Making Every Drop Count

Water! The very source of life and a vital agent that sustains socio-economic development and biodiversity. However, today's burgeoning population, massive urbanization and relentless industrialisation have gravely diminished water resources leading to severe water scarcity across regions. Estimates indicate that the world could face a 40 percent shortfall between forecasted demand and available supply by 2030. With greater realization and recognition for importance of water, there has been an increasingly sharper focus on its economical use and better management to meet the growing demand across sectors.

L&T - Fulfilling a Vital Human Need

As India’s largest engineering, technology, construction and manufacturing organization, Larsen & Toubro (L&T), has been at the forefront in creating infrastructure for a water-surplus, energy-secure and green world.

L&T Construction, the construction arm of L&T, is India’s largest construction organisation and ranked 28th globally among the top 225 contractors by Engineering News Record in 2013. The Company’s capabilities span the entire gamut of construction - civil, mechanical, electrical and instrumentation engineering and its services extend to all core sector industries and infrastructure projects.

Supply, clarification, desalination and distribution projects constitute a vital thrust area for L&T Construction in the water sector. Through its dedicated business group - Water & Effluent Treatment Strategic Business Group (WET SBG), L&T Construction, offers total solutions right from concept to commissioning of urban and rural water supply, water treatment plants, waste water treatment and network, industrial and water effluent treatment and lift irrigation projects.

Adopting state-of-the-art technologies, WSD BU enables access to clean and safe drinking water thereby fulfilling a vital human need.

By associating with Government and private organizations, WSD BU is playing a pivotal part in reaching water across the length and breadth of the country thereby providing succour to millions.

WSD BU has been consistently delivering turnkey water supply and distribution projects with single point responsibility and precision. Leveraging on its domain expertise, it undertakes composite works for water infrastructure specialising in intake structures, water treatment plants, pump houses, transmission and storage structures, distribution networks including house service connections.
Landmark Water Supply Schemes

Sri Sathya Sai Water Supply Project
For the Sri Sathya Sai Central Trust in Andhra Pradesh, L&T executed a mega water supply scheme covering more than 1000 villages that provides water to more than 2 million people. Considered one of the most successful water infrastructure ventures set up in the country, this scheme is operated and maintained by L&T for more than 15 years since its inception. The project involved laying of various types of pipelines ranging up to 600 mm dia across a span of 2000 Km.

Barmer Lift Water Supply Project
For the Government of Rajasthan, L&T executed a massive water supply scheme that supplies water to 691 villages spanning a distance of more than 200 Km in the arid zone of Barmer. The EPC contract involved execution of 172 MLD water treatment plant, 3845 ML raw water reservoir and 26 ML master balancing reservoir pipelines and pump houses.

Bisalpur - Jaipur Water Supply Project
India’s largest integrated water supply project supplying water to more than 3 million people of Jaipur in Rajasthan was executed by L&T on an EPC basis. The turnkey contract involved design, supply, construction, operation and maintenance of water supply, treatment and transmission system from the intake point at Bisalpur dam to the reservoir at Balawala on the periphery of Jaipur city.

Tirumala - Tirupathi Water Supply Project
A fast track project executed on EPC basis in 77 days enabling lifting of 4.5 million litres of water per day up the Tirumala hills in two stages, over a total head of 763 m water column defying gravity and steep gradients.

Projects for Delhi Jal Board
L&T has executed a complete value chain of water infrastructure for the Delhi Jal Board (DJB) that provides water for 15 million people every single day! Commencing with the Sonia Vihar Clear Water Transmission project in 2001, L&T has executed 13 mega water supply and distribution projects for DJB over the past decade which is a testimony of their confidence in L&T’s performance, quality and strict adherence to timelines.
All water infrastructure projects begin to flow from the tapping point. A well-established intake structure seamlessly facilitates the distribution network. Different kinds of water bodies like lakes, rivers and reservoirs need different kinds of intake structures. WSD BU has pioneered several intake structures such as intake wells, jack wells, water channels, and collector wells along with infiltration gallery at the major water sources.

Tapping the Gift of Life
Intake Structures

Significant intake structures executed by WSD BU
- 1760 MLD capacity at river Godavari
- 423 MLD capacity at (VIWSCo) Vizag Industrial Water Supply Company
- 33m high with 10m dia for Neelakantapuram WSS
- Collector well with radial arms for Melur WSS
- Intake with infiltration gallery for Bankura WSS
- Intake jetty at Sahebgunj and Garden Reach WSS

Pumping Main at Nagercoil
Jack well at Tumkur WSS
Intake well at Godavari
22m Dia Intake Well at Godavari
Intake well for Rishivandhiyam WSS, Villupuram
Bagheri Ka Naka WSS - Rajasthan
Outlook WSS
Satara WSS
Intake for Rohtakdharam WSS, Yellapuram
West Godavari WSS
Over the years, L&T has gained the expertise and mastered the processing technology for the removal of all types of contaminants and harmful microorganisms from raw water sources to provide potable quality drinking water. With an array of end-to-end customized solutions, the water treatment provided by WSD BU has been consistently superior. State-of-the-art processes engaged in water treatment include flat bottom clarifier, Lamella clarifier, tube settlers and high rate solid contact clarifier.

**Significant Water Treatment Plants**

- Bisalpur Jaipur WSS - Rajasthan 400 MLD
- South 24 Paraganas WSS - West Bengal 297 MLD
- Garden Reach WSS - West Bengal 239 MLD
- Vellore WSS - Tamil Nadu 181 MLD
- Barmer WSS - Rajasthan 172 MLD
- Dhanbad WSS - Jharkhand 143 MLD

**Major Refurbishment of Water Treatment Plants**

- Bhagirathi WTP at Delhi 450 MLD
- Kilpauk WTP at Chennai 270 MLD
Customized Electro-Mechanical Solutions

Pumping Stations

Electro-mechanical components play a crucial part in water infrastructure projects. WSD BU possesses the experience and expertise to implement complicated and challenging pumping systems with precision providing customized design solutions, adopting state-of-the-art technology that enhances the efficiency and performance of the electro-mechanical components across projects.

The Bisalpur – Jaipur Water Supply Scheme, the largest integrated water infrastructure project executed by L&T, has the unique feature of continuous pumping over 100Km with horizontal split casing pumps with no intermediate booster pumping stations between the pipeline spreads.

L&T has vast experience in the fabrication, supply and laying of critical pipeline networks by maintaining high quality and safety standards within stipulated time frame. Irrespective of whether it is above ground, underground or involves laying of pipelines on rugged hilly terrains over long distances, L&T’s cutting edge technology ensures a safe and reliable network. Various types of pipelines in different sizes up to 3000mm dia have been executed by L&T covering large geographical areas.

Safe Channels for Seamless Flow

Transmission and Distribution Network
L&T's Water Supply and Distribution Business (WSD BU) executed a significant part of the mega water supply scheme that enabled safe drinking water to the fluoride affected districts of Dharmapuri and Krishangiri under the Hogenakkal Water Supply Scheme. WSD BU's scope of work included construction of water infrastructure for package III and V which covered 4500 sq.Km, across 3500 habitations sufficing the daily water requirement of close to 1.3 million people.

The pipeline network in both the packages is designed to feed water supply by gravity and eliminates the need for power. The master balancing reservoirs are constructed at elevated levels to enable flow of water through gravity.

**Significant quantum of works**

- **Pipeline (MS, DI, HDPE)**: 4355 Km
- **Elevated Reservoirs (10000 – 12 lakh litres)**: 612 Nos
- **Underground Sumps**: 226 Nos
- **Pump rooms and Re-chlorination Building**: 236 Nos
Robust Retaining Structures

Storage Reservoirs

A very important segment in water infrastructure is the storage reservoir from where filtered water is distributed to the end-users. As a leader in water infrastructure, WSD BU has executed significant retaining structures involving overhead reservoirs, storage tanks, sumps, etc. By continually implementing value-added solutions for critical and complex works, WSD BU meets the comprehensive requirements of its customers.

WSD BU track record in storage reservoirs include:
- Summer storage of 8000ML capacity for Nellore WSP
- 3850 ML concrete lined earthen reservoir for Barmer WSS
- 66 ML service reservoir for Gulbarga WSP
- 45ML partially underground sump for NC-2 WSP at Gujarat
- 25 ML RCC clear water reservoir for Baisalpur-Jaipur WSS
- 3.7 ML capacity clear water reservoir for Neelakantapuram Sritami Reddy Phase III
- 2.45 ML overhead reservoir for Allahabad WSP

WSD BU also offers end-to-end responsibility in executing water cisterns and house service connections to expand the water network across rural and urban sectors. WSD BU has completed 1,70,000 house service connections in Chennai for Chennai Metropolitan Water Supply and Sewerage Board, executed large scale house connections for Greater Vishakapatnam Municipal Corporation Water Supply Scheme and constructed innumerable water cisterns for Sathya Sai Water Supply Project.
Operation & Maintenance

Operation, control and maintenance are essential for an extensive service and safe operation of any water infrastructure. WSD BU favourably responds to the growing demand from clients and undertakes the operation and maintenance of all types of water supply projects and treatment plants. For the last 15 years, WSD BU has been taking care of every single aspect of O&M for the Sri Sathya Sai Drinking Water Supply Scheme and continues to provide uninterrupted supply of water. The Tirumala Tirupathi WSS is another landmark project wherein L&T has been continuously providing operation and maintenance services for more than 10 years.

Bisalpur-Jaipur WSS is another significant project for which WSD BU is providing the operation and maintenance service since the last 5 years. The project caters to the predominant water needs of Jaipur city.

Making Every Drop Count

Water Management

Water meters are deployed to ensure efficient monitoring and accounting of water. Considering the huge volume of end-users, the task calls for a micro implementation process. For Delhi Jal Board, WSD BU executed a mega water metering project. The scope involved installation, operation and maintenance of 2.5 Lakh water meters in specific areas of Delhi. The project team interacted with consumers for certification of every meter and achieved a unique milestone, adding yet another domain in its water infrastructure capabilities.
Improving Efficiency

To decrease UFW (Unaccounted for Water) and increase the flow in service mains and many connections in the major towns and cities, several Leak Detection and Rectification works have been undertaken by L&T. This unique technique has several advantages: minimizing the loss of precious drinking water, avoiding contamination, maintaining stable pressure and improving tail end supply. The Leak Detection and Rectification project in Chennai involved testing of 1400 Km of distribution mains, replacement of 500 Km of pipelines and 1,70,000 house service connections.

L&T is executing leak detection and rectification of D2A and D2B projects for Bangalore Water Supply covering a length of 2056 Km of pipeline which will minimize the leakage by more than 60% and enable efficient use of potable water.

Supervisory Control and Data Acquisition (SCADA)

WSD BU has end-to-end capability to design and install Supervisory Control And Data Acquisition (SCADA) for various customers and help them monitor and improve the water supply distribution system by detecting, arresting and reducing leakages. The SCADA systems installed by L&T help clients have full information of water parameters like flow and pressure of pipeline laid throughout network from the main control center. Geographical Information System (GIS), is extensively used to map distribution systems, provide pictorial views and also identify the shortest route to manage disasters. WSD BU possesses the comprehensive capability and experience in executing engineering, supply, delivery, erection, testing and commissioning of instrumentation, telemetry and SCADA systems including construction of all associated infrastructure and operations & maintenance. The track record of successful projects implemented across the country reaffirms WSD BU’s commitment to preserve and manage the precious resource - water.
Comprehensive Design Solutions for Water Infrastructure

A well-equipped design facility - Engineering Design and Research Centre (EDRC) - at Chennai, provides a broad spectrum of design and engineering services, ranging from concept to commissioning of water projects. EDRC provides time bound and cost effective system design, basic and detail engineering in process, hydraulics, civil and structural, geotechnical, mechanical, electrical and instrumentation under a single roof for water supply and distribution.

EDRC has extensive project experience in water systems engineering and provides comprehensive solutions for:

- River and Sea water intake systems
- Waterways like open channels, closed conduits
- Storage facilities like ground level & elevated reservoirs
- Raw water treatment and desalination plants
- Pumping systems – fore bays, pump houses & related pumping machinery
- Cross country water transmission pipeline systems
- Distribution networks for industrial, urban & rural areas
- Feasibility studies
- Process design

- Alternate materials selection
- Hydraulic analysis & design, sump model study & pumping system design
- Surge analysis & flexibility/stress analysis
- Structural analysis
- Electrical & instrumentation designs like substations, power distribution, communication systems, SCADA
- System testing & commissioning procedures
- System operation & maintenance manual

EDRC is also backed up by an exclusive Construction Methods Planning Cell (CMPC) which complements execution of water projects by providing value-added solutions aimed at cost effective construction methods by incorporating latest trends in construction technology. EDRC is ISO 9001:2008 certified and strictly adheres to its quality policy and practices.
Flawless Project Management

At L&T Construction, the impetus for creating efficient and reliable water infrastructure is well supported by a multi-disciplinary team of professionals who cater to turnkey project requirements through meticulous planning and effective project management. WSD BU leverages on its domain expertise for providing suitable process systems / schemes to meet varying and ever-increasing customer requirements. To facilitate seamless project control, WSD BU aligns work schedules by integrating sequences through project monitoring softwares like Microsoft Project, Primavera which is backed up by a centralized in-house information system for data retrieval.

Desalination is Key

Desalination is the future source of water. Indigenous technology combined with high caliber engineering resources and large scale investment capabilities enable L&T to execute state-of-the-art desalination plants. As a leader in water management, WSD BU has the prowess to provide solutions for new generation water systems and meet the most demanding of delivery schedules.

WSD BU is presently executing seawater reverse osmosis based desalination plant for Sesa Sterlite Limited at Tuticorin. The phase 1 works involves establishing a 10 MLD capacity plant to suffice the water requirement of the copper smelter plant that can be enhanced to 25 MLD in future. The scope comprises of:

- Sea water intake and reject facilities
- Pre - Treatment
- UF-RO skids
- Product water tank

| 1. Intake |
| 2. Pre Treatment |
| 3. UF - RO Building |
| 4. Product Water Storage Tank |
L&T is committed to continual improvement of its business by implementing globally accepted standards of Quality and Safety Management across all its businesses and operations. Effective processes are developed to deliver high quality products and services that will meet or exceed customers’ needs. L&T seeks to go beyond compliance with regulatory standards in pursuit of excellence in Environmental, Health and Safety (EHS) management practices, as an integral part of its total quality management system. L&T’s corporate management has enunciated policies that emphasize on EHS through its structured and well defined procedures at every stage of construction that protect the environment.
A Tradition of Delighting Clients

A strong, customer-focused approach, strict conformance to global EHS standards and the constant quest for top-class quality has enabled the Water Supply and Distribution BU (WSD BU) to sustain market leadership in the water industry. WSD BU's established systems and practices at every stage of engineering, procurement, fabrication, assembly, erection, testing and commissioning of large and complicated projects give clients the added L&T advantage and the reassurance of being in safe hands.

Growing International Presence

L&T has executed water supply projects in the Gulf countries and Mauritius by implementing advanced technologies with the finest execution methods. Landmark projects executed by L&T include the Water Supply Distribution System in Saham and Khaburah towns in Oman and turnkey construction of the 10.8 MLD Water Treatment Plant at Mont Blanc, Mauritius.

Presently L&T is executing a Waste Water Treatment Plant (187 MLD Ultrafiltration & 92 MLD SBR) at Doha for Ashghal.

Map not to scale

Presence in major Gulf Countries