Commissioned by Macarthur Development on behalf of the Department of Planning and Environment

Wilton Town Centre Precinct

Water and Wastewater Servicing Feasibility Report

September 2018

Executive summary

A range of options for water and wastewater servicing of the Wilton Town Centre Precinct study area have been considered and are viable. Key features of these options are identified in Table 1 and Table 2. The Wilton Town Centre Precinct is located within the Wilton Priority Growth Area.

Table 1 Key features of water strategy options

Option	Component	Opportunities	Constraints
1 - Extension of Macarthur Delivery System	Treatment	• The Macarthur WFP has a nameplate capacity of 265 ML/d and is within 10 km of Wilton Town Centre Precinct. • There is sufficient treatment capacity at the existing Macarthur WFP in the short term to service the Wilton New Town developments including Wilton Town Centre Precinct.	• In the longer term towards 2036 capacity becomes constrained with increasing demand from the South West Priority Growth Area and the Northern areas within The Greater Macarthur Priority Release Area. • De-rated warranted capacities, as a consequence of poor source water quality, temporary limits capacity putting additional pressure on in-system storage.
	Conveyance	• The existing Appin Network is within 1 km of Wilton Town Centre Precinct. • Extensions from the Appin reservoir system within the Macarthur delivery system have been defined that also service the broader Wilton New Town development. • It is also possible to supply directly from the Macarthur WFP rather than via the Appin reservoir system.	• Extensions may be dependent on the progress of other developments within the Wilton New Town. • Accordingly, timing of these extensions are likely to be dependent upon agreements with Sydney Water. • The conveyance system will have to cross the M31 motorway.
	Pumping Stations	• There are currently two pumping stations within the Appin Water Supply Zone, one adjacent to the Appin Reservoir (12 km from Wilton Town Centre Precinct), and one at the Macarthur WFP (10 km from Wilton Town Centre Precinct). • A booster pumping station is proposed on the existing trunk main from WP0302 at Macarthur WFP along Wilton Road for initial servicing of the Wilton New Town. • WP0302 at Macarthur WFP is also proposed to be upgraded in 2033 (Stage 3) for supply to Wilton.	

Option	Component	Opportunities	Constraints
	Storage	• Water reservoirs within the Appin Water Supply Zone include Appin reservoir and the Clear Water Tanks at the Macarthur WFP. • One additional storage location has been identified within the Wilton New Town area on the south side of Wilton Road from the existing village of Wilton proposed to receive 2 x 6 ML reservoirs.	• One 6ML storage is proposed in 2033 and a further 6 ML after 2035 (Stages 3 and 5). In the interim there is additional risk of supply failure as a consequence of main breaks between Appin Reservoir and the development sites or de-rated capacity at the treatment plant • The location for the proposed reservoirs is at an elevation of approximately 200m AHD. The south-eastern corner of the Wilton Town Centre Precinct study area is at an elevation of approximately 190m AHD. The reservoirs will need to be elevated in order to provide sufficient pressure for the entirety of Wilton Town Centre Precinct under gravity, or a booster pumping station will be required.
2 **Extension of the Nepean Delivery System**	Treatment	• The Nepean WFP has a nameplate capacity of 31 ML/d and is within 13 km of Wilton Town Centre Precinct. • There is sufficient treatment capacity at the existing Nepean WFP to service the Wilton Town Centre Precinct.	
	Conveyance	• The existing Picton and Thirlmere Networks within the Nepean Water Delivery System are around 10 km from Wilton Town Centre Precinct. • A southern conveyance route may be possible through Pheasants Nest to Tahmoor, while a northern conveyance route may be possible through Maldon to Picton. • Supply from this system avoid the need to cross the M31.	• Conveyance capacity would need to be assessed to determine the appropriate connection to the existing Network. • Supply to the Wilton Town Centre Precinct from the Thirlmere network is likely to involve 2 or more bridge crossings.
	Pumping Stations	• If required, a booster pumping station could be constructed to provide adequate flow and pressure.	• There appear to be no existing pumping stations that may be able to be re-purposed to pump to the Wilton Town Centre Precinct.
	Storage	• The nearest reservoir is located at Thirlmere 11 km from the Wilton Town Centre Precinct (16.4 km travel by road) at an FSL of 348m AHD • The south-eastern corner of the Wilton Town Centre Precinct study area is at an elevation of approximately 190m AHD • This reservoir maybe be able to supply the Wilton Town Centre Precinct under gravity via a suitably sized supply main.	• The length of supply main required to supply the Wilton Town Centre Precinct from the Nepean Water Delivery System is likely to make transfer infrastructure very expensive.

Table 2 Key features of wastewater strategy options

Option	Component	Opportunities	Constraints
1 Bingara Gorge WRP	Treatment	• There is an existing plant at Bingara Gorge. • A new plant (see option 2) is being constructed. • The Bingara Gorge WRP may be able to be expanded into Wilton Town Centre Precinct land • The Bingara Gorge WRP may be able to be augmented to have capacity to service developments within the Wilton New Town area beyond just the Bingara Gorge development, including Wilton Town Centre Precinct	• The existing plant capacity was sized to cater for the Bingara Gorge development and existing village of Wilton only.
	Effluent Management	• Disposal through a mixture of recycled water, irrigation, detention ponds and discharges to the Nepean River. • Constructed wetlands for local effluent disposal on land that would otherwise be inaccessible to the owners / operators of the Bingara Gorge WRP for effluent management	
	Conveyance	• The Bingara Gorge WRP is within 1 km of the Wilton Town Centre Precinct development	• The Bingara Gorge WRP is on the opposite side of the Hume Highway (M31) from Wilton Town Centre Precinct. • A transfer main will be required to convey wastewater to Bingara Gorge WRP.
	Pumping Stations	• The Wilton Town Centre Precinct area topography enables efficient layout of Sewage Pumping Stations to service the area.	• A pumping station will be required to convey wastewater to the Bingara Gorge WRP.
2 New Wilton New Town WRP (adjacent to the existing Bingara Gorge WRP)	Treatment	• A new WRP is proposed to be constructed adjacent to the location of the existing Bingara Gorge WRP • The new WRP is proposed to receive wastewater flows from the wider Wilton New Town area including Wilton Town Centre Precinct, excluding Bingara Gorge Estate and the existing village of Wilton (currently serviced by Bingara Gorge WRP).	• Not currently designed or constructed or approved.
	Effluent Management	• Effluent management at the new WRP could involve disposal through a mixture of recycled water, irrigation, detention ponds and river/creek precautionary discharges (with similar requirements to those outlined in the current Bingara Gorge EPL). • Constructed wetlands for local effluent disposal on land adjoining Wilton Town Centre Precinct could provide an alternative or additional option for effluent management.	• Not currently designed or constructed or approved.

Option	Component	Opportunities	Constraints
	Conveyance	• The proposed location for the new WRP, adjacent to the existing Bingara Gorge WRP is in the Wilton Town Centre Precinct development. • The proposed location for the new WRP, adjacent to the existing Bingara Gorge WRP is on the opposite side of the Hume Highway (M31) from Wilton Town Centre Precinct.	• A transfer main will be required to convey wastewater from the larger Wilton Town Centre Precinct area beneath the Hume Highway to the new Wilton New Town WRP. • Conveyance of disposal to the constructed wetlands (if available) will also be required involving a pumping station, transfer main and potentially storage structures.
	Pumping Stations	• The Wilton Town Centre Precinct area topography enables efficient layout of Sewage Pumping Stations to service the area.	• A pumping station will be required to convey wastewater to the Bingara Gorge WRP.
3 Picton WRP	Treatment	• The existing plant capacity at Picton is being increased from 2.6 ML/d ADWF to 4 ML/d ADWF to cater for growth within the Picton system. • This WRP expansions has been approved by the EPA.	• Loads from Wilton Town Centre Precinct have not been considered within the planned Picton WRP expansion. • Wilton Town Centre Precinct loads may trigger additional expansion earlier than planned.
	Effluent Management	• The effluent management capacity at Picton is being increased to cater for growth.	• The EPA are yet to agree with the effluent management strategy being developed at Picton. • Loads from Wilton Town Centre Precinct have not been considered within the planned Picton effluent management expansions. • Wilton Town Centre Precinct loads may trigger additional expansion earlier than planned.
	Conveyance	• The Picton WRP is within 12 km (by road) of the Wilton Town Centre Precinct and a new rising main will be required.	• Transfer from the Wilton Town Centre Precinct to the Picton STP is likely to involve 2 bridge crossings.
	Pumping Stations		• A pumping station will be required to convey wastewater to the Bingara Gorge WRP

Option	Component	Opportunities	Constraints
4 Wilton Town Centre Precinct WRP	Treatment	• A new WRP with a similar capacity to the Bingara Gorge WRP could be constructed to service the Wilton Town Centre Precinct study area only. • An MBR plant receiving flows from the Wilton Town Centre Precinct sewer network would offer flexibility of location for the plant, and could be situated on the north side of the Hume Highway (M31) to avoid a road crossing. • The Wilton Town Centre Precinct WRP could be a temporary facility to accept early-stage flows from the Wilton Town Centre Precinct study area until a new WRP is constructed adjacent to the Bingara Gorge WRP.	• The current zoning plan for the Wilton Town Centre Precinct development (Figure 8) may need to be adjusted, and some developable land sacrificed in order to accommodate the Wilton Town Centre Precinct WRP footprint. • An MBR plant capable of treatment of effluent to high enough quality for reuse within a recycled water scheme is likely to be expensive to install and maintain. • Construction of a permanent Wilton Town Centre Precinct WRP may involve forfeiting the opportunity to share cost and achieve economy of scale at the new WRP proposed to accept flows from the wider Wilton New Town area.
	Effluent Management	• The Wilton Town Centre Precinct could be provided with a 'third pipe' recycled water reticulation system supplied by a new Wilton Town Centre Precinct WRP to reduce the quantity of effluent requiring disposal. • Wetlands could be constructed to receive effluent requiring local disposal. • Surplus effluent could be tankered to Picton STP or pumping station within the Picton Regional Wastewater Scheme. • Additional irrigable land may exist outside of the Wilton Town Centre Precinct development.	• There are no clear high use customers for recycled water in the Wilton Town Centre Precinct study area (i.e. requiring irrigation or similar use) • A 'third pipe' recycled water reticulation system is likely to be expensive to construct. • The current zoning plan for the Wilton Town Centre Precinct development (Figure 8) may need to be adjusted, and some developable land sacrificed in order to accommodate wetlands for effluent disposal. • Conveyance of disposal to the constructed wetlands (if available) will also be required involving a pumping station, transfer main and potentially storage structures.
	Conveyance	• The Wilton Town Centre Precinct WRP may be able to be located in the north of the Wilton Town Centre Precinct study area allowing conveyance to the plant by a local gravity sewer system.	
	Pumping Stations	• Flexibility of the plant location could eliminate the need for sewage pumping stations within the Wilton Town Centre Precinct study area.	

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1. Scope and limitations

This report has been prepared by GHD for NSW Department of Planning and Environment via a commission from Macarthur Developments and *may only be used and relied on by Macarthur Developments Pty Ltd for the purpose agreed between GHD and the Macarthur Developments Pty Ltd as set out in Section 2 of this report.*

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The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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2. Purpose

The purpose of this report is to:

- Introduce the Wilton Town Centre Precinct development area within the context of regional and other local water and wastewater servicing,
- Summarise estimates of water and wastewater loading anticipated for the development area,
- Identify existing water and wastewater infrastructure in the vicinity of the study area and planned or proposed augmentations and additions to that infrastructure,
- Identify preliminary feasible options for servicing the study area with water and wastewater, including the potential for recycled water.

The information presented in this report has been gathered from existing reports and publically available information and is therefore preliminary by nature. Costs presented are estimates only and are not intended to be relied upon for any purpose beyond high level options consideration.

3. Introduction

3.1 Greater Macarthur Growth Area

The Greater Macarthur Growth Area (GMGA) (Figure 1 and Figure 2) forms part of the NSW Government's strategy for accommodating residential and commercial growth within a 20-year horizon. The GMGA is located approximately 40 km south-west of the Sydney CBD, centred on the suburb of Campbelltown and is aligned with the rail corridor from Glenfield to Wilton. Ultimately, this area is planned to receive up to 50,000 new homes and create up to 30,000 new employment opportunities.

Three major growth areas have been identified within the Greater Macarthur region being Menangle Park, Mount Gilead and Wilton Priority Growth Area. West Appin has also been identified as a potential residential growth area further into the future, with the suggestion that this growth area could be accelerated to accommodate higher than expected demand for housing with adequate support for infrastructure from the private sector.

3.2 Wilton Priority Growth Area

Wilton Priority Growth Area (Figure 3) lies within the Greater Macarthur Growth Area and the Wollondilly Shire LGA, and is approximately bounded by the Nepean River to the north and south-west and Allens Creek to the east. The growth area includes the existing village of Wilton and the Bingara Gorge Estate.

3.3 Wilton New Town

The Wilton New Town area covers approximately 4,000 Ha. 2,700 Ha of this area is represented by the consolidated holdings of recognised developers. The four of the major landowners within the Wilton New Town area, recognised as the 'Wilton Landowners Group' are:

- Bradcorp Pty Ltd
- Walker Corporation
- Governors Hill
- Lend Lease

Wilton New Town is planned to receive up to 13,000 (recently upgraded to 16,000) new dwellings and create up to 11,000 new employment opportunities.

The Bingara Gorge Estate, developed by Lend Lease, is located in the central-east of the Wilton New Town area. This 455 Ha development is currently planned to receive 1,165 residential dwellings, with the potential to increase to 2,000 residential dwellings.

The Metropolitan Development Program (MDP) released by the Department of Planning and Environment (DPE) forecasts residential population within Wilton New Town, including Bingara Gorge to reach 7,400 by 2020 and then 35,500 by 2036.

3.4 Wilton Town Centre Precinct

The “Wilton Town Centre Precinct” (), comprises approximately 180 Ha and is located to the north-west of the intersection of Picton Road and the Hume Highway, immediately to the west of the Bingara Gorge Estate.

The development area is planned to include the Wilton New Town centre and a school, and be otherwise comprised of residential areas, parklands, playing fields, mixed use and employment areas.

Figure 1 Greater Macarthur and Wilton regional locality

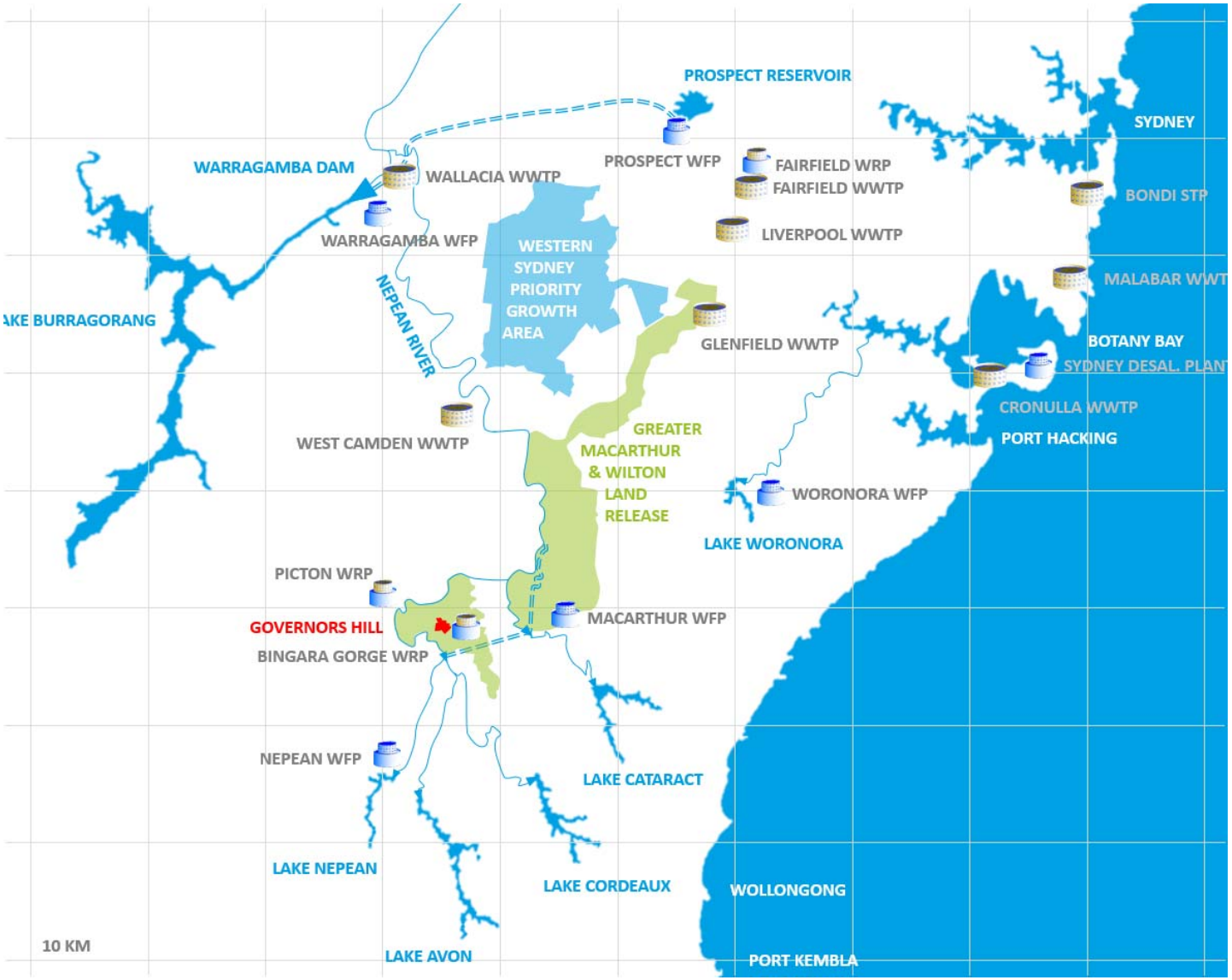
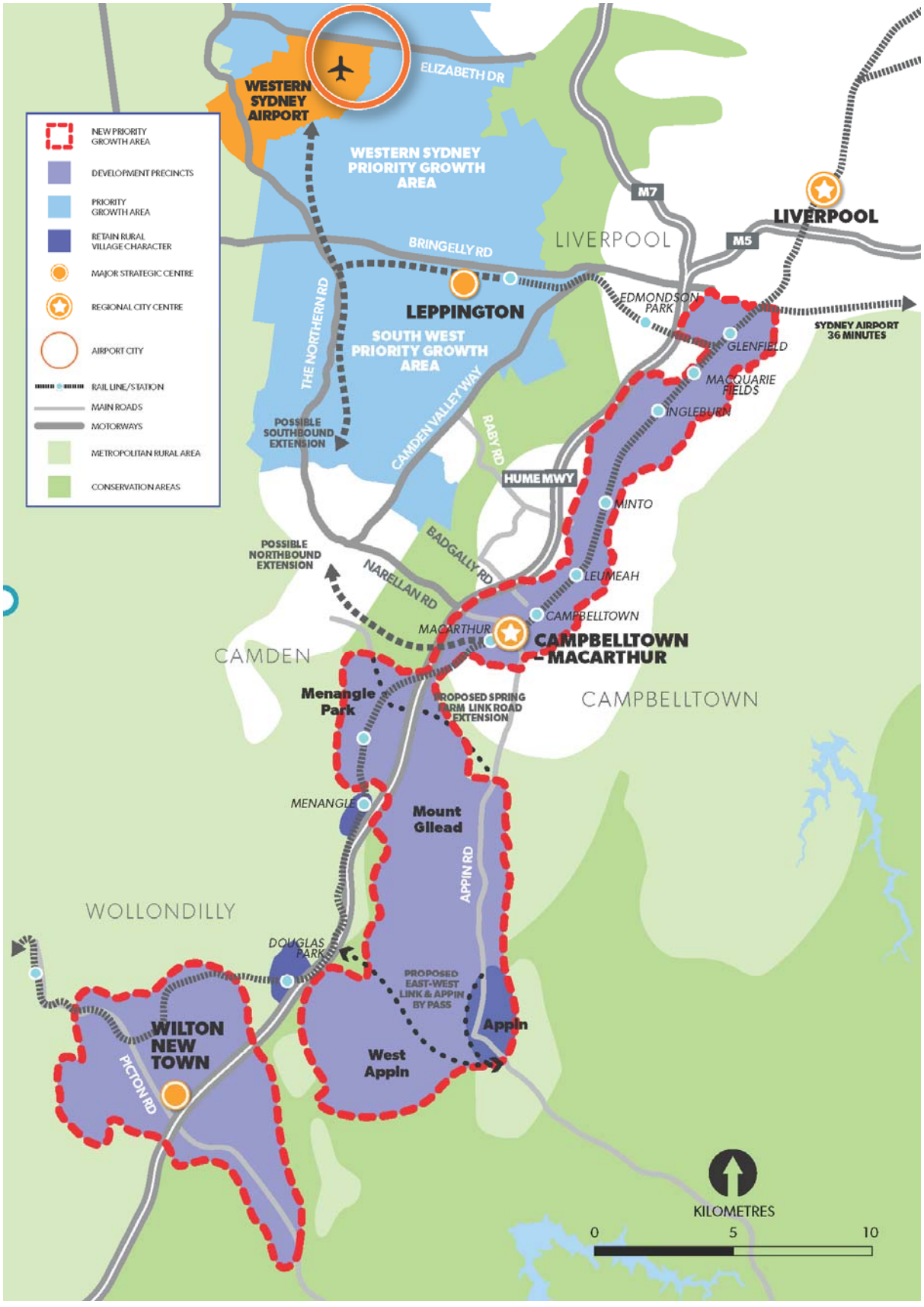


Figure 2 Greater Macarthur Growth Area locality



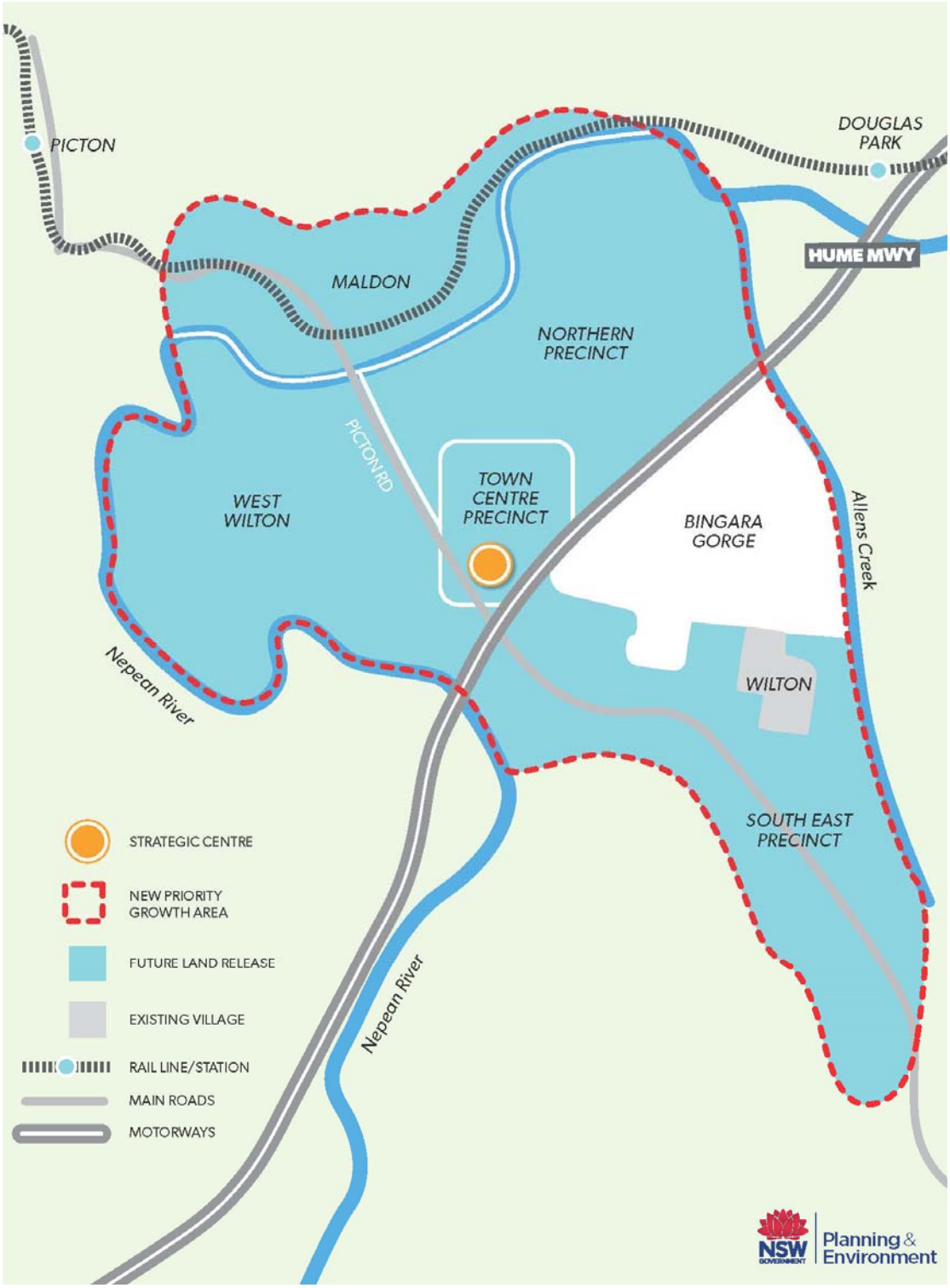
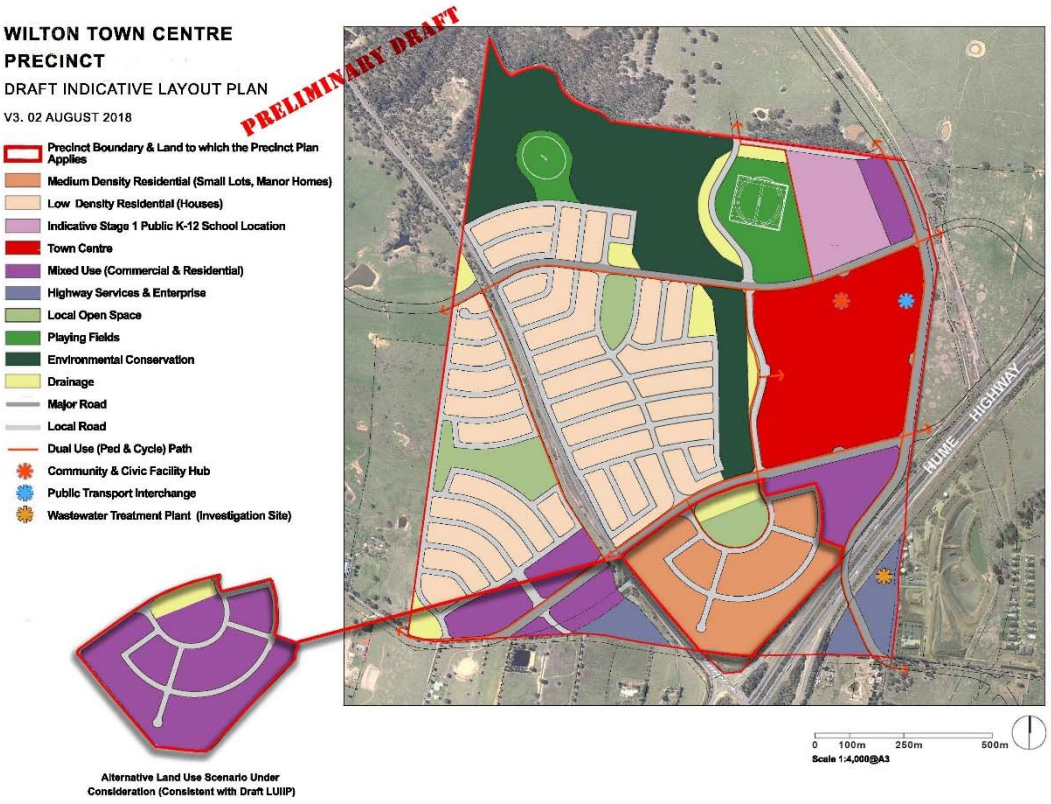


Figure 3 Wilton New Town growth area boundary

Figure 4 Wilton Town Centre Precinct Indicative Layout Plan



4. Existing Services

4.1 Water

Water infrastructure in the vicinity of the study area is shown in Figure 5.

The Wilton Town Centre Precinct is situated near two Water Delivery Systems, Nepean to the west and Macarthur to the east.

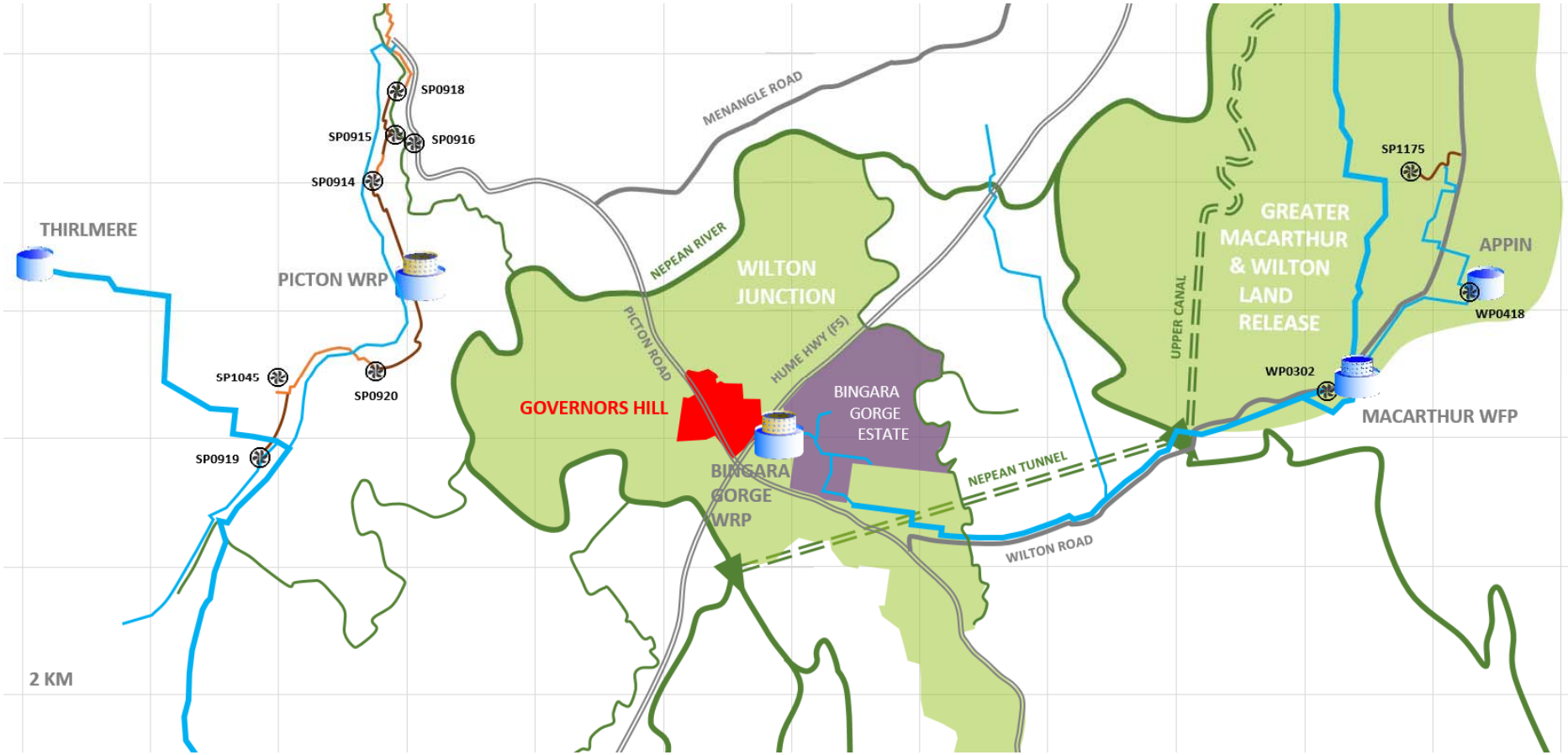
The Macarthur Delivery System is supplied by the Macarthur WFP (10 km east of the Wilton Town Centre Precinct) which filters water extracted at Broughtons Pass Weir. The Macarthur trunk water network currently services the water supply zone of Appin to the east of the study area including the existing village of Wilton and the Bingara Gorge Estate.

The Macarthur WFP has a nameplate capacity of 265 ML/d. The maximum day demand of the existing Macarthur Delivery System is 124 ML/d (MWH, May 2014) and is forecast to be 244 ML/d in 2036 based on DPE population forecasts within the South West Priority Growth Area. These forecasts exclude Wilton New Town and Bingara Gorge developments.

The Nepean Delivery System is supplied by the Nepean WFP (13 km south of the Wilton Town Centre Precinct) which filters water extracted at the Nepean Dam. The Nepean trunk water network current services the water supply zones of Picton to the north-west, Thirlmere to the west and Nepean to the south-west of the study area. The Nepean WFP has a maximum operating capacity of 31 ML/d (MWH, May 2014). The Nepean Delivery System maximum day demand was 18 ML/d in 2014 and is forecast to be 26 ML/d in 2036. Accordingly, the Nepean WFP is estimated to have a current spare capacity of 13 ML/d and 5 ML/d at 2036.

The nearest Nepean Delivery System trunk water mains are further from the Wilton Town Centre Precinct study are than trunk water mains supplied by the Macarthur Delivery System.

Figure 5 Existing water and wastewater infrastructure



4.2 Wastewater

Wastewater infrastructure in the vicinity of the study area is shown in Figure 5.

The Wilton Town Centre Precinct study area is in the regional vicinity of four existing Sewer Catchment Areas:

- Picton Regional Wastewater Scheme to the west,
- Douglas Park Priority Sewerage Area to the north-east,
- Bingara Gorge Scheme to the south-east, and
- Appin to the far east.

The Picton Regional Wastewater Scheme involves a network of gravity mains, sewage pumping stations and rising mains. Wastewater is treated at the Picton Wastewater Recycling Plant (WRP) where it is treated and discharged to the Nepean River via Stonequarry Creek. The Picton Scheme is approximately 12 km from Wilton Town Centre Precinct.

Douglas Park is a small pressure sewer system (approximately 200 lots) that discharges to a tank that is tankered to an existing wastewater pumping station.

The Bingara Gorge Scheme provides the existing village of Wilton with wastewater servicing by means of a pressure sewer system. The Wilton village pressure sewer system transfers wastewater to the existing Bingara Gorge WRP situated to the west of the Bingara Gorge development. The WRP also receives wastewater flows from Bingara Gorge Estate. The existing WRP is situated on land that adjoins land owned by Governors Hill on the east side of the Hume Motorway (M31).

An Environmental Impact Statement (EIS) (Planit Consulting Pty Ltd, December 2013) for the Bingara Gorge WRP describes construction of the plant in three stages, ultimately achieving a plant capacity of 2,000 Equivalent Tenements (ET) with more than four membrane bioreactor (MBR) trains, and producing class A+ recycled water for delivery via a new ‘third pipe’ recycled water reticulation network within Bingara Gorge Estate.

Appin is a mix of pressure and gravity sewers servicing approximately 1,000 properties that pumps to a transfer main to Glenfield wastewater system approximately 15 km away.

5. Proposed Services for Wilton New Town

In 2014, Water and Sewer Strategy reports for the Wilton New Town growth area (now called Wilton New Town) were prepared for Wilton Landowners Group. The reports identified preferred options for water and wastewater servicing of the growth area including the Wilton Town Centre Precinct study area. Works required by these strategies are not confirmed, but form part of the broader context of water and wastewater planning for the Wilton Town Centre Precinct study area.

5.1 Water

The Wilton Junction Water Strategy report prepared by MWH outlined a preferred strategy for the water supply to the Wilton New Town area, shown in Figure 6.

Key features of the strategy include:

- Supply to Wilton New Town to be from the Appin Water Supply Zone within the Macarthur Water Delivery System
- Existing pumping station at Macarthur WFP (WP0302) to be upgraded
- A booster pumping station to be installed on the existing trunk main from WP0302 at Macarthur WFP along Wilton Road
- Duplication of the existing trunk main from WP0302 at Macarthur WFP along Wilton Road to Ashwood Road with a 450 mm diameter main, including second crossings at Broughtons Pass and Clements Creek
- 2 x 6 ML reservoirs on the southern side of Picton road from the existing village of Wilton to service the Wilton New Town area
- A number of lead-in mains from the new Wilton New Town reservoirs and Bingara Gorge Estate into the Governers Hill and Bradcorp consortium lands, including crossing the Hume Highway in two locations

5.2 Wastewater

Existing Bingara Gorge WRP

The existing Bingara Gorge WRP, currently servicing Bingara Gorge Estate and the existing village of Wilton, was proposed to be augmented in response to growth within the Bingara Gorge Estate. The EIS prepared by Planit Consulting Pty Ltd in December 2013 describes a temporary 150 kL per day capacity 'Ecodisk' treatment plant with tertiary membrane filtration that was to be decommissioned after the Bingara Gorge WRP was commissioned. The Bingara Gorge WRP was planned to be constructed in three stages:

- Stage 1: 900ET capacity plant using a 2 train MBR
- Stage 2: plant capacity augmented to 1,540ET using a 4 train MBR
- Stage 3: plant capacity augmented to 2,000ET using additional MBR trains.

Timeline for the successive stages of construction are unknown at this time. Living Utilities Lendlease have advised that plant augmentation will be scheduled to meet growth within Bingara Gorge development.

Wilton New Town WRP

The Average Dry Weather Flow rate for the Wilton New Town wastewater system, exclusive of Bingara Gorge Estate and the existing village of Wilton, is estimated to be 62 L/s or 5.4 ML/d (MWH, May 2014).

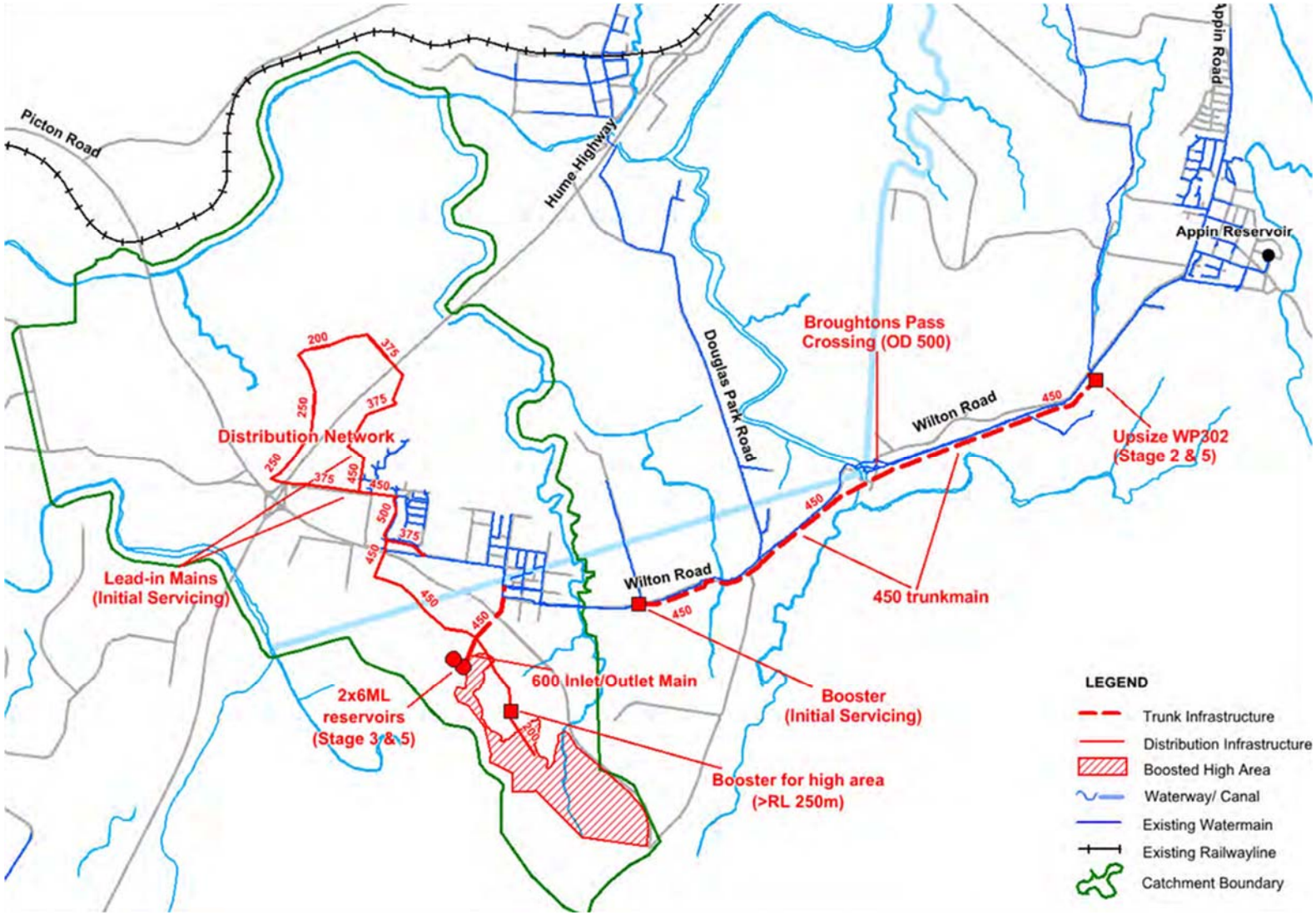
The Wilton Junction Wastewater Strategy report prepared by MWH considered both low infiltration gravity and pressure sewer options for the Wilton New Town area and outlined a preferred strategy for the wastewater servicing for the Wilton New Town area, shown in Figure 7. Key features of the strategy include:

- A new Membrane Bio-Reactor (MBR) WRP located near but separate to the Bingara Gorge WRP with tertiary media filters and an ultimate capacity of 5.4 ML/d
- 21 independent pressure sewer reticulation networks, 5 of which are partially or wholly contained within the Wilton Town Centre Precinct study area
- 6 sewage pumping stations (SPS), none of which are located within the Wilton Town Centre Precinct study area
- A number of pressure discharge structures and gravity mains enabling parts of the network to operate under gravity flowing to SPSs or to the STP.

The preference for a pressure sewer system over a low infiltration gravity sewer system was based on an NPV analysis for the two options. In addition, the following advantages of a pressure sewer system over low infiltration gravity sewer system were noted:

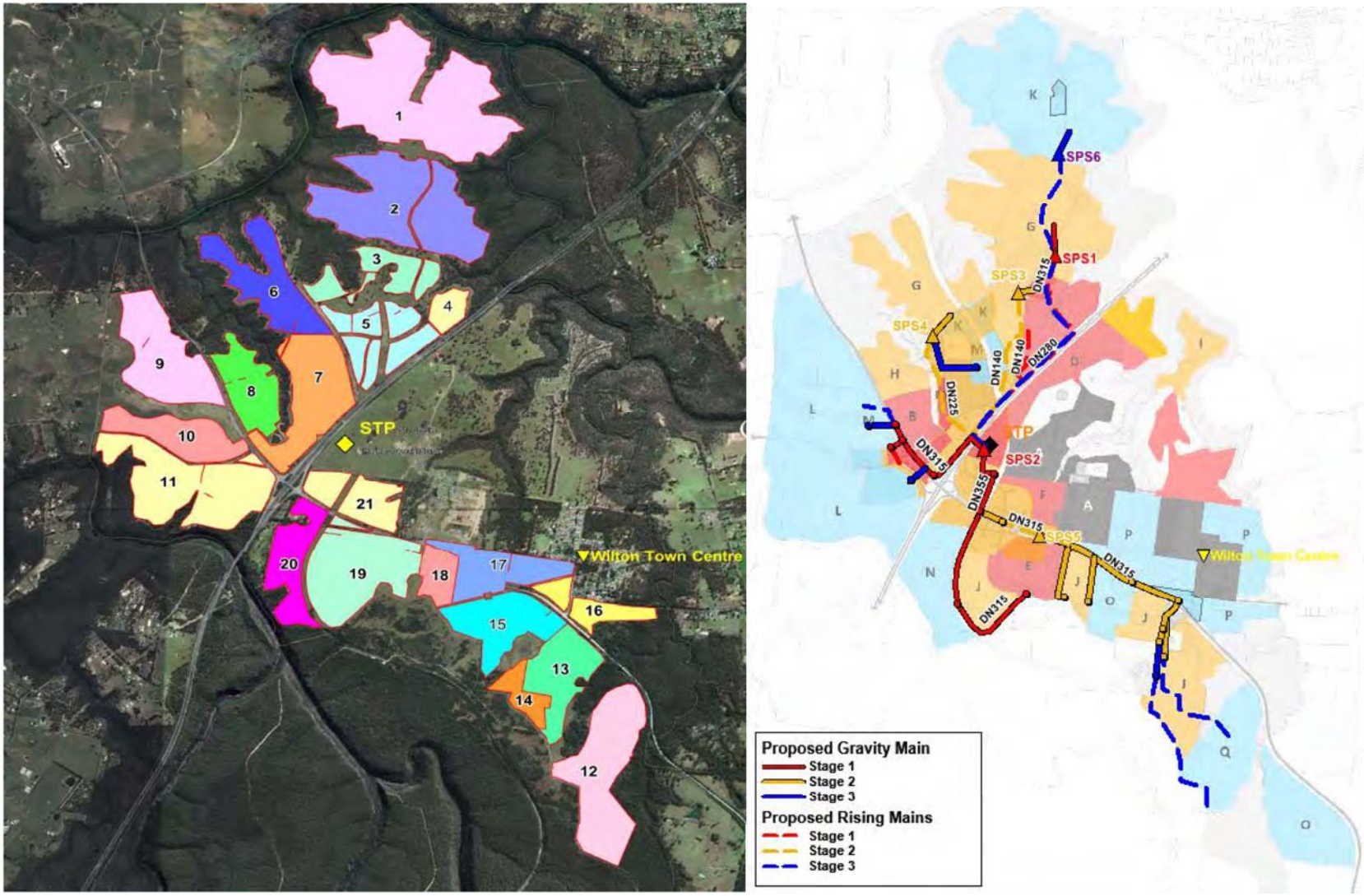
- Very unlikely to experience stormwater inflow or infiltration
- Pipelines are kept to a minimal diameter and minimal depth and it is therefore unlikely to strike difficult ground conditions such as rock or water charged ground during construction.
- Significantly reduced potential for overflows due to reduced likelihood of root intrusions
- Power outages are unlikely to result in overflows as the system is designed with 24 hours of storage

Figure 6 Wilton New Town preferred water strategy – MWH



Reference: Wilton Junction Rezoning – Water Strategy, May 2014

Figure 7 Wilton New Town preferred wastewater strategy – MWH



Reference: Wilton Junction Rezoning – Wastewater Strategy, June 2014

6. Wilton Town Centre Precinct

The Wilton Town Centre Precinct development is planned to be sectioned into 16 zones as shown in Figure 8. Zone types and areas have been used to estimate water demands and wastewater loads attributable to the Wilton Town Centre Precinct study area. The zone areas are in accordance with ultimate future development of the Wilton Town Centre Precinct study area, and so water demand and wastewater loads are also for the ultimate future development.

The plan shown in Figure 8 is preliminary only and subject to change, but considered sufficient for the purpose of this report.

6.1 Water

Preliminary estimated potable water demands for the Wilton Town Centre Precinct study area are provided in Table 3. Assumptions supporting these estimated demands are provided in Table 5.

Table 3 Estimated potable water demand for the Wilton Town Centre Precinct study area

Category	Gross Area (Ha)	Net Area (Ha)	No. of Dwellings	ADD (ML/d)	MDD/ADD	MDD (ML/d)
Residential	96.57	67.60	1,600	0.846	1.88	1.591
Commercial	37.74	26.42	400	0.243	2.0	0.486
Total	134.31	94.02	2,000	1.086	1.91	2.077

References:

1. Water System Planning Guideline (ver. 1- September 2014)
2. Oakdale Industrial- Revised Basis of Water Planning May 2016
3. Station Street Menangle - Strategic Planning Study - Stage 1 Water and Wastewater Assets Basis of Planning Report August 2016

6.2 Wastewater

Preliminary estimated wastewater loads for the Wilton Town Centre Precinct study area are provided in Table 4. Assumptions supporting these estimated loads are provided in Table 6 (Appendix A).

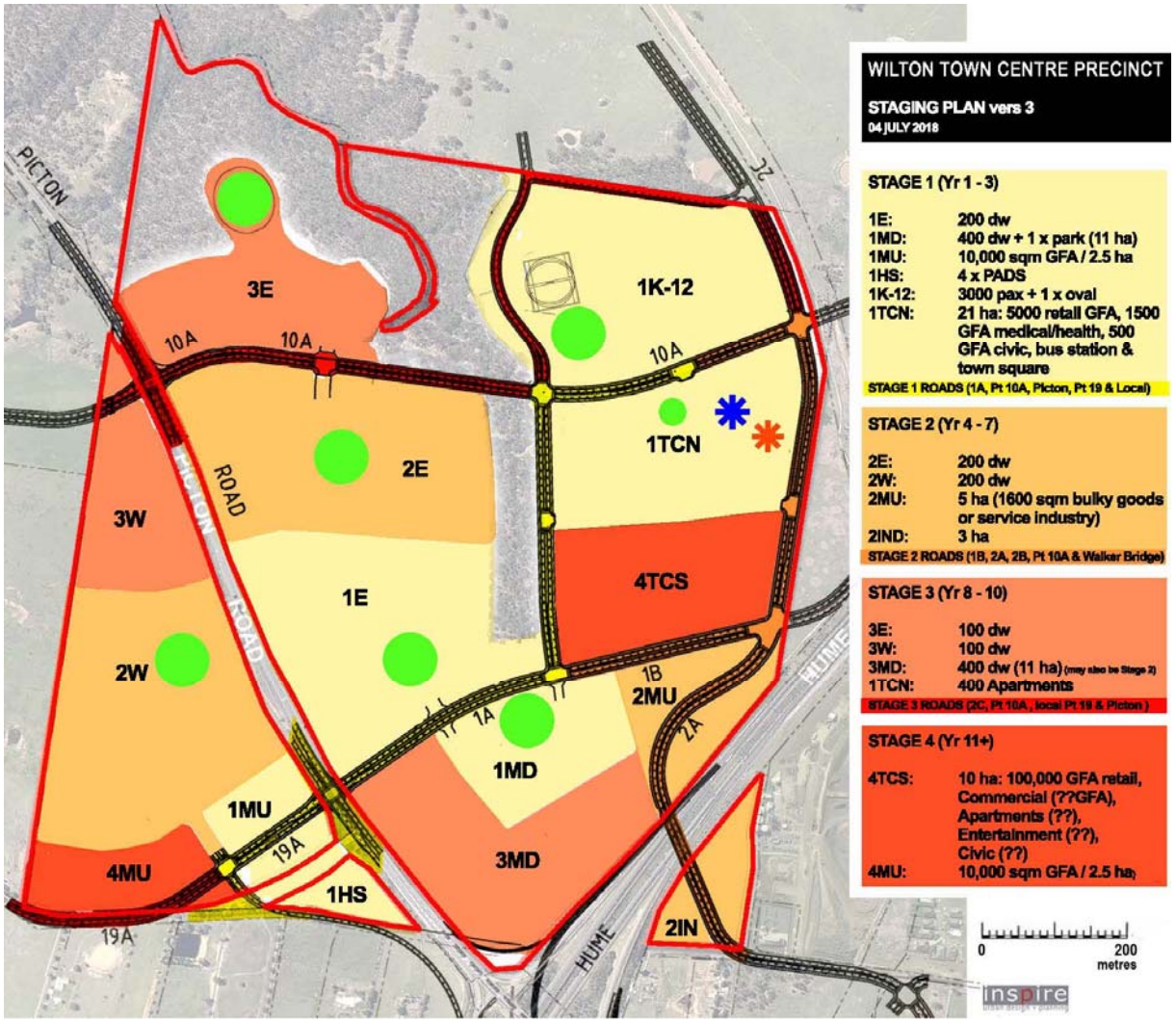
Table 4 Estimated wastewater load for the Wilton Town Centre Precinct study area

Category	Gross Area (Ha)	Net Developable Area (Ha)	No. of Dwellings	EP	ADWF (ML/d)	PDWF Factor (d)	PDWF (ML/d)
Residential	96.57	67.60	1,600	4,480	0.672	2.51	1.684
Commercial	37.74	26.42	N/A	1,510	0.226	3.02	0.684
Total	134.31	94.02		5, 990	0.898	2.64	2.368

References:

1. Sewerage Code of Australia WSA 02-2002-2.2, Sydney Water Edition 1 – Version 3
2. Wilton New Town Rezoning - Wastewater Strategy Report (MWH - June 2014)

Figure 8 Wilton Town Centre Precinct study area – Staging Plan



7. Potential Servicing

7.1 Local Systems

7.1.1 Water

The most feasible option for water supply to the Wilton Town Centre Precinct area appears to be to provide connectivity with the Appin Water Supply Zone within the Macarthur Water Delivery System.

Staging of trunk water assets indicated in the Wilton Junction Water Strategy report suggest that the south-eastern corner of the Wilton Town Centre Precinct study area is proposed to receive DN375 lead-in mains around 2018/19. A booster pumping station is also proposed to be installed on the existing trunk main from WP0302 at Macarthur WFP along Wilton Road at this time.

7.1.2 Wastewater

The preferred option for wastewater servicing of the Wilton New Town growth area identified in the Wilton Junction Wastewater Strategy report is to provide the growth area with a number of independent pressure sewer reticulation networks, and to construct a new Wilton New Town WRP adjacent to the existing Bingara Gorge WRP to accept wastewater flows from the Wilton New Town growth area.

7.2 Synergy with Wilton New Town schemes

7.2.1 Water – extension from the Appin Water System

Under the preferred option for water supply to the Wilton Town Centre Precinct study area outlined in the Wilton Junction Water Strategy report, the trunk water network supplying the Wilton Town Centre Precinct study area utilises trunk assets currently servicing Bingara Gorge Estate. In particular, both consortium lands will benefit from installation of the booster pumping station to be installed on the existing trunk main from WP0302 at Macarthur WFP along Wilton Road as part of the initial servicing arrangement proposed in the MWH Water Strategy report, and from enhanced supply capacity and resilience of the duplication of that trunk main as part of proposed works distributed between Stages 1 to 5 of the preferred strategy.

7.2.2 Wastewater – new Wilton New Town WRP adjacent to the Bingara Gorge WRP, local reuse and discharge

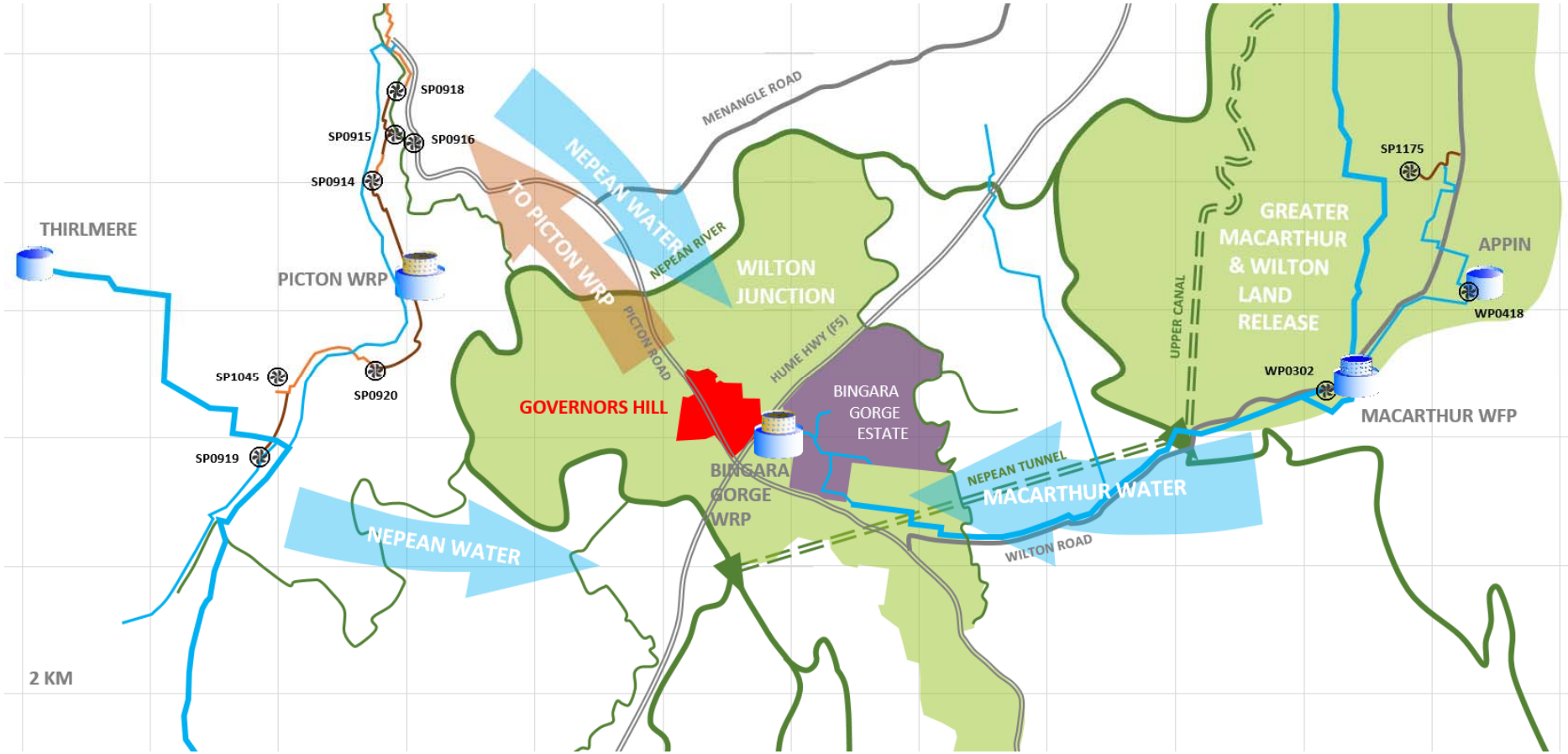
The Wilton Junction Wastewater Strategy report proposes a new WRP to be constructed adjacent to the existing Bingara Gorge WRP to the south-east of the Wilton Town Centre Precinct study area.

The capacity of the plant will be sized to accommodate growth and the effluent management strategy shall provide an integrated stormwater reticulation and treatment system to achieve a neutral or beneficial impact on the quality of stormwater leaving the site. Similar requirements to these are outlined in the current Bingara Gorge EPL.

7.3 Other options

Broadly, the opportunities for water and wastewater servicing of the Wilton Town Centre Precinct study area presented in Figure 9.

Figure 9 Options for water and wastewater servicing of Wilton Town Centre Precinct study area



7.3.1 Water: Nepean delivery system

The only clear alternative drinking water supply for the Wilton Town Centre Precinct study area, apart from supply via the Macarthur Water Delivery System, is the Nepean Water Delivery System. The ultimate development maximum day demand for the Wilton Town Centre Precinct study area, 2.0 ML/d is within the estimated spare capacity of the Nepean WFP at 2036, 5 ML/d.

Enabling drinking water supply to the Wilton Town Centre Precinct study area from the Nepean Water Delivery System would require approximately 10 km or more of DN200 water main, including 2 or more bridge crossings. This is likely to be more expensive than the preferred Appin / Macarthur supply option.

7.3.2 Wastewater: Integrated scheme, constructed wetlands, Wilton Town Centre Precinct WRP or Picton WRP

Alternatives to construction of a new WRP adjacent to Bingara Gorge WRP include:

Integrated Wilton New Town wastewater servicing scheme (including Bingara Gorge)

- Augmentation or expansion of the existing Bingara Gorge WRP to a capacity sufficient for the needs of developments within Wilton New Town additional to the Bingara Gorge Estate including Wilton Town Centre Precinct
  - Augmentation or expansion of the existing Bingara Gorge WRP could make use of the Governors Hill land adjoining the Bingara Gorge WRP site
  - A broader wastewater servicing scheme could involve the construction of wetlands for local effluent disposal and treatment on land that would otherwise be inaccessible to the owners / operators of the Bingara Gorge WRP for effluent management
  - This option would require the cooperation of the current owners / operators of Bingara Gorge WRP and of the owners of land potentially to be used for constructed wetlands.

Wilton New Town WRP constructed wetlands

- The Wilton New Town WRP described in the Wilton Junction Wastewater Strategy report could be replaced or enhanced through provision of constructed wetlands for local effluent disposal and treatment.

Wilton Town Centre Precinct WRP

- Construction of a new WRP to service Wilton Town Centre Precinct only.
  - The estimated wastewater load for the Wilton Town Centre Precinct study area is of a similar scale to the ultimate capacity of the Bingara Gorge WRP. A new WRP with a similar capacity to the Bingara Gorge WRP could be constructed to service the Wilton Town Centre Precinct study area only.
- Recycled water supply for the Wilton Town Centre Precinct study area to reduce volume of disposal
  - As currently implemented within the Bingara Gorge Estate, the Wilton Town Centre Precinct study area could be provided with a 'third pipe' recycled water reticulation system. Wastewater would still require treatment to a high quality before it could be returned to the Wilton Town Centre Precinct study area for reuse, and so a wastewater treatment plant with capacity to accept flows from the study area would still be required. A recycled water system would, however, reduce the quantity of treated effluent released to the environment.

The Wilton Town Centre Precinct study area naturally drains to the north, away from the location of the existing Bingara Gorge WRP and proposed location of the new WRP. It may be

possible to design a low infiltration gravity sewer system to capture the majority of flows within the Wilton Town Centre Precinct study area at a single sewage pumping station and construct a rising main from that location to the location of a new Wilton Town Centre Precinct WRP. The new Wilton Town Centre Precinct WRP location would not be constrained by the location of the existing Bingara Gorge WRP.

The small area in the south-west corner of the study area could be serviced by a smaller low infiltration gravity system and pumping station / rising main transferring flows either to the larger gravity system to the east of Picton Road, or directly to the new WRP. Alternatively, this small area could be provided with a pressure sewer reticulation system transferring flows either to the larger gravity system to the east of Picton Road, or directly to the new WRP.

Transfer to Picton WRP

- Construction of a transfer system from the Wilton Town Centre Precinct study area to the Picton WRP
  - Infrastructure required is likely to include a sewage pumping station and 8.5 km or more of DN200 transfer main.
  - Picton WRP is planned to be upgraded in response to forecast wastewater load increases within the next 5 years.
- Tankering of wastewater from the Wilton Town Centre Precinct study area to the Picton WRP
  - Similar to the previous alternative, this would involve transfer of wastewater to Picton WRP or a pumping station within the Picton Regional Wastewater Scheme by road tanker and would require construction of one or more extraction points. This option requires minimal capital expenditure, but has a much higher associated operating cost than a pump station and transfer main would. Transfer of wastewater to Picton WRP as a temporary solution until a local WRP is constructed may be more preferable than construction of a temporary transfer system.

8. Conclusion

The Wilton Town Centre Precinct study area has the potential for water and wastewater servicing.

The most feasible water supply option appears to be to provide the Wilton Town Centre Precinct study area with connectivity to the Appin Water Supply Zone within the Macarthur Water Delivery System. DN375 lead-in mains between Governors Hill and Bingara Gorge Estate, and a booster pumping station are proposed in the MWH Water Strategy report for 2018/19.

There are numerous options for wastewater servicing of the Wilton Town Centre Precinct study area. These options include:

- Augmentation or expansion of the existing Bingara Gorge WRP with enhanced effluent management including one or more of the following:
  - Constructed wetlands
  - Additional irrigation
  - Reuse
- Construction of a new Wilton New Town WRP possibly though not necessarily within the Wilton Town Centre Precinct parcel of land adjoining the existing Bingara Gorge WRP site
- Transfer of wastewater to the existing Picton WRP to be augmented or expanded by Sydney Water to have suitable capacity for servicing Wilton Town Centre Precinct.

The most feasible wastewater servicing option within the Wilton Town Centre Precinct study area appears to be installation of a pressure sewer system consistent with the preferred option for wastewater servicing of the Wilton New Town growth area identified in the Wilton Junction Wastewater Strategy report.

Appendices

Appendix A

Table 5 Assumptions supporting potable water demand estimate

Item	Design criteria	Units	Water	Planning Criteria Reference
Number of Residential Dwellings	Residential Dwellings per Ha	Dwellings/Ha	Number of residential dwellings is calculated using the gross hectares. No. of Residential Dwellings: 15 Dwellings/Gross Ha	Assumed based on previous planning projects
Residential Average Day Demand	Average Day demand (ADD)	ML/d	ADD is calculated from the forecast development yield and average per dwellings rate. i.e. Current residential average day demand 1 Single dwellings: 529 L/dwellings/d	Reference 3
Residential Max Day Demand	Max Day Demand (MDD)	ML/d	MDD is calculated based on the ADD and the peaking factor. MDD/ADD = 1.88	Reference 3
Commercial Average Day Demand	Average Day demand (ADD)	kL/NHa/d	ADD is calculated using net hectares. Commercial 2: 9.2 kL/NHa/d	Assumed the same as industrial ADD & Reference 2
Commercial Max Day Demand	Max Day Demand (MDD)	kL/NHa/d	MDD will is calculated based on the ADD and the peaking factor. MDD/ADD = 2.00	Reference 1

1. Calculated based on Camden Park evidence-base single residential demand data (i.e. 5-year CUGS data)

Table 6 Assumptions supporting wastewater load estimate

Item	Design criteria	Units	Wastewater	Planning Criteria Reference
Number of Residential Dwellings	Residential Dwellings per Ha	Dwellings/Ha	Number of residential dwellings is calculated using the gross hectares. No. of Residential Dwellings: 15 Dwellings/Ha	Assumed based on previous planning projects
Residential EP	Residential Occupancy Ratio	EP/Lot	Number of residential EP is calculated using residential occupancy ratio. Occupancy Ratio: 2.8 EP/Lot	Reference 5
Commercial EP	Commercial EP per Ha	EP/Ha	Number of commercial EP is calculated using gross hectares. commercial: 40 EP/Ha	Reference 5
Design Flow	Average Dry Weather Flow (ADWF)	ML/d	150 L/EP/day	Reference 4
Design Flow	Dry Weather Peaking Factor (d)		d = 0.01(log A)4 - 0.19(log A)3 + 1.4(log A)2 - 4.66 log A + 7.57 Where A is gross plan area of the development's catchment in hectares	Reference 4
Design Flow	Peak Dry Weather Flow (PDWF)	ML/d	PDWF = d x ADWF	Reference 4

2. School load has been included in the commercial

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