Water Transmission Systems (WTS)

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Why do we need WTS?

Supply water to areas with-

- Scarce ground water resources such as Saudi Arabia
- Hill and Mountain Terrain such as Asir Region in Saudi Arabia
- No surface water sources like lakes and rivers

Challenges that WTS designers need to address-

- Design new WTS with incomplete information concerning future water demand.
- Increase in water demand caused by population and economic growth,
- Inadequate operating pressures to meet higher-than-expected demands in the future.
- Pipe-diameter decisions

Safety and Reliability

- Pipe Ruptures
- Pump outage
- Leak Detection

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Case Study

Eastern Province Water Transmission System Phase – 2 Project

- **Customer:** Saline Water Conversion Corporation (SWCC)
- **Consultant:** ILF Engineers
- **Main Contractor**: YUKSEL
- **Sub Contractor:** Siemens N.V./S.A.

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Project Scope

Eastern Province Water Transmission System Phase – 2 Project

- **Complete Design, Engineering and Procurement of I&C System**
  - Field Instruments
  - SCADA & Control System
  - Interfacing of I&C System at Existing Sites of EPWTS Phase 1
  - Control Room Furniture
  - Cabling for Instrumentation and Control Equipment
- **Complete Design, Engineering and Procurement of Telecommunication System**
  - Fiber Optic Communication System
  - PABX and Telephone System
- **Services for I&C and Telecommunication System**
  - Supervision of Installation
  - Startup and Commissioning Services
  - Training and Familiarization Program
  - Warranty Services

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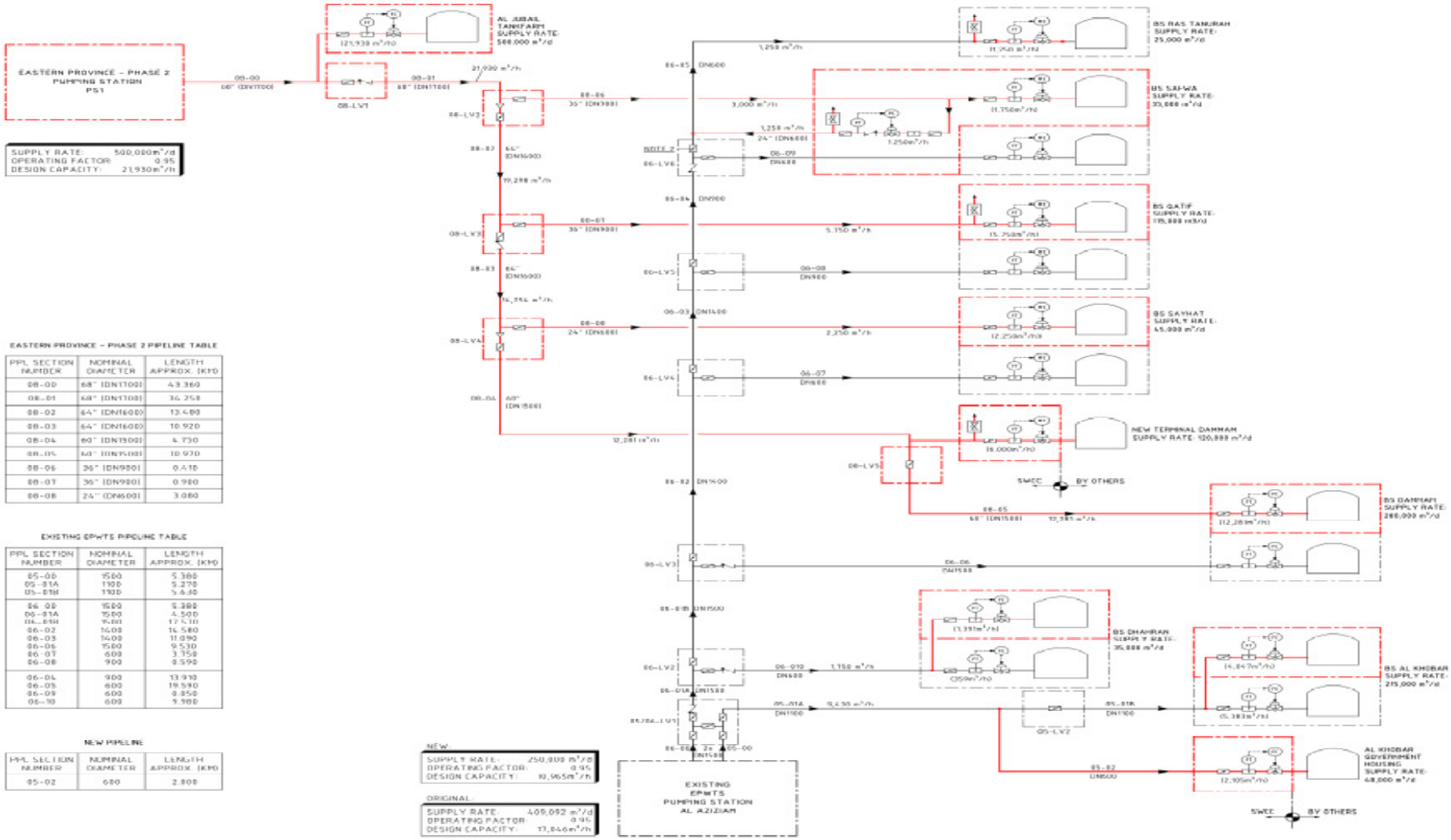
Process Overview



EASTERN PROVINCE – PHASE 2 PIPELINE TABLE

PPL SECTION NUMBER	NOMINAL DIAMETER	LENGTH APPROX. (KM)
08-00	68" (DN1700)	43.360
08-01	68" (DN1700)	36.258
08-02	64" (DN1600)	13.480
08-03	64" (DN1600)	10.920
08-04	60" (DN1500)	4.730
08-05	60" (DN1500)	10.930
08-06	36" (DN900)	0.410
08-07	36" (DN900)	0.980
08-08	24" (DN600)	3.080

EXISTING EPWTS PIPELINE TABLE

PPL SECTION NUMBER	NOMINAL DIAMETER	LENGTH APPROX. (KM)
05-00	1500	5.380
05-01A	1100	5.270
05-01B	1100	5.630
06-00	1500	5.388
06-01A	1500	4.500
06-01B	1400	17.430
06-02	1400	14.580
06-03	1400	11.090
06-05	1500	9.530
06-07	600	3.750
06-08	900	8.590
06-04	900	13.930
06-05	600	19.590
06-09	600	8.850
06-10	600	9.980

NEW PIPELINE

PPL SECTION NUMBER	NOMINAL DIAMETER	LENGTH APPROX. (KM)
05-02	600	2.800

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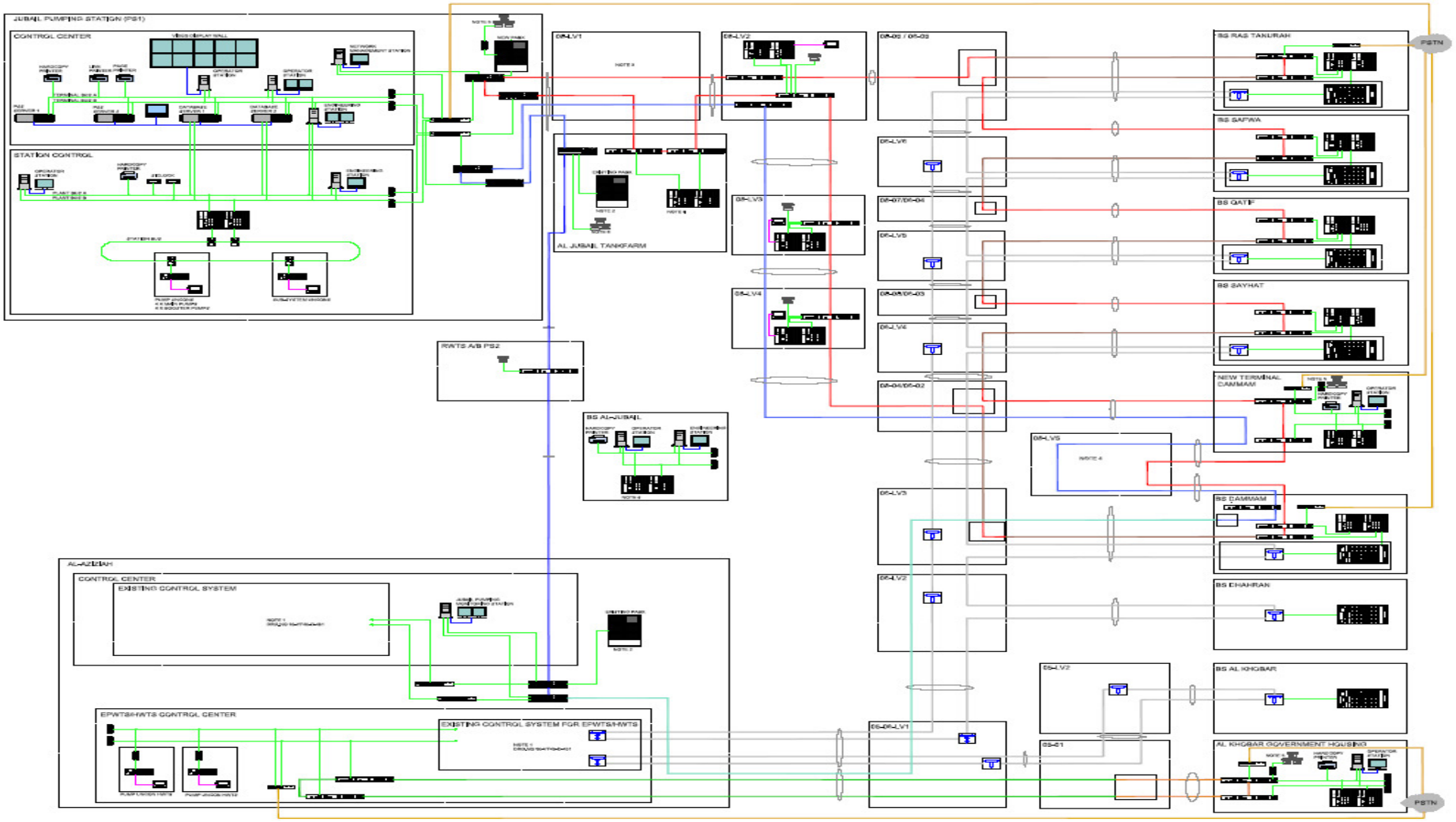
Control Concept



Interfaces

- CS7 Interface – Al-Aziziyah & HWTS
- Third Party Interfaces:
  - Cooling Water System – (Hardwired, Yuksel still finalizing on supplier)
  - Cathodic Protection System – (TCP/IP Interface, Info awaited from Yuksel after meeting dtd. 17/01)
  - Common Signals (F&G, Lighting, UPS, HVAC) – (Hardwired, signals used on assumptions)
  - Surge Vessels & Compressor – (Hardwired, signals used on assumptions)
  - Chlorination System – (Hardwired, signals used on assumptions)
  - Yokogawa Interface – (Hardwired, On-going co-ordination with Yokogawa)
  - DSAL Plant Interface – (Hardwired, Info awaited from Yuksel)

- Signal Interfaces
  - Motors & Pumps – (Termomeccanica)
  - Valves & Actuators – (Magwen) (Still not all valves are confirmed Motorized or Hydraulic ?)
  - Instruments – (Siemens)
  - LV, MV & ATT – (Siemens Belgium) – Typicals received awaiting detailed information).

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Project Progress - Summary

TARGETS ACHIEVED:

- Basic Design for I&C Package submitted to ILF for Approval
- Basic Design for Communication system including PABX submitted to ILF for Approval
- Room Layouts and Panel Typical Drawings for both Control & Communication System are approved
- Cables List & Cable Routing Plan submitted
- IO list are being Finalized: (with assumptions for missing information) - submitted

TASK UNDER PROGRESS:

- Ordering for Instruments and Automation equipment on hold due to Technical Specs & Datasheets not approved by customer.
- Finalization of Panel Manufacturers for the Control System
- Interface report for Existing Site preparation in Progress – to be submitted end of December
- Software Engineering for STATCON and UNCON for PS1 under progress

FUTURE TASKS:

- Panel Manufacturing
- Preparation of IFAT and SAT Procedures
- Procurement of sub-system packages (Communications, PABX, Instruments, SCADA)

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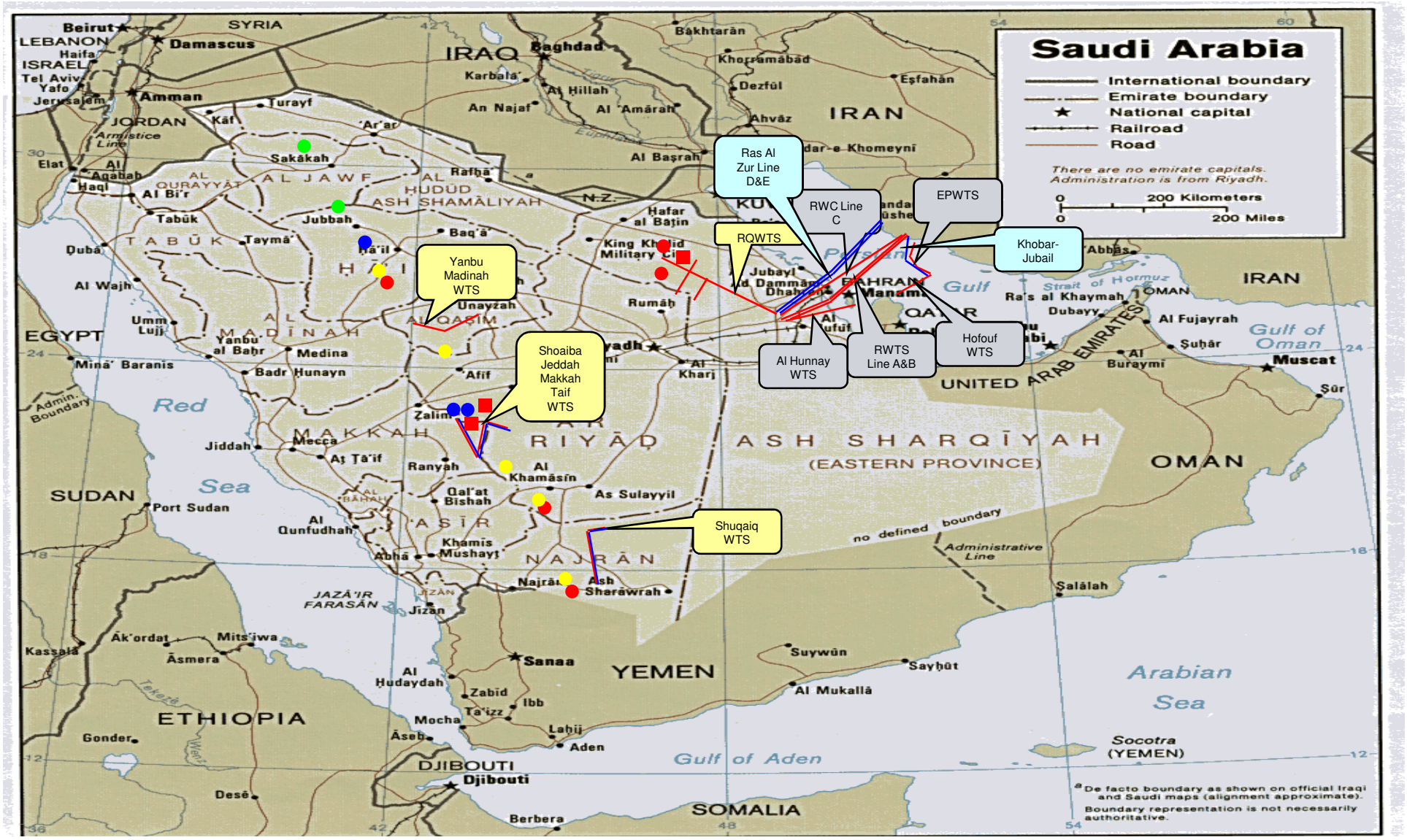
Major Water Transmission Systems



Major WTS in Saudi Arabia

Western Region

1. Al-Shoaibah-Jeddah
2. Makkah-Taif
3. Yanbu-Madinah
4. Aseer
5. Al-Shoaibah Phase 3
6. Rabigh
7. Qunfidah

Eastern Region

1. Eastern province
2. Jubail, Royal Commission, NAVY Base and Jubail Pipelines
3. RIYADH Water Feeding System
4. Khobar-Hofuf
5. Riyadh - Sudair - Qassem
6. Al Khafji
7. Buraydah Feeding System

WT Major Project References

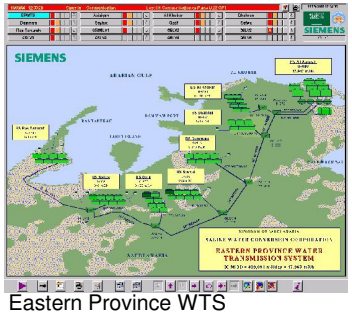
RWTS Jubail Riyadh Line-A&B WTS

- 460 KM WTS & Distribution
- SCADA System
- Human Machine Interface
- Leakage detection system

Largest Potable WS at the time of its implementation in early 80s

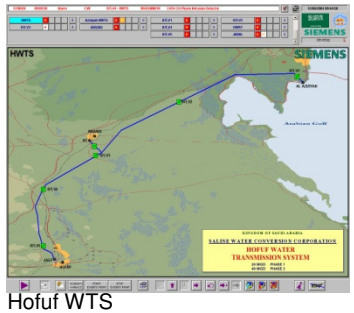
RWTS Jubail Riyadh Line-C WTS

- 460 KM WTS & Distribution
- SCADA System INCLUIDNG HMI
- COMMUNCIATION SYSTEM
- Leakage detection system



Eastern Province WTS

- Spanning Five Major Locations
- Redundant SCADA & Control System
- Human Machine Interface
- Communication through fiber optic cables
- Leakage detection system



Hofuf WTS

- 143 KM WTS & Distribution
- Daily capacity of 20MIGD, with future provision of 40MIGD.
- SCADA , PLC & OTN based telecontrol system
- PTT back up communication
- Pipeline Leakage detection system

Hunnay WTS

- 170 KM twin transmission pipeline
- Daily capacity of 360,000 m3/d
- HV & MV energy distribution
- MV motors and VSDs
- SCADA , PLC & OTN based telecontrol system
- Pipeline leakage detection system