



Decentralized Wastewater
Treatment Solutions

RESan | Sanitation for Real Estates



**A powerful solution to
overcome sanitation problems
and to improve welfare &
health for Real Estate**



BORDA

RESan |
DEWATS Service Package

Developed and disseminated by
BORDA & BORDA BNS Network

Space constraint & insufficient central sewer systems make urban Real Estate a key source of poor sanitation

Poor sewerage for Real Estate

Densely populated urban areas, individual houses, residential enclaves and apartment blocks are confronted with special problems related to wastewater collection and treatment, such as:

- o Legal requirements for wastewater treatment
- o No opportunity to connect to a centralized sewer system, due to high costs and existing system overload
- o Space constraint for the installation of a new wastewater treatment system



Discharge of untreated wastewater into the street: a consequence of missing connections to a central sewerage system.

As a result, most urban real estate with on-site facilities has only a small septic tank for each household. In the majority of cases, this solution does not meet governmental guidelines on wastewater effluent.

The effluent from insufficient or faulty septic tanks contaminates groundwater or even bore wells that are used for household water supply. This is one of the reasons why most of the bore wells in big cities are highly contaminated with e. coli.

Densely populated areas and urban centres often require new treatment solutions for handling the enormous amount of wastewater

Further drawbacks of common urban sewerage charge

The widespread use of septic tanks mostly necessitates intermediate and terminal point pumping of sewage, if a sewer is available at all.

This leads to:

- o Cost increases (almost 80% of the cost incurred by centralized wastewater management is often spent on wastewater collection)
- o Additional energy requirement
- o The need for efficient centralized wastewater management

Further, a connection to a central sewer system does not guarantee that the treated wastewater will meet legally required standards. Due to excessive loads, centralized systems are frequently not able to meet effluent regulations.

In the worst cases, wastewater is not treated at all, but discharged directly into an open drain or river. This practice leads to high environmental pollution rates that affect local neighbourhoods.

Borda BNS Network Mission

With a mission to improve the livelihoods of disadvantaged groups within societies and to sustain the functioning of eco-systems through dissemination of demand oriented Basic Needs Services (BNS), BORDA (Bremen Overseas Research and Development Association) and its BNS Partner Network develop and disseminate innovative solutions for facilitating the access to BNS.

DEWATS Service Packages

One BNS is DEWATS, an effective, efficient, affordable and proven wastewater treatment solution for (sub-) tropical regions and low-income countries. DEWATS stands for "Decentralized Wastewater Treatment Solutions", but it is much more than just a technical approach. DEWATS Service Packages include not simply the design and construction of hardware but a whole set of integrated measures on social and technical interventions which are combined according to demand. DEWATS RESan (Sanitation for Real Estates) is one of these Service Packages that aims to overcome Real Estate sanitation problems.



On-site wastewater treatment gives independence from centralized sewerage without losing space

DEWATS for Real Estates

RESan is an affordable solution to fill gaps in urban wastewater treatment services for individual houses, residential enclaves and apartment blocks from every income-level. With regard to legal regulations and space constraints, an on-site underground wastewater treatment plant (DEWATS) provides state-of-the-art technology when constructed and installed. The design and the capacity of the system are adaptable according to demand. A DEWATS can be applied to new constructions and existing real estate structures. The interests of all stakeholders are reconciled throughout the whole implementation process. Routine operation and maintenance, to ensure the sustainability of the plant, can be done by trained local staff.



The surface of the decentralized underground DEWATS system can be used as parking space.

Key RESan features

In order to combat the impact of poor sanitation in Real Estate, in particular groundwater pollution and pollution loads due to insufficient treated surface run off, the following measures are taken during RESan implementation:

- o Elaboration of financing, implementation and management of the project with participation of all stakeholders

- o Detailed planning according to local conditions (e.g. ground slope) and space constraints
- o Design of a system that is most beneficial to users while using locally available materials or prefabricated modules.
- o Installation of a decentralized, subterranean and locally adapted wastewater treatment system (DEWATS plant) including options for wastewater re-use and biogas generation
- o Proper Operation and Maintenance Training to local staff (e.g. maintenance department, gardener)
- o Optional (for existing housing complexes): Health Impact Assessment and Hygiene Education (HIA&HE) for evaluation and educational purposes

Resulting benefits

The listed features of RESan which are coordinated by BORDA's regional offices and implemented with local BORDA BNS Partner Organizations provide a multiplicity of benefits:

- o One custom designed treatment plant replaces hundreds of septic tanks, which can significantly reduce costs



The DEWATS horizontal gravel filter can be aesthetically incorporated in the local surroundings.

- o On-site treatment of wastewater that meets legal regulations and standard disposal criteria set by pollution control authorities
- o Reduction of health risks for real estate inhabitants and their neighbourhoods by avoiding contamination of groundwater and bore wells
- o Reducing environmental pollution by superseding open drainage



The units of the DEWATS plant are installed underground. Therefore, the system is nearly invisible.

- o No waste of space: the surface of the anaerobic units of DEWATS can be used for other purposes (e.g. as parking space, playground), the aerobic parts can be aesthetically incorporated into local surroundings (e.g. gardens, water forms)
- o Cost efficiency because piping to the central sewer system is avoided, no or little energy supply is needed and treatment by-products can be re-used

DEWATS RESan solves Real Estate sanitation problems in an affordable and sustainable way

Additional benefits

The innovative DEWATS technology allows the reuse of treatment by-products on-site:

- o the biogas that occurs through the treatment process can be used as an alternative energy source for cooking, and lighting
- o the treated wastewater can be used for irrigation and includes natural fertilizing solids

Therefore, electricity, water and fertilizer cost savings are possible.



DEWATS plant for an apartment block (above) and under full construction (below)

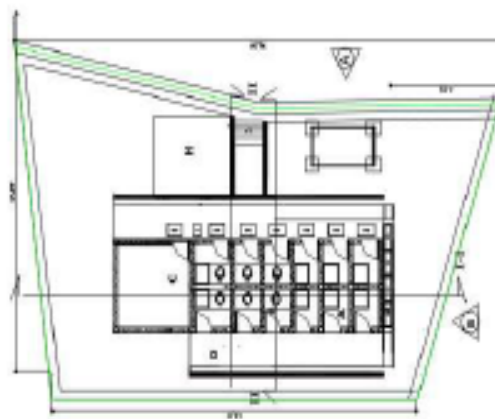


Implementation costs & duration

DEWATS RESan implementation takes at least three months. On average, a RESan project is completed within 6 to 8 months. This includes preparatory stages (concept, design, planning) and final training of maintenance staff. Project costs vary from 10,000 to 30,000 Euros for 200-600 persons depending on

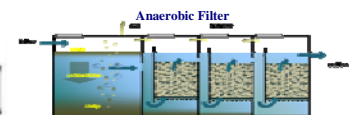
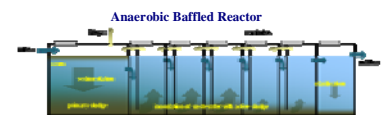
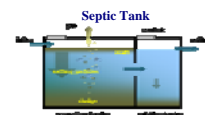
- o Regional conditions
- o Design & concept
- o Number of connected households
- o Estimated wastewater quantity
- o Reuse requirements

There are only a few required major maintenance tasks (e.g. desludging every two – three years) that can be outsourced to professional organizations. Compulsory effluent monitoring is carried out during the startup phase and can be done whenever there is an assumption that the system is not working correctly.



RESan - a proven solution

Today, BORDA and its BNS Partner Network, have already achieved the sustainable operation of more than 900 DEWATS plants worldwide. Over 30 RESan projects were successfully realized in five Indian regions (Tamilnadu, Kerala, Gujarat, Maharashtra and Karnataka) alone. Further projects have been implemented in BORDA's project regions in Southeast Asia (e.g. Medan, Indonesia).



Technical draft of a RESan design in Medan, Indonesia (left) – four basic elements of the DEWATS plant (above).

DEWATS Service Packages

- o Treatment Systems
- o Community Based Sanitation
- o School Based Sanitation
- o Sanitation for Hospitals & Hotels
- o Wastewater Treatment for Agro-Industry
- o Emergency Sanitation
- o Sanitation for Prisons
- o Sanitation for Real Estates
- o Sanitation Mapping
- o Municipal Sludge Treatment Plant
- o Health Impact Assessment & Hygiene Education
- o Capacity Development
- o Standardisation
- o Research & Development

DEWATS – Decentralized Wastewater Treatment Solutions

Developed & disseminated by BORDA and over 20 BORDA BNS Network Partners in South and South East Asia & Southern Africa

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