

Emergency
Water Supply Planning Guide
For Hospitals and Healthcare Facilities

Grab-and-Go
Summary



Introduction

This Emergency Water Supply Planning Guide (EWSP) for Hospitals and Healthcare Facilities Grab-and-Go Summary is meant to provide guidance to hospitals and healthcare facilities to prepare for a water supply interruption, outage, or emergency. It is a condensed version of the more extensive and detailed EWSP document, which is available for download at:

<https://www.cdc.gov/healthywater/pdf/emergency/emergency-water-supply-planning-guide-2019-508.pdf>.

While the Summary is not exhaustive, it does provide hospitals and healthcare facilities with the essential information they need to understand the purpose and overall approach to planning for an emergency water supply. It could also be used as a quick reference guide in the event of a water supply interruption, outage, or emergency.

Lastly, this Summary can act as a companion document to those who have read the full EWSP, but would like a more condensed version to review when necessary.

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Executive Summary

In order to maintain daily operations and patient care services, healthcare facilities should develop an Emergency Water Supply Plan (EWSP) to prepare for, respond to, and recover from a total or partial interruption of the water supply. An EWSP provides a road map for a healthcare facility's response and recovery efforts in the event of a water supply interruption by providing the guidance to assess water usage, response capabilities, and water alternatives.

The interruption or total loss of a water supply can be caused by several types of events including natural disasters, a water system failure or contamination, construction damage, or an act of terrorism. In the case of some natural disasters—such as a hurricane or flood—a facility and the water system may have a few days of warning. These events allow more time for preparation which typically speeds up response. In other cases—such as earthquakes, tornados, external/internal water contamination, or the accidental rupture of a distribution pipe during construction—a facility may have little or no prior warning. Because water supplies can and do fail, it is imperative to understand and address how these interruptions impact patient safety, quality of care, and the operations of your facility.

An EWSP will vary from facility to facility based on site-specific conditions. For a small facility, one individual may perform multiple functions, and the process may be relatively simple. However, for a large regional hospital, multiple parties will need to work together to develop an EWSP. Regardless of size, a robust EWSP must be prepared to ensure patient safety and quality of care while responding to and recovering from a water interruption.

Standards of the Joint Commission (EM.02.02.09) and the Center for Medicare and Medicaid Services (CMS) Conditions for Participation/Conditions for Coverage (42 CFR 482.41) require hospitals to address the provision of water as part of the facility's Emergency Operations Plan (EOP). Two elements of performance for Standard EM.02.02.09 address water needs and divide them into the following categories:

- Consumption and essential care activities
- Equipment and sanitary purposes.

Examples of activities that would be impacted by a water interruption

Consumption and essential care

- Drinking at faucets and fountains
- Food preparation
- Handwashing
- Wound care
- Emergency surgery

Equipment and sanitary purposes

- Flushing toilets
- Bathing patients
- Fire suppression sprinkler systems
- Heating, ventilation, and air conditioning



A Florida hospital lost water service for 5 hours due to water main break.



A hospital in Texas lost water service for 48 hours due to an ice storm that caused a citywide power outage that included the water treatment plant.



A 2014 chemical spill in West Virginia contaminated a water supply for roughly 300,000 residents and affected 10 hospitals in the area.

Overview of the Plan Development Process



The process of developing an EWSP requires the participation and collaboration of many individuals and stakeholders. The EWSP guide breaks down the development of an EWSP into four main steps:

STEP 1

ASSEMBLE
EWSP team and
gather documents

STEP 2

UNDERSTAND
Understand water
usage with audits

STEP 3

ANALYZE
emergency water
supply alternatives

STEP 4

DEVELOP
and exercise
your EWSP

STEP 1: Assemble EWSP team and gather documents

Identify appropriate staff members who will be responsible for the development of the EWSP and assemble documents about the facility and its water usage. Gathering expertise from a range of individuals will ensure a comprehensive and robust plan. Below are some examples of the areas of expertise that should be represented on your team and suggestions as to which staff members may be best suited to provide input:

- Facility Management
 - ▷ Engineering or Plumbing Supervisor
- Infection Control and Prevention
 - ▷ Infection Control Director or Specialist
- Medical Services
 - ▷ Chief of Surgery
 - ▷ Chief of Medicine
- Emergency Preparedness
 - ▷ Emergency Preparedness Coordinator
- Representatives from External Partners
 - ▷ Local drinking water utility
 - ▷ State drinking water agency
 - ▷ Public health department
 - ▷ Local fire department

- ▷ Water reclamation/purification department
- ▷ Emergency Manager
- ▷ Representative of external dialysis clinic

STEP 2: Understand water usage with audits

A Water Use Audit provides a series of steps/actions to help a facility to determine its critical emergency water needs by quantifying the details of its water use and determining where it is essential and where it can be restricted.

STEP 3: Analyze emergency water supply alternatives

Analyze other water supply options, such as bottled water and back up groundwater wells.

STEP 4: Develop and exercise your EWSP

Based on analysis of the water use audit and the availability of alternate emergency water supplies, develop a written EWSP for the facility. Exercise the plan annually and make any adjustments as needed. A "hot-wash" and after-action report should be conducted immediately after the exercise. Revise the EWSP in the event of a significant facility expansion/modification or after a water supply interruption.

STEP 2

UNDERSTAND Understand water usage with audits

See page 11 of EWSP document. The Water Use Audit provides a series of steps/actions that will enable a facility to determine its critical emergency water needs by quantifying the details of its water use and determining where it is essential and where it can be restricted.

This audit can also help identify water conservation measures in day-to-day operations. Reducing routine water usage can conserve energy, reduce long-term costs, and increase a facility's resiliency during an emergency.



A water use audit work plan typically includes FIVE PHASES:

PHASE 1

Determine
EWSP team
and gather
documents

PHASE 2

Identify
essential
functions and
minimum
water needs

PHASE 3

Identify
emergency
water
conservation
measures

PHASE 4

Identify
alternative
water supplies

PHASE 5

Develop
an emergency
water
restriction
plan

Phase 1: Determine water usage under normal operating conditions

Before Starting

- Identify involved personnel
- Establish/confirm points of contact
- Obtain information about the facility's operational needs under average and surge conditions
- Gather lists of all the facility's water-using buildings, locations, equipment, and systems

Collect

- Facility drawings
- Water meter records
- Water surveys
- Water and sewer bills from the past 12 months

When estimating the overall amount of water used per day under normal operating conditions, include information from water meter records for permanently installed flow meters as well as water consumption estimates for each functional area/department based both on usage estimates and on knowledge of actual direct water usage. Where water usage cannot be measured directly, it can be

estimated based on equipment design information, frequency and duration of use, interviews with the staff, and standard accepted water consumption values for common uses. Some facilities may be able to use wastewater discharge reports as a mechanism to back-calculate water usage.

PHASE 1: Water Use Audit Form

POPULATION

Date Auditor(s) Building # Department Level/Wing Department Function

How many major water-using activities in the dept.? Name/function of activity (new entry per activity)

Full-time employees

TYPE	AMOUNT
8-hour shifts	<input type="text"/>
12-hour shifts	<input type="text"/>
Part-time	<input type="text"/>

Inpatients

TYPE	AMOUNT
Occupancy rate	<input type="text"/>
Visitors	<input type="text"/>
Visitor Stay (hours)	<input type="text"/>

Outpatients

TYPE	AMOUNT
Outpatient Stay (hours)	<input type="text"/>
Visitors	<input type="text"/>
Visitor Stay (hours)	<input type="text"/>

How long can outpatients be temporarily postponed?

Description of activity

Why is it considered critical?

Quantity

Faucets Urinals Toilets Showers Other Other

ACTIVITY WATER USE

How much water is used for the activity?

How long is water used per activity (hrs./mins.)

How many times per day/week/month?

Is this process essential for hospital operation? Yes No

How long can the activity be temporarily postponed?

Are there waterless alternatives? Yes No

Is the process dependent on water use in the other hosp. dept.?

How long can the process operate without the need for outside water use?

Is it allowable for the air temp. to increase temporarily without adversely affecting health or safety? Yes No

Comments:

Step 2: Understand Water Usage With Audits

PHASE 1: Water Use Audit Form (continued)

The previous page provided an example of a water use audit form that could be used to obtain information for various functional areas/departments. Although each facility has unique attributes,

a typical facility will need to develop estimates of water usage for the functions outlined below.

Tip:

The estimates from each building/section should be compared to the total meter readings for accuracy.

Ideally, the total estimated amount of water being used by the facility and individual functions should equal the amount from the meter readings.

Meter readings often show higher water usage due to “unaccounted-for water”, which can result from water leakage, uncertain estimates, and missed categories of usage.

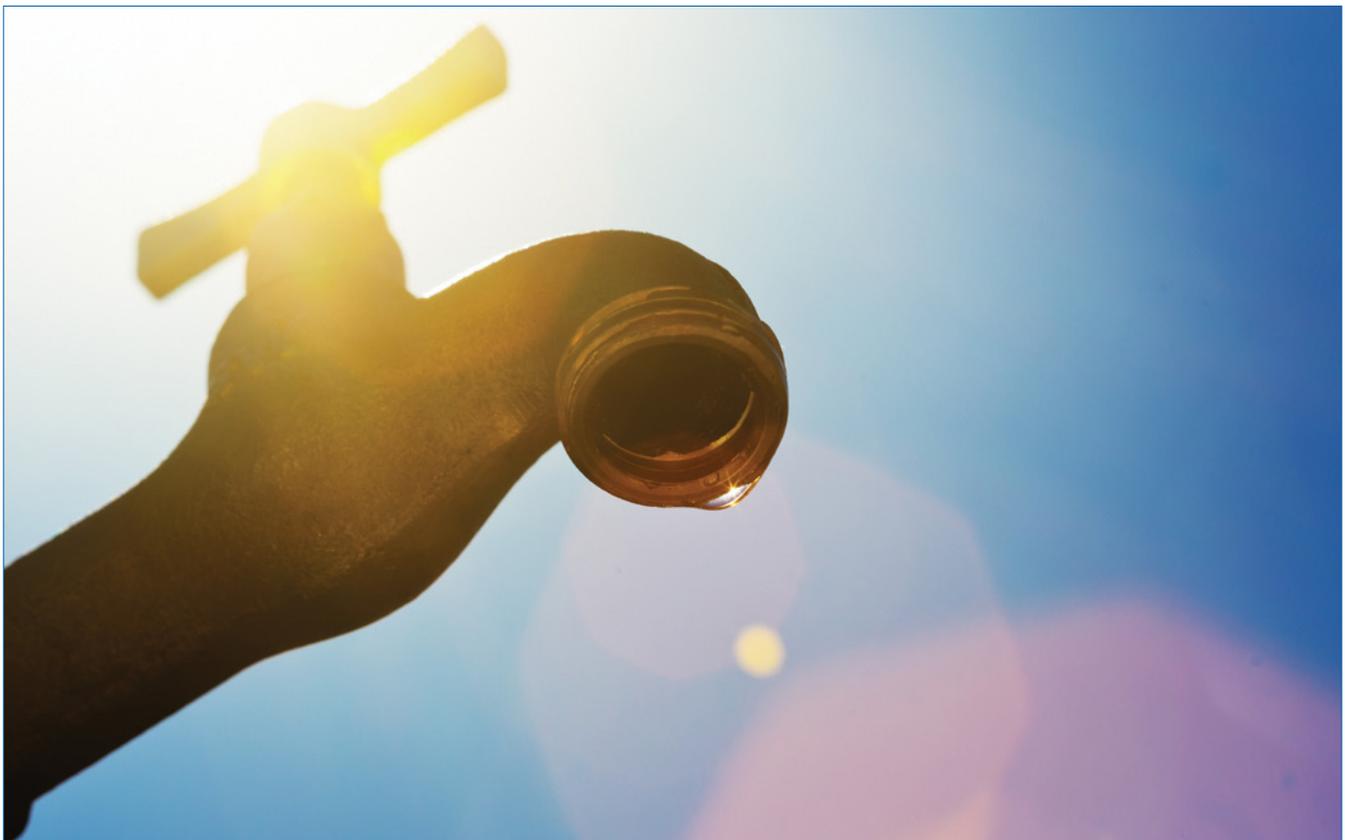
When reasonable estimates cannot be made based on usage information, or when the unaccounted-for water exceeds 20% of the meter readings, a facility may decide to use a portable flow meter.

Facility Usage

- Air-conditioning
- Boilers
- Dishwashing
- Laundry
- Autoclaves
- Medical equipment
- Outdoor irrigation systems
- Fire suppression sprinkler system
- Vacuum pumps
- Water system flushing
- Water-cooled air compressors

Facility Usage

- Drinking fountains
- Dietary
- Dialysis services
- Eye-wash stations
- Ice machines
- Laboratory
- Patient decontamination
- Patient floors
- Pharmacy
- Surgery
- Radiology
- Toilets, washrooms, showers
- Cooling IT equipment



PHASE 2: Identify essential functions and minimum water needs

Identify which functions are essential to protect patient health and safety and which functions can be temporarily restricted or eliminated in the event of an interruption in the facility's water supply; determine the steps required to restrict or eliminate the non-critical functions temporarily.

Facility functions and their corresponding water demands can be prioritized so that the plan can accommodate water emergency situations ranging from minimal to total water service loss (e.g., reduced pressure for a limited number of hours, loss of public water supplies following a major disaster, etc.). Classify functions by asking these questions:

- Is the function essential to total facility operations?
- Is the function essential to specific operations inside the facility or a particular building?

Essential and critical functions can sometimes be consolidated into a limited number of buildings and/or limited areas of a building to further reduce emergency water needs. **Caution:** Consolidation of functions and shutting off water to individual buildings or areas of a building requires a detailed understanding of the facility's plumbing system, including locating and testing shut-off valves to determine if they work as expected.

In addition, the facility should consider the following:

- Areas and/or functions that may not be available during a water supply outage (e.g., the fire suppression sprinkler system, water-cooled medical air pressure and suction systems).
- Area(s) that can be used as helicopter landing zones if the existing landing zone is on the roof of a building and the fire suppression sprinkler system is inoperative.
- Steps that can be taken to isolate and eliminate use of selected cooling towers and/or to reduce water consumption in critical cooling towers (e.g., increased cycles of concentration).
- Provisions that already exist or need to be constructed to allow for the use of emergency water supplies (e.g., appropriate pipes, valves, connections, and backflow prevention devices to receive and use water from tanker trucks).
- Steps that need to be taken to allow pressurization of the critical portions of the facility's water distribution system while using an emergency water supply (e.g., closure of urinal flush valves that normally can require a minimum of 30 pounds per square inch [psi] pressure to close).

PHASE 2: Fill-in matrix

Functions	Water Needs Under Normal Operating Conditions (gpd)	Waterless Alternative? (Yes or No)	Water Needs Under Water Restriction Situation (gpd)
Building			
HVAC			
Fire suppression			
Dietary			
Sanitation			
Drinking water			
Laundry			
Laboratory			
Radiology			
Medical care			
IT equip. cooling			
Other			
Other			

Total minimum water needs _____

PHASE 3: Identify emergency water conservation measures

After estimating the normal water usage patterns, the facility must determine what emergency water conservation measures can be used to reduce or eliminate water usage within each of its departments to meet its minimum water

needs. The facility can calculate the total amount of water that will be conserved by implementing the measures. Departments can also consider developing long-range plans to replace equipment dependent upon water.

Examples of Water Conservation Measures

- Canceling elective procedures
- Using waterless hand hygiene products, when safe to do so
- Sponge-bathing patients
- Using disposable sterile supplies
- Using portable toilets
- Transferring noncritical patients to unaffected facilities
- Limiting the number of Emergency Department (ED) patients
- Using the ED to triage patients for transfer to other appropriate facilities
- Using single-use dialyzers and suspending the hemodialyzer re-use program
- Postponing physiotherapy services that require hydrotherapy
- Shutting off the water supply to buildings that do not support critical functions



PHASE 4: Identify emergency water supply options

During a water restriction, emergency, or outage, efforts to restore or maintain all or part of a facility's operations will require an alternative water supply of sufficient quantity and quality, as well as the means to introduce such water into the

areas of the facility where it is needed. The EWSP Team should check with the water supplier and the regional emergency management agency to arrange for or confirm the availability of alternative water supplies sufficient to meet the facility's needs.

Storage Areas:

- Tank
- Swimming Pools
- Disposable Pools
- Other: _____

Alternate Emergency Water Supply:

- Isolation of nearby storage tank
- Interconnection with nearby water supplier
- Other: _____

Installations for Receiving Water:

- Appropriate connections
- Valves
- Backflow prevention devices
- Pressurization
- Other: _____

The EWSP Team should identify what provisions exist or would need to be installed to enable receipt and use of emergency water supplies.



PHASE 5: Develop an emergency water restriction plan

A water restriction plan can help guide decision-making and appropriate response actions during a loss of water supply. Faced with a water outage, facility staff must quickly assess the availability of water and determine at what level and for how long it can continue functioning.

If the expected water supply loss will be greater than the available volume of water that can be provided, mandatory water restriction measures must be implemented.

The water restriction plan should include criteria for determining when to enact restriction measures and may include various levels of response based upon the expected duration and severity of the water supply loss.

To further reduce demand on the available water supply, consider limiting visitors and to encouraging nonessential staff to work from home. Limit the use of restrooms to those with toilets that use a low water volume.

Facility management should establish standing contracts to ensure the availability of emergency support services, such as portable toilets, instrument sterilization, medical supplies, meal preparation, and potable water delivery via tanker truck or other means during an emergency water outage.

Information from the emergency water restriction plan will be used in the development of the EWSP and EOP.

Volume of Water Available:

Inter-connected water system	<input type="text"/>
Storage Tanks	<input type="text"/>
Reservoirs	<input type="text"/>
Wells	<input type="text"/>
OTHER:	<input type="text"/>

Volume of Water Available:

Expected duration of outage

Collect information on the number and status of patients, staff, and others at the facility at the time of the outage.

Limiting water use to critical services and suspend nonessential services:

- | | |
|--|--|
| <input type="checkbox"/> Accelerate patient discharge based on sound clinical judgment | <input type="checkbox"/> Determine clinic services that can be suspended |
|--|--|

Supplies, materials, and other measures that limit or do not require water use:

- | | |
|---|---|
| <input type="checkbox"/> Use alcohol-based hand sanitizers | <input type="checkbox"/> Only heat/cool essential areas and buildings when possible |
| <input type="checkbox"/> Sponge bathe patients | <input type="checkbox"/> Close nonessential areas within essential buildings |
| <input type="checkbox"/> Limit food preparation to meals-ready-to-eat (MREs) | <input type="checkbox"/> Consolidate floors and wings having low patient populations |
| <input type="checkbox"/> Use disposable plates, utensils, silverware, and similar items whenever possible | <input type="checkbox"/> Check for leaks and correct plumbing deficiencies, preferably well before a water emergency occurs |

STEP 3

ANALYZE emergency water supply alternatives

(See page 15 of EWSP document) If the facility management is not assured that the problem can be fixed in 8 hours or less, they should institute the short-term response and prepare to implement their longer term water emergency response if it becomes necessary.

If a water main break is the cause of the water supply interruption, part of the initial assessment will be to determine if the break is on the facility's property or within the distribution system of the water supplier. Offsite water main breaks emphasize the need to have good communication channels in place with the water supplier and local regulatory agencies before, during, and after an event.

Healthcare facilities should coordinate their response and recovery efforts with the appropriate public health agency and water supplier. Additional filtering and treatment of the water entering the facility's piping system can provide additional protection in these types of situations.

Options to help meet water needs during emergencies

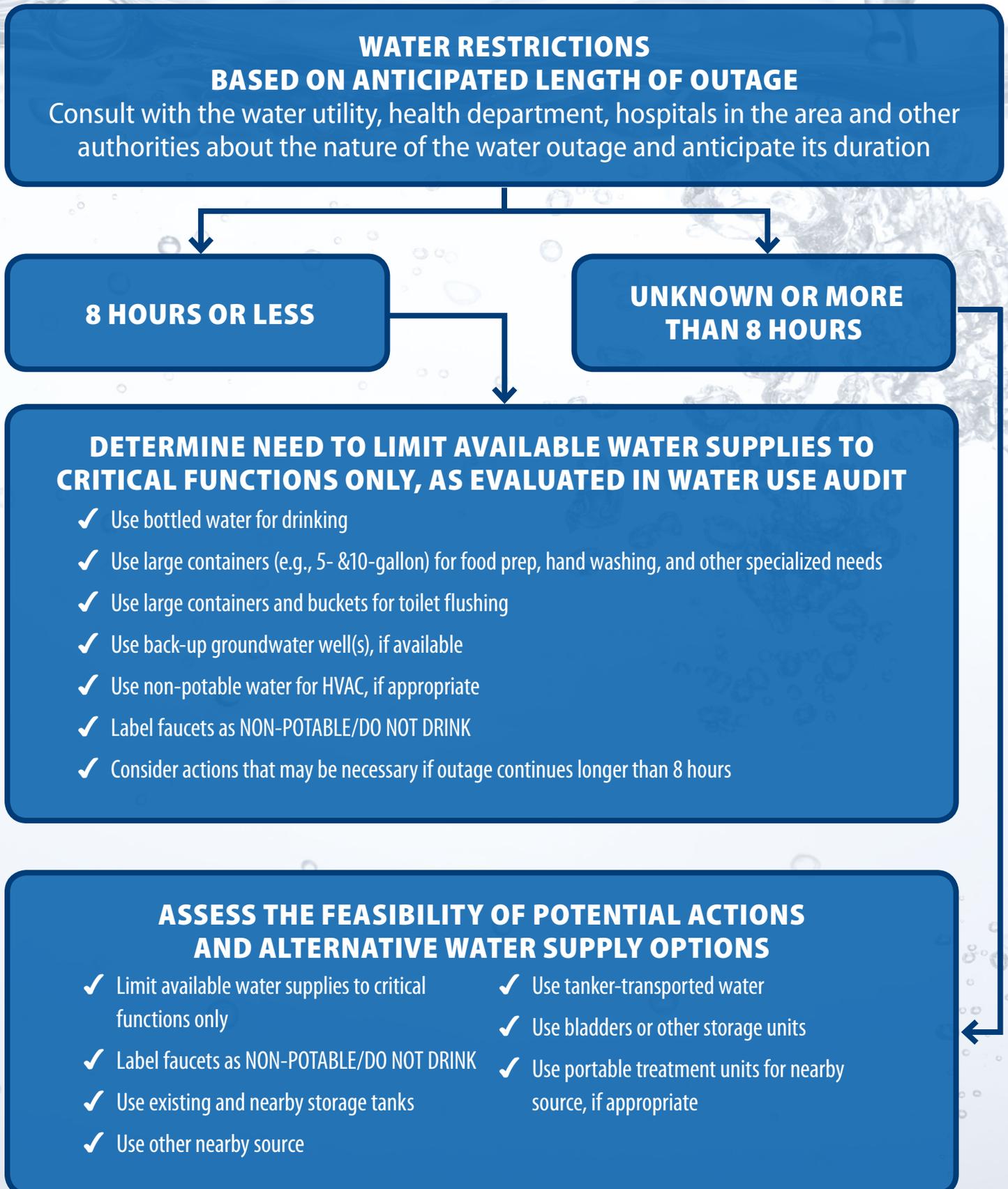
- Bottled water for drinking**—The volume of water will depend on individual needs, age, physical condition, activity level, diet, and climate. Children, nursing mothers, and ill people need more water.
- Back-up groundwater wells**—Facilities must determine how they will comply with state regulations governing the use of such wells. Wells should be tested monthly for function and quality.
- Use non-potable water for HVAC**—This can help reduce potable water use considerably. However, non-potable water could damage the HVAC equipment and result in substantial repair costs. Filtering and treatment of the water may make non-potable supplies usable in some situations.
- Label faucets Non-potable/Do not drink**—Maintaining an effective operations and maintenance program for cross-connection control will help minimize the potential for contamination of potable water faucets.
- Use large containers for food prep, handwashing and other specialized needs**—Sufficient storage space can sometimes present a limitation and water must be replaced regularly (FEMA recommends every 6 months). The distribution details should be addressed in the EWSP and EOP.
- Use large containers and buckets (trash cans, mop buckets, etc.) for toilet flushing**—The filling and distribution of these containers should be addressed in the EWSP and EOP.

Flow charts included on the following pages are intended to assist facility managers both in initial decision-making and in evaluating each of the various response options.



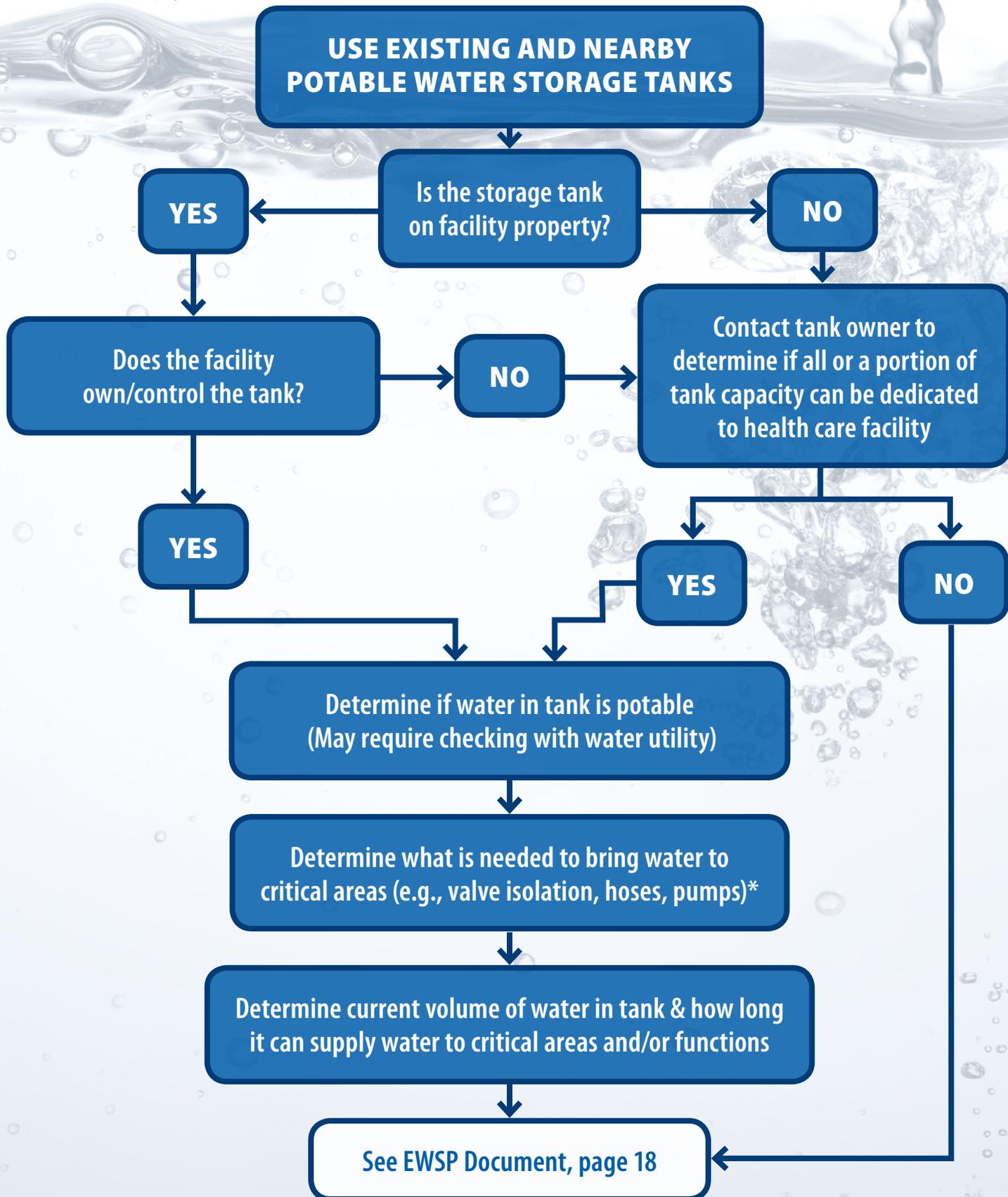
Alternative Water Supplies: Overview

See EWSP document, page 15.



Alternative Water Supplies: Storage Tanks

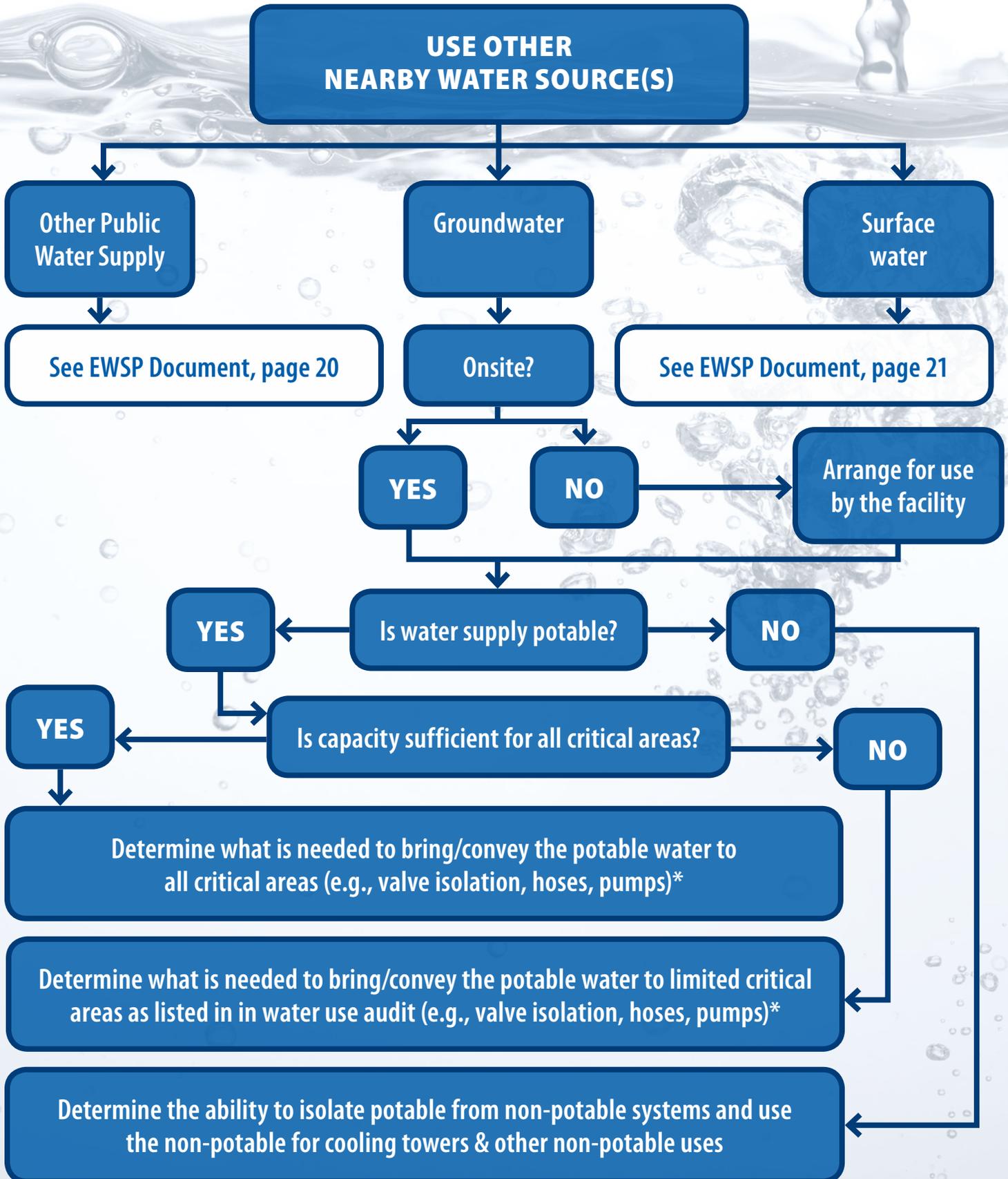
See EWSP document, page 17.



*Do not use fire trucks for potable water pumping

Alternative Water Supplies: Nearby Sources

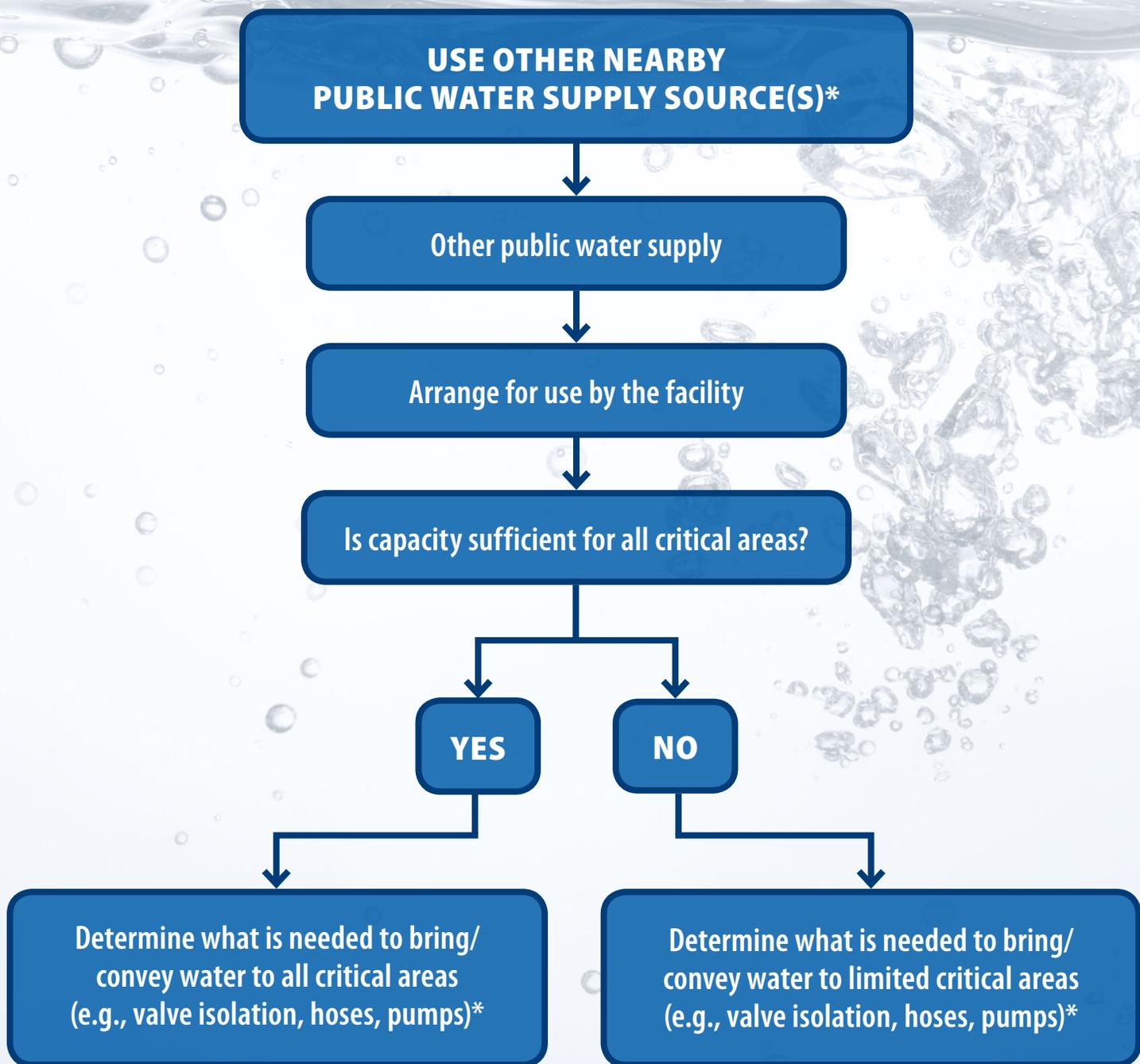
See EWSP document, page 20.



*Do not use fire trucks for potable water pumping

Alternative Water Supplies: **Other Nearby Public Water Supply Sources**

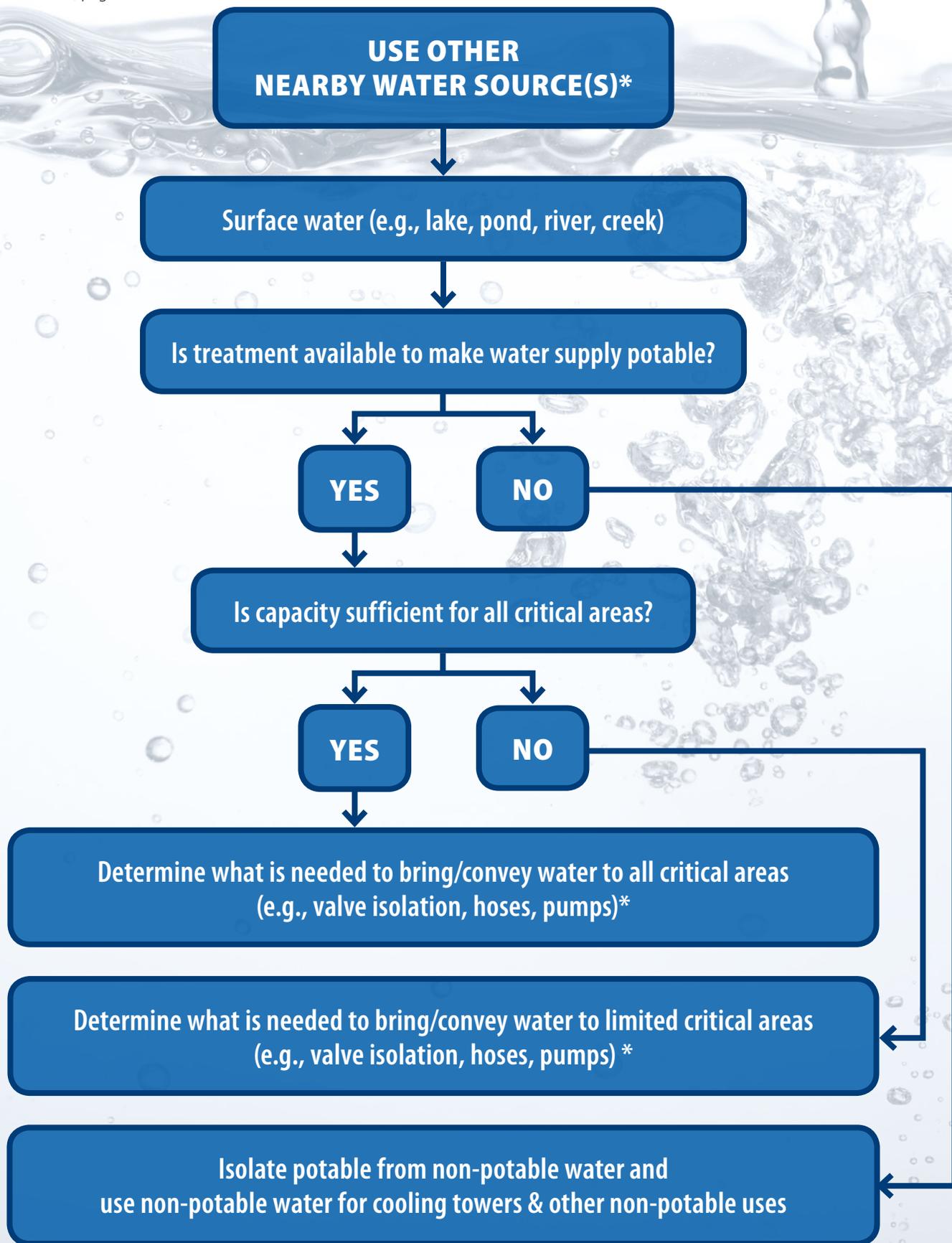
See EWSP document, page 25.



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Alternative Water Supplies: Nearby Sources—Surface Water

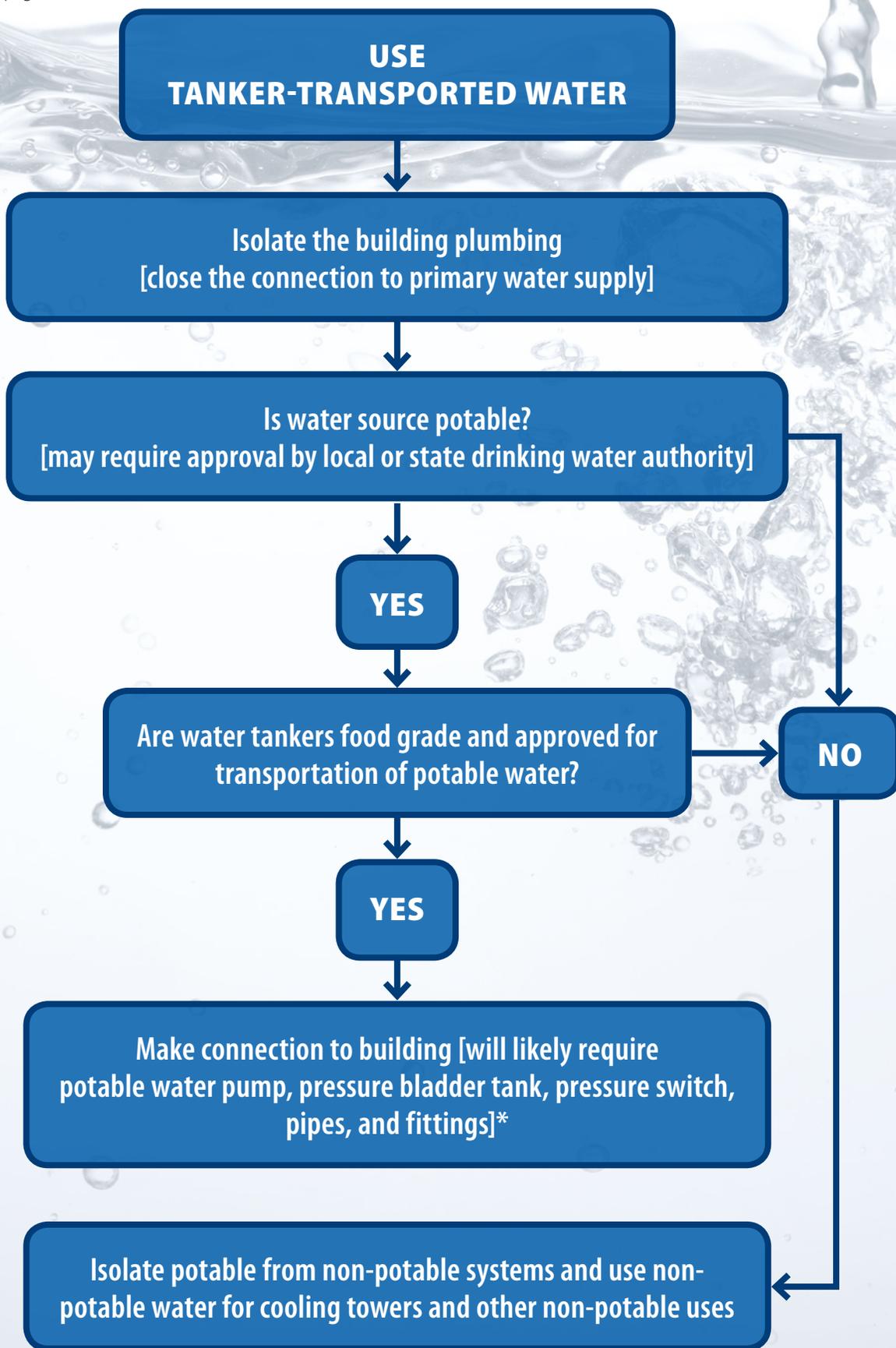
See EWSP document, page 21.



*Do not use fire trucks for potable water pumping

Alternative Water Supplies: **Tanker-Transported Water**

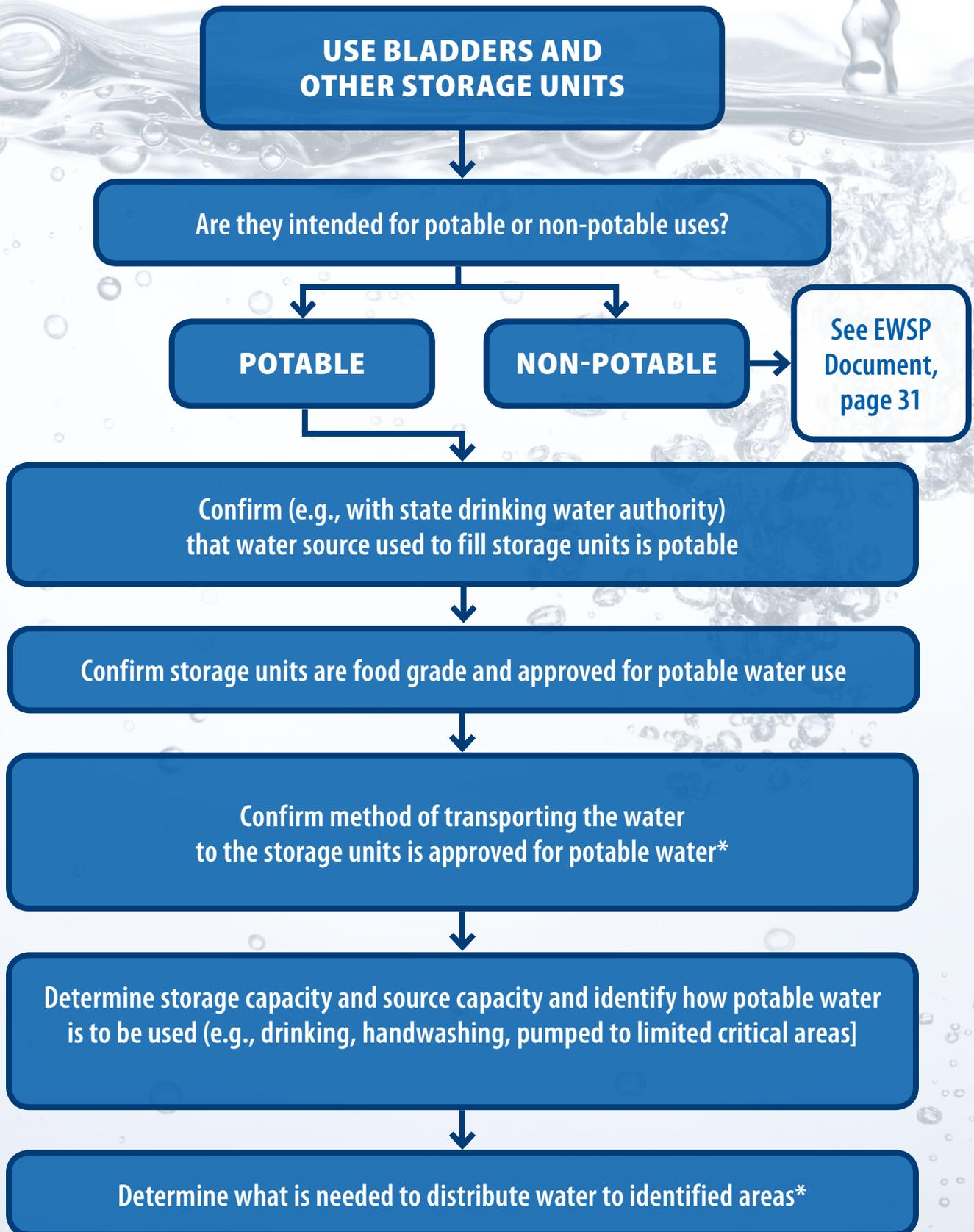
See EWSP document, page 25.



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Alternative Water Supplies: Bladders and Other Storage Units

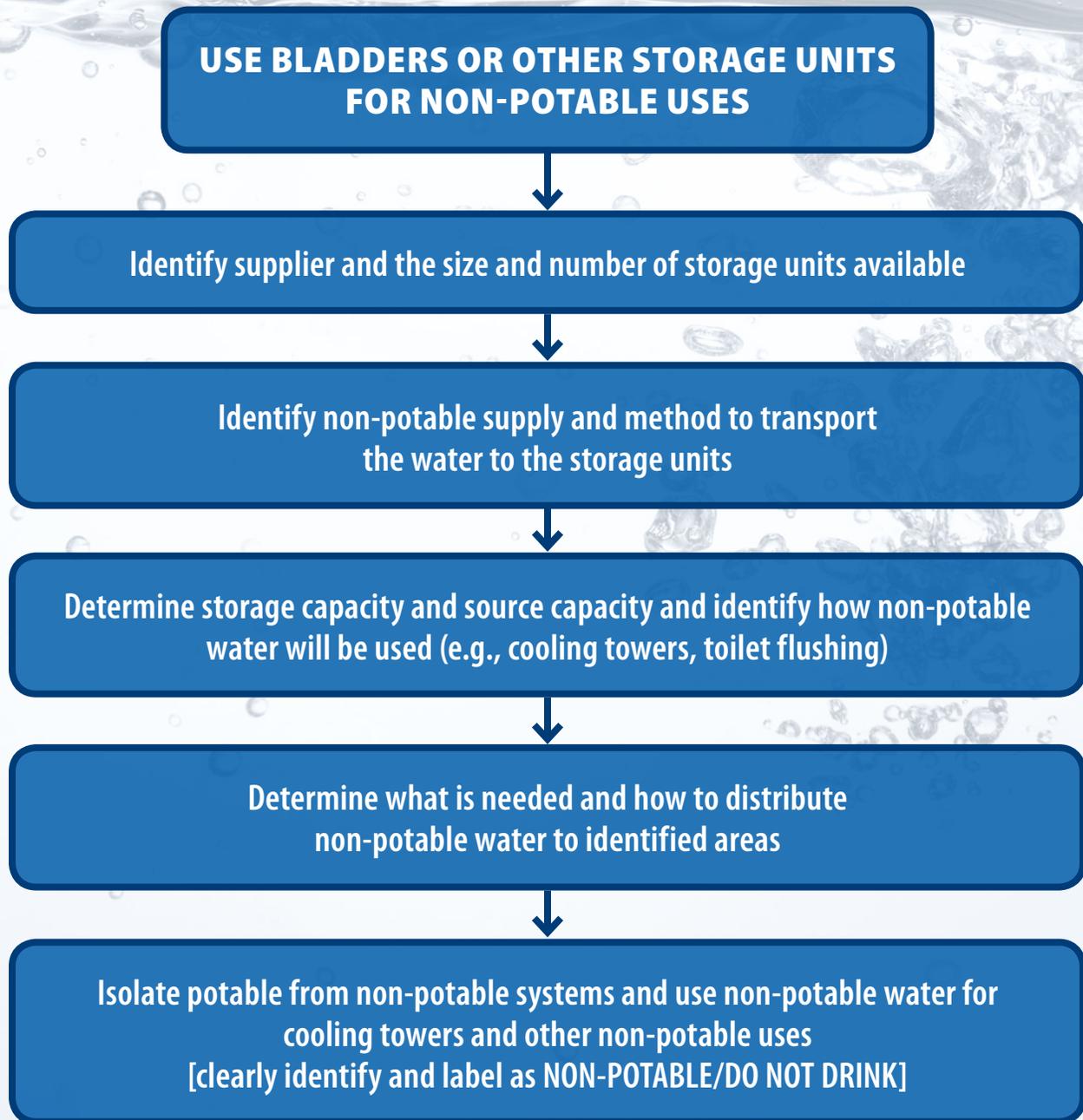
See EWSP document, pages 28-34.



*Do not use fire trucks for potable water pumping

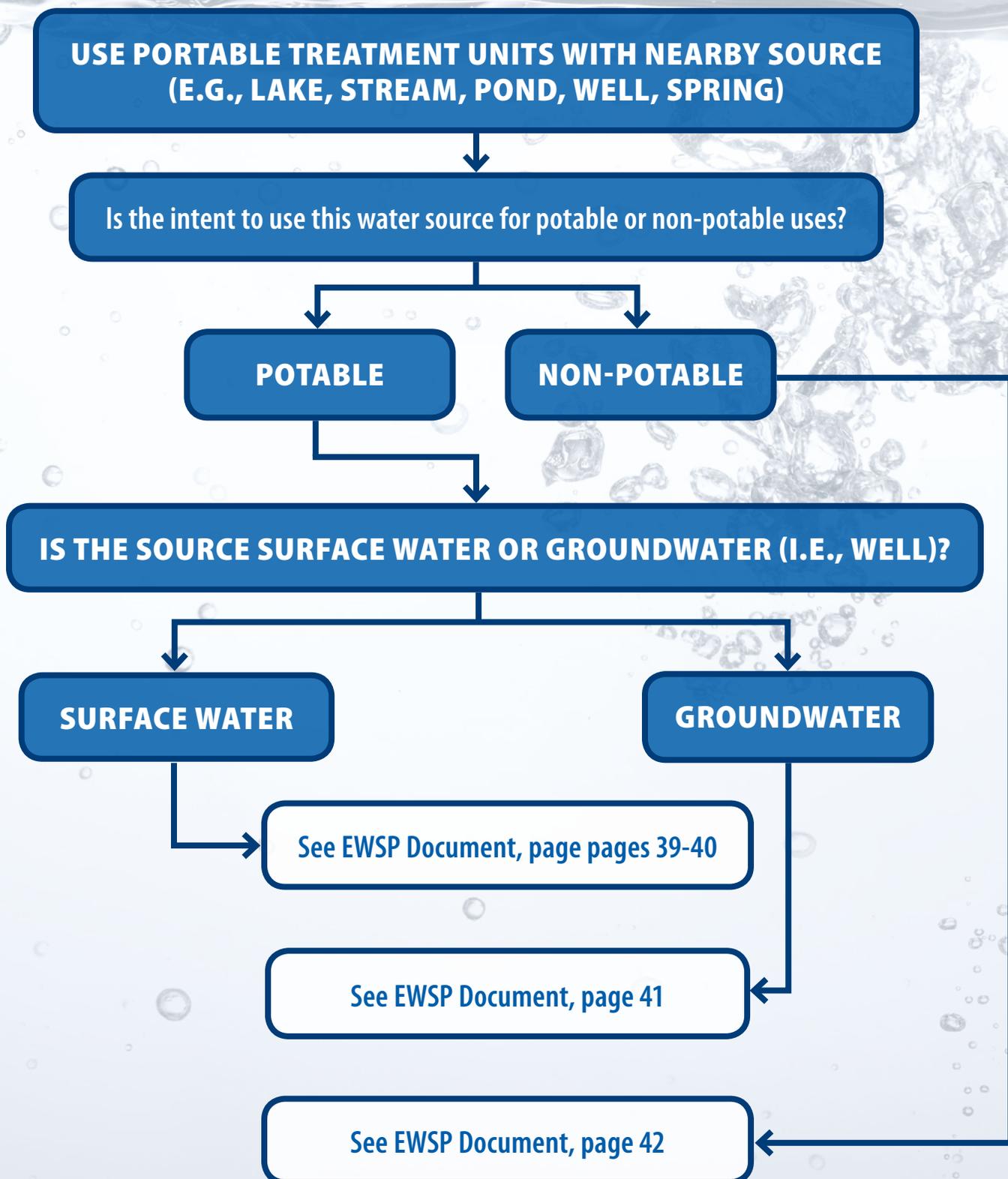
Alternative Water Supplies: **Bladders and Other Storage Units for Non-Potable Uses**

See EWSP document, page 31.



Alternative Water Supplies: Portable Treatment Units—Overview

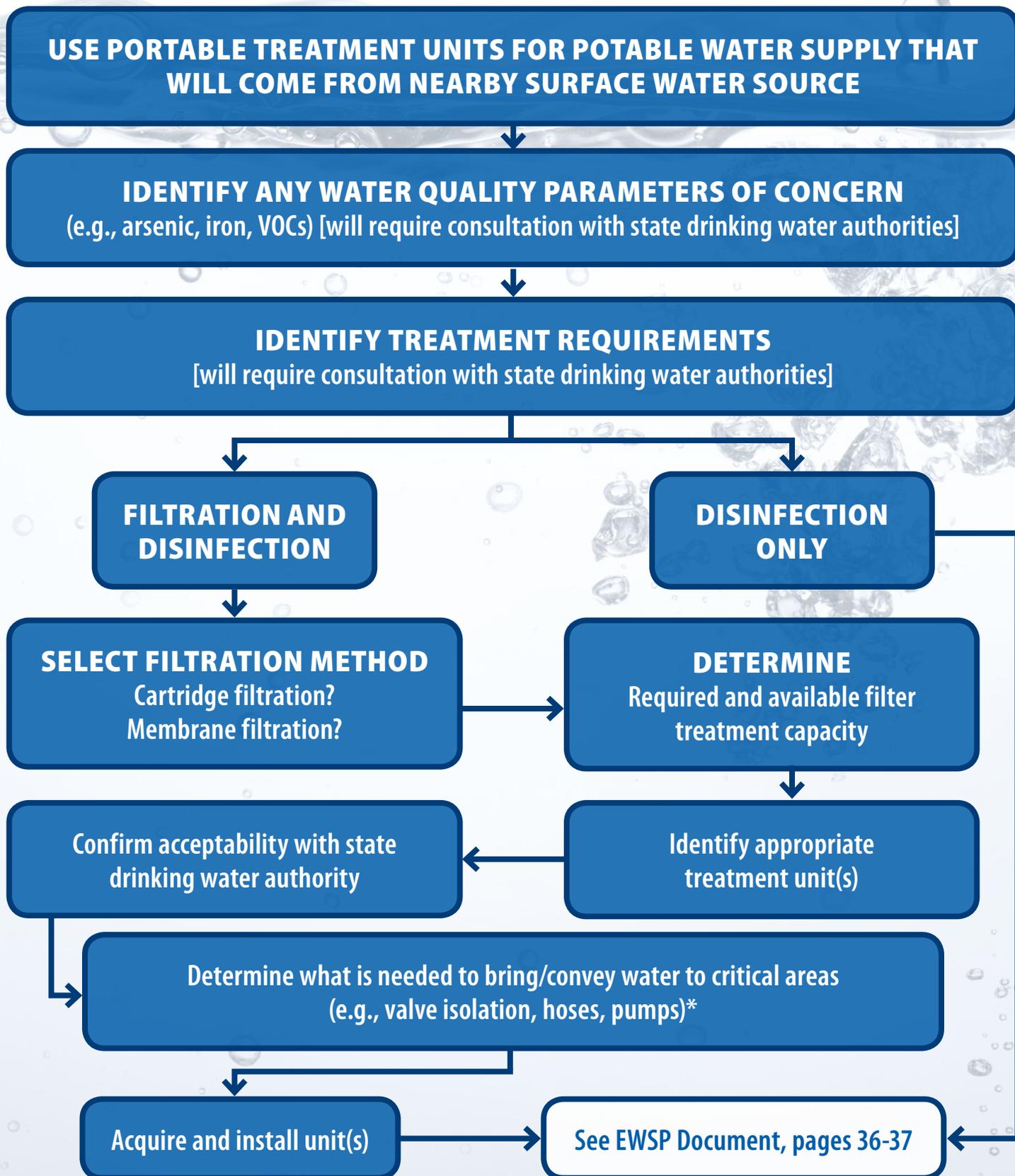
See EWSP document, page 38.



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Alternative Water Supplies: Portable Treatment Units for Surface Water Source

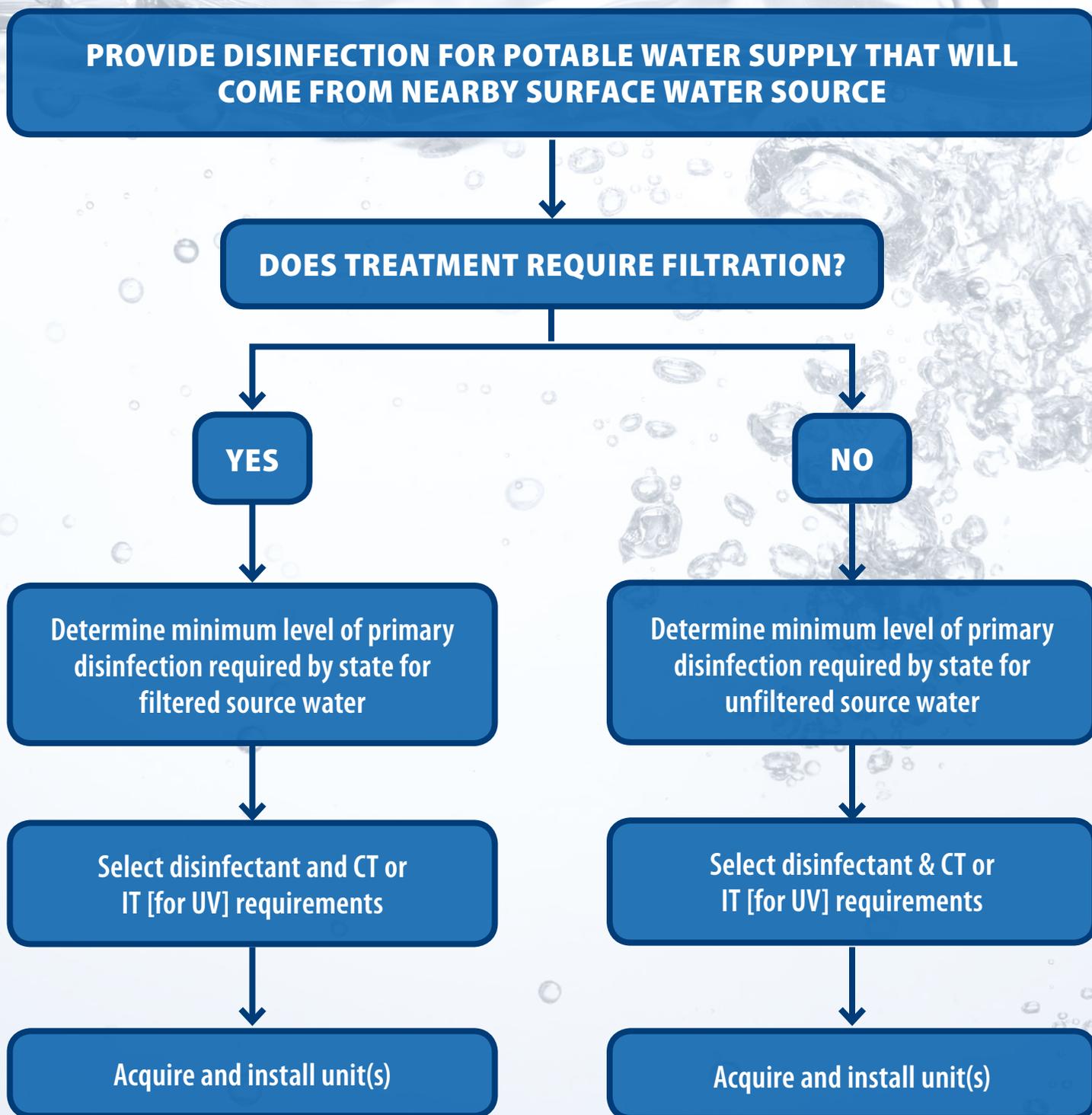
See EWSP document, page 42.



*Do not use fire trucks for potable water pumping

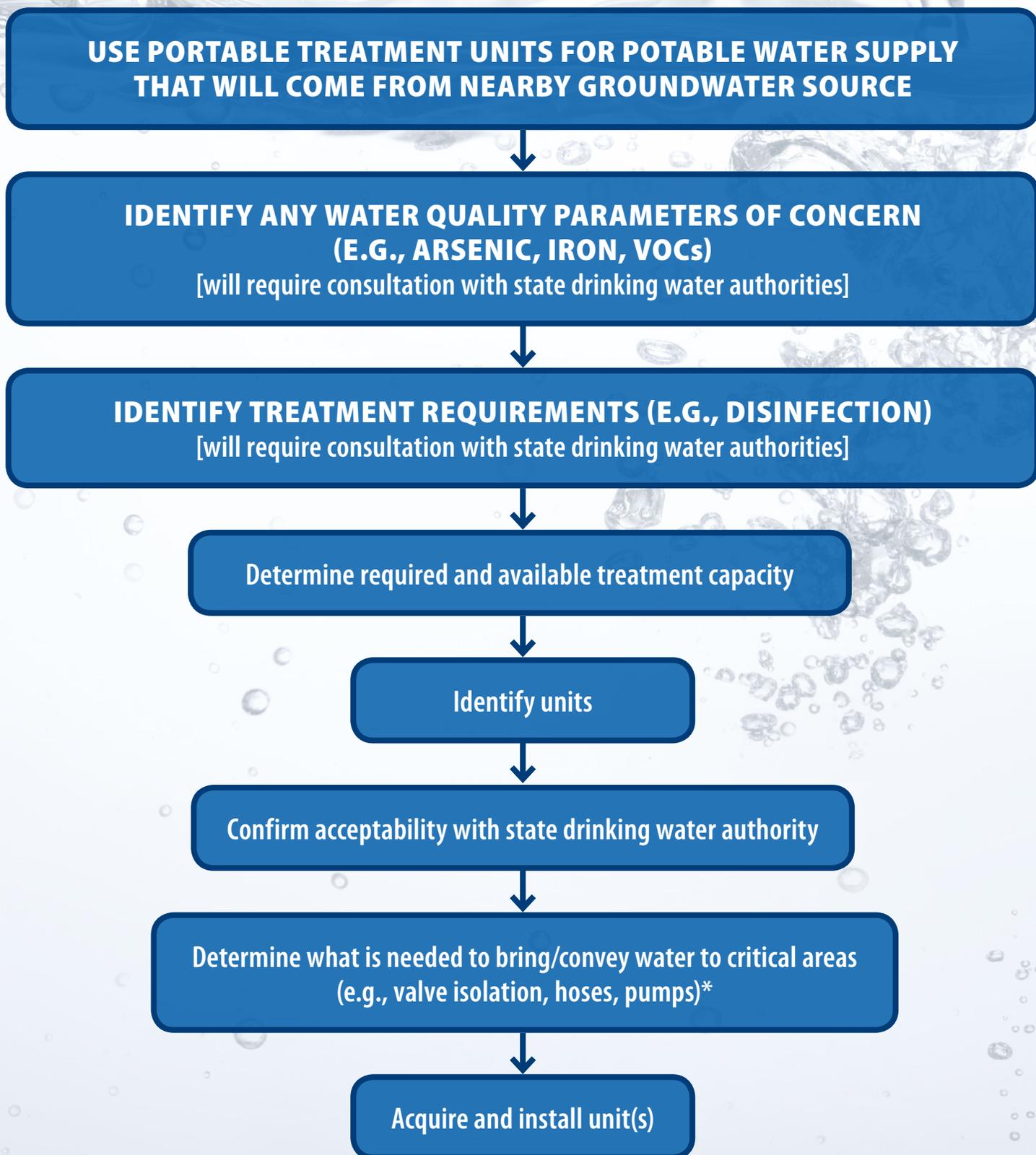
Alternative Water Supplies: Disinfection of Surface Water

See EWSP document, pages 36-37.



Alternative Water Supplies: **Portable Treatment Units For Groundwater Source**

See EWSP document, page 21.



*Do not use fire trucks for potable water pumping

Alternative Water Supplies: **Portable Treatment Units for Nearby Water Source**

See EWSP document, page 21.



*Do not use fire trucks for potable water pumping

STEP 4

DEVELOP and exercise your EWSP

Based on the analysis of the Water Use Audit and the availability of alternate emergency water supplies, develop a written EWSP for the facility. Exercise the plan annually and make any adjustments as needed. A “hot-wash” and after-action report should be conducted immediately after the exercise.

Revise the plan as needed after each exercise. Other reasons to consider revising the emergency water supply plan include a significant facility expansion or modification, or to incorporate the lessons learned following a response to an actual water supply interruption.

In the EWSP Guide, Appendices A, B, C, D, E, and F include case studies, an example plan, a loss of water scenario, water use audit forms, information about portable water flow meters, and information for dialysis centers to help with planning considerations.





**U.S. Department of Health and Human Services
Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases
Division of Foodborne, Waterborne, and Environmental Diseases**