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**NSW Department of
Planning**

Riverstone and Alex Avenue
Precincts

Bushfire Re-assessment

September 2009



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- A Residential and Commercial Development
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1. Introduction

1.1 Background

The NSW Department of Planning commissioned GHD Pty Ltd to undertake a reassessment of bushfire measures for the Riverstone and Alex Avenue Precincts. Specifically, GHD was commissioned to map Asset Protection Zone (APZ) setbacks and AS3959 Construction Standards associated with proposed riparian corridors and environmental protection / conservation areas.

This report displays and details the results of the reassessment.

1.2 Purpose of the report

The purpose of this report is to:

- » present and display Asset Protection Zone setbacks
- » present and display AS3959 construction standards as zones emanating from the riparian corridors and environmental protection / conservation areas
- » provide the basis and assumptions made in determining the APZ and building construction standards
- » identify areas where APZ setbacks may affect the development potential of the current Indicative Layout Plan and suggest possible solutions.



2. Planning Context

2.1 NSW Environmental Planning and Assessment Act 1979 (EP&A Act)

Section 146 (Bush Fire Prone Land) imposes a requirement for local councils to identify and map bush fire prone land. Such a map becomes the basis for the following bushfire related development controls under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act):

- » Local Planning Direction 4.4 (Planning for Bushfire Protection) made under Section 117(2) of the Act
- » Section 79BA (Consultation and development consent - certain bush fire prone land)
- » Section 91 (What is “integrated development”?) and S.91A (Integrated Development).

Local Planning Direction 4.4 relates to the amendment and preparation of a draft Local Environment Plan (LEP) (or “Planning Proposal”).

Section 91 and s.91A applies to “Integrated Development” *i.e.* residential and rural-residential subdivision whilst Section 79BA will apply during subsequent development applications.

2.2 Bush Fire Prone Land Map for Riverstone and Alex Avenue Precincts

Only a small portion of the study area is within Bush Fire Prone Land certified by the Commissioner of the NSW Rural Fire Service (NSWRFS) for the City of Blacktown (Figure 1). This area comprises Category 1 Vegetation (forests, woodlands, heaths, and/or wetlands) marked in red and the 100 m buffer (coloured yellow).

Although the Bush Fire Prone Land Map affects only a small proportion of the site, Blacktown City Council can change the map and may do so if large areas of the study site are revegetated to a more natural, and consequently more bushfire prone, bushland state. Determining authorities and/or referred agencies (*e.g.* NSW Rural Fire Service) may also regard the ‘reservation’ and revegetation of large areas within the Precincts as potentially constituting a future bushfire hazard. The application of the bushfire-related planning provision in the EP&A Act may therefore be considered appropriate.

2.3 Planning for Bushfire Protection 2006 (NSWRFS 2006b)

Planning for Bushfire Protection 2006 (PBP 2006) applies to all development applications on land classified as Bush Fire Prone Land. It is the principle reference used for each stage of development, including:

- » draft LEPs (or *Planning Proposals*)



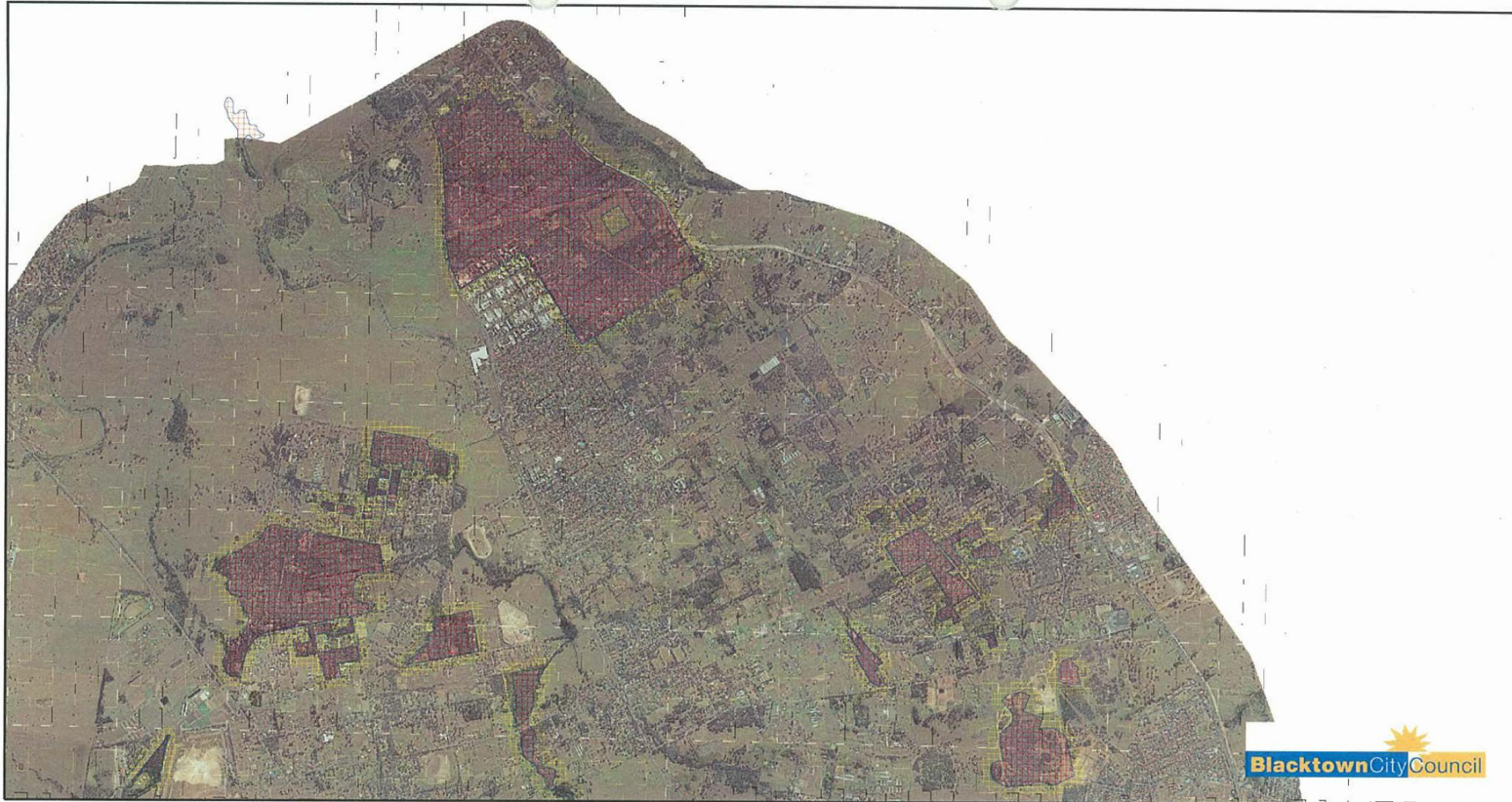
- » residential, rural-residential, and commercial subdivision
- » Development Applications for residential, rural-residential, and commercial buildings in bushfire prone areas.

The need to address the key objectives of PBP 2006 is also usually a requirement of Part 3A developments under the EP&A Act and referral to NSW Rural Fire Service will usually reinforce this requirement.

PBP 2006 is therefore the principal planning document that affects development of bushfire prone land and is the basis for the identified APZ Setbacks and Building Construction Standards presented in this report.



Figure 1 Bush Fire Prone Land Map (extract)



Copyright NSW Rural Fire Service

Plot Date: 29/04/2008

Copyright Blacktown City Council

**BLACKTOWN CITY COUNCIL
Bush Fire Prone Land**

For the purposes of Section 149 (2) of the Environmental Planning and Assessment Act, 1979, this map is hereby certified as being a Bush Fire Prone Land Map for the Local Government Area of Blacktown in NSW.

Approved by: Commissioner of NSW Rural Fire Services
Dated: 21 November, 2002.

Roads [Gis]	Local Government Area Coverage
Road Segment Coverage - Registered	Miscellaneous Items [Gis]
Pathway Coverage	Bushfire Zone Buffer 1 Coverage
Crossing Coverage	Bushfire Zone Category 1 Coverage
Boundaries [Gis]	Bushfire Zone Category 2 Coverage



Scale 1:50000





3. Assumptions and notes

3.1 Bush Fire Prone Land

Apart from the predominantly undeveloped lands north of Crown Street, the Riverstone and Alex Avenue Precincts currently contains only a small area of Bush Fire Prone Land (riparian vegetation north of Schofield Lane, Figure 1).

The development of the Precincts will however involve the 'reservation' and revegetation of bushland areas. These areas may be regarded by Determining and Referral Authorities / Agencies as comprising 'Bush Fire Prone Land'. Therefore, for the purposes of this assessment, the areas forecasted within the Indicative Layout Plan to be reserved and revegetated as "Riparian Corridors" and "Conservation Areas" have been regarded as 'Bush Fire Prone Land' within the meaning of s.146 of the NSW EP&A Act.

3.2 Predominant vegetation

For the purposes of this assessment, the predominant vegetation within the "Riparian Corridors" and "Conservation Areas" that are forecasted to be revegetated, has been determined as "Forest" (NSWRFS 2006). This determination is supported by previous reports (Travers 2008) and on-site inspections. The assumption is therefore conservative and considered 'worst case scenario'. Smaller APZ setbacks may be feasible if it can be demonstrated that the reserved areas are to remain (or managed) in a grassy woodland state or comprise a forested wetland as described by NSWRFS (2006b).

3.3 Determination of slope

For the purposes of this assessment, the effective slope for riparian corridors is $>0 - 5$ degrees downslope (from development areas). This determination was based on the analysis of contours and the shallow shape of creeklines in this general area. This determination is also supported by previous studies (Travers 2008).

The effective slope of the Conservation Areas within Alex Avenue and Riverstone Precincts has also been determined as either upslope/flat or $0-5$ degrees downslope depending on the location of the hazard with respect to the development areas. This determination was based on site investigations, previous studies (e.g. Travers 2008), and analysis of contours.

3.4 Fire (Weather) Area

Blacktown City Council is located within the "Greater Sydney Region" which has a corresponding FDI rating of 100 (NSWRFS 2006b p. 57). An FDI rating of 100 is the highest rating and results in the need for greater Asset Protection Zone setbacks.



3.5 Bushfire hazards associated with remnant vegetation and riparian areas

Remnant vegetation is defined in *Planning for Bushfire Protection 2006* (NSWRFS 2006) as:

“A parcel of vegetation with a size of less than 1 Ha or a shape that provides a potential fire run directly towards buildings not exceeding 50 m.”

Riparian areas are defined as (NSWRFS 2006) as:

“those areas of vegetation which are no greater than 20 metres in width and are found on either bank of a river”

Remnant vegetation and riparian areas are considered by NSWRFS (2006) as a low hazard and APZ setbacks and building construction standards for these will be the same as for rainforests (*i.e.* reduced). For the purposes of this assessment, any riparian corridors approximately 20 m in width have been regarded as a “riparian area” and APZ setbacks and buildings construction standards will be applied consistent with that for rainforest.

Riparian corridors larger than a hectare and wider than 20 m have not been considered as *remnant vegetation* or *riparian area*. APZs and construction standards for forests have been applied.



4. Asset Protection Zone setbacks

Asset Protection Zone (APZ) setbacks from proposed *riparian corridors* and *conservation areas* are provided as:

- » Appendix A: Residential and commercial developments
- » Appendix B: Special Fire Protection Purpose developments.

As Special Fire Protection Purpose (SFPP) developments such as childcare centres and schools are either planned or may be permissible, APZ setbacks have been determined in addition to those determined for residential and commercial developments.

APZs can comprise an “Inner Protection Area” (IPA) and “Outer Protection Area” (OPA). The IPA is critical to providing a defensible space and managing heat intensities at the building surface. The OPA serves to reduce the potential length of flames by slowing the rate of spread, filtering embers and reducing the likelihood of crown fire.

APZ setbacks displayed in Appendix A and B do not differentiate IPAs and OPAs, as the location of IPA and, consequently the OPA, is highly dependant on the ultimate location of the dwelling or building.

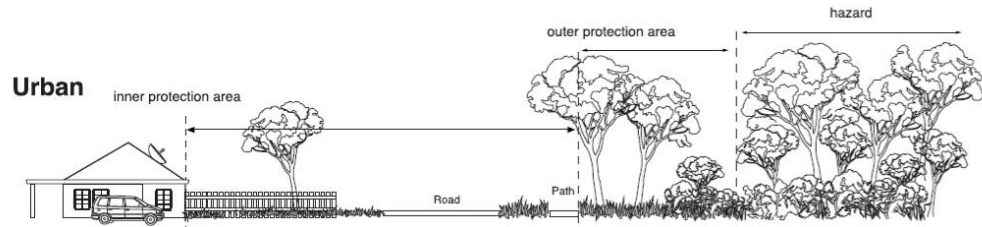
4.1 Location and Specifications

The APZ shown in Appendix A and Appendix B are displayed as setbacks from bushland / bushfire prone vegetation. In actuality, asset protection zones would be established from the building surface and extend towards the hazard and usually comprise the street building setback and the perimeter public road and managed road verges (Figure 2).

In situations where the street setback, roads, and road verges are insufficient to contain the full APZ, public parks, sediment retention basins, and other areas can also constitute the APZ if vegetation in the area is managed consistent with APZ specifications *i.e.* (NSWRFS 2006 and NSWRFS 2005), including:

- » Ground fuels such as fallen leaves, twigs (less than 6 mm in diameter) and bark removed on a regular basis.
- » Grass needs to be kept short and, where possible, green.
- » Trees are to have a discontinuous tree canopy leading from the hazard to the asset. Tree crowns should be separated by two to five metres.
- » If native trees and shrubs are retained, these should be restricted to clumps or islands to maintain a covering of no more than 20% of the area.
- » Tree canopy cover to be less than 15% in an IPA or 30% in and OPA.

Figure 2 Components of an Asset Protection Zone (NSWRFS 2006)



4.2 Residential and Commercial Development

Residential and commercial development appears to be unconstrained by the APZ Setbacks required adjacent to proposed riparian corridors and environment / conservation areas (Appendix A). Future residential and commercial development (subdivision and construction) would therefore be likely to be compliant with PBP 2006 and the deemed-to-satisfy provisions of the BCA (compliance with AS3959).

4.3 Special Fire Protection Purpose Development

SFPP developments such as schools are planned or may be permissible within the Riverstone and Alex Avenue Precincts. Other Special Fire Protection Purpose (SFPP) developments include:

- » child care centres
- » hospitals
- » hotels, motels or other tourist accommodation
- » housing for older people (retirement villages and Seniors Living)
- » group homes (SEPP 9).

Occupants of SFPP developments are considered to be more vulnerable to the effects of bushfire attack due to their reduced capacity to evaluate risk and respond to a bushfire emergency, the potential difficulties of evacuation and supervision, and the potential for significant communication barriers. Greater separation from the bushfire threat provides for safer emergency evacuation procedures (NSWRFS 2006b). It is for these reasons that APZ setbacks for SFPP development are larger than for other developments.

The APZ setbacks shown in Appendix B are areas where SFPP developments would generally be considered inappropriate. However, these types of development may not be entirely excluded as there may be situations where radiant heat shielding is provided to the SFPP development by other buildings between it and the bushfire hazard and where it can be demonstrated that *“radiant heat levels of greater than 10kW/m² will not be experienced by occupants or emergency workers entering or*



exiting a building". Regardless, it may be prudent to introduce controls¹ which avoid placing SFPP developments within the identified setbacks on bushland interface areas.

4.4 Schools

Schools are SFPP developments requiring relatively large APZ setbacks from bushfire prone areas. APZ setbacks are only applicable to buildings that are expected to be utilised and occupied by staff and students. Sports fields, agricultural study areas, grounds maintenance buildings, playgrounds, and other open space areas can be located in the APZ / APZ setback.

APZ setbacks shown in Appendix B generally do not appear to significantly constrain the development of schools within the Precincts. The largest APZ setback encroachment is within the school area on the eastern edge of the Alex Avenue Precinct where an APZ setback of up to 70 m would be required from the proposed conservation area to the north. A 70 m APZ entirely on school land is likely to significantly constrain development of the site. To mitigate this constraint the southern most portion of the conservation area could be managed by Council as an "Outer Protection Area" for a width of 20 m. This would reduce the APZ setback by 20 m (to 50 m) on the school land. The 20 m APZ would not require significant maintenance by Council and would compliment the proposed pedestrian link to 2nd Ponds Creek to the east. This suggestion is reflected in the APZ setback maps provided as Appendix B.

¹ These controls are already in place through the NSW *Environment Planning and Assessment Act 1979*, however it may be prudent to incorporate site-specific controls within any LEP, DCP, or Planning Proposal / Draft LEP.



5. Building Construction Standards

5.1 Building Code of Australia and AS3959

The BCA is a performance based code which obtains its statutory power through the EP&A Act and EP&A Regulation 2000. The EP&A Regulation 2000 (clause 145(1)(b)) requires a certifying authority to be satisfied that the relevant requirements of the BCA will be met prior to the issuing a construction certificate (or a complying development certificate under clause 136A of the Regulation). Clause 98(1)(a) of the Regulations also states that it is a prescribed condition of development consent (s.80A(11) of the EP&A Act) that building work must comply with the BCA. The BCA contains both Performance Requirements and Deemed-to-Satisfy Provisions relating to the construction of buildings in bushfire prone areas. These provisions apply to BCA class 1, 2, and 3 buildings, class 4 parts of buildings and class 9 buildings that are *Special Fire Protection Purpose* developments that are proposed for construction in “designated bushfire prone areas”.

The construction requirements of AS 3959 - 1999 *Construction of buildings in bushfire-prone areas* is recognised by Planning for Bushfire Protection 2006 as the Deemed-To-Satisfy construction standard for buildings in designated bushfire prone areas. The BCA has been amended with a NSW variation such that Appendix 3 of Planning for Bushfire Protection 2006 provides the appropriate site assessment methodology and replaces Section 2 of the AS 3959 - 1999 when determining bushfire attack and the construction levels required to comply with the BCA.

5.2 AS3959 – 1999 Construction Standards

Although AS3959 - 1999 construction standards have been presented as a zone emanating from the proposed bushland areas (Appendix A and Appendix B), they do not represent a constraint to the development potential of the Precincts.

The determination of building construction standards is considered more appropriate at the single dwelling development application stage as a number of variables (such as shielding from buildings) could influence and reduce the required construction standard. The AS3959 construction standard zones presented in this report should therefore be considered a guide only and subject to a building-specific assessment and determination pursuant to Section 79BA of the NSW *Environment Planning and Assessment Act 1979*.

5.3 AS3959-2009

On 6th March 2009 the Council of Standards approved the revised Australian Standard AS3959-2009 *Construction of buildings in bushfire prone areas* (AS3959-2009). This Standard was published by Standards Australia on 10th March 2009 and replaces the 1999 version of the document.

The Australian Building Codes Board (ABCB) has adopted the revised Standard which will require an update to the BCA. The ABCB undertakes amendments to the BCA on



an annual basis. AS3959-2009 will be formally adopted by the BCA as the national standard in May 2010.

The NSW Rural Fire Service have significant concerns with the 2009 standard and have decided to continue to assess development proposals against *Planning for Bushfire Protection 2006* and the (superseded) AS3959 – 1999 (NSWRFS 2009). From May 2010, NSWRFS may utilise AS3959-2009 but are likely to require NSW-specific variations to the BCA to include exceptions (currently undetermined).

Complicating matters further, is that the Standards Australia Committee will also be asked to review the standard in light of the Victorian Royal Commission into the February 2009 bushfires and the 2009 standard may be altered. As a consequence, the prepared drawings of AS3959 construction standard zone have been derived from the methodology contained within *Planning for Bushfire Protection 2006* referencing the 1999 standard. As discussed in Section 5.2 above, this may be inconsequential as the construction standard for a dwelling is more appropriately assessed on a building by building basis at the development application stage pursuant to Section 79BA of the EP&A Act.



6. References

NSW RFS (NSW Rural Fire Service) 2005 *Standards for Asset Protection Zones*

NSW RFS (NSW Rural Fire Service) 2006 *Planning for Bush Fire Protection: A Guide for councils, Planners, Fire Authorities and Developers*. NSW Rural Fire Service ISBN 0 975 1033 2 6

NSW RFS (NSW Rural Fire Service) 2009 *Fast Fact 01/09: AS3959-2009 Construction of Buildings in Bushfire Prone Areas*. NSW RFS Website at <http://www.nsw.rfs.gov.au>

Standards Australia 1999 *AS3959 Construction of Buildings in Bushfire Prone Areas*. Standards Australia International Ltd, Sydney.

Standards Australia 2009 *AS3959 Construction of Buildings in Bushfire Prone Areas*. Standards Australia, Sydney.

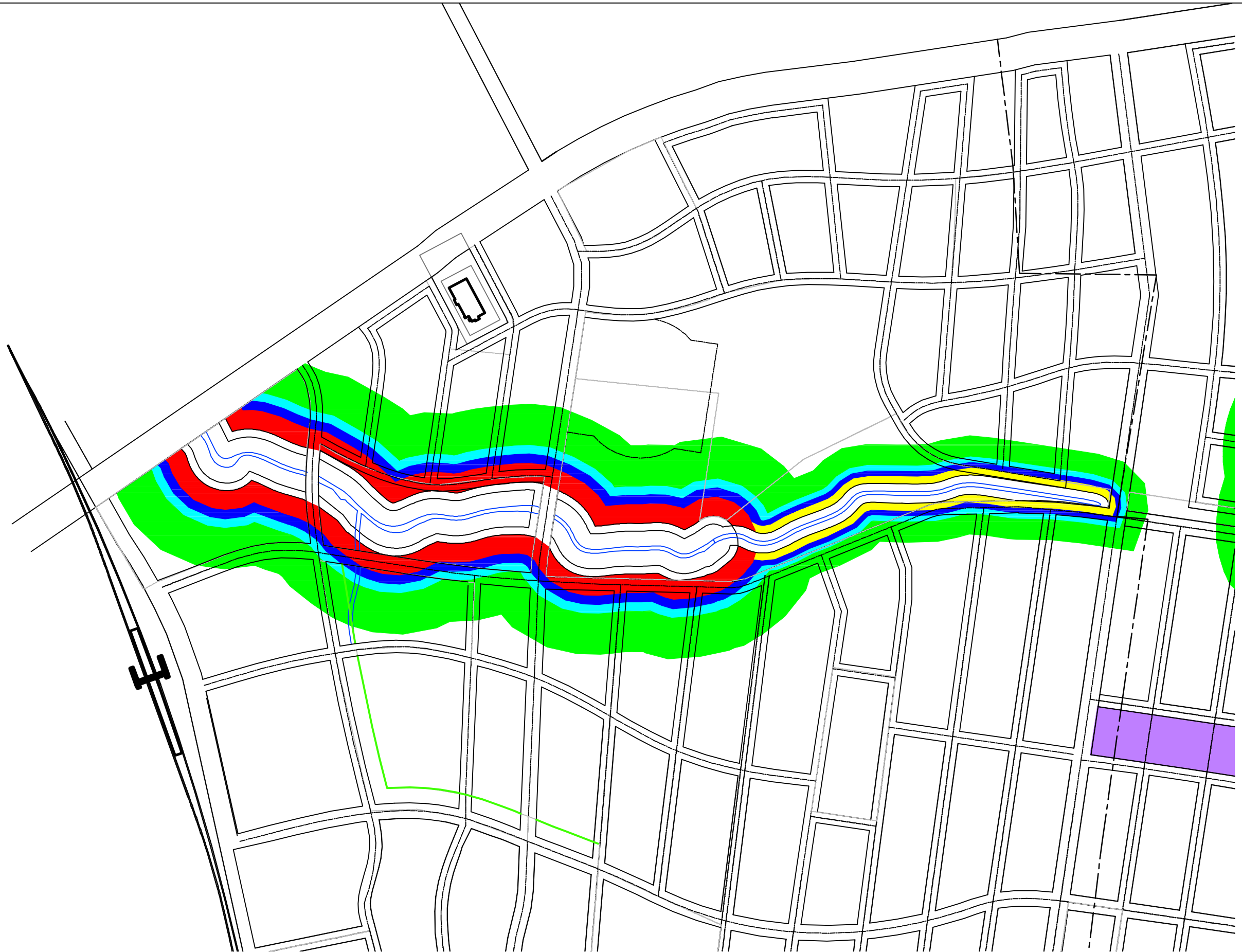


Appendix A

Residential and Commercial Development

Asset Protection Zone Setbacks

AS3959 – 1999 Construction Standards



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ASSET PROTECTION ZONE SETBACK

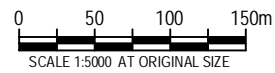
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- 25m APZ SETBACK

AS3959 - 1999 CONSTRUCTION STANDARD

- LEVEL 3
- LEVEL 2
- LEVEL 1

PRELIMINARY

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A	PRELIMINARY		S.A.	G.Y.		22/07/09



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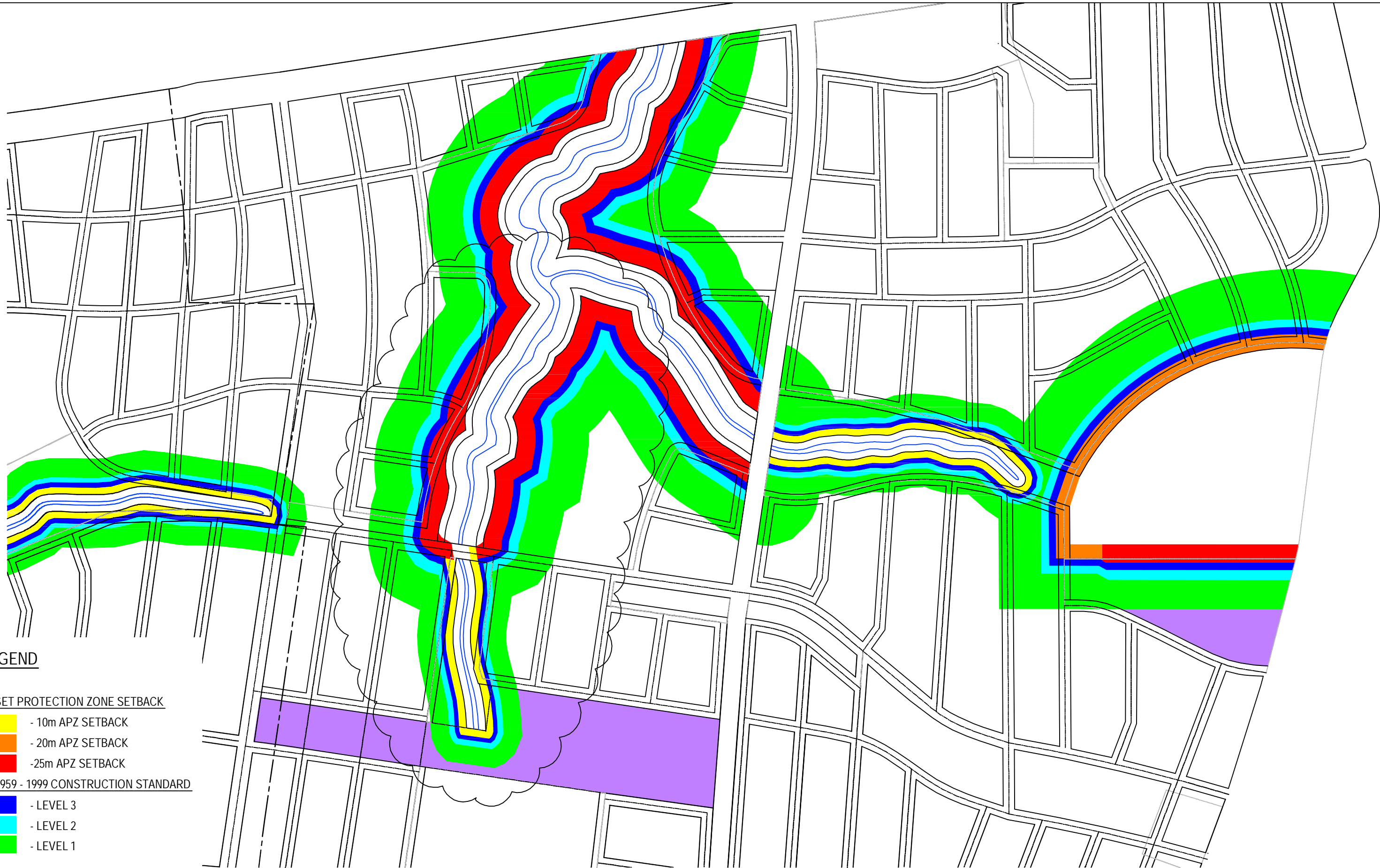
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Original Size	A3
Drawing No:	23-13279-F001
Rev:	A

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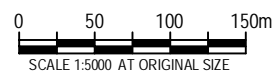
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- LEVEL 3
- LEVEL 2
- LEVEL 1

- PROPOSED SCHOOL

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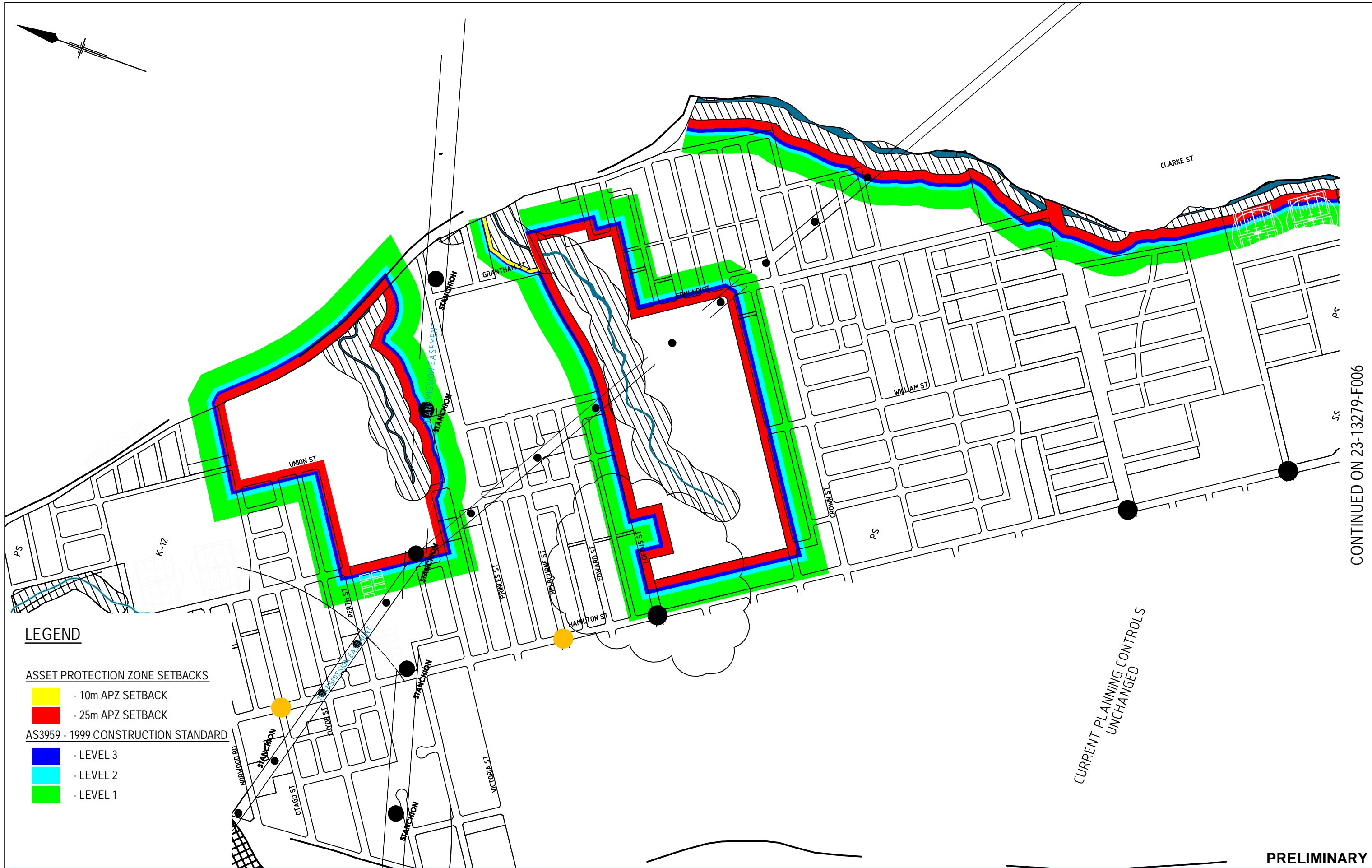
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Rev:	C



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ASSET PROTECTION ZONE SETBACKS

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- 25m APZ SETBACK

AS3959 - 1999 CONSTRUCTION STANDARD

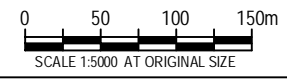
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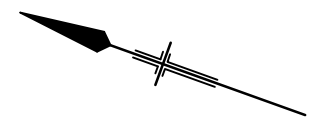
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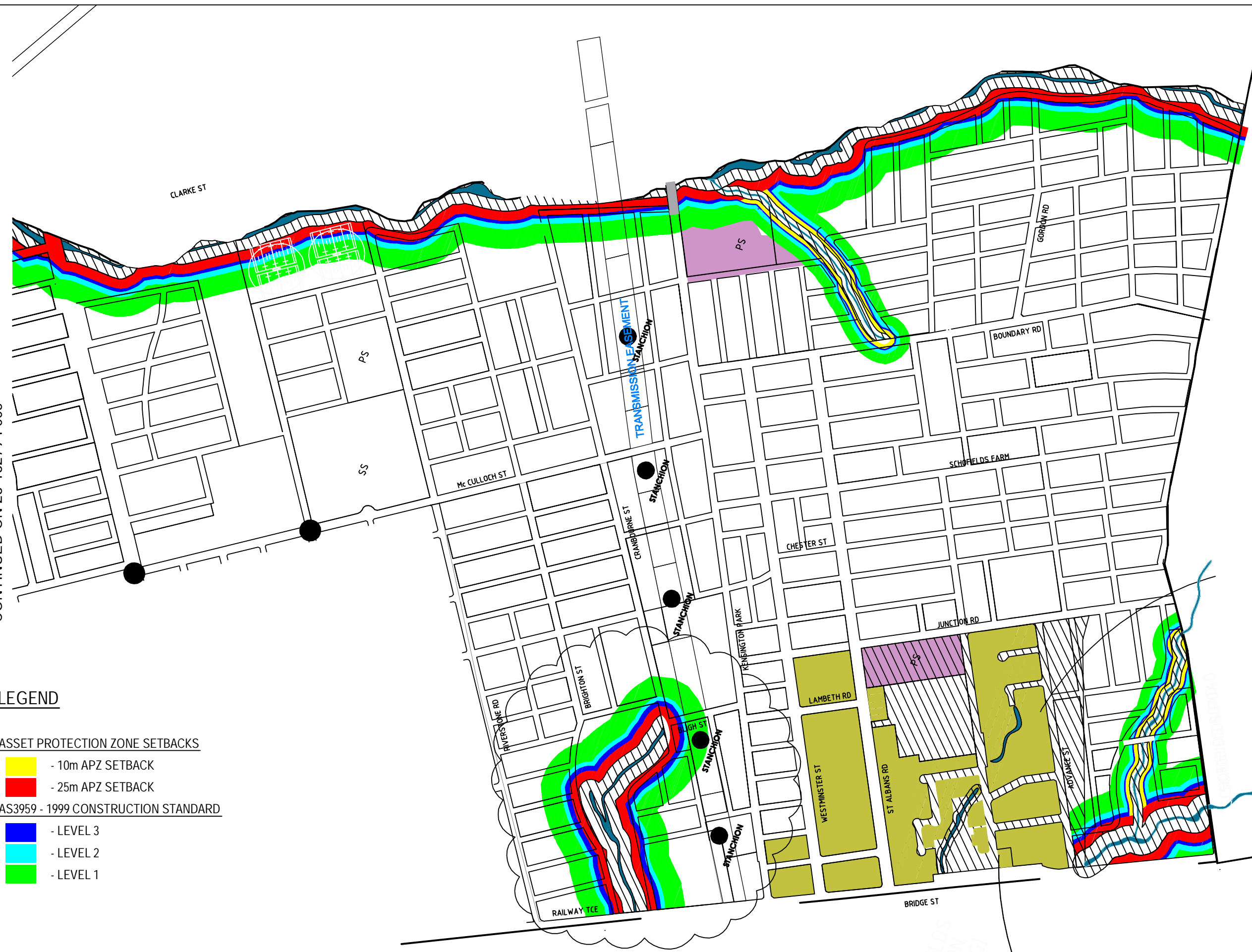
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Rev:	B



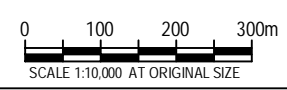
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- LEGEND**
- ASSET PROTECTION ZONE SETBACKS**
- 10m APZ SETBACK
 - 25m APZ SETBACK
- AS3959 - 1999 CONSTRUCTION STANDARD**
- LEVEL 3
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 - LEVEL 1

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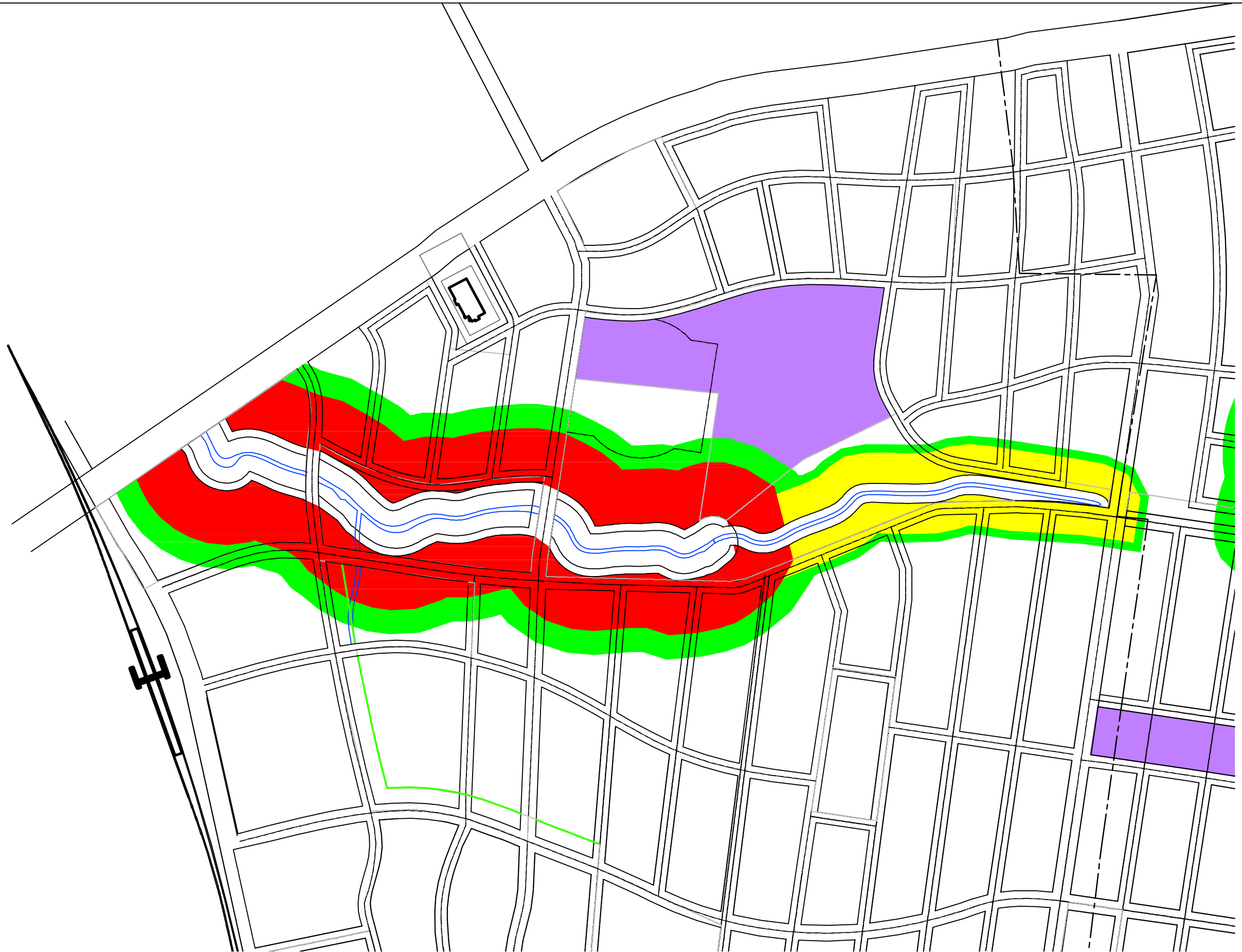
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Appendix B
Special Fire Protection Purpose

Asset Protection Zones
AS3959-1999 Construction Standards



CONTINUED ON 23-13279-F004

LEGEND

ASSET PROTECTION ZONE SETBACKS

- 40m APZ SETBACK
- 70m APZ SETBACK

AS3959 - 1999 CONSTRUCTION STANDARD

- LEVEL 3
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- LEVEL 1

- PROPOSED SCHOOL

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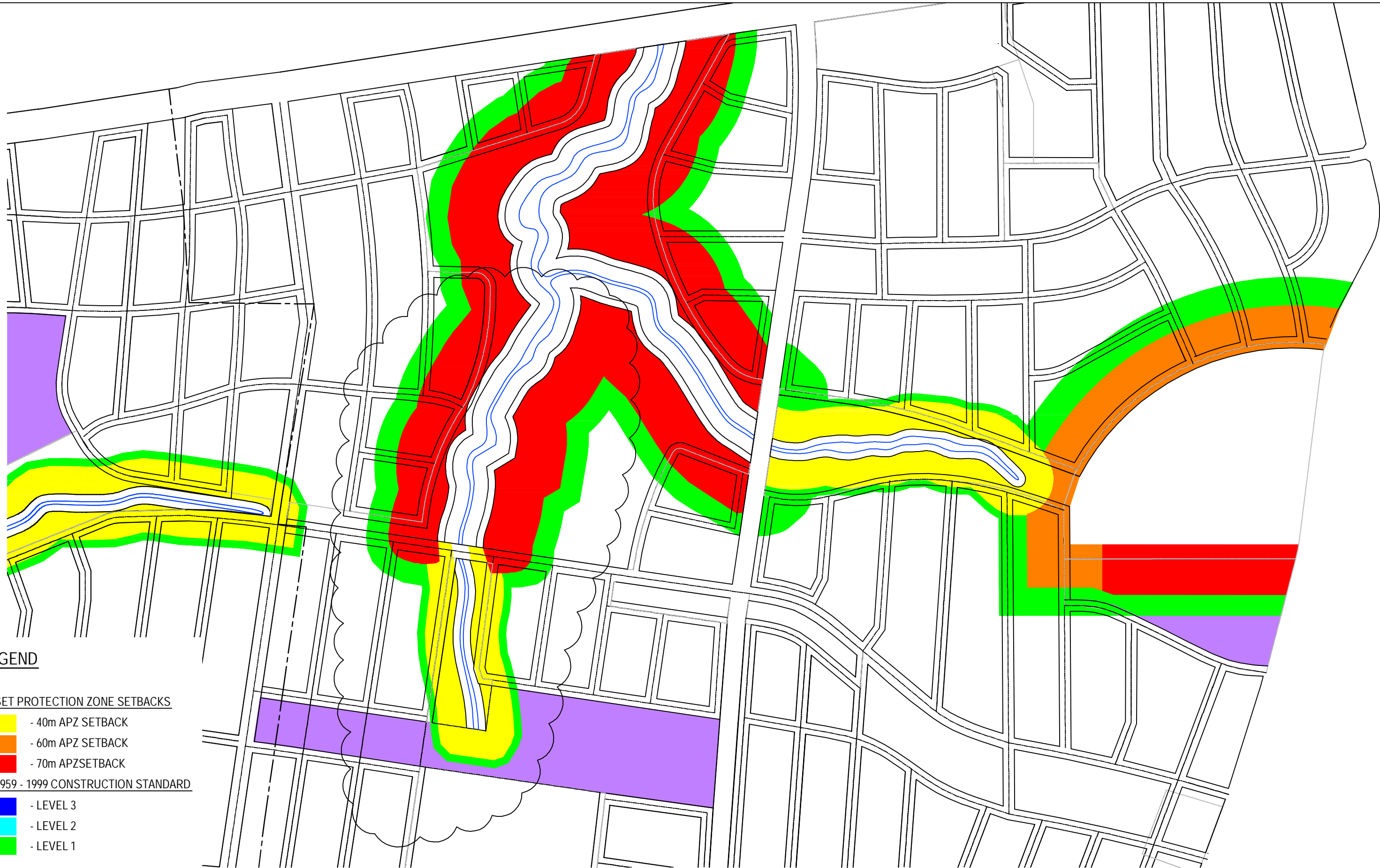
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LEGEND

ASSET PROTECTION ZONE SETBACKS

- 40m APZ SETBACK
- 60m APZ SETBACK
- 70m APZ SETBACK

AS3959 - 1999 CONSTRUCTION STANDARD

- LEVEL 3
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A	PRELIMINARY		S.A.	G.Y.		22/07/09

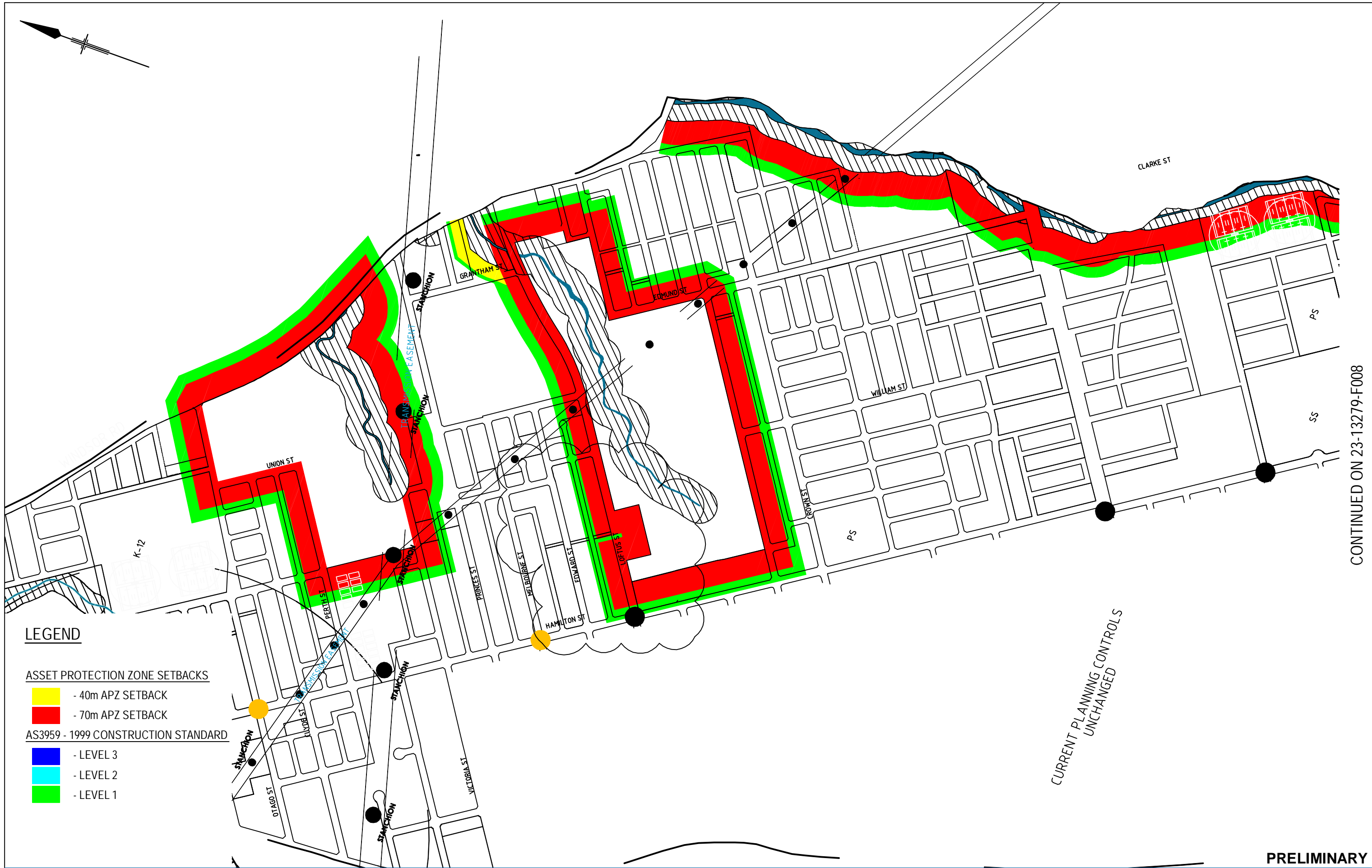
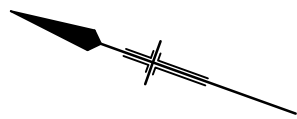


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Drawn S.ARMSTRONG	Designed G.YOUNG
Drafting Check	Design Check
Approved	
Date	
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved

Client	NSW DEPARTMENT OF PLANNING
Project	BUSHFIRE (RE)ASSESSMENT
Title	ALEX AVENUE PRECINCT APZ SETBACKS AND CONSTRUCTION STANDARDS - SPECIAL FIRE PROTECTION PURPOSE DEVELOPMENTS
Original Size	A3
Drawing No:	23-13279-F004
Rev:	C



LEGEND

ASSET PROTECTION ZONE SETBACKS

- 40m APZ SETBACK
- 70m APZ SETBACK

AS3959 - 1999 CONSTRUCTION STANDARD

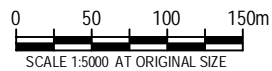
- LEVEL 3
- LEVEL 2
- LEVEL 1

CURRENT PLANNING CONTROLS UNCHANGED

CONTINUED ON 23-13279-F008

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
B	REVISED AS CLOUDED		S.A.	G.Y.		14/09/08
A	PRELIMINARY		S.A.	G.Y.		22/07/08



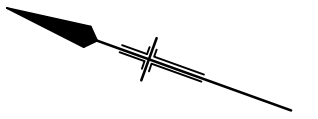
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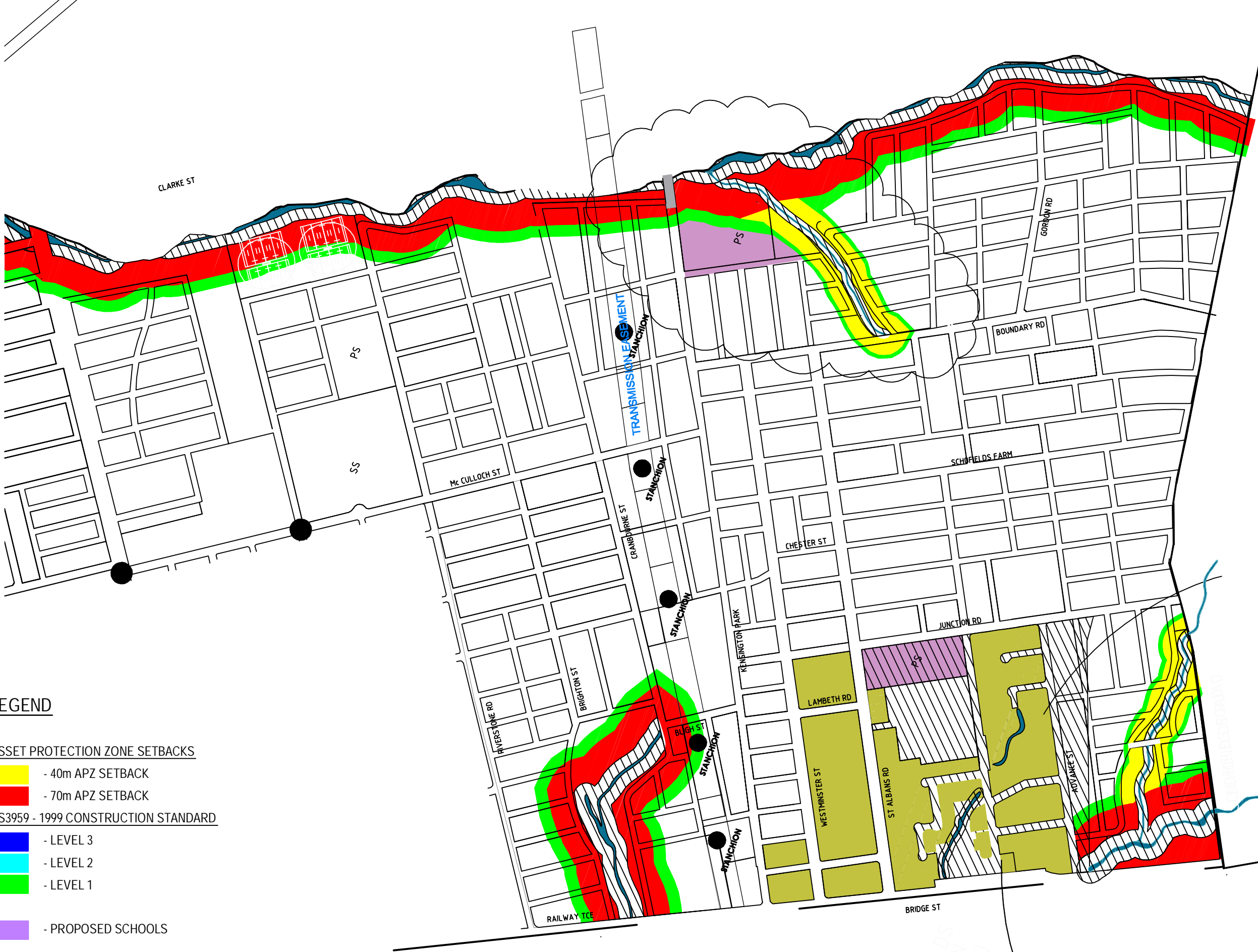
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Client	NSW DEPARTMENT OF PLANNING
Project	BUSHFIRE (RE)ASSESSMENT
Title	RIVERSTONE PRECINCT APZ SETBACKS AND CONSTRUCTION STANDARDS - SPECIAL FIRE PROTECTION DEVELOPMENTS
Original Size	A3
Drawing No:	23-13279-F007
Rev:	B



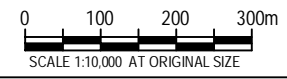
CONTINUED ON 23-13279-F007



- LEGEND**
- ASSET PROTECTION ZONE SETBACKS**
- 40m APZ SETBACK
 - 70m APZ SETBACK
- AS3959 - 1999 CONSTRUCTION STANDARD**
- LEVEL 3
 - LEVEL 2
 - LEVEL 1
- PROPOSED SCHOOLS

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
B	REVISED AS CLOUDED		S.A.	G.Y.		14/09/09
A	PRELIMINARY		S.A.	G.Y.		22/07/09



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Approved		Date	
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	NSW DEPARTMENT OF PLANNING
Project	BUSHFIRE (RE)ASSESSMENT
Title	RIVERSTONE PRECINCT APZ SETBACKS AND CONSTRUCTION STANDARDS - SPECIAL FIRE PROTECTION DEVELOPMENTS
Original Size	A3
Drawing No:	23-13279-F008
Rev:	B




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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
o	Geoff Young					
1	Geoff Young	Robert Harrison		Steven Thompson	On file	24/09/09