



WATER SERVICES
CORPORATION



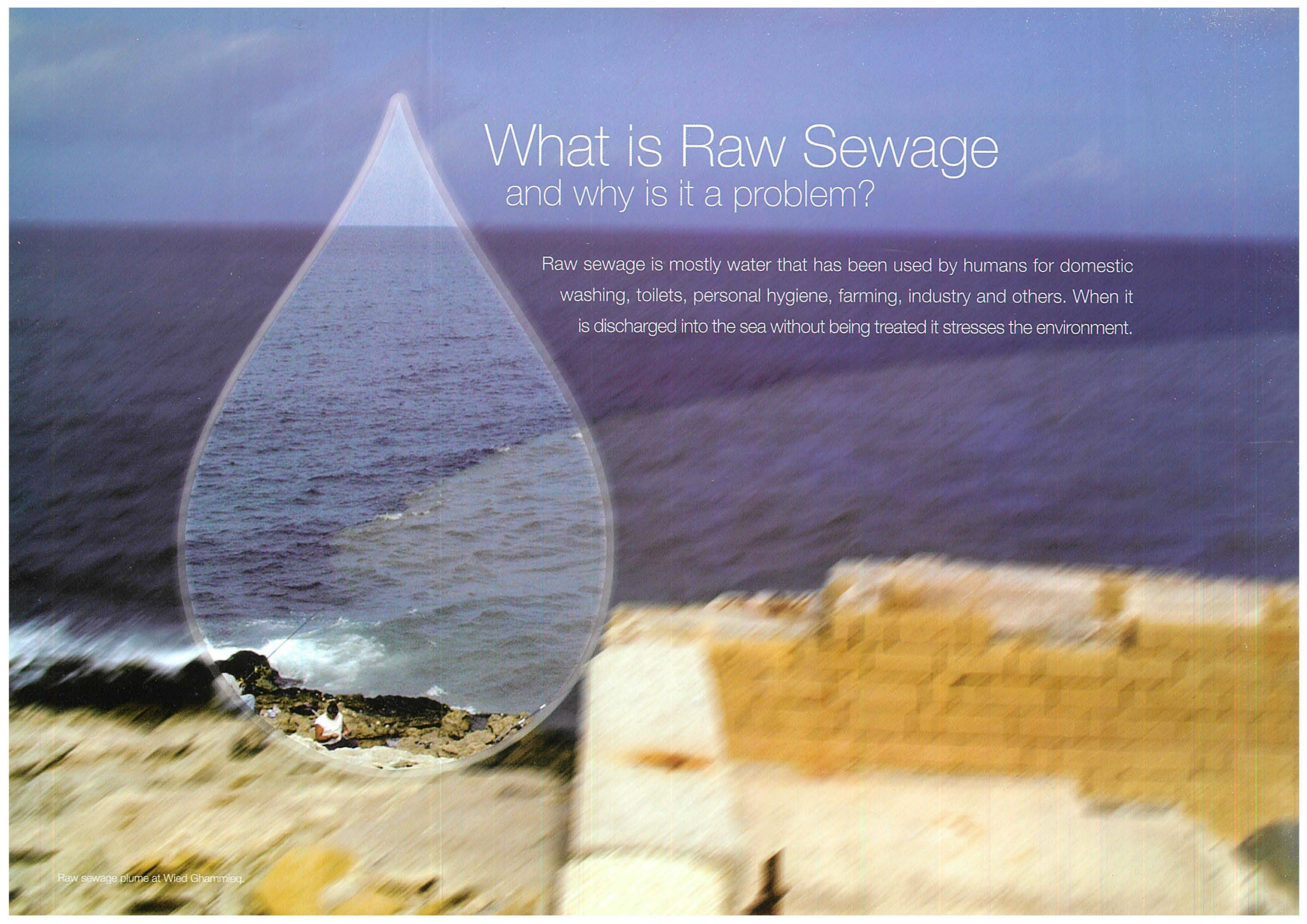
A MODERN WASTE WATER INFRASTRUCTURE





For thousands of years

the Mediterranean Sea has been hailed for the beauty of its clear blue waters as well as the thousands of kilometres of varied coastline. It has been the centrepiece for history and has provided abundant resources for its people. Yet for hundreds of years Malta, like so many other countries discharged its raw sewage into the sea without being treated. This has of course affected the quality of bathing water and marine life and curtailed the use of certain areas of the Maltese coastline. However, a huge upgrading programme of Malta's wastewater infrastructure has meant that raw sewage will not be discharged into the sea anymore prior to treatment. This programme has included the construction of three new sewage treatment plants and an aggressive building programme of new pumping stations, underwater galleries and a state-of-the-art SCADA control system.



What is Raw Sewage and why is it a problem?

Raw sewage is mostly water that has been used by humans for domestic washing, toilets, personal hygiene, farming, industry and others. When it is discharged into the sea without being treated it stresses the environment.

It can also cause health problems for bathers and harms a country's tourism potential. Malta's largest sewage outfall at Wied Ghammieg near Xghajra has left an impact on this once remote area, which has now become populated. The same also happened in Gozo and the north of Malta where once remote submarine outfalls are now side-by-side with the development that occurred over decades. This obviously affected the country's leisure and tourism sectors such as swimming and diving. An upgraded wastewater treatment infrastructure was therefore needed to improve the quality of the marine environment in line with the requirements set forth in the EU Urban Wastewater Directive (91/271/EEC). As part of the solution to address this problem, a master plan was drafted by the Drainage Department in 1992 and the Water Services Corporation implemented the wastewater treatment recommendations after carrying out the appropriate feasibility studies. The master plan called for three sewage treatment plants in the Maltese Islands and in 2005 the WSC started executing this plan with the actual works starting soon after.



A microscopic view of the activated sludge used to break down sewage.



How do sewage treatment plants work?

Any sewage treatment plant basically works by speeding up a natural process that uses bacteria. What normally takes nature weeks is done by sewage treatment plants in only around 18 hours. Raw sewage is fed into large aeration tanks and churned by large submerged blowers that introduce air through banks of diffusers.

A very heavy concentration of bacteria eats up the solid matter which is then extracted from the system as surplus sludge.

Clear, odourless water which is still fairly high in bacteria rises to the top and is then discharged into the sea. This water is not fit for drinking but is harmless to the marine environment. The surplus sludge is then de-watered and the resulting material can potentially be used for soil enrichment. If a tertiary treatment stage is also incorporated the treated sewage can be used for irrigation or other purposes rather than being discharged into the sea.

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The Treatment Plant in Ras il-Hobz, Gozo

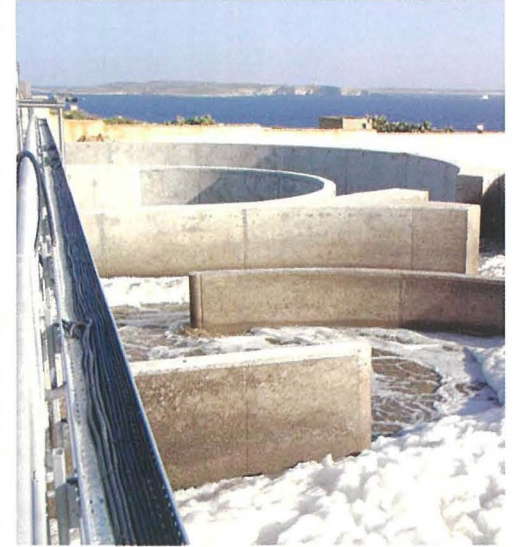
The Ras il-Hobz STP inaugurated in January 2008.



During construction works.



The first trials during November 2007. When enough bacteria have had time to build up, the foam disappears and is not present during normal operations.



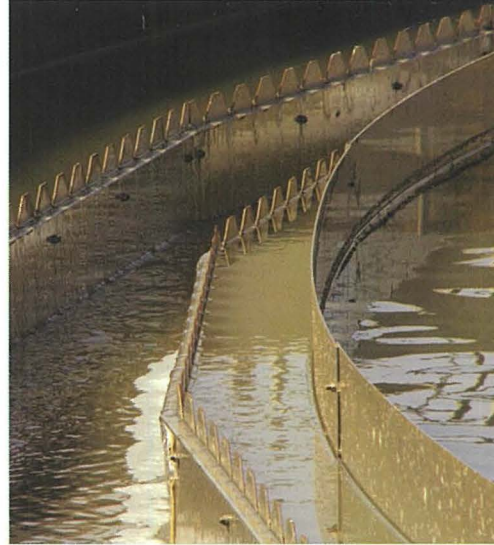
The Gozo wastewater treatment plant began operating in November 2007 and was officially inaugurated on the 29th January 2008. The plant can treat about 6,000 cubic metres of sewage per day. It was 51% co-financed through the EU 2003 Pre-Accession Programme (51% EU Funds - 49% Local Funds). It was designed to cater for substantial possible future expansion as well as increased flows during the rainy season and the peak month of August. The low-silhouette design minimises both the visual impact as well as light pollution.

The Treatment Plant in Ic-Cumnija, Mellieha

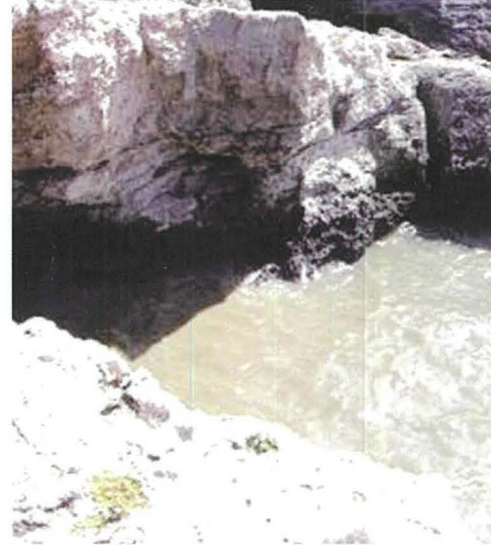




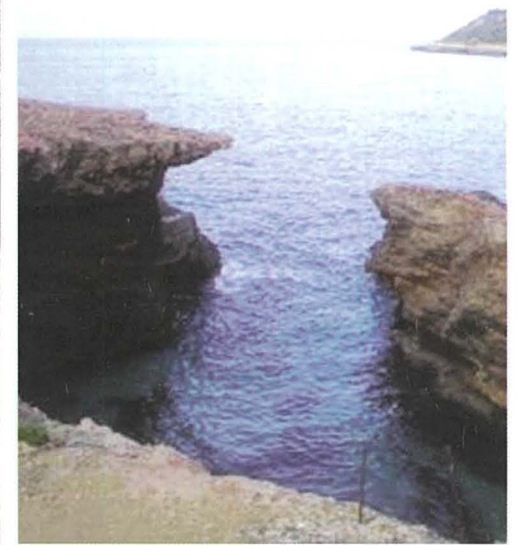
This photo taken during December 2006 shows the construction underway before completion in September 2008 and initial start-up one month later.



Part of the treatment process showing how clear water is decanted from the top before being discharged to sea.



The sea a few metres from the Ic-Cumnija plant before start-up of the plant.




The same area a few weeks after the plant started operating.

This plant was inaugurated in January 2009 and has a capacity to treat 6,700 cubic metres of sewage per day. It has eliminated the raw sewage contamination of popular sandy beaches and bays, particularly, Ghajn Tuffieha Bay, Gnejna Bay, Anchor Bay and Paradise Bay. It was funded through the 5th Italian Protocol Agreement. This plant too has had very little visual impact on the surrounding environment.

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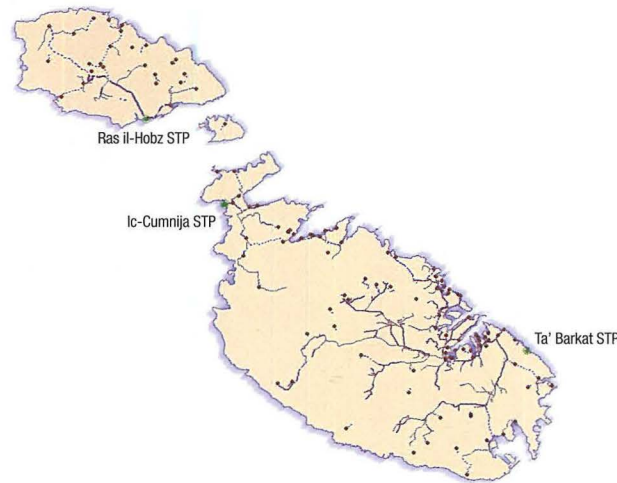
The Treatment Plant in Ta' Barkat, Xghajra



Wastewater Transmission Infrastructure

Building wastewater treatment plants, however was not enough. Malta's wastewater infrastructure was outdated and in a poor state unable to meet the needs of a country in continuous development.

A modern wastewater infrastructure takes sewage from people's homes, places of work, and leisure, etc. to the sewage treatment plants. It consists of gravity mains where the flow goes naturally downhill and pressure mains where pumps force the flow uphill. There are also pumping stations, galleries, sumps and monitoring systems. The infrastructure that existed up until the upgrading programme was simply not up to standard and a modern transmission infrastructure was needed to ensure that sewage is conveyed from users to the newly-built treatment plants.



North Sewage Transmission Infrastructure

The purpose of this infrastructure is to convey sewage from the northern part of Malta to the sewage treatment plant at Ic-Cumnija, to remove the existing bottlenecks and eliminate sewage outflow at Ras il-Prajjet. Two existing pumping stations at Pwales and Ghajn Zhuber, together with an inlet pumping station were upgraded. Existing transmission infrastructure such as gravity mains, and pumping mains were upgraded and a new gallery was built. This project was also financed through the 5th Italian Protocol.



North sewage infrastructure gallery works-in-progress.

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GOZO

In order to ensure that all of Gozo's wastewater reaches the new plant at Ras il-Hobz, substantial upgrading work was needed.

The cleaner seas around Gozo are obvious to all.



The San Blas pumping station under construction.

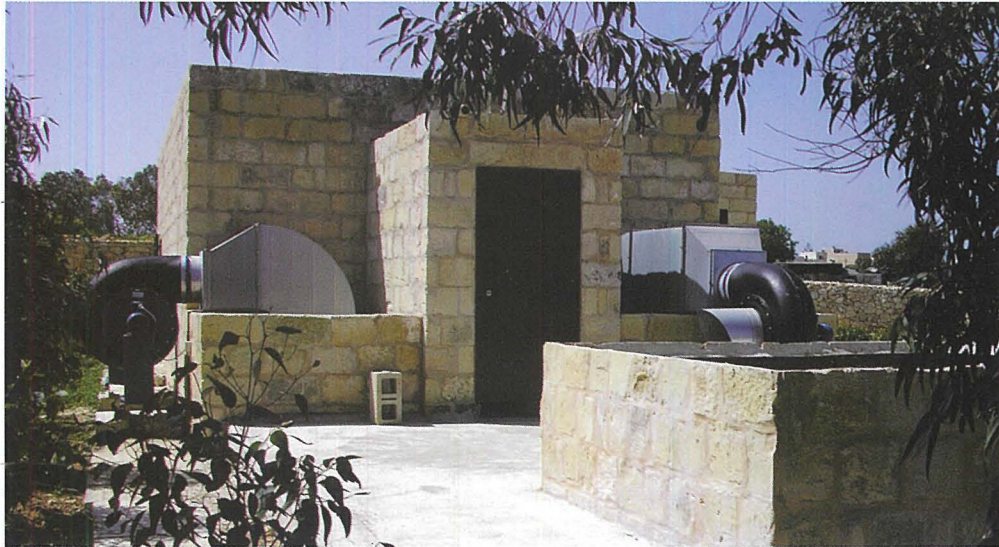


The Gharb pumping station.

A new sewage pumping station was built in Gharb to receive sewage from Gharb, Zebbug, Ghasri and San Lawrenz. Sewage from these localities used to be discharged raw through the Wied il-Mielah outfall situated to the northwest of the island.

South Sewage Transmission Infrastructure

This project upgraded the South Transmission Infrastructure from the Marsa Pumping Station up to the inlet of the new South sewage treatment plant at Ta' Barkat limits of Xghajra. The positive effects on the environment are a reduction in frequency of sewage overflows to the Grand Harbour (90% in the area next to the upgraded Marsa pumping station).



The Rinella Pumping Station.



A dual rising-main was constructed to take the pumped sewage from the Marsa Pumping Station into the entrance of the above new gallery.

The project allowed an increase of 1,700 lt/sec of flow through the Marsa Pumping Station. A new gallery was drilled to address a series of long-standing and major problems plaguing Birgu, Isla, Kalkara, and Xghajra. The new sewage gallery is relieving the existing gallery, which is currently serving a population of around 200,000 and operating well beyond its design capacity. The Marsa sewage pumping station (accounting for 20% of ERDF29 contract value) is fitted with a storm-water overflow to the Grand Harbour which currently operates whenever rainfall contributes to an increased inflow to the pumping station. Part of this project involves the upgrading of the Marsa Pumping Station. Given that the Marsa Pumping Station capacity will be upgraded as mentioned above, the frequency of overflow events will be cut down drastically. An overflow system will operate during abnormal storm events only.

A new 4.55 km gallery was drilled from Paola all the way up to Rinella. The end of the gallery was originally meant to be Wied Ghammieq, but was instead extended to the limits of Xghajra. This change came about due to the Smart City development which required that the new treatment plant be located in Ta' Barkat instead of Wied Ghammieq.

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A photograph of industrial machinery, likely a pump or motor, with a silver metal casing and a fan-like front. A label with the text 'B01' is visible on the motor. The background shows a dark, perforated metal screen and various pipes and electrical conduits. The lighting is dramatic, with strong highlights and deep shadows.

Wastewater Reuse

The Water Services Corporation is fully aware of the potential reuse of the treated sewage effluent for various water applications. In 2008 the Corporation launched the Water Reuse Master Plan, followed by a series of tests in order to assess the best available technologies in the field of water re-use.



The experimental aquifer recharging unit set up in Bulebel.

The first tests were started in 2009 and conducted in the Gozo Sewage Treatment Plant where the treated effluent from the Sewage Treatment Plant was further processed using Ultra-filtration Technology and subsequently Membrane Polishing. Around 100m³ of water per day were produced to a very high standard that was subjected to viral, bacterial and chemical tests to ensure that the proper safety standards were being met. Following this testing period the equipment was moved to Bulebel where treated effluent from the San Antnin wastewater treatment plant was processed. Once again the quality of water produced met the same high standards of quality and safety. Once this chosen location is approved the Corporation shall start experiments in artificial groundwater recharging to allow us to understand the impact on groundwater bodies. This project is in line with the Corporation's objective to "close the loop" in the water cycle beyond the Urban Waste Water Directive and develop new sources of water.