



Risk Management
Community Safety
Wildfire Protection
Project Management

Bushfire management plan

Lots 503-505, 507 and 900

Johnson Road Wellard

City of Kwinana



24 July 2016

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ICS Group

ICS Group specialises in risk and emergency management, wildfire protection and community safety. It provides consultancy services in fire preparedness and response planning, wildfire investigation, wildfire behaviour research and fire impact assessment.

Klaus Braun

Klaus Braun, the principal of ICS Group, has completed wildfire risk management and wildfire behaviour projects for State and Local Governments, conservation organisations, as well as for corporate clients within the land development, plantation and insurance industries. He assisted with the Council of Australian Governments National Inquiry on Bushfire Mitigation and Management (COAG, 2004), and conducted research in wildfire behaviour and impact in blue gum plantations in Australia and Portugal.

Klaus Braun presented papers on wildfire risk management at State, National and International conferences.

Prior to forming the ICS Group, Klaus has worked as Manager Wildfire Prevention and Environment Branch, Operations Manager, Regional Fire Safety Officer with the Bush Fire Service and the Fire and Emergency Services Authority of Western Australia. During this time he coordinated a number of major fire operations, developed the framework for wildfire mitigation planning in Western Australia, and undertook wildfire investigations.

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Summary

It is proposed to develop Lots 503-505, 507 and 900 Johnson Road Wellard, City of Kwinana, into 421 residential lots. The development will occur on cleared land. The area which will be developed is zoned Urban.

Land to the north of Bertram Road has already been developed into residential lots. The area to the east of Johnson Road is currently being developed.

The large area of woodland vegetation in the wetland in the western parts of Lots 503, 504, 505 and 507 will not be developed. This area will be ceded to the Government for conservation.

This Bushfire Management Plan addresses bushfire risk which exists in the bush-interface between the urban residential lots and the woodland vegetation in the wetland.

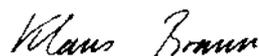
The Bushfire Management Plan was prepared in line with the requirements of the *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (DoP & WAPC, 2015) and the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015).

The Bushfire Management Plan applied the relevant acceptable solutions listed in the *Guidelines for Planning in Bushfire Prone Areas*. Alternative solutions were not applied.

Bushfire hazard and bushfire attack level assessments have been carried out. Section 2.3 contains the Bushfire Hazard Level Map and Section 2.4 the Indicative BAL Contour Map.

Section 4 contains the bushfire risk management measures which will be applied to the proposed development. It includes the following key elements:

- Separation between the bushfire hazard in the wetland and residential lots.
- Bushfire attack levels on houses along and near the ‘bush-interface’ with the woodland vegetation in the wetland do not exceed BAL-29.
- Houses in the designated bush fire prone area to be constructed to comply with AS3959.
- Access road between residential lots and the wetland buffer and/or Public Open Space.
- A short fire service access route adjacent to a small number of residential lots which border Public Open Space in the southern part of the proposed development.
- A road network which allows for through-traffic and which provides two different access options into and out of the proposed development.
- Additional road connections into developments on Lot 502 and Lot 506.
- Fire hydrants along roads at 200m intervals.
- Landscaping plan for Public Open Spaces and the 50m wetland buffer.
- Staging the development to achieve compliance with the requirements listed in the *Guidelines for Planning in Bushfire Prone Areas*.



Klaus Braun

Principal ICS Group

1 Introduction & background information

Lots 503-505, 507 and 900 Johnson Road Wellard, City of Kwinana, were used as lifestyle properties. Horses were kept on most of these properties. The area which will be developed is zoned Urban.

Land to the north of Bertram Road has already been developed into residential lots. The area to the east of Johnson Road is currently being developed. Lot 900 is also currently being developed.



Above: The area outlined in blue (the Subject Land) contains Lots 503-505, 507 and 900 Johnson Road. The residential development will occur on the cleared land.

It is proposed to subdivide Lots 503-505, 507 and 900 Johnson Road into 421 residential lots ranging in size from 228m² to 674m². Some areas will become Public Open Space. Vegetation in these areas will be managed parkland.

Applications to develop the adjacent Lot 502 and Lot 506 into urban residential lots are being made by other developers. Roads in the proposed development will connect to roads in the adjacent developments.

The large area of woodland vegetation in the wetland in the western parts of Lots 503, 504, 505 and 507 will not be developed. This area will be ceded to the Government for conservation.



Above: Map showing the proposed residential development as well as the areas set aside for Public Open Space and the 50m buffer around the wetland. The large areas of woodland vegetation in the wetland in the western part of the Subject Land will be ceded to the Government for conservation.

1.1 Scope

This Bushfire Management Plan outlines the bushfire protection measures which will be applied to the proposed development of Lots 503-505, 507 and 900 Johnson Road, to achieve compliance with the following:

- *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (DoP & WAPC, 2015);
- *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015);
- *Australian Standard for the Construction of buildings in bushfire-prone areas* (AS3959-2009); and
- City of Kwinana Firebreak Notice 2015/16.

The Bushfire Management Plan should be read in conjunction with the Local Structure Plan and associated planning documents prepared by Taylor Burrell Barnett, Town Planning and Design, and the Landscape Plan prepared by Emerge Associates, Integrated Science & Design.

This Bushfire Management Plan does not specifically address the management of the woodland vegetation in the wetland area, which will be ceded to the Government.

1.2 Bushfire management plan August 2015

In August 2015, ICS Group prepared the initial Bushfire Management Plan for the proposed development of Lots 503-505, 507 and 900 Johnson Road. This plan was prepared in line with the *Draft Planning for Bushfire Risk Management Guidelines* (DoP & WAPC, May 2014), which were in place at that time. This Bushfire Management Plan was submitted in October 2015 as an appendix to the Local Structure Plan for the proposed development, which was prepared by Taylor Burrell Barnett, Town Planning and Design.

The Department of Planning requested that the Bushfire Management Plan from August 2015 is updated to align it with the *Guidelines for Planning in Bushfire Prone Areas*, which were released in December 2015.

It should be noted that the bushfire protection measures proposed in this earlier Bushfire Management Plan also meet the requirements of the current *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015) and *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (DoP & WAPC, 2015).

This earlier Bushfire Management Plan was edited to align it with the sections and section numbering shown in Appendix 5 of the *Guidelines for Planning in Bushfire Prone Areas*. Furthermore, the bushfire hazard level and bushfire attack level contour maps were updated to include the 100m area surrounding the proposed development. A map showing designated bush fire prone areas (DFES, 21/05/2016) has also been included.

1.3 Other bushfire management plans

A Fire Management Plan for Lot 900 was prepared by *FirePlan WA* in July 2013 and updated in October 2014. Lot 900 is to the north of Tamblyn Place. The development design for this area has now changed and the Fire Management Plan prepared by *FirePlan WA* no longer applies to this area.

In August 2014, *FirePlan WA* also prepared a Bush Fire Hazard Assessment for the Wellard Concept Structure Plan (Development Works, 2015). The assessment carried out in August 2014 has been superseded by the Bush Fire Hazard level assessment and map contained in Section 2 of this Bushfire Management Plan (see below).

2 Spatial consideration

2.1 Description of the area

Zoning

The majority of the Subject Land and surrounding area is zoned Urban. Much of the surrounding land has already been developed, is currently being developed or will be developed at the same time as the Subject Land will be developed.

The wetland in the southern part of the Subject Land will not be developed. This land will be ceded to the Government for conservation.

Topography

The wetland in the western part of the site is essentially flat. Away from the wetland, the site rises slightly to the east. The wetland is less than 10m above sea level. The highest area is in the north eastern part of the site, which is approximately 15m above sea level.

Bushfire fuels

The area which will be developed is mainly grassland, which has been maintained low through grazing. Construction work has commenced on Lot 900, which is north of Tamblyn Place. The bushfire hazards on Lot 900, which previously included unmanaged grassland as well as woody introduced species, has now been removed.

In the wetland in the western parts of Lots 503, 504, 505 and 507, the predominant vegetation consists of woodland, rushes and unmanaged grassland. Small clusters of woodland trees occur in the 50m wetland buffer. Some of these clusters extend into areas which will become Public Open Spaces.

As part of the development, Public Open Spaces and urban residential areas will be landscaped. Treed areas in Public Open Spaces and in the 50m wetland buffer will be maintained as managed parkland. Some small areas will be revegetated with native plants. Please refer to the landscape plan developed by Emerge Associates, Integrated Science & Design, for further information.



Right: Looking from the future urban residential area towards the woodland vegetation in the wetland.

Right: Small clusters of woodland trees in the wetland buffer will be retained.



Right: Grasses and rushes (which have been classified as unmanaged grassland) in the wetland near the northern boundary of the Subject Land. The native woodland can be seen in the background.



Right: Woodland vegetation in the wetland in the southern part of the Subject Land.



Right: Construction on Lot 900, which is north of Tamblyn Place, has commenced. The bushfire hazards on this lot have been removed.



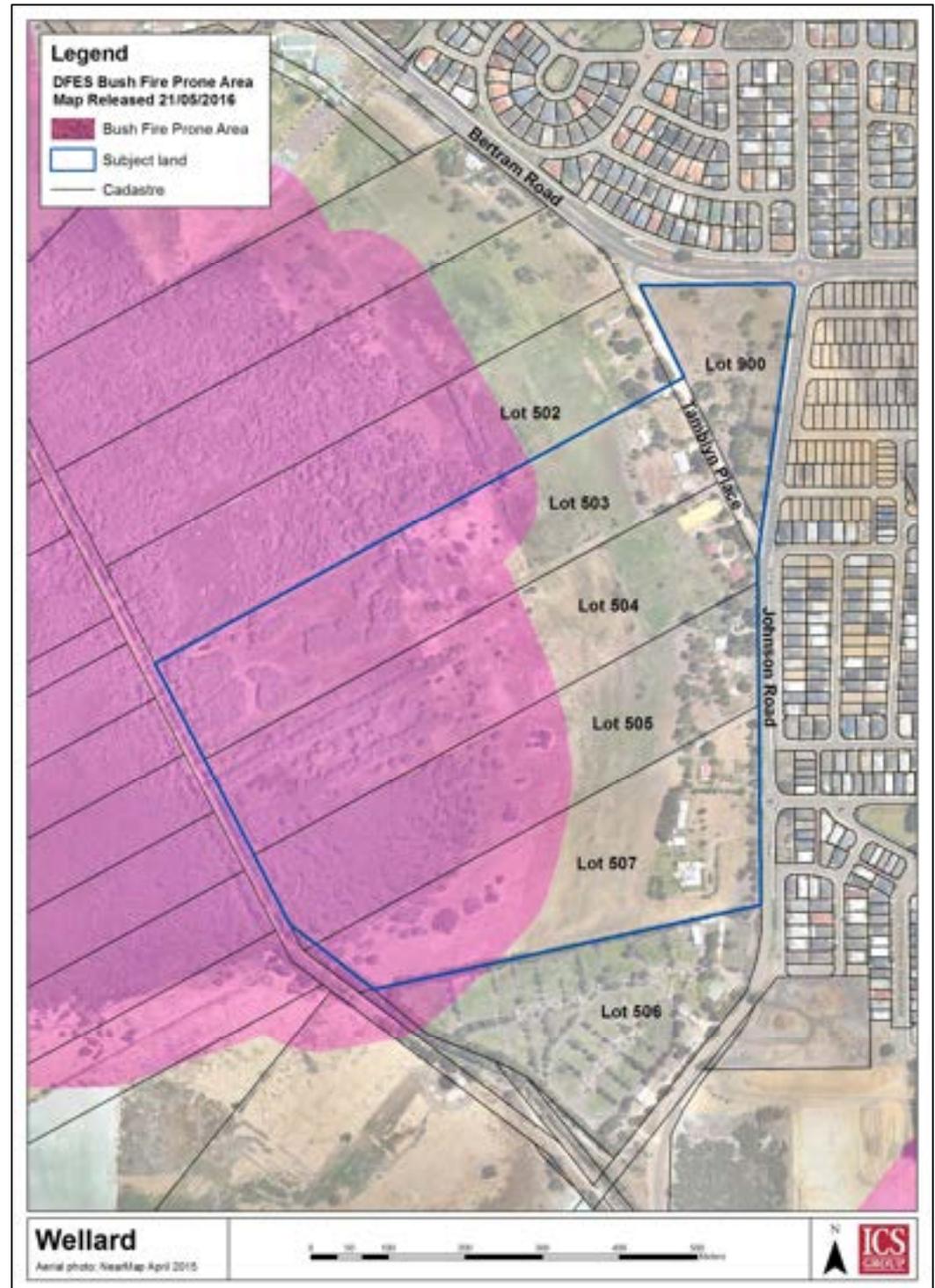
Right: The residential area to the north of Mortimer Road.



2.2 Bush fire prone area map

The map below shows the DFES Bush Fire Prone Area Map which came into effect on 21/05/2016. The main area identified as 'pink' on the map essentially covers the woodland vegetation in the wetland and a 100m buffer surrounding this vegetation. The grassland in the cleared areas of the Subject Land was not classified as bushfire prone vegetation and was therefore not included in the DFES Bush Fire Prone Area Map.

The DFES Bush Fire Prone Area Map will be updated annually.



Above: The DFES Bush Fire Prone Area Map which came into effect on 21/05/2016.

Where the bush fire prone area map covers a portion of a lot, the whole lot is designated as bush fire prone.

Lots 503, 504, 505 and 507 are designated bush fire prone and additional bushfire risk management planning requirements apply to development on these lots.

Lot 900 is not designated bush fire prone on the DFES Bush Fire Prone Area Map. Additional bushfire risk management planning requirements are therefore not required for development on Lot 900.

After the proposed development or parts of the proposed development have been constructed, an updated BAL Contour Map, associated GIS dataset and a compliance report will be provided to the Department of Planning and the City of Kwinana for endorsement, and to inform the update of the DFES Bush Fire Prone Area Map. The updated BAL Contour Map will include the assessment of the landscaping which will be carried out as part of the proposed development, as well as the management of the vegetation within the Public Open Spaces and wetland buffer post-development.

2.3 Bushfire hazard level assessment

For local structure plans, the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015) require that either a Bushfire Hazard Level assessment is carried out or, where the lot layout is already known, that a BAL contour map is prepared.

Even though the lot layout for this development is already known, a map showing Bushfire Hazard Levels has been included here as it was also included in the earlier Bushfire Management Plan, which was prepared in August 2015.

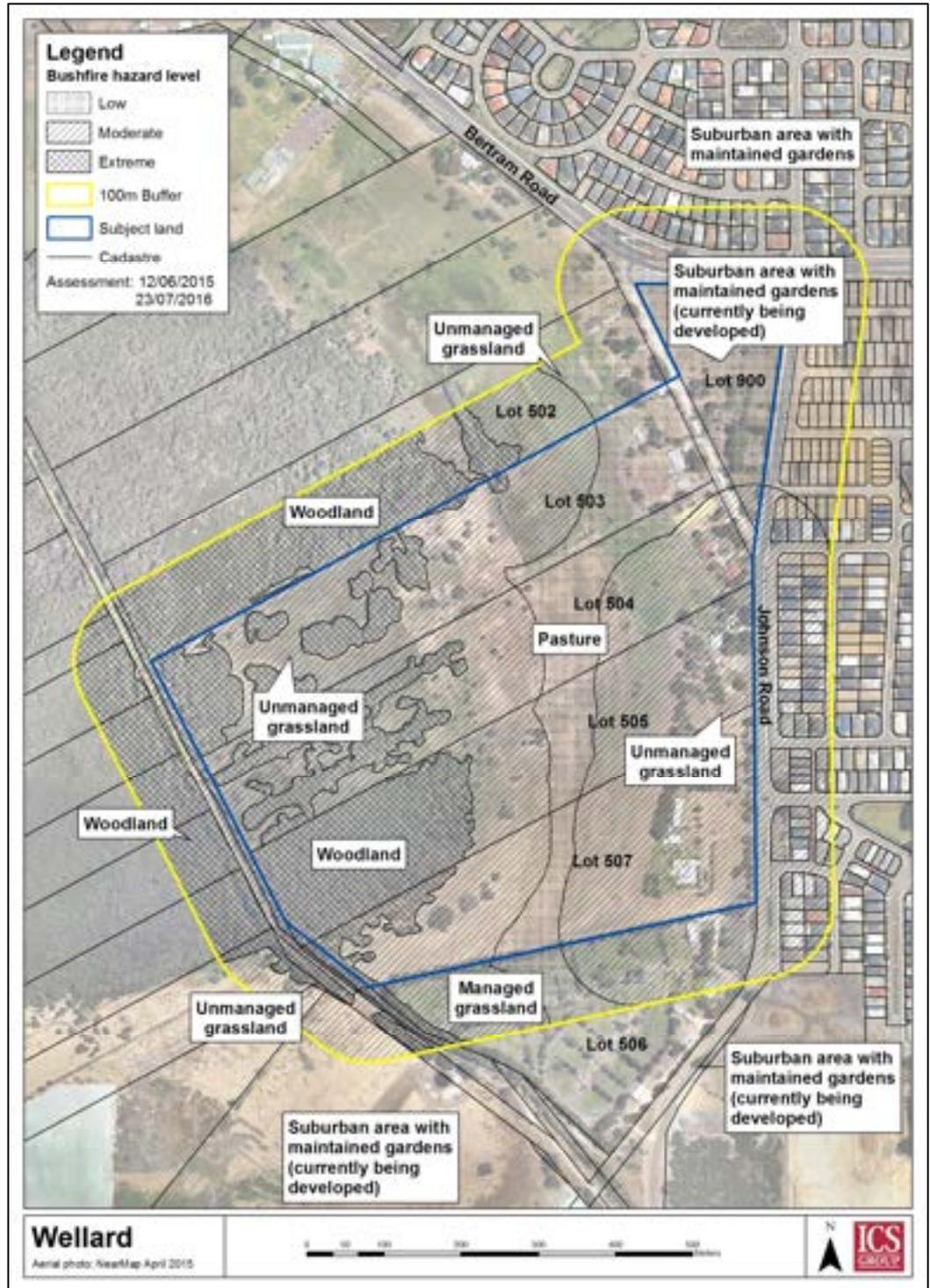
The Bushfire Hazard Level map was updated. It now aligns with the additional requirements listed in the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015). The Bushfire Hazard Level map also covers a 100m buffer surrounding the Subject Land.

The Bushfire Hazard Level map shows bushfire hazard levels on Lots 503, 504, 505 and 507 prior to development.

Even though Lot 900 is not designated bush fire prone, it was included in the Bushfire Hazard Level map.

The *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015) require that unmanaged grassland is classified as a moderate bushfire hazard. As a result, large areas which were not included in the DFES Bush Fire Prone Area Map are classified as a moderate bushfire hazard. This inconsistency does not affect the proposed development. As mentioned earlier, the bushfire hazards within the proposed urban residential areas will be removed when the development will be constructed.

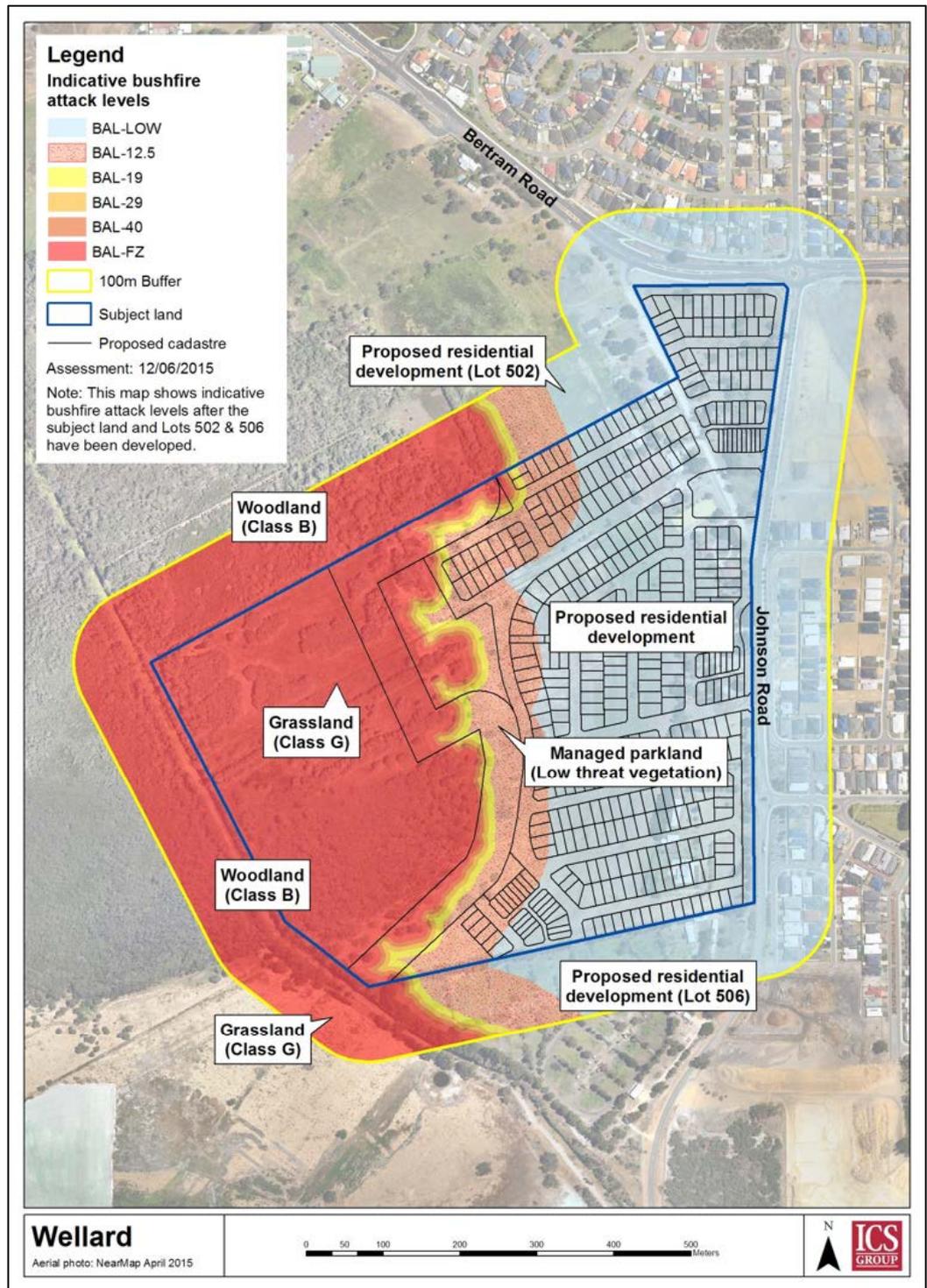
It must be noted that the classification for bushfire hazard levels listed in the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015) does not align with the bushfire attack level assessment and the bushfire attack level contour map, both of which are based on the *Australian Standard for the Construction of buildings in bushfire-prone areas* (AS 3959-2009). This inconsistency has the potential to cause some confusion. It is therefore recommended to primarily focus on the bushfire attack level assessment and the bushfire attack level contour map, which identify the level of bushfire attack a house (or a site) can potentially be exposed to in a major bushfire event. Bushfire attack levels also determine the construction requirements which apply to buildings in designated bush fire prone areas, in line with the requirements listed in AS3959.



Above: The Bushfire Hazard Level map for the proposed development and for a 100m buffer around the development. The map shows Bushfire Hazard Levels prior to the development of Lots 503, 504, 505 and 507.

2.4 Bushfire attack level contour map

An indicative BAL Contour map was prepared for the proposed development and a 100m buffer around the development, in accordance with the requirements listed in the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015) and those listed for Method 1 of AS3959. The map shows indicative bushfire attack levels after the Subject Land and Lot 502 to the north and Lot 506 to the south of the Subject Land have been developed into urban residential lots.



Above: This map shows indicative bushfire attack levels in the proposed development and in a 100m buffer around the development.

For the purpose of the indicative BAL Contour map, all the vegetation in the wetland along the ‘bush-interface’ was classified as Woodland (Vegetation Class B). The slope under the classified vegetation in the wetland was placed in the category ‘flat land’ (0°).

The unmanaged grassland in the wetland forms only a relatively small part of the ‘bush-interface’. This does not significantly change the outcome of the indicative bushfire attack level assessment. Furthermore, as a formal plan to manage the vegetation in the wetland is currently not in place, it was considered appropriate to use the worst case scenario, which assumes that woodland vegetation may re-establish in the unmanaged grassland. The vegetation classification ‘Woodland’ was therefore applied to determine indicative bushfire attack levels along the ‘bush-interface’.

The vegetation within the 50m wide wetland buffer and in the Public Open Spaces will be maintained as open parkland, in accordance with the requirements listed in AS3959 for low threat vegetation (S2.2.3.2(f)).

	Vegetation	Classification / exclusion
Residential development	Non-vegetated & managed gardens	Exclusion S2.2.3.2(e & f)
Public Open Spaces	Managed parkland	Exclusion S2.2.3.2(f)
50m wetland buffer	Managed parkland	Exclusion S2.2.3.2(f)
Wetland	Grassland (unmanaged)	Vegetation Class G
Wetland	Woodland	Vegetation Class D

Above: This table lists the vegetation in the different areas and the corresponding classification and/or exclusions which were applied to determine the indicative BAL contours shown on the above map. The vegetation classifications and exclusions were applied in accordance with AS3959.

As mentioned earlier, the indicative Bushfire Attack Level (BAL) Contour Map shown above will be reviewed and updated after the development has been constructed and when clearance for the development, or for stages of the development, will be sought.

The updated BAL Contour Map, associated GIS dataset and a compliance report will be provided to the Department of Planning and the City of Kwinana for endorsement, and to inform the update of the DFES Bush Fire Prone Area Map.

The updated BAL Contour Map will include the assessment of the landscaping which will be carried out as part of the proposed development, as well as the management of the vegetation within the Public Open Spaces and wetland buffer post-development.

3 Compliance

3.1 State planning policy 3.7

State Planning Policy 3.7 Planning in Bushfire Prone Areas (DoP & WAPC, 2015) lists the following four objectives:

- 5.1 Avoid any increase in the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact are paramount.
- 5.2 Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision-making at all stages of the planning and development process.
- 5.3 Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development applications take into account bushfire protection requirements and include specified bushfire protection measures.
- 5.4 Achieve an appropriate balance between bushfire risk management measures and biodiversity conservation values, environmental protection and biodiversity management and landscape amenity, with consideration of the potential impacts of climate change.

Note: Objective 5.1 of *State Planning Policy 3.7*, to “avoid any increase in the threat to bushfire ...” is somewhat ambitious and unrealistic. Furthermore, it is inconsistent with other parts of the policy and the guidelines which allow development in bushfire prone areas, provided that appropriate bushfire risk management measures, such as the acceptable solutions listed in the guidelines, are applied. Even when appropriate bushfire risk management solutions are applied, it could be argued that some additional “increase in the threat of bushfire ...” will occur when areas which may be exposed to bushfires are developed.

This Bushfire Management Plan, together with the Local Structure Plan and development proposal meet the above objectives. This has been achieved through the following measures:

Bushfire hazard level assessment

A bushfire hazard level assessment was carried out and a bushfire hazard level map has been prepared (see S2.3 above). The proposed development is located in an area which has been classified as having either a moderate or low bushfire hazard level.

The large area of woodland vegetation in the wetland in the western parts of Lots 503, 504, 505 and 507 will not be developed. This area will be ceded to the Government.

The above meets the requirements of the *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (DoP & WAPC, 2015) and the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015).

Bushfire attack level assessment

A bushfire attack level assessment was carried out in accordance with the requirements contained in the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015), the *Fact Sheet BAL Contour Maps* (DoP & WAPC, 2016) and those listed for Method 1 of AS3959 (see S2.4 above). The bushfire attack level assessment was used to inform the design of the development, to ensure that lots and houses are located in areas where bushfire attack levels do not exceed BAL-29.

The indicative BAL Contour Map shows that the majority of lots are located in an area where the bushfire attack level is BAL-Low. AS3959 does not require additional construction measures for houses located in areas where the bushfire attack level is BAL-Low.

The bushfire attack level for most of the lots located within 100m of the ‘bush-interface’ along the wetland will be BAL-12.5. These lots will primarily be exposed to ember attack and a radiant heat not greater than 12.5kW/m².

The indicative bushfire attack level contour map shows that BAL-29 extends approximately 4m into two lots. Where a setback of more than approximately 4m is achieved, houses can be constructed to comply with the requirements listed in AS3959 for BAL-19. BAL-19 also extends into a further lot on the ‘bush-interface’ along the wetland.

The above meets the requirements of the *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (DoP & WAPC, 2015) and the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015).

It is possible that vegetation management in the 50m wetland buffer and Public Open Space adjacent to the lots exposed to BAL-29 and BAL-19 will reduce the bushfire attack levels on these lots. This will be assessed in more detail after the development has been constructed and landscaping has been completed.

The more detailed assessment will be used to review and update the indicative bushfire attack levels before clearance for the development, or for stages of the development, is sought.

As was mentioned earlier, other developers have prepared proposals to develop Lot 502 and Lot 506, which are located to the north and south of the Subject Land. In the event that the development of these neighbouring lots is delayed, it is possible that bushfire attack levels along the northern and southern boundaries of the Subject Land are higher than show on the above indicative bushfire attack level map. This aspect is addressed in Section 4.6 Staging.

Conservation, biodiversity, environmental protection and landscape amenity

The wetland will not be developed. It will be ceded to the Government for conservation.

The design of the proposed development includes sufficient separation between houses and the wetland to ensure that residential lots and houses are not exposed to a bushfire attack level which exceeds BAL-29.

Furthermore, the indicative bushfire attack level assessment incorporated the possibility that the grassland areas in the wetland may be revegetated or will naturally revegetate with woodland species. The development design therefore ensures that additional bushfire hazard management is not required in the woodland vegetation in the wetland.

The above allows the vegetation in the wetland to be managed for biodiversity conservation values, environmental protection and biodiversity management and landscape amenity.

3.2 Guidelines for planning in bushfire prone areas

The proposed development complies with the requirements of the *Guidelines for Planning in Bushfire Prone Areas* (DoP, DFES & WAPC, 2015). It incorporates the relevant acceptable solutions listed in the guidelines. Alternative solutions were not required.

The proposed development incorporates the following key elements:

- Separation between the bushfire hazard in the wetland and residential lots.
- Bushfire attack levels on houses along and near the ‘bush-interface’ with the woodland vegetation in the wetland do not exceed BAL-29.
- Houses in the designated bush fire prone area to be constructed to comply with AS3959.
- Access road between residential lots and the wetland buffer and/or Public Open Space.
- A short fire service access route adjacent to a small number of residential lots which border Public Open Space in the southern part of the proposed development.
- A road network which allows for through-traffic and which provides two different access options into and out of the proposed development.
- Additional road connections into developments on Lot 502 and Lot 506.
- Fire hydrants along roads at 200m intervals.
- Landscaping plan for Public Open Spaces and the 50m wetland buffer.
- Staging the development to achieve compliance with the requirements listed in the *Guidelines for Planning in Bushfire Prone Areas*.

3.3 Existing bushfire management plans and assessments

Bushfire management plan August 2015

In August 2015, ICS Group prepared the initial Bushfire Management Plan for the proposed development of Lots 503-505, 507 and 900 Johnson Road (the Subject Land). The plan prepared in August 2015 will be replaced by the Bushfire Management Plan prepared by ICS Group, dated July 2016.

Earlier bushfire management plan

A Fire Management Plan for Lot 900 was prepared by FirePlan WA in July 2013 and updated in October 2014. Lot 900 is to the north of Tamblyn Place. The development design for this area has now changed and the Fire Management Plan prepared by FirePlan WA no longer applies to this area.

Earlier bushfire hazard assessment

In August 2014, FirePlan WA also prepared a Bush Fire Hazard Assessment for the Wellard Concept Structure Plan (Development Works, 2015). The assessment carried out in August 2014 has been superseded by the Bush Fire Hazard level assessment and map contained in the Section 2.3 of this Bushfire Management Plan (see above).

3.4 Local structure plan and landscaping plan

Taylor Burrell Barnett, Town Planning and Design, has prepared a Local Structure Plan and associated planning documents for the proposed development of Lots 503-505, 507 and 900 Johnson Road (the Subject Land). Please refer to the Local Structure Plan for information on local planning scheme and other relevant planning provisions.

Emerge Associates, Integrated Science & Design have developed the Landscape Plan for the Subject Land. The Landscape Plan is included in the appendix of the Local Structure Plan prepared by Taylor Burrell Barnett.

3.5 City of Kwinana Firebreak Notice

The City of Kwinana issues an annual Firebreak Notice. The Notice may change from year to year. The Firebreak Notice for 2015/16 lists the following requirements for lots which are 3,000m² or less:

- The applicable works outlined below must be completed before 1 December 2015 and maintained up to and including 31 March 2016.
- All flammable material such as long dry grass, weeds, etc. slashed, mowed or trimmed down by other means to a height no greater than 50mm across the entire property.
- Bare earth fire breaks are not necessary on properties that are 3,000m² or less in areas where slashing, mowing or living and maintained garden beds or lawn is established.

The proposed development will create urban residential lots. It complies with the City of Kwinana Firebreak Notice.

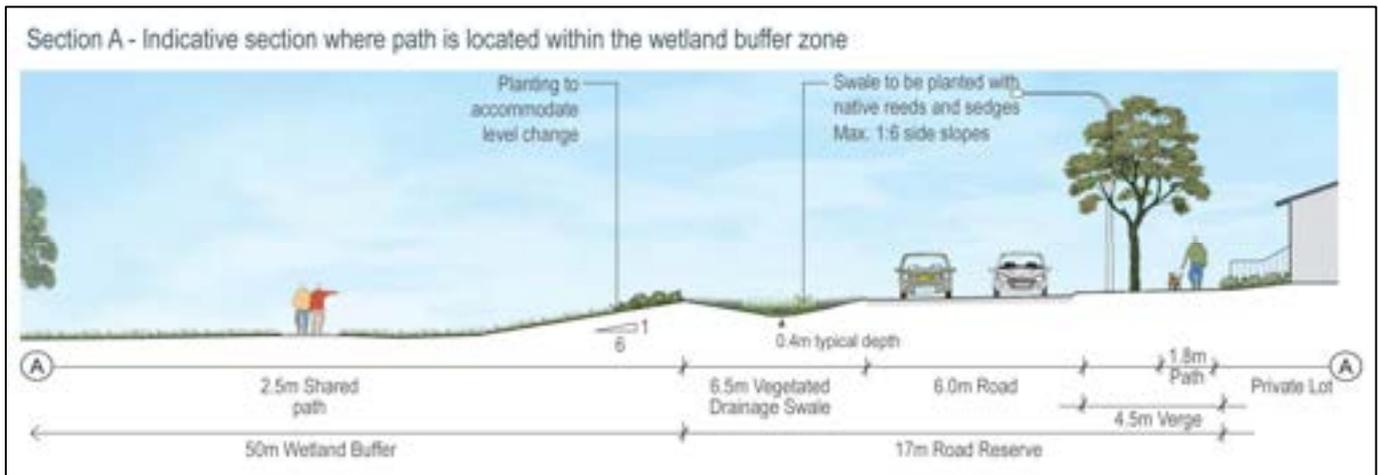
4 Bushfire risk management measures

The following section lists the bushfire risk management measures which will be applied to enable the proposed development, houses within the development and residents to withstand a bushfire event on days where the fire danger index is 80.

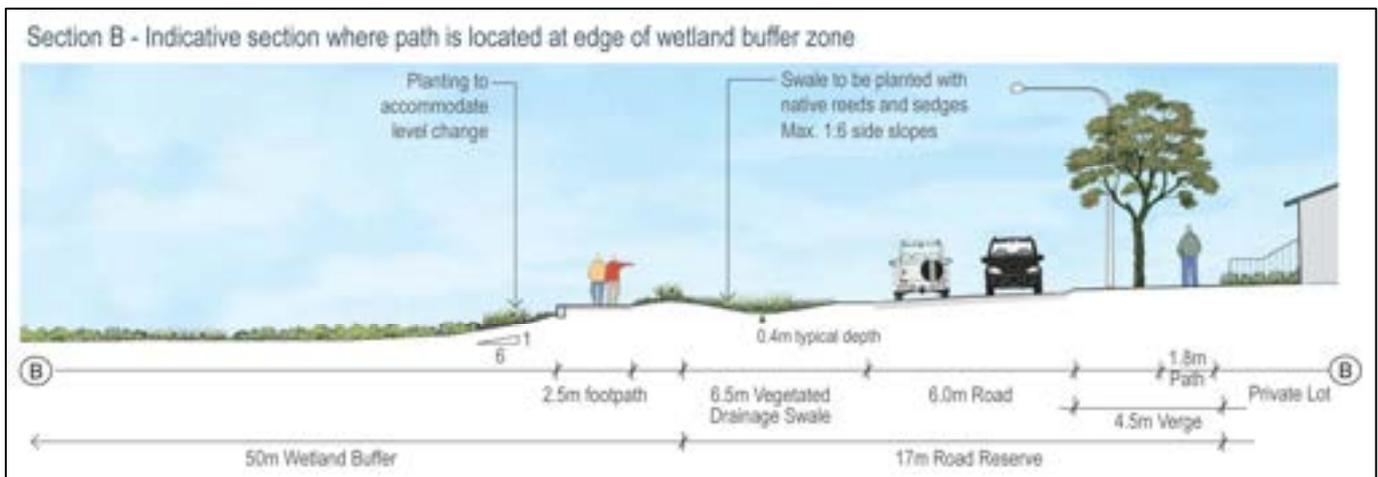
4.1 Managing bushfire fuel levels

A Landscape Plan was prepared by Emerge Associates, Integrated Science & Design for the proposed development. Vegetation within the residential areas, Public Open Spaces and the 50m wetland buffer will generally be maintained in accordance with the requirements for low threat vegetation listed in AS3959 (see below for detail).

The two cross sections from the Landscape Plan provide an indication of the vegetation cover along the interface between the wetland buffer and residential lots. Please refer to the Landscape Plan for further details.



Courtesy of Emerge Associates, Integrated Science & Design



Courtesy of Emerge Associates, Integrated Science & Design

The management of the vegetation in the wetland, which will be ceded to the Government, is not covered in the Landscape Plan. The Fire Management Plan therefore applied the default fuel load for woodland (25t/ha) listed in AS3959 to determine bushfire attack levels to the vegetation in the wetland.

The default fuel load for woodland was therefore also applied to areas of the wetland which currently have a cover of grasses and rushes (unmanaged grassland). The unmanaged grassland in the wetland currently forms only a relatively small part of the 'bush-interface'. This approach does not significantly change the outcome of the indicative bushfire attack level assessment.

Because the default fuel load for woodland vegetation was applied, hazard reduction in the wetland is not specifically required for the protection of the proposed development. As a result, bushfire management within the wetland can be undertaken to achieve conservation outcomes.

Low threat vegetation (AS3959-2009)

Clusters of trees will be retained and some revegetation will occur in line with the landscape plan for the proposed development. Clusters of vegetation will not exceed 2,500m² in size and will be a minimum of 20m away from the next vegetation cluster or classified vegetation adjacent to the subject site, and a minimum of 20m away from a house. Grass will be maintained short (less than 100mm in height).

AS3959-2009:

2.2.3.2 Exclusions – Low threat vegetation and non-vegetated areas

The Bushfire Attack Level shall be classified BAL—LOW where the vegetation is one or a combination of any of the following:

- (a) Vegetation of any type that is more than 100 m from the site.*
- (b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.*
- (c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other.*
- (d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.*
- (e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.*
- (f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.*

NOTE: Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

Above: Extract from AS3959-2009.

Residential lots

Bushfire fuels on residential lots have to be maintained low, in accordance with the City of Kwinana Firebreak Notice. In 2015/16, the Firebreak Notice listed the following requirements:

- The applicable works outlined below must be completed before 1 December 2015 and maintained up to and including 31 March 2016.
- All flammable material such as long dry grass, weeds, etc. slashed, mowed or trimmed down by other means to a height no greater than 50mm across the entire property.
- Bare earth fire breaks are not necessary on properties that are 3,000m² or less in areas where slashing, mowing or living and maintained garden beds or lawn is established.

These requirements apply to lots with houses as well as to vacant lots.

It should be noted that the City of Kwinana may change the Firebreak Notice in the future. Firebreak Notices are available from the City of Kwinana.

4.2 Vehicular access

Roads

Access to and from the proposed development will be via Johnson Road and Tamblyn Place, which both connect to Mortimer Road. The road network in the proposed development includes access points to Johnson Road and Tamblyn Place as well as to proposed roads in the future developments to the north and south of the Subject Land.

In most parts, the development has perimeter roads between the wetland buffer and houses. A fire service access route will be constructed in the southern part of the proposed development where a small number of lots are adjacent to Public Open Spaces.

Fire service access route

A fire service access route will be constructed in the south-western part of the proposed development where a perimeter road is not available between a small number of lots and Public Open Spaces.



Above: This map shows the indicative location and alignment of the fire service access route in the southern part of the proposed development. On the southern boundary, the fire service access road will connect to a road in the adjacent development.

The fire service access will be constructed in accordance with the requirements listed in the planning guidelines:

- 6m trafficable surface;
- 4m vertical clearance;
- suitable for use by 3.4 fire appliances (15t);
- removable bollards installed to prevent unauthorised access;
- the bollards may be locked, provided that the lock is keyed to a common key used by local brigades and DFES;
- if required, signs will be installed.

4.3 Fire fighting water supply

Fire hydrants and markers will be installed at 200m intervals along roads within the residential area in accordance with the requirements of the planning documents.

4.4 Building protection – AS3959

The map on page 12 shows indicative bushfire attack levels on houses in the proposed development. Where houses are located in a designated bushfire prone area as shown on the DFESA Bush Fire Prone Area Map, and where bushfire attack levels are BAL-12.5 or above, the *Australian Standard for the Construction of buildings in bushfire-prone areas AS3959* must be applied.

4.5 Map

Maps and GIS datasets will be provided to the City of Kwinana, the Department of Fire and Emergency Services and the Department of Planning. The maps and GIS datasets will include the following information:

- BAL contour map;
- development design;
- location of fire hydrants;
- fire service access routes;
- landscaping plan.

4.6 Staging

The developer has advised that the development will be staged. The following bushfire risk management measures should be incorporated into the staging plan. It is recommended that the staging plan is developed in close consultation with a fire officer at the City of Kwinana and/or DFES.

Separation between bushfire hazards and houses

Adequate separation must be available between houses and bushfire hazards on adjacent properties or in undeveloped stages so that bushfire attack levels on houses do not exceed BAL-29.

As mentioned earlier, this may be an issue in relation to a small number of lots along the northern and/or southern boundary of the proposed development, in the event that the development of Lot 502 and/or Lot 506 does not occur at the same time as stages along the northern and southern boundaries of the Subject Land will be constructed.

The following solutions can be applied to manage this aspect:

- Aligning the construction and release of lots along the northern and southern boundaries of the Subject Land with the construction of lots on the neighbouring properties.
- Working with the adjoining landowner to manage the vegetation along the boundaries to reduce bushfire attack levels. Where this approach is taken, a formal agreement must be developed to ensure that bushfire hazard levels will be maintained low in the long term.

Access & egress

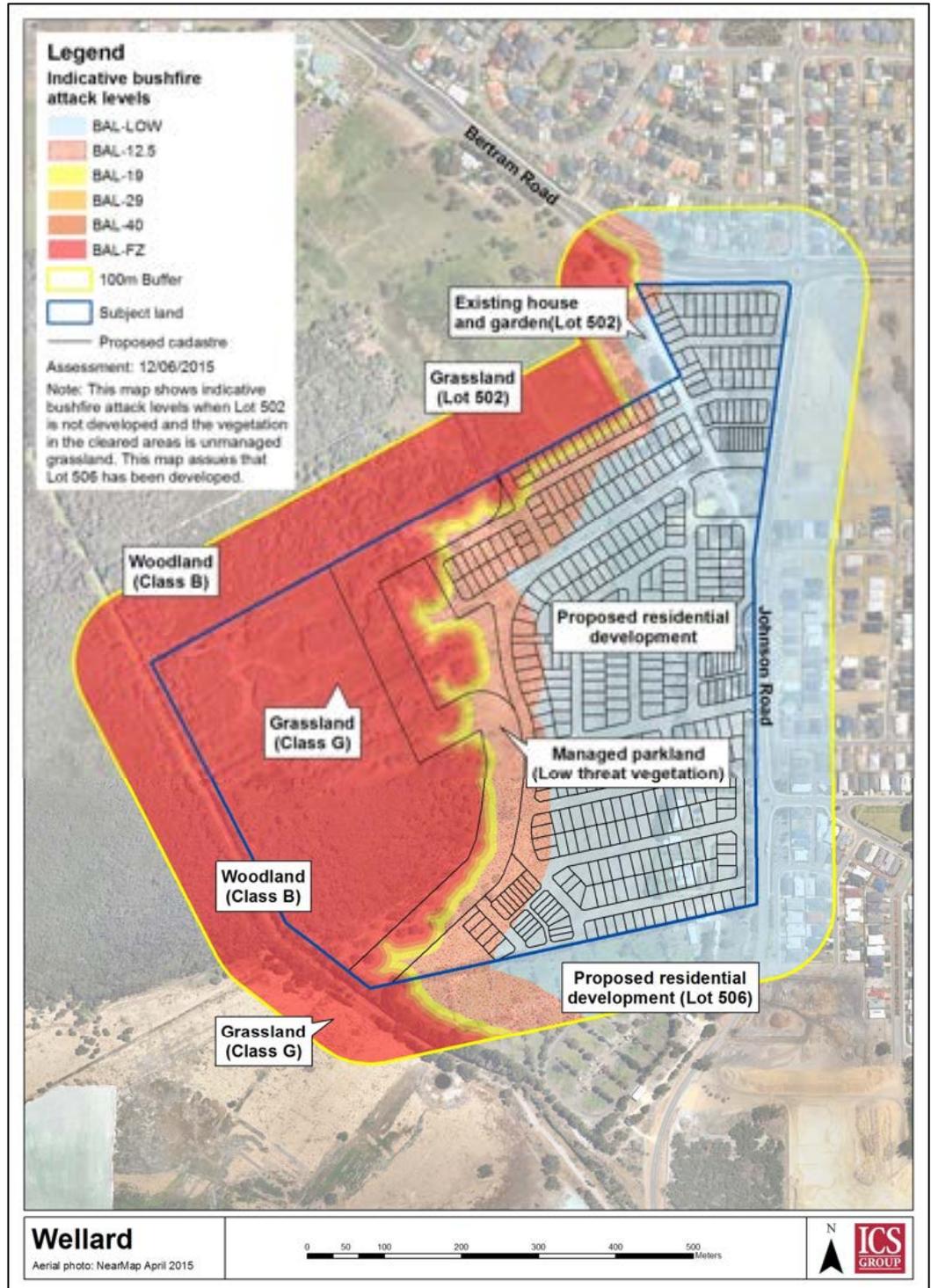
Two different access/egress options should be available for fire services and residents.

This may be achieved by providing temporary access/egress options via roads in stages which have not yet been completed.

Access for fire appliances

Access for fire appliances must be available between developed and undeveloped stages.

Possible solutions include not releasing lots along the boundary of a stage until the adjacent stage or the adjacent property is developed. Alternatively, interim fire service access may be established along the boundary of a stage.



Above: This map shows indicative bushfire attack levels for a scenario where Lot 506 has been developed but where Lot 502 has not been developed. Under this scenario bushfire attack levels along the northern boundary of the Subject Land could be higher than when Lot 502 has been developed into residential lots.

This aspect can be managed in a number of ways, including releasing the lots along the northern boundary only after Lot 502 has been developed. Alternatively, a formal agreement can be developed to ensure that bushfire hazard levels on Lot 502, adjacent to the northern boundary of the Subject Land, will be maintained low in the long term

5 Implementation

5.1 Developer's responsibility

- 5.1.1 For two summers after the Public Open Spaces are ceded, manage bushfire fuel levels by implementing the Landscape Plan so that the vegetation within the residential areas, Public Open Spaces and the wetland buffer will be maintained in accordance with the requirements for low threat vegetation listed in AS39459:

AS3959-2009:

2.2.3.2 Exclusions – Low threat vegetation and non-vegetated areas

The Bushfire Attack Level shall be classified BAL—LOW where the vegetation is one or a combination of any of the following:

- (a) Vegetation of any type that is more than 100 m from the site.*
- (b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified.*
- (c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other.*
- (d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified.*
- (e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops.*
- (f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.*

NOTE: Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).

- 5.1.2 Comply with the City of Kwinana Firebreak Notice. This applies to undeveloped stages and lots which have not yet sold.
- 5.1.3 Construct a fire service access route in the south-western part of the proposed development, where the perimeter road is not available, between the small number of lots and the Public Open Spaces or wetland buffer.

The fire service access route is to be constructed in accordance with the requirements listed in the planning guidelines:

- 6m trafficable surface;
- 4m vertical clearance;
- suitable for use by 3.4 fire appliances (15t);
- removable bollards installed to prevent unauthorised access;
- the bollards may be locked, provided that the lock is keyed to a common key used by local brigades and DFES;
- if required, signs must be installed.

- 5.1.4 Install fire hydrants and markers at 200m intervals along roads within the residential area in accordance with the requirements of the relevant planning documents.

- 5.1.5 In liaison with fire officers at the City of Kwinana and/or DFES, incorporate bushfire risk management measures in staging plans to ensure that the following can be achieved:
- separation between houses and bushfire hazards on adjacent properties or in undeveloped stages, so that bushfire attack levels on houses do not exceed BAL-29;
 - two different access/egress options are available to fire services and residents;
 - access for fire appliances is available between developed and undeveloped stages.
- 5.1.6 Provide maps and GIS datasets to the City of Kwinana and the Department of Fire and Emergency Services. The maps and GIS datasets must include the following information:
- BAL contour map;
 - development design;
 - location of fire hydrants;
 - fire service access routes;
 - landscaping plan.

5.2 Property owner's responsibility

- 5.2.1 Comply with the City of Kwinana Firebreak Notice.
- 5.2.2 Where a house will be located in a designated bushfire-prone area, construct the house in accordance with the Australian Standard for the Construction of buildings in bushfire-prone areas AS3959.

5.3 City of Kwinana's responsibility

- 5.3.1 Review and, where appropriate, endorse the BAL Contour Map prepared after the development (or stages of the development) has been constructed and landscaping has been completed, so that the BAL Contour Map can be used to:
- (a) inform the update of the DFES Bush Fire Prone Area Map; and
 - (b) determine bushfire attack levels when applications for building permits are made for lots in the Subject Land;
- 5.3.2 After the Public Open Spaces and wetland buffer have been ceded, manage bushfire fuel levels so that the vegetation within the residential areas, Public Open Spaces and the wetland buffer will be maintained in accordance with the requirements for low threat vegetation listed in AS3959. (Note: This requirement only comes into effect after two summers. The developer is responsible to manage bushfire fuel levels for two summers after the Public Open Spaces and wetland buffer have been ceded.)
- 5.3.3 Apply the *Australian Standard for the Construction of buildings in bushfire-prone areas AS3959* to building approvals in designated bushfire-prone areas.
- 5.3.4 Monitor and, at regular intervals, review compliance with this Bushfire Management Plan, in particular in relation to compliance with AS3959 and in relation to vegetation management within the residential areas, Public Open Spaces and the wetland buffer.

Monitoring and review is an ongoing process. It is recommended that an initial review is carried out within the first year after the development has, or stages of the development have been constructed and released, and at least at five-year-intervals after the initial review.

5.4 Department of Planning

- 5.4.1 Review and, where appropriate, endorse the BAL Contour Map prepared after the development (or stages of the development) has been constructed and landscaping has been completed, so that the BAL Contour Map can be used to inform the update of the DFES Bush Fire Prone Area Map.

6 Disclaimer

The preparedness and behaviour of people before, during and after a bushfire form an important part of bushfire risk management. This includes aspects such as being well informed about bushfire risk and risk management, leaving well before an area is affected by a bushfire or actively protecting a building, being able to deal with small spot fires, the maintenance of a building and its surrounds, wearing appropriate protective clothing and whether property owners have prepared a suitable plan for bushfires. Building design and construction, as well as development design, contribute to bushfire safety. They cannot, however, replace adequate preparedness and the appropriate behaviour of residents in relation to bushfire risk management.

This Bushfire Management Plan addresses development design and building construction requirements in line with fire services, planning and local government requirements. It cannot achieve the preparedness and behaviour of people after the development has been established. Residents who live in areas which may be exposed to bushfires must therefore take some responsibility to manage bushfire risk.

References

City of Kwinana, 2015. *Firebreak Notice 2015/16*.

Department of Fire and Emergency Services, 2015. *Mapping Standard for Bushfire-Prone Area Western Australia, Office of Bushfire Risk Management, 2015*.

Department of Planning and Western Australian Planning Commission, 2016. *Planning in Bushfire Prone Areas Bushfire Policy Framework, Fact Sheet Version 2, January 2016, BAL Contour Maps, Guidance on how to prepare a BAL Contour Map and when they can be used*.

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Department of Planning and Western Australian Planning Commission, 2014. *Draft Planning for Bushfire Risk Management Guidelines May 2014*.

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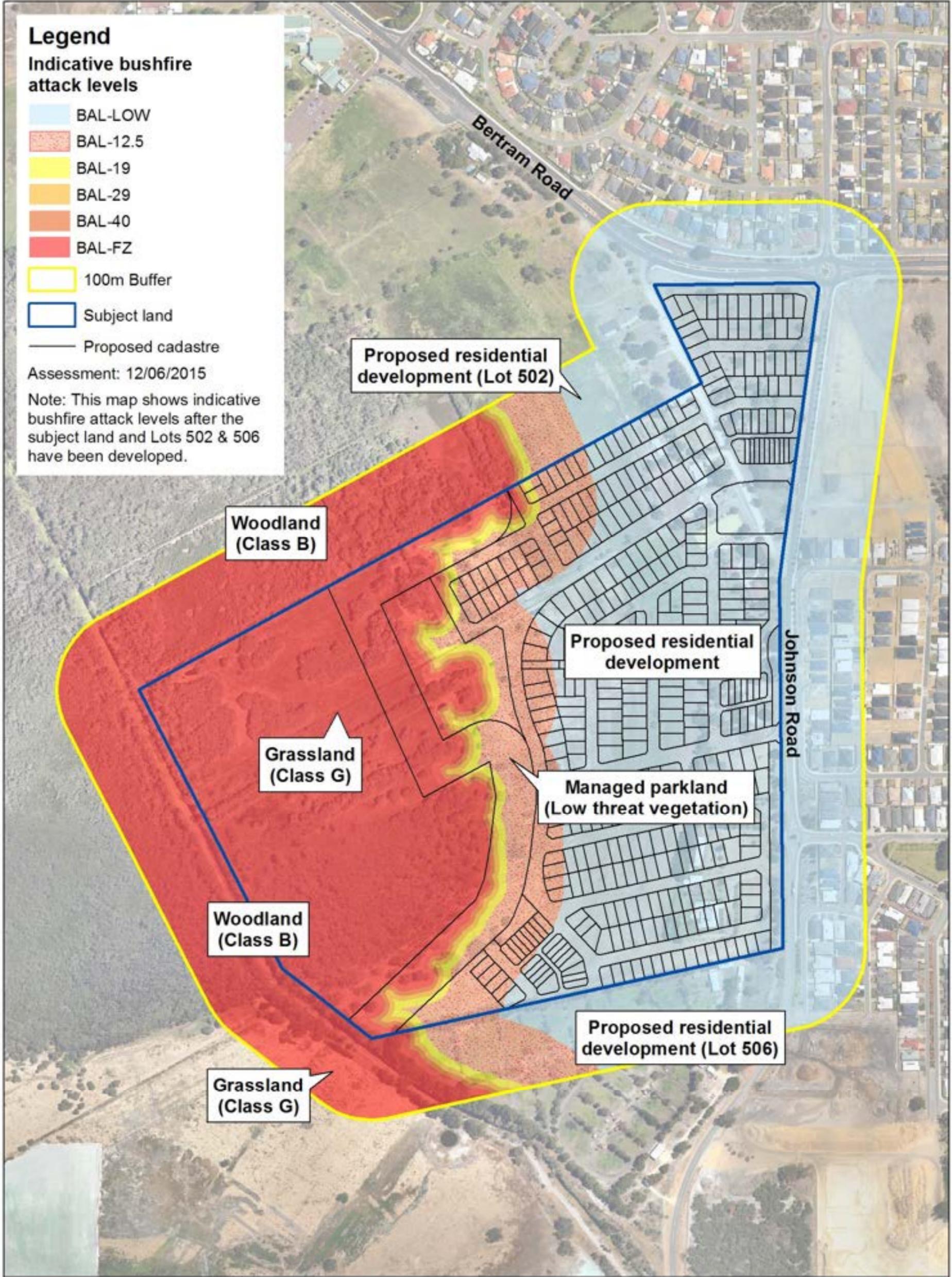
Legend

Indicative bushfire attack levels

- BAL-LOW
- BAL-12.5
- BAL-19
- BAL-29
- BAL-40
- BAL-FZ
- 100m Buffer
- Subject land
- Proposed cadastre

Assessment: 12/06/2015

Note: This map shows indicative bushfire attack levels after the subject land and Lots 502 & 506 have been developed.



Wellard

Aerial photo: NearMap April 2015

