Syria Potable Water Supply Infrastructure System Assessment
December 2025 Roadmap by Amrou Atassi, PE, BCEE

Background

The purpose of this document is to develop an overall high-level plan to address the potable water supply system in Syria. This document has been prepared without detailed knowledge of the existing system and is therefore based on industry-standard guidelines and successes from similar assessments completed around the world.

Objective

The objective of this document is to provide a roadmap for the assessment and modernization of the existing potable water supply system in Syria with the following goals in mind:

1. Assess the existing water supply systems
2. Establish level of service goals (quantity, quality, etc.)
3. Upgrade existing systems to meet minimum standards established in the world
4. Identify opportunities for optimization and modernization
5. Identify financial and human resource needs to upgrade and eventually operate the systems
6. Establish KPIs for upgrading the existing systems while establishing metrics for operation and maintenance

The major benefit of this plan is to provide potential funding sources/organizations with a clear need and to show that funding is critical to providing every Syrian with access to safe drinking water.

Roadmap Steps

Based upon the above goals, the following roadmap steps are developed:

Step no. 1 – Condition Assessment of Existing Systems

As part of a comprehensive condition assessment, the following should be completed:

- Develop a condition assessment strategy for all potable water systems in Syria, including:
  - Water sources (surface and groundwater supply)- e.g., wells, intakes, etc.
  - Raw water pumping facilities, including screens, pumps, piping
  - Water treatment facilities, including treatment systems – both physical and chemical processes
  - Water transmission/distribution systems, including water mains, pumps, reservoirs/tanks, isolation valves, and other system appurtenances
  - Overall SCADA (supervisory control and data acquisition) which monitors and controls the overall water supply system in each system
- Conduct physical condition assessment of above systems utilizing engineers with multiple disciplines, including hydrogeology, structural, process-mechanical, electrical, instrumentation and control, and others.
- Develop a matrix for each system and each component as follows:
  - A score of 1 to 5 for its condition (1 being in good condition and 5 being not working)
  - A score of 1 to 5 for its criticality (1 being not critical and 5 representing a life safety or critical to water production or supply).
- Identify existing obstacles to providing water, such as:
  - Human resources (humans to operate and maintain the systems)
  - Financial resources
  - Energy (Power, fuel)
  - Chemical supplies
  - Replacement parts
  - Others

- Review of available financial and human resources available for the condition assessment and also design and construction of new facilities.
- Develop a plan to immediately protect water sources from additional contamination, including directing any raw or treated sewage elsewhere, providing public education to residents, and other source water protection plans/measures.
- The final deliverable for Step 1 is a REPORT that can be used to establish funds and resources needed.

TIMELINE 0 to 12 months

Step no. 2 – Establish Water Demand Projections

In order to identify the needs for the upgraded or new systems, it's important to develop water demand projections for each City, including

- Current and future population projections
- Current and future water demands per capital and total

TIMELINE 0 to 9 months

Step no. 3 – Review Water Quality Data for Existing Water Supplies and Develop Treatment Options

For existing and potential water supplies, the following should be completed:

- Review historical water quality data if available
- Conduct water quality testing for existing and potential supplies, based on industry standards (bacterial, chemical, metals) – there is a high likelihood that the existing supplies have been contaminated and water will require additional treatment to reduce health exposure to residents.
- Review data and develop a summary
- Identify treatment technologies and develop a conceptual plan for treatment that will meet established minimum water quality standards
- While this shown as Step 3, it should start immediately to determine if the exiting water sources are safe for human consumption. If not, filters or water bottles should be provided.

TIMELINE 0 to 12 months

Step no. 4 – Establish Design Criteria

Based on condition assessment, demand projections, and water quality data, establish design criteria for:

- Quantity of water required by each city/community
- Pumping and treatment plant capacity by City
- Distribution system hydraulic capacity by City, including sizing of major water transmission mains
- Materials of construction for new systems that is selected based on an established criteria and suitability/accessibility in Syria (pipes, tanks, etc.)
- Overall disinfection and water quality monitoring strategy

TIMELINE 13 to 18 months

Step no. 5 – Conduct Preliminary Design, Detailed Design, and Procurement/Bidding

The following bid packages should be established:

- Raw or source water, including intakes, lake development, wells, etc.
- Water treatment facilities
- Water transmission/distribution composed of pipes, tanks, pumps, and distribution system appurtenances
- Identify financial and human resources required to complete this work, including:
    - Financial budget for each required improvement/upgrade
    - Required human resources to construct the improvements
        - Skills required for construction and operation of systems

- Workforce opportunities for locals, including training opportunities

TIMELINE 18 to 30 months

Step no. 6 – Construction, Startup and Testing

In this step, pre-qualified contractors would start constructing the recommended improvements with the following considerations:

- Long-lead time items are to be pre-purchased ahead of construction
- Construction can start at 60% in a progressive design-build delivery method
- Sequencing of work has to be completed in a way to minimize impact on existing water delivery

TIMELINE 31 to 60 months

Key Considerations

The following are key considerations:

1. Establish an advisory committee to guide the implementation team and provide input as required.
2. This plan is focused on achieving long-term goals with the understanding that short-term the focus on keeping existing facilities operational to maintain supply.
3. Reuse of domestic wastewater for irrigation to reduce potable supply requirements
4. As part of above effort, it is important to coordinate with the wastewater treatment by making sure that current water sources are not impacted by wastewater and that these sources are protected.
5. The long-term focus should be driven by guiding principles of:
    a. Providing every Syrian with safe water that meets international guidelines
    b. Building systems that are modern, efficient, sustainable, reliable, and user friendly
    c. Take into the future – both from a capacity but also considering emerging contaminants like PFAS, microplastics, etc.
    d. Creating jobs