

EIM Help – Well Information and Data

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Contents

What's covered?	1
What types of data should I submit?.....	2
Before you begin	2
How do I enter my data?	3
Location Template	3
General and horizontal coordinate metadata	3
Wellhead elevation metadata.....	4
Well water level measuring point metadata	6
Well construction and use metadata.....	8
Deepened or Reconstructed wells	9
Result Template	9
Groundwater chemistry and field measurement data	9
Manual well water levels	11
Transducer well water levels	14
Vertical hydraulic gradient – instream piezometers.....	16
Document revision history.....	19

What's covered?

This document explains how to enter well location information and data collected from the following types of **permanent groundwater wells**:

- ✓ Monitoring wells.
- ✓ Water supply wells.

- ✓ In-water piezometers.
- ✓ Irrigation and stockwater wells.

For other types of wells, see these documents:

- Environmental Investigation (temporary) wells (EIWs). [Download help for Temporary Environmental Investigation Wells.](#)
- Soil gas or vapor probes or wells. [Download help for Air, Vapor, and Soil Gas Data.](#)

What types of data should I submit?

Submit groundwater data that represent current or historical environmental conditions, including:

- ✓ Groundwater chemistry samples.
- ✓ Groundwater field measurements like pH, temperature, oxidation-reduction potential (ORP), conductivity, and dissolved oxygen (DO).
- ✓ Well water levels, both discrete (manual) and time-series (transducer).
- ✓ Vertical hydraulic gradient between instream piezometer and stream stage.

If your well is decommissioned but has data from before it was decommissioned, submit the data. Let your Data Coordinator know the well is decommissioned and they can link any available decommissioning logs to the location in EIM.

Don't submit data from:

- ✗ Treatment or collection systems like air stripping or sparging wells and soil vapor extraction.
- ✗ Vertical hydraulic gradient between wells.
- ✗ Download "[Data Types Not Entered into EIM](#)" for a complete list.

Before you begin

[Go to the EIM Help Center](#) and download the applicable templates and help documents.

- Location Template and Help document (for well location and construction details).
- Well Water Level Template and Help document (for manual water levels).
- Result Template and Help document (for groundwater chemistry samples and field measurements).
- Time-Series Template and Help document (for pressure transducer data).

Note: The Help documents show you how to fill out the templates. They have examples and other guidance for all fields. Use them along with this guidance.

How do I enter my data?

Location Template

Use the Location Template to enter your well locations into EIM.

Note: If you installed a well in soil boring, enter a **single well location** into EIM. Submit both the soil and groundwater results to that single location.

General and horizontal coordinate metadata

Columns A to AG in the Location Template contain location names and horizontal location metadata.

Table 1: **Key fields** for general and horizontal coordinate metadata. **Use this with the Location Help document.**

Column	Field Name, Location Template	Required?	Tips and Valid Values
A	Location ID	Yes	Can use <i>Ecology Well Tag ID</i> (Figure 1) or prefix Facility/Site ID or VCP numbers to insure unique ID.
B	Location Name	Yes	Same as above.
C	Location Setting		Land (most wells) Stream/River (in-water piezometer)
F	Is Location A Well	Yes	Y (Yes)
E	Ecology Facility/Site ID	Conditional	REQUIRED for cleanup and permit sites.
AC	Horizontal Coordinates Represent	Yes	24 (Discrete monitoring point)



Figure 1: Picture of an Ecology Well Tag (©2017, WA Dept. of Ecology).

Wellhead elevation metadata

Columns AI to AM in the Location Template contain elevation and metadata.

Note: Submit top of casing (TOC)/measuring point (MP) elevation **OR** land surface elevation. Cleanup sites typically use TOC.

(EIM calculates groundwater elevation from wellhead elevation, well water level measuring point, and well water level measurements.)

Table 2: **Key fields** for wellhead elevation metadata. *Use this with the Location Help document.*

Col- umn	Field Name, Location Template	Required?	Tips and Valid Values
AH	Elevation of	Yes	<p>Top of Well Casing - Most common for surveyed cleanup sites and landfills.</p> <p>Land Surface - Most common for water supply wells or unsurveyed sites.</p> <p>Well Water Level Measuring Point - Use if measuring point is not TOC. Example is access port.</p> <p>See Figures 2 and 3 below for examples.</p>
AK	Elevation Datum	Yes	<p>1 (NAVD88 (North American Vertical Datum of 1988). Convert other datums to NAVD88.</p> <p>For local datums, download help for “Convert Local Elevation Datums to NAVD88.”</p>

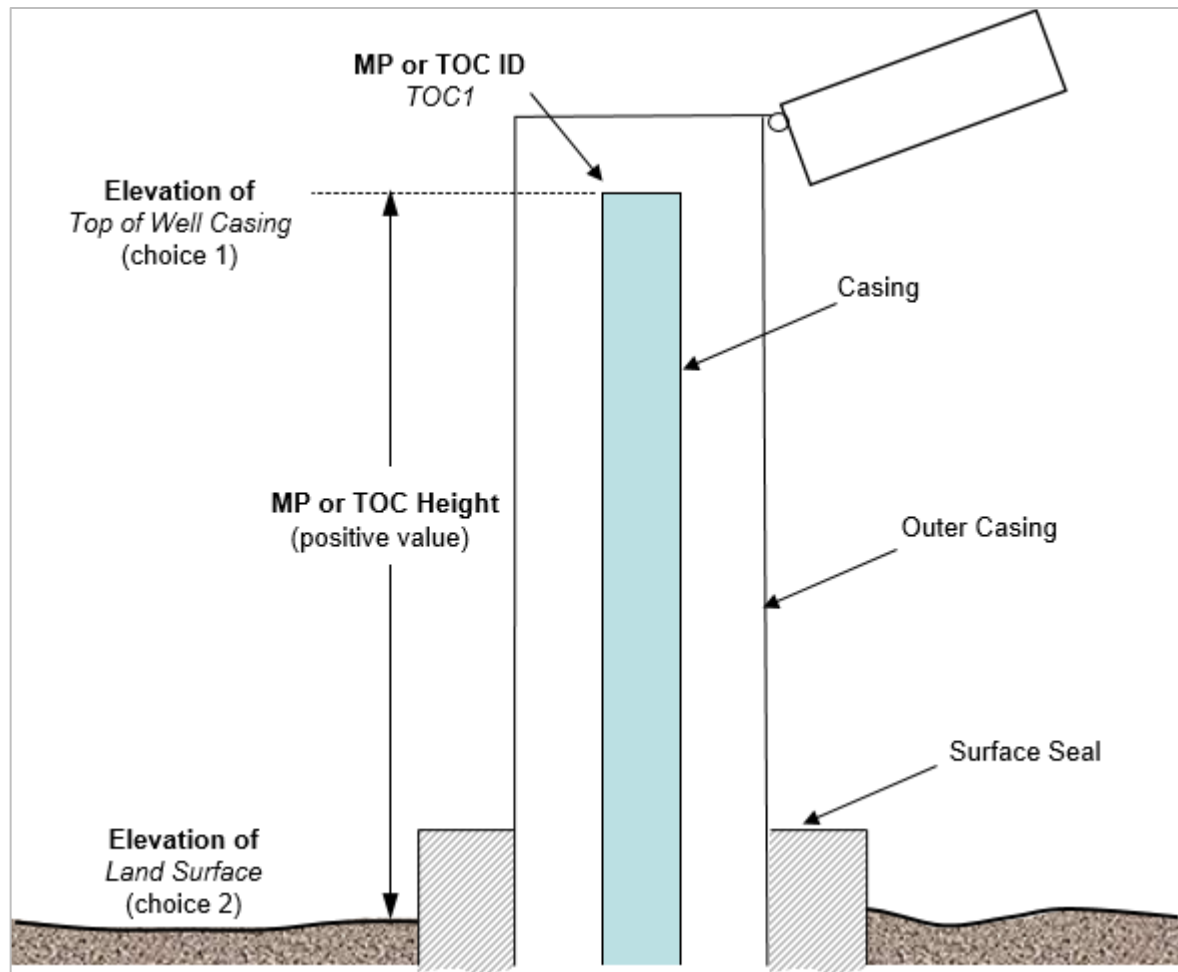


Figure 2: Well with casing stickup. MP = Measuring Point, TOC = Top of Casing (©2019, WA Dept. of Ecology).

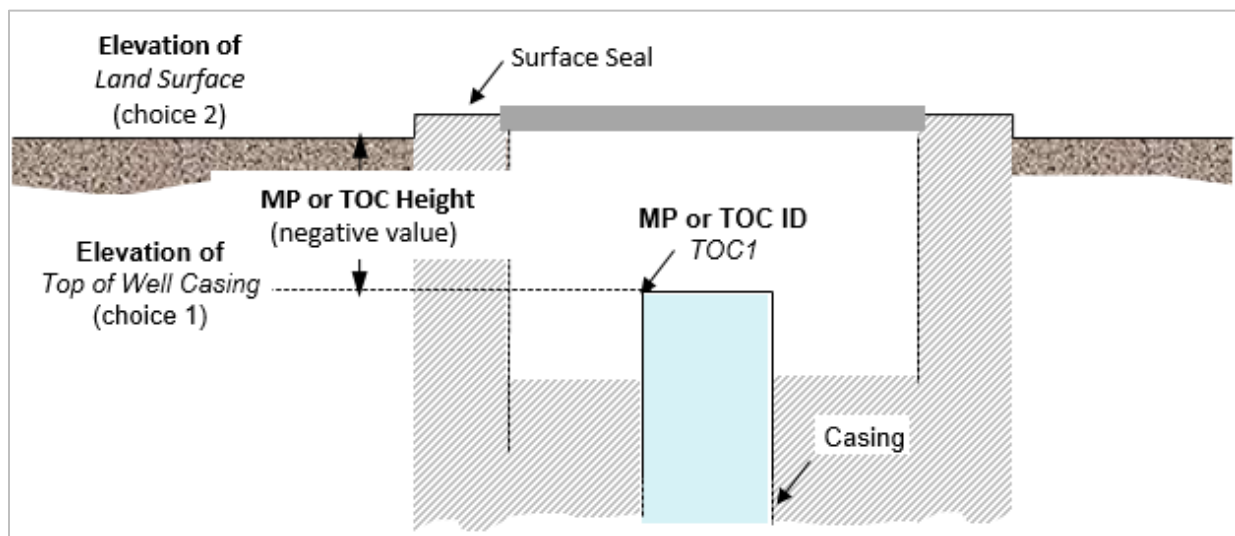


Figure 3: Flush-mount (surface-mount) well. MP = Measuring Point, TOC = Top of Casing (©2019, WA Dept. of Ecology).

Well water level measuring point metadata

Well water level measuring point (measuring point) is the point on the well from which you consistently measure water levels. Top of well casing (TOC) is common for monitoring wells (Figure 4). Access ports are more likely for water supply wells (Figure 5). Normally you use the same point each time, but EIM can handle more than one measuring point, discussed below.

Columns AO to AS in the Location Template contain measuring point information.



Figure 4: Arrow shows measuring point on a monitoring well, top of casing (©2012, WA Dept. of Ecology).



Figure 5: Arrow shows measuring point on a water supply well with access port (©2013, WA Dept. of Ecology).

Table 3: **Key fields** for measuring point metadata. *Use this with the Location Help document.*

Col- umn	Field Name, Location Template	Required?	Tips and Valid Values
AO	Well Water Level Measuring Point or TOC ID	Yes	<p>TOC1 - measured from top of casing. TOC2 - measured from different point at the top of casing (like when casing gets cut off). MP1 - measured from access port or similar. MP2 - measured from different access port or similar.</p> <p>This value also goes the in the Well Water Level Template. It ties your well water level measurements to the information you provide here.</p> <p><i>New measuring point?</i> Common reasons are well damage or monument replacement (Figure 6, below). Let your EIM Data Coordinator know. They will put the new measuring point in EIM for you.</p>
AP	Well Water Level Measuring Point or TOC Description	Yes	Be descriptive. Ex: "Top of Casing at notch."
AQ	Well Water Level Measuring Point or TOC Height	Conditional	<p>REQUIRED for wells reported with land surface elevation. Report height, not elevation.</p> <p>Enter a positive number for measuring points above land surface (casing stickup).</p> <p>Enter a negative number for measuring points below land surface (flush-mount well).</p> <p>See Figures 2 and 3 above for examples.</p>



Figure 6: Well outer protective casing and monument removed for replacement with flush-mount monument. Requires a new measuring point (©2018, WA Dept. of Ecology).

Well construction and use metadata

Columns AT to BM in the Location Template contain well construction information, including type of well, completion depth and type, and open interval (screen) depths.

We link Well Tag ID (Column AT) to the well log in [Ecology's Well Report Database](#), if there is a log. (Make sure you submit your driller's logs to [Ecology's Well Report Gateway](#).) Once we link a well, you can [access the log through EIM Groundwater Search](#) (Figure 7).

If your well doesn't have a log, and you don't have access to well construction information, let your EIM Data Coordinator know.

Data coordinators also accept emailed e-copies of supplemental logs (geologist, as-builts, geophysical) and photos and will upload them so they [can be accessed in EIM Groundwater Search](#) (Figure 7).

Logs and Other Documents

Well Logs:
Log ID: [389384](#) Image: [389384](#)

Additional Well Documents and Information:
[AKB696.tif](#) (Other)
[Borst cuttings 28-29.JPG](#) (Photograph)
[Borst cuttings 33-34.JPG](#) (Photograph)
[Borst cuttings 43-44.JPG](#) (Photograph)
[Borst cuttings 48-49.JPG](#) (Photograph)
[Borst cuttings 53-54.JPG](#) (Photograph)

Figure 7: Links to logs and other documents on Well Location Data Summary page in EIM Groundwater

Search.

Deepened or Reconstructed wells

Well deepening involves redrilling an existing well in order to find a deeper, more productive reservoir. Well reconstruction is where a completely new well is redrilled close to an existing well that needs to be replaced.

In both these instances, submit a new well to EIM. A deepened or re-drilled well should have a similar Location ID, but with an appended identifier like “D” for deepened or “R” for “redrilled” (ex. AODE0001_MW-1R). Add a well construction comment about deepening or redrilling.

Result Template

Groundwater chemistry and field measurement data

If you collected the following data, submit it to EIM:

- ✓ **Groundwater chemistry data** - samples you sent to the lab.
- ✓ **Field measurements** - data you collected in the field, like temperature, pH, turbidity, conductivity, ORP and DO.

*Table 4: **Key fields** for groundwater chemistry or field measurement data. Use this with the Result Help document.*

Column	Field Name, Result Template	Required?	Tips and Valid Values
X	Sample Matrix	Yes	Water
Y	Sample Source	Yes	Groundwater
AA	Sample Collection Method	Yes	See Table 5 below for common valid values. Search online for more values.
AB	Sample Preparation Method	Conditional	If filtered, enter filter size. See Table 6 below. Search online for more values.
AT	Fraction Analyzed	Yes	Total Dissolved (field or lab filtered samples)
AU	Field Filtered Flag	Conditional	Y (Yes) N (No)

Table 5: Common groundwater Sample Collection Method valid values and descriptions.

Sample Collection Method Valid Values	Description
BAILER-POLYETHYLENE	Bailer, Polyethylene
BAILER-PVC	Bailer, PVC
BAILER-STAINLESS	Bailer, stainless steel
BAILER-TEFLON	Bailer, Teflon
BAILER-UNKNOWN	Bailer, material unknown
DGT	Diffusive gradients in thin films passive sampling device
DIRECTPUSH	Direct Push (like Geoprobe)
DirectPushSplitSpoon	Direct Push (like Geoprobe) with Split Spoon
EquilPassiveGrab-GW	Equilibrated Passive Grab Groundwater Sampler
FAUCET	Water sample, faucet closest to well, pre-treatment, purged before collection
GRAB-MISC	Grab sampler, type unspecified
PDB-GW	Passive Diffusion Bag (PDB) Groundwater Sampler
PUMP-BLADDER	Pump, bladder
PUMP-GW-LOW-FLOW	Low-flow (low stress, minimal drawdown) groundwater sampling by pump (0.1 - 0.5 L/min, up to 1 L/min in coarse material).
PUMP-HAND-VACUUM	Pump, hand vacuum
PUMP-HYDROSTAR	Pump, HydroStar piston or similar
PUMP-INERTIAL-LIFT	Pump, WaTerra inertial lift or similar
PUMP-LFLOW	Pump, submersible with low flow (less than 1 liter per minute)
PUMP-PERISTALTIC	Pump, peristaltic
PUMP-SUBMERSIBLE	Pump, submersible electric

Table 6: Common Sample Preparation Methods and descriptions for filtered groundwater samples.

Sample Preparation Method Valid Values	Description
FILTER .45um-CA	Water sample filtered with 0.45 micron (micrometer) cellulose acetate filter (CA)
FILTER.45um	Water sample filtered with 0.45 micron (micrometer) filter (material unspecified)
FILTER.45um-GFF	Water sample filtered with 0.45 micron (micrometer) glass fiber filter (GFF)
FILTER.45um-PP	Water sample filtered with 0.45 micron (micrometer) polypropylene filter (PP)
FILTER.70um-GFF	Water sample filtered with 0.70 micron (micrometer) glass fiber filter (GFF)
FILTER.80um	Water sample filtered with 0.80 micron (micrometer) filter (material unspecified)
FILTER0.1um	Sample filtered with 0.1 micron (micrometer) filter (material unspecified)
FILTER1.0um-GFF-BF-B	Water samples filtered with 1.0 micron glass fiber filter (GFF), binder free (BF), borosilicate glass (B).
FILTER1.5um-GFF	Water sample filtered with 1.5 micron (micrometer) glass fiber filter (GFF)

Sample Preparation Method Valid Values	Description
FILTER11um-CA	Water sample filtered with 11 micron (micrometer) cellulose acetate filter (CA)
FILTER5um	Water sample filtered with 5 micron (micrometer) filter (material unspecified)

Manual well water levels

If you collected the following data, submit it to EIM:

- ✓ **Discrete (manual) water levels** (usually by e-tape or steel tape).
 - Use Result Template OR Well Water Level Template.
- ✗ **Don't submit water level elevations.**

*Table 7: **Key fields** for well water level measurement data. Use this with the Result or Well Water Level Help documents. Some field names differ between templates, noted in Field Name column (separated by “/”).*

Col- umn	Field Name, Result Template / Well Water Level Template	Required?	Tips and Valid Values
D/D	Field Collection Type	Yes	Measurement Observation (see Result Help document for specifics)
F/F	Field Collection Start Date	Yes	MM/DD/YYYY
G/G	Field Collection Start Time	Conditional	HH:MM:SS (24 hour) Required if available.
Q/J	Well Water Level Measuring Point or TOC ID	Yes	Whatever you entered in the Location Template (TOC1, MP1 , etc.). This field ties water level to well elevation. EIM uses it to calculate water level elevation. New measuring point? See measuring point tips and valid values for key fields above.
AH/K	Result Parameter Name / Water Level Parameter Name	Yes	Water level in well (depth below top of well casing) Water level in well (depth below measuring point) Water level in well (depth below land surface) Water level in well (unable to measure) (Observations only)

Col- umn	Field Name, Result Template / Well Water Level Template	Required?	Tips and Valid Values
AS/N	Result Data Qualifier / Water Level Qualifier	Conditional	Provide if applicable. See Table 8 below for valid values. For wells with LNAPL (light non-aqueous phase liquid), submit depth to water AND depth to product measurements. Use the Result Template. Download EIM help for “ LNAPL (Free Product) Well Data .”
AX/O	Water Level Accuracy	Required	Feet WL2 +0.01ft WL1 +0.1ft WL0 +1ft WL6 >1ft
AY/P	Result Method / Water Level Method	Required	See Table 9 below for valid values. For transducer measurements, see “ Well water levels collected by transducer ” section below for additional info.

Table 8: Data Qualifier valid values and descriptions for well water levels.

Result, Water Level, and Time Series Data Qualifier Valid Values	Description
WLA	Well water level affected by atmospheric pressure.
WLB	Well water level affected by tidal stage.
WLC	Well water level affected by ice.
WLD	Well was dry during measurement attempt.
WLE	Well was flowing recently.
WLF	Well was flowing and could not be measured.
WLG	Nearby well(s) flowing during measurement.
WLH	Nearby well(s) flowing recently.
WLI	Well site being injected during measurement.
WLJ	Nearby well site(s) being injected during measurement.
WLK	Water was cascading down inside of well.
WLL	Well water level affected by brackish or saline water.
WLM	Well was plugged and not in hydraulic contact with the aquifer.
WLN	Well measurement discontinued.
WLO	Well water level affected by/could not be measured due to obstruction in well.
WLP	Well site pumping during measurement.

Result, Water Level, and Time Series Data Qualifier Valid Values	Description
WLR	Well site pumped recently.
WLS	Nearby well(s) being pumped during measurement.
WLT	Nearby well(s) pumped recently.
WLV	LNAPL (floating product) or other foreign substance on well water.
WLW	Well was destroyed; water level could not be measured.
WLX	Well water level affected by nearby surface-water stage.
WLZ	Well water level affected by other conditions.

Table 9: Result and Water Level Method valid values and descriptions for well water levels.

Result and Water Level Method Valid Values	Description
GWLMA	Water level by airline measurement
GWLMB	Water level by analog (mechanical) recorder
GWLMC	Water level by calibrated airline measurement
GWLMD	Water level by float / digital punch tape
GWLME	Water level, estimated
GWLMF	Water level by float / shaft encoder / data logger
GWLMG	Water level by mechanical pressure-gage measurement
GWLMH	Water level by calibrated mechanical pressure-gage measurement
GWMLL	Water level interpreted from geophysical logs
GWLMM	Water level by manometer measurement
GWLMN	Water level by non-recording gage
GWLMP	Water level by pressure transducer
GWLMQ	Water level by downhole mechanical pressure recorder (DST)
GWLMR	Water level reported, method not known
GWLMS	Water level by steel tape measurement.
GWLMT	Water level by electric tape measurement.
GWLMU	Water level by sonic meter
GWLMV	Water level by calibrated electric tape measurement
GWLMZ	Water level by other method

Transducer well water levels

Use the Time-Series Result Template to submit continuously collected, barometric- and drift corrected- well water levels from a pressure transducer (transducer).

- ✓ *Corrected* transducer well water levels in depth below measuring point.
- ✓ *Constant collection interval data.*

Don't submit:

- ✗ Raw pressure values. Post-process and verify data first (see next section).
- ✗ Non-constant collection interval data.
- ✗ Water level elevations.

How to correct raw transducer data

If you don't have a procedure for correcting raw transducer pressure values, [download and follow Ecology SOP EAP074 "Use of Submersible Pressure Transducers during Groundwater Studies."](#)

Your procedure might include all or just some of the steps in Ecology's SOP, depending on the transducer's manufacturer and pre-deployment programming. Check your instrument's manual.

Typical processing steps:

1. Get ambient barometric pressure data from a barometer 20 or fewer miles from the well.
2. For absolute pressure transducers, subtract the measured ambient barometric pressure from the transducer results. Skip steps (1) and (2) if you used a gauged transducer.
3. Convert water pressure to equivalent feet of water over transducer sensor, if needed. (Conversion factor, 2.3079 feet of water for each pound per square inch of pressure, assuming water at 10 degrees Celsius and 500 mg/L total dissolved solids. See Appendix E in Ecology SOP EAP074).
4. Convert to depth of water below transducer hanging point. Account for any mid-deployment transducer adjustments (changes in hanging cable length, offset changes, or alterations to deployment).
5. Convert to depth of water below water level measuring point by adding or subtracting the hanging point offset (vertical distance between the transducer hanging point and the water level measuring point).
6. Compare barometrically corrected transducer water level values to confirmational manual water level values, usually by e-tape or steel tape.
7. Determine if transducer water level values meet accuracy criteria. If not, evaluate and correct for linear instrument drift. Transducer accuracy varies depending on the brand and maximum pressure rating.
8. Compare drift-corrected transducer water level values to manual water level values. Typical e-

tape accuracy is ± 0.02 feet for depths less than 250 feet.

9. Assess overall data quality. Assign appropriate Result Qualifiers and Groundwater Result Accuracies (Table 10, below).
10. Submit final, post-processed data to EIM in Time-Series Result Template.

Table 10: Key fields for transducer data. Use this with the Time-Series Help document.

Column	Field Name, Time Series Template	Required?	Tips and Valid Values
E	Field Collection Type	Yes	Measurement Observation - If you rejected and removed data during your quality review, use to explain data gap. Download EIM Observations help document.
J	Matrix	Yes	Water
K	Source	Yes	Groundwater
P	Result Parameter Name	Yes	Water level in well (depth below measuring point) Water level in well (depth below top of well casing) Water level in well (depth below land surface) Water level in well (unable to measure) - for Observations
S	Result Qualifier	Conditional	If you adjusted your data, download EIM's "Adjusted Time Series Data" help document. Use one of these qualifiers: <ul style="list-style-type: none"> IA - Instrument result adjusted; reported result meets study objectives. EST - Measurement value reported is estimated. See comment for additional detail. <p>If you also have a water level qualifier, it supersedes the adjusted data qualifier. EIM only has room for one data qualifier per data point. For example, if nearby well(s) were pumping during part of the deployment, enter WLS. If you also adjusted the data, put IA or EST in the Comment (U). See Table 8 above for more water level qualifiers.</p> <p>Note: qualifiers can apply to all or portions of your dataset.</p>
T	Result Method	Required	GWLMP - Water level by pressure transducer.
U	Comment	Conditional	Explain drift corrections, enter additional qualifiers, etc.
V	Groundwater Result Accuracy	Required	Feet WL2 +0.01ft WL1 +0.1ft WL0 +1ft WL6 >1ft

Col- umn	Field Name, Time Series Template	Required?	Tips and Valid Values
W	Groundwater Level Measuring Point ID	Required	<p>TOC1 - measured from top of casing.</p> <p>TOC2 - measured from different point at the top of casing (like when casing gets cut off).</p> <p>MP1 - measured from access port or similar.</p> <p>MP2 - measured from different access port or similar.</p> <p>This value also goes the in the Time-Series Result Template. It ties your well water level measurements to the information you provide here.</p>

Vertical hydraulic gradient – instream piezometers

Vertical hydraulic gradient (VHG) is the difference in hydraulic head between two nearby points separated by a known vertical distance. Surface water-groundwater interaction studies measure VHG between the stream and groundwater using instream piezometers. The goal is to determine if streams are losing or gaining (Figure 8).

Formula

$$VHG (i) = \frac{dh}{dl}$$

Table 11: Vertical hydraulic gradient components for instream piezometers

Character	Description
<i>i</i>	Vertical hydraulic gradient (dimensionless).
<i>dh</i>	Difference in head between stream stage and instream piezometer water level (Figure 8). Positive or negative value.
<i>dl</i>	Distance from top of streambed or lakebed to midpoint of the piezometer's screen (Figure 8). Positive value.

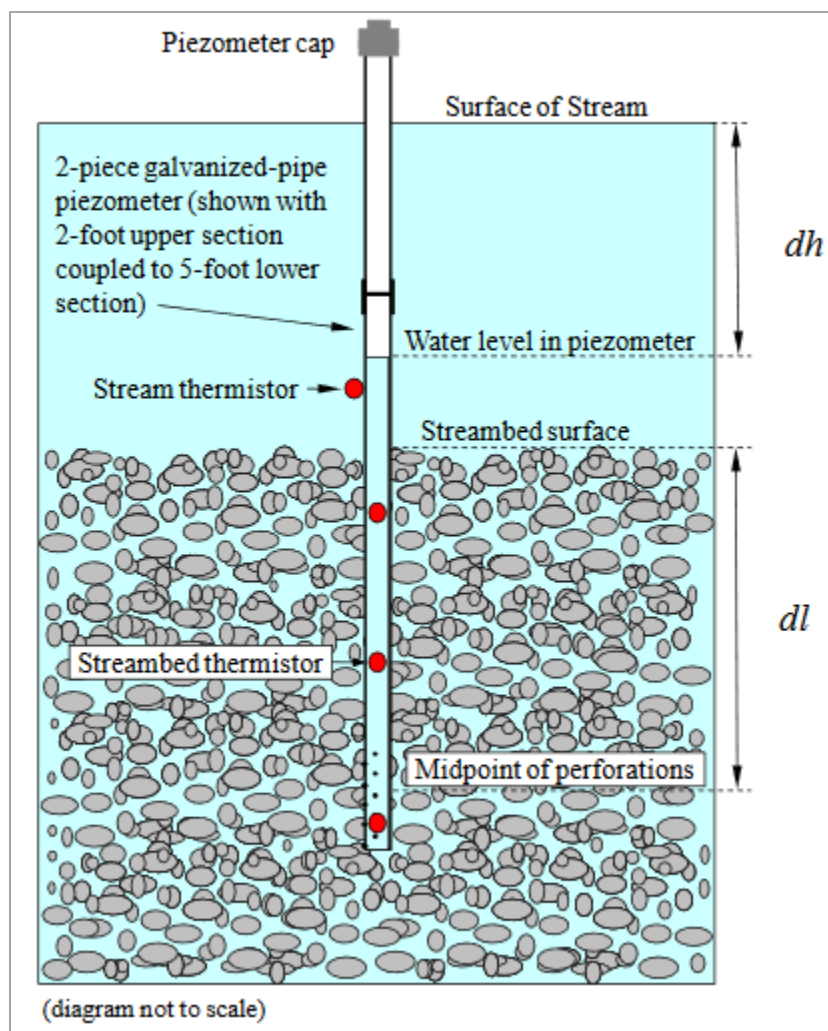


Figure 8: Surface water/groundwater VHG measured by instream piezometer. (©2019, WA Dept. of Ecology).

Table 12: **Key fields** for VHG locations. *Use this with the Location Help document.*

Column	Field Name, Location Template	Required?	Tips and Valid Values
F	Is Location A Well	Yes	Y (Yes)
AX	Groundwater Location Type	Yes	In-Water Piezometer

Table 13: **Key fields** for VHG results. *Use this with the Result Help document.*

Col- umn	Field Name, Result and Well Water Level Templates	Required?	Tips and Valid Values
D	Field Collection Type	Yes	Measurement
F	Field Collection Start Date	Yes	MM/DD/YYYY
G	Field Collection Start Time	Conditional	HH:MM:SS (24 hour) Required if available.
Q	Well Water Level Measuring Point or TOC ID	Yes	What you entered in the Location Template (TOC1 , MP1 , etc.) for the piezometer.
X	Sample Matrix	Yes	Water
Y	Sample Source	Yes	Groundwater
AA	Sample Collection Method	Yes	VHG-S-GW-PIEZO - Vertical hydraulic gradient between surface water and groundwater, by instream piezometer.
AH	Result Parameter Name	Yes	Vertical Hydraulic Gradient
AM	Result Value	Yes	Positive number - gaining stream. Negative number - losing stream.
AN	Result Value Units	Yes	Dimensionless ft/ft m/m
AX	Water Level Accuracy	Yes	Feet WL2 +0.01ft WL1 +0.1ft WL0 +1ft WL6 >1ft
AY	Result Method	Yes	GWLMV (Water level by calibrated electric tape measurement) GWLMT (Water level by electric tape measurement) GWLMM (Water level by manometer measurement) GWLMS (Water level by steel tape measurement) GWLMP (Water level by pressure transducer)

Document revision history

Revision Date	Revision Number	Summary of Changes	Reviser(s)
8/7/2019	1.0	Original document	KC/CN
05/04/20	1.1	Removed Water Level Accuracy valid values in meters from all tables.	KC
11/10/20	1.2	Updated “Is Location a Well” to “Is Location A Well” to match template.	KC
12/03/20	1.3	Fixed last table heading to Table 13, added section for Deepened and Reconstructed wells.	KC/CN
12/30/22	1.4	Clarified language in the Deepened and Reconstructed wells section. Added a sentence on page 2 about data coordinators linking decommissioning logs.	KC