# Appendix G

# Summary of Developer Servicing Strategies Southern Region 2019

# MEMO –Summary of developer servicing strategy documents for water and sewer in Southern Region Development Servicing Plan Area

***Background***

To support the next generation of the Developer Servicing Plan (DSP) 2019, this summary document is provided to give an overview of the methodology followed to identify the proposed assets to fulfil the system performance standards followed by Central Coast Council and to address the new development that takes place within the CCC southern area.

## 1. Coastal Carrier Strategy & Terrigal Major Strategy

The Coastal Carrier System (CCS) comprises all infrastructures in the Northern Beaches areas of Gosford City. The suburbs include, Forrester's Beach, Terrigal, Wamberal, North Avoca, Avoca, and Kincumber. The CCS joins the Gosford Kincumber Gravity Main (GKCM) just prior to Kincumber Major.

It has been identified that Coastal Carrier sewer system has been experiencing capacity constraints for a considerable time and to address these deficiencies two strategies have been carried out in the past as following;

Terrigal Major Strategy:

The Terrigal Major strategy has identified the pump station that are under capacity and some have been amplified in the past. Terrigal Major SPS and some of the upstream infrastructure have been augmented in the recent past, specifically pump stations C1, C4, C5, C8, C13, C15 and FB1. However, the amplifications carried out in the past have restricted operation capacity due to lack of capacity in the major carriers in the downstream area. In the recent past there had been rapid residential development in the northern most section of Terrigal catchment (refer Figure2). These consist of Forrest Glen Retirement village and Bakali Rd subdivisions. Due to these developments it was identified SPS FB4 is needed to be amplified in 2019/2020. The other major developments are located in C18 catchment and C1 catchments (Refer Table 1).

Coastal Carrier Strategy:

With the above developments and the additional flow that is anticipated from the infill the flow that is anticipated at SPS Terrigal Major is expected to increase in the future. However, the assets downstream of TMJ have restricted capacity to carry this flow and the flow from the catchment of North Avoca Service Area. A duplicate rising main for SPS TMJ had been partially constructed. The completion of this RM would increase the working capacity of SPS TMJ to about 810 L/s, but this would exceed the capacity of some downstream components. Coastal Carrier Strategy has identified the infrastructure shown in Figure 2 and Figure 3 as necessary to service the areas TMJ and NAMJ service Areas. However, reassessment of the Coastal Carrier Strategy is planned for 2019/2020 that may result in a change in the currently identified infrastructure.

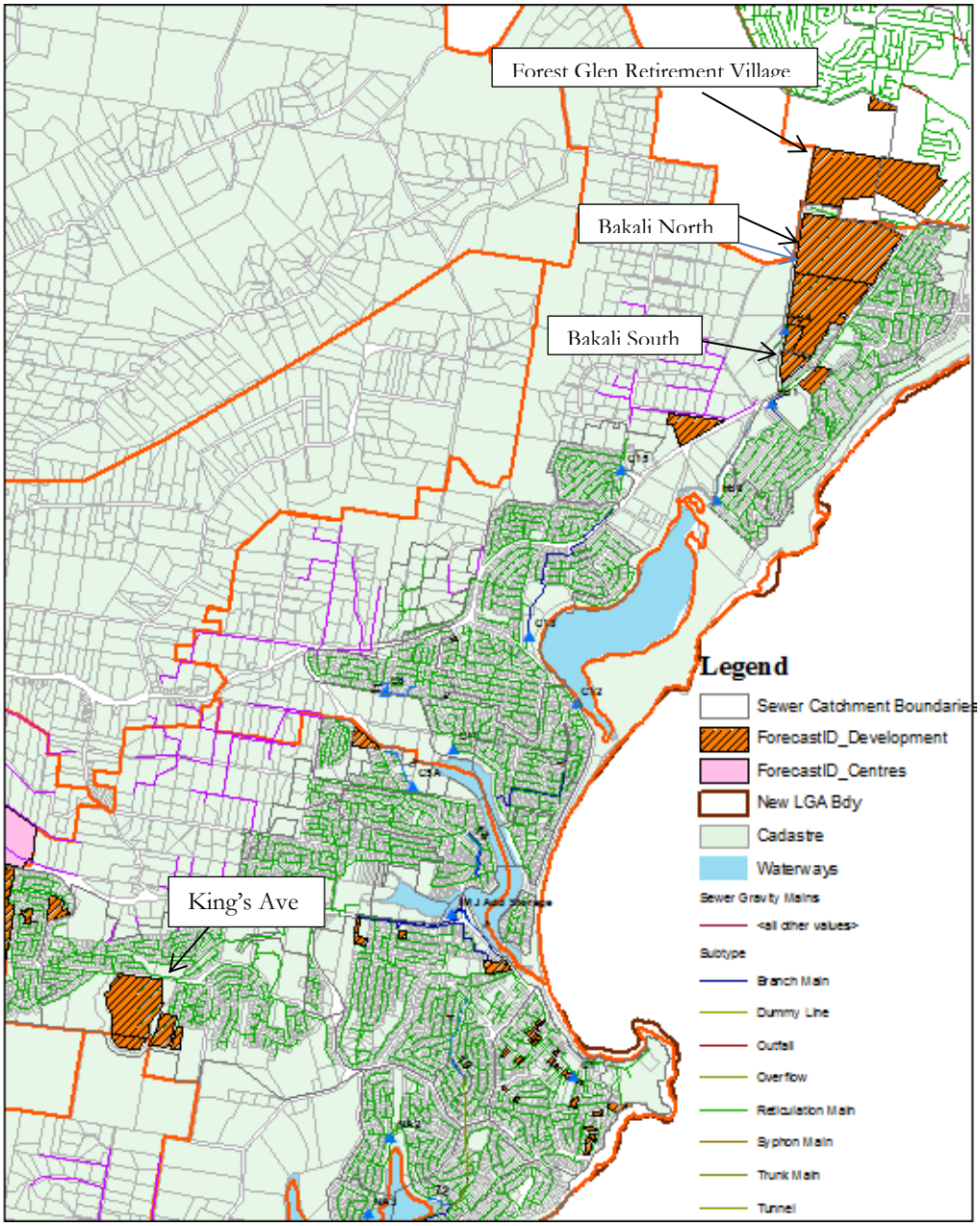


Figure 1: major Developments in Terrigal major catchment

Table 1: Major developments in Terrigal catchment

| | Forecast ID Dev | Contributing ET(2018-2036) |
|---|---|---|
| **Forrester's Beach & Wamberal** | Forest Glen retirement Village (SPS FB4) | 232 |
| | Bakali North (SPS FB4) | 100 |
| | Bakali South (SPS FB1) | 57 |
| | Forecast ID Infill | 157 |
| **Terrigal & North Avoca** | SPS C18 catchment(Kings Ave) | 127 |
| | SPS TMJ Catchment (Misc) | 84 |
| | SPS C1 Catchment(Misc) | 365 |
| | Forecast ID Infill | 403 |

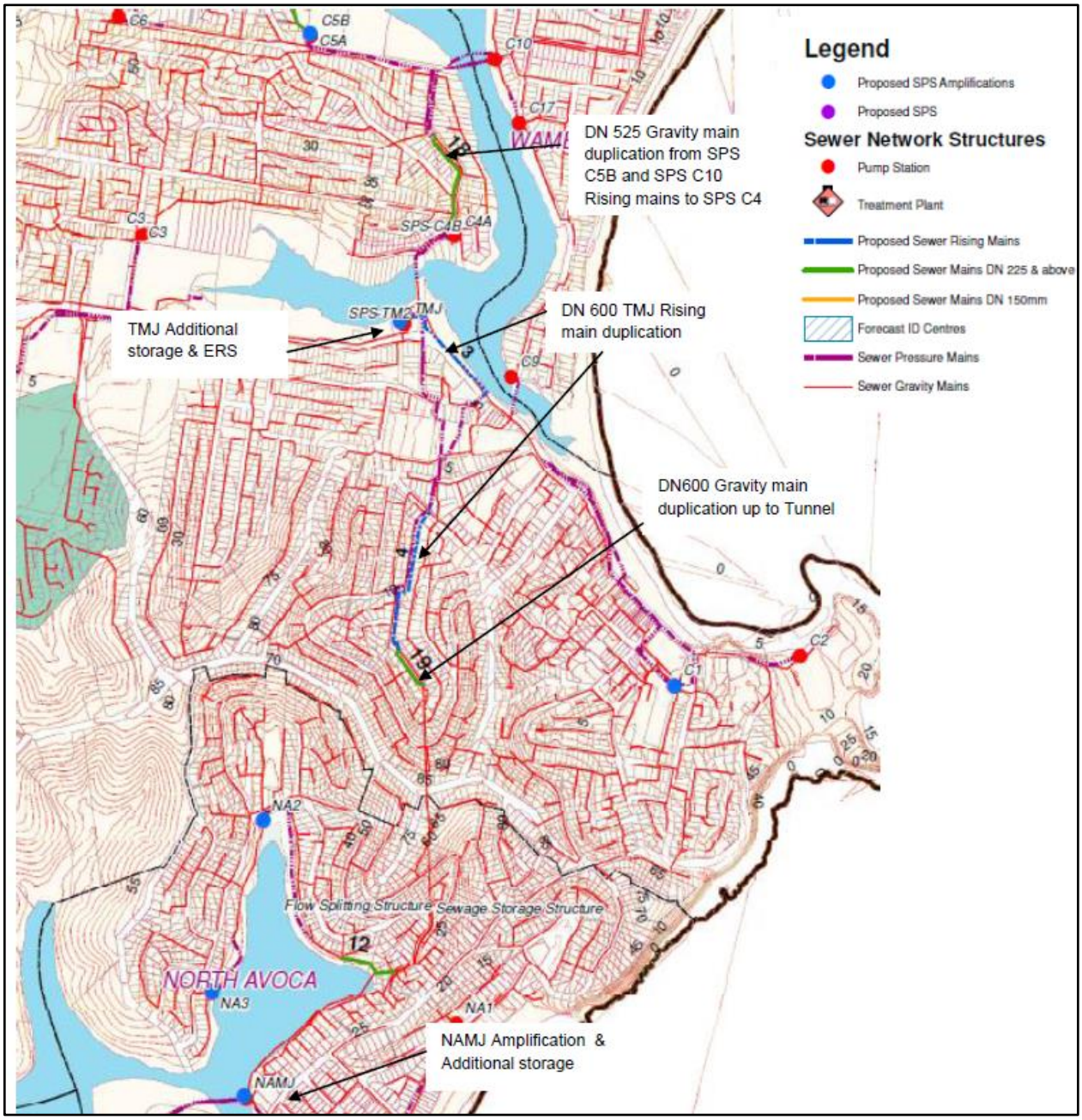


Figure 2: Infrastructure identified by Terrigal Major Strategy & Coastal Carrier Strategy


Figure 3: Infrastructure identified in Coastal Carrier Strategy

## 2. Master Plan 2012

A Master Plan for former Gosford council was developed in 2012 and it consisted of identification of the necessary infrastructure to service the population growth, satisfying the desired standard of service followed by CCC. Following are the main items that consisted of the Master Plan.

- Analysis and Development of level of Service for Water and Sewer services
- Analysis of Population Growth and identifying Future Service Areas
- Calculate Water demands and Sewer flows for each horizon
- Preparation of Water servicing Strategy and Sewer System Servicing Strategy

Master Plan identified following population growth forecast within former Gosford LGA and Table 2 shows the comparison of Master Plan Projections and 2019 Forecast ID projections.

Table 2: population Forecast in Master Plan 2012 and Forecast.id 2019

| Year | 2011 | 2016 | 2021 | 2026 | 2031 | 2036 | 2041 | 2046 | 2051 |
|---|---|---|---|---|---|---|---|---|---|
| Population | 166900 | 172800 | 177700 | 181800 | 185700 | 189900 | 192700 | 195500 | 198400 |
| Forecast ID* | - | 172046 | 179377 | 183557 | 186415 | 189883 | - | - | - |

* From 2019 report http://forecast.id.com.au/central-coast-nsw

Master Plan consisted of identification of infrastructure to serve the 2051 projected populations that consisted of major developments, Centres and the infill within the suburbs as forecasted by Forecast.id . Two separate studies for water and sewer infrastructure were carried out as requirements for water and sewer services were different due to presence of Onsite Sewerage Management (OSSM) were in operation for some areas that already had water service.

- Existing Service Area

The existing serviced area for master planning purposes generally comprised all properties, including vacant properties, within the general boundaries of the year 2010 serviced area. A major component of the development consisted of Gosford CBD area, Somersby Industrial Park and Mount Penang developments. Based on Master Plan 2012 two separate strategies were developed in (2016/2017) for Gosford CBD water and sewer Infrastructure amplifications. These infrastructure are at the design and construction stage currently and have been excluded from 2019 DSP. In addition, Industrial/Commercial precincts Somersby and Mount Penang also have been excluded in the 2019 DSP. The balance infrastructure is shown in Figure 4 and Figure 5 and briefly described

- Potential Service Areas; The following categories have been identified in Master plan and description of each development area is provided in Table xx.
    - DSP Areas; Servicing vacant urban lands covered by Developer Servicing Plans as a result new growth occurring of the Wyoming, Narara, Kariong and Erina by extension of low density residential zone into adjoining vacant lands
    - Investigation and Future Development Areas; These areas comprise relatively small isolated pockets of principally residential development, zoned urban and/or non-urban, with water but not sewer service that have on-site sewage management which may require servicing with sewer in near future
    - Rezoning of non-Urban lands; Formerly, the Gosford Horticultural Research Station (Narara Eco village), this 12 Ha property is zoned for urban residential development. The land will require water and sewer reticulation to be extended upon sub-division.

Table 3: Details of Potential Service Areas

| | Unserviced Area (Ha) | | ET | Timing | Water mains | Sewer Gravity main | Sewer Rising main | SPS |
|---|---|---|---|---|---|---|---|---|
| **DSP Area** | Water | Sewer | | | | (DN 150) | (DN100) | |
| Wyoming East | 79 | 88 | 199 | 2021-2031 | | 1636 | | |
| Kariong | 16 | 16 | 66 | 2019-2031 | | | 250 | 1 |
| Erina (East of James Sea Dr | 31 | 31 | 219 | 2021-2031 | | 583 | | |
| Lisarow | | 15 | 14 | 2015-2031 | | 214 | | |
| **Investigation and Future Development** | | | | | | | | |
| Erina Heights | | 167 | 2667 | 2031-2051 | 930(DN250) | 12100 | | |
| Killcare Heights | | 9 | 33 | 2021-2031 | | 1109 | | |
| Wamberel North | | 121 | 139 | 2031-2051 | | 11100 | | |
| Wamberel South | | 214 | 205 | 2031-2041 | | 16700 | | |
| Mac Masters Beach | | 162 | 84 | 2015-2041 | | 1480 | | |
| Karalta Rd | | 12 | 44 | 2031-2036 | | 1200 | | |
| SIP Eastern Extn | | | | 2031-2036 | | | 550 | 1 |
| **Rezoning of Non-Urban Lands** | | | | | | (DN225) | | |
| Narara Eco Village | 12 | 12 | 150 | 2020-2031 | 175(DN150) | 296 | | |

- Water Strategy:

After excluding infrastructure that fall within Gosford CBD, Somersby Industrial Park and Mount Penang development, the system performance analysis has shown that new growth occurring as a result of the Wyoming, Narara, Kariong and Erina do not need major upgrades. Some local service extensions have been identified for these in 2014 DSP that have been included in 2019 DSP too. Out of the identified link mains and extensions some have been already constructed.

- Sewer Strategy:

Sewer Strategy consisted of upgrades of storages of three major pump stations (NAMJ, WYMJ and TMK) and infrastructure needed to service the potential service areas indicated in Table 3. Figure 4 shows the reticulation sewer mains of DN 150 that need to service these new areas. Master Plan had identified the sewer gravity mains that have capacity constraints but they have not been included in the proposed asset list.

Master Plan study identified the SPSs that needed emergency storages by analysing the dry weather flow for current and future. Also PWWF for current and future (2051) scenarios were assessed for 1 in2 yr ARI, 1in 5yr ARI event and 1in 10yr ARI event. These wet weather assessment have identified a list of minor SPSs that need amplification but they have not been included in the future asset requirements. Hence a separate assessment (LEP analysis) was used to identify SPSs that need capacity amplifications and emergency storage requirements.

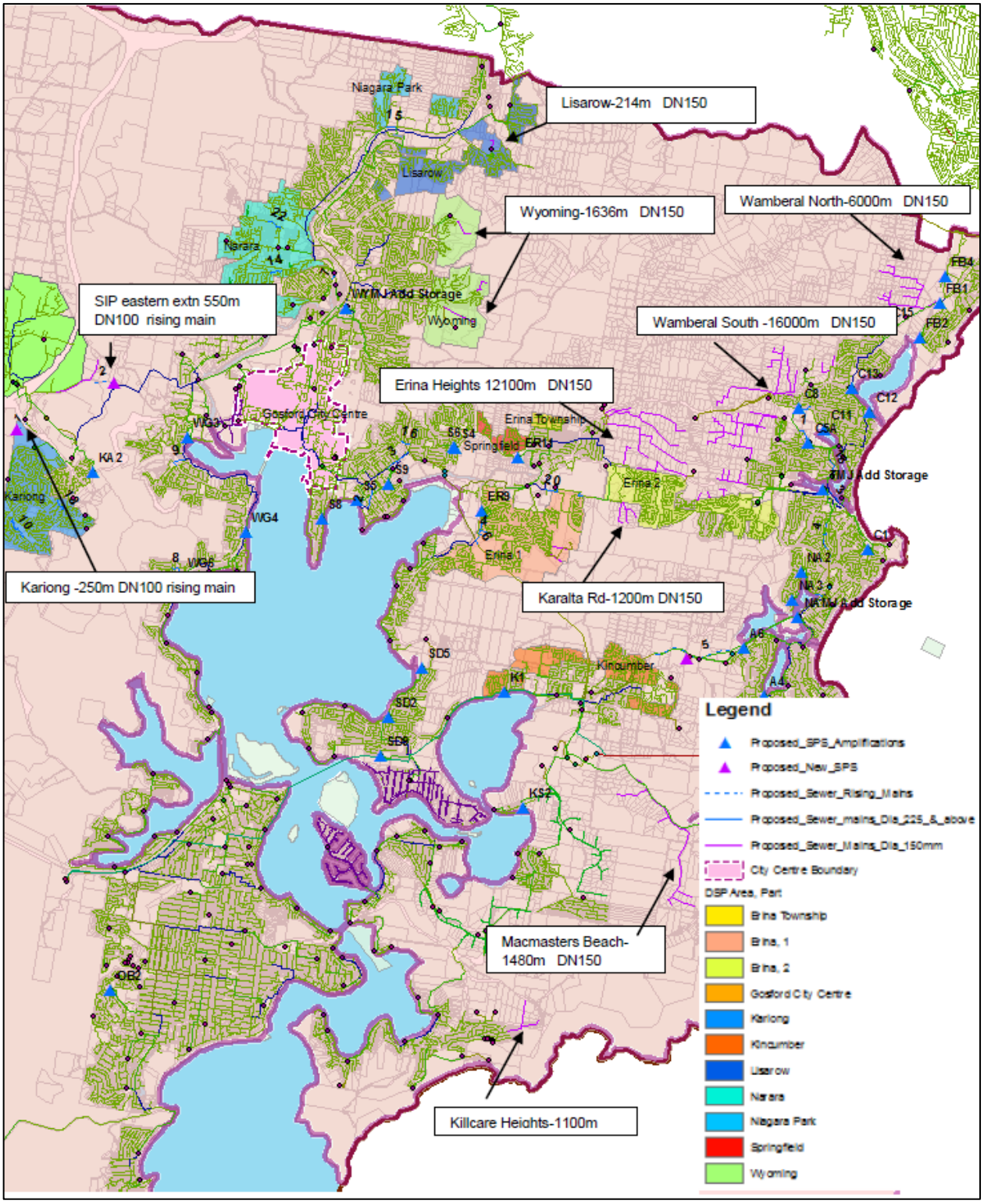


Figure 4: Sewer Gravity and rising mains mains for Potential Service Areas identified in Master Plan 2012

## 3. System Performance assessment for new Local Environmental Planning (LEP)

A system performance assessment was carried out for the new proposed Local Environment Plan (LEP) to assess how the system performance would change with the introduction of the proposed LEP (new lot size 450m$^2$ instead of 550m$^2$). The CCC south water network and sewer network were assessed to identify the assets that need amplification for the current demand with the potential additional lots.

**Water network system performance;** Max day demand analysis carried out for current scenario identified some mains that experience high head loss>10m/km and velocity around 2m/s. The following marked water mains have been included in the 2019 DSP as they were identified for capacity constraints. Some of the assets identified in this exercise have also been identified in 2014 DSP too.

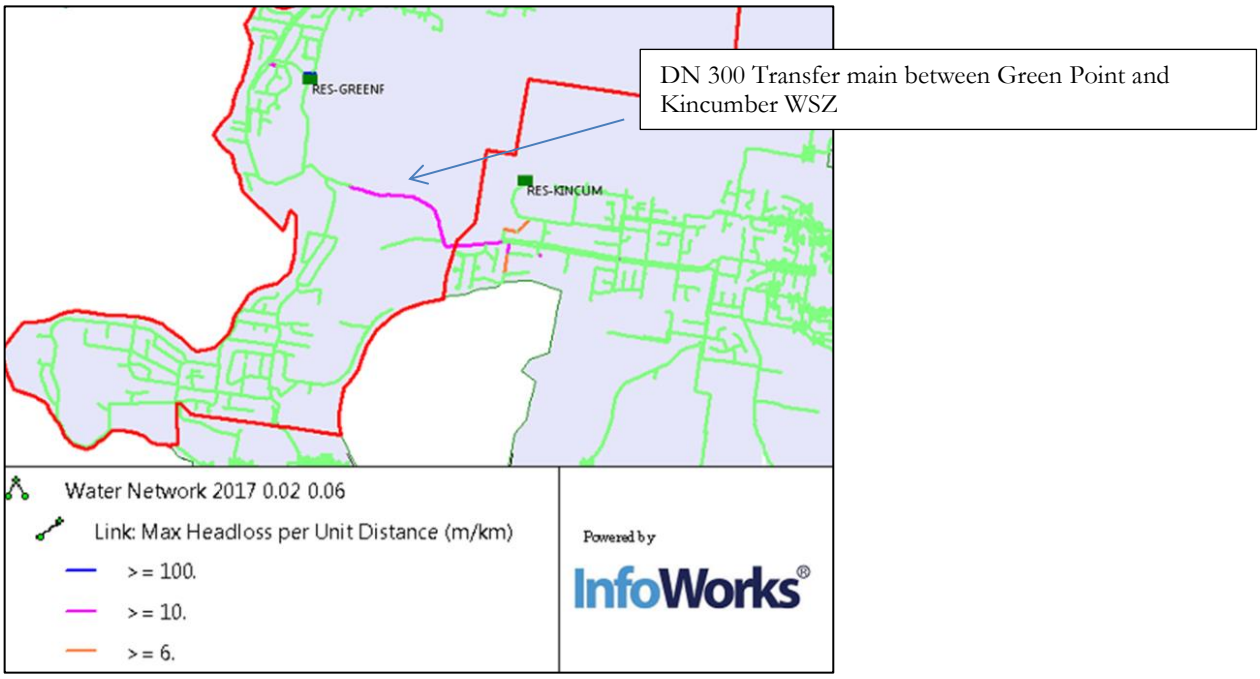


Figure 5: Identified trunk water mains with capacity constraints for current demand

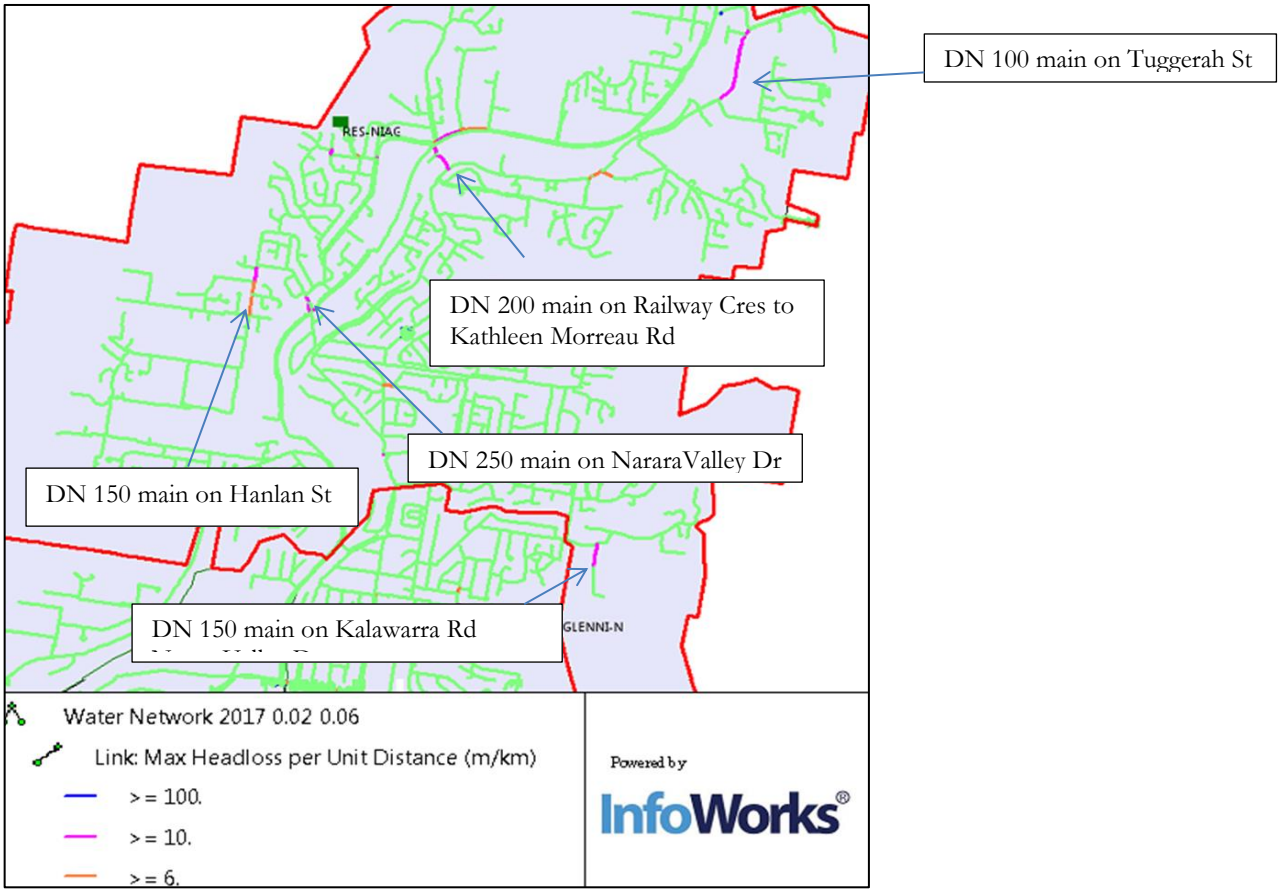


Figure 6: Identified reticulation mains with capacity constraints

**Sewer network system performance assessment;**

Following were sewer mains that were identified as mains that need amplification as these mains experienced a peak wet weather flow for 1: 5 year ARI event exceeding the pipe full capacities. The lines marked in the following figures have been included in 2019 DSP.


Figure 7: Sewer Gravity mains with capacity constraints in Erina Syphon Service Area

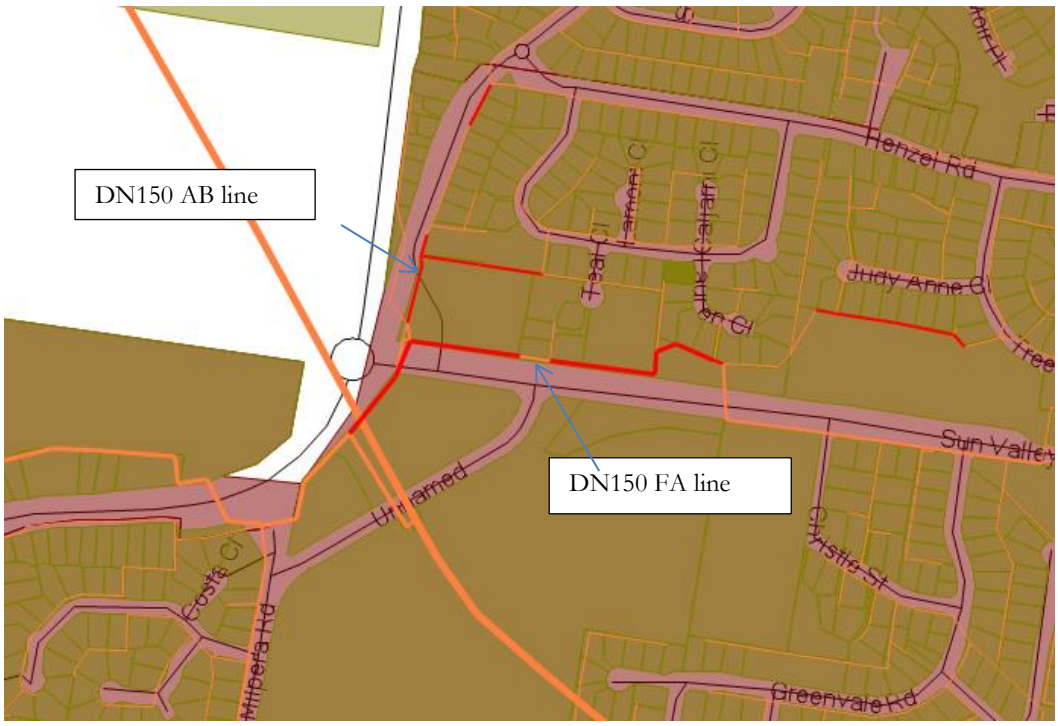


Figure 8: Reticulation mains identified in Erina Green Point Service Area

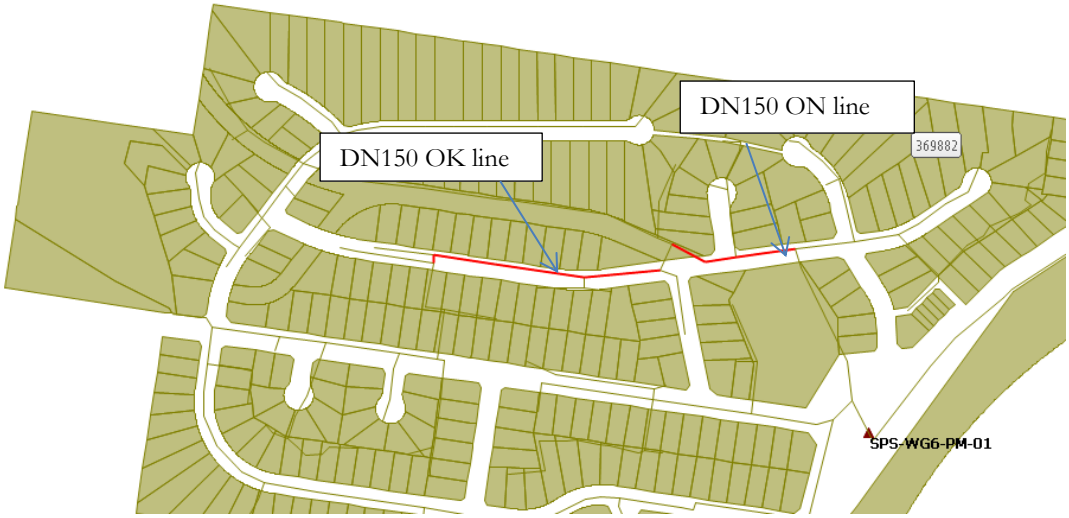


Figure 9: Sewer Gravity reticulation mains in West Gosford Service Area-WG6 catchment


Figure 10: Sewer Gravity main identified in West Gosford_WG3 catchment

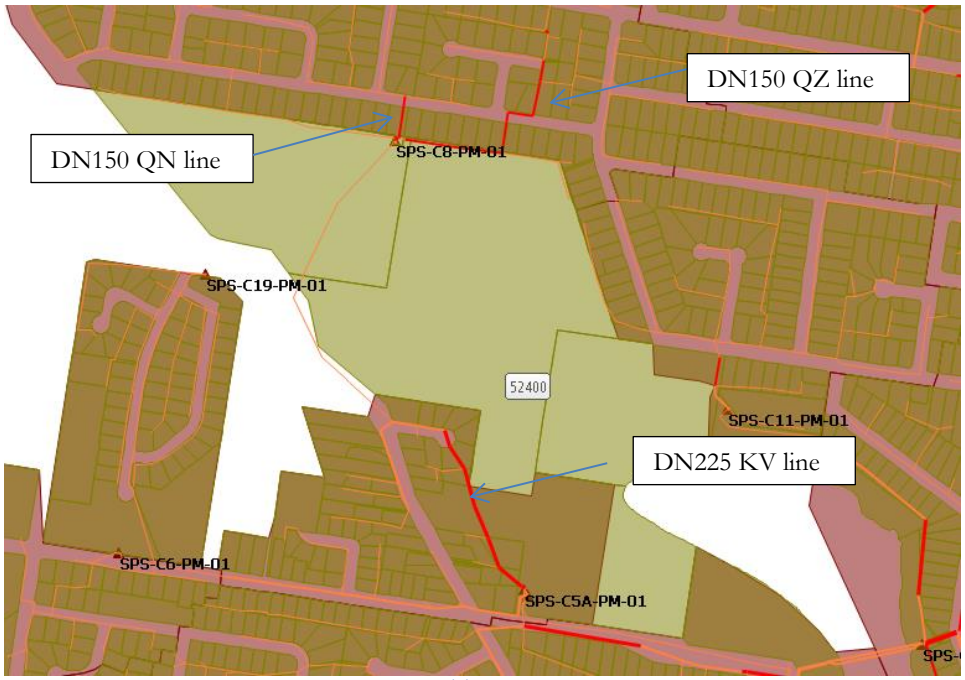


Figure 11: Sewer Gravity mains identified in Terrigal Major Service Area_C8 and C5A catchments

## 4. Pump Station Performance Assessment

2012 Master Plan had identified the pump stations that need amplifications on emergency storage and pump capacity by assessing dry weather emergency storages and by assessing peak wet weather at different intensities of wet weather events. Peak wet weather have been carried out for 1in 2 yr ARI, 1in 5 yr ARI and 1 in 10Yr ARI rainfall events. Some of the pump stations identified as capacity restricted in 2012 have been amplified already.

The assessment carried out for new Local Environment Plan (LEP) assessment also carried out an analysis on the pump capacity for each catchment. All sewer systems were assessed for 1in 5 yr ARI event and pump stations that had a capacity less than or close to the peak wet weather flow were for current scenario were selected for as SPSs that need amplification.

Two sewer models were used to assess future wet weather flow;

- Master Plan Model 2012; The average and peak dry weather in each catchment was assessed by running dry weather flow runs for model scenarios in Master Plan 2012 model for future(2026,2031,2036). The growth up to 2031 horizon in each catchment was assessed by these results.
- Calibrated model 2015; The storm allowance for each catchment was calculated based on dry weather and wet weather flow in the calibrated model(2015). The future wet weather flow was calculated based on future dry weather flow and storm allowance in each catchment. Proposed pump capacity was decided on the above procedure.

The current emergency storage time for each pump station was assessed by using the current calibrated model. The future emergency storage time for each pump station was assessed by calculating the holding time proportionately to the growth within the catchment.

Rising main velocity for the current pump capacities were obtained from the current calibrated model. The rising mains that had velocities higher than 2.5 m/s were identified for amplifications. In addition the rising main velocities were assessed for future pump capacities and proposed for amplification if the velocities were higher than 2.5 m/s.

## 5. 2014 DSP

2014 DSP indicated some assets that were identified to improve the system performance in Narara and Niagara Park and Lisarow. They are mostly link mains to connect dead ends and are aimed to system performance and water quality in the above areas. They have been included in 2019 DSP.

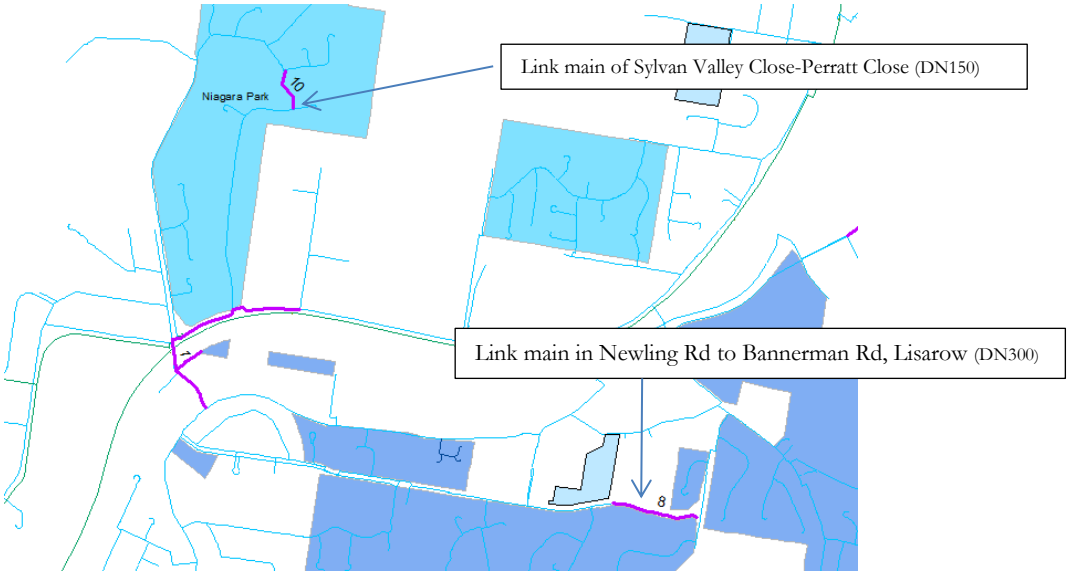


Figure 12: link mains in Narara and Lisarow areas

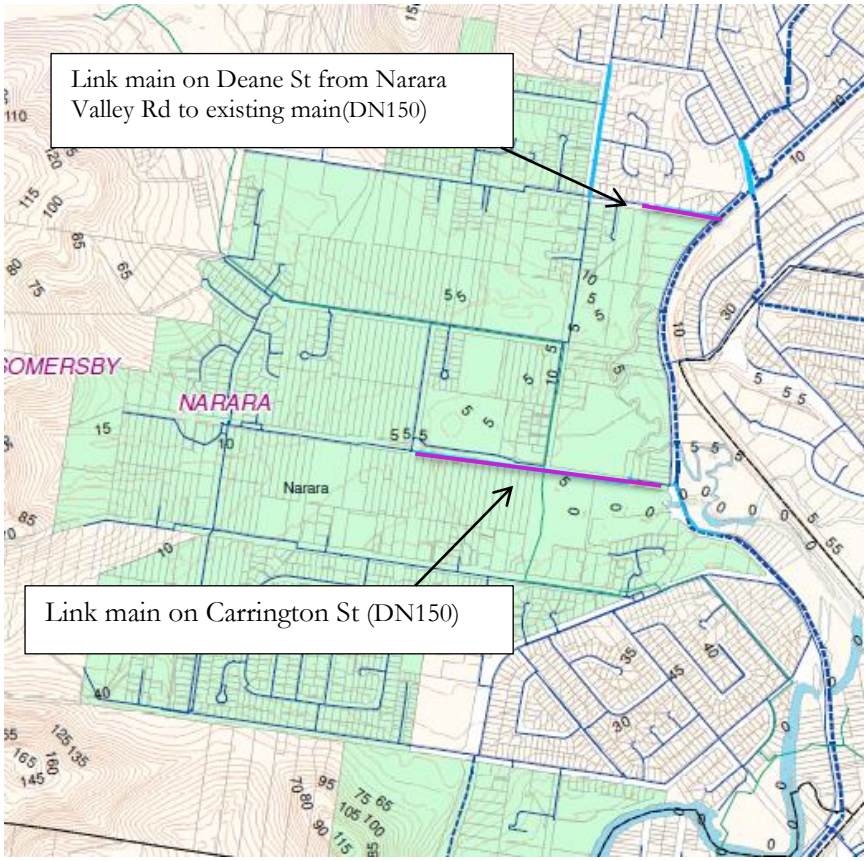


Figure 13: Link mains in Narara

***References:***

1. Water and sewerage Master Plan 2051- water system tech memoranda-2012
2. Water and sewerage Master Plan 2051- sewer system tech memoranda-2012
3. Servicing and Infrastructure capacity Analysis-2018
4. Terrigal Major sewer Pump Station Detailed Design Report -2000
5. Coastal Carrier Strategy Briefing Paper-Chris McDonald-2019
6. Gosford NAVGS detail design report-AECOM-2012