



Coombs Residential Estate

EDP Design Response Report

Job Number YN292347

Land Development Agency

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1. INTRODUCTION

The Molonglo Valley, to the west of Lake Burley Griffin, is the future land release to house Canberra's growing population. Over the next 40 years the development of the valley is expected to house over 30,000 residents. Coombs and Wright are the first residential developments. Coombs is located between the Molonglo River Corridor and the future John Gorton Drive, whilst Wright is located south-west of Coombs between Uriarra Road, Cotter Road and the proposed John Gorton Drive.

The development of these two areas will set the benchmark for the quality of development in Molonglo which capitalises on the site's unique location adjoining the Molonglo River corridor, Stromlo Village, and Mount Stromlo (Stromlo Forest Park) and utilises these natural features and views to Black Mountain and the Brindabella Ranges to create easily identifiable landmarks to assist in wayfinding.

The Coombs Residential Estate is to be developed by the ACT Government. It is being managed by the Land Development Agency (LDA), an agency established to develop land in the ACT on behalf of the Territory in accordance with the principles and policies laid down in the Territory Plan.

This Estate Development Plan report outlines the key planning objectives and principles upon which the Coombs Residential Estate is planned. The Coombs Estate Development Plan provides the important planning requirements of the Concept Plan and the LDA's Draft Coombs, Wright & North Weston (Part) Urban & Landscape Guidelines.

This Coombs Estate Development Plan provides for 651 residential blocks, 21 Multi Unit (M/U) sites, 9 mixed use commercial/residential blocks, a local centre, and a school precinct incorporating a primary school, school oval, community and child care sites. The Estate contains blocks for one or two storey housing including, small block courtyard (SR 3), premium villa (SR3), villa (SR1), and compact blocks (C1 and C2), and a number of larger traditional and custom blocks (SR5) up to 1,000m². This mix provides a choice of block sizes suitable to allow a wide range of housing design at various price points.

The block layouts have been designed in accordance with Rule 62 and 63 of the Concept Plan and the Draft Territory Plan Variation 301 regarding solar access provision.

This Estate Development Plan has been prepared based on the Guidelines for the Preparation of Estate Development Plans (ACTPLA, February 2007) and as defined in the Territory Plan and Section 94 of the *Planning and Development Act 2007*.

The Estate Development Plan is submitted under the Impact Track development application and assessment process. The ACTPLA has already conducted extensive environmental assessments associated with the development of the Molonglo Structure Plan and based on these assessments the Planning Minister on 22 July 2009 granted an exemption for the need to submit an Environmental Impact Statement with the development applications for both Wright and Coombs (see Appendix I).

DRAWING SCHEDULE

Civil Design and Services (Cardno Young Pty Ltd)

Locality Plan and Drawing List	292347-C-LOC-01
Land Use Plan	292347-C-LUP-01
Estate Development Plan	292347-C-EDP-01 to 04
Block Details Plan	292347-C-BDP-01 to 07
Road Hierarchy Plan/Traffic Analysis Plan	292347-C-RHP-01 to 05
Chainage Plan	292347-C-CHP-01 to 04
Road Longitudinal Sections	292347-C-RDLS-01 To 40
Road Typical Sections	292347-C-TYP-01 to 07
Slope Analysis Plan	292347-C-SAP-01 to 04

Public Transport Network & Off Road Movement System	292347-C-PATH-01 to 04
On Street Parking Plan	292347-C-PP-01 to 04
Waste Collection Plan	292347-C-WCP-01 to 04
Bushfire Risk Assessment & Management Plan	292347-C-BFP-01 to 05
Preliminary Fill Plan	292347-C-FILL-01 to 04
Environmental Management Concept Plan	292347-C-EMCP-01 to 02
Vehicular Turning Paths	292347-C-VTP-01 to 20
Road Details Plan	292347-C-RDP-01 to 08
Staging Plan	292347-C-STG-01
Water Sensitive Urban Design Outcomes Plan	292347-C-WSUD-01 to 03
Concept Master Plan	292347-C-CMP-01

Master Plans

Stormwater Master Plan	292347-C-SWMP-01 to 04
Sewer Master Plan	292347-C-SMP-01 to 06
Water Supply Master Plan	292347-C-WMP-01 to 02

Landscape and Urban Design (John Easthope and Associates)

Energy Audit	EAP-01 to 07
Block Typology Plans	BTP-01 to 07
Landscape Master Plan	LMP-01 to 07
Tree Retention Plan	TRP-01 to 09
Multi Unit Development Intentions Plan	DIP-01 to 03
Building Envelope Plan	BEP-01 to 05
Planning Control Plans	PCP-01 to 07
Tree Management Plans	TMP-01 to 07
Concept Open Space	OSC-01
Shadow Diagrams	SHD-01 to 03

1.1. Site Characteristics

Location and Views

Coombs Estate is a greenfield site located in the Molonglo Valley. The proposed development site is approximately 110 hectares in area and is flanked by the proposed John Gorton Drive to the south, the Molonglo River to the north (and partially to the north east and north west), Holdens Creek to the west and the proposed North Weston Pond to the east.

Site characteristics are:

- Site is surrounded by green ridges;
- Site undulates with ridges, and local valleys. Two main ridges in a north south orientation predominate in the east and west of the site;
- Markedly limited amount of land below 5% slope;
- Vistas to Black Mountain, Mount Stromlo, Dairy Farmers Hill, Arboretum and surrounding hilltops;
- Visual connection to key Canberra axes, and vista points;
- Strong vertical landform, in immediate vistas; and
- Molonglo Valley environmental assets.

Existing Vegetation

The site was previously a pine plantation destroyed in the 2003 bushfires. As part of the Molonglo Structure Plan ACTPLA conducted a tree assessment to identify significant trees to be retained. This study concluded there are no significant trees in Wright or Coombs (see Appendix E).

Associated with the EDP, the LDA conducted an additional tree assessment of the immature eucalypts which are generally located on the Coombs ridge. The tree assessment was undertaken by dsb Landscape Architects in October 2009.

These trees have some cultural significance as they were planted by ACT Forests for the women's Jog for Life Organisation. The trees originally linked Deeks Park with the ridge of Coombs, however the majority were lost after the bushfires. The remaining trees located along the Coombs ridgeline are generally considered to be in poor condition or form, however the Estate Development Plan has been developed to retain these trees where possible. In particular the proposed road reserves for Road C03, C08E and C08W have been widened to accommodate retention of the existing eucalypts.

In addition it is proposed to retain some existing pines in two proposed local parks. The first is adjacent to the town centre and bounded by Road C03, Road C07, Road C08 and Road C28. The second is on the east side of the ridge in West Coombs and bounded by Road C23, Road C37 and Road C40. The retention of pines is included as a reference to the sites former usage as a pine plantation. Tree retention plans are included within the EDP set.

Environmental Protection and Biodiversity Conservation (EPBC)

Ecological studies conducted by ACTPLA in Coombs found a single threatened species, the Pink Tail Worm Lizard (PTWL). As such, a referral under sections 75 and 77A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was made on 25 August 2009 referencing the proposed Coombs residential estate and associated regional infrastructure (outside the scope of this EDP).

A decision notification was issued on 28 September 2009 by the Commonwealth (Department of the Environment, Water, Heritage and the Arts [DEWHA]). The notification determined the proposed development of Coombs is not considered a controlled action providing development is undertaken in accordance with the listed conditions.

On 2 March 2010 ACTPLA applied to amend the original determination and down grade a number of PTWL potential Habitats based on additional field studies. Subsequently the amended determination was issued by DEWHA on 16 April 2010 again finding that the development of Coombs is not a controlled action if development is undertaken in accordance with the listed conditions (a copy of this determination is contained at Appendix H).

Compliance with these conditions was discussed at the Agency workshop on 8 November 2010 and each condition was allocated to either a capital works project or the Coombs EDP or both. Section 9 of this report discusses these requirements and their relationship to the Coombs EDP in greater detail.

The Coombs EDP has been developed consistent with the requirements of the EPBC determination.

No additional referrals are required to the Department of the Environment, Water, Heritage and the Arts.

1.2. Heritage

As part of the initial investigations for the Molonglo Valley, the ACT Government through the ACT Planning and Land Authority (ACTPLA) engaged AASC in 2006 to undertake a desk top heritage review for the proposed future development areas in the Molonglo Valley. The findings of this review were presented in a series of site specific mitigation strategies for previously recorded Aboriginal and non-Aboriginal heritage sites previously identified within the designated bounds of the Molonglo Valley study area. The report also presented a series of management strategies for undertaking further archaeological investigations within the Molonglo Valley Study Area.

In 2008 ACTPLA expanded the heritage study to include field investigations of Wright and Coombs. The ACT Archaeological Society identified a number of possible heritage sites in Coombs, and ACTPLA conducted additional investigations.

Heritage approval for the development of Coombs was granted 5 October 2010 and development in Coombs will be subject to the unanticipated discovery plan included in Coombs, Wright and Environs Detailed Heritage Assessment Report No. 0901 (10/1/09).

1.3. Planning Context

This Estate Development Plan has been prepared to respond to the provisions of the Territory Plan and, specifically, the Coombs and Wright Concept Plan (effective 8 July 2011).

The land is defined as Future Urban Area and contains a mixture of land use zones including, Residential, Mixed Use (commercial/residential), Community Facility and Urban Open Space. There are no gazetted or constructed roads currently on the site.

The site is directly adjacent to the Molonglo River Corridor. The River Corridor is zoned NUZ4 under the Territory Plan. It is acknowledged that some works under this EDP fall within the River Corridor (specifically filling for roads, road construction and stormwater infrastructure) however all are permissible land uses under both the Territory Plan and National Capital Plan.

1.3.1 Community Titling

This Estate Development Plan contains a number of Sections proposed for creation under a community titles scheme. Sections AN, AO, BA and BB all propose terrace blocks with rear access provided via a private community titled block (shared driveway). While a shared driveway is not considered a rear lane under the Territory Plan the EDP has been developed consistent with its requirements.

Where Sections are proposed for development as part of a Community Title Scheme it is noted that none of the Crown leases intended to form part of the Schemes will be transferred until the relevant Community Title Scheme is registered at the Land Titles Office.

Sections subject to community titling have been nominated on the Estate Development Plans, 292347-C-EDP 01 to 04 with details further clarified on the Block Details Plans, 292347-C-BDP 01 to 07.

1.4. Molonglo Surge Protection Line

A review of the "Molonglo Catchment and Scrivener Dam Flood Hydrology" was commissioned by ACTPLA and undertaken by SKM to assess, amongst other things, the risk posed to downstream residential development by the Scrivener Dam.

The Coombs and Wright Concept Plan includes the Molonglo Surge Protection Line (SPL) which represents the flood level under a dam failure assessment completed by SKM as part of the above commission. The significance of the SPL is that leases will not be granted on land below the surge protection line without implementation of mitigation measures.

Regarding Coombs an agreement was reached between LDA and ACTPLA that filling of land to bring above the surge protection level was an appropriate mitigation measure. ACTPLA have also confirmed that SKM's latest modelling (Draft February 2011) assumes the development area is filled by 6m to simulate double storey dwellings on the boundary. The maximum filling proposed under the Coombs EDP to raise land above the surge protection level is less than 4m.

ACTPLA have subsequently provided written confirmation that the proposed filling is acceptable, refer Appendix M.

In light of that noted above we can verify that no blocks proposed under the Coombs EDP will require restrictions due to potential flood hazards.

SITE PLANNING POTENTIAL AND CONSTRAINTS

2.1 Potential

- Develop the Estate Development Plan within the framework of the Territory Plan;
- Ensure that the planning and design principles of the Coombs and Wright Concept Plan are incorporated into the EDP;
- Capitalise on views to natural features within and beyond the site to Canberra landmarks;
- Provide a connective street pattern that reduces vehicle trips and encourages pedestrian activity;
- Design the blocks to achieve solar access;
- Allow for larger street trees to provide future micro climate (summer shade and winter sun) for pedestrians;
- Respond to the local landform;
- Incorporate ACTPLA's solar code provisions to ensure all dwellings have acceptable solar access;
- Access to extensive outdoor recreation; and
- Proximity to central Canberra.

2.2 Constraints

- A number of drainage easements will be required to pass through the site. These would ideally be contained within the road corridors and open space areas;
- River corridor and habitat (PTWL) protection;
- Landform;
- Location and orientation of John Gorton Drive;
- Stormwater treatment;
- Bushfire protection measures;
- Integration with Wright to the south of John Gorton Drive; and
- Interface with various Capital Works projects (trunk sewer, North Weston Pond and Coombs Ponds).

2.3 Planning Controls/Technical Amendments

Planning Controls are generally consistent with the current Territory Plan, however LDA request the Coombs Concept Plan is amended via a Technical Amendment to include the following:

- Technical amendments to ensure the multi-unit sites adjacent to John Gorton Drive provide noise mitigation measures in accordance with Rule 156 of the Residential zones – Multi unit Housing development Code;
- Bushfire protection measures as identified in the EDP submission;
- Surveillance blocks in community title laneways as per Rule 32B of the Residential Zones – Single Dwelling Code as identified in the EDP submission;
- Zero dwelling setbacks on a number of blocks contrary to Figure C4 of the Residential Zones – Single Dwelling Code to accommodate traffic calming devices and as identified in the EDP submission;
- Additional technical amendments may be required, as the detail design progresses, eg. to ensure driveways are in safe locations, etc.

2.4 Solar Setbacks

LDA requested additional building envelopes (R62 and R63) to be included in the Concept Plan to ensure neighbours do not overshadow their southern neighbour more than the 1.8m high boundary fence at 12 noon winter solstice (21 June).

In addition all blocks within Coombs have been designed to comply with the allowable blocks shown in *Draft Territory Plan Variation 301 (Single Residential Block Compliance Tables)* which are designed to ensure each dwelling has access to winter sunlight.

Shadow Diagrams have also been provided for all terrace blocks to verify compliance with the relevant sections of the Territory Plan.

3.0 PLANNING PROPOSAL

3.1 Geotechnical Assessment

A detailed geotechnical investigation was undertaken in December 2009 by Douglas Partners.

The investigation was carried out to provide information on:

- Subsurface profiles including groundwater conditions,
- Excavatability of subsurface strata,
- Suitability of onsite materials for reuse,
- Erosion potential,
- Site preparation and earthworks,
- Subgrade CBR values,
- Design bearing capacities,
- Likely site classifications to AS2870-1996,
- Suitable foundation systems.

The field tests encountered variable conditions underlying the site with the principal succession of strata broadly summarised below:

- TOPSOIL: silty sand topsoil with rootlets to depths of 0.1 – 0.2 m.
- SILTY SAND: dense, dry to moist silty sand to depths of generally 0.4 – 0.5 m.
- SAND, CLAY & SILT: medium dense to dense and stiff to hard (cemented in parts) sand, clay and silt to depths of 0.25 – 2.6 m.
- DACITE/RHYODACITE: extremely low to low strength, extremely to highly weathered dacite and rhyodacite bedrock below depths of 0.25 – 2.6 m continuing to the limit of investigation at depths of 0.9 – 4.2 m.

The investigation has indicated subsurface conditions generally comprising silty topsoils, silty sands then soils of variably sand, clay and silt composition overlying weathered dacite/ rhyodacite bedrock. The silty topsoil, natural soils and extremely low to very low strength bedrock could be expected to be removed using conventional earthmoving plant and as such no difficulties are anticipated.

Below test pit refusal depths, excavation will largely be dependent on the degree of fracturing/jointing and the strike and dip of bedding within the rock relative to the excavation.

The use of large excavators fitted with toothed buckets and rippers could excavate up to 3-4 m within weathered rocks based on previous experience in similar bedrock conditions within the Molonglo area.

The upper silty sandy layer (underlying the root zone) is considered to be unsuitable for engineering applications and may be difficult to handle and compact. The soils can be placed in the verge, in landscape mounds or other non-structural applications. Blending in thin layers with clayey, gravelly and/or weathered rock material may be possible with reuse in controlled filling areas.

After stripping and removal of topsoils and the upper silty/sandy layer, it would be expected that most of the materials available from cutting on the site would be suitable for reuse as filling over the lower areas depending on the depth of the excavation. The clayey material derived from the initial phase of stripping, though, would be expected to be the weakest of the borrow materials available and consequently, provision should be made for placing the clay soils at the base of the deeper filled sections of the site.

The weathered dacite/rhyodacite would be suitable for re-use as general filling or controlled filling provided oversized pieces (greater than 75 mm in any dimension) are removed. As excavation proceeds into higher

strength bedrock, it would be expected that cobble and boulder sized bedrock pieces would be removed, which would need to be crushed prior to use as filling. It is expected that minimal fines would be created during the crushing process and that blending with the overlying soil may be required to create a suitable well-graded filling material.

3.2 Noise

GHD has undertaken a desktop assessment of the potential traffic noise impacts of the proposed North-South Arterial Road, now known as John Gorton Drive (JGD), on proposed adjacent residential areas.

A 63 dB(A) L10 (18-hr) contour plot was produced for the projected (2021) traffic flows along the John Gorton Drive. Predicted results indicate that the ACTPLA's traffic noise goal may be exceeded at some parts of the proposed residential areas adjacent to the John Gorton Drive.

GHD suggests there are a number of options for mitigation of traffic noise that can be contained within the road reserve. However, it is understood that ACTPLA's intention is that the property developers within the proposed residential areas will address noise attenuation requirements and that no attenuation measures will be built within the road reserve.

Noise mitigation measures can only be enforced if affected multi-unit sites are identified in the Concept Plan. Therefore LDA request a Technical Amendments to the Concept Plan to ensure the multi-unit sites adjacent to John Gorton Drive (identified in the EDP planning control plans) provide noise mitigation in accordance with Rule 156 of the Residential zones – Multi Unit Housing Development Code.

3.3 Street Lighting

ActewAGL will undertake the underground electricity reticulation and street lighting design in accordance with the current Design Standards for Urban Infrastructure.

All local access roads will be designed to Category P3. The street light types proposed for Coombs shall be equal to and compatible with the street light selection for recent new developments. The pole spacing, regardless of the eventual pole type, will be similar to current street light systems.

The streetlight poles have been positioned 1.9m behind the kerb line on roads. This is in accordance with the ActewAGL requirements for locations of street lights in laneways and main roads. For consistency throughout the development, a standard distance behind the kerb line has been adopted for all roadways.

The detail design will consider the location of lighting and street trees, low energy lighting and manage the potential issue of intrusive lighting, in particular light spillage due to Coomb's proximity to the Mount Stromlo Observatory.

3.4 Road Hierarchy & Traffic

The identification of a road hierarchy serves not only to identify the road's role to carry vehicles but should attempt to match the class of road to its use and the environmental needs of the community. The desire to separate through and local traffic should improve the general amenity of all areas within the development.

If roads are viewed as either purely for local access or purely for traffic movements then inconsistencies will arise. For example, a main road passing through a shopping centre. Where road network design alone is unable to remedy this situation traffic management can be applied to minimise impacts and prioritise conflicting functions.

Traffic management objectives at a local level need to be consistent with government objectives for community planning and development. The need to ensure cohesive precincts, ensure accessibility of neighbourhood areas for all road users and ensure the environmental integrity is respected are levers which traffic management most closely affects.

The classification of roads in the ACT is based on a formal road hierarchy. The classification fundamentally relates to the predominant function of a road and to the extent it serves the two basic purposes of the road network, i.e. the movement of traffic and access to property. A road's physical characteristics and traffic volume will reflect its function and role in the network. The road classifications used are:

- **Arterial Roads**

Arterial roads predominantly serve longer distance travel within a district and through traffic from one district to another, and form the principal avenues of communication for metropolitan scale traffic movements. They include limited access roads and parkways (or freeways) having full access control and grade separated intersections.

- **Major Collector Roads**

Major collector roads collect and distribute traffic within residential, industrial and commercial areas. They form the link between the primary network and the roads within local areas and should carry only traffic originating or terminating in the area. The volume of traffic carried is constrained by environmental objectives - safety and traffic noise - rather than road geometry and reflects the limited area that they serve. Direct property access is still permissible but the level of traffic may dictate that access and egress arrangements should be such that vehicles can exit properties in a forward direction.

- **Minor Collector Roads**

Minor collector roads collect and distribute traffic from access streets, linking to the major collector roads within the neighbourhood. They can also provide secondary connections direct to the external arterial road network. Traffic volumes are compatible with direct property access.

- **Access Streets**

Access streets are generally streets where the residential environment is dominant. Traffic volumes and speed environments are low.

However, traffic volumes alone should not be the only criterion used in road classifications. Factors such as traffic compositions, bus service routes, pedestrian / cycle considerations and connections to other road categories should also inform the classification.

Intersection connections should be provided between roads of identical or adjacent classifications. As an example it is undesirable for a local road to connect directly to an arterial road. Closer spacing of intersections is also possible the further down the classification ranking.

Typically the speed limit on access streets and minor collector roads is 50 km/h, major collector roads is 60 km/h and arterial roads is 60 km/h or above.

Peak hour volumes on roads are typically eight to twelve per cent of the daily flows.

- **Rear Access Lanes**

All blocks in Sections AN, AO, BA, BB that have rear access from the lane will be part of the community title scheme with the rear lanes forming the common property for the scheme.

Waste collection will be from the adjacent public road network as indicated on the waste collection plans (Drawings 292347-C-WCP 01-04).

- **Pedestrian / Cycle Facilities**

Cycling and walking are supported by the ACT Government and are recognised as healthy, low cost and environmentally friendly forms of transport. The ACT Government has adopted the National Strategy for Ecologically Sustainable Development and the National Greenhouse Strategy. Both of these strategies support an increase in commuter cycling and walking in favour of private car use.

Recreation policies also strongly support walking and cycling as a means of improving community health and fitness, and of helping to reduce greenhouse gas emissions and vehicle-produced noise and air pollution.

Provision for pedestrians and cyclists is indicated in the public transport network and off road movement systems plans (Drawings 292347-C-PTP-01 to 04). The proposed network exceeds the Standards and provides every street with a path on both sides of the road and links major desire lines with trunk paths. The trunk paths will connect Coombs with Mount Stromlo, Wright, the Molonglo River and to the existing trunk pathway system to Lake Burley Griffin, Weston Creek and Civic.

- **Public Transport Provision**

Coombs has been designed to support both the high frequency bus route on John Gorton Drive and a local network that connects Duffy, Wright and Coombs. Extensive consultation has been undertaken with TAMS and ACTION regarding bus service for the estate and the school precinct in particular.

Major Collector and Minor Collector Roads have been designed as bus routes, all roads fronting the proposed school have been designed as bus capable. This is consistent with ACTION and TAMS direction and will provide a degree of flexibility in final route selection for the estate. Drawings 292347-C-PTP-01 to 04 indicate the proposed public transport network. ACTION is supportive of the proposed bus network.

Roundabouts and other traffic calming measures have been designed to fully accommodate bus movements and turning paths.

ACTION and TAMS have also requested that Coombs be designed to accommodate a 14.5m rigid vehicle new to the fleet, namely a Scania Steer Tag. The 14.5m rigid is a more onerous requirement than provisioned under the Territory Plan though we understand a Draft amendment has been circulated for Agency comment.

Cardno has created a turning template for a 14.5m rigid vehicle that ACTION has approved for use in the Coombs EDP. Intersections throughout the proposed bus network have been designed to accommodate those turning movements required by a 14.5m rigid vehicle.

3.4.1 Traffic Generation

A forecast of the traffic generation potential of the broader Coombs & Wright master plan area was undertaken based upon the potential lot yields identified. These areas were then used to determine appropriate traffic generation using traffic generation rates identified within the RTA Guidelines for Traffic Generating Developments (October 2002) for non residential land uses and ACTPLA Residential Subdivision Development Code for residential land uses. Standard assumptions on the likely inbound/ outbound split of traffic were adopted as follows:

- 20% inbound 80% outbound for residential uses during AM peak hour. PM peak hour assumed to be the reverse.
- 30% outbound 70% inbound for commercial uses during AM peak. PM peak hour assumed to be the reverse.

To assist in the assessments a zoning system was created for the master plan yields. The following assumptions are made to determine the number of units for each zone:

- RZ1** Residential Suburban Zone: total number of lots as identified on the master plan and assessed on the basis of one dwelling per lot.
- RZ4** Medium Density Residential Zone: Min 40 dwellings per hectare as per the Territory Plan. (Maximum of 100 dwellings per hectare used for traffic generation).
- RZ5** High Density Residential Zone: 50 dwellings per hectare as per the Territory Plan. (Maximum of 100 dwellings per hectare used for traffic generation).
- CZ5** Mixed Land Use: residential one dwelling per 150m² of site and commercial based upon one storey of total site area.

3.4.2 Traffic Distribution

A traffic distribution of travel external to the site area has been assessed on the basis of the traffic distribution identified in the Molonglo Roads Feasibility Study (SMEC) in which the trips were proportionally assigned to the major attractors and generators for Molonglo traffic. The SMEC analysis identified a distribution of 65% to the south/east (to the city), 30% north/west (towards Belconnen) and 5% to the south to Stromlo Village. Short term traffic generation while a link to Belconnen is not provided does not unduly affect local traffic volumes.

3.4.3 Intersection Performance

The SIDRA results determined that the internal intersections within the development operate satisfactorily during both the AM and PM peak hour periods.

Based upon the results it is deduced that all other intersections within the masterplan area should operate at satisfactory levels of operation. A full copy of the Traffic Impact Assessment is included in Appendix A.

The intersection operating performance was assessed using the SIDRA software package to determine the Degree of Saturation (DS), Average Delay (AVD in seconds) and Level of Service (LoS) at each intersection. The SIDRA program provides Level of Service Criteria Tables for various intersection types.

3.5 Stormwater

3.5.1 Proposed Stormwater Infrastructure

The proposed stormwater system for the development is based on the design requirements set out by the Department of Urban Services, Design Standards for Urban Infrastructure, Section 1. Stormwater is to be diverted wherever possible to rain gardens and bio-swales prior to downstream discharge to either a regional stormwater management facility or direct to the Molonglo River. Otherwise the stormwater system will be a conventional drainage system consisting of a 5 year ARI capacity road pipe network overlain by a 100 year ARI major overland flow system.

3.5.2 Overland Flow Management

ACTPLA have developed a detailed stormwater strategy for North Weston, Coombs and Wright that provides stormwater attenuation to pre development flows at Coombs Pond A and B.

It is generally proposed that the 100 year ARI flows from Coombs will be attenuated within these ponds prior to discharge to the Molonglo River. However due to the site topography it is not practical for all Coombs sub-catchments to drain direct to the Molonglo River without flood attenuation.

Cardno sought a clarification in this regard from ACTPLA on and received confirmation that catchments beyond the Coombs Ponds can discharge without attenuation given the proximity of the Molonglo River and the proportionate sub-catchment size within the wider Molonglo catchment.

3.6 Water Sensitive Urban Design

3.6.1 Aims

The aims of the catchment based water quality assessments were to:

- Assemble a MUSIC models for planned Future Conditions and to estimate the size of water quality measures to meet the adopted stormwater quality targets for development in the Molonglo Valley;
- Assess the overall reduction in pollutant exports from planned developments in Coombs and Wright prior to discharge to receiving waters including North Weston Pond, Pond A, Pond B and local watercourses downstream of regional ponds.

3.6.2 ACT Stormwater Treatment Objectives

As stated in the 2009 WaterWays Water Sensitive Urban Design General Code (ACTPLA, 2009), the objectives for stormwater quality management will be achieved by the combination of works undertaken by the ACT Government, through its capital works program, and by Government or the private sector through works undertaken in new developments and redevelopments.

The responsibility for meeting targets on development or redevelopment sites lies with the developer (Government or private) or builder, while responsibility for meeting the regional or catchment-wide targets lies with Government.

The final adopted targets are shown in Table 1. They refer to reduction in pollutant export compared to an urban catchment with no water quality management controls.

Table 1: Final Adopted Targets for Reduction in Average Annual Pollutant Exports (after ACTPLA, 2009)

	Development or Redevelopment Site	Regional or Catchment-Wide
TSS	60%	85%
TP	45%	70%
TN	40%	60%

3.6.3 Molonglo Valley Subcatchment Stormwater Treatment Objectives

As discussed in the Summary of Stormwater Quality Modelling of Coombs and Wright (ACTPLA, undated), due to the range of catchment types, and the limited ability in some catchments to install large stormwater treatment facilities, it was considered too onerous to make every catchment reach the Catchment-wide stormwater quality targets. Therefore, the catchments were classified into 4 types and each catchment was assigned targets as a range of the Developer targets. These are listed in the table below.

**Table 2: Pollutant Reduction Targets for Subcatchments in the Molonglo Valley
 (after ACTPLA, undated)**

	Target	TSS		TP		TN	
		lower	upper	lower	upper	lower	upper
No Ponds Downstream	100-150% of Developer	60%	90%	45%	68%	40%	60%
Large Pond D/S only	50% -75% of Developer	30%	45%	23%	34%	20%	30%
Small Pond with Large Pond D/S	75%-100% of Developer	45%	60%	34%	45%	30%	40%
Small Pond D/S only	100-150% of Developer	60%	90%	45%	68%	40%	60%
Out flow from Large ponds	Regional	85%		70%		60%	

While eight subcatchments within Coombs would be classified as having a “Large Pond Downstream” which would require developer measures to only achieve 75% - 100% of the Developer targets, the targets adopted for the purpose of sizing local WSUD measures was to achieve 100% or greater of the developer targets.

Likewise for the purpose of sizing local WSUD measures the targets adopted for the eight subcatchments discharging to local watercourses downstream of major ponds was to achieve 100% or greater of the developer targets.

3.6.4 Modelling Software - MUSIC

The CRC for Catchment Hydrology (CRCCH) has developed a Model for Urban Stormwater Improvement Conceptualisation (MUSIC), which packages the results of many research activities undertaken at the CRCCH and other organisations into a user-friendly stormwater management tool.

MUSIC enables urban catchment managers to:

- (a) determine the likely water quality emanating from specific catchments,
- (b) predict the performance of specific stormwater treatment measures in protecting receiving water quality,
- (c) design an integrated stormwater management plan for a catchment,
- (d) evaluate the success of a treatment node or treatment train against a range of water quality standards, and
- (e) analyse the lifecycle costs of a treatment node or treatment train.

To support the consistent assessment of stormwater pollutant exports and stormwater treatment trains, calibration of the rainfall/runoff and pollutant export parameters for the MUSIC and xpaqualm were undertaken and reported in the 2009 WaterWays Water Sensitive Urban Design General Code (ACTPLA, 2009).

The calibration process for MUSIC and the resulting recommended model parameters was described in the 2007 Code. On 1 May 2009 the Proposed Technical Amendment to the Territory Plan No. V20009-08 was published. This Amendment updated the stormwater quality parameters for the MUSIC and xpaqualm models given in the previous 2007 Code.

3.6.5 Landuse

The subcatchment areas and their estimated imperviousness under planned Future Conditions which were adopted are as given in Table 3

3.6.6 Rainfall/Runoff

Hourly rainfall data was obtained for Canberra Airport (Station 70014).

The time period selected for input into the MUSIC models was:

1/1/1968 – 31/12/1977 (for simulation of a 10 year period)

The adopted rainfall/runoff parameters were as given in the 2009 WaterWays Water Sensitive Urban Design General Code (ACTPLA, 2009).

3.6.7 Water Quality Parameters

The Event Mean Concentrations were as given in the 2009 WaterWays Water Sensitive Urban Design General Code (ACTPLA, 2009).

3.6.8 Assumed Rainwater Tank Characteristics

The following assumptions were adopted for rainwater tanks to be installed on residential properties:

- The area of roof draining to the rainwater tank is 150 m²;
- The rainwater tank has a volume of 2,000 L (2 kL);
- The rainwater tank supplies water for garden watering and toilet flushing
- The average annual demand for garden watering is 140 kL/yr (in accordance with Table 1, Appendix A, Rainwater Tanks, Guidelines for Residential Properties in Canberra", (ACTPLA, 2004))
- The average annual demand for toilet flushing is 60 kL/yr (in accordance with Table 1, Appendix A, Rainwater Tanks, Guidelines for Residential Properties in Canberra", (ACTPLA, 2004)).

3.6.9 Assumed GPT Characteristics

The capture of pollutants by a CDS trap was guided by the performance data given in Figures C-2, C-3 and C-4 for TSS, TP and TN given in the 2005 User Guide for MUSIC Version 3.

Each CDS trap was modelled with:

- a low flow bypass = 0.05 m³/s to give nil treatment of low concentration flows (refer Figures C-3 and C-4 for low concentrations)
- a high flow bypass = 0.69 m³/s to represent bypassing of 6 month ARI and greater flows

3.6.10 Assumed Biofilter Characteristics

The following assumptions were adopted when conceptually sizing of biofilters:

- The extended detention depth is 0.3 m;
- The surface area and the filter area are the same;
- The filter depth is 0.6 m;
- The filter median particle diameter is 0.24 mm; and
- The saturated hydraulic conductivity is 120 mm/hr.

For modelling purposes it was assumed that all inflows up to a 6 month ARI flow would enter the biofilter ie. higher flows would bypass the biofilter. A notional high flow bypass of 0.69 m³/s was adopted for assessment purposes.

3.6.11 MUSIC Model

An overall MUSIC model of planned development in Wright and Coombs was assembled to estimate the size of water quality measures in Coombs to meet the adopted stormwater quality targets for development in the Molonglo Valley as well as to assess the overall reduction in pollutant exports from planned developments in Coombs and Wright prior to discharge to receiving waters including North Weston Pond, Pond A, Pond B and local watercourses downstream of regional ponds.

The model excluded all high density and/or mixed use sites because these sites are responsible for treating runoff from the site in accordance with the Developer Targets.

The number of properties with and without rainwater tanks and the resulting size of biofilters required to achieve 100% or greater of the developer targets are given in Table 3.

It will be noted that a number of subcatchments in Wright represent road reserves only within areas of high density or mixed use development. Runoff from these subcatchments is treated only in downstream major ponds.

The MUSIC model is shown in Figure 1. The model was run using Version 3.1 to maintain consistency with previous assessments.

3.6.12 MUSIC Results

The performance of the treatment trains for subcatchments in Coombs and Wright are given by subcatchments and by receiving waters in Tables 4 and 5 respectively.

It will be noted the reductions in stormwater pollutants discharged to the North Weston Pond and Pond A match or exceed 100% of Developer targets. In the case of Pond B the TN reduction prior to discharge into the pond is 93% of the Developer target. This is because of untreated road runoff from road reserves external to high density and/or mixed use sites.

In a comparison with the targets given in Table 2 the following reductions in average annual pollutant exports from the various subcatchments with treatment trains are achieved:

No Ponds Downstream (100% - 150% of Developer Targets)

	TSS	TP	TN
Min	130%	127%	101%
Max	144%	138%	101%

Large Ponds Downstream only (50% - 75% of Developer Targets)

	TSS	TP	TN
Min	129%	116%	99%
Max	137%	132%	101%

It is concluded that in subcatchments discharging to local watercourses downstream of major ponds that the treatment trains deliver reductions in average annual pollutant exports within the range identified by ACTPLA.

It is concluded that in subcatchments discharging to major ponds that the treatment trains deliver reductions in average annual pollutant exports that exceed the range identified by ACTPLA.

It was also concluded that the rainwater tanks achieved a 20% reduction in average consumption of potable water based on the total average consumption per household of 330 kL/yr given in Table 1, Appendix A, Rainwater Tanks, Guidelines for Residential Properties in Canberra", (ACTPLA, 2004).

Table 3: Summary of Subcatchment Areas and Number of Properties with Rainwater Tanks

Subcatchment	Impervious (Ha)		Pervious (Ha)		Total (Ha)	No. of Lots		Total
	Untreated	Treated	Untreated	Treated		No RWT	With RWT	
Wright								
JG1	0.00	5.40		9.69	15.09		109	109
JG2A		6.50		9.60	16.10		181	181
JG2B		4.00		7.00	11.00		76	76
JG3		1.50		0.50	2.00		0	0
JG4		0.59		0.69	1.28		8	8
JG5	0.10	0.00	0.156		0.260		0	0
JG6	0.08		0.12		0.20		0	0
JG7	0.14		0.20		0.34		0	0
JG8		2.23		3.19	5.42		45	45
JG9		3.35		5.94	9.29		74	74
JG10	0.37		0.20		0.57		0	0
JG11	0.77		0.14		0.91		0	0
N64		1.19		4.18	5.37		25	25
N65B		0.06		0.06	0.12		0	0
	1.46	24.83	0.82	40.85	67.96			
Coombs								
C1		0.79		0.09	0.88		0	0
C2		2.10		0.73	2.83		57	57
C3		1.68		1.19	2.87		27	54
C4		0.90		0.43	1.33		5	5
C5		6.64		3.66	10.30		78	78
C6		1.40		0.79	2.19		21	21
C7		1.54		0.83	2.37		16	16
C8		2.13		1.62	3.75		0	0
C9		8.03		2.33	10.36		8	80
C10		9.29		5.00	14.29		0	163
C11		1.87		0.86	2.73		0	23
C12		1.77		0.77	2.54		0	24
C13		1.56		0.62	2.18		0	14
C14		6.58		3.71	10.29		0	102
C15		3.11		1.34	4.45		23	56
C16		4.72		5.32	10.04		60	124

Table 4: Summary of Performance of Treatment Trains by Subcatchment

Subcatchment	Total Area (Ha)	Imperviousness	Rainwater Tanks	CDS GPT	Biofilter Area (m2)	Ave Annual Reduction		
						TSS	TP	TN
Wright								
JG1	15.09	36%	Y	Y	100	75.0%	51.0%	39.9%
JG2A	16.10	40%	Y	Y	115	78.4%	55.9%	44.3%
JG2B	11.00	36%	Y	Y	110			
JG3								
JG4	1.28	46%	Y			10.5%	10.2%	13.2%
JG5	0.26	40%				0%	0%	0%
JG6	0.20	40%				0%	0%	0%
JG7	0.34	40%				0%	0%	0%
JG8	5.42	41%	Y		85	75.8%	56.5%	40.1%
JG9	9.29	36%	Y		110	72.6%	54.9%	40.0%
JG10	0.57	65%				0%	0%	0%
JG11	0.91	85%				0%	0%	0%
N64	5.37	22%	Y			73.3%	55.6%	40.0%
N65B	0.12	50%				0%	0%	0%
Coombs								
C1	0.88	90%		Y	44	85.4%	61.8%	39.5%
C2	2.83	74%		Y	120	86.3%	62.0%	40.3%
C3	2.87	59%		Y				
C4	1.33	68%	Y	Y	88	80.5%	57.7%	40.2%
C5	10.30	64%	Y	Y	172	80.9%	55.5%	40.4%
C6	2.19	64%	Y	Y	44	78.2%	57.0%	39.8%
C7	2.37	65%	Y	Y	64	81.6%	59.8%	40.5%
C8	3.75	57%			148	85.5%	62.6%	40.3%
C9	10.36	78%	Y	Y	210	81.9%	55.4%	40.0%
C10	14.29	65%	Y	Y	142	77.1%	52.3%	40.5%
C11	2.73	68%	Y	Y	64	80.2%	57.9%	40.0%
C12	2.54	70%	Y	Y	60	80.3%	58.5%	40.7%
C13	2.18	72%	Y	Y	64	82.1%	59.5%	40.2%
C14	10.29	64%	Y	Y	136	78.6%	54.1%	40.3%
C15	4.45	70%	Y	Y	124	80.9%	59.3%	40.1%
C16	10.04	47%	Y	Y	132	79.3%	54.9%	40.0%

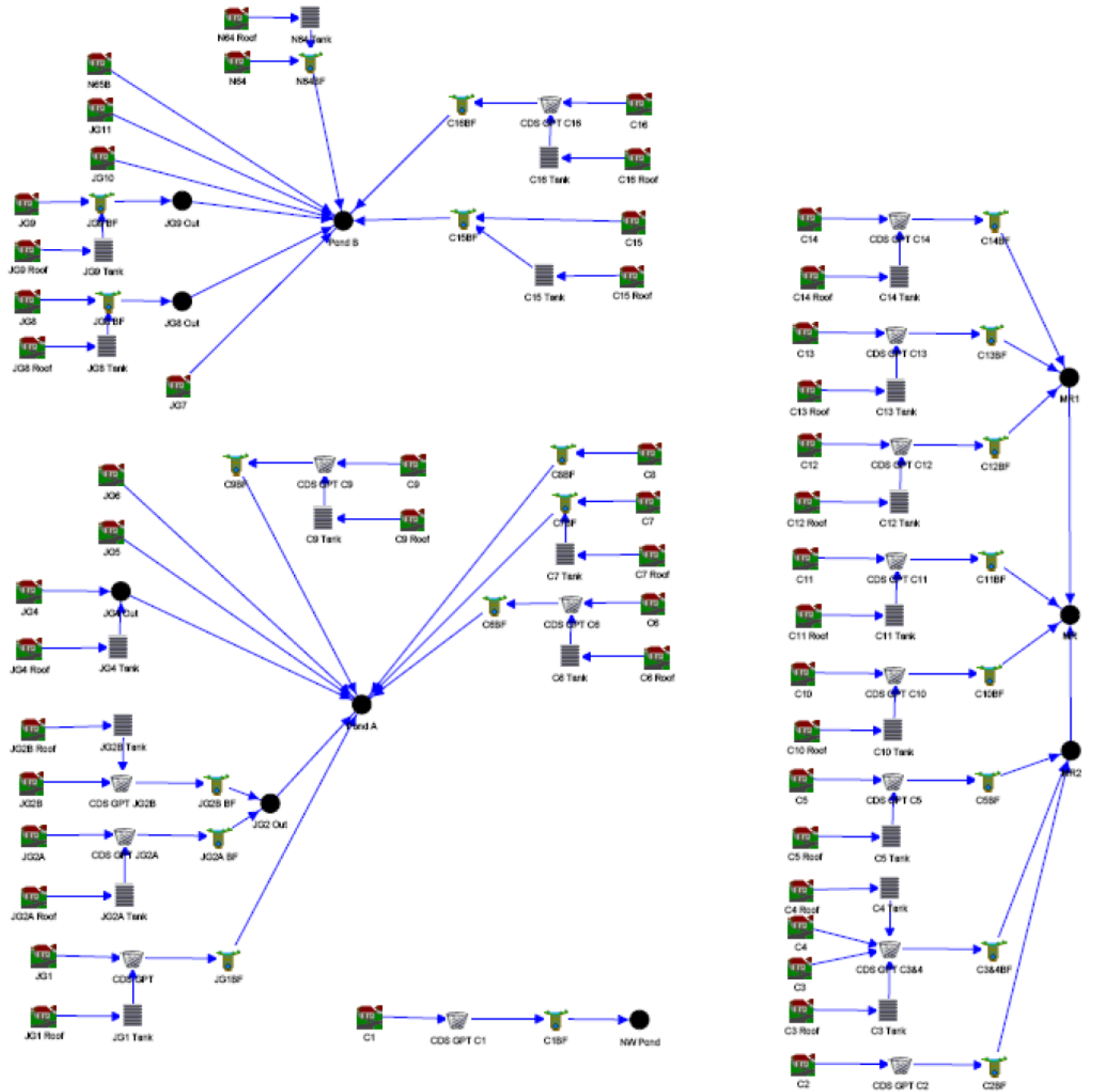


Figure 1: MUSIC Model Layout for Wright and Coombs

3.7 Sewer

The sewerage network for Coombs drains to the existing 500mm and 600mm diameter Molonglo trunk sewer at 7 locations. Additionally, there are five and two connections into the existing 225mm and 300mm sewer lines from Wright Estate respectively. A 225mm diameter sewer line is proposed along the majority of the eastern edge road (Road C11) due to loadings from the upstream high density blocks.

Ongoing communication between Cardno, ActewAGL and Brown Consulting are underway to coordinate necessary proposed manhole sizes, pipe sizes, bearing and invert levels of connections into the Molonglo trunk sewer.

The equivalent population (EP) has been calculated in the commercial areas based on the assumptions that the proposed buildings will be one storey high and their gross floor area (GFA) comprise 60% of the proposed block area. The EP in the high density residential areas were estimated based on the maximum number of dwellings as dictated by the Territory Plan.

For blocks with less than 1.2 metres fall from the front to the back of the block, it is proposed to install the sewer in the verge to minimise the impact of sewer access easements on the block area. This will be designed in accordance with Actew Standards.

A separate submission of the Sewer Master Plan has been made directly to ActewAGL under their formal approval process.

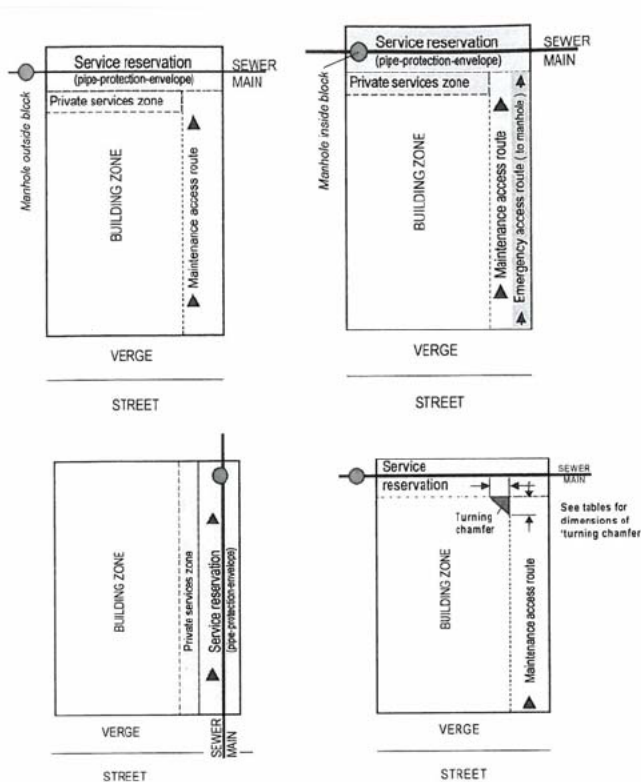


Figure 2: Access of Utility Sewerage Services in Rear of Blocks

3.8 Water

Coombs is proposed to be supplied by an existing 300mm diameter water main along John Gordon Drive which extends to Cotter Road. Coombs is proposed to have 10 connection points into the DN300mm water main within John Gordon Drive. This external DN300mm trunk main is supplied by both the Oakey and Duffy reservoirs where the nominal water level in the low zone is 640m. The Oakey reservoir TWL is 685m, however is reduced by pressure reducing valves to 640m, prior to reaching the Coombs development. The Duffy reservoir TWL is 644m.

The zone boundary for Coombs was modelled for two looped systems set by the nominated 563m contour which divided the Estate into the Low and Low Low pressure zones. The Low Zone mains were extended further east of the 563m contour to service the future high density and commercial blocks so that higher pressures can be gained during fire fighting in these areas. Two pressure reducing valves (PRV) have been modelled to decrease the pressure from the Low Zone to the Low Low Zone at the east and west extremities of the Estate. Two additional PRV's are proposed to ensure that security of water supply is achieved during the staged construction of the Coombs development.

The Low Zone system consists of a 150mm water main to service commercial and high density blocks. Fire flow category F6 "for residential areas" is predominant throughout Coombs with the F5 fire rating applied in the high density, commercial areas and along the edge road around Coombs. Water mains with accompanying easements are proposed through the terrace block laneways as the length is greater than 100m and additional hydrants are required to comply with ACT Fire Brigade Guidelines. The fire zones have been agreed in principal with ACT Fire Brigade during the master planning process.

The internal pipe network has been modelled hydraulically using the computer program WaterCAD. Through the use of this program, the pipes have been sized accordingly to meet Actew Water Supply Standards. The modelling has shown that all category F5 and F6 fire risk zones have reached the anticipated fire flow peak demand loads of 45 l/s and 25 l/s respectively with a minimum of 10m pressure head. Analysis of the zone boundary and the different pressures also showed that the PRV's proposed are adequate in reducing the pressure for more acceptable water pressures in the different zones.

In addition to the EDP, a separate submission of the Water Master Plan has been made direct to ActewAGL under their formal approval process and also to the ACT Fire Brigade for their endorsement.

The water supply strategy is illustrated in the Water Master Plan in drawings: 292347-C-WMP-01 and 292347-C-WMP-02.

3.9 Utilities

Discussions with ActewAGL and Jemena indicate that Coombs can be fully serviced from proposed infrastructure to be accommodated in the John Gorton Drive road reserve.

All dwellings will be provided with Fibre to the Home (FTTH). LDA are currently engaged in a procurement process with telecommunications service providers for provision of service to Coombs. Cardno will liaise with the successful service provider as soon as an appointment is made.

3.10 Bushfire Risk Assessment

A Bushfire risk assessment was undertaken by Australian Bushfire Protection Planners for ACTPLA as part of the Structure Plan for the whole of Molonglo Valley.

Subsequently LDA has commissioned Australian Bushfire Protection Planners to undertake a bushfire risk assessment for the whole of the proposed Coombs Estate. The findings of this assessment have been used to determine the widths of inner and outer asset protection zones and home asset protection zones. See Appendix C and Plans BFP-01 to 05.

The LDA has developed this plan in consultation with ESA and TaMS with the final report being issued for endorsement on 02/03/2011.

The report recommends the bushfire protection measures below:

Molonglo River Corridor

(a) Rehabilitation and bushfire hazard management of the vegetation within the river corridor:

The Molonglo Stage 2 Bushfire Risk Assessment recommended a 30 metre wide IAPZ and a HAPZ of between 30 – 50 metres – based on the advice that the river would be dammed and that the river corridor would be managed as a 'foreshore reserve'. This advice has now been withdrawn as the proposal is for the river corridor to be rehabilitated as a habitat/riparian corridor, increasing the potential bushfire risk from unplanned bushfire events occurring in unmanaged vegetation.

The reduction of the fuel hazard in this corridor is critical to the safety of the occupants of the future suburb of Coombs [and North Weston] and the emergency services that will attend to fire events in the river corridor. The difficulty is however, reaching a balance between retaining a habitat corridor and reducing the bushfire risk, exacerbated by the difficulty of managing steep, rough land which is also the habitat for the Pink Tailed Worm Lizard, whilst retaining water quality in the river.

The rehabilitation of the vegetation within the corridor should remove the introduced species and replicate the natural River Sheoak community with scattered 'patches' maintained along the edge of the river bank – broken by wide sections of native grasses in order to provide a disconnected canopy along both sides of the river.

The steeper, rocky sections of the higher river bank shall be retained as open grassland with the remainder of the corridor rehabilitated and maintained as an 'open woodland community' with an open, separated tree canopy and a grassy understorey. Canopy separation between the River Sheoak and the woodland community is important.

Management of bushfire fuels, by traditional methods such as slashing, is impractical due to the nature of the landform and the requirement to minimise damage to the Pink Tailed Worm Lizard habitat [surface rocks] which prevails across much of the river corridor.

It is therefore recommended that a Fire Management Plan be prepared specifically for the corridor which establishes a management protocol based on the primary management being by stock grazing, hand slashing in the PTWL Habitat areas, mechanical slashing (where possible) and periodic ecological hazard reduction burning in order to provide certainty over the reduction of the bushfire fuels to levels which are identified, in the Strategic Bushfire Management Plan for the ACT – Version Two, to maintain the corridor as an Outer Asset Protection Zone.

The corridor should not be gazetted as a 'Nature Reserve' and annual funding shall be provided, specifically (& separately) for the fuel management of the river corridor. Funding for the maintenance of the existing fire access trails along the north-eastern side of the river corridor shall also be provided in order to provide access for maintenance and fire-fighting access.

An edge road shall be provided to the full perimeter of the river corridor including across the stormwater detention ponds in order to provide continuity of fire-fighting access.

A 50 metre wide Inner Asset Protection Zone shall be provided to the blocks facing the river corridor with a 100 metre wide Outer Asset Protection Zone extending from the outer edge of the IAPZ and managed to provide a maximum Overall Fuel Hazard Level of < 35, as agreed by ESA.

The Ember Zone [HAPZ] to the residential precinct which faces the river corridor shall be BAL 29 for 100 metres plus BAL 19.0 for the next 150 metres, in accordance with A.S. 3959 – 2009 – ‘Construction of Buildings in Bushfire Prone Areas’.

The stormwater detention ponds on Holdens Creek, Weston Creek and the internal creek lines shall be maintained as an Inner Asset Protection Zone.

Northern aspect to the north-eastern portion of Coombs

(a) Provision of Inner Asset Protection Zone:

There shall be provided a 50 metre wide Inner Asset Protection Zone, as agreed by ESA, measured from the block boundary.

(b) Provision of Managed Outer Asset Protection Zone:

There shall be provided an Outer Asset Protection Zone, of a minimum width of 100 metres, measured from the northern edge of the Inner Asset Protection Zone, as agreed by ESA. The OAPZ shall incorporate the land within the medium/high quality potential PTWL Habitats and shall be maintained in an ecologically sympathetic manner to the satisfaction of TAMS in accordance with TaMS PTWL habitat fuel & fire suppression guidelines to achieve a Grassland Fuel Hazard of < 35, without significantly impacting on the Pink-tailed Worm Lizard habitat.

(c) Provision of Ember [HAPZ] Zone:

The Ember Zone [HAPZ] to the residential precinct which faces Misery Point and the remainder of the river corridor shall be BAL 29 for 100 metres plus BAL 19.0 for the next 150 metres, in accordance with A.S. 3959 – 2009 – ‘Construction of Buildings in Bushfire Prone Areas’.

Northern aspect to Coombs

(a) Management of the Holdens Corridor:

The full width of the Holdens Creek corridor, including the edge road and landscape buffer (refer Section D of the *Coombs and Wright Concept Plan*) shall be maintained as an Inner Asset Protection Zone. The minimum width of the IAPZ shall be 50 metres, as agreed by ESA.

(b) Provision of Managed Outer Asset Protection Zone:

There shall be provided an Outer Asset Protection Zone, of a minimum width of 100 metres, to the north of the Holdens Creek corridor, measured from the northern edge of the Inner Asset Protection Zone, as agreed by ESA.

(c) Provision of Ember [HAPZ] Zone:

There shall be provided an Ember Zone of a minimum width of 200 metres, measured from the Inner Asset Protection Zone, where those buildings erected within the first 50 metres of the HAPZ are constructed to comply with BAL 19 and the remainder to BAL 12.5, in accordance with A.S. 3959 – 2009 – ‘Construction of Buildings in Bushfire Prone Areas’.

South-western edge to Coombs

(a) Management of the future suburb of Wright:

Should the construction of the new suburb of Wright not occur concurrently or before the new suburb of Coombs, the regenerating vegetation within the future suburb of Wright shall be slashed or removed in order to minimise the change of a fire starting and spreading, under south-westerly winds, towards the south-western edge of Coombs.

The management prescription for this work shall be that combustible fuels shall be maintained to a maximum height of 100mm.

The minimum width of this management shall be 500m, including the width of the proposed north-south arterial road corridor.

North-western corner to Coombs

(a) Provision of Managed Outer Asset Protection Zone:

Until such time that the Stromlo Forest Park development can provide a managed buffer zone to the northwest corner of Wright, capable of minimising the passage of fire from the northwest, there shall be provided, to the northwest of the Uriarra Road corridor a minimum 400 metre wide managed Outer Asset Protection Zone.

Southern edge of Coombs [Cotter Road]:

The southern edge to the new suburb of Coombs adjoins the Open Space corridor between Warragamba Avenue and Cotter Road. This corridor has been replanted with various species of trees.

The Molonglo Stage 2 Bushfire Risk Assessment [ABPP – 2006] identified that this corridor, if unmanaged, would provide a high level of risk to the southern edge of Coombs. This level of risk has been determined by this risk assessment.

The Risk Assessment also recommended that a 40 metre wide IAPZ and 50 metre wide HAPZ be provided to this aspect of the new suburbs.

Therefore, it is recommended that the full width of the Cotter Road corridor, the landscape buffer zone, Service Street and to the front boundary blocks facing Cotter Road shall be managed as an Inner Asset Protection Zone.

A 50 metre wide Ember [HAPZ] Zone shall be established inside southern edge of the new suburb, to the east from the eastern edge of the Stromlo Rural Village, measured from the Inner Asset Protection Zone, where those buildings erected are constructed to comply with BAL 12.5 in accordance with A.S. 3959 – 2009 '*Construction of Buildings in Bushfire Prone Areas*'.

4 AGENCY LIAISON AND CONSULTATION

4.1 Agency Liaison

Consultation on the Coombs EDP to date comprises two components:

1. Liaison with relevant agencies including ACTPLA; and
2. Liaison with interest groups and the broader community.

In terms of liaison with relevant agencies, Cardno and/or the LDA have been involved in a series of meetings with a number of agencies and interest groups in the lead up to finalising the EDP.

A summary of the Agency and stakeholder consultation in development of the Coombs Estate Development Plan is outlined in Table 6 below:

Table 6: Summary of Agency and Stakeholder Consultation

Date	Agency	Purpose and Outcome
24/6/09	Weston Creek Community Council	LDA presentation, detailed discussion, Q&A by over 200 attendees
1/7/09	Woden Valley Community Council	LDA presentation, detailed discussion, Q&A by attendees
8/7/09	Weston Creek Community Council	Follow up presentation, detailed discussion, Q&A by attendees
10/11/09	ACTPLA	Discuss the proposed Concept Plan Technical Amendment and impacts on Coombs and Wright design.
18/11/09	ACTPLA Development Assessments Unit	Confirm how various provisions in the proposed Technical Amendment would be applied.
18/11/09	Various Equestrian Groups.	Discuss Equestrian groups concerns and requirements with regard to site access during and post construction.
19/11/09	Project Team attended workshop on solar access presented by The Expert Client (TEC) and ACTPLA	Recommendations of ACTPLA's Draft Solar Code to be incorporated into planning for Wright & Coombs EDP. In particular to consider for block plans and orientation.
19/11/09	Project Team met with Molonglo sustainability consultants (FWR).	FWR findings on sustainability initiative to be incorporated into planning for Coombs & Wright.
24/11/09	ACTPLA	To discuss integration with various capital works projects including John Gorton Drive, trunk infrastructure and regional stormwater detention and water quality basins.
10/12/09	ACTPLA	To discuss the Technical Amendment/Concept Plan.
11/12/09	Equestrian groups	Discuss equestrian track diversions during and post construction
14/12/09	ACTPLA	Discuss further revisions to the Technical Amendment/Concept Plan.
15/12/09	ACTPLA, Sport + Rec. and Education	To discuss requirements for primary school precinct, including oval.
11/01/10	Equestrian Association	To provide input into the Riparian Management Strategy in terms of tracks through Coombs and Wright.

COOMBS RESIDENTIAL ESTATE - EDP Design Response Report

Prepared for Land Development Agency

Date	Agency	Purpose and Outcome
13/01/10	ACTPLA	Comments provided on latest Technical Amendment (issued 23 December 09) and in particular minimum area requirements in terms of densities within precincts.
13/01/10	Chief Ministers Office	Discussions related to program for land release and Government requirements in terms of release.
28/01/10	Conservation Council, Bush on the Boundary, Southern ACT Catchment Group, Molonglo Catchment Group, Upper Murrumbidgee Catchment Committee	Wright & Coombs early design work and master plan discussion.
8/2/10	Pedal Power	Wright & Coombs early design work and master plan discussion
24/02/10	ACTPLA	Pre-lodgement meeting to discuss any Technical Amendment/Concept Plan compliance issues.
04/03/10, 11/03/10 and 12/03/10	ACTPLA	Pre-lodgement meeting to discuss required revisions to Coombs Master Plan including NCA boundary issues.
16/03/10	ACTION Buses	Meeting to discuss proposed bus routes and bus stops
13/04/10	ACTPLA	Further pre-lodgement meeting to discuss required revisions to Coombs Master Plan including NCA boundary issues.
21/04/10	ACTPLA	Meeting on John Gorton Drive interface issues.
26/04/10 (and then fortnightly - ongoing)	ACTPS	Molonglo infrastructure co-ordination meetings.
30/6/10	LAPS	Meeting to discuss Bushfire, Riparian Zone, Structure Plan & Limits of Urban Development
26/7/10	ACTPLA, TaMS, DECCEW & JACS,	ACTPLA workshop on EPBC strategic assessment for Molonglo Valley
28/7/10	DHCS	Meeting to discuss potential allocation of land for Get a life program
30/07/10	ACTPLA	Confirmation that stormwater discharge unable to drain to Coombs Ponds does not require attenuation.
5/8/2010	ACTPLA, TaMS, LAPS & DECCEW	Non potable water use in Molonglo and Lawson
18/8/10	Will Osborn (PTWL expert)	Discuss the PTWL confirmation study potential management of habitats.
20/8/10	TaMS & LAPS	Land custodianship of Wright and Coombs
16/9/10	ACTPLA & DET	To discuss size, boundaries and topography of the Molonglo school site including a brief outline of surrounding sites and any proposed works on those sites.
20/9/10	ACTPLA & LAPS	PTWL and bushfire issues for Molonglo
7&8/10/10	Canberra Organic Growers Society	Discuss the community use of the Sewer attendants Cottage in Coombs and the proposal for a Community Garden.
11/10/10	TaMS, ACTPLA, LAPS, JACS	Meeting to discuss conservation of PTWL Habitat and implementation of Bushfire mitigation measure in Molonglo.
03/11/10	ACTPLA	Meeting to discuss Coombs development area boundary.
08/11/10	LDA, ACTPLA, TaMS, JACS, DECCEW, DET, CMD, LAPS	Agency workshop on Coombs EDP.
22/11/10	TaMS	Meeting to discuss bus routes.
06/12/10	ACTPLA	Pre-lodgement meeting to discuss EDP.
31/1/11, 7/2/11, 10/2/11	Commissioner for Environment and Sustainability	Discussion regarding the possible retention of pine trees in Wright & Coombs
25/01/10	ESA	Meeting to discuss ESA requirements with regards to hydrant spacing, water pressures and laneway configurations.

Date	Agency	Purpose and Outcome
16/02/11	TAMS	Coombs EDP – Pre lodgement meeting to discuss various design requirements.
23/02/11	ACTPLA, LMP	Meeting to discuss stormwater discharge and adherence to EPBC requirements for medium and high quality PTWL habitats.
25/02/11	ACTION	Issue of Draft Public Transport Network for comment, noting the proposed PTN to be consistent with meeting outcomes to date.
08/03/11	ACTION	Confirmation on suitability of Cardno Steer Tag turning template.
01/3/11	DECCEW, JACS, ACT Fire Brigade, LAPS	Meeting to discuss Wright temp. Bushfire mitigation and Coombs OAPZ
25/02/11, 28/02/11	ACTPLA	Emails and discussion regarding definition of Road 7 in the Concept Plan and confirmation of intent for Coombs EDP.
02/05/11	TAMS	Coombs EDP – Meeting to discuss stance in dealing with TAMS EDP comments.
10/06/11 & 28/06/11	Department of Education	Coordination of school access points and general responses to EDP comments.
28/06/11	ESA	Meeting to discuss revised EDP documentation and confirm response to ESA comments.

4.2 Community Consultation

In parallel with the above stakeholder consultation, the LDA held four formalised public information sessions during December 2009 and March 2010.

The first two sessions were held on 8 and 10 December 2009 with further sessions on 1 and 4 March 2010. Formal feedback from the community was sought until the end of March 2010.

The community was invited to participate in these sessions through the following channels:

- advertisements in The Canberra Times and The Chronicle in the two weeks leading up to the sessions; notification on the LDA's Molonglo Valley website;
- telephone calls to key stakeholders by LDA staff;
- notification on the Weston Creek Community Council website; and
- a self-initiated letterbox drop by the Weston Creek Community Council.

December 2009 Public Information Sessions

The December 2009 sessions provided the community with the opportunity to review the LDA's site assessment, (opportunities and constraints), the resulting key planning principles and two preliminary designs for Wright and Coombs. Based on the site constraints and opportunities and community feedback the LDA prepared a Consultation Paper on the findings of these sessions, a summary of which is reproduced below. An updated consolidated report was also produced following the formal period of submission at the end of March 2010.

It is relevant to note that the Molonglo information sessions were spread across the afternoon and evening to ensure all interested parties had an opportunity to attend. Members of the Molonglo Valley Project Team were on hand throughout the sessions to answer questions about the draft Estate Development Plans. Representatives from ACTPLA and Roads ACT were also present to answer questions relating to other areas of Molonglo Valley's development.

At these sessions, members of the public could view a range of information including:

- site analysis;
- environmental considerations;
- sustainability (including solar access);
- factors influencing subdivision design (e.g. views, Arboretum, Stromlo Forest Park, land form and views, desire lines); and
- landscape aspirations.

Two preliminary subdivision designs were also on display offering different options for Wright and Coombs' development.

Feedback forms were provided to allow participants to give their views. Registrations of Interest forms were also available and there was significant interest from the public in purchasing land in the Molonglo Valley.

A total of 100 people provided input and feedback to the December sessions. The issues raised included:

- impact on equestrian use;
- roads and traffic;
- affordable housing;
- sustainability (solar orientation, water reuse);
- environmental issues (river corridor, habitat and species protection);
- landscape/ urban design;
- impact on Stromlo Village;
- provision of ageing in place dwellings; and
- block sizes.

The community feedback generally supported Option 2 that retained the immature Eucalypts along Coombs Ridge, and uses landmarks for way finding and connecting the majority of people in the suburb with natural features.

March 2010 Public Information Sessions

From the December community feedback the LDA further developed/refined Option 2 and in March 2010 presented 2 more options and supporting background information for community review.

The March 2010 sessions were a follow up to the December 2009 sessions and provided the community with the opportunity to view the updated planning relating to the draft Estate Development Plans for both Wright and Coombs. Matters of interest arising from the December sessions were dealt with in more detail such as the proposed means of access for equestrian groups during and post construction and the intended methods for achieving Water Sensitive Urban Design (WSUD).

Most of the focus however, was on the design for Coombs where unresolved issues were flagged, including options for solar compliance and the impact of the Molonglo River management strategy and bushfire assessment on the final EDP layout.

5 LANDSCAPE MASTER PLAN

5.1 Design Intent of Master Plan

The Design Intent of the Landscape Master Plan is to further develop the Landscape Principles of the Coombs Concept Plan. The EDP Landscape Master Plan integrates the WSUD principles of the development, street trees, landscape plantings, and built embellishments in order to provide a comprehensive streetscape and open space concept. The Landscape Master Plan concept is broken down into the following parts:

5.2 Streetscape Character

Street tree species selection provides hierarchy to the estate and provides a variety of street characters and identities.

- The overall streetscape planting theme is intended when viewed from above (Mt Stromlo) to visually represent deciduous forest groupings, similar to that of The National Arboretum Canberra and the proposed tree groupings in the Stromlo Forest Master Plan. The grouped tree species will aid in defining neighbourhood street character and have been selected with contrasting autumn colour in mind;
- The prevalence of deciduous trees positioned in the verges according to TAMS (Territory and Municipal Services) standards facilitates solar access to residential blocks, enabling residences to attain optimal energy efficiency all year round;
- Large verge-friendly Eucalypts define the primary north-south median and help to supplement existing eucalypts retained along the main ridgeline in Coombs. The north-south Eucalypt planting scheme carries through into the southern suburb of Wright and may also provide useful ecological corridors for Eucalypt-favouring wildlife;
- All paths and plantings beyond the Coombs outer roadways are future works by others. It is recommended, however, that small scattered groups of native tree planting, compliant with Asset Protection Zone requirements and viewsheds should be located along the perimeter of the site to continue the fitness trail planting scheme from Wright;
- Existing grassing within the Inner Asset Protection zone will be upgraded to slashable standards to enable hazard reduction activity.

Street tree species and locations have been conceptually developed based on detailed drawings for Wright, by Oxigen Landscape Architects and Urban Designers. Trees are specified on the Landscape Master Plan as follows:

TREE SPECIES	ROAD NUMBERS
Eucalyptus sideroxylon 'Rosea'	C07, C09, C18, C21, C23, C25, C37, C40, C52, C53
Fraxinus americana	C10, C11, C19, C36, C40, C43, C45
Fraxinus velutina	C07, C14, C19, C20, C22, C37, C41
Pistachia chinensis	C03A, C03B, C07, C13, C20, C29, C30, C35, C39
Sophora japonica	C09, C22, C27, C32
Quercus phellos	C21, C22, C24, C26
Quercus robur	C15, C16, C20, C42
Quercus palustris 'Freefall'	C03A/B, C03C/D, C04, C08W/E, C25
Quercus coccinea	C04, C10, C11, C17, C23, C44
Ulmus 'Sapporo Autumn Gold'	C07
Ulmus pumila	C51, C52, C53
Zelkova serrata	C12, C15, C31, C33, C34, C38

5.3 Parks and Open Space

Parks and Open Spaces vary in amenities depending on their size and location.

The 'Pond A', 'Pond B' and North Weston Pond areas are designed by others; however, it would be advantageous to continue landscape themes found in Coombs & Wright in these areas such as signage, trails, plantings, and furniture.

The formal parks in this Estate Development Plan are approximately 4.8ha in area and are classified as Neighbourhood Parks by TAMS. Neighbourhood Parks are typically adjacent residential areas and include playground facilities. The majority of Coombs Neighbourhood Parks contain play facilities. Each park is different in amenity but unifies the nature of Coombs & Wright:

- Local Neighbourhood Park, between of Road C28 and Road C08E: Located among mixed use, medium density buildings, this park is visible from the main roadway entry to Coombs and is bounded by arterial roads on two of its sides. In order to best take advantage of the size and situation of this park, the park's design is intended to adopt the formal atmosphere of the adjacent café precinct and blend it with sculptural play features, dining, seating, and innovative use of landscape materials and plantings. This area will also be characterised by retained and pruned existing pine stands. There is scope to locate public artwork in this open space. Site furniture and paving should be contemporary, built from high quality materials to fit in with the sculptural play design scheme. This park should be representative of a "town square" for Coombs;
- Central Neighbourhood Park, Road C40 and Road C37: This central neighbourhood park is surrounded by local roads and is set within a low density housing area. It would be advantageous to retain some existing pines (to reflect the past land use of the site) and build on their presence by incorporating informal natural play areas and play equipment with soft fall surfacing. This park will boast a varied landscape that offers a range of play opportunities in both natural and structured environments. Natural refuge areas will include exciting toddler to teenager play programming, seating, and a circuit path that ties all functions together.

There are also informal open spaces within Coombs. These informal open spaces are generally designed for pedestrian / multi-use access, drainage, and as landscape buffers. Wherever feasible, open space corridors in Coombs have been outfitted with connective pathways to ensure pedestrian, cyclist / multi-use, equestrian, and mountain bike activities are distributed across the suburb where appropriate. There are several distinct open spaces in Coombs that are not formal parks such as:

- Coombs and Wright Fitness Trail: Skirting Coombs' periphery is a future area by others intended to become a path system with native shade trees. The fitness trail will be made up of a 6m wide multi use path in the Molonglo River Corridor. This is part of a sequence of fitness equipment links into Wright's fitness trail that form a continuous loop. There will also be a future 3m wide gravel path provided by others for mountain biking and hiking in this corridor.
- Axial Open Space: Open space has been dedicated to the road C03A median and perpendicular Road C08W and Road C08E to preserve existing eucalyptus trees along ridgelines. The Road C25 open space contains a central pathway so that users can easily travel between the paths within Block AW. The C03A median is meant to be a visually dramatic corridor between John Gorton Drive and the Molonglo River as well as accentuate the natural ridgeline. This can also be used by pedestrians for north-south travel.
- Internal Park Pathways: All Parks within Coombs are designed with hierarchical off-road pathway systems that integrate into the greater paths network. An important location for directional signage will be the T-intersection of the fitness trail and the trail through the 'Pond A' open space; this where all major paths converge, especially for commuting cyclists.

5.4 Tree Management and Retention

A number of tree assessments and surveys have been completed relevant to Coombs, they are:

- ACTPLA tree study, which states there are no registered or regulated trees in Coombs;
- dsb tree study, which is a more detailed assessment of the existing eucalypts along the main ridge line;
- Molonglo Amenity Tree Assessment for Coombs and Wright suburbs, dsb study dated January 2010, that makes recommendations on the retention and staged removal of the existing eucalypts along the ridge line.

The above noted surveys are provided as Appendix E.

In summary we note the following:

- ACTPLA's tree assessment found there are no trees within the Coombs development area governed by the Tree Protection Act;
- With the exception of the eucalypts along the main ridge line the remaining vegetation within Coombs is a pest plant, *Pinus radiata*, generally 3-6m tall and not considered regulated or registered trees;
- Two stands of *pinus radiata* are proposed to be retained within urban open space areas. This is to reflect the sites natural heritage and to reflect the current visually dominant feature;
- Further details on the size and number of *pinus radiata* to be retained will be provided during detailed design. A detailed tree survey of existing pines proposed for retention will also be prepared at detailed design stage;
- Where existing eucalypts are proposed for retention, refer to Tree Management Plans, refer Sheets 180-186 and Tree Retention Plans, Sheets 154-162 provide further details.

5.5 Energy Audit

The Territory Plan – Appendix C Energy Audits of Subdivisions – Detached Residential Blocks forms the basis for this assessment.

All blocks (attached and detached) were assessed under Table 9 Criteria for Determining Block Rating. Those blocks that did not comply with the criteria (a) or (b) were assessed under criteria (c).

Each of the block ratings had further rating applied due to slope of land and aspect of block.

5.6 Zero Setbacks

In determining blocks which should have a zero setback, the following principles have been adopted:

- There are no zero blocks on N-S streets.
- Zero setbacks on blocks on E-W streets are located on the western side (unless a corner block).
- No zero setbacks to any street frontage, except on corner blocks when the street is a laneway.
- If there is no advantage in terms of energy performance then zero setbacks are avoided to allow for greater flexibility for housing product choice.

The results of the Energy Audit, refer Table 7 below, indicate that 76% of all blocks (attached and detached) in the Estate obtained a rating of 3 stars or greater. This exceeds the Territory Plan requirements as only detached block need to comply with this provision. The composite results are shown in a table on the Energy Audit. The block-by-block ratings are shown on drawing EAP 1-7.

Table 7: Energy Ratings for Coombs

Rating	Blocks	%
1	0	0
2	146	22.4
3	96	14.8
4	157	24.1
5	252	38.7
TOTALS	651	100

The Energy Guidelines assessment criteria do not assess blocks narrower than 9m. As a result all small blocks fall into the 2 star rating.

5.7 Land Use Plan

An Estate Development Plan (EMP-01) has been prepared to indicate the land use policy applicable to the site – refer also to Section 1.2 'Planning Context'.

5.8 Development Intentions Plan/Building Envelope Plan

A typical Development Intentions Plan has been prepared to show the building intent (DIP 1-7). Block typologies are shown along with indicative footprints for each single dwelling house and multi unit site.

6 ASSESSMENT OF EDP AGAINST RESIDENTIAL SUBDIVISION CODE

Element 1: Neighbourhood Design

Intent:

To provide safe, convenient, accessible and attractive neighbourhoods that meet the diverse and changing needs of the community. This encompasses offering a wide choice in good quality housing and associated community and commercial facilities, providing for local employment opportunities, encouraging walking cycling and use of public transport, minimising energy and water consumption, and promoting a sense of place through neighbourhood focal points and the creation of a distinctive identity which recognises and, where relevant, preserves the natural environment.

Element 2: Street Works

Rules / Criteria	Compliance
2.1 Functions and Structure	

Rules / Criteria	Compliance
<p>C1</p> <p>The street network has a clear structure and component streets conform to their function within the network.</p>	<p><i>Complies:</i></p> <p><i>The street network has a clear structure with roads conforming to their function in the network.</i></p> <p><i>Major and Minor Collectors Roads, Roads C03 and C04, form the main north south spines between the signalised intersections on John Gorton Drive and with East and West Coombs.</i></p> <p><i>Strong links between Roads C03 and C04 are provided within the road hierarchy by Roads C07 and C08, together with Road C20 on the eastern side of the main ridge in east Coombs (which also links east and west Coombs). These roads are higher order within the hierarchy, generally Local Access C or higher) and represent the main links carrying the majority of localised traffic. In addition these roads form the basis of the Public Transport Network through the estate.</i></p> <p><i>The higher order roads and main spine links throughout the estate are further supplemented by lower order roads (Local Access B) carrying a reduced number of vehicles typically derived from the lower density, RZ1 areas though in some isolated cases from higher density development. The lower order roads are part of a clear structure that link with the Major, Minor Collectors and Local Access C spine network and therefore provide efficient transport links to John Gorton Drive in the south.</i></p> <p><i>There are some Local Access A roads though consistent with the requirements of Table 4 from the Residential Subdivision Code these have only been nominated on roads where no through traffic can be reasonably expected.</i></p> <p><i>It is also noted that all streets link with other roads that are no more than two levels higher or lower in the hierarchy as defined by this Code with the exception of Road C28.</i></p> <p><i>Road C28 is a short (approximately 100m) street connecting Road C3 (major collector) at its western extent to Road C7 (minor collector) at its eastern extent. This access street has been geared as a local access B and is anticipated to facilitate approximately 400 vpd, of which the majority of trips are generated by MU site Section AT Block 'b' and further supplemented by traffic accessing the Local Centre. In order to deter through movements from utilising this connection, this street will be appropriately calmed through the incorporation of LATM measures such as road cushions and road narrowings, with details to be provided at the detailed design stage.</i></p> <p><i>The lower order category for Road C28, with traffic control measures, will be further developed at detailed design to provide synergy between the local centre and the open space area directly to the north.</i></p>

Rules / Criteria	Compliance
<p>R2</p> <p>The street network reflects the characteristics specified in Table 2.</p>	<p><i>Complies: The street network consists of Access Streets and Collector Streets which are based on the indicative traffic volumes and road characteristics notes in Table 2.</i></p> <p><i>There are a number of cases where the road characteristic notes determine the classification of the road instead of the indicative traffic volumes. e.g. Local Access A do not convey traffic from other areas, and the Coombs and Wright Concept Plan requires Road 3 to be a Collector Road.</i></p>
<p>2.2 Corridors and Precincts</p>	
<p>R3</p> <p>Streets within any neighbourhood do not operate as through traffic routes for externally generated traffic (other than for pedestrians, cyclists and public transport).</p>	<p><i>Complies: Externally generated traffic will be served by the John Gorton Drive, rather than through traffic movements in Coombs. The main external traffic destinations from the John Gorton Drive will generally be to the primary school precinct (including the adjoining community facilities), the Local Centre and the Molonglo River Corridor. These are not considered as through traffic routes.</i></p> <p><i>The exception to that noted above is the future link to North Weston as required by the Coombs and Wright Concept Plan. The proposed road network is consistent with the Coombs and Wright Concept Plan including the identification of key roads and their relationship to Precincts.</i></p>
<p>R4</p> <p>Connections between residential streets and arterial roads are in accordance with the requirements of Table 3.</p>	<p><i>N/A: The connections with John Gorton Drive are mandated in the Concept Plan and are to be constructed as part of the Capital Works Project</i></p>
<p>C5</p> <p>Safe and convenient links are provided for pedestrians and cyclists across transport corridors.</p>	<p><i>Complies: Signalised intersections and pedestrian underpasses are part of the John Gorton Drive Capital Works project. These crossings will provide a safe and convenient link for pedestrians and cyclists at approximately every 400m. In addition pedestrian refuges will be provided at convenient locations for the crossing of major collector roads within the Coombs Estate.</i></p>
<p>R6</p> <p>Junctions between the external roads and the internal street network are located so as to minimise restriction of movement on the roads, and to avoid traffic volumes in excess of 6000 vehicles per day (vpd) on major collector streets and 3000 vpd on minor collector streets.</p>	<p><i>Complies: The spacing of junctions between external roads and the internal street network restricts traffic volumes to less than 6,000 vpd on Roads C03A, C03B and C04 and to less than 3,000 vpd on all other minor collector streets.</i></p> <p><i>All roads have been designed to comply with Ausroads and TaMS Standards.</i></p> <p><i>See Road Hierarchy Plan (Drawing RHP 01 to 04)</i></p>
<p>2.3 Safety, Access and Convenience</p>	

Rules / Criteria	Compliance
<p>R7 Junctions are spaced as set out in Table 3.</p>	<p><i>Complies</i></p>
<p>C8 The street network creates convenient movement for residents between their homes and higher order roads</p>	<p><i>Complies: The block layout complies with this criterion and the requirements of the Concept and Structure Plans. The only element of R8 the EDP does not comply with is the maximum 1200m distance between any dwelling and the arterial road and this is because the Territory Plan locates dwellings over 1300m (in a straight line) from the Arterial Road. Otherwise the driving distance from any dwelling to the nearest collector road complies with Rule 8 and the road network provides convenient movement for residents to all other higher order roads.</i></p>
<p>R9 No more than three turning movements at intersections or junctions are required in order to travel from any home to the most convenient collector street or higher-order road.</p>	<p><i>Complies: Coomb's street design is a connective grid. This generally reduces the length of vehicle trips and requires 3 or less turning movements between all dwellings and the most convenient collector road.</i></p>
<p>R10 Proposed housing development along a movement corridor does not have direct vehicle access to an arterial road, unless there are no suitable access alternatives, in which case vehicle access on to the corridor must be able to be made in a forward direction.</p>	<p><i>Complies: There is no direct access to the arterial road from dwellings. Access to dwellings is only permitted via the internal road network (individual dwellings) and service roads (limited to high density sites).</i></p>
<p>2.4 Traffic Impacts and Residential Amenity</p>	
<p>R11 No more than 5% of dwellings have direct access to streets with the long-term maximum desirable traffic volume in excess of 3000 vpd.</p>	<p><i>Complies: No dwellings have direct driveway access to streets with traffic volumes greater than 3,000 vpd.</i></p>
<p>R12 An acoustic analysis identifies internal and external noise impacts.</p>	<p><i>Complies: GHD has undertaken a desktop assessment of the potential traffic noise impacts of the proposed John Gorton Drive on proposed adjacent residential areas.</i></p> <p><i>As stated in the EDP report the LDA is requesting a technical amendment to the concept plan to require the high density developments along John Gorton Drive to mitigate the predicted future traffic noise levels. A planning control plan that clearly identifies blocks requiring acoustic noise mitigation has been prepared and submitted as part of the EDP submission.</i></p>
<p>2.5 Functions and Width</p>	

Rules / Criteria	Compliance
<p>R13 The road cross-sections and location of utilities and driveways within verges maintain an alignment for the planting of street trees as required by Table 4.</p>	<p><i>Complies: Road reserves and driveway locations have been designed throughout the estate to accommodate all services and proposed large street tree planting in accordance with Table 4.</i></p>
<p>R14 The road network caters for the efficient provision of public utility networks including water, sewerage, stormwater, electricity, telecommunications and gas, as demonstrated by certification by relevant authorities.</p>	<p><i>Complies: all services can be fully accommodated within the road verge to meet authority requirements. See typical cross sections (Drawings TYP 01 – 06).</i></p>

Rules / Criteria	Compliance
<p>C15</p> <p>Street reserve width is sufficient to cater for all street functions, including:</p> <ul style="list-style-type: none"> a) Safe and efficient movement of all users b) Provision for parked vehicles c) Location, construction and maintenance of network utilities; d) Overland flow paths within depth and velocity safety criteria for pedestrian and vehicles e) Provision for water sensitive urban design f) Carriageway and pedestrian lighting are integrated with a tree management plan that maintains designed lighting levels over time g) Street tree planting h) Retaining walls i) Public lighting j) Pedestrian and cycle paths. 	<p><i>Complies: The proposed widths for all streets are sufficient to cater for all street functions noting:</i></p> <ul style="list-style-type: none"> a. <i>A minimum 1.5m wide footpath is proposed on both sides of streets generally to maximise pedestrian connectivity and efficiency of movements.</i> <i>On road cycle lanes have been provided along main desire lines such as Road C03 A&B and C04.</i> <i>In addition a 2.5m shared pathway is proposed on Roads C03 C&D, C07, C08 to efficiently convey cyclists and pedestrians to and from strong desire lines such as the school, local centre, River Corridor and open space areas such as North Weston Pond. 2.5m shared pathways are also nominated around the Mixed-Use Zones.</i> <i>The street network establishes a road hierarchy and traffic management that restrains vehicle speeds, deters through traffic and is appropriate for other road uses. Trafficable lanes have been designed in accordance with the Territory Plan and intersections have been designed in accordance with the relevant standards. In addition intersections along the bus routes have been designed to accommodate the requirements of ACTION buses.</i> b. <i>Indented parking has been provided in front of dwellings, along main traffic routes and adjacent to amenity. Lower order roads within the road hierarchy will accommodate informal parking within the road reserve in accordance with R32 and table 4. Parking has been provided at a rate of 1 space per 2 blocks <12.5m wide. Larger blocks with frontages greater than 12.5m accommodate visitor parking on block;</i> c. <i>Utility services, (shared trench, potable water, sewer and stormwater) have been designed with clearances nominated in keeping with the relevant standards;</i> d. <i>Road reserves have been designed to convey minor storm events via stormwater pit and pipe infrastructure. Major storm events up to and including the Q100 will be conveyed via a combination of pit and pipe and overland flow within the road reserve in keeping with the relevant standards regarding velocity depth and hazard;</i>

Rules / Criteria	Compliance
	<p>e. <i>The majority of the street verges are 7.5m wide, which allow for WSUD elements to be included in the streets. The design has included kerb watering of street trees, however the majority of WSUD measures, gross pollutant traps and bio retention areas are generally proposed at downstream discharge points and not within the road reserve;</i></p> <p>f. <i>Street trees and street lighting are proposed on a common alignment to provide an efficient verge configuration and consider clearances to services and other infrastructure. Street trees will be adequately spaced to maintain desired lighting levels and on consideration mature tree canopy;</i></p> <p>g. <i>Street tree planting has been nominated in keeping with the relevant standards and consistent with the Territory Plan;</i></p> <p>h. <i>Retaining walls are proposed within the central median of Road C03 and Road C46. The road reserves are of sufficient width to accommodate retaining walls while still maintaining adherence to the relevant standards and Territory Plan. Other retaining walls along roads 9 and 20 are not located within the road reserve, but sited either in the public open space or on blocks;</i></p> <p>i. <i>All road reserves have been designed in keeping with the relevant standards in relation to public lighting and are of sufficient width in order to accommodate street lights and associated electrical infrastructure;</i></p> <p>j. <i>A minimum 1.5m wide footpath is proposed on both sides of streets to maximise pedestrian connectivity and efficiency of movements.</i></p> <p><i>On road cycle lanes have been provided along main desire lines such as Road C03 A&B and C04. In addition a 2.5m shared pathway is proposed on Roads C03 C&D, C07, C08 to efficiently convey cyclists and pedestrians to and from strong desire lines such as the school, local centre, River Corridor and open space areas such as North Weston Pond. 2.5m shared pathways are also nominated around the Mixed-Use Zones.</i></p>

Rules / Criteria	Compliance
<p>R16</p> <p>Speed reduction devices are part of the design for the total street environment which demonstrates that:</p> <ul style="list-style-type: none"> a) Slow points, including either horizontal or vertical deflection, are designed to slow traffic to design speeds. b) Slow points and carriageway narrowings are designed to take into account the needs of cyclists, by ensuring speed compatibility, adequate space for concurrent passage or off-street diversions. c) Landscape design, on-street parking and streetscape design are used to complement speed restriction measures. d) Speed restriction techniques and devices are not used in isolation and only exist as part of an integrated traffic management solution. e) The verge, when considered in conjunction with the horizontal alignment and permitted fence, wall and other property frontage treatments, provides safe sight distances, taking into account expected vehicle speeds and pedestrian and cyclist movements. a) f) Traffic control devices are designed in accordance with national standards that take into account the access requirements for emergency vehicles. 	<p><i>Complies: The street network incorporates numerous traffic calming measures including roundabouts, four way intersections and associated priority controls coupled with speed attenuation measures.</i></p> <p><i>Complies: The proposed street network accommodates 1.5m wide on street cycle paths on major and collector roads.</i></p> <p><i>Complies: On street parking is proposed (in areas) on collector streets to assist in maintaining a low speed environment.</i></p> <p><i>Complies: As stated above a suite of speed reduction devices are proposed to provide an integrated traffic management solution that clearly conveys vehicle speeds.</i></p> <p><i>Complies: Verge widths are generally greater than those nominated in Table 4 and provide safe sight distances for vehicle, pedestrian and cycle movements. The exception being adjacent to open space areas where a reduced verge is appropriate due to limited infrastructure allocation and considering increased view corridors.</i></p> <p><i>Also Road C46 proposes a 6.15m verge though Table 4 nominated 6.25m minimum. Again this is appropriate given the allocation within the verge and the desired urban outcome – a one-way large lot dress circle. An in principal agreement has been received from TaMS and all infrastructure clearances are in line with in principal agreements from Jemena and ActewAGL.</i></p> <p><i>Complies: The detail design will ensure all traffic control devices will be in accordance with access requirements for emergency vehicles.</i></p>
<p>R17</p> <p>The impact of measures intended to restrain traffic speeds and traffic volumes take account of the needs of other road users and adjoining dwellings, by avoiding:</p> <ul style="list-style-type: none"> a) unacceptable traffic noise to adjoining dwellings b) devices that reduce convenience or safety levels for cyclists and public transport. 	<p><i>Complies: No traffic control devices are proposed that are considered to have an unacceptable impact on adjoining dwellings through traffic noise or the convenience and safety of cyclists and public transport.</i></p>
<p>R18</p> <p>Shared Use Zones comply with AUSTROADS requirements.</p>	<p><i>Complies: There are no Shared Use Zones Roads proposed in Coombs.</i></p>

Rules / Criteria	Compliance
R19 Sight distances at pedestrian and cyclist crossings and at junctions and intersections are in accordance with Part 5 Guide to Traffic Engineering Practice or its successor.	<i>Complies: Sight distance for all intersections have been tested and comply.</i>
2.6 Site Access and Width	
R20 Motorists are able to enter or reverse from a block or site in a single movement.	<i>Complies: Blocks are generally perpendicular to streets and allow sufficient manoeuvring space to enter or reverse from a block in a single movement.</i>
R21 Driveways and direct vehicle access to major collector streets and other streets that carry more than 3000 vpd are designed to require forward entry and exit of vehicles from properties.	<i>Complies: No direct access is provided to lower density blocks from roads which exceed 3,000 vpd. Access from higher density developments are required by the Territory Plan to provide forward entry and exits (Multi-unit housing code Rule 76 (d))</i>
2.7 Geometric Design	
R22 Longitudinal gradient does not exceed the gradients specified in Table 4, and street pavement cross-fall is between 2.5% and 5%.	<i>Complies: Road gradients and pavement crossfalls are in accordance with Table 4. Where a priority road has a gradient greater than 5% the intersection grading as part of detailed design will ensure that the crossfall does not exceed 5%</i>
R23 Geometric design for intersections, roundabouts and slow points are consistent with the vehicle speed and maximum design vehicle envelop intended for each street and is consistent with AUSTRROADS Guidelines and in accordance with the Australian Road Rules.	<i>Complies: The design of all intersections, roundabouts and slow points are in accordance with AUSTRROADS guidelines and the Australian Road Rules.</i>
R24 At intersections, turning vehicles are accommodated using AUSTRROADS Design Vehicles and Turning Templates to enable turns to be made in a single forward movement as follows: <ul style="list-style-type: none"> a) For turns between a major collector and a minor collector or access street, the 'design articulated vehicle' provides a turning path radius of at least 15 m in accordance with the Australian Road Rules. b) For turns between a minor collector street and access streets, the 'design heavy rigid vehicle' provides a turning path radius of at least 15 m, using any part of the pavement, in accordance with the Australian Road Rules. c) For turns between access streets, the B99 'design car' provides a turning path radius of at least 7.5 m using the correct side of the pavement only. 	<i>Complies: All turning paths and vehicles comply with Australian road rules. Refer to vehicle turning path drawings submitted as part of the EDP.</i>

Rules / Criteria	Compliance
<p>R25</p> <p>Kerb radii do not exceed desirable kerb returns in Table 4, except when required to accommodate larger vehicle turning movements in accordance with the <i>Australian Road Rules</i>.</p>	<p><i>Complies: Kerb radii do not exceed desirable kerb returns in Table 4 except where required to allow safe design vehicle movements in accordance with the Australian Road Rules.</i></p>
<p>2.8 Laneways</p>	
<p>R26</p> <p>Laneways must serve one of the following purposes:</p> <ul style="list-style-type: none"> a) Run east–west and provide small-lot rear-parking access to maximise solar access to habitable areas; b) Access multi-unit housing; c) Rear access to lots fronting busy streets; or d) Service retail and commercial areas. 	<p><i>No laneways are proposed under the EDP however community title shared driveways in Sections AO, AN, BA and BB provide rear access to terrace blocks and perform a similar function. With regards R26 we confirm the following:</i></p> <ul style="list-style-type: none"> a. <i>The community title shared driveways generally run East/West and provide rear access to small lots and maximise solar access to habitable areas.</i>
<p>C27</p> <ul style="list-style-type: none"> a) Good passive surveillance into, along and through lanes is provided; b) Continuous lines of garage doors and fences are avoided; c) Opportunities for privately maintained landscape areas are provided; d) Modifications to all code items to the satisfactions of Asset Acceptance at TAMS are addressed; e) Emergency Services Bureau supports the use of the rear lane as its primary access. 	<p><i>No laneways are proposed under the EDP however community title shared driveways in Sections AO, AN, BA and BB provide rear access to terrace blocks and perform a similar function. With regards C27 we confirm the following:</i></p> <ul style="list-style-type: none"> a. <i>Surveillance rooms have been nominated on the northern side of all community titles shared driveways to provide good passive surveillance along and through the shared driveway as well as the community titled open space areas. In addition the lanes are straight and offer unrestricted sight lines;</i> b. <i>Community titled shared driveways proposed under this EDP are all lineal elements provided rear access to terrace dwellings. The terraces are proposed in rows of no more than 6 dwellings with community titled open space areas to ensure the rear facades of dwellings are not continuous elements;</i> c. <i>Community titled open space areas have been provided to all terrace sections within community titled shared driveways (total width of 2m landscaped verges);</i> d. <i>The terrace configuration has been reviewed to the satisfaction of TAMS;</i> e. <i>ESA has given its in principal support for the community titled shared driveways configuration with formal endorsement expected as part of this EDP submission.</i>
<p>2.9 Culs-de-sac</p>	
<p>R28</p> <p>No more than 15% of lots across the entire sub division are served by culs-de-sac.</p>	<p><i>N/A: There are no culs-de-sac roads proposed within Coombs.</i></p>

Rules / Criteria	Compliance
R29 Culs-de-sac are no longer than 100 m.	<i>N/A: There are no culs-de-sac roads proposed within Coombs</i>
R30 Linking paths to adjoining areas for use by pedestrians and cyclists include lighting and allow for surveillance from the surrounding roads and private properties.	<i>Complies: Paths through sections AK, BS, BR, AI and BM will be adequately lit and allow for surveillance from the surrounding roads and properties.</i>
R31 For turning movements at the head of a cul-de-sac, sufficient area is provided for the 'design refuse vehicle' (as advised by the relevant waste collection authority) to make a three-point turn.	<i>N/A: There are no culs-de-sac roads proposed within Coombs</i>
2.10 On-street Parking	
R32 In streets where visitor parking is not provided on site, one car-parking space is provided for every two dwellings. These are located against the kerb if the carriageway width is sufficient, or in parking bays constructed within the verge and located within 60 m from the frontage of each dwelling.	<i>Complies: See parking plan (PP01 – 05) which demonstrates the proposed parking complies with this rule and the requirements of Table 4 that requires one hard standing space per two block frontages less than 12.5m.</i>
R33 The dimensions of car spaces and access comply with the requirements of AS 2890.	<i>Complies: All car spaces have been designed to comply with AS2890.</i>
2.11 Water Sensitive Urban Design	
R34 Water Sensitive Urban Design treatments are provided in accordance with the Water Ways: <i>Water Sensitive Urban Design General Code</i> .	<i>Complies: The Water Sensitive Urban Design strategy proposed meets the requirement of Water Ways: <i>Water Sensitive Urban Design General Code</i> and the Concept Plan.</i>

Element 3: Pedestrians and Cyclist Facilities

Intent:

- a) To encourage walking and cycling by providing safe, accessible, convenient and legible movement networks to destinations within and beyond the neighbourhood

Rules / Criteria	Compliance
3.1 Location and Design	
R35 Footpaths and cycle paths are provided in accordance with Table 4.	<i>Complies: All footpath and cycle paths meet or exceed the requirements of Table 4. All Streets will have 1.5m footpath on both sides of the road. 2 – 2.5m paths are provided where higher use is foreseen, with 2.5m paths provided in high amenity areas in accordance with R37 c).</i>
R36 a) Lighting is provided to paths in accordance with AS/NZ 1158; and b) A tree management plan is provided demonstrating how required lighting levels can be maintained as tree canopies develop over time.	<i>N/A - Lighting design will be undertaken as part of the detailed design and will meet these requirements. The lighting design will fully consider the proposed landscape treatment within the verge.</i>
R37 a) For collector streets on which block access is provided, pedestrian or cycle paths are provided on either side of the street and separated from the carriageway pavement. b) Minor paths, where required, are a minimum width of 1.2 m and do not exceed 10% gradient, or the gradient is no greater than any adjacent street pavement. c) Minor paths are 2.5 m minimum width in the vicinity of meeting points, schools, shops and other activity centres. d) Minimum stopping sight distances at path intersections is in accordance with AUSTRoads <i>Guide to Traffic and Engineering Practice</i> or its successor.	<i>Complies: pedestrian or cycle paths are provided on either side of the street and are separated from the carriageway pavement.</i> <i>Complies: All minor paths exceed the 1.2m minimum width and with a gradient that does not exceed the adjacent street pavement.</i> <i>Complies: Paths of 2.5m width are to be provided adjacent to shops and other activity centres.</i> <i>Complies: Minimum stopping sight distances at path intersections are in accordance with AUSTRoads Guide to Traffic and Engineering Practice.</i>
3.2 Safe Crossings	
R38 Where traffic volumes exceed 3000 vpd or speeds exceed 50 km/h, safe crossings are created with the use of pedestrian refuges, slow points, thresholds or other appropriate mechanism.	<i>Complies: Pedestrian refuges are provided for all paths crossing streets where traffic volumes exceed 3000 vpd or speeds exceed 50 km/h.</i>
R39 At potential conflict points or junctions on high-use facilities, paths are widened to a minimum width of 2.5 m to allow for passing of pedestrians and cyclists in opposite directions.	<i>Complies: See rule 37 (c).</i>

Rules / Criteria	Compliance
R40 Safe street crossings are provided for all street users with sight distances, pavement markings, warning signs and safety rails (where appropriate for cyclists) in accordance with AUSTRROADS requirements.	<i>Complies: Safe street crossing locations are to be fully incorporated into the EDP and detailed design of the estate. The EDP shows the general location of each crossing. The detailed design will further refine the designs to ensure the crossings fully comply with AUSTRROADS requirements.</i>
R41 Compliant pram and wheelchair crossings are provided where cycle and pedestrian paths intersect with kerbs.	<i>Complies: The EDP shows pram crossings at each street intersection. Detail design process will ensure they comply with standards.</i>
R42 Markings and tactile aides are provided in accordance with the relevant Australian Standard to assist sight-impaired people, the elderly and children.	<i>N/A - These will be incorporated into the detailed design.</i>

Element 4: Public Transport

Intent:

- a) To increase opportunities for choice in mode of transport, and provide cost-effective and energy-efficient public transport services that are accessible and convenient to the community

Rules / Criteria	Compliance
4.1 Bus Stop Location and Design	
R43 a) At least 90% of dwellings are within 400 m safe walking distance from an existing or potential bus route, or 200 m safe walking distance from an existing or proposed demand-responsive or community bus service route. In addition, at least 90% of dwellings are within 500 m from the nearest existing and proposed bus stop. OR b) at least 90% of dwellings are within 750 m of a high frequency trunk service bus stop that has, or is projected to provide, a minimum of eight outbound buses an hour during the morning peak.	<i>Complies: More than 90% of all dwellings are located within 400m walking distance of a proposed bus route and within 500m from the nearest bus stop.(refer to Public Transport Network & Off Road Movement Systems Plan). In addition more than 90% of dwellings are located within 750m of a high frequency trunk service bus stop on the arterial road.</i>
R44 The siting of bus stops is related to the pedestrian path network.	<i>Complies: The proposed bus stops fully consider the pedestrian path network and linkage with open space. The street grid network provides great pedestrian permeability and a variety of routes to bus stops.</i>

Rules / Criteria	Compliance
<p>R45</p> <p>Bus stops are located within 400 m of sporting, community, retail and educational facilities.</p>	<p><i>Complies: The bus stops within Coombs are located within 400m of sporting, community, retail and educational facilities, and the mixed use sites along John Gorton Drive are adjacent to high frequency stops.</i></p>
<p>R46</p> <p>Bus stops are in accordance with <i>Disability Access Standards for Public Transport</i>.</p>	<p><i>NA: Bus stops are shown on the road hierarchy plan and the detailed design will ensure they comply with the design standards.</i></p>
<p>R47</p> <p>Bus stops are designed in accordance with TaMS Design Guidelines.</p>	<p><i>NA: These requirements will be incorporated in the detailed design. Locations are shown in the EDP.</i></p>
<p>R48</p> <p>The geometry of streets identified as bus routes are suitable for turning, stopping sight distance, grade and parking requirements of buses (as determined from appropriate design documents) has a carriageway width of 7.5m or within ranges specified in Tables 4 and 5.</p>	<p><i>Complies: Bus routes meet the requirements of this rule including the use of Tag Steer buses as shown on the vehicle turning path diagrams.</i></p> <p><i>In addition, indented on street parking has been provided along the bus routes to ensure parking does not restrict bus movements. As roundabouts have an impact on block locations the EDP demonstrates that the roundabouts comply with a Tag Steer bus. Additional detail will be provided at detail design.</i></p>
<p>C49</p> <p>a) Convenient connections to adjoining areas and other public transport routes (including future routes), provide for ease of movement of buses between neighbourhoods, and link activity centres within and external to the neighbourhood.</p> <p>b) Buses are able to safely gain access to the neighbourhood and cross arterial roads without complicated turning manoeuvres when travelling between neighbourhoods.</p>	<p><i>Complies: The proposed bus routes have been discussed with Action. The location of the bus routes provide Action with the opportunity to extend the Duffy route into Wright , Coombs and North Weston or provides access directly off John Gorton Drive.</i></p> <p><i>NA - Two signalised intersections connect Coombs with John Gorton Drive. These intersection are not part of Coombs EDP but are included in the Capital Works Program</i></p>

Element 5: Public Open Space and Sporting Facilities

Intent:

- a) To provide public open space and sporting facilities as formative elements in the neighbourhood layout that meet community requirements for safe and accessible outdoor recreational space and that contribute to the community identity through landscaping, heritage and biodiversity protection.

Rules / Criteria	Compliance
5.1 Size and landform	
<p>R50 Local neighbourhood parks must have a minimum size of 0.5 ha, unencumbered by utilities infrastructure, to provide sufficient size for amenity, recreation and environmental purposes.</p>	<p><i>Complies: Local neighbourhood parks have an unencumbered area greater than 0.5ha.</i></p>
<p>R51 Pedestrian parkland serving multiple purposes (e.g. for community paths, bikepaths, stormwater, utilities and the like) achieves minimum widths as described in Table 4 and TaMS Design Standards.</p>	<p><i>Complies: The parkland in and around Coombs serves a variety of functions, including stormwater management, recreational use. The parklands also contain bikepaths and footpaths that link dwellings, river corridor, school, etc.</i></p> <p><i>Only minimum widths of paths are included in Table 4. Path widths comply with Table 4 and the construction details will comply with TaMS design standards.</i></p>
<p>R52 Open space in watercourses and drainage swales are inundated only in a storm event of greater than two-year average recurrence interval and do not present a safety hazard.</p>	<p><i>Complies: WSUD principles adopted across the site allow swales to carry low flows. These however do not present a safety hazard as all recreational open space areas associated with water courses are above 2 year storm events.</i></p>
<p>R53 Drainage swales are contoured, unfenced, grassed, and landscaped.</p>	<p><i>Complies: The Landscape Masterplan shows that the drainage swales are unfenced, grassed and landscaped.</i></p>
5.2 Accessibility	
<p>R54 Fully compliant pedestrian and cycle paths are provided to be contiguous with the on-road and off-road trunk network and achieve access through and to the open space. Service vehicle access and public parking is provided in accordance with TaMS design standards.</p>	<p><i>Compliant pedestrian and cycle paths are provided throughout the estate with on-road cycle paths provided on the main collectors.</i></p> <p><i>Service vehicle access to open spaces will be resolved as part of the detailed design.</i></p>

Rules / Criteria	Compliance
<p>R55</p> <p>Barriers and integrated landscape design prevent motor vehicle trespass onto open space in accordance with TaMS design standards</p>	<p>NA – This is a detailed design issue as it does not relate to land take, however, a combination of kerb types (Barrier and Castellated Kerbs) and landscape treatments (including stock fencing along the river corridor) will be provided to prevent vehicular access onto open spaces.</p>

Element 6: Block Layout and Building Envelope Plans

Intent:

- a) To ensure the layout and orientation of blocks achieves required energy standards and provides for attractive and safe streets and public open space

Rules / Criteria	Compliance
6.1 Section Size	
<p>C56</p> <p>a) Street and block layouts are pedestrian-friendly and provide for perimeter buildings fronting a perimeter street around sections.</p> <p>b) Where sections depths are less than 50m, details are provided about housing types, urban design and affordability objectives.</p>	<p>Complies: Street and block layouts are pedestrian friendly with the street layout in a preamble grid and paths on both sides of the road. Perimeter buildings front street around sections.</p> <p>Complies: No sections are less than 50m deep.</p>
<p>R57</p> <p>The estate includes a combination of multi-unit sites and single and two-storey attached and detached residential dwellings.</p>	<p>Complies: The dwelling types and range complies with the concept plan requirements and provides a variety of housing products.</p>
<p>R58</p> <p>Smaller blocks and blocks capable of supporting higher density are located in sections adjacent to commercial centres, public transport, or high amenity areas such as parks.</p>	<p>Complies: Smaller blocks and higher density development are located adjacent to public transport, commercial centres and parks.</p>
6.2 Solar Efficient Subdivisions	
<p>R59</p> <p>An energy audit carried out in accordance with <i>Energy Audits of Subdivisions – Detached Residential Blocks</i> (Appendix C) achieves the following:</p> <p>a) a minimum of 75% of blocks have an energy rating of three stars or above</p> <p>b) all blocks have a minimum rating of one star.</p>	<p>Complies: 75.9% of blocks are 3 stars or higher; the remaining 24.1% have a 2 star rating. The 2 star blocks are principally made up of attached terrace house, facing north/south with rear access. The current rating scheme is not designed to rate attached house products.</p>

Rules / Criteria	Compliance
<p>C60</p> <p>By applying the current building setbacks it is impossible to ensure all dwellings will not be overshadowed by their neighbour. LDA request additional setbacks from ATPLA's draft Solar Code are applied to protect solar access. All blocks comply with this document however on block controls need to be applied to ensure solar access.</p> <p>a) Demonstrate that energy efficiency and amenity considerations are achieved.</p> <p>b) Demonstrate that the private open space receives sufficient sunshine to support its intended uses, including outdoor eating, clothes drying, and growth of plants.</p>	<p><i>Complies: All detached blocks within the estate can achieve north-facing, habitable rooms with a minimum of 3 hours direct sunlight onto the floor or wall of the main daytime living area, and to 50% of the POS, between 9.00am and 3.00pm on 21 June.</i></p> <p>LDA requested additional building envelopes (R62 and R63) to be included in the Concept Plan to ensure neighbours do not overshadow their southern neighbour more than the 1.8m high boundary fence at 12 noon winter solstice (21 June).</p> <p><i>In addition LDA has designed all blocks to comply with the Draft Territory Plan Variation 306 (Single Residential Block Compliance Tables) which are designed to ensure all block achieved solar access.</i></p> <p><i>With the application of these new requirements all detached and attached blocks within the estate can achieve north-facing, habitable rooms with a minimum of 3 hours direct sunlight onto the floor or wall of the main daytime living area, and to 50% of the POS, between 9.00am and 3.00pm on 21 June. Refer to Building Envelope Plans for indicative footprints and POS location and shadow diagrams for terrace blocks.</i></p>
6.3 Multi-unit Sites	
<p>R61</p> <p>Multi-unit sites are located within 200m of a commercial zone, public transport node, or public open space.</p>	<p><i>Complies. Multi units are located within 200m of commercial zone, public transport node or public open spaces.</i></p>
<p>R62</p> <p>Sites for multi-unit development sit within a public road layout that provides similar address and frontage opportunities as the urban structure for single residential blocks.</p>	<p><i>Complies: All multi-unit sites sit within a public road layout that provides similar address and frontage opportunities as single residential blocks.</i></p>
<p>R63</p> <p>When providing access to more than four attached dwellings, shared driveways run east-west and maximise solar access to dwellings.</p>	<p><i>Complies: the attached dwellings driveways run east west and the dwellings north south. On higher density sites basement parking will be required. All dwellings are sited to</i></p>

Rules / Criteria	Compliance
	ensure living areas and private open spaces achieve good solar access.
<p>R64</p> <p>Units address public streets or open space. Continuous rear fencing along public roads is avoided.</p>	<p><i>Complies: The blocks have been designed to comply with current Territory Plan requirements for multi unit sites. The intention plans show how units can be designed to provide an internal open space with units addressing the streets. All fencing is to be in accordance with the Territory Plan, which does not permit continuous rear fencing along public roads.</i></p>
<p>R65</p> <p>Where internal private roads maintained by the body corporate accommodate more than 300 vehicle movements a day, the roads are developed with the same opportunities for on-street parking, pedestrian paths, verge landscaping and Water Sensitive Urban Design as the public roads described in Table 4.</p>	<p><i>Complies: The provision of internal roads in multi unit sites is subject to the design of each site and a separate development application from this EDP. The development intention plans show indicative layouts for multi unit sites and indicative driveway cross sections of internal driveways. These internal roads combine opportunities for on street parking, pedestrian paths, verge landscaping and WSUD with the multi unit code driveway requirements. In addition the estate has been designed to provide extensive on street parking adjacent to multiunit sites.</i></p> <p><i>The only other private road which has over 300VPD is the lane at Section AN. The amenity of the public lanes per Table 4 is less than the EDP's private lane as Table 4 does not permit lanes to provide landscaping, street trees, on-street parking, footpaths, etc. All of the private lanes have significant areas of landscaping (at the entrances and in the middle) to provide slow points and to avoid continuous lines of garage doors and fencing.</i></p>
<p>6.4 Security, Surveillance, Safety, and Amenity</p>	
<p>R66</p> <p>Where blocks adjoin streets with traffic volumes in excess of 3000 vpd, the block layout achieves one or more of the following:</p> <ul style="list-style-type: none"> a) Incorporates service roads or rear lane access adjacent to busier arterial roads; b) Uses battle-axe blocks to provide vehicle access from a side or rear street; c) Provides pedestrian access to the busy road where vehicle access is not provided; d) Arranges blocks to side onto busier streets with vehicle access from a side street; e) Where road safety standards are met, on-street parking is provided; f) Provides for forward exit from garages and driveways for larger blocks; or g) Incorporates shared driveways to garages at the rear of the blocks to facilitate exit in a forwards direction. 	<p><i>Complies: Two roads (part only C03 & C04) have predicted daily traffic volumes in excess of 3000 vpd. All road sections with predicted daily traffic volumes in excess of 3000 vpd are fronted by multi unit / mixed use sites or open space. No direct vehicular access is proposed in these locations, though appropriate pedestrian linkages and crossing points are proposed.</i></p>