



AUSTRALIAN BUSHFIRE CONSULTING SERVICES



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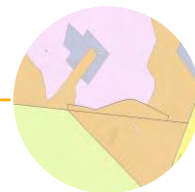
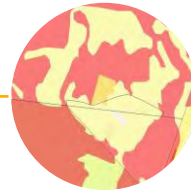
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Bush Fire Assessment Report



Water & Wastewater Infrastructure Kings Hill Urban Release Area NSW

8th September 2019
Reference 19-175

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Abbreviations:

ABCS	Australian Bushfire Consulting Services Pty Ltd
APZ	Asset Protection Zone
AS3959 - 2009	Australian Standard 3959 – 2009 Construction of buildings in bushfire prone areas including amendments 1-3
AS3959 - 2019	Australian Standard 3959 – 2018 Construction of buildings in bushfire prone areas
BAL	Bushfire Attack Level
BCA	Building Code of Australia
BPMs	Bushfire Protection Measures
BPLM	Bushfire Prone Land Map
Council	Port Stephens Council
DA	Development Application
EP&A Act	Environmental Planning and Assessment Act - 1979
ESD	Ecologically Sustainable Development
FR NSW	Fire & Rescue NSW
IPA	Inner Protection Area
LGA	Local Government Area
NCC	National Construction Codes
NP	National Park
NSP	Neighbourhood Safer Place
OPA	Outer Protection Area
PBP 2006	Planning for Bush Fire Protection – 2006
PBP 2019	Draft Planning for Bushfire Protection – 2019
ROW	Right of Way
RF Act	Rural Fires Act - 1997
RFS	NSW Rural Fire Service
SEARs	Planning Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply
URA	Urban Release Area
WPS	Wastewater Pumping Station

1.0 Introduction.

"Kings Hill Development Pty Ltd (KHD) is seeking approval for the development of a water and waste water supply pipeline and a waste water pumping station (the Proposal) to support the development of the Kings Hill Urban Release Area (Kings Hill URA).

The Kings Hill URA was rezoned in 2010 to support a mix of general residential, mixed use and local centre land uses. It is expected to comprise in excess of 3,500 residential dwellings developed over a twenty-five-year period. Key development features of the Kings Hill URA will also include the provision of utilities and supporting infrastructure, including a Pacific Highway grade separated interchange, stormwater channel and water and wastewater infrastructure. There is currently no water and wastewater infrastructure present with the capacity to service Kings Hill URA.

An Environmental Impact Statement (EIS) is to be prepared for the Proposal seeking approval as Designated Development under Part 4 of the Environmental Planning and Assessment 1979 (EP&A Act).

The key components of the Proposal would include:

- Installation of a water and wastewater pipelines, approximately 6.7km and 4.2km in length, respectively. These pipelines would be located within a joint corridor. This would require vegetation clearing, trenching and underboring for the pipes to be laid.*
- Construction of a wastewater pumping station (WWPS) within the eastern catchment of Kings Hill URA, including installation of electrical components, mechanical installation of pumps, valves and fittings, and construction of adjacent hardstand areas.*
- Restoration of area upon completion of pipe laying, including backfilling the trench and restoring all surfaces to their pre-construction condition where practicable.*
- Connection of the proposed infrastructure to existing Hunter Water services.*

The water pipeline would connect to existing Hunter Water infrastructure in the south and the Kings Hill URA in the north, while the wastewater pipeline would connect to the proposed WWPS in Kings Hill URA and existing Hunter Water infrastructure in the south.

The Proposal is located within Port Stephens Local Government Area (LGA), approximately 4 kilometres north of Raymond Terrace, 25 kilometres north of Newcastle and 135 kilometres north of Sydney. The Proposal stretches approximately 6.7 kilometres (the Proposal Site) between Raymond Terrace in the south, and Kings Hill URA in the north".

Arcadis 2019
Project information for technical specialists

The NSW RFS have provided advice that the Environmental Impact Study should address the following bush fire considerations regarding bush fire protection measures for the proposed development:

- mapped bush fire prone land within 140 metres of the infrastructure footprint;*
- potential ignition risks from infrastructure installation and operation;*
- strategies to minimise identified ignition risks and to facilitate firefighting operations.*

NSW RFS Ref19073119832AB
13 August 2019

This report has considered all mapped and unmapped bushfire hazards within 140 metres of the infrastructure footprint and the potential risks of ignition from infrastructure operation. To minimise identified ignition risks and to facilitate firefighting operations during operation this report recommends minimisations strategies including the provision of asset protection zone and advice on construction materials and services supply.

Recommendations have also been included to address bushfire safety within the future Safe Work Operating Procedures during installation operational activity (including plant and equipment).

2.0 Property details.

Address: Kings Hill URA & Raymond Terrace NSW.
LGA: Port Stephens Council.

3.0 Legislative context.

The proposal is seeking approval as Designated Development under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). In preparing the environmental assessment requirements for a Part 4 application, the Planning Secretary is to consult relevant public authorities. They must have regard to the need for the requirements to assess any key issues raised by those public authorities.

The project traverses areas mapped as bushfire prone land. The wastewater pumping station is located within an area mapped as buffer zone from Category 1 Vegetation. Consequently, the Planning Secretary's Environmental Assessment Requirements (SEARs) is that the Environmental Impact Assessment includes;

bushfire – including an assessment of the risk of bushfire, including addressing the requirements of Planning for Bush Fire Protection 2006 (RFS). Any proposed Asset Protection Zones must not adversely affect environmental objectives (e.g. buffers).

The aims of PBP 2006 are to *provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bush fire, while having due regard to development potential, on-site amenity and protection of the environment.* This is achieved by determining available asset protection zones, applying the relevant construction requirements, ensuring adequate access and egress has been considered, providing safe service supply with adequate water provisions for occupants and attending emergency services.

This assessment and report has also considered the *Draft Planning for Bush Fire Protection 2019* and the newer construction standard *AS3959 – 2018 Construction of buildings in bushfire prone areas*, both of which are as yet not captured by legislation. These standards are expected to be formally gazetted in September 2019.

The following legislative standards and guidelines pertinent to development on bushfire prone land have been considered:

- AS3959 – 2009 Construction of buildings in bushfire prone areas,
- AS3959 – 2018 Construction of buildings in bushfire prone areas,
- Planning for Bush Fire Protection 2006,
- Pre-release Planning for Bush Fire Protection 2019,
- Rural Fires Act 1997,
- Rural Fires Regulation 2013,
- Environmental Planning and Assessment Act 1979.

4.0 Referenced documents and people.

The following documents have been referenced in the preparation of this report;

- Port Stephens Local Environmental Plan 2013,
- Port Stephens Development Control Plan 2012, incl. part D14 Kings Hill Raymond Terrace
- Port Stephens Council Bushfire Prone Land Map,
- 10/50 Vegetation Clearing Code of Practice,
- NSW RFS Guide for bush fire prone land mapping V5b Nov 2015,
- Ocean Shores to Desert Dunes – David Andrew Keith 2004,
- Plans titled Development Application Masterplan by Northrop Reference NL120526 Dwg SK-22-C1.00, SK-22-C1.01, SK-22-C1.02, & DA-08-C3.00,
- Hunter Water / Sewerage Standard SCP-606 Sewerage Pumping Stations,
- Hunter Water / Sewerage Standard SCP-1003 Educt Vent Shaft and holding down bolt detail,

- Hunter Water / Water and Sewer Design Manual / Section 4 Small to medium submersible sewerage pumping stations and sewer rising mains,
- Hunter Water / Water and Sewer Design Manual / Section 5 Water Pumping Stations,
- Hunter Water Planning Secretary's Environmental Assessment Requirements No 1291.

Consultation with Malcolm Withers at Hunter Water regarding the flammability of educt pipe gas's and / or the need for ember protection mesh instead of the standard bird protection mesh on vent pipes occurred and concluded that there was no requirement for the ember mesh.

5.0 Copyright, scope and disclaimer.

This assessment of possible bushfire impact (including smoke, ember, radiant heat and flame contact) and compliance with other matters such as access and service supply is pertinent to the Water & Wastewater Infrastructure proposal for Kings Hill URA only. Where reference has been made to the surrounding lands, this report does not assess impact to those lands rather it is an assessment of possible bushfire progression and impact on or from those lands towards the subject site.

Apart from any use permitted under the Copyright Act 1968 or contractual agreements between ABCS and Arcadis no part of this document, including any wording, images, or graphics, can be modified, changed or altered in any way without written permission from Australian Bushfire Consulting Services Pty Ltd. This report may only be referenced, distributed or forwarded to other parties in its original format.

The statements and opinions contained in this report are given in good faith and in the belief that such statements and opinions are correct and not misleading. AS3959 – 2009 states that “...*there can be no guarantee that a building will survive a bushfire event of every occasion. This is substantially due to the unpredictable nature and behaviour of fire and extreme weather conditions*”. The NSW RFS state “*Homes are not designed to withstand fires in catastrophic conditions*”. Correspondingly any representation, statement of opinion, or advice expressed or implied in this document is made on the basis that Australian Bushfire Consulting Services Pty Ltd is not liable to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement or advice made by Australian Bushfire Consulting Services Pty Ltd.



Image 01: Extract from PBP 2019 / Bushfire Protection Measures in combination.

FORMS OF BUSHFIRE ATTACK

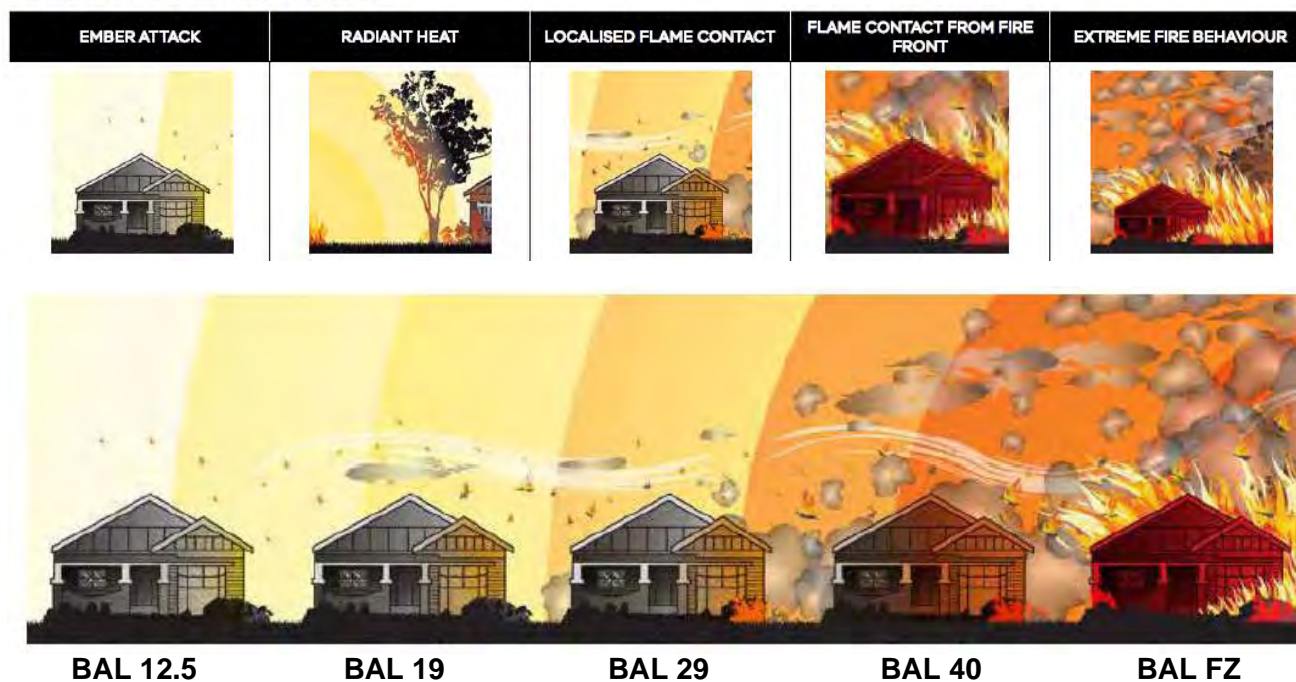


Image 02 & 03: Extract from *Planning Permit Applications, Bushfire Management Overlay. Technical Guide*, September 2017. Department of Environment Land Water and Planning, Victoria.

6.0 Images and maps.



Image 04: Draft Kings Hill Pipeline EIS study area

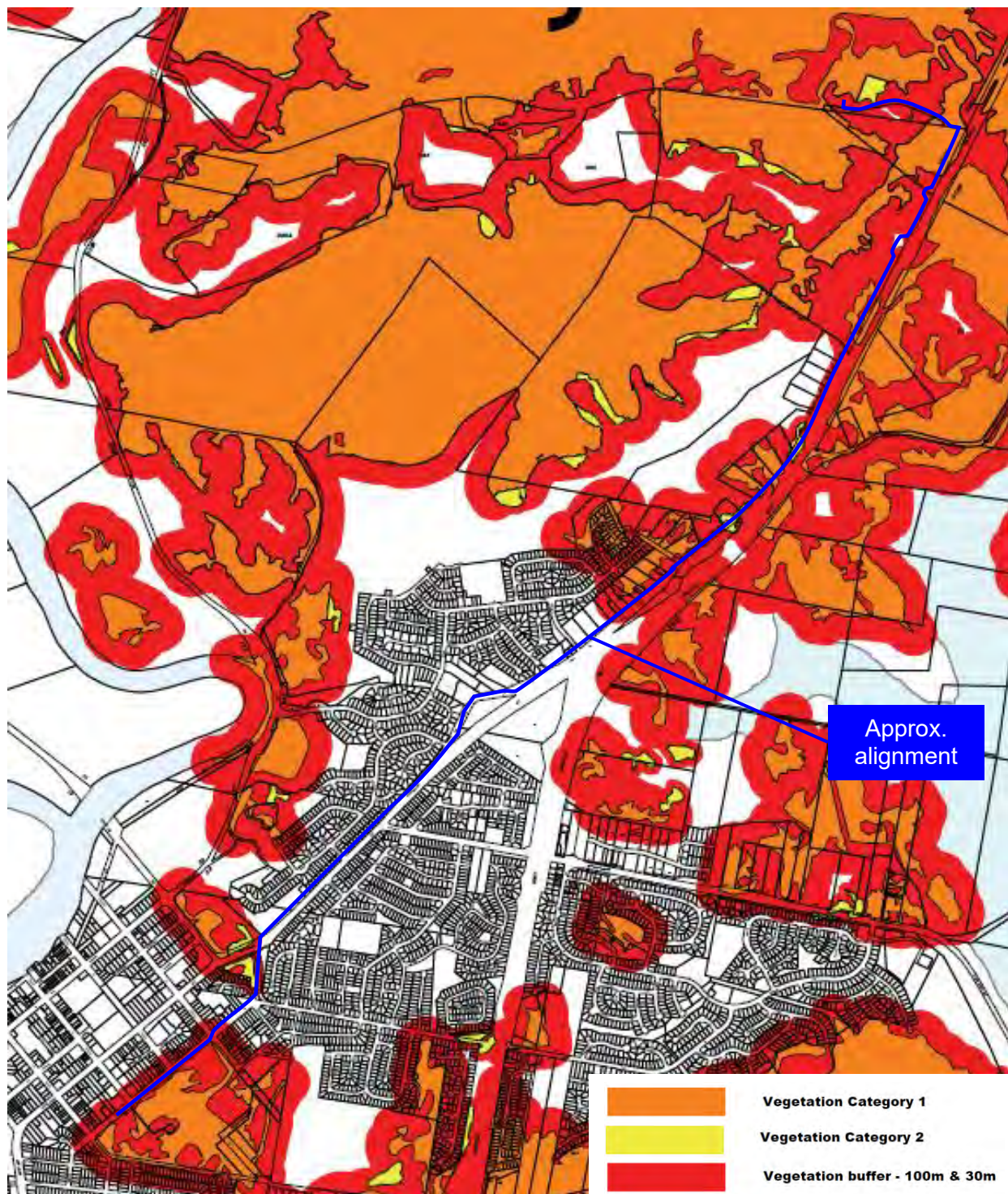


Image 05: Extract of Port Stephens Council's Bush Fire Prone Land Map

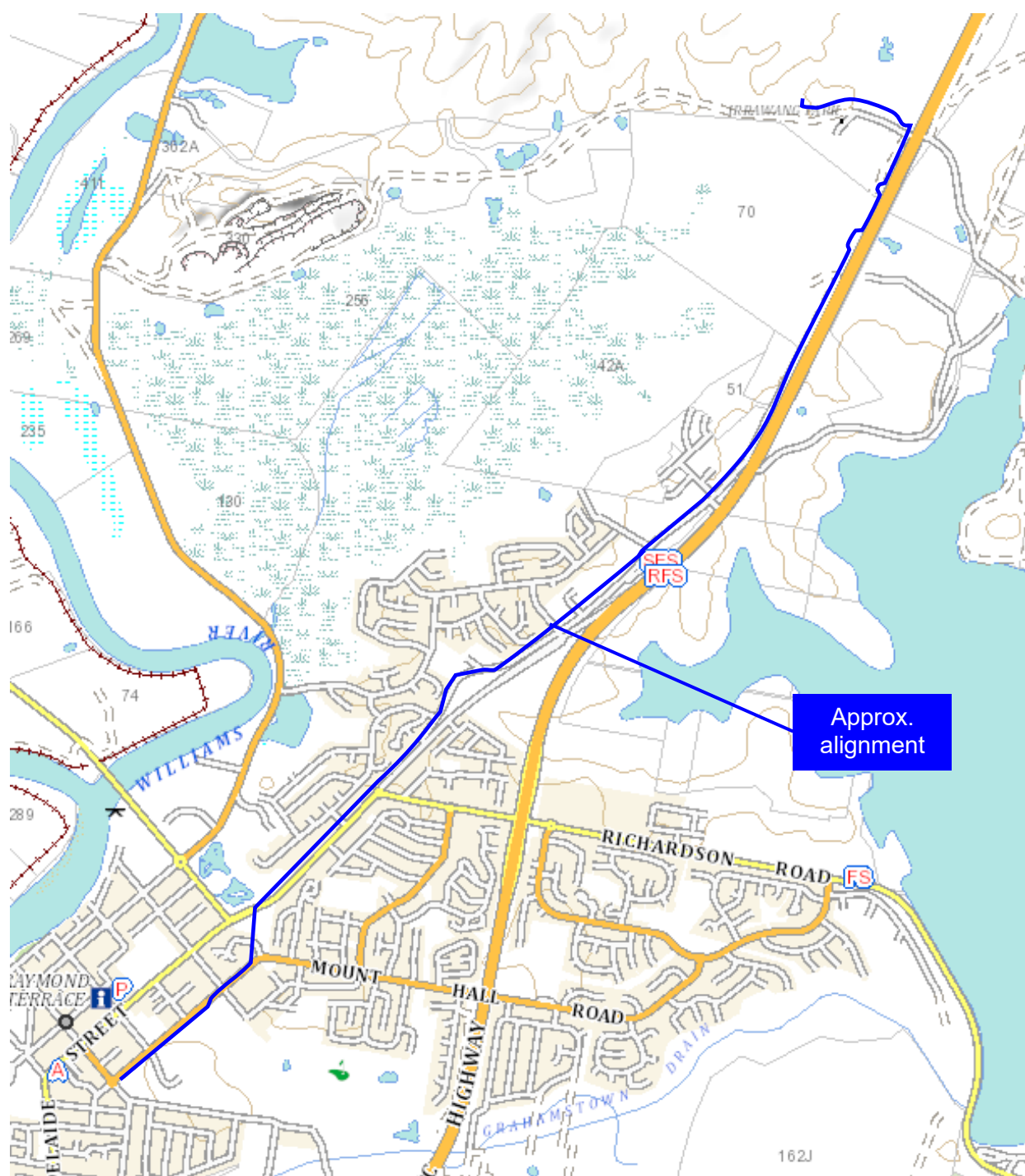


Image 06: Topographic image NSW Land & Property Information / Spatial Information Exchange



Image 07: Extract from street-directory.com.au



Image 08: Aerial image NSW Land & Property Information / Spatial Information Exchange

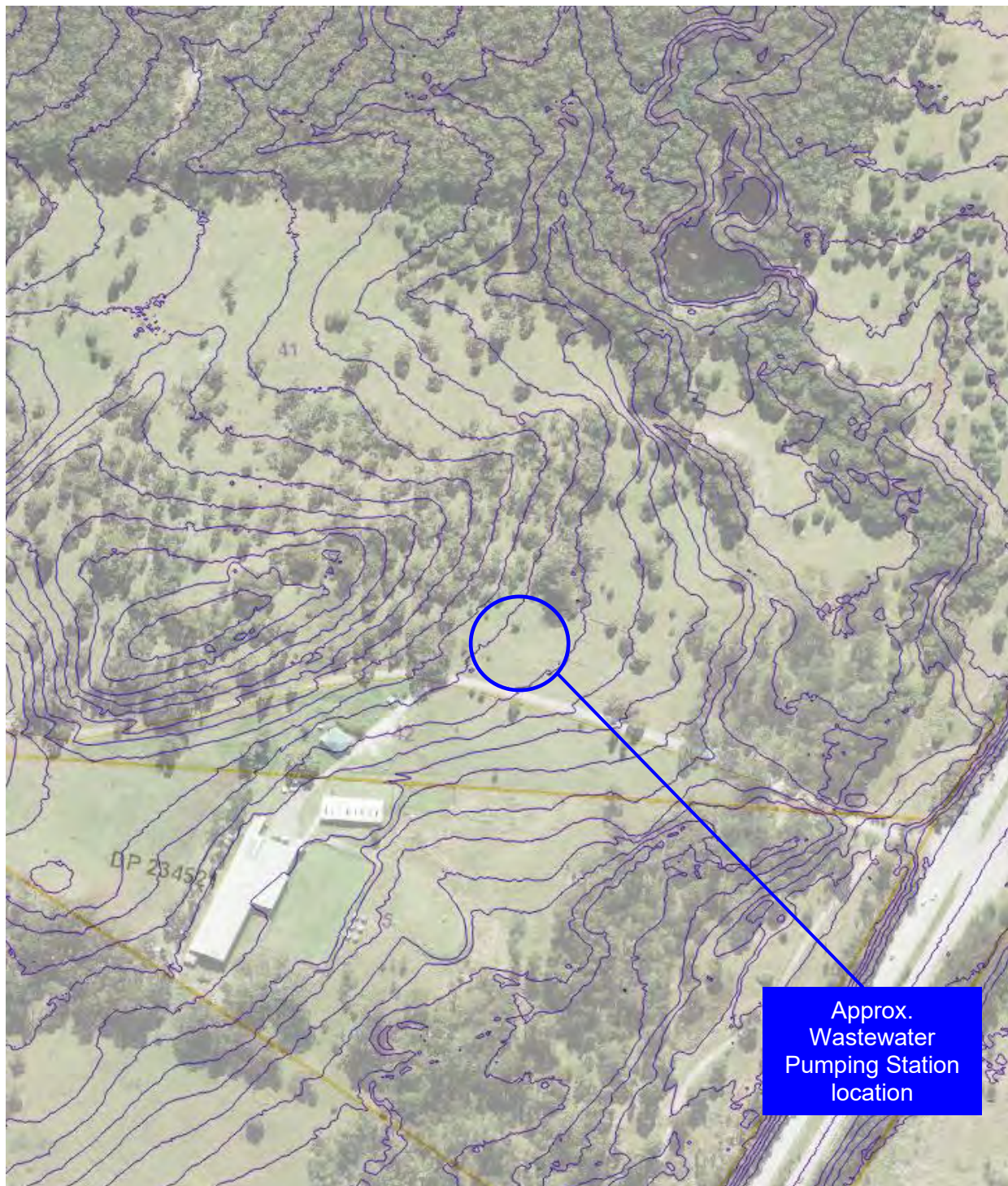


Image 09: 1 metre contour data from NSW Gov. Elevation Foundation Spatial Data

7.0 Bushfire hazard assessment

Properties considered to be bushfire prone land are identified on Councils Bushfire Prone Land Map as being:

- *within or within 100m of Category 1 (high) hazards or,*
- *within or within 30 m of Category 2 (low) hazards or,*
- *within or within 30 m of Category 3 (medium) hazards.*

The NSW RFS document PBP – 2006 is applicable to all development on bushfire prone land, this includes an assessment of the proposals adequacy in providing an appropriate combination of bushfire protection measures in terms of asset protection zones, landscaping, access and service supply. This document also provides a means of determining the necessary level of building construction under AS3959 - 2009. All development on bushfire prone land must be accompanied with a bushfire hazard assessment that includes;

- *a statement that the site is bush fire prone land, where applicable,*
- *the location, extent and vegetation formation of any bushland on or within 100 metres of the site,*
- *the slope and aspect of the site and of any bush fire prone land within 100 metres of the site, which may determine the likely path of any bush fires,*
- *any features on or adjoining the site that may mitigate the impact of a high intensity bush fire on the proposed development, and*
- *a statement assessing the likely environmental impact of any proposed Bush Fire Protection Measures.*
- *whether any building is capable of complying with AS 3959-2009 in relation to the construction level for bush fire protection.*

By incorporating bush fire protection measures into a development, the six objectives of PBP 2006 are addressed:

1. *afford occupants of any building adequate protection from exposure to a bush fire*
2. *provide for a defensible space to be located around buildings*
3. *provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition*
4. *ensure that safe operational access and egress for emergency service personnel and residents is available*
5. *provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ)*
6. *ensure that utility services are adequate to meet the needs of fire fighters (and others assisting in bush fire fighting).*

7.1 Site

The proposed development footprint covers an area from Irrawang Street, Raymond Terrace to the south-eastern corner of Kings Hill URA as shown on Image 04 and Attachment 01 of this report. The majority of the proposal relates to underground pipe network which is inconsequential to this bushfire assessment.

Components and infrastructure above ground considered as part of this review include a Wastewater Pumping Station located at the northern end of the proposal within Kings Hill URA and educt vent pipes at intervals along the route from Raymond Terrace.



Approximate
Wastewater
Pumping Station
location

Photograph 01: View northwest of proposed WWPS footprint within the southeast corner of Kings Hill URA

7.2 Vegetation

For the purpose of this assessment the educt vent shaft pipes are considered to be non-habitable ancillary development similar to Class 10a & 10b structures in the context of PBP 2006.

Class 10b buildings include a fence, mast, antenna, retaining or free-standing wall, swimming pool, or the like. At the planning level, class 10b buildings in bush fire prone areas (e.g. fencing) should be non-combustible

There is no bush fire protection requirement for Class 10a and 10b structures located more than 6m from a dwelling in bush fire prone areas. Where a Class 10a and 10b structure is located within 6m of a dwelling it must be constructed in accordance with the NCC

There is little risk of the ignition of the surrounding bushland by vent shafts in normal operational conditions. Considering the robust nature of the galvanised steel pipes, the need for a defendable space around the educt vents is superfluous. However, space may be provided by default during the installation inclusive of access provisions for inspection and maintenance arrangements.

The Wastewater Pumping Station WWPS includes aboveground and subsurface componentry as well as service supply (electricity) to the location. A bushfire impact assessment of the WWPS in terms of Appendix 3 of PBP 2006 is necessary to ensure the development meets the aims and objectives of PBP 2006.

The vegetation must be assessed out for a distance of 140 metres from the proposed development footprint and, where a mix of hazards is found the highest hazard is said to predominate.

The vegetation identified as being the hazard to the proposed WWPS footprint is within the future residential area to the north and west and within E2 Environmental Conservation land to the east and south. The vegetation to the north and west is grassy woodland within grazed pastures in excess of 170 metres in all directions. This vegetation will eventually be removed as the URA is developed. The vegetation to the south and east is within an area zoned E2 Environmental Conservation which will prevail post URA development. This vegetation to the south was found to be grasses and pastures around the existing Riding for the Disabled (RDA) establishment. The vegetation to the east will be retained in an environmental corridor that extends northwards for the entire length of the URA. This vegetation is (or will revert to) eucalypts 10 - 20m tall having crowns that touch and overlap with an understorey of small trees, shrubs and grasses. For the purpose of assessment under Appendix 2 Table A2.1 PBP 2006 and Table A2.4.2 AS3959 – 2009 the vegetation to the east has been determined to be forest.



Photograph 02: View northeast of the hazard / proposed E2 corridor east of the proposed WWPS

7.3 Topography

The slope must be assessed over a distance of at least 100m from the existing property boundary (or building footprint) towards the various vegetation communities constituting the hazard. In assessing the slope, it may be found that there are a variety of slopes covering different distances. The gradient within the hazard (vegetation) which will most significantly influence the fire behaviour must be determined.

The slope was assessed onsite using an inclinometer and verified from topographic data as being:

- 0-5 degrees downslope within the hazard to the east and south
- 0 degrees or upslope within the hazard to the north and west

7.4 Asset Protection Zones

There are no minimum APZ applied to non-habitable structures located greater than 6 metres from a habitable dwelling. To meet the aims and objectives of PBP 2006 the WWPS should be provided with appropriate asset protection zones (i.e. defensible space) to avoid flame contact and minimise the risk of material ignition.

During the initial phase APZs will be necessary to ensure adequate separation is maintained until the surrounding lands are developed. The minimum APZ recommended are 12 metres to the north, west, and south and 29 metres to the east of the WWPS footprint. This separation space ensures the proposed WWPS footprint is in an area determined to be less than or equal to 29 kW/m² radiant heat impact.

Following development of the Kings Hill URA there will be managed or built upon land providing an APZ in excess of 100 metres to the north and west, 30 metres to the south and 60 metres to the east of the WWPS footprint. This separation allows for sufficient reduction in radiant heat in so far as the proposed WWPS footprint is in an area determined to be less than or equal to 12.5 kW/m² radiant heat impact.

The APZs are located within R2 zoned land and outside any environmental conservation areas. The APZs are essentially existing and the only management and ongoing work necessary is that grass should be kept mown (as a guide grass should be kept to no more than 100mm in height) and leaves and vegetation debris should be removed.

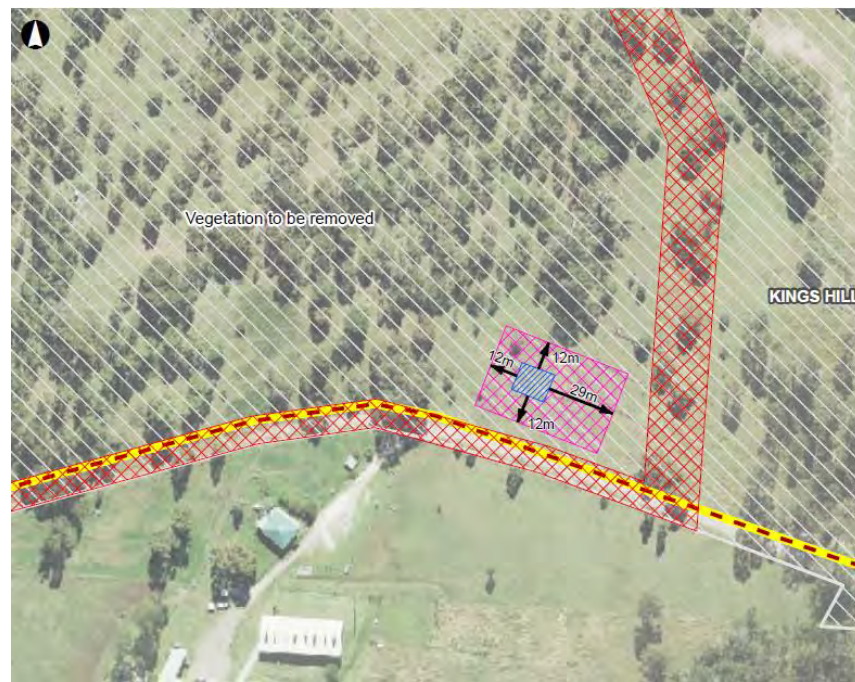


Image 10: Proposed interim Asset Protection Zones

7.5 Access & egress

A requirement of Hunter Water is that access is provided to the WWPS for maintenance and service vehicles. Following development of Kings Hill URA, the WWPS footprint will be surrounded by an internal road network and perimeter roads will be in place to the south and east of its location. At this future time specific access requirements for fire services to the WWPS for fire suppression or property protection would not be necessary. The general access requirements for Hunter Water services and those imposed by DA Consent for the URL would be sufficient.

As an interim, if temporary access is provided to the WWPS for construction and servicing needs, any temporary access should be designed to also allow for the safe access for fire vehicles. This is only necessary until the release area is developed. Therefore, it is unnecessary for this access to cater for evacuating residents and the property access requirements, or fire trail standards would be sufficient for its design.

Recommendation will be included within this report that ensure any temporary access to the WWPS platform meets these requirements, inclusive of a suitable turning area.

7.6 Services

The proposed WWPS will be provided with an electrical service for its operational needs. Electrical supply within Kings Hill URA will be conditioned to comply with PBP 2019 as part of its future development process through Council. Similar conditions are necessary to ensure that the location of electrical supply to the WWPS limits the possibility of ignition of surrounding bush land or the fabric of buildings. Recommendations will be included that electricity supply complies with Table 5.3C of PBP 2019.

Once Kings Hill URA is developed the WWPS will be surrounded by a road network with hydrants installed compliant with *AS2419.1:2017 Fire hydrant installations System design, installation and commissioning*. In the interim the only asset requiring protection is the above ground components of the WWPS. These will have been provided with suitable APZs and construction measures for bushfire protection. It is considered that, if present at the time of any fire, a single Category 1 Fire Appliance that has a water capacity of >3½k litres would be a sufficient resource for this task. A hydrant or Static Water Supply is not being recommended as an interim or post URA development measure.

7.7 Construction

Australian Standard 3959 – 2009 'Construction of buildings in bushfire-prone areas' provides for six (6) levels of building construction these being BAL - Low, BAL - 12.5, BAL - 19, BAL - 29, BAL - 40 and BAL - FZ. The Australian Standard 3959 specifies construction standards for buildings within various Bushfire Attack Levels as determined by the Planning for Bushfire Protection – 2006 document. The NSW Rural Fire Service will not accept deemed to satisfy provisions for BAL Flame Zone and therefore have a NSW variation to the listed standard provisions of BAL FZ under AS3959 - 2009.

Generally, where a Class 10a or 10b structure is constructed >6 metres away from a habitable building the construction standards of AS3959 – 2009 are not applied. To meet the aims and objectives of PBP and limit the risk of material ignition the following recommendations for the above ground componentry of the WWPS are included:

- That the housing for services and equipment is made from non-combustible material.
- That above ground pipes and vent shafts are made from non-combustible material.
- That wiring is housed in non-combustible conduit or enclosed metal gantry trays.
- That the electrical connection box and switch board housing are ember proof when in the closed position. There should be no gaps greater than 2 mm into the internal side of the housings.

Note: BAL 29 Construction under AS3959 – 2009 or 2018 Construction of buildings in bushfire prone areas may be used as a guide only.

Consultation with Malcolm Withers at Hunter Water regarding the flammability of educt pipe gas's and / or the need for ember protection mesh instead of the standard bird protection mesh on vent pipes occurred and concluded that there was no requirement for the ember mesh.

7.8 Installation

Potential ignition risks from infrastructure installation include human activity (e.g. smoking), vandalism (e.g. arson), sparks from plant or machinery operations (e.g. grinding, rock cutting) & Hot Work operations (e.g. welding, gas cutting). During installation safe work procedures shall include means to limit smoking in bushfire risk areas to predetermined safer areas, appropriate signage, maintenance of plant and equipment, an operator awareness program and a bushfire policy for hot work operations and ignition prevention or fuel reduction in hot work areas.

For example, a Hot Work Permit should be required if Hot Work is undertaken in the open in a hazardous area or if a TOBAN is in force, regardless of whether the Hot Work is in a hazardous area or not. It is prohibited to carry out any Hot Work activity in the open during a Total Fire Ban (TOBAN) unless authorised under an exemption issued by the RFS.

Recommendations will be included that, during the installation phase, the lead contractor shall include within the Safe Work Method Statement and Procedures policies that address bushfire safety during installation operational activity (including human activity, hot work, plant and equipment).

8.0 Recommendations

8.1 Asset Protection Zones / landscaping

1. That all grounds surrounding the of above ground components of the WWPS for a minimum distance of 12 metres to the north, west and south and 29 metres to the east are maintained as an Asset Protection Zone / Inner Protection Area as detailed in the NSW Rural Fire Service's document 'Standards for Asset Protection Zones' and Appendix 4 of Planning for Bushfire Protection 2019.

Note: These APZ may only be interim APZ as the surrounding area is developed in accordance with the DCP Guidelines.

8.2 Construction

2. That construction of the WWPS above ground components are able to withstand ember attack and radiant heat impact up to 29 kW/m² as follows;
 - That the housing for services and equipment is made from non-combustible material.
 - That above ground pipes and vent shafts are made from non-combustible material.
 - That wiring is housed in non-combustible conduit or enclosed metal services gantry trays.
 - That the electrical connection box and switch board housing are ember proof when in the closed position. There should be no gaps greater than 2 mm into the internal side of the housings.

Note: BAL 29 Construction under AS3959 – 2009 or 2018 Construction of buildings in bushfire prone areas may be used as a guide only.

8.3 Services

Electricity

3. That location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings:
 - where practicable, electrical transmission lines are underground;
 - where overhead, electrical transmission lines are proposed as follows:
 - lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas;
 - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.

8.4 Access

4. That any access provided to the WWPS for construction and servicing needs should be designed to also allow for the safe access for fire vehicles as follows;
 - minimum carriageway width of 4m.
 - have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m, at the passing bay.
 - a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches.
 - access must provide loop around the WWPS compound or a suitable turning area in accordance with Type A – D turning areas illustrated below.
 - curves have a minimum inner radius of 6m and are minimal in number to allow for rapid access and egress.
 - the minimum distance between inner and outer curves is 6m.
 - the crossfall is not more than 10°.
 - maximum grades for sealed roads do not exceed 15° and not more than 10° for unsealed roads.
 - an RFS compatible lock is provided within any locked gate system.

Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed.

8.5 General installation

5. That during the installation phase, the lead contractor shall include within the Safe Work Method Statement and Procedures policies that address bushfire safety during installation operational activity (including human activity, hot work procedures, plant and equipment).

9.0 Conclusion

The proposed development is for a water and wastewater supply pipeline and a wastewater pumping station to support the development of the Kings Hill Urban Release Area (Kings Hill URA). The Planning Secretary's Environmental Assessment Requirements (SEARs) is that the Environmental Impact Assessment includes an assessment of the risk of bushfire, including addressing the requirements of Planning for Bush Fire Protection 2006 (RFS).

To meet the aims and objectives of PBP 2006 the development must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire and intensity of the bushfire attack on the building.

This is achieved by providing construction measures to mitigate against the impacts from bush fire including smoke, embers, radiant heat and flame contact and including suitable access, services supply and means of maintaining the bushfire protection measures for the life of the development.

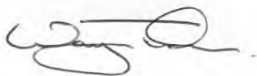
This bushfire hazard and determination has been made on a site-specific basis which includes an assessment of the local bushland area and its possible impact to the proposed development. Suitable recommendations have been made herein to ensure the aims and objectives of Planning for Bushfire Protection have been achieved.

This report has also considered the *Draft Planning for Bush Fire Protection 2019* and the newer version of *AS3959 – 2018 Construction of buildings in bushfire prone areas* both of which are as yet not captured by legislation. These documents are expected to be formally gazetted in September 2019. Where this report draws conclusions the context of both documents have also been considered and the recommendations made herein remain valid under either planning policy, whichever is in force at the time of the development approval.

In consideration of the bushfire risk posed to the proposed development, in combination with the recommended bushfire protection measures contained within this report, I am satisfied they will provide a reasonable and satisfactory level of bushfire protection to the proposed development.

I am therefore in support of the proposed development.

Australian Bushfire Consulting Services Pty Ltd



Wayne Tucker

Managing Director
G. D. Design in Bushfire Prone Areas.
Certificate IV Fire Technology
Ass Dip Applied Science
FPA Australia BPAD Level 3 Accredited Practitioner
BPAD Accreditation No. BPAD9399

10.0 List of attachments

Attachment 01: Arcadis Plans Sheets 1-6 / KHD_EIS_001_ConstructionFootprint_A3P_v4



- LEGEND
- Construction footprint
 - Compound area
 - Cadastre (LPI 2017)
 - Proposed water alignment
 - Proposed wastewater alignment

Construction Footprint

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George Street, Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001
Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 9, 2019

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ARCADIS

NELSONS PLAINS KINGS HILL
NELSONS PLAINS FERODALE
MILLERS FOREST RAYMOND TERRACE



- LEGEND
- Construction footprint
 - Compound area
 - Cadastre (LPI 2017)
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Construction Footprint

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NELSONS PLAINS KINGS HILL
NELSONS PLAINS
MILLERS FOREST RAYMOND TERRACE
FERODALE



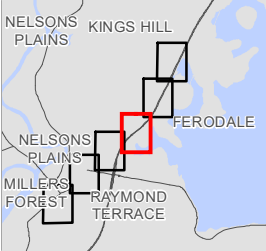
LEGEND

Construction footprint	Proposed water alignment
Compound area	Proposed wastewater alignment
Cadastre (LPI 2017)	

Construction Footprint

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LEGEND

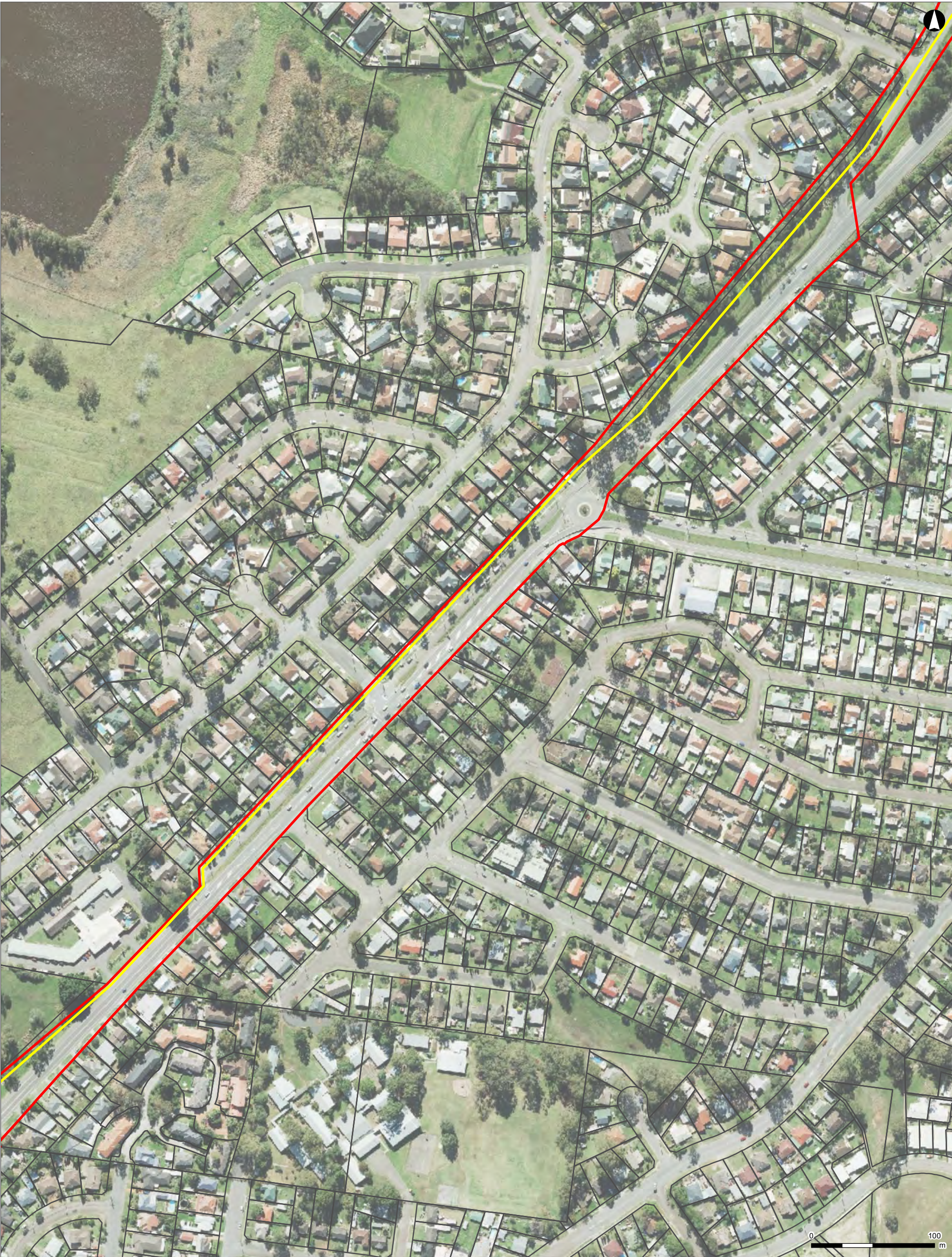
	Construction footprint		Proposed water alignment
	Compound area		Proposed wastewater alignment
	Cadastre (LPI 2017)		

Construction Footprint

ARCADIS AUSTRALIA PACIFIC PTY LTD
ABN 76 104 485 289
Level 16, 580 George Street, Sydney NSW 2000
P: +61 (0) 2 8907 9000 | F: +61 (0) 2 8907 9001
Coordinate System: GDA 1994 MGA Zone 56
Date issued: October 9, 2019

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ARCADIS



LEGEND

Construction footprint

Proposed water alignment

Compound area

Cadastre (LPI 2017)

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Date: 9/10/2019 Path: \\hs-aus-nz-fs-01\jobs\AA006855\L-GIS\A_Current\B_Maps\EIS\KHD_EIS_001_ConstructionFootprint_A3P_v5.mxd
Created by : RP
QA by : EM



- LEGEND
- Construction footprint
 - Compound area
 - Cadastre (LPI 2017)
 - Proposed water alignment

Construction Footprint

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