

Ignition Living Lab: Dashboard Metadata

Data description

There are four research focus areas monitored within the Living Lab. These include energy, water, biodiversity and human interaction. The monitoring system combines various types of sensors for prospective information from the monitoring system. These include **heat performance measurements** of the green wall and green roof on Cockcroft building and Lady Hale building respectively, different **hydrologic parameters** such as water flow and water levels throughout the living lab, soil moisture for biodiversity measurements throughout the living lab, and **climate conditions parameters** for human interaction research. The data on the dashboard is divided according to location, field of research and type of sensors. These are highlighted in *Figure 1* below.

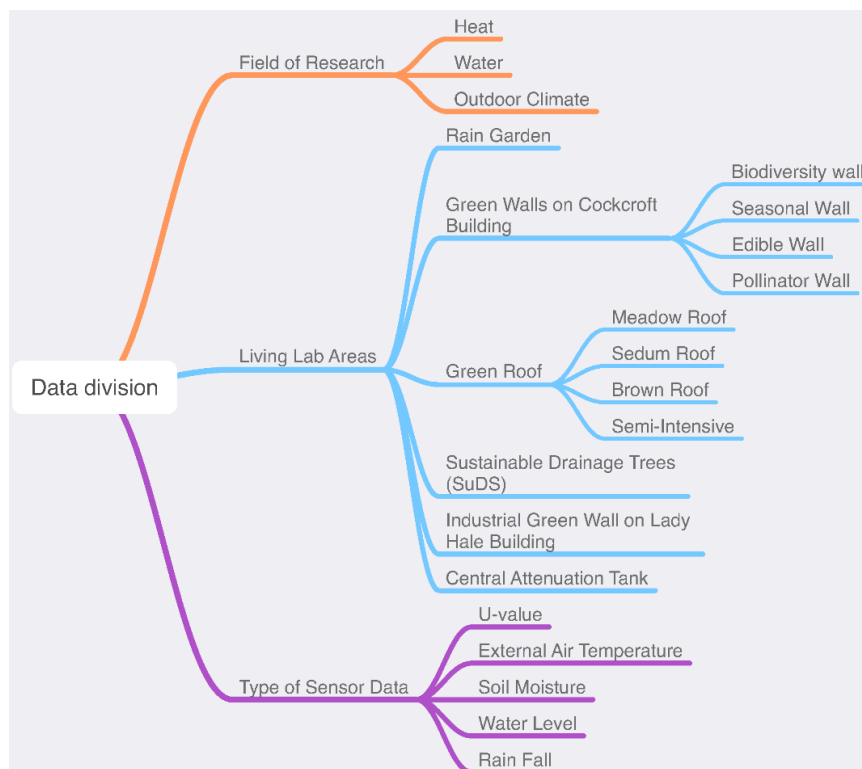


Figure 1 – Data divisions on the dashboard (data filters situated left of the data charting space)

Operational guide and access

The system outputs CSV files containing the collected data for the displayed period on the dashboard, and will follow the following format:

- Device Name
- Sensor Name
- Reading
- Location
- Datetime

The regular database exports to [GitHub](#) will be in database exports & incremental updates, as well as a full dump of the available data in CSV format. This is to prevent excessive load on the database & dashboard servers trying to retrieve and export all the available data on demand.

DATETIME	readingValue	unitName	sensorName	mUnitName
28/05/2021 01:57	58.6	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 01:58	58.7	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 01:59	58.6	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 02:00	58.6	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 02:01	58.6	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 02:02	58.5	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 02:03	58.5	Control Panel 4 PH1	Moisture Sensor 1	%
28/05/2021 02:04	58.6	Control Panel 4 PH1	Moisture Sensor 1	%

Date and time of data capture	Value / Data	Unit Name (reference to location in Living Lab)	Sensor Name (data collection point)	Measurement Unit
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Figure 2 - Sample of CSV file output with explanation of fields

CSV downloads can be accessed through the included 'Download' button that will be featured along the top navigation bar of the dashboard. An additional link to the [GitHub](#) repository containing the complete exports is also included alongside this button.

Data types and units

The data types, units and locations of sensors are identified in the below table. This corresponds to the data divisions on the platform in *Figure 1*.

Table 1 - Monitors Sensors List with link to monitoring system

Research Focus	Measures	Measured Indicators	Location	Measuring units
Outdoor Climate (Human Factors)	Measure and monitor conditions around the buildings.	Temperature / Heat	Outdoors on campus	t in C
		Wind speed and direction		m/s and direction (degree)
		Air quality (might be removed)		SO2, CO, NO2, Ground O3, PM2.5, PM10
		Solar exposure		W/m2
		Relative Humidity		rh in %
Fabric Monitoring (Heat)	Measure environmental conditions within buildings, energy consumption and fabric performance.	U-value	On both sides of building envelope (Lady hale roof and Cockcroft wall)	Wm2/K
		Thermography (Thermal effect on envelopes)		t in C
		Air temperature (internal and external)		t in C
		Relative Humidity	Internal	rh in %
		CO2 levels		CO2
		Energy consumption		kWh
Water Monitoring (Hydrology)	Monitoring stations for water quality	Rainfall	Outdoors	mm
	SEL irrigation control units	Water flow rate		l/s (l/m).
		Water level		mm
		Soil moisture		%

Sensors locations

Fabric Monitoring (Energy)

The heatflux sensors are placed on the interior wall of Cockcroft and the roof of Lady Hale and are clustered into zones of two plates per zone.

Green Wall: The green wall has flux monitoring for three of its four sections with these being edible, seasonal, and biodiversity. Monitoring of the pollinator wall proved difficult due to the position of the wall in front of a tiled room that's difficult to install sensors in.

Green Roof: The green roof also has flux monitoring for three of its four sections with these being sedum, meadow, and brown. Sensor were designed and laid out to monitor all four areas but due to last minute design changes the sensors intended for the semi-intensive area were covered with additional meadow matting instead.

Hydrology/Water Monitoring

All living lab interventions have their own sensor system connected to the central monitoring platform. The water monitoring is done through water flow, water level and soil moisture sensors. The abundance and locations differ from one part to another according to the design and need for data.

Raingarden: sensors deployed in the rain garden measure water flow, water level and soil moisture.

Street trees: sensors deployed in the trees measure water flow, water level and soil moisture.

Green wall: sensors deployed in the green wall measure only water flow and soil moisture as these are the measurands relevant to green walls.

Attenuation Tank: sensors deployed in the tank measure only water flow and water levels as these are the measurands relevant to the tank performance.

Green Roof: sensors deployed in the green wall measure only water flow and soil moisture as these are the measurands relevant to green walls.

Outdoor Climate Monitoring

The weather station is deployed centrally to track localised rainfall on the green infrastructure.

Contact

This data is property of the IGNITION Living Lab. For further details or data access inquiries, please email UoS-IgnitionLL@salford.ac.uk

More information on IGNITION Living Lab and IGNITION Project can be found through these links:

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