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Final Report

Bushfire Risk Assessment: Clarkefield Township, Victoria

Prepared for

Clarkefield Developments Pty Ltd

March 2022

Ecology and Heritage Partners Pty Ltd

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DOCUMENT CONTROL

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Address	Clarkefield Township, Victoria
Project number	14576
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Client	Clarkefield Developments Pty Ltd
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VERSION CONTROL

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1 Introduction

1.1 Background

Ecology and Heritage Pty Ltd were engaged by Clarkefield Developments Pty Ltd to prepare a Bushfire Risk Assessment for the mixed-use development that will form part of the Clarkefield township expansion.

The purpose of this report is to undertake a bushfire risk assessment of the local and broader landscape and address the legislative implications associated with for the proposal against Clause 13.02-1S Bushfire. Clause 44.06 Bushfire Management Overlay (BMO), Clause 53.02 Bushfire Planning and Australian Standard (AS) 3959:2018 Construction of buildings in bushfire prone areas (Standards Australia 2018) are also addressed as part of this report.

1.2 Study Area

The study area adjoining the existing Clarkefield township is approximately 22.95 hectares in area and 40 kilometres north of Melbourne's CBD. The study area is bound by paddocks to the north and south, Melbourne-Lancefield Road to the east and Clarkefield township to the west (Attachment 1).

The study area and surrounding landscape are largely characterised by agricultural paddocks (Plate 1; Plate 2), with some rural residential properties generally to the west of the trainline and residential dwellings within Clarkefield township (Plate 3). The study area and the broader landscape are generally flat, with deep gullies cutting through intermittently, the closest of which is 450 metres south-west of the study area.

The study area is zoned Township Zone (TZ). None of the study area is in the Bushfire Management Overlay (BMO), but it is wholly within the designated Bushfire Prone Area (BPA) (Department of Environment, Land, Water and Planning (DELWP) 2020a).

According to NatureKit (DELWP 2020b), the study area is located within the Victorian Volcanic Plain bioregion, Port Phillip and Western Port Management Authority and Macedon Ranges Shire Council.

The study area was originally assessed as part of the preliminary bushfire assessment undertaken in July 2018. It is noted that its broader landscape conditions have not changed since this time.

2 Response to Clause 13.02-1S

Clause 13.02-1S has the objective to '*strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life*' (p1). This clause applies to land in the Bushfire Prone Area (BPA), Bushfire Management Overlay (BMO) and/or proposed to be used or developed in a way that may create or increase bushfire hazard. The study area falls within the BPA category.

Clause 13.02-1S contains five key strategies to meet the objective, which are:

- Protection of human life;
- Bushfire hazard identification and assessment;
- Settlement planning;
- Areas of biodiversity conservation value; and
- Uses and development in a Bushfire Prone Area.

A detailed assessment against each of the strategies is provided below.

The bushfire hazard risk is assessed at four different levels (Attachments 1 to 5), with a bushfire management plan provided in Attachment 6.

2.1 Protection of Human Life Strategy

These strategies require that the priority be given to the protection of human life.

2.1.1 *Prioritising the protection of human life over all other policy considerations*

Several mitigation measures will be employed as part of any future development to prioritise the protection of human life. These include adequate opportunities for occupant and emergency vehicle access and egress (i.e. appropriate road width, curve, angle etc.) and providing two bollarded access points along Melbourne-Lancefield Road for emergency services only (Attachment 6). The largely bound by perimeter roads, thereby creating a solid fuel break between future dwellings and the adjoining paddocks. Emergency vehicle access to water supply via a hydrant network will also be provided in accordance with CFA requirements (i.e. hydrants will be positioned within 120 metres of the rear of each dwelling/building). The protection of human life will be prioritised by ensuring that all dwellings within the development will not be exposed to a radiant heat flux of more than 12.5 kilowatts/square metre, which is commensurate to a Bushfire Attack Level (BAL) 12.5 construction standard (Attachment 6).

2.1.2 *Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire*

The development is in a highly modified and low bushfire risk setting, which is largely characterised by land currently used for agricultural purposes and intersected by non-vegetated areas, e.g. rural roads, rail lines and water bodies.

The wider landscape largely contains unmanaged Grasslands greater than 100 millimetres, low threat grassed areas (i.e. managed/landscaped lawns and sports ovals), and rural residential properties (Attachments 1 to 4). Given the landscape context, occupants will be able to easily move to areas where life can be better protected from the effects of fire by travelling into the centre of the expanded Clarkefield township area, or further afield along Melbourne-Lancefield Road 10 kilometres south into the built-up areas of the Rolling Meadows Estate at the northern end of the Sunbury urban area.

2.1.3 *Reducing the vulnerability of communities to bushfire through the consideration of bushfire risk in decision making at all stages of the planning process*

Clause 13.02-1S is a strategic state-wide planning policy that provides the first opportunity to consider the bushfire risk in this process. This development addresses the risk by ensuring the following:

- All proposed future dwellings within the study area can be constructed to an appropriate BAL construction standard;
- Access from the existing road network (i.e. Station Street and Melbourne-Lancefield Road);
- An internal road network that ensures adequate occupant egress;
- Emergency vehicle access opportunities to and from the study area; and,
- Ensuring that a hydrant network is provided.

The CFA provide four principles to respond to Clause 13.02-1S, including that settlement planning decisions should:

- '*Direct development to locations of lower bushfire risk;*
- *Carefully consider development in locations where there is significant bushfire risk that cannot be avoided;*
- *Avoid development in locations of extreme bushfire risk; and*
- *Avoid development in areas where planned bushfire protection measures may be incompatible with other environmental objectives*' (CFA 2015, p.4).

The proposal is considered to apply all four principles by building in paddocks, surrounded by other paddocks, that do not pose an extreme bushfire risk. There are also no incompatible environmental/biodiversity implications.

2.2 Bushfire Hazard and Identification Assessment Strategies

These strategies require the bushfire hazard be identified and an appropriate risk assessment be undertaken.

2.2.1 *Applying the best available science to identify vegetation, topography and climatic conditions that create a bushfire hazard*

This report identifies the bushfire hazard and applies the standard site assessment methodology used in AS 3959:2018 (Standards Australia 2018), which is applied to developments in the BPA and BMO and is based on the best available science. The bushfire modelling inputs that form the basis for this

methodology factor in vegetation type (e.g. Forest, Woodland, Grassland), potential fuel-loads in a long-unburnt vegetation community, weather conditions on higher bushfire risk days (e.g. wind speed, fuel moisture content, days since last rainfall) and the effect of slope gradient on the way fire travels through unmanaged vegetation.

The site assessment process and desktop assessment using GIS software has determined the most appropriate vegetation type and commensurate slope category for each section/aspect of unmanaged vegetation (Attachment 5), which has produced the requisite defendable space for BAL-12.5 construction across the study area (Attachment 6).

2.2.2 *Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under the Act*

The BPA applies to the entire study area and wider area due to the presence of pastures (i.e. Grassland) across the landscape. The BPA covers an extensive area east of Melbourne across largely agricultural and horticultural landscapes, with the closest area not covered by the BPA being Riddell's Creek approximately nine kilometres to the north-west of the study area and the Sunbury township eight kilometres south of the study area.

2.2.3 *Applying the Bushfire Management Overlay to areas where the extent of vegetation can create an extreme bushfire hazard*

The BMO has not been applied to the study area or within one kilometre of it, which highlights that the study area or the surrounding properties are not considered to contain an extreme fire hazard.

2.2.4 *Considering and assessing the bushfire hazard on the basis of:*

- *Landscape conditions – meaning the conditions in the landscape within 20 kilometres from a site;*
- *Local conditions – meaning the conditions in the area within approximately 1 kilometre from a site;*
- *Neighbourhood conditions – meaning conditions in the area within 400 metres of a site; and*
- *The site for the development*

<u>Landscape, local and neighbourhood conditions</u>

The bushfire hazard assessment identifies the broader landscape as being a Landscape Type One in which there is little treed vegetation beyond 100-metres of the study area, and extreme bushfire behaviour is not possible. The wider landscape scale (Attachment 1) is characterised by agricultural land and rural residential properties, while the townships of Sunbury (10 kilometres to the south) and Riddells Creek (nine kilometres by road to the north-west) are near the study area and easily accessible. Contiguous forested vegetation is found approximately 11 kilometres north-west on the opposite side of Riddells Creek within the Macedon Ranges (Attachment 1), which can still produce embers that may impact the study areas. However, these would likely be relatively sparse (compared with locations much closer to a fire) and require a favourable wind direction in order to reach the study area.

At the local (Attachment 2) and the neighbourhood scales (Attachment 3), the landscape context highlights the dominance of agricultural properties and rural residential properties. Grassland vegetation can be found at this level within the surrounding paddocks on all aspects and some treed/shrubby vegetation is observed within Jacksons Creek to the west. However, given the limited fuel available within surrounding Grassland vegetation and the riparian nature of the vegetation within the creek itself, the likelihood of a fire reaching the severity required to impact a development is largely reduced.

While there is potential for embers to impact the site from a forest fire within the Macedon Ranges to the north-west, the vegetation between the site and the bushfire hazard at the landscape, local and neighbourhood scales to the north-west and south-west (i.e. the directions of approach most associated with severe bushfire behaviour) is highly fragmented and is intersected by roads, rural residential properties and grazed/cropped agricultural land, which all reduce the overall possibility of a landscape scale fire impacting the study area (Attachments 2 to 4).

Site conditions

The bushfire hazard site assessment describes the bushfire hazard within 100 metres of the study area through vegetation and slope classification in accordance with the site methodology in AS 3959:2018 (Standards Australia 2018). The assessment shows that buildings within the development can achieve a BAL-12.5 construction standard and provide the commensurate defendable space within and adjoining the study area boundaries.

Classified vegetation within the study area and 100-metre assessment zone comprises Grassland. Grassland in the form of paddocks is found in all directions (Plate 1; Plate 2), with Grassland also being found adjoining the study area's eastern boundary along the road reserve (Plate 4; Attachment 5). The remaining areas on Attachment 5 are excluded, as they are either low threat vegetation or non-vegetated areas (Plate 3) (Standards Australia 2018, Section 2.2.3.2). The topography is considered flat within the 100-metre assessment zone on all aspects (Attachment 5).

The defendable space requirements in accordance with Table 2 to Clause 53.02-5 for each development area are shown in Table 1 below. The vegetation classification is presented in Attachment 5, while the commensurate defendable space distances are shown in Attachment 6.

Table 1. Defendable space calculations for the development area using Table 3 to Clause 53.02-5.

Aspect	North	East	South	West
Vegetation Classification	Grassland	Grassland	Grassland	Grassland
Slope	Upslope / Flat land	Upslope / Flat land	Upslope / Flat land	Upslope / Flat land
BAL Construction Standard	BAL-12.5	BAL-12.5	BAL-12.5	BAL-12.5
Defendable Space Distance	19-metres	19-metres	19-metres	19-metres

2.2.5 *Consulting with emergency management agencies and the relevant fire authority early in the process to receive recommendations and implement appropriate bushfire protection measures*

While the proponent has not liaised with the Council or CFA at these early stages, they plan to liaise with both Council and CFA regarding vegetation management, water and access requirements and how best to implement mitigation measures into the design during the detailed design phase of the development. This dialogue will ensure that emergency management agencies are aware of the development's progress and are able to discuss certain design aspects and provide guidance where necessary.

2.2.6 *Ensuring that strategic planning documents, planning scheme amendments, planning permit applications and development plan approvals properly assess the bushfire risk and include appropriate bushfire protection measures*

Clause 13.02-1S, Clause 44.06, Clause 53.02, DELWP advisory and practice notes (DELWP 2017a, 2017b, 2018), CFA guidance note (CFA 2015) and the building regulations (i.e. AS 3959:2018) regarding bushfire matters have been referred to when assessing the bushfire risk. The standards and requirements provided in these documents have been addressed through several bushfire mitigation measures.

2.2.7 *Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied, or bushfire protection measures can be adequately implemented*

Several bushfire mitigation measures will be implemented as part of the study area's development, which include implementing all the access and water supply requirements stipulated under the planning scheme, constructing all dwellings within the development to a BAL-12.5 construction standard and ensuring all vegetation within the development will be maintained in a low threat state (i.e. lawn maintained to less than 100 millimetres in height, ornamental gardens, communal open spaces). Access will also ensure adequate occupant egress and emergency vehicle access opportunities and a compliant hydrant network will need to be supplied.

The CFA specifies four situations where development should not proceed, which include:

- '*Isolated settlements where the size and/or configuration of the settlements will be insufficient to modify fire behaviour and provide protection from a bushfire;*
- *Where bushfire protection measures will not reduce the risk to an acceptable level;*
- *Where evacuation (access) is severely restricted; and*
- *Where the extent and potential impact of required bushfire protection measures may be incompatible with other environmental objectives or issues, e.g. vegetation protection, land subject to erosion or landslip.*' (CFA 2015, pp.5-6)

None of the above criteria apply to the study area.

2.3 Settlement Planning Strategies

These strategies plan to strengthen the resilience of settlements and communities and prioritise protection of human life.

2.3.1 *Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018)*

The individual buildings at the periphery of the development blocks have been located so they can achieve a radiant heat flux of 12.5 kilowatts/square metre (Attachment 5), which aligns with a BAL-12.5 construction standard.

The 19-metre separation distance in response to Grassland to achieve a BAL-12.5 construction standard for the residential lots is outside the study area boundary where it adjoins Grassland vegetation (Attachments 5; Attachment 6). The separation distance overlaps existing paddocks to the north, south and south-west, which will be managed in a low-threat state (i.e. maintained less than 100 millimetres in height) during the fire danger period be the adjoining property owners. Management of the paddocks adjoining the study area is already part of a management agreement between the proponent and farm owners as part of ongoing bushfire protection works.

The 19-metre separation distance along the Melbourne-Lancefield Road reserve is proposed to be maintained in a low-threat state during the fire danger period by the proponent before and during the construction phase to ensure the development remains presentable for prospective lot buyers. It is envisaged that the management of this grass strip will be passed to Council after a certain period following development completion. This proposed management action will need to be discussed with Council.

2.3.2 *Ensuring the availability, and safe access to, areas assessed as a BAL-LOW rating under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018) where human life can be better protected from the effects of bushfire*

Moving more than 50 metres away from Grassland vegetation and into areas containing non-vegetated areas such as buildings, roads, carparks and footpaths, and low threat vegetation such as managed lawns, ornamental gardens and public open spaces, are considered part of a landscape rated as BAL-LOW (Standards Australia 2018). Moving towards the centre of the township (which would include the existing township and proposed development area) and away from the Grassland adjacent to the study area would therefore provide ample space in which human life would be better protected from the effects of fires (Attachment 6). Alternatively, occupants will have immediate access to the built-up areas of Riddells Creek to the north-west and Sunbury to the south. The closest Neighbourhood Safer Place is within the Riddells Creek township approximately 10 kilometres by road (Attachment 2).

2.3.3 *Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development*

The development of this subdivision is not expected to increase bushfire risk to existing and future residents, property or community infrastructure. The buildings will be separated from unmanaged Grassland vegetation by 19 metres in accordance with a BAL-12.5 construction standard, with the separation distance being entirely comprised of a perimeter road for many of the outer lots. The development will also contain entirely low threat vegetation (i.e. managed lawns, and landscaping) and non-vegetated areas (i.e. buildings, roads, carparks, footpaths). These measures will reduce the fire risk within the study area and therefore provide fire behaviour and management benefits for the existing buildings as well as for future residents and businesses.

2.3.4 *Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reducing bushfire risk overall*

The development of the study area will result in a reduction in the overall fuel available in the landscape due to the replacement of Grassland with a subdivision, which will contain associated low threat vegetation (e.g. nature strips, landscaping) and non-vegetated areas (e.g. buildings, roads, carparks, footpaths). There will be no net increase in risk to infrastructure as a result of the development, as appropriate bushfire mitigation measures will be implemented. These include providing enough separation distance to facilitate BAL-12.5 construction, access/egress points and hydrants.

2.3.5 *Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction*

This report addresses the bushfire hazard posed to the study area at a range of scales in Section 2.2.4.

The potential for ember attack to influence fire behaviour at the site level on severe fire weather days is relatively low due to the lack of contiguous vegetation within the local and neighbourhood scales. If a fire were to approach from the north-west or south-west, i.e. the most likely directions of fire attack on severe fire weather days, it would be moderated by the short pasture grasses/crops present within the agricultural properties in the surrounding area, several roads, the trainline to the south-west and managed vegetation within the Clarkefield township.

2.3.6 *Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis*

No alternative low risk locations have been assessed as part of this proposal, as the study area is the logical location to expand the township.

2.3.7 *Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959:2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia 2018)*

Not applicable – the study area is for a residential subdivision and does not require or include a strategic planning document, local planning policy or planning scheme amendment.

2.4 Areas of Biodiversity Conservation Value Strategy

This strategy directs growth away from unacceptable biodiversity impacts.

2.4.1 *Ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value*

The study area currently consists of unmanaged exotic pasture grasses with very little biodiversity value (Attachments 5).

2.5 Use and Development Control in a Bushfire Prone Area Strategy

These strategies require certain developments in the BPA to consider the bushfire risk and potential impacts.

2.5.1 *In a bushfire prone area designated in accordance with regulations made under the Building Act 1993, bushfire risk should be considered when assessing planning applications for the following uses and development:*

- *Subdivisions of more than 10 lots.*
- *Accommodation*
- *Child care centre*
- *Education centre*
- *Emergency services facility*
- *Hospital*
- *Indoor recreational facility*
- *Major sports and recreation facility*
- *Place of assembly*
- *Any application for development that will result in people congregating in large numbers*

The development is entirely within the BPA and falls under the category of 'Subdivision of more than 10 lots'. The site assessment methodology and commensurate separation distances in AS 3959:2018 (Standards Australia 2018) have been applied to ensure all future proposed dwellings will achieve a

BAL-12.5 construction, which is considered appropriate given the low bushfire risk within the immediate and surrounding landscape.

2.5.2 *When assessing a planning permit application for the above uses and development:*

- *Consider the risk of bushfire to people, property and community infrastructure*
- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts*

These considerations have been discussed throughout Section 2. The risk of a grassfire impacting the study area is low (highly unlikely as anything more than embers or radiant heat), and as such, bushfire mitigation measures have been adequately implemented. These include all buildings within the development achieving a BAL-12.5 construction standard.

The risk of a bushfire and/or grassfire impacting the study area is minimal due to the local landscape context. Given the limited fuel available, the riparian nature of the vegetation in Jacksons Creek to the west and the surrounding Grassland, the likelihood of a fire reaching the severity required to impact a development is very low. That being said, the development accounts for any potential hazard by achieving a BAL construction standard of BAL-12.5 and the commensurate separation distance (Attachment 6).

3 Conclusion

This report has assessed the bushfire hazard within the study area and in the wider landscape in accordance with Clause 13.02-1S of the Macedon Ranges Planning Scheme and the bushfire site assessment methodology provided in AS 3959-2018 (Standards Australia 2018).

The wider landscape (Attachment 1) is characterised by agricultural land and rural residential properties, while the townships of Sunbury (10 kilometres to the south) and Riddells Creek (nine kilometres to the north-west) are in close proximity to the study area. Contiguous forested vegetation is found approximately 11 kilometres to the north-west within the Macedon Ranges (Attachment 1). At the local scale (Attachment 2) and the neighbourhood scale (Attachment 3), the landscape context highlights the dominance of agricultural properties and rural residential properties. Grassland vegetation can be found at these scales within the surrounding paddocks on all aspects and some vegetation is observed within Jacksons Creek to the west. However, given the limited fuel available, the riparian nature of the vegetation within the creek and surrounding Grassland vegetation the likelihood of a fire reaching the severity required to impact a development is very low.

While there is potential for embers to impact the site from a forest fire within the Macedon Ranges to the north-west, the vegetation between the site and the bushfire hazard at the landscape, local and neighbourhood scales to the north-west and south-west (i.e. the directions of approach most associated with severe bushfire behaviour) is highly fragmented. The landscape is intersected by roads, rural residential properties, cropped/grazed agricultural land, a trainline to the south-west and the existing Clarkefield township, which all reduce the overall possibility of a landscape scale fire impacting the study area (Attachments 2 to 4).

Several mitigation measures have been engaged to reduce the grassfire risk to an acceptable level. These include the provision of access/egress points for the study area from the established road network, including perimeter roads across much of the development, ensuring the internal study area road network meets CFA access requirements, providing two access points for emergency vehicles and the installation of a hydrant network. All dwellings will achieve a BAL-12.5 construction standard, which is considered acceptable given the low bushfire risk to the development based on the site, local and landscape conditions. Vegetation within the study area and separation distance along Melbourne-Lancefield Road will be managed in a low-threat state by the proponent until such time management is transferred to the landowner, while vegetation within the adjoining private properties will be managed by that property owner under an existing bushfire protection agreement.

The proposed subdivision will decrease the bushfire risk to the surrounding areas, as the construction of buildings, roads, carparks, footpaths and managed vegetation will reduce the fuel available to burn.

4 Site Photos

Plate 1. Crops in the field north of the study area (Ecology and Heritage Partners Pty Ltd 31/07/2018).

Plate 2. Pasture grass within the paddocks west of the study area (Ecology and Heritage Partners Pty Ltd 31/07/2018).

Plate 3. Dwellings along Station Street (Ecology and Heritage Partners Pty Ltd 31/07/2018).

Plate 4. Grass within the Melbourne-Lancefield Road reserve (Ecology and Heritage Partners Pty Ltd 31/07/2018).

5 References

CFA 2006. *Requirements for Water Supply and Access for Subdivisions in Residential 1 and 2 and Township Zones*. Country Fire Authority, Burwood East, Victoria.

CFA 2011. Landscaping for bushfire: Garden design and plant selection, Country Fire Authority, Burwood East, Victoria.

CFA 2015. *FSG LUP 008 Land Use Planning: Strategic Land Use Planning - Bushfire*. Country Fire Authority, Burwood East, Victoria.

DELWP 2018. *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68. Department of Environment, Land, Water and Planning, East Melbourne, Victoria.

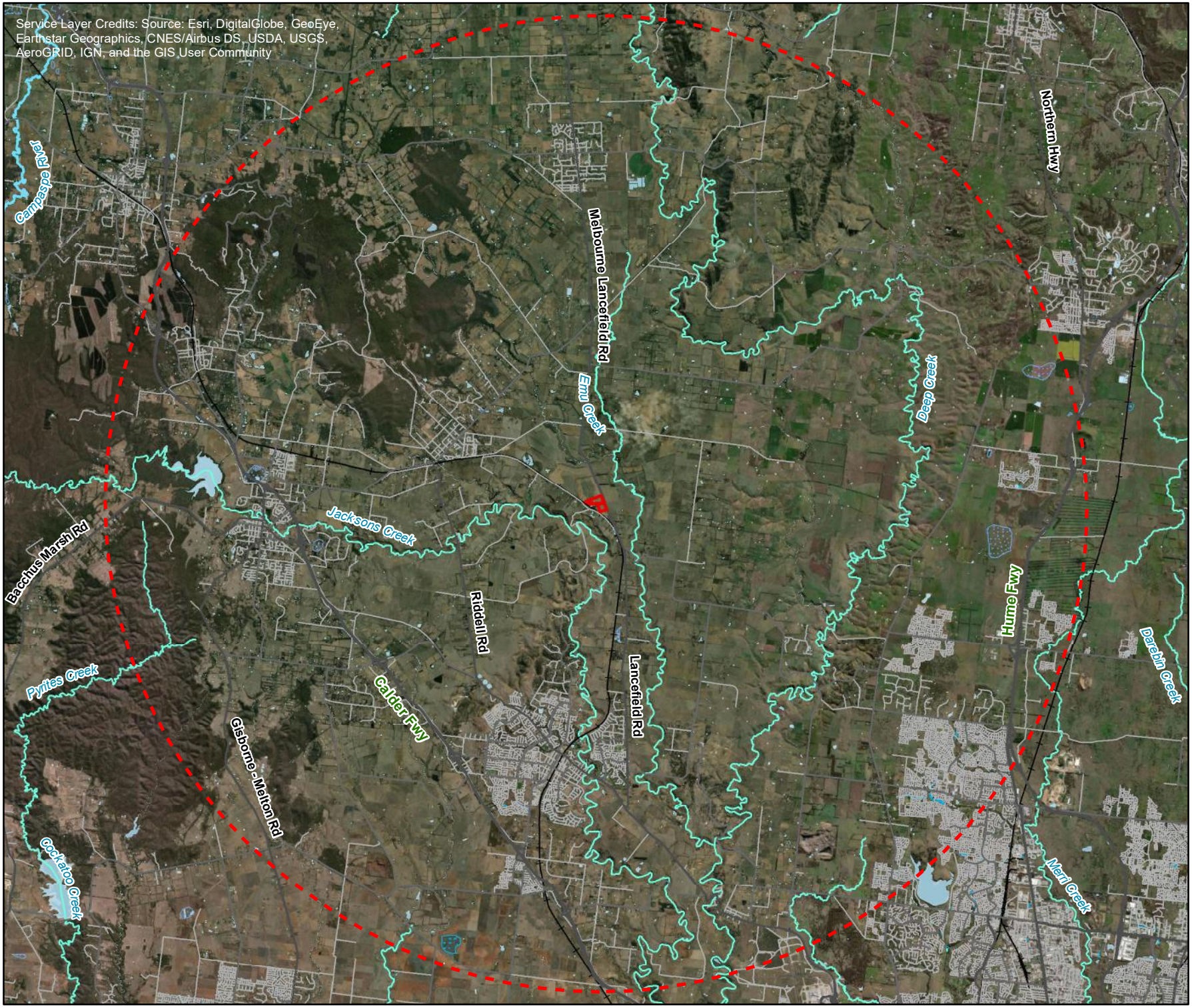
DELWP 2020a. Planning Maps Online, Department of Environment, Land, Water and Planning, East Melbourne, Victoria. Accessed 16/07/2020. URL http://services.land.vic.gov.au/landchannel/jsp/map/PlanningMapsIntro.jsp

DELWP 2020b, NatureKit, Department of Environment, Land, Water and Planning, East Melbourne, Victoria. Accessed 16/07/2020. URL http://maps.biodiversity.vic.gov.au/viewer/?viewer=NatureKit

DTPLI 2013. *Bushfire Management Overlay Mapping Methodology and Criteria*. Planning Advisory Note 46. Department of Transport, Planning and Local Infrastructure. Melbourne, Victoria.

Standards Australia 2018. *AS 3959:2018 Construction of buildings in bushfire-prone areas*. SAI Global Limited, Sydney, New South Wales.

6 Attachments



Legend

- Study Area
- 20km Landscape Assessment Zone
- Freeway and Major Roads
- Collector Road
- Minor Road
- Minor Watercourse
- Major Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp

Attachment 1

Bushfire Hazard Landscape Assessment

Clarkefield Township

N

0 3 6

Kilometres

Map Scale: 1:210,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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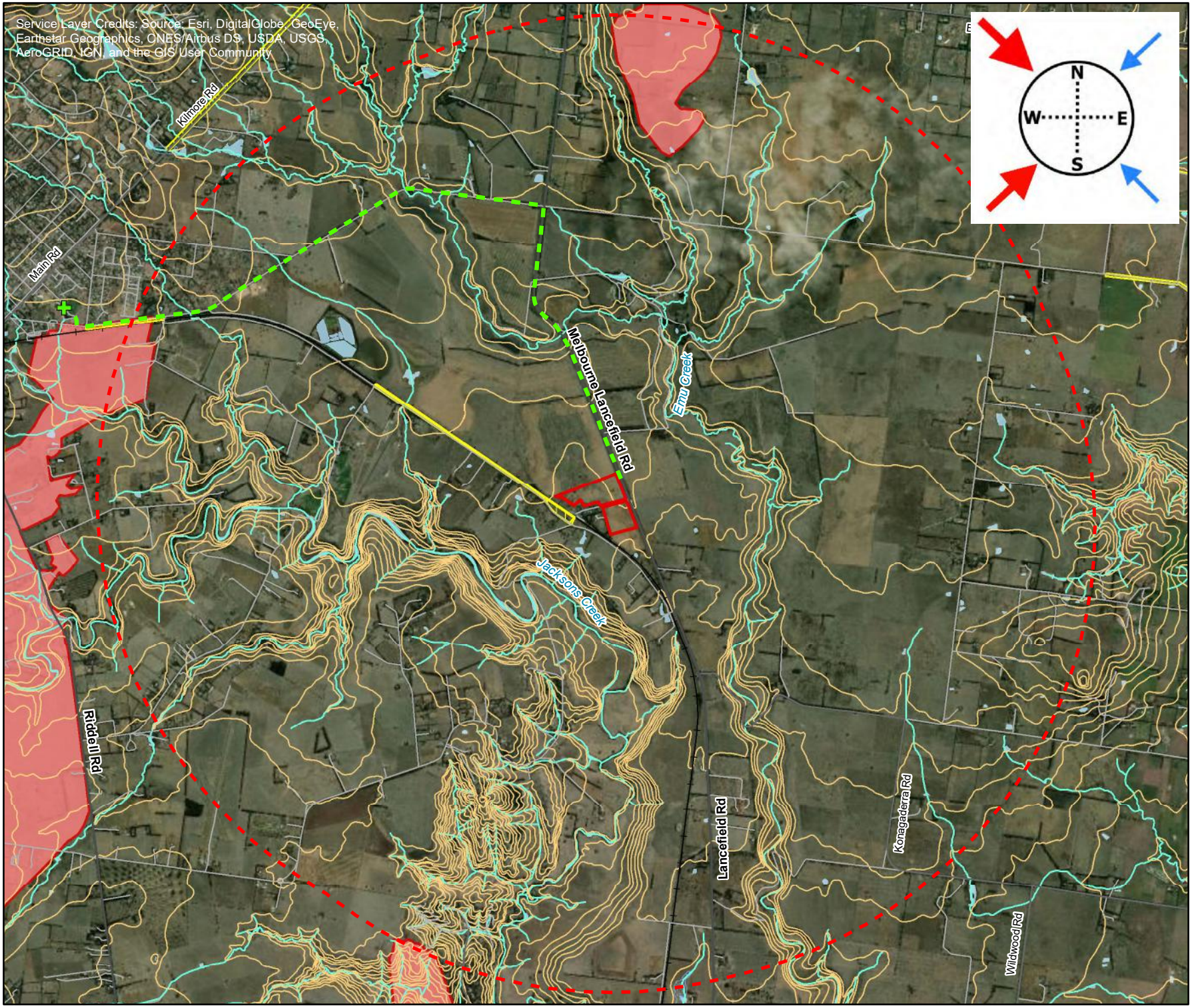

Legend

- Study Area
- 5km Assessment Zone
- Freeway and Major Roads
- Collector Road
- Minor Road
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Contour (10m)

Fire History

- Bushfires since 2013
- DELWP Planned Burn Area (2017-2019)

Neigbourhood Safer Place

- Neighbourhood Safer Place
- Access to Neighbourhood Safer Place

Attachment 2

Fire History and Neighbourhood Safer Place Assessment

Clarkefield Township

N

0 750 1,500

Metres

Map Scale: 1:55,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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14116_2_FH_NSP_Assessment_G20 15/07/2020 melsley

Legend

- Study Area
- 1km Local Assessment Zone
- Freeway and Major Roads
- Minor Road
- Minor Watercourse
- Permanent Waterbody
- Contour (10m)

Attachment 3

Bushfire Hazard Local Assessment

Clarkefield Township

N

0 200 400

Metres

Map Scale: 1:14,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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14116_3_Loc_Assessment_G20 14/07/2020 melsley

Legend

- Study Area
- 400m Neighbourhood Assessment Zone
- Freeway and Major Roads
- Minor Road
- Minor Watercourse
- Permanent Waterbody
- Contour (10m)

Attachment 4

Bushfire Hazard Neighbourhood Assessment

Clarkefield Township

N

0 100 200

Metres

Map Scale: 1:8,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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14116_4_NH_Assessment_G20 15/07/2020 melsley

Aerial source: Nearmap 2020

Legend

- Study Area
- 100m Site Assessment

Other features

- Permanent Waterbody
- Contour (10m)
- Major Road
- Minor Road
- Walking Track

Classified vegetation

- Grassland

Attachment 5

Bushfire Hazard Site Assessment

Clarkefield Township

Site Size: 22.95 ha

N

0 75 150

Metres

Map Scale: 1:5,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

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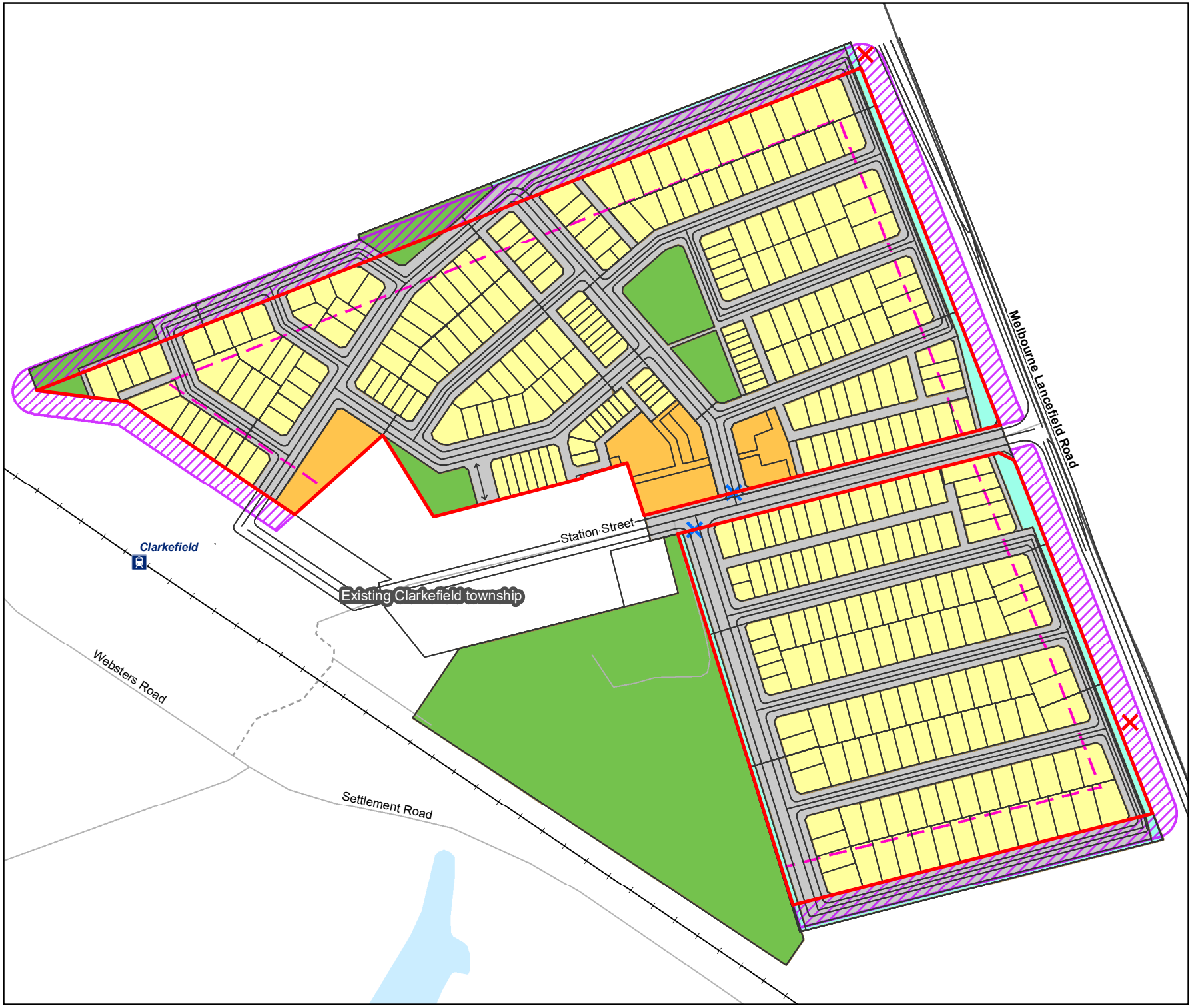
14116_5_Site_Assessment_G20 15/07/2020 melsley

Aerial source: Nearmap 2020



Legend

Study Area

Development plan

- Lot
- Super lot
- Road
- Public open space landscape reserve
- Public open space other
- Overall development plan
- Bollarded emergency vehicle access point. Not for public use
- Access

Bushfire mitigation measures*

- 19m separation distance from Grassland to achieve BAL-12.5
- 50m separation distance from Grassland to achieve BAL-LOW

Other features

- Permanent Waterbody
- Major Road
- Minor Road
- Proposed Road

*All lots and public open space are expected to be managed in a low-threat state in perpetuity as reasonably expected as part of any urban development

Attachment 6

Bushfire Management Plan

Clarkefield Township

N

0 50 100

Metres

Map Scale: 1:4,000 @ A4
Coordinate System: GDA2020 MGA Zone 55

ecology & heritage partners

14576_6_Mgmt_Plan_G20_fm14116 18/03/2022 spannipitiya