



wahaso™

WATER HARVESTING SOLUTIONS

# Water Harvesting System Scoping from Wahaso

Scoping is the crucial first step in any water harvesting project. Wahaso supports its clients with a best-in-class scoping process that quickly identifies the best system approach to maximize the value of a custom water harvesting system for any project.

We help optimize water sources and uses, and provide a system concept and project budget so clients are confident that they have the information they need at each step in the process.

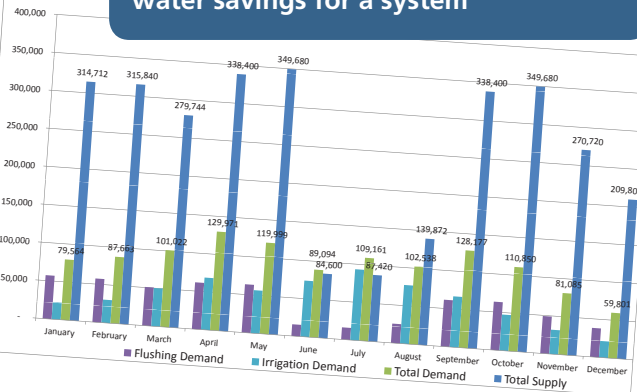
## Proper System Scoping is Essential to an Efficient Harvesting System

### Wahaso's Objectives for Every System Design

- Make a significant and meaningful impact on reducing the amount of municipal water use
- Match a system to meet the unique characteristics of the building
- Ensure that the water is safe for storage & application
- Keep the system as simple as possible
- Keep the system cost-per-gallon saved as low as possible

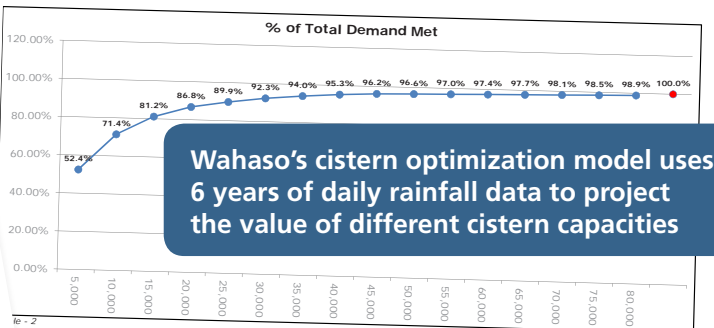
Processing System & Wahaso Services	
Sanitization & Filtration System	1
550 Gallon Snyder HDPE Day Tank with Fittings	1
UV Purification System (60 GPM)	1
Filtration - In-line Automatic Self-Cleaning Filter - 50 Micron	1
Final Filter 5µ Bag Filter	1
50 Extra Filter Bags	2
Pressurization	1
Repressurization Skid - Duplex 75 GPM Total @ 80 PSI	1
Pump Manifolds	1
Bladder Tank (B&G) for pressurization system (80 Gallon ASME Rated)	1
<b>CONTROLS</b>	
Main Tank Level Sensors (Flowline Birdcage)	1
ULI-28 Level Sensor for Day Tank	1
Wahaso Control System - Hardware & Programming	1
Control System Programming	2
Variable Frequency Drive Controls for Pumps	1
Water Inlet Backseat Solenoid Valves	1
Municipal make-up air gap to day-tank	2
Water Meters	1
<b>Miscellaneous</b>	
Misc Parts - Valves, wiring, skids, etc.	60
Other Value Added Services	1
Wahaso Engineering Design & Support	1
System - Pre build and test	1
Installation & Maintenance Manuals	1
One Year Limited System Warranty	1
On-Site Installation support - Wahaso will travel to site to oversee final installation and start-up. One trip at number of days shown.	2
On-Site Commissioning and Training - Wahaso will travel to site to commission system and train staff on maintenance and use.	1
Inbound Freight	1
<b>System Estimate</b>	<b>\$30,000 - \$100,000</b>
Freight Estimate	\$4,000

## A recap of monthly supply and demand provides a visual overview of potential water savings for a system



Reliable budget estimates draw on our experience with hundreds of system designs

Cistern Size	% of Total Demand Met	Non-Potable Gallons Used	Gallons Change from Previous Increment	Rain Event Size Capable of Being Handled (inches)
5,000	52.45%	-	-	-
10,000	71.40%	227,422	309,612	2/5
15,000	81.21%	352,163	42,551	4/5
20,000	86.77%	376,252	24,089	1 1/5
25,000	89.89%	389,752	13,501	1 3/5
<b>30,000</b>	<b>92.31%</b>	<b>400,280</b>	<b>10,527</b>	<b>2 3/8</b>
35,000	94.01%	407,628	7,348	2 7/9
40,000	95.28%	413,164	5,536	3 1/6
45,000	96.18%	417,045	3,882	3 4/7
50,000	96.58%	418,808	1,763	4
55,000	96.97%	420,475	1,667	4 1/3
60,000	97.35%	422,142	1,667	4 3/4
65,000	97.74%	423,808	1,667	5 1/6
70,000	98.12%	425,475	1,667	5 5/9
75,000	98.51%	427,142	1,667	6
80,000	98.89%	428,808	1,667	6 1/3



Wahaso's cistern optimization model uses 6 years of daily rainfall data to project the value of different cistern capacities

Wahaso - Water Harvesting Solutions, Inc.

Project Name: Cherry Point BEQ P136 (A & B)  
 Project Location: Havelock, NC  
 Prepared By: John Bauer & Kim Seay

Water Sources: Rainwater  
 Applications: Toilet Flushing  
 Date: November 17, 2011

- Pre-Treatment.** Rainwater will be collected from each side of the 47,700 square feet of rooftop of the building and directed for pre-filtration through one of two Wahaso WCDS 300-05 filtration units, (48" diameter). Each CDS unit can handle 300 GPM of rainwater coming from the roof.
- Storage.** Screened rainwater will be diverted to one of two 20,000 gallon fiberglass cisterns located below grade on each side of the two BEQs. The water will enter the cistern through a smoothing inlet and will be turned daily using a recirculation pump to keep the water from becoming anaerobic. Water from the base of each cistern will exit through a submersible pump running 60 GPM at 45 PSI. Overflow from the cistern will be diverted to the stormwater system.



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## Water Scoping Process

### 1. Consultation

We want to learn everything about your project. What type of building is this? How will it be used? What are the motivations for having a system? ROI on water savings? LEED certification? What water source(s) would you like to collect? How do you want to use the harvested water? What site or budget constraints must be considered?

### 2. Supply and Demand Analysis

Based on the consultation, we will analyze all potential supplies of water for harvestings and see how that balances with projected demand. The objective is to maximize the total water savings and match supply to demand as closely as possible month to month.

### 3. Cistern Modeling

Often the most expensive component of a rainwater harvesting system is the water storage cistern. Wahaso uses a proprietary computer model to evaluate the value in water savings of different cistern options. Six years of actual daily rainfall history for your area are used to optimize the proposed storage capacity.

### 4. System Concept

Based on our consultation and analysis, we will recommend a system concept for the project that includes recommend water sources and uses, storage methodology, filtration, pressurization and controls. Our concept is written in plain English as a series of steps and assumptions so that all team members can understand the approach and comment. We include a projection of total annual water savings from the system. We then work with you to refine the concept and develop an initial engineering schematic.

### 5. System Budget

Based on the agreed upon system concept and initial design, we will provide a budget range for the system that can be used in your planning. Our budget number identifies key assumptions and has a low to high range so that the building owner can determine if the system will work in the overall project budget. If local water rates have been provided, we can also project the ROI for the system. Most systems break even in 8-16 years depending on the system efficiency and the local price for municipal water.

**Let us scope your project!**

**Contact Wahaso's Client Service Team Today**

**Phone: 800-580-5350**

**What does Scoping cost?** For most projects, Wahaso does not charge for Scoping. We see this step as our opportunity to establish our company as the expert partner you are seeking in your project.

**During Design and Specifications,** our engineering team does the detailed engineering work that support the proposed system. Wahaso can provide schematics and skid drawings in 2D and 3D CAD that can be included directly into the building specifications. These detailed designs will be used to quote the final system and build the skids for the project. Depending on the type of project, the cost of this stage may be included in the price for the delivered system or provided in a consulting agreement.