



# WEO MVSP APP USER GUIDE

Sep-2022

## WEB SERVICE APPLICATION VER1.1.0.0

Minimum viable software product (MVSP) is a real software product with a set of functional features developed based on the real dataset.

WEOTech LTD.

[www.weotech.ca](http://www.weotech.ca)

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## Problem

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The Wastewater Treatment Industry is a mixture of various intricate series of biological, physical, and chemical processes that are used to treat and remove contaminants or pollutants from wastewater or sewage. Water treatment represents the most significant energy use for most municipal governments, according to Posterity Group Research. There are four segments in Water Treatment Industry, comprising Wastewater Treatment Plants (WWTP), Drinking Water Treatment Plants (DWTP), Wastewater Pumping stations (WW Pumping), and Drinking Water Pumping stations (DW Pumping). There are many chances to reduce energy utilization, lower electrical peak needs, and decrease Greenhouse Gas (GHG) emissions in water treatment sectors. The effective operation of wastewater treatment plants (WWTPs) is vital to make sure a sustainable and friendly green environment is maintained. Annual GHG emissions in the water treatment segments are approximately 0.58 Mt CO<sub>2</sub>e. WWTPs correspond to most of these emissions (46%), with a footprint of 0.27 Mt CO<sub>2</sub>e (Posterity Group Research). The CO<sub>2</sub> emissions arising from water and wastewater transport and sub-optimal treatment is also a concern. An analysis of electric energy intake, specifically, shows the most dominant energy end-utilization in the water treatment sectors is pumping, signifying 1.9 TWh, with 65% of all energy use.

## WEO Solution

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Our solution to this challenge will enable a decrease in energy use and energy costs; Lower peak demand, and Diminish Greenhouse Gas (GHG) emissions within the context of the Waste Water Treatment Sector. Our proposed predictive control can anticipate the incoming Wastewater intake rate (WWIR) and to adjust the reservoir buffer accordingly. We are introducing a two-stage framework using ML, Learning Stage, and Operational Stage

# MVSP Project Overview

## Project Goals

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Minimum viable software product (MVSP) is a real software product with a set of functional features developed based on the prototype findings. The client’s actual data is used and is exposed to a small group of real customers as a simplified version of the end product. The goals of this project are reaching out Version 1 of commercial software product or MVSP that its specifications and features should be defined after phase 1.

Basic goals of this project are:

- Selecting an industry for reaching out a solution and finally a software in order to Business Plan
- Development a software offering in market
- Creation main Features for a commercial product like brochures, user guides and ....
- Main features for a commercial product like user management, database structure, operational reports, web applications and ....

## MVSP Features

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MVSP features are categorized in four sections as following table:

<b>MVSP Features</b>	
<b>System Features</b>	<ul style="list-style-type: none"><li>• Web application with access through Internet/ WAN or LAN</li><li>• Administration dashboard settings</li><li>• Back up and restoration ability</li><li>• File management</li><li>• Organization definitions</li><li>• Parameters Definition</li></ul>

<b>User Management</b>	<ul style="list-style-type: none"><li>• User Management with different access levels to the Software abilities</li><li>• Roles definitions for users as per:<ul style="list-style-type: none"><li>○ Admin</li><li>○ Supervisor</li><li>○ User</li></ul></li><li>• Access permission to users for each page</li><li>• User(s) profile definition</li></ul>
<b>Inputs Data Features</b>	<ul style="list-style-type: none"><li>• Project Overview Definition including:<ul style="list-style-type: none"><li>○ Name of Process</li><li>○ Client Information and Details</li><li>○ Process Workflow Schematics and Equipment (pumps)</li></ul></li><li>• Number of data set rows</li><li>• Select Parameters for each Equipment (pumps)</li><li>• Definition of limitation for each parameter</li><li>• Input ability of parameters data sets and produced output</li><li>• Definition of target output value in order to calculating the parameters</li></ul>

## Company Overview

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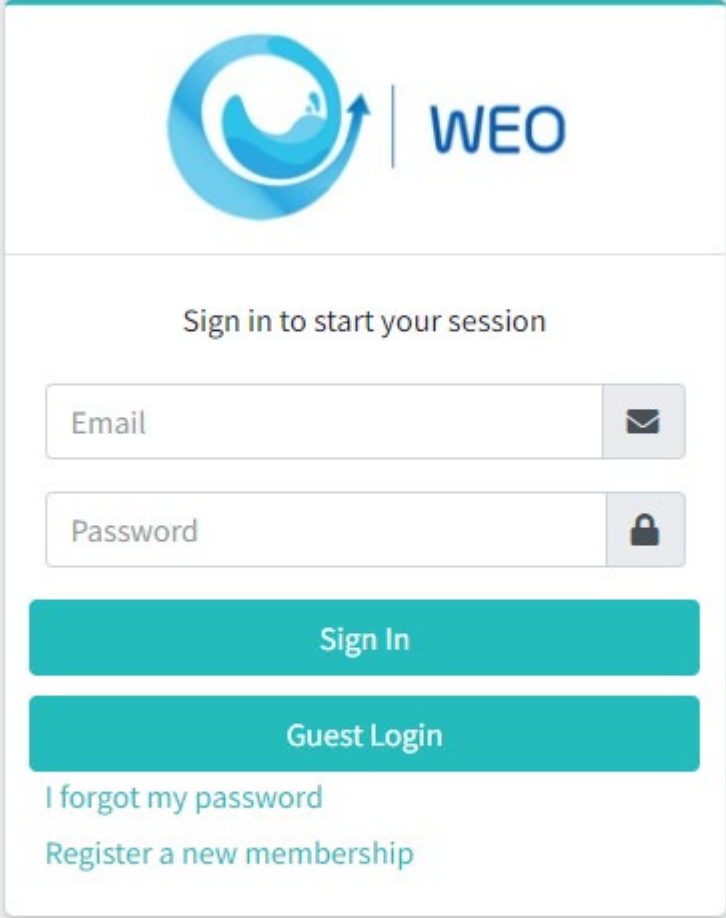
WEOTech LTD., which operates under as a Numbered Company Incorporated under the Province of Manitoba, develop and distribute the Proprietary software applications for Waste Water Process Optimization purposes. According to the plan, the commencement of operations was scheduled on November, 2020. Our apps are estimated to reduce energy costs by 16.7% and alarms by 97%. Besides, the reduction of Carbon footprint will be in alignment with the Energy optimization, reduction in water &, and organic waste delivery schedules. Also, we provide a solution to save costs for the facilities by reducing the human intervention aspect of monitoring and attending to pumps, monitors, and alarm. The Data-driven solution is intended to convert, idle data, into a positive cash saving solution for the Wastewater Treatment companies in Manitoba, and to other Provinces in Canada.

## Sign In (Login Page)

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You can access this software by visiting the website or entering the following address:

<https://5.152.221.178:8070>

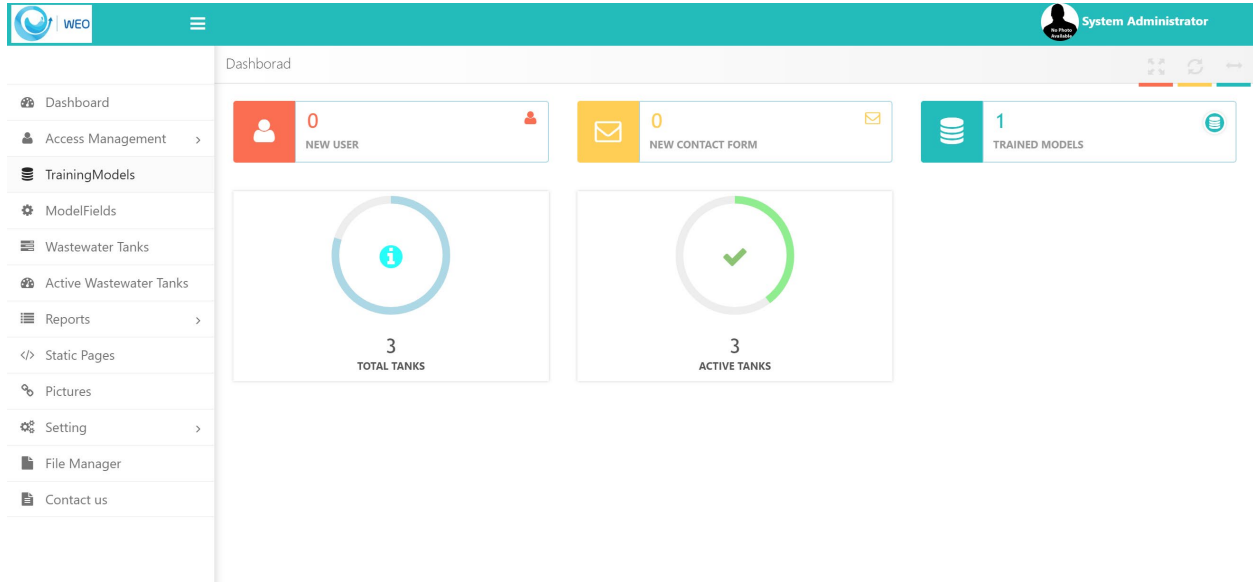


The image shows a login page for WEO. At the top left is a blue circular logo with a white arrow and a person icon. To its right is the text 'WEO'. Below the logo is the text 'Sign in to start your session'. There are two input fields: 'Email' with an envelope icon and 'Password' with a lock icon. Below these are two teal buttons: 'Sign In' and 'Guest Login'. At the bottom are two links: 'I forgot my password' and 'Register a new membership'.

By clicking on Guest, you can enter the software without entering username and password.

# Dashboard Page

When you enter the software, you will see the dashboard page, which provides general information about the project.



When you enter the software, you will see the dashboard page, which provides general information about the project.

New users, new contact forms, trained models, total number of repositories and active repositories are displayed.

On the upper right side after clicking on System Administrator, the software version, user profile and some related settings can be adjusted.

User menus are available on the left side.



# Access Management

In the Access Management menu, there is user management and access management, which includes three menus: User, Roles, and Menu Permissions.

The screenshot shows the 'User Management' interface in the WEO System Administrator. The sidebar on the left contains the following menu items: Dashboard, Access Management (expanded), Users, Roles, Menu Permissions, TrainingModels, ModelFields, Wastewater Tanks, Active Wastewater Tanks, Reports, Static Pages, Pictures, Setting, File Manager, and Contact us. The main content area is titled 'User Management' and features a '+ New User' and 'Excel Export' button. Below this is a table with the following data:

Username(Email)	User Type	Fullname	Status	Email	Register...	Manage...	Avatar
demouser	System User	user demo	Active	demouser@ip...	2022/01/28	Manage Role	
administrator	Admin User	System Administrator	Active	admin@doma...	2019/12/27	Manage Role	



At the bottom of the table, there is a pagination control showing '1' of 2 items, '20 items per page', and '1 - 2 of 2 items'.

Under the Roles menu, the admin can define and assign user roles, in this case, users can have different accesses according to the role defined for them.

WEO | System Administrator

User Management

+ New User Excel Export

Username(Email)	User Type	Fullname	Status	Email	Register...	Manage...	Avatar
demouser						Manage Role	 Edit Delete
administrator						Manage Role	 Edit Delete

**Edit**

First Name: System Last Name: Administrator

Username: administrator User Type: Admin Use

Mobile: 09153210910 Email: admin@domain.com

Start Date: 2019-12-27

Expire Date: 2029-12-27

Active:

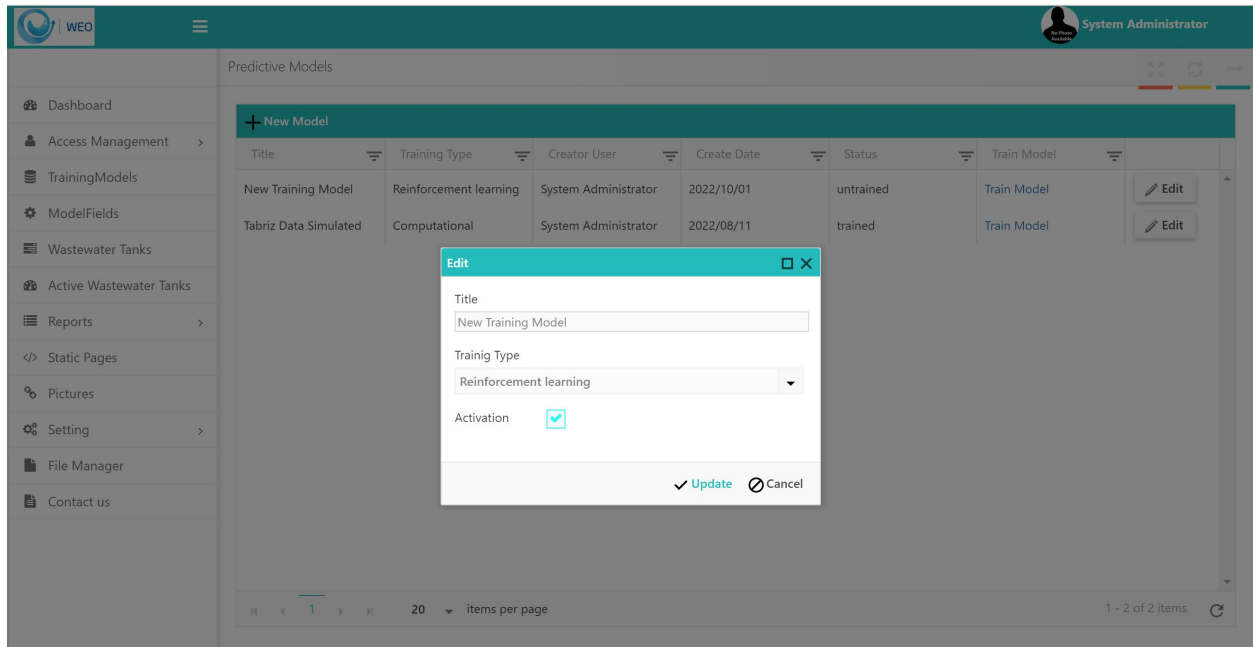
Password:

Update Cancel

1 - 2 of 2 items

# Training Models

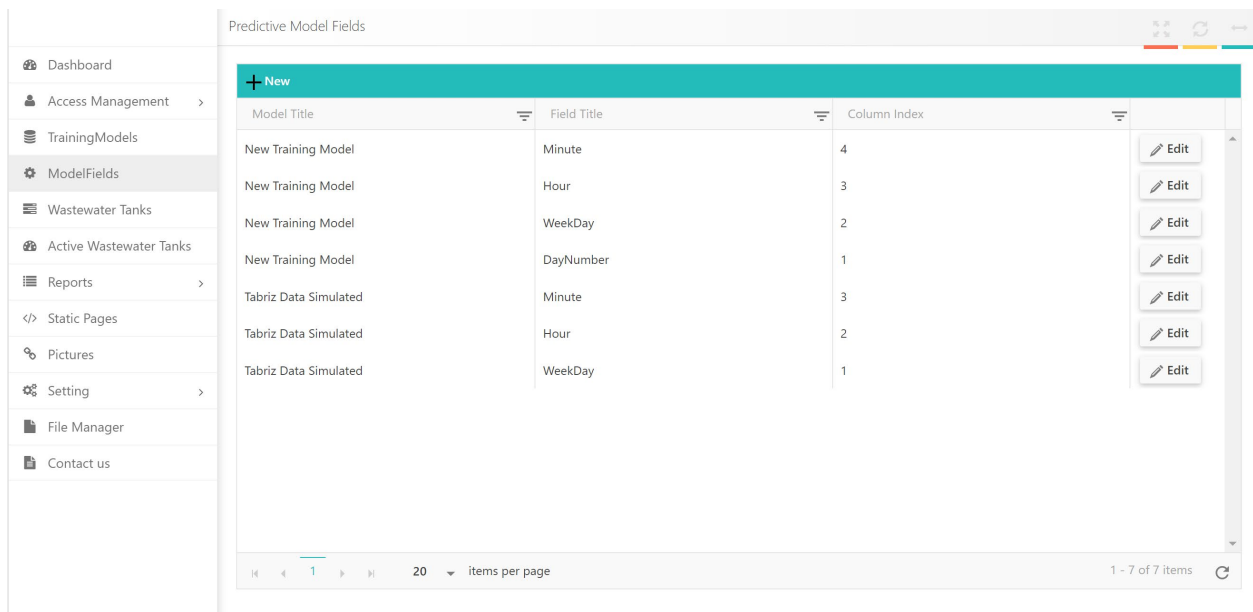
Training models can be defined in the TrainingModels sub menu. In this section, you can choose whether the selected model is in the form of reinforcement learning or based on mathematical calculation. Also, in this section, the defined models can be viewed and edited.



If you choose the reinforcement training option, you can upload the relevant data set and after the training, the status will change and the accuracy of the training and the time spent on the training will be observed.

# Model Fields

Before the dataset is loaded, its fields must be defined for the system, which is done in the ModelFeild menu. It must be determined exactly how many columns the Excel file has and what type of content each column contains.



After defining the dataset fields, the user goes to the TrainingModels menu and loads the dataset and the system is trained. After the system is trained and its status is changed to trained, the user can define the tanks.

# Wastewater Tank

Tanks are defined in the Wastewater Tank menu. In this section, the name of the Tank, based on which training model the prediction is made, and the start and end time of the processing on the reservoir are specified. The volume of the tank, the number of pumps involved with the tank, the frequency and power of each pump, the expected level and the margin can also be defined.

The screenshot shows the 'Tanks' management interface. A sidebar on the left contains navigation options: Dashboard, Access Management, TrainingModels, ModelFields, Wastewater Tanks, Active Wastewater Tanks, Reports, Static Pages, Pictures, Setting, File Manager, and Contact us. The main area displays a table with the following data:

Model Title	Title	User	Radius	Pumps	Unique Key	Activation	
Tabriz Data Simulated	Guest Sample	user demo	8	5	b245a5c7-994e-4241-8407-c522ab6d5f5a	Active	<a href="#">Edit</a>
Tabriz Data Simulated	Tank no.2	System Administrator	10	5	8ea28606-c802-408b-9330-52b914df3b3a	Active	<a href="#">Edit</a>
Tabriz Data Simulated	Tank no.1	System Administrator	11	6	feaa67ac-e578-427c-a4aa-808f22309143	Active	<a href="#">Edit</a>

At the bottom of the table, there is a pagination control showing '20 items per page' and '1 - 3 of 3 items'.

After determining the parameters in this section, when the date is equal to the set value, the system starts processing and forecasting the level of water input and output.

The screenshot shows the 'Tanks' management interface with an 'Edit' modal open. The modal contains the following fields and values:

Title	Guest Sample	Trainig Model	Tabriz Data Si
Start Date	2022-09-30		
Expire Date	2022-10-19		
Tank Radius	8	Pump Count	5
Pump Power (kw)	110	Pump Frequency (hz)	50
Forecast Time Frame(minute)	5	Forecast Steps	4
Desired Level(m)	7	Margin Level(m)	1
Activation	<input checked="" type="checkbox"/>		

At the bottom of the modal, there are 'Update' and 'Cancel' buttons.

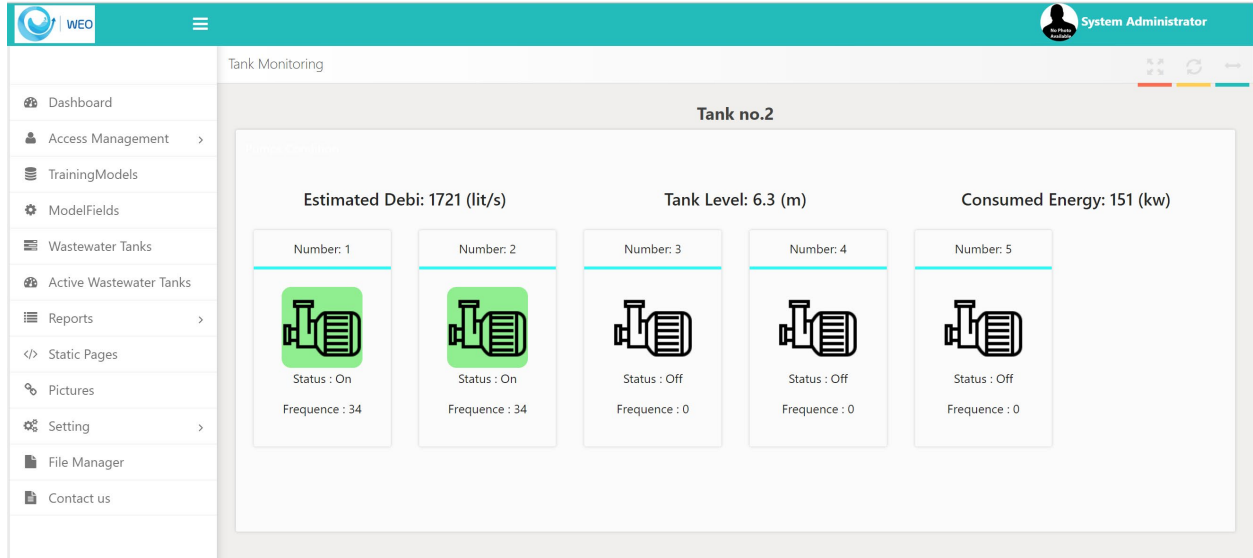
# Active Wastewater Tanks

Users will see active waste water tanks in Active Wastewater Tank. A unique ID is generated for each tank, and the actual water flow rate or the use of this ID is sent to the server through the web service so that the system can calculate the difference between the estimated and actual flow rate and, in case of a difference, make the necessary corrections.

The screenshot displays a web application interface for managing wastewater tanks. The top navigation bar is teal and contains the WEO logo, a menu icon, and the user profile 'System Administrator'. The left sidebar menu lists various system components: Dashboard, Access Management, TrainingModels, ModelFields, Wastewater Tanks, Active Wastewater Tanks, Reports, Static Pages, Pictures, Setting, File Manager, and Contact us. The main content area, titled 'Devices', shows three active wastewater tanks, each with a unique ID, start and end dates, and a pump count. Each tank card includes a 'View Tank Status' link.

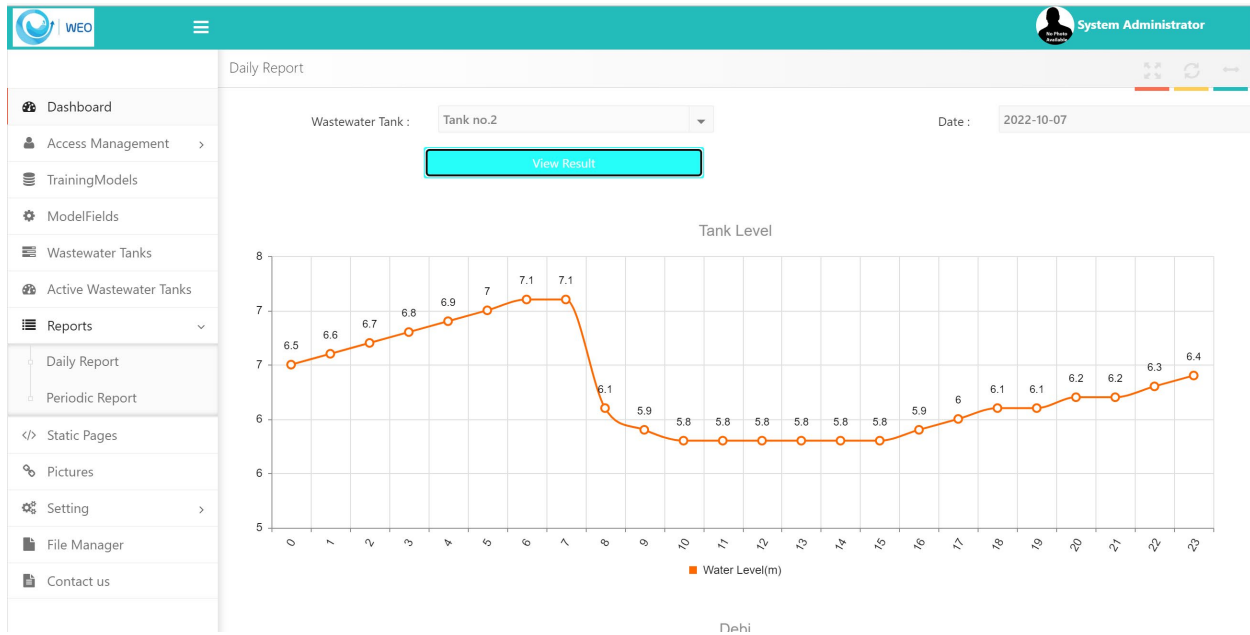
Device Name	UniqueID	StartDate	EndDate	Pump Count	Action
Guest Sample	b245a5c7-994e-4241-8407-c522ab6d5f5a	10/1/2022 12:00:00 AM	10/20/2022 12:00:00 AM	5	<a href="#">View Tank Status</a>
Tank no.2	8ea28606-c802-408b-9330-52b914df3b3a	9/30/2022 12:00:00 AM	10/30/2022 12:00:00 AM	5	<a href="#">View Tank Status</a>
Tank no.1	feaa67ac-e578-427c-a4aa-808f22309143	8/12/2022 12:00:00 AM	9/12/2022 12:00:00 AM	6	<a href="#">View Tank Status</a>

By clicking on each tank, the status of the pumps can be seen, for example, for tank number two, at this moment, the flow rate is 1869 liters per second and the water level is 6.2 meters. Out of 5 pumps, two pumps with frequency 37 are working to remove water from the tank.



# Report

Two reports are prepared in the Report menu. Daily Report You can see the report of each tank every day, you can see the water level, actual flow rate and predicted flow rate together, the total energy used per hour can be seen in three separate graphs.

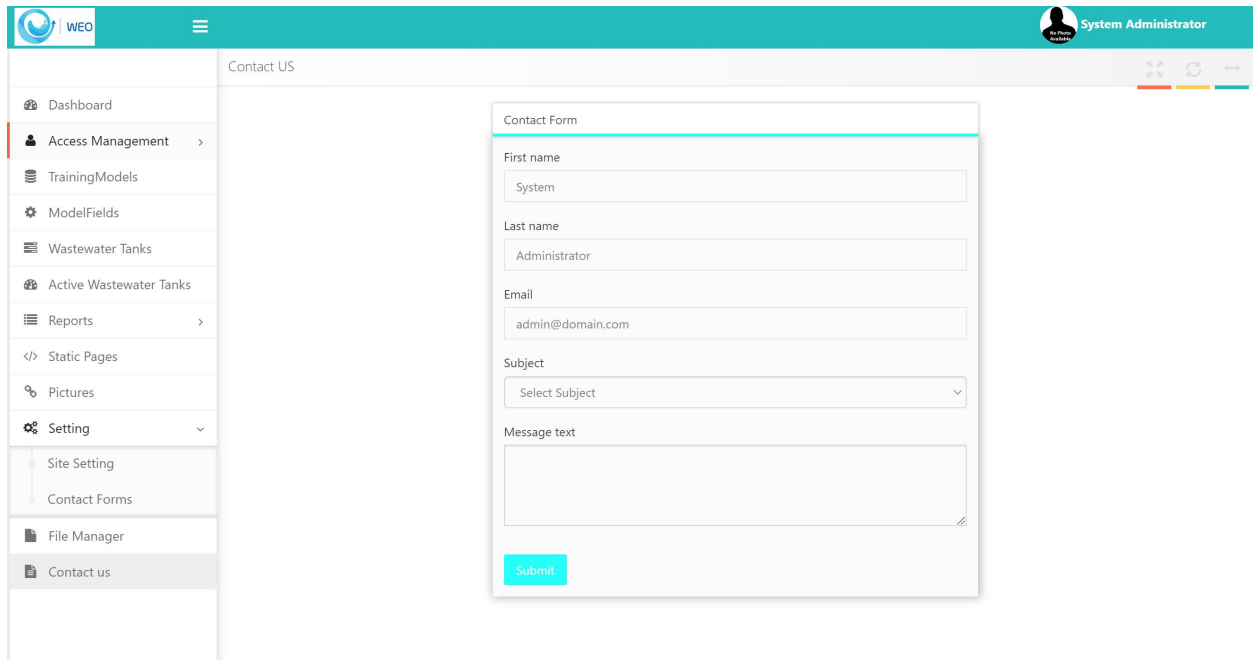


In the Periodic Report menu, the user can see all three charts above in the time period specified by the user.



# Contact us Menu

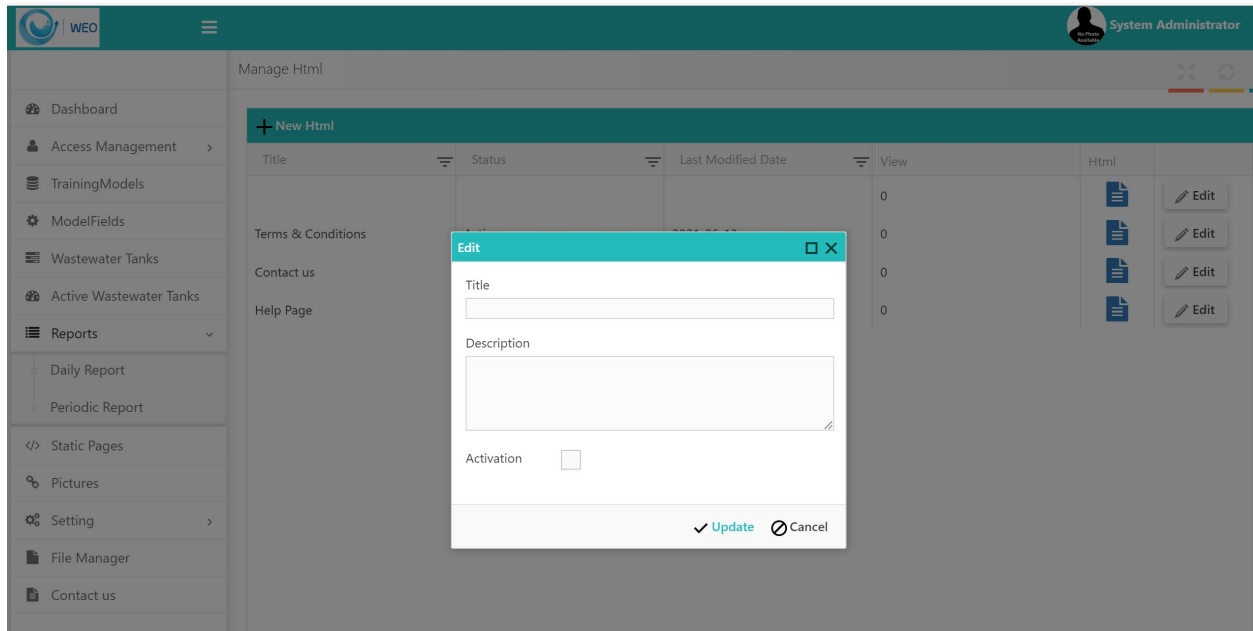
In the Contact us menu, the user will be able to communicate with the site management and inform the admin if they do not see any errors or bugs.



Other menus can be seen by the admin and will not be accessible to normal users.

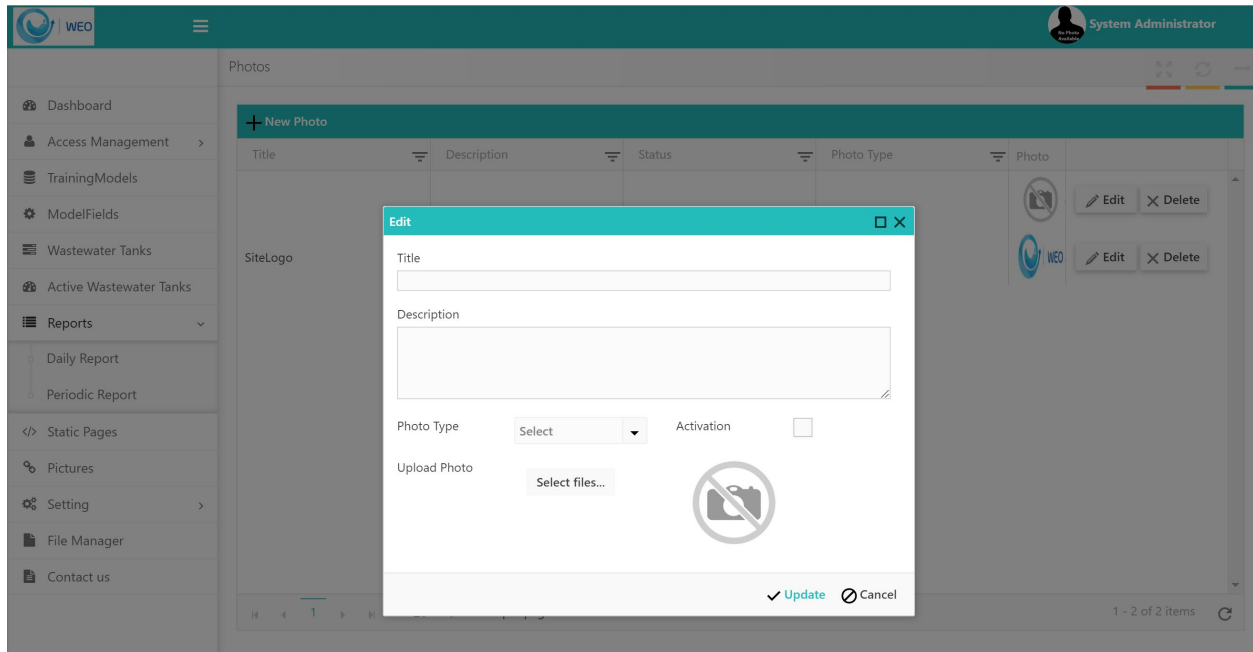
# Static page Menu

The static Page menu can be used to define pages that can be seen by the end user and must be set by the administrator, such as software usage criteria, user guides, and other items.



# Picture Menu

Project specifications and logo can be defined in the Picture menu



# Setting Menu

In the Setting menu and the Site Setting sub-menu, the settings related to the web service title and description and email address, password and host security settings can be defined.

The screenshot displays the 'System Setting' page in the WEO System Administrator interface. The page features a sidebar menu on the left with the following items: Dashboard, Access Management, TrainingModels, ModelFields, Wastewater Tanks, Active Wastewater Tanks, Reports, Static Pages, Pictures, Setting, Site Setting, Contact Forms, File Manager, and Contact us. The main content area is titled 'System Setting' and contains the following configuration fields:

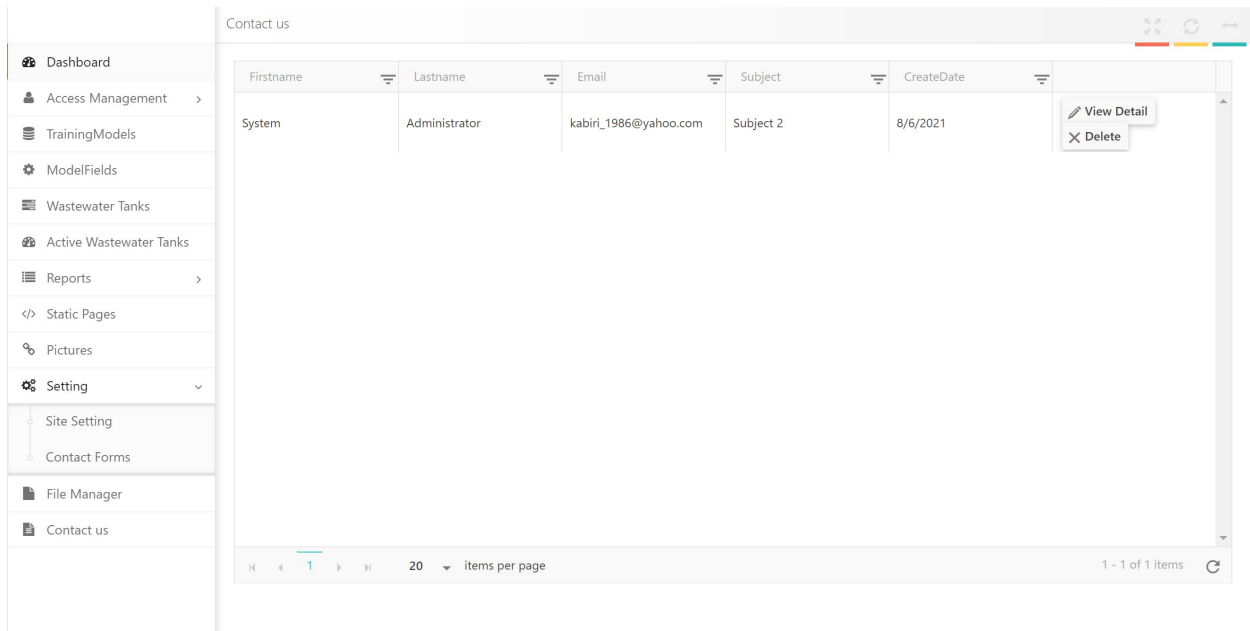
- Site Title: Wastewater Energy Optimaization
- Site Description: Wastewater Energy Optimaization
- Email server username: a.kabiri@tolue.com
- Email Server Password: .....
- Enable SSL for email?:
- Email Server Port: 25
- Email Server Host: mail.tolue.com
- Topics Contact Us Isolation with (+): Subject 1 + Subject 2 + Subject 3 + Subject 4

A blue 'Submit' button is located at the bottom right of the form.

Also, the default topics in Contact us can be improved in this section

# Contact Form Menu

Under the Contact Form menu, the admin can see the messages and forms sent by users.



The screenshot displays the 'Contact us' menu in an administrative interface. On the left is a sidebar with navigation options: Dashboard, Access Management, TrainingModels, ModelFields, Wastewater Tanks, Active Wastewater Tanks, Reports, Static Pages, Pictures, Setting (with a dropdown arrow), Site Setting, Contact Forms, File Manager, and Contact us. The main content area is titled 'Contact us' and contains a table with the following data:

Firstname	Lastname	Email	Subject	CreateDate	
System	Administrator	kabiri_1986@yahoo.com	Subject 2	8/6/2021	<a href="#">View Detail</a> <a href="#">Delete</a>

At the bottom of the table, there is a pagination control showing '20 items per page' and '1 - 1 of 1 items'.

# File Manager

In the File Manager menu, the admin can upload different files such as photos, PDFs, etc., and the link provided can be used in the site setting or static page menus.

