

This presentation premiered at WaterSmart Innovations

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PRIORITY GREEN Clarington

Building Liveable Neighbourhoods



Glen Pleasance Region of Durham





Durham Region





Durham Region & Clarington

- Just east of Toronto, Durham covers 1,000 mi²
- Clarington is the eastern most of the 8 counties that make up Durham Region
- Most of population concentrated along shore of Lake Ontario
- 80% homes metered, rest on rural private wells
- Clarington's population will double in 20 years
- Without conservation, will cost \$210 million to expand the infrastructure over those 20 years
- Use water efficiency so we do not expand infrastructure in lock-step with growth



Durham & Clarington

- Durham is responsible for major roads, water and sewer infrastructure and water billing
- Clarington is responsible for all other municipal services including the majority of development approvals
- Clarington has had two iterations of a sustainability committee composed citizens
- Few tangible results, until this project

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- Three projects in one;
 - i) Transform development approvals to favour Green Developments
 - ii) Change public attitudes concerning higher density residential
 - iii) Field test and monitor latest water & energy efficient technologies
- Project to run through October 2015
- Presentation focus is Field Test

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- Clarington paid salary of project coordinator
- Hired her full-time less than a year into project
- Durham – defined water efficiency technologies & sub-metering, greywater water quality testing
- Provincial funding of \$217,000 from Ministry of Environment focused on defining BMPs in water efficiency and stormwater mitigation
- Federal funding from Federation of Canadian Municipalities' Green Municipal Fund; \$145,000
- Funding community outreach

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- Builders preferred expedited approvals over increased allotments or lower development charges
- Decided to pilot Expedited Approvals
- Changing the culture in Planning, Engineering & Building Inspection
- Have defined 'green development' via a schedule of beyond code measures

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- Strong support from Mayor & Council
- Developed schedule of Green Best Management Practices (BMPs)
- Builders asked to choose minimum of 10 BMPs, all choose over 20 BMPs
- Mix of water and energy improvements
- Target to be 15% better than Code
- New Building Code January 2014: Toilets @1.28 Gpf, Showerheads @ 2 Gpm

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- 3 builders signed on, all innovators
- 2 SFD, third is building townhomes
- Water BMPs; 0.8 & 1.0 Gpf toilets, 3 *Recover* Greywater systems, ENERGY STAR *Most Efficient Clothes Washers*, 1.2 Gpm showerheads, condensing hot water heater, hot water recirculation
- Energy BMPs; ERVs, 24" studs=20% > R-value, 96%/2 stage furnace, 14 SEER A.C.

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- 24" studs
- Called advanced framing
- Less wood
- More insulation
- 20% higher 'R' value
- Reduced thermal bridging

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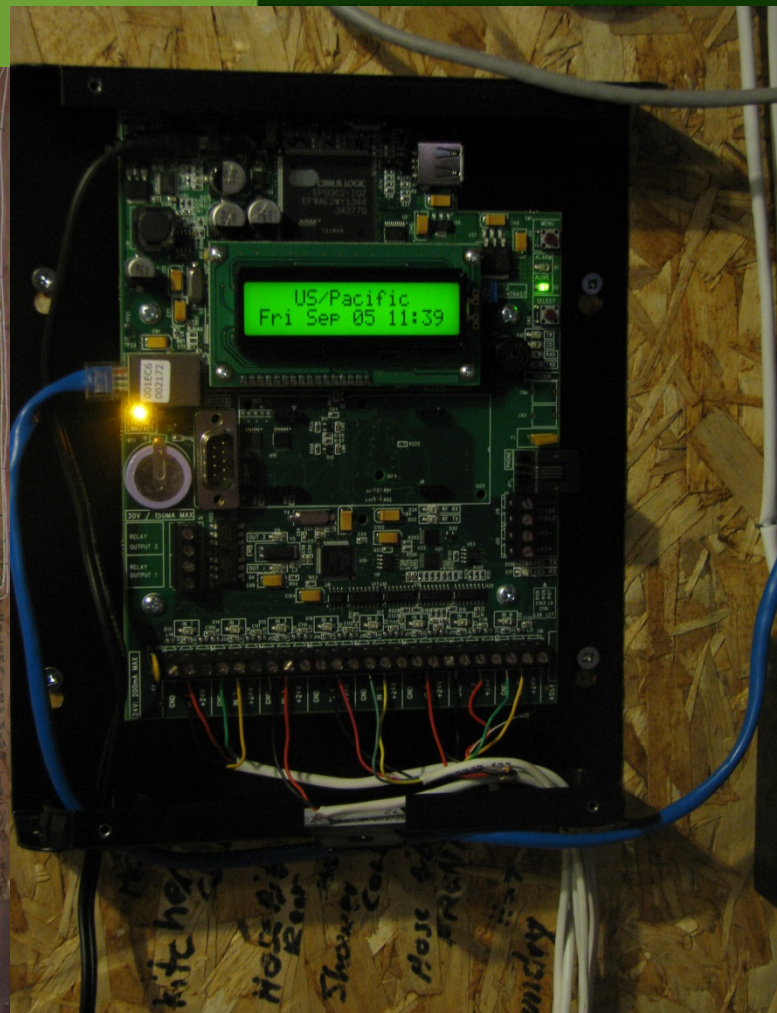
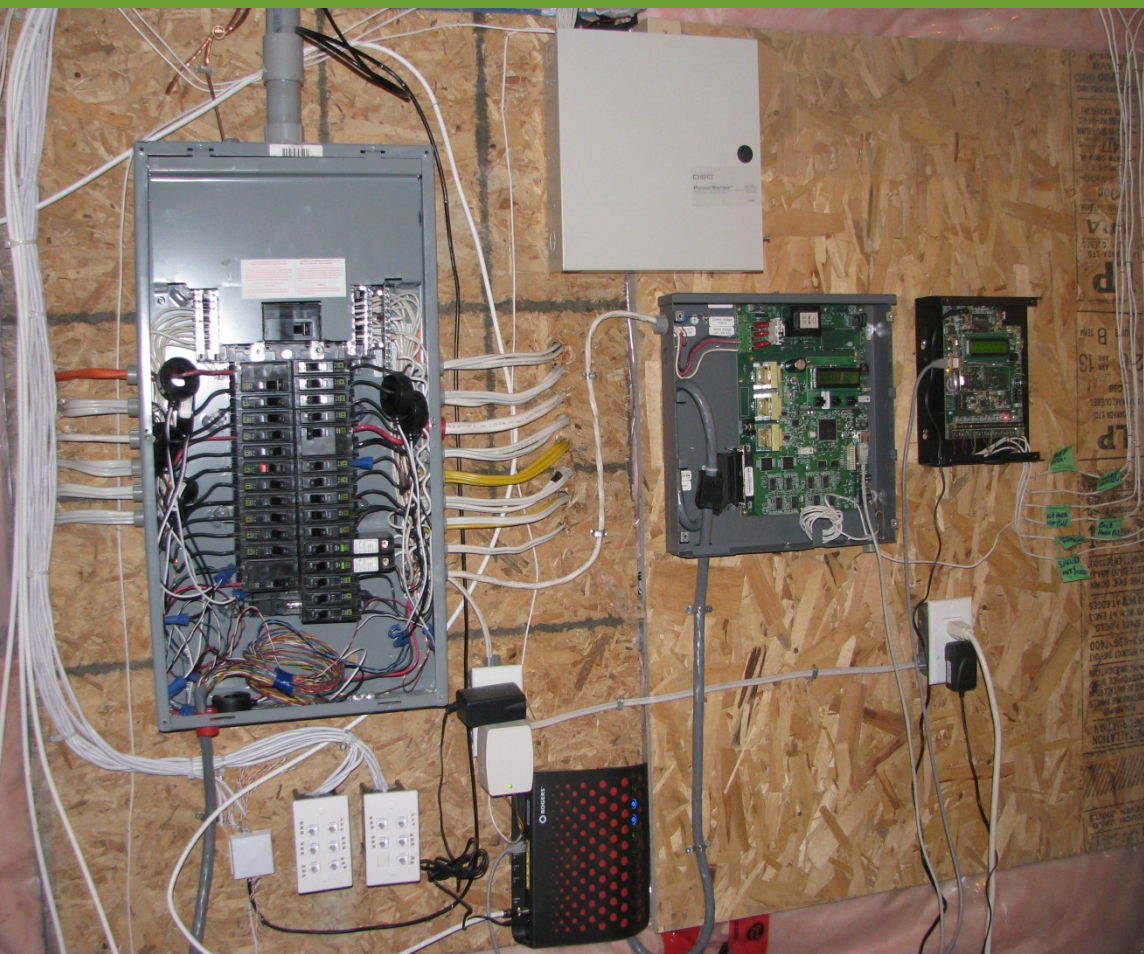
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- Minimum 6 homes, 2 per builder
- 'beyond code' upgrades paid by builder
- 9 water sub-meters & 8 electrical sub-meters/home
- Sub-metering \$6,000/home
- WiFi sub-meters to a dedicated website
- 12 months of monitoring data through October 2015
- Quantify water & energy improvements, calc. ROI and GHG reductions

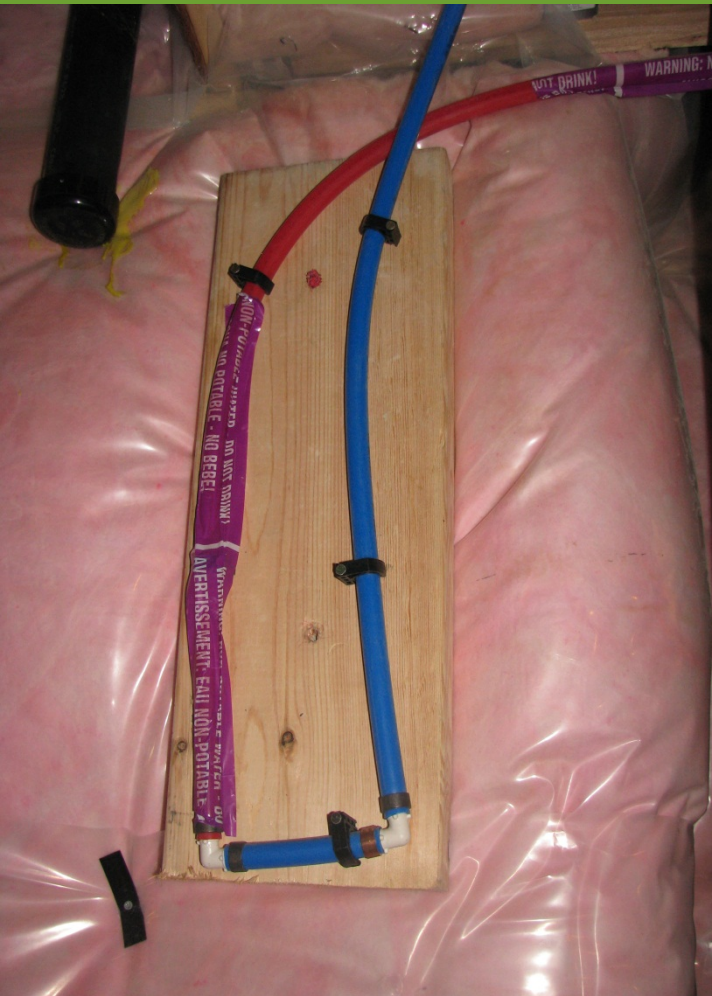
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- Water sub-meter tucked away in the basement
- Each meter is hard-wired into *Obvius* data acquisition server

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- Number of suppliers donated equip
- Ecobee smart thermostats
- Stealth 08.
- Gpf toilets
- Panasonic Whisper ENERGY STAR bathrm. fans



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- Field Testing to define the return on investment (ROI) of each BMP
- Quantify real world savings
- Greywater systems being metered at inflow, outflow & potable top-up
- Outflow water quality being analyzed
- Water quality meets provincial regulations to date

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- Greywater system harvests shower & bath water in 50 gal. tank
- Treats and returns to flush toilets
- Automatically cleans
- Tracks water savings
- Canplas' *Recover* unit retails for \$2,500



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- Homes built to 2006 Ontario Building Code (OBC) = 50 Gcd (indoor use only)
- Homes built to 2012 OBC use 40 Gcd
- Green Permit Clarington target is 34 Gcd or 15% reduction
- Energy target of 15% beyond 2012 OBC
- Next OBC due in January 2017
- These 6 homes meet the water and energy reductions in 2017 OBC

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- ***Preliminary Field Results...***
- The one year of Sub-metering began in October 2014
- Will be completed Oct. 31st. 2015
- Jeffrey Homes built another 20 townhomes to Priority Green Clarington (PGC) specification
- Shows 2 things, a market for these homes & homes are price competitive

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- ***Preliminary Field Results...***
- Electricity and Natural Gas savings to date are 10.5% better than 2012 OBC
- Three builders had 8, 9 & 13 energy eff. attributes Better Than Code
- Better wall & basement insulation, ERV vs. HRV, duct sealing, air tightness...

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- ***Preliminary Field Results...***
- Water savings to date for homes with greywater systems; 18% reduction
- Equates to 32.8 Gcd
- Non-greywater homes; 11% reduction or 35.6 Gcd
- Average water savings for all homes is 14.5% (project target is 15%)
- OBC 2017 = 34 Gcd

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- Water savings for the two of three homes with greywater systems will increase
- For the first 9 months, units were purging every 48hrs.
- August – October two of the three units were set to purge once/week

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- Final report will be completed Dec. 2015
- Will calc. Return on Investment (ROI) for all 'beyond code' features
- Will calculate CO₂e for all energy savings, including embedded energy in reduced water delivery & sewage treatment
- Will conduct homeowner exit interviews to get their feedback
- Transitioning to expedited approvals for green development (beyond bldg. code)

Looking Ahead - Changing Climate

- There have been four 100 year storms in the past 10 years
- There have been six 50-year storms in the past 25 years
- Old way of managing stormwater cannot handle these storms
- Mapping urban areas at flood risk
- Next projects to focus on Low Impact Development (LID) stormwater management

Testing LID

- LID; Rain Water Harvesting (RWH), Rain Gardens, Permeable Pavement, Perforated Pipe, Bioswales, Ponds, Wetlands, Green Roofs
- RWH is in 2012 OBC
- Expand OBC to 'codify' lot level LID
- 'taking the code outdoors'
- Increases climate resiliency of OBC
- Many LID pilots are exceeding design for quantity and quality of water

Thank you - Questions?

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