

# Preservation and Sustainability of the Niagara Escarpment

Presented by The Hamilton East Mountain  
Community

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# Summary of Presenting Topics

- Community goals and advocacy
- Public health and safety
- Geological instability
- Contributing factors to slope instability: Geological structure, Water, Global Warming and Transportation.
- Challenges
- Recommendations

# Community Goals

- The preservation and sustainability of the Niagara Escarpment in the Sherman and Kenilworth area of Hamilton, for current and future generations.
- A Moral imperative to provide a safe and healthy environment for all citizens.
- Working together to protect our environment in the face of critical climate change.
- To respect that the process of geological erosion will continue.
- Our goal is congruent with the Ontario Government's land use planning review as of June 1, 2017, as it relates to protecting the Natural and Cultural Heritage, responding to Climate change, greenhouse gas inventories and emission reduction.

- We are advocating for the long-term protection, integrity, resilience of the natural heritage environment of the Niagara Escarpment for all citizens. The natural heritage environment is designated as a UNESCO site for its significant ecosystem and its special plan.
- The Ontario Government is proposing amendments to the planning act to strengthen climate change policies and new adaptation strategies to become more climate resilient.
- Many future climate risks may be significantly underestimated or unknown at this time.

- We are advocating for Climate change policies to the City of Hamilton official plan, as it relates to vulnerability of the Niagara Escarpment, and doing risk assessments when planning or replacing infrastructure.

# Public Health and Safety

- Protecting public health and the environment; preventing injury and death.
- Safety risks to the public resulting from slides of boulders, mud and vegetation onto the road, are ongoing issues.
- Dr. Caroline Eyles from the Earth Sciences at McMaster, in an interview with CBC Hamilton, says that “we have to respect the geological processes are going to continue”. Scientists say that the City must plan for an escarpment that will always be falling down.
- Dr. Eyles states we have to think in terms of planning ,and where it’s going to be most effective and to create geologically stable routes.

# Geological Instability

- The geological instability of the escarpment has reached a critical condition in the Sherman and Kenilworth areas, as evidenced by progressive erosion, slope failure, and road closures.
- It is our expectation as a community that the City of Hamilton has a shared responsibility with the Niagara Escarpment Commission and the Ministry of Natural Resources, the Ministry of Environment and Climate Change, to protect the area using the best science that is available.

- Our Councillor Mr. Tom Jackson and our group has been working with our community for years, to preserve and protect green space and ecologically sensitive lands. We are appreciative of the work of Mr. Jackson, City of Hamilton Staff and Golder Associates.
- The area in and around the escarpment is a popular recreational area for walking, cycling, jogging, and skate boarding.



# The citizens concerns are:

- public safety
- slope failure, slides
- continuous erosion and ongoing instability of the escarpment
- climate change
- soil loss of citizens homes and properties on Mtn. Brow Blvd
- road usage by large trucks, busses and the volume of traffic
- proximity of traffic to the escarpment edge and its effects on the escarpment.

- Our group has consulted with professional geotechnical engineers, City of Hamilton engineers, the Ministry of the Environment and Climate Change, Professors of Civil Engineering and a Senior Geologist with the Ministry of Natural Resources of Ontario, the Niagara Escarpment Commission planners, the Ministry of Transportation, Hamilton Police Services, the City of Hamilton and many residents of Hamilton in this area.

## Contributing Factors to Slope Instability

- Geology of the Niagara Escarpment consists of a hard cap with bedrock, red shale and sandstone beneath. Water seepage and moisture is observable.
- Fracturing of the top of the Escarpment from freezing water, further comprises the hard cap which eventually breaks apart.
- Mass wasting has been occurring over many years.
- Forces of nature- physical weathering, freeze and thaw contribute to the erosion.





- Water enhances the weakness of the escarpment—there are many theories about what bodies of water are present behind the escarpment including lakes, ponds, cascades and caves.
- Nov 1996, the retaining wall collapsed on Kenilworth Access; water was thought to be the likely contributing factor.



- Water sources contribute to the degradation of the escarpment.
- In 2015, water poured over the face of the escarpment onto the Kenilworth Access; this water flow was never investigated as far is known.
- There is a water pipe at 6 Mountain Brow which flows under the road over the area of the escarpment where there is rapid erosion and instability occurring; whether this has been investigated or not is unknown.

- A sink hole developed between 6 and 12 Mountain Brow in 2016. There is the potential for more sink holes to develop and buckling of the road.
- To the best of our knowledge, geological and hydrological studies have never been done by the City. We wonder if these studies would provide worthwhile information to guide how to deal with problems of the escarpment.



- Global warming/ climate change and its damaging effects contribute to instability of the Escarpment, leading to slope failure and instability, slides and vegetation leading to damage to infrastructure such as roadways.
- Soil loss causes the escarpment to impinge on the road.
- The proximity of traffic to the escarpment edge, causes fracturing of the bed rock.

- “Climate on balance will bring more extreme weather, ecological and infrastructure damage financial loss and human misery” , says Dr. Diane Saxe, the Environmental Commissioner of Ontario, articulated recently on a visit to Hamilton. What used to be normal weather has gone and is unlikely to return.



- The provincial Government has instructed Municipalities to include in their official plans Climate change policies, to prepare and incorporate policies to advance mitigation and adaptation goals.
- To undertake vulnerability risk assessments when planning or replacing infrastructure.
- To develop greenhouse gas inventories, mission reduction strategies and develop storm water management plans.
- We have to manage changing climate risks; our health, safety, economy, ecosystems and infrastructure.



- Transportation contributes to slope instability. Continuous and inappropriate road use by large trucks, double gasoline tankers, large trucks, city and school busses, volume of traffic; and mix of traffic. Profoundly unsafe road.
- Vibration from traffic weakens the escarpment structure.



- There is no setback between the escarpment and the road in the area of the north side of Mountain Brow and no bylaw to protect the sustainability of the escarpment and properties along the Brow.
- The City has had a slope study done in 2015, the report by Golder Associates was submitted to the City of Hamilton on the 22 Feb. 2016. Maintenance, scaling, wire mesh, Jersey barriers have been installed, and slope repairs initiated.

# Challenges

- Our community recognizes the complexity of these escarpment issues and would encourage the city to take advantage of any resources available in our community such as geotechnical and hydrological studies.
- As a community, we recognize the potential large cost of investigating and remediating some of these issues.

- In 2015, the City had a slope study done by Golder Associates, which was valid for 18 months from the date of the report which was submitted to the City of Hamilton on 22 February, 2016. Field inspections report are documented as been done on 16 May, 2015 on the Kenilworth Access and the Sherman Access east report was done also in May, 2015. Conditions have changed and there have been many slope failures, slides and road closures in this area. The time limit of the Golder report has expired.

- Professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, resulting in limitations to the report.
- In Hamilton, climate change already has contributing to many impacts. We have to show leadership on climate change and the broader environmental agenda. There are enormous costs to non-action. This challenge has become more urgent.
- Planning in the short term needs to be proactive. Along term planning strategy is needed to design better roads that are more stable and cost effective.

# Recommendations

## Short Term

- Consider doing a geological and hydrological studies to establish best practices for preserving the integrity of the escarpment. Consider research opportunities such as measuring the erosion over time.
- Dr. Eyles states it is prudent to be proactive in planning in the face of Climate Change. She also states that our Engineers and our Geologists have to design better roads.
- Implementation of the recommendations of the above studies-slope stabilization.

- Consider redirecting heavy vehicles permanently away from the escarpment edge, such as encouraging use of Red Hill Parkway and Linc, exiting at Dartnall Rd. as opposed to using Kenilworth and Sherman Accesses. This route would be quicker and result in less wear and tear and less emissions than driving through the City, improving safety and quality of life for all citizens.



- Government of Ontario is recommending risk assessments of climate change vulnerability.
- A major slope failure is potentially very expensive, and inconvenient for traffic flow, with resulting loss of convenience for citizens and businesses, making prevention cost effective over the long term.



### **Provincial Government Recommendations:**

1. Encourage municipalities to develop greenhouse gas inventories and emission reduction strategies and related target and performance measurement; providing municipalities with clear direction for a more integrated approach to land use and infrastructure planning.
2. Promote and encourage citizens to use public transit and mass transit when available.
3. Improve public transit services for those living on the south-east mountain, where population growth is increasing fast.



4. Car pooling lots on east and southeast mountain

5. More goods and products could be delivered during night time hours.

6. Photo radar enforcement to reduce speeding and improve quality of life and safety for residents in the east mountain area.

7. Use of new technologies for monitoring slope instability (as developed by University of Oregon) to improve rock fall analysis on cliffs to save money and lives.

## Long term recommendations:

1. Consideration be given to widening Redhill and Linc to 3 lanes in both directions.
2. Consider lane closure adjacent to the Escarpment; this lane could be used for bicycles and walking.
3. More co-ordination of Planning with the Ontario Government Transportation Ministry, City of Hamilton Engineers and Planners, McMaster University Earth Science Dept. and other appropriate faculties, and local scientists in an interdisciplinary approach, to create more stable roads for travel.



## Summary and Key Points.

The City of Hamilton has a Moral imperative and responsibility to work on the Urgent issues we have articulated to day.

The preservation and sustainability of the Niagara Escarpment in the East Mountain Community:  
Geological and slope stability. The area has been under threat for years and the core of the problems need to be investigated.

The area needs respect, protection, conservation, restoration, maintenance and stewardship.

Protecting Public Health, Public, Safety and the Environment.

Climate change: The City has the authority and responsibility to curb and cut carbon pollution for the benefits and health of all Citizens, the Economy and the Environment.

Transportation: redirecting large traffic away from the Escarpment edge, for example, City trucks which are the biggest polluters, school buses large and small.

Planning : needs to be more proactive and long term strategy is needed to design better roads that are more stable and cost effective.