6.3.4 Building standards to minimize water use

- Alexandria University is committed to reducing Water consumption in accordance with the targets established in its 2030 Strategic Plan. The University implements projects to install water-efficient faucet equipment and improve the performance of the Water Supply System, thereby reducing water loss and supporting Water Conservation. Awareness workshops and educational activities are organized to encourage students and staff to adopt sustainable water-use practices and understand the environmental Impact of excessive consumption. These projects are subject to annual Monitoring, Assessment, and Evaluation to determine their effectiveness, analyze relevant Data, measure changes in consumption levels, and adapt the Methodology and implementation strategies to existing Conditions and emerging environmental challenges.
- Furthermore, Alexandria University adopts an Integrated Water Management approach that combines efficient resource use, Wastewater Treatment, Waste Water Recycling, Water Quality Monitoring, and innovative Technology Development to support Sustainable Development. Water Management projects include advanced Irrigation Systems, water-efficient devices, greywater recycling, wastewater recovery, and renewable energy-powered Desalination technologies. These processes contribute to reducing freshwater demand, improving Water Supply efficiency, controlling Water Pollution, and protecting Groundwater Resources, Surface Water, and marine Ecosystems. The University also promotes Research and Development into efficient treatment Methods, pollutant Removal, water-quality Analysis, and sustainable solutions for addressing environmental risks associated with Climate Change, drought, and increasing water demand. Through environmental education, community participation, and continuous performance Evaluation, Alexandria University strengthens its contribution to Environmental Protection and sustainable Water Resources Management.
- Alexandria University has designated approximately 22.41 million m^2, representing 78.89% of its total campus area, as permeable or semi-permeable surfaces that support sustainable Water Management, natural water infiltration, and Groundwater recharge. These surfaces improve the interaction between Rain, Soil Water, and the underlying Groundwater Resources by increasing infiltration and reducing surface Runoff. This approach helps control stormwater flow, reduce the risk of localized flooding, and minimize the transport of pollutants and contaminants into nearby water systems. The vegetation and landscaped areas also contribute to Ecosystem protection, biodiversity conservation, and climate resilience by improving soil conditions and supporting sustainable environmental Development. Continuous Environmental Monitoring and Assessment of land-cover characteristics can help evaluate the effectiveness of these measures in protecting Water Resources and reducing the environmental Impact of Climate Change.
- Furthermore, Alexandria University has implemented a comprehensive Water Conservation Program aimed at improving Water Supply efficiency and reducing water consumption by more than 50%, according to the reported institutional performance. The program integrates improved Irrigation Systems, leak detection, regular maintenance, water-efficient technologies, water recycling, and environmental awareness campaigns. Water-saving equipment, including low-flow taps, sensor-operated faucets, and optimized flushing systems, has been installed across more than 80% of campus facilities. These technologies help reduce water demand, minimize losses from the distribution network, and improve the overall Performance of the University's Water Management System. Regular inspection, Measurement, and Monitoring of water consumption support the Evaluation of conservation strategies and the identification of opportunities for further Improvement. Through these integrated approaches, Alexandria University strengthens sustainable Water Resources Management, reduces water waste, and contributes to Environmental Protection and the achievement of Sustainable Development goals.
- Water recycling is a central component of Alexandria University's Sustainability Strategy and Integrated Water Management System. More than 50% of wastewater is reported to be treated and reused for non-potable Applications, including landscape Irrigation, agricultural activities, and campus cleaning. Recycled Water supports green areas, agricultural Research farms, rooftop gardens, and aquaculture facilities,

contributing to Water Conservation and reducing demand on freshwater Water Resources. Innovative projects include greywater Recycling Systems, air-conditioning condensate Recovery, Wastewater Treatment units, a 100 m^3 Desalination plant, and renewable energy-powered Desalination Technologies. These Processes improve water-use efficiency and support Sustainable Development. To prevent Water Pollution and protect the Environment, Alexandria University applies water pollution control policies that incorporate Wastewater Treatment, controlled Discharge Systems, accredited laboratory Monitoring, and continuous Water Quality Assessment. The University's Central Laboratory and specialized Research facilities conduct physical and chemical Analysis of water Samples to evaluate relevant Quality Parameters, identify potential Contaminants, and assess the effectiveness of treatment Methods in accordance with recognized standards. These activities support Environmental Monitoring, pollution prevention, and the protection of surrounding aquatic Ecosystems. In addition, community initiatives, including coastal cleanup campaigns, marine conservation activities, and environmental awareness programs, promote sustainable Water Management and strengthen the University's contribution to Environmental Protection.

- Research and Innovation in sustainable Water Resources Management are further supported by the Alexandria University Water Resilience Center of Excellence (AWR-CoE), which serves as a platform for applied Research, capacity building, professional Training, and national and international Collaboration. The Center promotes the Development and Evaluation of innovative Water Technologies and integrated Solutions addressing Wastewater Treatment, Desalination, water Recycling, circular economy approaches, and Climate Change resilience. Its activities focus on improving treatment Performance, optimizing resource Recovery, reducing environmental Impact, and strengthening the sustainable use of Water Resources. Through specialized academic Programs, workshops, scholarships, and partnerships with leading institutions, the Center supports knowledge exchange, technological Development, and evidence-based Water Management strategies. These initiatives contribute to improved water security, pollution control, and ecosystem protection while advancing the Sustainable Development Goals and reinforcing Alexandria University's commitment to Sustainability, Research Excellence, and environmental stewardship.



The STDF-funded HMDed project on innovative wastewater treatment technologies concluded with a workshop held at the Faculty of Science, Alexandria University, in December 2025. The workshop combined lectures and hands-on training in water quality analysis and nanomaterial applications, bringing together academics, industry experts, and 51 researchers and students.



The SOA/C workshop was organized by the Alexandria University Water Resilience Center of Excellence (AWR-CoE) to promote knowledge exchange, strengthen research collaboration, and enhance capacity building in sustainable water management and water resilience.



The water Quality Parameters Training and Innovative Strategies Workshop focused on water quality testing, teaching, and the development of innovative strategies for water quality assessment and sustainable water management.

- Under the Water Conservation Program, Alexandria University has implemented a range of water-efficient technologies to improve Water Management, reduce water consumption, and protect Water Resources. These technologies include sensor-activated faucets, low-flow toilets, and bidets, which contribute to an estimated 50% reduction in potable Water Supply consumption across its faculties. A proactive leak detection and preventive maintenance System helps identify losses associated with aging infrastructure, improve distribution efficiency, and reduce unnecessary water waste. The University also applies innovative Irrigation Methods, including drip Irrigation Systems and soil moisture sensors, across landscaped areas to optimize water application according to soil conditions and plant requirements. The introduction of drought-tolerant Plants further reduces irrigation demand and strengthens resilience to drought and Climate Change. In addition, awareness campaigns organized in collaboration with the Alexandria Drinking Water Company and the Holding Company for Water and Wastewater promote Water Conservation and sustainable consumption practices among students, academic staff, and employees. These integrated approaches support efficient resource use, Environmental Protection, and the long-term Sustainability of campus water systems.
- The Water Recycling Program at Alexandria University demonstrates progress in wastewater reuse, resource Recovery, and Integrated Water Management. Treated sewage effluent (TSE) from the campus, reported at

approximately 1.12 million m^3 annually, is reused for landscape Irrigation, reducing dependence on potable water and supporting sustainable land management. At the Faculty of Pharmacy, a greywater pilot System treats hand-washing wastewater for toilet flushing, while air-conditioning condensate Recovery Systems in selected buildings provide additional water for Irrigation and flushing Applications. Rainwater harvesting and storage in a central retention lake provide another source for green-area Irrigation and help manage stormwater Runoff. At the Faculty of Agriculture, the aquaculture facility reuses nutrient-rich effluent from its eight-pond fish farm to irrigate adjacent Crops, supporting nutrient Recycling, soil fertility, and agricultural Yield. Furthermore, the University operates a 100 m^3/day solar-powered Desalination unit at Wadi El-Natroun and has developed a renewable energy-driven multi-stage flash desalination System (RE-NF-MSF) incorporating nanofiltration pre-treatment. These innovative Technologies demonstrate the potential of membrane separation, renewable energy, and advanced treatment Processes to improve water Recovery and treatment Performance. Through these initiatives, Alexandria University strengthens sustainable Water Resources Management, reduces Water Pollution risks, and supports environmental resilience and the achievement of Sustainable Development objectives.

- Alexandria University has significantly expanded the implementation of Water-Efficient Appliances as part of its Water Conservation Program and Integrated Water Management Strategy. Approximately 80.1% of all campus fixtures are reported to be water-saving devices, including 90.97% of bathroom faucets, 50.48% of toilets, and 57.69% of urinals equipped with flow-control mechanisms. These technologies help reduce water consumption, improve the efficiency of the Water Supply System, minimize water loss, and support the sustainable use of Water Resources. The University also applies institutional policies that require water-efficient design standards in new buildings and major renovation projects, integrating Water Conservation into campus infrastructure Development. The Abis Campus provides an example of sustainable land management, with green infrastructure covering approximately 52% of its total site area. These landscaped and green areas support soil infiltration, reduce surface Runoff, improve the ecological quality of the campus Environment, and contribute to climate resilience. Through regular Monitoring, Assessment, and maintenance, these initiatives help evaluate water-use efficiency and strengthen the University's commitment to Sustainable Development and Environmental Protection.
- Furthermore, the Faculty of Pharmacy at Alexandria University is pursuing a greywater Recycling System designed to reuse wastewater from sanitary washbasins and sewage collection basins, excluding wastewater generated by laboratory basins because of the potential presence of hazardous Chemicals and Contaminants. The proposed System involves collecting wastewater from appropriate sources, applying Filtration and primary Treatment, and transferring the treated water to toilet-flushing cisterns for non-potable Applications. The initiative also considers Rainwater harvesting and reuse for Irrigation and other suitable operational purposes, subject to appropriate treatment and water-quality requirements. Before implementation, the System should include an assessment of wastewater characteristics, treatment Performance, microbiological risks, and the suitability of the recycled water for its intended use. This approach can reduce potable Water Supply demand, improve Water Conservation, and lower monthly water bills, helping to ease financial pressure on the Faculty's budget. Overall, the proposed initiative supports Wastewater Treatment, water Recovery, pollution prevention, and sustainable Water Management while demonstrating Alexandria University's commitment to resource efficiency and environmentally responsible campus operations.





Adopting a mechanism to maintain water pipes to prevent waste resulting from leaks (Alexandria University, Egypt)





Supplying water taps with water conservation units (Alexandria University, Egypt)





Supplying water taps with water conservation units (Alexandria University, Egypt)





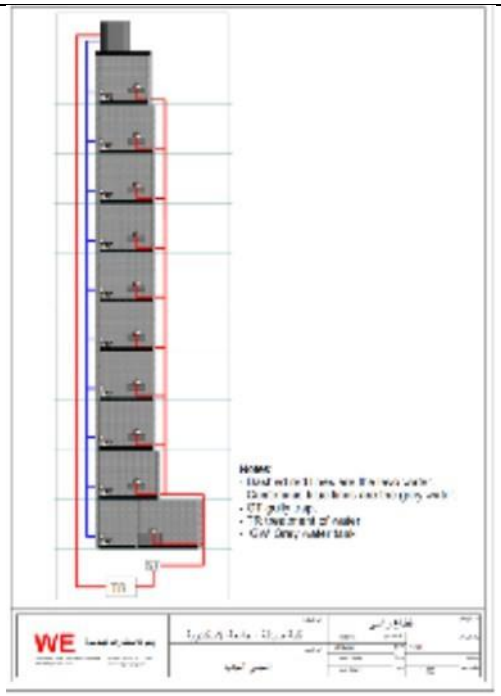
Air conditioning water collection and reuse unit - Faculty of Engineering

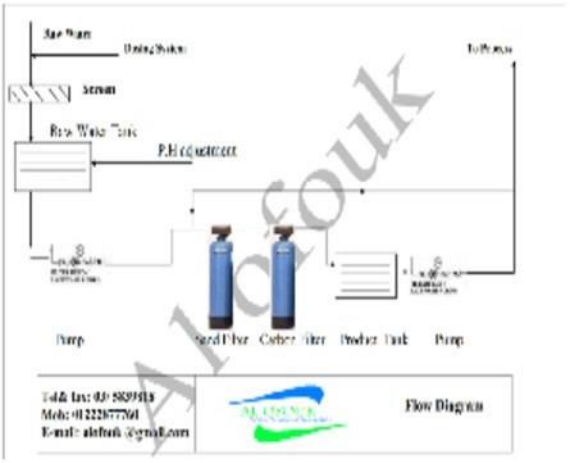


Wastewater treatment unit at the Faculty of Engineering



The sewage water will be treated and reused in the irrigation of green areas in the project (Alexandria University)





Grey water recycling system organized by Faculty of Pharmacy (Alexandria University)

Smart Building in Alexandria University

No.	Name	Place	automation		safety				energy		water		Indoor environment				lighting				Building Area (m^2)
			B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4	
1	University Alexandria; Abis Campus, Buildings 1-11	Alexandria, Egypt			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	667,730.988
2	University administration building	Alexandria, Egypt		x		x	x		x	x	x	x	x	x	x	x	x	x	x	x	1940
3	Faculty of Physical Education for Boys	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	113311.93
4	Faculty of Physical Education for Girls	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	2891
5	The medical complex	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	91216
6	Faculty of Science in Horia Street	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	22197
7	Faculty of Science in Moharram Bek	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	5485
8	Faculty of Engineering	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	111034
9	Campus of Humanities and Social Sciences	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	80707
10	Faculty of fine Arts	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	2569
11	Faculty of Specific Education	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	1194
12	Faculty of Early Childhood Education	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	1407
13	Medical Research Institute (Horia Street - Smouha)	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	2500

14	Higher Institute of Public Profession	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	**700**
15	University land in Smouha (College of Nursing - Children's Hospital - Faculty members residences)	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	**105218.22**
16	Land of Mouwasat Hospital	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	**20234.27**
17	Institute of Graduate Studies and Research	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	**2764**
18	Faculty of Agriculture Saba Pasha	Alexandria, Egypt		x		x	x		x	x	x	x	x	x		x	x	x	x	x	**144200.934**
	Total																				**1,377,300.34**