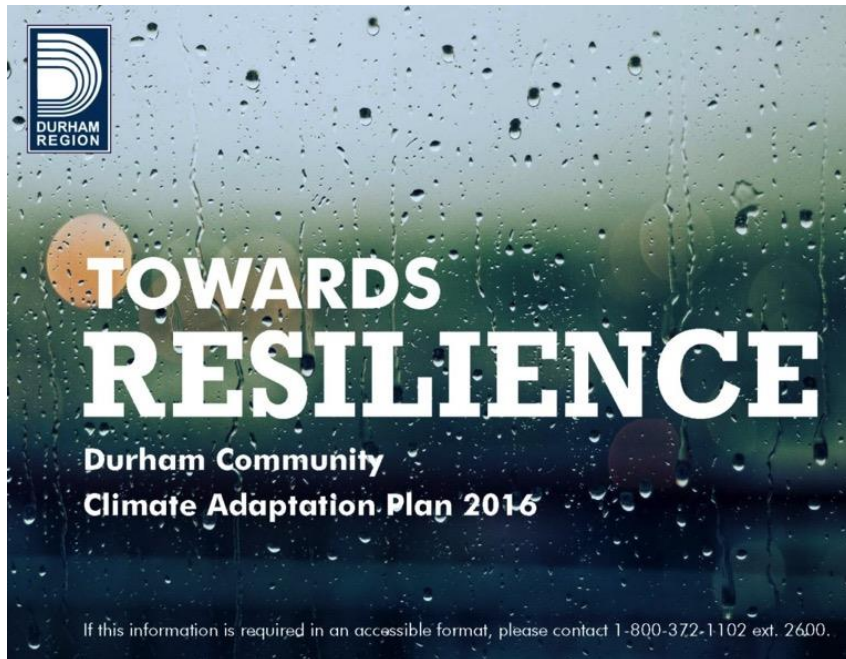


# **Durham Region Climate Resilience Standard for New Houses**

Notes for a story by  
Brian Kelly, Manager of Sustainability,  
Region of Durham  
to the Clean Air Council, May 25, 2018

# Durham's Adaptation Plan



## Buildings Sector

- Program B1: The Durham Climate Resilience Standard for New Buildings
- Buildings need to be resilient to the **future** climate
- Measures are much easier and cheaper to install now rather than retrofit later
- Low-rise residential buildings first

# Why It Really Matters in Durham

- Building boom in Durham
- 53,000+ new housing units to be built between now and 2025
- Half the residential units existing in 2050 will be new - built between now and then
- If built to current OBC, they will not be resilient to the climate they will experience
- Huge opportunity to do it right (or a lost opportunity)

# Climate Classics: An Updated Story

- The classic children's story of **house resilience**
- with elements of:
  - Ignorance
  - Laziness
  - Foolishness
  - Resistance to change
  - Foresight
  - Sibling rivalry
  - Threat
  - Peril
  - Destruction
  - Survival
  - Redemption
- What is the story?

# The Three Little Pigs



# The Three Little Pigs - Revised



# The Three Little Pigs of the Building Industry



**Straw house pigs** – builders who build houses below the OBC

**Wooden house pigs** – builders who build houses to the OBC

**Brick house pigs** – builders who build houses to the new Resilience Standard

# The Three Wolves of Climate Change



**The Water Wolf –  
flooding**



**The Wind Wolf –  
extreme wind**



**The Warmth Wolf –  
extreme heat**



# Durham Region Climate Resilience Standard for New Houses

Institute for Catastrophic Loss Reduction  
Institut de Prévention des Sinistres Catastrophiques



DURHAM REGION  
CLIMATE RESILIENCE STANDARD FOR NEW HOUSES

February 2018  
Draft for consultation

- Prepared in 2017 for the Region of Durham under contract by the Institute for Catastrophic Loss Reduction (ICLR)
- 3 Technical Committees involving Canadian and US experts from universities, research organizations, municipalities, building officials, consultants, insurance companies etc.
- ICLR contributors: Dan Sandink, Sophie Guilbault, Holly Wacker
- Represents **Expert Opinion**

# Climate Resilience Standard for New Homes

Three sections:

- Basement Flood Protection – 22 measures
- Extreme Wind/Tornado Protection – 10 measures
- Extreme Heat Protection – 10 measures

Each section has:

- Discussion of the hazards
- Building science solutions
- Table of recommended measures (incl. purpose and notes)
  
- 42 measures in all
- 72 pages, “thud value”

# Characteristics of Standards

- Low-rise residential buildings (single family, duplexes, row houses and town houses)
- Standards, not yet codes
- Mostly prescriptive standards (for simplicity), a few performance standards
- All products currently available
- Measures deal with both building and lot
- Measures within control of the builder and the trades

# Basement Flood Protection

## Highlights:

- Impervious cap on backfill
- No reverse slope driveways
- No basement stairwells\*
- No window wells\*
- Backwater valves on sanitary and foundation drains (accessible for servicing)
- Sump pump systems supplied with backup pumps and backup power supply, check valves
- Downspouts drain  $\geq 1.8$  m from foundation
- Rough-ins for external generators
- Gaskets on sanitary lateral pipe connections

# Wind Protection

## Highlights:

- Hip roofs framed with engineered trusses\*
- “Hurricane ties”
- Roof sheathing min 12.7 mm (1/2 “) fastened with 8d ring shank nails
- Ice-and-water shield over sheathing
- Wall sheathing continuous, min 12.7 mm (1/2”) fastened with 8d ring shank nails
- Wall sheathing to overlap common rim joist and sill plate
- Garage doors rated to 217 km/h

# Heat Protection

## Highlights:

- Shading overhangs (eaves) for E,S and W facing windows
- Operable windows on opposite sides of house
- Solar heat gain coefficient of maximum 0.4 on all glazing
- Cool roof colours (SR value of 0.55 for low-slope; 0.20 for steep slope) (max 0.75 thermal emittance)
- Deciduous trees to shade S, E and W facing windows
- Min 25% vegetation cover on lot
- Half of hardscaping to have min. 0.3 SR value
- Recommend energy modelling to identify optimal thermal characteristics of shell

# The Moral of the Story



**Straw house pigs:** houses not even resilient to last century's climate



**Wooden house pigs:** houses won't be resilient for long, as the climate changes



**Brick house pigs:** houses ready for the rigors of the new climate

# Implementing the Standard

- The next step beyond the “standard”
- A spectrum of possibilities from:
  - Voluntary standard (*“The Resilient House”*)
  - Voluntary with home insurance incentives
  - Regional policies and conditions (e.g. OP, site servicing agreements)
  - Municipal conditions (e.g. OP, secondary plans, subdivision approval, site plans, site servicing approvals, architectural approvals etc.)
  - Local building codes (Supplemental Standards to OBC, adopted through local by-laws\*)
  - Ontario Building Code



# Next Steps in Durham

- Currently setting up consultation meetings with Durham Region Home Builders Association, OHBA and BILD to review each recommended measure
- Goal is to reach a “consensus standard” with building industry
- Reviewing each measure for feasibility, costs/benefits and other considerations
- See Summary and Worksheet document
- Hope to take a “consensus standard” to Regional Council in early 2019 and implement the standard as of 2020
- Looking for other opportunities to incorporate measures into planning and approvals
- Need to maintain unity among municipalities

# Next Steps beyond Durham

- Undertake formal discussions with the insurance industry to adopt as “The Resilient House Standard”
- Introduce the Standard to other jurisdictions and encourage adoption
- Introduce the Standard to the OBC Branch of MMA and request inclusion into the OBC as a new “Supplementary Standard”

# What Can Other Regions and Municipalities Do?

- Introduce the Draft Standard to your building officials / public works / planning staff and develop support
- Adopt the standard into regional and municipal planning procedures and by-laws
- Pass council resolutions to Province requesting incorporation into the OBC

**Questions?**