

Environment Data API Documentation

Ver 2.1

1	Introduction.....	1
	Useful URLs	2
2	API Overview	3
	Accessing the API	4
	What data is provided?	5
3	Calling the API.....	7
	ApiLogin Methods	9
	TimeSeries Methods	11
	Three Day Flood Forecast Methods.....	16
4	Glossary of Terms	19
	TimeSeriesStation	19
	TimeSeriesGauge	20
	Unit Data	21
5	References.....	22

1 Introduction

The following document provides an explanation of how to access the environmental data available

through the Shoothill Environment Data API.

The environment data API is a ReST ful API using JSON for data serialization.

Useful URLs

The Environment Data API is available at the following URL:

<http://riverlevelsapi.shoothill.com/>

Additional help, including detailed method and property descriptions and sample response formats are all available at the following URL:

<http://riverlevelsapi.shoothill.com/help>

2 API Overview

The API has three main method groups that return the following data:

- APILogin methods - Login is the first step using any of the API methods and is responsible for generating an authentication ticket which is required to use any other API methods.
- Time Series methods – these method groups return a specified value and the time at which this value occurred. At present the following types are supported.
 - River Levels
 - River Downstream Levels
 - Tidal River Levels
 - Borehole Levels
 - River Flow Values
- Three Day Flood forecast methods – supplies the Environment Agency Three day flood forecast as issued by the Environment Agency.

Accessing the API

The Environment Agency Data API is an authenticated API.

The API Login methods are used to generate an authentication token which must be supplied in the header of any subsequent requests. To login to the API you will need an API Key which can be obtained by filling in the form at the Signup URL

Sign Up URL

<http://www.shoothill.com/environment-agency-liveapi/environmental-data-api/>

When you sign up for the API, you will be supplied with a unique registered API Key and the number of the API version that you are authorised to use.

What data is provided?

The API currently provides Time Series Data and Three day flood forecast data.

Time series data is any data that has a discrete value at a specific time. The three day flood forecast data supplies the Environment Agency's flood forecast for the next 3 days.

Time Series Data Overview

The Time Series Data is organised as follows:

TimeSeriesStation – this object contains geographical data about the station and also past statistics about the station where these are available.

A TimeSeriesStation can have one or more gauges located at that station.

E.g. A station may have a River Level and River Flow gauge, hence each TimeSeriesStation object contains an array of TimeSeriesGauges located at that Station.

TimeSeriesGauge – represents a single gauge reading a specific DataType that is located at a TimeSeriesStation.

DataTypes – an integer representing specific types of data. Each TimeSeriesGauge may be of one specific type. At present the supported types are:

- 3 EA River Levels
- 4 EA Tidal River Levels
- 7 EA Borehole Data
- 12 EA Flow monitoring abstraction
- 13 EA Flow Item 1
- 14 EA Flow Item 2
- 15 EA Flow Logged
- 16 EA Flow Speed
- 17 EA Flow Stage
- 18 EA Flow Water
- 27 EA Water Level Down Stream

For a member by member description of the TimeSeriesStation and TimeSeriesGauge classes and the full datatype list please see the following Help URLs:

Member	Help Page
TimeSeriesStation	http://riverlevelsapi.shoothill.com/Help/Api/GET-TimeSeries-GetTimeSeriesStations
TimeSeriesGauge	http://riverlevelsapi.shoothill.com/Help/ResourceModel?modelName=TimeSeriesGauge
DataTypes	http://riverlevelsapi.shoothill.com/Help/ResourceModel?modelName=GeoEntityDataTypes

Three Day Flood Forecast overview

The Three Day Flood Forecasts data provides access to the Environment Agency Flood Forecasts.

The forecast provides summary strings in English and Welsh for the following:-

- Country Wide
- Region Wide
- Risk Type level

The Three Day Flood Forecast is published once a day.

All functions of the API return a [ThreeDayFloodForecast](#) object.

This consists of two objects

- [ThreeDayFloodForecastSummary](#)
- [ThreeDayFloodForecastDay](#)

Note: The [ThreeDayFloodForecastSummary](#) object contains images for each day. These are passed as base64 encoded strings.

3 Calling the API

The documentation below sets out how the API should be called and gives a brief explanation of what the methods do.

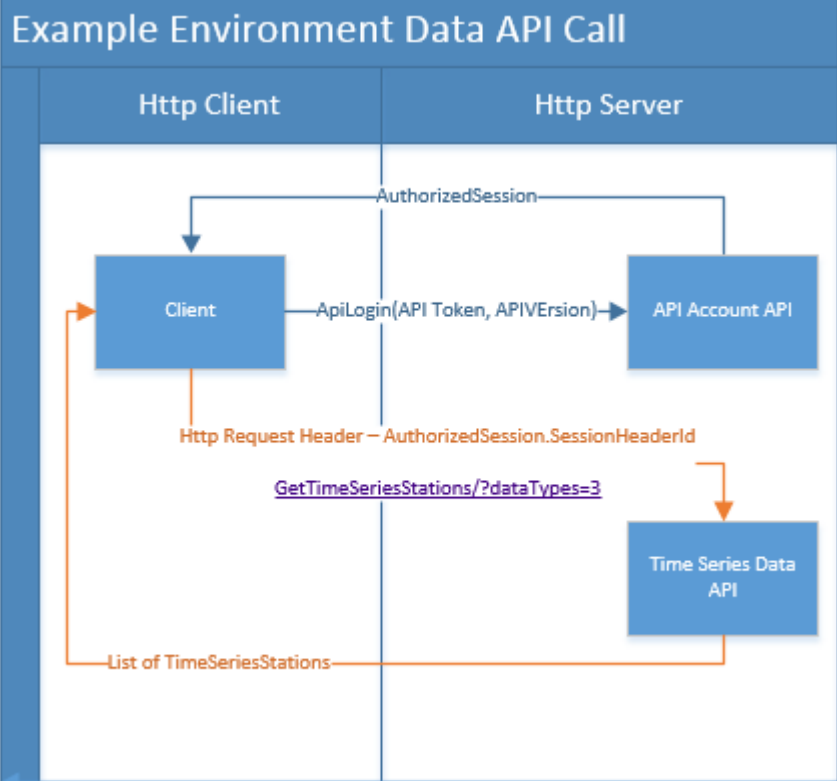
The following API Calls will return a JSON encoded string. Further details on JSON serialization and programming language support can be found at json.org [3]

Further help on the API calls and request and response data structures can be found at: <http://riverlevelsapi.shoothill.com/help>

The examples in this section are written in C#, but will hopefully prove useful to developers using other languages.

Each described method contains a link to the appropriate online help page. This page contains a sample of the request and response formats.

Each function call requires the "SessionHeaderId" Http Request Header to be present with a valid authentication token, obtained from the API Account Login method.



In the above example:-

- The client initially calls the API function ApiLogin, supplying a valid API Key and API version number.
- An AuthorizedSession object is returned containing the “SessionHeaderId” value and other details about the authenticated user.
- The call to ApiLogin only needs to be made once as the “SessionHeaderId” does not expire.
- The client can then call any data methods provided the “SessionHeaderId” value is set in the HTTP Request Header.
- The image shows a call to the GetTimeSeriesStations method on the Time Series Data API, requesting stations for the river level type stations.

ApiLogin Methods

The Api Login methods are used to generate a valid Authentication token to be used in the HTTP Request Headers to make subsequent calls to other data methods.

The ApiLogin currently has one function call APILogin.

API Login

APILogin is used to generate a "SessionHeaderId" for the client to use on subsequent calls to the Time Series Data API or Three Day Flood Forecast API.

The method is called by posting a JSON encoded string containing the API key and the API version. The exact format of this request can be found at the Help URL below.

NOTE: The current version of the API is 2, this should be used for the 'YourApiVersion' value.

URL	http://riverlevelsapi.shoothill.com/ApiAccount/ApiLogin
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/POST-ApiAccount-ApiLogin
Method type	HTTP POST

In this example we are generating and storing the "SessionHeaderId" value by calling APILogin, where the 'YourApiVersion' should be set to the current API version (currently 2).

```
string SessionHeaderId = string.Empty;

using (WebClient wc = new WebClient())
{
    wc.Headers[HttpRequestHeader.ContentType] = "application/json";
    string uri = "http://riverlevelsapi.shoothill.com/ApiAccount/ApiLogin";
    string data = "{\"PublicApiKey\":\"yourRegisteredApiKey\", \"ApiVersion\":\"YourApiVersion\"}";
    string result = wc.UploadString(uri, data);
    dynamic authorizedSession = JsonConvert.DeserializeObject<dynamic>(result);
    SessionHeaderId = authorizedSession.SessionHeaderId;
}
```

The [AuthorizedSession](#) object returned from the call's response, is in the format

```
Sample Login Call Response:
{
  "Id": 1,
  "PublicKeyApild": 2,
  "SessionHeaderId": "sample string 3",
  "PublicApiKey": "sample string 4",
  "CreationDateTime": "2014-12-12T09:44:25.5762302+00:00",
  "LastActivityDateTime": "2014-12-12T09:44:25.5762302+00:00",
  "DataSetCollectionItems": [ 1, 2 ]
}
```

The "SessionHeaderId" response parameter will be required to be used in the rest of the API examples.

Session Header key points

- The “SessionHeaderId” authentication token needs to be obtained by using the ApiLogin method on the LoginAccount API, with the supplied API Key and API version number.
- The authentication token needs to be sent as a HTTP request header on each call to any of the data methods.
- The authentication token HTTP request header name is “SessionHeaderId”
- The “SessionHeaderId” authentication token is validated by the server on each API call request.
- The “SessionHeaderId” authentication token never expires.

TimeSeries Methods

The Time Series data is a numeric value that occurred at a specific point in time. The supported dataTypes are described in section [Accessing the API](#)

The Environment Agency Data API is an authenticated API.

The API Login methods are used to generate an authentication token which must be supplied in the header of any subsequent requests. To login to the API you will need an API Key which can be obtained by filling in the form at the Signup URL

Sign Up URL

<http://www.shoothill.com/environment-agency-liveapi/environmental-data-api/>

When you sign up for the API, you will be supplied with a unique registered API Key and the number of the API version that you are authorised to use.

A Time Series Station can have one or more Time Series Gauges associated with it.

For example, a Time Series Station may contain:

- a river level gauge and a downstream gauge (e.g. station MapleDurham Lock)
- a river level gauge and a flow gauge (e.g. Station Chester Suspension Bridge)
- Only have a river level gauge (e.g. Bridgnorth).

GetTimeSeriesStations

Retrieves a list of all [TimeSeriesStation](#) by time series gauge type. This method must be called with one or more dataTypes.

The TimeSeriesStation object contains a number of parameters which exist on all Gauge types and an AdditionalDataObject which contains data pertinent to that type of gauge.

A station can have multiple gauges associated with it.

It may be useful retrieve groups of Time Series Gauge types together.

For example:

River Levels might be grouped by

- 3 EA River Levels
- 4 EA Tidal River Levels
- 27 EA Water Level Down Stream

Whereas Water Flow encompasses the following combined types:

- 12 EA Flow monitoring abstraction
- 13 EA Flow Item 1
- 14 EA Flow Item 2
- 15 EA Flow Logged
- 16 EA Flow Speed
- 17 EA Flow Stage
- 18 EA Flow Water

URL	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStations
Example	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStations?dataTypes=3
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-TimeSeries-GetTimeSeriesStations

NB All examples use a valid "SessionHeaderId" which is generated by the APILogin method from the previous section. Notice the SessionHeaderId is added to the Http Request Header collection in the following line:

```
wc.Headers["SessionHeaderId"] = SessionHeaderId;
```

In this example we are retrieving EA River Level stations only.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    string result =
    wc.DownloadString("http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStations?dataTypes=3");
    //Each TimeSeriesStation object in the result contains a list of its gauges.
}
```

In this example we are retrieving EA Borehole Data stations only.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    string result =
    wc.DownloadString("http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStations?dataTypes=7");
    //Each TimeSeriesStation object in the result contains a list of its gauges.
}
```

In this example we are retrieving multiple EA Flow DataTypes.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    string result =
    wc.DownloadString("http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStations?dataTypes=12&dataTypes=13&dataTypes=14&dataTypes=15&dataTypes=16&dataTypes=17&dataTypes=18");
    //Each TimeSeriesStation object in the result contains a list of its gauges.
}
```

GetTimeSeriesDataPoints

Retrieves the telemetry data for a given number of days a given Time Series Station and a given datatype.

The method returns details about the Time Series Gauge with a list of recorded values for the time period.

URL	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesDataPoints
Example	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesRecentDatapoints?stationId=1&dataType=3&numberDays=5
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-TimeSeries-GetTimeSeriesRecentDatapoints_stationId_dataType_numberDays
Method type	HTTP GET

The example use the “SessionHeaderId” from the previous Login example Here it is added to the Http Request Header.

Typically data is sampled every fifteen minutes and collected from a stations once or twice a day to minimise the data transfer costs. At some sites data may be collected more frequently.

More details can be found in the [\[1\]](#)

The below call will retrieve the last 5 days of data for the time series station with Id 1 and dataType of 3.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string result =
        wc.DownloadString("http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesRecentDatapoints/?stationId=1&dataType=3&numberDays=5");
}
```

GetTimeSeriesDataPointsDateTime

Retrieves the telemetry data for a period for stations of the given dataTypes.

The method returns details about the Time Series Gauge with a list of recorded values for the time period.

URL	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesDataPointsDateTime
Example	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesDatapointsDateTime?stationId=1&dataType=3&endTime=2014-12-09T09:51:06Z&startTime=2014-12-12T09:51:06Z
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-TimeSeries-GetTimeSeriesDatapointsDateTime_stationId_dataType_endTime_startTime
Method type	HTTP GET

The example use the “SessionHeaderId” from the previous Login example Here it is added to the Http Request Header.

The below call will retrieve a date range for the station with Id 1 and dataType of 3.

Note dates are in UTC format.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string url =
        "http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesDatapointsDateTime/?stationId=1&data
Type=3&endTime=2014-12-09T09:51:06Z&startTime=2014-12-12T09:51:06Z";
    string result = wc.DownloadString(url);
}
```

GetTimeSeriesStationById

Gets the Time Series Station information and a list of its Time Series Gauges.

URL	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStationById
Example	http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStationById/?stationId=37
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-TimeSeries-GetTimeSeriesStationById_stationId
Method Type	HTTP GET

The example use the “SessionHeaderId” from the previous Login example Here it is added to the Http Request Header.

The below call will retrieve the details for the station with Id 37.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string url =
        "http://riverlevelsapi.shoothill.com/TimeSeries/GetTimeSeriesStationById/?stationId=37";
    string result = wc.DownloadString(url);
}
```

GetNearestTimeSeriesStations

Get the nearest TimeSeries stations to the specified latitude and longitude values that are of a given datatype from datatypes.

URL	http://riverlevelsapi.shoothill.com/TimeSeries/GetNearestTimeSeriesStations
Example	http://riverlevelsapi.shoothill.com/TimeSeries/GetNearestTimeSeriesStations?latitude=52.7098&longitude=-2.75807&count=5&dataType=3&dataTypes=4
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-TimeSeries-GetNearestTimeSeriesStations_latitude_longitude_count
Method type	HTTP GET

The example use the “SessionHeaderId” from the previous Login example Here it is added to the Http Request Header.

The below call will search for five stations of type 3 and 4 that are nearest to the location (52.7098, -2.75807).

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string url =
        "http://riverlevelsapi.shoothill.com/TimeSeries/GetNearestTimeSeriesStations/?latitude=52.7098&lon
        gitude=-2.75807&count=5&dataTypes=3&dataTypes=4";
    string result = wc.DownloadString(url);
}
```


Three Day Flood Forecast Methods

The Three day flood forecast data supplies the Flood Forecast from the Environment Agency.

The Three day flood forecast is issued once a day.

GetCurrentForecast

Gets the current Three Day Flood Forecast for the entire country.

URL	http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecast
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-ThreeDayFloodForecast-GetCurrentForecast
Method type	HTTP GET

The example use the “SessionHeaderId” from the previous Login example here it is added to the Http Request Header.

The following example shows how to call the Current Three Day Flood Forecast

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string url =
        "http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecast";
    string result = wc.DownloadString(url);
}
```

GetCurrentForecastByRiskTypes

Allows the flood forecasts to be queries by specific Risk Type.

URL	http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecastByRiskTypes
Example	http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecastByRiskTypes?riskList=1&riskList=2
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-ThreeDayFloodForecast-GetCurrentForecastByRiskTypes
Method Type	HTTP GET

The following are the Risk Types Values:

- 0 – High Risk
- 1 – Medium Risk
- 2 – Low Risk
- 3 – Very Low Risk

The example use the “SessionHeaderId” from the previous Login example Here it is added to the Http Request Header.

The following example retrieves the Three Day Flood Forecast for Medium and low Risk only.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string url =
        "http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecastByRiskTypes?riskList=1
&riskList=2";
    string result = wc.DownloadString(url);
}
```

GetCurrentForecastByRegions

Allows flood forecasts to be retrieved by Region List.

URL	http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecastByRegions
Example	http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecastByRegions?regions=Anglian&regions=Midlands&regions=Northeast
Help URL	http://riverlevelsapi.shoothill.com/Help/Api/GET-ThreeDayFloodForecast-GetCurrentForecastByRegions
Method type	HTTP GET

Full region list:

- Anglian
- Midlands
- Northeast
- Northwest
- Southeast
- Southwest
- Wales

The example use the “SessionHeaderId” from the previous Login example Here it is added to the Http Request Header.

The following example gets the Three Day Flood Forecast for Anglian, Midlands and the Northeast regions.

```
using (WebClient wc = new WebClient())
{
    wc.Headers["SessionHeaderId"] = SessionHeaderId;
    wc.Headers[HttpRequestHeader.Accept] = "application/json";
    string url =
        "http://riverlevelsapi.shoothill.com/ThreeDayFloodForecast/GetCurrentForecastByRegions?regions=Anglian&regions=Midlands&regions=Northeast";
    string result = wc.DownloadString(url);
}
```

4 Glossary of Terms

Each TimeSeriesStation and TimeSeriesGauge contains an AdditionalDataObject that may contain further information about the station or gauge. Not all Datatypes have additional data.

TimeSeriesStation

This section defines the possible fields in the AdditionalDataObject for the TimeSeriesStation Object.

Note: Not all stations have values for these properties where no value is available the property is not returned.

Property	Description
CatchmentName	For river and downstream level sites is the catchment the station is within. For tidal levels, a suitable catchment area is assigned by the EA.
Elevation	Elevation above sea level This is not supported and may disappear at any time.
Id	Placeholder item. This is unsupported and may disappear at any time.
Ordinal	This is not supported and may disappear at any time.
Region	Agency region
RiverGroupingId	Only used where there is more than one river with the same name. This is not supported and may disappear at any time.
RiverGroupingName	For river, downstream and tidal levels, the name of the river the station is on. Only used when there is more than one river with the same name. This is not supported and may disappear at any time.
RiverName	For river, downstream and tidal levels, the name the of the river the station is on
StationReference	This is a regionally unique reference for the station using a combination on numbers and letters.
StationType	S – Indicates the time series station has either one river level gauge or indicates that the EA does not display the downstream gauge. M – Indicates the station has both river level and downstream gauges. C – Indicates the station is either a coastal site or has a large tidal influence.
SiteId	Unique four figure Id. South East 1 or 7 (Southern and Thames merged in 2011) Midlands 2, South West 3, Wales 4, North West 5, Anglian 6, North East 8
DateOpen	The date the station was opened or started operating
Stage Datum	If known, it is the mAOD value for the station

TimeSeriesGauge

This section defines the possible fields in the AdditionalDataObject for TimeSeriesGauges.

Note: Not all gauges support all these properties where no value is available the property is not returned.

Property	Description
Id	This is unsupported and may disappear at any time.
PORMax	For River and Downstream Level sites input the maximum recorded level for the available period of record (after post processing). For tidal sites input the Highest Astronomical Tide level (HAT) in mAOD for the site.
DatePORMax	The date and time the PORMax level was recorded for River and Downstream Level sites. Tidal sites are left blank
PORMin	For River and Downstream Level sites input the minimum recorded level for the available period of record (after post processing). For tidal sites input the Highest Astronomical Tide level (HAT) in mAOD for the site.
DatePORMin	The date and time the PORMin level was recorded for River Level and Downstream sites. Tidal sites are left blank
Percentile95	Calculated value that is exceeded 95% of the time, over a usable quality controlled period. This figure is used to produce the bottom of the 'Typical Range' hydrograph
Percentile5	Calculated value that is exceeded 5% of the time, over a usable quality controlled period. This figure is used to produce the top of the 'Typical Range' hydrograph.
RecentHighest	The maximum record level in the past 5 years. This is different than PORMax and represents the highest level people are more likely to have memory of. There are cases where the data shows RecentHighest and DateHighest that is not within the last five years. This applies to stations where the Recent Highest was recorded prior to 01/01/2005
DateHighest	The date and time the RecentHighest level was recorded for River Level and Downstream sites.
PostProcessValue	This needs to be subtracted from the gauges incoming data values, if post processing is needed. This value may be negative for sites below sea level.
Stage Datum	If known, it is the mAOD value for the gauge.

Unit Data

Here is an explanation of the units returned in the telemetry data.

Unit	Description	Applies to DataTypes
Ls	Volume. Litres a second	EAFLOWStage
m	Height. metres	EARiverLevelGauge, EATidalLevelGauge, EABoreholeData, EAWaterLevelDownstreamStage
m3s	Volume. Cubic meters a second	EAFLOWAbstraction, EAFLOWItem1, EAFLOWItem2, EAFLOWLogged, EAFLOWStage, EAFLOWWater
mAOD	Height. Metres above Ordinance Datum. Based on the mean sea level at Newlyn Cornwall.	EARiverLevelGauge, EATidalLevelGauge, EABoreholeData, EAWaterLevelDownstreamStage
mASD	Metres above Stage Datum	EARiverLevelGauge, EAWaterLevelDownstreamStage
mBDAT	Height. Metres below measurement datum	EABoreholeData
Mld	Volume. Million Litres a day	EAFLOWAbstraction, EAFLOWSpeed
mm	Height. millimetres	EARiverLevelGauge

5 References

[1] Hydrometric data feed User Manual

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/280938/Hydrometric_data_feed_User_Manual_v1.0.pdf

[2] Shoothill River Levels and 3-Day Flood Forecast APIs

<http://riverlevelsapi.shoothill.com/help>

[3] JSON

<http://www.json.org/>