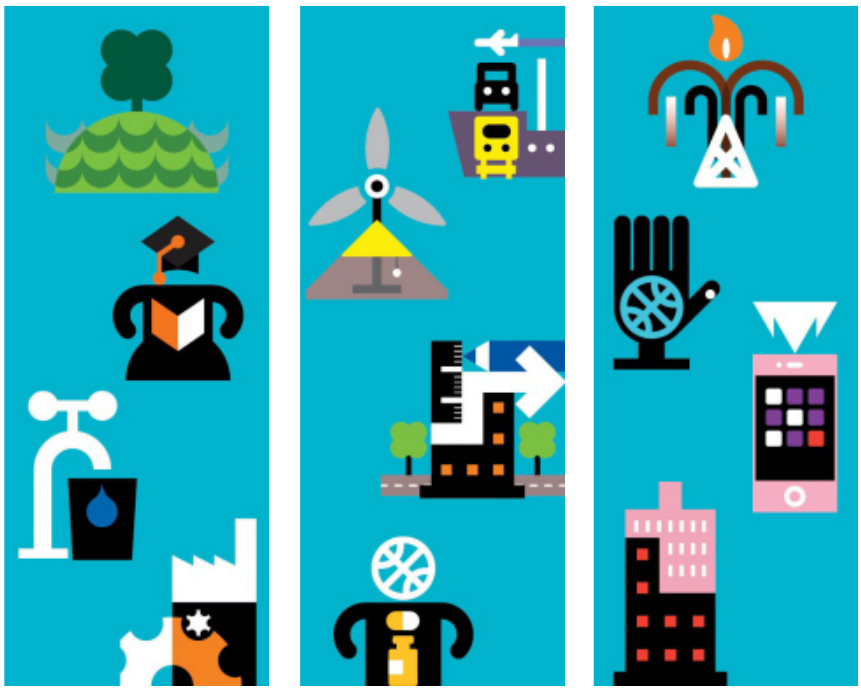

Priority Land Release Areas Infrastructure Master Plan

North West Priority Land Release Area

October 2015

Department of Planning & Environment

Mott MacDonald

Priority Land Release Areas Infrastructure Master Plan

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Department of Planning & Environment

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Please note that Land Use and Infrastructure Strategy (the Strategy), as referred to in this report, is now called Land Use and Infrastructure Implementation Plan (the Implementation Plan).

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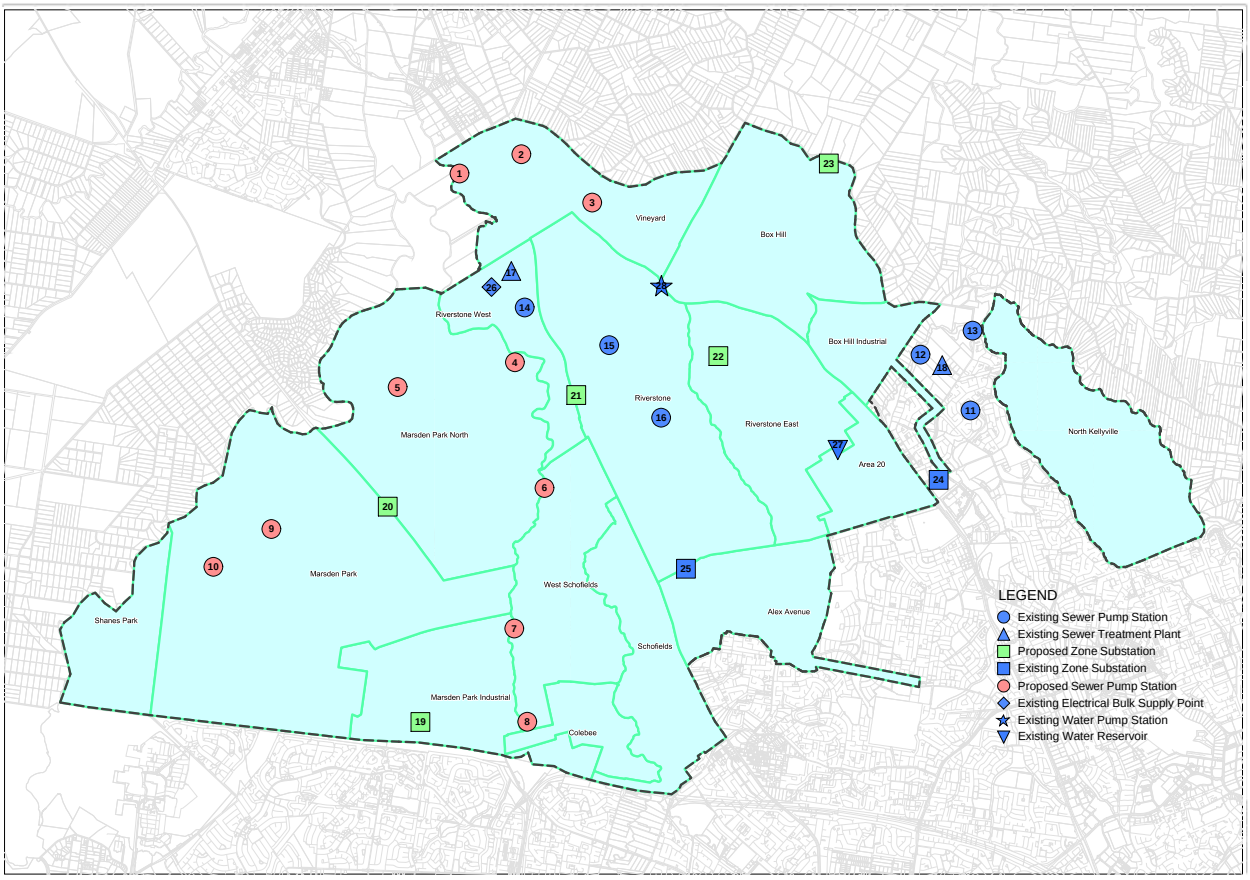
Abstract

This report provides an analysis and evaluation of the infrastructure servicing strategies of major utility authorities, being Sydney Water and Endeavour Energy in the North West Priority Land Release Area (NWPLRA). Using market demand data from AEC, it then highlights the changes to those strategies required to meet the anticipated housing demand for a number of growth and dwelling yield scenarios. It consists of three main parts:

- An analysis of the authority's current growth strategies;
- An overview of AEC's Housing Market Needs Analysis; and
- Testing of growth and yield scenarios to make recommendations on the staging of services infrastructure to meet demand, as well as providing an indication of the expected date existing services will reach capacity under different density scenarios.

The following map and table summarises general findings from Section 2.1 of the authorities' bulk services infrastructure provisions, including existing and proposed items to service the ultimate development of the NWPLRA. With Table 1.2 going further to also include findings from Section 4.

Figure 1.1: NWPLRA Bulk Supply Infrastructure Map



Market Analysis

The market demand analysis for the NWPLRA has been provided by AEC and comprises of a high and low dwelling yield as well as high and low growth scenarios. The Low Density scenario correlates relatively well with the Indicative Layout Plan (ILP) minimum densities whilst the High Density scenario has been calculated based on a detailed market assessment and adds approximately 50% to the dwelling yield.

Table 1.1 below shows the dwelling yields and timeframes of dwelling delivery.

Table 1.1: Dwelling Yield and Growth Scenarios

Density Scenario	Yield (Dwellings)	Low Growth Scenario (Year Achieved) [1]	High Growth Scenario (Year Achieved)
Low Density	62,824	2052	2044
High Density	92,533	-	2052

Source: AEC Group

Three scenarios were tested against the current authority servicing strategies (including developer driven/ PAP forecasts) to identify constraints and opportunities in the staging and timing of bulk infrastructure items. From this, an alternative strategy for each scenario was created which optimized the roll-out of infrastructure to meet market demand and minimise capital expenditure where possible. These three scenarios were as follows:

- Low Growth – Low Density (LGLD) - 62,824 Dwellings
- High Growth – Low Density (HGLD) - 62,824 Dwellings
- High Growth – High Density (HGHD) - 92,533 Dwellings

The following Table 1.2 shows a summary of the servicing issues associated with each of the bulk infrastructure items including delivery dates and capacity issues.

[1] Estimated completion date based on extrapolation of AEC data

Table 1.2: NWPLRA Bulk Infrastructure Table

Infrastru-cture Number	Authority Code	Description	Indicative Delivery Date	Planned Capacity (dwellings)	Low Density Yield	Low Density Shortfall	Low Density Capacity Reached	High Density Yield	High Density Shortfall	High Density Capacity Reached
1	SPS W	Vineyard (West) Sewer Pump Station pumping to Riverstone WWTP	2020	**654**	460	-	-	915	261	2030
2	SPS E	Vineyard (North) Sewer Pump Station pumping to SPS1154	2018	**1,520**	1,069	-	-	2,127	609	2026
3	SPS 1154	Existing Vineyard (East) Sewer Pump Station pumping to Riverstone WWTP	existing	26,601	25,695	-	-	35,419	8,818	2038
4	PAP C*	Marsden Park North Sewer Pump Station pumping to Riverstone Carrier	2036*	**2,300**	2,000	-	-	3,917	1,617	2021
5	PAP G*	Marsden Park North Sewer Pump Station pumping to Riverstone Wastewater Carrier	2020*	**9,281**	8,936	-	-	12,439	3,158	2031
6	SPS B	Schofields West Sewer Pump Station pumping to Riverstone Carrier	2036	**3,278**	2000	-	-	3,968	690	2040
7	PAP S/1173 *	Marsden Park Industrial Sewer Pump Station pumping to Riverstone Carrier	2017*	**1,228**	1,228	-	-	1,228	-	-
8	SPS 118	Existing Schofields West (services Colebee)Sewer Pump Station pumping to Quakers Hill WWTP	existing	1,000	1,000	-	-	1,000	-	-
9	PAP F/1160 *	Marsden Park Sewer Pump Station pumping to Riverstone Wastewater Carrier	2016*	**5,276**	4,100	-	-	6,737	1,461	2045
10	SPS A	Marsden Park (West) Sewer Pump Station pumping to PAP F/1160	2036	**1,679**	500	-	-	2,305	626	2048
11	SPS 1022	Existing Sewer Pump Station pumping to North Kellyville	existing	1,540	1,774	234	2041	2,649	1,109	2029
12	SPS 1139	Existing Sewer Pump Station pumping to North Kellyville	existing	3,143	3,359	215	2045	6,143	3,000	2024
13	SPS 1107	Existing Sewer Pump Station pumping to North Kellyville	existing	2,960	3,410	451	2040	5,091	2,131	2028

Infrastru-cture Number	Authority Code	Description	Indicative Delivery Date	Planned Capacity (dwellings)	Low Density Yield	Low Density Shortfall	Low Density Capacity Reached	High Density Yield	High Density Shortfall	High Density Capacity Reached
14	SPS 0564	Existing Sewer Pump Station pumping to Riverstone West	existing	31,231	27,585	-	-	42,230	10,999	2033
15	SPS 0571	Existing Sewer Pump Station pumping to Riverstone	existing	**Decommissioned in 2014**						
16	SPS 0572	Existing Sewer Pump Station pumping to Riverstone	existing	**Sydney Water advised not to be decommissioned. Mott MacDonald assumes it will maintain its current capacity, with additional demand serviced by First Ponds Creek Carrier main.**						
17	RIV WWTP	Existing Riverstone Wastewater Treatment Plant	existing	62,523	53,280	-	-	77,648	15,125	2036
18	RH WWTP	Existing Rouse Hill Wastewater Treatment Plant	existing	7,643	8,543	900	2041	13,884	6,240	2026
19	SMP ZS	South Marsden Park zone substation (Stage 1 – 16.5 MVa)	2017	**1,351**	1,228	-	-	1,264	-	-
20	MP ZS	Marsden Park zone substation (Stage 1 - 45 MVa)	existing	**18,489**	16,808	-	-	26,797	8,308	2034
21	RIV ZS	Existing Riverstone zone substation (33 MVa)	existing	10,546	9,587	-	-	15,729	5,183	2038
22	RE/BH ZS	Riverstone East/ Box Hill zone substation (45/90 MVa)	2022	**10,589**	9,626	-	-	12,460	1,871	2033
23	NBH ZS	North Box Hill zone substation (45 MVa)	2022	**5,366**	4,879	-	-	6,710	1,344	2039
24	MUP ZS	Existing Mungerie Park zone substation (90 MVa)	existing	8,804	8,003	-	-	13,141	4,337	2029
25	SCH ZS	Existing Schofields zone substation (45/ 90MVa)	existing	12,861	11,692	-	-	15,431	2,570	2036
26	VBSP	Existing Vineyard Bulk Supply Point	existing	**Sufficient Capacity – All Scenarios**						
27	RHWR	Rouse Hill Water Reservoir**	existing	62,523	53,280	-	-	77,648	15,125	2036
28	VWPS	Vineyard Water Pumping Station	existing	**Not Assessed**						

*Delivery dates are indicative and are to be determined by the developer based on their development program
**Assumed capacity to meet minimum ILP demands
Bold “Service Authority Planned Capacity” indicate future infrastructure whose capacities can be increased during the planning and design phase, if needed.
Electrical service capacities are based on advice from Endeavour Energy that the network has been planned for at least, the minimum ILP yields

Infrastructure Delivery Strategies

The infrastructure servicing strategies for Endeavour Energy (EE) and Sydney Water Corporation (SWC) typically look at the 0-3 year timeframe in some detail with more high level and flexible plans for the longer term. In the NWPLRA the authorities' strategies are generally consistent, but some differences do present risks to dwelling delivery. These include time "lags" between the provision of services by each authority in some precincts, as well as bulk supply issues due to an underestimation of dwelling yields in the Centre as a whole.

In order to assess the required delivery date for infrastructure items for each growth scenario, the annual dwelling demand was plotted against the infrastructure capacities at each year. Based on advice from AEC, the dwelling demand for the entire priority land release area was proportionally spread over the zoned and serviced precincts. This analysis highlighted instances where the infrastructure supply fell behind market demand in some precincts. It also revealed the infrastructure items that needed to be accelerated to ensure that infrastructure provision/dwelling supply met the market demand. The following is a summary of the required delivery timeframe for each infrastructure item for each of the growth scenarios.

Table 1.3: Infrastructure Delivery Summary Low and High Growth Scenarios

Infrastructure Number	Authority Code	Indicative Delivery Date	Low Growth Scenario	High Growth Scenario
1	SPS W	2020	2043	2033
2	SPS E	2018	2041	2030
3	SPS 1154	existing	existing	existing
4	PAP C*	2036	-	-
5	PAP G*	2020	-	-
6	SPS B	2036	2039	2027
7	PAP S/1173 *	2017	-	-
8	SPS 118	existing	existing	existing
9	PAP F/1160 *	2016	-	-
10	SPS A	2036	2044	2032
11	SPS 1022	existing	existing	existing
12	SPS 1139	existing	existing	existing
13	SPS 1107	existing	existing	existing
14	SPS 0564	existing	existing	existing
15	SPS 0571	existing	existing	existing
16	SPS 0572	existing	existing	existing
17	RIV WWTP	existing	existing	existing
18	RH WWTP	existing	existing	existing
19	SMP ZS	2017	2017	2017
20	MP ZS	existing	existing	existing
21	RIV ZS	existing	existing	existing
22	RE/BH ZS	2022	2028	2020

Infrastructure Number	Authority Code	Indicative Delivery Date	Low Growth Scenario	High Growth Scenario
23	NBH ZS	2022	2028	2020
24	MUP ZS	existing	existing	existing
25	SCH ZS	existing	existing	existing
26	VBSP	existing	existing	existing
27	RHWR	existing	existing	existing
28	VWPS	existing	existing	existing

*Delivery dates are indicative and are to be determined by the developer based on their development program

Table 1.3 above shows four key pieces of infrastructure that could be accelerated to cater for the high growth scenario and meet the projected market demand, ensuring development will not be hindered. In a low growth scenario they could generally be delayed though this is seen as less critical. Both options are explored further in Section 4. Data shows that the Marsden Park (West) Sewer Pump Station (SPS A) could be brought forward to cater for the high growth scenario (to 2032 from 2036). This is a minor adjustment to the servicing strategy that does not necessarily need to be addressed now and can be monitored as development progresses. More pressing is the delivery of the two new zone substations at Riverstone East/Box Hill and North Box Hill which may need to be brought forward in delivery to 2020 in a high growth scenario from 2022. Further, SPS B which services the majority of the West Schofields precinct may need to be brought forward to 2027 from 2036 under a high growth scenario.

The next phase of the study assessed the sensitivity of the service capacity against dwelling yields. Generally, the authority's growth servicing plans have been based on the minimum density data from ILP work undertaken to date. However, changes in lot size and mix, due to the Housing Diversity Package, affordability, etc. have resulted in dwelling densities considerably higher than those previously estimated. An analysis was undertaken on both the Low and High Density scenario on the overall capacity of the infrastructure as well as an estimate of when the capacity of the infrastructure is reached.

Table 1.4 below shows infrastructure capacity issues for the low density scenario. The results indicated that three (3) sewer pump stations and the Rouse Hill Wastewater Treatment Plant are unable to service the number of dwellings planned in their service catchment, even in the low density scenario. No issues were observed in the electrical supply for the low growth scenario.

Table 1.4: Low Density Scenario – Sydney Water Capacity Assessment

Infrastructure Number	Infrastructure Item	Sydney Water Capacity (Dwellings)	Low Density Yield (Dwellings)	Shortfall (Dwellings)	Capacity Reached (Year)
13	SPS 1107	2960	3410	451	2040
11	SPS 1022	1540	1774	234	2041
12	SPS 1139	3143	3359	215	2045
18	Rouse Hill WWTP	7643	8543	900	2041

For the high density scenario, the higher load on infrastructure has resulted in considerably more items requiring an increase in capacity. These include existing infrastructure items that will need to be upgraded, as well as items that are not yet designed and/or constructed. Service Authorities should consider whether all new infrastructure be designed to accommodate either the high density scenario from the onset, or that they are able to be staged in a manner that can eventually cater for the high density scenario. Table 1.5 and Table 1.6 below show infrastructure capacity issues for the high density scenario.

It should be noted that no analysis was undertaken on the capacity of the water supply network. A more detailed modelling assessment may need to be undertaken in relation to flow capacity and pressure with the increased dwelling yield to determine additional infrastructure required.

Table 1.5: High Density Scenario – Sydney Water Capacity Assessment

Infrastructure Number	Infrastructure Item	Sydney Water Capacity (Dwellings)	High Density Yield (Dwellings)	Shortfall (Dwellings)	Capacity Reached (Year)
13	SPS 1107	2960	5091	2131	2028
11	SPS 1022	1540	2649	1109	2029
12	SPS 1139	3143	6143	3000	2024
18	Rouse Hill WWTP	7643	13884	6241	2026
3	SPS 1154	26601	35419	8818	2038
2	SPS E	1520	2127	609	2026
1	SPS W	654	915	261	2030
10	SPS A	1679	2305	626	2048
9	PAP F/1160*	5276	6737	1461	2045
5	PAP G*	9281	12439	3158	2031
6	SPS B	3278	3968	690	2040
4	PAP C*	2300	3917	1617	2021
14	SPS 0564	31231	42230	10999	2033
17	Riverstone WWTP	62523	77648	15125	2036
27	Rouse Hill Water Reservoir	62523	77648	15125	2036

*Dates are indicative and are to be determined by the developer based on their development program

Table 1.6: High Density Scenario – Electrical Capacity Assessment

Infrastructure Number	Infrastructure Item	Planned Electrical Capacity (Dwellings)	High Density Yield (Dwellings)	Shortfall (Dwellings)	Capacity Reached (Year)
20	Marsden Park ZS	18489	26797	8308	2034
21	Riverstone ZS	10546	15729	5183	2038
22	Riverstone East / Box Hill ZS	10589	12460	1872	2033
23	North Box Hill ZS	5366	6710	1344	2039
24	Mungerie Park ZS	8804	13141	4337	2029
25	Schofields ZS	12861	15431	2570	2036

Although the high dwelling yield analysis has highlighted a number of upgrades and augmentations required, it is possible that changes in demand profiles, supply technologies and/or the regulatory environment may result in increased efficiencies or reduced demand per dwelling. This could mean that the existing infrastructure is suitable in its current/planned form. It is therefore recommended that the services infrastructure strategy be reviewed regularly to monitor the critical factors for both the supply and demand of infrastructure services.

1 Introduction

In 2005 the NSW Government identified a need to sustainably plan Sydney's urban growth at its outer perimeters to accommodate part of an expected additional 1.7 million people in Sydney by 2036. From this, two priority land release areas were established. The North West Priority Land Release Area (NWPLRA) located within The Hills, Blacktown and Hawkesbury local government areas and The South West Priority Land Release Area (SWGC) located within Liverpool, Camden and Campbelltown local government areas.

The two Priority Land Release Areas were planned to provide up to 181,000 new homes for 500,000 people over the next 25-30 years. The NWPLRA, which this report is focused around, aims to provide about 70,000 of these homes for 200,000 residents.

In order to streamline the rezoning processes to facilitate development of the Priority Land Release Areas, a Precinct Planning process has been used. This ultimately coordinates the planning and delivery of water, waste water, recycled water, power, telecommunications, roads and other key services in order to facilitate new communities.

Mott MacDonald has been engaged by the Department of Planning and Environment (DP&E) to undertake a study to inform an Infrastructure Staging/ Strategy Plan for the Structure Plan Review of the North West Priority Land Release Area (NWPLRA), focusing on potable water, waste water and electrical services.

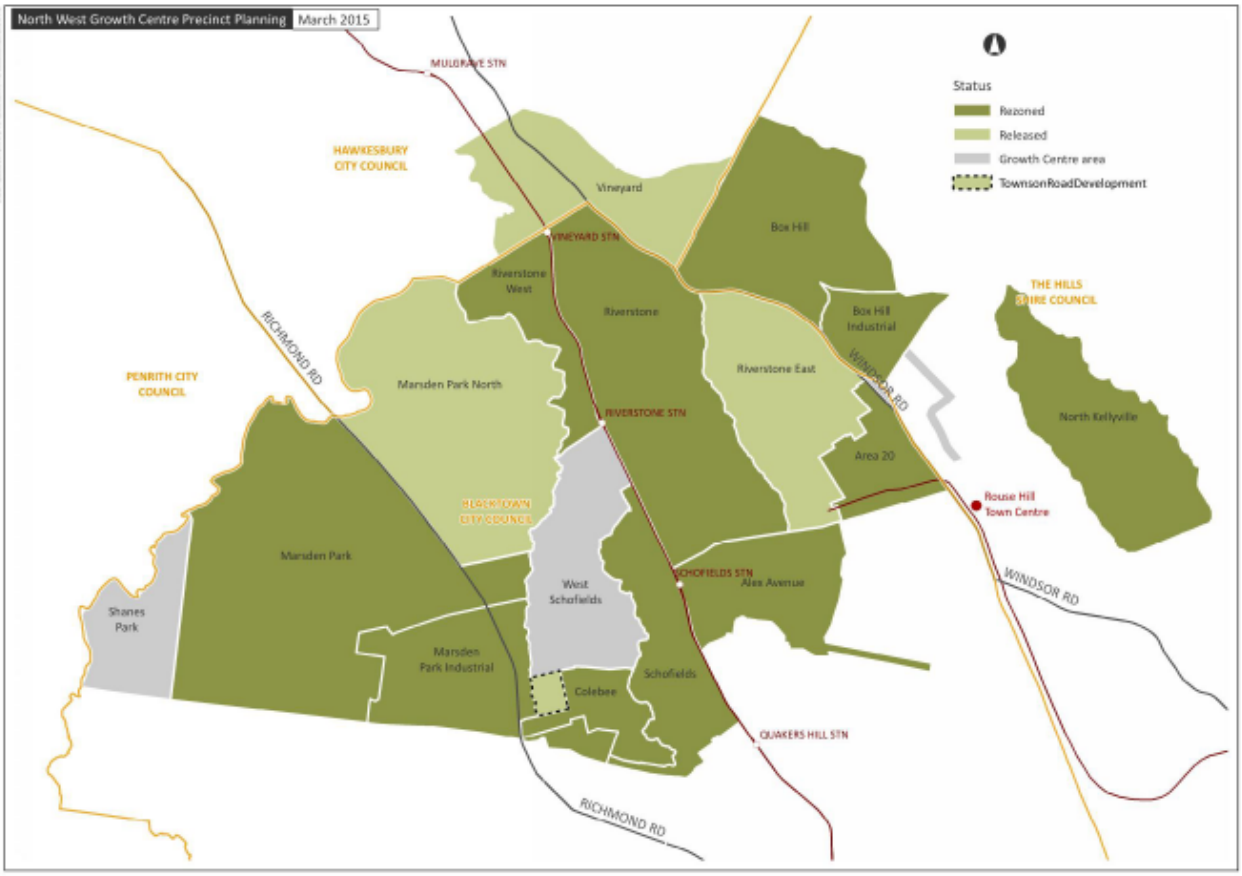
1.1 Site Context

The North West Priority Land Release Area is located approximately 50km north-west of Sydney's CBD, and borders Rouse Hill Town Centre at its eastern corner. Figure 1.1 below shows the overall NWPLRA structure layout and current rezoning status.

It is crossed by Richmond Road and Windsor Road generally between South Creek (also Wianamatta Creek) and Commercial Road to the north respectively and generally between the Westlink M7 and Schofields Road to the south respectively. At the southern border on Richmond Road, entry and exit to and from the Westlink M7 can be gained in both a south and east direction.

The Western Rail Link bisects the NWPLRA with existing stations at Schofields, Riverstone and Vineyard. The North West Rail Link (NWRL) is proposed to have stations at the Rouse Hill Town Centre and Cudgegong Road in Area 20 as well as the Cudgegong Stabling Yards in the Riverstone East Precinct.

Figure 1.1: North West Priority Land Release Area Structure Plan



Source: NSW Department of Planning and `Environment

1.2 Planning Context

Since the Priority Land Release Area Structure Plans were released in 2005, most precincts in the NWPLRA have been released for planning and subsequently rezoned. Along with this, other initiatives have progressed, including the North West Rail Link, the M9 Outer-western Sydney Orbital and the Second Sydney Airport at Badgerys Creek. In light of these initiatives and a lack of development progress in some rezoned areas, DP&E have identified a need to review and update the Priority Land Release Area Structure Plans to ensure development in “Priority Land Release Areas” is not adversely impacted. Issues which may impact on the serviceability are outlined in Section 2.3.1.

1.3 Purpose

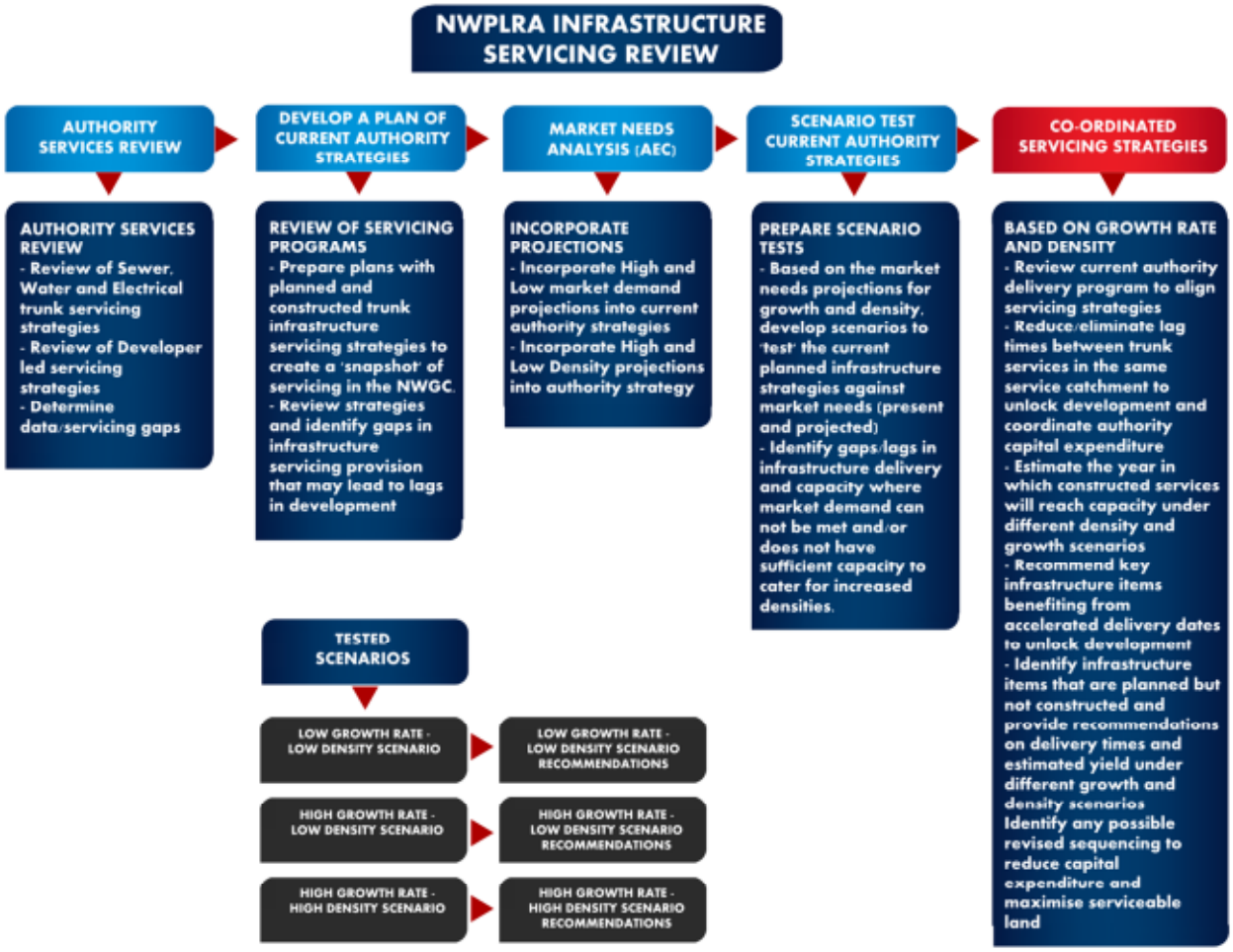
The objective of this report is to prepare a plan for the coordinated, staged delivery of critical infrastructure to ensure growth in priority areas is facilitated and prioritise government expenditure.

1.4 Methodology

The following details the steps to be taken to achieve the above:

- Review all available authority documentation relating to existing and future serviceability against the structure plan;
- Liaise with authorities to confirm current and planned infrastructure arrangements;
- Based on the authority's growth plans, determine the existing utility capacities, the zero to three year timeframe utility capacities and the remaining long term timeframe utility capacities;
- Identify general issues associated with providing trunk services to support the delivery of dwellings in pace with market demand;
- Consult with project Property Economics consultant to identify current market trends and future dwelling demand profiles across the priority land release area;
- Using the determined demand, identify any potential limitations or lags in trunk service provision which could prohibit dwelling delivery;
- Provide coordinated strategies to eliminate limitations or lags in trunk service provision and achieve the required demand for a number of growth and density scenarios.

Figure 1.2: Infrastructure Servicing Review - Procedure



2 Current Priority Land Release Area Infrastructure Servicing Strategy

2.1 Precinct Utility Service Provisions

The following outlines the major servicing infrastructure for each precinct across the priority land release area that is currently available, under construction and/or planned for the future. This includes trunk sewer carrier mains, sewer pumping stations (SPS), waste water treatment plants, trunk water mains, water reservoirs, water pumping stations and electrical zone substations. Other minor infrastructure may be required to connect developments to major infrastructure, though for the purposes of this investigation has been excluded. This includes sewer and water lead-ins and electrical feeders, noting these are generally provided by and at the expense of the developer.

Sydney Water have created packages of works to stage the sewer and water delivery across the NWPLRA, generally in line with the release & rezoning of the precincts. Package 1 which was completed in 2011, services the west of North Kellyville, Area 20, the western areas of Alex Avenue and a southern portion of Riverstone, generally the area at the corner of Schofields Road and Railway Terrace. Package 2 & 3A which was completed in early 2015 services the eastern area of North Kellyville, the north section of Schofields, the eastern area of Alex Avenue, Riverstone East, northern parts of Box Hill and south-eastern areas of Vineyard. A Package 3 of works is currently being designed, with a general target delivery for mid-2018. Sydney Water has not committed funding of the assets in this package and the dates proved within the report are indicative only. Package 3 will generally service the remainder of Box Hill & Box Hill Industrial, Vineyard, Schofields and West Schofields, with some areas, including in Vineyard and Box Hill Industrial, excluded which are to be provided for by a future unplanned package of works.

Four (4) precincts are being serviced under a Precinct Acceleration Protocol (PAP) agreement. In this scenario, the developer is responsible for delivery of all services. It is generally assumed that the developer will provide this infrastructure at a time to suit their own objectives and delivery targets, which will be adjusted as they see fit. These precincts include Colebee, Marsden Park Industrial, Marsden Park and Marsden Park North.

To service the NWPLRA with power, Endeavour Energy will provide a network of new zone substations and upgrades/ augmentations to existing zone substations and the existing transmission network. A new zone substation will generally supply between 7,000 – 15,000 dwellings and are generally located to minimise the cost of feeders to supply power to individual developments. This means that a single zone substation could supply dwellings across multiple precincts.

The following summary of infrastructure has been represented graphically based on the summary of authority servicing strategies tabulated in Appendix B. Appendix B breaks up each of the precincts into servicing sub-catchments, and assigns a date for trunk infrastructure based on authority correspondence and relevant planning studies.

Reference should be made to Appendix A for all plans which show the approximate locations of the overall described services and the various relevant dates. Notwithstanding this, a snapshot of Figures 3-7 for each precinct has been supplied with each of the following precinct servicing strategies. For reference, the

following figure has also been provided which compiles the legends/ keys (shown on the appropriate plan in Appendix A).

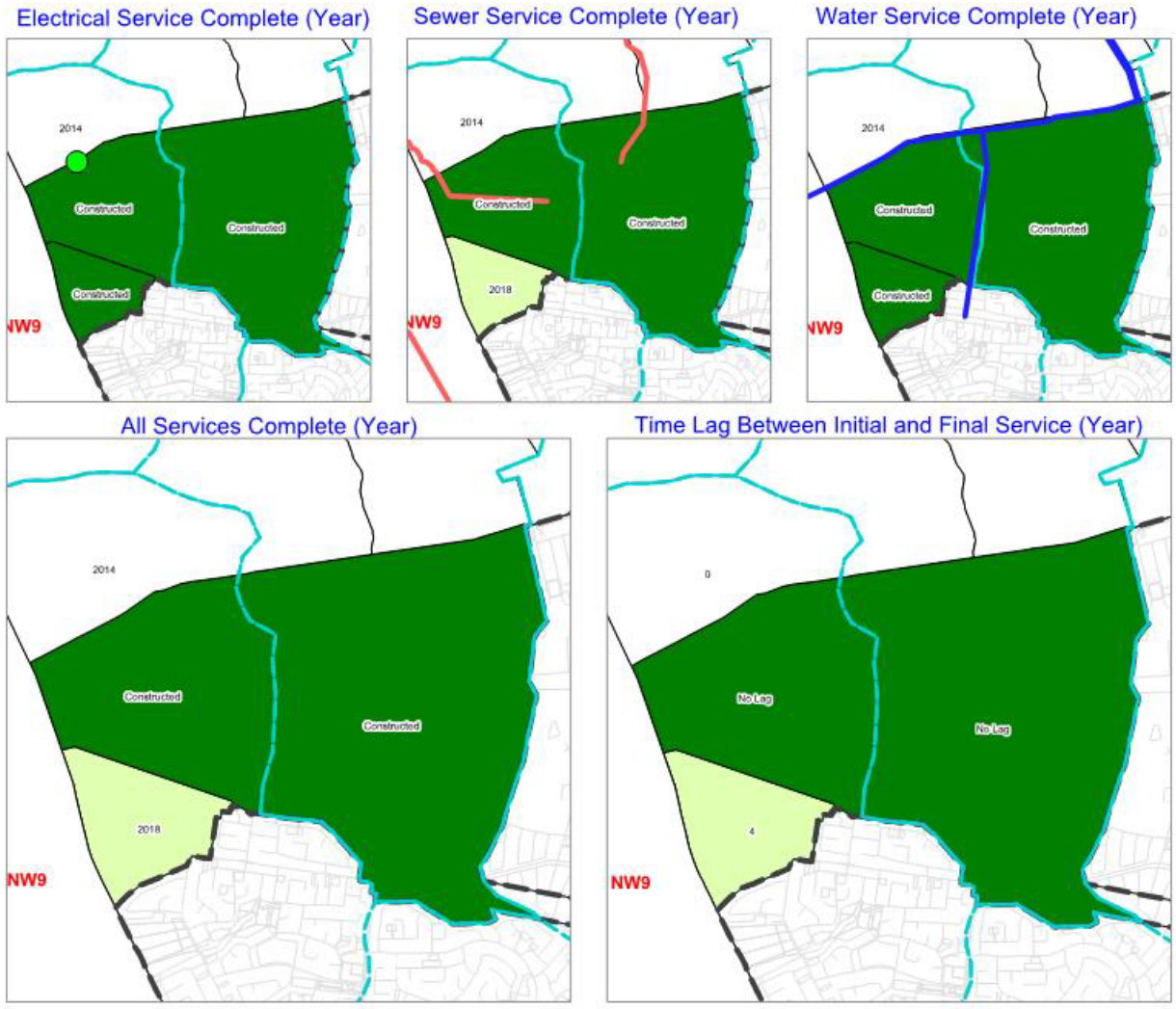
Figure 2.1: Compilation Plan Legends/ Keys

2.1.1 Alex Avenue

Located on the eastern side and at the southern extremity of the NWPLRA, bordered by Schofields Road to the north and Railway Terrace to the West, Alex Avenue was rezoned in May 2010. It has an anticipated dwelling yield of 6,240.

Development in the Alex Avenue Precinct has been quite strong, with a mix of both apartment and low density single dwelling product. To date roughly, 1,350 dwellings are at various stages of development (i.e. application lodged, approved or under construction) with 91 dwellings so far constructed.

Figure 2.2: Alex Avenue Servicing Maps



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Sewer

The precinct is divided into two distinct catchments with Package 1 works from Riverstone, constructed in 2011 servicing the west (approximately 1,750 dwellings) via extensions to the existing Eastern Creek carrier main, and Package 2 & 3A works from Riverstone East servicing the east (approximately 3,880 dwellings) constructed in early 2015 providing a new carrier main along First Ponds Creek. A sub-catchment of the western catchment (approximately 43 ha located at the south between the precinct boundary and the railway line to Schofields Station) drains through Schofields. This requires an extension to the Schofields Package 2&3A works under Package 3 projected for delivery in approximately 2018 (indicative - funding not yet committed).

Water

Package 1 and Package 2&3A includes new trunk mains along Schofields Road and Alex Avenue. These were provided in 2011 and 2015 respectively. Both provide full trunk serviceability to the precinct.

Electrical

The new Schofields zone substation located on Schofields Road, within the precinct provides the ultimate supply to the precinct. As outlined previously, a substation can generally accommodate between 7,000 & 15,000 dwellings. Therefore Schofields zone substation would have excess capacity to supply other neighbouring precincts.

Table 2.1: Alex Avenue - Remaining Infrastructure to be Delivered

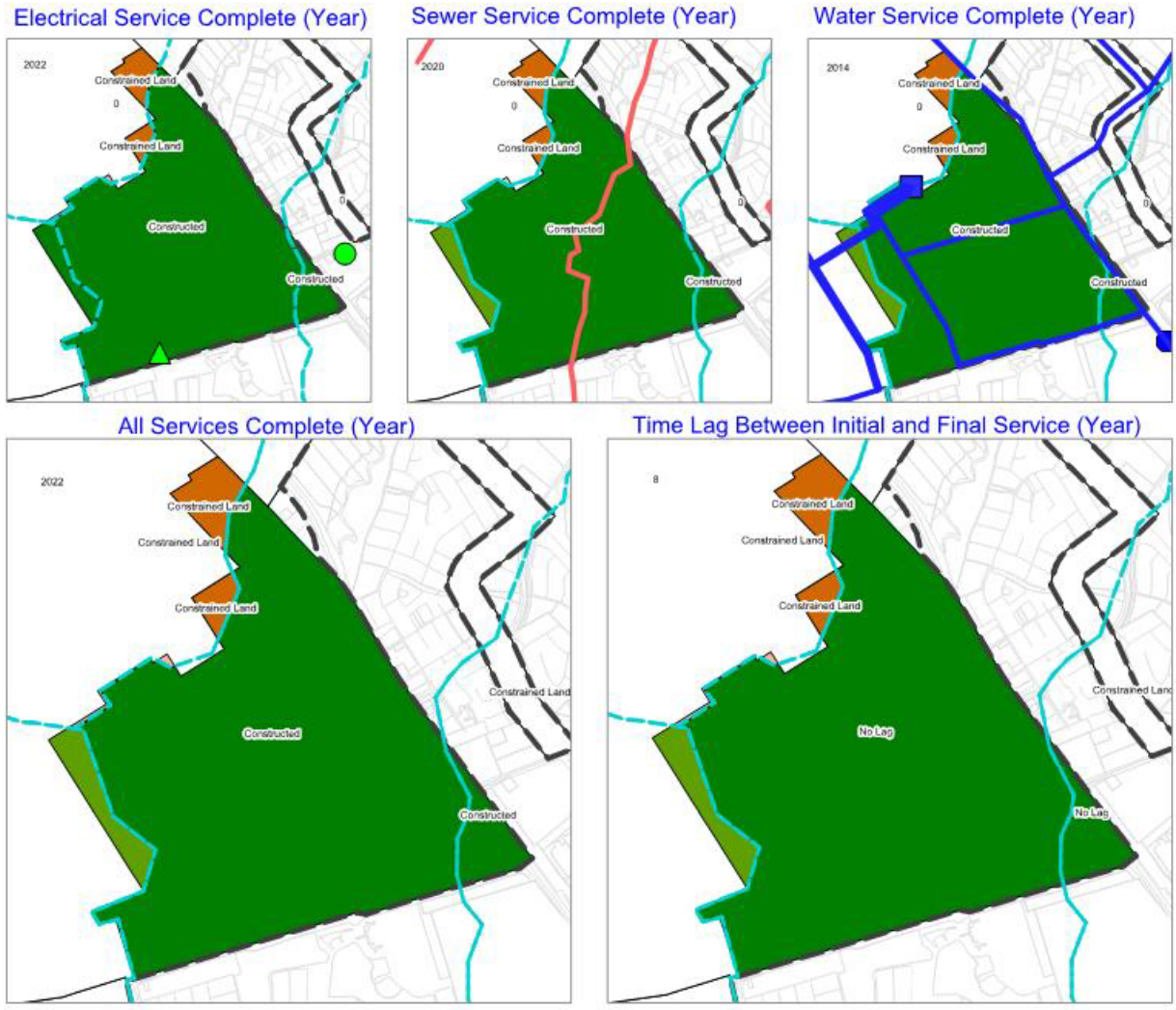
Precinct	Remaining Infrastructure	Anticipated Delivery Date	Estimate of Additional* Capacity (lots)
Alex Avenue	Package 3 sewer works	2018	661

2.1.2 Area 20

Located centrally at the eastern extremity of the NWPLRA, bound by Windsor Road to the east and Schofields Road to the south, Area 20 was rezoned for development in October 2011. It has an anticipated dwelling yield of 2,500.

Development in the Area 20 Precinct has been progressing at a reasonable rate, with a notable preference to apartment product. To date, over 2,100 dwellings are at various stages of development (i.e. application lodged, approved or under construction).

Figure 2.3: Area 20 Servicing Maps



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Sewer

The precinct is fully serviced by sewer with the large majority of the precinct drains to the existing Second Ponds creek carrier main. The remainder of the precinct falls to the south which is serviced by existing reticulation network to Caddies Creek carrier main.

Water

Sydney Water's Package 1 works, which were constructed as of 2011 included the new Rouse Hill Reservoir and associated trunk mains, delivering potable water in the vicinity of the precinct. A minor area (considered negligible) above RL 60 Australian Height Datum (AHD), currently has no service, Sydney Water will assess the serviceability of this area under a future package of works.

Electrical

The Mungerie Park zone substation located on Commercial Road at Rouse Hill was constructed in 2009 and provides full trunk capacity to the precinct along with parts of the neighbouring precincts.

Table 2.2: Area 20 - Remaining Infrastructure to be Delivered

Precinct	Remaining Infrastructure	Anticipated Delivery Date	Estimate of Additional* Capacity (lots)
Area 20	Fully serviced	-	-

2.1.3 Box Hill and Box Hill Industrial

Located at the north east of the NWPLRA, bordered by Windsor Road to the south and Boundary Road to the west, Box Hill and Box Hill Industrial was rezoned for development in May 2013. It has an anticipated dwelling yield of 9,652 (per the approved ILP) and 16,000 jobs.

Development in the Box Hill and Box Hill Industrial Precinct has not progressed with registration of any lots yet, although approximately 250 dwellings are at various stages of development (i.e. application lodged, approved or under construction).

Figure 2.4: Box Hill Servicing Maps

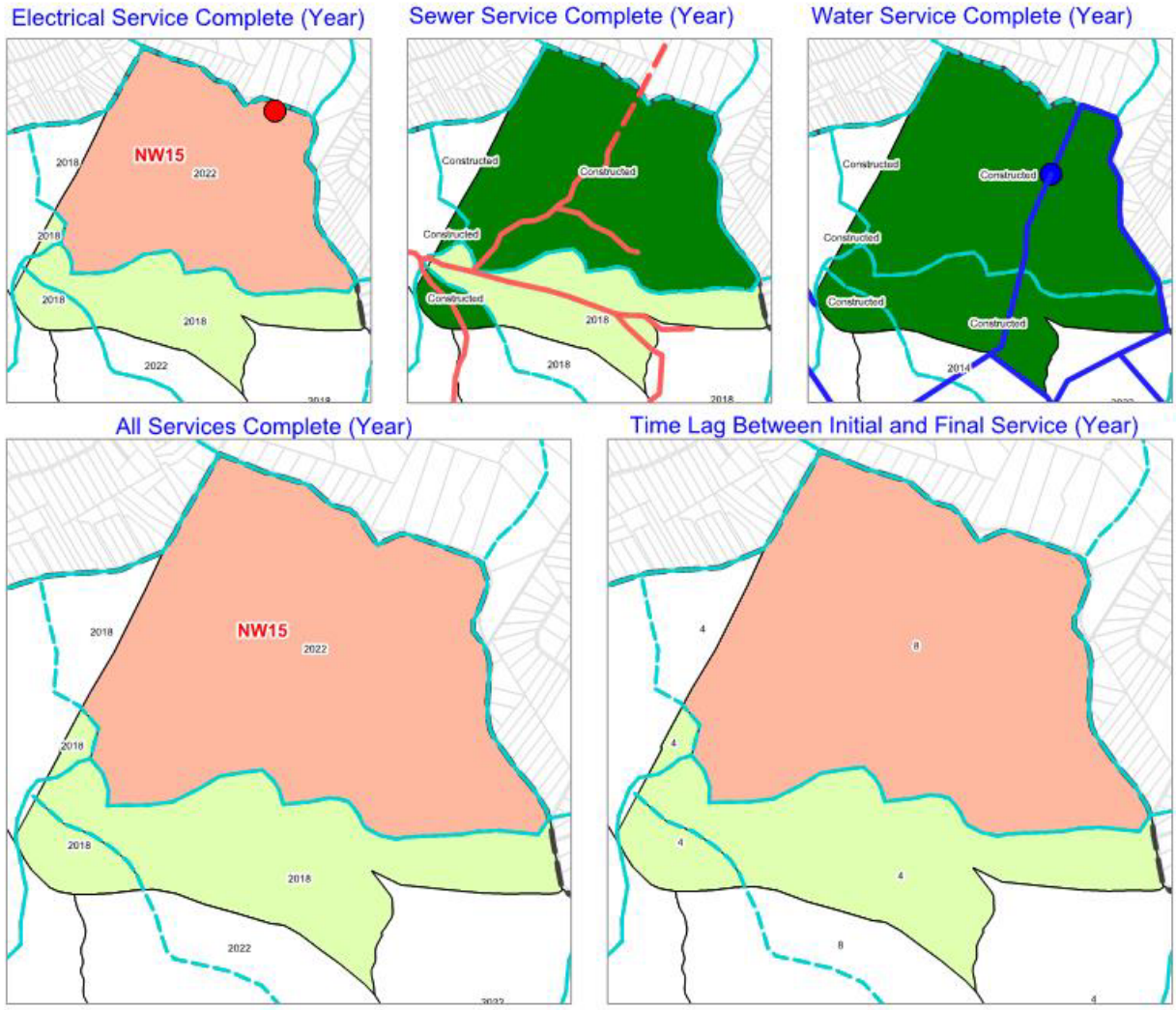

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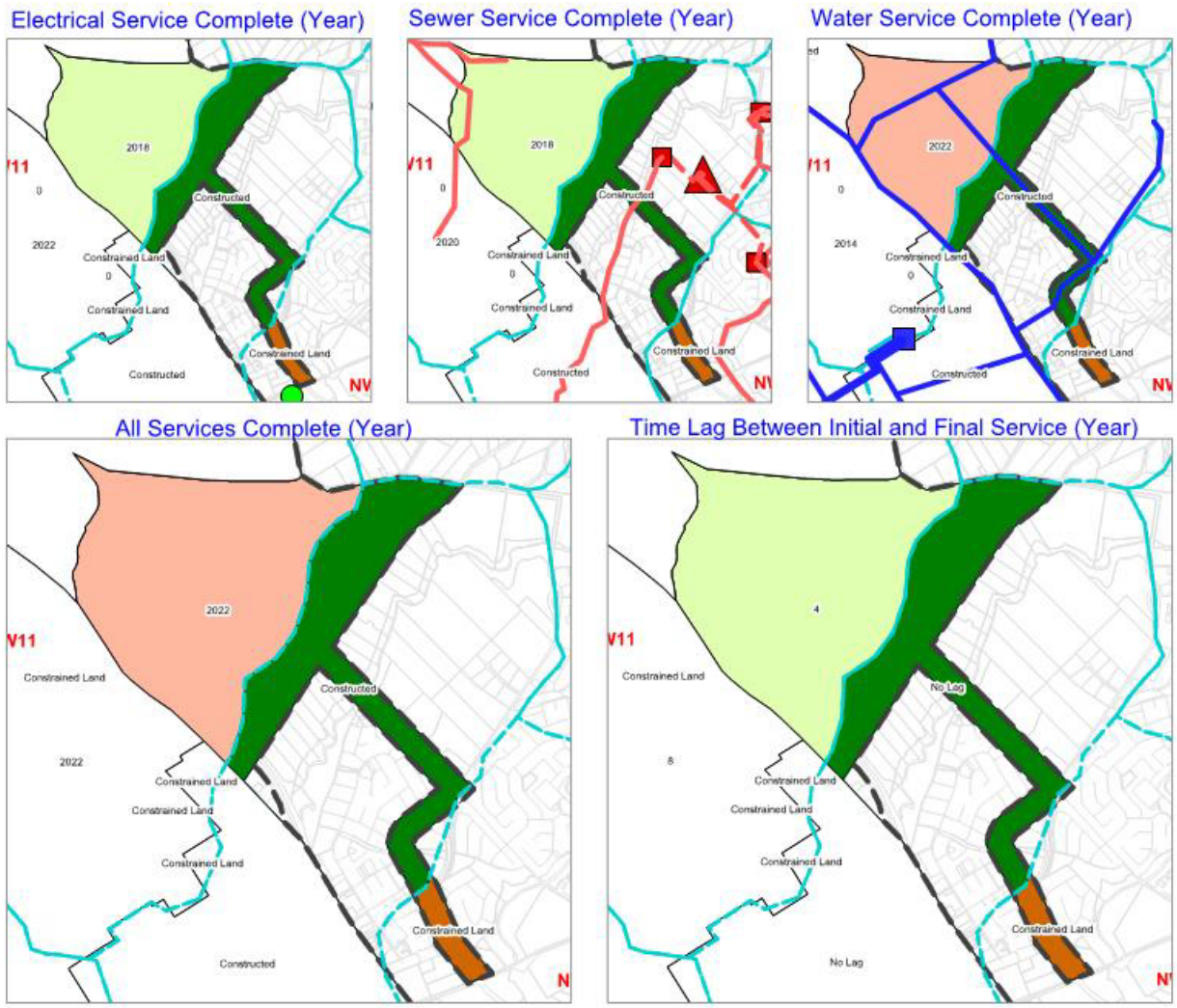
Figure 2.5: Box Hill Industrial Servicing Maps



Sewer

This precinct is broken largely into two catchments, both draining to the north into the Killarney Chain of Ponds trunk carrier and then into Vineyard. The northern catchment (approximately 4,880 dwellings) has been serviced as part of package 2&3A works which completed construction in early 2015. Some package 3 works have been brought forward to anticipated be delivered by 2018 (indicative - funding not yet committed) to fully service the southern precinct catchment adjacent Windsor Road (approximately 3,550 dwellings, including Box Hill Industrial). A small catchment of the industrial precinct drains to the existing Second Ponds Creek carrier main.

Water

The greater precinct is serviced by the Package 2&3A works via a new trunk main along Terry Road which was completed in early 2015. A future package of works would branch from this main at Windsor Road, which will extend services to the Box Hill Industrial precinct. Sydney Water has not identified a timeframe for delivery of these works; as such Mott MacDonald has assumed it would be provided by 2022, to align with the overall serviceability of the precinct when considering other services. Other future mains (unspecified timeframe) will extend services to North Box Hill and link to existing services in Rouse Hill both through Box Hill Industrial.

Electrical

There is capacity for some initial development (up to 1,600 dwellings) to be supplied from the Mungerie Park zone substation, as the developer is to provide lead-in works, it is anticipated that the cost will generally limit development to the southern areas of the precincts. Endeavour Energy has outlined a package of planned upgrade works in the Box Hill area which will include a 22kV conversion and supply from Mungerie Park zone substation, due for completion in 2018. The package will supply 3,750 dwellings. Following this, new zone substations in North Box Hill and Riverstone East/ Box Hill (location to be determined) will provide the ultimate supply for the area in 2022. It is likely the delivery of the substations will be staged to minimize capital expenditure with upgrades undertaken as the market requires. Though for the purpose of this report, it is assumed the total supply will be available at the initial inception of the zone substation.

Mott MacDonald notes that although 3,750 capacity is supplied by the 22kV works, it is assumed approximately half (1,500 lots) of this will be used to offset existing loading on the Riverstone zone substation so as to free capacity and allow development in the Riverstone area for (1,500 lots).

Table 2.3: Box Hill/ Box Hill Industrial - Remaining Infrastructure to be Delivered

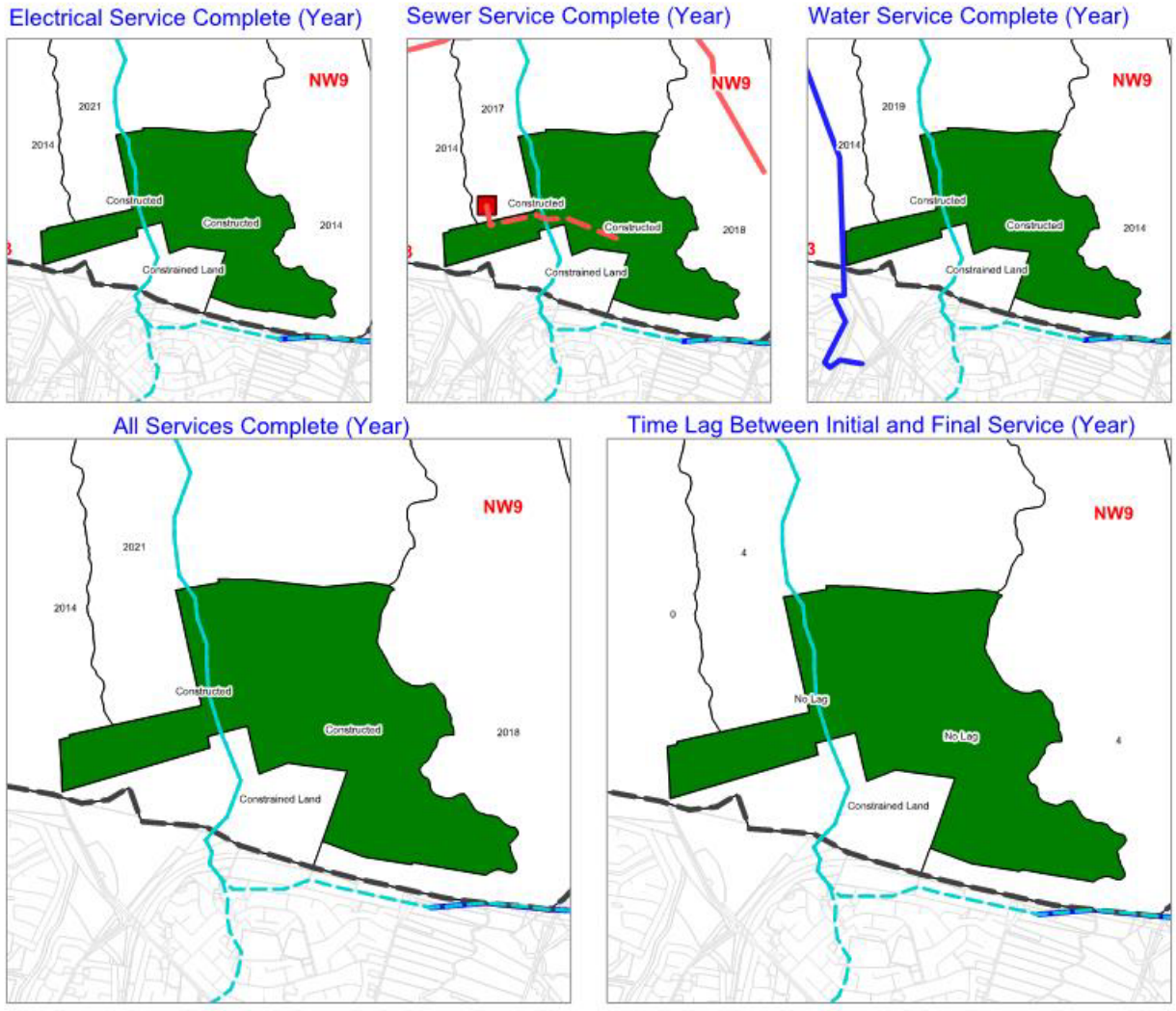
Precinct	Remaining Infrastructure	Anticipated Delivery Date	Estimate of Additional* Capacity (lots)
Box Hill and Box Hill Industrial	22kV conversion and upgrade	2018	1,500
	Sewer carrier main to Killarney Chain of Ponds	2018	3,542
	Extension of Terry Road Water main	2022	1,485
	New Riverstone East/ Box Hill zone substation (Infrastructure item no. 22)	2022	6552 In conjunction with item 23
	New North Box Hill zone substation (Infrastructure item no. 23)	2022	6552 in conjunction with Item 22

2.1.4 Colebee

Located centrally at the south of the NWPLRA, bordered by Eastern Creek to the east, and generally Colebee Nature Reserve and Richmond Road to the west, Colebee, the smallest precinct, was rezoned for development in 2005 under Council's LEP prior to the SEPP. It has an anticipated dwelling yield of 1,000.

To date 286 new dwellings have been constructed with the Stonecutters Ridge Development comprising the extreme majority of the dwelling yield. Currently, all 904 lots of this estate have been sold and are at various stages of development (i.e. application lodged, approved or under construction).

Figure 2.6: Colebee Servicing Maps



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Sewer

As part of the Stonecutters Ridge development, all services have been provided by the Developer to accommodate for the delivery of dwellings. Noting that SPS 118 (Infrastructure item no. 8) is located in Schofields, though services Colebee and conveys flows to Quakers Hill WWTP.

Water

As part of the Stonecutters Ridge development, all services have been provided by the Developer to accommodate for the delivery of dwellings.

Electrical

The existing Quakers Hill zone substation located on Chaplin Crescent in Quakers Hills, supplies already established suburbs in its surrounding area, either partially or wholly. These include but are not limited to Quakers Hill, Acacia Gardens, Marayong, Woodcroft and Dean Park. Spare capacity has been used to support all development in the Colebee precinct.

Table 2.4: Colebee - Remaining Infrastructure to be Delivered

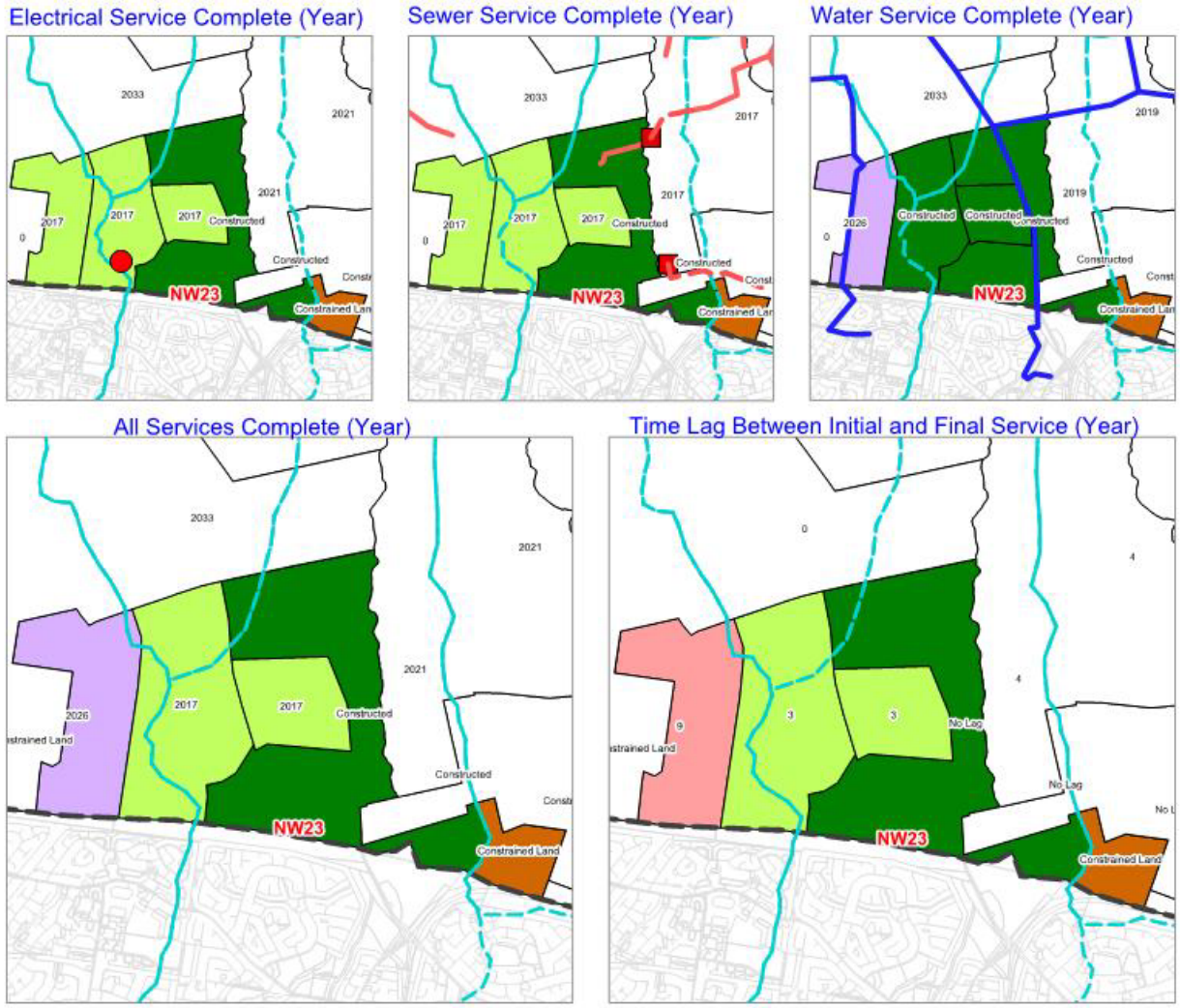
Precinct	Remaining Infrastructure	Anticipated Delivery Date	Estimate of Additional* Capacity (lots)
Colebee	Fully serviced	-	-

2.1.5 Marsden Park Industrial

Located generally on the western side of Richmond Road and at the south of the NWPLRA, bordered by Bells Creek to the east and Marsden Park to the north and west, with Richmond Road traversing its eastern section in a generally south-north direction, Marsden Park Industrial was rezoned for development in October 2010, under the NSW Governments Precinct Acceleration Protocol (PAP) being developed by Marsden Park Development Pty Ltd. It has an anticipated dwelling yield of 1,228 and 10,000 potential jobs. No residential lots have been constructed to date, though 650 dwellings are at various stages of development (i.e. application lodged, approved or under construction) as well as other industrial lots.

The Voluntary Planning Agreement (VPA) associated with the PAP outlines that the developer must provide all trunk servicing infrastructure to the approval of the relative authority. This is described in the Infrastructure Delivery Report which was prepared in support of the VPA. In this report, details of the proposed servicing strategies are outlined. **It is important to note that the delivery dates shown are indicative and are to be determined by the developer based on their development program.**

Figure 2.7: Marsden Park Industrial Servicing Maps



Sewer

Divided into three separate catchments, the ultimate strategy involves primarily gravity carrier mains with two pumping stations and associated rising mains to the Riverstone Waste Water Treatment Plant (WWTP). These trunk services are all largely located outside of the precinct, also servicing those neighbouring downstream precincts through which the carrier mains will run. If they were to be delivered to service Marsden Park Industrial precinct, prior to their need in the neighbouring precincts, significant negotiations with those precinct land owners and potential cost implications may result in order for this to occur.

In light of the difficulties associated with delivering the ultimate strategy at this early stage, interim/ semi-permanent strategies have been proposed. These can be tied into the ultimate at a later date when the gravity mains in downstream catchments have progressed sufficiently. They include Sewer Pumping Stations (SPS) within the precinct and associated rising mains to convey waste water to the St Marys WWTP or Riverstone WWTP, depending on the catchment.

Water

A new water main extension has been proposed along Richmond Road was completed in 2015. This will be delivered in conjunction with the neighbouring developer of the Marsden Park precinct. This will service the greater eastern portion of the precinct with a second main traversing the western portion of the site to bring services to this area by 2026 (indicative – dependent on developer program) and is generally in line with developer dwelling release targets.

Electrical

A new zone substation is proposed to service the precinct (South Marsden Park zone substation), with Stage 1 to be delivered in 2017. Endeavour Energy has outlined that the delivery of the second stage of the zone substation will depend on the growth in the area and could be delivery as early as 2019/20. This will ultimately depend on the changing needs of the developer who, under the PAP, will drive infrastructure in this precinct.

Table 2.5: Marsden Park Industrial - Remaining Infrastructure to be Delivered

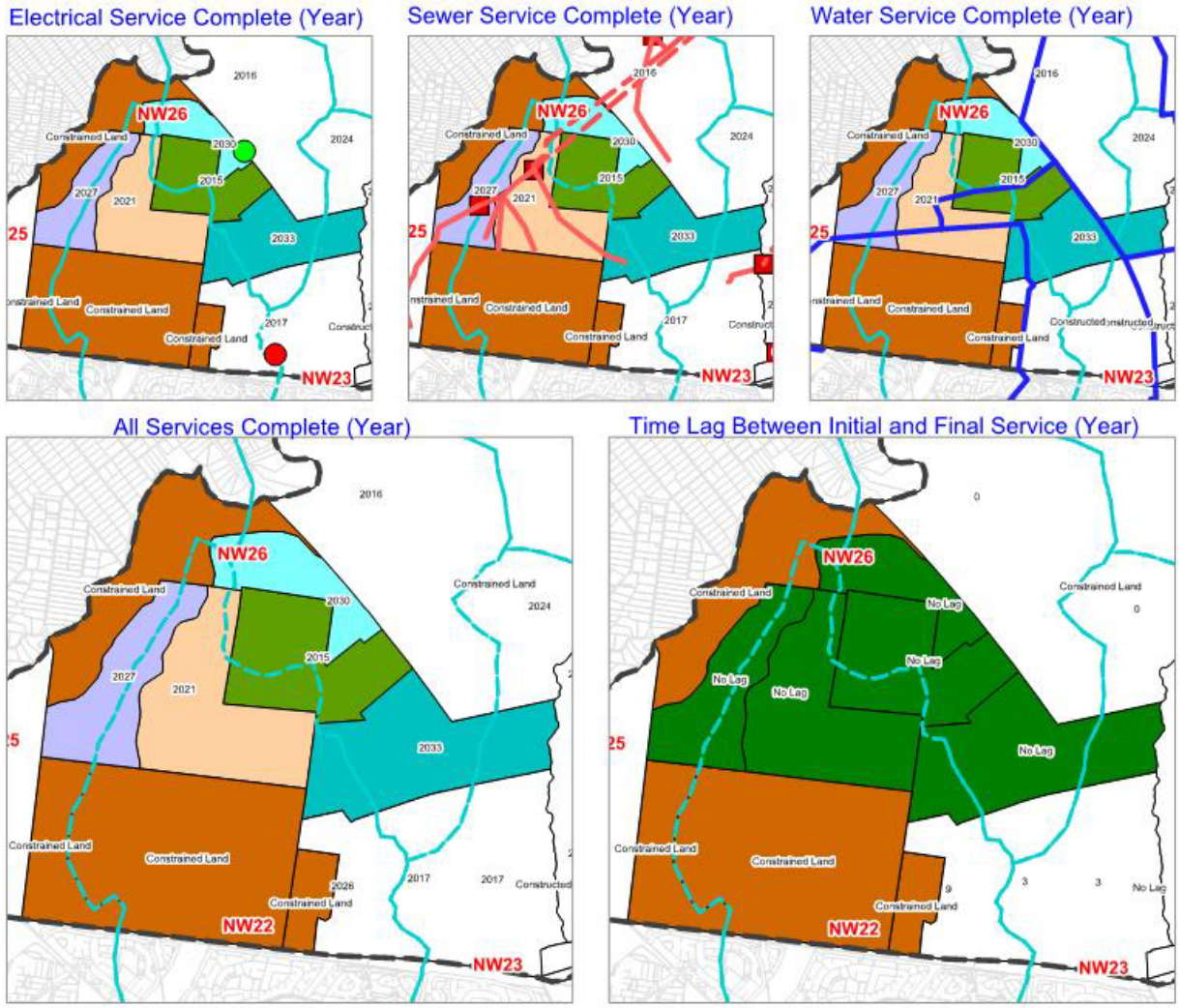
Precinct	Remaining Infrastructure	Anticipated Delivery Date	Estimate of Additional* Capacity (lots)
Marsden Park Industrial	Developer to provide infrastructure at pace with projected dwelling delivery	-	-

2.1.6 Marsden Park

Located on the eastern side of the NWPLRA, bordered by Stony Creek Road to the west, South/ Wianamatta Creek to the north, Richmond Road to the north-east, Marsden Park Industrial to the south east, Marsden Park was rezoned for development in October 2013 under the PAP being developed by Winten Developments Pty Ltd and Stockland Development Pty Ltd. It has an anticipated dwelling yield of 10,308, with the first of 5 stages currently under development. The project has an expected completion date of 2036. Stage 1 will provide 2,400 dwellings to 2020.

Under PAP requirements for developing this precinct, Stockland have focused on the Stage 1 servicing strategy, with options for the remainder of the precinct to be confirmed as development progresses. **It is important to note that the delivery dates shown are indicative and are to be determined by the developer based on their development program**

Figure 2.8: Marsden Park Servicing Maps



Sewer

A number of carrier mains are proposed to service the precinct, along with two SPS's and associated rising mains to deliver waste water to the Riverstone WWTP. This also forms the strategy to service the Marsden Park Industrial precinct as previously discussed. Carrier mains include; Bells Creek carrier, Marsden Park North carrier, Marsden Park carrier and the Richmond Road carrier.

As with the Marsden Park Industrial precinct strategy, an interim strategy has been proposed for stages 1 and 2 which include a pumping station within stage 2 and single rising main to the Riverstone WWTP.

Water

The stage 1 water service will be provided in conjunction with the Marsden Park Industrial precinct. An agreement was made between the two developers to upgrade an already proposed new trunk water main along Richmond Road to be able to supply the first stages of the two precincts.

Electrical

A new zone substation has been provided in early 2015 to service the precinct, located on Richmond Road at the eastern border of the site, adjacent the existing overhead transmission lines. The second stage will largely depend on the changing needs of the developer who, under the PAP, will drive infrastructure in this precinct, though as this zone substation services surrounding precincts also, the growth in these areas will play a factor. Is has been anticipated that the second stage may be required as early as 2021.

Table 2.6: Marsden Park - Remaining Infrastructure to be Delivered

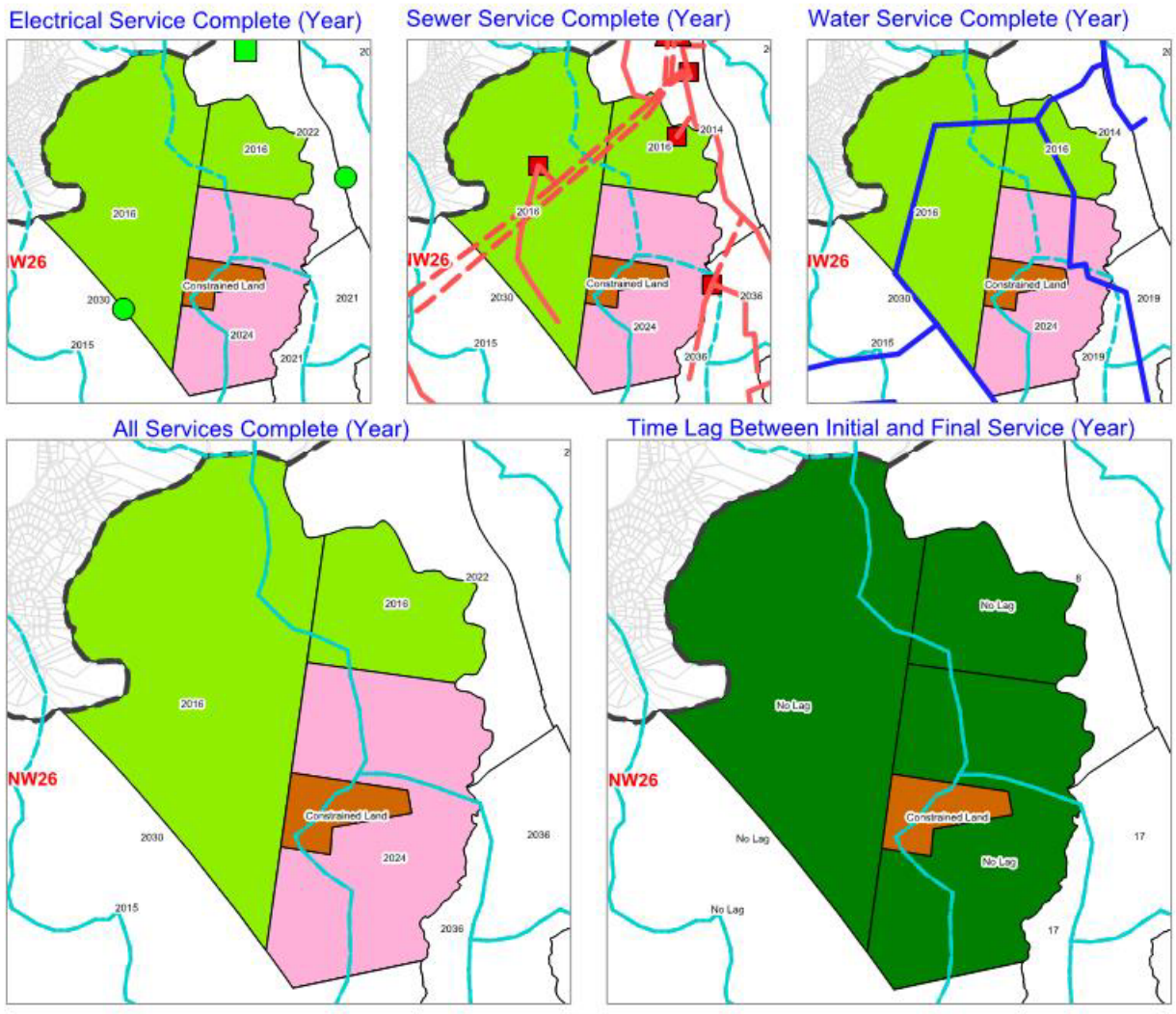
Precinct	Remaining Infrastructure	Anticipated Delivery Date	Estimate of Additional* Capacity (lots)
Marsden Park	Developer to provide infrastructure at pace with projected dwelling delivery	-	-

2.1.7 Marsden Park North

Located on the eastern side at the north of the NWPLRA, bordered by Richmond Road to the south-west, and eastern creek to the east, Marsden Park North was released for planning in June 2014 under the PAP being developed by Angliss Estate (Garfield) Pty Ltd and MAC 1 MP Pty Ltd. It currently has an anticipated dwelling yield of 4,000 and is broken into three sub-precincts.

Under the VPA, the developer must prepare a draft Services Infrastructure Strategy within 12 months of the release date. **It is important to note that the delivery dates shown are indicative and are to be determined by the developer based on their development program.**

Figure 2.9: Marsden Park North Servicing Maps



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