

5.3.5 Sanquelim Water Supply Scheme

(1) System Development Plan

a. Expansion of the Treatment Plant

The Sanquelim WSS has two water treatment plants. The Podocem WTP has a capacity of 40,000 m³/day and the Sanquelim WTP has a capacity of 12,000 m³/day. Currently the Sanquelim WSS transfers 15,000 m³/day of treated water from the Podocem WTP to the Assonora WSS. It is proposed that an additional 8,000 m³/day of treated water will be supplied from the Podocem WTP to the Assonora WTP until 2012. Therefore the total amount of treated water transferred from the Podocem WTP to the Assonora WSS will be 23,000 m³/day.

The relationship between the daily maximum water demand and the supply capacity for the Sanquelim WSS is shown in Figure 53.22.

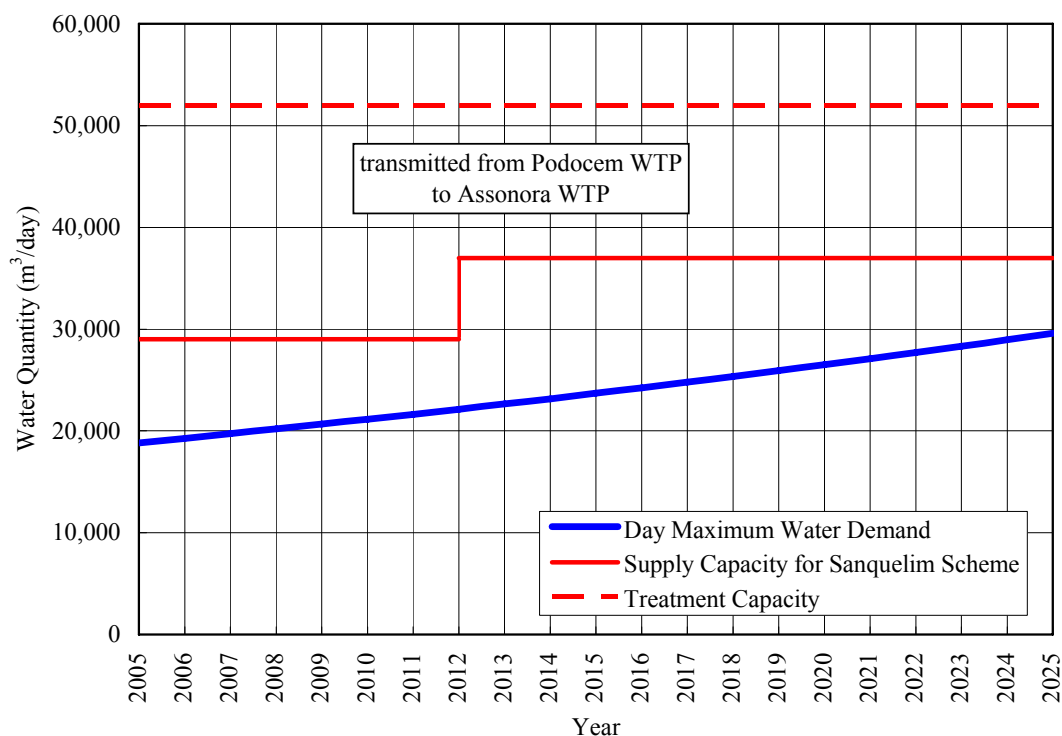


Figure 53.22 Relationship between Daily Maximum Water Demand and Supply Capacity for the Sanquelim WSS

As shown in Figure 53.22, the Sanquelim WSS can meet demand until the year 2025. Therefore an expansion of the existing treatment plant is not required.

b. Transmission Plan

The proposed transmission plan for the Sanquelim WSS in 2025 is shown in Figure 53.23.

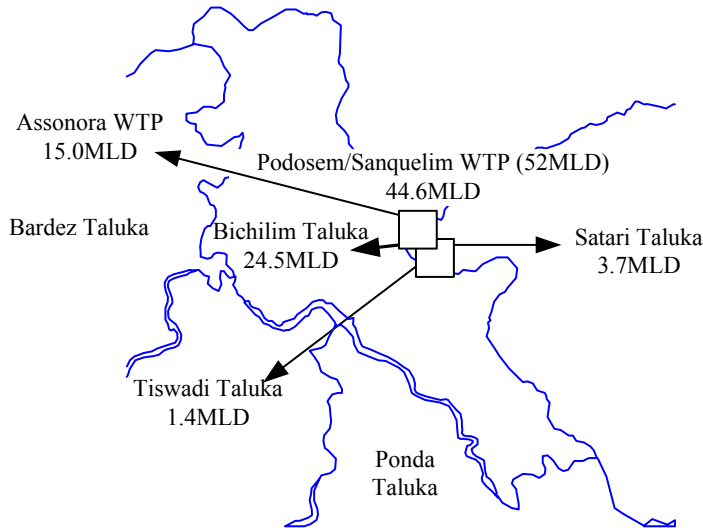


Figure 53.23 Transmission Plan for the Sanquelim WSS

(2) Treatment Plant

a. Water treatment Plant Capacity

The total capacity of 52 MLD covers the projected water demand of Bicholim Taluka in year 2025, and includes 15 MLD for the Assonora WSS. Therefore, the master plan does not propose an expansion of the water treatment capacity.

b. Implementation Schedule

The timeline for implementing the WTP plan is shown in Table 53.27. Rehabilitation and improvement of the existing water treatment plants will be conducted in two stages. Stage I will involve the rehabilitation and improvement of the Sanguelim WTP. Stage II will involve the rehabilitation and improvement of the Podocem WTP. 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 these two stages. To improve water quality, pre-chlorination equipment will be installed to remove iron, and the coagulation process will be modified to reduce turbidity.

Table 53.27 Implementation Schedule for Sanquelim WTP

Stage		Existing Plants
Stage I	Components	Mainly Rehabilitation and Improvement for Sanquelim WTP - Installation of safety equipment (Sanquelim & Podocem) - Replacement of raw water pumps and backwash pumps - Installation of generator and flow meters (Sanquelim & Podocem) - Installation of pre-chlorination equipment - Modification of coagulation process
Stage II	Components	Mainly Rehabilitation and Improvement for Podocem - Replacement of raw water pumps and backwash pumps - Installation of generator - Installation of pre-chlorination equipment - Modification of coagulation process

(3) Transmission System

a. Proposed Transmission System

The transmission system shown in Figure 53.24 and summarized in Table 53.28 is proposed to cover future service areas and to meet the increase in demand. Calculations using WaterCAD are attached in Volume IV Appendix M53 Results of Hydraulic Analysis.

Table 53.28 Proposed Transmission Mains for the Sanquelim WSS

Material	Diameter (mm)	Length (km)
Ductile Iron	250	4.40
	100	3.00
Total		7.40

b. Rehabilitation of the Existing Transmission System

The Sanquelim WSS has a total length of 4.2 km asbestos cement (AC) pipelines installed from 1957 to 1971 (Sector Status Study – WSS Goa, 2004) as the transmission mains to distribution reservoirs. The Study proposes that the existing 4.2 km of AC pipelines will be replaced with ductile iron pipes to secure and stabilize the transmission system..

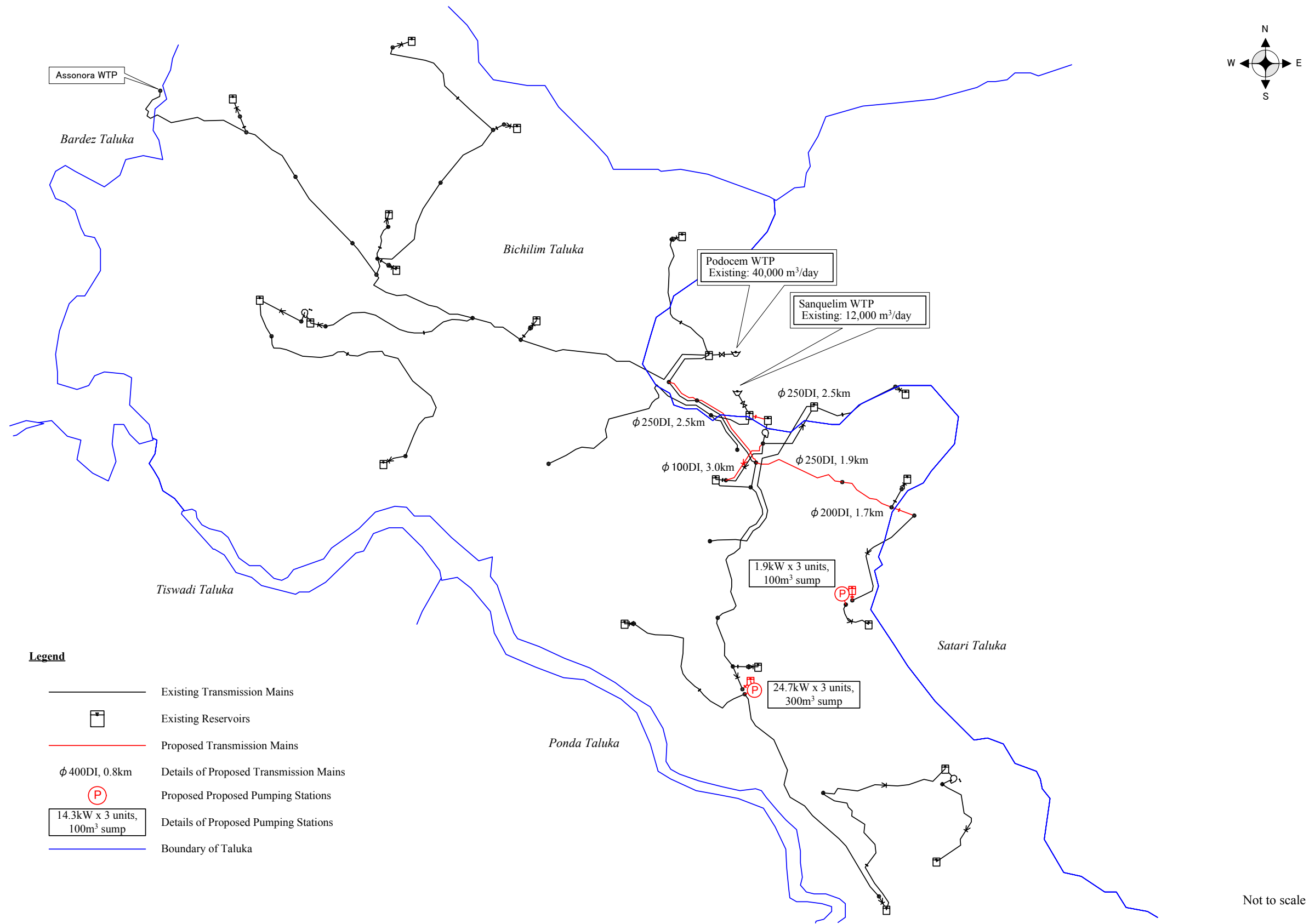


Figure 53.24 Proposed Transmission System for the Sanquelim WSS in 2025

(4) Reservoirs

a. Proposed Reservoirs

The master plan does not provide for construction of new reservoirs within the Sanquelim WSS, because the Sanquelim WSS covers almost all of the Bicholim Taluka and its supply condition is superior to other WSSs.

b. Rehabilitation of the Existing Reservoirs

The Sanquelim WSS has 26 reservoirs, as summarized in Table 53.29. A detailed list of the reservoirs is attached in Volume IV Appendix M31 Existing Water Supply System. Table 53.29 also identifies the reservoirs that need to be rehabilitated.

Table 53.29 Number of Existing Reservoirs

Reservoir Volume (m ³)	Number of Reservoirs	
	Existing	to be rehabilitated
800	6	2
300	12	2
150	4	1
100 and less	4	
Total	26	5

Note: not include the reservoirs at Podocem WTP and Sanquelim WTP

(5) Pumping Station

a. Proposed Pumping Stations

Hydraulic analysis shows that the following pumps are required to deliver the treated water to the existing reservoirs:

- Dignem Pumping Station: 3 X 1.9 kW pumping equipment with 100 m³ sump
- Navelim Pumping Station: 3 X 24.7 kW pumping equipment with 300 m³ sump

b. Rehabilitation of the Existing Pumping Stations

The design life of the pumping equipment is assumed to be 15 years. Therefore, the pumping equipment in all the existing pumping stations should be replaced by 2025. Details are shown in Table 53.30.

Table 53.30 Pumping Equipment Replacement Details

Name of Station	Pumping Unit (pump and motor)	
	Rated Output (kW)	No. of Units
Lamgao	16.2	3
Sanquelim	13.3	3
Vlgem	3.6	3

(6) Distribution Pipeline and House Connection

a. Proposed Distribution Pipeline and House Connection

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 53.31 shows the proposed number of house connections and length of distribution pipelines.

Table 53.31 Proposed Number of House Connections and Length of Distribution Pipelines in the Sanguelim WSS (incremental basis)

Year	2007	2008	2009	2010	2011	2012	2013
Distribution Pipeline (m)	4,769	4,818	4,882	4,925	4,963	5,002	5,068
Number of House Connection	334	338	342	345	348	351	355
Year	2014	2015	2016	2017	2018	2019	2020
Distribution Pipeline (m)	5,128	5,201	5,172	5,242	5,308	5,361	5,427
Number of House Connection	360	365	363	368	372	376	381
Year	2021	2022	2023	2024	2025	Total	
Distribution Pipeline (m)	5,465	5,517	5,583	5,651	5,706	99,189	
Number of House Connection	383	387	392	396	400	6,956	

b. Rehabilitation of the Existing Distribution Pipeline and House Connections

The design life of the distribution pipelines is assumed to be 50 years. It is planned that 2 % of the existing 160km of distribution pipeline will be replaced every year. This will total 38 % from 2007 to 2025. As a result the existing 61km of about 61 km will be replaced with new pipelines during the 19 years from 2007 to 2025.

The design life of house connections is assumed to be 10 years. It is planned that all 17,996 existing house connections will be replaced within 10 years. As a result about 37,330 house connections will be replaced during the 19 years from 2007 to 2025.

(7) Summary of Planning

The components of the Sanquelim WSS master plan are summarized in Table 53.32. Figure 53.25 depicts the Sanquelim WSS in 2025.

Table 53.32 Components of the Sanquelim WSS Master Plan

Facility	Proposed	Rehabilitation/ Replacement
Treatment Plant	-	52,000 m ³ /day
Transmission Main	7.4 km	4.2 km
Reservoir	0	5
Pumping Station	2	3
Distribution Pipeline	99 km	61 km
House Connection	6,956	18,000

(8) Additional Plan proposed by the PWD

The additional plan is proposed by the PWD.

1. The conveying main from Valpoi Nanus to Cotorem, initial stretch is shown of 150 mm dia pipelines and after branching for the water supply to Padeli, the pipeline is proposed to be of 200 mm dia. This lines should be of 200 mm dia at the initial stretches upto Cortorem and then it should be of 150 mm dia. Further, the pipelines from proposed 150 m³ GLR at Cortorm to proposed 150 m³ GLR at Gawane, should be of 150 mm dia instead of 100 mm dia as shown.
2. 150 m³ GLR at Charaunem of V.P. Thane is required.
3. 600m³ MBR at Bhuimpal is desirable for additional storage point of view.
4. 150-m³ reservoirs at Kumbharkan of Village Panchayat Pissurlem is desirable.
5. 300m³ sump at Cotorem as additional storage is desirable.
6. The capacity of intermediate reservoir at Dhava & Kumthal is required to be 150 m³ as against 100m³ provided.
7. 150m³ GLR is required at 130 RL at Rivem.
8. Sanquelim Pumping station to Honda. The actual length is 5 Kms.as against 3.5 kms. considered.
9. Replacing of PVC pipelines from Dodamarg to Sal is desirable.

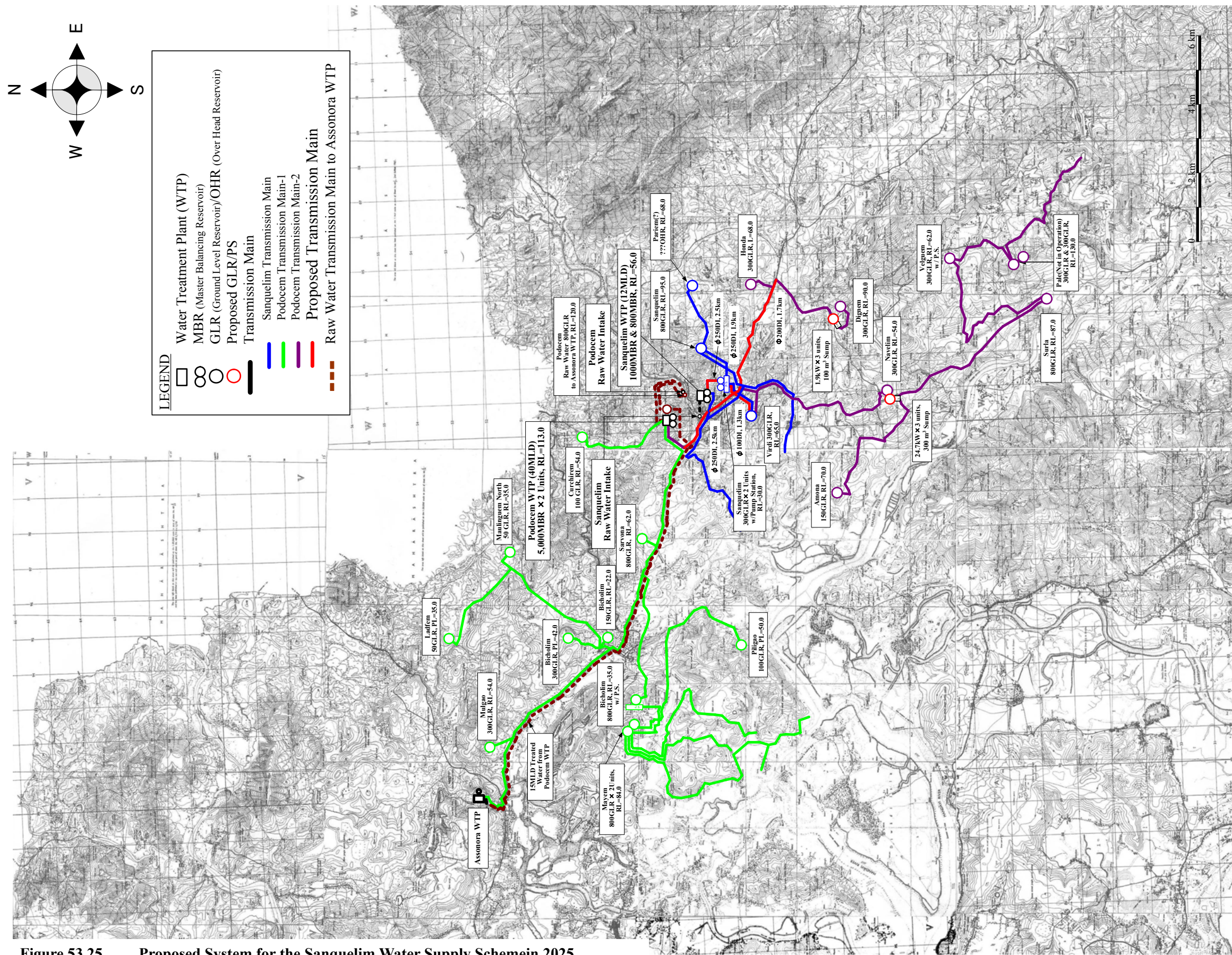


Figure 53.25 Proposed System for the Sanquelim Water Supply Scheme in 2025