Jacka
Concept Plan

January 2008

ACT Planning & Land Authority

ACT GOVERNMENT






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1 INTRODUCTION

The Jacka Concept Plan outlines the main planning and infrastructure requirements for the new suburb. The Concept Plan also identifies the important planning requirements for the suburb and matters that require further assessment in the future. These requirements will inform future more detailed (subdivision) planning associated with land release and development.

The Jacka Concept Plan has been adopted as a Planning Guideline under the Territory Plan. As such, the Concept Plan guides planning decisions and is required to be taken into consideration in detail subdivision planning and development.

Concept planning is the next stage towards development after the Variation to Territory Plan No.130 (North Gungahlin) in 2003 and provides a greater level of detail for the suburb including land uses, major infrastructure requirements, higher order road network, key features, and the suburb's boundaries.

An area in north Jacka, referred to as the Elm Grove Homestead Precinct, is currently subject to a provisional heritage registration process under the *Heritage Act 2004*. Subject to the outcome of this registration process, the Concept Plan may need to be reviewed and amended.

1.1 Site Description

Jacka is located in north Gungahlin at Canberra's northern edge as shown on Figure 1. The suburb is currently held under rural lease and lies to the north of the suburb of Amaroo and the future Horse Park Drive alignment and west of the new suburb of Bonner.

An important feature within the suburb is the Horse Park Wetlands located in the southern central part of the central valley. The Wetlands are included as part of the 1990 listing of the 'Horse Park Homestead Complex, Sedgeland and Surrounds' on the Register of the National Estate. The Wetland is an important habitat for Latham's Snipe (*Gallinargo hardwickii),* which is one of the species subject to a migratory bird treaty between the Australian, Japanese and Chinese Governments. The Wetlands and Homestead have also been nominated for inclusion on the ACT Heritage Register.

The original vegetation pattern has changed dramatically over time. Virtually all the pre-European woodland together with the understorey is cleared. There are infestations of Serrated Tussock, Phalaris and thistles in areas of the site. Only on the southern slopes and crest of the hill immediately north of the west arm of Horse Park Wetland is there some good quality secondary grassland with a reasonable forb content and relatively few weeds. The northeastern corner contains intact some of the original woodland-forest intergrade made up of understorey, mature and regenerating trees especially Red Stringybark. In the north and northwest are dense immature firewood plantations.

Further to the west are two hilltop areas containing immature and mature trees along with areas of eucalyptus plantation.

Soils are of reasonable depth on the flood-fed central flats but very shallow on the hills. A geotechnical site assessment has confirmed there are no impediments to the future residential development of Jacka.

Figure 1
Metropolitan Context

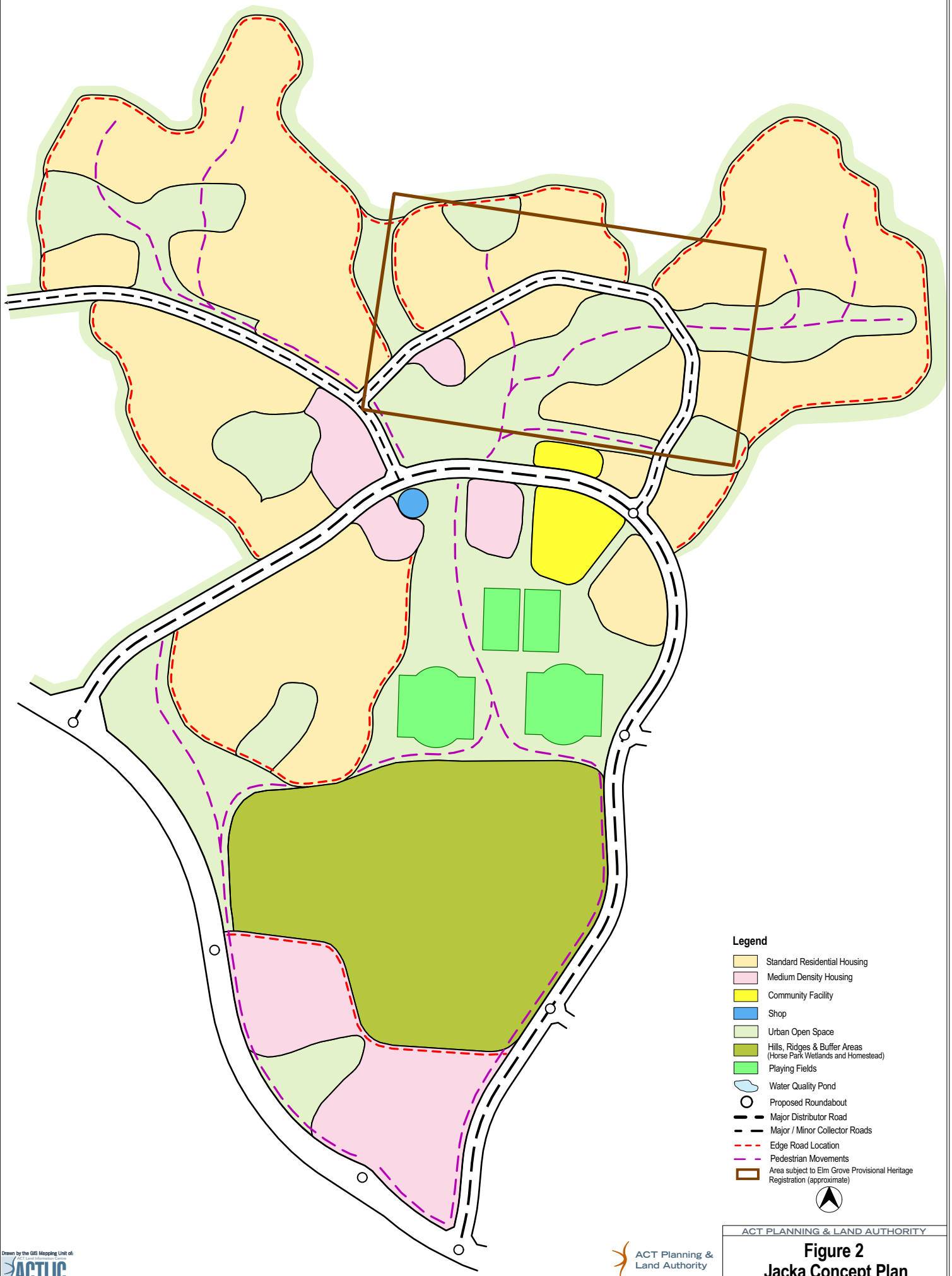
2 JACKA CONCEPT PLAN

The Concept Plan for Jacka is shown in **Figure 2**, the main elements of which are discussed below. The Concept Plan is supported by the Indicative Landscape Plan and Important Planning Requirements. Planning has produced a water sensitive ecologically sustainable urban environment that protects the Horse Park Wetlands and its associated pedoderm.

Planning Principles

A number of design principles have been adopted as part of the Jacka Concept Plan. These principles are set out below. They incorporate the relevant planning principles from Variation to the Territory Plan No. 130.

- The Horse Park Wetland and heritage precinct is to be protected by inclusion within a substantial area of Urban Open Space (generally incorporating the curtilage boundaries identified by the Register of the National Estate listing for the Wetland), which will be subject to specific planning policies and management practices. The precinct shall have high visibility but restricted access by the public. The wetlands are to be protected by the inclusion upstream of water sensitive urban design techniques.
- A "convenience" local shopping centre is to be located centrally in the suburb (with uses able to change in parallel with changing community needs) adjacent to areas of higher residential density.
- A primary school, neighbourhood oval and district playing fields are to be located upstream of the wetlands and central to the school catchment and near the local centre.
- Local bus routes to be provided through the suburb, encouraging public transport use.
- Edge roads shall be provided around the edge of residential development immediately adjacent to the suburb edge and act as a buffer between residential development and areas of open space. An edge road shall be predominantly used as a buffer where the adjoining open space contains substantial cultural heritage or environmental values and in areas identified in the bushfire risk assessment.
- To ensure the integrity of water quality and flow to the wetland area, water sensitive urban design water management measures are to be implemented in the locations identified upstream of the Horse Park Wetland. The detail design of these measures will be the subject of future hydraulic studies.
- Provide an area close to the local centre for a community facility site adjacent to the main public transport route on the distributor road.
- Provide for an urban edge trail (equestrian and other uses) around the outer edge of Jacka that will move incrementally as the urban edge develops, subject to land management and tenure arrangements.
- Provide hilltop reserves on the western ridgeline and in other strategic locations that provide opportunities for lookouts and viewsheds.



Drawn by the GIS Mapping Unit of: ACTLIC

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Figure 2
Jacka Concept Plan

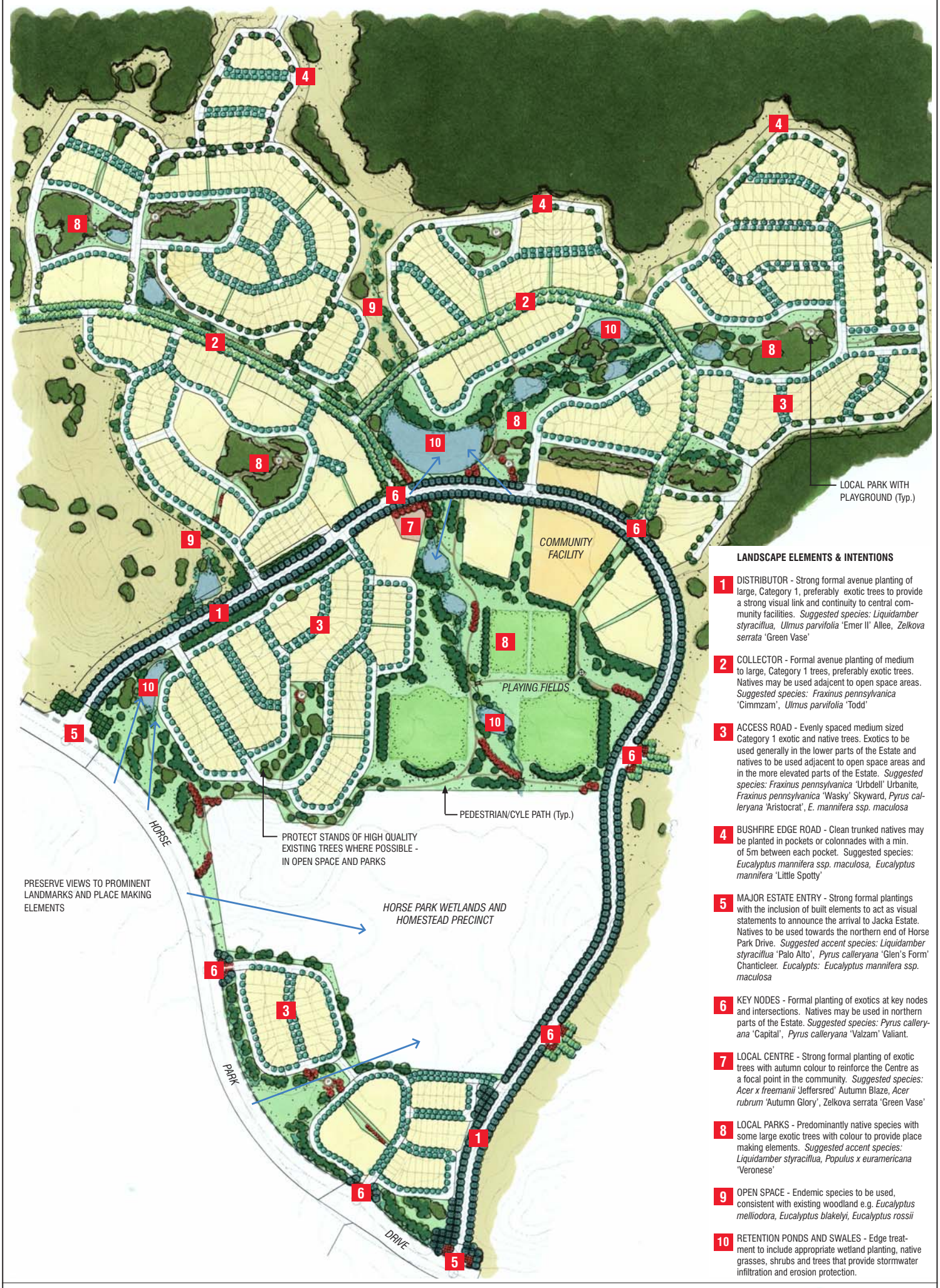
3 INDICATIVE LANDSCAPE PLAN

The Indicative Landscape Plan for Jacka recognises and responds to the planning principles of the Jacka Concept Plan and the Gungahlin Landscape Policy Plan.

The Indicative Landscape Plan (Figure 3) seeks to the show broad landscape intentions for Jacka. It responds to the existing landscape character of the site, its natural features, hydrology, aspect and context within Gungahlin and the City of Canberra. It seeks to create a place where the landscape will provide quality of life, is sustainable and provide habitat for native flora and fauna.

Specifically, the planting theme and landscape principles are:

- Strengthen the existing native landscape character through the incorporation of native plants indigenous to the area, particularly in open space areas.
- Provide visual links to the Horse Park Wetland and Heritage Precinct from major road corridors and from within the Estate to enhance the precinct's importance as a place making element.
- Incorporate remnant stands of woodland vegetation within pocket parks and open space throughout the Estate.
- Provide connections of native planting with natural open space areas within the site and beyond.
- Provide street planting that strengthens and enhances legibility of street hierarchy for all users, including local residents, visitors, emergency and support services.
- Provide planting and place-making elements to strengthen the local centre as a community focal point and to enhance sense of place.
- Provide planting and place-making elements at entry nodes to strengthen legibility and to enhance sense of place.
- Maintain visual links to other prominent landscape features within the subdivision and beyond.
- Ensure views to the broad landscape from arterial roads are maintained whilst providing appropriate buffer planting to adjacent residential areas.
- Incorporate Water Sensitive Urban Design elements such as retention ponds, swales and rainwater gardens for sustainable stormwater management and to achieve targets identified in the Waterways – Water Sensitive urban Design General Code.



LANDSCAPE ELEMENTS & INTENTIONS

1 DISTRIBUTOR - Strong formal avenue planting of large, Category 1, preferably exotic trees to provide a strong visual link and continuity to central community facilities. *Suggested species: Liquidamber styraciflua, Ulmus parvifolia* 'Emer II' Allee, *Zelkova serrata* 'Green Vase'

2 COLLECTOR - Formal avenue planting of medium to large, Category 1 trees, preferably exotic trees. Natives may be used adajcent to open space areas. *Suggested species: Fraxinus pennsylvanica* 'Cimmzam', *Ulmus parvifolia* 'Todd'

3 ACCESS ROAD - Evenly spaced medium sized Category 1 exotic and native trees. Exotics to be used generally in the lower parts of the Estate and natives to be used adjacent to open space areas and in the more elevated parts of the Estate. *Suggested species: Fraxinus pennsylvanica* 'Urbdell' Urbanite, *Fraxinus pennsylvanica* 'Wasky' Skyward, *Pyrus calleryana* 'Aristocrat', *E. mannifera ssp. maculosa*

4 BUSHFIRE EDGE ROAD - Clean trunked natives may be planted in pockets or colonnades with a min. of 5m between each pocket. Suggested species: *Eucalyptus mannifera ssp. maculosa, Eucalyptus mannifera* 'Little Spotty'

5 MAJOR ESTATE ENTRY - Strong formal plantings with the inclusion of built elements to act as visual statements to announce the arrival to Jacka Estate. Natives to be used towards the northern end of Horse Park Drive. *Suggested accent species: Liquidamber styraciflua* 'Palo Alto', *Pyrus calleryana* 'Glen's Form' Chanticleer. *Eucalypts: Eucalyptus mannifera ssp. maculosa*

6 KEY NODES - Formal planting of exotics at key nodes and intersections. Natives may be used in northern parts of the Estate. *Suggested species: Pyrus calleryana* 'Capital', *Pyrus calleryana* 'Valzam' Valiant.

7 LOCAL CENTRE - Strong formal planting of exotic trees with autumn colour to reinforce the Centre as a focal point in the community. *Suggested species: Acer x freemanii* 'Jeffersred' Autumn Blaze, *Acer rubrum* 'Autumn Glory', Zelkova serrata 'Green Vase'

8 LOCAL PARKS - Predominantly native species with some large exotic trees with colour to provide place making elements. *Suggested accent species: Liquidamber styraciflua, Populus x euramericana* 'Veronese'

9 OPEN SPACE - Endemic species to be used, consistent with existing woodland e.g. *Eucalyptus melliodora, Eucalyptus blakelyi, Eucalyptus rossii*

10 RETENTION PONDS AND SWALES - Edge treatment to include appropriate wetland planting, native grasses, shrubs and trees that provide stormwater infiltration and erosion protection.

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Figure 3

JACKA
INDICATIVE LANDSCAPE PLAN

Scale: 1:3500@A3

4 IMPORTANT PLANNING REQUIREMENTS

This section outlines the Important Planning Requirements derived for the Jacka Concept Plan that will be used as the framework for subsequent detail planning and development.

Figure 4 shows the Important Planning Requirements for the Jacka Concept Plan, and should be read in conjunction with the list of Important Planning Requirements in this section.

4.1 Dwelling Number and Housing Mix

The likely block yield for Jacka is expected to be approximately 1500 blocks. The suburb is to contain a variety in housing types including:

- Standard residential;
- medium and higher density residential (consistent with the provisions of Residential B8 and B9 Area Specific Policies of the Territory Plan);
- Compact block housing in the locations identified in the *Compact Block Housing for New Estates: Interim Territory Plan Guideline* August 2007; and
- "affordable housing" in accordance with the *Affordable Housing Action Plan*.

As a result of the concept planning process, the number of dwellings proposed for Jacka has been reduced to approximately 1500, compared to approximately 2500 dwellings identified in the Variation to the Territory Plan No. 130. The reduction in the dwelling number and the extent of developable land is principally as a result of the further heritage and environment studies undertaken as part of the concept planning process. In particular:

- the area of the Horse Park Heritage Precinct and Wetlands have increased;
- the pedoderm (a geological subsurface feature) associated with the Wetlands has been identified and protected;
- the extent of residential land around the northern perimeter of the suburb has been reduced due to topography and infrastructure servicing issues; and
- open space spines and areas through the suburb have increased.

4.2 Commercial Centre

A local commercial centre shall be constructed in the location shown on the Jacka Concept Plan and Important Planning Requirements Plan, making provision for local retail services and community facilities. The gross floor area of the retail component of the local centre shall be in the order of 500m^2.

Effective pedestrian and bicycle access will be integrated with the proposed local centre development, as will strong public transport links. Jacka Local Centre may also provide significant opportunities for the co-location of 'urban housing' (i.e. medium density multi-unit residential developments to encourage an effective mixed use character in accordance with the "urban village" concept).

The Local Centre should aim to provide convenience shopping with 'mixed use' characteristics together with other small-scale retail, office, personal service tenancies, and community uses. There is also opportunity for residential development at the upper floor level. The centre shall be designed to be flexible to accommodate the changes in community demands over time and should be supported by

concentrations of adjacent medium density housing which will foster the 'mixed use' characteristics of the area.

4.3 Recreation and Community Facilities

The Concept Plan makes provision for district sporting facilities (two basic sports units and one neighbourhood oval) within the suburb. A basic sports unit comprises two playing fields/cricket oval, where as a neighbourhood oval is smaller and comprises only two playing fields. These sporting facilities are located partly above the pedoderm, located north of the Wetlands (see below). The co-location of the sporting facilities with the pedoderm does not affect the integrity of the pedoderm or the Wetlands.

The neighbourhood oval could be enlarged to a Basic Sports Unit, if required. Furthermore, the inclusion of a fourth Basic Sports Unit may also be possible, but this would be dependent on detailed design of the central area associated with future land release and development. This sports precinct will need to accommodate a pavilion / toilet block and associated car parking. There is an opportunity for carparking to be located so as to provide additional overflow carparking for the school.

Other community and recreation facilities such as half-court basketball, tennis courts and scout hall can also be accommodated within the suburb at various locations, consistent with the Territory Plan.

A government primary school site has been reserved in the Concept Plan for Jacka, despite the likelihood of the suburb only accommodating approximately 1500 dwellings. Public schools in Gungahlin are generally serving a larger catchment size. However with land release in Jacka not expected for a number of years, the primary school will be confirmed closer to the time of land release. Government primary schools are also proposed in Bonner and Taylor.

A further community facility site of approximately 0.7ha is identified in Jacka adjacent to the distributor road and the main open space network. The use of this site shall be consistent with the Territory Plan.

4.4 Ecologically Sustainable Design (ESD) Principles

Subdivision design should demonstrate best practice ESD principles and ensure that optimum solar orientation is achieved for residential blocks. Solar access and cross ventilation should be provided in the built form, together with habitable spaces being designed to maximise views.

4.5 Open Space

The Jacka Concept Plan contains a hierarchy of open spaces totalling approximately 73 ha serving different purposes. The total open space network in and adjacent to Jacka acts as part of the WSUD Strategy and acts as a structural element, contributing to sustainability as well as providing an important resource and visual amenity for future residents.

The main elements in the open space network include:

- Non-urban land (Hills, Ridges & Buffer Areas Land Use Policy) on the western ridge and northern creek line that provide habitat and visual backdrop to Jacka. This may in time be available for public recreation as part of a regional open space network in Gungahlin, subject to resolution of land management and tenure.
- Urban Open Space including the pedoderm, district sporting facilities and several small parks incorporating significant trees.

- Sustainable urban stormwater management system where overland stormwater and flood movements are accommodated predominantly in road reservations and within the open space system.
- Hilltops that are reserved for public open space.
- Park edge roads to separate urban open spaces from areas of residential and other development.
- Management in accordance with the requirements of the bushfire risk assessment including internal urban open spaces as well as the protection of Asset Protection Zones as specified at the urban edge in the bushfire risk assessment.

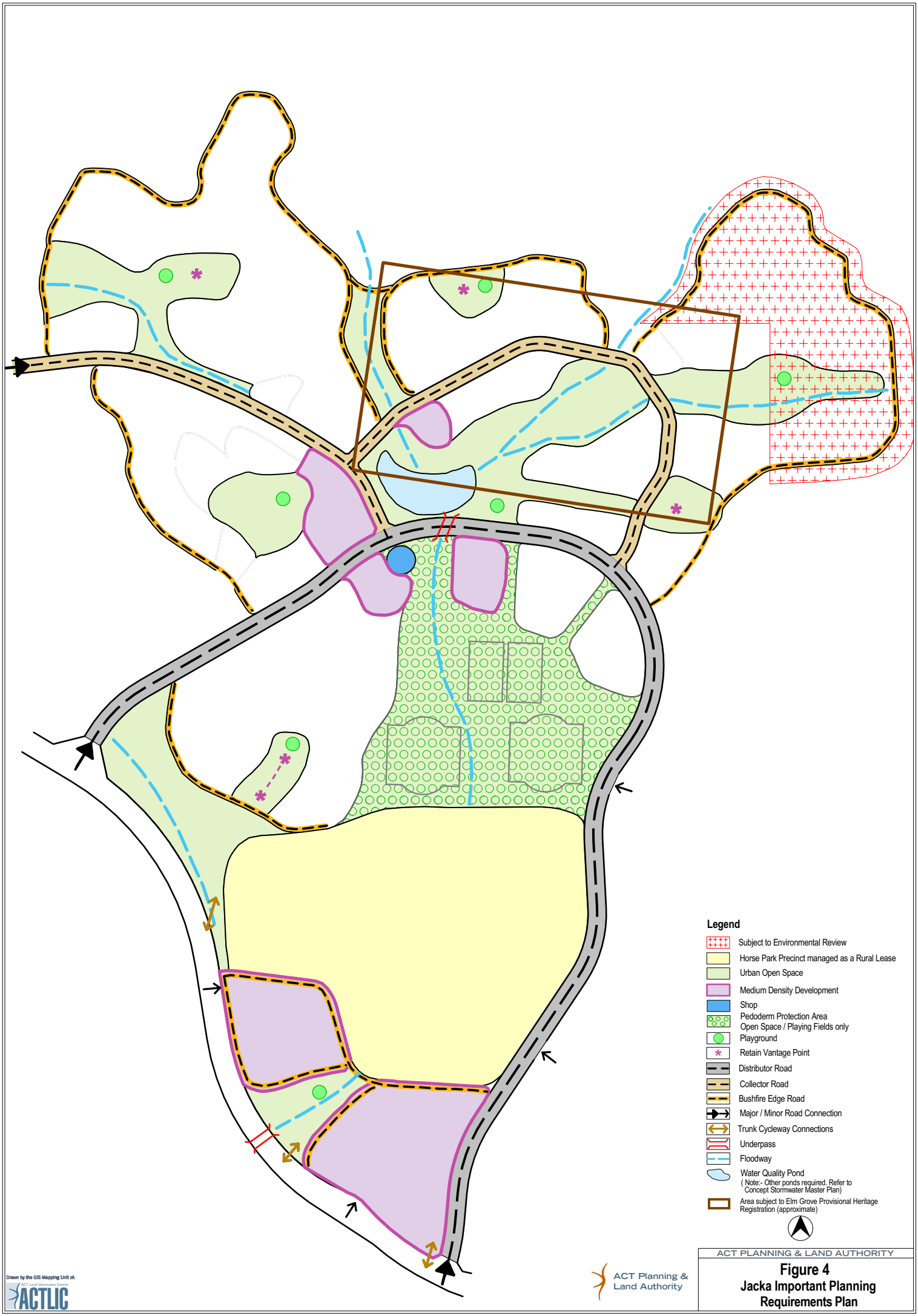
Preservation of the vistas from the ridge immediately to the north west of the Wetland Heritage Precinct, the knoll at the northern central end of the central valley, and other vantage points are required. Public access to these areas as parks within the Urban Open Space system for the suburb is required.

4.6 Environment

4.6.1 Environment Assessment

An environment assessment was undertaken for the suburb and the following recommendations made and are incorporated into the Concept Plan, where appropriate:

1. Remnant and regenerating woodland trees should be retained within the urban infrastructure where it is prudent, possible and feasible to do so. A stand in the northwest area of the site should be incorporated into an area of open space.
2. Further consideration is given to the conservation of the Red Stringybark occurrence in the NE corner of the suburb.
3. Small area of secondary grassland situated adjoining and to the north of the Wetland lease be incorporated into the wetland lease.
4. Major and minor open space corridors within the urban area be planted with local and regional native species.
5. Mature woodland trees be retained wherever practicable on the site.
6. Avenue of trees along the Horse Park – Elm Grove boundary be retained and used as the basis for an east-west corridor through the suburb.
7. Major hilltops and ridges be retained as urban open space.
8. Appropriate precautions to control the spread of the Serrated Tussock, including containing all fill to the site, be established prior to, during and post the construction phase.
9. Consideration should be given to extending the Forde and Bonner cat containment requirements to Jacka.



4.6.2 Tree Protection

A detailed tree survey and assessment has been undertaken that identifies individual trees and tree groups in the suburb. The Concept Plan retains all 'exceptional' value trees in open space and almost all the 'high' value trees in open space, road reservations and within larger blocks. However, the issue of tree retention and removal consistent with the requirements of the *Tree Protection Act 2005* will be considered further at the detail subdivision stage and as part of the estate development plan (subdivision) development application.

4.7 Horse Park Heritage Precinct Management

It is recommended that the Wetlands and homestead within the Horse Park Heritage Precinct be managed as a rural lease within a Hills, Ridges & Buffer Areas Land Use Policy under the Territory Plan to reflect tenure arrangements. It is also recommended that the Precinct has a minimum area as shown in the Concept Plan and is to be managed under a Conservation Management Agreement agreed by all relevant parties. The protection of the pedoderm and the Wetlands are paramount.

4.8 Horse Park Wetlands and Pedoderm

A specific environmental assessment was undertaken for the Horse Park Wetland. The study provided a description of the existing condition of Horse Park Wetland, determined the possible effects on the wetland from urban development and outlined measures to minimise any adverse impacts from the development of Jacka. The outcomes of this assessment have been incorporated into the Concept Plan.

An analysis of wetland drainage and morphology identified a major pedoderm system within the valley upstream of the wetland, having significance stormwater storage and flow attenuation capacity (see Figure 5). This system explains the substantial absence of drainage channels though the valley zones. A pedoderm is a region of gravels and sandy clays lying between residual surface soils and bedrocks. This pedoderm variers in thickness from 0.5 metres to around 3.0 metres.

The scale of this groundwater system and its values, significantly influenced planning for the suburb and management opportunities and constrains, particularly in respect to Water Sensitive Urban Design (WSUD) based urban development. The analysis also established the seepage slope basis of the wetland, making it perhaps a unique wetland system in the ACT region.

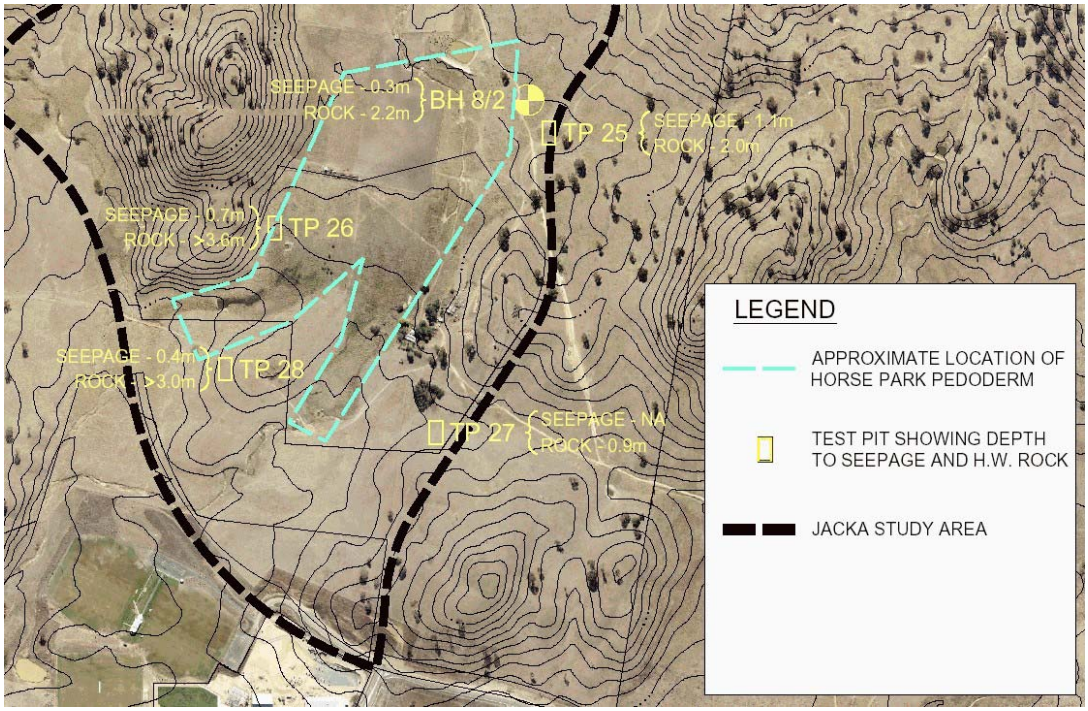
The pedoderm basin immediately upstream of the wetland is integral to its sustainability and structure. The basin, through its significant water storage and flow attenuation capacity, ensures that some 95% of catchment discharge is by seepage into the wetland zone, and sustains slow release of water storage (maintenance of seepage within the wetland zone) through extended dry periods.

The retention of the pedoderm together with the WSUD based development approach provides a significant buffer protecting the wetland in terms of attenuation of major storm discharges and interception of water pollutants.

Uses such as playing fields are permitted above the pedoderm. However, no deep trenched infrastructure servicing is permitted to intrude into or across the pedoderm. If infrastructure services are required, they are to be located in the transition areas between the pedoderm and the change of slope.

To ensure that the integrity of the Wetlands and Pedoderm are maintained and protected, a number of future recommendations are identified in Section 5, below.

Figure 5 Location of the Pedoderm



4.9 Contamination

A contamination assessment has been undertaken for the Concept Plan. The assessment concluded that soil and groundwater are likely to be contaminated at a number of sites and that a detailed soil and groundwater analysis must be undertaken in accordance with ACT Government policy and appropriate remedial action taken at the time of land release. This is to include each of the three sheep dip sites, sites adjacent to the two septic systems located adjacent to 'Horse Park' homestead and the 'Elm Grove' cottage together with the respective farm machinery and storage sheds.

4.10 Heritage

A preliminary cultural heritage assessment has been undertaken as part of the Concept Plan. The heritage assessment contains a number of recommendations for investigation and management of particular sites.

Aboriginal and European heritage sites within the Horse Park Heritage Precinct are to be retained in accordance with the current Conservation Management Agreement. All other sites within Jacka are to be preserved within open space, wherever possible.

An additional heritage assessment will be required to be undertaken ahead of land release and development and any actions that may impact upon heritage items shall be carried out to the satisfaction of the Authority and Heritage ACT.

4.10.1 Elm Grove Homestead Precinct

A heritage nomination has been made for the Elm Grove property, located in north Jacka. On 2 August 2007, the ACT Heritage Council accepted the nomination for provisional heritage registration of part of the Elm Grove property (i.e. Elm Grove Homestead Precinct). The Precinct represents approximately 36 hectares.

Consistent with the statutory requirements of the *Heritage Act 2004*, provisional registration for the Elm Grove Homestead Precinct commenced on 7 August 2007. The decision by the Heritage Council on whether the provisional heritage registration will progress to full registration is pending.

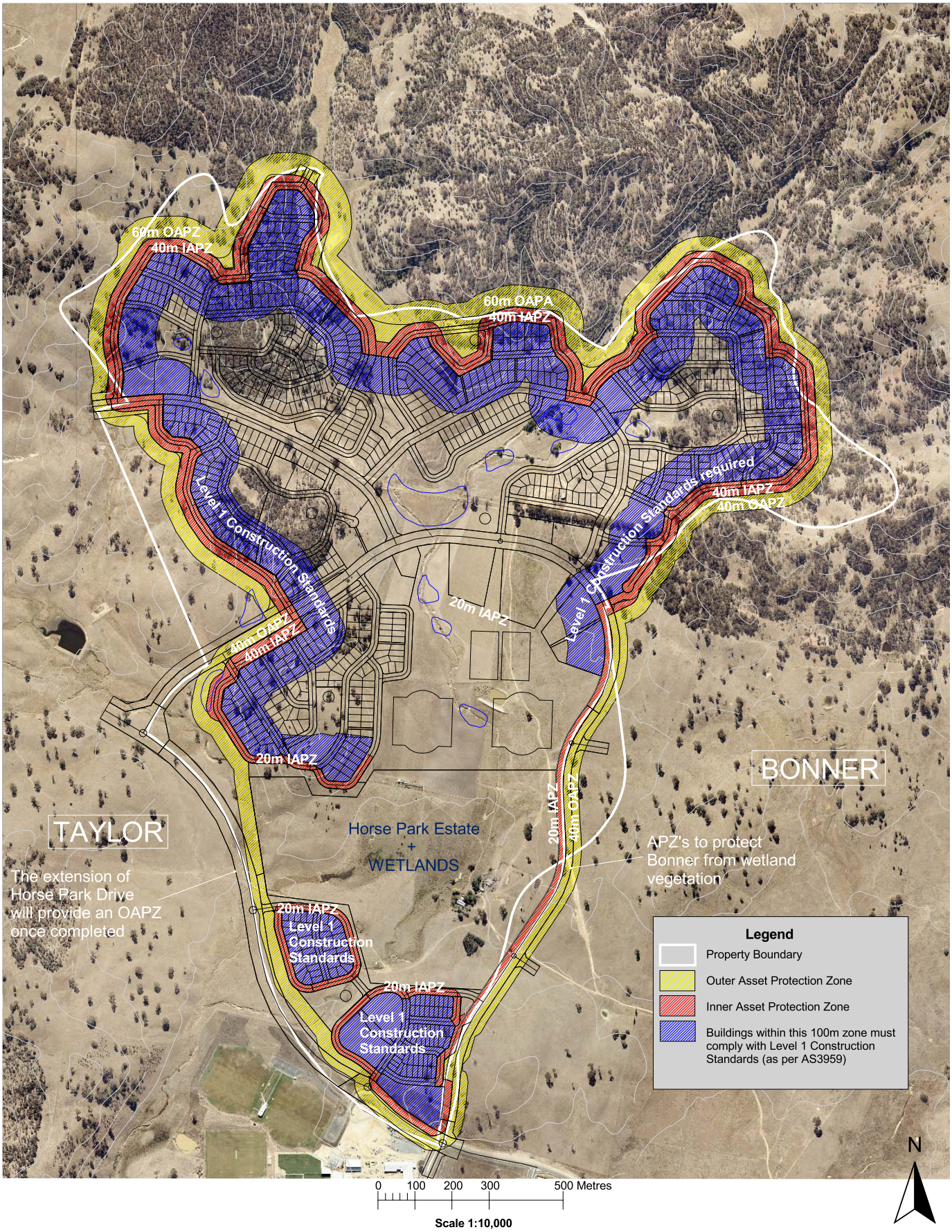
Subject to the outcome of this registration process, the Concept Plan may need to be reviewed and amended.

4.11 Bushfire Risk Assessment

A bushfire risk assessment was carried out as part of the preparation of the Concept Plan. The required bushfire risk mitigation measures that are recommended for Jacka are:

- Outer Asset Protection Zone – 40 to 60 metres;
- Inner Asset Protection Zone – 20 to 40 metres; and
- House Asset Protection Zone (buildings to comply with Level 1 construction under AS3959) – 100 metres into the suburb.

In addition, a road system capable of providing safe and efficient access and egress in times of emergencies should also be established. The mitigation measures are graphically described in Figure 6. A further bushfire risk assessment will be required to support the estate development plan (subdivision) development application.



CONACHER TRAVERS

Bushfire & Environmental Consultants

Building 40 The Avenue, Mt Penang Gardens
Pacific Highway Somersby NSW 2250
Ph (02) 4340 0677 Fax (02) 4340 2367
e-mail: bushfire@conachertravers.com.au

Figure 6

Bushfire Protection Measures - Jacka

Ver.S3
21/06/05
Ref.No.4469

Source: ACT Planning and Land Authority

4.12 Movement Network

4.12.1 Road Hierarchy

Jacka is to be accessed by one main distributor road with two intersections with Horse Park Drive. A major collector road will connect this main distributor with the future suburb of Taylor to the west. Two additional minor road connections are permitted to Horse Park Drive at the southern end of the suburb below the Wetland. Other minor road connections off the main distributor and major collector roads will service the suburb. Allowance is to be made for connection from Bonner in two locations on the major distributor road.

The road network and hierarchy has been laid out to provide accessibility, connectivity and legibility. There is an orderly progression into the suburb using distributor and then collector roads before arriving at the local access streets.

4.12.2 Intersection Controls

Key intersection controls for Jacka are:

- The intersection of the eastern end of the distributor with Horse Park Drive will be signalised, even though the expected traffic volumes could be managed by a roundabout solution. Traffic lights are preferred at this intersection due to its proximity to the Amaroo School and the future Group Centre as they provide improved and safe pedestrian crossing opportunities.
- Other intersections along Horse Park Drive are expected to be roundabouts.
- On the distributor road there is to be roundabouts on the intersections at each side of the school site to help 'gate' the 40kmph school zone.
- Also on the distributor road there is to be a roundabout with the collector road near the local centre and with the two collector roads that provide access into Bonner.

All other intersections are to be uncontrolled.

4.12.3 Underpasses

It is proposed to provide an underpass on the main watercourse under the distributor road, near the local centre. This will offer safe access for residents in the northern half of the suburb to reach the local centre, the school and the large playing field site, plus allow commuter cyclists to continue along an off-road trunk cycle path that would join the rest of the Gungahlin trunk cycleway network.

Horse Park Drive should be graded to allow for another pedestrian underpass in association with the main watercourse downstream from the Horse Park Wetlands.

4.12.4 Pedestrian and Bicycle Network

Pedestrian and off-road cycling facilities are required to be implemented in accordance with the Master Plan for Trunk Cycling and Walking Path Infrastructure and the North Gungahlin Structure Plan review incorporated into Variation to the Territory Plan No. 130.

There is to be a trunk community path (off-road) that follows the central spine through Jacka to the north from Horse Park Drive avoiding the Horse Park Wetland and Heritage Precinct. There is ample opportunities for lesser paths along the main distributor road and collector road network in Jacka. A

trunk off-road community path is also identified to be implemented along the Jacka side of Horse Park Drive. It should incorporate opportunities to utilise an alignment through adjacent urban open space identified in the Concept Plan if appropriate.

Trunk cycleway connections are to be provided to connect to main trunk cycleways.

4.12.5 Public Transport

Bus routes are intended to use the Distributor and Collector roads. Actual bus routes and the location of bus stops will be determined by ACTION. The proposed routes should:

- Be within 400 metres of most residents.
- Provide access to the local centre, the Amaroo Group Centre and commuter routes to Gungahlin Town Centre and Civic.
- Provide for easy movement of buses through incorporation of a 12.5 metre turning radius at all intersections along possible bus routes.

4.13 Engineering Services

4.13.1 Water Supply

Jacka is split between the intermediate (TWL 685.0) and the high water (TWL 715.0) supply pressure zones.

The intermediate zone is currently serviceable through the Nicholls Reservoir but there may be some height development restrictions until a second intermediate one reservoir known as Elmgrove 1 is built just north of Bonner. A 450mm diameter will run from the northern collector road into Bonner and follow the Distributor road through Jacka and back to Horse Park Drive to join back into the remainder of the Gungahlin intermediate system. There will be two minor loops off this main with the remaining pipes being 100 and 150mm diameter pipes.

The high water zone (TWL 720) will be serviced by the future Elmgrove 2 reservoir, which will be located on the same ridge as Elmgrove 1 between Bonner and Jacka but at the necessary higher elevation. A 300mm main will run through the northern part of Bonner to the Jacka Distributor road and then along the eastern edge road to roughly midway into the suburb's high pressure zone before turning west. This 300mm main will continue in a generally westward direction to the western edge road before turning south to meet the Collector road and continuing onto the suburb of Taylor. The proposed alignment is not the most direct route but it does run along some bush fire edge roads and close to others thus providing fire fighters with a much larger volume of water with which they can use their booster pumps to such the water out of the pipes. Minor loops off this main will also be provided as required.

4.13.2 Sewer

Currently there is an existing 600mm trunk sewer main following the watercourse beside Mirrabei Drive to the north western end of Amaroo where it splits into a 375mm trunk main to service Ngunnawal and a 150mm local main to service housing in Amaroo. There is also a150mm main below the Amaroo District playing fields, which flows south to the Amaroo School. The existing sewer at Mirribei Drive will need to be extended (in 525mm diameter) up to Horse Park Drive, as this section of sewer is not yet constructed

The existing 600mm trunk sewer main will have sufficient capacity to service all the future suburbs in its catchment including Jacka. The two 150mm mains are unsuitable to service Jacka due to a lack of capacity.

The sewer concept design is relatively straight forward with the reticulation system generally following the existing watercourses. The Concept Plan provides for all blocks to be serviced by gravity sewers and no pumping will be required.

The existing trunk sewer connection lies near the current Amaroo Playing Fields, south of Horse Park Drive. Connection to this sewer will involve laying trunk sewers around the Horse Park Wetlands Pedoderm. The extent of the pedoderm is indicated by the dashed blue on the hydraulics figures. These trunk sewers will need to pass through the Horse Park Heritage Management zone. In the case of the eastern trunk sewer, the alignment will probably have to run to the east of the homestead requiring trench depths up to 4 metres.

Trench bulk heads will be needed to reduce the risk of the pedoderm groundwater draining out through the trench bedding or backfill material.

4.13.3 Stormwater

The only stormwater infrastructure in the Jacka are farm dams and roof water tanks associated with the two existing homesteads.

There are two principle catchments covering Jacka. These are:

- The western catchment that mainly drains the Taylor area plus 53.8 ha of Jacka or 19% of the study area.
- The remaining 224.5 ha of Jacka plus the northern broadacre and northern ridges to the NSW border plus the western part of wetlands.

There are two principle creek systems, which drain the larger catchment, which are a north western watercourse, which also drains the north eastern watercourse. These watercourses combine in the centre of Jacka and then continue to flow southward into the pedoderm and then to the Horse Park wetlands.

Stormwater will be managed using the latest techniques of water sensitive urban design (WSUD) and will integrated. This will include:

- Peak or flood flow control;
- Water quality management;
- Daily flow pattern management; and
- Conservation and reuse of all water resources.

WSUD is very important for this suburb given that the Horse Park Wetlands is immediately downstream of the bulk of the suburb. The Wetland is a relatively intact example of a wetland plant association of sedges and rushes. The wetland is also distinctive in that it is a ground water-dependent system, whereas most others in the region are basin type wetlands.

4.13.4 Electricity

Power to the ACT is drawn from the TransGrid Canberra 330kV substation near Parkwood and the Queanbeyan 132kV station in Oaks Estate. From the Parkwood substation electricity is transported via ActewAGL's 132kV sub transmission lines to the Gungahlin zone substation off Mirrabei Drive.

At the zone substation the electricity voltage will be reduced from 132kV or 66kV to 11kV and distributed through feeders to distribution substations, which in turn reduce voltage to 415V (3 phase) for distribution through the low voltage (240V) network to future users in Jacka.

4.13.5 Telecommunications

Communication infrastructure will be provided as required to service Jacka.

4.13.6 Gas

Gas infrastructure will be provided as required to service Jacka.

4.14 Indicative Development Staging

The indicative expected development staging for Jacka is shown on Figure 7 and is based on the provision of water infrastructure for stages later than Stage 1. It indicates:

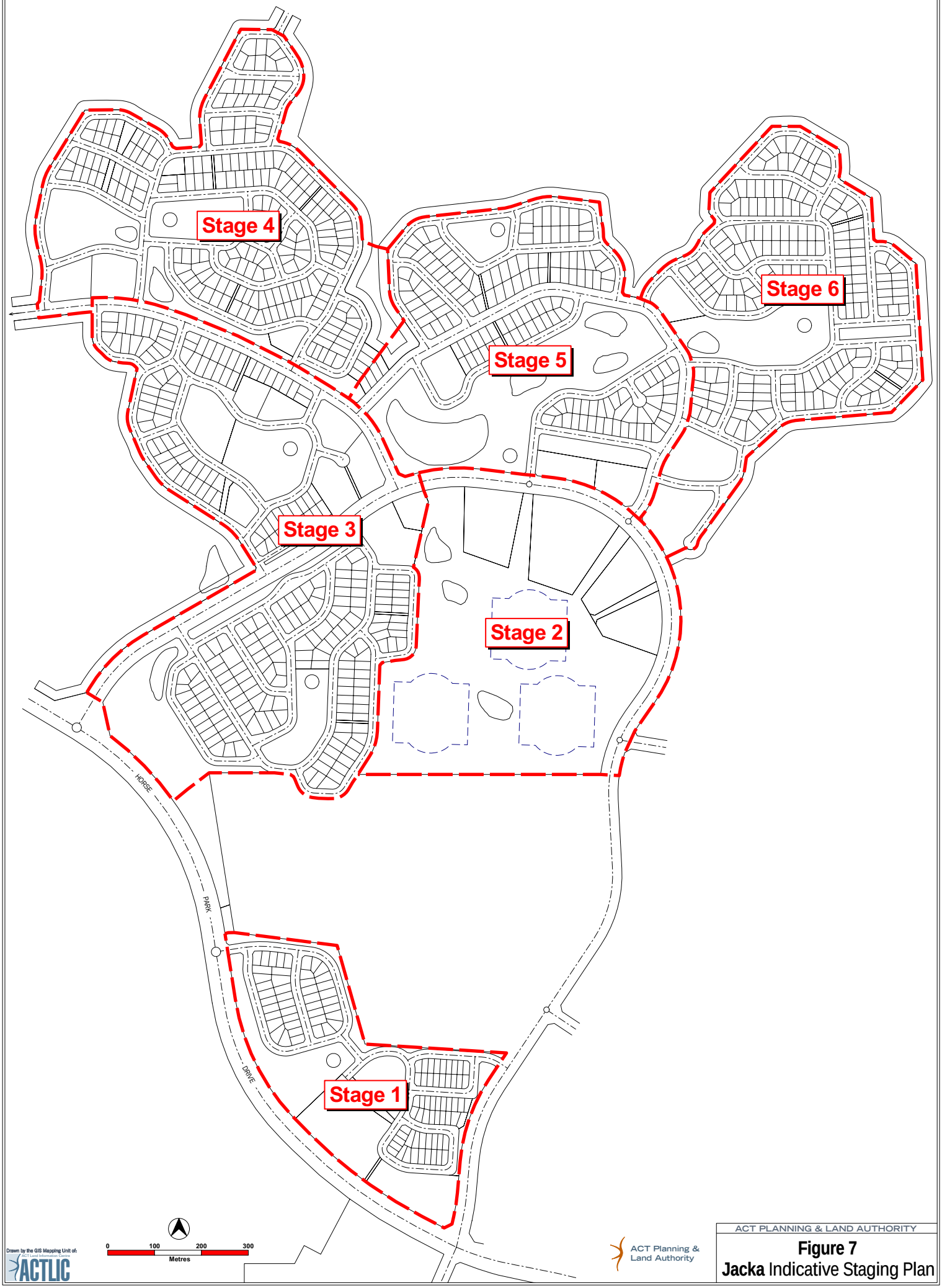
- Stage 1 – the land south of the Horse Park Wetland shown in the Concept Plan as medium density housing. It is opposite the Amaroo Group Centre and Amaroo school precinct. This area is higher density to support the group centre and is on a major transport route. This section can generally be serviced via existing infrastructure.

- Stage 2 – the area south of the main distributor road and to the east containing the flatter land associated with the pedoderm, playing fields, the possible school and medium density housing. This stage is dependent on extension of the major distributor between Jacka and Bonner, and measures in the central valley to protect the wetland and pedoderm.

- Stage 3 – the areas to the south of the main distributor road in Jacka and generally in the central western area of the suburb to the south of the main collector road linking Jacka to Taylor. This stage is dependent on completion of the Elmgrove 1 reservoir to provide water supply.

- Stages 4-6 – generally the remaining area north of the main collector road linking Jacka to Taylor and the area north of the main distributor road through Jacka. These stages require completion of the Elmgrove 2 reservoir to provide water supply. These stages are also identified to be developed after the southern half of Taylor is developed.

Final staging will depend on more detailed consideration of land parcels, methods of release, timing for other land releases, and the provision of infrastructure whether included in development packages, off-site works or capital works.



ACT PLANNING & LAND AUTHORITY

Figure 7

Jacka Indicative Staging Plan

4.15 Urban Edge Treatment

All residential areas in Jacka north of the main distributor road are to contain an urban edge road separating the residential areas from non-urban areas. South of the distributor road, all residential areas west and south of the Wetland are to be designed as for development north of the road. The identified areas of multi-unit housing adjacent to the possible school site shall take all design steps necessary to minimise the bushfire risk to the required standards.

Urban edge roads are to be designed as Bushfire Edge roads where they separate urban from non-urban areas and where they abut Urban Open Space within the suburb.

Bushfire Edge Roads shall be designed to accommodate emergency services vehicles for fire fighting purposes, and meet the following current criteria:

- A minimum un-obstructed sealed road width of 7.5m to allow for passing of two fire trucks;
- 7.5m verge adjacent to housing, with street planting on the house side only;
- A concrete edge incorporating gutter with minimum 2m width on the fire edge or non-urban edge of the road;
- Any areas to be travelled by fire truck shall be of sufficient strength to accommodate a 15 tonne load and allow for turning circles of a 12.5m truck; and
- Access to hydrants, including parking of emergency services vehicles, shall be provided and may include suitable access points to emergency services tracks, lay-by parking, and hardstand or reinforced ground areas for tanker filling at hydrants.

5 FURTHER INVESTIGATIONS

Prior to detail planning and development of the suburb, further detail investigations are required to be undertaken that are beyond the scope of the Concept Plan. These include:

5.1 Heritage

An archaeological investigation of Jacka shall be undertaken to determine the location and conservation value of any unregistered aboriginal sites and PADs. In order to undertake these investigations, an archaeologist will be required to submit a methodology for investigating these PADs to the Heritage Council who, in consultation with the relevant Aboriginal Organisations, will need to endorse the proposal prior to giving approval for the archaeological work to begin.

5.2 Contamination Assessment

An accredited auditor should be engaged to review the known contamination information and provided advise on the suitability or otherwise of the site for the proposed uses. Based on the information supplied on the past activities at the site a further review may be required.

A Site Contamination Assessment Report shall be prepared and provided to the Environmental Protection Agency (Territory and Municipal Service) for assessment and endorsement prior to development works commencing or be incorporated in the development plans for the subdivision. Any contaminated fill shall be removed.

5.3 Geotechnical

A detailed geotechnical investigation shall be carried out once road and block layouts are finalised to ensure that subsurface conditions will not adversely affect the construction of infrastructure within the estate. The investigation is to include determination of the extent of the Horse Park Wetland pedoderm.

5.4 Stormwater

Water Sensitive Urban Design measures adopted within the suburb shall be investigated in detail to determine that the infrastructure sizes proposed shall not adversely affect any other infrastructure including the Horse Park Wetland, pedoderm or private property, prior to finalisation of the road and block layout for incorporating into the Estate Development Plan.

5.5 Housing for the Elderly

An assessment of the specific demand for the provision of housing for the elderly within Jacka should be undertaken closer to the date of land release to determine if any sites are required.

5.6 Bushfire Risk Assessment

A further Bushfire Risk Assessment shall be undertaken at the preparation of the Estate Development Plan and the outcomes incorporated into the design to the satisfaction of the Territory. The assessment is to detail any incremental bushfire risk mitigation measures to be implemented during the staging of the development.

5.7 Environmental Assessment

A further review of environmental values is required closer to the time of land development for as a minimum the area shown on the Important Planning Requirements Plan in the northeast corner of Jacka. The review is to specifically address the quality of the regenerating Red Stringybark/Scribbly Gum/Brittle Gum community and the likely impacts from development. In addition, it is to address the best method of retaining the integrity of any part of the community recommended as necessary while allowing residential development in suitable forms.

5.8 Horse Park Wetlands and Pedoderm

It is recommended that a review be undertaken to improve the management regimes for the Horse Park Wetland including a geotechnical determination of the extent of the pedoderm. Other investigations that could be undertaken include:

- Implementing field experiments for control of phalaris and consider possible replacement with common reed.
- Monitoring wetland hydrology before development and modelling the spatial wetland dynamics under different groundwater regimes as necessary.
- Assessing the soil seed bank for weeds and wetland species, especially if spatial change in groundwater seepage is likely or the hydroperiod is seasonally adjusted.
- Commissioning a field survey for a full plant species list and refined vegetation mapping as a baseline. Include a detailed analysis of historical change in vegetation to assess rainfall and stocking effects. These investigations should result in a clearer description of vegetation potential for the wetland.
- Re-commencing surveys of Latham's snipe and analyse the data collected between 1994 and 2000. Map the distribution of habitat elements for snipe e.g. location of channels and seasonally waterlogged areas, cover quality and continuity. Consider spatial fluctuations in these requirements arising from climate and urban development.
- Establishing a water quality monitoring and assessment program to help understand and detect environmental changes over time.
- Establishing ongoing monitoring of habitat and frogs.
- Monitoring of groundwater levels through Piezometers in the Wetland, the recognised Pedoderm area and upstream creek lines is required to be undertaken in an on-going program up to the final release of all or part of Jacka for development.

5.9 Elm Grove Heritage Precinct

If the Heritage Council decides to fully register the Elm Grove Homestead Precinct, the concept plan and all the associated studies will need to be fully reviewed and updated.

6 OFF-SITE WORKS OR CAPITAL WORKS

Off-site or capital works items will be required to implement the Jacka Concept Plan and ultimately the development of Jacka. These items include:

- The Extension of Horse Park Drive including the four intersections complete with traffic controls from Jacka to Horse Park Drive, the underpass on the eastern arm of the Wetland and drainage culvert on the western arm of the Wetland. Two of these are major intersections while the other two are minor intersections into medium density housing areas immediately south of the Horse Park Wetland;

- Provision of the major water quality pond at the confluence of the two arms of the creek north of the main distributor road;

- The provision of three District Level Playing Fields together with the provision of a "chain-of-ponds" stormwater management treatment of the main creek upstream of the pedoderm associated with the Wetland and south of the main distributor road; and

- Provision of the main distributor road complete with traffic intersections and traffic controls.