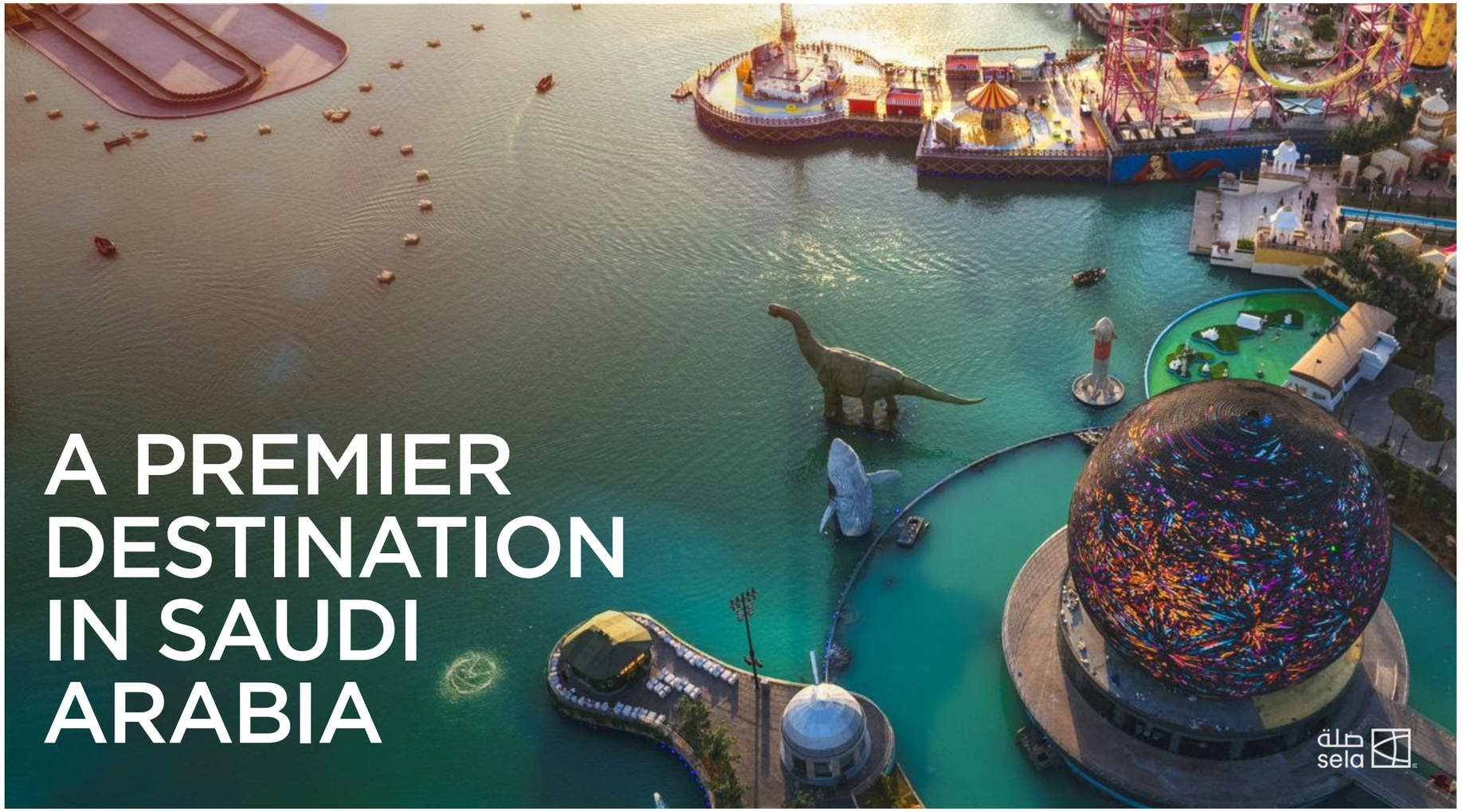
KHATIB & ALAMI

MULTI-AWARD WINNING PROJECTS

THAT WILL CHANGE THE FUTURE

THE MULTI-AWARD WINNING PROJECTS THAT WILL CHANGE THE FUTURE ARE

SUCCESSFULLY DELIVERED PROJECTS THAT HAVE BEEN RECOGNIZED FOR THEIR IMPACT, CONTRIBUTION, INNOVATIVE RESULTS, CREATIVE APPROACH, AND GOOD PRACTICES.



PROJECT LOCATION
Kingdom of Saudi Arabia

START DATE
2022

COMPLETION DATE
2024

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

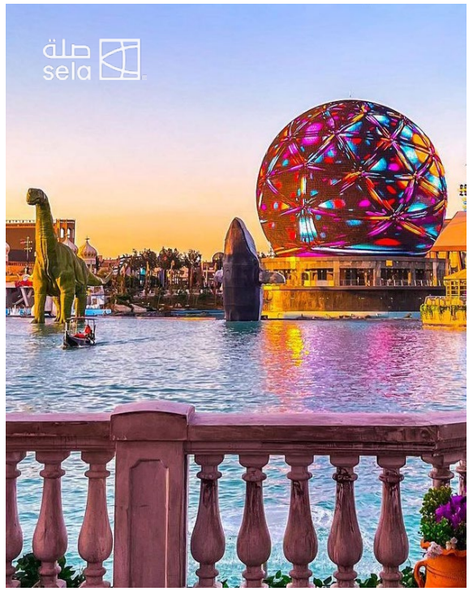
- **ENR GLOBAL BEST PROJECTS AWARDS 2023,** Best Project in Sports/Entertainment
- **CONSTRUCTION WEEK KSA AWARDS 2023,** Commercial Project of the Year
- **GUINNESS WORLD RECORDS 2023,** Largest artificial lake in the world with an area of 121,900 m^2
- **GUINNESS WORLD RECORDS 2023,** Tallest metal replica model of a fictional character in the world with a height of 33.7 m
- **GUINNESS WORLD RECORDS 2023,** Largest LED light ball with a diameter of 35 m
- **GUINNESS WORLD RECORDS 2023,** Largest music production studio in the world spanning 4023.83 m^2

Breaking Remarkable Feats in the Entertainment Industry

With components breaking ever-increasing numbers of Guinness World Records, Boulevard World marks a pivotal step in achieving Saudi Vision 2030, attracting tourists and boosting tourism growth.

The new entertainment zone in Riyadh Season has achieved a remarkable feat in celebrating Saudi Arabia's social positioning and cultural capital. The multicultural theme park earned well-renowned recognition from the Guinness World Records, breaking new records with its largest artificial lagoon, the tallest metal replica model of a fictional character, the biggest LED light ball, and the largest music production studio. Aligned with the Kingdom's Vision 2030, the Boulevard World promotes culture and entertainment by taking visitors on a journey across ten countries, allowing them to experience the joy of traveling from one country to another. One minute, you're in the Taj Mahal, and the next, in Venice. The United States, France, Greece, China, Spain, Japan, Morocco, and Mexico are among the other represented countries.

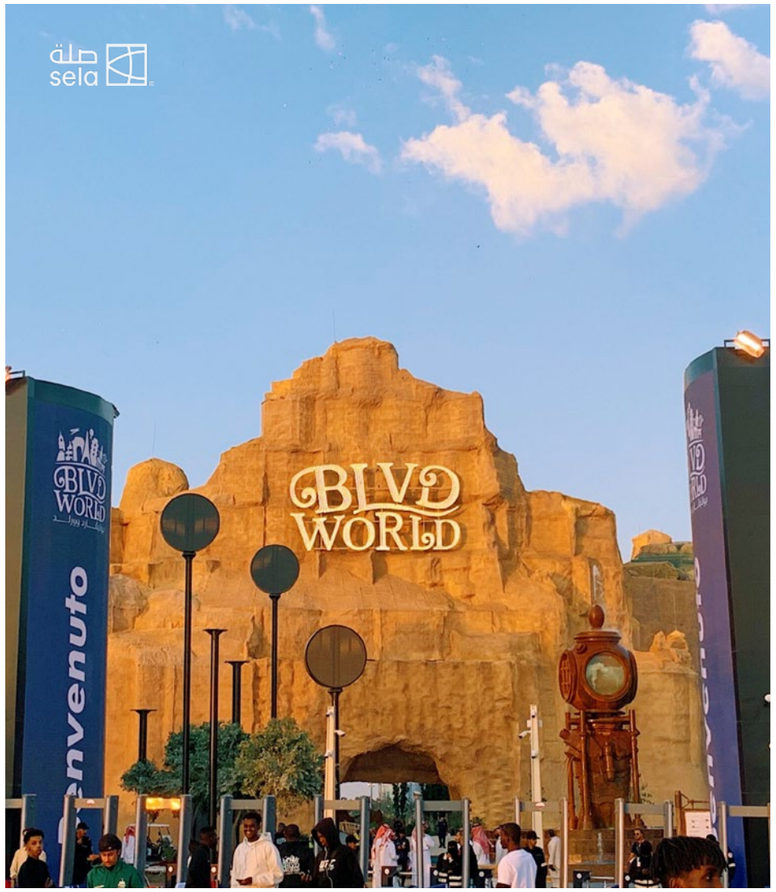
In addition to reaping global success, the Boulevard World has set a new record for completion time - only 80 days - thanks to an effective project management plan that utilized



agile and lean methods. The project incorporated innovative construction processes and modern building materials to create the artificial lake, optical ball, metal structures for the cities, and unique architectural cladding for each international style. Additionally, using pre-engineered steel structures and ready-to-install materials through modular construction significantly expedited the construction process, while ensuring the delivery of top-notch output.

The project brought together a team of 70 contractors and around 4,800 people who worked tirelessly in two to three shifts to ensure timely completion.

The organizers reported that six million individuals have visited Riyadh Season since its inception, and with the inauguration of Boulevard World, the number of attendees at the season's events has more than doubled. By achieving these milestones, the project has successfully established a sustainable entertainment system in the Kingdom.



NEW DELTA WASTEWATER TREATMENT PLANT

Benchmarking Green and Sustainable Solutions for Agriculture and Environmental Preservation

PROJECT LOCATION
Al Dabaa Axis

START DATE
2021

COMPLETION DATE
2023

ROLE OF K&A
Design Review
Construction Supervision

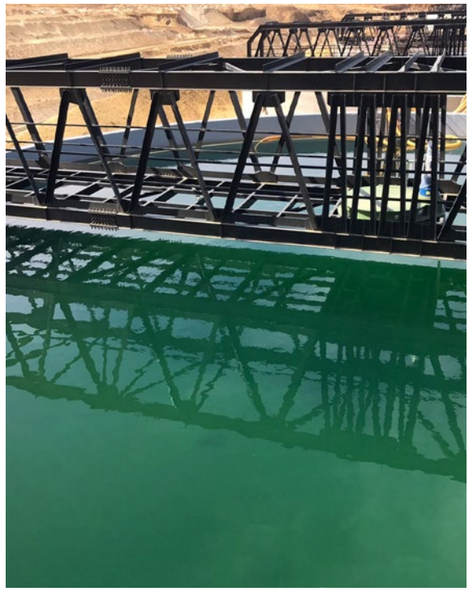
AWARDS

- **ENR GLOBAL BEST PROJECTS AWARDS 2023,**
  Best Project in Water/Wastewater
- **MEED PROJECTS AWARDS 2023,**
  National Winner - Water Treatment Project of the Year
- **BIG 5 GLOBAL IMPACT AWARDS 2023,**
  Partnership of the Year (Joint Venture of Khatib & Alami, Metito Limited, Orascom Construction, The Arab Contractors Company, and Hassan Allam Construction)
- **GUINNESS WORLD RECORDS 2023,**
  Largest Water treatment plant with a capacity of 86.8m^3 per second
- **GUINNESS WORLD RECORDS 2023,**
  Largest Water treatment facility with a total area of 320,600 m^2
- **GUINNESS WORLD RECORDS 2023,**
  Largest sludge treatment plant with a capacity of 670.01 kg/s
- **GUINNESS WORLD RECORDS 2023,**
  Largest epoxy coating in a building with an area of 520,339 m^2

The world's largest New Delta Wastewater Treatment Plant makes a further leap forward in agricultural wastewater treatment across Africa.

The New Delta Wastewater Treatment Plant in Egypt is a significant milestone in agricultural wastewater treatment, built on the success of the previously completed Bahr Al-Baqar and Al Mahsama projects. With a capacity of 86.8 m^3 per second, it is the largest water treatment facility in the world and a fundamental component of the government's $50 billion water-saving plan to combat water scarcity through 2037. The facility processes wastewater from the Old Delta agricultural drainage before transferring it to a 174-kilometer canal, the world's longest artificial river in Egypt's Western Desert. Advanced digital technologies have been integrated to improve performance, reduce wastage, and control water quality, ensuring compliance with industry standards and client specifications.

The plant features Egypt's largest disc filter with 132 filter discs, along with the biggest inlet



pumps for raw water. It operates through seven underground networks, including electricity, water, sewage, rain, fire, irrigation, and pipe operating systems.

In addition, it hosts a supervisory control and data acquisition (SCADA) system that collects and processes data from sensors, allowing remote control of all equipment.

The New Delta Wastewater Treatment Plant reuses agricultural wastewater by processing resources from wastewater to enhance water usage efficiency, irrigate 210,000 hectares of additional agricultural fields, and safeguard marine and coastal ecosystems from environmental contamination.

The plant will help Egypt meet its 2030 National Agenda and UN Sustainable Development Goals by filling the 20 billion m^3 water gap annually. It will also create jobs and improve livelihoods in the remote, unpopulated desert region, and enhance resilience to climate change-exacerbated flooding by diverting wastewater and floods from Behira Governorate to the New Delta area.

THE NEW COLLEGE OF LAW

PROJECT LOCATION
Qatar

START DATE
2017

COMPLETION DATE
2023

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- ENR GLOBAL BEST PROJECTS AWARDS 2023,
Award of Merit in Education/Research

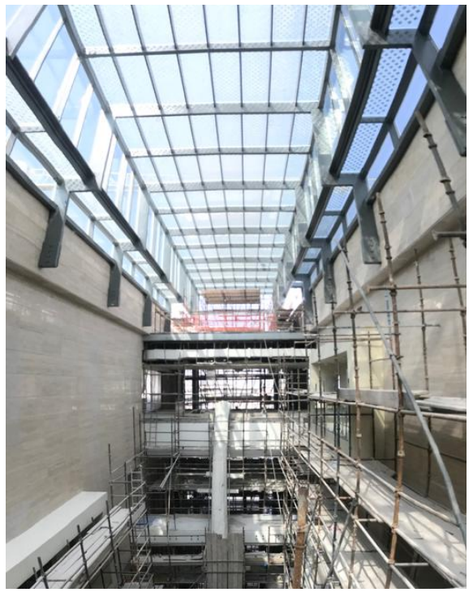
Fulfilling Qatar University's Ambition to Become a Leading Academic Institution in the Region

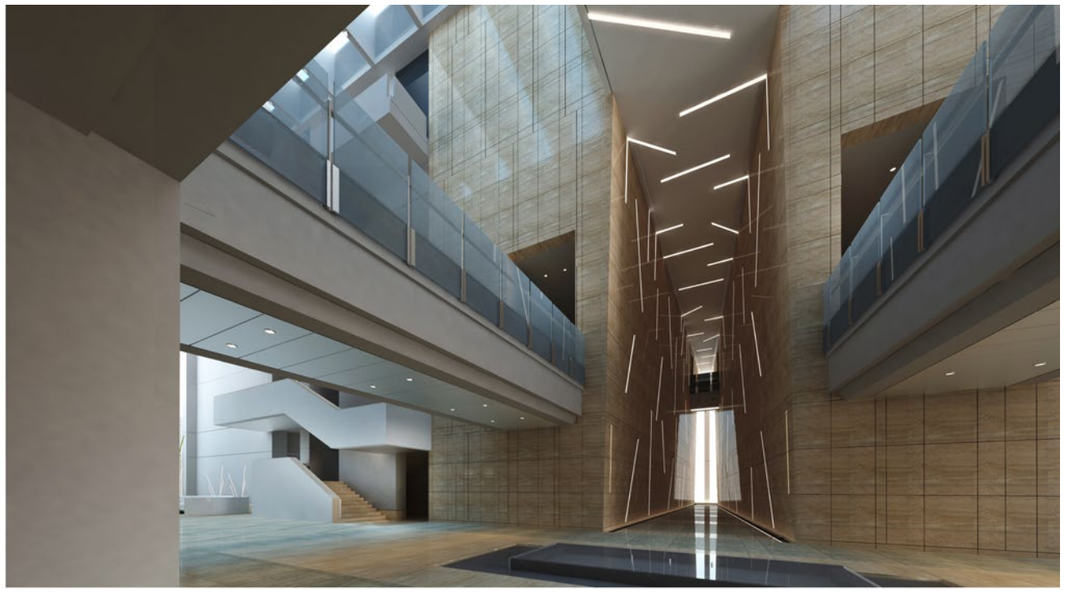
The New College of Law (NCL) was designed as a living-learning resource environment to support the long-term expansion of Qatar's education sector. It provides real-life cases for law students and faculty to explore and examine in an environment that mirrors the real world.

The college serves 2,000 students and 200 academic and administrative staff, and is built to 4-star GSAS standards, making it a sustainable development model. Located in the heart of the university campus, the facility allows students to move freely through indoor and outdoor open spaces that complement academic activities and promote knowledge sharing, work collaboration, and social activities. The building is divided into three distinct blocks that are interconnected internally. This design allows for a gender-segregated educational facility that still provides equal access to a state-of-the-art educational establishment.

During the design process, advanced technologies, materials, and strategies were seamlessly incorporated into the design process to minimize the building's energy waste. For instance, two long permeable facades play an important role in the reduction of the system's energy demand by significantly decreasing solar radiation and providing a comfortable, secure, healthy, energy-efficient, and sustainable indoor environment. Additionally, the integration of information and communications technology (ICT) at the building and building systems level ensures intelligent and efficient operations.

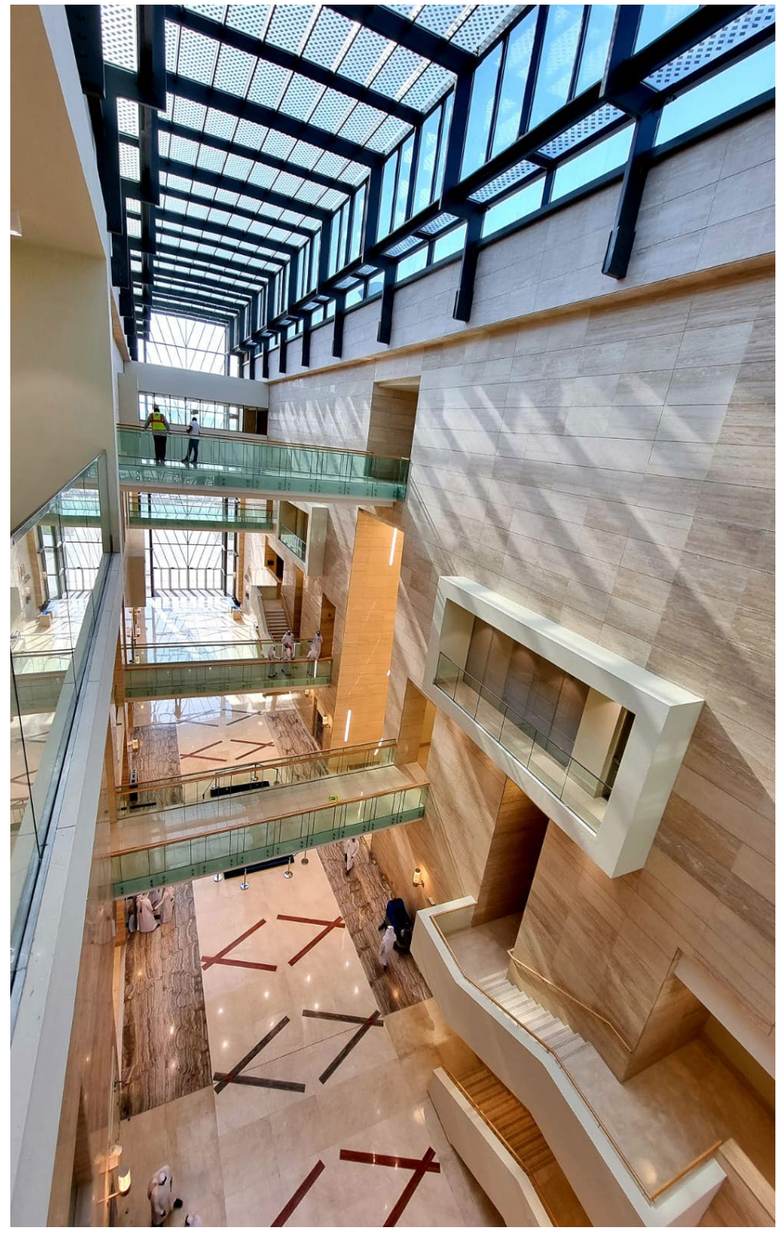
The NCL is an exemplary project demonstrating the effective utilization of BIM technology. It saw the implementation of BIM from the design stage to execution, ensuring seamless coordination among teams and clash-free models. Digital tools like Revit and NavisWorks have improved engagement levels and facilitated instant data sharing.





This has reduced the possibility of human error, enhanced reviews, and enabled a thorough analysis of the solar effect to create an efficient building envelope.

By fostering a culture of lifelong learning, leading in innovation, and empowering the local community, Qatar University is not only contributing to the growth and development of the country but also to the betterment of society as a whole.



Transforming into a World-Class, Fully Functional Patient Care Facility

PROJECT LOCATION
Qatar

START DATE
2019

COMPLETION DATE
2023

ROLE OF K&A
Lead Consultant for the Interior Design and Engineering Services

AWARDS

- MEP MIDDLE EAST AWARDS 2023,
Highly Commended - Retrofit Project of the Year

Initially designed as a high-rise hotel apartment, The View Hospital was converted halfway through construction into a fully functional hospital where all types of healthcare-specific elements were fitted into the pattern of hotel rooms.

The View Hospital boasts the best healthcare and hospitality design, such as hotel-like amenities and top-of-the-line finishes.

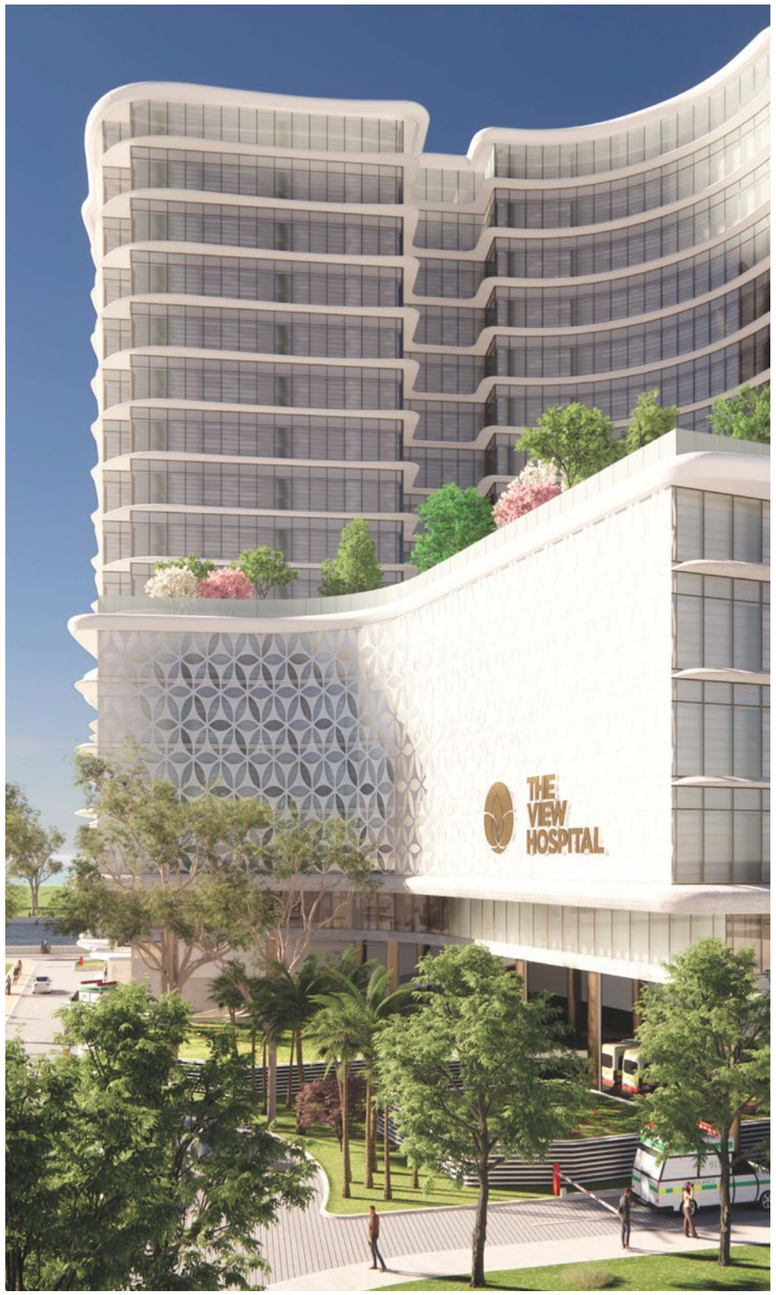
With 240 single private suites, 62 VIP suites, and three royal suites, it provides an unparalleled patient experience that is both luxurious and comforting. Extensive modifications were made to transform the hotel into a fully functional hospital that meets the industry's healthcare standards.

This included changing the room layouts, incorporating specialized medical equipment and advanced healthcare technologies into the hospital's design, allocating appropriate infrastructure, MEP provisions such as new shafts, installing a helipad, and implementing infection control measures.

Moreover, the design incorporated flexible space planning principles, which allow for easy reconfiguration and scalability to accommodate different medical departments and potential changes in healthcare service delivery.

The hospital uses an advanced building management system that adjusts lighting, HVAC, and ventilation systems based on occupancy and external weather conditions. This has reduced energy costs by 20% while maintaining a comfortable environment. It has also integrated energy-efficient MEP systems, including LED lighting and energy recovery systems, resulting in a 30% decrease in overall energy consumption. Additionally, a green roof garden and a rainwater harvesting system contribute to natural insulation and

reduce water usage by 50%. The View Hospital has revolutionized the healthcare industry with its patient-centered approach, cutting-edge technology, and advanced medical equipment. By setting new standards in medical excellence, it supports Qatar in becoming a regional leader in the health sector and broader health economy.



WATER REUSE AND WASTEWATER TREATMENT

Turning the Arid Sinai Desert into Green Valleys and Productive Farmland

PROJECT LOCATION
Egypt

START DATE
2019

COMPLETION DATE
2021

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **ENR GLOBAL BEST PROJECTS AWARDS 2021,**
  Best Project in Water/ Wastewater, and Global Best Project of the Year

- **MEED PROJECTS AWARDS 2021,**
  National and regional winner - Water Project of the Year and MEED Project Award of the Year

- **GUINNESS WORLD RECORDS 2021,**
  Largest treatment plant in the world with a capacity of 64.8 m^3 per second

- **GUINNESS WORLD RECORDS 2021,**
  Largest sludge treatment plant with a capacity of 360 kg per second

- **GUINNESS WORLD RECORDS 2021,**
  Largest LED light ball with a diameter of 35 m

Bahr Al Baqar Wastewater Treatment Plant is a transformational project that will contribute to the Egyptian Government's goal of increasing self-sufficiency, driving economic growth, reducing water stress, and tackling environmental pollution.

With a capacity of over 2 billion m^3 of water per year, the Bahr Al Baqar water treatment plant has been recognized by Guinness World Records 2021 as the largest plant for purifying water, treating pollutants, and using ozone for sterilization.

The plant consists of four water treatment lines, each with a daily processing capacity of 1,400,000 m^3, and repurposes 5.6 million m^3/day of mixed-use drainage, agriculture drainage, treated sewage, and treated industrial wastewater from the 106 km-long Bahr Al Baqar drainage canal.

Previously, this water was released directly into Lake Manzala, causing significant pollution. The effluents entering the drainage originate mainly from irrigation water drainage, as well as treated effluent from the Delta region and some industrial discharge. The raw water is transported to the new 660,000 m^2 reclamation plant through deep tunnels passing down the new Suez Canal to the eastern side of the Canal.

The plant is equipped with advanced processes such as pumping raw water,

coagulation, flocculation, decantation, filtration, and disinfection to produce clean water for irrigation. Unlike conventional wastewater treatment plants, it is specifically designed and operated to remove residual concentrations of micropollutants from wastewater using ozone treatment technology to prevent leakage of harmful micropollutants into the surface water, soil, and groundwater.

Additionally, the facility uses sustainable technologies and techniques to treat sludge efficiently. The sludge solar drying system is a first of its kind and captures solar energy inside 128 green beds, turning sludge into a year-long asset that can be used in agricultural and industrial fields.

The project aims to support the Egyptian government's efforts to green areas of the desert by reclaiming 1,400 km^2 of agricultural land, directly supporting communities, creating job opportunities, and improving the quality of life for half a million people.

DIGITAL TWIN REALITY MODEL

Enhancing Security and Readiness for Climate-Related Disasters in the Sultanate of Oman

PROJECT LOCATION
Oman

START DATE
2019

COMPLETION DATE
2022

ROLE OF K&A
Lead Consultant

AWARDS

- **CONSTRUCTION TECHNOLOGY AWARDS 2023,** Digital Twin Project of the Year
- **BENTLEY SYSTEMS' YEAR IN INFRASTRUCTURE AWARDS 2020,** Winner in the Reality Modeling Category

This large-scale digital twin involved capturing and modeling 250 km² of difficult topography in Oman within a very tight timeframe.

The Sultanate of Oman aims to improve its national security and readiness for climate-related disasters by creating a comprehensive digital twin of the area encompassing approximately 250 km² in and around Muscat. This initiative will also serve as a prototype and guide for the development of similar 3D modeling services in the region.

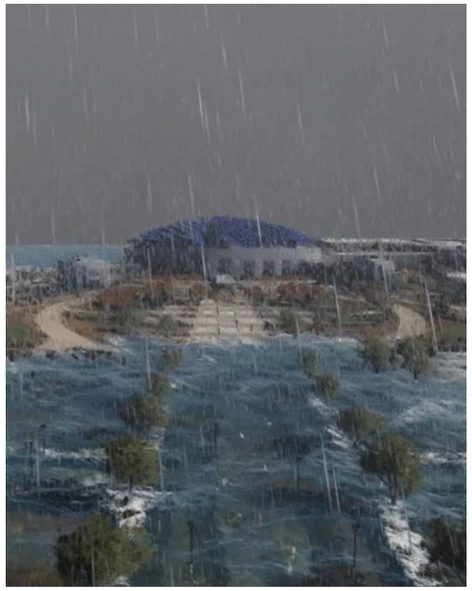
The digital twin reality model involved capturing images with unmanned aerial vehicles (UAVs) and constructing a 3D reality model of the area, which included 43,000 fully textured buildings. Every aspect of the complex project had to be finished within a deadline of 125 days. Additionally, due to the country's airspace constraints including working around classified areas and commercial flights, the team only had 14 days available for flying and image capture. Adding to the pressure was the weather, which presented a challenge with harsh sunlight, high temperatures, elevated humidity, and windy conditions.

To deliver the project, our team captured 330,000 drone images to create a digital twin model, and auto-vectorized 43,000 buildings of the whole area in 3D using Bentley's iTwin Capture and Esri ArcGIS, resulting in extremely detailed, high-quality visualizations and analysis. The 3D model was delivered in just 90 days – 35 days ahead of schedule with enhanced quality and at a reduced cost.

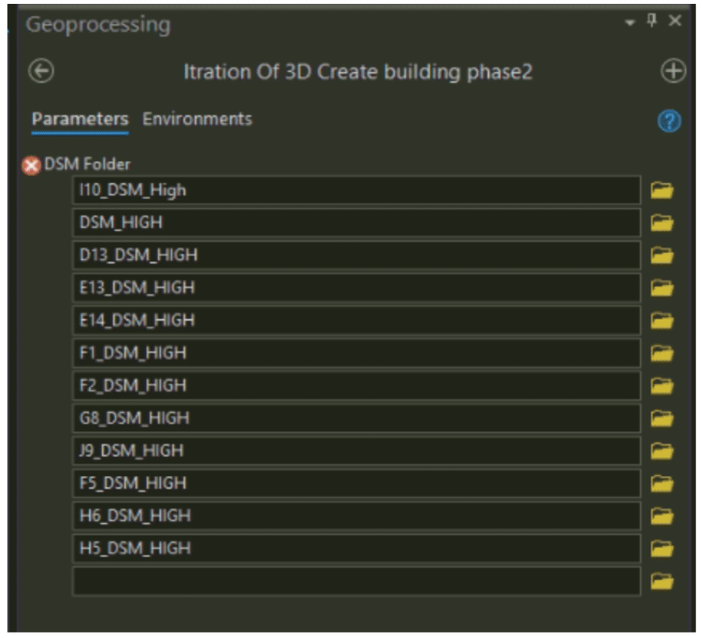
The Omani Digital Twin is a role model for other similar projects in the region, demonstrating the potential of integrating Building Information Modeling (BIM) with Geographical Information System (GIS) to produce digital twin applications.

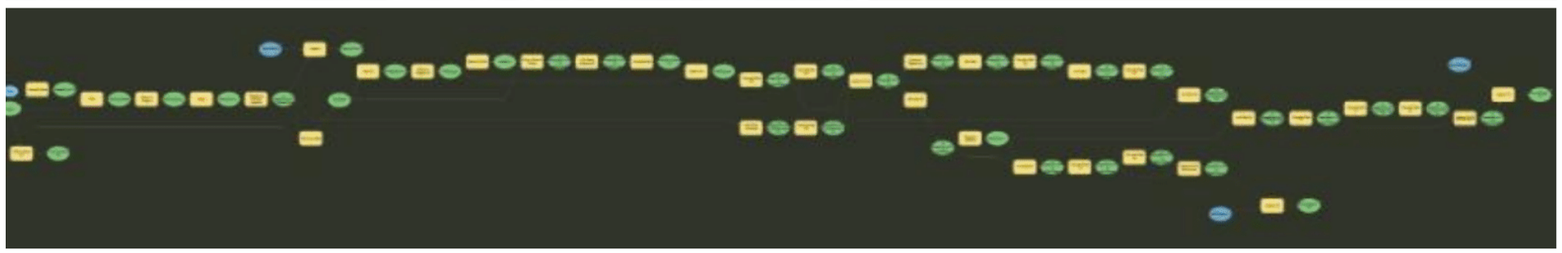
CONSTRUCTION TECHNOLOGY AWARDS 2023

The Year in INFRASTRUCTURE and GOING DIGITAL AWARDS



The project will provide essential tools to the government to forecast and understand climate behavior on seasonal, annual, decadal, and centennial time scales by allowing accurate modeling of multiple scenarios — particularly those related to flooding, cyclones, sand and dust storms, and drought in the Sultanate of Oman. It will also bring significant benefits to the community by aiding decision-making related to mitigation measures, urban planning, and crisis preparedness.





MODERN MALL

Showcasing a Genuine Commitment to Innovation and Sustainability in the Emirate of Sharjah

PROJECT LOCATION
United Arab Emirates

START DATE
2016

COMPLETION DATE
2021

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- MEP MIDDLE EAST AWARDS 2021,
Mechanical Project of the Year

City Centre Al Zahia stands as an exemplar of green infrastructure and architectural design, reflecting Majid Al Futtaim's sustainable vision.

City Centre Al Zahia is the largest shopping mall in the Northern Emirates of the UAE. Despite the challenges posed by the pandemic, it was the first major retail project to be launched and completed in the MENA region.

Located within a short walk of Majid Al Futtaim's one - million - square - meter residential community in Sharjah, the project is a premier urban retail and entertainment destination and a community mall for pedestrians. It will serve more than 1.9 million residents in the Al Zahia gated community, Sharjah, and the Northern Emirates.

Inspired by the Sharjah Light Festival, the mall's design is similar to that of a lantern. The entrance has a wave-shaped canopy ceiling supported by columns resembling the branches of a tree. The layout offers a perfect balance between public spaces and commercial areas, enhancing the visitor experience.

City Centre Al Zahia has a contemporary, light-filled aesthetic while also demonstrating the client's true commitment to sustainable, environmentally friendly building practices. This LEED Gold-certified development meets the highest standards of energy, water, and waste minimization. Ambitious goals for water conservation and recycling, as well as optimizing energy efficiency and promoting sustainability were carefully integrated into the project's key performance indicators (KPIs) and overall plan. The design of the mechanical systems has contributed significantly to the project, resulting in a 15.47% energy reduction and a 37.81% reduction in water use. The project also considered the comfort levels of both indoor and outdoor spaces for future occupants.

The project uses passive and active design measures and optimizes natural daylight in the concourse areas. Moreover, innovative solutions were seamlessly integrated into the mall's architecture, resulting in a completely sustainable structure. Among the cutting-edge technologies is an automated building management system (BMS), which controls and monitors important MEP systems as well as energy use throughout the building. The BMS initiates control sequences in various systems by adjusting settings based on real-time data, occupancy patterns, and weather forecasts.

By prioritizing sustainable development, celebrating the city's heritage, and enhancing community well-being, City Centre Al Zahia represents a bold and innovative approach to urban development that puts people and the environment at the center of its vision.

AVANT-GARDE INSTITUTION

Establishing the Foundations for Future Education

PROJECT LOCATION
Qatar

START DATE
2017

COMPLETION DATE
2021

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **ENR Global Best Projects Awards 2021,**
  Award of Merit Education /Research

The New College of Education (NCE) supports Qatar University's ambition to improve the country's education system and become a leading educational institution in the region.

The college was constructed to serve as a hub for student-centered learning, teaching, and community partnerships. It accommodates 2,500 students and is staffed by 200 academic and administrative personnel. It is located within the Qatar University Campus and exemplifies sustainable development, having been built to 4-star Design and Construction standards by Qatar's Global Sustainability Assessment System (GSAS).

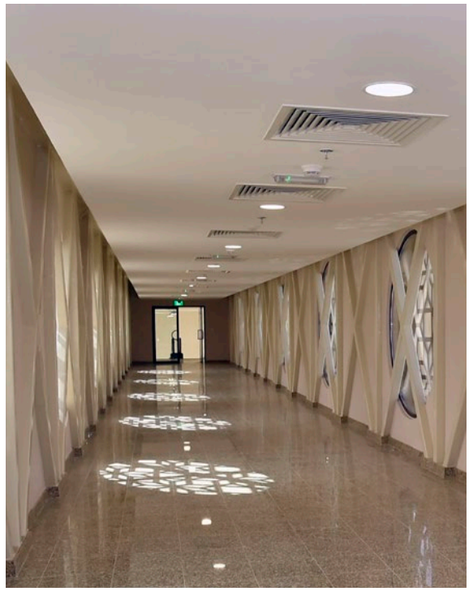
The NCE is a massive structure covering an area of 59,000 m^2, featuring a monolithic block design with two interior courtyards that allow natural light to penetrate the building's inner spaces. The courtyards are symmetrically positioned on both ends of the building cores, creating four natural light sources. The access halls and staircases feature a series of hydroponic green walls that enhance the indoor space's air quality and aesthetics. The building's façade is made of stunning aluminum and large ceramic panels with calligraphy engraved onto the ceramic surfaces, engineered in a combined system.

The project showcases the best use of Building Information Modeling (BIM) from design to execution, resulting in clash-free models and increased engagement from the public. The use of Revit and NavisWorks allowed for instant data sharing, reduced human error, enhanced reviews, and analysis such as the solar impact to create an energy-efficient building envelope.

Moreover, the NCE is a model of sustainable development, designed with an integrated process to achieve energy and water conservation, outdoor thermal comfort, indoor environmental quality, local materials use, and accessibility to public services.

New College Of Education - Qatar University

Qatar



The NCE supports Qatar's government's vision for world-class education and social progress through state-of-the-art laboratories and audio-visual technologies for interactive learning. The clinics, 3D labs, Black Box simulation room, and the 'Industrial co-bots understanding behavior' (I-CUBE) enable research in human-robot cooperation, and attract international educational partnerships, supporting the development of highly qualified professionals and globally recognized scholarly activities.

WATER DISPATCH CENTER

Breaking New Ground in Desalination

MEED PROJECTS AWARDS

PROJECT LOCATION
Kingdom of Saudi Arabia

START DATE
2023

COMPLETION DATE
2025

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **MEED Projects Awards 2020,**
  Digital Infrastructure Project of the Year, National Winner, and Overall Best Project Award

This strategic and groundbreaking project stands out from the rest in the GCC as it brought about a complete digital transformation of the water management business of the world's largest producer of desalinated water, the Saline Water Conversion Corporation (SWCC).

SWCC aims to achieve its corporate vision of becoming a world leader in seawater desalination and power production, providing high-quality, affordable, and economic returns to its customers. On a global scale, SWCC produces 22% of the world's total desalinated water.

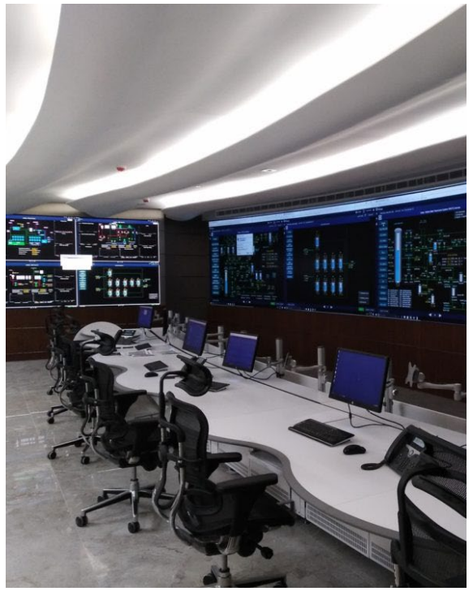
Through its establishment, the water dispatch center has helped to tackle one of the biggest challenges facing the Kingdom – water scarcity and high consumption rates – in a much more cost-efficient and technologically advanced manner than ever before and provided competitively priced potable water and electricity to millions of people.

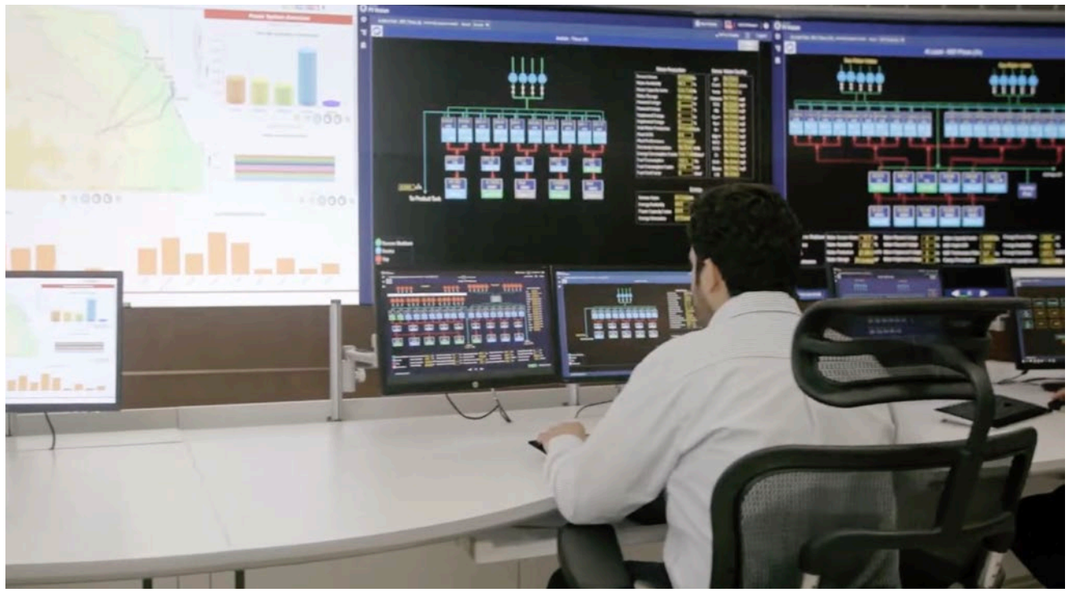
The main challenge of the project from the outset was reconciling SWCC's water transmission and production facilities information, which was in different formats and geographies in the Kingdom, by setting up an integrated water management system (WMS); PI of OSIsoft constitutes the cornerstone, together with Esri GIS Platform and further deployment of IT/OT applications.

The innovative WMS housed in a new water dispatch center has enabled SWCC to monitor the real-time operation, plan and instruct the scheduling of production/transmission, and review the performance of the past operation. Automatic controls harness the WMS capabilities to schedule hourly productions based on fuel prices or sell water and electricity in the future. The project has also resulted in a leveling up of the SWCC workforce's skills, ensuring they are working according to international best practices.

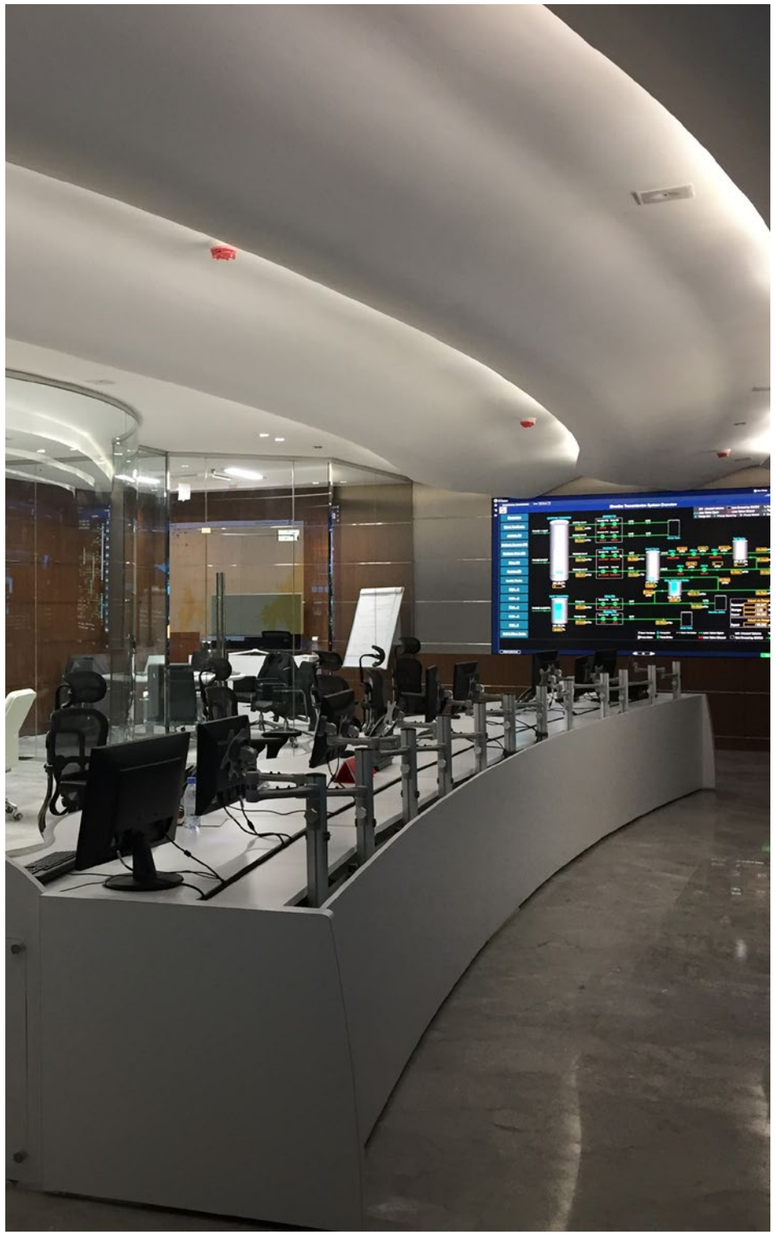
Saline Water Conversion Corporation Water Dispatch Center

KSA





This was a first-of-kind project for the Kingdom of Saudi Arabia's water desalination sector given the level of integration between the AEC (Architecture, Engineering, and Construction) and IT/OT (Information & Operational Technologies) to deliver the final WMS to SWCC. The project has delivered a solid PI infrastructure tightly integrated with the latest in GIS, ERP, SCADA DCS, and other enterprise applications such as production scheduling and dispatch to optimize the overall cost of water production.



A NEW GENERATION PROJECT

Minimizing the Environmental Impact of Wastewater Treatment and Sludge Management in the Kingdom

PROJECT LOCATION
Kingdom of Saudi Arabia

START DATE
2011

COMPLETION DATE
2018

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **MEED Projects Awards 2020,** Excellence in Civil Engineering
- **Big Projects Middle East Awards 2019,** Infrastructure Project of the Year

Saudi Arabia is investing in wastewater treatment and sludge management facilities to address water stress and urbanization, focusing on safe, environmentally sensitive disposal, energy, and nutrient recovery.

The Al-Madinah Al-Munawwarah Wastewater Treatment and Sludge Management project is a life-critical project that supports Saudi Arabia's Vision 2030. It aims to improve the poor sanitation standards in the city caused by the overwhelming of the existing sewage treatment plant and the high accumulation of sludge pools that were blighting residents with pollution, insects, and bad odors.

The project becomes even more critical when considering the city's status as the Kingdom's second holy city after Makkah and the increasing number of pilgrims visiting both cities, which is expected to reach 30 million per year by 2030. To properly treat the increased wastewater and shock loads from Al Madinah, the project involved the construction of domestic and industrial treatment plants, a solar sludge drying system, and a sludge landfill. The new sewage treatment plant with a capacity of 200,000m^3 per day was added to the existing facility, increasing the total capacity to 440,000 m^3 per day.

Furthermore, the project incorporated the Kingdom's first-ever solar sludge drying system, which captures solar energy inside specially designed greenhouses and turns sludge into a year-long asset that can be used in the agricultural and industrial fields. This two-pronged approach to treating domestic and industrial wastewater and managing sludge in an environment-friendly manner is unprecedented in Saudi Arabia.

Since its completion, the project has had a positive impact on Al-Madinah Al-Munawwarah, putting it on the green track to sustainability.

Al-Madinah Al-Munawwarah Wastewater Treatment and Sludge Management Project

KSA

Today, the area benefits from significantly reduced pollution of water wells because the wastewater is now being conveyed to the sewage treatment plant and is tertiary treated, as per local and international standards. Moreover, the treated water is being reused for irrigation and agricultural purposes, while odor and insect infestations are being controlled by treating old sludge lagoons. Beautification and bio diversification of the surrounding area have also occurred through tree-planting schemes.

Overall, the project has seen a marked improvement in the well-being of Al-Madinah residents, by being one of a new generation of wastewater treatment plants and sludge management projects that aim to capitalize on securing safe environmental disposal and energy, and nutrient recovery.

Bringing a New Source of Water Wealth to Egypt's Desert Region

PROJECT LOCATION
Egypt

START DATE
2018

COMPLETION DATE
2020

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **ENR Global Best Project Awards 2020,** Best Project in Water/Wastewater
- **Construction Week Awards 2020,** Highly Commended Infrastructure Project of the Year

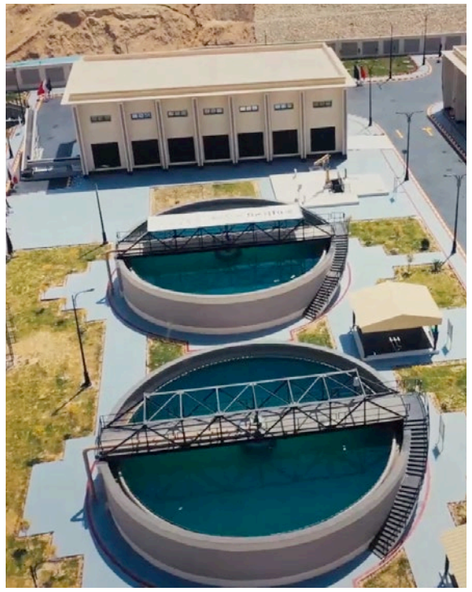
The Al Mahsama project is a milestone in Egypt's water security agenda and represents a qualitative leap in the field of agricultural wastewater treatment across Africa, where water reuse and recycling are still evolving as a sustainable solution to water scarcity.

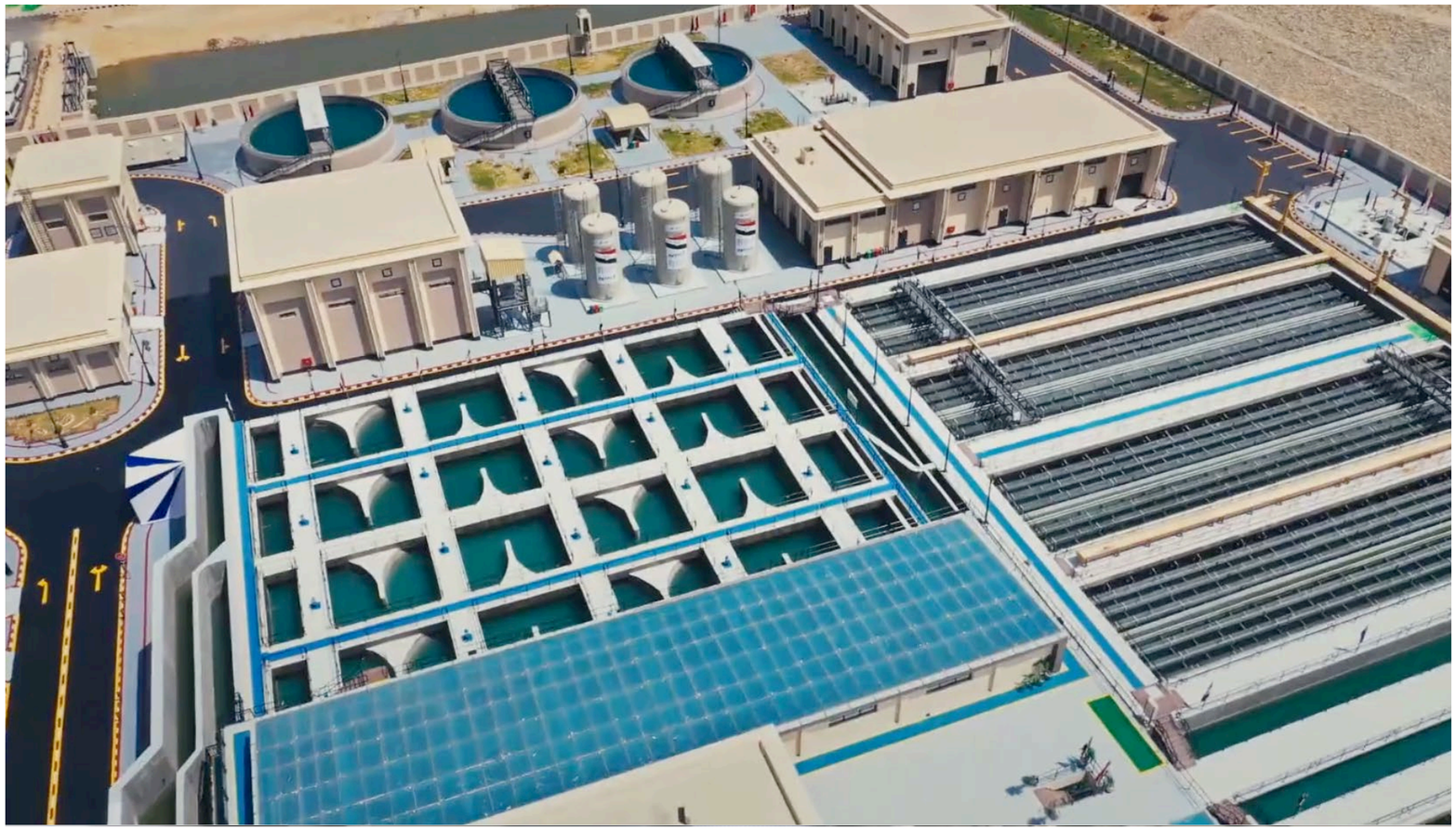
The plant repurposes one million cubic meters per day of mixed-use drainage, agriculture drainage, treated sewage, and treated industrial wastewater from the Al Mahsama drain to provide irrigation water for up to 100,000 acres of land in central Sinai. The water is taken below the Suez Canal to the new 42,000m^2 reclamation plant for treatment and onward distribution.

The daily capacity of this project will help relieve pressure on the Nile water and contribute towards preserving the natural ecology of Al Temsah Lake. The lake is situated west of the Suez Canal and has been severely impacted by wastewater disposal, causing severe consequences for animal habitats and the local fishing culture.

Despite the project's sheer scale and complexity, the Al Mahsama Water Reclamation Plant was delivered within a fast-track 12-month construction period despite many challenges from material supply to staffing, planning, construction, equipment delivery, testing, and commissioning. The remote location of the plant led the team to adopt an operational system that could be controlled completely from off-site. This was supported by collaborative technologies to enable a seamless and transparent virtual environment, allowing round-the-clock effective delivery of materials and equipment.

Because the Suez Canal had to remain open during the plant's construction, materials — including 7,860 tons of steel—were moved across the canal on temporary floating pontoonbridges.





The team worked to make sure long lead time items from Europe and elsewhere arrived on schedule when the bridges would be operational.

The project adopted a vertical plant approach for the first time in Egypt, which reduced the space required by 70% and created major efficiencies in terms of construction cost and time. In addition to the reduced footprint, vertical alignment of the treatment units also supports operational efficiency by enabling the facility to benefit from low-head (energy) losses.

The plant has facilitated the development of a remote, unpopulated desert region, creating jobs, improving livelihoods, and enhancing the environmental condition of the Sinai Peninsula.

OMAN-BASED HOSPITAL EXTENSION

Revolutionizing Healthcare Delivery Through Modular Construction, Robotics, and Artificial Intelligence

PROJECT LOCATION
Oman

START DATE
2013

COMPLETION DATE
2019

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **MEED Awards 2019,**
  Healthcare Project of the Year, and Innovation Medal Category
- **Construction Week Oman Awards 2019,**
  Commercial Project of the Year

The Specialist Hospital Extension boasts the largest modular operating theatre and the first-ever catheterization lab in the MENA region using augmented reality.

The hospital's modular construction provides unparalleled flexibility in medical facilities. It allows for the easy addition of equipment and adjustment of space, making it possible to transform a traditional surgical room into a robotic or hybrid theatre with ease.

The modular operating theatre is the biggest in Oman, consisting of eight operating rooms dedicated to organ transplant procedures and conventional, hybrid, and robotic surgeries. The level of integration and controllability of the medical equipment has taken hybrid surgery a step forward.

Moreover, the hospital is home to the MENA region's first-ever catheterization lab featuring augmented reality (AR). This artificial intelligence technology will guide the surgeon in different procedures without using a CT scan.

All the operating rooms, including the centralized control system for medical equipment, digital healthcare archiving, and audio-video matrix, are connected to classrooms and conference rooms serving as real-time medical and educational services platforms.

This world-class project was successfully delivered thanks to a close collaboration between the client, end-users, and project stakeholders.

The excellent teamwork has improved the quality and buildability of the design and delivery which took into account future demand and expansion while prioritizing

the health and safety of workers. The hospital extension has significantly increased bed capacity from 251 to 371 and the number of operating theatres from five to thirteen, allowing for complex and minimally invasive surgeries.

SUSTAINABLE INFRASTRUCTURE PROJECT

Delivering Safe Drinking Water to More than Half a Million People in Bisha and Tathleeth

MEED AWARDS Construction Week AWARDS

PROJECT LOCATION
Kingdom of Saudi Arabia

START DATE
2009

COMPLETION DATE
2016

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **MEED Awards 2019,**
  Water Project of the Year, National Winner, Engineering Achievement of the Year, and Innovation Medal Category Winner
- **Construction Week Awards 2018,**
  Infrastructure Project of the Year

Located in Saudi Arabia's Empty Quarter, the world's largest uninterrupted sand mass, the Al-Wajeed Water Master Plan aims to establish a 68,000 m^3/day water treatment plant and conveyance system to extract and purify water from Al-Wajeed wells and transport it 600 km to Tathleeth reservoirs.

This life-sustaining project has helped safeguard the well-being of more than half a million people in Tathleeth and Bisha governorates who were at risk from water shortages, presenting a serious threat to health and the economy. These shortages were exacerbated by Wadi Bisha's pollution and the drying up of local wells. Moreover, the two settlements' distance from the sea (+300 km) and height above sea level (1,000 m) meant the Saline Water Conversion Corporation was unable to transport the required water to households.

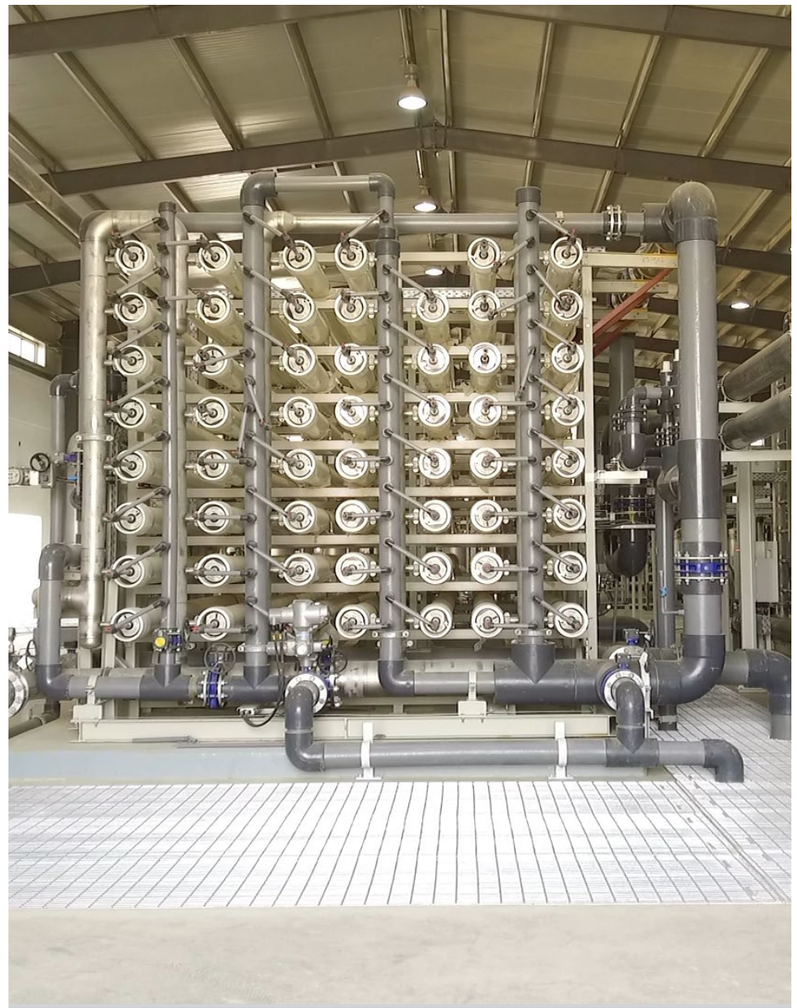
Due to the significance, sensitivity, and complexity of the project, plus the harsh Empty Quarter desert climate, our team designed a robust conveyance system for potable water distribution in the Empty Quarter desert. The system uses pneumatic or solar power for water supply and pumps, reducing energy costs and minimizing maintenance risks. The main supply artery is a 1000 mm diameter ductile iron pipe, with maintenance-free hammer protection and automatic liquid-air quality adjustments. Innovative access roads and buffer trees were used to protect the project infrastructure, namely the evaporation ponds of the water treatment plant, which had a surface area of more than two million km^2 demand and expansion while prioritizing the health and safety of workers.

Since the project required millions of tons of imported backfill material, the team encouraged contractors to use excavated

soil as backfill material, reducing imported backfill material and environmental impact.

The project utilized Geographic Information Systems (GIS) technology to gain a comprehensive understanding of the environment, creating intelligent base maps with topography, geology, climate, population, road networks, utilities, and sensitive natural areas. GIS helped in automatically alerting design mishaps, reducing design time, and aiding contractors in their approach.

Al-Wajeed has spurred infrastructure development by boosting the local economy and ensuring long-term sustainability in a part of the Kingdom previously viewed as inaccessible for investment opportunities. The project provides 40,000 m^3 of potable water daily to Bisha and Tathleeth inhabitants, with potential for further expansion to 108,000 m^3/day.



PROJECT LOCATION
United Arab Emirates

START DATE
2013

COMPLETION DATE
2018

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- ENR Global Best Project Awards 2019,
Award of Merit in Hospitality

Blending Harmoniously into its Natural Surroundings to Preserve Biodiversity and Restore Local Habitats

The resort not only supports the conservation of native wildlife, but also secures the long-term future of the beach as a nesting ground for the Hawksbill turtle.

Saadiyat Rotana Resort & Villas is a luxurious five-star hospitality development situated on the natural island of Saadiyat, 500 m off the coast of Abu Dhabi. The property spans 112,000 m^2 of beachfront, with 17,000 m^2 dedicated to a protected nesting beach for indigenous Hawksbill turtles.

The project, covering 78,000 m^2, includes 327 rooms and suites, along with 13 villas, each featuring a swimming pool and a terrace facing the sea. It offers a variety of Food & Beverage outlets and features attractions such as a lazy river, splash pool, cinema zone, and water slide.

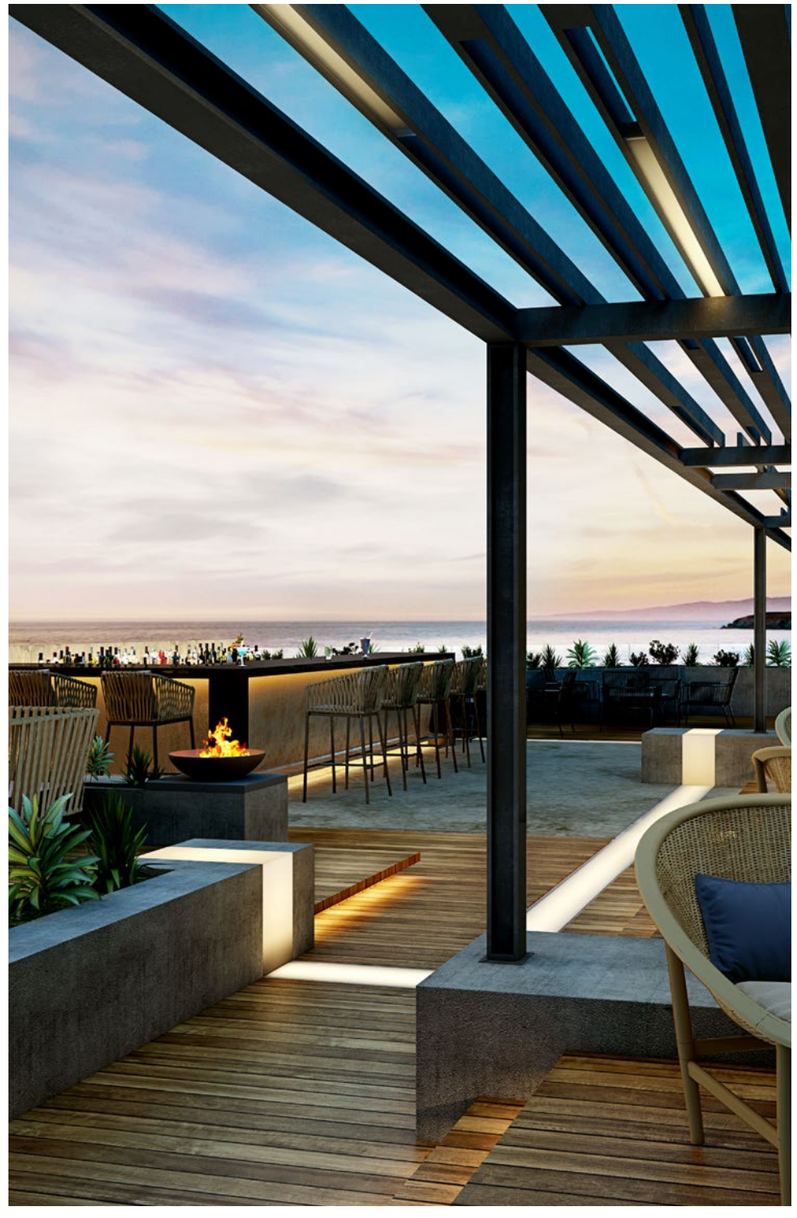
The resort's design incorporates architectural elements of the Arabic Region and blends contemporary features with a focus on capturing views of the ocean, landscaped courtyards, and lagoon areas. Large expanses of glass feature windows against solid and traditional load-bearing walls to create a unique aesthetic.

Recognized for its best practices in sustainable design, construction, and operational efficiency, Saadiyat Rotana Resort & Villas has received a two-pearl rating from local authorities. The property has been acknowledged for its efforts in energy, water, and waste management within the resort's buildings and associated facilities.

Being a major nesting ground for the critically endangered Hawksbill turtle, Saadiyat Island's nine-kilometer beach posed a unique challenge during the design and construction process. The project team worked closely with several agencies, including the Environment Agency – Abu Dhabi (EAD), to ensure compliance with exacting standards throughout the construction process.

To protect and sustain the environment, the project team provided special training to all site staff and implemented various technologies, such as solar panels and a wastewater management system.

Saadiyat Island aims to become a premier destination supporting Abu Dhabi's overall tourism development goals. The addition of Saadiyat Rotana Resort & Villas enhances the island's exclusive luxury hotel offerings and visitor experience.



INTRICATE ARCHITECTURE

Bringing Ingenious Innovation to Safeguard Construction Workers

Construction Week AWARDS

PROJECT LOCATION
United Arab Emirates

START DATE
2014

COMPLETION DATE
2025

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **Construction Week Awards 2019,**
  Highly Commended Health and Safety Initiative of the Year

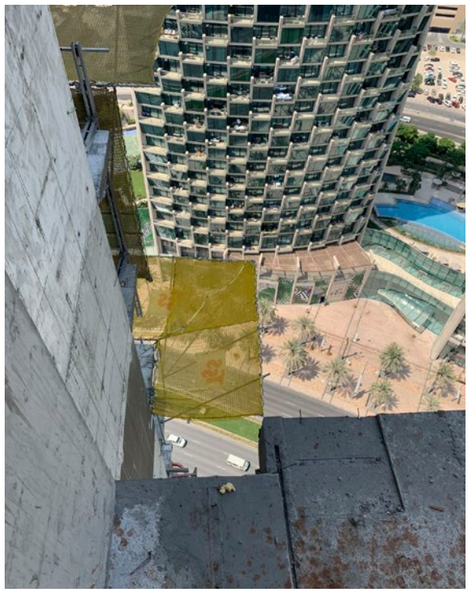
The Vertifan Protection Screen on Tower A2 of the Address Residences Dubai Opera project has drastically reduced the risk of falling objects and construction workers falling from heights.

The Address Residences Dubai Opera project by Emaar is a luxurious service apartment development located in Downtown Dubai. The towers are inspired by Arabian Sea sailboats and feature an expansive podium between them, offering various retail, leisure, and entertainment facilities.

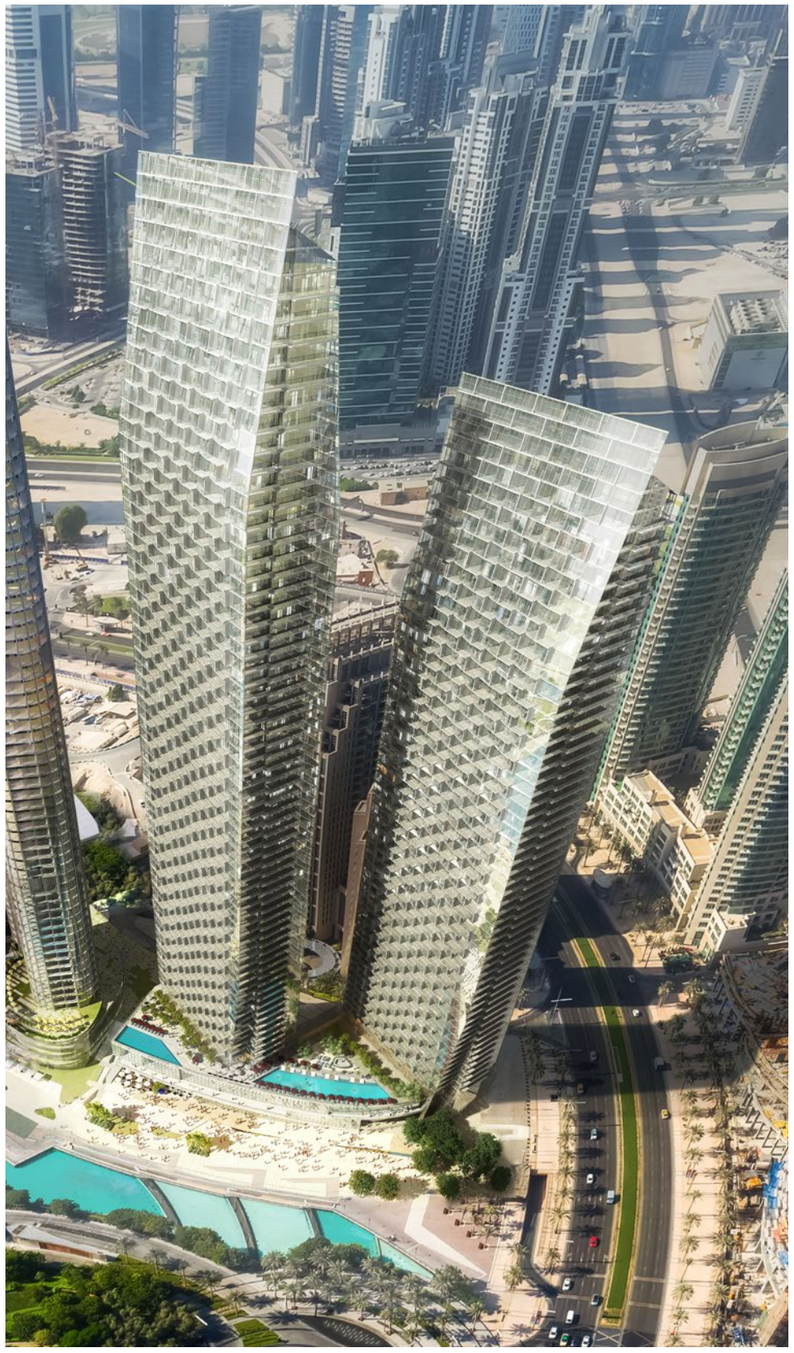
Due to the unique geometry of the buildings, with their staggered balconies, conventional safety and fall arrest systems were insufficient to provide adequate safety from falling objects or for arresting slips and falls. Two areas of concern were the edge protection on the active slab and the protection of people from falling objects. Tower A2, located close to Mohammed bin Rashid Boulevard, carried a greater risk to the public, in particular, of falling objects.

To address these safety concerns, the team launched the “Stop the Drop” campaign, which sought to protect workers, site staff, and the public. Total Safety Solutions (TSS), a leader in fall safety systems, was engaged to develop a unique solution for the Address Residences Dubai Opera project, which was a first for the UAE.

The Vertifan Protection Screen was deployed on Tower A2, which provided a self-climbing fan to free up crane time and position the fan as close to the leading edge as possible. The Vertifan also brought a vertical screen for up to three floors so that cleaning work and installation of edge protection and blockwork could be carried out from behind a safe screen. The versatile modular design has been adapted to the geometry of Tower A2; hence it works well with the project›s table form system, staggered balcony, and irregular shape.



Since the deployment of the Vertifan Protection Screen on Tower A2, the risk of falling objects and arrested potential falls by site operatives have been drastically reduced. The project has reached 34 million safe man-hours without LTI.



HOTEL COMPLEX

Becoming a World-Class Leisure Destination in the Heart of Dubai

PROJECT LOCATION
United Arab Emirates

START DATE
2012

COMPLETION DATE
2017

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **ENR Global Best Project Awards 2018,**
  Best Project in Residential/Hospitality

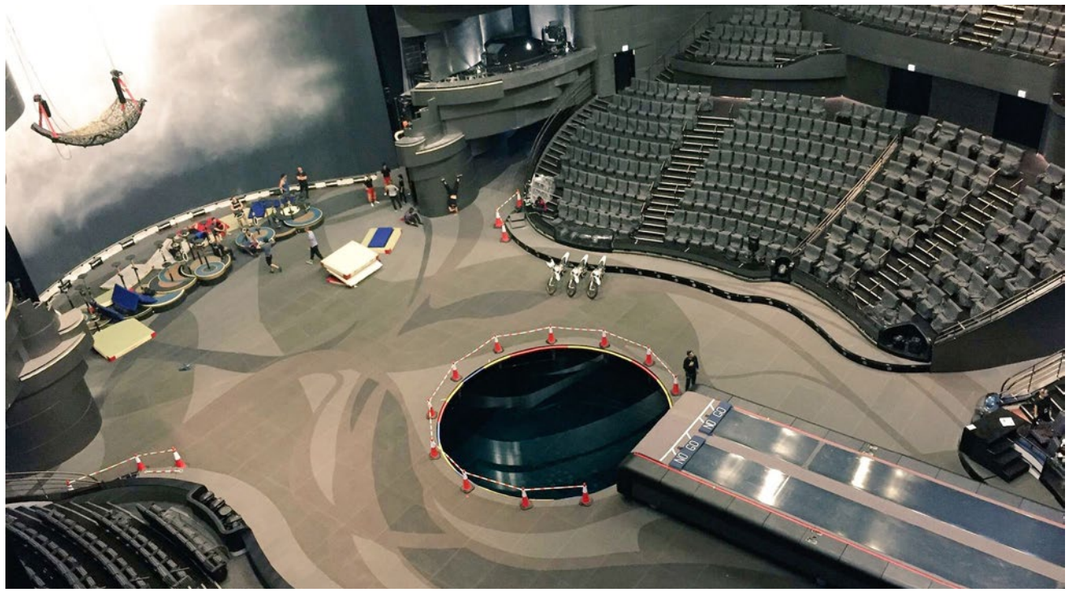
Home to three 5-star hotels with unparalleled amenities, Al Habtoor City redefines luxury living in Dubai. It hosts the region's first permanent show, La Perle, in a tailor-made state-of-the-art aqua-theatre.

Al Habtoor City is a multi-use development with a 360,000 m^2 built-up area and three world-class hotels, known as the Al Habtoor City Hotel Collection. The project features the Middle East's largest Hilton, the Hilton Dubai Al Habtoor City, Habtoor Palace Dubai, LXR Hotels & Resorts, and V Hotel Dubai, Curio Collection by Hilton. Each of the three 5-star hotels has been designed by world-famous international architects and designers and offers more than 1,600 elegant rooms between them.

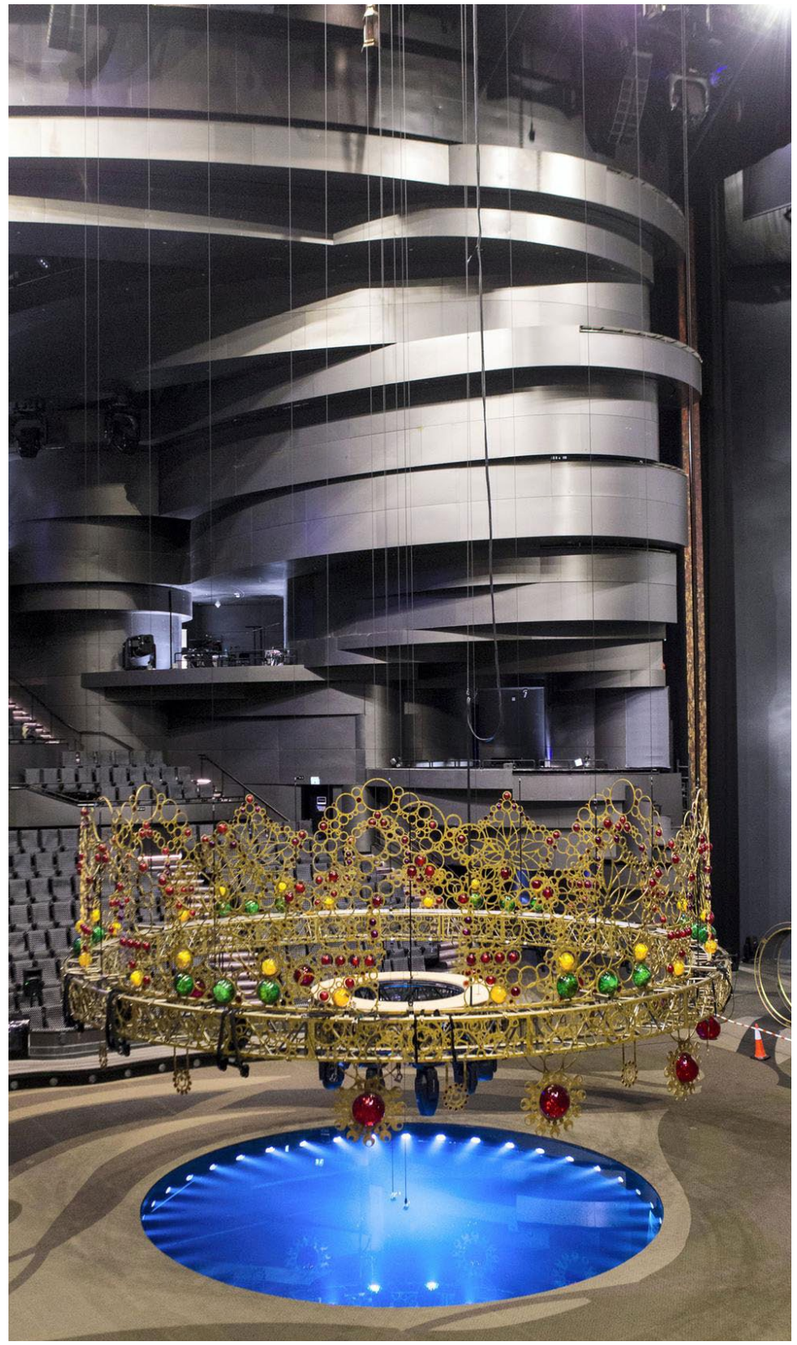
The complex is also home to the stunning 1,300-seat aqua-theatre, which is only one of three in the world, featuring the region's first permanent show, La Perle. This show boasts aquatic theatrics and gravity-defying performances that can only be delivered in a theatre custom-built with automated staging, high-tech overhead rigging, and cutting-edge technologies.

The Boulevard and Marina Promenade are other attractions within the complex, with elegant boutiques, gourmet restaurants, and al fresco cafés. Additionally, there is a tennis academy and clubhouse with eight courts and a 5,000-capacity car park for visitors.
The simultaneous construction of three hotels, including multiple F&B, leisure, and recreational facilities, and multiple stakeholders within the confines of a single site required exceptional project and program management. This involved collaboration from over 150 companies and 5,000 workers from 36 countries.

The theatre design and construction involved a multidisciplinary team working remotely across different time zones, achieving a



seamless virtual environment through collaborative technologies. The venue was built around a large pool with dynamic water features, allowing the stage to transform from a dry platform to a 300 mm water-filled pool.



PROJECT LOCATION
Lebanon

START DATE
2014

COMPLETION DATE
2018

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **ENR Global Best Project Awards 2018,**
  Best Project in Retail/Mixed-Use

Becoming a Green Lung for the City

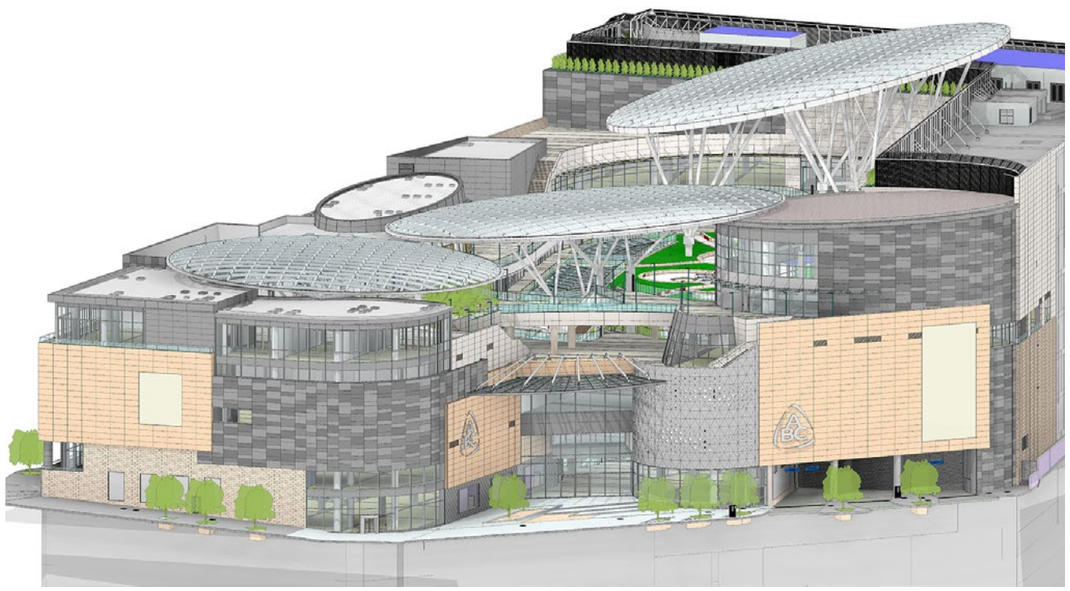
Designed with sustainable architecture and green spaces, ABC Verdun is Lebanon's first LEED-certified community mall in Beirut, offering a seamless connection to the city's residential areas and an impactful visitor experience.

ABC Verdun Mall is a prime urban retail and entertainment destination in one of the most vibrant Beirut districts. The LEED-certified development features an open mall concept with a permeable structure connected to the predominantly residential neighborhood.

The mall's design reflects a Mediterranean sensibility of openness and community and accommodates a 10,000 m^2 anchor department store, 6,000 m^2 of entertainment and leisure, a family entertainment area, 11 cinema screens, 1,800 m^2 of landscaped gardens, and a lush al fresco courtyard. The indoor and outdoor spaces make it an interconnected urban park, offering unique experiences beyond traditional shopping.

This complex project was located in one of Beirut's busiest neighborhoods and needed to be completed within a fast-track 28.5-month program. The site was heavily urbanized, surrounded by major roads and buildings, which posed significant challenges during the project's construction. The structural design had to be altered significantly by substituting conventional concrete slabs with precast concrete elements, which resulted in reduced manpower requirements, improved health and safety, and cost-efficiency.

Moreover, a detailed schedule and follow-up mechanism were implemented to ensure the timely delivery of around 110,000 m^2 of precast elements, with a logistics plan to manage the circulation of delivery trucks in the surrounding congested areas. The team successfully managed 63 subcontractors, suppliers, and tenant contractors, collaborating with over 150 representatives from diverse backgrounds.



They implemented Lean principles, a first in Lebanon, to improve coordination, collaboration, planning, and execution of the project.

ABC Verdun holds the distinction of being the first construction project in Lebanon to embrace Building Information Modeling (BIM) technology using REVIT software, facilitating the acquisition of the LEED Building Design and Construction (LEED BD+C) certification. This development has established new standards in sustainable design, construction, and operations, with an intricate waste management program, LED lighting, durable materials, and a solar photovoltaic system.

The mall has become a hub for the neighborhood, attracting additional investment and creating employment opportunities, with over 2,000 jobs. Additionally, it offers a green oasis in the heart of the city, with a positive impact on air quality and well-being.

CUTTING-EDGE AVIATION TRAINING CENTER

Driving Innovation and Restoring Beirut's Influence in the Region

ENR GLOBAL BEST PROJECTS AWARDS

PROJECT LOCATION
Lebanon

START DATE
2009

COMPLETION DATE
2016

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- **ENR Global Best Project Awards 2018,** Award of Merit in Education/Research

This project is a groundbreaking achievement for Lebanon as it establishes the country's inaugural flight simulator training center. It embodies the visionary outlook of Middle East Airlines and sets a new standard for aviation training in the region.

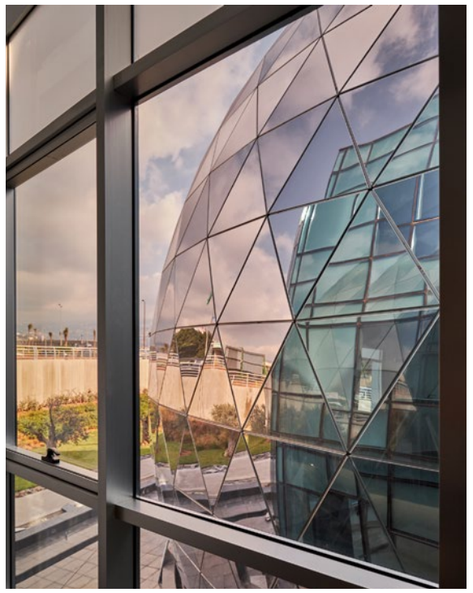
The Middle East Airlines (MEA) Training and Conferences Center is Lebanon's first flight simulator training center for the Middle East Aviation Academy near Beirut's International Airport.

MEA established the first professional Airline Training Institute in the Middle East in 1960, training pilots from Lebanon and internationally. However, political unrest in Beirut led to its closure in 1982. Following this, the Training & Development Center underwent a complete revision of its mission, functions, and facilities to incorporate advanced techniques in professional airline training.

The center was redesigned to create a technologically advanced learning environment, which will improve training effectiveness and ensure that pilots are trained at the highest level of proficiency, with access to the latest technologies. The team visited the Airbus Training Center and Factory in Hamburg, Germany, where they gained inspiration for the project.

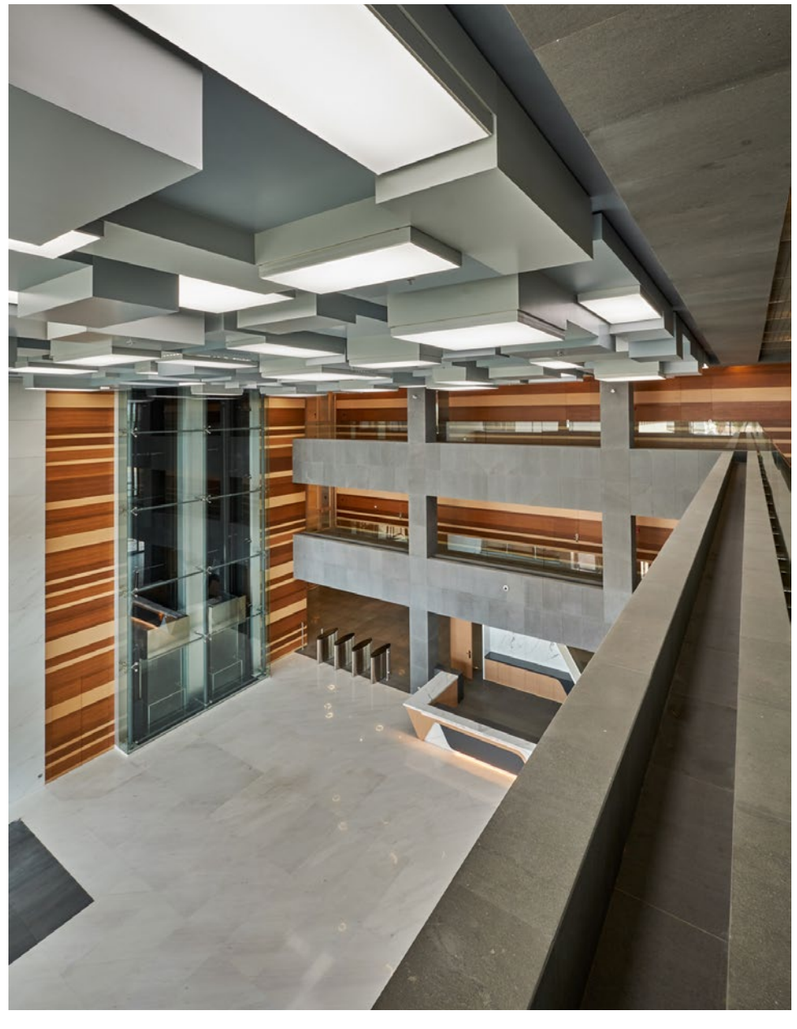
Spanning a site of 13,755 m^2, the facility boasts several support spaces and business functions seamlessly integrated to meet the needs of trainees, trainers, and staff. It features training divisions for pilots, cadets, cabin, ground, and administrative crews, as well as a library and administrative offices. Additionally, there is a conference center featuring a 19m high dome with a 300-person auditorium, an olive garden, a ballroom, and a multipurpose reception hall, as well as auxiliary services.

All team members involved in building this iconic project coordinated closely to ensure



the various elements were aligned and properly implemented. Special attention was given to the fine details of the project's functions. The focus areas included the auditorium inside the Dome with its unique internal wooden-clad ceiling, the cockpit simulators area, and the cabin crew area, which underwent significant changes from a conventional to an exposed concrete ceiling design. On the 3rd floor, there was a kitchen extension for 400 people, a wide cantilevered balcony, and unique designs for banquet, multipurpose, and VIP areas, with exceptional false ceiling output.

The MEA Training and Conferences Center has brought new technologies and innovations to Beirut, re-establishing the city's regional training role and rejuvenating Lebanon with a will to build, develop, and activate its national institutions, with MEA at the forefront.



PROJECT LOCATION
United Arab Emirates

START DATE
2012

COMPLETION DATE
2017

ROLE OF K&A
Lead Design
Construction Supervision

AWARDS

- MEP Middle East Awards 2018,
Plumbing Project of the Year

Showcasing a Fusion of Art and Technology

The first-of-its-kind aqua theatre required extensive MEP expertise to execute stunning stunts and special effects in a tailor-made venue that magically transforms wet stage to dry instantly.

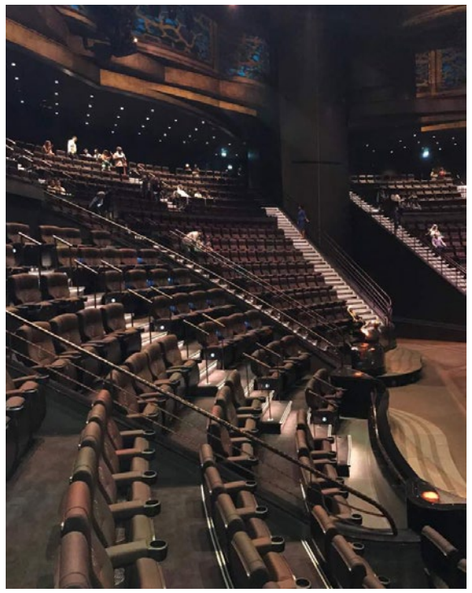
Dubai's La Perle is a stunning 1,300-seat aqua theatre and one of only three worldwide featuring the region's first permanent show.

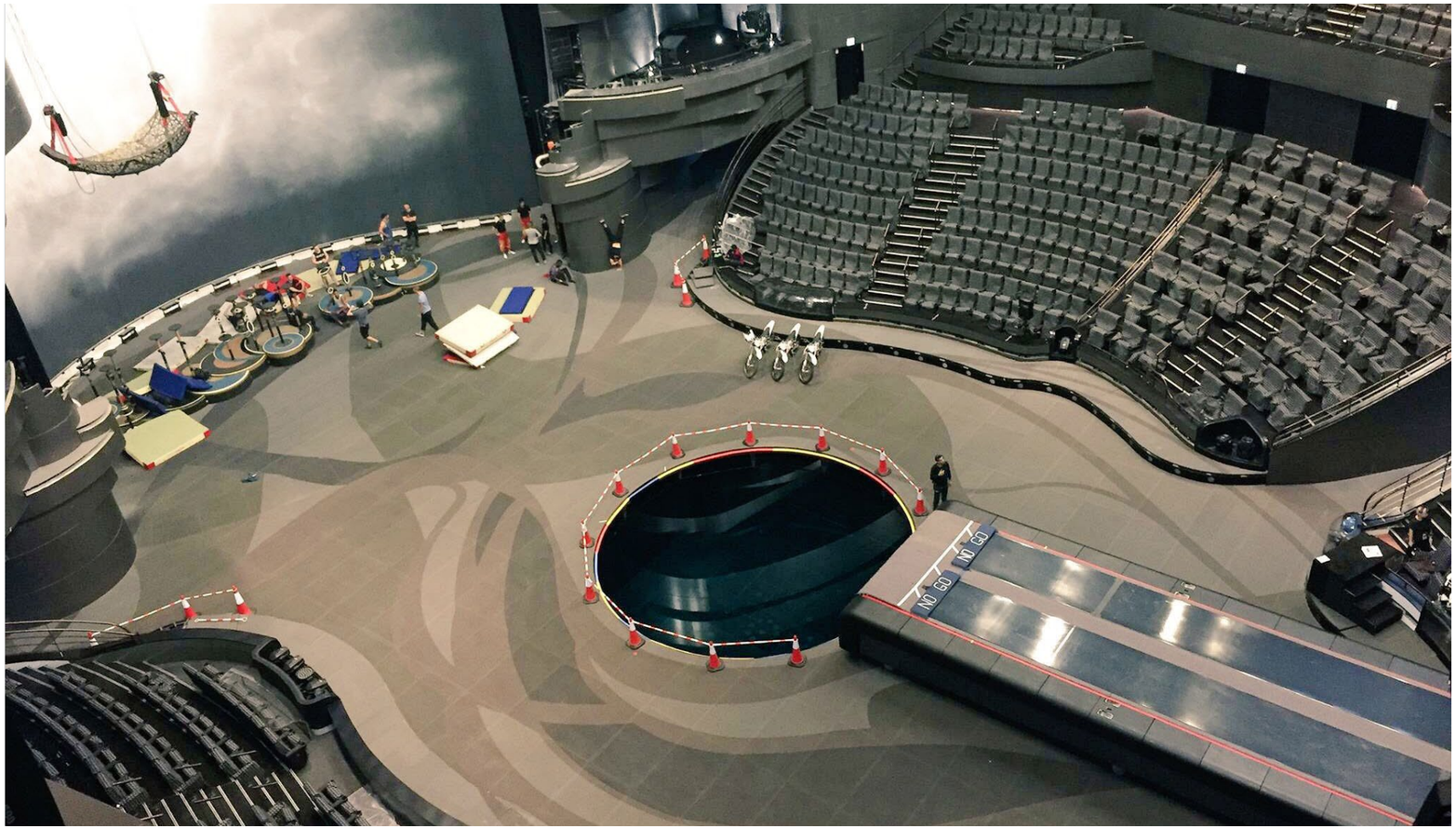
The show's aquatic theatrics and gravity-defying performances could only be delivered in a theatre custom-built theatre with automated staging, high-tech overhead rigging, and cutting-edge technologies.

To create an interactive experience, the theatre was built around a large, 5 m-deep, pool that uses 2.7 million liters of water to simulate effects such as rainfall and floods. The entire stage is covered in perforated flooring which enables it to fill to a depth of 30 cm. It is designed to be submerged and drained in just 90 seconds thanks to an SFX (special effects) pump room that has two 300 HP pumps pumping 1,000 liters of water per minute. This is achieved via four 600 mm pipes that carry out the quick drain operation from the main performer pool. There is also an in-between storage tank, where the water is temporarily stored.

The SFX pump room uses multiple strategies to deliver different effects: performers are hidden from view inside the 5-meter-deep pool thanks to the creation of billions of micro bubbles; rainfall can be simulated across the entire performance area; and a spectacular waterfall plays a role in rapidly refilling the stage.

Another particular challenge was meeting the contrasting thermal comfort demands of the audience and performers. The performers needed a temperature above 30 degrees Celsius and humidity of 80%, whereas the audience needed a temperature of 24 degrees Celsius and 50% humidity. The design team



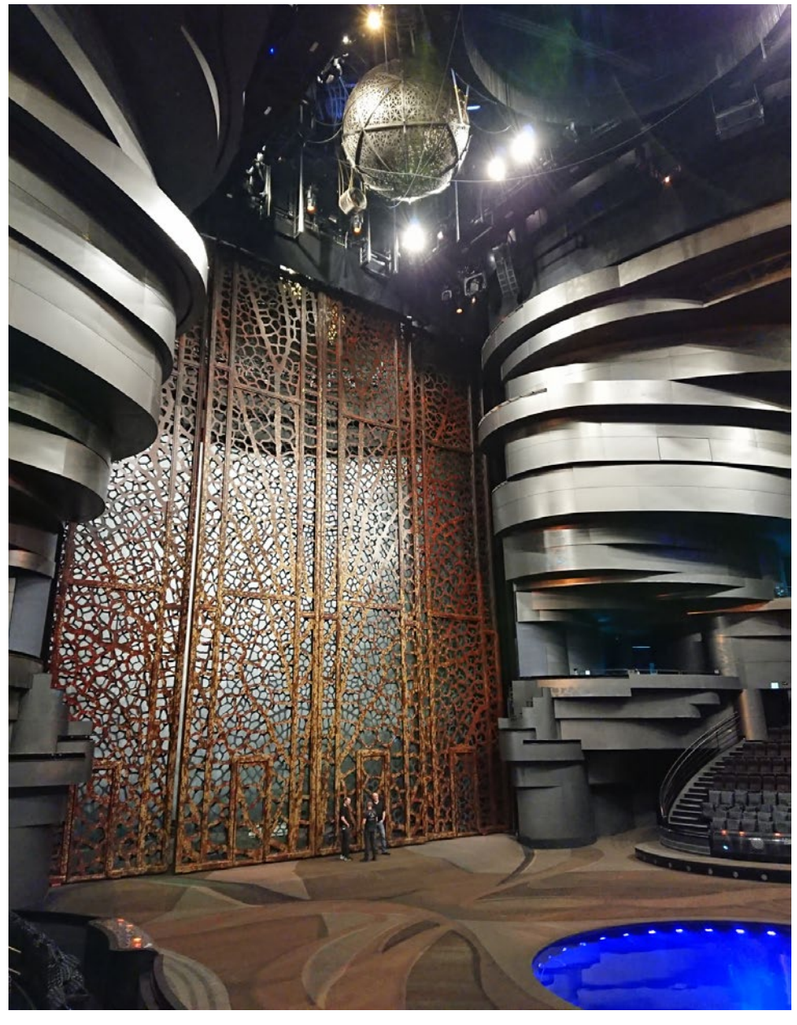


chose to create ‘air curtains’ that separated the two zones without impacting the audience’s experience.

This non-physical solution ensured the audience’s comfort and enjoyment of the performance.

In a country with limited water resources, recycling water is crucial to minimize waste. The project involved a comprehensive system that treated water using different grades of sand and monitored chlorine levels.

La Perle’s successful delivery involved outstanding collaboration and a can-do approach from the entire MEP team, working closely with the client, contractor, and wider design team to ensure it met the exacting requirements of a world-class show that attracts audiences from across the world.



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