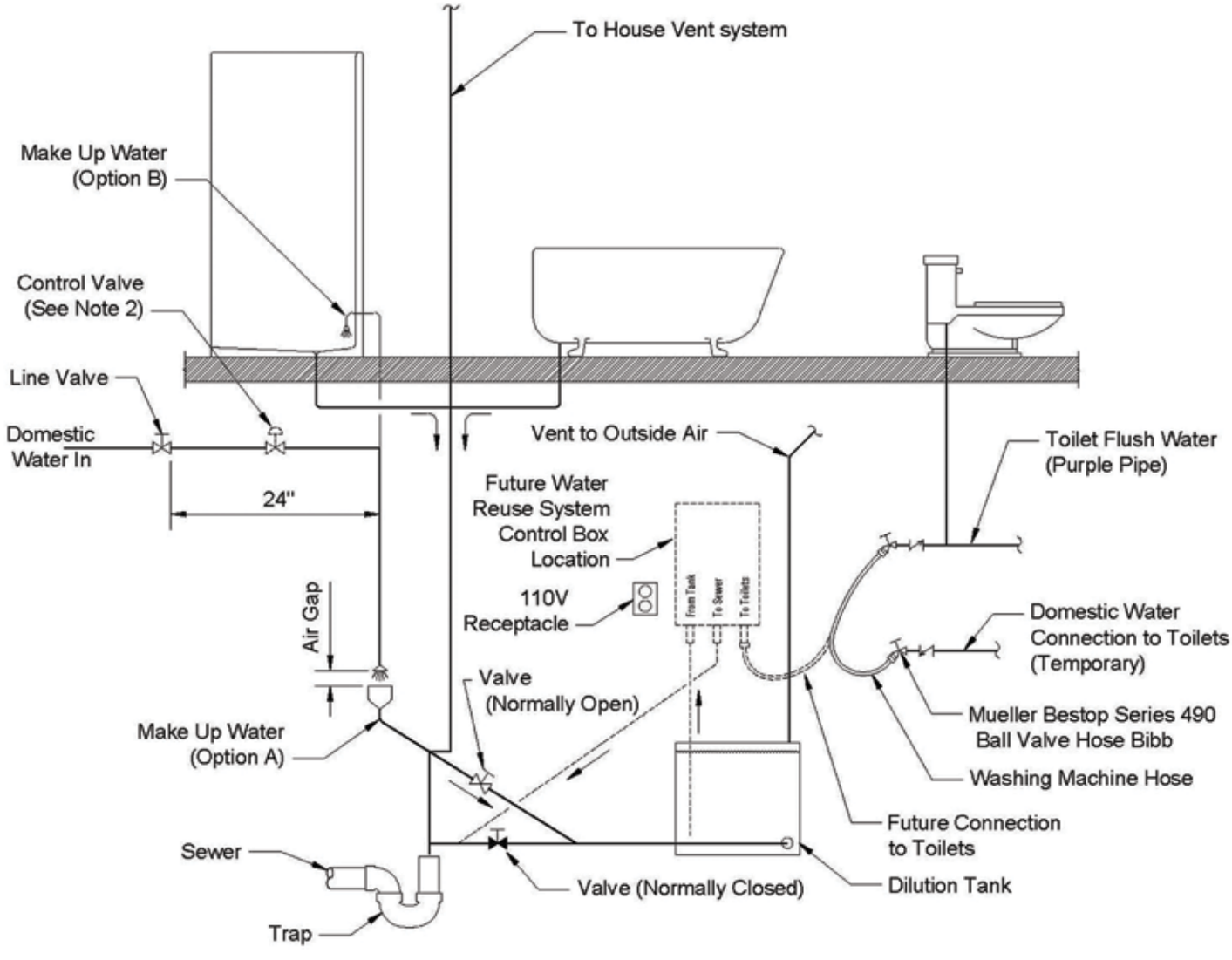
Purple Pipes — Driving the Next Wave of Water Conservation

BY RON HARTMAN



Energy has alternatives — but clean water doesn't. Many water suppliers already feel the real pressure point. Their problems are systemic — lessening supply, growth exceeding capacity, and combined with ageing deteriorating infrastructure — it's clear they need to act. So the BC government has proclaimed that 50 per cent of growth-driven water demand must be met through conservation. The question is: how will that conservation be achieved? Purple pipes carrying recycled water are one likely answer, and the reasons might surprise you.

Simple water conservation measures have all been enacted: low-flow fixtures, watering restrictions, refined metering/pricing structures. Yet many Canadians still use more water per capita than most others. So the need to engage water users more fully is clear; conventional device-driven conservation is not enough. People, not appliances, conserve water.

Governments know this and are looking at new initiatives to encourage behavioural change; metering projects, water use education, and other programs with metering emerging as 'the next step' for many. But installing meters in developed areas costs a lot up-front ($1,000-2,000 per unit and more) and results in altered revenue streams, variable conservation cost/benefit and potentially alienates conservers through the inevitable rate hikes when the resulting revenue short-falls must be made up. Plus, current low water rates enjoyed by the relatively well-off water users in the West diminish the conservation effectiveness of metering even further.

Here is where purple pipe programs can shine; they encourage conservational behaviour directly. At a small percentage of the cost of metering or infrastructure upgrades, they have the potential to make a sea of change in consumer water use patterns. Why is that, when other approaches are delivering such mediocre results? Because despite all the promotion and hoopla, most people are not yet taking water conservation initiatives seriously. Why? The reason is that we still see perfectly clean drinking water being wasted every day; every time we use a toilet. And so we never truly buy in to the concerns that governments are expressing through their WaterSmart-type programs. But purple pipes provide the solution, albeit indirectly. They allow the replacement of drinking water in toilets with reuse water. And then every flush reminds us to conserve, and we become the water conservers in all aspects of our water use. This is the real power of the purple

pipe. And reuse of bathing water for toilet flushing is ideal; the cleanest used water is used for the least demanding application. Add the fact that most homes generate about the same amount of bathing water as their toilets use makes 'bath to toilet' the ideal application of purple pipes.

B.C. committed to purple pipes by 2010, as an Olympic legacy and as an indication of what the government's vision for B.C. is. But past purple pipe experiments in Europe and the US have been problematic. Typically they envisioned large-scale communal reuse systems (usually fed by highly treated sewage) under government responsibility. These systems require huge upfront capitalization coupled with perpetual operations and maintenance expenditures. But their main problem is that they deliver clean-tasting 'reuse water' to houses that is more expensive and potentially very dangerous to drink, particularly if there has been a treatment malfunction at the source as happened in Walkerton. And because it's all happening outside the home, there is inherently poor awareness of 'what's in the purple pipe' by the users of the water. This has resulted in significant cross connection safety incidents. Combined with its poor cost-effectiveness, the concept has all but been defeated in areas where it has been tried.

Unit systems (one per home) avoid these problems. There is no capital cost to government, low system costs to owners, easy owner maintenance, and they virtually eliminate cross-connection hazards. The water is obviously not drinkable, it's under lower pressure, the owner has better awareness, and there is no cross-impact between families. Unit systems are a great way to reuse water.

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However, the uptake of unit systems has been slow. Proprietary water reuse systems are not referenced in building codes that local governments rely on to ensure building safety and reduce their risk. And so their building officials routinely deny them or require Letters of Assurance from engineers before permitting systems to be installed. This often renders them awkward, expensive and non-universal.

Fortunately, moving the code-related plumbing elements out of the 'proprietary system box' allows code-compliant installation of a 'standard' water reuse system into a house. Such a system is shown in the attached diagram. This new layout adds make-up water, connects the fixtures and plumbs a dilution (storage) tank all in compliance with existing building codes. A simple pumping/control station to feed the reuse water to the purple pipes completes the system. This method was used successfully in 2009 at a number of Vancouver Island in-home Conservepump™ water reuse installations.

This demonstrates that purple pipe programs can now provide local government meaningful opportunity to take the next step in implementing water conservation safely, without bearing capital costs or increasing operational expenses. And it can start with their next building permit application. **CB**

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