

**Appendix E**  
**Methodology for Sewerage Capital Works**

Sewer network augmentations were decided based on three studies carried out as following;

- Master Plan 2012
- Terrigal Major Strategy and Coastal Carrier Strategy
- System assessments carried out for Local Environmental planning (2018)
- Pump Station system performance Analysis

#### *Master Plan 2012;*

The strategy was developed with the consideration of current capacity, performance and future growth.

- Development of level of service for Sewer services
- Analysis of Population Growth and identifying Future Service Areas
- Derive dry weather and wet weather flows for each horizon and assess system performance for each horizon
- Preparation of Sewer System Servicing Strategy

The storm flow analysis has been based on the rational method as described within the for infiltration and inflow analysis WSA 02 code. A course validation of the parameters of the applied rational method has been undertaken. As the system ages it is likely to allow increased IIF. A deterioration allowance of 0.5% per year has been applied to predicted storm and GWI flows. This equates to 20% increases of storm flows between 2011 and 2051.

Master Plan has analysed the requirements of the potential service areas that have Onsite Sewerage Management (OSSM) in operation that need to be connected to the system in future.

Also the new reticulation mains required for Future Development Areas have been identified the sewer gravity mains (mostly DN 150) as shown following;

	Un-serviced Area (Ha)	ET	Timing	Sewer Gravity main	Sewer Rising main	SPS
<b>DSP Area</b>				(DN 150)	(DN100)	
Wyoming East	88	199	2021-2031	1636		
Kariong	16	66	2019-2031		250	1(5l/s)
Erina (East of James Sea Dr	31	219	2021-2031	583		
Lisarow	15	14	2015-2031	214		
<b>Investigation and Future Development</b>						
Erina Heights	167	2667	2031-2051	12100		
Killcare Heights	9	33	2021-2031	1109		
Wamberal North	121	139	2031-2051	11100		
Wamberal 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(5 l/s)
<b>Rezoning of Non-Urban Lands</b>						
Narara Eco Village	12	150	2020-2031	296 (DN225)		

Master Plan study identified the SPSs that needed emergency storages by analysing the dry weather flow for current and future and upgrades of storages of three major pump stations (NAMJ, WYMJ and TMJ) were identified. 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.

*Coastal Carrier Strategy and 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. In the recent past there had been rapid residential development in the northern most section of Terrigal catchment. These consist of Forrest Glen Retirement village and Bakali Rd subdivisions. Also there is considerable development proposed in Terrigal Haven area and Terrigal Centre (SPS C1 Catchment) in near future. Following table shows the anticipated development contributing to Coastal Carrier flow.

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

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. Coastal Carrier Strategy has looked at the major infrastructure that is necessary to hold the above flow. Also, reassessment of the Coastal Carrier Strategy is planned for 2019/2020 that may result in a change in the currently identified infrastructure. Following major assets have been identified by the studies carried up to now.

1. DN 525 Gravity main duplication from SPPS CB5B and C10 ring main end to SPS C4
2. DN 600 TMJ Rising main duplication (Two sections of length)
3. Additional storages and ERS at TMJ pump station
4. NAMJ SPS capacity upgrade, storage upgrade and ERS
5. NAMJ rising main duplication up to Kincumber Tunnel
6. Relocation and upgrading of SPS A7 and re-directing of rising main

Further details are shown in Figure 2 and Figure 3 of Summary of Developer Servicing Strategies South 2019 (Appendix G).

*Servicing and Infrastructure Capacity Analysis 2018;*

Under the above study 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<sup>2</sup> instead of 550m<sup>2</sup>). The CCC south sewer network was assessed to identify the assets that need amplification for the current demand with the potential additional lots.

Some sewer mains were identified as mains that needed amplifications as these mains experienced a peak wet weather flow for 1: 5 year ARI event exceeding the pipe full capacities. The locations are shown in Figure 7, Figure 8, Figure 9 & Figure 10 of Summary of Developer Servicing Strategies South 2019.