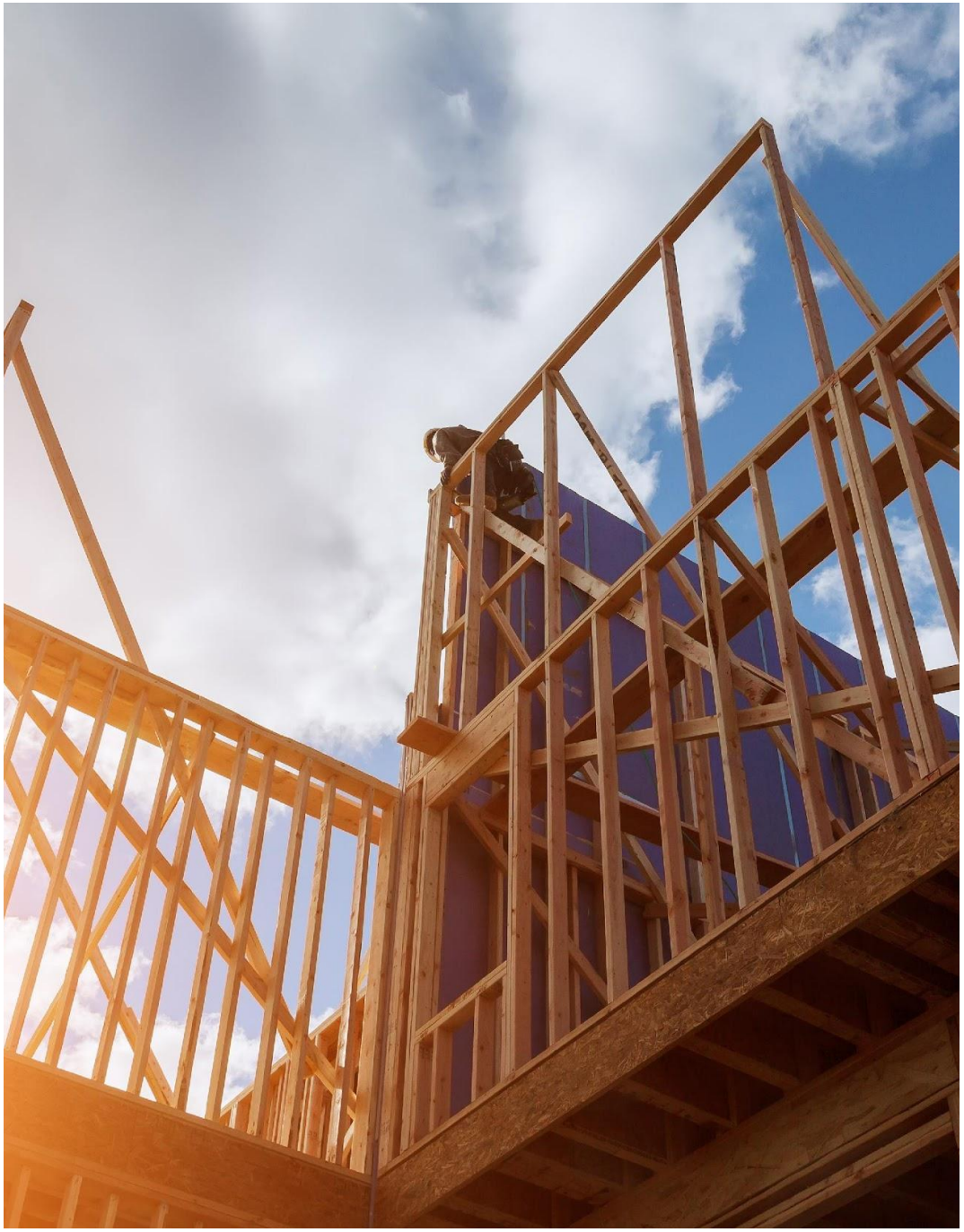
Jan 2025

$HERS_{H2O}$ in Ekotrope

Paul Kintner

ekotrope



Overview

- Water Conservation matters
- $HERS_{H2O}$ and WaterSense
- How to model $HERS_{H2O}$ in Ekotrope
- Why Ekotrope?
- What's next?

Water matters

- Water is essential for life.
  - 2.8% of water on Earth is freshwater, and only 0.5% is available for use.

- New Construction needs Water!
  - Arizona limits construction around Phoenix as the water supply dwindles.
  - But small towns need water too.

https://www.nytimes.com/2023/06/01/climate/arizona-phoenix-permits-housing-water.html

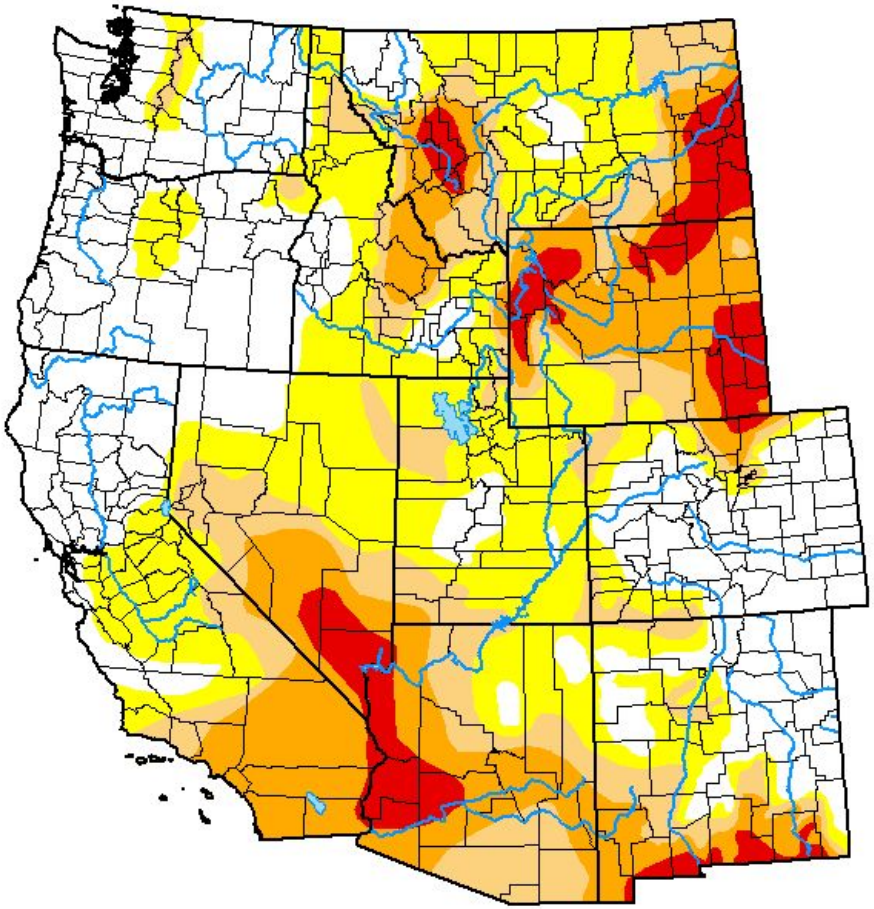
U.S. Drought Monitor

West

January 14, 2025

(Released Thursday, Jan. 16, 2025)

Valid 7 a.m. EST



Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

Brad Pugh
CPC/NOAA

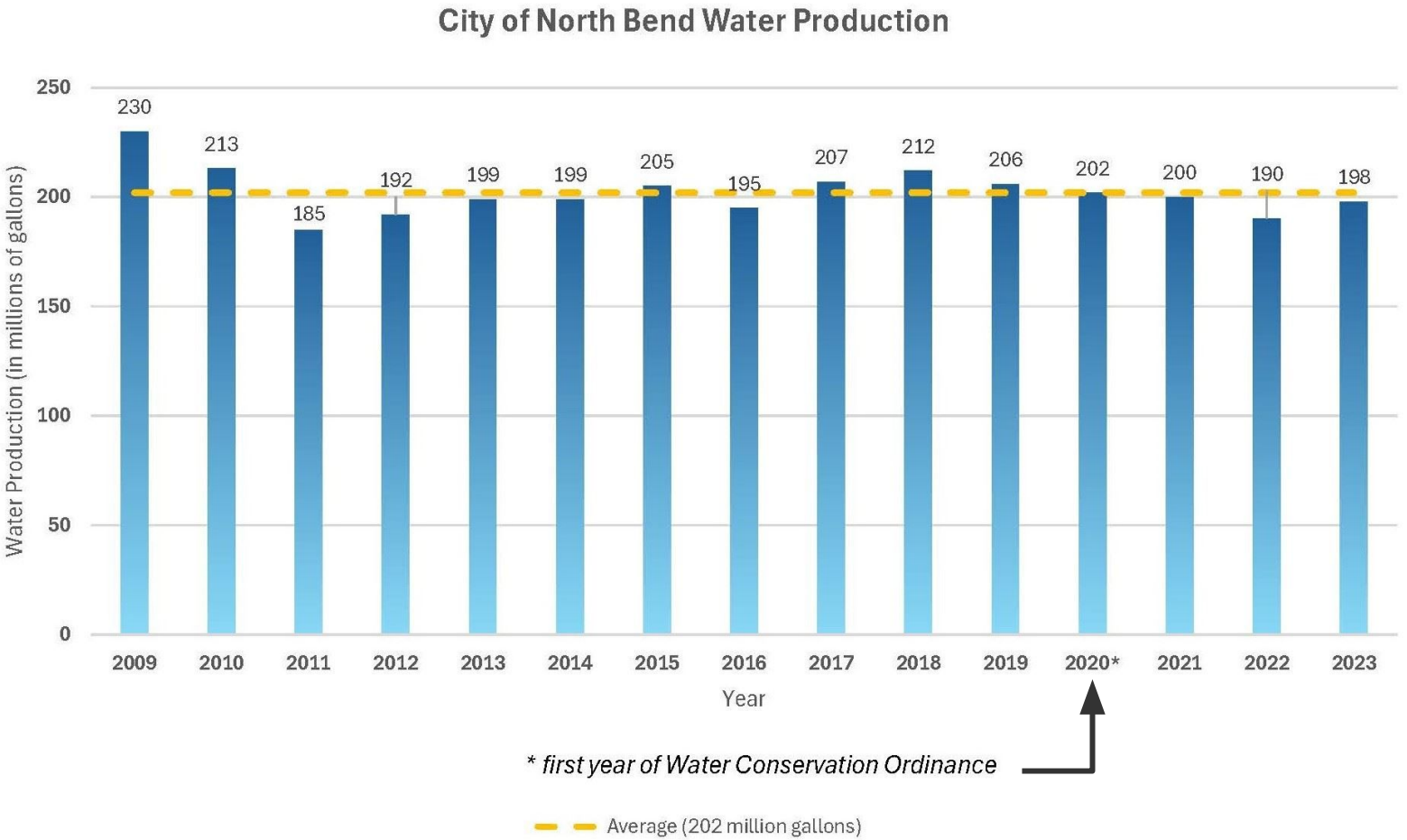
droughtmonitor.unl.edu

Water matters

- North Bend, WA had decade long building moratorium for water lack of rights ending in 2008.
- Beyond the residences the city is also required to provide water mitigation for the local Snoqualmie River at low levels. (This is fed by the snowpack!)
- Water rights to support growth and existing permits finally secured in 2023.
    - Now North Bend pumps more water from its sources, but purchases water from Seattle Public Utilities to provide mitigation water to the Snoqualmie River

Water matters

- To promote conservation North Bend has issued annual Water Conservation Ordinance and partnered with organizations provide rebates and services for water efficiency.



HERS$_{H2O}$ and WaterSense

- Standard ANSI/RESNET/ICC 850, released in 2020, defines a water efficiency rating index (WRI) procedure
- $HERS_{H2O}$ is the RESNET program based on Standard 850.
  - Need to be a $HERS_{H2O}$ Rater or $HERS_{H2O}$ Rating Field Inspector
  - Working with a $HERS_{H2O}$ Provider.
- WaterSense Approved Certification Method (WACM)

- Optional program similar relationship to $HERS_{H2O}$ as ENERGY STAR to HERS.
  - Water efficiency and flexibility in meeting it.
  - Faster hot water with less waste.
- For this Raters need to be a certified WaterSense Home Verifier.
- And Builders need to be a partner with EPA WaterSense Program.

What goes into HERS$_{H2O}$ Ratings

Basics

- Geography
- House size
- Bedrooms

Inside the Home

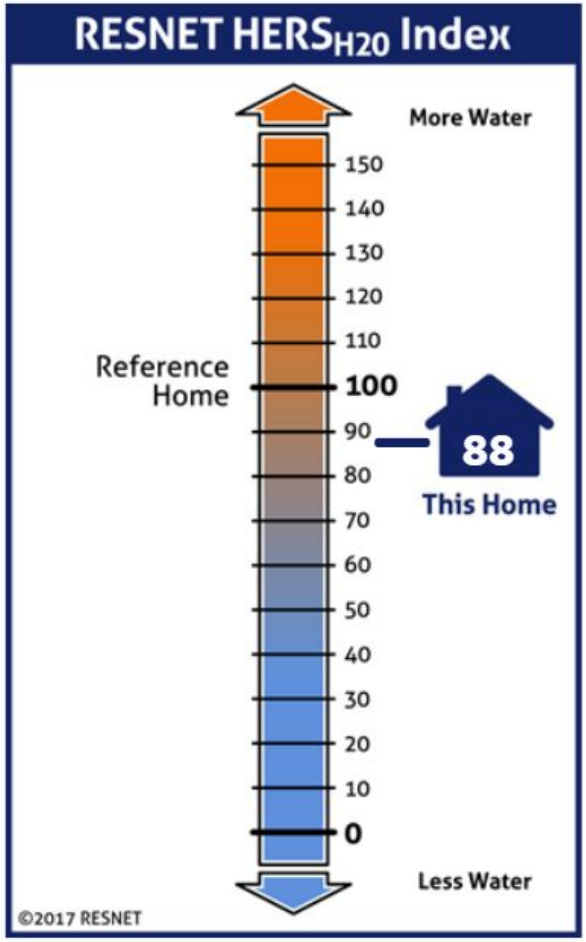
- Fixtures
- Toilets
- Hot water distribution
- Water Pressure
- Water softener
- Appliances

Outside the home

- Lot Size
- Irrigation
- Pool

What goes into $HERS_{H2O}$ Ratings

- Water Rating Index (WRI) compares the proposed home to the reference home similar to a HERS rating.
  - Can also be broken down into:
    - Indoor Water Rating Index
    - Outdoor Water Rating Index
- Reference home water use is derived from the Proposed home.
  - Will have WRI at ~100



$HERS_{H2O}$ And EPA WaterSense

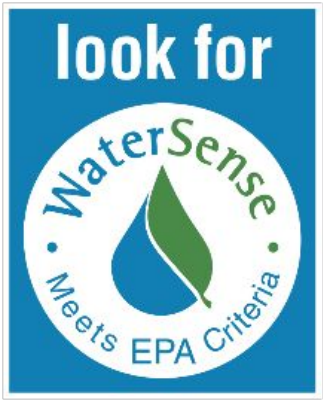
EPA WaterSense

- $HERS_{H2o}$ index of 70 or less
- Mandatory Requirements require extra inspection points:

Pressure loss test

Leak free connections

And WaterSense fixtures



Performing a $HERS_{H2O}$ Rating in Ekotrope

Getting going

General Info | Envelope | Fenestration | Mechanical | **Water** | Lighting & Appliances | Infiltration | Onsite Generation | Codes & Programs | Usage

Water Distribution

Water Fixture Type: Standard

Use Default Hot Water Pipe Length (83.25 ft) ☑

At Least R3 Pipe Insulation? ☐

Recirculation System

Hot Water Recirculation System? ☐

Drain Water Heat Recovery

Drain Water Heat Recovery? ☐

Fire Sprinkler System

Has Fire Sprinkler System: Unspecified

☐ **Water Use for Water Rating Index (HERS H2O)**

Selected Codes and Programs

Select codes and programs to show in Quick Results for all projects. Quick results load faster with fewer codes selected.

HERS
- ☑ HERS

Water Codes
- ☑ HERS H2O (Beta)
- ☑ EPA WaterSense (Beta)

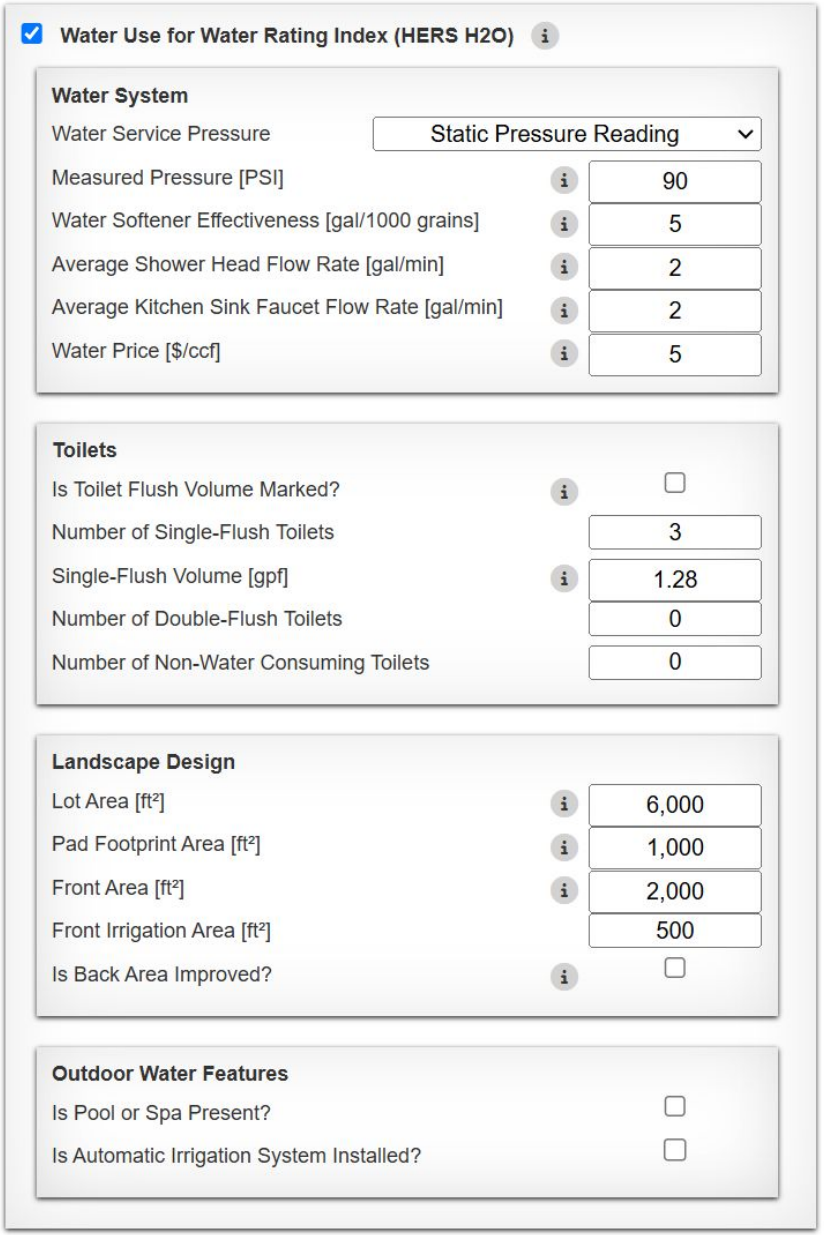
ASHRAE
- ☐ ASHRAE 62.2 2016
- ☐ ASHRAE 62.2 2013
- ☐ ASHRAE 62.2 2010

National Programs
- ☐ IECC 2018 ERI
- ☐ IECC 2018 Prescriptive
- ☐ IECC 2018 Performance

IECC 2015
- ☐ IECC 2015 ERI

Water Use Checkbox

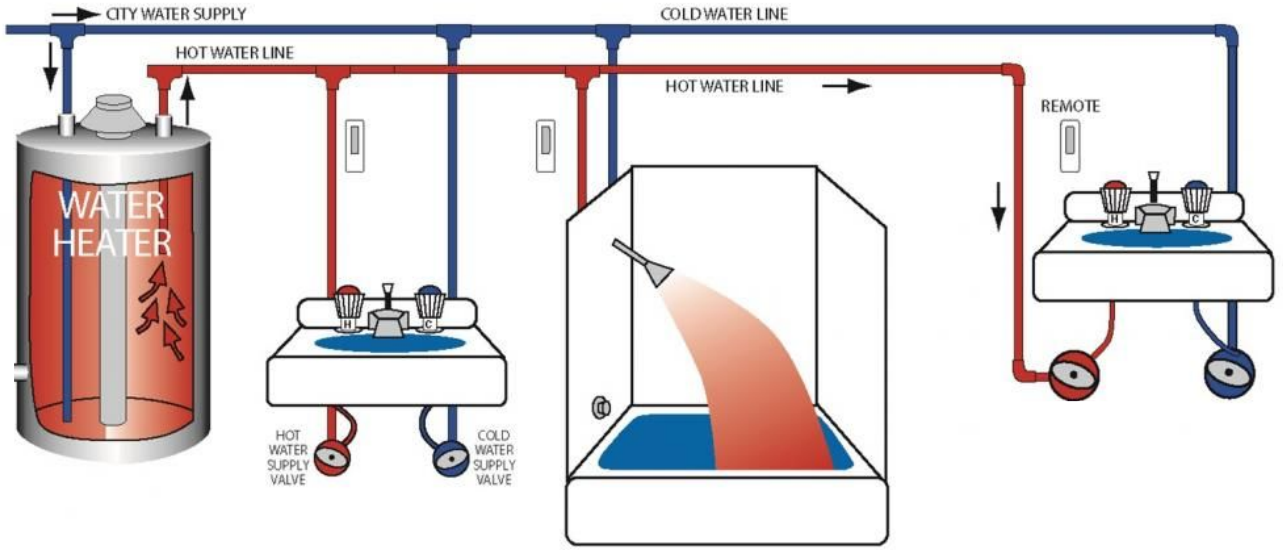
- Signals intent to do a $HERS_{H2O}$ Rating.
- Adds Water Rating Index to Quick Results.
- Enables $HERS_{H2O}$ and EPA WaterSense analyses.



Performing a $HERS_{H2O}$ Rating in Ekotrope

Water Distribution

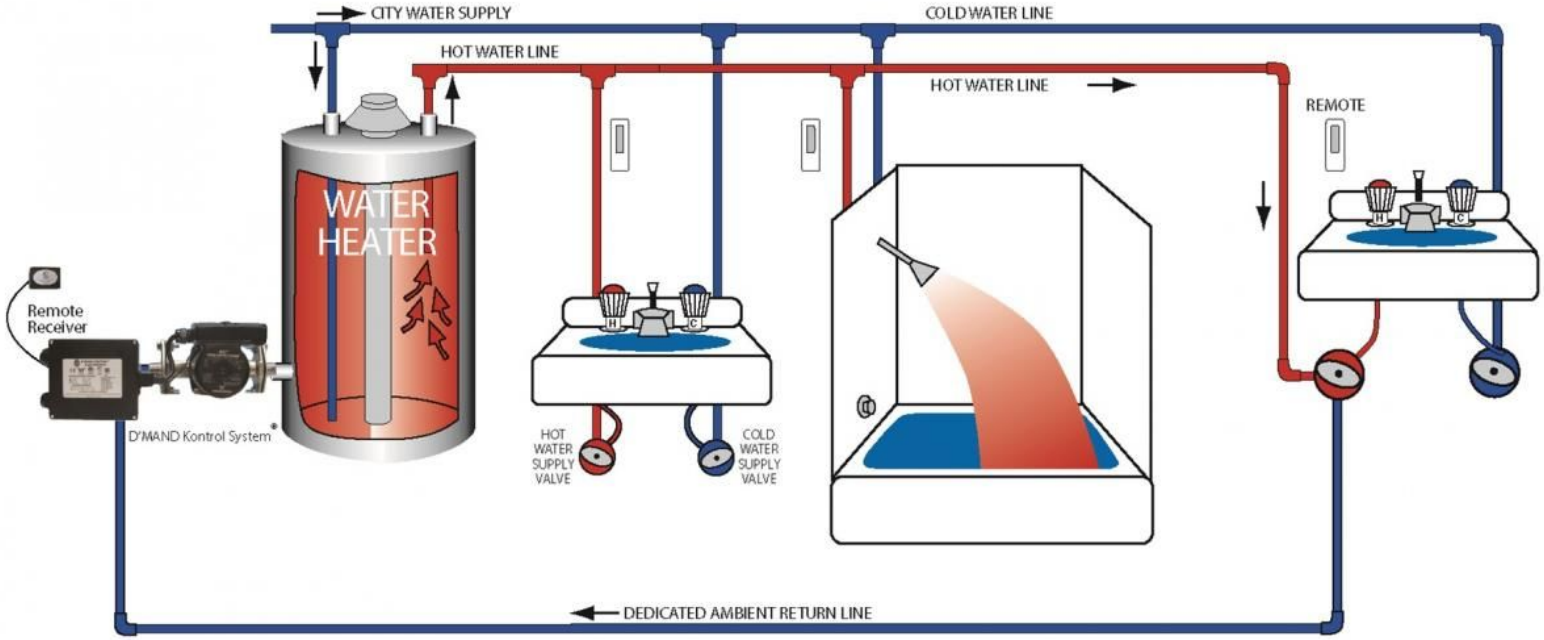
Water Fixture Type	Low-flow
Use Default Hot Water Pipe Length (83.25 ft)	☐
Hot Water Pipe Length [ft]	60
At Least R3 Pipe Insulation?	☑



Performing a $HERS_{H2O}$ Rating in Ekotrope

Recirculation System

Hot Water Recirculation System?		☑
Hot Water Branch Length [ft]	i	6
Recirculation System Pipe Loop Length [ft]	i	30
Recirculation System Control		Manual Demand Control
Recirculation Pump Power [Watts]	i	50
Shared?	i	☐

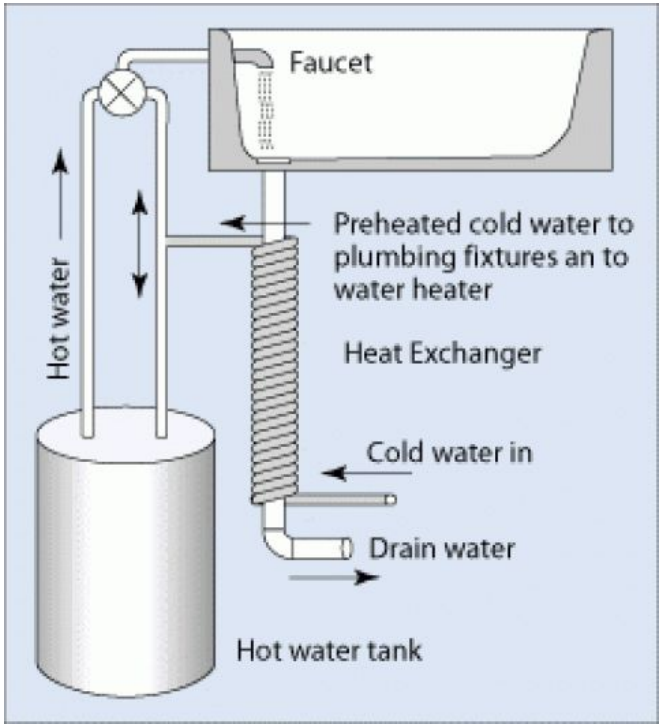


https://basc.pnnl.gov/resource-guides/demand-plumbing

Performing a $HERS_{H2O}$ Rating in Ekotrope

Drain Water Heat Recovery

Drain Water Heat Recovery?	☑
Drain Water Heat Recovery Efficiency	0.5
Supplies preheated water to:	Cold Water and Hot Water Fixture:
Fixture Factor of Drain Water Heat Recovery	1.0



https://www.energy.gov/energysaver/drain-water-heat-recovery

Performing a $HERS_{H2O}$ Rating in Ekotrope

Water System

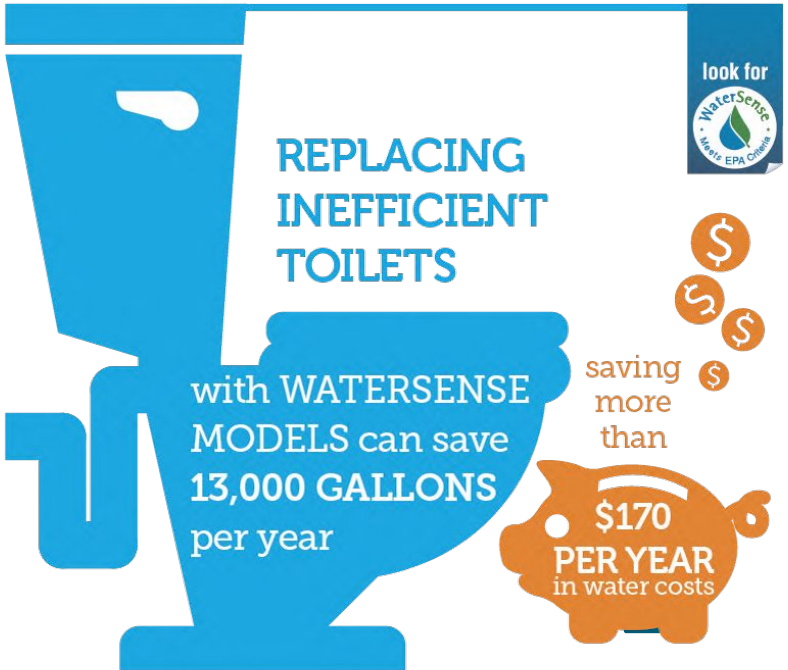
Water Service Pressure		Static Pressure Reading
Measured Pressure [PSI]	i	90
Water Softener Effectiveness [gal/1000 grains]	i	5
Average Shower Head Flow Rate [gal/min]	i	2
Average Kitchen Sink Faucet Flow Rate [gal/min]	i	2
Water Price [$/ccf]	i	5

Performing a $HERS_{H2O}$ Rating in Ekotrope

Toilets

Is Toilet Flush Volume Marked?	i	☑
Number of Single-Flush Toilets		1
Single-Flush Volume [gpf]	i	1.28
Number of Double-Flush Toilets		1
Double-Flush Volume [gpf]	i	1.28
Number of Non-Water Consuming Toilets		1

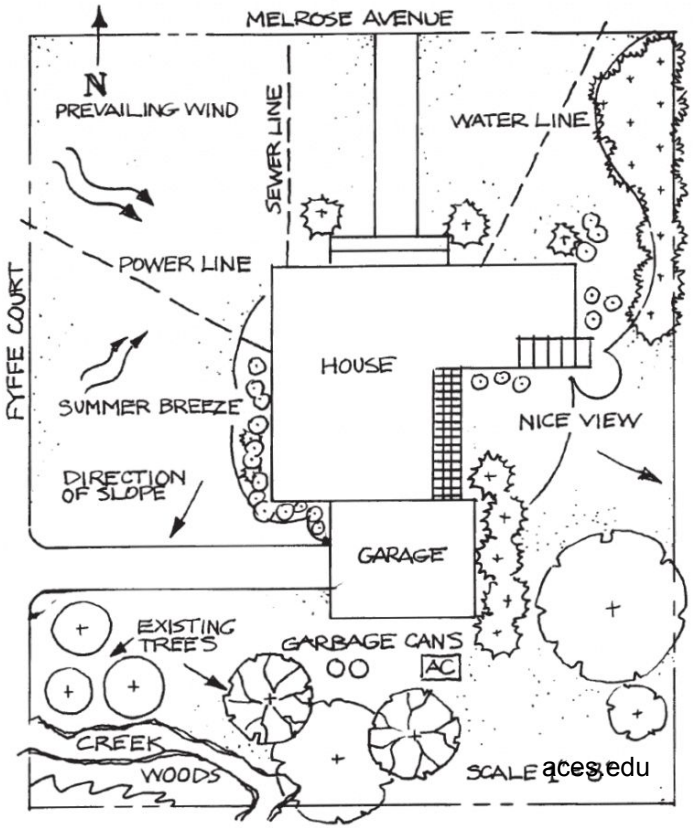
- Number of toilets and average flush volume for all similar toilet types.
- Double flush volume is average of two reduced flushes and one full flush.



Performing a $HERS_{H2O}$ Rating in Ekotrope

Landscape Design

Lot Area [ft²]	i	10,000
Pad Footprint Area [ft²]	i	1,400
Front Area [ft²]	i	2000
Front Irrigation Area [ft²]		400
Is Back Area Improved?	i	☑
Back Irrigation Area [ft²]	i	0



Performing a $HERS_{H2O}$ Rating in Ekotrope

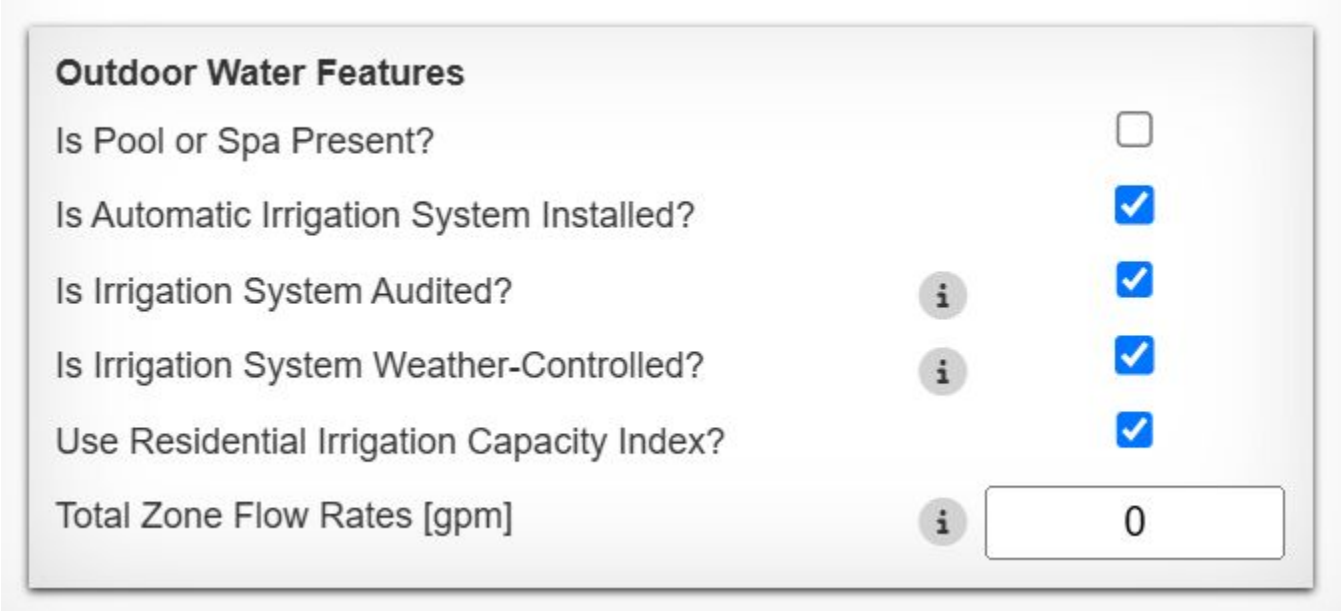


TABLE 4.6.5APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

1	4.6.2—Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	4.6.3—Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	4.6.4—Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section 4.6.4 and adjusted in partially finished landscapes to be calculated as: $RICI\_rat = \frac{\text{sum of flow (gpm) of all irrigation valves} + (0.005 \times \text{predicted } Back\_irr)}{\text{square feet irrigated area}} \times 1{,}000$ (Predicted *Back_irr* is defined in Section 5.3.)

Performing a $HERS_{H2O}$ Rating in Ekotrope

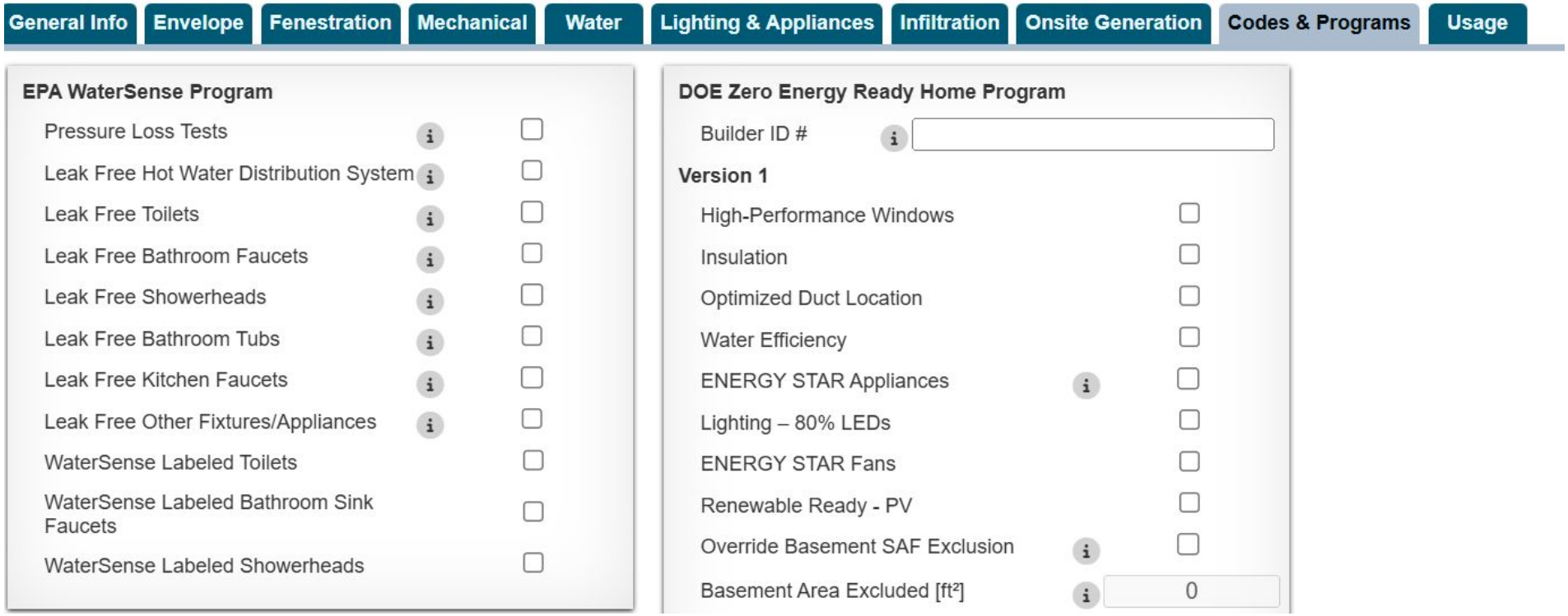
Dishwasher ☑

Manufacturer	Ekotrope
Model	12345
Dishwasher Default:	Custom
Efficiency Type	kWh/yr
Labeled Energy Rating [kWh]	467
Dishwasher Size	Standard
Natural Gas Operating Cost [$]	33.12
Gas Rate [$/therm]	1.09
Electric Rate [$/kWh]	0.12
Outside Conditioned Space?	☐

Clothes Washer ☑

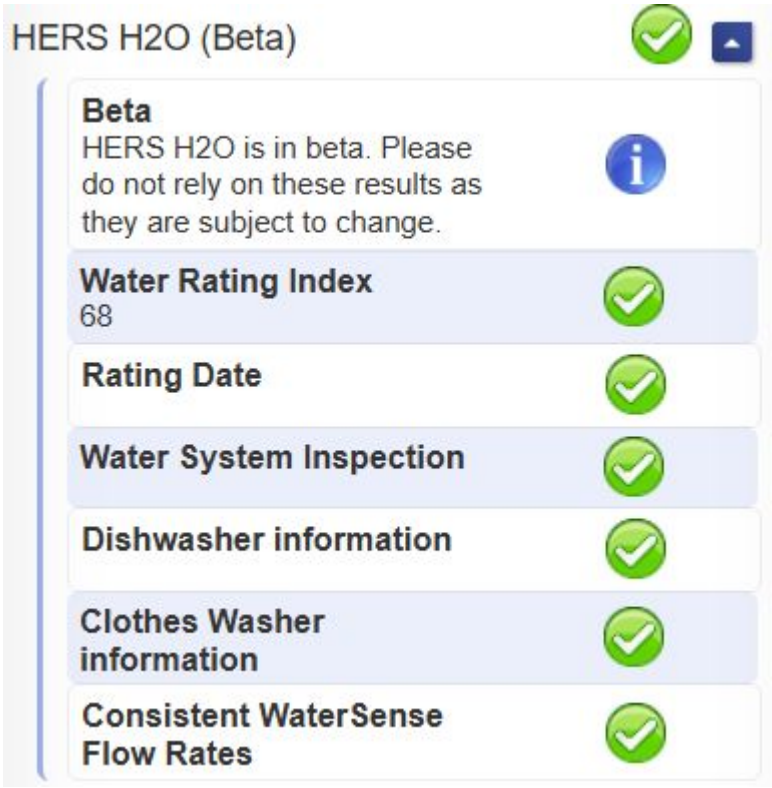
Manufacturer	Ekotrope
Model	54321
Integrated Water Factor	11.4
Set Washer Properties:	Custom
Washer Labeled Energy Rating[kWh]	400
Washer IMEF	1
Natural Gas Operating Cost [$]	27
Washer Capacity [ft³]	3
Gas Rate [$/therm]	1.09
Electric Rate [$/kWh]	0.12
Washer Labeled Loads Per Week	6
Load Type	Front-load
Outside Conditioned Space?	☐

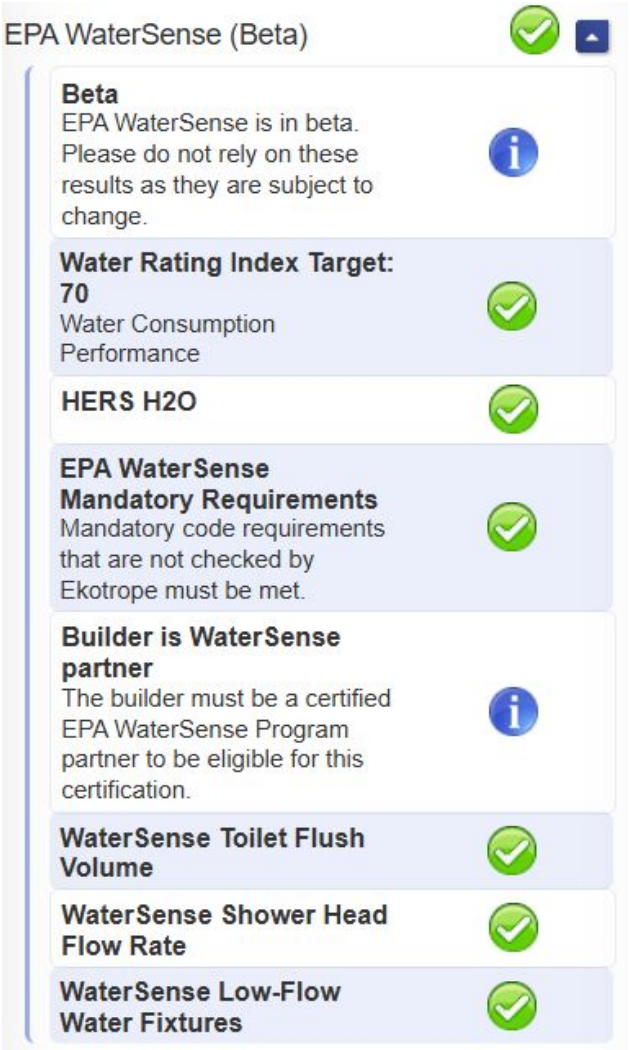
Performing a WaterSense Rating in Ekotrope



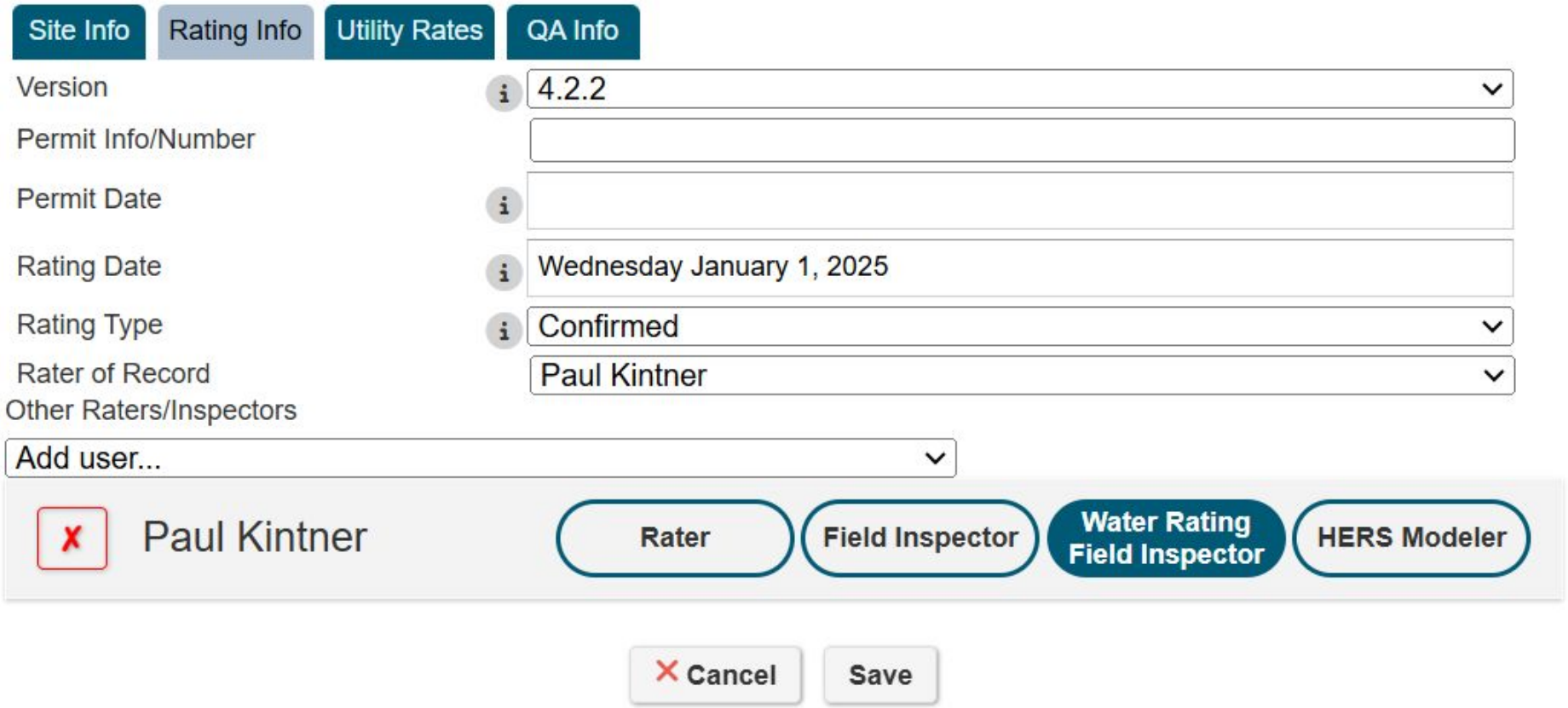
QA Checks

- Reviewing outputs and scores.

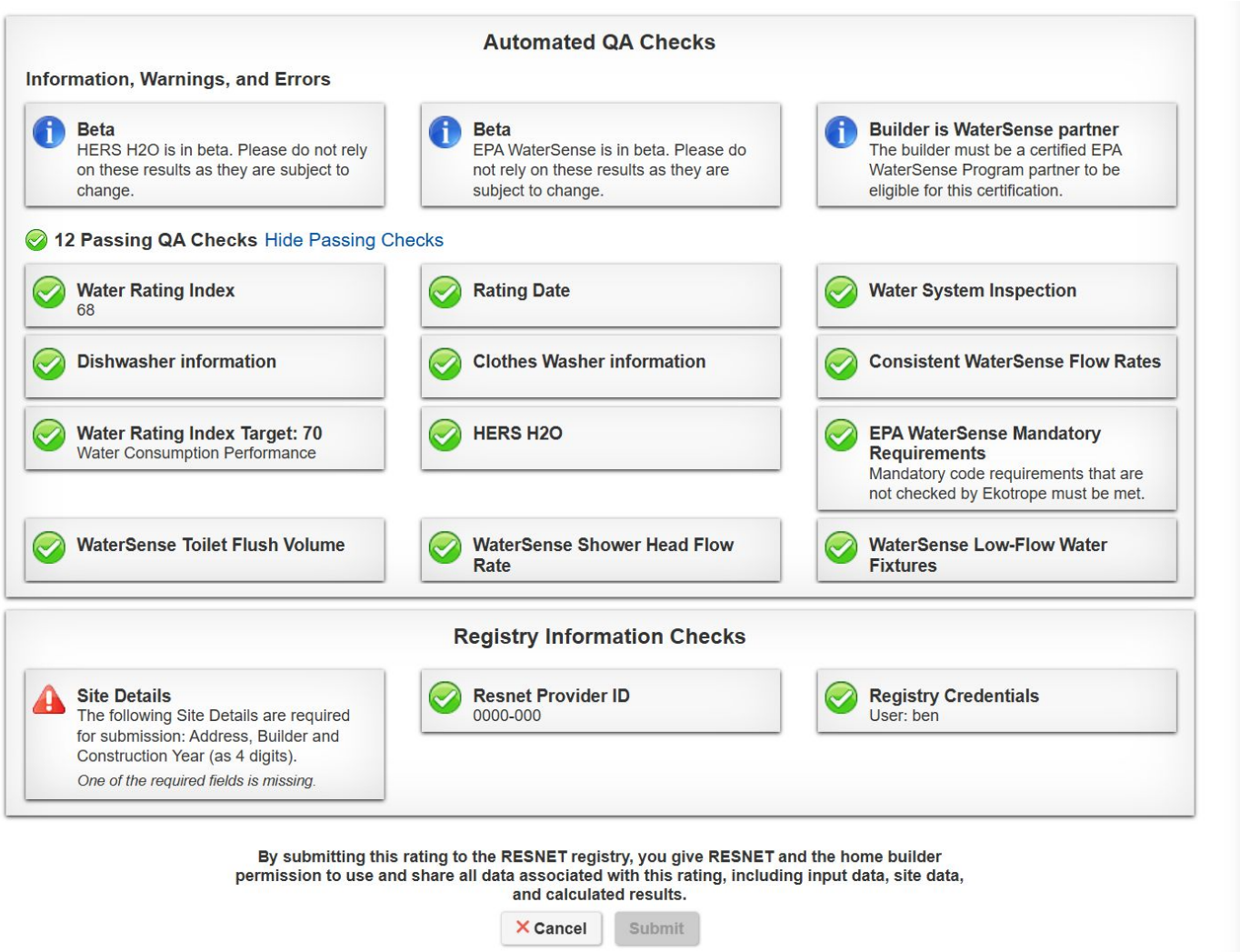




Performing a $HERS_{H2O}$ Rating in Ekotrope



Submissions



Generating Reports

- $HERS_{H2O}$ certificate
- Expect to see:
  - WaterSense Labels and Certificates
  - Water Summary Comparison
  - Home Summary

HERS H_2O Certificate

Projected Report
Based on Plans

Rating Date:
Registry ID:
Ekotrope ID: LZg1NQ5d

ekotrope

RESNET HERS$_{H2O}$

75
HERS$_{H2O}$ Index

About this rating:
This rating is a relative performance score. A lower HERS H2O index means better water efficiency for a home. For more Information, see: https://www.resnet.us/about/hersh2o/

Home:
, NY
Builder:

ESTIMATED INDOOR WATER USAGE AND SAVINGS

Daily Water Usage	108.38 gal.
Daily Water Savings Compared to Reference Home	24.38 gal.

ESTIMATED OUTDOOR WATER USAGE AND SAVINGS

Daily Water Usage	46.62 gal.
Daily Water Savings Compared to Reference Home	26.13 gal.

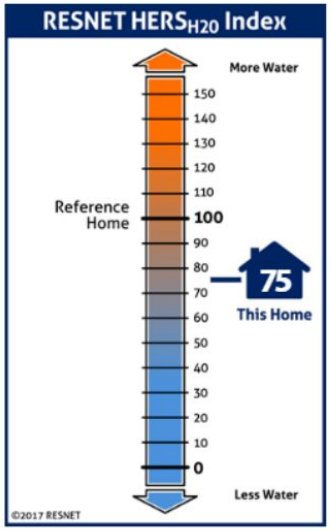
BETA

How this Home Compares to the Reference Home:

25%
More Water Efficient

18,436
Gallons, Annual Water Savings

$123
Estimated Annual Water Cost Savings



Home Feature Summary:

Conditioned Floor Area:	2,000 ft^2
Number of Bedrooms:	3
Lot Size:	6,000 ft^2
Irrigated Area:	500 ft^2
Automatic Irrigation:	Yes
Average Toilet Flush Volume:	1.28 gpf
Kitchen Faucet Flow Rate:	2.00 gpm
Bathroom Faucet Flow Rate:	Low-flow
Average Shower Flow Rate:	2.00 gpm

Rating Completed by:

Energy Rater: Paul Kintner
RESNET ID:

Rating Company: Ekotrope
2 Avenue De Lafayette, Fourth Floor

Rating Provider: Ekotrope
2 Avenue De Lafayette, Fourth Floor

Paul Kintner, Certified Energy Rater
Date: 1/14/25 at 7:08 AM

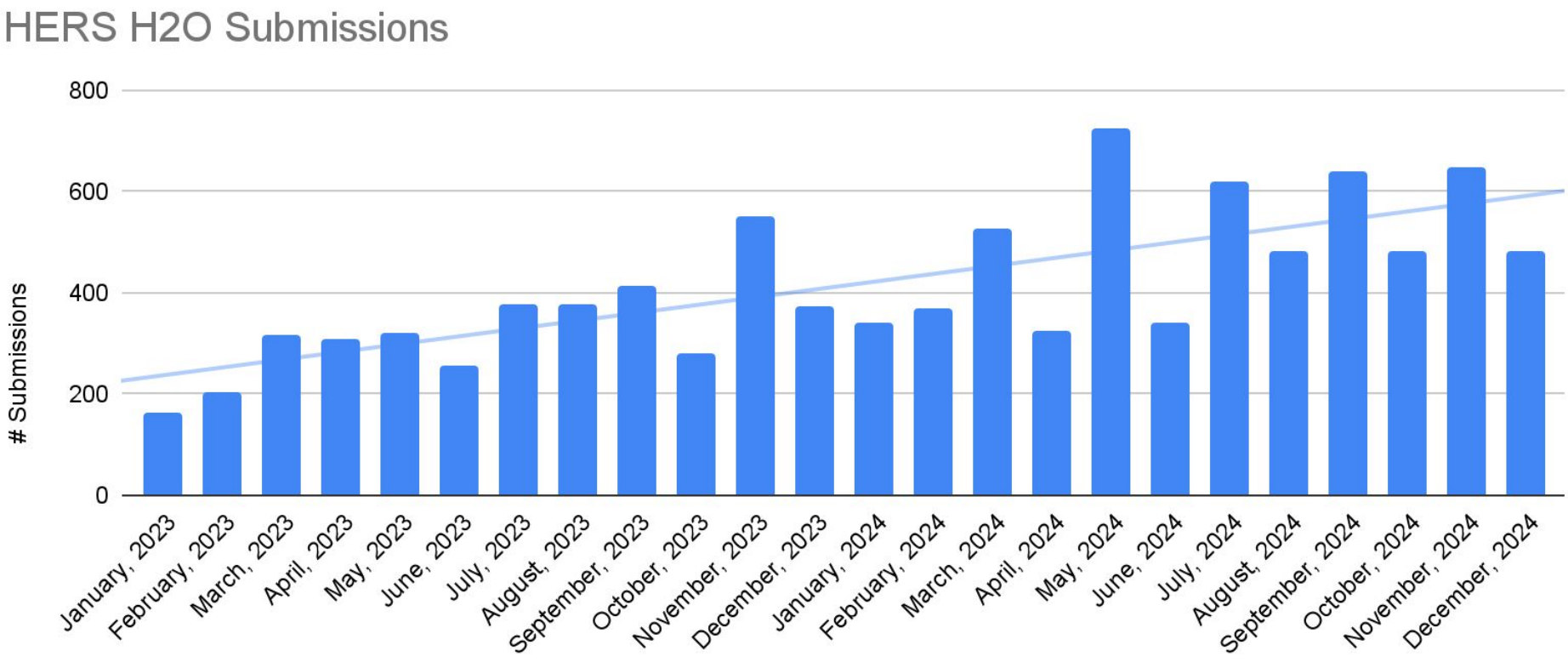
Beyond a HERS Rating

- Additional testing and inspection:
  - Individual fixture lookups and/or flow rate testing
  - Pressure loss testing
  - Leak inspection
  - Lot sizes
  - Irrigation inspections
    - (Optional) Residential Irrigation Capacity Index (RICI) testing

- (Audience) What is the hardest part and takes the longest time with inspections?

Why perform $HERS_{H2O}$ Ratings in Ekotrope?

Submissions are on the Rise



Ekotrope Value

- Data all in one place
  - No duplicate entry
  - Less to manage across different platforms
- Easy version control - Don't have to manage the different excel versions
- Reports / Certifications / Labels on demand and in batch
- Saves time
- Support of Ekotrope (support@ekotrope.com)

Coming Soon

- Additional Reports
  - WaterSense Certificates and Labels
  - Diagnostic Reports
  - Home Summary Reports
- Batch registration
- Integration with DOE ZERH v2 WaterSense requirement
- Final Release

Why do builders do this?

- Goodness of the heart?
- Saving the client on utility bills?
  - WaterSense estimated that labeled homes could save ~$500 annually
- RESNET and the Alliance for Water Efficiency proposed a federal tax credit to amend 45L
  - Are there other incentives out there?
- Municipalities requiring it?
  - Does it make it easier/possible to get permits in water constrained municipalities?
- Just because it's a DOE ZERH SF v2 requirement?

Thank You!

Paul Kintner

paul@ekotrope.com