

Best Practice Guide for Heat Pump Installation

AND NOISE MITIGATION

What you need to know to support a high quality
heat pump installation in Oak Bay



This guide provides simple advice for residents looking to purchase and install a heat pump. It will help you:

- Determine an optimum outdoor location
- Select a quiet heat pump system
- Properly maintain your heat pump
- Control and prevent noise travel

Benefits of Heat Pumps

Heat pumps are efficient heating and cooling systems that provide several benefits:

- due to their high energy efficiency, heat pumps can lower the cost of electricity bills
- heat pumps provide both heating and cooling, which is increasingly important during extreme heat events and hotter summer months
- due to BC's low-carbon electricity grid, heat pumps emit less greenhouse gas emissions than fossil-fuel based home heating systems such as oil, propane, or natural gas furnaces

How to Select a Heat Pump

SELECT A QUIET UNIT

Most manufacturers will specify a 'sound power rating,' a lab-tested decibel dB(A) measurement of the sound generated by a heat pump at full capacity. Most quality models are around 40-50 dB(A) while newer 'ultra-quiet' models are achieving lower ratings.

These mechanical ratings are different than the Noise Bylaw which specifies a 'sound pressure rating' measured with a noise meter at the property line.

That's why properly locating the unit is critical to achieving a no-complaint system.

SELECT PROPERLY SIZED EQUIPMENT

The contractor should select the appropriately sized system based on the space that is to be heated/cooled. An oversized unit may 'short cycle' i.e. turn on and off more than necessary. This can result in excess noise and can reduce the life of the system.

Consider other energy efficient improvements with your heat pump installation. A less leaky house with more insulation requires less energy to heat and cool, and could help further reduce the size of the unit needed.

Noise Considerations

DISTRICT OF OAK BAY ANTI-NOISE BYLAW

The District of Oak Bay Anti-Noise Bylaw includes a daytime (7am-10pm) limit of 50 dB(A) and a nighttime (10pm-7am) limit of 45 dB(A) on noise from exterior heat pump condensing units.

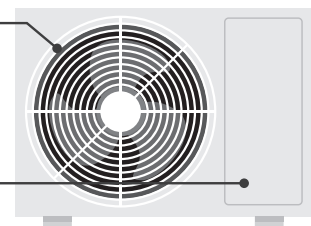
WHERE DOES HEAT PUMP NOISE COME FROM?

CONDENSER FAN

- » High frequency "whirring"
- » Directional noise (horizontal or vertical depending on your unit)

COMPRESSOR

- » Low frequency "drone"



COMPARATIVE NOISE LEVELS IN dB(A)

Common Outdoor Sound Levels	Noise Level dB(A)	Common Indoor Sound Levels
CAR HORN AT 3FT.	110	ROCK BAND
GAS LAWN MOWER AT 3 FT.	100	INSIDE SUBWAY TRAIN (NYC)
DIESEL TRUCK AT 150 FT.	90	FOOD BLENDER AT 3FT.
NOISY URBAN	80	GARBAGE DISPOSAL AT 3FT. SHOUTING AT 3FT.
BUSY HIGHWAY AT 50 FT.	70	VACUUM CLEANER AT 10FT.
COMMERCIAL AREA	60	NORMAL SPEECH AT 3FT.
QUIET URBAN	50	LARGE BUSINESS OFFICE DISHWASHER IN NEXT ROOM
QUIET RURAL	40	SMALL THEATRE, LARGE CONFERENCE ROOM (BACKGROUND)
	30	LIBRARY
	20	BEDROOM AT NIGHT
	10	CONCERT HALL (BACKGROUND)
	0	BROADCAST + RECORDING STUDIO
		THRESHOLD OF HEARING



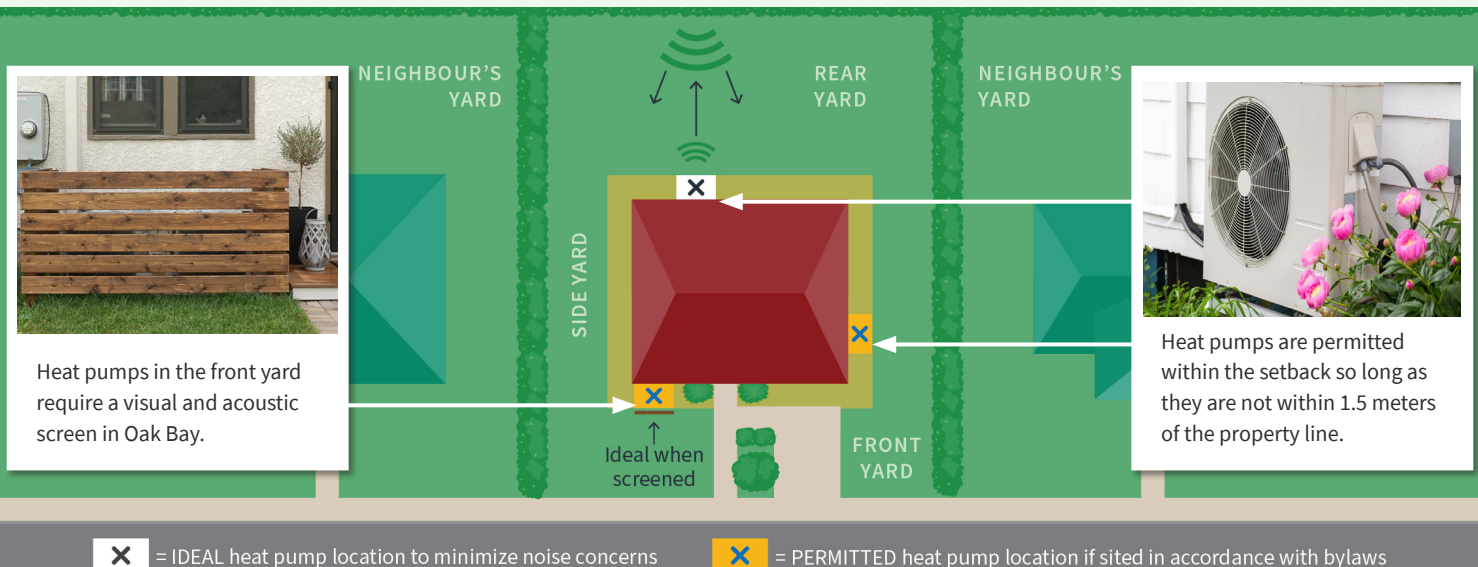
Locating the Heat Pump

Most noise complaints are a result of locating the outdoor unit facing, or too close to neighbouring windows, bedrooms or living areas. In Oak Bay, heat pumps are allowed in the front, side, and rear yards, including within the setbacks as long as they are sited a minimum of 1.5 m from the property line. Heat pumps sited in front yards are subject to screening requirements to limit visual and acoustic impacts. Consider the following unit placement to reduce noise travel:

1. **Position the unit as far from the property line as possible.** Where possible, avoid placing it in the interior side yard and ensure a minimum of 1.5m distance from the property line.
2. **Keep it away from high-traffic areas and locations exposed to the weather.** For instance, the unit should not be installed beneath a roof's drip line, condensation should not drain onto walkways, and the unit should not block access to parking or paths.
3. **Ensure the unit is out of sight.** Utilize existing barriers like fences, landscaping, or decks to minimize noise transmission to neighbours or

the main residence. Avoid placing the unit near neighbouring windows or openings, especially bedroom windows on both the ground and upper floors. Position it behind existing barriers or install a new barrier if the unit can only be placed in a noise-sensitive area.

4. **Mount the unit on the ground.** Set it on a solid foundation such as a concrete pad or block with rubber pads or dampeners to minimize vibrations. Wall-mounted units are generally sited higher and may allow noise to travel more freely.
5. **Ensure adequate airflow clearance.** Placing the unit under a deck, patio, or in a dedicated outdoor mechanical space can be a good option, acknowledging that heat pumps need sufficient airflow to operate efficiently and minimize noise.
6. **Consider acoustic barriers if noise remains an issue.** Heat pumps produce both high and low-frequency noise. While structures can block high-frequency sounds, low frequencies can penetrate unless reduced at the source. Acoustic barriers or treatments may be required to mitigate noise issues further.



OTHER CONSIDERATIONS

- Locate your unit outside the drip-line of your roof
- Be careful of hard surfaces that may reflect sound towards your neighbour
- Have your heat pump installed by a certified technician
- Clean or change your air filter regularly
- Keep coils clear of dirt and debris

Maintaining Your Heat Pump

Heat pumps use fans and motors to move and transfer heat efficiently. The noise produced by these devices can increase over time without periodic maintenance to replace worn parts such as bearings, or tighten loose screws that can cause rattling. Ask your contractor to provide you with an appropriate maintenance schedule.

SELECTING A CONTRACTOR

Seek a reputable heat pump contractor that will obtain the proper permits and install the equipment safely and correctly. Be sure to discuss the above proper heat pump selection criteria with them, and ensure the details are in writing before signing a contract.

Consider working with a contractor that is part of the High Performance Contractor Network (HPCN). HPCN contractors have completed best practices training, committed to ethical business practices, and are subject to ongoing quality assurance measures.

Learn more at: homeperformance.ca/find-a-contractor

APARTMENT & STRATA BUILDING CONSIDERATIONS

Apartment and strata buildings have unique considerations including strata bylaws and building-specific technical specifications for heat pump installations and siting. Contact your strata organization for more information.

By considering these recommendations, a new heat pump owner can experience many years of comfort and good neighbourly relations.

If you have questions, please contact Oak Bay Community Building and Planning Services for more information at 250-598-3311 or email: planning@oakbay.ca