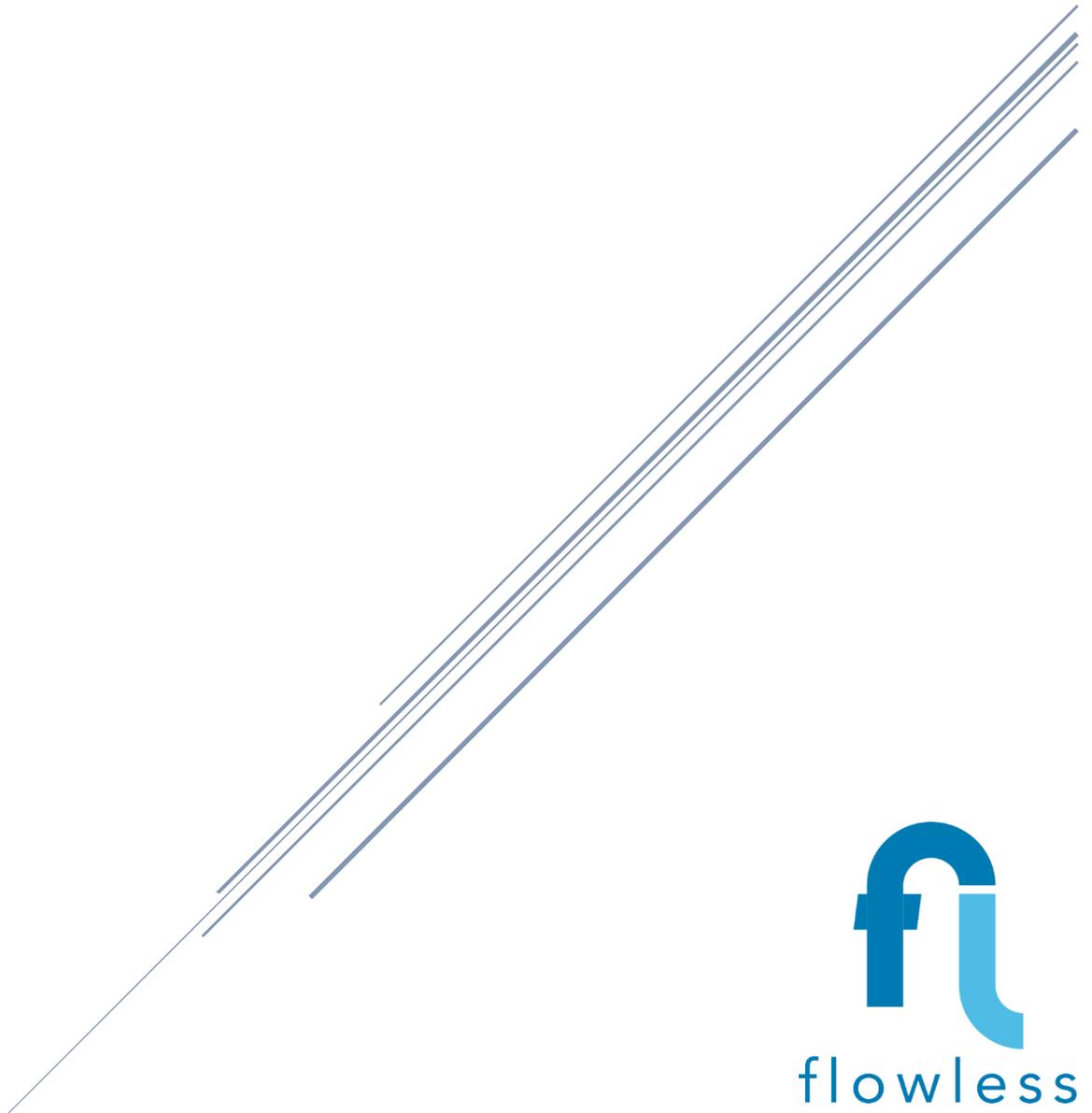


FLOWLESS WEB PLATFORM USER GUIDE



Sustainable Water Solutions



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1 Introduction

This document provides a detailed user guide for Flowless Web Platform. It provides step by step description of the wastewater flow monitoring platform designed and developed by Flowless. The information included in this manual are specific for the Transboundary Wastewater Monitoring project.

This project is implemented by Flowless Smart Water Solutions in partnership with UNDP and PWA. The project involves setting up a full comprehensive system to digitalize wastewater flow meters in six selected locations in the West Bank.

For any further comments or inquiries, please do not hesitate to reach out to Flowless team at info@flowless.co. Your inquiries are most welcomes and our team would be more than happy to provide the needed support.

2 System Description and Methodology

Flowless system utilizes IoT devices to collect real-time data about the water network, then analyzes the data through Flowless web platform to provide interpretations about water flow. Results are provided through Flowless web platform for regular remote monitoring.

FlowLess comprehensive system follows a unique approach to ensure full monitoring of the network and timely detection of incidents and events. The system is comprised of smart data transmitters to collect real-time data and a dedicated web platform specially designed and configured to provide automated analysis and interpretation of the received data. The following figure depicts Flowless system structure and components. More details on each component is provided in subsequent sub-sections.



Figure 1. Flowless Smart System Structure

2.1 Flowless data loggers and transmitters

FlowSmart data transmitter is specially designed to provides a reliable and flexible solution for real-time data collection in water and wastewater networks, covering wide range of parameters for flow and quality monitoring. It also provides the ability to control fittings and pumping devices. The following points summarize main features of this smart unit.

- Real-time monitoring and control
- High accuracy and interoperability
- Reliability and Robustness

- Regular updates and development

2.2 Flowless Data Analysis and Monitoring Software

Flowless web platform serves as the user interface utilized to monitor system variables and analysis results. The platform is unique in that it is accessible from any internet-connected device and specifically developed for the purpose of water networks monitoring and control. It is also user-friendly, where anybody without technical experience can easily access and interact with the analysis results. It is highly customizable and adaptable to meet the specific needs of utility companies and water service providers.

Flowless system has unique characteristics that make it stand out as a reliable, convenient and flexible system. The following points summarize main system features and advantages.

1. **Real-Time Data Collection and Analysis:** Data is collected frequently to provide continuous monitoring of the network status.
2. **Automatic Data Analysis:** data analysis is carried out automatically to keep track of any new incidents in the network. All analysis results are archived and stored for future reference
3. **Automated Alarm:** Alarm notifications are provided in for outliers in flow to help monitor unusual events.
4. **Statistics and Logs:** Statistics are provided for wastewater flow. Such information is readily available on request and is archived for future reference.
5. **Automatic Reporting:** Highly customizable reports are generated automatically with minimum human intervention to meet the user needs. Reports include daily, monthly, and annual flow tracking reports.
6. **System Flexibility:** The system is highly flexible and could be upgraded to monitor more network variables like quality monitoring, tank levels monitoring and control modules for valves and pumps.

3 Flowless Web Platform – General Description

The following points summarize main sections within the platform.

1. **Main Dashboard:** This is the main page in the web platform. Through this page, user can have an overview of the system components and main statistics. Detailed description is provided in subsequent sections.
2. **Reports Page:** This section provides flow reports and useful statistics on a daily, monthly and annual basis.
3. **Alerts:** This page provides information on recent alerts.
4. **Flow Meters:** Provides details on installed flow meters and their readings.

4 Main Sections

4.1 Main Dashboard

The main dashboard provides an overview of the system components and main statistics. It also provides links and handles to access different sections.

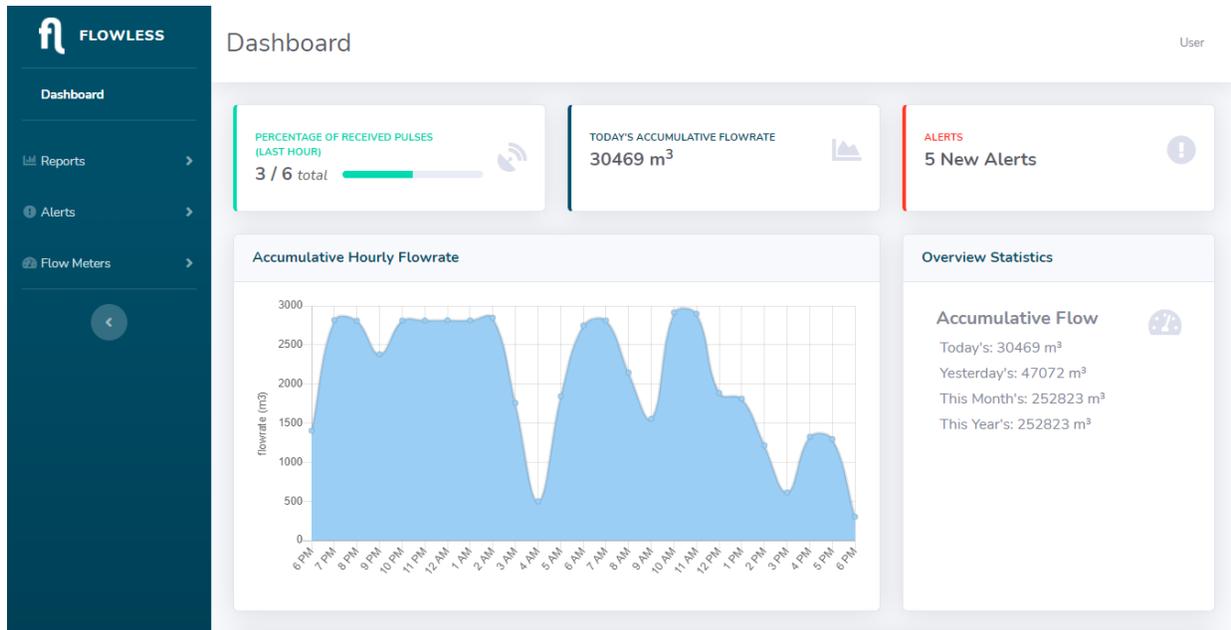


Figure 2. Flowless Main Dashboard

To the left of the main dashboard screen, a left-side pane enables users to navigate through the web platform sections. On the top of the dashboard, there are three cards that provide essential details on system status. This includes:

1. Signal Status: which provides information on available signal on daily basis, indicating which of the devices' signal is received on current day in terms of percentage.
2. Today's Flow: this card provides a quick overview of today's flow up until the current point of time.
3. Alerts: This card provides notifications for recent alerts. Clicking on this card redirects the user to tabulated data of alerts details.

A graph is provided in the middle of the main dashboard indicating the hourly accumulated wastewater flow for all meters for a period of 24 hours. This graph is automatically updated based on received data and flow calculations.

To the right of the graph, consumption statistics are shown, depicting main statistics for flow, including daily and monthly flow and average flow.

Below the accumulated flow graph lies another graph for hourly flow for each meter. User can toggle different views for various meters' flows on the graph by clicking on the corresponding meter icon on top of the graph. The following figure depicts this graph.

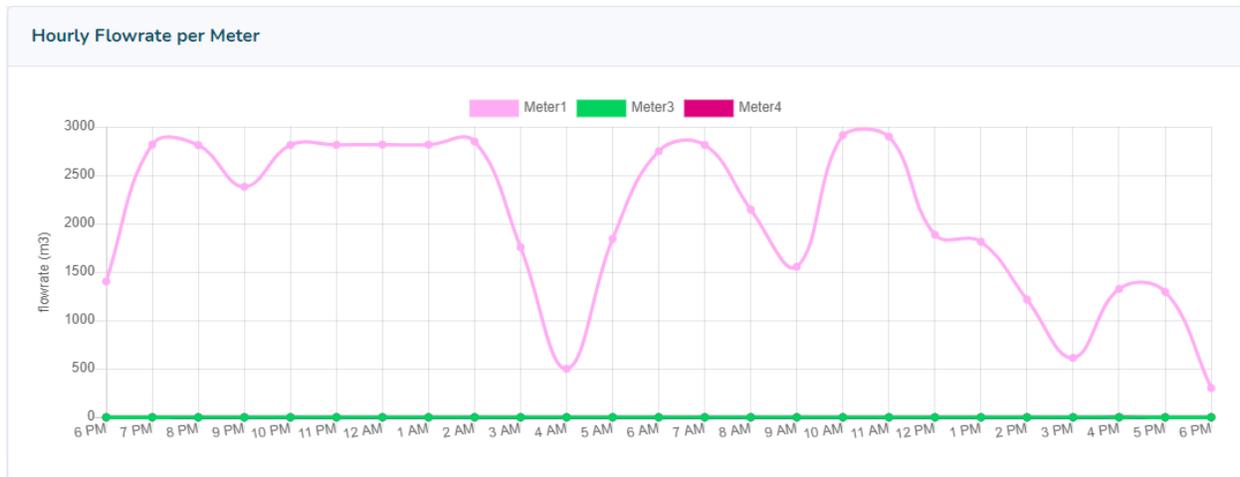


Figure 3. Graph Depicting Hourly Flow Rate Per Meter

Scrolling down further to the bottom of the main screen takes users to a map view of the installed meters. The map is adopted from Google Maps so it is navigated and controlled in the conventional way used in Google Maps.

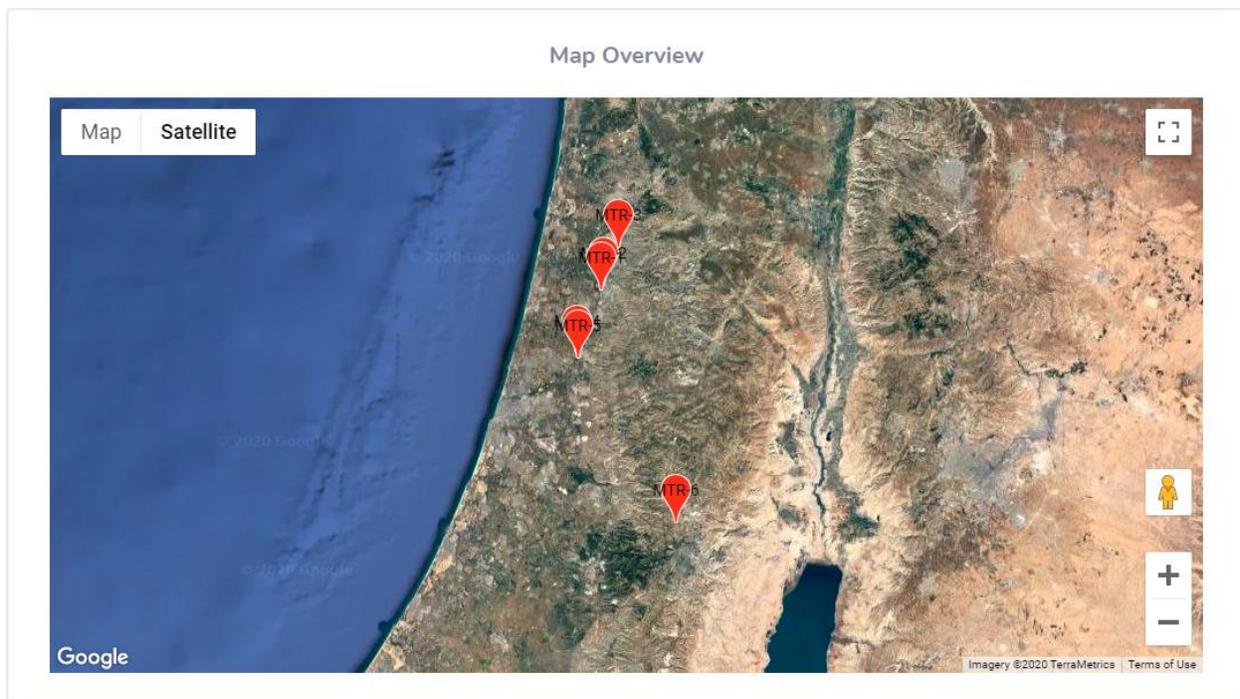


Figure 4. Map View of the Installed Meters

4.2 Reports Section

This section provides reports on flow and useful statistics on a daily, monthly, and annual basis. It is divided into three sub-sections:

- Daily reports: providing flow data interpretations on hourly basis for a selected time period

- Monthly reports: providing flow data interpretations on daily basis for a selected time period
- Annual reports: providing flow data interpretations on monthly basis for a selected time period
- The section is accessed through clicking on “Reports” in the left-side pane, then choosing between “Daily Reports”, “Monthly Reports”, or “Annual Reports”.

The figure below depicts daily reports page. In this page, users can access data analysis, interpretations and statistics for daily consumption. Users can select the date of the report, applying a filter for the data to be presented within the graphs in the report in tabulated form or in a time series graph.

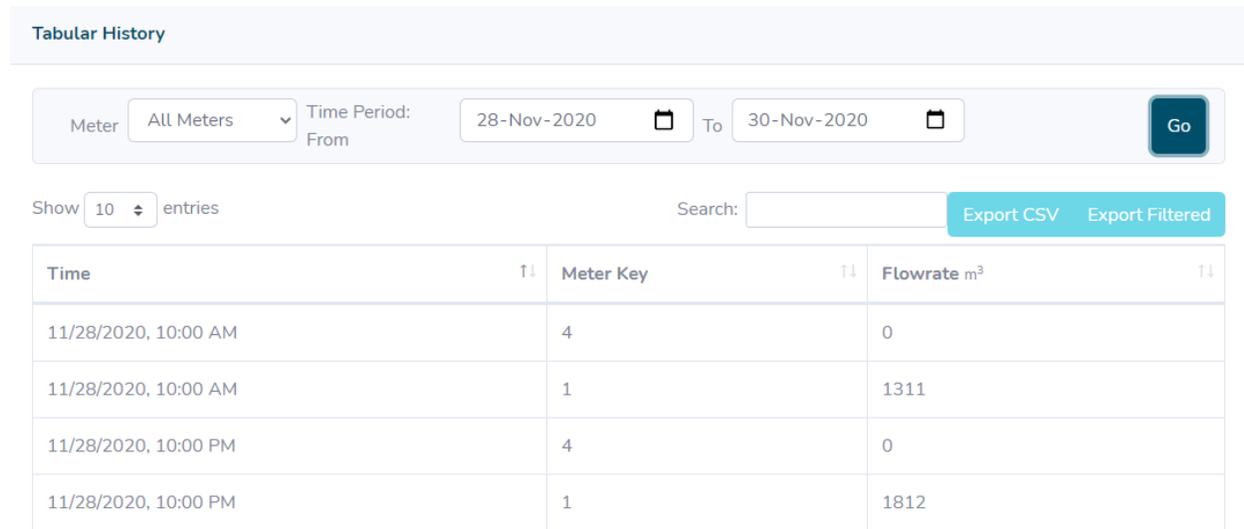


Figure 5. Daily reports – Tabulated View

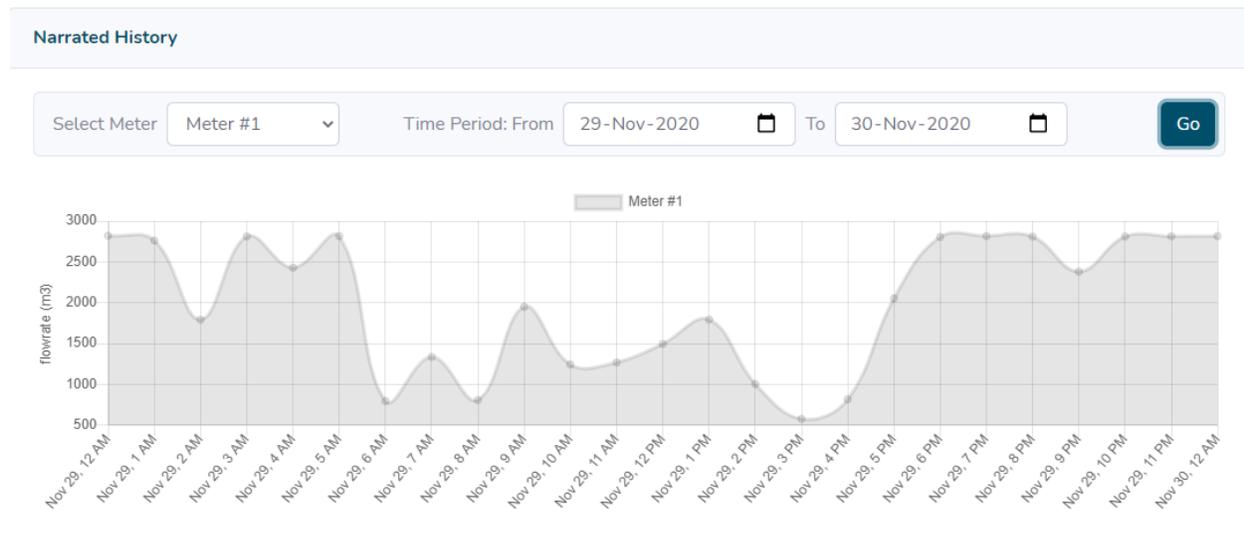


Figure 6. Daily reports – Graph View

4.3 Alerts Section

This section provides tabulated data on the outliers flow values based on preassigned thresholds. It is accessed by clicking on “Alerts” from the left side pane then choosing “Active Alerts”. The figure below

depicts demonstration of reported outliers. Alerts can be hidden by clicking on “Hide” next to each alert in the table.

Alerts							
Show <input type="text" value="10"/> entries		Search: <input type="text"/>					
Alert Key	Time	Code	Value Detected	Upper limit	Lower limit	Actions	
2	11/27/2020, 11:00 AM	Outlier	689	500	100	<input type="button" value="Hide"/>	
3	11/27/2020, 11:15 AM	Outlier	402	500	100	<input type="button" value="Hide"/>	
4	11/27/2020, 11:30 AM	Outlier	530	500	100	<input type="button" value="Hide"/>	

Figure 7. Active Alerts Section

The threshold flow values for alerts can be customized using the “Alerts Policy” section. The following figure depicts this section, where users can activate alerts for each meter by clicking on the check box near the meter name and setting the upper and lower thresholds.

Alert Policies				
Device	Active	Upper limit m ³ /h	Lower limit m ³ /h	Action
Meter #1	<input checked="" type="checkbox"/>	<input type="text" value="500.000"/>	<input type="text" value="100.000"/>	<input type="button" value="Save"/>
Meter #2	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="button" value="Save"/>
Meter #3	<input type="checkbox"/>	<input type="text"/>	<input type="text"/>	<input type="button" value="Save"/>

Figure 8. Alerts Policies Subsections

4.4 Flow Meters Section

This section provides tabulated data for wastewater flow meters. It is accessed by clicking on “Flow Meters” from the left side pane then selecting between three different sub sections; **Meters List, Latest Readings, and History.**

1. **Meters list:** This page provides a list of all the installed meters.
2. **Latest Readings:** This page is regularly updated with latest readings for each meter. It shows details on the latest reading, the previous reading and the flow amount between the two readings. The following figure depicts the table in which all data is organized within this sub section.

Latest Readings

Show entries Search:

Meter Key	Latest Reading Time	Latest Reading m ³	Previous Reading Time	Previous Reading m ³
1	11/30/2020, 10:15 PM	581034	11/30/2020, 10:00 PM	580332
3	11/30/2020, 10:15 PM	466155	11/30/2020, 10:00 PM	466155
4	11/30/2020, 10:15 PM	63990	11/30/2020, 10:00 PM	63990

Showing 1 to 3 of 3 entries Previous **1** Next

Figure 9. Latest Readings Table

3. History: Provides a record for historical readings of all meters as depicted in the figure below.

Tabular History

Time Period: From To Meter

Show entries Search:

Pulse Time	Meter Key	Reading m ³	Flowrate m ³
11/28/2020, 12:00 AM	1	457474.000	705
11/28/2020, 12:15 AM	1	458179.000	705
11/28/2020, 12:30 AM	1	458884.000	705
11/28/2020, 12:45 AM	1	459592.000	708
11/28/2020, 1:00 AM	1	460301.000	709
11/28/2020, 1:15 AM	1	461012.000	711
11/28/2020, 1:30 AM	1	461726.000	714

Figure 10. Meters Reading Historical Record – Tabulated Data

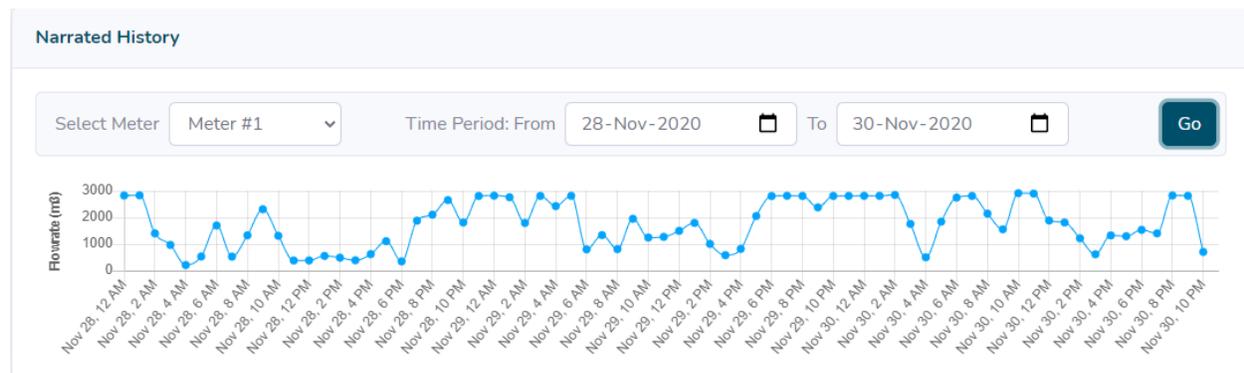


Figure 11. Meters Reading Historical Record – Graph View