To be tested.
802	5 Forest Road (Mater Maria)	37471.9	Approx 50% in Class 2 (south portion), Remainder in Class 3 & 4. West boundary abuts Class 5	Biodiversity, Certified Bushfire Map, Geotech, Slope, Ridgeline	Whole of site affected by Biodiversity B, Bushfire buffer area. Northern half is in High Geotech Hazard 1. Slope - southern portion not affected, remainder of site is 15-25% & western portion is >25%. Biodiversity C in 3 boundaries (except eastern boundary); Secondary ridgeline (minor affectation).	NO	Criteria 1	Originally in Sector 8 however was not rezoned as part of Sector 8. Not included in 2010 Planning Framework. Mater Maria School exists on site. Not to be tested. Landowner may seek to lodge rezoning application.
901	Lots 11, 12 & 13 DP 1092788 (Sector 8); 1, 2, 3, 4, 5, 9 & 10 Fern Creek Road; 2, 4, 6 Orchard Street & Orchard Street road reserve (2a, 4a, 6a & 8 Orchard Street)	143191.6				YES		Analysis undertaken in subsectors where similar environmental attributes existed (See Table and Map of Sector 901 subsectors shown at end of Appendix 3). Constraints applicable to specific locations only. Sector to be tested.

10A.1	115 Orchard Street (portion of property only in sector)	5566.0	Majority in Class 3, remainder in Class 2 (align eastern boundary), however immediately west is Biodiversity C (highest order)	Biodiversity, Certified Bushfire Map, Geotech, Slope	Whole of Site is Biodiversity B, Bushfire buffer area, Slope 15-25%. Western portion is High Geotech Hazard 1. Immediately west is Biodiversity C (highest order).	YES		To be tested.
10A.2	111, 111a & 113 Orchard Street (eastern portion of 3 lots in sector)	3767.8	Class 2, however immediately west is Class 4 & 5	Biodiversity, Certified Bushfire Map, Geotech, Slope	Whole of Site is Biodiversity B, Bushfire buffer area, Slope 15-25%. SW portion is High Geotech Hazard 1. Abuts Biodiversity Cat C (highest order).	YES		To be tested.
10B	109 Orchard Street	22334.2				YES		To be tested.
10C	194 Garden Street	11676.5	Class 2		Potential Acid Sulphate Soils Classes 2 & 3 - located at the south-eastern corner; Biodiversity Cat B; Bushfire Buffer Area;	NO	Criteria 1	Originally part of Sector 10, however was not rezoned with Sector 10. Not identified in 2010 Planning Framework. Retirement Village exists on site. No environmental constraints to development. Not to be tested. Landowner may seek to lodge rezoning application.
120 Mona Vale Road	120 Mona Vale Road	82948.5	>50% in Class 4 & 5, remainder in Class 3, however the Class 3 relates to no connection to sewer & slope constraint	Biodiversity, Certified Bushfire Map, Slope, Geotech, Ridgeline, Hydrographic, Sewer, Water	Whole of Site is Biodiversity C, High Geotech Hazard 1, Not connected to reticulated sewage system, Not connected to reticulated water system. Majority of Site is Slope 15-25% (with >25%), Bushfire Buffer Area. Western portion of Site is Bushfire Flame Zone & Fern Creek alignment. Secondary ridgeline (dissecting NW to SE).	NO	Criteria 3	Criteria 3 - significant environmental constraints affecting 50% of the site. Not to be tested. Landowner may seek to lodge rezoning application.
Buffer 1a	61 Warriewood Road	7700.1	Majority Class 2; Class 3	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1b	53 Warriewood Road	7504.3	Class 2	Biodiversity	Biodiversity B	YES		To be tested.

Buffer 1c	53a Warriewood Road	5616.1	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1d	53b Warriewood Road	446.5	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1e	53c Warriewood Road	4814.9	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1f	49 Warriewood Road	6511.7	Majority Class 2, Class 3	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1g	45 Warriewood Road	7281.9	Majority Class 2, Class 3	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1h	43 Warriewood Road	292.4	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1i	41 Warriewood Road	12336.6	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1j	31 Warriewood Road	12358.6	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1k	29 Warriewood Road	6658.4	Class 2	Biodiversity	Biodiversity B	YES		To be tested.

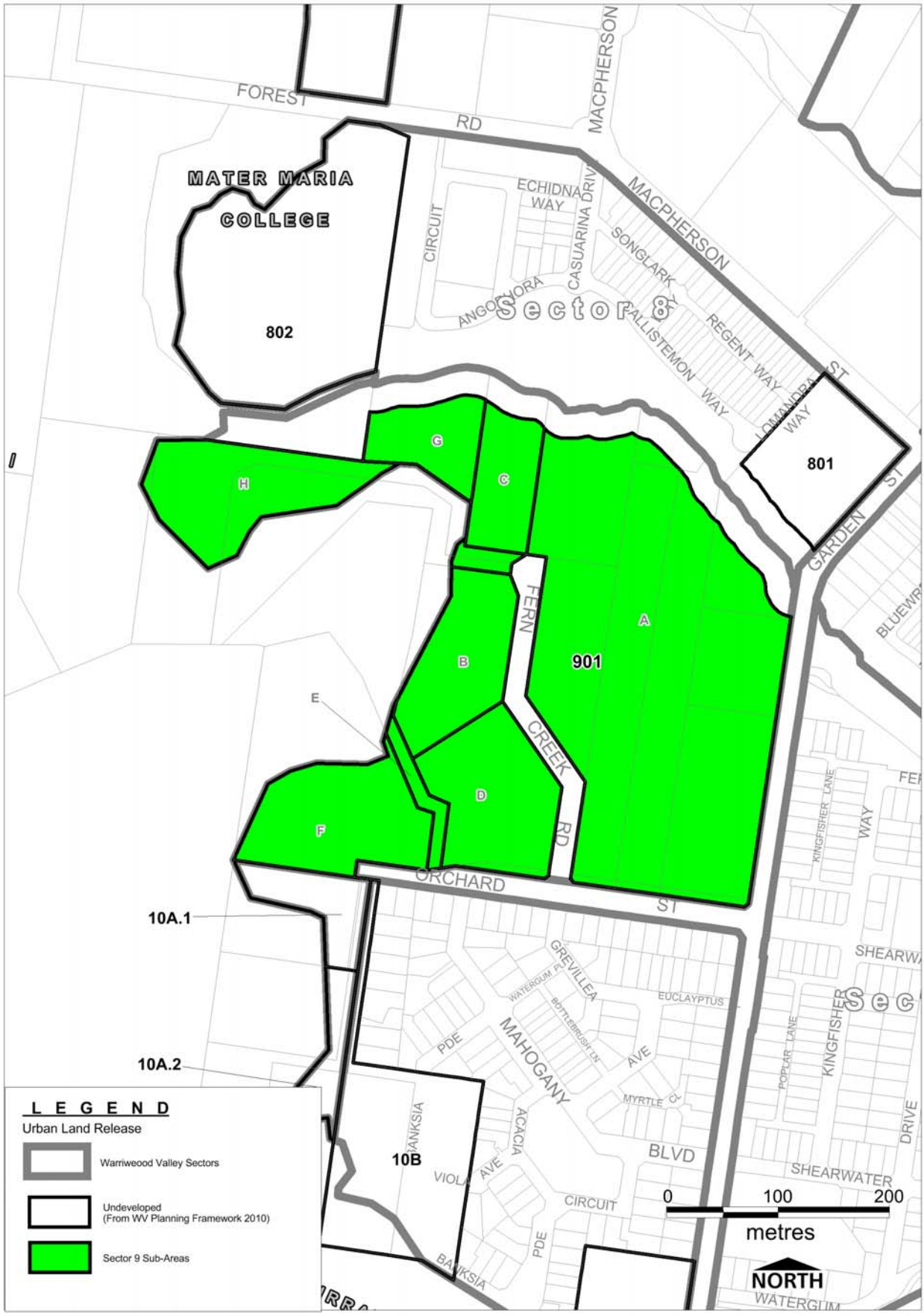
Buffer 1l	23, 25 & 27 Warriewood Road	21193.1	Class 2	Biodiversity	Biodiversity B	YES		To be tested.
Buffer 1m	2 Macpherson Street	15453.5	Class 2	Acid Sulphate & Biodiversity	Acid Sulphate B; Biodiversity B Final sieving stage (Hydrology Study) shows this sector has no development potential on its own.	NO		Outcome of Hydrology Study - no development potential on its own. Not to be tested.
Buffer 2a	4 Macpherson Street	12955.5	Class 2	Acid Sulphate & Biodiversity	Acid Sulphate B; Biodiversity B Final sieving stage (Hydrology Study) shows this sector has capacity to develop its own.	YES		Outcome of Hydrology Study - cut and fill balance on own site shows capacity to develop on its own. To be tested.
Buffer 3a	14-18 Boondah Road	74426.8	Majority Class 2; Class 3 (SW corner - Fern Creek & dissecting handle); Class 4 - dissecting handle with Class 3; remainder (NW corner) is Class 1.	Biodiversity, Certified Bushfire Map, Acid Sulphate, Hydrographic	Whole of Site is Biodiversity B. Majority of site is in Bushfire Buffer Area. SW (Fern Creek) & another portion dissecting site (At handle - Boondah Road) is also affected by Bushfire Flame Zone, Acid Sulphate, Fern Creek, and portion also Biodiversity C (highest order).	YES		Landowner requested for removal from Strategic Review however await outcome of Court proceeding to ensure site given equitable opportunity as other sites. Not to be tested following Land & Environment Court decision. No longer considered undeveloped.
Buffer 3b	5 & 7 Macpherson Street	2995.8				YES		To be tested.
	SUBTOTAL	**687848.6**						

Due to the range of environmental constraints applicable to Sector 901, it was determined to identify areas (sub-sectors) with similar environmental attributes. The Table below must be read in conjunction with Map 13.

Sector 9 subsector ID	Address	Area (m^2)	Composite classification	Applicable map layers	Detailed environmental constraints	To be tested	Comments
901A	Lot 13 DP 1092788; 9 & 10 Fern Creek Road; 2, 4, 6 Orchard Street & Orchard Street road reserve (2a, 4a, 6a & 8 Orchard Street) - East side of Fern Creek Road including 9 Fern Creek Road	74034.2	Class 1 & 2 - No environmental constraints	Biodiversity, Slope	Slope Map - SW boundary in 15-25% & majority unaffected.	YES	Minor constraint to the north, includes 9 Fern Creek Road
901B	2 Fern Creek - west side of Fern Creek Road	11218.6	Class 2, however Biodiversity C (highest order) is located immediately west	Biodiversity, Slope	Biodiversity - Cat B; SW portion of site (minor) has Slope 15-25%. Immediately to west is Biodiversity Cat C (highest order).	YES	
901C	Lot 12 DP 1092788 (Sector 8) - west side of Fern Creek Road	6879	Class 2 - No environmental constraints	Biodiversity	Biodiversity B; SW corner of Biodiversity Cat C (highest order)	YES	
901D	1 Fern Creek Road - west side of Fern Creek Road	13,240	Approx 60% Class 4, Remainder in Class 2 (very minor - north point) & Class 3 dissecting Class 4 land	Biodiversity, Geotech, Slope	Majority in Biodiversity C (highest order), High Geotech Hazard 1, Slope 15-25%. Northern portion Biodiversity B.	YES	
901E	12 Orchard Street - battleaxe portion in Sector only	1,914	Class 3, however Biodiversity C on entire part of site	Biodiversity	Biodiversity C (highest order)	YES	

901F	14 Orchard Street - southern portion of site in Sector only	13,907	Majority in Class 2, eastern portion in Class 3	Biodiversity, Certified Bushfire Map	Majority in Biodiversity B; north-east portion in Biodiversity Cat C (highest order); western half in Bushfire Buffer Area.	YES	
901G	Lot 11 DP 1092788 (Sector 8) - west side of Fern Creek Road	6470	Class 2, however Biodiversity C (highest order) is located immediately south	Biodiversity	Whole of Site is Biodiversity B. Immediately south is Biodiversity C (highest order).	YES	
901H	4 & 5 Fern Creek Road (only northern portion in Sector) - west side of Fern Creek Road	13,934.6	Majority of bulb in Class 2, southern portion of bulb in Class 3	Biodiversity, Certified Bushfire Map, Geotech, Slope, Water	Whole of Site not connected to reticulated water system & Biodiversity B (NB. Middle portion of property - affecting access into that portion of property that is in the sector is Biodiversity Cat C); Majority in Bushfire Buffer Area; Southern portion of bulb in High Geotech Hazard 1 & Slope 15-25%.	YES	Access (middle portion of the site) not in sector & Class 3 due to Biodiversity C & Slope 15-25%

Map 13: Sector 901 Sub-sectors A - H



Appendix 4: Strategies for Provision of Infrastructure & Community Facilities

Source: ***Warriewood Valley Planning Framework 2010***

STORMWATER MANAGEMENT FACILITIES PROVISION STRATEGY

Objective

To provide an overall stormwater management system which serves those areas within Warriewood Valley designated for urban development and ensures that stormwater does not adversely impact on private property, public land, or receiving waters.

Land to which this strategy applies

The strategy applies to all land in Warriewood Valley Urban Land Release area together with the residential and industrial/commercial areas of Stage 1 (of the Warriewood Valley Urban Land Release) released in 1986.

Note: In 1997, part of Sector 1 was zoned for light industrial use under the 1986 Warriewood Valley Stage One Release. Its inclusion in the land release as residential land follows from Council decision based on the premise that there should be no financial disadvantage to Council in terms of its existing and future Section 94 liabilities.

The strategy applies to all of the land shown on the map, in that the provision of the drainage and stormwater management facilities, while being located along or adjacent to major watercourses through the Valley, provide a shared level of amenity for all these undeveloped areas designated for urban development.

On this basis, provision of community water management facilities by developers (either direct or indirect) should be proportional to the number of dwellings to be developed in the residential areas regardless of location or sector. Contributions from remaining land undeveloped in the Stage 1 industrial/commercial areas and proposed new industrial/commercial areas at the northern end of the Valley should be on a per m2 basis.

Sector 20 is an isolated sector to the north of Mona Vale Road and drains towards Pittwater. As it is a single sector draining to independent receiving waters the implementation of stormwater management facilities and structures are isolated from those associated with the remaining development area and therefore should be treated independently and as part of the development process for that sector.

Combined use of land required for Stormwater Management Facilities

The Environmental and Demographic studies for the land release have identified a requirement for preservation of open space strips along natural watercourses flowing through the Valley including Narrabeen Creek, Mullet Creek and Fern Creek. These open space strips will need to include Stormwater Management structures designed in an environmentally sensitive way to achieve the combined objectives of both the Stormwater Management Strategy and the need to provide open space.

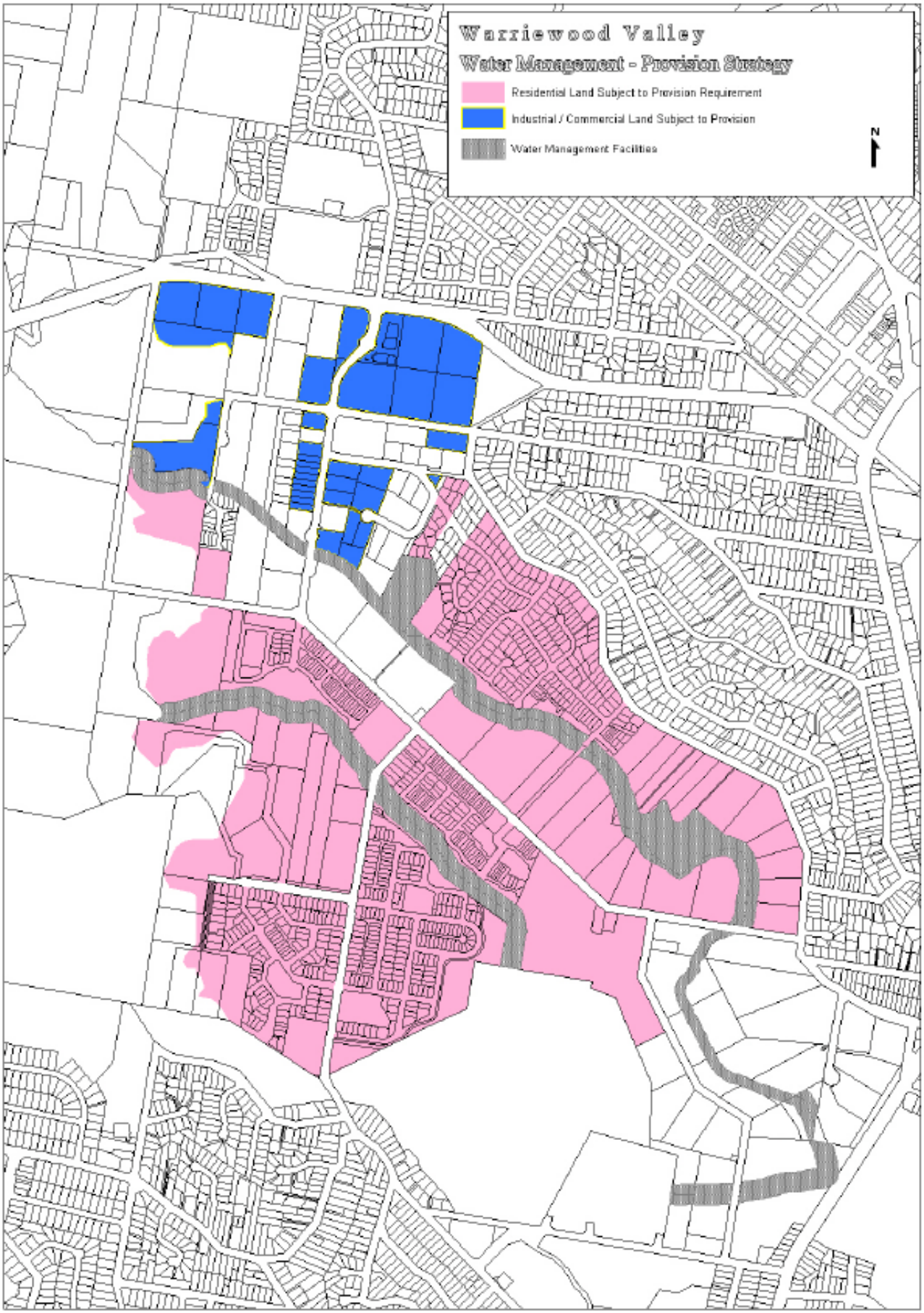
In this regard 30% of the land provided by residential development for the Stormwater Management Facilities can be credited towards open space contributions that would otherwise be required.

Opportunities for provision of facilities

Those sectors which have direct frontage to the water courses passing through the Valley allow an opportunity for developers to directly provide facilities. Remaining areas which are not adjacent to

watercourses (including the underdeveloped properties in the industrial/commercial area) can be levied through Section 94 Plan Contribution or offered an opportunity to construct facilities on land already acquired by Council to the value of the contribution that would otherwise be payable.

Figure 4: Water Management



TRAFFIC AND TRANSPORT PROVISION STRATEGY

Objective
To provide an overall traffic and transport management system which serves those areas of Warriewood Valley designated for urban development.

Land to which this strategy applies
The strategy would apply to all of the land in Warriewood Valley Urban Land Release with the exception of Sector 20, together with the industrial/commercial and residential areas of Stage 1 of Warriewood Valley released in 1986 in the northern sections of the Valley.

Note: In 1997, part of Sector 1 was zoned for light industrial use under the 1986 Warriewood Valley Stage One Release. Its inclusion in the land release as residential land follows from Council decision based on the premise that there should be no financial disadvantage to Council in terms of its existing and future Section 94 liabilities.

The strategy requires the provision of the traffic and transport facilities at a shared level of amenity for all those undeveloped areas designated for urban development.

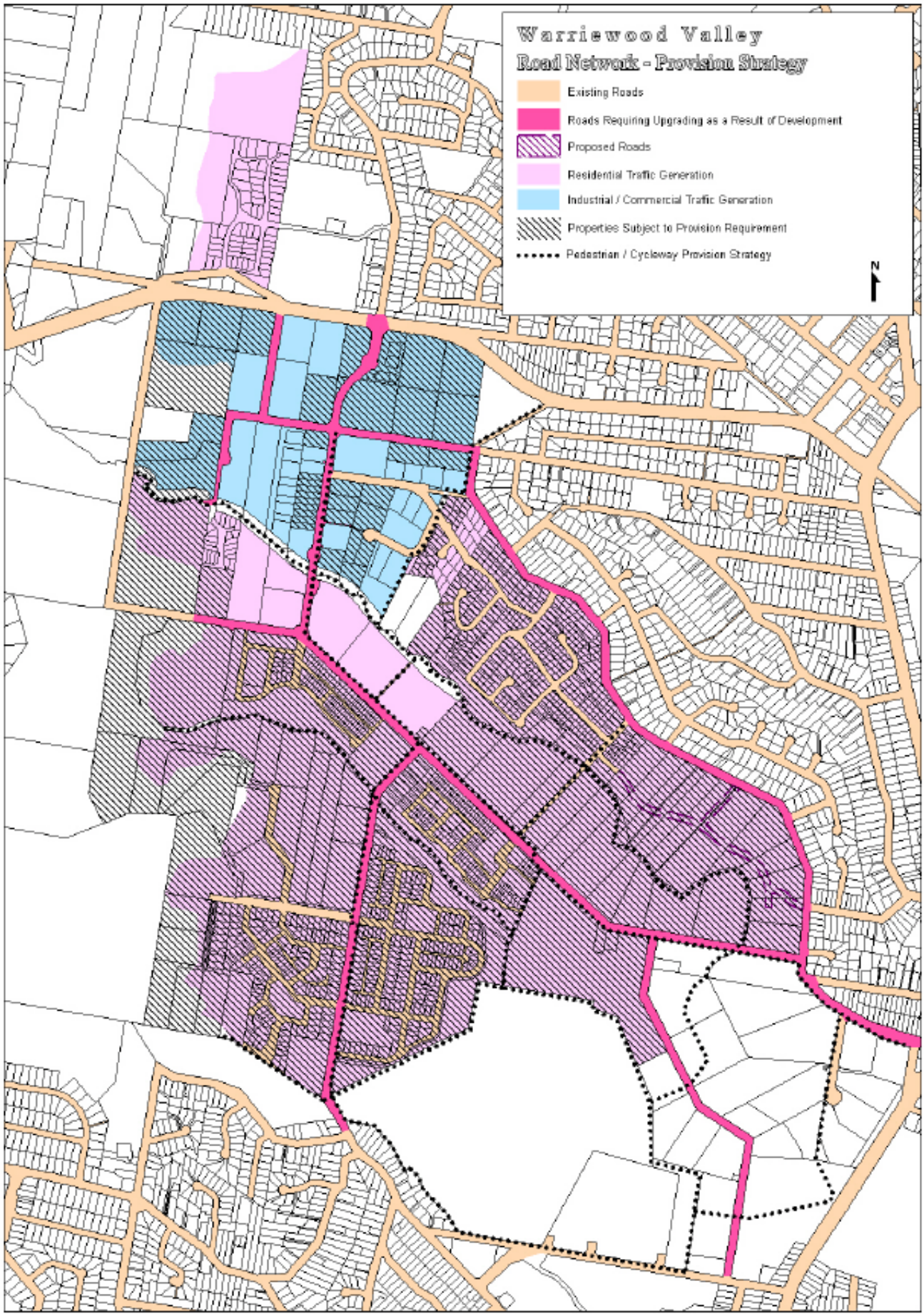
On this basis provision of traffic and transport facilities by developers (either direct or indirect) should be proportional to the number of dwellings to be developed in the residential areas regardless of location or sector. Contribution from remaining land undeveloped in the Stage 1 industrial/commercial and residential areas at the northern end of the Valley together with the adjoining sectors designated for industrial/commercial development should be on a per m² basis and relate to the traffic generation capacity.

Sector 20 is an isolated sector to the north of Mona Vale Road. The implementation of its traffic and transport management facilities to service this sector is not associated with the remaining development area and therefore should be treated independently and as part of the development process for that section.

Opportunities for provision of facilities
All sectors that have direct frontage to road reserves where there is opportunity to directly provide facilities particularly half width road construction.

In addition to half road constructions there are significant opportunities for direct provision of traffic and transport facilities through construction of intersections, traffic control structures and bridges.

Figure 5: Road Network (Subject to change as a result of the Strategic Transport Study and future planning in the Southern Buffer area)



PUBLIC RECREATION AND OPEN SPACE PROVISION STRATEGY

Objective
To provide a public recreation and open space system which serves those areas within Warriewood Valley designated for urban development.

Land to which this strategy applies
The strategy applies to all of the land in Warriewood Valley Urban Land Release, in that the provision of public recreation and open space facilities provide a shared level of amenity for all these undeveloped areas designated for residential urban development.
Note: In 1997, part of Sector 1 was zoned for light industrial use under the 1986 Warriewood Valley Stage One Release. Its inclusion in the land release as residential land follows from Council decision based on the premise that there should be no financial disadvantage to Council in terms of its existing and future Section 94 liabilities.

On this basis provision of facilities by developers (either direct or indirect) should be proportional to the number of dwellings to be developed in the residential areas regardless of location or sector.

Land provided by multiple use facilities
The buffer areas, open space links and drainage facility areas provide a multiple use function. Where residential development has provided for these facilities it is appropriate to credit that contribution with a 30% factor in regard to open space requirements.

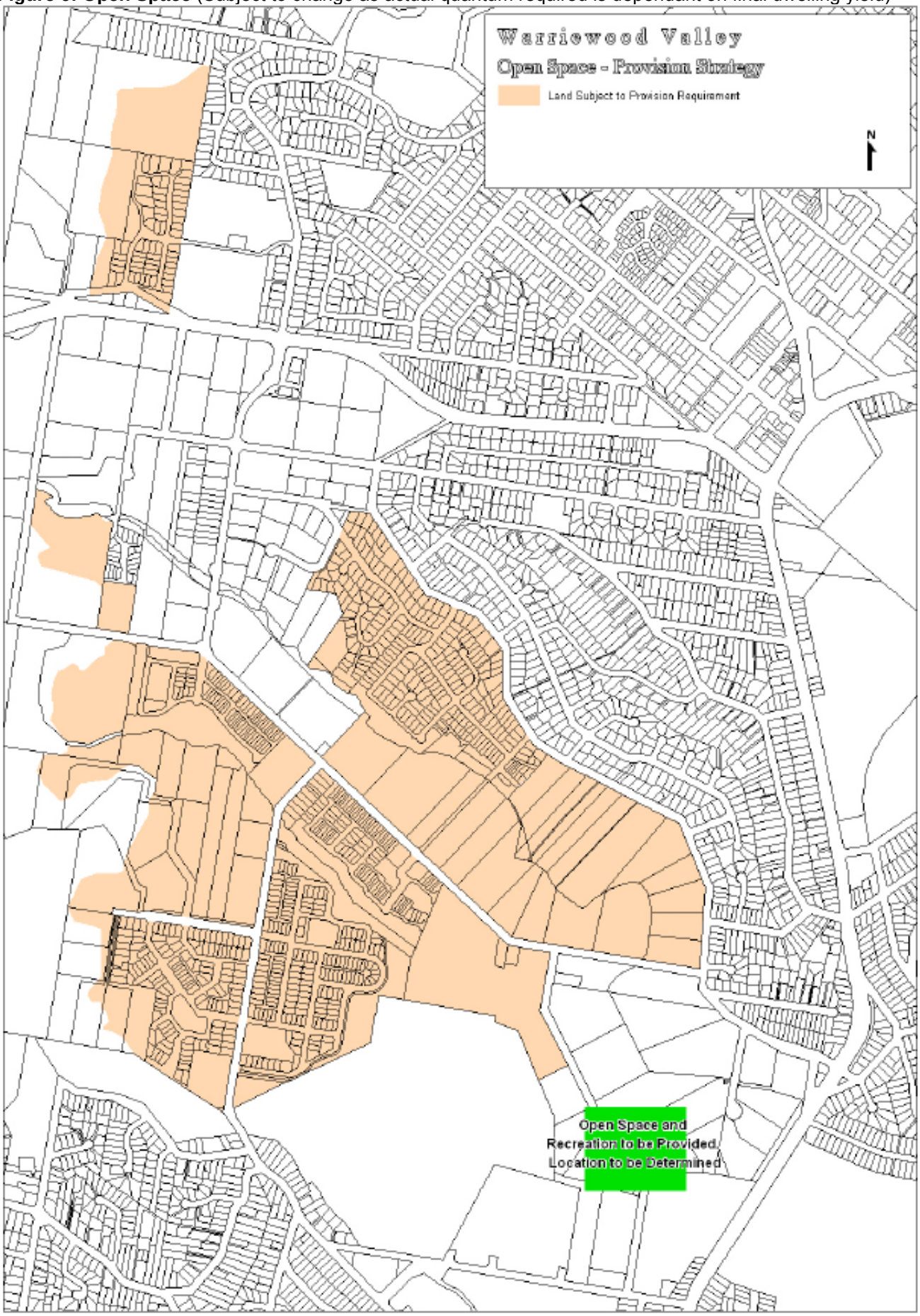
All proposed residential development has contributed to these facilities (in combination) other than Sector 20. In the case of Sector 20, offsets can be offered depending on the level of provision of these facilities at detailed planning and development application stage.

This principle may also be applicable to other sectors should land be proposed to be used in a way that will provide realistic multi-use open space functions (i.e. water management structures).

Opportunities for provision of facilities
Those sectors which have land suitable for public open space and recreation facilities provide an opportunity for developers to directly provide facilities. There is relatively limited opportunity in the early stages of development to directly provide recreation and open space as an open space plan specifying areas to be targeted for development will need to be produced.

Areas which cannot directly provide facility, can be levied through a Section 94 Plan Contribution or offered an opportunity to construct facilities on land already acquired by Council to the value of the contribution that would otherwise be payable.

Figure 6: Open Space (Subject to change as actual quantum required is dependant on final dwelling yield)



PEDESTRIAN AND CYCLEWAY NETWORK PROVISION STRATEGY

Objective

To provide an overall pedestrian and cycleway network which serves those areas within Warriewood Valley designated for urban development.

Land to which this strategy applies

The strategy would apply to all of the land in the Warriewood Valley Urban Land Release.

Note: In 1997, part of Sector 1 was zoned for light industrial use under the 1986 Warriewood Valley Stage One Release. Its inclusion in the land release as residential land follows from Council decision based on the premise that there should be no financial disadvantage to Council in terms of its existing and future Section 94 liabilities.

The strategy applies to all residential land in that the provision of a pedestrian cycleway network provides a shared level of amenity for all these undeveloped areas designated for residential development.

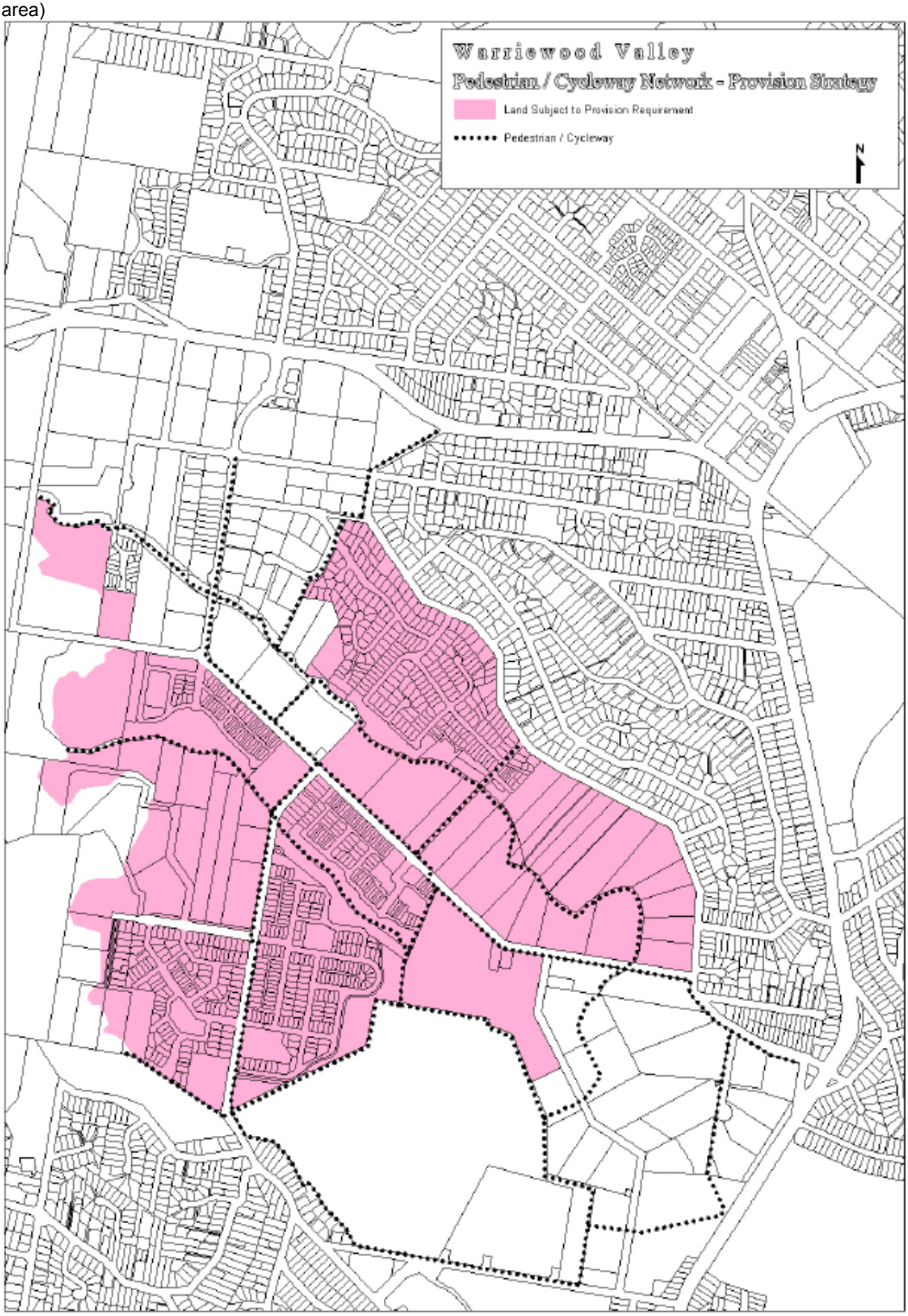
On this basis, provision of facilities by developers (either direct or indirect) should be proportional to the number of dwellings to be developed in the residential areas regardless of location or sector.

As Sector 20 is an isolated sector to the north of Mona Vale Road, the provision of this facility to service its future residents should be treated independently and as part of the detailed planning and development process for that sector.

Those sectors which provide an opportunity for developers to directly provide facilities will be encouraged to do so. In this regard the majority of sectors have an opportunity for direct provision.

Where facilities cannot be directly provide costs can levied through a Section 94 Contribution Plan.

Figure 7: Pedestrian/cycleway network (Subject to change, with future planning of the Southern Buffer area)



COMMUNITY SERVICES PROVISION STRATEGY

Objective

To provide an appropriate level of community service facilities which serves those areas within Warriewood Valley designated for urban development.

Land to which this strategy applies

The strategy would apply to all of the land in Warriewood Valley.

Note: In 1997, part of Sector 1 was zoned for light industrial use under the 1986 Warriewood Valley Stage One Release. Its inclusion in the land release as residential land follows from Council decision based on the premise that there should be no financial disadvantage to Council in terms of its existing and future Section 94 liabilities.

The strategy applies to all residential land in that the provision of community service facilities provide a shared level of amenity for all these undeveloped areas designated for residential development.

On this basis, provision of facilities by developers (either direct or indirect) should be proportional to the number of dwellings to be developed in the residential areas regardless of location or sector.

Appendix 5: Recommendations for Residential Densities

Sector ID	Address	AREA (m²)	To be tested	Reason	2010 Planning Framework Density	Density recommended by Urban Design Study	2010 Planning Framework Yield	Yield as per Urban Design Study	Agreed Density	Agreed Yield	Additional Dwellings above 2010 Planning Framework	Comments
101	165-167 Warriewood Road	1566.5	YES		15/HA	26/HA	1	14	26/HA	4	3	Able to develop on its own.
102	185 Warriewood Road	4560.7	NO	Criteria 1	Industrial							
103	10c, 10d, 12a, 12b, 12c, 14a, 14b, 14c, 16a Ponderosa Parade	8199.4	NO	Criteria 1	Industrial							
104	3 Harris Street & 16 Apollo Street	594.6	NO	Criteria 1	Industrial							
105	15 Jubilee Avenue	4561.8	NO	Criteria 1	Industrial							
201	4 Walana Crescent	1302.7	NO	Criteria 1	NOT IDENTIFIED							Landowners may seek to lodge rezoning application.
202	14 Walana Crescent	4155.1	NO	Criteria 1	NOT IDENTIFIED							Landowners may seek to lodge rezoning application.
203	3 Harrier Place	14678.6	NO	Criteria 1	NOT IDENTIFIED							Landowners may seek to lodge rezoning application.
204	79 Cabbage Tree Road	38642.9	NO	Criteria 1	NOT IDENTIFIED							Landowners may seek to lodge rezoning application.

301	20 Macpherson Street	16657.1	YES		25/HA	38/HA	42	63	32/HA	53	11	Rezoning to be progressed to enable sector to develop at 32/HA
302	18 Macpherson Street	26225.7	YES		25/HA	37/HA	66	130	32/HA	84	18	HBO+EMTB recommends 302 & 303 amalgamate to achieve 37/HA density Rezoning to be progressed to enable each sector to develop at 32/HA
303	16 Macpherson Street	9078.6	YES		25/HA		23		32/HA	29	6	Rezoning to be progressed to enable each sector to develop at 32/HA
501	4 Forest Road	31049.6 (by itself 9823.78)	YES		25/HA	4/HA	75	4	32/HA	94	19	Rezoning to be progressed to enable sector to develop at 32/HA (any urban form, however need to develop as whole sector to achieve density) *Note: Exhibited report and Urban Design Study showed incorrect yield (99 dwgs).*
	8 Forest Road	21210.3	YES			42/HA		90	32/HA			
701	2 Daydream Street and 96 Mona Vale Road	9214.6	NO	Criteria 1	Industrial							
801	23B Macpherson Street	11858.0	YES		25/HA	51/HA	19	61	32/HA	38	19	Rezoning to be progressed to enable sector to develop at 32/HA *DA approved under Affordable Housing SEPP for 46 dwellings plus retail floor space, equating to approximate density of 39/HA*

802	5 Forest Road (Mater Maria)	37471.9	NO	Criteria 1	NOT IDENTIFIED							Landowners may seek to lodge rezoning application.
901	Lots 11, 12 & 13 DP 1092788 (Sector 8); 1, 2, 3, 4, 5, 9 & 10 Fern Creek Road; 2, 4, 6, Street & Orchard Street road reserve (2a, 4a, 6a & 8 Orchard Street)	143191.6	YES		25/HA (with 15m street frontage) *Note: Staff have previously recognised that some subsectors can only achieve 10/ha, other subsectors able to achieve up to 25/ha*	29/HA	245 *Note: Yield calculated on densities between 10/ha & 25/ha*	420	*Various* *See breakdown of sub-sectors below*	264 *See breakdown below*	19 *See breakdown below*	*Not yet rezoned to 2(f).* *Decision to separate Sector 901 into sub sectors on basis of distinct environmental constraints that apply to specific sub sectors.* *Agreed with HBO+EMTB to break up sector according to land capability, particularly as the eastern half can be progressed given no significant environmental constraints.*
901A	East of Fern Creek Road including Orchard Street road reserve (2a, 4a and 6a Orchard Street)	74034.2	YES		*25*	36/HA	*156*	263	32/HA	192 *(No allocation on 9 Fern Creek Rd)*	*36*	Rezoning to be progressed to 2(f) and enable individual properties to develop on own at 32/HA
901B	2 Fern Creek (west side of Fern Creek Road)	11218.6	YES		*25*	39/HA	*12*	43	32/HA	36	*24*	Rezoning to be progressed to 2(f) and enable sector to develop on own at 32/HA
901C	Lot 12 DP 1092788 (Sector 8) - west side of Fern Creek Road	6879	YES		*25*	Recommended to amalgamate with 901G to achieve 77/HA	*17*	102 (across 901C & 901G)	32/HA	22	*5*	Rezoning to be progressed to 2(f) and enable sector to develop on own at 32/HA

901D	1 Fern Creek Road - west side of Fern Creek Road	13,240	YES		*10*	*Proposed parkland*	*14*	0		0	*-14*	Onus on landowners to bring forward rezoning application supported by necessary studies.
901E	12 Orchard Street (battleaxe portion in Sector only)	1,914	YES		*10*	*Retain as battle-axe entry*	*2*	0		0	*-2*	Onus on landowners to bring forward rezoning application supported by necessary studies.
901F	14 Orchard Street (southern portion of site in Sector only)	13,907	YES		*10*	8/HA	*14*	11	10/HA	14	0	Rezoning to be progressed to 2(f) and enable sector to develop on own at 10/HA
901G	Lot 11 DP 1092788 (Sector 8) - west side of Fern Creek Road	6470	YES		*10*	Recommended to amalgamate with 901C to achieve 77/HA	*16*	102 (across 901C & 901G)		0	*-16*	Onus on landowners to bring forward rezoning application supported by necessary studies.
901H	4 & 5 Fern Creek Road (only northern portion in Sector) - west side of Fern Creek Road	13,934.6	YES		*10*	1/HA	*14*	1	*Retain exiting density*	0	*-14*	Onus on landowners to bring forward rezoning application supported by necessary studies.
10A.1	115 Orchard Street (portion of property only in sector)	5566.0	YES		15/HA	*No development potential due to bushfire buffer requirements*	8	0	*Retain exiting density*	0	*-8*	Onus on landowners to bring forward rezoning application supported by necessary studies.

10A.2	111, 111a & 113 Orchard Street (eastern portion of 3 lots in sector)	3767.8	YES		15/HA	*No development potential due to bushfire buffer requirements*	6	0	*Retain exiting density*	0	*-6*	Onus on landowners to bring forward rezoning application supported by necessary studies.
10B	109 Orchard Street	22334.2	YES		15/HA	20/HA	28	45	20/HA	45	17	Rezoning to be progressed to enable sector to develop at 20/HA
10C	194 Garden Street	11676.5	NO	Criteria 1	NOT IDENTIFIED							Landowners may seek to lodge rezoning application.
120 Mona Vale Road	120 Mona Vale Road	82948.5	NO	Criteria 1 & 3	NOT IDENTIFIED							Onus on landowners to bring forward rezoning application supported by necessary studies.
Buffer 1a	61 Warriewood Road	7700.1	YES		25/HA (with 15m street frontage @10/HA)	*No density recommended – sector no longer considered undeveloped*	17		*Retain existing density*	*15 dwellings under constructio n*	*-2*	Construction underway. Sector no longer considered undeveloped. No change to density.
Buffer 1b	53 Warriewood Road	7504.3	YES		25/HA (with 15m street frontage @10/HA)	Buffer 1b, 1c, 1d & 1e recommended to amalgamate to achieve 36/HA	17	66	32/HA	24	7	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1c	53a Warriewood Road	5616.1	YES		25/HA (with 15m street frontage @10/HA)		13		32/HA	18	5	Rezoning to be progressed to enable sector to develop at 32/HA

Buffer 1d	53b Warriewood Road	446.5	YES		25/HA (with 15m street frontage @10/HA)		1		32/HA	1	0	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1e	53c Warriewood Road	4814.9	YES		25/HA (with 15m street frontage @10/HA)		11		32/HA	15	4	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1f	49 Warriewood Road	6511.7	YES		25/HA (with 15m street frontage @10/HA)	Buffer 1f, 1g, & 1h recommended to amalgamate to achieve 55/HA	14	75	32/HA	21	7	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1g	45 Warriewood Road	7281.9	YES		25/HA (with 15m street frontage @10/HA)		17		32/HA	23	6	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1h	43 Warriewood Road	292.4	YES		25/HA (with 15m street frontage @10/HA)		1		32/HA	1	0	Rezoning to be progressed to enable sector to develop at 32/HA

Buffer 1i	41 Warriewood Road	12336.6	YES		25/HA (with 15m street frontage @10/HA)	Buffer 1i, 1j, & 1k recommended to amalgamate to achieve 53/HA	27	165	32/HA	39	12	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1j	31 Warriewood Road	12358.6	YES		25/HA (with 15m street frontage @10/HA)		26		32/HA	40	14	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1k	29 Warriewood Road	6658.4	YES		25/HA (with 15m street frontage @10/HA)		14		32/HA	21	7	Rezoning to be progressed to enable sector to develop at 32/HA
Buffer 1l	23, 25 & 27 Warriewood Road	21193.1	YES		25/HA (with 15m street frontage @10/HA)	32/HA	43	67	32/HA	67	24	Rezoning to be progressed to enable sector to develop at 32/HA.
Buffer 1m	2 Macpherson Street	15453.5	YES		*No development potential*				*No development potential*		0	Onus on landowners to bring forward rezoning application supported by necessary studies
Buffer 2a	4 Macpherson Street	12955.5	YES		*Requires site specific design*	22/HA (Option 1) 32/HA (Option 2)	20	29 (Option 1) 43 (Option 2)	22/HA	29	9	Rezoning to be progressed to enable sector to develop at 32/HA

Buffer 3b	5 & 7 Macpherson Street	2995.8	YES		25/HA	*HBO did not test (anomaly)*	7	*HBO did not test (anomaly)*	32/HA	9	2	Rezoning to be progressed to enable sector to develop at 32/HA
DEVELOPABLE AREA		**460002**								**TOTAL ADDITIONAL DWGS**	**193**	

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