



# **From Tanker to Treatment: The Role of Ghabawi Treatment Facility's Design in Solving Septic Wastewater Challenges**



An aerial photograph of a city skyline, likely Dubai, featuring numerous skyscrapers and a large body of water. A large, bold, yellow 'Aji' logo is centered over the image.

# Aji

**64+** Years of Innovative Work

**2000+** Successful Projects

**1000+** Clients & Operators

**Your partners in building  
a world, better crafted  
for humanity**



## A Global Presence and Beyond

AJi Group has offices in **KSA, UAE, Oman, Jordan, Iraq, Kuwait, and Yemen**, and has left its mark in over **20 countries**.



Our ENR Top 225 International Design Firms history

2010

161 #

## A Global Presence and Beyond

AJi Group has offices in **KSA, UAE, Oman, Jordan, Iraq, Kuwait, and Yemen**, and has left its mark in over **20 countries**.



Our ENR Top 225 International Design Firms history

2016

154 #



## A Global Presence and Beyond

AJi Group has offices in **KSA, UAE, Oman, Jordan, Iraq, Kuwait, and Yemen**, and has left its mark in over **20 countries**.



Our ENR Top 225 International Design Firms history

2021

135 #

## A Global Presence and Beyond

AJi Group has offices in **KSA, UAE, Oman, Jordan, Iraq, Kuwait, and Yemen**, and has left its mark in over **20 countries**.



Our ENR Top 225 International Design Firms history

2023

115 #



# A Global Presence and Beyond

AJi Group has offices in **KSA, UAE, Oman, Jordan, Iraq, Kuwait, and Yemen**, and has left its mark in over **20 countries**.

## Our ENR Top 225 International Design Firms history

2024  
107 #

AJi Group has obtained BIM ISO 19650, ISO 9001, ISO 14001 and ISO 45001.



## ENR's Top Global Sourcebook Market Rankings for the year 2024:

### Top 15 List

#14 Mixed-Use

### Top 50 List

#31 Sewer & Solid Waste

#48 General Building

### Top 25 List

#17 Wastewater Treatment

#14 Education

#16 Healthcare

**Our Partners / Clients**



## Our Partners/Clients

# Aji



Hashemite Kingdom of Jordan  
Ministry of Water and Irrigation



وزارة التخطيط والتعاون الدولي  
Ministry of Planning and International Cooperation



## Our Partners / Clients

# Aji



WORLD BANK GROUP



**USAID**  
FROM THE AMERICAN PEOPLE

**CDM  
Smith**



**European Bank**  
for Reconstruction and Development

**giz**



**AQABA**  
SPECIAL ECONOMIC ZONE  
AUTHORITY



**MORGANTI**  
A SOLID FOUNDATION



صندوق أبوظبي للتنمية  
ABU DHABI FUND FOR DEVELOPMENT



الهيئة العامة للكهرباء والمياه  
Public Authority for Electricity and Water



شركة المياه الوطنية  
National Water Company



نيوم NEOM

حكومة دبي  
GOVERNMENT OF DUBAI





## Our Partners / Clients

# Aji





A one-stop-shop.

## Covered sectors

---

### 1 Urban Environment

Hotels, Leisure, & Conference Centers  
Mixed Use & Commercial  
Governmental & Public Facilities  
Educational Facilities  
Industrial Facilities  
Data Centers  
Residential Compounds & Housing  
Master Plans

### 2 Wellness and Healthcare

Healthcare Centers & Clinics  
Hospitals  
Medical Cities  
Rehabilitation Centers  
Biotech Facilities

### 3 Utilities and Environment

Water Transmission & Distribution  
Water Collection, Disposal & Environment  
Dams & Reservoirs  
Major Developments

### 4 Mobility and Transportation

Transportation & Planning  
Rails  
Highways & Roads  
Intersections, Bridges & Tunnels Borders

### 5 Eco futurism

Environmental & Social Impact Assessment  
Solid Waste Management  
Energy Efficiency & Renewable Energy

### 6 Advisory and Solutions

Large Scale Mixed Use Projects  
Healthcare & Life sciences  
Mega Infrastructure Projects  
Project Management Office Setup  
Asset & Facility Management Setup  
Public Private Partnerships (PPPs)





**Hamzeh Awwad**  
Chief Executive Officer



**Samer Zeidan**  
Chief Financial Officer,  
Aji Group



**Issam Qubbaj**  
Construction Supervision  
Director, Aji Saudi



**Khalid Odaibat**  
Design & Planning Director,  
Aji Saudi



**Mohammad Shafie**  
Director of Infrastructure  
& Sustainability, Aji Saudi



**Yazan Shahwan**  
Business Development  
Director, Aji Saudi



**Bader Karmi**  
Operations Director,  
Aji Oman, QHC-Aji



**Maysoun Dissi**  
Operations Director,  
Aji Built Environment



**Ghada Sawalha**  
Director of Health Service  
Unit, HDP



**Marc Traboulsy**  
Head of Operations, HDP



**Mohammed Habaib**  
Head of Architecture Dept., HDP

# Technical Leadership



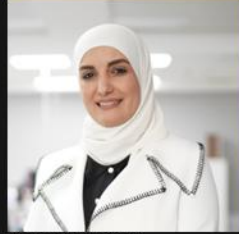
**Basel Abdellatif**  
Head of Project  
Management Dept., AJI Ltd.



**Fawzi Abu Moghill**  
Managing Director, AJI Built  
Environment



**Waleed Mabrouk**  
Head of Structural  
Engineering Dept., AJI



**Sanaa Abu Elzein**  
Head of Mechanical Engineering  
Dept., AJI Built Environment



**Mohammed A. Awad,**  
Head of Studies & Planning, AJI  
Saudi



**Saifeddin Alomari**  
Head of BD & Acting Region  
Manager, AJI Saudi



**Jehad Suboh**  
Head of Structural Department ,  
AJI Saud



**Saad Ghalth**  
Head of PMO, AJI Saudi



**Jerjes Hreimat**  
Head of Architecture Dept.,  
AJI Built Environment



**Samer Almurshed**  
Lead Electrical Engineer, AJI  
Built Environment



**Dana Najib**  
Head of Quantity Surveying  
Dept., AJI Built Environment



**Sana' Abdel Ghanl**  
Head of Structural Engineering  
Dept., AJI Built Environment



**Alun Dolton**  
Master planning Director, AJI  
Saudi



**Goodluck Omorune**  
Strategic Planning and Studies  
Director, AJI Saudi



**Nicholas J. Firbank**  
General Director, AJI Saudi



**Nader AlQaisi**  
Design Project Manager, AJI  
Saudi



**Ghada Jabr**  
Process Design Manager,  
AJI Water & Environment



**Yazan Al Lozi**  
Head of Roads & Transportation  
Dept., AJI Water & Environment



**Aseel Zraikat**  
Team Leader, Water &  
Wastewater Dept., AJI Water &  
Environment



**Enas Abu Zahla**  
Head of Water & Wastewater  
Dept., AJI Water & Environment



**Feras AlMahayekh**  
Strategic Planning and Studies  
Director, AJI Saudi



**Mahdi AlQaddomi**  
Senior Electrical Engineer,  
AJI Saudi



**Mohamed Abu Elezz**  
Senior Architect, PM, AJI  
Saudi



**Danya Abudari**  
Senior Architect, AJI Saud



**Arch. Asma Al Buhaisi**  
Senior Team Leader,  
Architecture, HDP



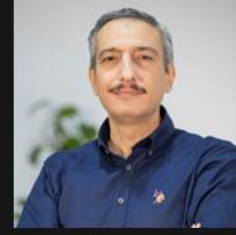
**Maher Al Tahawi**  
Head of Structural  
Engineering Dept., HDP



**Haytham Abualsamen**  
MEP Manager, HDP



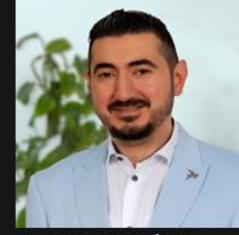
**Samer Harb**  
Western Region Manager, AJI  
Saudi



**Baraa Ma'anil**  
Lead Electrical Engineer, AJI  
Saudi



**Abdelhameed Mohamed**  
Senior Electrical Engineer,  
AJI Saudi



**Mohammad Khreisat**  
Senior Architect, PM, AJI  
Saudi



**Mohammad Shobaki**  
Senior Architect, PM, AJI  
Saud





 **Sharjah Maritime Academy**  
BUA: 174,000 m<sup>2</sup>



 **Ayla Oasis Development**  
BUA: 4,300,000 m<sup>2</sup>



 **Reportage Village 2**  
BUA: 15.37 hectares



 **Marsa Zayed**  
BUA: 3,200,000 m<sup>2</sup>

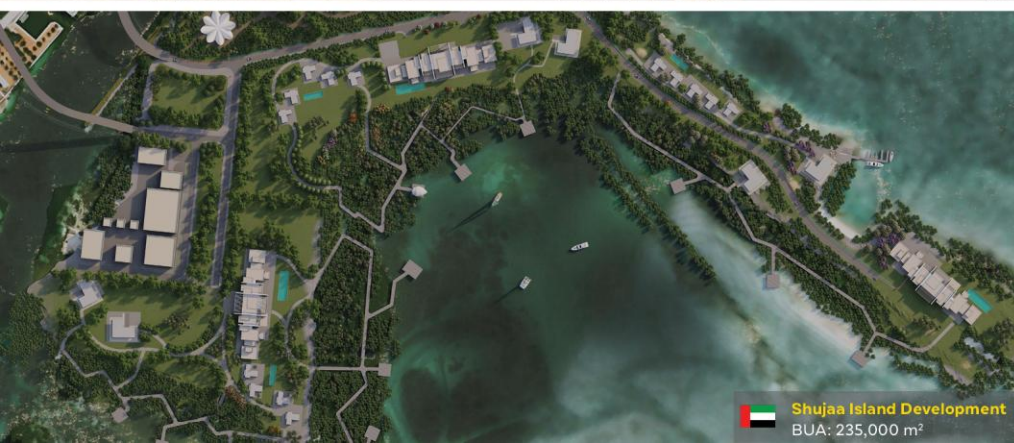


 **King Abdullah Economic City**  
BUA: 168 km<sup>2</sup>

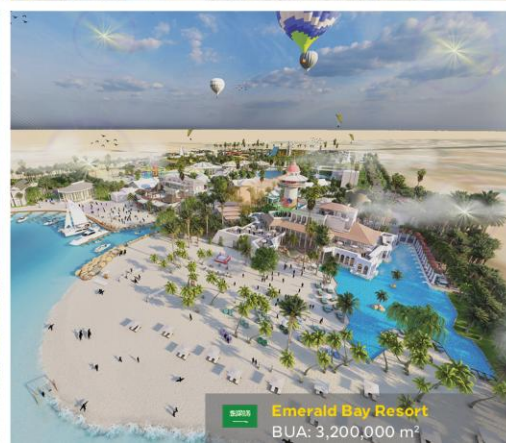
## Urban Developments & Masterplans

# +5,000

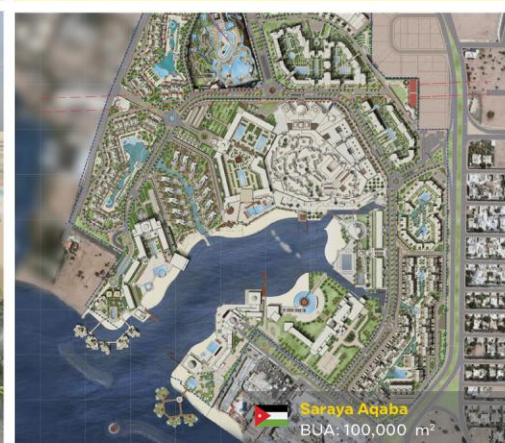
Hectares of smart growth for  
sustainable urban density.




 **Shujaa Island Development**  
BUA: 235,000 m<sup>2</sup>



 **Emerald Bay Resort**  
BUA: 3,200,000 m<sup>2</sup>



 **Soraya Aqaba**  
BUA: 100,000 m<sup>2</sup>



 **Sadr City**  
BUA: 1,630 hectares





**Tanal Project**  
BUA: 291,226 m<sup>2</sup>



**Ghabawi Masterplan and Residential Project**  
BUA: 213,890 m<sup>2</sup>



**Al Faredah Project**  
BUA: 283,395 m<sup>2</sup>

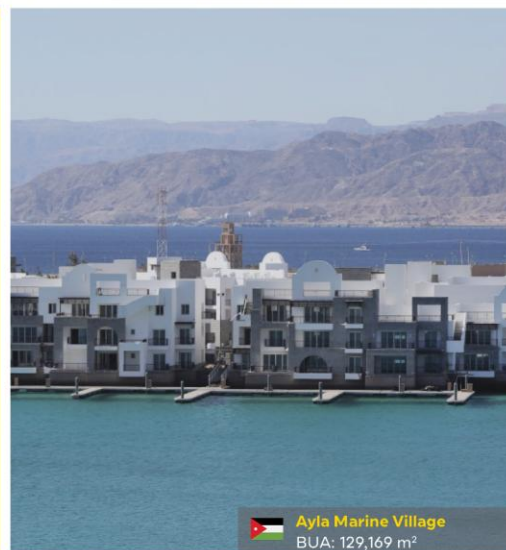


**Andalusia Project**  
BUA: 756,000 m<sup>2</sup>

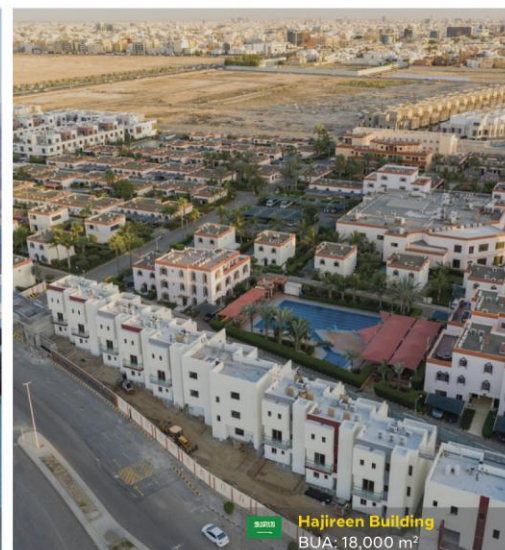
## Residential & Housing Projects

# +100,000

Beautiful Homes



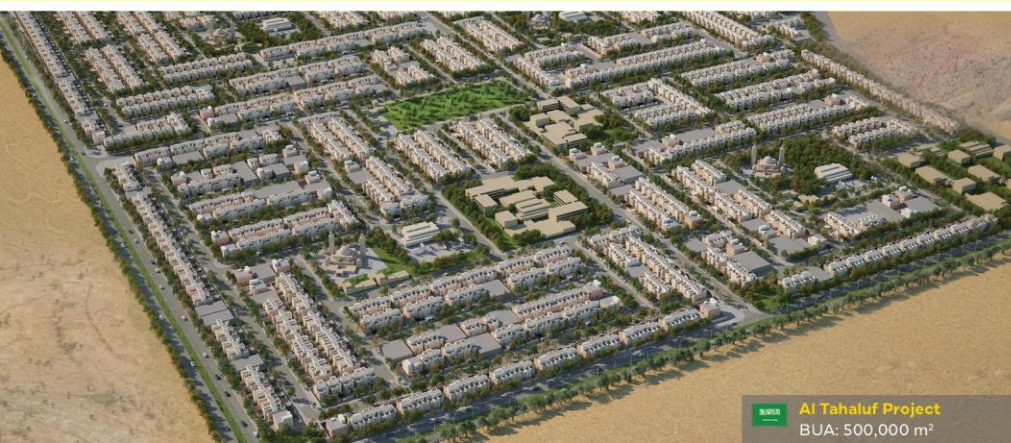
**Ayla Marine Village**  
BUA: 129,169 m<sup>2</sup>



**Hajireen Building**  
BUA: 18,000 m<sup>2</sup>



**Rawasin Project**  
BUA: 200,000 m<sup>2</sup>



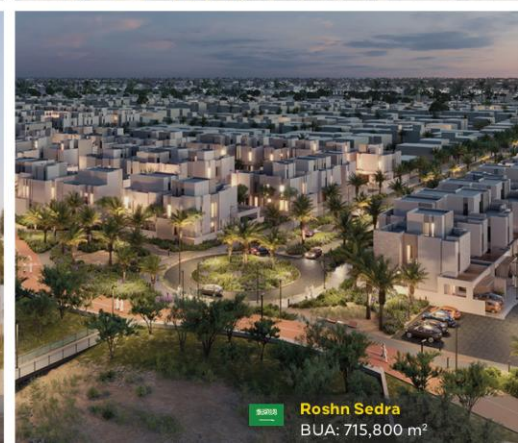
**Al Tahaluf Project**  
BUA: 500,000 m<sup>2</sup>



**Tahleeya Gate Towers**  
BUA: 214,700 m<sup>2</sup>



**Zahraa Development**  
BUA: 33,400 m<sup>2</sup>



**Roshn Sedra**  
BUA: 715,800 m<sup>2</sup>





 **Marriot Autograph Hotel**  
BUA: 45,000 m<sup>2</sup>



 **Four Points by Sheraton**  
BUA: 28,000 m<sup>2</sup>



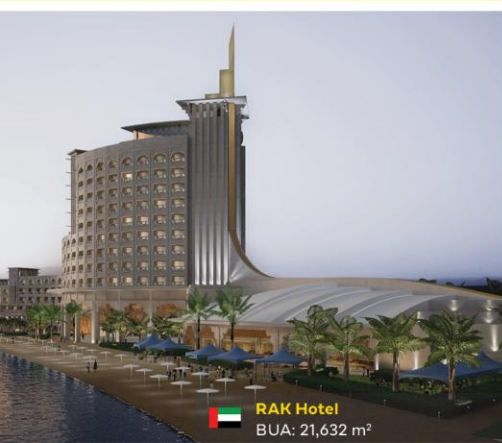
 **Four Seasons Hotel**  
BUA: 43,000 m<sup>2</sup>




 **Intercontinental Hotel**  
BUA: 28,000 m<sup>2</sup>



 **Crowne Plaza Muscat**  
BUA: 36,198 m<sup>2</sup>



 **RAK Hotel**  
BUA: 21,632 m<sup>2</sup>



 **Ayla Pulse Hotel**  
BUA: 58,130 m<sup>2</sup>



 **The St. Regis Hotel and Serviced Apartments**  
BUA: 126,300 m<sup>2</sup>



 **Turtle Bay Hotel**  
BUA: 13,000 m<sup>2</sup>

## Hospitality and Tourism Projects

# +6,000

Guests Welcomed





**Tatweer Schools in Western Region**  
BUA: 30,200 m<sup>2</sup>



**College of Medicine at Al Faisal University**  
BUA: 35,000 m<sup>2</sup>



**International Community School (ICS)**  
BUA: 14,500 m<sup>2</sup>



**Britus International School**  
BUA: 16,000 m<sup>2</sup>



**Al Raed Al Arabi School**  
BUA: 18,000 m<sup>2</sup>



**USAID Schools**  
BUA: 20,000 m<sup>2</sup>



**Sarat Abidah Technical College for Boys**  
BUA: 36,000 m<sup>2</sup>



**Zarqa University**  
BUA: 75,000 m<sup>2</sup>

## Schools and Educational Facilities

# + 3,000,000

Square meters of learning environments



**Amman Academy School**  
BUA: 22,000 m<sup>2</sup>



**Hashemite University Medical Faculty**  
BUA: 24,000 m<sup>2</sup>



**Aqaba Training Hub**  
BUA: 6,100 m<sup>2</sup>



**WWW Research Center**  
BUA: 2,543 m<sup>2</sup>



**Technical College for Girls in Majarda**  
BUA: 32,000 m<sup>2</sup>





 **Royal Jordanian Airlines Headquarters**  
BUA: 126,300 m<sup>2</sup>



 **Osus Eye Mixed-Use**  
BUA: 103,094 m<sup>2</sup>



 **Mixed-Use Downtown Office Hub**  
BUA: 546,000 m<sup>2</sup>



 **Jeddah Historic District**  
BUA: 44,732 m<sup>2</sup>



 **Abu Dhabi Central Market**  
BUA: 24,000 m<sup>2</sup>



 **Chamber of Commerce Tower**  
BUA: 96,000 m<sup>2</sup>



 **ADIB Headquarters**  
BUA: 24,000 m<sup>2</sup>

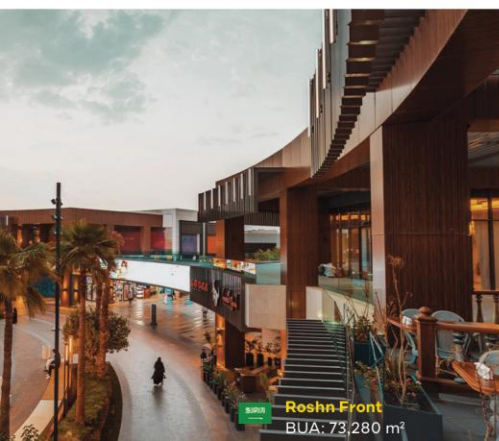



 **Abu Dhabi Plaza**  
BUA: 370,000 m<sup>2</sup>

## Commercial & Mixed-Use Projects

# + 5,000,000

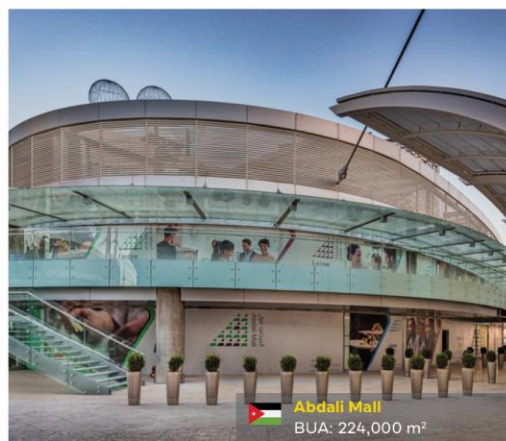
Square meters of opportunity



 **Roshn Front**  
BUA: 73,280 m<sup>2</sup>



 **The Stage**  
BUA: 62,347 m<sup>2</sup>




 **Abdali Mall**  
BUA: 224,000 m<sup>2</sup>



 **The Housing Bank for Trade & Finance Headquarters**  
BUA: 78,737 m<sup>2</sup>



 **ABC Bank Headquarters**  
BUA: 25,000 m<sup>2</sup>





## Critical Buildings


# + 2,000,000

Square meters of digital infrastructure spaces







 **Erbil Tobacco Factory**  
BUA: 7,000 m<sup>2</sup>



 **Nuqul Service Center**  
BUA: 19,166 m<sup>2</sup>




 **Al Mutahed Factory**  
BUA: 51,235 m<sup>2</sup>

## Industrial Facilities

# +1,600,000

Square meters




 **Sinlora New Green Plant**  
BUA: 15,000 m<sup>2</sup>




 **Private Jets Hangar at Alula Airport**  
BUA: 2,745 m<sup>2</sup>




 **ZAD Cooked Meal Facility**  
BUA: 6,070 m<sup>2</sup>




 **MESC Cable Factory**  
BUA: 21,500 m<sup>2</sup>



 **Japan Tobacco International Factory (JTI)**  
BUA: 19,262 m<sup>2</sup>



 **Al Muthalath Gas Station**  
BUA: 900 m<sup>2</sup>





 **Algeria Pharmaceutical Production Facility**  
BUA: 1,760 m<sup>2</sup>



 **Preventive Health Directorate**  
BUA: 1,905 m<sup>2</sup>



 **Doctors Company For Pharmaceuticals**  
BUA: 21,861 m<sup>2</sup>




 **Aqaba International Laboratories**  
BUA: 2,200 m<sup>2</sup>

## Pharmaceutical and Life Sciences


# + 600,000

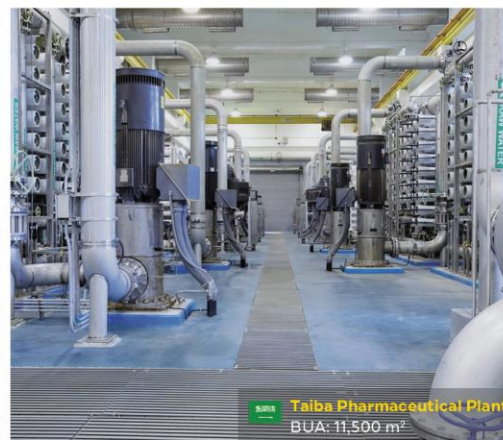
Square meters




 **Al Razi Pharmaceutical Plant**  
BUA: 1,785 m<sup>2</sup>




 **MIDPHARMA Pharmaceutical Factory**  
BUA: 12,500 m<sup>2</sup>



 **Taiba Pharmaceutical Plant**  
BUA: 11,500 m<sup>2</sup>




 **Mushata Pharmaceutical Plant**  
BUA: 11,000 m<sup>2</sup>





 **Gastroenterology Hospital**  
BUA: 22,000 m<sup>2</sup> | 200 Beds




 **K9 Hospital**  
BUA: 1,425 m<sup>2</sup>



 **Mouwasat Hospital**  
BUA: 58,000 m<sup>2</sup> | 173 Beds



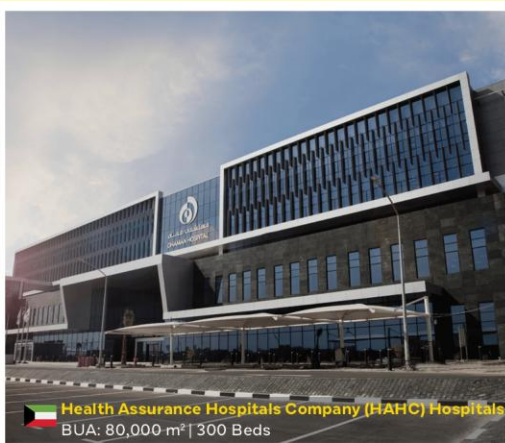
 **Al Salama Hospital**  
BUA: 80,000 m<sup>2</sup> | 200 Beds



 **Dallah Hospital**  
BUA: 117,700 m<sup>2</sup> | 200 Beds




 **Jordan Medical Simulation Centre**  
BUA: 17,964 m<sup>2</sup>




 **Health Assurance Hospitals Company (HAHC) Hospitals**  
BUA: 80,000 m<sup>2</sup> | 300 Beds



 **Nuclear Medicine Building**  
BUA: 25,505 m<sup>2</sup>



 **Reem Hospital**  
BUA: 62,000 m<sup>2</sup> | 275 Beds



 **Karbala Teaching Hospital**  
BUA: 118,000 m<sup>2</sup>

## Wellness and Healthcare

# + 16,000


Healing Beds





 **Rehabilitation of Mosul Second Bridge (Al Hurriya)**  
Length: 340 m | 6 Spans



 **NBI Railway and CTW 130, CTW120**  
Length: 412 km




 **Shmeisani Interchange**



 **Jeddah/Jazan Coastal Road to Highway Road**  
Length: 210 km

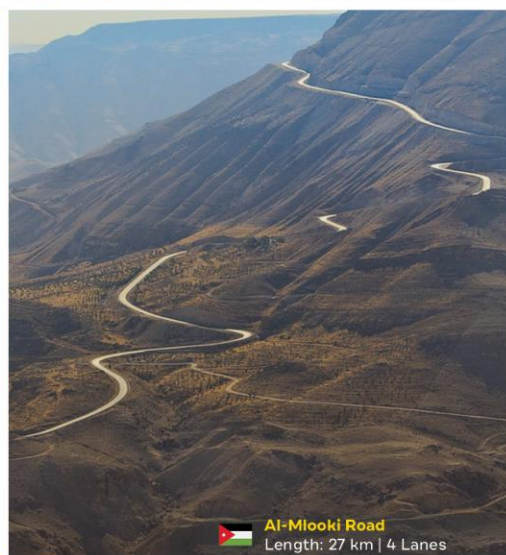



 **Prince Nayef and Ali Bin Taleb Intersection**  
Length: 515 m

## Mobility and Transportation

# + 100

Connected pathways



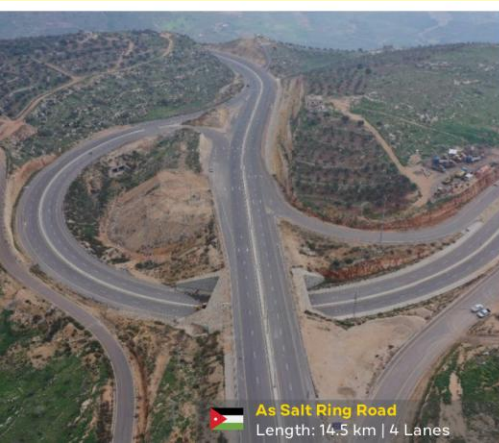
 **Al-Mlooki Road**  
Length: 27 km | 4 Lanes



 **Maliha-Kalba Road Rehabilitation**



 **King Abdullah Toll Road**  
Length: 15 km



 **As Salt Ring Road**  
Length: 14.5 km | 4 Lanes




 **Amman BRT Feeder Buses Operations**  
Length: 28.5 km



 **Irbid Ring Road**  
Length: 54 km



 **Bridge Intersection at King Abdul Aziz Street**  
Length: 475 m



 **Desert Highway Road**  
Length: 330 km

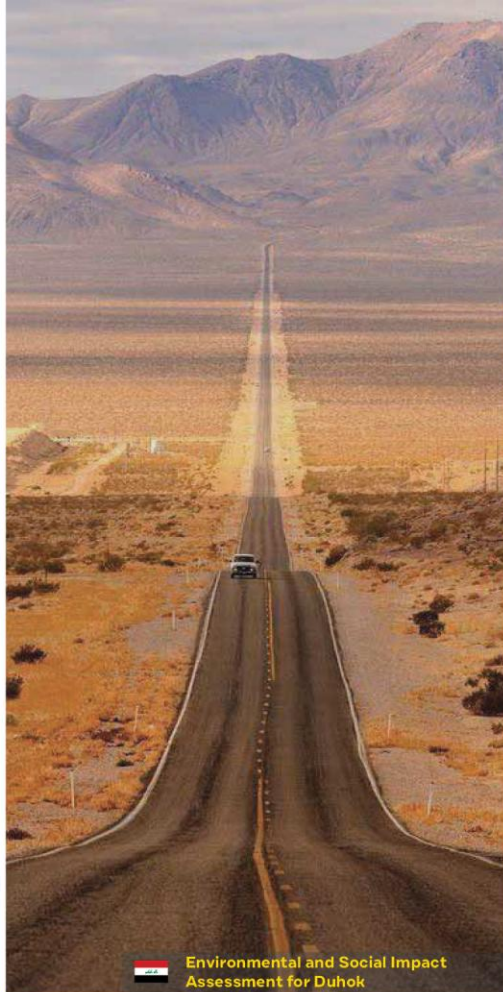




## Eco-Futurism

# + 100

ESIA & Waste Management & Renewable Energy Projects



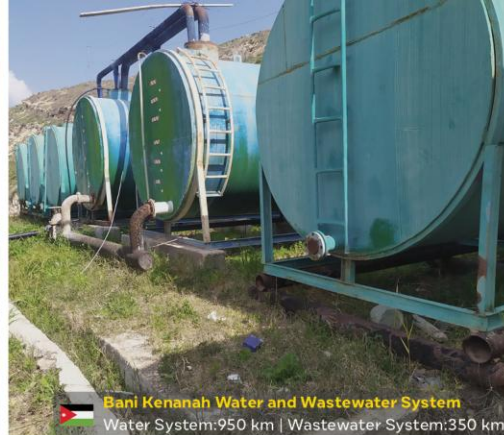




**Al Mukalla Water Supply & Wastewater Collection**  
Capacity: 14,000 m<sup>3</sup>/day



**Tafilah Wastewater Plant**  
Capacity: 10,000 m<sup>3</sup>/day



**Bani Kenanah Water and Wastewater System**  
Water System: 950 km | Wastewater System: 350 km



**Jeddah Airport Sewage Treatment Plant**  
Capacity: 500,000 m<sup>3</sup>/day



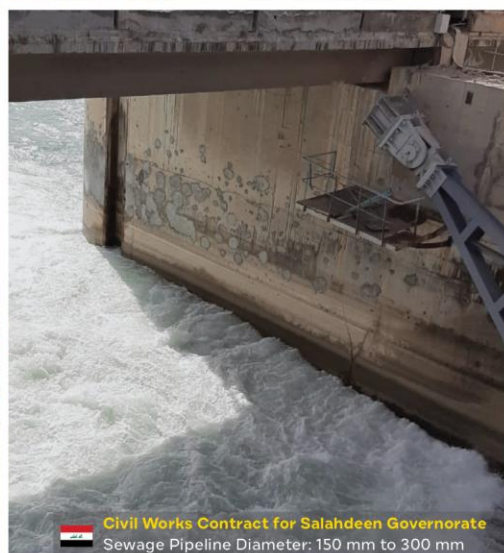
**Ramtha Wastewater Treatment Plant**  
Capacity: 22,000 m<sup>3</sup>/day



**Adana Wastewater Treatment Plant Project**  
Capacity: 245 m<sup>3</sup>/day



**Alexandria West WWTP Extension and Upgrade**  
Sewage Pipeline Diameter: 600,000 m<sup>3</sup>/day



**Civil Works Contract for Salahdeen Governorate**  
Sewage Pipeline Diameter: 150 mm to 300 mm

## Water and Wastewater Utilities

# + 50 M

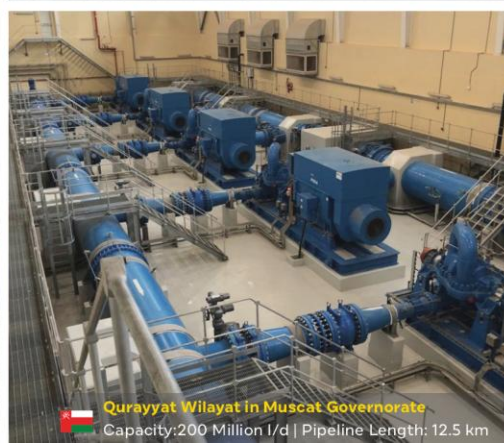
People Served



**Expansion of North Aqaba Wastewater Treatment Plant**  
Capacity: 21,000 m<sup>3</sup>/day



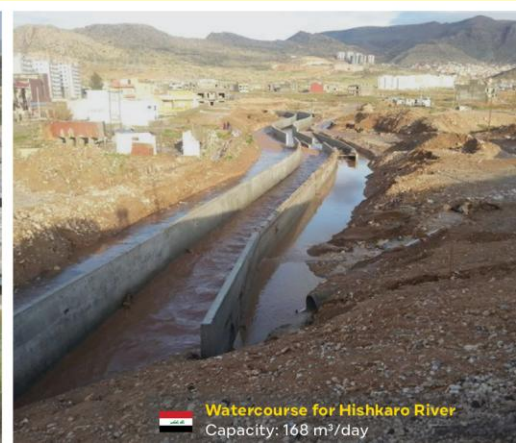
**Al Iskan Reservoir**  
Capacity: 30,000 m<sup>3</sup>/day



**Qurayyat Wilayat in Muscat Governorate**  
Capacity: 200 Million l/d | Pipeline Length: 12.5 km



**East Jerash Wastewater Treatment Plant**  
Capacity: 10,000 m<sup>3</sup>/day



**Watercourse for Hishkaro River**  
Capacity: 168 m<sup>3</sup>/day





**Aji in The Water Sector**



## ROLE IN GOVERNMENTAL / LOCAL WATER SECTOR

AJi Group is widely recognized for delivering high-quality projects within governmental and local sectors.

We work in close collaboration with prominent entities in Jordan and outside of Jordan to ensure the successful planning, implementation, and maintenance of essential water infrastructure and management projects.

These entities mainly include but not limited to:

- Ministry of Water and Irrigation (Jordan)
- Public Authority for Electricity and Water (Oman)
- National Water Company (KSA)
- Various other regional governmental bodies



Hashemite Kingdom of Jordan  
Ministry of Water and Irrigation



الهيئة العامة للكهرباء والمياه  
Public Authority for Electricity and Water



شركة المياه الوطنية  
National Water Company



## ROLE IN GOVERNMENTAL / LOCAL WATER SECTOR

Aji has been successfully contributing to the development, expansion, and maintenance of :

### Wastewater and Sewage Treatment Plants/Facilities

Aji is specialized in the design, optimization, and sustainable management of treatment facilities, ensuring compliance with local and International standards and efficient resource recovery.

### Transmission Pipelines:

Aji provides end-to-end solutions for water transmission pipelines, covering: Design & Engineering, Hydraulic modeling, route optimization, and material selection for efficient, long-distance water transfer.

### Water Treatment, Supply and Distribution Networks

Aji provides comprehensive services for Design, optimization, and supervision of conventional and advanced treatment systems and Pumping stations, reservoirs.

### Water Resources Management Programs

Aji provides comprehensive services in Water Resource Governance, Strategic Master Planning, and Alternative Resource Development, with a strong focus on reducing Non-Revenue Water (NRW) to enhance water use efficiency and sustainability.





Distribution Network In Al Mudhaibi Fulaij Ibri Wilayat  
Al Mudhaibi Wilayat, Oman



Alexandria West Wastewater Treatment Plant  
Alexandria, Egypt



Expansion Of North Aqaba WWTP  
Aqaba, Jordan



Ramtha WWTP Expansion Design and Environmental Impact Assessment  
Ramtha, Jordan





Jeddah Airport 2 Independent Sewage Treatment Plant Project  
Jeddah, KSA



Tafilah Wastewater Treatment Plant  
Tafilah, Jordan



Adana Wastewater Treatment Plant Project  
Adana, Turkey



Construction Of A New Septic Tank Reception Treatment  
Facility At Al Ghabawi  
Al Ghabawi, Jordan



**Aji**

**Construction Of A New Septic Tank Reception  
Treatment Facility  
At Al Ghabawi**



# Table of Contents



01 Introduction

02 Projects Highlights

03 Project Objectives

04 Design Criteria

05 STP Treatment Technology

06 Key Project Distinctions



# Introduction



# Introduction



- ✓ The Ministry of Water and Irrigation (MWI) and the Water Authority Jordan (WAJ) have approached the **European Bank for Reconstruction and Development (EBRD)** to support the preparation and financing of the construction of a new septic tank facility to replace and relocate the existing facility at Ain Ghazal Treatment Plant (AGTP).

## 📍 Strategic Location

- ✓ Situated in Al Ghabawi, approximately **20 km east of Amman**, Jordan's capital.
- ✓ Designed for areas in **Amman and Zarqa** lacking adequate sewage infrastructure and served by septic tankers.



# Introduction

## Employer



Water Authority of Jordan

## Consultant



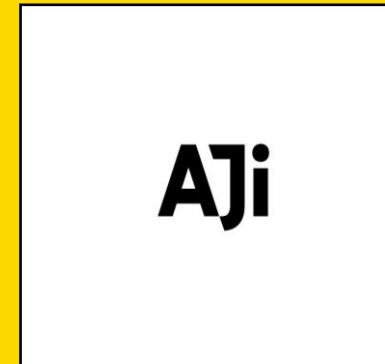
Al-Mustashar Lil Handasah  
CO. (Engicon)

## Contractor



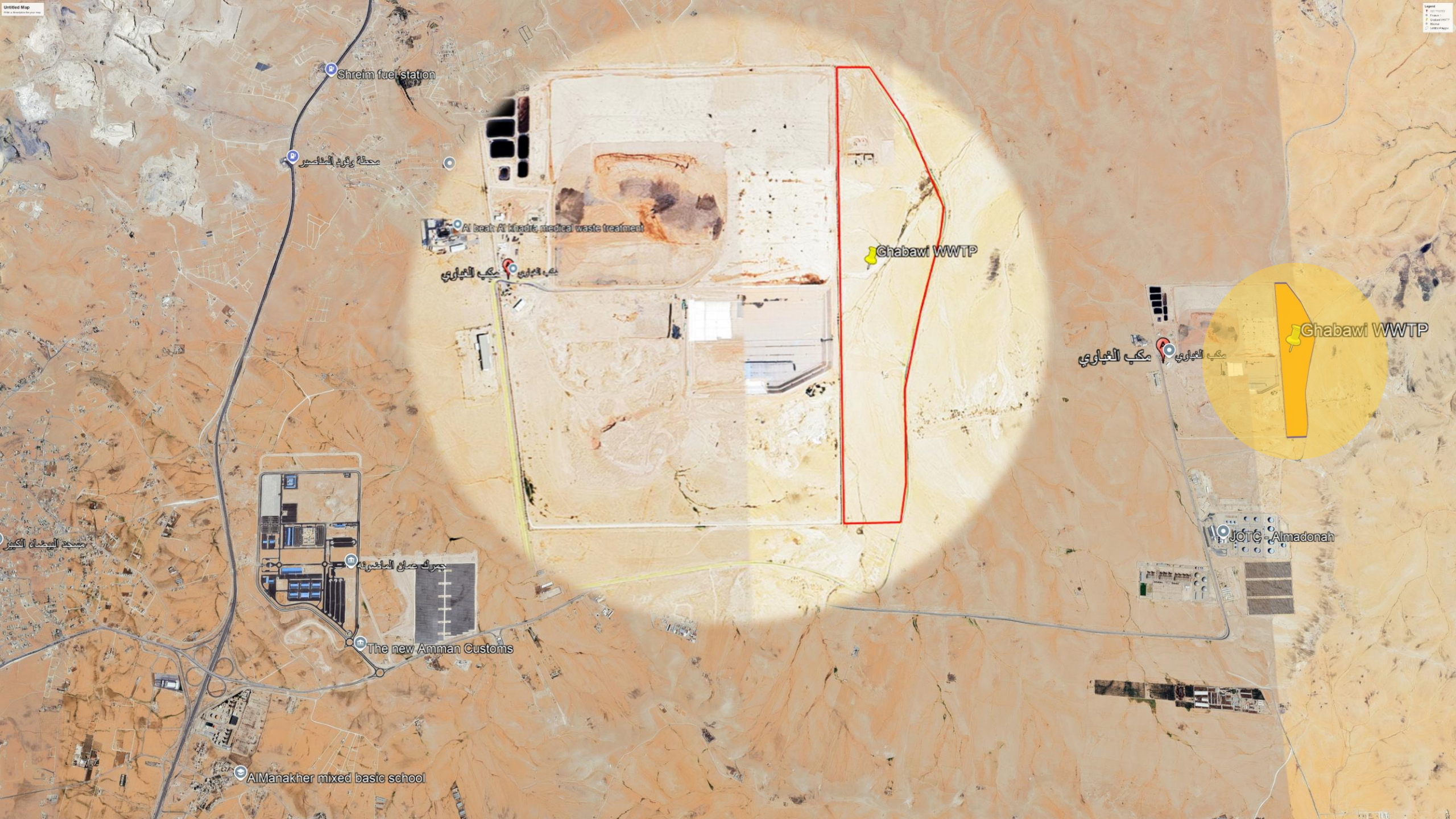
Arab Towers Contracting  
Company  
(ATCCO)

## Contractor's Designer



Arabtech Jardanah Water  
and Environment (AJWEi)







# **Projects Highlights**



# Projects Highlights



- ✓ Ghabawi Wastewater Treatment Plant Project, was submitted by the government to the London Conference under the guidance of His Majesty the King.
- ✓ The project was presented as part of several projects at the London Conference (including the National Water Carrier, Non-Revenue Water Reduction Project (NRW), Ghabawi Wastewater Treatment Plant, Desalination Project in Hisban, and the Phase 3 Expansion of the Samra Wastewater Treatment Plant),
- ✓ Ghabawi WWTP Project is part of a National Water Sector Plan aimed at developing a comprehensive wastewater strategy to enhance environmental quality and protect public health across the Kingdom.



# **Projects Objectives**



# Project Objectives



✓ Ghabawi project is a **distinctly Jordanian achievement.**

The project aims to:

- Constructing the first modern septic sewage treatment plant **outside urban areas in Jordan.**
- Relocating **Old Ain Ghazal TP (AGTP)** with its septage tanker receiving station located in central Amman.
- Reducing **odors, noise pollution** Ain Ghazal area
- **Solving traffic problems** in the Ain Ghazal area
- Enhancement of environmental conditions and **reduces the biological load on the Khirbet Samra WWTP**

# Project Objectives



## Long-Term Benefits

- Provides **employment and training opportunities** for local communities.
- Improve the **quality of life** for residents in nearby areas.
- Aligning with the government's **Urban Development Plans**
- Supports Jordan's **Economic Modernization Vision**.
- Aligns with the country's goals to **improve water and sanitation services**, especially in refugee-hosting areas



# **Projects Highlights**

# Projects Highlights



## European Union



**European Bank**  
for Reconstruction and Development



### **Ghabawi Wastewater Treatment Plant**

- ✓ A Milestone in Jordan's Water Sector
- ✓ Construction and operation of a new station to serve the region through **2045**, with a **daily capacity of 24,750 m<sup>3</sup>**.
- ✓ On a land of **300 donum area**
- ✓ Utilizes **sewage tankers** to transport wastewater to the facility, replacing the outdated Ain Ghazal treatment plant.
- ✓ Total project financing of **€71.3 million** ( European Union & EBRD)
- ✓ Additional **€1.24 million** allocated for project supervision.



# Projects Highlights



## Award Recognition

- ✓ **Bronze Global Sustainability Award** from the European Bank for Reconstruction and Development (EBRD) in 2022.
- ✓ Recognized for its commitment to **sustainable development** and environmental protection.
- ✓ The international award was given based on strict international **environmental, financial, and technical standards**,
- ✓ The award helped facilitate both **funding and implementation** of the Ghabawi project.

# **Design Criteria**



# Design Criteria – Hydraulic Load



- ✓ The plant is designed to have a treatment capacity of **24,750 m<sup>3</sup>/day** of septage wastewater that will be discharged to the plant via septage trucks for a maximum period of **10 hours** per Day.
- ✓ The peak septage flow calculations based on **30 simultaneously discharging septage trucks**.
- ✓ Data on **trucks emptying** time is obtained through actual **analysis and emptying time records conducted** at AGTP during the septage sampling exercise.

# Design Criteria – Biological Load



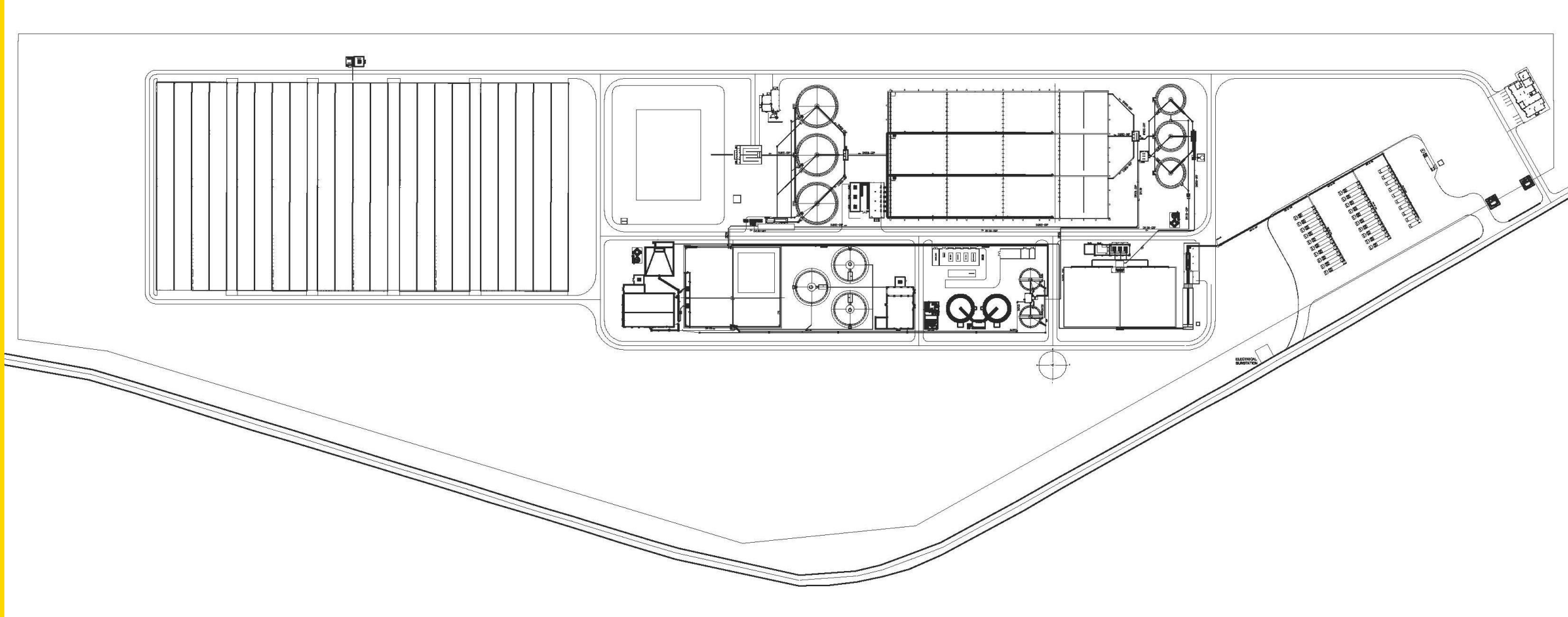
- ✓ A sampling campaign was conducted over a **7 days period in July 2023** to review and characterize raw septage.
- ✓ **Composite samples** were taken of influent septage every 1 hour, and they were analyzed by the **RSS**.
- ✓ The influent and biological design loads were assumed to be as follows :

Parameter	Influent Concentration (mg/l)	Influent Load (kg/day)	Design Load with Sidestream (kg/day)
BOD <sub>5</sub>	2,700	66,825	69,720
COD	5,950	147,263	156,479
TSS	3,300	81,675	89,454
TN	330	8,168	10,011.5
TP	48	1,188	2,240



# **Treatment Technology**

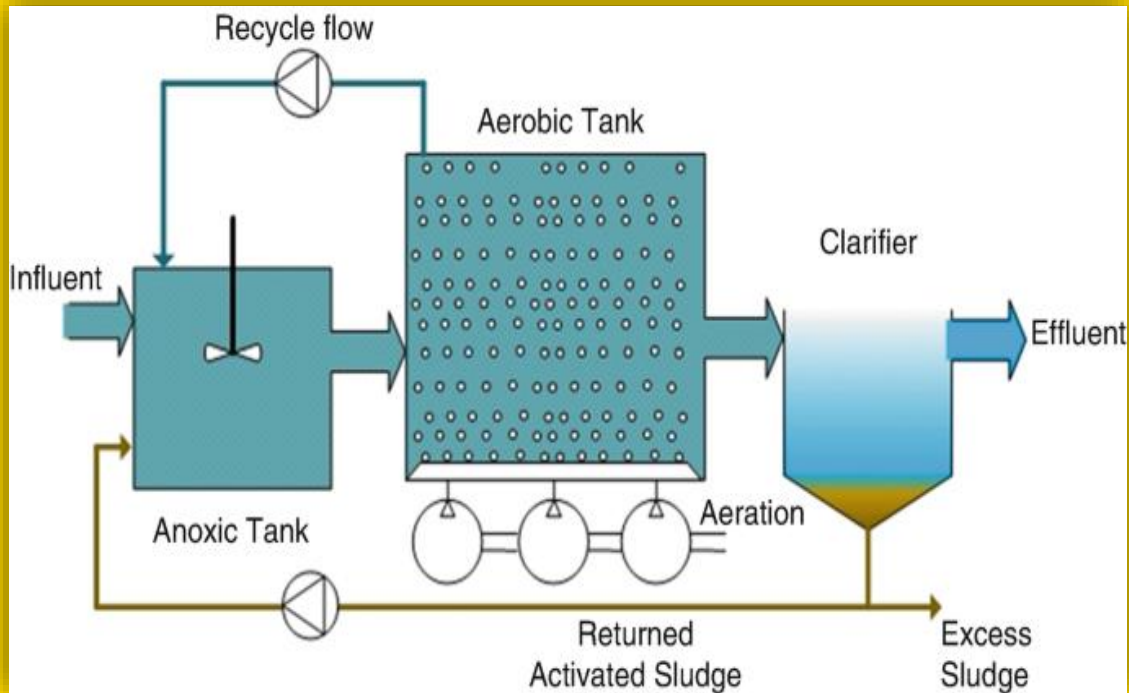
# Treatment Technology – WWTP General Layout





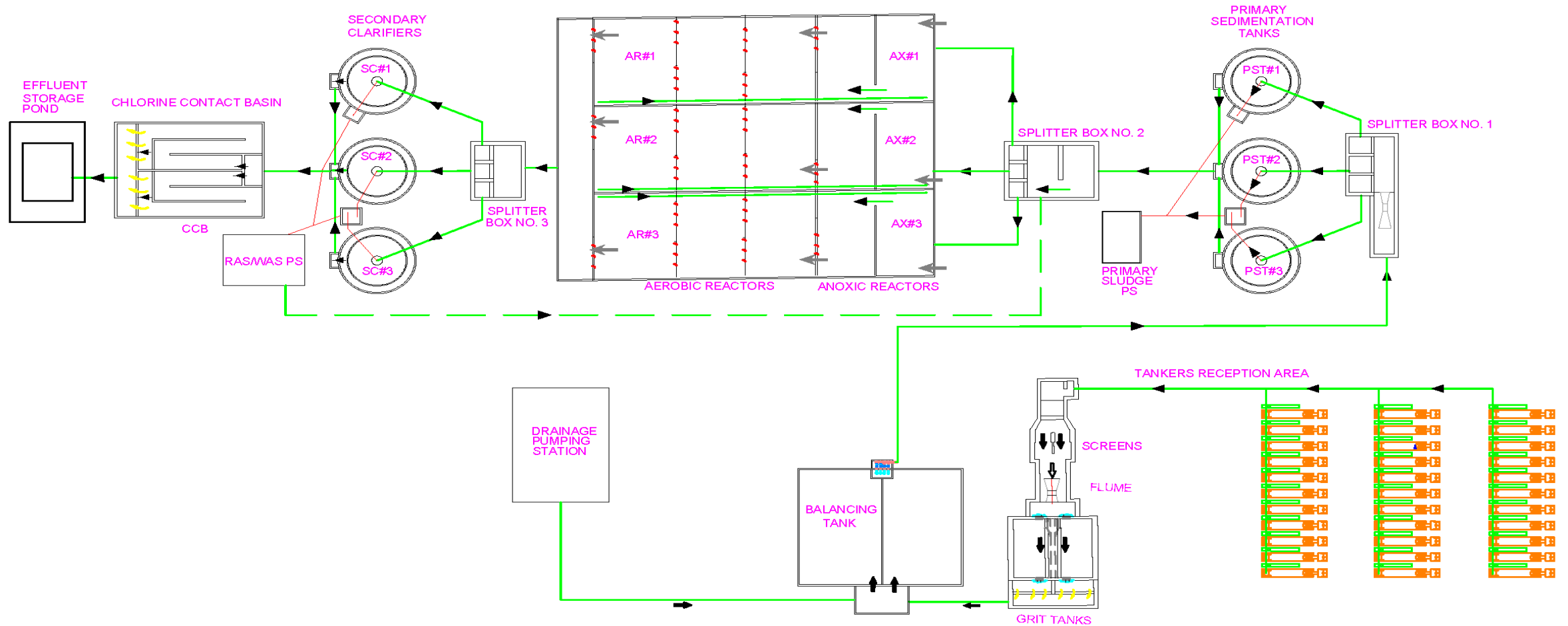
# Treatment Technology

## Sewage Treatment



- ✓ The plant is designed to implement a **conventional activated sludge scheme (CAS)**
- ✓ The sewage treatment design includes:
  - a. Mechanical screening unit & grit removal
  - b. Primary settling
  - c. Anoxic and aerobic zones (bioreactor)
  - d. Secondary settling
  - e. Tertiary treatment using gas chlorination system.
- ✓ The effluent quality design is adopting **Jordanian Standard JS893/2021**, the category on “**Parks, Playground and Urban Roadside Inside Cities**”.

# Treatment Technology – Sewage Treatment





# Treatment Technology

## Sludge Treatment



- ✓ The plant is designed to implement a conventional activated sludge scheme.
- ✓ Before being released into environment or sent to landfills, primary and waste sludge must undergo proper treatment.
- ✓ The treatment process should at least stabilize the sludge, reducing its volume and making long-term storage viable.

# Treatment Technology

## Sludge Treatment



- ✓ Sludge thickening will be achieved using gravity thickeners for primary sludge and gravity belt thickeners for WAS.
- ✓ Primary and secondary sludge are stabilized through anaerobic mesophilic digestion, where organic material is converted into biogas (methane, hydrogen, carbon dioxide, and hydrogen sulfide).
- ✓ The proposed solution involves anaerobic stabilization followed by mechanical dewatering.
- ✓ This process reduces the mass of volatile solids significantly.



# Treatment Technology

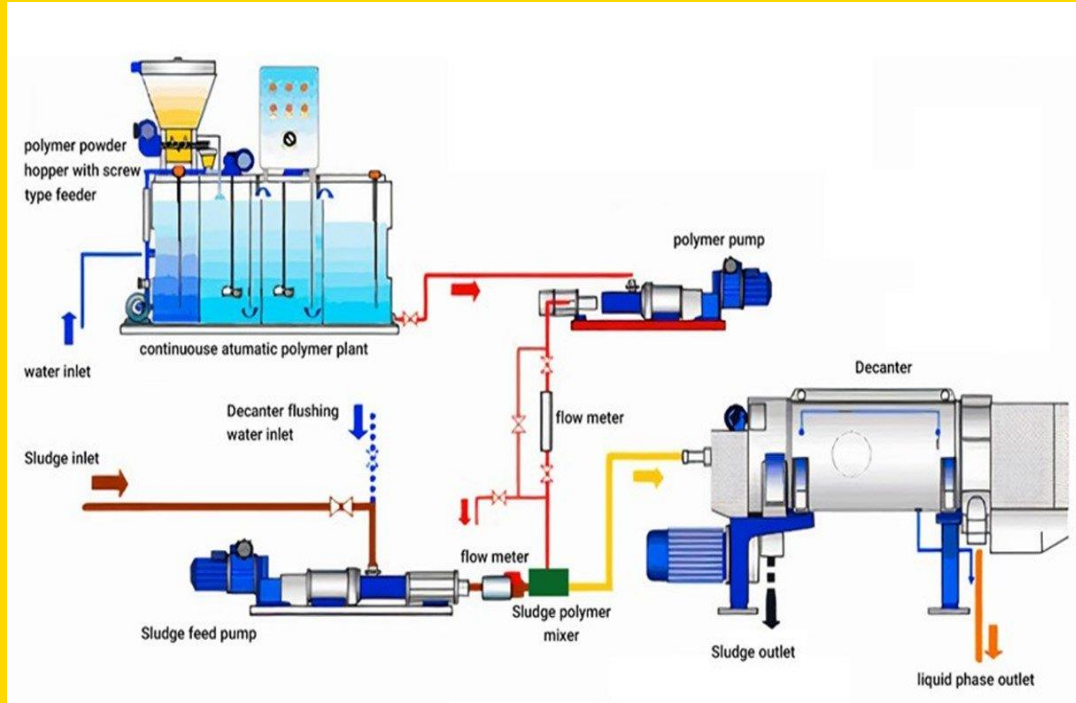
## Sludge Treatment



- ✓ The biogas is collected at the top of the digester tank and used in a **combined heat and power (CHP) unit for energy production and boiler heating.**
- ✓ **Amount of Biogas Produced 32,000 m<sup>3</sup> per Day**
- ✓ **Total generated power approximately 4 MWe**
- ✓ The thermal energy from the biogas is sufficient to heat the raw sludge and compensate for heat losses.
- ✓ Excess biogas will be flared off.

# Treatment Technology

## Sludge Treatment



- ✓ Sludge Decanter (centrifuge) units will be used for sludge dewatering.
- ✓ Polymer dosing system is used to enhance the dewatering efficiency
- ✓ Solar sludge drying beds will enhance the drying of the dewatered sludge.

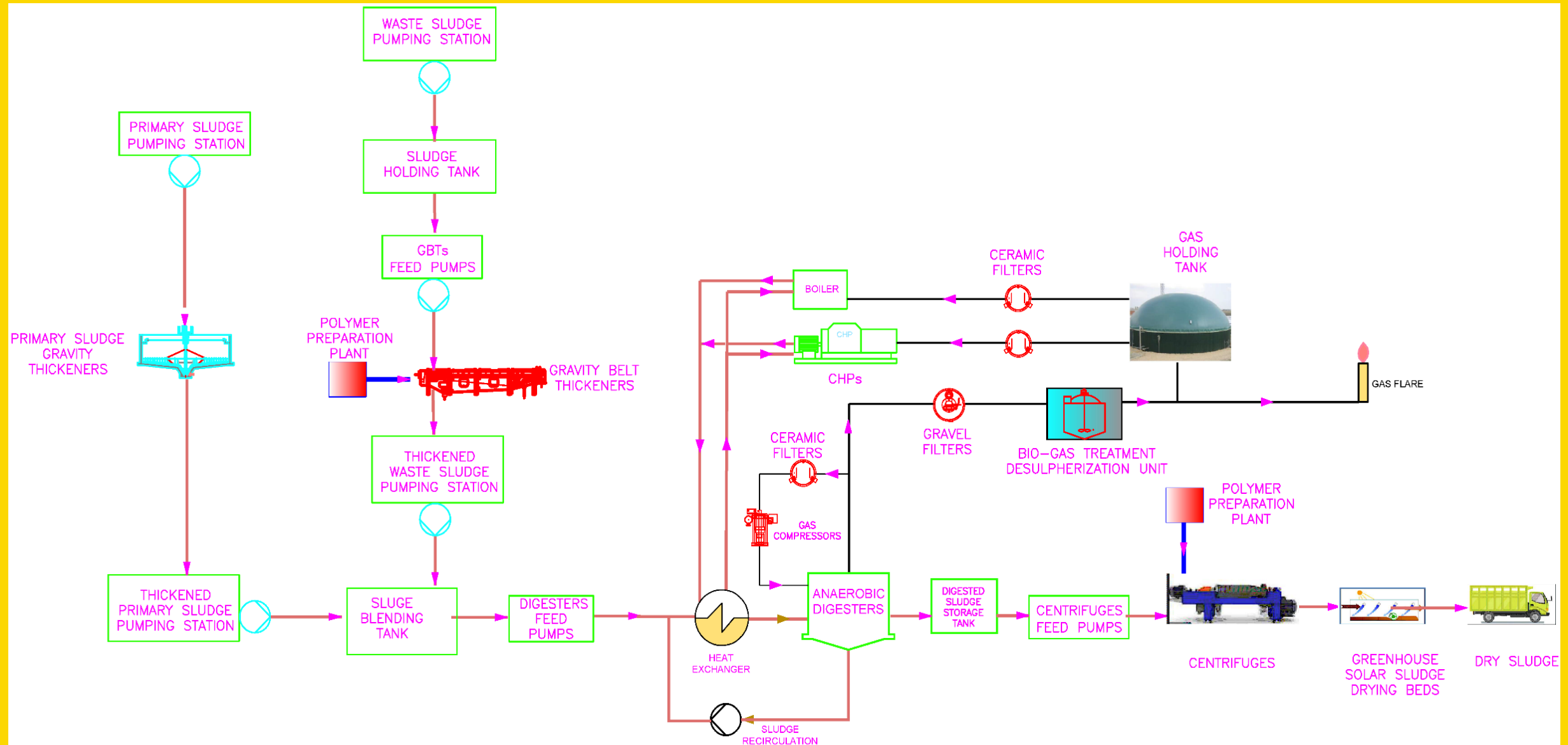


# Treatment Technology – Sludge Treatment

- ✓ Sludge dewatering will achieve at least **80% dry solids (D.S.)**, using **solar greenhouse drying beds**.
- ✓ The solar drying beds require an area of approximately **42,000 square meters** to achieve the targeted drying performance.



# Treatment Technology – Sludge Treatment





# **Key Project Distinctions**

# Key Project Distinctions



- ✓ This project marks a major milestone in Jordan's infrastructure development, featuring an advanced **design tailored to the most challenging influent conditions ever recorded in the country.**
- ✓ With the largest sewage tank and the most extensive sludge treatment area, it is **built to handle extremely high pollutant loads**
- ✓ Setting a benchmark for **technical complexity and operational resilience** in wastewater treatment.



# Key Project Distinctions



The Ghabawi WWTP includes one of the largest anaerobic digesters system in Jordan, with a total volume of 30,000 cubic meters.



The Ghabawi Wastewater Treatment Plant features the largest sewage tank in Jordan, measuring **92 by 160** meters with a depth of **7** meters, and a total capacity of approximately 100,000 cubic meters.



The Ghabawi WWTP housing the largest solar Greenhouse in Jordan, covering an area of approximately **42,000 square meters**.



Thank you