

Heat Pump Water Heaters in New Townhomes



Presented by

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Products

Integrated Heat Pump Water Heater



Split-System



HPWHs in a Nutshell

Benefits

- All electrically powered
- Reduce energy use by 2-4x
- Lowest lifetime GHG emissions of any water heater

Differences

- Uses heat from ambient environment to heat water
- Makes sound from moving air and refrigerant compressor
 - 45-50 dBA (like a dishwasher)
- Condensate
- Can be slower to reheat water so consider upsizing the tank

Townhouses

Seattle - Typical



General Concepts

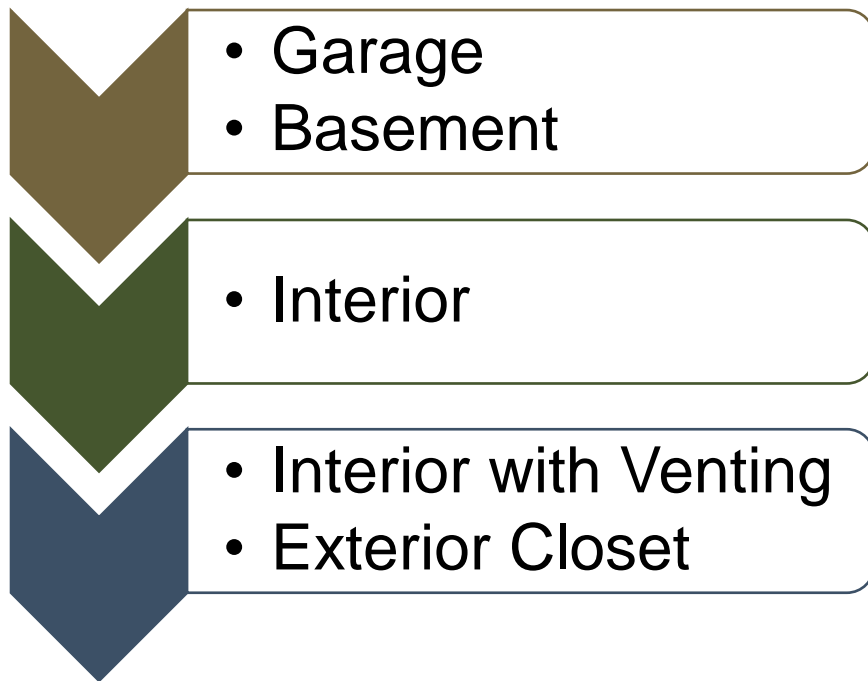
Recommended Locations

Climate Implications

Clearances

Install Location

General Guidance

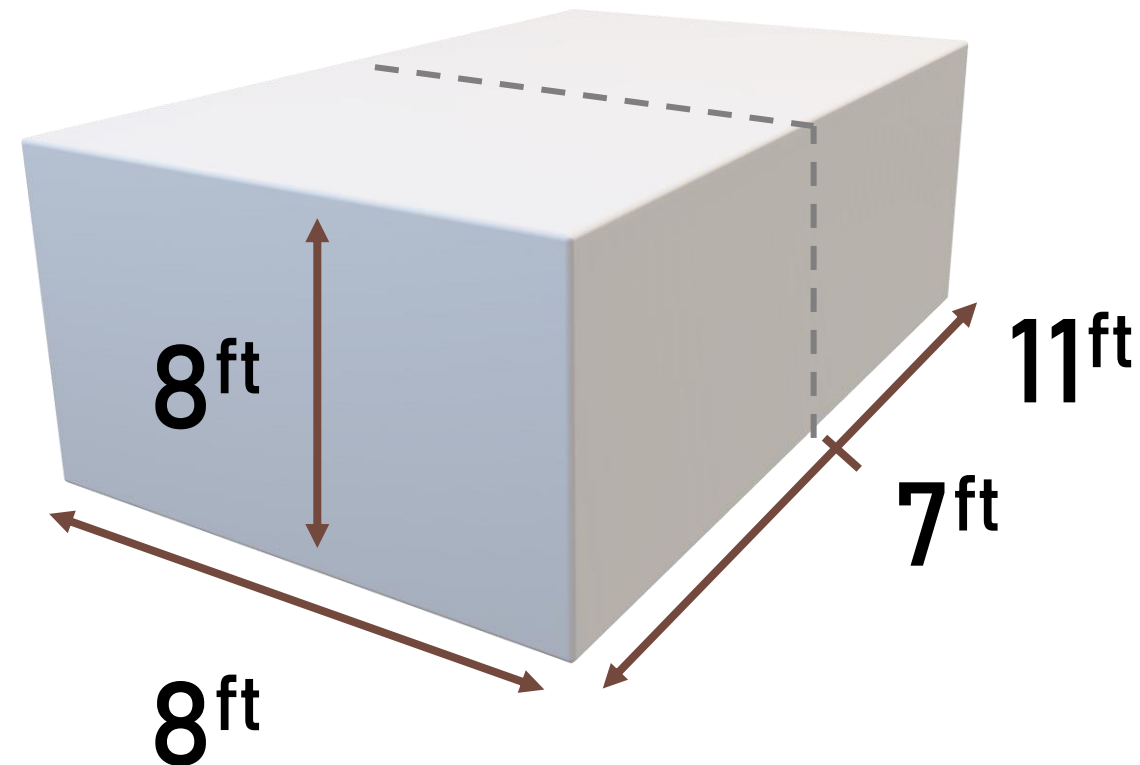


Manufacturers require at least 450
or 700 ft³ (cubic ft) of volume

Example

$$8 \times 8 \times 7 = 448 \text{ cubic feet}$$

$$8 \times 8 \times 11 = 704 \text{ cubic feet}$$



Garages

If it's normal to put water heaters in garages in your climate, a garage is a great place for a heat pump water heater.

Put a louvered door or add grilles to the wall to exchange air between water heater closet and garage



First Floor Standard

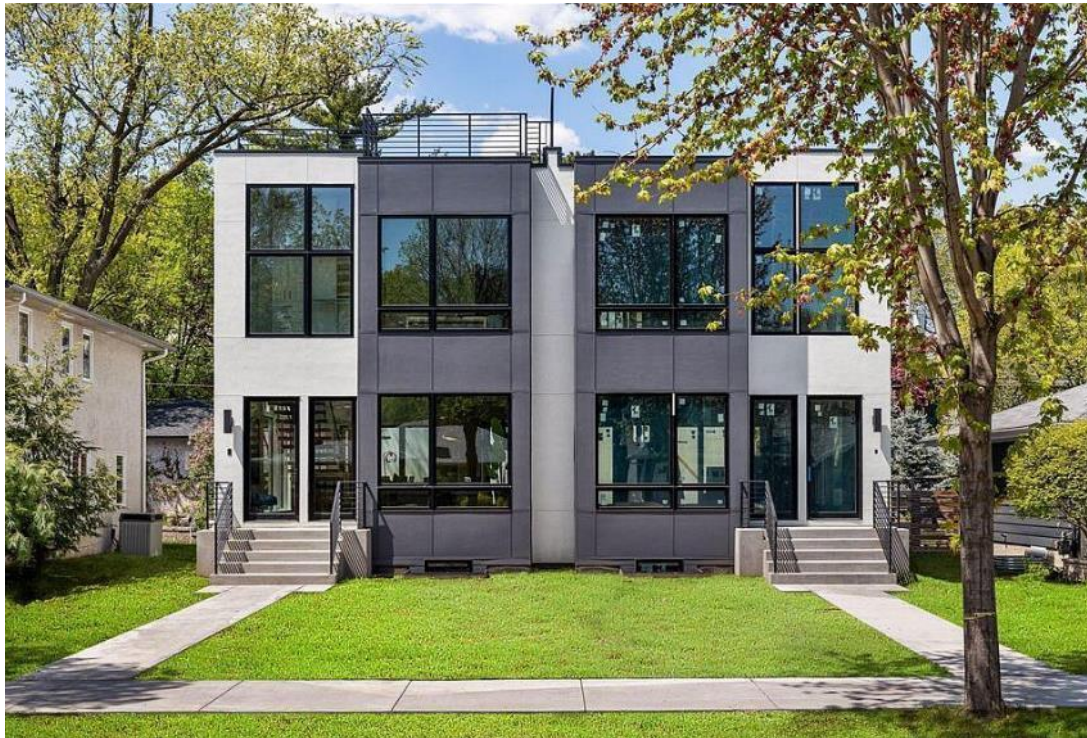


Denver

Basements

Too cold for pipes in the garage?

Basements are great for HPWHs too.



Minneapolis

No Garage? No Basement?

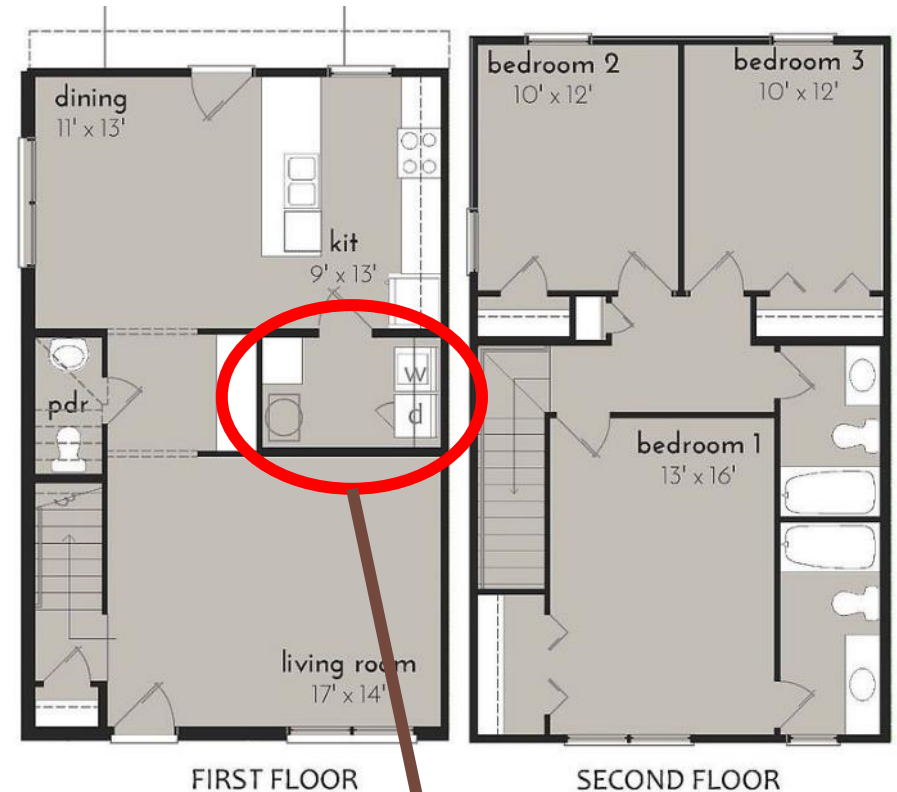
Interior installs are good too, but require a bit more thinking for best results.

Be aware of proximity to bedrooms and other areas where noise could be a nuisance.

Plan for enough space / air movement.

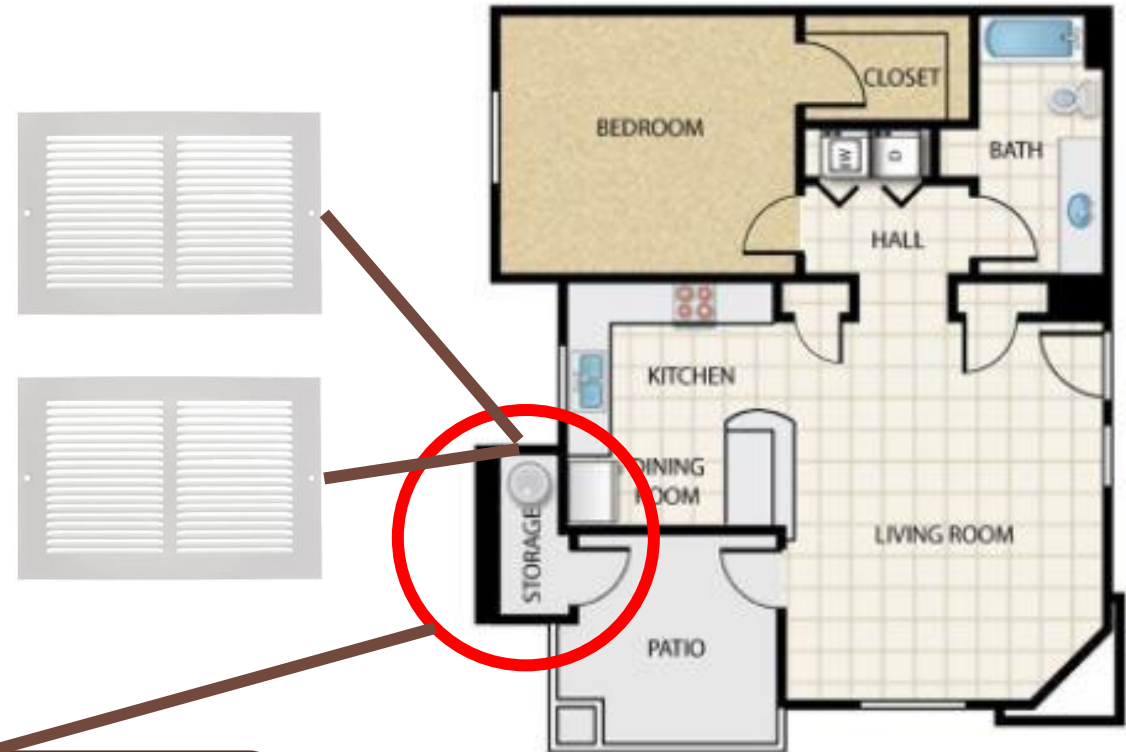
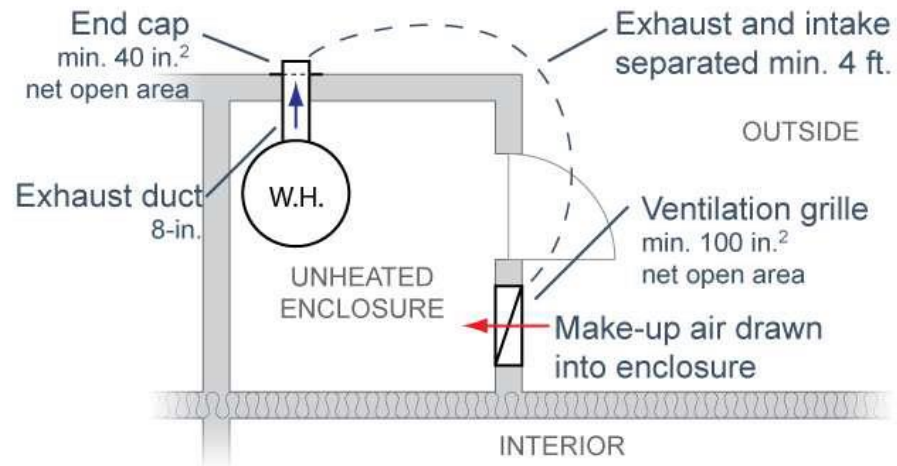


Nashville



This laundry and utility room is large enough for a HPWH without doing anything else.

Exterior Closets

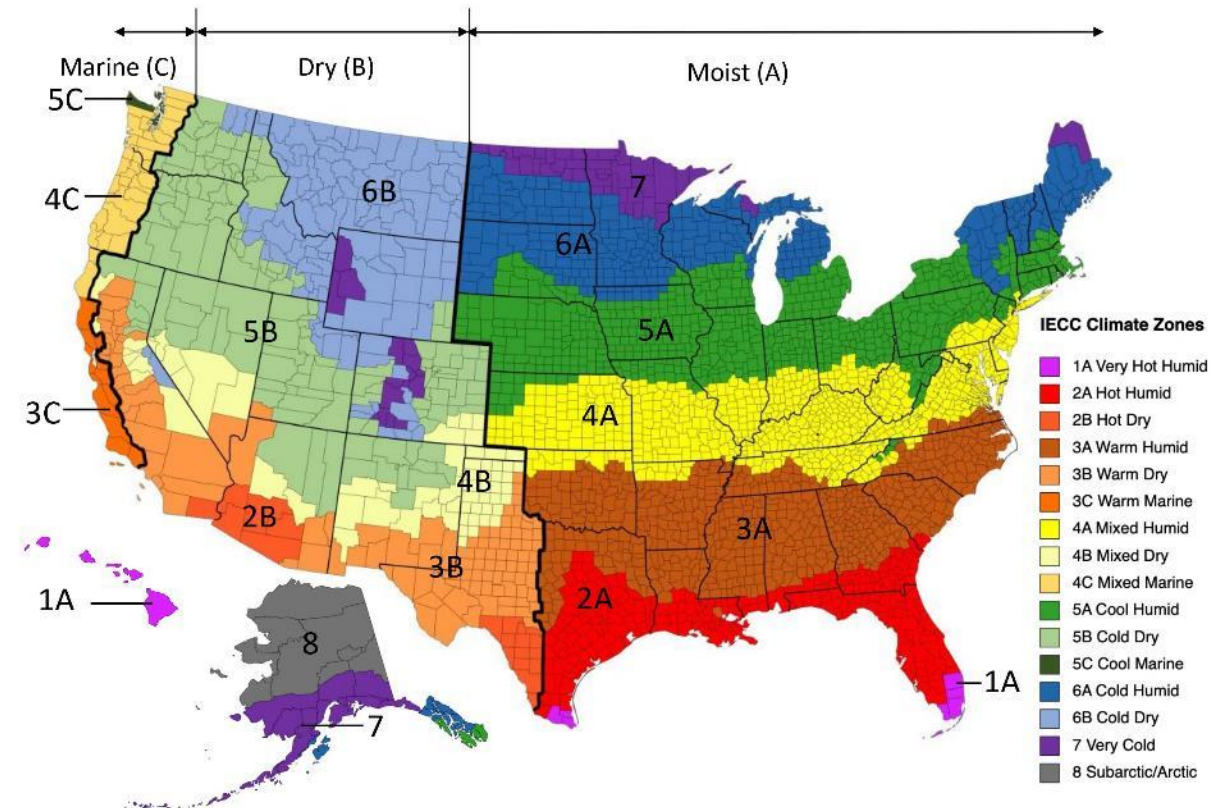


Add grilles to the wall or a louvered door.

Climate Review

Climate Zone	Garage	Basement	Interior	Exterior Closet
1	✓	✓	✓	✓
2	✓	✓	✓	✓
3	✓	✓	✓	✓
4 A+B	✓	✓	✓	✗
4 C	✓	✓	✓	▲
5	▲	✓	✓	✗
6	✗	✓	✓	✗
7	✗	✓	✓	✗

Garages and Basements Preferred



■ I'm Stuck with a Small Closet. What Works?

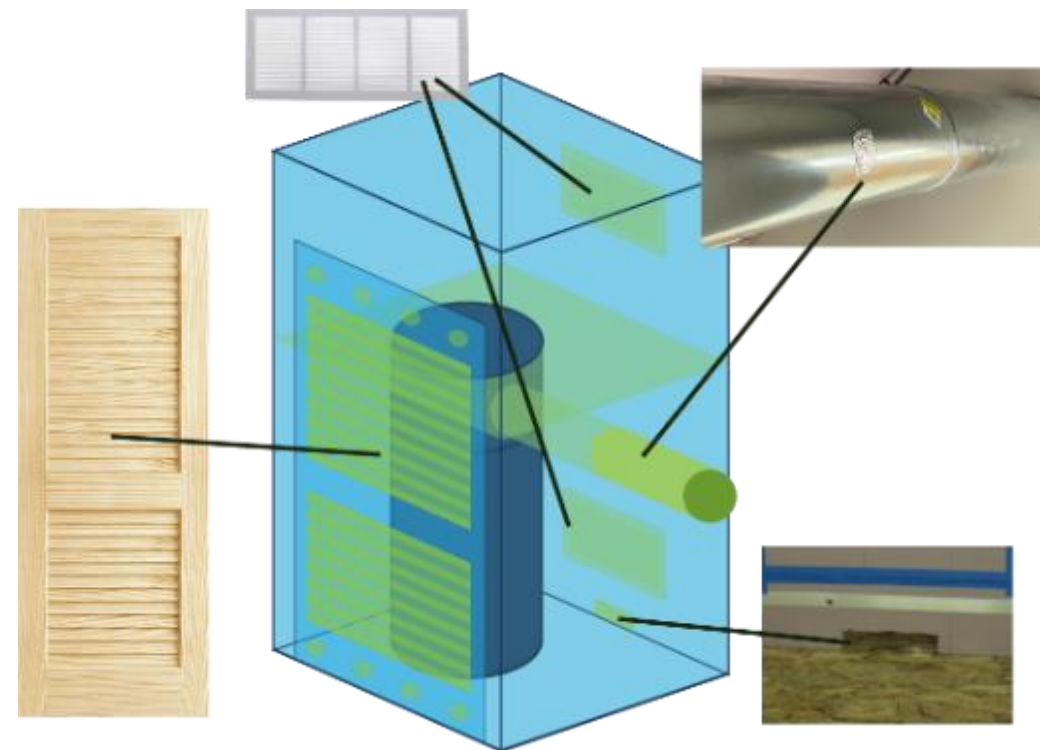
Don't get stuck:

Integrate HPWH into design from beginning.

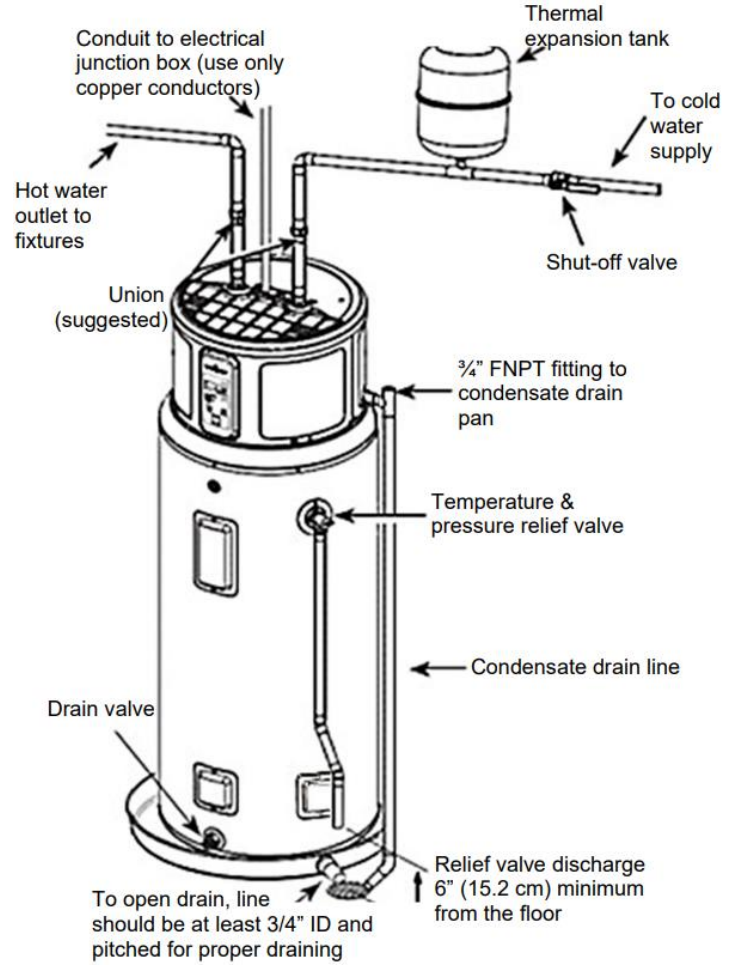
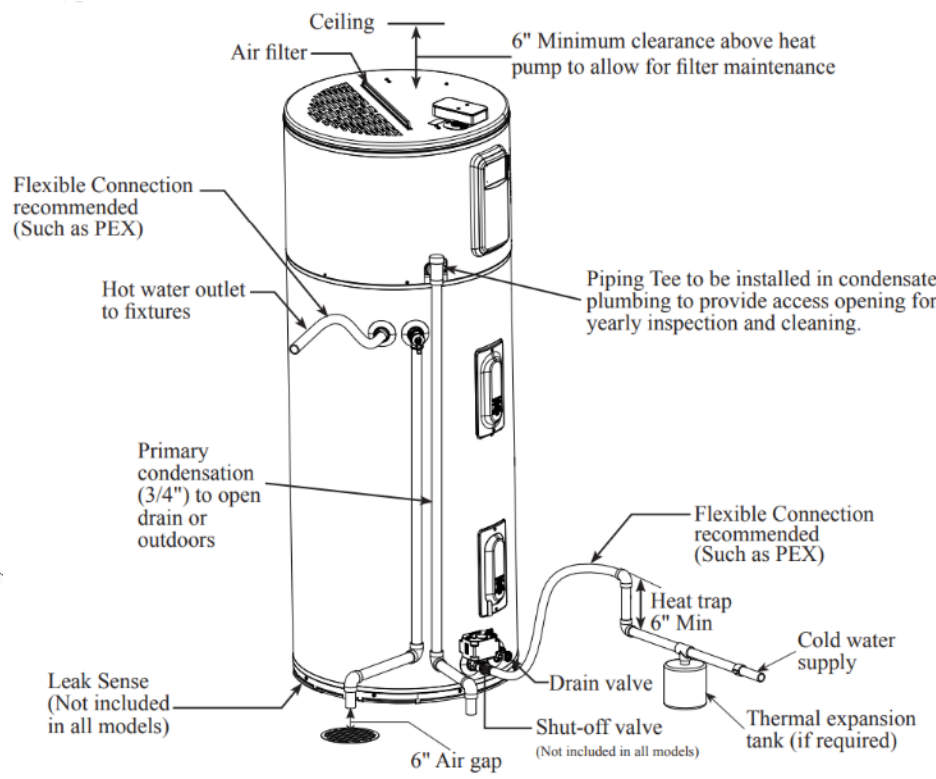
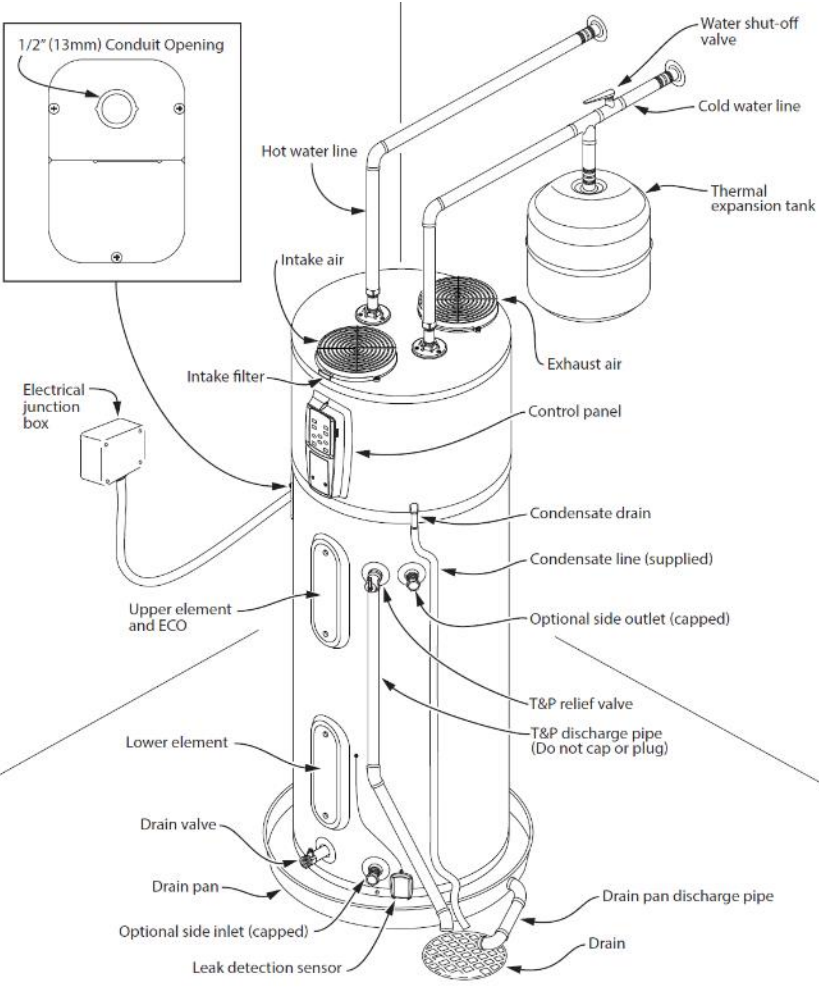
Still Stuck?

- Provide ventilation to HPWH closet.
 - Louvered doors or wall grilles with net free area $> 300 \text{ in}^2$ (split evenly high and low)
 - Duct to adjacent space inside dwelling (do not cross air barrier)
- Lab tested and verified options:

[The Amazing Shrinking Lab Test Project Report](#)



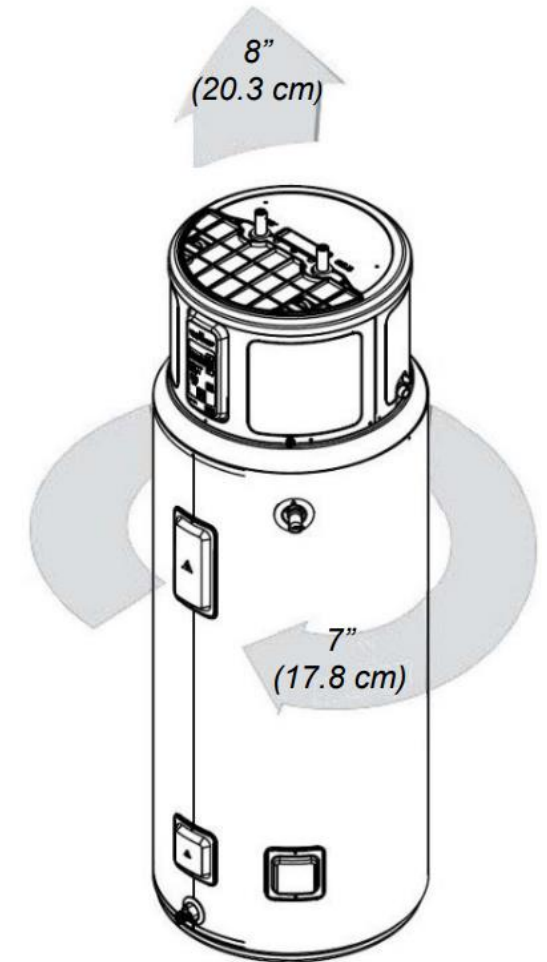
HPWH Installation



HPWH Clearances

Room Dimensions	50 Gallon	65-66 Gallon	80 Gallon
Height	6-6.5'	6-6.5'	7'
Length x Width (minimum)	2.5'	2.5'	2.5'
Length x Width (Best Practice)	3' +	3' +	3' +

- Specific dimensions vary by product.
- Table provides generalized dimensions from survey of install specifications.
 - (Useful rules of thumb for design)
- Verify with manufacturer documentation.



Specific Examples

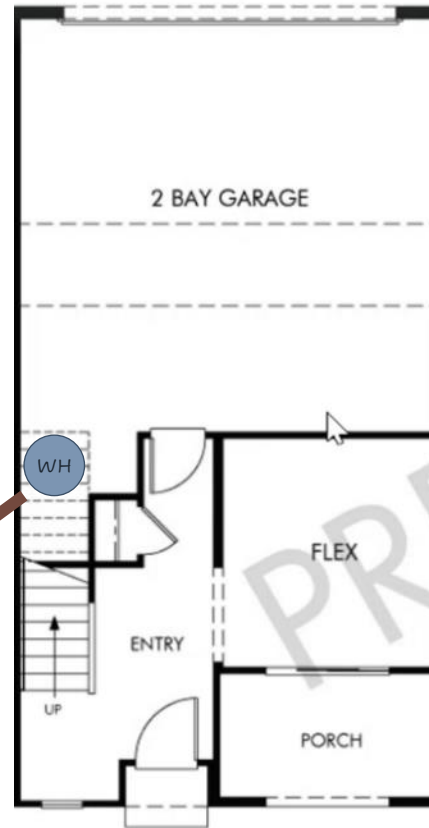
Garage – Mild Climate

Garage – Cold Climate

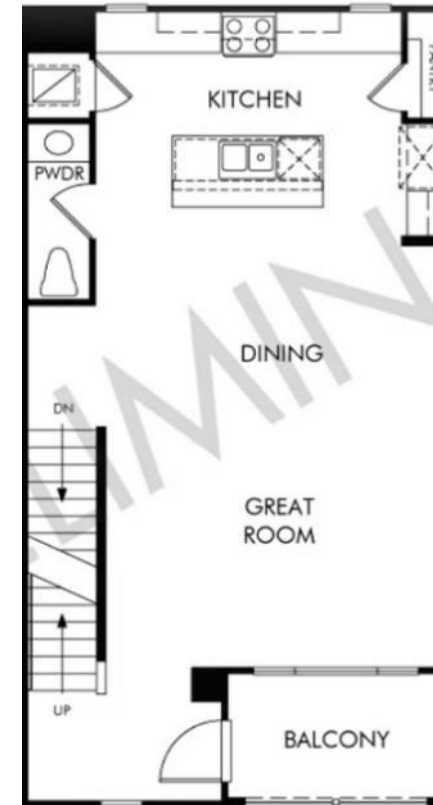
Interior – Tankless Switch Out

Garage, Warm or Mild Climate

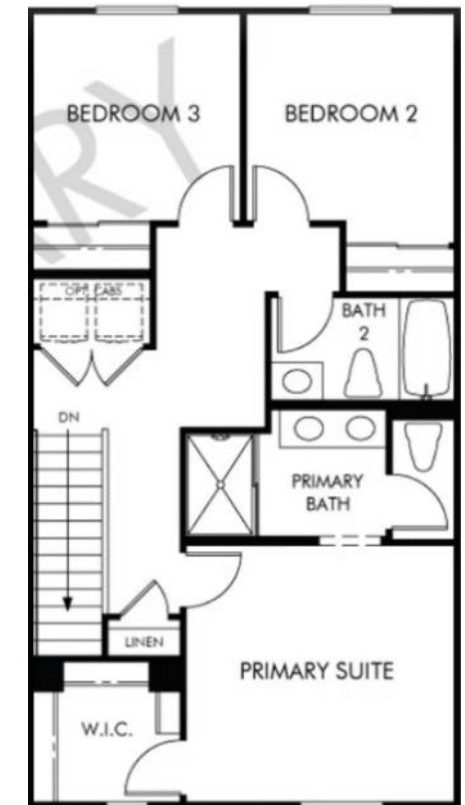
Heat pump water heater fits under stairs, where a conventional low-efficiency tank water heater would be sited



FIRST FLOOR



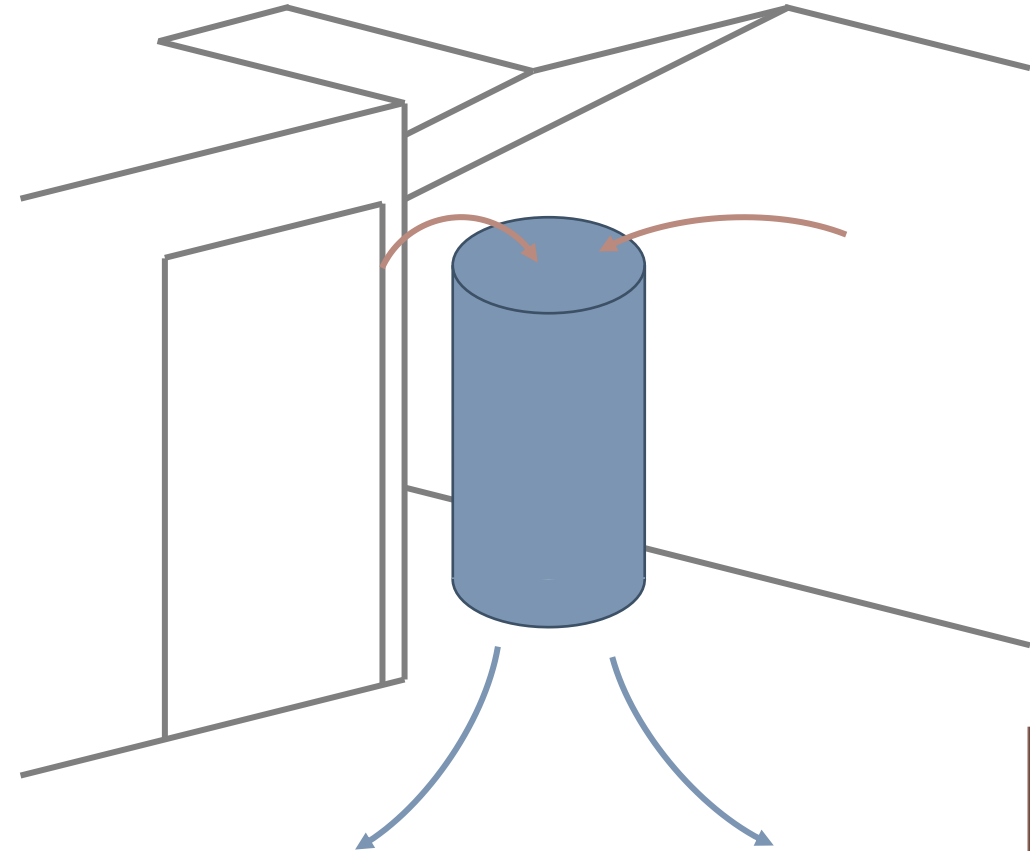
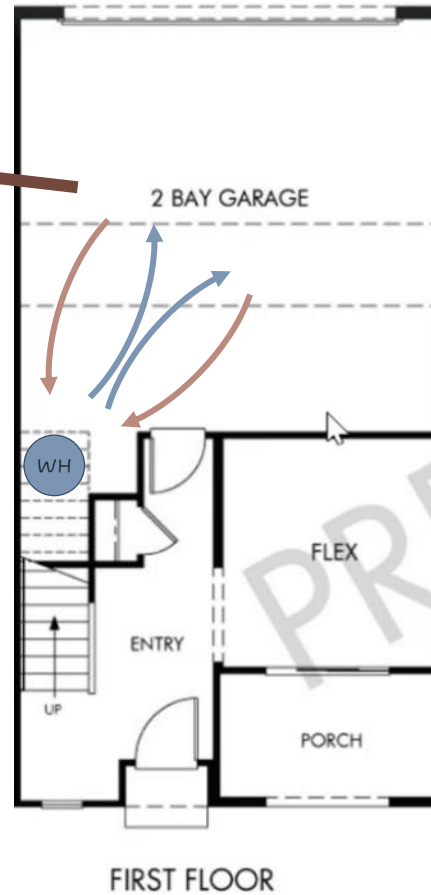
SECOND FLOOR



THIRD FLOOR

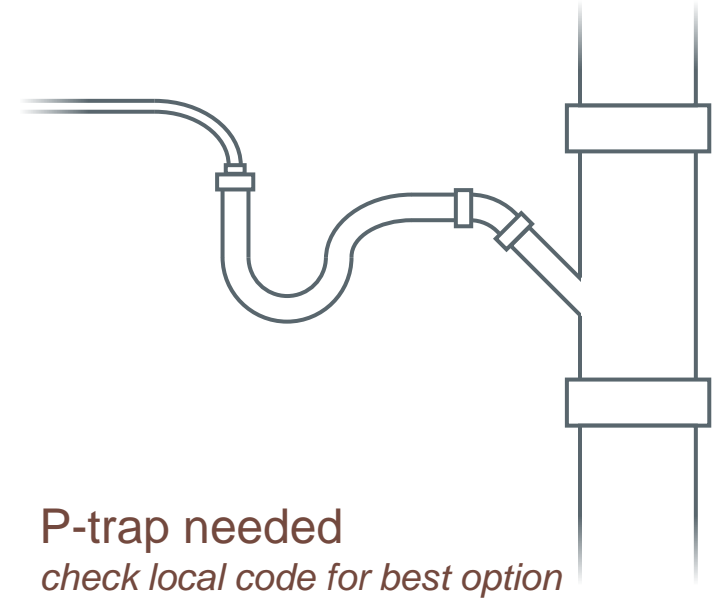
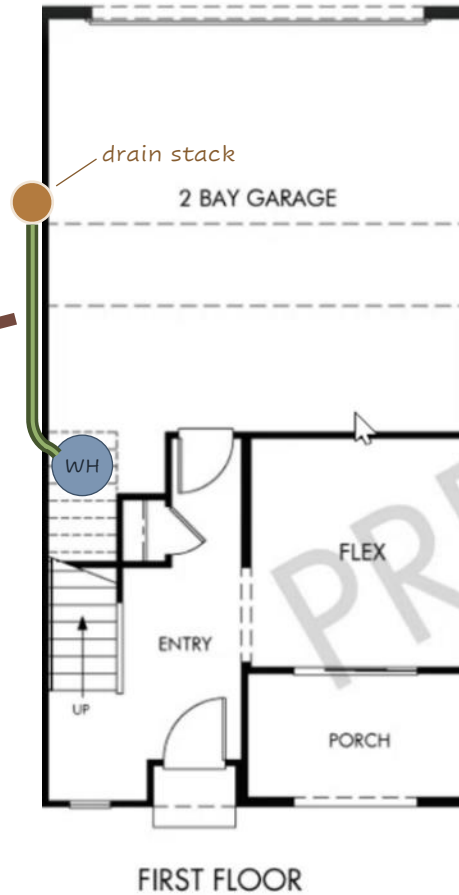
Garage, Warm or Mild Climate

2-car garage provides ample source of air for heat pump

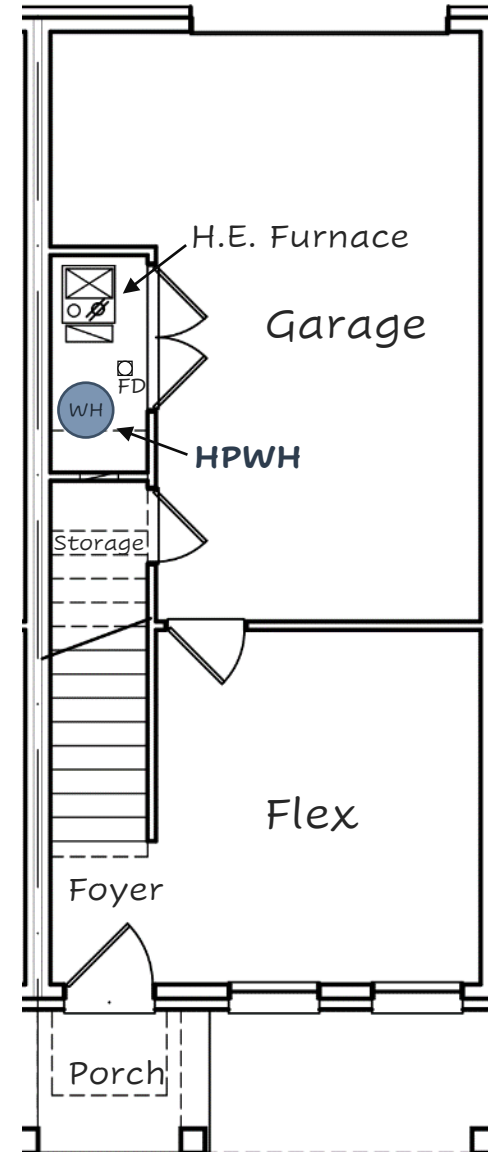


Garage, Warm or Mild Climate

Condensate
can be drained
to nearest stack

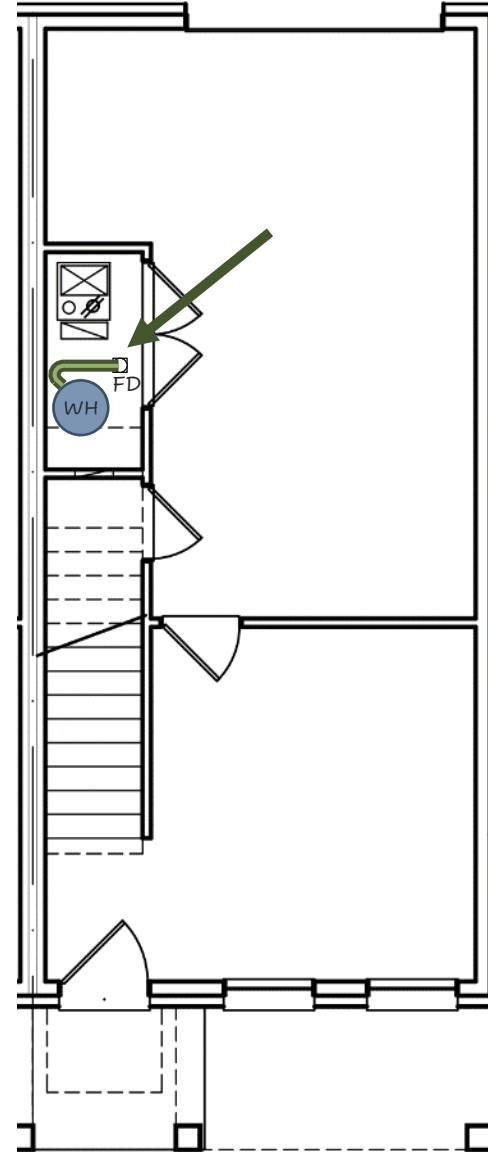


Garage, Cold Climate



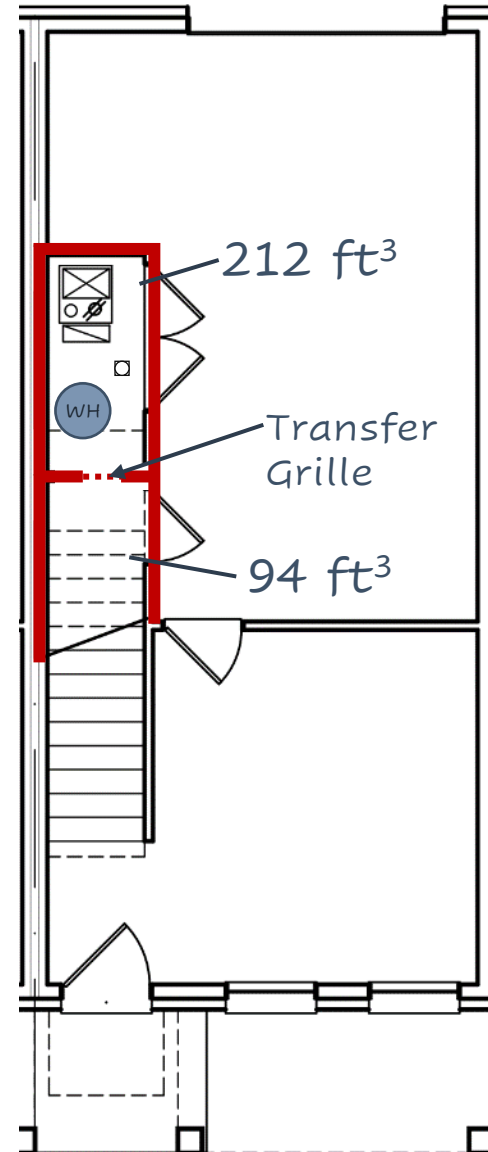
Garage, Cold Climate

- Condensate can be drained to floor, along with furnace



Garage, Cold Climate

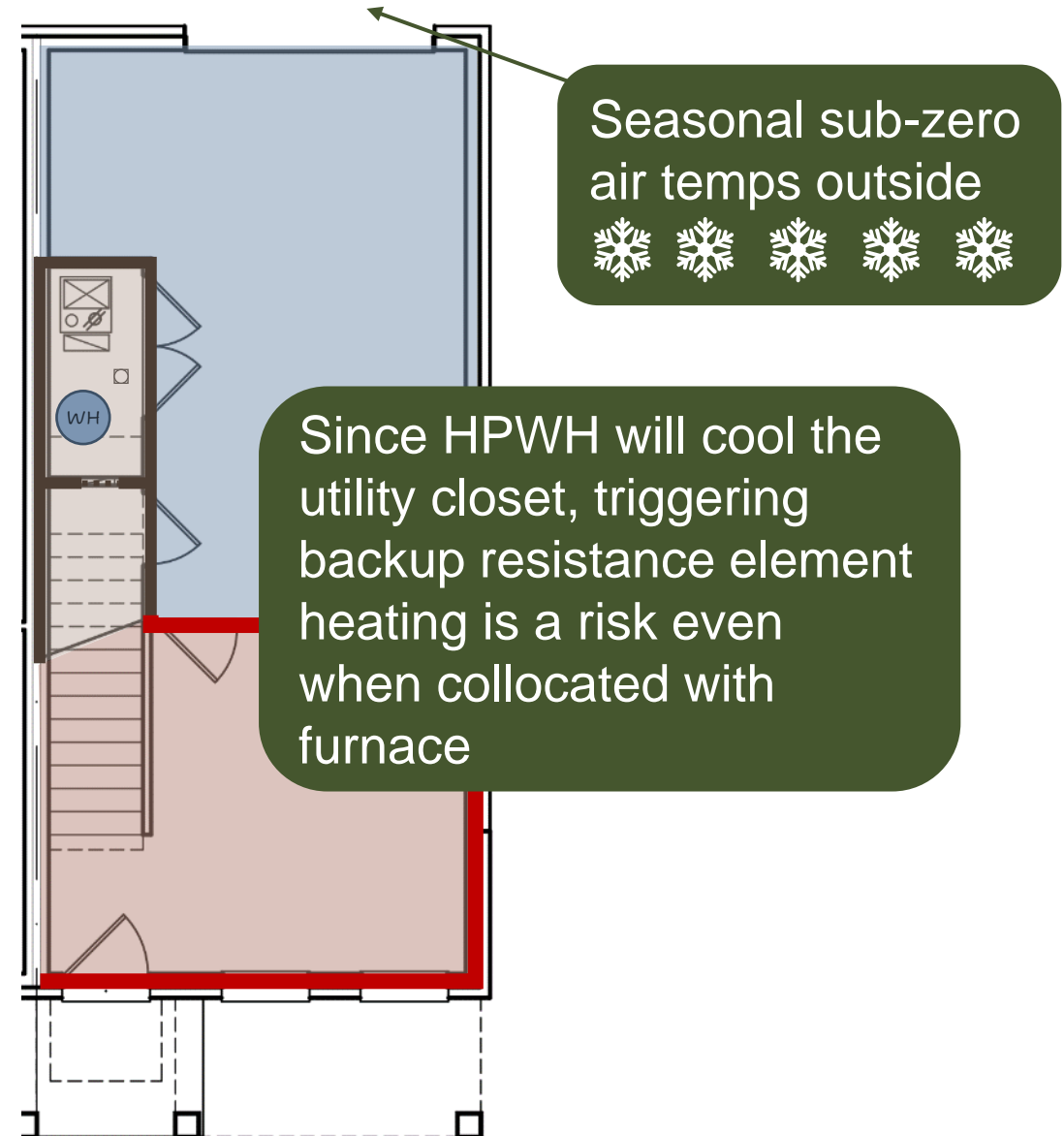
- Condensate can be drained to floor, along with furnace
- Two problems with air supply:
 - Enclosed space with insufficient volume



Even if including the storage space connected with a transfer grille, still only 2/3 of minimum volume

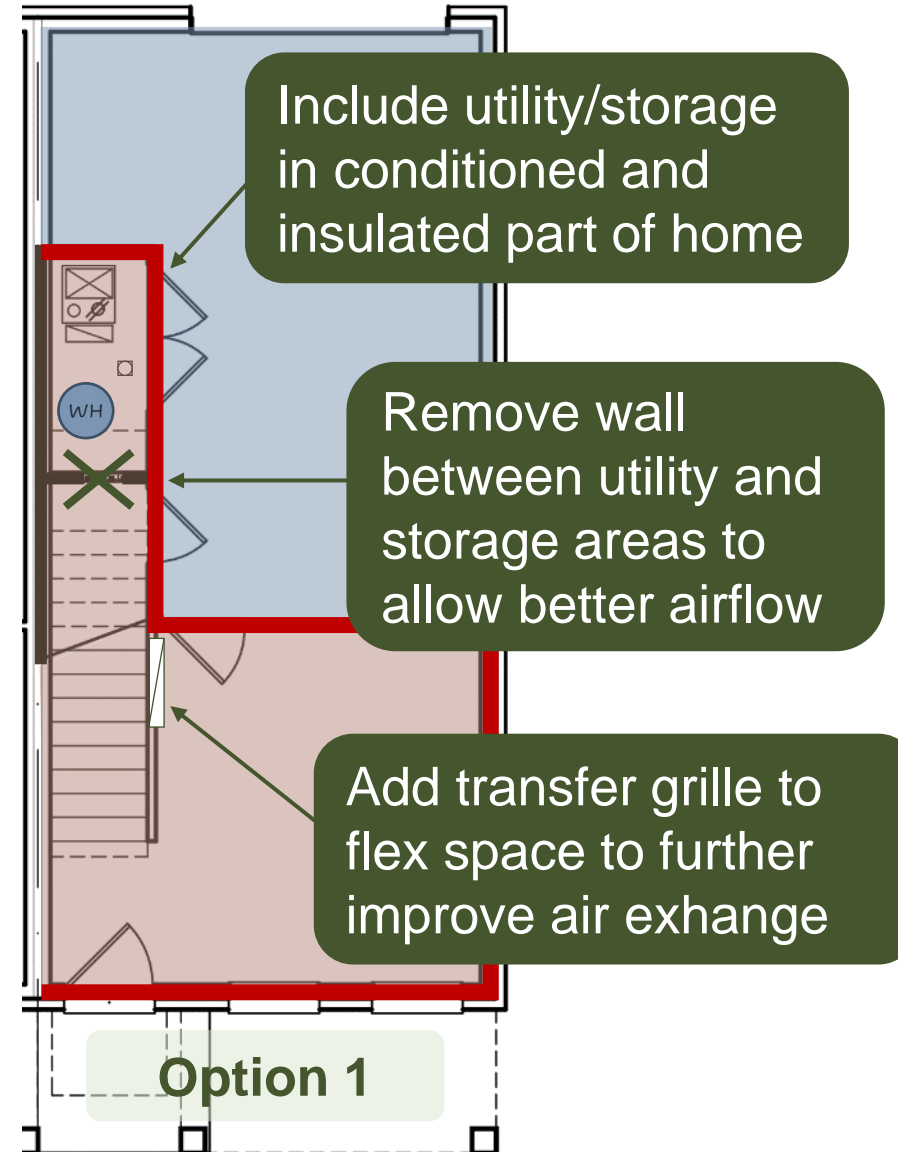
Garage, Cold Climate

- Condensate can be drained to floor, along with furnace
- Two problems with air supply:
 - Enclosed space with insufficient volume
 - WH is outside thermal envelope



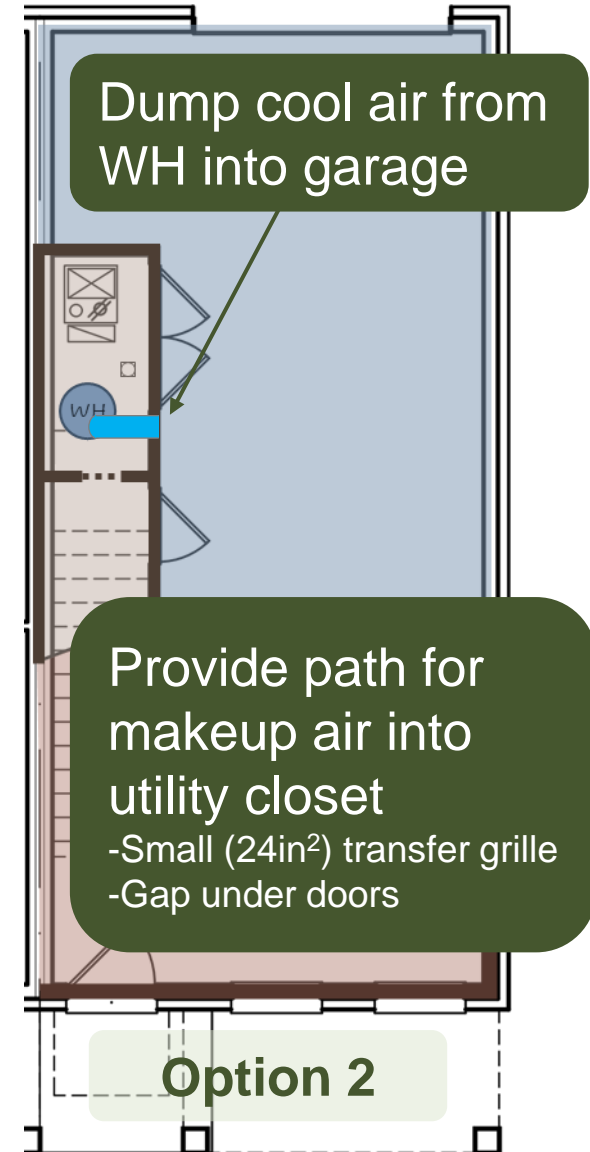
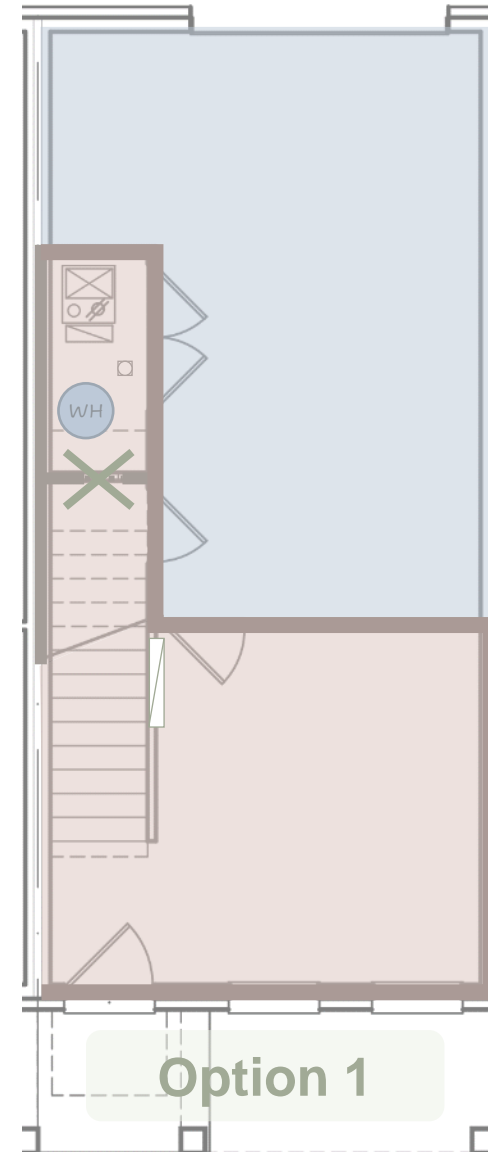
Garage, Cold Climate

- Condensate can be drained to floor, along with furnace
- Two problems with air supply:
 - Enclosed space with insufficient volume
 - WH is outside thermal envelope
- Two solutions for air supply:
 - Extend thermal envelop



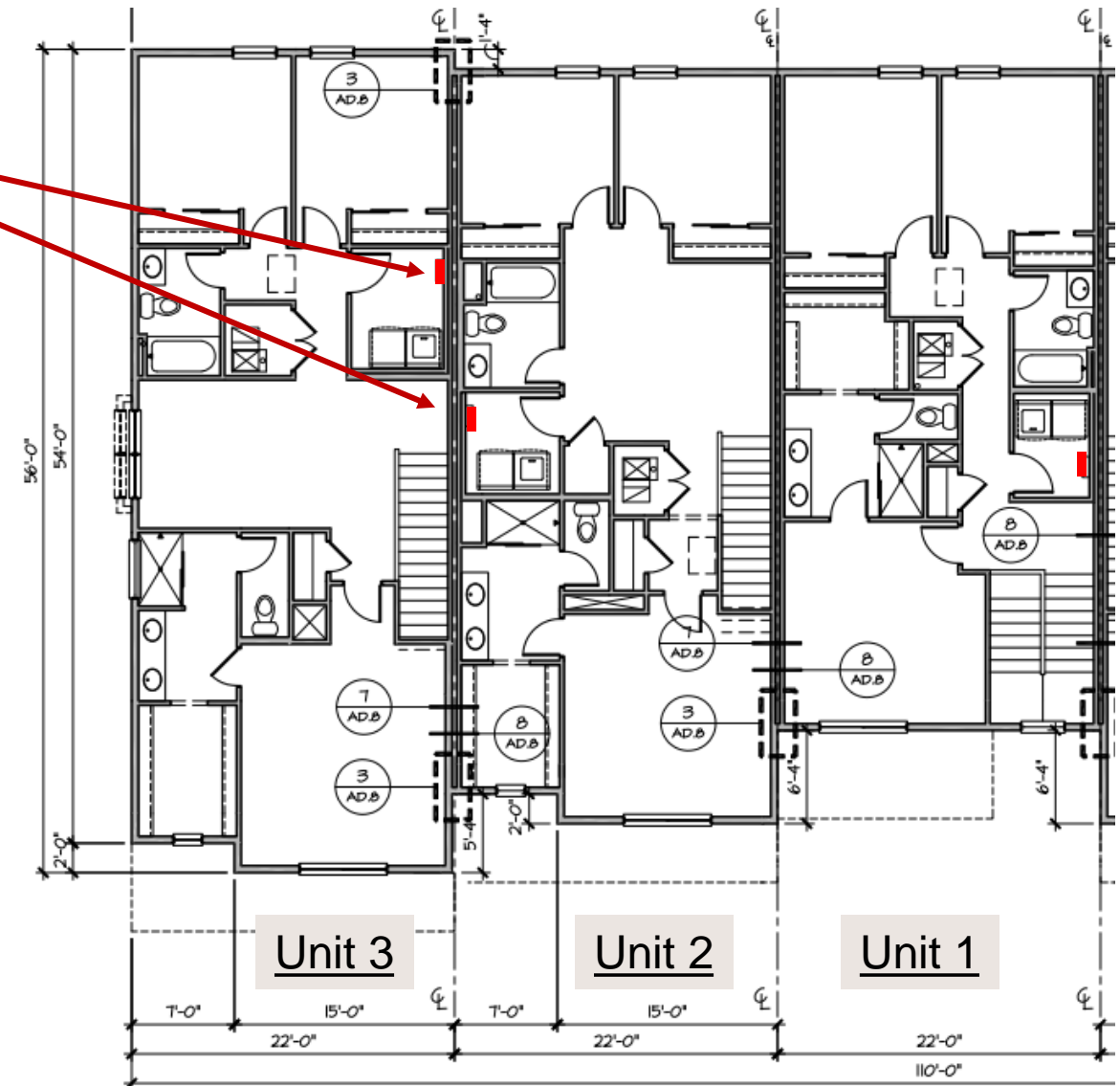
Garage, Cold Climate

- Condensate can be drained to floor, along with furnace
- Two problems with air supply:
 - Enclosed space with insufficient volume
 - WH is outside thermal envelope
- Two solutions for air supply:
 - Extend thermal envelop
 - Duct WH exhaust to garage



Tankless Switch Out - Interior

- Tankless water heater in laundry room
- New HPWH will take up more floor space



Tankless Switch Out - Options

● HPWH to scale

■ Unit 3

- HPWH in laundry room
- $\sim 7' \times 8' \times 8' = 450 \text{ ft}^3$
*No need for additional ventilation.
Room will be temporarily cool when HPWH runs.*

■ Unit 2

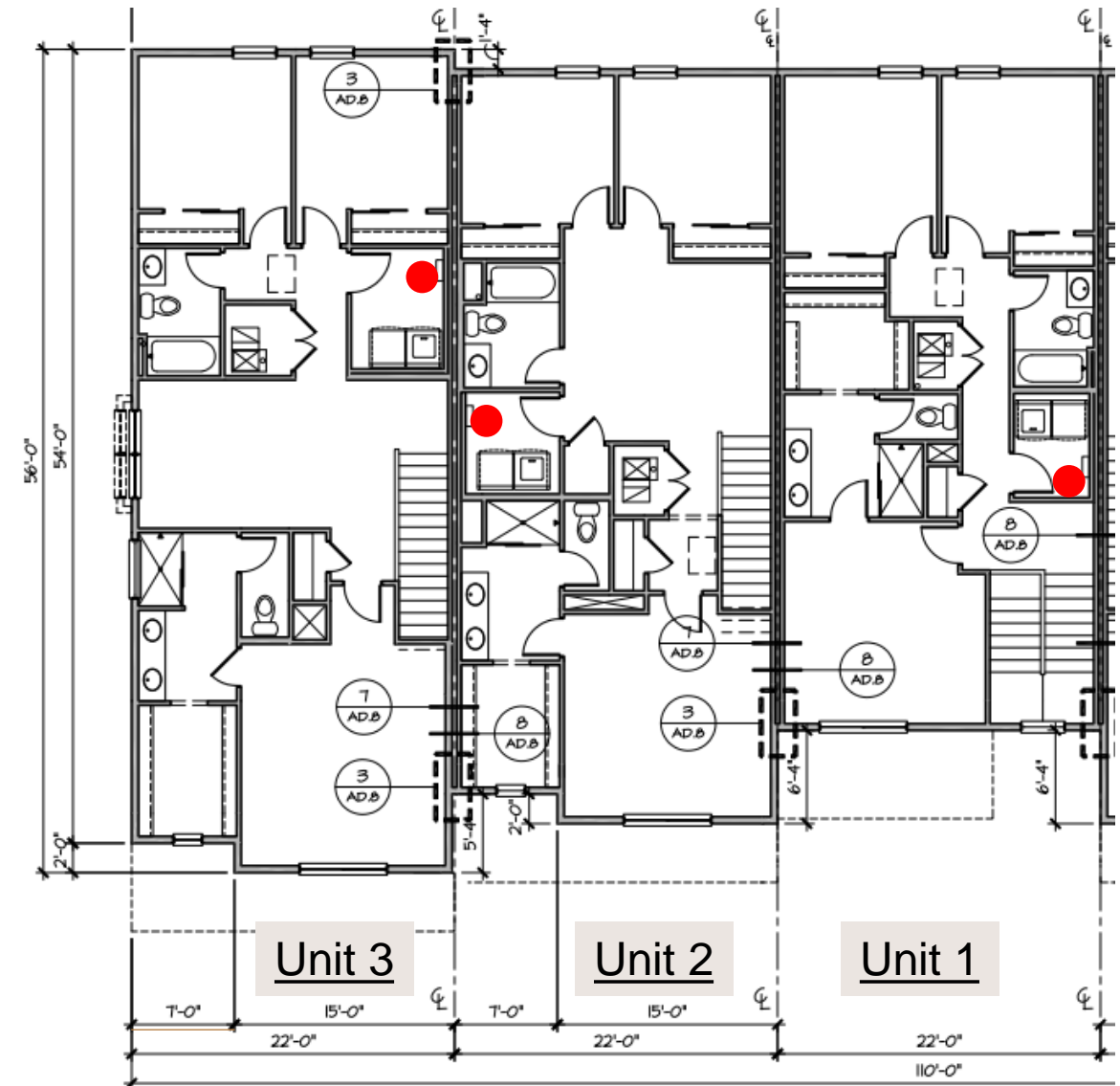
- Tight squeeze for HPWH
Move to linen closet and open wall to washer/dryer?

■ Unit 1

- Not enough room in laundry closet
Stacked washer/dryer?

■ All Units

- Condensate drain to clothes washer drain
(or to shared condensing furnace drain)
- Mostly, lots of walls between HPWH & living spaces; expect sound to be muted



Tankless Switch Out - Options

● HPWH to scale

- Relocate water heater
 - New floor plan or...
- Move water heater to garage if climate allows it
- Run condensate to
 - Floor drain
 - Plumbing stack for bathrooms and laundry rooms from floor above
Use p-trap to tee into drain

