An aerial photograph of a landscape featuring a large, dark reservoir in the upper right quadrant. The surrounding area includes a mix of urban development, green fields, and brownish, possibly eroded or cleared land. A network of roads and paths is visible across the terrain. The text is overlaid on a blue rectangular background in the top left corner.

MOLONGLO 3
STAGE 2
PROOF OF CONCEPT
FOR EPSDD

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CLIENT	EPSDD
DATE	26/03/2019
REVISION	B
STATUS	FINAL DRAFT
PREPARED	DJ
APPROVED	AK



Introduction

INTRODUCTION

RobertsDay were commissioned by EPSDD to provide a review of the previous Molonglo 3 Stage 2 Concept Design, and provide planning/design advice on key components of the subject precinct.

Key components of the project:

- Provide advice on the alignment and interface of the Bindubi Street extension including a potential Intertown Public Transport (IPT) route
- Group Centre interface with IPT and Coppins Creek
- Yield advice - including solar access requirements and limitations

The review of the master plan and yield scenarios identified limitations in the current Estate Development Code (EDC) with difficult terrain such as Molonglo, and potential opportunities to update codes for both planning and infrastructure.

The Proof of Concept Code Reform looks at providing best case scenario design outcomes and compares that with an ACT 'code compliant' scheme to understand the limitations the current codes impose of development within the ACT.
















The proof of concept has been prepared on the basis of the Planning and Design Framework (PDF) for Molonglo Stage 3 and as such, is consistent with the intent of the PDF. The proof of concept provides more information on a number of aspects but it does not constitute an indicative design plan required through the PDF. The proof of concept will assist further with planning and in the potential consideration of Territory Plan code reforms, which are discussed further in this document.

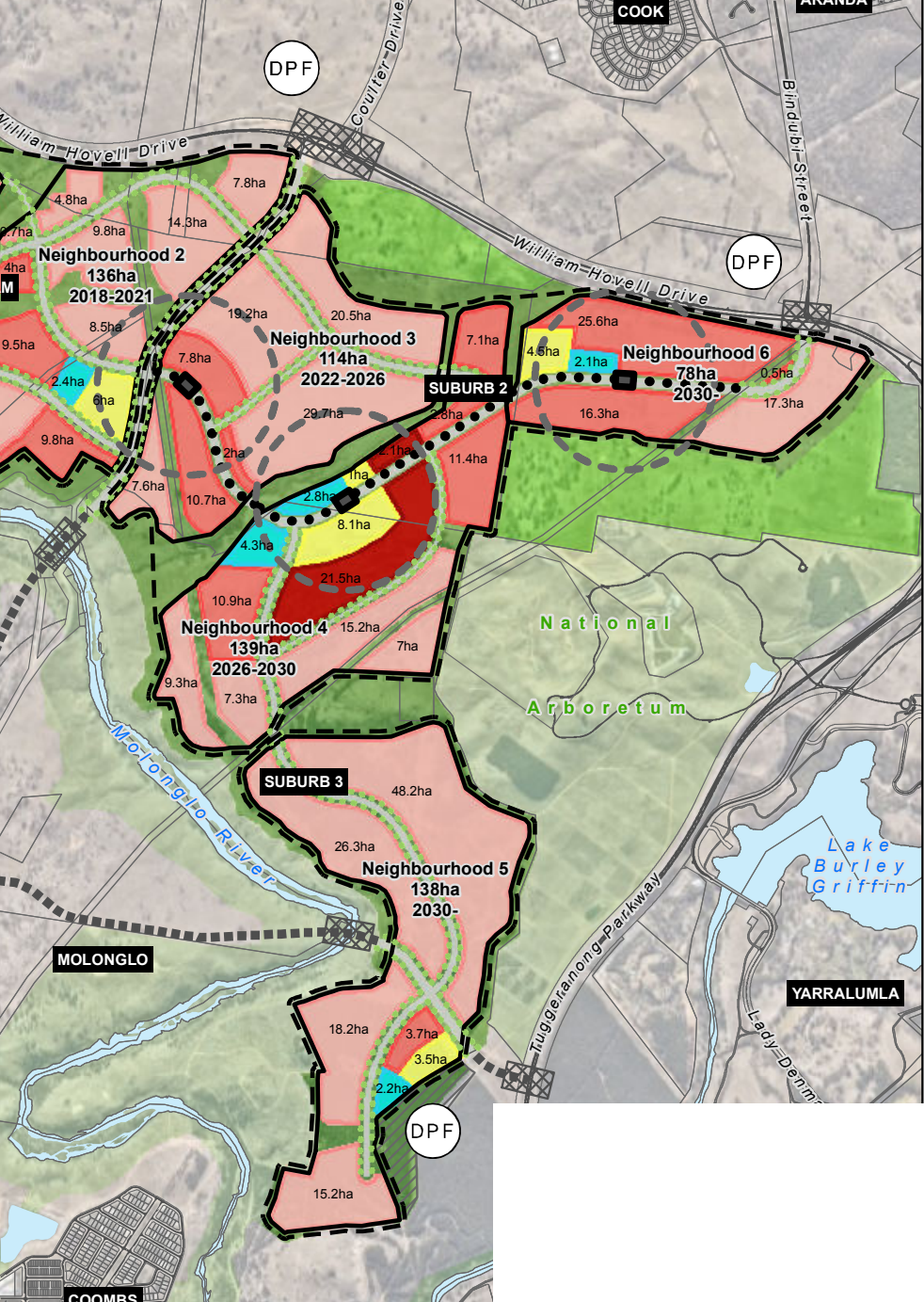


PDF MASTER PLAN

The Draft Planning Design Framework Master Plan by EPSDD sets up the structure and zoning for Molonglo 3 Stage 2.

The PDF was approved on 27 February 2019

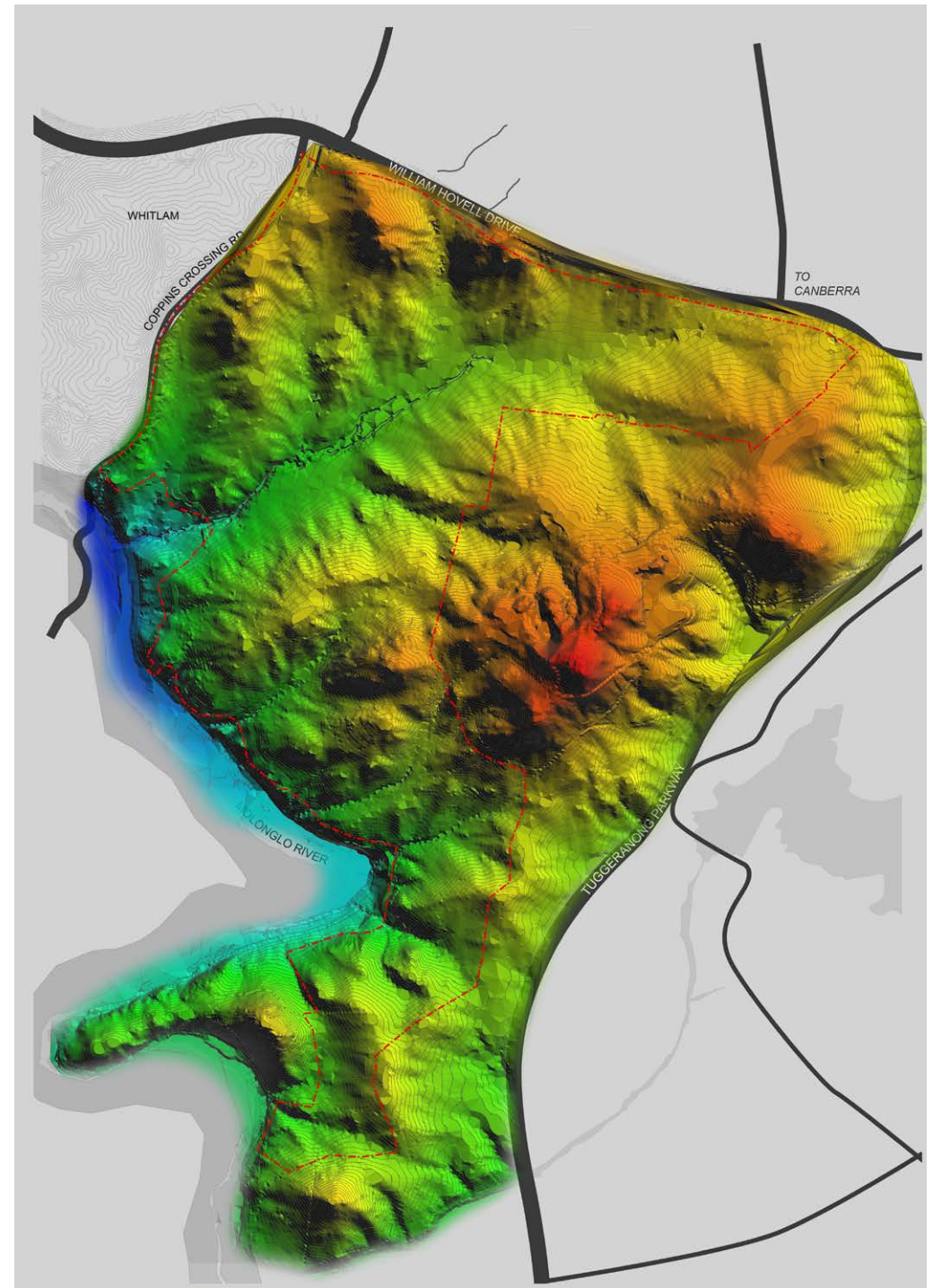
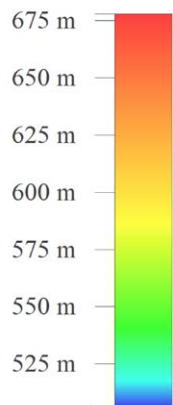
-  Indicative District Playing Fields
-  Commercial Centre
-  Community Facilities
-  Residential
-  Medium Density
-  High Density
-  Roads
-  Open Space
-  Offset Areas
-  National Arboretum / River Corridor
-  IPT Stop
-  400m Walkable Catchment
-  Transit Boulevard
-  Designated Land
-  Intersection / Bridge Design - To Be Determined



DRAFT PLANNING DESIGN FRAMEWORK LAYOUT (SOURCE: EPSDD)

SITE

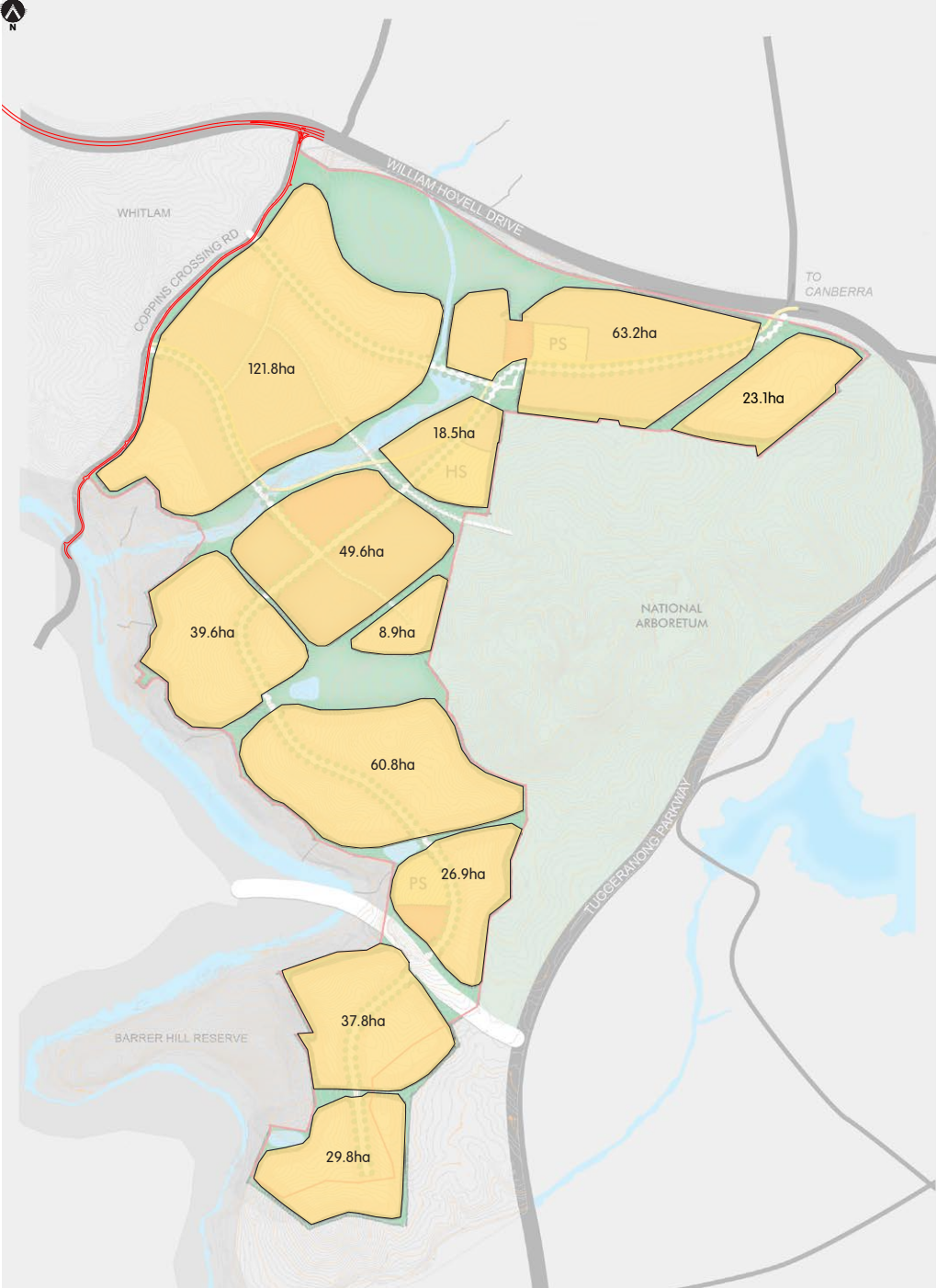
- Site is approximately 6.5kms from Civic
- Adjacent the National Arboretum
- Bordered by the Molonglo River
- Surrounded on three sides by key arterial roads: William Hovell Drive, John Gorton Drive, and Tuggeranong Parkway
- Picturesque views across Canberra and to the Brindabellas
- Very steep topography limits development potential
- Steep topography provides opportunities for broad views
- Multiple localised hilltops provide south facing slope
- Coppins Creek bisects site



DEVELOPABLE AREA

There are a number of topographic and environmental constraints that reduce the potential developable area.

The total developable area (excluding roads) is **480.0ha** is based on the PDF.



Developable Areas

DEVELOPMENT PATTERN

A preliminary updated master plan was developed based on combining the original RobertsDay master plan and the EPSDD Planning Design Framework.

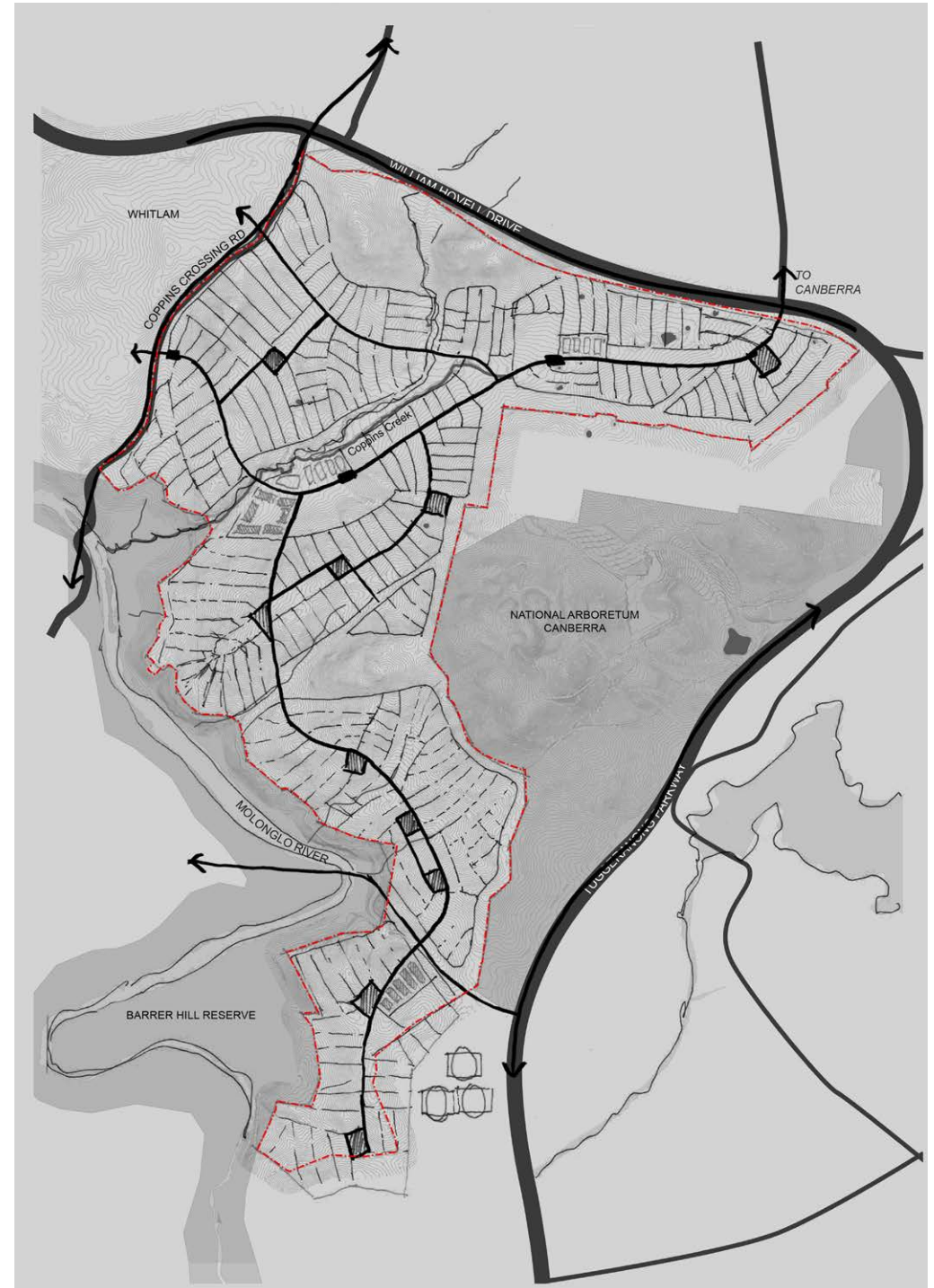
The local road layout was developed based on providing the bulk of the roads perpendicular to contours to provide the best streetscape and built form outcome and to reduce bulk earthworks.

This initial layout demonstrates one way of many that the site could be developed and was used to understand the potential compliant yield the site could achieve based on the orientation of the blocks in relation to Appendix A - Block Compliance in the Estate Development Code (2013).

Block compliance is determined by the combination of orientation of blocks to the street, and the direction and % grade of the slope.

A block with its street address to the north can achieve blocks of almost any size regardless of slope. Whereas a block facing north-east or south-west for example is limited to very large blocks. If the slope is greater than 15% to the south for blocks in the incorrect orientation, they can not be made compliant regardless of size.

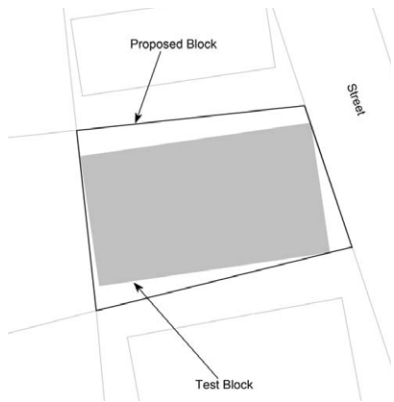
The requirements of block compliance puts a limitation of the development potential of any site, but the significant topography and large quantity of south facing slope increases that burden on Molonglo 3.



ORIENTATION

The preliminary road layout highlights that a significant portion of the site falls outside the ideal orientation of N/S or E/W. **66%** of potential developable area falls within the NE/SW or SE/NW orientations, which limits yield significantly as blocks must be larger than 500m².

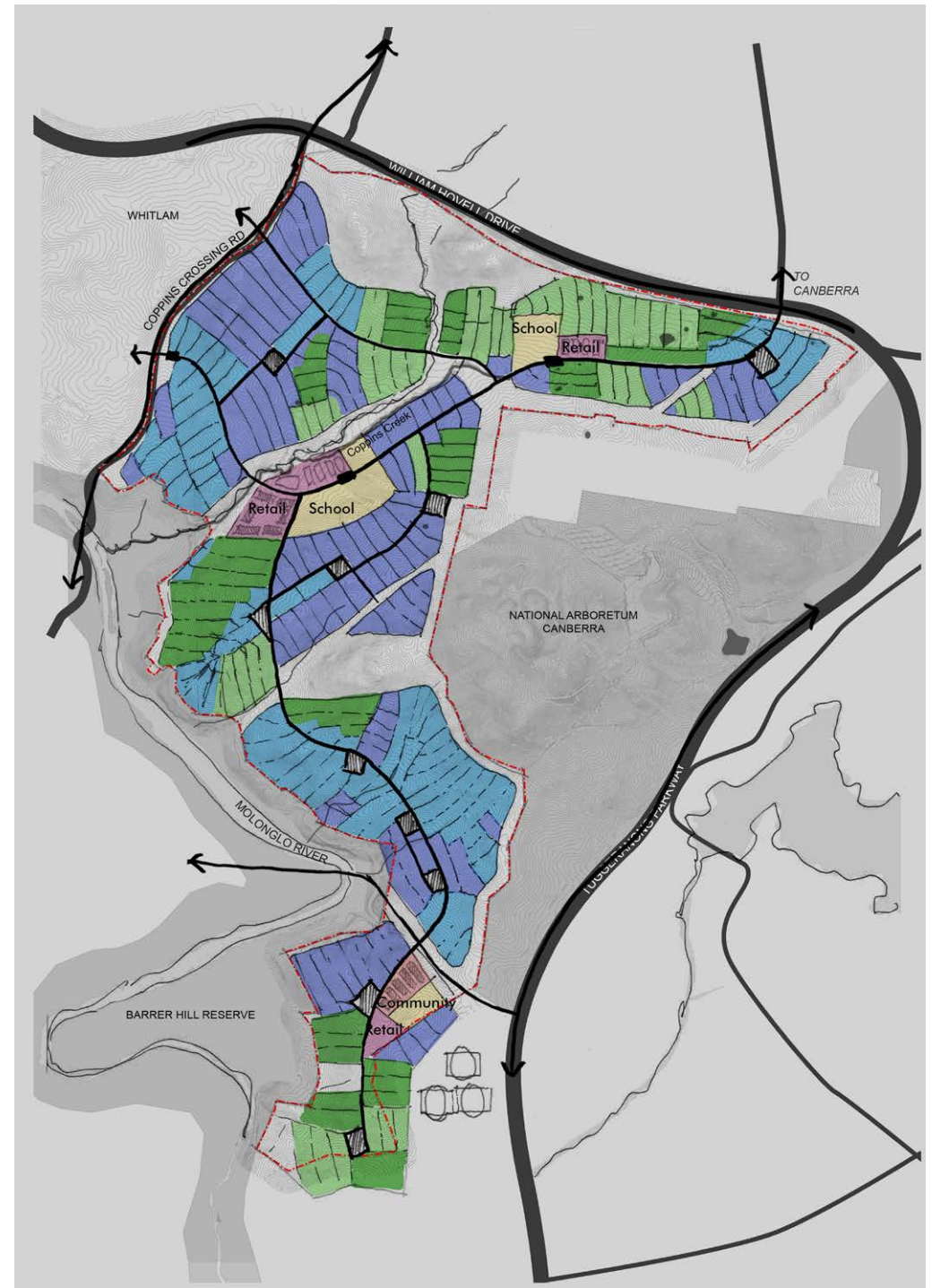
The layout of roads curve to follow contours where possible, which results in blocks that are somewhat 'fan' shaped. Block compliance requires that a 'test block' fits perfectly within each block, which as shown below greatly increases the size of a block without increasing the quality of development. The test block for large blocks needs to be 500m² in size, so the additional space surrounding it can result in blocks greater than 600-700m²



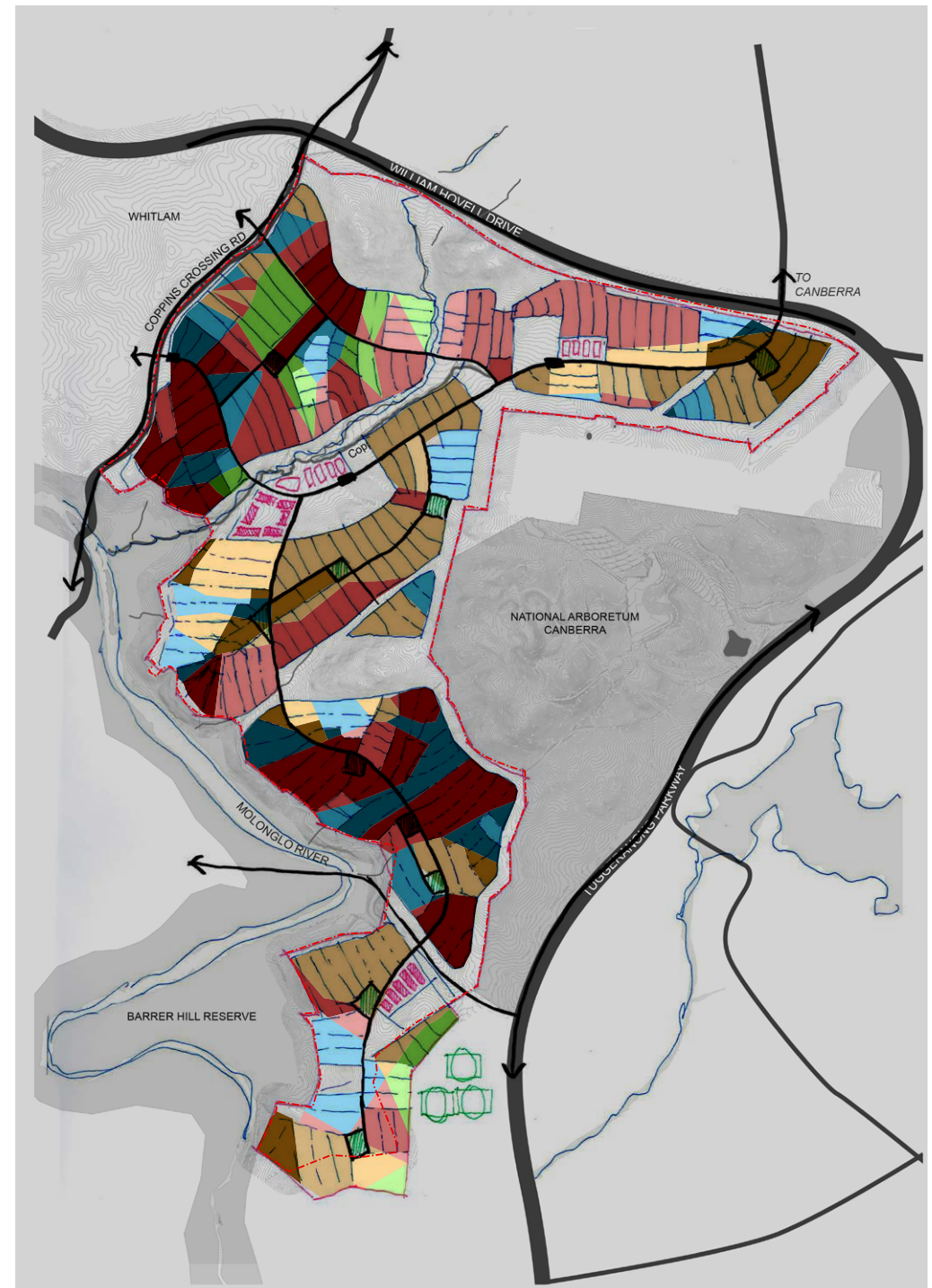
BLOCK COMPLIANCE TEST BLOCK
(SOURCE: ESTATE DEVELOPMENT CODE FIGURE A2)

LEGEND

- N/S Orientation
- E/W Orientation
- NE/SW Orientation
- SE/NW Orientation



To understand the compliance for the site a slope analysis was undertaken to understand the quantity of south facing land. **40%** of developable area has south facing slope, which limits block compliance. When you combine this with the orientation of the blocks **80%** of potential developable area is either south facing slope or within the NE/SW & SE/NW orientations. These constraints of the land greatly limit the development potential of the site when looked at through the lens of EDC Block Compliance.



PRELIMINARY YIELD - COMPLIANT

A high level yield analysis was undertaken based on the Development Patterns. Code compliant densities were allocated to each orientation/slope combination to understand the yield.

The yield assumes a TCCS compliant **34%** land take for local road reserves, but does not consider land take for higher order roads such as sub-arterial or IPT corridors. Additional land for larger road reserves will reduce the developable area. The 34% is an assumption based on benchmarking of local RobertsDay projects and development/ land budgets.

The yield excludes areas for apartments and mixed-use retail.

TOTAL PRELIMINARY YIELD 5,603

Development Pattern	Approx. Area (ha)	%	Code Compliant Max. Density	Yield
N/S Orientation - North Slope	26.82		22	590
N/S Orientation - South Slope	11.69		22	257
N/S Orientation - East Slope	7.30		22	161
N/S Orientation - West Slope	29.22		22	643
SUB-TOTAL	75.02	18%	22	1,651
E/W Orientation - North Slope	14.31		20	286
E/W Orientation - South Slope	46.22		17	786
E/W Orientation - East Slope	4.88		17	83
E/W Orientation - West Slope	2.31		17	39
SUB-TOTAL	67.71	16%	18	1,194
NE/SW Orientation - North Slope	81.97		11	902
NE/SW Orientation - South Slope	40.77		9	367
NE/SW Orientation - East Slope	15.48		9	139
NE/SW Orientation - West Slope	19.38		9	174
SUB-TOTAL	157.60	37%	9.5	1,582
SE/NW Orientation - North Slope	23.75		11	261
SE/NW Orientation - South Slope	70.92		9	638
SE/NW Orientation - East Slope	0.60		9	5
SE/NW Orientation - West Slope	30.13		9	271
SUB-TOTAL	125.39	29%	10	1,176
TOTAL	425.73	100%		5,603

NOTE: Yields exclude higher density lands with apartments



2

Concept

CONCEPT LAYOUT

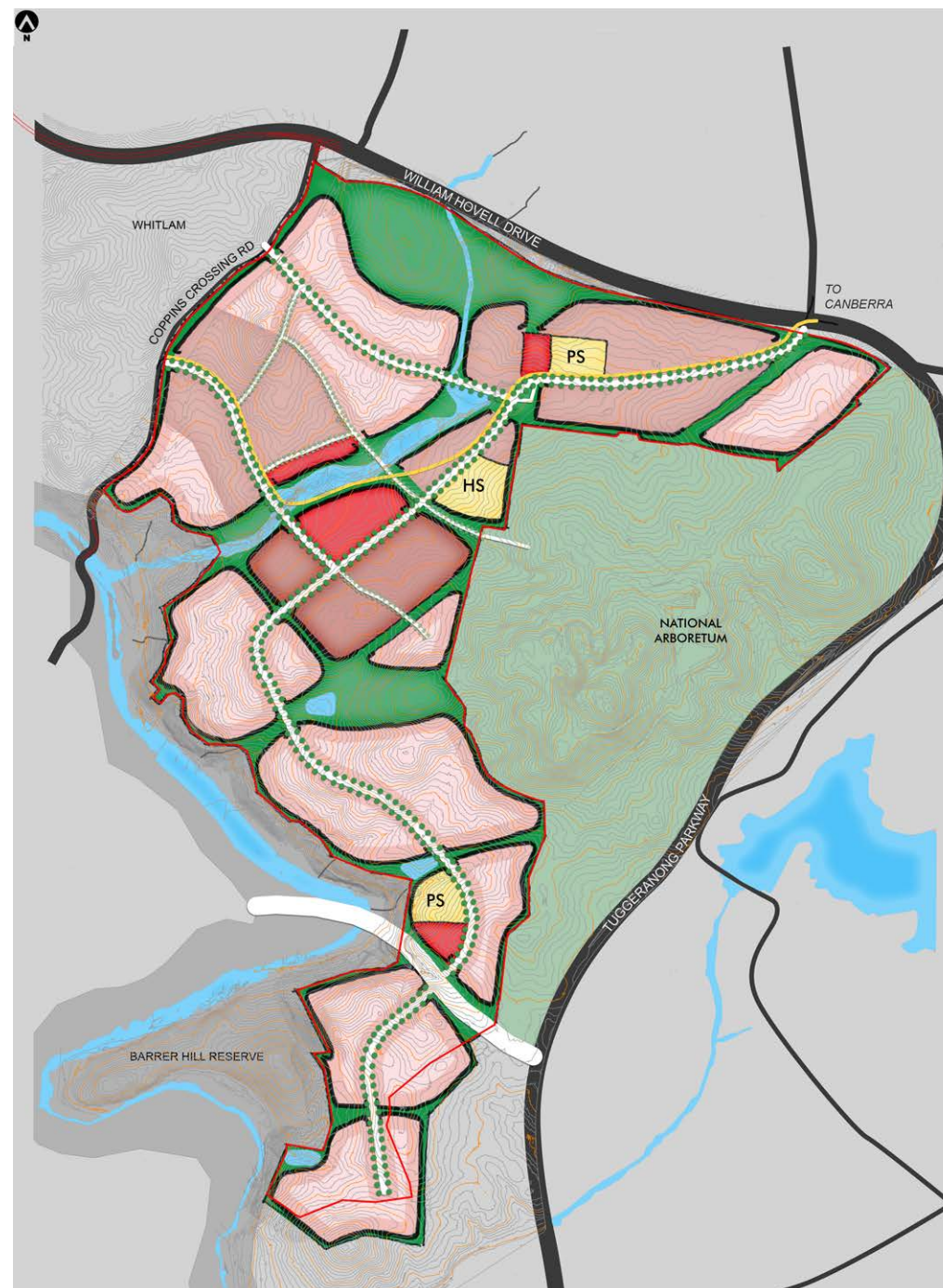
The concept layout builds upon the master plan previously completed by Roberts Day, the Planning Design Framework (PDF) by EPSDD, and discussions with EPSDD about desired outcomes for the precinct.

The key changes in this layout include:

- Create distinct neighbourhoods
- IPT alignment travels between retail group centre and Coppins Creek decoupled from roads
- Relocate the southern school/retail centre north of the proposed east-west arterial road. This provides multiple access/egress points for the school during an emergency as the southern neighbourhoods have only one entry point.
- Include a key landscape link to the Arboretum that provides a direct visual connection to Coppins Creek.
- Provide schools with limited frontage to residential land uses to limit land-use conflicts
- Where properties face arterial roads acoustic treatments will need to be considered

LEGEND

- Residential
- Residential - Park frontage
- Residential - Medium Density
- Residential - Higher Density
- Retail
- School / Community
- Open Space



CONCEPT LAYOUT

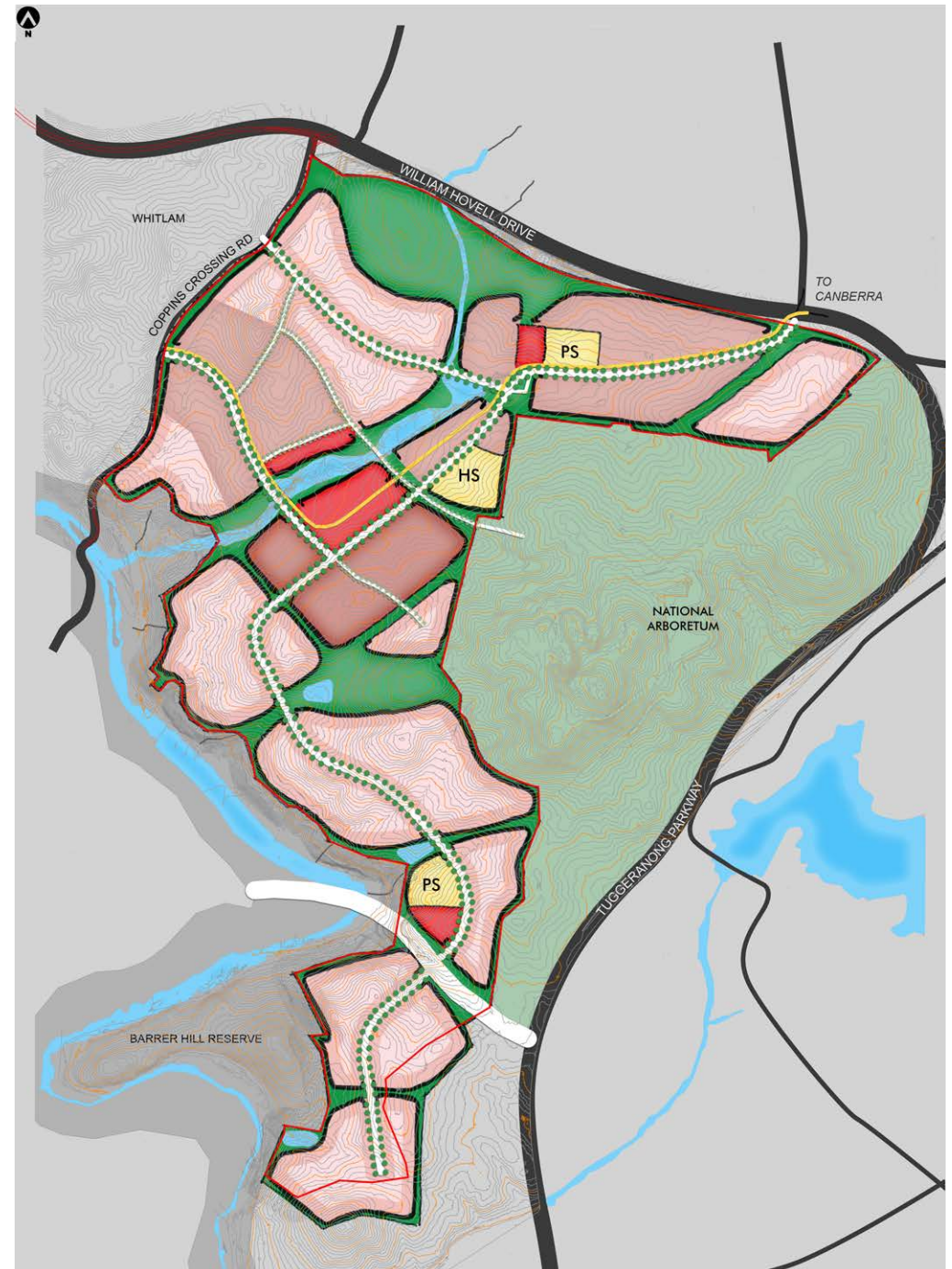
ALTERNATE ALIGNMENT

Providing an alternative alignment for the IPT that travels in the centre of the retail group centre.

This alignment could function as a street in the interim until the light-rail is built in the future.

LEGEND

- Residential
- Residential - Park frontage
- Residential - Medium Density
- Residential - Higher Density
- Retail
- School / Community
- Open Space



CONCEPT LAYOUT

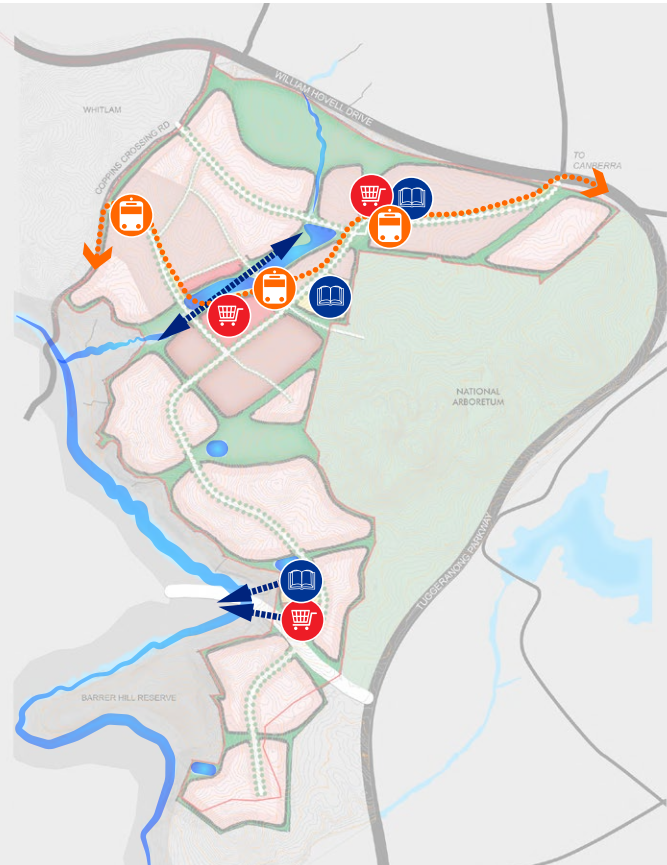
DESIGN PRINCIPLES

CENTRES / SCHOOLS ARE LOCATED NEAR WATER OR LIGHT RAIL STOPS

Centres and Schools are located adjacent proposed light rail stops to create a community hub.

Where there isn't a light rail hub, they are located near water for a unique local centre experience.

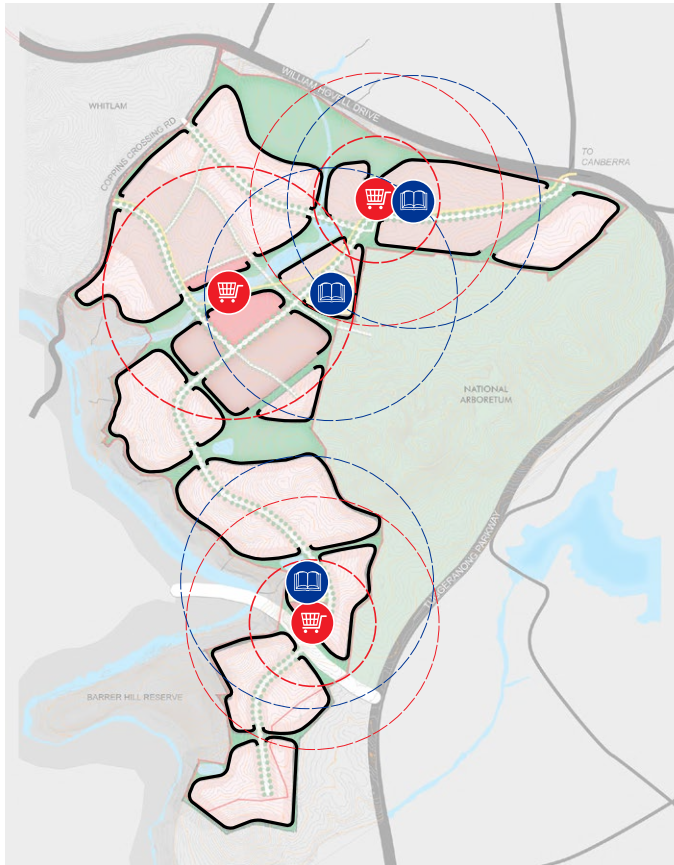
Schools are to be located on collector roads near light rail stops, and provided with vehicle access away from residential zones.



CENTRES / SCHOOLS ARE SHARED BY MULTIPLE NEIGHBOURHOODS

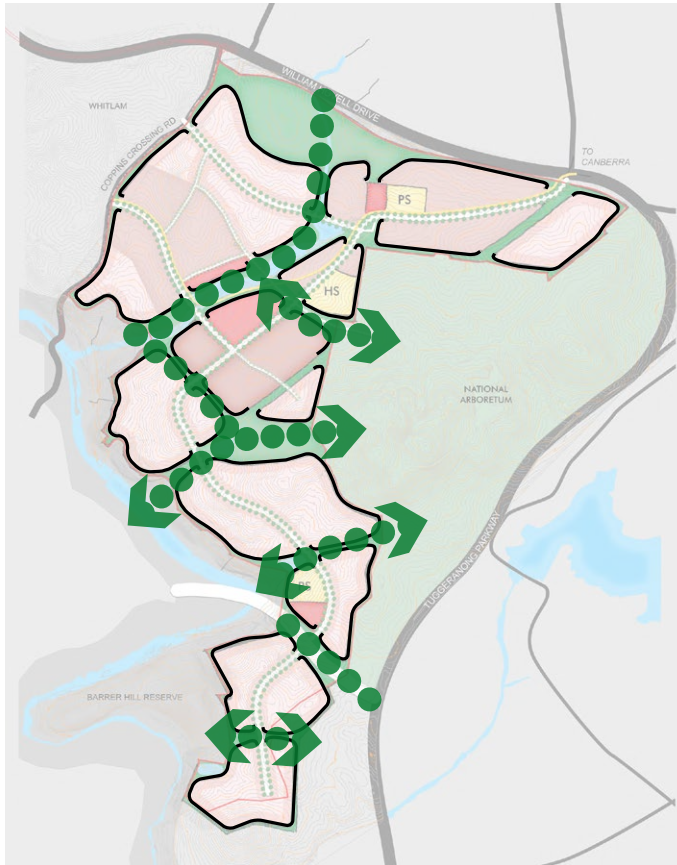
Retail Centres and Schools are located between neighbourhoods to be shared by the widest group.

The southern school has been moved north due to the constraints on accessing the southern neighbourhoods via a single road.



GREEN SPINES DEFINE NEIGHBOURHOOD EDGES

Neighbourhoods are defined by green buffers that align with existing natural features, including Coppins Creek. Some of the buffers will function as narrow linear open space connections.



ACTIVE TRAVEL NETWORK LINKS LOCAL CENTRES

Neighbourhoods and Retail Centres are linked via an Active Travel network.

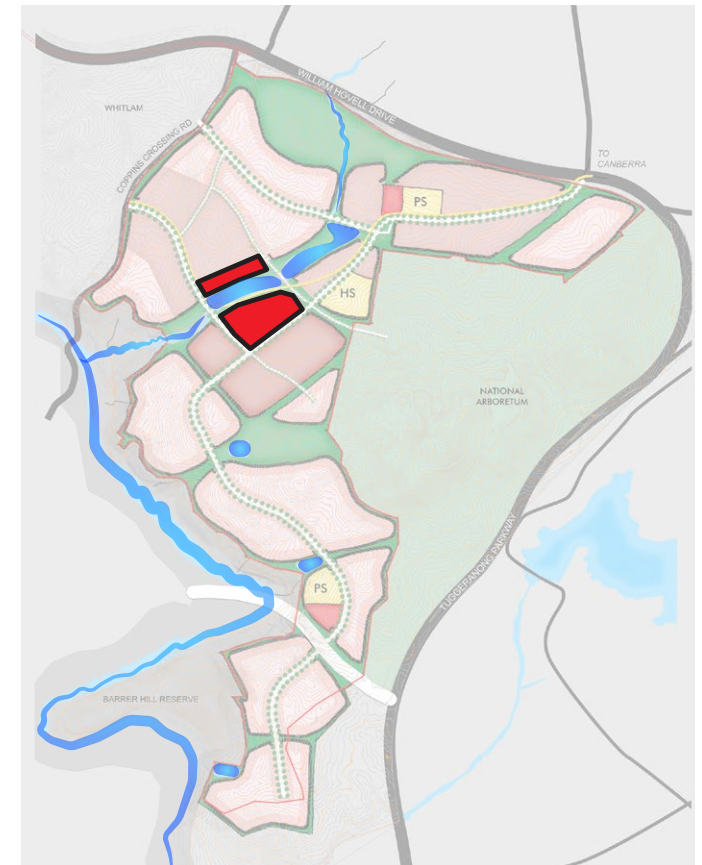
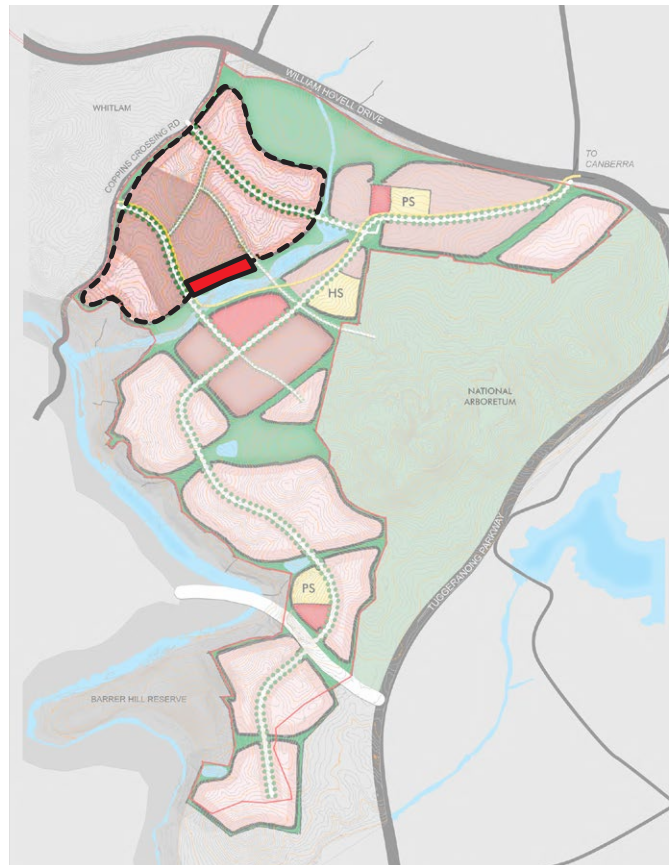
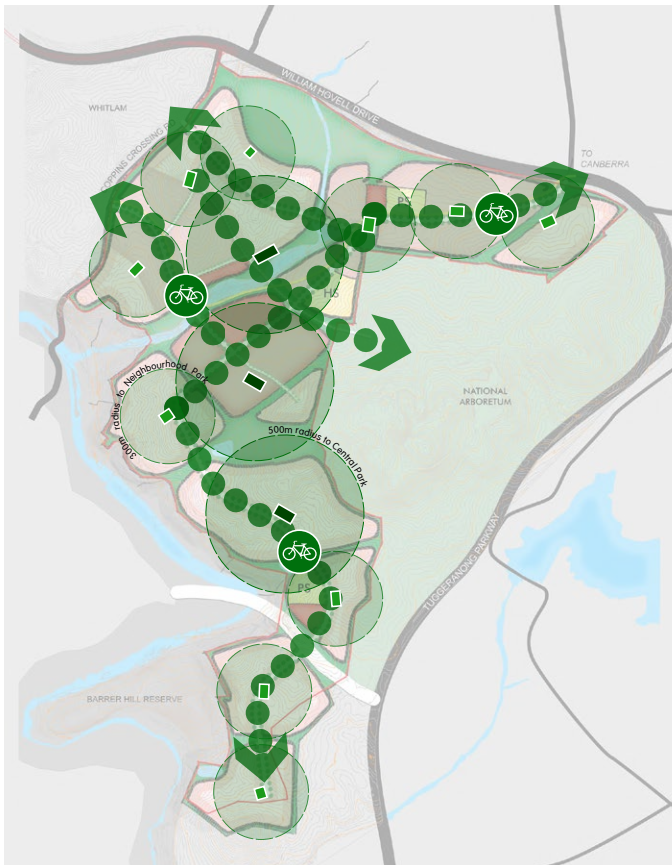
Each neighbourhood will have either a Central Neighbourhood Park or a Local Park at its centre connected via the Active Travel network.

FIRST STAGE INCLUDES DAILY CONVENIENCE

A small portion of retail is located within the first stage to provide convenience to the first residents.

CREEK CORRIDOR WIDTH TO BE DECREASED TO CREATE AN INTIMATE RETAIL EXPERIENCE

Decrease the width of the creek between the two retail areas to create a retail experience that crosses both sides of the creek.



BINDUBI STREET ALIGNMENT

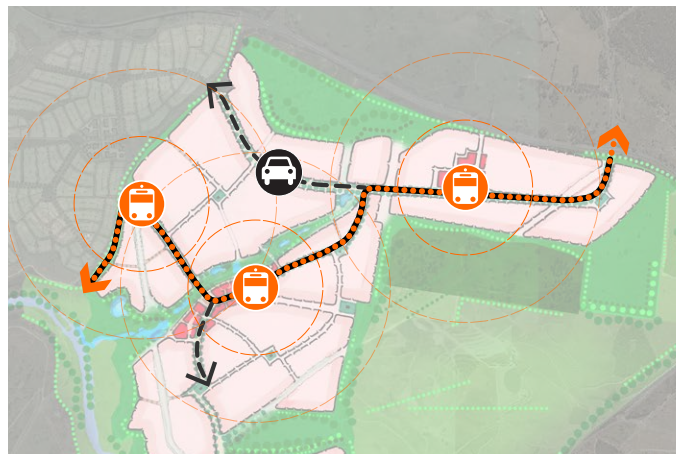
PREVIOUS MASTER PLAN

From William Hovell Drive the Bindubi Street extension connects directly west to John Gorton Drive, with a 'T' intersection directing traffic south towards the Group Centre. The alignment of this intersection prioritises traffic west which mimics the alignment of William Hovell Drive.

The major road continues through the middle of the Group Centre, which limits opportunities for a pedestrian friendly environment as the bulk of traffic heading south will move through the community heart.

From John Gorton Drive, the road terminates at the Group Centre, creating a sense of arrival at the heart of the community, before providing opportunities to continue south or east.

Aligning the light rail and Bindubi Street extension creates a wide corridor through the middle of the community heart that limits pedestrian permeability.

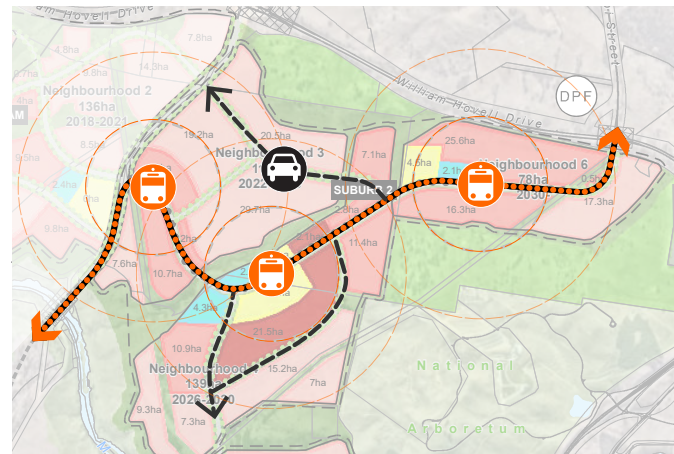


PLANNING DESIGN FRAMEWORK (PDF)

The Bindubi Street alignment changes the alignment of the 'T' intersection and prioritises traffic towards the centre of Molonglo 3. The large radius curves of the road alignment prioritises traffic speed and limits any sense of arrival at either the major Group Centre or the smaller Local Centre.

Additional collector roads near the Group Centre provide alternative paths of travel south without going through the heart of the community.

Aligning the light rail and Bindubi Street extension will create a wide corridor through community heart between the retail centre and the school, limiting opportunities for easy pedestrian connectivity.



UPDATED MASTER PLAN

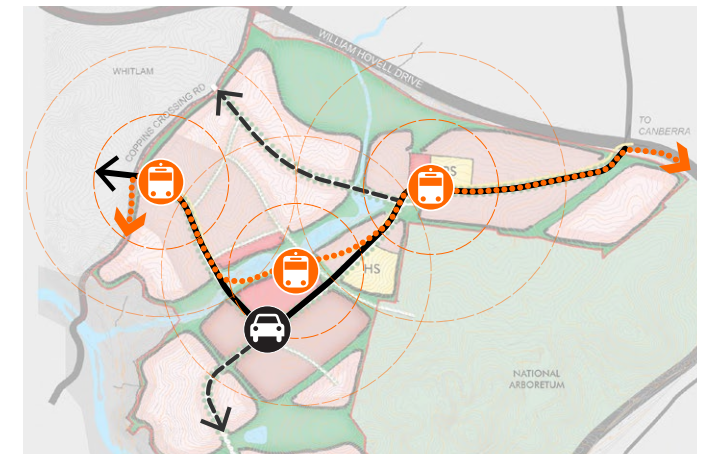
The proposed alignment of Bindubi Street combines components of the previous concepts and introduces the concept of decoupling the light rail from the street when entering the heart of the community.

The 'T' intersection at the Local Centre provides a sense of arrival at a local community centre, whilst also providing a traffic calming measure through the estate by limiting the road radius.

Bindubi Street travels past the High School and Group Centre to provide access to the neighbourhoods further south, with a secondary collector road providing access to the community heart.

At this point, the light rail diverts from the road, and travels past the Group Centre along the edge of the retail in a promenade along the edge of Coppins Creek. The light rail will be de-coupled from the road for some part in a narrower corridor, including in a plaza space between the creek and the retail centre.

By separating the road and rail passengers on the tram will have an experience that can't be replicated via driving.



PUBLIC TRANSPORT

INTEGRATED PUBLIC TRANSPORT INFRASTRUCTURE

The proposed master plan provides for multiple public transport opportunities, include a potential light rail alignment through the northern portion of the site.

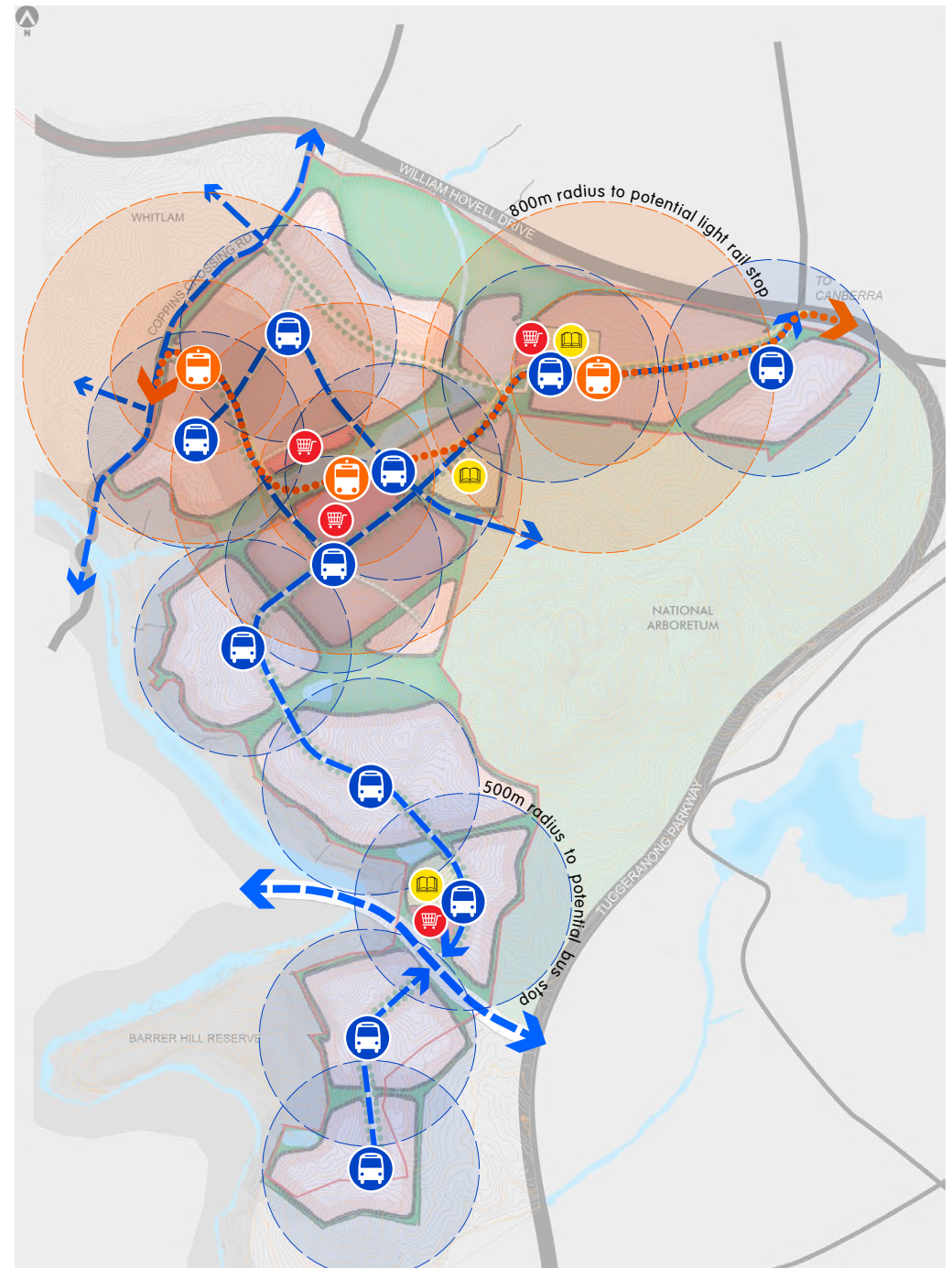
The concentration of activity in the northern portion of the site includes the Group Centre, a Local Centre, High School, and Primary School. These community facilities are served by the proposed IPT from William Hovell Drive through to John Gorton Drive as well as the bus route.

INTERTOWN PUBLIC TRANSPORT (IPT)

Proposed through the site is an alignment for the future Intertown Public Transport Route which can be either Rapid Bus, light rail, or trackless trams. This route connects key community infrastructure and covers a wide section of the site.

BUS ROUTE

The alignment of the bus route provides a single bus stop that serves each neighbourhood and is located adjacent central neighbourhood parks or local centre.



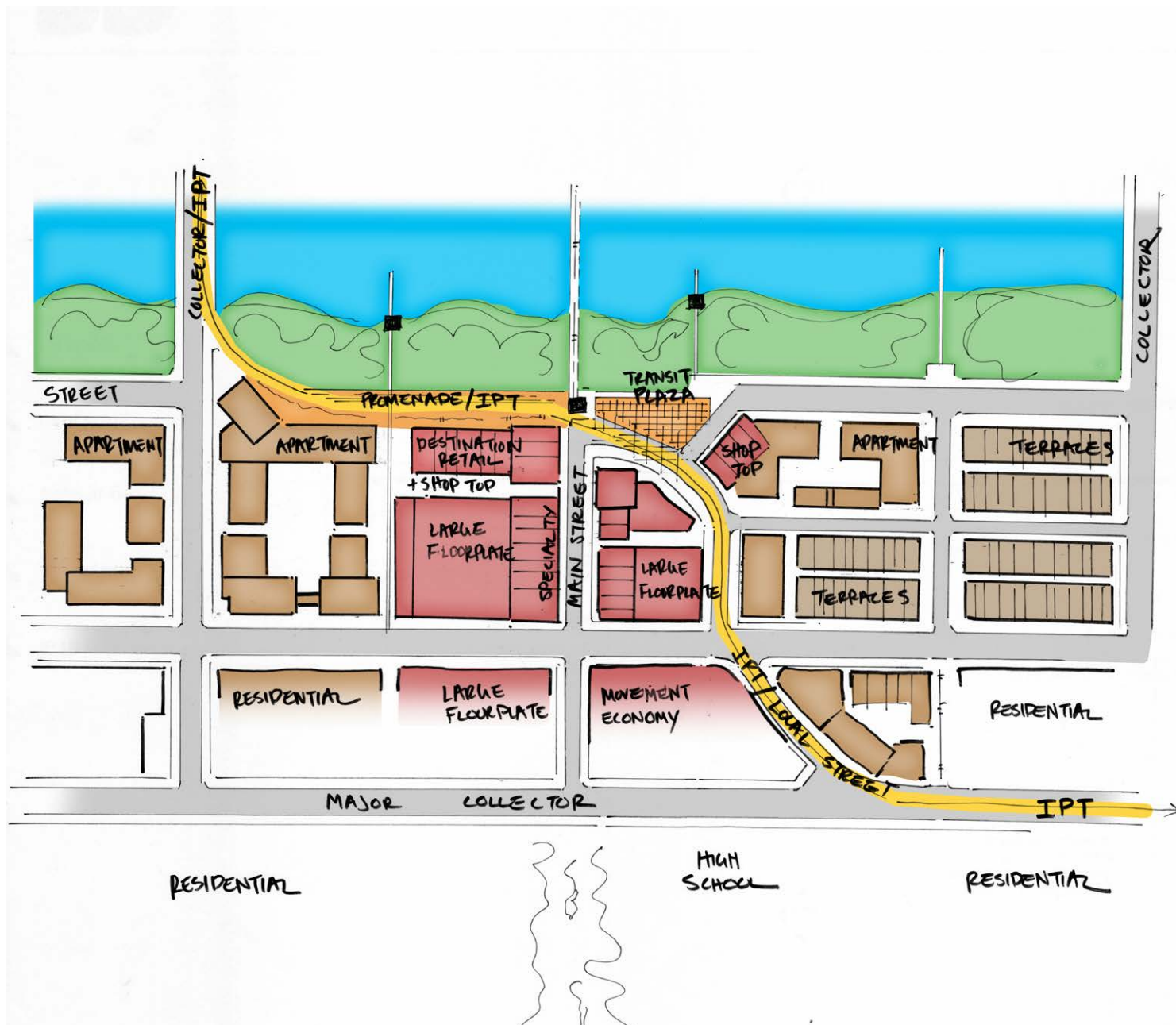
PUBLIC TRANSPORT ALIGNMENT

CENTRE ACTIVATION / IPT FUTURE-PROOFING

The following spreads provide an indicative layout for both IPT alignment options in order to demonstrate an integrated land use/ transport planning solution that focuses on place activation balanced with functional centre and movement principles.

OPTION 1

The layout of the Group Centre is designed to decouple the IPT from the road network for a short period and include it within a public promenade along Coppins Creek. Placing the IPT stop at the Transit Plaza promotes activation along the creek frontage, with a traditional Main Street providing a central heart to the district.

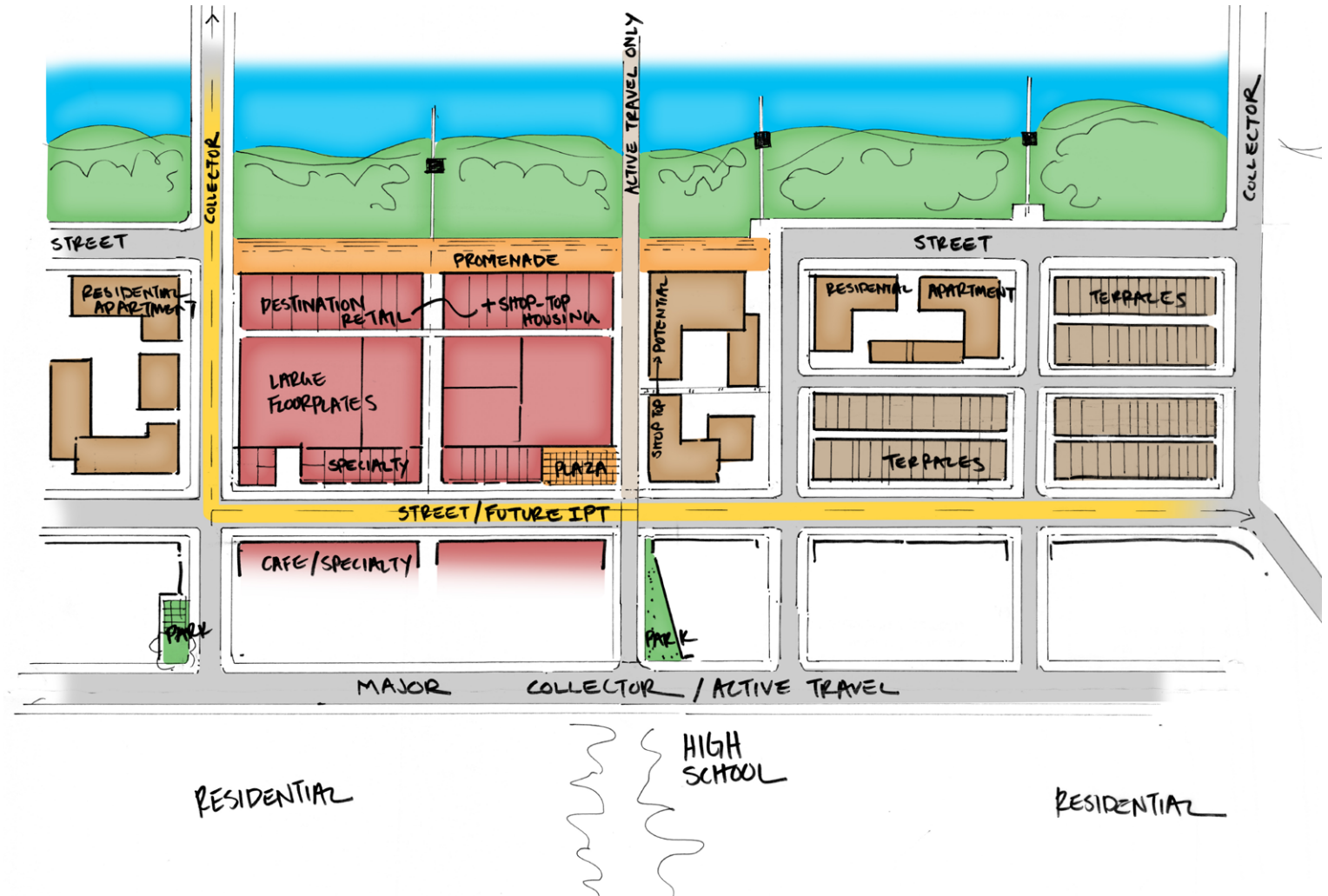


OPTION 2

The layout of the Group Centre allows for the IPT to be included in the future within the road reserve. Parking and travel lanes can be removed to include the light rail within the central core to create a pedestrian friendly area.

A public promenade with destination shops will front onto Coppins Creek, creating activation on two key frontages.

By locating the IPT and Promenade separately, cross flow of pedestrian traffic will naturally occur and activate the centre.



LIGHT RAIL CORRIDOR - ADAPTABILITY

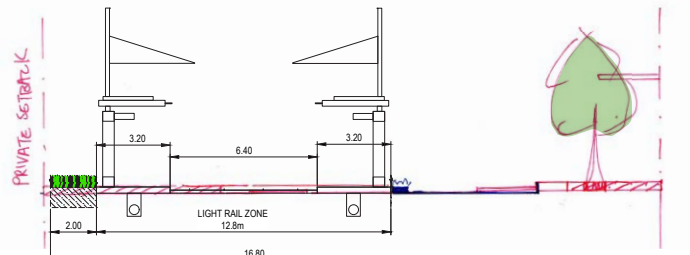
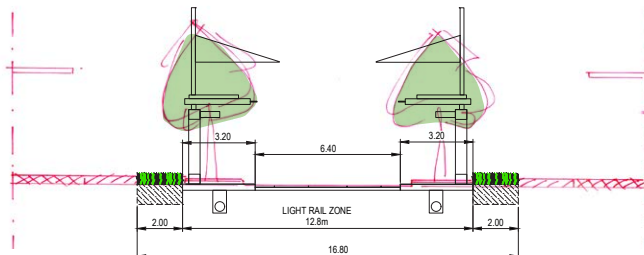
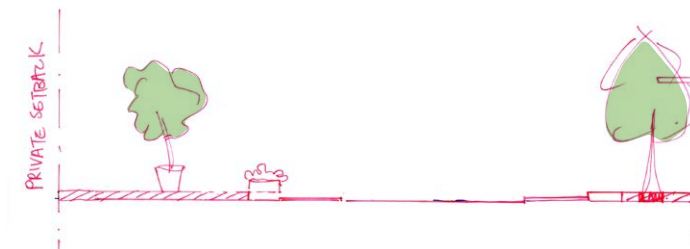
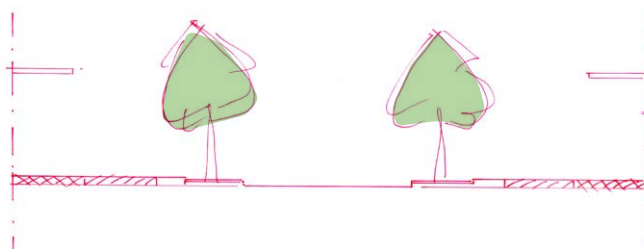
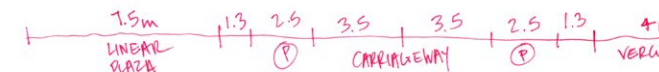
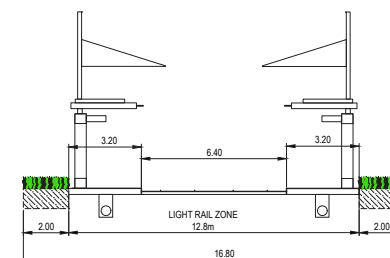
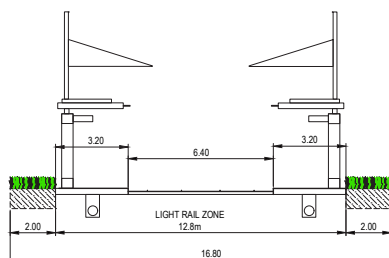
As the light rail is to be retrofitted many years after the development of the Group Centre, the proposed road reserves need to be adaptable. Both options can be applied to Centre Activation Details on the previous pages and in particular the Local Street/ Main Street and IPT co-located scenario.

Option A corridor proposes converting local streets into a light rail corridor by replacing the carriageway with rails. The location of street trees will need to be considered initially as they will need to remain in place during construction and after the light rail is operational.

Option B corridor proposes locating a linear plaza with temporary landscaping and local street to be replaced by the light rail corridor and a shared street. The shared street allows vehicular access to the retail centre for servicing, and allows for street trees to be retained.

There are plenty of examples that an independent light rail corridor has been used both nationally and internationally. Examples of independent IPT corridors are:

- Sydney Light Rail
- Waverly Light Rail
- Melbourne
- Sunshine Coast
- Adelaide



Option A - Local Street converted into Light Rail Corridor

Option B - Linear Plaza and Local Street converted into Light Rail and Shared Street

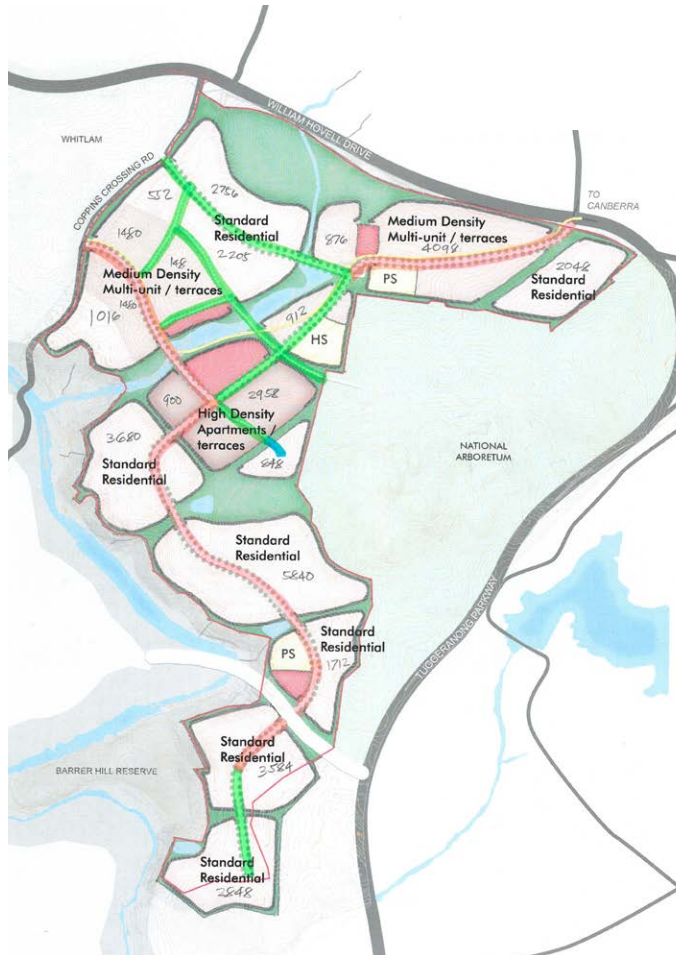
ROAD HIERARCHY

The following road hierarchies have been developed by Cardno based on three yield scenario's discussed later in the report.

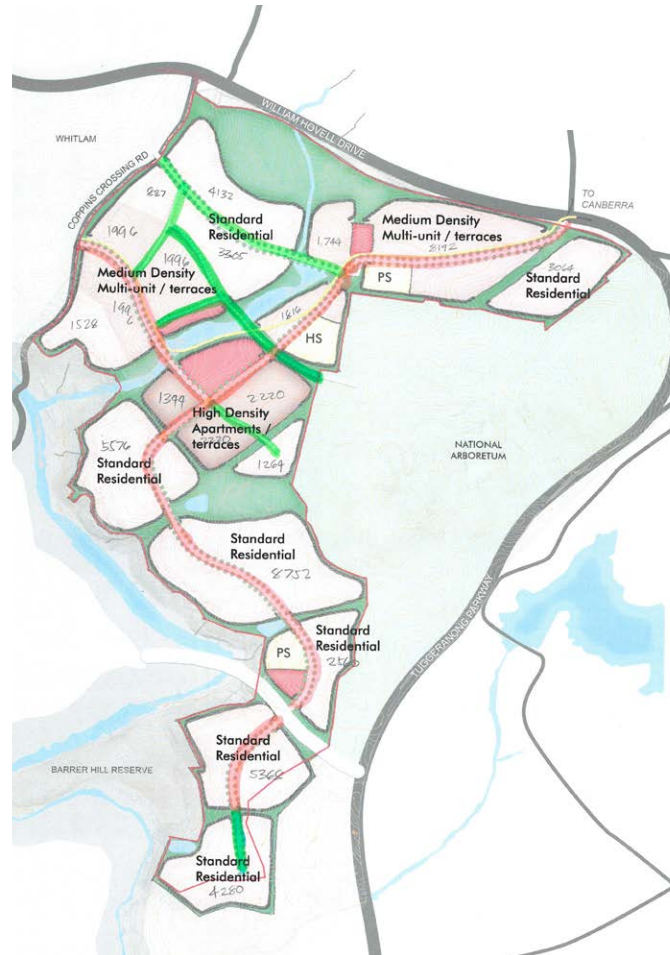
LEGEND

- Arterial
- Major Collector
- Minor Collector

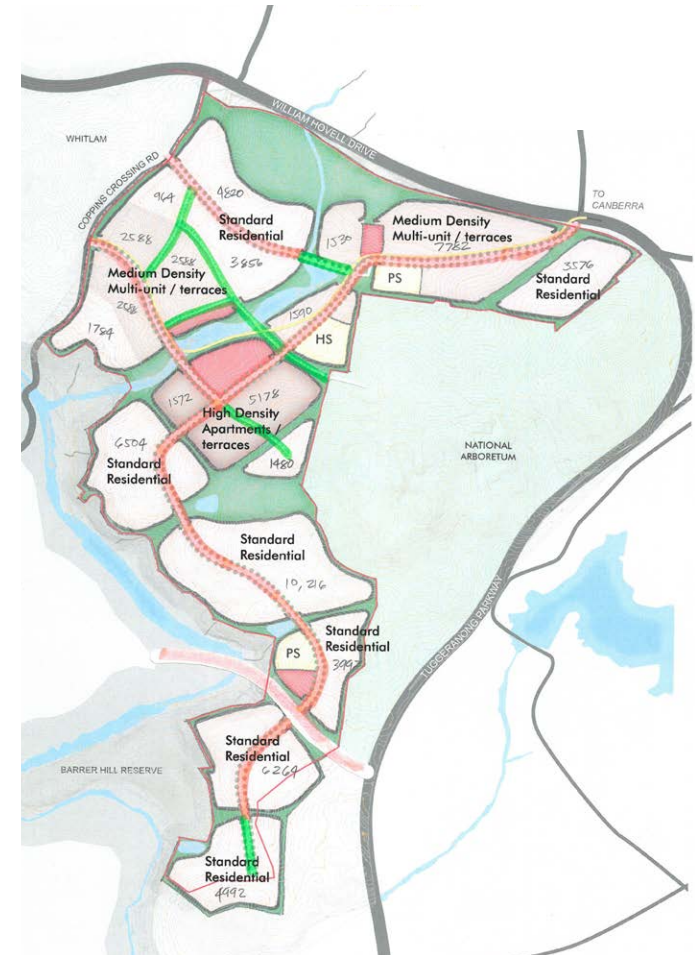
COMPLIANT YIELD HIERARCHY



MID YIELD HIERARCHY



ULTIMATE YIELD HIERARCHY



TRAFFIC GENERATION

Traffic Generation in the ACT is currently specified in the Estate Development Code as 8 veh/d for single residential dwellings, 7 veh/d for single residential blocks 360m² or smaller, and 6 veh/d per dwelling for multi-unit developments. These figures have been utilised in the ACT for over 10 years.

According to the Australian Bureau of Statistics, not being able to access public transport is one of the main reasons people prefer to use passenger vehicles to get to work or study. In 2012, of adults who travelled by passenger vehicle to work or study, over half (53%) stated that a lack of public transport services (at all or at the right or convenient time) was one of the main reasons for not taking public transport. Only a quarter (28%) preferred the convenience, comfort, or privacy a private vehicle provided.

According to the ACT Government, 40% of Canberras travel less than 10km to work, a distance easily cycled or made by public transport. With the ACT Government's concerted efforts in the improvements in public transport (light rail, enhanced bus services and ITP corridors), and the slow rise in congestion levels in the ACT, the appeal for the use of private vehicles has been constantly diminishing.

Discounts to traffic generation rates for the territory and for specific developments therefore should be considered by a case to case basis in light of the above.

The review should consider the following:

TERRITORY WIDE	DEVELOPMENT SPECIFIC
<ul style="list-style-type: none">• Land Uses• Census data• Public Transport policies• Active Travel Infrastructure• Traffic Modelling/ Congestion• Parking Policy	<ul style="list-style-type: none">• Specific measures introduced by the development to avoid or manage development traffic demand• Trip internalisation within the site, such that the volume of traffic entering and leaving the site is reduced;• Presence of public transport within the vicinity of the site;• Parking availability within the site

As identified in the Road Hierarchy - Modal Shift page, the reduction in traffic generation rates has a significant impact to the category of roads. This reduction of road category has benefits for the community as the neighbourhoods are more walkable if pedestrians are not required to cross major roads such as arterial roads.

The additional benefits comes from an increased availability of developable land, and a reduction of long term maintenance with smaller roads.



3

Code Reform

DESIGNING ON SLOPE - CODE REFORM

The following matrix reviews a series of desired principles for designing on sloping land. The code reform outlines:

1. a desired principle
2. a code reform to achieve that principle
3. a best practice reference
4. provides an indicative uplift in yield

The code reform matrix is divide into the following categories:

- Layout
- Streets
- Block Size
- Siting
- Climate Change
- Controls
- Built Form

Each code reform is colour coded into either green for easy changes or yellow for more difficult changes.

Easy road infrastructure reforms:

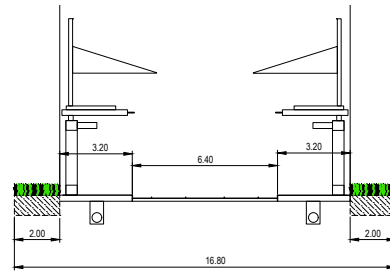
- Narrowing streets in areas of 12% or greater- could be achieved quickly because typically more local streets/ lower density and therefore limited application and 'typical' characteristics
- Reduced/ case- based corner splays- this is already happening in sites such as Jacka and Ginninderry. There are broader changes occurring around acceptable/ safe design speeds that will facilitate reduced sight line/ splays.

Harder road infrastructure reforms:

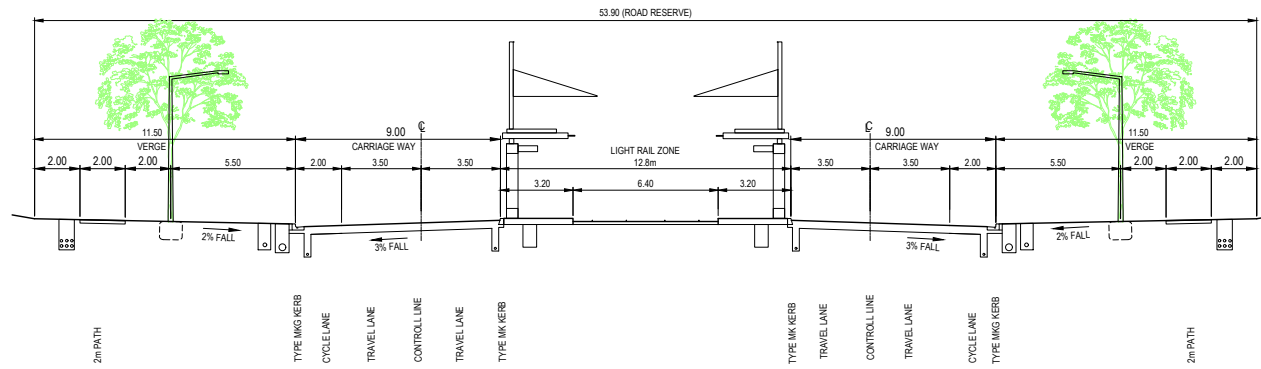
- Assuming an overall reduction in width across the network- time intensive due to traffic volume/ infrastructure requirement variables
- Rear lane width reduction based on attached lighting- time intensive as it requires external agencies and ownership negotiations etc.
- Sewer to be allowed in carriageway- time intensive as it requires external agency coordination.
- Bus route slope changes- as identified by EPSDD
- IPT corridors/ sections- as identified by EPSDD

DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT									
LAYOUT												
Streets run perpendicular to contours when less than 12% slope to optimise streetscape experience and earthworks.	<p>Appropriate densities should be facilitated irrespective of orientation.</p> <p>Block compliance to be reviewed in respect to orientation and slope.</p>	<p>General Principle and Methodology Applied to all Smart Codes and Form Based Codes (http://codesproject.asu.edu/)</p> <p>BioStreet Cross Sections (Source: McGregor Coxall for Ginninderry, 2013)</p>	<p>SAVINGS achieved on a single typical neighbourhood unit with a natural slope of 12% by varying TCCS standards and using a reduced street cross section:</p> <ul style="list-style-type: none"> • Approximately 5,000 cubic metres of cut and fill • Approximately 7,500 tonnes of soil • Less than half of the earthworks required • Approximately 260 square metres of retaining wall • Approximately \$92,000 on retaining walls <p>Assumptions:</p> <table border="1"> <thead> <tr> <th></th> <th>TCCS RR WIDTH (M)</th> <th>ALTERNATIVE RR WIDTH (M)</th> </tr> </thead> <tbody> <tr> <td>Minor Collector</td> <td>35.7</td> <td>20.2</td> </tr> <tr> <td>Access Street B</td> <td>27.9</td> <td>16.05</td> </tr> </tbody> </table>		TCCS RR WIDTH (M)	ALTERNATIVE RR WIDTH (M)	Minor Collector	35.7	20.2	Access Street B	27.9	16.05
	TCCS RR WIDTH (M)	ALTERNATIVE RR WIDTH (M)										
Minor Collector	35.7	20.2										
Access Street B	27.9	16.05										
Controls should be varied where layout/ infrastructure promotes modal shift.	Reduced and or best practice maximum parking rates apply within 400/ 800m of light rail.	<p>City Sydney LEP 2012 (Clause 7.5) (Source: City of Sydney)</p> <p>NSW Apartment Design Guide (Objective 3J-1) (Source: NSW Department of Planning & Environment, 2015)</p>	<p>Resident parking- reduction/ removal of on- site parking and/ or opportunities for 'flexi- spaces' (can function as parking or courtyard) provide:</p> <ul style="list-style-type: none"> • an affordable product offering matching lifestyle choice (126sqm block @ less than \$340k) • When looking at a typical micro lot: for every 1ha of net development, 0.3 ha is saved when 1 x on site car space is removed. <p>For dwelling densities of 66 dw/ha the requirements of visitor and residential spaces cannot be accommodated with on-street parking alone, additional parking supplemented in a carpark would be required.</p> <ul style="list-style-type: none"> • For every 12 dwellings (at 66 dw/ha) a loss of approximately 150m² of developable area (or 1 dwelling) would be required for carparking. 									

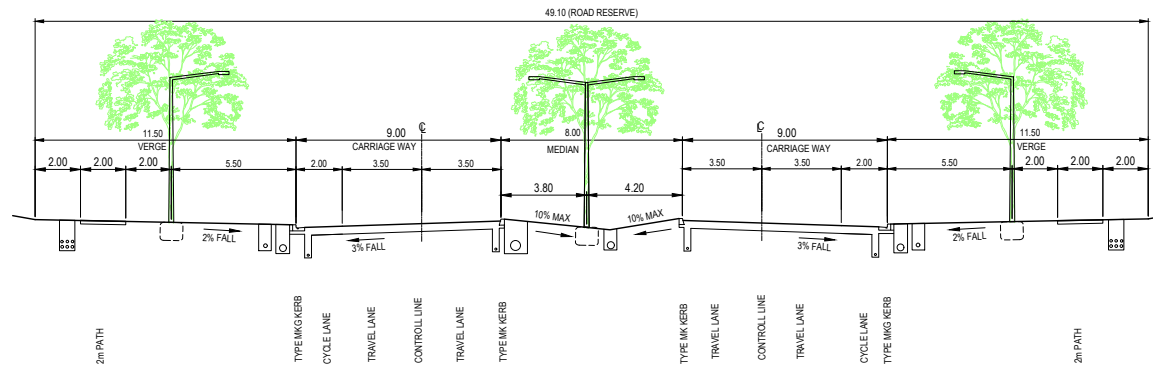
DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT
<p>Bus routes should provide access to the greatest number of residents.</p>	<p>Increase slope limit for bus capable streets and invest in a fleet that can safely navigate.</p>	<p>National networks.</p>	<p>Uplift is based on an increased catchment and therefore increased density capability. EDC-90% of dwellings within 500m of a stop.</p>
<p>IPT should be accommodated in association with a road corridor and without.</p> <p>The IPT should not include service roads adjacent like John Gorton Drive at Coombs, or Flemington Road</p>	<p>Develop cross section tool-kit for a range of context and interface scenarios.</p>	<p>There are plenty of examples that an independent light rail corridor has been used both nationally and internationally. Examples of independent IPT corridors are:</p> <ul style="list-style-type: none"> • Sydney Light Rail • Waverly Light Rail • Melbourne • Sunshine Coast • Adelaide 	<p>Existing light rail corridors are very wide.</p> <ul style="list-style-type: none"> • Flemington Road is approximately 65m in width, including service roads. • John Gorton Drive between Wright and Coombs is approximately 74m in width, including service roads. <p>These roads that include or are proposed to include the light rail, are substantial in their width, which reduces potential yield. If the service roads are removed and the corridor width was 53.8m wide the additional developable area per 100m of road length would be: (REFER SK 1001)</p> <ul style="list-style-type: none"> • 2,020m² compared to John Gorton Drive • 1,120m² compared to Flemington Road <p>The indicative length of Bindubi Street IPT is 3.6km, which would see an indicative increase in developable area of:</p> <ul style="list-style-type: none"> • 72,720m² compared to John Gorton Drive • 40,320m² compared to Flemington Road. <p>Decoupling the light rail from streets could be contained in a corridor of around 16.8m. The proposed concept master plan includes a length of approximately 400m associated with the retail centre.</p> <p>Reducing the corridor width from 50m to 16.8m for this stretch would increase the developable area by approximately an additional:</p> <ul style="list-style-type: none"> • 13,280m² <p>A total gain of developable land of approx. 53,600m² to 86,000m² the length of IPT.</p>



LIGHT RAIL ONLY

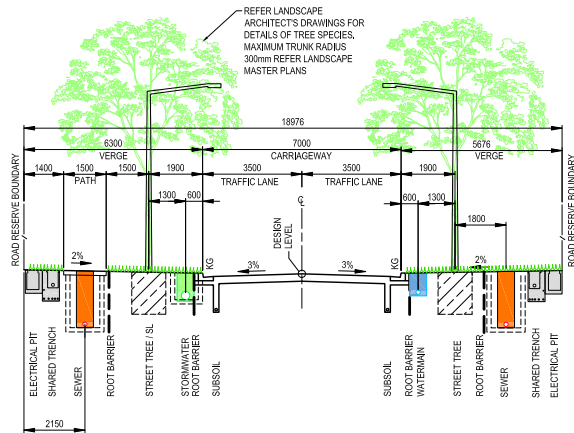


TYPICAL ARTERIAL ROAD WITH LIGHT RAIL



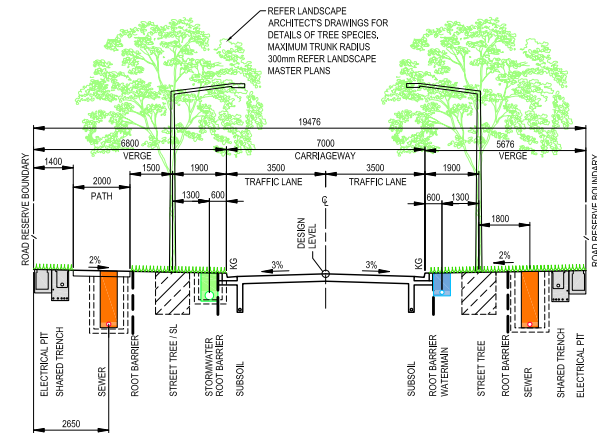
TYPICAL ARTERIAL ROAD WITHOUT LIGHT RAIL

DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT														
STREETS																	
Where greater than 12%, streets run parallel to contours and have a narrow pavement width to reduce cut and fill.	<p>Narrow streets should be a minimum of 5m. This will mean that there is minimal opportunity for on-street parking unless it is indented.</p> <p>The verge widths are driven by the required clearances of above ground infrastructure, i.e. kerb to tree/streetlight (1.9m), tree/streetlight to path (1.5m) and path to block boundary (1.4m). This means a minimum verge width of 6.8m.</p> <p>The EDC currently requires an Access Street B to have a 2.0m wide path on one side of the road. If this was to be done only on one side, then the minimum verge width becomes 5.7m. If we were also able to relocate the sewer to the carriageway, we can further reduce this to 3.9m. (Refer SK 1002)</p>	<p>Jindee Local Structure Plan - Part 1C Design Code Thoroughfare Standards (Source: Roberts Day prepared for City of Wanneroo, 2019)</p> <p>Ginninderry EDP Stage 2 (Source: Calibre Cross Section 2017)</p> <p>Los Angeles Complete Streets Manual (Source: Los Angeles Department of City Planning, 2014)</p> <p>Tuckfield Street, Freemantle WA 9built example)</p>	<p>Typical Estate Development Code compliant Access Street road reserves vary between 18.5m to 19.5m in width. (Access A or B) plus any additional requirements for servicing.</p> <p>Aim to reduce the road reserve width to match the Ginninderry section of 14.65m (5.1m Verge on high side/ 6m Carriageway / 3.55m Verge low side).</p> <p>Per 100m lineal length of Access Roads that are parallel to contours the additional uplift in developable area would be:</p> <ul style="list-style-type: none"> • 385m² compared to 18.5m width • 485m² compared to 19.5m width <p>Across the site there is approximately 117.6ha of developable land greater than 12% slope. (25% of developable area) By decreasing the road reserve width the additional developable area would be approximately:</p> <ul style="list-style-type: none"> • 4.5 ha compared to 18.5m width • 5.7 ha compared to 19.5m width 														
Rear lanes should be clearly secondary to streets through dimension, function and network hierarchy.	<p>Design for slow speeds including reducing overall widths, infrastructure setbacks</p> <p>Reduce laneways to their minimum width, and exclude large setbacks or notches to blocks for street lights by providing lights on buildings.</p>	<p>SOL Square, Christchurch, NZ (built example)</p> <p>Palmerston City Centre Public Realm Great Streets Strategy (Source: Roberts Day prepared for City of Palmerston, 2016)</p>	<p>For a standard 60m laneway reducing the laneway from 10.0m to 8.15m (1.5m verge / 5.0m carriageway / 1.65m verge) would provide an additional 111m² of developable area.</p>														
Lower the category of roads to reduce the speed of traffic and land take			Road Hierarchy's are calculated based on the quantity of dwellings, dwelling type, and road network.														
With the introduction of transport initiatives to promote modal shifts in people's travel patterns to work/school/leisure, we should also push for the reduction of trip generation stipulated in the current version of the Estate Development Code.	<table border="1"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">TRAFFIC GENERATION (TRIPS / DW / DAY)</th> </tr> <tr> <th>SINGLE RESIDENTIAL</th> <th>MULTI-UNIT</th> </tr> </thead> <tbody> <tr> <td>CURRENT EDC</td> <td>8 trips / day</td> <td>6 trips/day</td> </tr> <tr> <td>PRACTICAL TARGET</td> <td>6 trips/day (based on a typical household of 2 adults and 2 children with 2 vehicles)</td> <td>4 trips/day (based on 2 bedroom unit with 1 vehicle parking per unit)</td> </tr> <tr> <td>PUSH TARGET</td> <td>4 trips/day</td> <td>2 trips/day</td> </tr> </tbody> </table>		TRAFFIC GENERATION (TRIPS / DW / DAY)		SINGLE RESIDENTIAL	MULTI-UNIT	CURRENT EDC	8 trips / day	6 trips/day	PRACTICAL TARGET	6 trips/day (based on a typical household of 2 adults and 2 children with 2 vehicles)	4 trips/day (based on 2 bedroom unit with 1 vehicle parking per unit)	PUSH TARGET	4 trips/day	2 trips/day		<p>Reducing the way that trips per dwelling are calculated may lower the category of street and therefore lower the width of the road reserve required.</p> <p>As discussed in the higher order road hierarchy section, many of the Arterial Roads required could be lowered to Major Collectors. This reduces land take, changes the character of the area, and makes walkability easier as you don't need to cross an arterial road.</p>
	TRAFFIC GENERATION (TRIPS / DW / DAY)																
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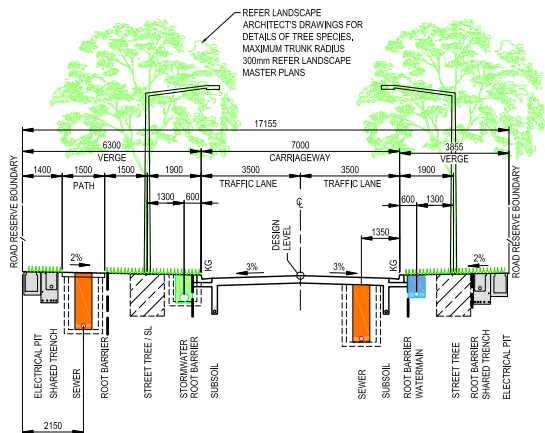
TYPICAL SECTION 1
(Access Street Type-A)

SCALE 1:100 @ A1



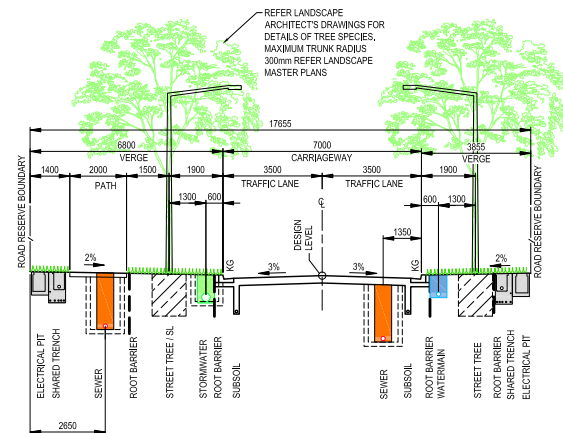
TYPICAL SECTION 2
(Access Street Type-B)

SCALE 1:100 @ A1



TYPICAL SECTION 3
(Access Street Type-A)

SCALE 1:100 @ A1



TYPICAL SECTION 4
(Access Street Type-B)

SCALE 1:100 @ A1



DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT
Where streets are parallel to contours, footpaths to be adjacent the kerb to allow grading verges sooner.	<p>Footpath setbacks from kerbs to be reduced.</p> <p>Footpaths adjacent to kerbs will also assist with sight lines. Footpaths will need to be wider to compensate for the VC of the driveway.</p> <p>Grading of verges to be greater than 5%</p>	<p>Stowport Avenue, Crace, ACT (built example, NOTE: double footpath here is not proposed)</p> <p>Cumalalum DCP (Source: Roberts Day prepared for Ballina Shire, 2015)</p>	<p>Increasing the verge grading to 5% doesn't present any issues other than earthworks on the downstream side of the road to maintain symmetrical grading in the verges and to ensure capacity for major overland flows.</p> <p>Additional yield isn't gained, however grading on blocks is reduced as it doesn't have to meet a flat verge.</p>
Narrower verges on streets parallel to contours to limit earthworks	<p>Reduced offsets from services to reduce verge width and allow for large street trees.</p> <p>Allow services, particularly stormwater to be laid in the carriageway to assist in freeing up the verge.</p> <p>TCCS currently allows SW in the road only for pipes greater than 675mm in diameter.</p>	<p>TCCS Standard for pipes greater than 675mm.</p> <p>Shared trenching in NSW, QLD.</p>	<p>If the sewer is allowed to be laid within the carriageway, there will be opportunity to reduce the verge width.</p>
Slower streets to provide a safer environment	<p>Narrower streets, smaller radius of corners to slow traffic, smaller service vehicles to reduce intersection radius, greater flexibility in traffic calming measures, reduced speed limits, reduced design speeds.</p> <p>The speed environment, particularly the kerb return radii are dictated upon by the design vehicle.</p> <p>TCCS has a policy to use the 12.5m rigid truck to be used as the design vehicle. We would recommend the use of the typical garbage truck (9.9m HRV rather than 12.5m) to be the checking vehicle as this is considered a non-typical movement.</p> <p>Splays to be determined based on required sight-lines for design speeds.</p> <p>Narrower streets with narrower verges would mean that overland flow capacity of the road reserve could be restricted and would need to be analysed to ensure flooding doesn't occur. Steepening up the verges would assist in increasing capacity, but as per item 4 above, may result in excessive earthworks filling on the downstream side of the road.</p>	<p>Fairwater, NSW - Mandated 3m kerb radii (built form example)</p> <p>Greater Ascot, QLD- Mandated 3m kerb radii and no splays (built form example)</p> <p>Ginninderry EDP 1- splays based on sightlines and reduced design speed aspirations.</p>	<p>Based on a typical splay of 6m, a developable land savings of 2.7ha is achieved across M3S2:</p> <ul style="list-style-type: none"> • results in a loss of 18sqm of developable area/ splay • 4 splays per intersection equals 72sqm • There are generally 54 intersections in a neighbourhood unit (64ha) • $54 \times 72\text{sqm} \times (\text{M3S2 Developable Area of } 454\text{ha} / 64) = 27,216\text{sqm}$ <p>Based on a typical laneways splay of 1m, an additional 2sqm per rear loaded section can be recouped by reducing speeds/ removing splay requirements.</p>

DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT
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BLOCK SIZE

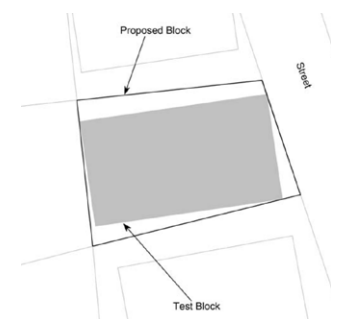
Built form should drive block size.

To comply with the EDC block compliance requirements on south facing land, and land within the NE/SW & SE/NW orientations requires blocks greater than 540m² (min 18m width)

Block compliance on non-rectangular blocks (eg. fan shaped on curved sections) typically results in very large blocks (greater than 800m²) in order to fit a compliant shape, increasing the overall average lot size.

Block compliance tables should be reviewed as they dictate the type and location of block sizes. Block compliance limits the location of compact and mid-size blocks.

Block sizes should be determined by site specific built form and not a general block compliance table.



BLOCK COMPLIANCE TEST BLOCK
(SOURCE: ESTATE DEVELOPMENT CODE FIGURE A2)

General Principle and Methodology Applied to all Smart Codes and Form Based Codes (<http://codesproject.asu.edu/>)

By allowing a greater variety of built form dependant on the orientation, solar access, views, amenity, garage access etc, block sizes can be decreased in size from larger than 540m² to below 300m².

Reducing the average lot size from 650m² to one of the following averages would increase the yields by:

- 550m² - increase by 15%
- 450m² - increase by 31%
- 350m² - increase by 46%
- 250m² - increase by 62%

Built form specific block sizes will provide a greater diversity of housing choice than the block compliance tables. Each neighbourhood should have a mixture of different block sizes/types, from compact to large.

SITING

On the low side of the street, garages can be located closer to the street when accompanied by design excellence controls.

Building setbacks

Jindree Local Structure Plan - Design Code (Source: Roberts Day prepared for City of Wanneroo, 2019)

Shearwater Design Guidelines (Source: prepared by Roberts Day for Breen Development)

Vaucluse and Northern beaches, NSW (built form examples)

Reduced block depth by 5m. Average mid size block of 420sqm (15m x 28) becomes 300sqm (15 x 20m) with same built form capacity. Net density increases from 24 to 27dw/ha.

Assuming a net developable area of 82 ha (117ha x 30% Road Reserve) = Additional 246 dwellings.

DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT
CLIMATE CHANGE			
Focus on walkability, pedestrian priority, reduction of pavement to contribute to reduced carbon footprint, runoff, heat island.	Site specific tailored street solutions.	<p>Queensland Complete Streets Manual (Source: Engicom via IPWEA, 2015)</p> <p>Bondi Junction Complete Streets (Source: prepared by Roberts Day for Waverely Council, NSW 2013)</p> <p>Context Sensitive Design Guideline (Source: District Department of Transportation, 2017 and 2019)</p> <p>Ginninderry EDP 1 and 2</p>	<p>Typical road reserve land take reduced from 34- 30% (general and averaged across typologies). Further reduction in land take associated with hillside streets proposed in excess of 12%. Additional 17 ha of developable area at M3S2.</p>
Provide large shade trees on all streets to help reduce the heat island effect	<p>Reduce/remove soil volume requirements to allow for a wider variety of large street trees.</p> <p>Review offset to kerbs/driveways/services/lights requirements that limit location of street trees.</p> <p>The absolute minimum width of the verges of rear lanes would be 1.5m on one side and 1.65m on the other. This is to accommodate for a shared trench and electrical pit on one side and a water main on the other side. Sewer and stormwater services would go under the actual road. Assuming a 5m wide road, the total width would be 8.15m.</p>	<p>SOL Square, Christchurch, NZ (built example)</p> <p>Palmerston City Centre Public Realm Great Streets Strategy (Source: Roberts Day prepared for City of Palmerston, 2016)</p>	<p>For laneways longer than 60m the requirement of street lights in the laneway increases the verges to from 1.65m to 3.5m to provide sufficient setbacks to the light pole, or requires a notch of approximately 12.5m² in the neighbouring blocks every 40-60m.</p> <p>Maintaining a narrow verge and attaching street lights to buildings would provide additional developable area of 185m² per 100m of laneway.</p>
On block trees to increase overall tree canopy in neighbourhoods	<p>Lower plot ratios with wider rear setbacks to allow for additional large trees within backyards. Potential to offset reduced area with portions of taller built form or reduced side setbacks.</p> <p>Volume builder workshops/ education/ collaboration required to ensure an affordable solution is provided to buyers.</p>		<p>The objective is to allow flexibility in built form controls to accommodated increased planting without detriment to development potential.</p>

DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT																												
CONTROLS																															
Retaining walls should be integrated into built form.		<p>Macarthur Heights Stage 1 Form Based Code and built form example (Roberts Day)</p> <p>Hunterford, NSW (built form examples)</p> <p>Red Hill EDP (Source: prepared by RD for LDA, 2017)</p>	Uplift relates to amenity/ value.																												
Principal private open space can be located as a roof terrace if habitable rooms are adjoining.	<p>Flexibility in building storeys to allow for dwellings to step down the slope and allow roof top terraces</p> <p>Site coverage controls reduced/ removed depending on slope and building type.</p>	<p>Red Hill EDP (Source: prepared by RD for LDA, 2017)</p> <p>Ginninderry EDP 1 and 2 (Source: prepared by RD for LDA, 205,2017)</p> <p>Jacka 2 EDP (Source: prepared by RD for SLA, ongoing)</p>	<p>Land savings of approximately 24sqm/ block (based on 4m depth typically required for at grade POS and 6m wide attached product block).</p> <p>As an example, Urban Hill terrace has upper level POS and produces a yield of 60 dw/ha on certain orientations/slopes. Due to the compact nature of the product it is currently only compliant in the N/S orientation, however it is also suitable (based on previous testing as an integrated product) in:</p> <table border="1"> <thead> <tr> <th></th> <th>Compliant dw/ha</th> <th>Uplift dw/ha</th> <th>% Yield Increase</th> </tr> </thead> <tbody> <tr> <td>N/S with North slope</td> <td>60</td> <td>60</td> <td>0%</td> </tr> <tr> <td>N/S with East Slope</td> <td>60</td> <td>60</td> <td>0%</td> </tr> <tr> <td>NW/SE with North slope</td> <td>18</td> <td>60</td> <td>233%</td> </tr> <tr> <td>E/W with East slope</td> <td>23</td> <td>60</td> <td>161%</td> </tr> <tr> <td>NE/SW with East Slope</td> <td>18</td> <td>60</td> <td>233%</td> </tr> <tr> <td>NW/SE with East slope</td> <td>18</td> <td>60</td> <td>233%</td> </tr> </tbody> </table> <p>As seen above, most of the EDC block compliance orientations don't allow for compact blocks, however the Urban Hill terrace built form is suitable. The increase in yield is considerable.</p>		Compliant dw/ha	Uplift dw/ha	% Yield Increase	N/S with North slope	60	60	0%	N/S with East Slope	60	60	0%	NW/SE with North slope	18	60	233%	E/W with East slope	23	60	161%	NE/SW with East Slope	18	60	233%	NW/SE with East slope	18	60	233%
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DESIRED PRINCIPLE	CODE REFORM	BEST PRACTICE CODE REFERENCE	RESULTANT DEVELOPMENT UPLIFT
Compact/ affordable building types should have flexibility in the provision of private open space, car parking rates and solar access.	Reflected/ ambient light can be counted.	Medium Density Housing Code, NSW, 2016 (Source: NSW Department of Planning & Environment) City Sydney LEP 2012 and DCP (Source: City of Sydney)	Uplift/ benefits addressed elsewhere in this table.
Corner lot splays should be avoided wherever possible.	Splays to be determined based on required sight-lines for design speeds.	As mentioned elsewhere.	Refer previous calculations under 'Streets' section.
Private amenity, affordability and streetscape contribution should be balanced.	Remove solar fence requirements and achieve objectives through other controls.	As mentioned elsewhere.	Uplift/ benefits addressed elsewhere in this table.

BUILT FORM

Reduce land take of schools with vertical schools and leverage off slope to minimise built form/ height impacts on surrounds.	Mandate for shared facilities/ assets such as playing fields and 'town hall' elements. Establish ACT education program requirements for urban schools to ensure amenity/ functionality is maintained.	NSW Department of Education. Recent vertical school program agreed to for Rhodes East Priority Precinct 2019 (Source: prepared by Roberts Day for NSW Source: NSW Department of Planning & Environment and Education)	Primary School- Based on Rhodes East, NSW requirements for 1000 students: Conventional standards- 3.5ha primary school (including requirement for an oval) Vertical school with co- located and shared public/ private oval and playing fields- 4 storeys over 1ha. Land savings of $2.5 \times 2 = 5.0\text{ha}$ @ $60\text{dw/ha} = 300\text{dw}$ High School- (based on National benchmarking): Conventional standards- 7.5ha (assumes co- located and shared public/ private oval) Vertical school (1250- 1500 students)- 4- 6 storeys over 1ha (assumes co- located and shared public/ private oval) Land savings of $6.5 \times 1 = 6.5\text{ha}$ @ $60\text{dw/ha} = 390\text{dw}$
Built form should respond to slope and minimize excavation.	Boundary fence heights are measured cumulatively as retaining wall plus fence/ courtyard wall.		Uplift relates to amenity/ value.

SUMMARY

The code reform matrix outlines a series changes to the current EPSDD and TCCS codes for development and provides an indicative uplift in yield.

The two reforms that will have the largest impact to the development of future neighbourhoods on sloping lands are:

1. Block Compliance

- Block orientation and the slope of the land limit the type of block that can be delivered under the current Estate Development Code Block Compliance. As outlined, due to the steep topography the orientation of the majority of blocks in Molonglo 3 Stage 2 fall outside the compliant directions. In addition to this, the high percentage of south facing slope also restricts the block types.
- By removing the Block Compliance requirements and delivering block types based on site specific built form, yields can be greatly increased.

2. Vehicle Movements per dwelling / per day

- The vehicle movements per dwelling/ per day dictates the quantity of vehicles on any given road and ultimately dictates the road type.
- The current vehicle numbers are out-dated and don't consider transport modal shifts or active travel. By reducing the vehicle movement numbers per dwelling it can reduce the categories of many of the streets, which will increase yield, but also change the character of the areas.
- As noted in other sections of this report, the reduction in vehicle movements reduces many of the Arterial Roads throughout Molonglo 3 to Major Collector Roads. This has significant positive impacts to the neighbourhoods in terms of walkable communities as pedestrians / cyclists are required to cross Arterial Roads.



Sustainable Neighbourhood

TYPICAL NEIGHBOURHOOD

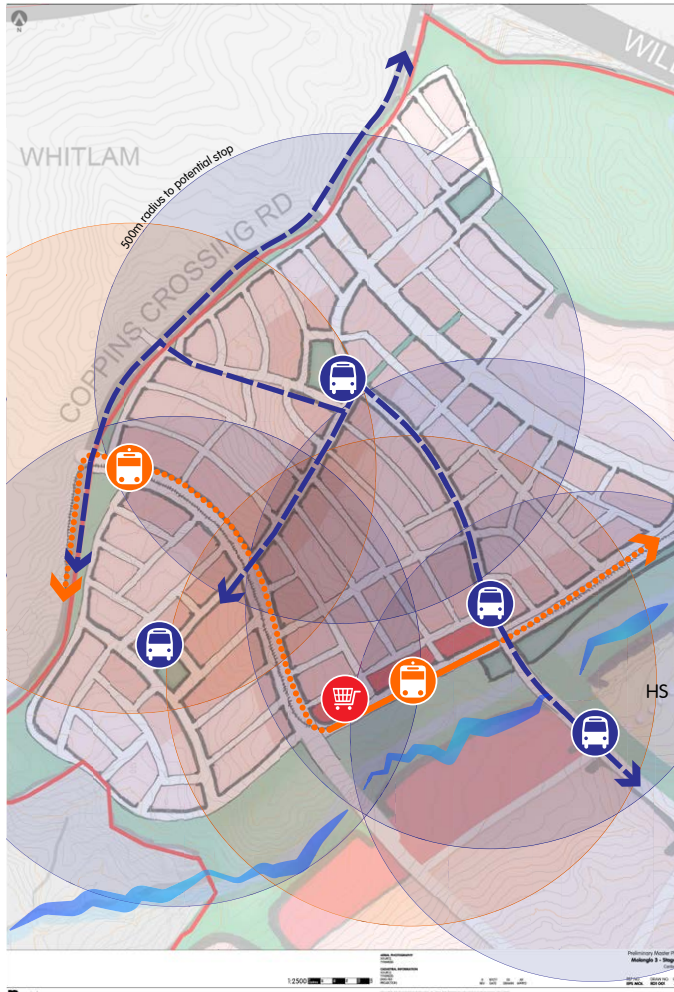


INDICATIVE DEMONSTRATION OF PRINCIPLES

The illustrative plan opposite shows one way that this neighbourhood within Molonglo 3 Stage 2 could be structured. The objective of the illustrative plan is to demonstrate the realisation of the overarching proposed design principles at a legible scale. These principles are repeatable and beneficial in terms of amenity, liveability, value and increased development and diversity capability. Whilst this level of detail will not be included in the Concept Plan, these principles are inherent in the structure.

The table below outlines code reforms associated with the realisation of the proposed principles compared to conventional and/ or compliant practice.

INNOVATIVE/ REFORM	CONVENTIONAL/ COMPLIANT
1 Bus avenues connecting neighbourhood centres (increased catchment and destination patronage contributing to modal shift)	Bus avenues on flat land and peripheral to neighbourhoods (reduced catchment)
2 Streets running perpendicular to topography	Street orientation driven by compliant block orientation requirements
3 Slope responsive cross sections in excess of 12%	Standard cross sections parallel to contours increase cut and fill
4 Streets connecting to high amenity areas (creek)	Streets running parallel to high amenity areas creating a privatised edge
5 Narrower rear lanes	Wide rear lanes
6 Removal of splays wherever possible	Default application of splays to all streets and lanes
7 Varied block depths suited to slope, orientation and desired product	Standard 30m deep blocks
8 Reduced land take for streets/ lanes	Significant land take for streets/ lanes and infrastructure.
9 Density/ dwelling types based around locational amenity, access and services	Density limited to flat land with optimum Code compliance orientation and services



TRANSPORT

- Bus alignment
- Light Rail
- Opportunity for Light Rail to be decoupled from road corridor



ACTIVE TRAVEL



STREET ALIGNMENT

- Parallel to contours over 12 %

DESIGNING FOR DIVERSITY

INTRODUCTION

21st century best practice design and planning of new communities promotes diversity and a range of lifestyle options. It is critical to provide equitable access to desirable community environments irrespective of an individual's dwelling priorities. Residents should not be forced to compromise on the liveability factors that they value based on conventional practice or volume build solutions. Choice and balance will facilitate appropriate levels of density, affordability and amenity across new towns and neighbourhoods in Canberra and accommodate the changing development landscape and lifestyle demand.

The below Lifestyle Package outlines a strategy for how diversity and balance can be achieved, accommodating differing liveable values without compromising overall quality of life. A scoring system also endeavours to protect residents from development and/ or building solutions that might have otherwise used alternative solutions to deliver the lowest common denominator.

This process encourages and relies on relationships with, and the education of, local builders to tailor their standard product in a way that is commercially viable for them and meets the government's objectives.

THE LIFESTYLE PACKAGE

Both options are prepared based on the premise that our optimum lifestyle is a combination of the house and community in which we choose to live. Affordable housing should not exist without amenity and access to amenity should not be limited to those that choose a conventional household.

The first option demonstrates a 'trade scheme' whereby a block/ dwelling can select a tailored collection of values to be realised as compliant and the balance of the values can be provided in a less onerous manner.

The second option promotes diversity at the scale of the neighbourhood by requiring compliance as an average.

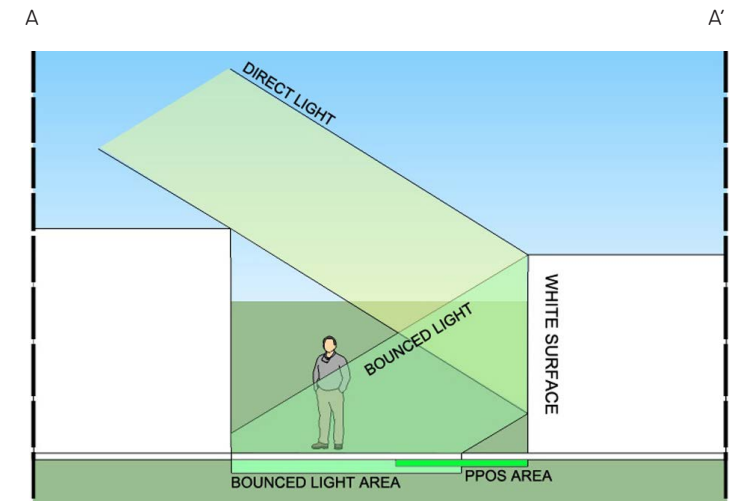
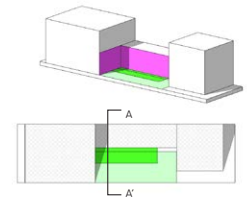
LIVEABLE VALUE TRADE SCHEME

In high amenity areas that fulfil the following design excellence criteria, ie, go beyond basic code compliance, a block may be approved by achieving 3 of 5 'Liveable Values' AND an acceptable alternative for the 2 of 5 not achieved.

Design Excellence Criteria:

- Within 50m of a public park/ plaza that receives 3 hours of direct sunlight between 10- 3pm.
- Within 400m of Light Rail or 100m of bus
- Within 200m of a dedicated cycleway
- Within 400m of retail
- Within 800m of employment?

LIVEABLE VALUES	COMPLIANCE	ACCEPTABLE ALTERNATIVES
Private Open Space	At grade Private Open Space	Balcony, upper level terrace, rood garden with a cumulative area equivalent to the Code requirements or shares a block boundary with a public park.
Solar Amenity	3 hours of direct sunlight between 10-3.	Demonstrate 2 hours direct sunlight from sunrise to sunset or 5 hours of reflected light or 4 hours cumulative.
On- Site Parking	1 x on- site carspace for 1 bed 2 x on- site carspace for 2+ bed	Within 200m of a shared carcourt and/ or carshare space 1 x on site carspace plus 6m long driveway inside block boundary or at grade POS with dual function of carspace
Affordable	Demonstrates affordability threshold	Must comply with 4 of 5.
Views	3rd storey with reduced site coverage. Floorspace redistribution allowance	



Demonstration of use of reflective light (Section A- A').

DIVERSITY AT THE SCALE OF THE NEIGHBOURHOOD

A neighbourhood unit, with a defined centre and edges and generally contained with a 400m radius or 5 minute walk, must deliver a reasonable mix of housing. This mix should go beyond density bands and provide a variety of lifestyle choice beyond that of a conventional house and block. This means that only a certain percentage of dwellings/ blocks will be code compliant in the conventional sense. However, it will also mean that a certain percentage of dwellings/ blocks are guaranteed to deliver affordability and amenity, as defined by various individuals.

The below table proposes a mix of dwellings/ blocks based on specific block characteristics contributing to the delivery of genuine diversity.

A different mix is proposed for urban and suburban new communities based on the assumption of urban areas having greater access to public transport, services, daily convenience and distribution of parks. The Design Excellence Criteria outlined in the Liveable Value Trade Scheme could be used to assess and categorise.

The table could be expanded to include additional community typologies such as renewal areas and slope- affected communities, both urban and suburban.

BLOCK CHARACTERISTIC	URBAN	SUBURBAN
EDP/ SDC Compliance	40-50%	60- 70%
Less than 100sqm	10-15%	5- 10%
Alternative POS and/ or solar solutions	10-15%	10- 15%
No on-site parking and/ or reduced on- site parking	15- 20%	5%
Affordable threshold	10-15%	5- 10%





5

Yields

DENSITY LOCATIONS

The standard residential areas will have a mix of block sizes that may include some multi-unit sites, but the majority will be detached houses. The densities are located along areas of higher amenity.

The bulk of the medium to higher density land is located along the future IPT, schools, and local/group centres. This locates the maximum amount of dwellings to the higher amenity areas of the site.

Sub-arterial road reserves have been excluded from the developable areas.

The following yield scenarios are based the Australian Model Code For Residential Development (AMCORD) calculation methods:

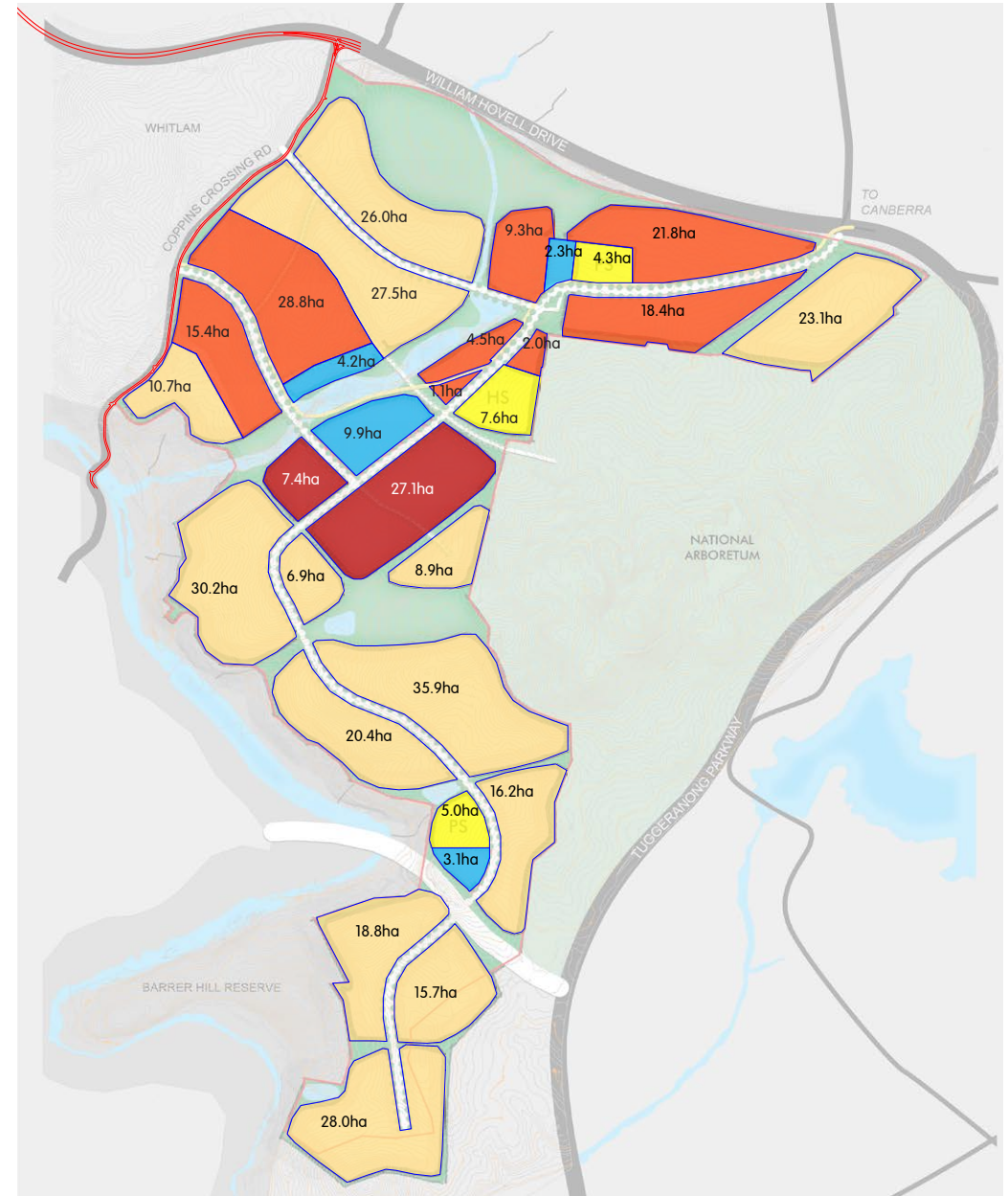
- **Compliant** - Estate Development Code
 - Larger average lot size due to steep south facing topography and, site orientation
 - Medium Density development will require multi-unit sites or integrated development to achieve higher yields in incorrect orientations
 - Higher Density development require multi-unit sites/ apartments
- **Mid-way** - Based on the 'easy wins' in the code reform, including reducing some of the road reserves and relaxing some block compliance.
- **Ultimate** - Achieving all code reform changes, including removing block compliance, reducing road reserves, reducing vehicle movements per day to lower the road hierarchy.

Each yield scenario has a low and high level scenario based on the average block size / dimensions in the table below it.

Note: Due to the high-level nature of the yield calculations, the actual final yields will vary depending on further detailed designs, market analysis, site conditions, etc.

LEGEND

- | | |
|---|--|
| Residential - Standard | Retail / Group Centre |
| Residential - Medium Density | Schools |
| Residential - Higher Density | |



Density Locations

YIELD SCENARIOS

COMPLIANT

Residential Zone	Total Dev Area (ha)	Low Scenario		High Scenario	
		Net dw / ha	Total Dwellings	Net dw / ha	Total Dwellings
Standard	268.3	10.0	2,683	12.5	3,354
Medium	101.3	22.9	2,320	28.6	2,897
High	34.5	41.7	1,439	55.6	1,918
Sub Total	404.1		6,441		8,169
Retail	19.5				
Schools	16.7				
TOTAL	440.3				

- Net dw / ha includes average 20m Road Reserve
- Developable Area excludes Arterial Road Reserves and IPT Corridor of 65m width

Average block sizes / dimensions:

Residential Zone	Net dw / ha	Avg block m ²	Block Depth (m)	Block Width (m)
Standard				
low scenario	10.0	750	30.0	25.0
high scenario	12.5	600	30.0	20.0
Medium				
low scenario	22.9	313	25.0	12.5
high scenario	28.6	250	25.0	10.0
High				
low scenario	41.7	160	20.0	8.0
high scenario	55.6	120	20.0	6.0

NOTE:

The low / high scenarios are based on the average block sizes / dimensions tables

MID-WAY

Residential Zone	Total Dev Area (ha)	Low Scenario		High Scenario	
		Net dw / ha	Total Dwellings	Net dw / ha	Total Dwellings
Standard	268.3	13.5	3,622	16.9	4,534
Medium	101.3	26.7	2,705	32.7	3,313
High	34.5	49.3	1,701	69.0	2,381
Sub Total	404.1		8,028		10,227
Retail	19.5				
Schools	16.7				
TOTAL	440.3				

- Net dw / ha includes average 18m Road Reserve
- Developable Area excludes Arterial Road Reserves and IPT Corridor of 65m width
- EDC Block Compliance removed

Average block sizes / dimensions:

Residential Zone	Net dw / ha	Avg block m ²	Block Depth (m)	Block Width (m)
Standard				
low scenario	13.5	560	28.0	20.0
high scenario	16.9	448	28.0	16.0
Medium				
low scenario	26.7	275	25.0	11.0
high scenario	32.7	225	25.0	9.0
High				
low scenario	49.3	140	20.0	7.0
high scenario	69.0	100	20.0	5.0

NET RESIDENTIAL DENSITY (NET DW / HA)

Represents the ratio of the number of dwellings to the area of land they occupy including internal public streets.

ULTIMATE

Residential Zone	Total Dev Area (ha)	Low Scenario		High Scenario	
		Net dw / ha	Total Dwellings	Net dw / ha	Total Dwellings
Standard	268.3	17.8	4,776	22.3	6,251
Medium	103.2	35.8	3,695	59.9	5,562
High	34.5	61.7	2,129	82.3	2,839
Sub Total	406.0		10,599		14,653
Retail	19.5				
Schools	16.7				
TOTAL	442.8				

- Net dw / ha includes average 16m Road Reserve
- Developable Area excludes Arterial Road Reserves and IPT Corridor of 54m width
- Road Reserve standards reduced

Average block sizes / dimensions:

Residential Zone	Net dw / ha	Avg block m ²	Block Depth (m)	Block Width (m)
Standard				
low scenario	17.8	425	25.0	17.0
high scenario	22.3	325	25.0	13.0
Medium				
low scenario	35.8	198	22.0	9.0
high scenario	59.9	132	22.0	6.0
High				
low scenario	61.7	108	18.0	6.0
high scenario	82.3	81	18.0	4.5



Conclusion

CONCLUSION

The Proof of Concept report has reviewed the existing ACT controls in relation to the Molonglo 3 Stage 2 site and provided recommendations for code reform to provide improved amenity, increased yield, and better design outcomes.

Three key items outcomes were identified:

IPT CORRIDOR

The proposed IPT corridor has been envisioned to provide a variety of experiences from the passengers point of view, and will be included in three main different corridor types:

- **Sub-Arterial median** - Similar to Flemmington Road
- **Local Street** - Flush with local traffic
- **De-coupled from streets** - located in a promenade

GROUP CENTRE INTERFACE

The two options for the Group Centre provide public interaction with Coppins Creek in different ways, with either the IPT located in a public plaza and a 'Main Street' style retail hub, or located one block back in a street that can be adapted to include rail in the future to allow the public promenade to be free of public transport. These options are designed to provide the most street activation to create a vibrant hub in the centre of Molonglo.

CODE REFORM

A variety of code reforms were investigated to understand what limitations these put on development in a challenging environment. The two biggest code reforms that gain the most increase in yield and impact to development are:

- **Block Compliance** -
 - By removing or revising how block compliance is achieved, significant increases in yield can be achieved on blocks with steep slope, or perceived poor orientation.
- **Road Hierarchy** -
 - The current Vehicle Movements per Day (vpd) calculations are higher than actual use, and much higher than predicted future uses which results in larger streets. By reducing the calculation to a more reasonable number (from 8vpd to 4vpd) road types can be lowered (e.g from sub-arterial to major collector) which increases available land for development.

