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CRAIGIEBURN WEST PSP:

Integrated Water Management Issues and Opportunities

March 2019

Document history

Revision:

Revision no.	01
Author/s	Olivia Blair-Holt
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Revision no.	02
Author/s	Olivia Blair-Holt
Checked	Dan O'Halloran
Approved	Jonathon McLean

Distribution:

Revision no.	01
Issue date	December 2018
Issued to	Ella Adams (Victorian Planning Authority)
Description:	Draft for comment

Revision no.	02
Issue date	March 2019
Issued to	Ella Adams (Victorian Planning Authority)
Description:	Final

Citation:
Alluvium (2018). Craigieburn West PSP: Integrated Water Management Issues and Opportunities. Report 0118213 by Alluvium Consulting Australia for Victorian Planning Authority, 35 Collins St Melbourne

Acknowledgements:
We would like to acknowledge and thank those who attended the central workshop for this project. They and their organisations are listed within this document.

Ref:
R:\Work\2018\213_IWM_Issues_Opportunities_for_Craigieburn\10_Project\1_Deliverables\0118213_V02R01_IWM Issues and Opportunties_Craigieburn West PSP.docx

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1 Introduction

Alluvium Consulting Australia Pty Ltd (Alluvium) was engaged by the Victorian Planning Authority (VPA) to investigate and identify Integrated Water Management (IWM) issues and opportunities to inform the subsequent preparation of the Craigieburn West Precinct Structure Plan (PSP). The central aspect of this work was the facilitation of a workshop on Friday December 14th, 2018 at Hume City Council Broadmeadows.

In addition to the Craigieburn Wets PSP, an additional area to the south of the PSP, and north of Greenvale Reservoir known as 1170 Mickleham Road, was also included within the investigation area.

This report summarises the strategic and planning context for the PSP, the discussion within the workshop and an analysis of the opportunities identified within that workshop.

1.1 Location

The Craigieburn West precinct is located approximately 30km north of Melbourne CBD and 4km west of Craigieburn on the western edge of Melbourne's Urban Growth boundary (Figure 1 and Figure 2). Covering an area of 564 hectares, the precinct is mainly in the Upper Merri Creek catchment. Aitken Creek runs through the PSP draining to the Merri Creek. The southern portion of the investigation area drains to Yuroke Creek.

Greenvale Reservoir is located to the south of the 1170 Mickleham Road site. The reservoir is a critical potable water supply asset that functions to supply water to approximately 1 million people.

1.2 Workshop

The workshop in December 2018 included attendees from Hume City Council, Yarra Valley Water, Melbourne Water, DEWLP and the Victorian Planning Authority. The aims of the workshop were to:

- Develop a shared understanding of the background strategic work relevant to the Craigieburn West PSP
- Based on this, discuss and agree IWM objectives for Craigieburn West PSP (and 1170 Mickleham Road)
- Identify IWM opportunities (and associated issues) that align with those objectives
- Discuss how these opportunities might be implemented or opportunities to learn from concurrent IWM work.

Prior to the workshop, brief interviews were conducted with representatives from each of these organisations to understand their expectations for the workshop. In summary, the feedback from these discussions was that workshop attendees:

- Were happy that VPA has initiated this collaborative process
- Timing is critical if IWM opportunities are to be included within the PSP
- What level of detail that is required prior to an IWM opportunity being included within the PSP?
- How can this process contribute to the protection of waterway values and achieving Melbourne Water's Healthy Waterways Strategy objectives?
- We're looking for innovation in the application of IWM opportunities.

Table 1. Workshop attendees

Organisation	Attendee	Role
Hume City Council	Claire Fenby	Acting Senior Sustainable Environment Officer
	Amanda Dodd	Acting Manager, Sustainable Environment
	Fenella Maine	Strategic Planner
Melbourne Water	Rob Considine	Manager, Water Services Planning
	Michael Prior	Precinct Structure Planning Coordinator
	Birgit Jordan	Senior Stormwater Quality Technical Advisor
DELWP	Dennis Corbett	Senior Project Manager, Integrated Water Management
Yarra Valley Water	Michael Browne	Manager, Water Growth Planning
	Kevin Dawson	Urban Development Manager
	Marnie Ireland	Divisional Manager, Sustainable Growth Planning
VPA	Ella Adams	Planner
	Chris Braddock	Water and Engineering Manager
	Zachary Powell	Student Planner
	Monique So	Infrastructure Engineer
	Ben Weiner	Senior Strategic Planner

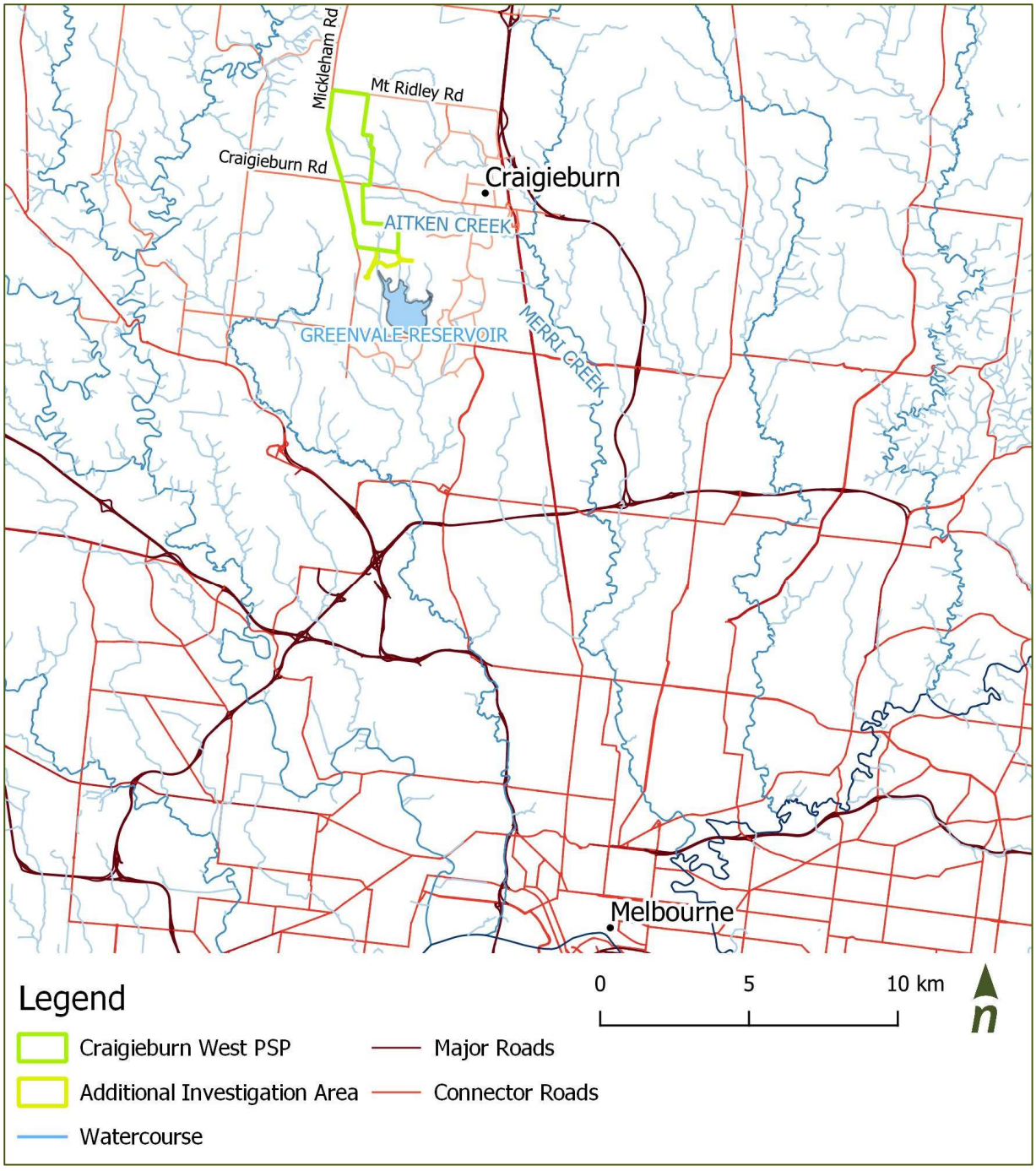

Figure 1. *Craigieburn West PSP Location*

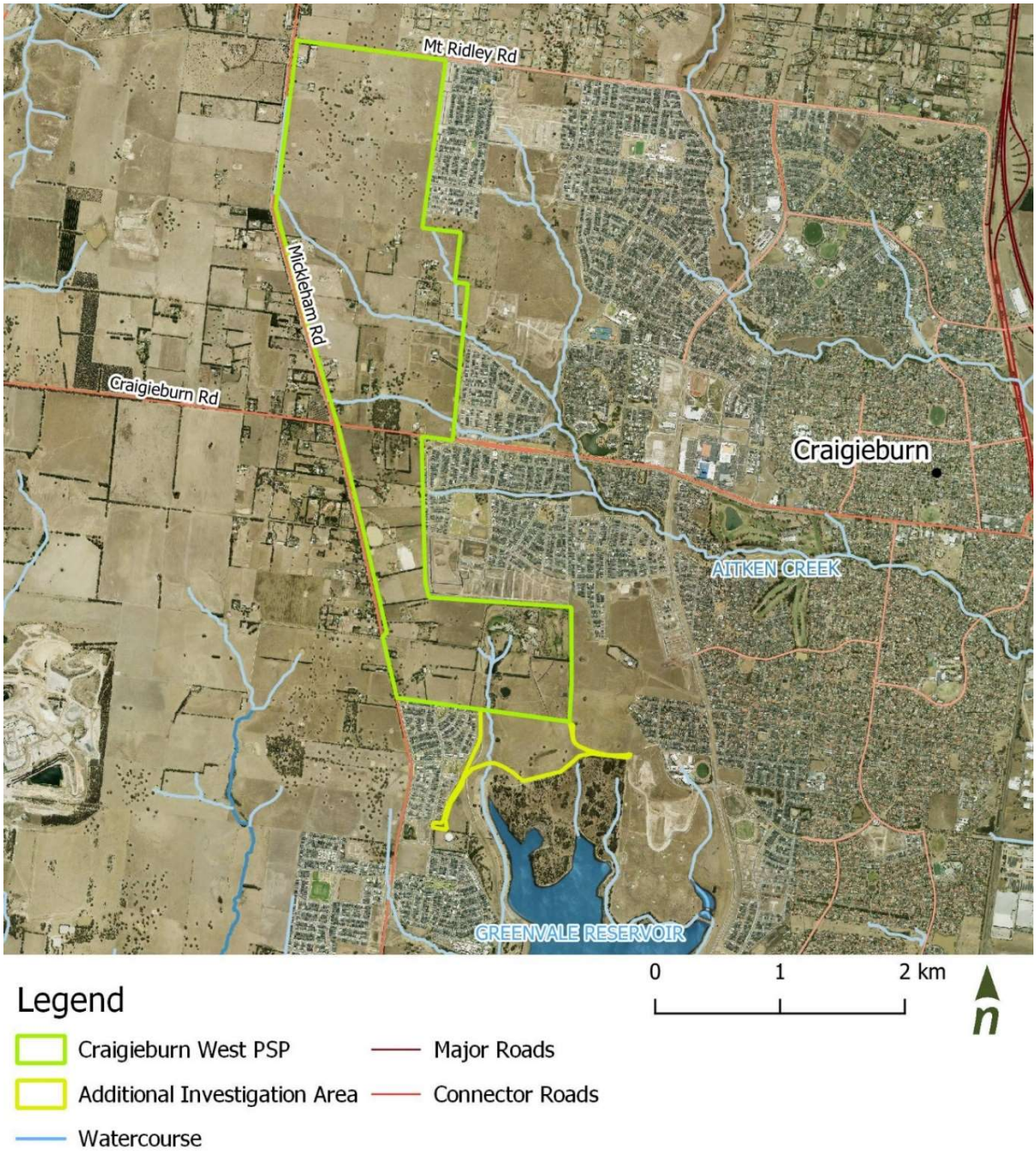

Figure 2. *Craigieburn West PSP and the additional investigation area*

2 Site Data

The following is a high-level desktop summary of the data and information available on the nature and potential future servicing of the PSP.

2.1 Catchment review

Overland flow directions and local catchments were delineated using GIS and are shown in Figure 3. Most of the site has a less than 2% slope, with steeper areas along the creek banks and to the south. The site covers parts of three separate creek catchments:

- Aitken Creek - flowing through the centre of the site and south easterly towards Merri Creek. External flows enter the site from rural areas in the north and west. Flows from this catchment leave the site via Aitken Creek or some smaller tributary creeks. There are existing constructed wetlands in the developed areas downstream.
- Moonee Ponds Creek - a small part of the southern area of the PSP drains westerly into the rural area and flows towards Moonee Ponds Creek.
- Yuroke Creek - forms in the south of the site and drains south around the reservoir to Moonee Ponds Creek. In the south west corner of the site a small area drains to the south west and the Upper Brodies Creek which connects to Yuroke Creek further to the south.

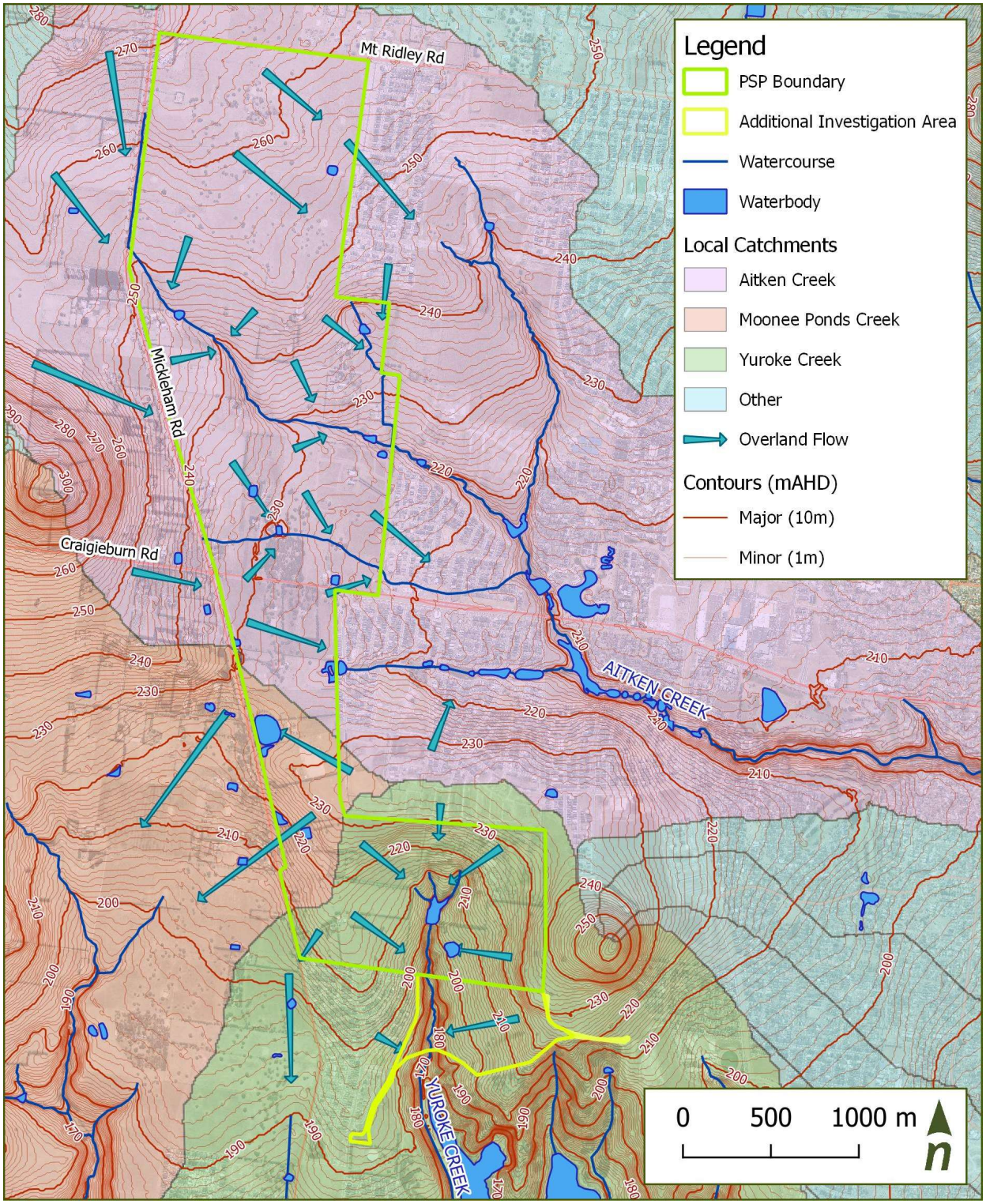

Figure 3. *Catchment delineation*

2.2 Ecology

The PSP is largely disturbed, however there are pockets of remanent native vegetation , predominantly Plains Grassy Woodlands (Figure 4). This includes a designated conservation area in the north of the PSP. It is reported that there are stands of River Red Gums within the precinct that will also require protection and consideration when urbanisation changes catchment hydrology. Aitken Creek can also be seen on this plan running west-east across the precinct.

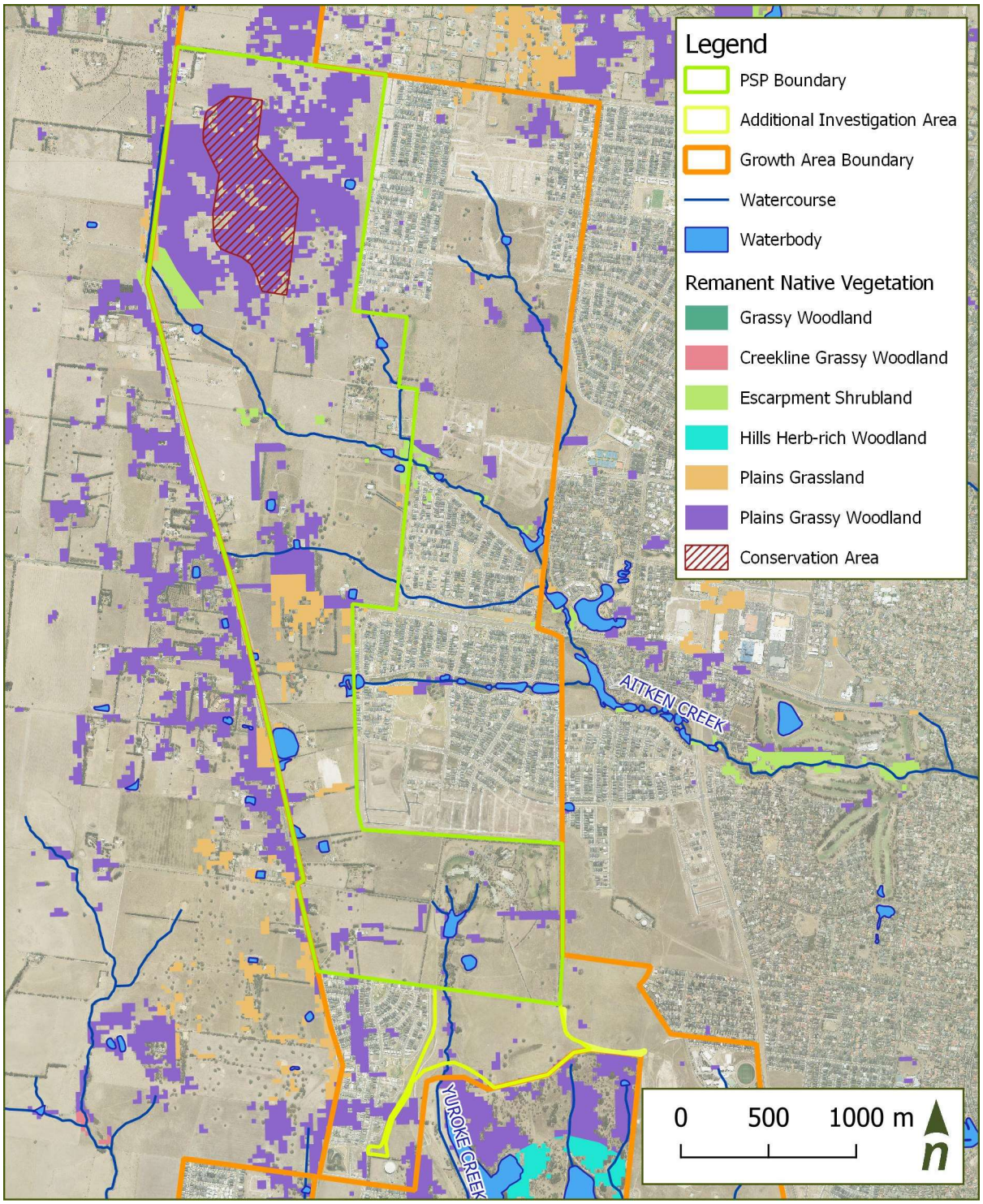

Figure 4. *Ecological Vegetation Classes*

2.3 Indigenous Heritage

Craigieburn West PSP is on Wurundjeri Country. The Indigenous Cultural Sensitivity Area shown in Figure 5 follows the alignment of the Aitken Creek, and is consistent with a 200m buffer on either side. It is not understood at this stage whether there are significant indigenous artefacts within the precinct, however an Aboriginal Cultural Heritage Impact Assessment is being prepared for the PSP which will result in more detailed investigation.

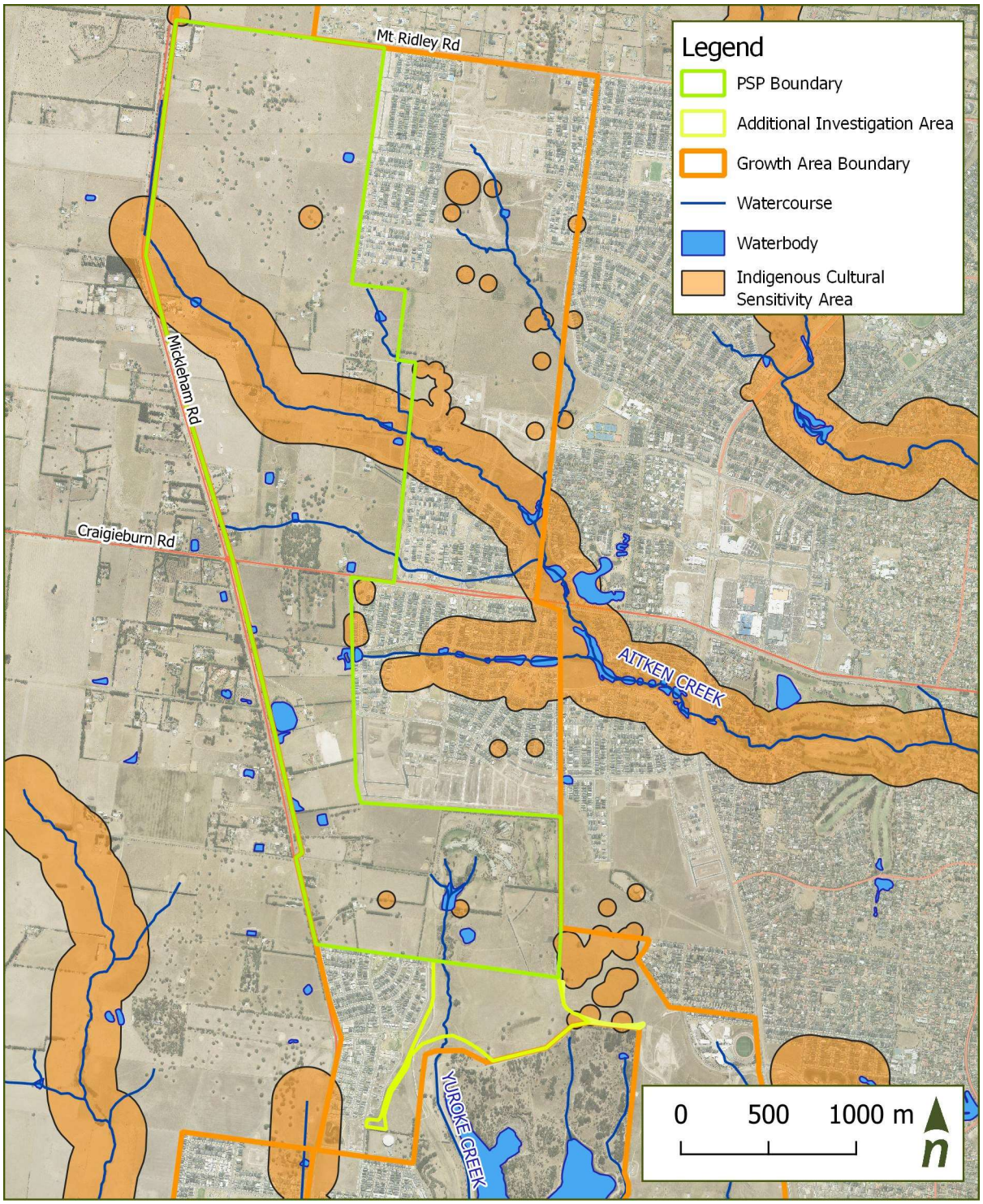

Figure 5. *Indigenous Cultural Sensitivity Overlays*

2.4 Developer Services Schemes

Melbourne Water prepares Develop Services Schemes to define the flood management requirements for particularly catchments. They set out the location, area and alignment of retarding basins, waterways and wetlands. These schemes enable planning authorities and land developers to better understand existing drainage and flooding constraints.

The Melbourne Water 100-year flood extents are shown in Figure 6, with flooding predominantly confined to the alignments of the Aitken and Yuroke Creeks. At its widest, the flood envelope extends approximately 40m from the creek centreline.

The site is covered by three Developer Services Schemes (DSS) that have been prepared by Melbourne Water:

- the Aitken Creek
- Upper Brodies Creek
- Yuroke Creek DSS'.

The Aitken Creek and Upper Brodies Creek Schemes have been attached as appendices, however the Yuroke Creek DSS is yet to be published.

Figure 7 shows the major flooding and waterway assets within the PSP. What can be observed is that there are no flood mitigation assets or wetlands recommended for the PSPs.

There is a greater concentration of assets in the south of the investigation area. This is partly due to the presence of Greenvale Reservoir and the importance of protecting water quality within the reservoir's catchment. This is discussed further in Section 2.5.

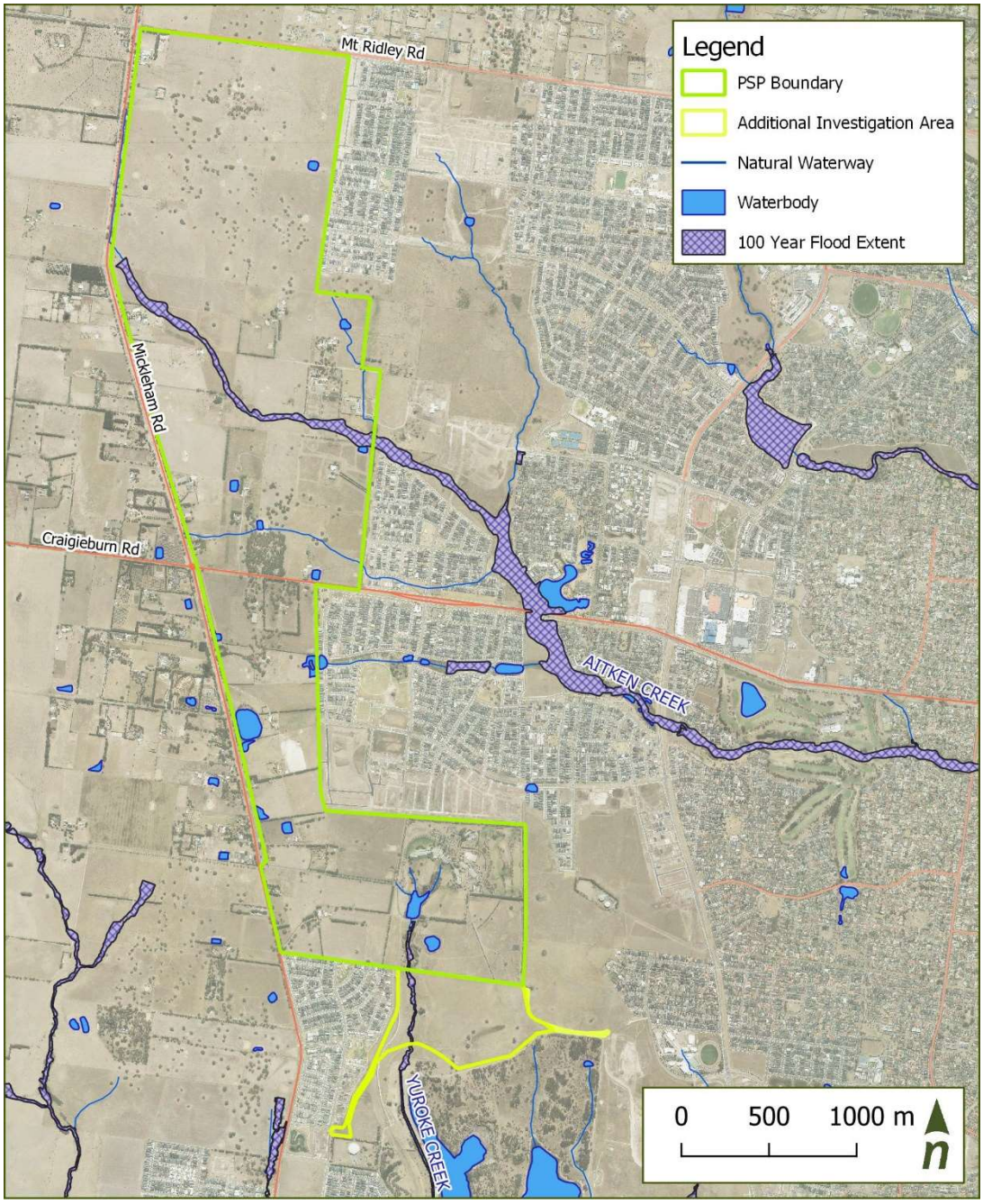

Figure 6. *100-year flood extents (Melbourne Water)*

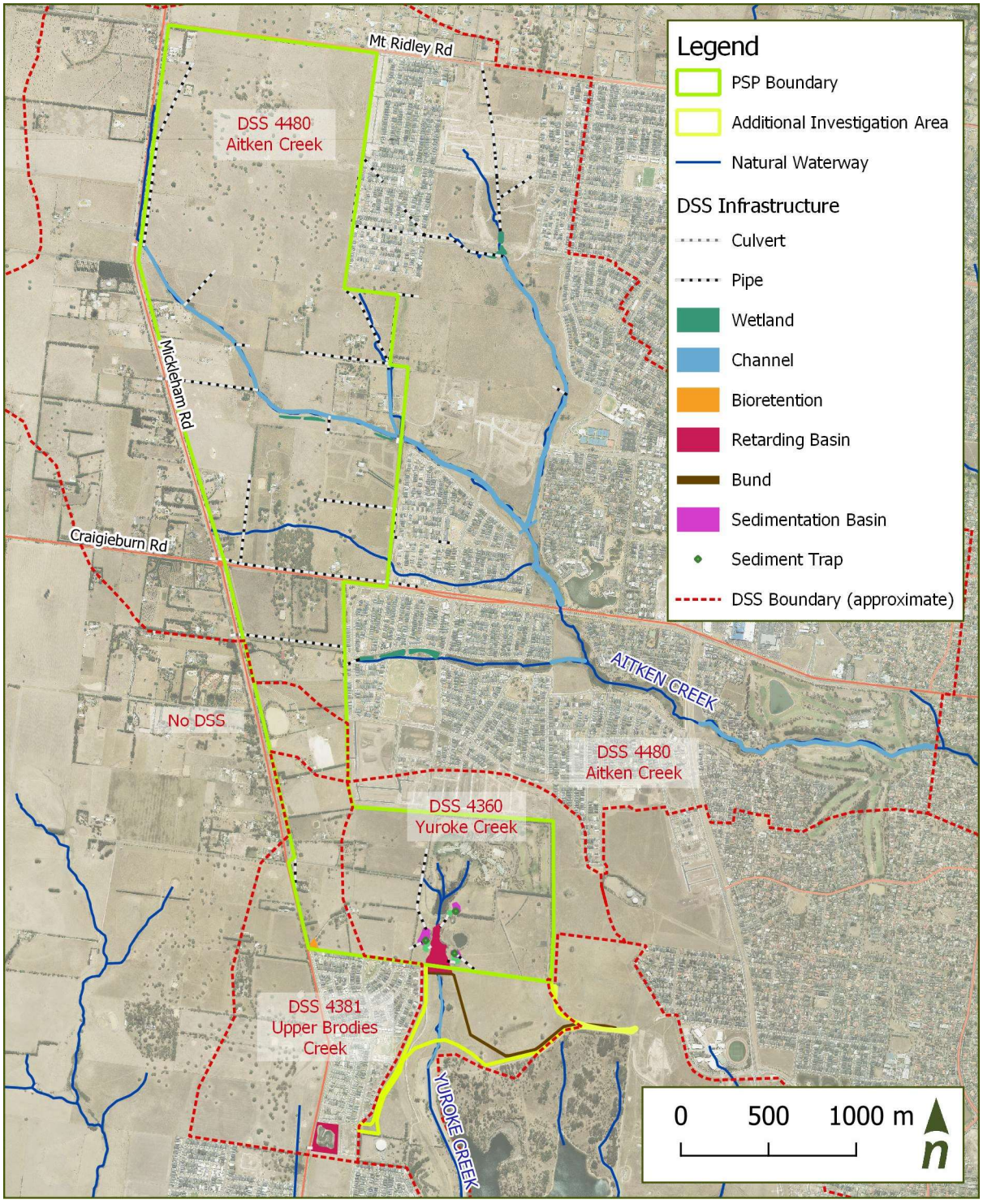

Figure 7. *Structures indicated on the relevant schemes*

2.5 Water, sewerage and non-drinking water servicing (Yarra Valley Water)

Water

The nature and timing of planned potable water assets can be seen in Figure 8 below. It can be seen that potable water assets servicing the northern section of the PSP are planned for approximately 2024 feeding off existing or planned mains along Mt Ridley Road and Craigieburn Road. An extension of the watermain north along Mickleham Road is planned for 2019.

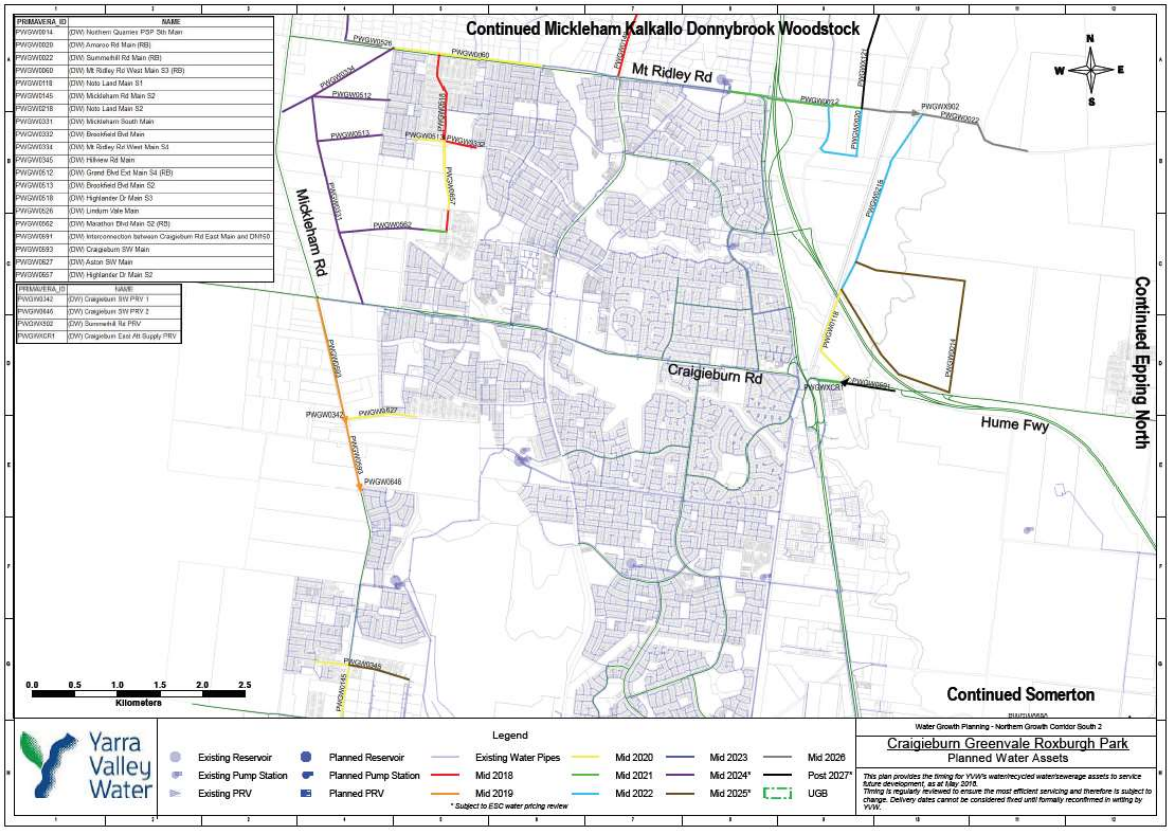

Figure 8. *Potable water servicing plans (Yarra Valley Water)*

Greenvale Reservoir: Greenvale Reservoir is a critical potable water storage and distribution facility that services Melbourne's northern and western suburbs. Greenvale Reservoir's catchment area is referred to as the Greenvale Reservoir Protection Area.

Maintaining high water quality is critical and an imperative of Melbourne Water, the asset manager. The objectives for water management within this catchment, as set out within the Greenvale North PSP (2011) include:

- To protect the Reservoir from the impacts of development, in terms of both stormwater volume and quality
- To ensure the cumulative effect of land use and development in the Greenvale Reservoir Protection Area maintains or reduces the level of risk to the quality of water supplied from the Reservoir
- To ensure development and land use is consistent with the Greenvale Reservoir Catchment: Drinking Water Quality Risk Management Plan (March 2008)
- To protect the water quality of the Reservoir from storm events with an annual recurrence interval up to a 1 in 1,000,000 AEP flood event
- To ensure that development and land use is compatible with the protection of the Reservoir
- To ensure the provision of protection measures for the Reservoir are integrated with other measures being undertaken by Council and the Victorian Government to achieve coordinated urban development in the relevant locality.

It is also noted within the Greenvale North PSP document that "all new developments must be designed to protect the Reservoir from stormwater contamination". The objectives and requirements to meet this requirement are included within the Greenvale Reservoir Catchment: Drinking Water Quality Risk Management Plan (March 2008).

Sewerage

Planned sewerage assets can be overserved to follow the contour and gradient along Aitken Creek with the Aitken Creek West branch sewer (coming off Craigieburn Road) planned for construction from 2021 to 2024. The Highlands Lake branch sewer is the other main sewer asset extending to Mickleham Road, that will also be constructed from 2021.

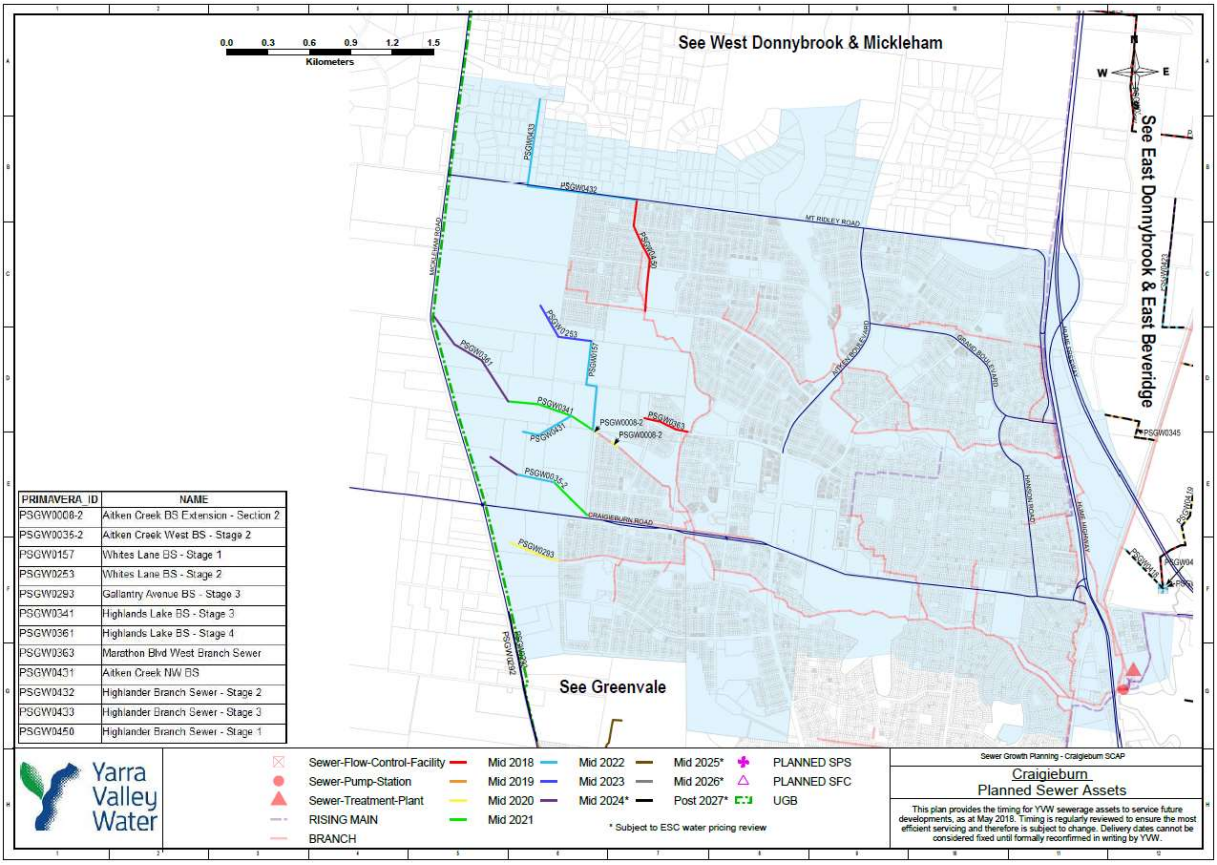

Figure 9. *Sewerage servicing plans (Yarra Valley Water)*

Non-drinking water

Non-drinking water (NDW) has been mandated by Yarra Valley Water for the PSP. NDW will be delivered via an extension to NDW mains along Mt Ridley Road from mid-2020, with the Mt Ridley Road West main extending into the PSP from about 2024.

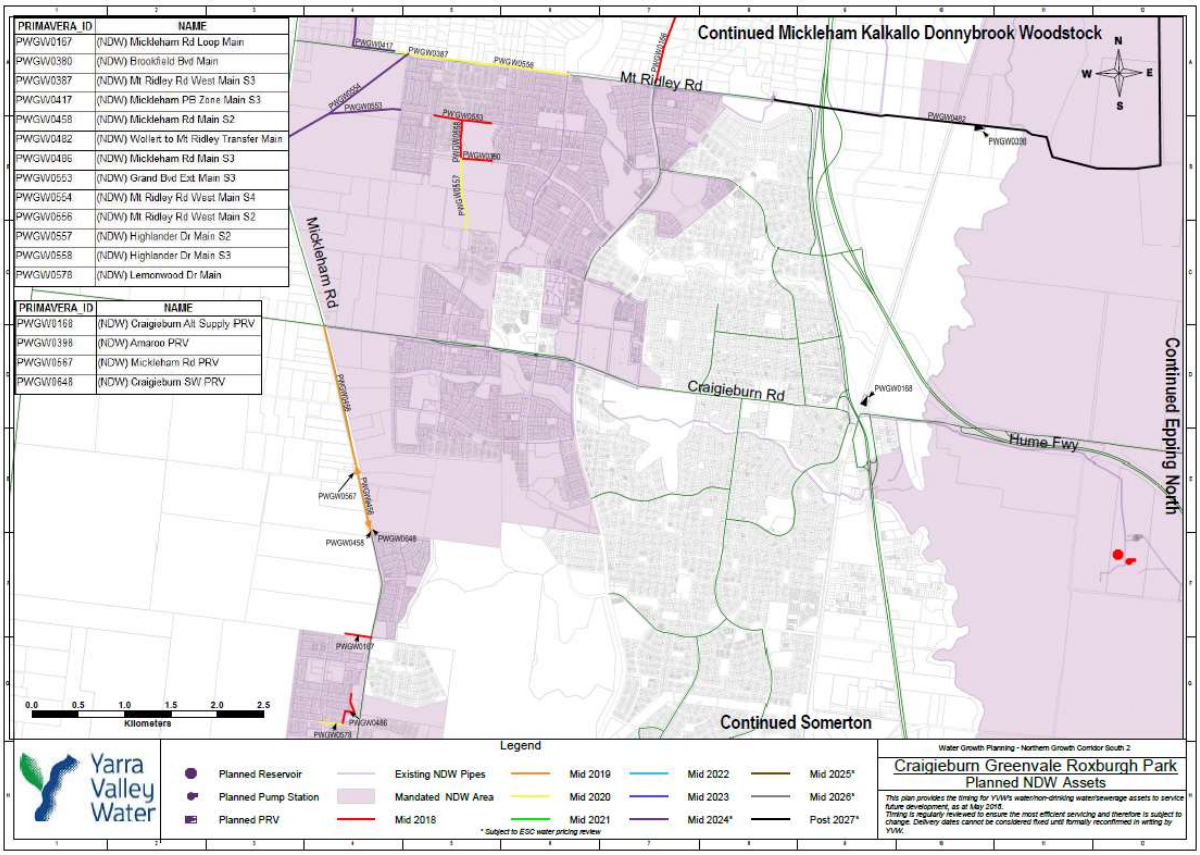

Figure 10. *Non-drinking water plans (Yarra Valley Water)*

2.6 Summary of servicing advice

In summary

- The DSS largely drains to the south east (much of it to Aitken Creek), with an area near Yuroke draining to the west of Mickleham Road
- There are no significant retarding basins or wetlands planned of the PSP, with the exception of the RB planned for the north of Greenvale Reservoir, and three wetlands along Aitken Creek
- An 'area of Aboriginal cultural heritage sensitivity' follows the alignment of Aitken Creek
- There are stands of vegetation to be preserved, notable River Red Gums
- Non-drinking water has been mandated for the PSP.

3 Strategic context

A number of background documents were reviewed within the workshop by the group to establish the context for integrated water management within the PSP. During the discussion and review of these documents, their outcomes and objectives were listed and grouped with their applicability to Craigieburn West PSP highlighted.

Table 2. Background documents

Stakeholder	Document	Key points
State Government	Water for Victoria Plan: Chapter 5 – Resilient and liveable cities and towns (2016)	Victorian State government plan for managing water into the future. Chapter 5 summarises the five key outcomes to achieve 'Resilient and Liveable Cities and Towns' including efficient and affordable water and sewerage services, effective stormwater management to protect the urban environment, healthy and valued landscapes and community values reflected in place-based planning.
	Stormwater Ministerial Advisory Council (MAC) (2018)	The stormwater MAC reviewed the regulation of stormwater management in Victoria and delivered a series of recommendations in September of 2018. The first stage (planning reforms) have been gazetted and is embedded into the Victorian Planning Policy Framework. This extends the range of developments that are required to meet Clause 56 best practice environmental management (BPEM) pollution reduction targets beyond residential subdivisions to include commercial subdivisions and developments, industrial subdivisions and developments, public-use developments and multi-dwelling residential subdivisions and developments. Further recommendations cover future policy directions and supporting actions and are not gazetted at this stage.
	Integrated Water Management Framework for Victoria (2017) / Yarra Strategic Directions Statement (2018)	The IWM Framework for Victoria is designed to help local governments, water corporations, Catchment Management Authorities, Traditional Owners and other organisations work together to ensure the water cycle efficiently contributes to the urban liveability of the region, with communities at the centre of decision making.
Melbourne Water	Healthy Waterways Strategy (2018)	Craigieburn West PSP is within the Merri Creek Upper Sub-catchment. This identifies stormwater harvesting and infiltration targets for this sub-catchment, and while the strategy doesn't specifically include the Craigieburn West PSP, the explanation provided in Section 4 below suggests that those targets may still be pursued. The strategy also highlights a number of objectives for the sub-catchment including to: - Identify and implement opportunities to maintain or improve the flow regime - Establish a continuous riparian vegetated buffer, and maintain existing vegetation along priority reaches - Maintain or achieve high and very high-quality vegetation and protection of endangered EVCs - Improve stormwater condition through directly connected imperviousness, stormwater harvesting and infiltration targets - Mitigate threats to physical form and other high values - Increase access to and along waterways - Promote access and participation - Manage sedimentation from construction activities - Indigenous co design - Share connection to country and active respect for the river.
	Developer Services Schemes (DSS)	The DSS' have been prepared for the Craigieburn West PSP. The PSP is mostly within the DSS for the Aitken Creek DSS though the southern end includes Upper Brodie's Creek DSS and Yuroke Creek DSS.
Yarra Valley Water	Upper Merri Creek sub-catchment IWM project	This project has recently commenced, however attendees to the Craigieburn West PSP workshop were able to relay initial perceptions of the direction and objectives of that much broader, sub-catchment scale investigation. It is proposed that the work of the sub-catchment project can be used to inform the IWM work within the PSP
	Local Water, Sewerage, Non-drinking Water planning	Servicing plans have been prepared for the PSP. It is notable that "purple pipe" reticulated non-drinking water has been mandated for Craigieburn West.
	People, Planet, Prosperity Report	Yarra Valley Water's report on adopting the United Nations Sustainable Development Goals and the commitments they've made to supporting these. In particular, commitments to IWM include: - Participating in Integrated Water Management (IWM) forums to maximise water-related amenity. - Integrating Traditional Owner engagement in our planning and management frameworks. - Making optimal use of alternative water sources
Hume City Council	Hume City IWM Plan 2014-2017 *(this document is currently being updated)*	Key goals from 2014-2017 document: GOAL 1: Excellence in Integrated Water Management including - Council aims to demonstrate excellence in integrated water management by implementing projects and programs that progress towards the achievement of long-term targets. GOAL 2: Community Learning and Action - A range of practical on ground projects, education and capacity building will contribute to the goal of improving all aspects of water management. GOAL 3: Influence and Advocate - Influence the actions of external organisations and advocate for improved support and the regulatory environment that supports integrated water management
	Hume City Land and biodiversity plan 2015-2019	Key goals from this document GOAL 1: The City's natural heritage, environment and rural spaces are protected, enhanced, maintained and valued. GOAL 2: Cultural heritage sites are identified, protected and effectively managed. GOAL 3: Suburbs are leafier with increased canopy cover
	Urban Forest and Open Space (*in preparation*)	Hume City Council are developing other related policies and principles which an IWM strategy can support, such as the urban forest vision.
	Metropolitan Urban Forest Strategy (*in development*)	As part of the 100 Resilient Cities initiative, Hume City Council have joined the Resilient Melbourne Metropolitan Urban Forest Strategy which is currently in development.

4 Healthy Waterways Strategy - Discussion

The Healthy Waterways Strategy (HWS) was of significant interest to the group, in terms of both its recent release and 'game changing' targets. For many it was their first opportunity to understand how the HWS may be applied in the PSP planning process.

Craigieburn West PSP sits within the Upper Merri Catchment that is addressed within the 'Yarra co-designed catchment program' document. The workshop group was informed that the HWS is the result of an extensive consultation process and has been 'signed off' on by a range of organisations, including the Urban Development Institute of Australia (UDIA).

The strategy sets out a long-term vision for its nine key values while also specifying stormwater harvesting, infiltration and directly connected imperviousness targets as part of a suite of objectives designed to drive the industry beyond business as usual. The implication, as discussed by the group, was that meeting these targets and going beyond best practice could not be achieved via business as usual approaches. As such, the HWS represents a challenge to the status quo and the approaches typically adopted by water managers and planners.

Cost was also discussed. It was noted that more ambitious targets will cost more money, however whilst the estimated cost are prima facie high, they may not be insurmountable in the context of an innovative, collaborative, multi stakeholder approach.

It was noted also that Craigieburn West PSP isn't within the 'Priority Stormwater Area', however it was explained that this does not imply that stormwater condition is not important in this area. Rather it suggests that specific modelling is yet to be undertaken and it is fair to assume in this context that the targets within the broader sub-catchment should be considered for Craigieburn West PSP. Further opportunities associated with achieving the HWS targets are discussed further below.

5 Identification of objectives

Through discussion around strategic and planning documents, important objectives were highlighted for application to water management within the Craigieburn West PSP. During the course of that discussion, thematic objectives emerged with opportunities and issues identified under each. Asset (WSUD) protection during construction was an additional theme raised as a critical issue, however it was agreed that this was a large enough issue to be addressed within an alternative meeting. In addition, discussion around indigenous engagement is noted here with ongoing engagement with Yarra Valley Water to ensure consistency with the engagement process being undertaken as part of the Upper Merri IWM Plan project.

Based on this discussion, the objectives identified for Craigieburn West PSP to explore include:

1. Stormwater management which goes beyond best practice
2. Fosters a participative community
3. To incorporate meaningful indigenous participation and input into the IWM planning process
4. To reduce mains water use through the use of fit-for-purpose alternative water supply
5. Reframes 'open space'.

An objective of meeting Healthy Waterways Strategy targets (for DCI, stormwater harvesting and infiltration) was also discussed. At the time of writing the physical requirements to meet these targets within Craigieburn West PSP are relatively unclear in terms of things like land take and cost. This will become clearer as this and other PSPs investigate what is required to meet those targets. Therefore, this has been committed to as an objective, neither has it been discounted.

A summary of the thematic objectives to explore, the opportunities identified under each and the analysis and potential actions associated with these opportunities is summarised in the tables below.

Craigieburn West PSP: Stormwater management which goes beyond best practice

Objectives	Opportunities	Analysis and Potential Actions
Stormwater management goes beyond best practice	**Collaboration**: To collaborate with Yarra Valley Water in the development of the Upper Merri Sub-catchment IWM Plan to learn how they plan to meet Healthy Waterways Strategy targets	**Analysis**: Meeting the HWS targets will be challenging and will require a cross stakeholder effort. This will also have implications for land use as area is dedicated to achieving the HWS outcomes. **Action**: VPA to become involved in the Merri Creek Upper Merri Sub-catchment IWM Plan to understand what is required to meet those targets from a planning and land use perspective.
	Stormwater harvesting: primarily for the irrigation of open space	**Analysis**: there is sufficient catchment to support the investigation of a stormwater harvesting scheme. This will also contribute to HWS targets. Note that recycled water is mandated for Craigieburn West PSP, therefore further work is required (with Yarra Valley Water) to understand the role of stormwater harvesting within a third pipe network e.g. can treated stormwater be 'shandied' with recycled water, or can recycled water 'top-up' a stormwater harvesting scheme? **Action**: Include stormwater harvesting as part of the 'alternative' water supply mix for Craigieburn West PSP and determine it's role in the context of recycled water being supplied.
	Stormwater diversion: from Craigieburn West, across Mickleham Road to agricultural land to the west	**Analysis**: Farmers to the west of Mickelham Road could benefit from an additional water source. Most of the PSP drains to Aitken Creek and away to the south east. Conveying water to the west may be possible, as the grade is relatively flat, however that would require drainage infrastructure to go against that grade. There is however a small area of catchment that drains naturally to the west of Mickelham Road. This area could be used as a pilot study. **Action**: Quantify the impact stormwater diversion to west will have on achieving HWS targets (in the context of the broader sub-catchment plan). If the volume is significant, quantify the potential catchment that could be diverted, beginning with the 'pilot' site that flows west naturally.
	MAR: Use managed aquifer recharge (MAR) as part of meeting infiltration targets	**Analysis**: The groundwater table is relatively shallow in areas of the site, including along the alignment of Aitken Creek. This opportunity would involve infiltration ponds, or pumping of treated stormwater to reengage surface water with the local aquifer. This will increase infiltration rates and there is the suggestion that greater aquifer recharge could reengage a spring that used to feed Moonee Ponds Creek. **Action**: Preliminary, desktop investigations should be undertaken to understand the feasibility of MAR in this location. Ideally this work will be undertaken in collaboration with the Upper Merri sub-catchment IWM Plan to understand, on a sub-catchment level, what role infiltration is likely to play in meeting the HWS targets. Given the relatively degraded values of Aitken Creek, it is unlikely that an MAR scheme is justifiable solely within the PSP boundary. However, it may be justifiable on a sub-catchment basis, inviting the involvement of external stakeholders.
	Rainwater harvesting: Mandate rainwater tanks	**Analysis:** Rainwater harvesting at a lot scale can contribute to the a reduction in runoff reaching our waterways, particularly if the tank is plumbed to internal demands (toilet, laundry). Modern development however have diminishing backyards and therefore less potential to use rainwater for irrigation. This PSP will also have recycled water that is aimed at meeting toilet and laundry demands. **Action:** In collaboration with the Upper Merri project, investigate the benefits of combining recycled water and rainwater tanks in contributing to the HWS targets. This could include maintaining a smart or leaky tank that is filled with enough rainwater / recycled water to meet daily toilet / laundry and irrigation needs, but leaves 'air space' to collect and store rainwater for use, delayed release downstream or infiltration into the backyard. Smart controls also open up the potential for smaller, cheaper tanks that can be more easily housed within smaller lot areas.
	Opportunities	**Analysis and Potential Actions**
	Maintenance: Prioritise the maintainability of assets in the design stage	**Analysis:** Council needs improved WSUD designs that prioritise maintenance along with function and aesthetic based on recent experiences where this is creating issues, particularly in terms of access. **Action:** Council to collaborate with VPA and designers to specify WSUD asset and maintenance requirements. Council will need to publish and share there requirements for common WSUD assets including wetlands and biofilters.

Figure 11. *Stormwater management which goes beyond best practice*

Craigieburn West PSP: Fosters a participative community

Objectives

Community has a sense of place and ownership

Opportunities

European heritage: To engage with local farmers and collate European heritage via story telling and preservation of physical artefacts (e.g. stonework)

Natural Heritage: Document and share local understanding of natural history and heritage including historical flooding, fires, River Red Gums and remnant vegetation

Existing community:

- To engage the diversity of existing community groups
- To engage with Friends of Merri Creek (FMC) and Merri Creek Management Committee (MCMC)
- To reconsider maintenance models to include volunteers and working bees

Future community: Work with the developer to understand future community.

Analysis and Potential Actions

Analysis: A sense of place and character can be enhanced through the introduction of information and signage that connects the community to local European Heritage and the environmental values surrounding the site.

Action: Council expressed that they have some connections within the existing farming community who could assist in this documentation. Council should consult with and document the history of the area. This should include man made and natural characteristics. If the Council wish to incorporate this into the development:
- Council will consult with local landowners and community groups to compile relevant historical, European cultural and natural history information
- VPA can review the outcomes of this work with Council and revisit the question as to how this might be expressed within the development (e.g. through signage, public art etc).

Analysis: There is diversity within the surrounding local community, and the prospect of involving them in the development of the plans for Craigieburn West PSP was discussed. For example, there are a number of churches and temples in the area with active religious communities as well as local school groups and Friends of Groups who could contribute to creating a sense of place and ownership.

Action: This action is likely to be Council driven and may include:
- Council to engage local community groups to gauge their interest in understanding what they would like to see within Craigieburn West PSP and what role community groups may play in that.
- Engage with friends groups (like the Merri Creek Management Committee and Friends of Merri Creek) to understand their objectives for a redesigned or reconstructed Aitken Creek and their role in ongoing monitoring and maintenance
- To engage with (current and future) Community and Friends Groups to discuss alternative waterway maintenance models whereby Council and Melbourne Water could support the involvement of the local community in undertaking basic or regular maintenance tasks

Analysis: In undertaking the activities described above, demographic and market knowledge can be shared between the land developer, Council and VPA to get a better understanding of the reasons people are likely to move to this area and therefore, what type of people that are likely to move in. This can support the development of an approach to the creation of place and community ownership

Action: Prior to commencing place making activities, Council and the developer can collaborate, sharing background information to inform future strategies.

Objectives

The community interacts with water and nature

Opportunities

Education: To improve the community's understanding of the areas natural and built water assets

Access: Set minimum standards for waterway access

Analysis and Potential Actions

Analysis: An improved understanding of the reason and function of water cycle assets (like WSUD) can improve the chances that the community take ownership of those assets.

Action: Connect with local teacher's environment network to encourage them to introduce their students to the role of WSUD and connect that to local waterways, whether that be Aitken or Merri Creek
Engage these student groups in citizen science activities
Consider the inclusion of outdoor classrooms as part of the open space / school design, so that there are informal, shaded areas that can be used for gathering and discussion

Analysis: Part of the sense of place, ownership and ensuring the community interact with natural assets and green infrastructure is ensuring that they are accessible and that there is physical infrastructure that supports engagement and relaxation (e.g. shaded areas, benches, BBQ areas, walkways etc).

Action: For the VPA, in collaboration with Melbourne Water, to include requirements for waterway accessibility within the PSP

Figure 12. *Foster a participative community*

Craigieburn West PSP supports meaningful indigenous engagement

Objectives

To incorporate meaningful indigenous participation and input into the planning process

Opportunities

Co-design: To engage with the Wurundjeri representative groups to co-design indigenous heritage and water management strategies.

Cultural Flows: To implement the findings from cultural flows studies that are currently underway (as part of the Upper Merri IWM Plan)

Analysis and Potential Actions

Analysis: The *Healthy Waterways Strategy* (Melbourne Water, 2018) and *Water for Victoria* (DEWLP, 2016) emphasises the preference for co-design and the recognition and management of Aboriginal values. It is understood that the Wurundjeri are being consulted as part of the broader Upper Merri Creek sub-catchment IWM Plan, being led by Yarra Valley Water (YVW). Based on discussions with YVW, it is agreed that the outcomes from the Upper Merri Creek project will be extended to the Craigieburn West PSP, rather than undertaking a separate engagement process.

Action: VPA to maintain engagement in the Upper Merri Creek project, on a range of matters, including how to recognise and protect Aboriginal values within the PSP.
Cultural Flows Research Project: Paul Lane (Lingiari Foundation) and Rene Woods (Murray Lower Darling Rivers Indigenous Nation)

Craigieburn West PSP: Reduces reliance on mains water

Objectives

To reduce mains water use through the use of fit-for-purpose alternative water supply

Opportunities

Recycled Water, stormwater and rainwater: It is acknowledged that recycled water is mandated for the area which will see non-potable water provided at the lot scale for uses like toilet flushing and garden irrigation

Smart rainwater tanks (as per the AquaRevo development): Smart rainwater tank systems can be remotely controlled and managed depending upon the objective being pursued

Analysis and Potential Actions

Analysis: Recycled water infrastructure has been mandated for the PSP and therefore YVW's objective is to optimise the use of that infrastructure and use recycled water to reduce the volume of wastewater flowing to the downstream system. Coupled with this is the objective of meeting Healthy Waterway Strategy targets, implying the harvesting and/or infiltration of stormwater.
Within the workshop there was discussion about combining alternative water sources to optimise the use of the third pipe network and the benefit to the community and environment. For example, potentially providing treated stormwater to the recycled water network. This could assist in meeting waterway protection targets (by removing stormwater from the system), but may conflict with YVW goal of reusing the maximum volume of recycled water. Can rainwater tanks perform a flood storage / waterway protection role and be 'topped up' by recycled water to maximise the reduction in potable water use? In summary, how can rainwater tanks, stormwater harvesting and the recycled water network function optimally together.

Action: Further work is required (between Council, Melbourne Water and Yarra Valley Water) to understand the potential role of stormwater (and rainwater) harvesting within the context of a recycled water, third pipe network. These investigations are likely to be taking place within the Upper Merri IWM Plan project, and therefore the learnings from that project should be transferred to the Craigieburn West PSP as it is likely that, from YVW and Melbourne Water's perspective, they will prefer operating a consistent system across the Upper Merri sub-catchment and Craigieburn West PSP.

Analysis: Smart tanks perform the dual role of providing an alternative water supply source and also being able to be emptied (remotely) if the storage within those tanks is required to provide distributed storage to meet flood or waterway protection objectives. Land developers are identifying these type of smart systems as a 'point of difference', and while they come with additional cost, their additional may be consistent with the aspirations of the future community and their reasons for buying in the area (this links back to the discussion around purchaser demographics).

Action: This initiative is likely to be driven by the developer with Melbourne Water and YVW, particularly if Smart Tanks are seen as an important part of meeting Healthy Waterways Strategy targets. Again, Craigieburn West PSP is likely to take the lead from the Upper Merri IWM Plan. A cost benefit analysis on the inclusion of smart tanks can be undertaken if this is supported by the developer. The benefits assessed should include how these tanks contribute to Healthy Waterways Strategy targets.

Figure 13. *Support meaningful indigenous engagement / Reduce reliance on mains water*

Craigieburn West PSP: Reframes open space

Objectives	Opportunities	Analysis and Potential Actions
Rethink the use and function of public and open spaces	**Multifunctional natural and open space assets**: There is an opportunity to reconsider the traditional approach to the definition and use of open space so that open spaces meet a broader range of community and environmental objectives	**Analysis:** If the Healthy Waterways Strategy objectives are to be meaningfully pursued, then it will require a rethink of how traditional urban developments are planned. One element of this is the role of open space. With more demanding stormwater management objectives, there will be demands on open space to achieve multiple objectives and fulfil multiple roles. For example, stormwater treatment, flood mitigation, storage for the reuse of stormwater, infiltration, recreation, relaxation, shade and comfort. This may mean that Melbourne Water and Council reconsider the zoning and definition of this type of multi functional space. For example, can open space that is traditionally defined as encumbered (to accommodate flooding) also house stormwater harvesting, recreational or community assets that are designed to accommodate or withstand those flows? **Action:** This is a separate and stand alone collaboration opportunity for Council, Melbourne Water, the VPA and the land developer. This will require getting an appreciation of the land take requirements to meet Healthy Waterways Strategy targets versus those to meet business as usual, BPEM targets. A facilitated workshop could then be the forum to investigate how, theoretically, the PSP could be reconfigured, and current restrictions on the multi-function of open space, redefined to achieve those outcomes. Everything should be on the table and open for negotiation. The outcome from this workshop could be a set of recommendations for further consideration for all organisations involved.
	Passive Irrigation: to irrigate street trees and potentially smaller, neighbourhood open spaces and garden beds	**Analysis**: More and more Councils are adopting passive irrigation to support the growth and health of their street trees. The City of Hume has done this successfully outside their Broadmeadows building. Passive irrigation has proven to improve tree health, increase canopy cover, provide amenity benefits and contribute to a reduction in the urban heat island effect. This approach of redirecting road runoff can also be applied to smaller open spaces and garden beds. **Action**: Confirm the in principle acceptance of passive irrigation of street trees within the PSP by Council. In developing the street layout for the PSP, identify 'green' or 'cool' corridors that should be targeted for passive irrigation (e.g. these would link parks to schools to shopping hubs to waterways etc. Identify opportunities to redirect runoff to smaller open spaces and garden beds.
	Ecology: Support River Redgum health through passive irrigation	**Analysis**: The PSP includes stands of River Redgums that will require preservation and physical protection during construction, but also protection to their hydrologic regime post urbanisation. There is an eco-hydrology study currently underway as part of the Upper Merri IWM Plan that is designed to understand the needs of the trees and how passive irrigation approaches can be designed to meet those needs. **Action**: Craigieburn PSP should implement the finding of the ongoing report to ensure that the hydrologic regime of the River Red Gum is maintained to support their continued survival.

Figure 14. *Reframes open space*

6 Summary of potential actions

Objectives	Action summary
Stormwater management goes beyond best practice	VPA to become involved in the Upper Merri Sub-catchment IWM Plan process
	Include stormwater harvesting as part of the 'alternative' water supply mix for Craigieburn West PSP
	Quantify the impact stormwater diversion to the west of Mickleham Road will have on achieving HWS targets
	A desktop investigation to understand the feasibility of managed aquifer recharge (MAR) in this location
	In collaboration with the Upper Merri project, investigate the benefits of combining recycled water and rainwater tanks in contributing to the HWS targets
	Council to collaborate with VPA and designers to specify WSUD asset and maintenance requirements
Community has a sense of place and ownership	Council will consult with local landowners and community groups to compile relevant historical, European cultural and natural history information
	Council to engage local community groups to gauge their interest in understanding what they would like to see within Craigieburn West PSP and what role community groups may play in that
	To engage with (current and future) Community and Friends Groups to discuss alternative waterway maintenance models
	Prior to commencing place making activities, Council and the developer can collaborate, sharing background information (including demographics) to inform future strategies
The community interacts with water and nature	Connect with local teacher's environment network to encourage them to introduce their students to the role of WSUD and connect that to local waterways, including Merri Creek
	In collaboration with Melbourne Water, VPA to include requirements for waterway accessibility within the PSP
To incorporate meaningful indigenous participation and input into the planning process	VPA to maintain engagement in the Upper Merri Creek project, on a range of matters, including how to recognise and protect Aboriginal values within the PSP.
To reduce mains water use through the use of fit-for-purpose alternative water supply	Further work is required between Council, Melbourne Water and Yarra Valley Water (and the EPA and Department of Health) to understand the potential for stormwater (and rainwater) harvesting in the context of a recycled water, third pipe network. This may be investigated as part of the Upper Merri IWM Plan
	A cost benefit analysis on the inclusion of smart tanks can be undertaken if this is supported by the developer. The benefits assessed should include how these tanks contribute to Healthy Waterways Strategy targets
Rethink the use and function of public and open spaces	A stand-alone opportunity for Council, Melbourne Water, the VPA and the land developer to investigate how the PSP could be reconfigured to contribute to the Healthy Waterways Strategy targets
	Confirm the in-principle acceptance of passive irrigation of street trees within the PSP by Council.
	Craigieburn PSP should implement the finding of the ongoing report to ensure that the hydrologic regime of the River Red Gum is maintained to support their continued survival.

7 Discussion and next steps

This report builds on the physical and strategic context of the Craigieburn West PSP to identify IWM opportunities for the precinct. The opportunities were identified within a collaborative forum attended by water cycle stakeholders from across the industry.

The extent to which the objectives are adopted and carried through the PSP process has the potential to fundamentally alter how the PSP is planned. Fundamentally it can influence the area of developable land as space is allocated toward water management. It can redefine the nature of open space and particularly how this interacts with natural assets like waterways. Further IWM can influence development at a street and lot scale through smaller scale interventions like passive street tree irrigation and rainwater tanks.

The issues and opportunities discussed in the workshop were grouped thematically under the following five headings:

1. Stormwater management goes beyond best practice
2. To foster a participative community
3. To incorporate meaningful indigenous participation and input into the planning process
4. To reduce mains water use through the use of fit-for-purpose alternative water supply
5. To reframe 'open space'

The description of the opportunities points to what the next steps may be and what organisations are likely to be critical stakeholders. These opportunities will need to be discussed further and in more detail with stakeholders to determine which are feasible, what stakeholders are willing to commit to and what level of detailed analysis is required for their inclusion within the PSP.

The unanimous feedback from the workshop group was that the involvement of the VPA at this early stage was welcome and critical if these opportunities are to be developed further, and the aspirations set out in our most recent of planning documents are to be realised.

It is also noteworthy that the Upper Merri Creek IWM Plan project is underway and will provide valuable and more detailed guidance as to what IWM initiatives and being pursued and how. This is particularly relevant for:

- The approach to meeting the Healthy Waterways Strategy targets, and
- The approach to Aboriginal engagement and establishing agreed cultural flows.

Workshops for this project have commenced with a tentative project timeline extending to June of 2019. Attendees to the Craigieburn West IWM workshop will also be attending the Upper Merri Creek IWM Plan project meetings and can therefore inform the Craigieburn West process with those outcomes.

7.1 Next steps

1. Distribute this document to workshop attendees and collaboratively review and identify priority actions among those identified in section 5
2. Where an identified priority action requires technical analysis, perform investigations such as determining feasibility by examining parameters like land take, cost and responsibility for design through to ongoing management and maintenance
3. Following any investigations, collectively identify the initiatives that stakeholders agree to implement at Craigieburn West and determine whether additional analysis is required prior to including those initiatives within the PSP.
4. Perform analysis and include agreed initiatives in PSP as appropriate.

Note: Planning for the Craigieburn West PSP should be aligned with the outcomes of the Upper Merri Creek IWM Planning process, however, it is recommended that IWM initiatives for Craigieburn West are sufficiently independent that they can progress in the event that the Upper Merri process is delayed.

Attachment A
Workshop notes summary

Table A. Workshop notes

Theme	Opportunities, actions and targets	Considerations for implementation	Relevant strategy
1. Stormwater Management and Volume Reduction	Adoption of Directly Connected Imperviousness (DCI), stormwater harvesting and infiltration targets as per adjacent areas within the HWS to drive innovation and new approaches.	Ensuring that the approach is robust enough to withstand VCAT challenge Determining an appropriate funding source or model	Healthy Waterways Strategy
	Capture and divert stormwater generated within the PSP to provide agricultural water to the rural land to the west of Mickleham Road - There is one section of land, not within the PSP that naturally drains to the west that may provide a potential pilot of that idea	Civil works and funding Draining water against the natural grade Binding agreements for water recipients	Hume City IWM (Increase availability of non-drinking water sources)
	Mandate rainwater tanks - Water readily available for gardening or toilet flushing - Consider an alternative ownership and maintenance model e.g. where the water authority manages, maintains and centrally controls tanks operation and level - Lessons for the 'redefinition of "lot scale" water services can be drawn from a rethinking of septic tanks management being undertaken by Yarra Valley Water?	The diminishing demand for irrigation water in smaller backyards and a better understanding of the community's gardening habits The water authority's role in the private space Household willingness to pay for water cycle services	Hume City IWM (Increase availability of non-drinking water sources)
	Asset Design – Maintainability - Council requires assets to be able to be maintained in order to function	A requirement for sufficient area and space within the PSP for the correct design (including maintenance of) WSUD assets	Hume City IWM - Improve waterway quality in developed catchments by addressing stormwater runoff and associated pollutant loads (WSUD knowledge and design)
	Using managed aquifer recharge to increase infiltration rates and meet HWS targets	Shallow groundwater table (<5mBGL) Revitalising/restarting/reengaging the historical Moonee Ponds Spring	
2. Community and Participation	Tie in post 1800s history and heritage by engaging with local farmers for storytelling and preserving stoneworks		Hume City Land and Biodiversity Plan- Cultural heritage sites are identified, protected and effectively managed.
	Document understanding of historical flooding		
	Engaging the diverse existing community including religious groups (noting the range of churches and temples in the area) / Engaging with the local community through school		Water for Victoria Plan: Promoting co-design, local engagement and place-based solutions.
	Engaging "Friends of" groups including the Friends of Merri Creek		
	Engage environmental management agencies like the Merri Creek Management Committee (MCMC)		
	Reconsider the maintenance model? Adopt a "Volunteering Model" for park working bees. This has been successful along Darebin Creek	Engage with the local community to understand the enthusiasm for protecting water cycle assets and values e.g. Aitken Creek	
	Work with the developer (and VPA) to share knowledge and understand the reasons people want to move to the area and use that information to co-design and approach		
	Draw from the local - Mickleham primary school and the associated teacher's environment network		Healthy Waterways Strategy – encourage citizen science, increase participation Hume City IWM - Build community capacity and knowledge of water use efficiency, waterway issues, WSUD

Theme	Opportunities, actions and targets	Considerations for implementation	Relevant strategy
3. Indigenous Culture and Engagement	Engage and codesign with the Wurundjeri: Support Aboriginal participation in planning and management frameworks	Noting that the Wurundjeri are involved and focused on the Upper Merri Creek work. Paul Lane (Lingiari Foundation) and Rene Woods (Murray Lower Darling Rivers Indigenous Nation) have been assisting the Wurundjeri in Developing a Cultural Flows Assessment.	Healthy Waterways Strategy Water for Victoria
	Opportunity to implement findings from current Cultural Flows study	*To be discussed with Yarra Valley Water*	
4. Reframing Open Space	Opportunity to communicate differently with community, rethinking green spaces and promoting multi-functional assets. - Consider new ownership and maintenance models (e.g. volunteering models)	Getting community feedback New models of ownership of/responsibility for multifunctional assets Reconsidering the definition of encumbered and unencumbered space	
	Set minimum standards for waterway access	Need to consider safety around water for vulnerable community members	
	Rethink the nature or design of stormwater treatment assets: for example, could the waterway corridor be used for stormwater treatment (e.g. in-stream treatment trains) to free up other open spaces		
	Support remnant River Red Gum through passive irrigation - Eco-Hydrology study currently underway	Understanding the eco-hydrology requirements of those trees and designing appropriate passive irrigation designs to accommodate those requirements.	
5. Alternative Water Sources	Craigieburn West is within a "Purple Pipe" non-drinking water region and lots will be supplied with a third pipe for non-potable water.	This water could be sourced from recycling or from harvested stormwater, assisting the "volume reduction" theme as well as reducing mains water demand. If stormwater was used, this would have to consider the costs or implications of not reusing recycled wastewater	Yarra Valley Servicing Strategy
	Passive irrigation, particularly of 'passive' open space (i.e. not use for sports, but rather relaxation) and street tress.		
	Rainwater tanks	Discussed above, re: a management and maintenance model that optimises the hydrologic 'return' on that asset.	
	Aquarevo development (South East Water) - Developers are identifying this as a point of difference that they may like to implement elsewhere	Finding the appropriate community to apply this model to (i.e. the demographic where affordability may not be the only or primary concern)	

Attachment B
Developer Services Scheme

Melbourne Water

4381 - Upper Brodies Creek DSS Infrastructure 1/1

N

Melway Ref: 385 K12

Author: Rebekah Campbell

Scale @ A1 1:4000

DSCM Legend

- DSS Boundary
- DS Strategy Boundary
- DSCM Property
- Stage (Allocated)
- Stage (Works in Progress)
- Stage (Finalised)
- Nodes
- Bio-Retention Swale
- Channel
- Cleanout works
- Culvert
- Grassed Swale
- Low flow pipe with Channel
- Overland flow path
- Pipeline
- Soft Engineering
- Bio-Retention Basin
- Buffer Strip
- Inlet/Outlet Structure
- Junction Pit
- Litter trap
- Retarding Basin
- Sediment trap
- Wetland

As Constructed Legend

- Channel
- Natural Waterway
- Sewer Main
- Underground Drain
- Water Main
- Flood Extents
- Lake
- Retarding Basin
- Sediment Trap
- Wetland

Plan Date: April 2017

Melbourne Water is providing our indicative assets information and is not to be used as the basis of future design and expects that the appointed engineering consultant will perform their own calculations as part of requirements for their development.
Please note that as schemes develop and Melbourne Water receives additional information, the conceptual/indicative advice you have been provided as part of the feasibility request may become ou-dated. Under the QA process it is the responsibility of the consultant to ensure that Melbourne Water's feasibility advice is current and to certify that all information ultimately provided to Melbourne Water for acceptance is correct having completed their own detailed catchment analysis.

4381

4360

B1 B2 B3 B4 B5 B6 B7 B8 BB1

A2 A3 A4 A5 A6 A7 A8 A13 A14 A14A A16 A17

SB2 SB3 SB4 BIO2 RB

BUNDD1 BUNDC1 FLW CH

RB1 RB1LA WL1

M1 M2 M3

1 (4365/03) 2 (4365/10) 3 (4365/09) 4 (4365/13) 5 (4365/10) 6 (4365/13)

1 (4360/08) 2 (4360/XX) 1 (4365/01) 5 (4365/07)

1 2 3 4 5 6 7 11 12 21 22 23 24 25 26 27 28 29 31 32 34 35 36 39 48

200 210 220 225 175 190 300 500 600 900 1,200 1,500

Melbourne Water

N

Melway Ref: 386 B5

Author: Rebekah Campbell

Scale @ A1 1:9000

DSCM Legend

- DSS Boundary
- DS Strategy Boundary
- DSCM Property
- Stage (Allocated)
- Stage (Works in Progress)
- Stage (Finalised)
- Nodes
- Bio-Retention Swale
- Channel
- Cleanout works
- Culvert
- Grassed Swale
- Low flow pipe with Channel
- Overland flow path
- Pipeline
- Soft Engineering
- Bio-Retention Basin
- Buffer Strip
- Inlet/Outlet Structure
- Junction Pit
- Litter trap
- Retarding Basin
- Sediment trap
- Wetland

As Constructed Legend

- Channel
- Natural Waterway
- Sewer Main
- Underground Drain
- Water Main
- Flood Extents
- Lake
- Retarding Basin
- Sediment Trap
- Wetland

Plan Date: April 2017

4480 - Aitken Creek DSS
Infrastructure 1/1

4480