Our reference: ECM: 9770802
Contact: Peter Wood
Telephone: (02) 4732 7577

14 December 2021

Department of Planning, Industry and Environment
Attn: Nathan Heath

Email: nathan.heath@planning.nsw.gov.au

Dear Mr Heath,

**Council Response to Request for Advice**
**Upper South Creek Advanced Water Recycling Centre SSI-8609189**

I refer to the exhibition of this State Significant Infrastructure Development Application. Thank you for providing Council with the opportunity to review the proposal and make a submission.

Further to Council's draft submission dated 15 November 2021 and subsequent correspondence dated 24 November 2021, a finalised version of Council's submission is now formally referred to the Department for consideration in the assessment of the State Significant Infrastructure Development Application.

As previously indicated, Penrith City Council supports the aims of this project in principle. The utility will form an integral component of a broader water management system that will support predicted population and economic growth in Western Sydney, including within the Western Sydney Aerotropolis Growth Area. The overarching premise of the facility to deliver sustainable wastewater treatment and high-quality recycled water aligns with the planning priorities and actions embedded in Council's Local Strategic Planning Statement (LSPS) and related City strategies that support moving towards an energy, water and waste efficient city with cooler, greener urban environments.

Council officers have undertaken a review of the Environmental Impact Statement (EIS) and provided comments to inform the attached draft submission. A number of issues have been identified requiring further detail, analysis and potential amendments to demonstrate that the proposal will not present significant impacts as follows:

- Biodiversity Conservation, in particular the location of proposed pipelines and impacts on Water Quality in the Warragamba and Nepean Rivers;
- Potential impacts of proposed pipelines on the Heritage of Wallacia Village;
- Construction Traffic Impacts on the condition of roads, capacity and the need for upgrades;
- Potential land contamination and hazardous conditions;
- Noise Impacts; and;
- Flood Modelling validity and proposed Infrastructure located on flood affected land including floodways.

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Penrith City Council raises particular issue with aspects of the proposal under the current application and EIS, including impacts on existing roads and other infrastructure, floodway considerations and impacts on water quality.

Due to the nature of potential impacts on the Warragamba and Nepean Rivers, it is also recommended that Sydney Water provide an assessment of this proposal addressing any accumulated impacts of the project in conjunction with the concurrently lodged SSI application from Water NSW, proposing to increase the height of the Warragamba Dam wall.

In addition to the above matters, clarity is requested on whether or not a number of sustainability measures proposed to be enabled by the development including water reuse, energy generation, publicly accessible greenspace can and will be delivered. An integrated Information & Education Facility is also recommended to form part of the proposal.

Should you wish to discuss any aspect of Council's comments further, please contact me on (02) 4732 7577.

Yours sincerely

Peter Wood
Development Services Manager

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**Council Response to Request for Advice - EIS**
**Upper South Creek Advanced Water Recycling Centre SSI-8609189**

## 1. Planning Matters

### (a) Project description

Council understands that Sydney Water is proposing to build and operate a new facility and associated pipelines to provide wastewater services for the Western Sydney Aerotropolis Growth Area (WSAGA) and the South West Growth Area (SWGA).

The site is approximately 78ha in area and is bounded by South Creek to the west and Kemps Creek to the north-west and is located to the north of the planned M12 motorway. Access to the site will be from Elizabeth Drive via Clifton Avenue.

The EIS includes that the proposal involves the following:

- Construction and operation of an Advanced Water Recycling Centre (AWRC) which will collect wastewater and treat it, producing high-quality treated water, renewable energy and biosolids for re-use.

- A new green space area around the AWRC, adjacent to South Creek and Kemps Creek contributing to the development of a green spine through Western Sydney including water sensitive urban design and landscaping for visual screening. The green space will include infrastructure to release treated water and stormwater to South Creek.

- Infrastructure from the AWRC to South Creek, to release excess treated water during significant wet weather events, estimated to occur 3-14 days each year.

- Construction of a treated water pipeline (16.7kms of 1.2m diameter underground pipeline) from AWRC to Nepean at Wallacia Weir to release high-quality treated water to the river during normal weather conditions.

- Construction of an environmental flows pipeline, from Wallacia to Warragamba River, to release high-quality treated water via a 4.5km long underground pipeline being up to 1m in diameter) to the river just below Warragamba Dam and related treated water release structure.

- Construction of a 24km long, 0.6m diameter, brine pipeline from the AWRC connecting into Sydney Water's existing wastewater system to transport brine to the Malabar Wastewater Treatment Plant.
  The brine pipeline will cross under the M7 and the rail line at Cabramatta, traversing Liverpool City Council, Fairfield City Council and Canterbury-Bankstown City Council local government areas in the suburbs of Badgerys Creek, Cecil Hills, Canley Heights and Fairfield.

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- Temporary enabling works.
- Various ancillary structures and works including internal roads, pumping stations, a two-storey administration building, hard stand areas and surface car parking.
- Renewable energy generation infrastructure including generation of renewable energy from co-generation and operation of solar photovoltaic panels.
- Installation of on-site detention basins, chemical storage, switch rooms.
- Tree and vegetation removal and civil and earthworks.
- The EIS includes (p.8) that as part of the project's scope, Sydney Water proposes to recover:
    - High quality treated water to be used as environmental flows in waterways,
    - Organic material (biosolids) for use as an alternative to chemical fertilisers in farming and gardening, and
    - Renewable energy from co-generation within the AWRC and solar energy generation.

**(b) <u>Pipeline construction</u>**

The EIS informs that all pipelines will be underground and, in most cases will be constructed using open trenching having a typical construction zone of between 15-30m in width with options for more narrow construction corridors where constraints exist, such as potential for impacts on Aboriginal heritage sites, areas of endangered vegetation or other sensitive items. Open trenching is proposed to occur at some creek crossings.

The EIS also includes that some pipelines will be constructed by tunnelling methods (Horizontal Directional Drilling (HDD) which involves excavating an entry trench and an exit trench. This methodology is identified for Nepean River, Prospect Creek, Upper Canal, the railway line at Cabramatta, the M7 Motorway and other key roads and creeks.

**Figure 2:** Excerpt from EIS. Typical underground pipeline construction method examples (benching (L) and shoring (R))

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**(c) Release structures**

Limited detail on scale, design dimensions, locations, noise and vibration impacts, access points for maintenance. Limited detail is provided in relation to proposed temporary enabling works.

**(d) Operation**

The AWRC will operate 24 hours per day, 7 days per week. It is proposed that the AWRC will include a range of design measures to minimise odour impacts, generate renewable energy and provide treated biosolids for use as agricultural fertilisers.

**(e) Staging**

Council understands that the project will be built in Stages. Stage 1 will include constructing and operating the AWRC to treat wastewater flow, known as the average dry weather flow (ADWF), of up to 50 megalitres per day () and the construction of all pipelines to cater for up to 100ML/day flow ML/day coming through AWRC (only operating to transport and release volumes produce by Stage 1).

The SSI application seeks approval for the overall concept of the AWRC operating with operational volumes of up to 100ML/day.

**(f) Future Stages**

Future Stages are proposed to involve expansion of the AWRC capacity which will not involve the installation of new pipelines.
It is noted that the ultimate capacity will likely be 100ML/day. The timing and scale of future stages is proposed to be established over time to align with demand in the service area.

**(g) Timeline**

The application states that Sydney Water expect to begin construction in mid-2022 and begin operations in mid-2025. It is identified that the project will take 3 years to complete, and it is also noted that the facility will service the Western Sydney International Airport, which is proposed to be operational in 2026.

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**Figure 1:** Excerpt from EIS Indicative visualisation of AWRC site.

**(h) Council provides the following comments for consideration:**

- Council supports the integrated and early approach to the provision of essential infrastructure, in the Aerotropolis precinct and would encourage the same proactive and integrated approach toward stormwater management in the Aerotropolis zoned lands.

- Council supports the inclusion of the production of renewable energy generation infrastructure including generation of renewable energy from co-generation and operation of solar photovoltaic panels and supports the inclusion of these activities (as is noted in the EIS, Volume 1 (V1), p.51) as an offset to carbon emissions produced as a result of the construction of the project.

- Council supports the proposal to utilise treated water from the AWRC for agriculture and business/commercial purposes, in place of potable/drinking water.

  Notwithstanding this, it is noted that the EIS does not clarify/confuses whether this re-use option is included in the scope of Stage 1 works and activities. There are several instances within the EIS which state that these activities are included and others where this activity is a future option or is a potential (example EIS, Volume 2 (V2), p.51 and EIS, V2, p.87 3.5.1).

  Sydney Water are to clarify the full scope of works and activities proposed as part of Stage 1.

  Council has included above its understanding of the scope of Stage 1 as has been detailed in the EIS.

- Council supports the delivery of a new green space area around the AWRC, adjacent to South Creek and Kemps Creek which is identified to be included in the scope of Stage 1 works and which will contribute to the development of a green spine through Western Sydney including water sensitive urban design and landscaping for visual screening.

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- It is noted that the EIS includes at V2, page 51 *'…the design and landscape of the AWRC site will consider country, support biodiversity and has the potential to provide public open space'*.
  As with the project's proposal for energy generation and for treated water re-use, Sydney Water is to clarify the full scope of works to be delivered in Stage 1.

- Council supports the capture of the project's sustainability measures in a Sustainability Management Plan (EIS, V1, p.51) and the proposal to produce a project specific, Operational Environmental Management Plan (OEMP).

- Council would encourage the inclusion into Stage 1 of one of the 'key opportunities' identified as being outside the project scope (EIS, V1, p.9). This includes that the recycled water produced can be used by industry, agriculture and to complement stormwater in irrigating open spaces (this is identified elsewhere within the EIS as being within the Stage 1 project scope).

- Council does not support the second key opportunity identified as being the development of a future Bioenergy Hub at the AWRC (EIS, V1, p.9), for waste collection, reuse, resource recovery and renewable energy generation.

  Although it is noted that the addition would align with the principles of a multi-utility approach to servicing Western Sydney and may support policies to promote a circular economy in the Western Parkland City, details of waste streams and related environmental and operational impacts would need to be reviewed and considered, as the selected site is located in an environmentally sensitive area, flanked on each side by creeks.

- Council supports the Environment Protection Authority's (EPA) inclusion of the Hawkesbury-Nepean Nutrient Framework, which will limit nutrient concentrations, on Sydney Water's Environmental Protection Licence (EPL).

- <u>Public Education Hub</u>

  The EIS details that the project will ensure that waterways remain healthy, and that processing of wastewater demonstrates advanced technologies and best practice operations.

  Located within the Western Parkland City (WPC) and being part of the Aerotropolis, it is expected that the project will showcase Sydney Water's largest investment in infrastructure for Western Sydney by demonstrating a significant contribution to a circular economy and sustainable water use.

  An opportunity exists to incorporate an Education Hub for public access and school groups, which would align with Sydney Water's Western Sydney Regional Master Plan, in that 'whole-of-community benefits' and identified outcomes expressed in the Plan, may be presented and experienced firsthand.

  The provision of an Education Hub would also support the NSW Government's ambitions for the WPC, and the Western City Deal's commitment to education opportunities and job creation.

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Further, an Education Hub would present an opportunity to exhibit Sydney Water's investment in the future infrastructure needs, the sustainability of growth in Western Sydney and its alignment with Infrastructure NSW Smart Places and Smart Infrastructure Policy.

- Public Consultation

  It is recommended that a robust and regular community consultation programme be formulated and adopted. The programme shall require regular and detailed updates on the project, such as location of works, timelines and details of scheduled works, details of any community information sessions, where information can be found and, must provide contact details for residents.

- Signage

  Directional and wayfinding signage is to be provided for the AWRC. The proponent shall produce a signage and wayfinding strategy and plan. Consideration shall be given to the provision of future signage along Elizabeth Drive and the future M12 motorway advising of exit and access points.

- Servicing of existing villages

  This project provides an opportunity for the villages of Luddenham and Wallacia currently in Priority Service Areas to be included in a reticulated system.

- Detailed Design

  The EIS is not detailed sufficiently for Council to be comfortably informed of the location and design dimensions pipelines and related infrastructure.
  It is raised as a concern that the EIS includes at V2, p.78 that Sydney Water is 'continuing to consider minor pipeline realignments in areas such as a crossing at Kemps Creek and, in the vicinity of Elizabeth Drive and Northern Road although it is noted that this will largely be in response to planner roadway realignments.

  Detailed design dimensions of the structures located within the AWRC are not provided on a set of plans. A set of architectural and landscape plans are to be provided for the Department's assessment and for public exhibition.

  A visual impact analysis is to address visual impacts of the structures within the AWRC including the administration building, solar collectors and those structure proposed to be up to 20m/30m in height. Reflectivity of materials is to be addressed.

- Village of Wallacia

  Council raises the importance of limiting impacts on the township of Wallacia. Wallacia Village is identified as being significant in terms of scenic and landscape quality and European and Aboriginal Cultural Heritage.

  Schedule 5 of Council's LEP identifies several locally listed heritage and archaeological sites and heritage conservation areas, which are of high significance, with a cluster of these sites located close to the intersection of

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Park Road and Greendale Road. The area is identified as being significant to Aboriginal people and the likelihood of the discovery of items of cultural significance during works is high.

The entry gateway to Wallacia Village between Golfview Drive/Jerrys Creek and Greendale Road is noted also as being of significance in Council's plans.

It is raised that the installation of pipelines along Park Road, and the open trenching methods will result in the removal of native trees and vegetation forming part of areas identified as having scenic and landscape values to be protected.

Vegetation within the roadway verge area contributes to local character, scenic, landscape and biodiversity values and contributes to local amenity.

Open trenching details at creek crossings are to be detailed and impacts (noise, vibration, sediment and erosion impacts, earthworks, civil works, night works and lighting) on sensitive flora and fauna is to be addressed including impacts on Platypus, which have been sighted and are known to frequent these waters and riverbanks.

- Jerrys Creek and Crossman Reserve

  Careful consideration is to be had of the environmental impacts from open trenching and related works proposed along Park Road, in the village of Wallacia, and in the vicinity of Jerrys Creek and Crossman Reserve.
  It is raised for the Department's consideration that significant volunteer led conservation works including with the assistance of local and State Government funding, have been undertaken to restore and protect the reserve, acknowledging its vital contribution to a contiguous riparian corridor.

  Penrith City Council recently committed to the planting of 2000 trees in the area which formed part of the Premier's Priority Greening our City initiative to plant one million trees by 2022 and is part of Greening Australia's Nature in Cities stream.

  Further, conservation works in the areas of Crossman and Fowler Reserves in Wallacia, have been committed to in partnership between Western Sydney Airport, Conservation Volunteers Australia and Penrith City Council for regeneration works. Proposed works must not detract from the planned and already undertaken conservation works.

- Limit wet weather and sever wet weather flows

  There is considerable concern raised in relation to the potential for up to 85ML/day for the Nepean and Warragamba Rivers, and 45-59ML/day for South Creek, being a tributary of the Nepean River, to be released upstream from pristine sections of the Nepean River, having high economical, recreational and biodiversity values.

  Through a combination of greater holding capacity, and greater advanced treatment and tertiary treatment capacities, the proposed wet weather and sever wet weather primary treatment and disinfection only flows, shall be reduced.

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## 2. City Planning/Strategy Considerations

### (a) Aerotropolis Development Control Plan Phase 2

The draft Aerotropolis Development Control Plan (DCP) Phase 2 is currently on public exhibition. The EIS should be updated to discuss the DCP and detail how the design of the Recycling Centre has had regard to the DCP. There are components of the DCP including Airport Safeguarding and Tree Planting controls and the preferred species list, that are relevant to the proposal.

### (b) Liveability, productivity, and sustainability in Western Sydney

Council understands that the current project involves the treatment of wastewater to produce high-quality recycled water suitable for a range of uses that support liveability, productivity, and sustainability. Council supports this initiative and notes that the scope of activities and operations proposed at the AWRC site, are generally aligned with key priorities and actions in Council's LSPS and Green Grid Strategy, which recognise the key role of water and good water management in creating quality places for the community and support greening and reducing heat island effects.

However, in addition to providing an essential wastewater service, as noted the project presents a range of opportunities to improve liveability, sustainability, and the environment across Western Sydney, including the use of recycled water to support some or all of the following:

- Complement stormwater (top-up of rainwater and stormwater tanks/basins), in the irrigation of open spaces and street trees to provide cooling and support recreational or sporting activities and active transport for residents and workers in Western Sydney,
- Industrial processes and cooling towers to support industries around Western Sydney International Airport, and
- Food production in the Agribusiness Precinct.

The EIS states that these opportunities are 'enabled' by the project. However, as has been raised above, it is unclear whether any or all of them will be achieved or delivered.

Council strongly supports the use of recycled water to cool and green the urban environment and open space areas and would encourage Sydney Water and DPIE to pursue these opportunities with relevant government departments and stakeholders, as part of future development proposals (e.g., conversations with developers about how to connect).

It is also raised that should the timeline of construction prohibit the inclusion of the outcomes of such discussions, that adequate 'future proofing' be included in the scope to enable the identified opportunities to be realised and to underpin and encourage innovation.

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## (c) Supporting Key Green Grid Outcomes

The South Creek and Kemps Creek Corridors are key elements of both the Sydney Green Grid and Penrith's Green Grid. As part of the project, a green space area is proposed to be established on the non-operational part of the AWRC site. Council understands it will be landscaped to enhance biodiversity and provide visual screening of the AWRC. This green space proposed along South Creek, will help to deliver on the green grid outcomes and is a key strength/opportunity of the project.

However, it is not clarified that public access to this green space area forms part of the current proposal due to permissibility constraints under State Environmental Planning Policy (Western Sydney Aerotropolis) 2020 [SEPP WSA], and as is raised above, it is not clear that green space will be delivered as part of Stage 1.

Penrith City Council strongly encourage Sydney Water and DPIE to pursue the opportunity for this green space to be developed into a publicly accessible recreation area to deliver on the NSW Government's priority vision for South Creek as a green corridor that provides a regional open space recreation network.

To this end, consideration should be given to including a condition of consent requiring the NSW Government to determine/resolve the issue of public access to the site for future stages of AWRC development.

The site is located directly to the north of the future M12 Motorway. The Place, Design and Landscape Plan (**PDLP**) for the motorway (recently released for community engagement) appears to locate the proposed shared path adjacent to the motorway in this location on the northern side of the road, presenting a strategic opportunity for a future connection to the green space proposed as part of the AWRC.

The urban design concept plans for the AWRC site should consider a potential entry to and from a future shared path extending from the M12 corridor, as part of a broader network of green grid connections that incorporate active transport links.

## (d) Enabling a Circular Economy

A key action of Penrith City Council's Employment Lands Strategy **(ELS**) is 'Fostering a circular economy'. The ELS identifies the existing uses in the North South Corridor (defined by our LSPS) that create a cluster of uses relating to the circular economy.

The EIS states the AWRC will play a vital role in building a sustainable, thriving, circular economy in Western Sydney by recycling organic waste to produce electricity, as well as biosolids for use in landscaping or as fertiliser.

Council notes that the project will also rely on renewable energy from co-generation within the AWRC and solar energy generation, with potential for any excess self-generated electricity generated on the site to be exported to the grid.

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The EIS also identifies a range of other sustainable outcomes and opportunities that are enabled by the project including:

- Producing treated water suitable for a range of beneficial uses, contributing to Sydney's water resilience.

- Beneficially reusing biosolids and generating renewable energy with potential for this to expand in the future to create a centre for circular economy activity at the AWRC.

- Providing water that could be used for greening and cooling the landscape.

It is unclear whether the project will deliver on any of these outcomes.

It is recommended that further detail be provided around the 'range of beneficial uses' and which ones will actually be implemented and delivered as part of this project.

Penrith City Council would strongly encourage Sydney Water and DPIE to identify and scope these further opportunities in detail and progress any necessary consents or approvals under the Environmental Planning and Assessment Act 1979.

In addition, specific opportunities identified in the EIS relating to the creation of a circular economy should be explored in greater detail and delivered over the life of the project. In particular, Council encourage Sydney Water to work with key stakeholders in the market to develop plans for future energy generation and procurement and resource recovery at the AWRC, with the aim of maximising circular economy initiatives and enabling future technologies to improve overall sustainability performance.

**(e) Urban Design**

It is noted that the proposed urban design approach for the AWRC site includes architectural treatments for visual screening of the facility, and potential to adopt a landscape-led approach by integrating aspects of the heritage and natural assets around infrastructure requirements.

Whilst Council supports this approach, we understand that if the recreational opportunity in the green space area does not proceed, these design components will be substantially scaled back to focus on biodiversity and water sensitive design elements and any infrastructure needed to maintain these areas.

Regardless of whether the recreational opportunity for the green space area is realised or not, the urban design approach for the site should align with the Government's overarching vision for the South Creek Corridor and key green grid priorities/outcomes. It should also ensure that any visual and amenity impacts of the proposed facility are mitigated for nearby properties and from key vantage points in the area. Limited detail accompanies the EIS in this regard and in relation to built structures forming part of the project.

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## 3. Development Engineering and Traffic Considerations

### (a) Construction Traffic Impacts

It is proposed that Clifton Avenue is to be utilised for construction site access to Site Compound C8 (Water Recycling Centre).

Clifton Avenue is a local rural road which has not been designed to cater for the expected volumes of construction traffic and it is raised that this road will fail prematurely as a result of the construction phase of the development.

Council requests that during the preparation of the individual Site-Specific Construction Traffic Management Plans (SSCTMP's) the following items be addressed for Site Compound C8 SSCTMP:

- Geotechnical testing of the existing pavement design life of Clifton Avenue,
- Required pavement upgrade works and localised widening of Clifton Avenue to accommodate expected construction traffic volumes, and
- Dilapidation report of all existing Council assets along Clifton Avenue including drainage assets, signs, pavement etc.

Council will continue to advocate that road upgrades to any impacted local roads are to be undertaken by the DPIE, to ensure that the assets are safe, fit for purpose and to ensure that these assets do not become a financial maintenance burden to Council and our residents.

## 4. Public Health Considerations

Council raises the following matters in relation to and in particular, the release of treated wastewater into the Nepean and Warragamba Rivers.

Detailed analysis of pollutant and pathogen loading, and impact and flow models have not been undertaken by Penrith City Council however, comments on the inputs and assumptions used in the modelling are provided below for consideration by the Department in its assessment of the proposal.

It is recommended that DPIE, in its assessment undertake a more detailed analysis of pollutant and pathogen loading.

### (a) Wastewater Use and Impacts of High Increase to Median Daily River Flows

The EIS estimates that the facility will service an expected 184 500 new houses in the next 20 years and an estimated 4 million people, living west of Parramatta in the next 40 years.

Stage one of the proposal is to treat up to 50 million litres of wastewater per day (ML/day) and Stage two 100 ML/day, and release this wastewater predominantly into the Nepean River at Wallacia.

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It is proposed to use some of the advanced treated wastewater for irrigation and agriculture, industry, non-potable use in households, and for environmental flows (refer comments above in section 2(d) surrounding certainty of these aspects of the proposal).

As it is not clear how much of the treated wastewater will be used for these purposes the EIS assumes all treated wastewater will be released into the environment.

Median daily river flows of the Nepean River between Wallacia and the Weir at Penrith (near the Rowing Club) are approximately 250 ML/day. The proposed increase of this by 50 -100 ML/day represents a significant change to the waterway, particularly the flow and nutrient regime of the river.

The EIS discusses the construction of an environmental flow pipeline to the Warragamba River from Wallacia however, this has not been completely committed to by Sydney Water as yet.

The advanced wastewater treatment plant will treat wastewater to an advanced standard in dry weather conditions, however, in wet weather conditions treatment will be reduced to a tertiary standard because of stormwater inflows into the sewerage and treatment system.

Whist this is considered a reasonably high standard of treatment, the water will contain higher concentrations of nutrients and toxicants such as pharmaceutical and other chemical residues. The EIS includes that in extreme wet weather conditions wastewater will only be treated a primary level (screened) and released into South Creek.

Clarification and further detail is to be provided by the applicant on the above matters, so as to allow consideration by the Department as part of the assessment.

**(b) Receiving River Context and Recreational Values of Warragamba and Nepean Rivers**

The Nepean River, downstream of Wallacia and to the Weir at Penrith, is a significant freshwater recreational waterway used for boating, fishing, rowing and kayaking, swimming and other recreational activities.

Penrith City Council continues to complete work along the river to allow greater public greater access and enjoyment of this unique waterway. Projects completed in recent years have included:

- the upgrade of the public boat ramp at Tench Reserve,
- the installation of access platforms along river that are being used for fishing, swimming and launching kayaks and stand-up paddle boards,
- significant weed removal and bush regeneration works.

In addition to the above, a major upgrade of Regatta Park has commenced and plans to upgrade Tench Reserve have also been completed.

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This part of the river is also home to the Women's National Training Centre for Rowing and water from the river is used at the Sydney International Regatta Centre and Whitewater Stadium.

**(c) Recreational Water Quality Monitoring**

Penrith City Council introduced a River Watch program over 5 years ago, based on the Beach Watch Program, and routinely monitors water quality from October until March each year to provide the public with information on when it is safe to access the water. This information is readily available and is published on Penrith City Council's website.

The sample sites were chosen as they are popular primary contact recreational water sites. Sampling locations, include:

- Tench Reserve, Jamisontown
- Regatta Park, Emu Plains
- Rowing Club, Penrith, and
- Devlin Road, Castlereagh.

The river water is sampled weekly for *enterococci* and analysed in a NATA accredited laboratory in accordance with the National Health and Medical Research Council (NHMRC) Recreational Water guidelines. Physical and chemical properties of the water are tested in the field on a monthly basis.

The three sites above the weir at Penrith are generally acceptable for primary contact recreation, such as swimming, except after rainfall. While acceptable, under NHMRC Recreational Water guidelines, they have a beach grade (river grade) as "poor" this is described in the guidelines as:

***Poor:*** *Conditions may not always be okay for swimming, as indicated by past results. The water can be affected by elevated bacteria, mostly during and after rainfall events or due to animal pollutant sources (e.g. bird faeces). There may be a higher risk of illness if you ingest the water during these times, particularly by the very young, the very old and those with compromised immunity. Swimming or putting your head under the water should be avoided during these times. Other factors such as low dilution, tidal movement, wind direction and stormwater pollution may help pathogens survive longer in these waters.*

The Devlin Road site at Castlereagh is very marginal for swimming and routinely records bacterial results that are poorer than the other three sites.

This site is downstream of considerable existing Sydney Water infrastructure, such as the wastewater treatment at Winmalee, and the release point for the St Marys Advanced Wastewater Recycling Plant. This plant releases into Boundary Creek which is immediately downstream of the weir at Penrith.

Council raised that if the water quality modelling is not robust or the model inputs have gaps in information, then the reality of what could occur short term or longer term might be very different to that predicted.

It is raised for the Department's consideration, that if the background data utilised for input to the modelling was taken from sampling in the last 2

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years, when the catchment has been particularly stressed from bushfires and floods, then this data may not be highly representative of regular conditions.

Likewise, when establishing a 95th percentile for *enterococcal* for recreational water purposes the NHMRC guidelines require a minimum sample number of 100 samples. If the sample number was smaller than this, and was used in modelling, then this data may not be representative and could result in erroneous conclusions.

Water quality decline could also occur from poor performance of the wastewater treatment plant, partial treatments, and failures in any part of the treatment and distribution system such as pump station failures and sewer blockages as infrastructure breaks down over time.

The impacts of the above has the potential to cause water decline and put at risk, river health and the recreational water values of this part of the Nepean River. It is raised that the river's health is fragile and small or incremental (or cumulative) impacts from the above, may have the propensity for the beach grade (river grade) to go from poor to very poor, ruling out swimming in these locations as described from the NHMRC guideline below:

***Very Poor:*** *Avoid swimming at these locations, as there are direct discharges of faecal material. Permanent signage may be erected at the beach stating that swimming is not recommended.*

At present, the public are advised not swim in the river for 3 days after rainfall. This allows for the river to slow and clear and for pathogens (disease causing organisms) to die off.

With the ongoing release of treated wastewater, during and after rainfall, this may have the effect of transporting pathogens (keeping pathogens in suspension) from further upstream to downstream into popular swimming areas. This could mean that instead of having to wait for the river to slow and clear and pathogens to die off over 3 days it could take many more days as the pathogens remain in transport.
In summer rainfall patterns, this may result in restricting swimmable days to the point where there are very few days where it is considered safe to swim in this part of the river.

The pathogens of concern are not necessarily from the Advanced Wastewater Treatment Plant, or the Wallacia Sewage Treatment Plant, but other sources of faecal contamination within the catchment such as from septic systems or agriculture. In effect, the ongoing flows from the treatment plant act as a mechanism for transporting faecal contamination after the river would have typically slowed and the contamination settled.

It is recommended that Sydney Water respond to these matters in detail with justification provided for all assumptions. It is also recommended that a risk analysis be considered in the Department's assessment of the proposal as to the impacts of the above raised aspects on river water quality, inclusive of the impacts on swimming and other recreational activities.

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**(d) Recreational Water – Blue green Algae**

Historic data collected by the Regional Algal Coordinating Committee demonstrates that toxic algal blooms, red alerts, are not a common issue within the Nepean River from Wallacia to the Penrith Weir.

However, green and amber algal alerts are not uncommon in summer and well into autumn. Council has responded to one red alert in the last seven years. This required the installation of signage and media releases advising the public against primary contact with the water.

The Alert definitions are as follows:

Alert Definitions for Recreational Waters Alert Definitions as specified in The National Health and Medical Research Council (NHMRC) Guidelines for Managing Risks in Recreational Water 2008.

RED ALERT

*These alert levels represent 'bloom' conditions. Water will appear green or discoloured and clumps or scums could be visible. It can also give off a strong musty or organic odour. Algae may be toxic to humans and animals. Contact with or use of water from red alert areas should be avoided due to the risk of eye and skin irritation. Drinking untreated or boiled water from these supplies can cause stomach upsets. Alternative water supplies should be sought or activated carbon treatment employed to remove toxins. People should not fish when an algal scum is present. Owners should keep dogs away from high alert areas and provide alternative watering points for stock.*

AMBER ALERT

*Blue-green algae may be multiplying, and the water may have a green tinge and musty or organic taste and odour. The water should be considered as unsuitable for potable use and alternative supplies or prior treatment of raw water for domestic purposes should be considered. The water may also be unsuitable for stock watering. Generally suitable for water sports, however people are advised to exercise caution in these areas, as blue-green algal concentrations can rise to red alert levels quickly under warm, calm weather conditions.*

GREEN ALERT

*Blue-green algae occur naturally at low numbers. At these concentrations, algae would not normally be visible, however some species may affect taste and odour of water even at low numbers and does not pose any problems for recreational, stock or household use.*

A red alert occurs when toxic algae species reach bloom conditions and toxins are released. These toxins can damage the liver and neurological system of both humans and animals. The cell walls of all blue–green algae contain contact irritants which can cause gastrointestinal, skin, eye and respiratory irritations to humans and animals.

While algae occur naturally in the aquatic ecosystems, increased nutrient concentrations encourage the growth of blue-green algae.

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The EIS acknowledges that there will be a general increase in bioavailable nitrogen concentrations and a further increase in nutrient concentrations when tertiary treated wastewater is released into the river with wet weather. This additional nutrient has the potential to increase blue-green algae in the river, and similar to pathogens in the water, push the river over the edge and restrict the use of the river for primary contact recreation.

With increased development in the catchments, and the addition of the nutrients from treatment plant, nutrient concentrations will increase and there is the potential for green and amber alerts to escalate to red alerts. These red alerts again will advise that swimming is not suitable in this part of the Nepean River and will restrict public access to the river. While modelling completed as part EIS suggests it may not present an issue it is hard to conceive that it won't.

These matters are to be addressed by the applicant in their response to submissions and to inform the Department's assessment.

**(e) Project Options**

The EIS notes that Sydney Water has been undertaking investigations into wastewater servicing of the Upper South Creek Servicing Area for over a decade. Sydney Water formed a longlist option that included:

1. Transfer of treated wastewater to the Malabar wastewater treatment plant.
2. Extension of current servicing.
3. Transfer of untreated wastewater to the Malabar wastewater treatment plant.
4. Decentralised water recycling plants (WRPs).
5. Advanced wastewater solution.

A shortlist was created that included the following three options:

1. Option 5 - advanced wastewater solution.
2. Option 1 – transfer of treated wastewater to Malabar WWTP (base case), and
3. Option 4 – decentralised WRPs.

Option 5 the advanced wastewater solution was chosen for the reasons described in the EIS as:

*Additional benefits for the advanced wastewater solution relate to improved liveability and support for economic growth in Western Sydney, greater alignment with key NSW Government strategies, the ability to establish a circular economy hub, provide environmental flows and recycled water. The high-quality treated water produced as part of this option would support providing additional environmental flows in natural waterways or providing recycled water for greening and urban cooling, as well as increasing resilience against drought and climate change.*

*The assessment of the shortlisted options clearly demonstrated the advanced wastewater solution to be the optimal solution to address the project need and achieve superior benefits for Sydney Water's customers and Western Sydney. The advanced wastewater solution became the*

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*preferred option which has been further developed and refined as described in the following section.*

While the option of an advanced wastewater treatment plant is supported the release locations and the quality of the wastewater to the release points is considered to need further discussion and investigation.

Council raises that South Creek would have been the more suitable location to release treated wastewater from the advanced wastewater treatment plant. This is because it is already a significantly degraded waterway, it has limited recreational water use, and most of the wastewater generated will come from households within the South Creek Catchment.

Instead, it has been proposed to release the treated wastewater to a comparatively pristine waterway that is highly valued for its primary contact recreational water use and fishing.

Appendix D of the EIS – Assessment of dry weather flows to South Creek, summarises Sydney Water's reasoning for not proceeding with treated water flows to South Creek during dry weather.

The EIS, however, proposes that South Creek receive primary treated wastewater in extended wet periods when advanced or tertiary treatment is not possible due to wet weather inflows. Essentially, it is proposed that South Creek can receive poorly treated wastewater in extremely wet periods but can't receive advanced treated wastewater when it is dry. It is recommended that the applicant explain their rationale in detail.

Sydney Water has completed modelling for South Creek and used this to establish that dry weather discharges would not meet DPIE ESS waterway health objectives for South Creek. The modelling does not appear to be robust, and Sydney Water acknowledges that there is uncertainty around growth forecasts and development rates. It is also unclear as how the Mean Annual Runoff Volume (MARV), the main input parameter used in the modelling, expressed in ML/ha/year is so high at 4.2 ML/ha/year for (1) existing residential development and (2) land where rezoning is on the way. It would also be interesting to further investigate the DPIE ESS objectives for South Creek.

The level of treatment and release points for the treated wastewater varies as rainfall increase and stormwater enters the treatment system. This is shown in table one below and the Sydney Water figure 4-6 from the EIS.

Under dry weather conditions, some of the advanced treated wastewater can be released to the Warragamba River as environmental flow if required (and if the pipeline is constructed) otherwise all of the treated wastewater will be will be released to the Nepean River at Wallacia.

As rainfall increases, and more stormwater enters the treatment system, treatment levels decrease, and tertiary treated wastewater is proposed to be released into the Nepean River. Tertiary treated wastewater has higher concentrations of nutrients and other pollutants compared to the advanced treated wastewater. When influent flows into the treatment plant reaches 3 times the average dry weather flow it will be primary treated and released into South Creek. Primary treatment is the lowest level of treatment and is basically just the screening out of solids.

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The lower level of treatment (tertiary) and release to the Nepean River is not considered ideal given any decline in water quality in the Nepean River could trigger algal blooms, increased aquatic weeds, and a risk to the use of the river for primary contact recreation.

Council raises that there is also the risk of toxicants such as pharmaceutical residues entering the river which can impact aquatic ecology, such as fish reproduction from increased hormones in the water.

A greater level of protection for the river would be achieved if only advanced treated wastewater was allowed to be released into the Nepean and Warragamba Rivers. Further consideration could be given to releasing the lesser treated wastewater elsewhere such as South Creek or to the brine line for discharge at Malabar.

**Table one (below):** Discharge locations and treatment levels with increased rainfall and stormwater ingress into the sewerage system.

| Level of influent flow at treatment plant | South Creek release | Nepean release |
|---|---|---|
| Dry weather to 1.3 x average dry weather flow (ADWF) | No release | Advanced |
| 1.3 – 1.7 ADWF | No release | Advanced/Tertiary Treated |
| 1.7 x ADWF | Advanced treated | Advanced/Tertiary Treated or Tertiary treated only |
| More than 3 x ADWF | Advanced and Primary Treated release | Tertiary |

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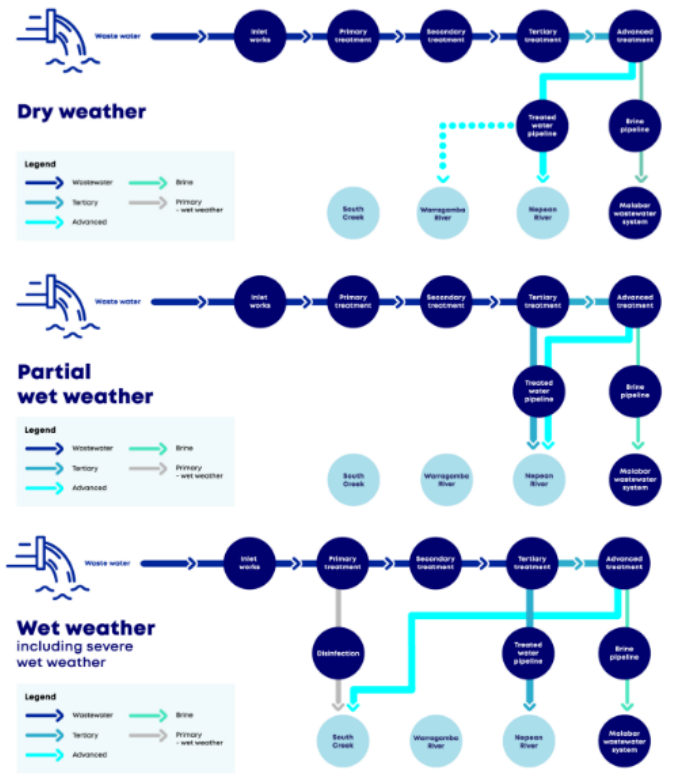


Figure 4-6 Schematic diagram of the AWRC treatment and release system

Council raises that further options are to be explored include releasing the advanced treated wastewater into Boundary Creek at Penrith where the St Marys Advanced Wastewater Treatment System already releases or alternatively directing the wastewater to the St Marys plant itself.

Either option would protect the Nepean River from Wallacia to the weir at Penrith from increased nutrient concentrations, toxicants, and failures associated with treatment plants and distribution systems.

It is strongly recommended that the Department in its assessment, seek further detailed justification from the applicant as to why the current option was selected and as to why the above options could not be considered.

**(f) Monitoring Wastewater and Water Quality of the Nepean and Warragamba Rivers in the Penrith LGA**

During the operation of the wastewater treatment plant, it is proposed to monitor wastewater release quality in accordance with NSW EPA licence requirements. Likewise, monitoring upstream and downstream of release points will occur in accordance with EPA licence requirements.

It is raised for consideration by the Department, that this monitoring will not identify changes in the river and water from the altered flow and nutrient regime nor will provide an immediate indication of risk to river users. Council raises that additional and further monitoring is required to protect the river and river users. Primary concerns are blue-green algae and pathogens associated with faecal contamination of the river.

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Because of the risk Sydney Water's treatment plant poses to the river additional sampling and monitoring should be required of Sydney Water.

This should include:

Installation of wireless communication remote monitoring stations and data loggers along the river that can provide real time monitoring of: chlorophyll, algae, conductivity, dissolved oxygen, pH, turbidity, clarity, total suspended solids, water temperature, *enterococci* and *E. Coli* and any other relevant parameter to recreational water;

Additional sampling and sampling sites monitoring blue-green algae and enterococci in accordance with NHMRC guidelines for recreational water.

Additional research should be facilitated by Sydney Water into the transport of pathogens in the river, particularly between Wallacia and the Weir at Penrith, and also the die off rates of pathogens in the river to better understand the risk to those using the river and to understand how many days, after rainfall, are needed before it is safe to swim in the river again.

This research and remote monitoring should be used to develop and expand the existing River Watch program that Penrith City Council operates.

**(g) Recommendations**

- That the Department review, or have expert independent review, of the modelling and decision not to release all treated wastewater into South Creek.

- That the Department review, or have expert independent review, of all nutrient and pathogen modelling associated with this proposal in respect to blue-green algae and recreational water quality.

- That the Department seek further explanation as to why releasing advanced treated wastewater at Boundary Creek downstream of the weir at Penrith was not considered.

- That the Department seek further explanation as to why the existing advanced wastewater treatment plant at St Marys could not receive the wastewater, either treated or untreated, with final release to Boundary Creek downstream of the weir at Penrith.

- That only advanced treated wastewater be approved for release into the Nepean and Warragamba Rivers.

- That any approval for this a proposal would require Sydney Water to provide additional monitoring, sampling, and research to ensure river health and the continued safe access of the public for recreational water use. As a minimum the following should be included:

    - Installation of wireless communication remote monitoring stations and data loggers along the Nepean River from Wallacia to Yarramundi and downstream of Warragamba Dam to the Nepean River of the Warragamba River. The remote stations should provide

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real time monitoring of: chlorophyll, algae, conductivity, dissolved oxygen, pH, turbidity, clarity, total suspended solids, water temperature, enterococci and E. Coli and any other relevant parameter to river health and recreational water.

- Additional sampling and sampling sites monitoring blue-green algae and enterococci in accordance with NHMRC guidelines for recreational water.

- Additional research should be facilitated by Sydney Water into the transport of pathogens in the river, particularly between Wallacia and the Weir at Penrith, and also the die off rates of pathogens in the river to better understand the risk to those using the river and to understand how many days, after rainfall, are needed before it is safe to swim in the river again.

- This research and the additional sampling and remote monitoring should be used to collaboratively work with and develop and expand the existing River Watch program that is operated by Penrith City Council.

## 5. Environmental Management Considerations

### (a) General

The Department is to obtain all outstanding information for assessment.

All outstanding or more detailed design advice and information must be reviewed by the appropriate consent authority and technical expert, prior to consent being granted.

Furthermore, there are multiple references to additional information being captured in a Construction Environmental Management Plan.

The Management Plan should address the environmental aspects of the construction phase of the development and should include details on the environmental management practices and controls to be implemented throughout the construction works. The Management Plan should address, but not be limited to, the following:

- Water quality management
- Noise control and hours of operation
- Dust suppression
- Waste management (including solid and liquid waste)
- Erosion and sediment control
- Air quality

It is recommended that all construction activities undertaken are to be implemented and carried out in accordance with the Management Plan.

### (b) Hazardous Development:

The development proposal includes a Preliminary Hazard Analysis prepared by Aurecon Arup (dated 22 June 2021, ref 269002-02. The Analysis considers the suitability of the site and thoroughly assesses the risks and

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hazards associated with the site in accordance with SEPP 33 and the relevant associated assessment guideline and advisory papers published by the NSW Department of Planning.

The Analysis identifies the most hazardous activities undertaken on site as being the methanol storage area and digester gas holders, as well as the transport of methanol to the site which involves passing sensitive land uses.

It is noted within Section 5.5 of the Analysis, which assesses goods not classified as dangerous, that at the time of writing, it was not yet confirmed which product is proposed to be used as an antiscalant additive in the reverse osmosis procedure. As such it is recommended that the Preliminary Hazard Analysis be amended to address this concern.

Furthermore, in Section 6.6 which discusses release of firewater into the environment, it is stated that the stormwater design for the proposed development was not yet complete at the time of this writing, and as such it is again recommended that the Preliminary Hazard Analysis will need to be amended to demonstrate that there will be sufficient capacity to contain firewater in the event of a fire.

**(c) Land Contamination:**

It is noted that a Soils & Contamination Impact Assessment prepared by Aurecon Arup (dated 27 July 2021, ref 20036007) has been provided along with the proposal.

The Assessment recommends that as part of the detailed design phase of the project, a supplementary Detailed Site Investigation should be undertaken across the project areas to analyse for contaminants of potential concerns and areas of environmental concern.

Penrith City Council are in support of this recommendation, and whilst it could be supported that additional investigations may be undertaken on an as necessary basis through implementation of an Unexpected Finds Protocol for areas along the proposed pipelines which are not suspected areas of concern, it is recommended that the Detailed Site Investigation for the subject site of the Advanced Wastewater Recycling Centre be undertaken and submitted to the appropriate consent authority for review prior to a determination.

Furthermore, it is identified within the Assessment that previous investigations have located asbestos containing materials in soils and buildings across the subject site, as well as minor localised exceedances of heavy metals in reference to appropriate ecological investigation levels. It is stated that additional investigations in the form of a Detailed Site Investigation mentioned above, is required prior to construction to determine remedial or management actions.

Penrith City Council are of the opinion that asbestos containing material and exceedances of criteria for heavy metals found within soils across the site would indicate that the land is currently not suitable for the proposed use as per Clause 7 of SEPP 55, and therefore cannot yet be satisfied that the land is suitable in its contaminates state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out.

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As has been mentioned above, Council strongly recommends that a Remedial Action Plan (RAP) be prepared by an appropriately qualified consultant following a Detailed Site Investigation and be submitted to the appropriate consent authority for review prior to a determination.

It is also noted that a Hazardous Materials Survey is recommended within the Contamination Assessment to be prepared for the proposed development.

Council supports this recommendation that the Hazardous Materials Survey be carried out to assess the location, extent and condition of hazardous building materials including, but not limited to, asbestos, synthetic mineral fibres (SMF), polychlorinated Biphenyls (PCBs), lead-containing paint, ozone depleting substances and lead dust in ceiling cavities.

The Survey should provide recommendations for the removal of the hazardous materials, including the preparation of safe works method statements and risk assessments to appropriately address health and safety issues.

Furthermore, the Contamination Assessment also recommends that an Unexpected Finds Protocol be prepared for the construction phase of the proposed development. Council recommends that the Protocol be prepared prior to the commencement of construction works, and that The Protocol should address, at minimum, the management of any contamination found on the site during the excavation and construction phase of the development, including at minimum, contaminated soils, groundwater, buried building materials, asbestos, odour and staining.

While it is mentioned that the Construction Environmental Management Plan will address the risk of potentially impacted soil migrating from the subject site, it is also recommended that the Management Plan address material proposed to be imported on to the site. It is therefore recommended that no fill material shall be imported to the site until such time as a Validation Certificate (with a copy of any report forming the basis for the validation) for the fill material has been provided and approved by the appropriate consent authority.

The Validation Certificate should include the following at minimum:

- be prepared by an appropriately qualified person (as defined in Penrith Development Control Plan) with consideration of all relevant guidelines (e.g. EPA, ANZECC, NH&MRC), standards, planning instruments and legislation,
- clearly indicate the legal property description of the fill material source site,
- provide details of the volume of fill material to be used in the filling operations,
- provide a classification of the fill material to be imported to the site in accordance with the Environment Protection Authority's "Environmental Guidelines: Assessment, Classification & Management of Non-Liquid Wastes" 1997, and

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- Based on the fill classification, determine whether the fill material is suitable for its intended purpose and land use and whether the fill material will or will not pose an unacceptable risk to human health or the environment.

**(d) Noise Impact:**

A Noise and Vibration Impact Assessment prepared by Aurecon Arup (dated 28 April 2021, ref AC04) has been provided along with the development proposal for comment. It is acknowledged that no background acoustic monitoring has been undertaken, and that data from noise monitoring undertaken in 2017 in locations close to the subject area has been adopted for the Assessment.

It is noted in relation to the predicted operational noise levels of the proposed Recycling Centre, a 5-decibel modifying factor has been applied to the calculated noise levels as the site contribution dB(C) exceeds dB(A) by more than 15 dB.

Given Council's experience in relation to Co-Gen operation, it is recommended that with relation to the proposed Co-gen flare, engine and exhaust at the Recycling Centre, it should be clarified to what extent the predicted dB(C) will exceed the dB(A) by more than 15dB, as the low frequency sound produced by Co-gen activities has the potential to carry across large distances.

As the predictions have currently been provided, Council would not be satisfied that the modifying factor is adequate without further clarification which demonstrates that surrounding sensitive receivers are not significantly impacted in terms of noise.

Furthermore, it is noted that for the proposed air release valves along the proposed pipelines, it is stated that air release valve sizing is to be determined at the detailed phase, as well as whether mitigation measures will be required.

It is recommended that the Assessment be amended accordingly to clarify the unknown sizing of the proposed release valves and recommend (where applicable) suitable mitigation measures prior to a determination by the appropriate consent authority.

As has been mentioned above, a similar proposal has been provided in relation to noise emissions of the Recycling Centre, which are proposed to be reviewed at the detailed sign phase, as well as exploring measures to reduce noise impacts to ensure that appropriate noise criteria is met. Again, this is satisfactory, provided that the Assessment is amended accordingly to include the outstanding information to be reviewed by the appropriate consent authority prior to determination.

It is also noted upon reviewing the Land Use Survey within the Assessment which identifies surrounding or nearby sensitive receivers associated with the proposed development, some land uses have been identified but have been classified incorrectly or have not been identified at all.

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For example, several dwellings located south-west of TP-T2 have been classified as industrial/utilities, or a dwelling located approximately 150m north-west of the proposed construction compound C5a has not been identified at all.

It is recommended that the Land Use Survey be amended to ensure that all sensitive receivers associated with this proposed development have been identified and have been classified correctly. It is also recommended that the Assessment be amended to reflect any changes in potentials noise impacts which may arise because of the additional identified receivers and provide suitably amended mitigation recommendations where necessary.

The Assessment also states that a detailed Construction Noise and Vibration Management Plan is to be prepared by a suitably qualified consultant prior to commencement of works associated with the proposed development.

The Management Plan should include and address noise impacts on surrounding sensitive receivers during the construction phase of the development, and should consider the details of the construction program, methods, equipment and vehicles in accordance with the NSW Department of Environment Change's "Interim Construction Noise Guideline" and appropriate standards in relation to assessing vibration.

Given the scale and complexity of the proposed development, it is recommended that the Construction Noise and Vibration Management Plan be provided to the consent authority prior to determination.

## 6. Air Quality Considerations

In relation to the Air Quality Impact Assessment prepared by Jacobs, report reference IS315300, dated 15 June 2021 for the Upper South Creek Advanced Water recycling Centre. The following comments are provided:

- The report includes a detailed assessment of potential air quality impacts based on inflows of 50ML per day (initial capacity) and a higher-level assessment of inflows of 100ML per day (final design capacity).

- The assessment has considered impacts associated with dust resulting from construction of the AWRC, odours from operation of the AWRC and other emissions from operation of the cogeneration engines at the AWRC. This is considered satisfactory.

- The selection of weather data use for the odour model appears satisfactory in that the data used is worst case for the years of meteorological data examined for suitability.

- The proposal will incorporate best practice odour collection and treatment systems to minimise odour impacts. This involves collecting odorous air from across the facility and directing it to a 2-stage air treatment system (which incorporates a biological trickle filter followed by carbon polishing) which will likely be reduce odours to less than 500 OU.

- Weather data selection and odour generation rates from biosolids handling and emissions from the odour control unit are both conservative and therefore likely to estimate potential worst-case odour impacts.

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- The modelling assumes that air will be discharged from a 6m high stack at the site.

- The odour modelling shows that at 50ML/day the 2 OU contour extends to just outside the site boundary to the north-west. This impacts on ENZ zoned land in the SEPP which is likely to be used for recreational purposes. I consider this to be a minor impact given:

    a. the area that is predicted to be impacted is relatively small; and
    b. the fact that the 2 OU criteria is a 99$^{th}$ percentile criteria, i.e. the odour only exceeds 2 OU for 1% of the time – or 87.6 hours per year.

- No existing residential receivers have been predicted to be impacted by odour of 2 OU or greater at 50ML/day and 100ML/day.

- At the final 100ML/day capacity the modelling shows that the 4 OU contour extends slightly beyond the site boundary to the north-west and north-east, whilst the 2 OU contour extends significantly into the ENZ land to the north-west, north, and north-east of the site. This is a concern as it is likely to adversely impact on future users of this land.

- Modelling of emissions from the cogeneration engines indicates that the level of $NO_X$ is below the criteria for annual average and 24-hour maximum concentrations of $NO_2$ (assuming all $NO_X$ is $NO_2$) will be below EPA criteria at surrounding residential receivers under both 50ML/day and 100ML/day operating conditions even when cumulative impacts associated with existing background levels and the M12 operating are included.

In short, the air quality impact assessment appears satisfactory and indicates that surrounding sensitive receivers are not likely to be adversely impacted by odour or emissions from the cogeneration engines. However, three points that need to be highlighted are:

- The extent of ENZ zoned land to the north of the site identified as being impacted by the 4 OU and 2 OU contours at the final 100ML design capacity is significant and needs further assessment and discussion.

- Confirmation that a stack of at least 6m in height will be used.

- The preparation of a Construction Environmental Management Plan that covers dust monitoring and control measures is essential.

## 7. Waterways Considerations

Based on a review of the information contained in the EIS, the project does present some risks to water quality during both the construction and operational phases of the project.

With respect to the construction of the site and associated pipelines and the impact on waterways, the documentation indicates that in general, pipelines would be constructed across watercourses using temporary open trenching

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methods and deeper waterway crossings would be constructed using trenchless methods.

It will be important that adequate consideration of the design and safeguarding of creeks is undertaken during the detailed design stage. It will also be important that all disturbed areas are revegetated following the works.

With respect to stormwater management, the Surface Water Assessment indicates the project reference design for the AWRC includes commitments to provide a range of stormwater treatment infrastructure and water sensitive urban design elements.

The report states that these have been sized to achieve the relevant water quality and flow objectives but there were inadequate details to assess in detail. However, the documentation indicates that the stormwater management approach for the project site has been iteratively sized to achieve the Water Quality Objectives set by DPIE EES, as well as the pollutant load reduction targets and stream erosion controls set by the Penrith City Council.

The supporting documentation notes that the proposed treatment measures to mitigate potential impacts of increased imperviousness on water health.

These measures will be refined during the detailed design of the ARWC. With respect to this approach, it is suggested than an opportunity for further review and assessment should be provided once the final design is being prepared.

With respect to the operational stage, the EIS and supporting documents included a discussion of impacts which may result from the discharge of treated water into the receiving waterways. The reports prepared included the Aquatic Ecology and Riparian Ecosystem Impact Assessment, Ecohydrology and Geomorphology Impact Assessment and the Hydrodynamic and Water Quality Assessment.

During operation of the scheme, the main potential risks result from the treated water releases to South Creek and Nepean and Warragamba rivers. These reports note that releases have the potential to impact on water quality, geomorphology, aquatic ecology and as a result of altered flow regimes.

It is noted that the supporting studies included in the EIS, included numerous recommended mitigation measures and safeguards to manage the risks, as well as commitment to develop and implement a detailed monitoring and reporting program.

The reports indicate that there will be a moderate increase in water surface elevation (averaging about 18cm) upstream of the Wallacia Weir.

The geomorphology report noted the increased elevation as a result of the higher AWRC release, may result in the potential for additional impacts on bank erosion in the reach upstream of Wallacia Weir and indicated additional mitigation measures to be investigated, such as targeted bank protection.

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The report notes that monitoring will be implemented, and it will be important that this is done in a consultation with relevant stakeholders for all affected reaches of the relevant waterways.

The EIS includes commitments that a baseline and post-commissioning monitoring program to help understand impacts of the project once it is operational. This will need to have water quality, aquatic ecology and geomorphic components.

In finalising the detailed design of the project and in finalising operational plans, consultation with relevant stakeholders should be undertaken.

In doing so, it will be important that adequate consideration is undertaken to ensure the design and operation of the AWRC continues to meet water quality objectives, and that any impacts as a result of the project with respect to water quality management, impacts to creek geomorphology and aquatic species are identified and managed.

## 8. Biodiversity Considerations

### (a) Development impacts – summary

Direct impacts will result of the construction works comprising of:

- The project will remove 13.81 hectares of native vegetation 86 % of the vegetation impacted considered to be in 'Thinned' of 'Scattered Trees' ecological condition, and just 14 % recorded as 'Intact'.

  This includes the following threatened ecological communities:
  - 4.83 ha of Cumberland Plain Woodland (of which 1.88 hectares meets EPBC condition thresholds);
  - 0.02 ha of Freshwater Wetlands;
  - 4.53 ha of River-flat Eucalypt Forest;
  - 0.92 ha of Swamp Oak Floodplain Forest (of which 0.22 ha meets EPBC condition thresholds); and
  - 1.54 ha of Shale Gravel Transition Forest

- The vegetation provides habitat for a number of threatened flora species and will result in a direct impact to a total of 7 individual plants, and 3.19 ha of known or expert mapped habitat. Threatened flora species habitat affected consist of:

  - Acacia pubescens
  - Dillwynia tenuifolia
  - Grevillea juniperina subsp. juniperina
  - Marsdenia viridiflora subsp. viridiflora
  - Pultenaea parviflora
  - Pultenaea pedunculata
  - Callistemon linearifolius

- Loss of connectivity as a result of the project will occur through direct loss of habitats and through minor fragmentation of vegetation and habitats as a result of construction of the pipeline.

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- Direct impacts result in removal of potential habitat for threatened fauna species comprising of:

    - Large-eared Pied Bat
    - Cumberland Plain Land Snail
    - Large Bent-winged Bat
    - Southern Myotis

- The project will also result on impact on impacting habitat for a number of other threatened fauna species that the Biodiversity Assessment Method does not require survey and assessment of as they are identified as 'Ecosystem' species credit species.

**(b) Threatened flora species – further consideration**

It is understood that targeted threatened flora species surveys were undertaken with the exception of an approximately 650 metres section, between the eastern end of Cross Street and Brandown Quarry at Kemps Creek, where access could not be arranged. Portions of the impact assessment area were not subject to targeted survey for threatened flora.

This area is further discussed below, as an area where there appears to have been clearing undertaken. If the proposed pipeline is proposed to go through the Cumberland Plain Conservation Area, then it is essential that targeted flora surveys are undertaken prior to approving the project.

There may be other species that may be present within this area that has not been assumed present or detected previously.

**(c) Altered hydrology and impacts to the aquatic environment**

Indirect impacts to biodiversity values during the operational phase of the project are likely to occur because of alteration of inundation depth and duration. This relates to a minor increase in river depth resulting from the increased water released into the Nepean River system.

The report states that the project will result in 'improved water quality, resulting in slightly beneficial outcomes for aquatic ecology' and impact are 'negligible.'

The project appears to have a permanent change on the hydrology and therefore further scrutiny is required to determine if the project will have impacts on the aquatic environment as a result of the altered hydrology regimes as well as the type of water that will be piped into the Warragamba River and Nepean River.

It is recommended that DPIE engages an independent consultant of their choosing based on relevant expertise to undertake a critical review.

The rivers contain habitat for a number of threatened species and iconic fauna species such as the Platypus that could become significantly impacted if this was not to be appropriately assessed. There is also the risk of algal blooms and aquatic weeds that could lead to long-term degradation of the aquatic environments (refer discussion above).

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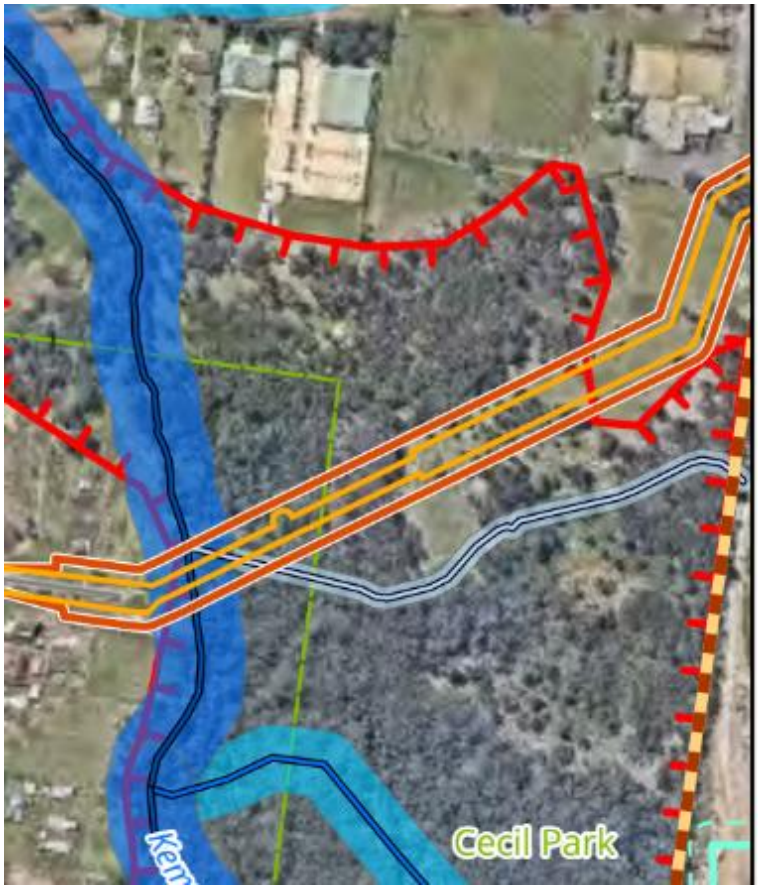
**(d) <u>Recommendations – further refinement to avoid and minimise impacts</u>**

Regarding the proposed location of pipelines, further exploration needs to be undertaken as there may be less biodiversity constrained areas the pipeline could go through. For example, on Site map 7 in the Biodiversity Development Assessment Report it shows the pipeline going through Cumberland Plain Conservation Lands.

Upon review of aerial imagery, it appears either development consent has been granted or there is unauthorised clearing of portions of this land that goes from eastern end of Cross Street up to Elizabeth Drive and to Brandown Quarry at Kemps Creek.

By locating the pipeline in this already disturbed footprint this will avoid/ reduce clearing of native vegetation and impacting on threatened flora and fauna species habitat.

The two images below show the proposed pipeline route intersecting the Conservation Lands and the second shows a Nearmap Aerial imagery that shows the perimeter of disturbance (shown in red outline) compared to the proposed pipeline route (shown in yellow).

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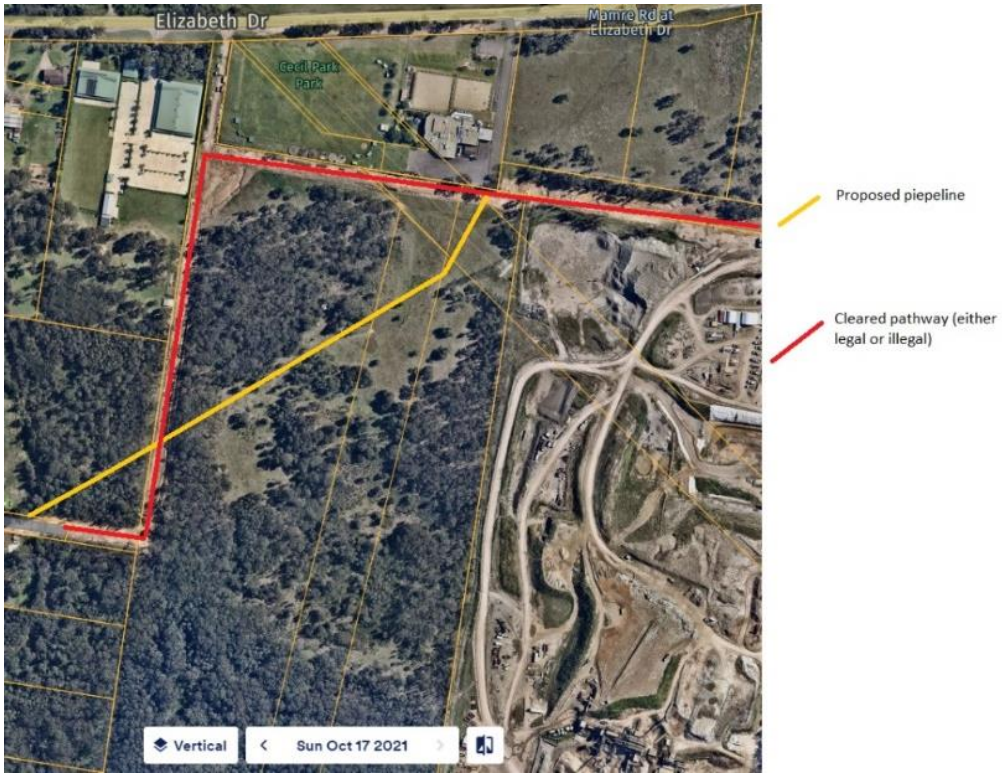


**(e) Cumulative Impacts and Impacts on other Projects**

This project has cumulative consequences impacting biodiversity and if approved will need to be considered as part of the Warragamba Dam wall raising project as the project has the potential to affect the modelling of future flood risk and associated impacts.

**(f) Conflicting information presented in the report**

Table 45, Table 58 and Table 59 in the Biodiversity Development Assessment Report has different area amounts for Threatened Ecological Communities compared to Table 1 and The BAM Credit calculator.

Not all tables and figures were double checked in the report.

**(g) Summary**

Overall, the Project will result in impacts to terrestrial biodiversity which in respect to the overall size of the project is comparably small. The project has been able to demonstrate that the project has been designed to avoid (to a practical level) areas containing high biodiversity values.

As discussed, there are opportunities to explore further reduction of impacts by utilising existing cleared areas to construct the pipeline and should be considered. It is difficult to scrutinize or determine whether the project has adequately assessed the impacts on the aquatic environment.

It is recommended that the Environment, Energy and Science division of the NSW Department of Planning, Primary Industry and Environment commission an independent review of the documentation by relevant species and ecological experts to review the information provided in the EIS

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to ascertain whether the project will not have irreversible impacts on the aquatic environment within the Warragamba River and Nepean River.

## 9. Landscape Considerations

It appears from a review of the EIS that the greatest landscape and visual impact will be at Wallacia, where the pipeline meets the river (impacting vegetation and views to and from the river), and streetscapes where the pipeline is located in road reserves (involving removal of street trees and removing potential for future street trees which would provide both amenity and canopy to Cool the City).

The centre itself appears to be constrained by vegetation requirements set by the Airport and there is insufficient detail to provide comment.

Various forms of planting have been identified to ameliorate the bulk and scale of proposed built forms and development, which appear to be comprehensive. Given the type of operational development at the Centre, in the long term it is considered green walls are an unsustainable form of screening (unless high levels and budgets are enabled for ongoing maintenance) and is not supported.

Council requests active dialogue with design teams throughout the design process.

### (a) Vegetation removal and revegetation:

Existing vegetation should be retained wherever possible and protected according to Australian Standards during construction.

Site compounds should avoid existing vegetation. If this is not possible, vegetation must be treated as a high value asset and protected and maintained in a healthy state during construction phases.

The quantity of vegetation should be documented as with revegetation.

The area of canopy at 10 years should not be less than the existing area and the replacement ratio is to be identified.

Figure 4.5 illustrates a pipe jacking tunnel being a maximum of 3m deep positioned under existing vegetation. The height of the tunnel is not indicated and there are concerns that the tunnel and its construction, may negatively impact the rootzones of extensive existing vegetation.

The proposed like-for-like replacement of vegetation is not reflective of the aim to enhance, protect and re-invigorate the landscape identified within the Aerotropolis Plans and Precincts. Given the urban heat of Western Sydney, this project should deliver optimal vegetation to contribute to the cooling of Western Sydney, within the constraints set by the Aerotropolis.

Specialists should be engaged to work with engineers to maximise the potential for effective revegetation. Council has a developed a species list guide for the LGA which can be provided upon request.

The NSW Greener Places Draft Policy and Guidelines should be addressed by the development as design progresses.

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**(b) Street trees**

- Pipeline alignment in road reserves is not supported due to the negative impact it will have on future street trees and the impact its canopy will have on Cooling the City as well as visual amenity

- When not avoidable, pipelines in road verges should be consolidated with other utility infrastructure to reduce the footprint impact. This can involve alignment on the side of road with overhead wires, thereby maximizing potential for canopy planting on the non-wired side of the road.

- Table 4.4 – 1. Council does not support low-level vegetation (shrubs and groundcovers) in road verges as they are maintenance and management liabilities and can create pedestrian / community safety issues due to lack of passive visibility.

- The report proposes low level vegetation as replacement for the removal of street trees (for example in Wallacia). The impact is much greater as the potential for effective canopy tree planting is removed. The project should provide effective and localized replacement (compensatory) canopy plantings. Council is committed to Cooling the City (Strategy) and is actively planting canopy street trees across the LGA.
- Any revegetation in the public domain requires establishment maintenance. Refer to Council's Street and Park Tree Management Plan available at the following link:

  *https://www.penrithcity.nsw.gov.au/images/documents/waste-environment/environment/StreetParkTreeManagementPlan_2019_Elizabeth_Oct%202019.pdf*

  *and appendix available at*

  *https://www.penrithcity.nsw.gov.au/images/documents/waste-environment/environment/Street%20and%20Park%20Tree%20Management%20Plan%20Appendix%20final%20draft.pdf*

**(c) Green Grid**

This recently adopted Council document has not been acknowledged in the report (refer to Precinct 11, Project 18 – Kemps Creek from South Creek open space and hydrological corridor).

The proposed recreational connections to Kemps Creek corridor should be identified and enabled, whether the possible recreational facility to the west proceeds or not.

The walking trail with heritage satellite dishes and interpretation is supported provided it is part of an open space recreational network. Access to Kemps Creek should be future-proofed

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## 10. Heritage Considerations

The EIS is accompanied by heritage assessments for both Aboriginal and non-Aboriginal archaeology. Recommendations regarding engagement of an Archaeologist during on site construction works is supported by Council.

The heritage report includes the following:

- Regarding the Fluers Telescope Heritage listed item/site - Removal of buildings is advised, with recommendations of archival recording and heritage interpretation (such as landscaping, public art, retention of 2 x antennas).

  The report also identifies the above item as being highly significant and that the proposal *"will have a major impact to heritage values on this site".*

  It further mentions that this *"may warrant a reassessment of the site curtilage for the LEP listing of the local heritage item".*

  The recommendations of these reports do not include options that consider retention (or partial retention) of buildings on the heritage listed site, which is not in line with the Burra Charter, Council nor Heritage NSW development control guidelines.

  It is recommended that an amended heritage assessment for the Fluer Telescope site (heritage item) be undertaken having consideration of the above.

- Further to the above, Council requests that the Applicants heritage consultants provide a report for approval of Council prior to issue of Construction certificate. The report should outline the details of consultants on site involvement during the Construction Works, what was found and what measures were taken regarding any archaeological findings, including details of any negotiations with local indigenous groups.

- Further details requested by Council regarding the details of what elements of the remains of the Fleur Radio Telescope heritage items (telescope elements, buildings or associated structures) are to be preserved or removed from site.

  Where elements are preserved a detailed Schedule of Works, Specifications and drawings showing the conservation measures to be taken. The information regarding location of heritage items to show a clear and detailed overall scaled site plan (particularly for the Fleurs Telescope heritage item)
  .

- Applicant to provide a detailed Interpretation Plan showing its locations, text, materials sizes and that the Interpretation Plan is to be completed and approved by Council prior to issue of a Construction Certificate.

- Council requests that the Applicants heritage consultants provide a report for approval of Council prior to issue of Construction certificate. The report should outline the details of consultants on site involvement during

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the Construction Works, what was found and what measures were taken regarding any archaeological findings, including details of any negotiations with local indigenous groups.

- As the site is directly opposite a heritage item, the building current design should be further developed so that:

  a) A setback from the font boundary is appropriate, as per relevant DCP guidelines for the area.

  b) High quality landscaping especially adjacent to front boundary is further developed so that the bulk of building is ameliorated, again as per relevant DCP guidelines for the area.

  c) Recommend that the front façade is sufficiently modulated along the long length of proposed front. It is noted that there is a corner feature that is modulated, however, all elevations and prominent points of view shall be considered in a similar regard.

**11. Aboriginal Heritage Considerations**

It is recommended that the application detail liaison with Deerubbin Local Area Land Council and other Aboriginal stakeholders.

**12. Floodplain Management Considerations**

Sydney Water proposes to build and operate a wastewater treatment plant, known as the Upper South Creek Advanced Water Recycling Centre (USC AWRC), to service the South West and Western Sydney Aerotropolis Growth Areas. A Flood Impact Assessment report has been prepared to support the USC AWRC Environmental Impact Statement (EIS) which is now on public exhibition. Council Floodplain and Drainage Engineering team has undertaken a review of the following appendices of the EIS that are related to the flood impact assessment and associated results:

- Appendix L Flood Impact Assessment – Part 1
- Appendix L Flood Impact Assessment – Part 2

The following comments provide a summary of our review outcomes from flooding perspective.

- The Western Sydney Aerotropolis South Creek Flood Study (2019) formed the basis of the AWRC study. A comprehensive flood modelling has been undertaken for the entire South Creek catchment by Aurecon and AECOM joint venture (AAJV). The XP-RAFTS hydrology model has been used to simulate the rainfall-runoff process with 435 sub-catchments.

  A 1D/2D hydraulic model has been undertaken using TUFLOW based on Australian Rainfall and Runoff (ARR) 2016 utilising a 10m grid resolution. It seems that this model did not follow the Floodplain Development Manual requirements. Our preference is to use the existing Council's adopted South Creek Flood Study 2015 model.

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- The hydrology and hydraulic modelling assessed the impacts on flooding conditions of South Creek for a range of flood events from 10% AEP, 1% AEP, 0.5% AEP, 0.2% AEP and PMF. The assessment did not address the requirement of Flood Development Manual where the impact on existing flood behavior should be assessed for the full range of flood events including up to the probable maximum flood (refer to Table 3-1 row 31 (b)). For instance, the FIA did not assess the 5% and 2%AEP design storm events.

- The AAJV (2019) TUFLOW model use a relatively coarse grid size of 10 m. The AWRC study focused on the USC AWRC and its vicinity, hence the model is downscaled to cover a smaller area and a finer grid size of 3m was used instead, to improve the resolution of the model results.

- The WARC TUFLOW model validated against Council South Creek FS 2015 using the ARR1987 and 36-hour critical duration. However, the WARC TUFLOW then modelled the existing and developed scenarios using ARR2016 procedures and 12-hour critical duration. In this case the validation process of the TUFLOW model is questionable as the model has been validated based on different parameters.

- For existing scenario and using ARR1987 procedures, the comparison of the 1%AEP flood levels in Section 4.4.7, Table 4.7 and Figure 4.11 shows that the AWRC TUFLOW model results are slightly higher than the adopted Council 1%AEP flood levels. The difference is in the range of 200 mm to 300 mm.

- Table 4-7 of Appendix L Part 1 presents the difference in the 1%AEP flood levels between Council adopted South Creek FS 2015 and AWRC model at different locations for existing case using ARR1987. As shown in the table, the increase in flood levels along South Creek at Downstream of the Study Area (increase by 180mm) and at Upstream of Erskine Park (increase by 330mm) need second look as they are beyond the acceptable limit. Similarly, increase in flood levels in Badgerys Creek at Downstream of Elizabeth Drive (increase by 250mm) and at Upstream of South Creek Confluence (increase by 210mm) are also beyond the acceptable limit. These results require further refinement.

- Figure 4-13 and Table 4-8 of Appendix L Part 1 show that the modelled flows in this study are close to the lower boundary (green line) of the 90% Confidence Limit envelope using the ARR2016 procedures. Table 4-8 shows the WARC TUFLOW modelled South Creek flowrates upstream of Elizabeth Drive for different design storm events. The table clearly shows that the modelled flowrates for all design events are well below Council adopted South Creek FS 2015.

  For instance, for the 1%AEP design storm event, the modelled flowrate in TUFLOW is 290 m3/sec while the flowrate in South Creek FS 2015 is 450 m3/sec. For 0.2%AEP, the modelled flowrate in TUFLOW is 384 m3/sec while the flowrate in South Creek FS 2015 is 600 m3/sec. It is clearly that the flowrates modelled in AWRC TUFLOW model are 35% less than the flowrates modelled in South Creek FS 2015. These are massive differences and cannot be accepted.

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For consistency, the same flowrates modelled in Council South Creek Flood Study 2015 should be adopted in AWRC TUFLOW model along with the ARR1987 to establish the flood behaviour for the existing scenario.

- The gauge 212320 is for South Creek at Elizabeth Drive. The report on page 39 in Appendix L Part 1 should be corrected.

- The Appendix L Part 1 found that the 12-hour 1% AEP storm and 6-hour PMP storm event are the critical storm durations at the proposed location of the site. Whereas Council adopted flood study found 36-hour is the critical duration for 1%AEP storm. These could be the reasons for the differences in flow rates. The WARC TUFLOW flow rated should be matched with Council's flow rates otherwise the existing scenario is not correctly defined for comparison of flood levels.

- Appendix L Part 1 page 40 states that "A review of the AWRC model calibration should be undertaken at the detailed design stage to capture any new information or uncertainties in the current calibration information." The detailed review of the AWRC model calibration should be undertaken before proceeding with the modelling to overcome any uncertainties with the model.

- The flood impact assessment report says that *"The flood modelling undertaken was for the purpose of regional flood assessment and not considering the local flooding/runoff in detail."* Local overland flow flooding should also be considered in the AWRC modelling to ensure the proposed development is not affected by major overland flow-path from local catchment.

- Chapter 6 of Appendix L Part 1 documents the WARC modelled existing flood behaviour results using ARR2016 guidelines. These results are with lower design flowrates. WARC model adopted lower flowrates for the estimation of flood levels, and hence resulted lower flood levels. The flowrates modelled in Council South Creek FS 2015 must be used by the WARC TUFLOW model together with the ARR1987 guidelines.

  The existing scenario is not correctly defined.

- Appendix L Part 1 page 68 reports that the 1% AEP flood levels along the western side of the site range from 37.5 to about 38.5 m AHD and along the eastern side from 37.5 to 39.2 m AHD. Council adopted flood study shows that the 1% AEP flood levels along the western side of the site range from 38.1 to about 39.1 m AHD and along the eastern side from 38.0 to 39.1 m AHD.

  WARC TUFLOW results are lower by 0.5m compared to Council South Creek FS 2015. The flood level difference of 0.5m is a real concern and the modelling of the existing scenario needs to be revisited to ensure the flood levels are comparable to Council adopted flood levels. Otherwise, Council's adopted model should be used to assess the flood impacts.

- Appendix L Part 1 page 68: under the 0.2% AEP event, water levels along the western side of the site range from 37.6 to about 38.7 m AHD and along the eastern side from 37.7 to 39.3 m AHD.

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Council adopted flood study shows that the 0.2% AEP flood levels along the western side of the site range from 38.2 to about 39.3 m AHD and along the eastern side from 38.0 to 39.3 m AHD. WARC TUFLOW results are lower by 0.6m compared to Council South Creek FS 2015.

This outcome also emphasis on our earlier comment that the modelling of the existing scenario needs to be revisited to ensure the flood levels are comparable to Council adopted flood levels.

- The FIA keeps referring to Council adopted South Creek FS 2015, while the results presented are based on completely different modelling parameters. There is no comparison for existing scenario between the two flood model results to fully understand the difference in flood levels. Also, the reason behind using lower flowrates is not fully appreciated. The results for the existing case should be sourced from Council adopted South Creek FS 2015 so the FIA of the proposed WARC can be investigated and fully assessed.

  Currently, the FIA using lower flowrates and assess the pre and post scenarios. The FIA did not show the full impact of the proposed WARC using Council adopted flood results.

- Figure 6.3 shows that the 1%AEP flood extent from WARC TUFLOW model is narrower than the adopted 1%AEP flood extent from Council adopted South Creek FS 2015. The results presented in Figure 4.11 are not compatible with the results presented in Figure 6.3 using the same WARC TUFLOW model.

- The hydraulic categories presented in Figure 6-30 are not consistence with the hydraulic categories mapped on Council adopted South Creek Flood Study Worley Parsons 2015. The heading of this figure is misleading and incorrect. This issue needs to be rectified. The Figure shows the hydraulic categories based on the parameters listed in Table 6-4 as part of Sydney Water WARC FIA.

- No details on the proposed filling of the site are provided in Appendix L Part 2. The extent and the depth of filling in the site should be described in this Appendix.

- For the proposed case, Appendix L Part 2 report doesn't provide details on the proposed three detention basins, their proposed drainage features, and how they will drain to the South Creek. The proposed swale (1 to 2m deep) to direct flows from the southern detention basin to South Creek will be fully submerged in 1%AEP South Creek Flood this may have an impact of the proposed WARC.

- The proposed swale (1 to 2m deep) to direct flows from the southern detention basin to South Creek is in the middle of South Creek floodway and hence this configuration is not supported.

- Figure 6.37 shows the design case 1% AEP FFA peak flood levels and depths. The proposed filling of the site encroaches the flood extent on the eastern side causing a minor localised blockage and displacement of flow. The report failed to quantify the impact on flood levels for this event.

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- Under the PMF event shown in Figure 6-38, the changes in flood levels and depths occur due to the elevated pad which results in a blockage of flow and loss of flood storage. The report failed to quantify the impact on flood levels for this event. The access road is cut in the PMF event and the three proposed basins will be submerged.

- The proposed filling pad is not mapped on Figure 6-53 suggesting the site is affected by 1%AEP high flood hazard.

- The proposed green space area as shown in Figure ES3 is located within the South Creek 1%AEP floodway. This is not supported.

- The flood impact assessment of the proposed WARC filling pad is based on lower flowrates as listed in Table 4-8. However, the assessment should consider the flowrates adopted in Council South Creek FS 2015 for all design events in order to quantify the flood impact from the proposed filling pad on flood behaviour.

- As the site is affected during PMF a food evacuation strategy/plan is required. The FIA doesn't include any discussion on this matter.

- The flood impact assessment did not include the land classified as "Future Development" in this report. If Sydney Water proposed to have a future development for this section of the site (including any proposed filling) this should be considered in this flood modelling and investigation to fully understand the impact on flood behaviour.

- The proposed Treated Water Pipeline is crossing several creeks and floodplains, the report does not provide details how deep this pipeline will be and what are the impacts during the construction time if flooding occurred.

- Table 7-1 needs to revisit sections C5, C6 and C7 of the Treated Water Pipeline as these sections of the pipeline are within the floodplains and affected by 1%AEP Nepean River and 1%AEP overland flow flooding. It should be fully analysed and provide adequate details.

- Table 7-2 needs to be revised considering flooding from local catchment. This is needed to understand the impact of the proposed Treated Water Pipeline on local flood behaviour. Particularly this pipeline crossing several creeks that are treated as mainstream e.g. Jerrys Creek, Cosgroves Creek etc.

Based on the above Floodplain Management considerations the proposed development cannot be supported based on the current application as the EIS does not adequately assess the flood impacts. Further, parts of the proposal are located within the South Creek Floodway defined by the Council's adopted South Creek Flood Study, 2015.

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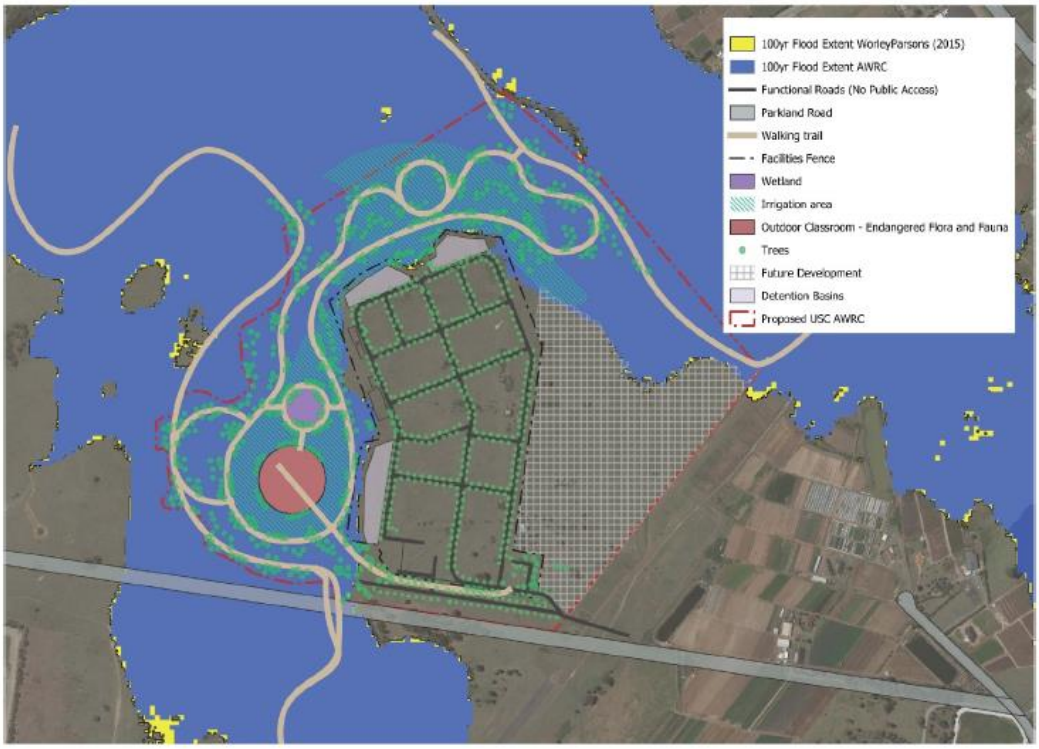


Source: Aurecon, Sydney Water, LPI, Nearmap, ESRI, Worley Parsons
Date: 12/03/2021

1:13,000
0 100 200m

Advanced Water Recycling Centre

**Projection:** GDA2020 MGA Zone 56

**Figure 4-10 WorleyParsons (2015) and AWRC study 1% AEP flood extents using ARR 1987 Guidelines**

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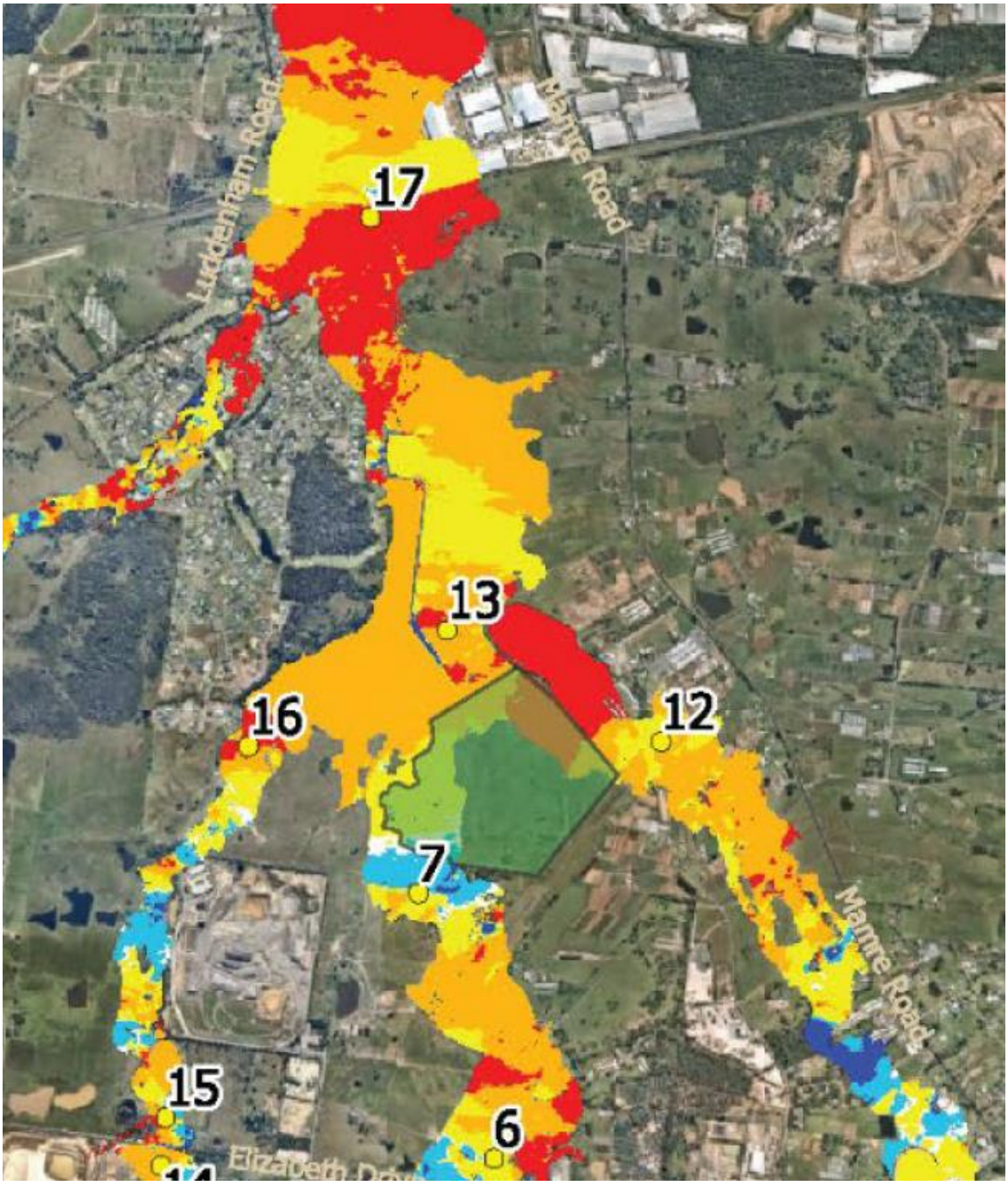


**Figure 4-11 Difference in 1% AEP Flood Levels Between AWRC Model and WorleyParsons (2015)**

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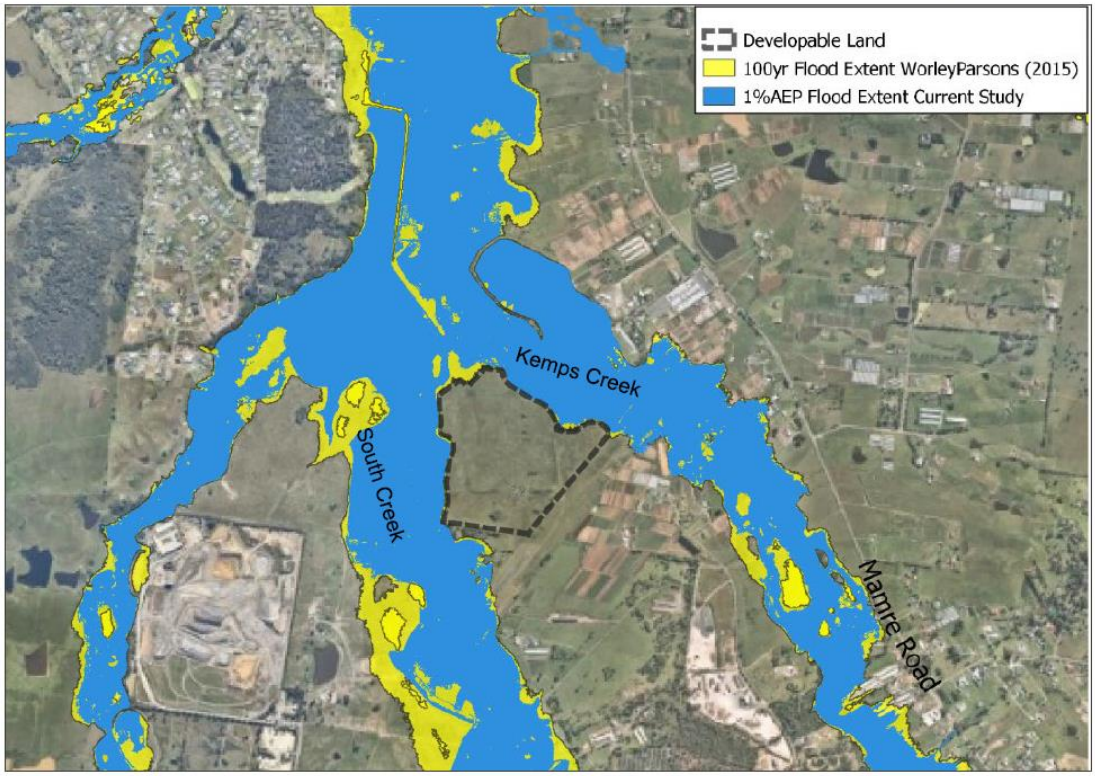


**Figure 6-3 The 1% AEP flood extents based on WorleyParsons (2015) and AWRC study using ARR 2016**

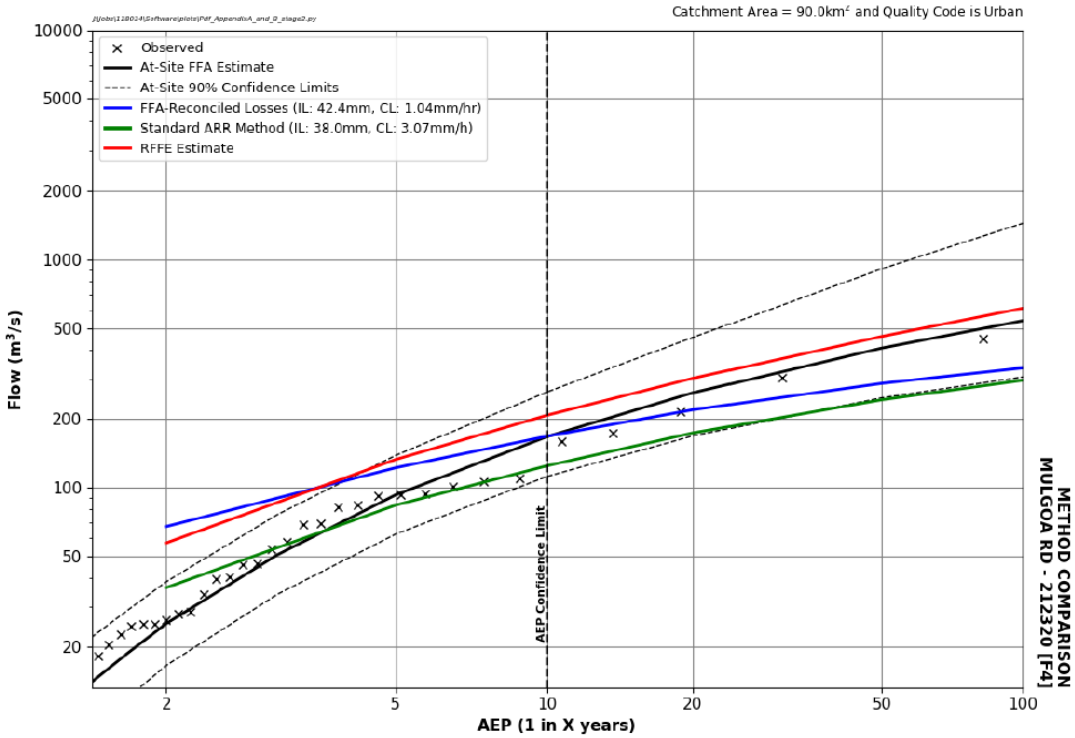


**Figure 4-13 Comparison of flow estimation methods at Mulgoa Rd Gauge (WMA Water, 2019)**

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Table 4-8 Modelled South Creek flood flowrates upstream of Elizabeth Drive

| Event modelled | WorleyParsons (ARR 1987) | OEH Study^ (At-site FFA*) | OEH Study^ (ARR 2016) | Advisian Study (ARR 2019) | AWRC Study (ARR 2016) |
|---|---|---|---|---|---|
| 10% AEP flowrate ($m^3/s$) | - | 170 | 124 | | 115 |
| 1% AEP flowrate ($m^3/s$) | 450 | 538 | 295 | 492 | 290 |
| 0.5% AEP flowrate ($m^3/s$) | 520 | - | - | - | 321 |
| 0.2% AEP flowrate ($m^3/s$) | 600 | - | - | - | 384 |
| PMF | 1680 | - | - | - | 1651 |

^ Now known as DPIE
* Flood Frequency Analysis

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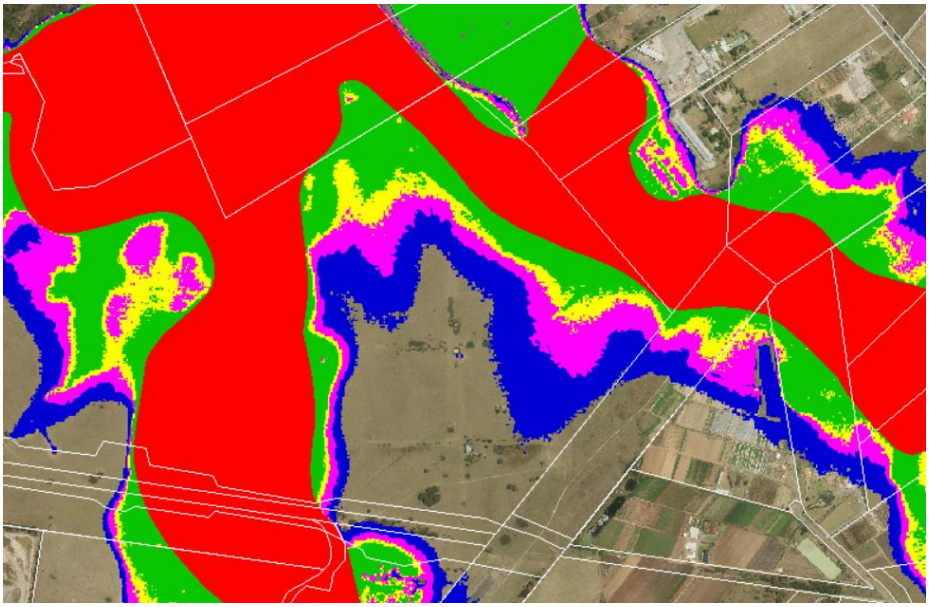
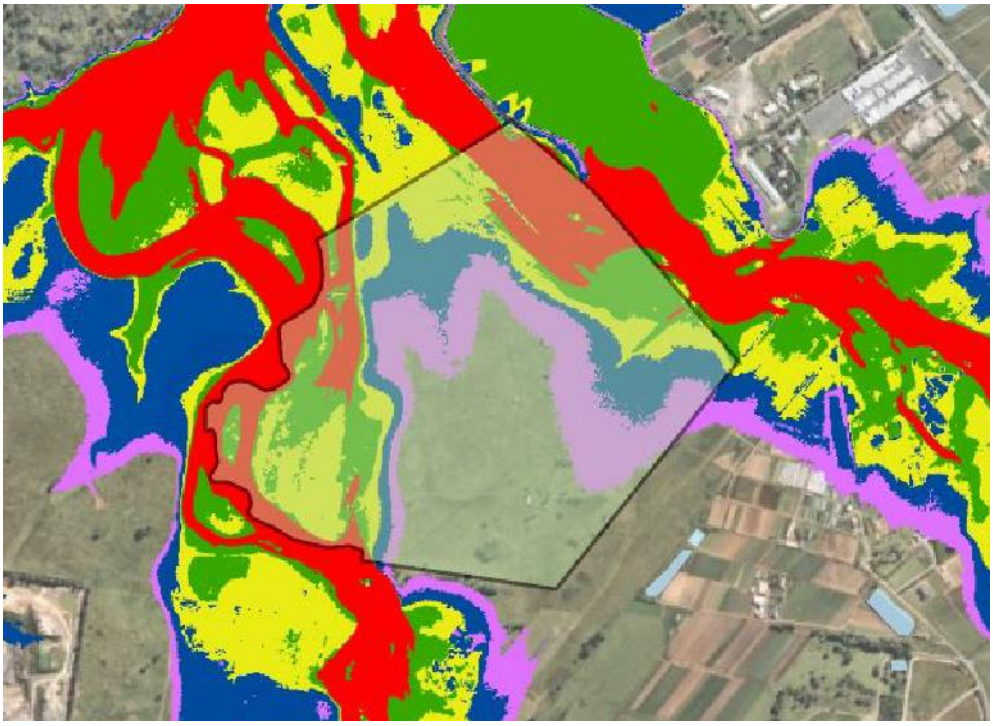


South Creek FS 2015: Magenta FPA, Blue PMF and Red-Green-Yellow Hydraulic Categories



Sydney Water FIA: Blue FPA, Magenta PMF and Red-Green-Yellow Hydraulic Categories

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## Conclusion & Recommendation

The proposed development represents essential infrastructure which is required to service substantial future development in the region and its' early provision is supported. Based on the application and EIS however, the issues identified in Council's review as outlined in this submission need to be closely considered by DPIE in the assessment of the application and adequately responded to by the proponent.

Should you wish to discuss any aspect of Council's comments further, please contact Council's Principal Planner Kathryn Saunders on (02) 4732 8567.

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