

Worked Examples

Overview

The following worked examples show the url requests and illustrate some of the interpretation of the data. The url's should be entered (copied) into a web browser and a text response will be displayed. These examples do not describe how to get this data into spreadsheet programmes or analysis packages, or how to script and automate the processes, but all of these are possible using features of spreadsheet programmes such as Excel (Power Query) or scripting languages such as R or Python.

The examples cover the basic operations, for more detailed information, and descriptions of additional requests and options please refer to the Hilltop Server documentation.

Water Quality Data

Query the Sites metadata service to identify a Water Quality Site.

Navigate to LAWAMonitoringSitesReferenceData on the Hawke's Bay Open Data portal (<https://opendata-hbrc.opendata.arcgis.com/>), select the data tab and then download.

Open the download in your spreadsheet program.

Enable filters on all of the columns and then filter the SWQuality column for 'Yes'.

The CouncilID column shows the site names that have Surface Water Quality data available.

Check what measurements are available for the site

Using the site Tukituki River at Black Bridge as an example.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Tukituki River at Black Bridge](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Tukituki%20River%20at%20Black%20Bridge)

See section "Useful Information from a Measurement List Request" below for more information about this output.

Obtain the last result data for a water quality measurement

Using E. Coli as a measurement we want to get data for.

[https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site=Tukituki River at Black Bridge&Measurement=E. Coli](https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site=Tukituki%20River%20at%20Black%20Bridge&Measurement=E.%20Coli)

Obtain results for a water quality measurement

The previous request just returned the last result that was obtained, to get more add a From date, a To date can be added too.

[https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site=Tukituki River at Black Bridge&Measurement=E. Coli&From=1/10/16](https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site=Tukituki%20River%20at%20Black%20Bridge&Measurement=E.%20Coli&From=1/10/16)

Note that some of the results have quality codes, and some don't.

Interpreting the results

Notice that there are samples from different project codes for this site. The site is monitored monthly throughout the year for State of The Environment monitoring (Project 415 01) and weekly between November and April for Recreational water quality monitoring (Project codes starting with BB). The full set of metadata is required in order to identify this, and for analysis it is important to make sure that bias is not introduced by using data sets that have been gathered for different purposes. There are also comments and observations made during sampling that may be relevant.

River Flow

Query WFS to identify a river Flow site.

Navigate to LAWAMonitoringSitesReferenceData on the Hawke's Bay Open Data portal (<https://opendata-hbrc.opendata.arcgis.com/>), the data tab and then download.

Open the download in your spreadsheet program.

Enable filters on all of the columns and then filter the SWQuantity column for 'Yes'.

The CouncilSiteID column shows the site names that have Surface Water Quantity data available.

Check what measurements are available for a site

Using the site Ngaruroro River at Fernhill as an example

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Ngaruroro River at Fernhill](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Ngaruroro%20River%20at%20Fernhill)

See section "Useful Information from a MeasurementList Request" below for more information about this output.

Obtain the data for instantaneous flow

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro River at Fernhill&Measurement=Flow](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro%20River%20at%20Fernhill&Measurement=Flow)

This returns the last result, which is from 2008, however the site is still in use, rechecking the Measurement List request shows that we should have requested Flow [Water Level]. Using this we get an up-to-date result.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro River at Fernhill&Measurement=Flow\[Water Level\]](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro%20River%20at%20Fernhill&Measurement=Flow[Water%20Level])

Again, we can specify a time range to get more data, however the results are logged every few minutes so if the time range is large then the request may time out.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro River at Fernhill&Measurement=Flow\[Water Level\]&From=1/4/2017&To=7/4/2017](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro%20River%20at%20Fernhill&Measurement=Flow[Water%20Level]&From=1/4/2017&To=7/4/2017)

Obtain the data for daily average flow

Aggregating the data can be useful and allows you to reduce the amount of data returned, e.g. daily average flow for the same period.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro River at Fernhill&Measurement=Flow\[Water Level\]&From=1/4/2017&To=7/4/2017&Interval=1 Day&Interpolation=Average](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro%20River%20at%20Fernhill&Measurement=Flow[Water%20Level]&From=1/4/2017&To=7/4/2017&Interval=1%20Day&Interpolation=Average)

Obtain the quality information for the flow measurement

The quality data is stored as a separate time series and has discrete data points that describe the quality up to a point in time, hence in the request below the date has been moved backwards to ensure that some data is returned.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro River at Fernhill&Measurement=Flow\[Water Level\]&From=1/1/2016&tsType=StdQualSeries](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Ngaruroro%20River%20at%20Fernhill&Measurement=Flow[Water%20Level]&From=1/1/2016&tsType=StdQualSeries)

Rainfall

Query WFS to identify a Rainfall site.

Navigate to LAWAMonitoringSitesReferenceData on the Hawke's Bay Open Data portal (<https://opendata-hbrc.opendata.arcgis.com/>), the data tab and then download.

Open the download in your spreadsheet program.

Enable filters on all of the columns and then filter the Rainfall column for 'Yes'.

The CouncilSiteID column shows the site names that have Rainfall data available.

Check what measurements are available for the site

Using the site Te Haroto Climate as an example.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Te Haroto Climate](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Te%20Haroto%20Climate)

See section "Useful Information from a MeasurementList Request" below for more information about this output.

Obtain the data for Rainfall

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te Haroto Climate&Measurement=Rainfall](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te%20Haroto%20Climate&Measurement=Rainfall)

Again, we can specify a time range to get more data, however the results are logged every few minutes so if the time range is large then the request may time out.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te Haroto Climate&Measurement=Rainfall&From=1/4/2017&To=7/4/2017](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te%20Haroto%20Climate&Measurement=Rainfall&From=1/4/2017&To=7/4/2017)

Obtain the data for daily total rainfall

Aggregating the data can be useful and allows you to reduce the amount of data returned, e.g. daily total Rainfall for the same period.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te Haroto Climate&Measurement=Rainfall&From=1/4/2017&To=7/4/2017&Interval=1 Day&Interpolation=Total](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te%20Haroto%20Climate&Measurement=Rainfall&From=1/4/2017&To=7/4/2017&Interval=1Day&Interpolation=Total)

Obtain the quality information for the rainfall measurement

The quality data is stored as a separate time series and has discrete data points that describe the quality up to a point in time, hence in the request below the date has been moved backwards to ensure that some data is returned.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te Haroto Climate&Measurement=Rainfall&From=1/1/2016&tsType=StdQualSeries](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Te%20Haroto%20Climate&Measurement=Rainfall&From=1/1/2016&tsType=StdQualSeries)

Groundwater

Query WFS to identify a Groundwater site.

Navigate to LAWAMonitoringSitesReferenceData on the Hawke's bay Open Data portal (<https://hbrcopendata-hbrc.opendata.arcgis.com/>), the data tab and then download.

Open the download in your spreadsheet program.

Enable filters on all of the columns and then filter the appropriate groundwater column for 'Yes'.

GWQuality= Yes for current SoE water quality sites

GWLevel= Yes for currentSoE water level sites

The CouncilSiteID column shows the site names that have groundwater data available.

Check what measurements are available for the site

Using the site Well...222 Comminutor Stn as an example we can generate a measurement list for EMAR.hts (water quantity data) or EMARDiscrete.hts (water quality data)

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Well...222 Comminutor Stn](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=Well...222%20Comminutor%20Stn)

[https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=MeasurementList&Site= Well...222 Comminutor Stn](https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=MeasurementList&Site=Well...222%20Comminutor%20Stn)

See section "Useful Information from a Measurement List Request" below for more information about this output.

Obtain the data for Groundwater

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site= Well...222 Comminutor Stn &Measurement= Elevation Above Sea Level \[Manual Water Level\]](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Well...222%20Comminutor%20Stn&Measurement=Elevation%20Above%20Sea%20Level%20[Manual%20Water%20Level])

Again, we can specify a time range to get more data, manual water level is taken on average around once per month (depending on the site) however recorder water level is logged every 15 minutes so if the time range is large then the request may time out.

Note: groundwater data is collected as Depth From Measuring Point but is usually report on in terms of a datum, either Depth From Land Surface or Elevation Above Sea Level so look for these in the measurement list.

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site= Well...222 Comminutor Stn &Measurement= Elevation Above Sea Level \[Manual Water Level\]&From=1/4/2017&To=1/5/2018](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Well...222%20Comminutor%20Stn&Measurement=Elevation%20Above%20Sea%20Level%20[Manual%20Water%20Level]&From=1/4/2017&To=1/5/2018)

Groundwater quality examples below. The quality code for the data is listed along with the result for the discrete water quality results.

[https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site= Well...222 Comminutor Stn&Measurement= Chloride](https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site=Well...222%20Comminutor%20Stn&Measurement=Chloride)

[https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site= Well...222 Comminutor Stn&Measurement= Chloride&From=01/01/2020](https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=GetData&Site=Well...222%20Comminutor%20Stn&Measurement=Chloride&From=01/01/2020)

Obtain the quality information for the groundwater level measurement

The quality data can be retrieved as a separate data series or as a quality value alongside each data point. Only ground water level sites with Recorder data will have quality codes.

Example of retrieving quality codes as a time series:

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Well.16879 Bridge St Ongaonga 90m&Measurement= Depth From Land Surface \[Recorder Water Level\]&From=1/1/2017&To=1/5/2021&tsType=StdQualSeries](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Well.16879 Bridge St Ongaonga 90m&Measurement= Depth From Land Surface [Recorder Water Level]&From=1/1/2017&To=1/5/2021&tsType=StdQualSeries)

Example of retrieving quality codes alongside result values (Q1 is the Quality code):

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Well.16879 Bridge St Ongaonga 90m&Measurement= Depth From Land Surface \[Recorder Water Level\]&From=1/1/2017&To=1/5/2021&ShowQuality=Yes](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=Well.16879 Bridge St Ongaonga 90m&Measurement= Depth From Land Surface [Recorder Water Level]&From=1/1/2017&To=1/5/2021&ShowQuality=Yes)

```
▼<Hilltop>
  <Agency>HBRC</Agency>
  ▼<Measurement SiteName="Well.16879 Bridge St Ongaonga 90m">
    ▼<DataSource Name="Recorder Water Level" NumItems="1">
      <TSType>StdSeries</TSType>
      <DataType>SimpleTimeSeries</DataType>
      <Interpolation>Instant</Interpolation>
      ▼<ItemInfo ItemNumber="1">
        <ItemName>Depth From Land Surface</ItemName>
        <ItemFormat>F</ItemFormat>
        <Units>m</Units>
        <Format>#####.###</Format>
      </ItemInfo>
    </DataSource>
    ▼<Data DateFormat="Calendar" NumItems="1">
      ▼<E>
        <T>2021-01-01T00:00:00</T>
        <I1>-22.786</I1>
        <Q1>500</Q1>
      </E>
    </Data>
  </Measurement>
</Hilltop>
```

Coastal Water Quality

HAWQi buoy

There are a number of parameters measured by HAWQi buoy located in Hawke Bay.

HAWQi measurement list:

<https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=MeasurementList&Site=HAWQi>

Note that some of the measurements have not been processed. To see which have been processed you can use a url to ask for the measurement's quality codes. If there are quality values returned, then you can see the data has been processed. QC500 and QC600 is good quality data. The url below calls the quality codes for temperature measurements at 0.5m.

<https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=GetData&Site=HAWQi&Measurement=Temperature%200.5m&From=01/01/2021&To=01/02/2021&tsType=StdQualSeries>

If the data is raw, you may get QC200 quality codes or a comment that the XML file does not have any style information with it.

Site List by Measurement Type

Sometimes you are interested in looking at a certain parameter rather than at a specific site. Then it is useful to call a site list for all sites that have a specific measurement. Note that you may need to call a Measurement List for a known site first to get the correct measurement name.

Examples for water temperature and chloride:

[https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=SiteList&Measurement=Water%20Temperature%20\(WQ\)](https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=SiteList&Measurement=Water%20Temperature%20(WQ))

<https://data.hbrc.govt.nz/Envirodata/EMARDiscrete.hts?service=Hilltop&request=SiteList&Measurement=%20Chloride>

This example calls for a site list for Elevation Above Sea Level [Manual Water Level] which is a groundwater quantity measurement:

[https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=SiteList&Measurement=%20Elevation%20Above%20Sea%20Level%20\[Manual%20Water%20Level\]](https://data.hbrc.govt.nz/Envirodata/EMAR.hts?service=Hilltop&request=SiteList&Measurement=%20Elevation%20Above%20Sea%20Level%20[Manual%20Water%20Level])

Useful information from a MeasurementList request.

The results of a MeasurementList request provide a variety of useful information, of note are: -

TSType	StdSeries indicates standard measurements. StdQualSeries indicates quality code data.
Data Type	SimpleTimeSeries WQSample
Interpolation	Instant – continuous measurement Discrete – one off sampled measurement Histogram – such as rainfall, amount in a period Event – Applies to all data up to this date.
From	The date of the first measurement available.
To	The date of the last measurement available.
Request As	The name to use to request the measurement from the server.
Units	The units that the measurement is reported in.