

5.3.4 The Assonora Water Supply Scheme

(1) System Development Plan

a. Expansion of the Treatment Plant

The Assonora WTP has a capacity of 42,000m³/day. It currently receives 15,000 m³/day of treated water from the Podocem WTP, which is part of the Sanquelim WSS. It is proposed that an extra 8,000 m³/day of treated water will be supplied from the Podocem WTP to the Assonora WTP until 2012, as shown in Figure 53.16. This will result in a total transmission of 23,000 m³/day of treated water from the Podocem WTP to the Assonora WTP. However, when the expansion of the existing Assonora WTP is completed, the transmission volume from the Podocem WTP will be returned to the current 15,000 m³/day level.

The existing plant, constructed in 1968, has a capacity of 12,000 m³/day. It is proposed that this plant be abandoned in 2012, due to its age and because a new plant is expected to be constructed by that time. Although the PWD has a plan of 40,000 m³/day augmentation, it is recommended that the plant capacity be expanded to 50,000 m³/day in 2012, to meet demand from the Assonora WSS.

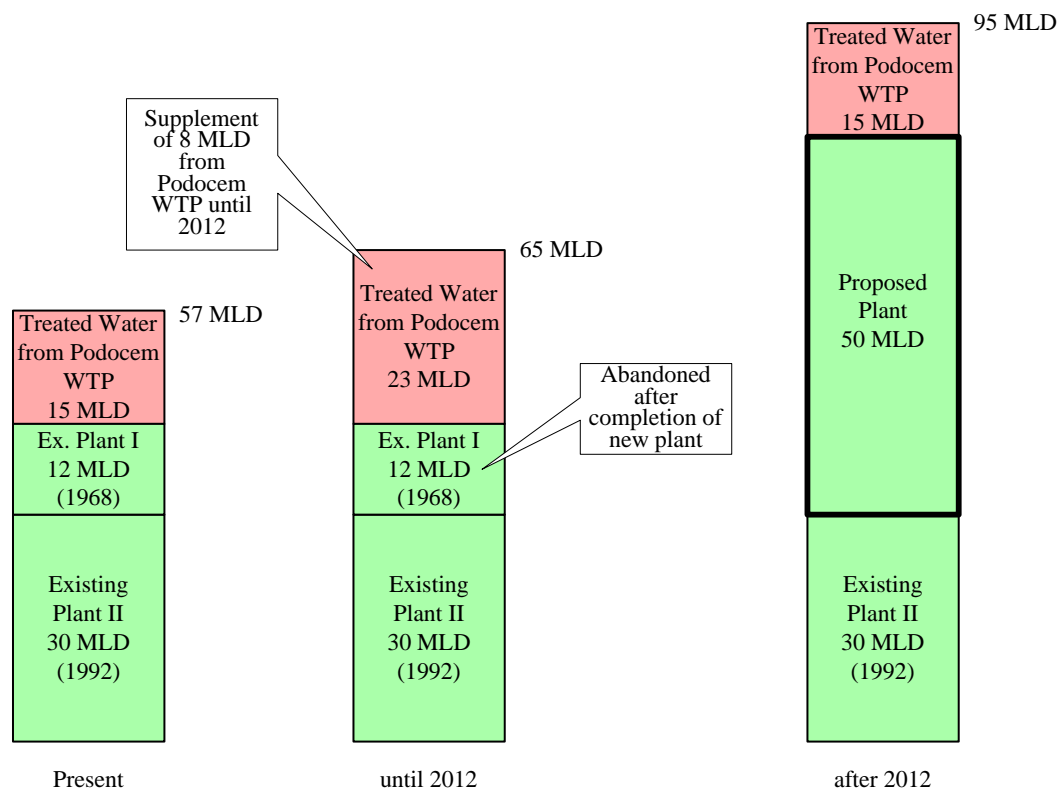


Figure 53.16 Supply Capacity of the Assonora WTP

The relationship between the daily maximum water demand and the supply capacity for the Assonora WSS is shown in Figure 53.17.

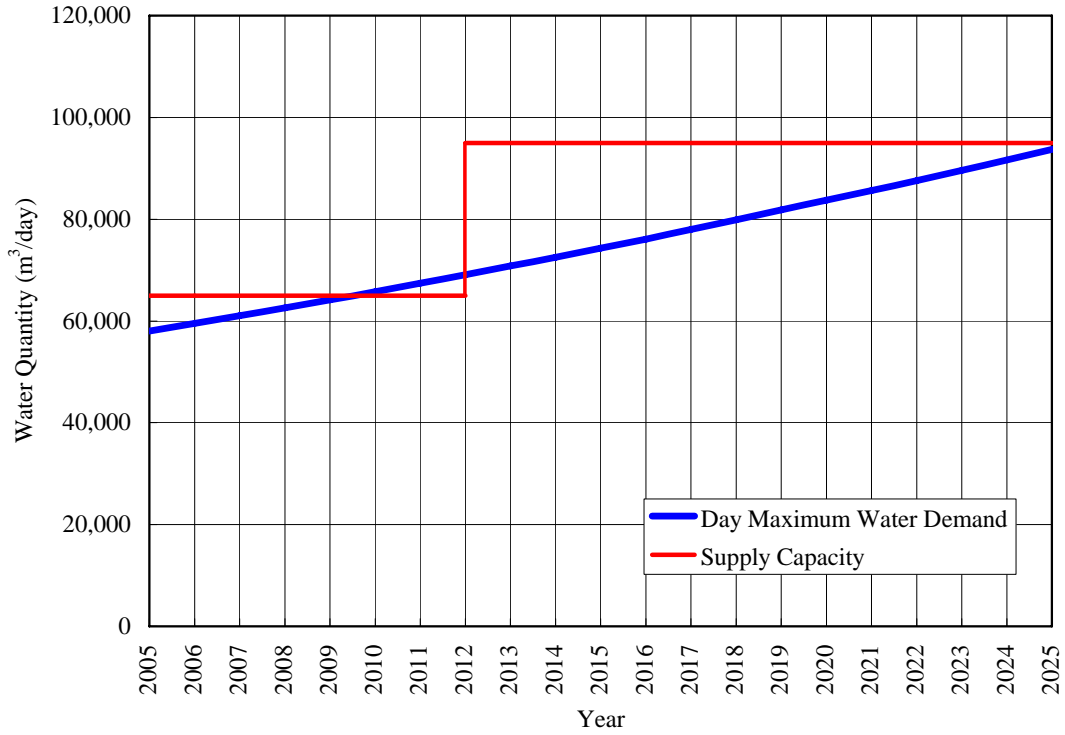


Figure 53.17 Relationship between Daily Maximum Water Demand and Supply Capacity for the Assonora WSS

b. Transmission Plan

The proposed transmission plan for the Assonora WSS in 2025 is shown in Figure 53.18.

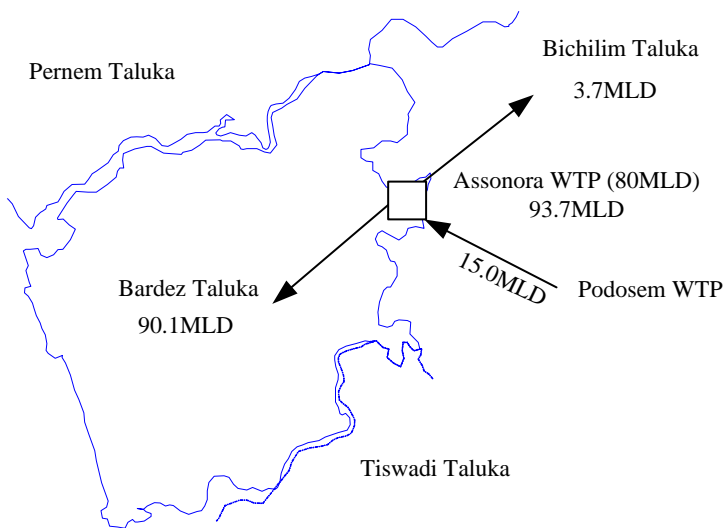


Figure 53.18 Transmission Plan for the Assonora WSS

(2) Treatment Plant

a. Water treatment plant capacity

The existing Assonora WTP has a capacity of 42 MLD, excluding the 15 MLD supplied from the Podocem WTP. It is recommended that the existing 12MLD plant, commissioned in 1968, be abandoned in 2012 due to its age. This will reduce the plant capacity from 42 MLD to 30 MLD. The master plan proposes that an extra 50 MLD of new water treatment capacity is required to address water shortages that are expected in 2025. Therefore, the plant capacity will increase from 42 MLD (12 MLD + 30 MLD) to 80 MLD (30 MLD + 50 MLD). According to the Water Resources Department, the water resource availability for the Assonora WTP is 250 MLD from the Tillari Canal, which is enough for the future expansion.

b. Proposed Water Treatment process

The proposed water treatment process for the new water treatment plant consists of contact aeration, a coagulation basin, flocculation/sedimentation, sand filtration and chlorination. This process was designed with consideration of the raw water quality and existing process conditions (See Figure 53.19).

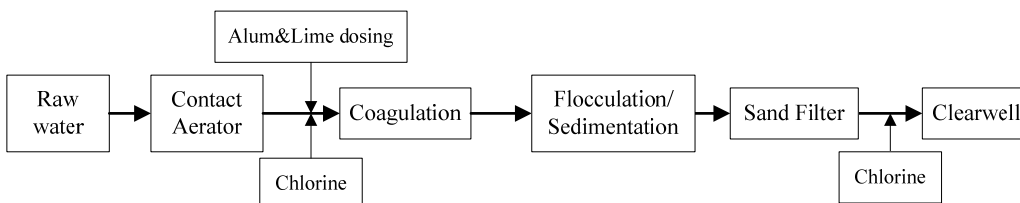


Figure 53.19 Proposed Water Treatment Process at the Assonora WTP

c. Implementation Schedule

The timeline for the implementation schedule of WTP is shown in Table 53.20. Rehabilitation and improvement of the existing water treatment plant will be conducted during Stage I. Installation of chlorine safety equipment, replacement of equipment that has exceeded its design life, and installation of a generator and flow meters will be conducted over this period. It is recommended that a new treatment plant with a capacity of 50 MLD is constructed during Stage I.

Table 53.20 Implementation Schedule for Assonora WTP

Stage		Existing Plants	New Plants
Stage I	Components	<ul style="list-style-type: none"> - Installation of safety equipment - Replacement of raw water pumps and backwash pumps - Installation of generator and flow meters - Modification of coagulation process 	Expansion of 50 MLD plant

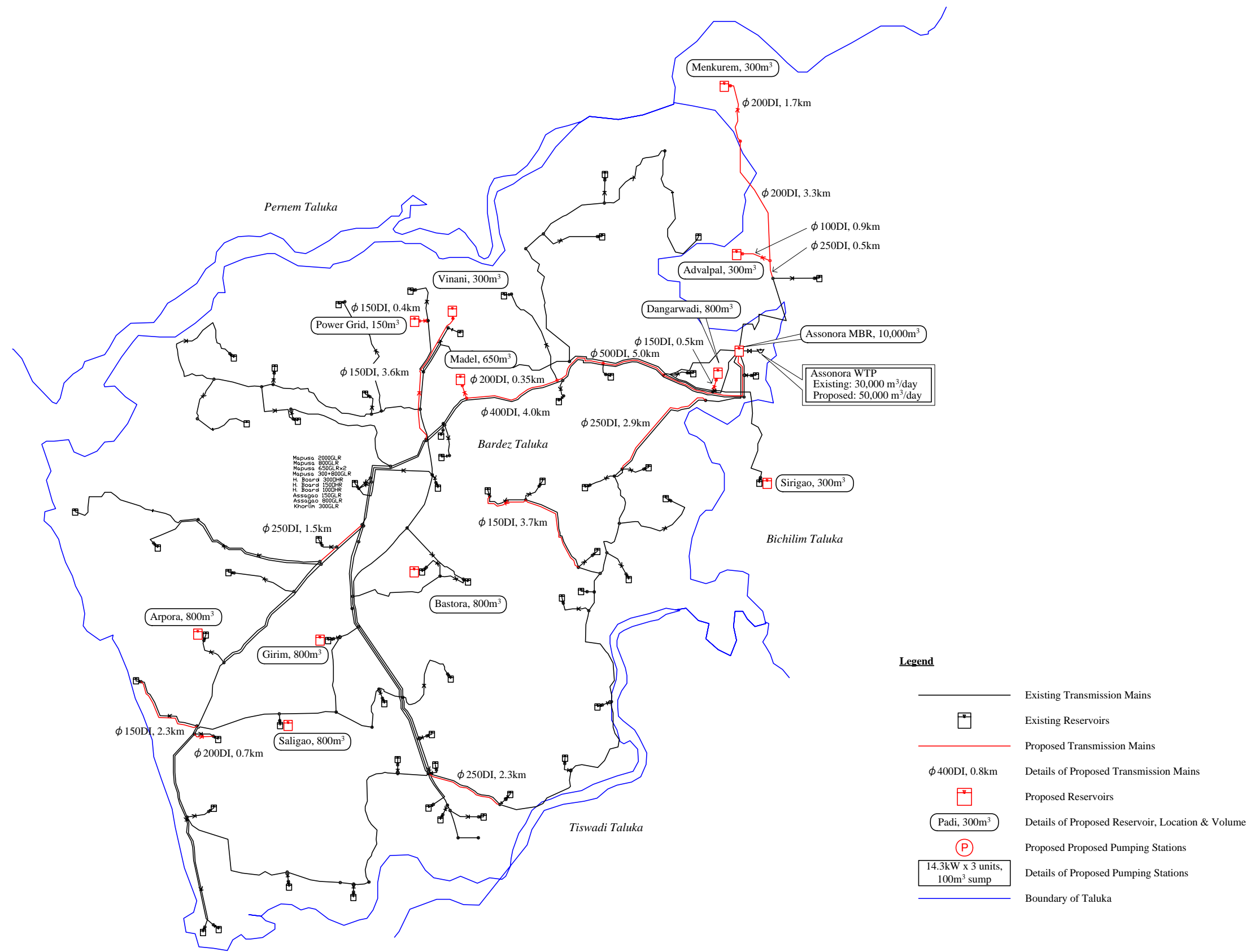
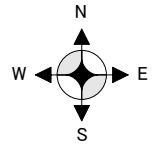
(3) Transmission System

a. Proposed Transmission System

To cover the future service areas and to meet the increased demand, the transmission system shown in Figure 53.20 and summarised in Table 53.21 is proposed. Calculations using WaterCAD are attached in Volume IV Appendix M53 Results of Hydraulic Analysis.

Table 53.21 Proposed Transmission Mains for the Assonora WSS

Material	Diameter (mm)	Length (km)
Ductile Iron	500	5.00
	400	4.00
	250	7.20
	200	6.05
	150	10.50
	100	0.90
Total		33.65



Legend

	Existing Transmission Mains
	Existing Reservoirs
	Proposed Transmission Mains
	Proposed Reservoirs
	Proposed Proposed Pumping Stations
	Details of Proposed Reservoir, Location & Volume
	Details of Proposed Pumping Stations
	Boundary of Taluka

Not to scale

Figure 53.20 Proposed Transmission System for the Assonora WSS in 2025

b. Rehabilitation of the Existing Transmission System

The Master Plan recommends the replacement of 30% of old transmission pipes installed before 1975, which is an estimated length of 6.0 km, to secure the transmission system of the Assonora WSS.

(4) Reservoirs

a. Proposed Reservoirs

To supply treated water to an expanded service area, construction of thirteen reservoirs (as listed in Table 53.22) is proposed. Locations and volumes of the proposed reservoirs are shown in Figure 53.20.

Table 53.22 List of Reservoirs proposed for the Assonora WSS

Location	Capacity (m ³)	Remarks
Assonora MBR	10,000	addition to the existing reservoir of 10,000 m ³
Advalpal	300	-
Menkurem	300	-
Sirigao	300	addition to the existing reservoir of 50 m ³
Dangarwadi	800	-
Madel	650	-
Power Grid	150	-
Vinani	300	-
Bastora	800	addition to the existing reservoir of 250 m ³
Girim	800	addition to the existing reservoir of 150 m ³
Saligao	800	addition to the existing reservoir of 800 m ³
Arpora	800	addition to the existing reservoir of 150 m ³
Housing Board Porvolim	650	

b. Rehabilitation of the Existing Reservoirs

The Assonora WSS has 85 reservoirs, as summarised in Table 53.23. A detailed list of the reservoirs is attached in Volume IV Appendix M31 Existing Water Supply System. Table 53.23 also identifies the reservoirs that need to be rehabilitated.

Table 53.23 Number of Existing Reservoirs

Reservoir Volume (m ³)	Number of Reservoirs	
	Existing	to be rehabilitated
2,000 & 3,000	2	0
800 & 650	18	4
250, 300, 350	27	5
150	29	6
100 and less	9	2
Total	85	17

Note: not include the reservoirs at Assonora WTP

(5) Pumping Station

a. Proposed Pumping Station

According to the Master Plan, the Assonora WSS does not require the construction of new pumping stations.

b. Rehabilitation of the Existing Pumping Station

The design life of the pumping equipment is assumed to be 15 years. Therefore the pumping equipment in all the existing pumping stations will need to be replaced by 2025. Details are shown in Table 53.24.

Table 53.24 Pumping Equipment Replacement Details

Name of Station	Pumping Unit (pump and motor)	
	Rated Output (kW)	No. of Units
Mapusa	5.9	3
Socorro	4.7	2
Pundalik Nagar	2.3	3
Porvorim	5.0	3
Torda	10.3	3
P.D.A. Colony	33.4	3

(6) Distribution Pipeline and House Connections

a. Proposed Distribution Pipeline and House Connections

The proposed length of distribution pipelines was calculated by multiplying the number of house connections to be installed (which reflects the increase in population served) by the unit pipeline length per connection (which is 14.26m as mentioned in section 5.1.2). Table 53.25 shows the proposed number of house connections and length of distribution pipelines.

Table 53.25 Proposed Number of House Connections and Length of Distribution Pipelines in the Assonora WSS (incremental basis)

Year	2007	2008	2009	2010	2011	2012	2013
Distribution Pipeline (m)	16,648	16,941	17,286	17,610	17,966	18,293	18,660
Number of House Connection	1,167	1,188	1,212	1,235	1,260	1,283	1,309
Year	2014	2015	2016	2017	2018	2019	2020
Distribution Pipeline (m)	19,049	19,409	19,806	20,220	20,640	21,064	21,488
Number of House Connection	1,336	1,361	1,389	1,418	1,447	1,477	1,507
Year	2021	2022	2023	2024	2025	Total	
Distribution Pipeline (m)	21,474	21,930	22,393	22,839	23,336	377,055	
Number of House Connection	1,506	1,538	1,570	1,602	1,636	26,442	

b. Rehabilitation of the Existing Distribution Pipelines and House Connections

The design life of the distribution pipelines is assumed to be 50 years. It is planned that 2 % of the existing 724km of distribution pipelines will be replaced every year. This will total 38 % from 2007 to 2025. As a result, the existing 275 km of distribution pipelines will be replaced with new pipelines during the 19 years from 2007 to 2025.

The design life of the water meters at the house connections is assumed to be 10 years. It is planned that all 55,355 existing water meters will be replaced within 10 years. As a result about 116,500 water meters will be replaced during the 19 years from 2007 to 2025.

(7) Summary of the Planning

The components of the Assonora WSS master plan are summarised in Table 53.26. Figure 53.21 depicts the proposed Assonora WSS in 2025.

Table 53.26 Components of the Assonora WSS Master Plan

Facility	Proposed	Rehabilitation/ Replacement
Treatment Plant	50,000 m ³ /day	30,000 m ³ /day
Transmission Main	41 km	6 km
Reservoir	16	14
Pumping Station	1	2
Distribution Pipeline	377 km	275 km
House Connection	26,442	116,500

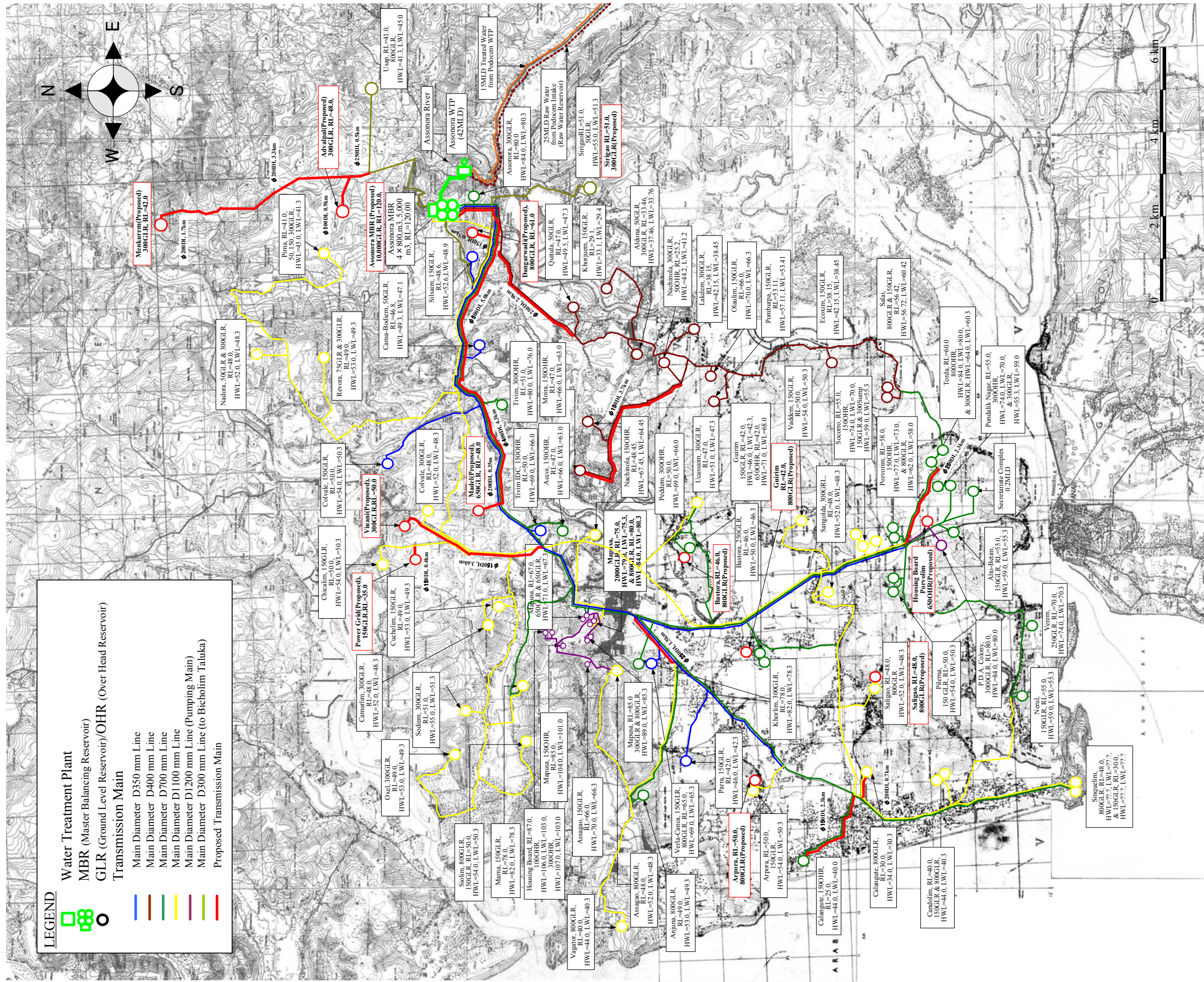


Figure 53.21 Proposed System for the Assonora Water Supply Scheme in 2025