

# **WATERLOO** **ENGINEERING**

**Consulting Engineering Design Problem**

Spring 2010  
Waterloo Engineering Competition  
July 9-10

**General Rules & Guidelines**

1. All communication devices must be turned off.
2. Competitors will be allowed to use:
  - a. Computers, USB keys, CDs, pre-existing files etc.
  - b. Internet
  - c. Reference books

All other tools must be cleared with the competition coordinator before use. Cell phones, BlackBerrys, online communication (e.g. MSN, GoogleChat, Skype) or other communication devices are prohibited.

**Violation of these rules may result in disqualification.**

3. Visitors are not allowed throughout the development and build stage.
4. Keep work stations clean. Clean up at the end.

**Schedule**

The schedule for Consulting Engineering is as follows:

Friday, July 9	6:15 p.m. – 6:30 p.m.	Check-In	WEEF Lab
	6:30 p.m. – 7:00 p.m.	Welcome/Briefing	WEEF Lab
	7:00 p.m. – 12:00 a.m.	Design	WEEF Lab
	12:00 a.m. – 12:30 a.m.	Submissions/Debriefing	WEEF Lab
Saturday, July 10	8:45 a.m. – 9:00 a.m.	Check-In	RCH 3 <sup>rd</sup> Floor Lobby
	9:00 a.m. – 12:00 p.m.	Presentation/Demonstration	RCH 309
	12:00 p.m. – 12:30 p.m.	Prizes and Winner Announcements	RCH 309

Volunteers will bring food and drinks around to teams between 9:00 and 10:00 p.m. Each competitor will be given one (1) can of drink. Competitors are encouraged to bring water bottles as bottled water will not be provided. There will be water fountains nearby for refills. Please remind the competition coordinators and volunteers of your dietary restrictions and/or allergies.

There will be a question period after the problem is presented during the briefing session. No questions will be answered during the development and build stage to ensure fairness in the competition.

Internet use (“penetration”) in Canada is among the highest in the world [1], but Internet speeds (upload and download) lag behind other countries [2]. With the increase in Internet users, as well as high bandwidth Internet resources such as YouTube, streaming TV, and file sharing, speed and data caps are becoming a concern with an ever-increasing tech-savvy population. As more people and businesses move a higher percentage of their time online, Internet is seen as an important marketing tool to stay competitive in today’s society. The competitiveness is not only limited to a regional level, but at the international level as well with a CBC article noting that broadband internet is “the roads and railways of the modern age” [3].

#### References

[1] <http://www.internetworldstats.com/top20.htm>

[2] <http://www.worldpoliticsreview.com/Images/commentarynews/broadbandspeedchart.jpg>

[3] <http://www.cbc.ca/technology/story/2010/03/15/waterloo-digital-economy-johnston.html>

#### **Motivation**

The Region of Waterloo comprises of the cities of Waterloo, Kitchener and Cambridge and Townships of Wellesley, Woolwich, Wilmot, and North Dumfries. This region, noted for its concentration of high-tech companies and academic institutions, needs to remain attractive to new potential “high-tech professionals” that would re-locate to the area. The purpose of this competition is to assist your client, the Region of Waterloo, to continue to attract new population as well as improve internet access for those living in the area already. Some questions the Region of Waterloo may want answered are below.

- What are these issues?
- What are the root causes?
- Who do they impact?
- What are the benefits?
- Are there any negative consequences?
- Are current resources adequate?

These are, however, merely motivation to your group to assist in solving a pressing question that has been given to you...

**Problem Statement**

Your group has been hired by the Region of Waterloo to devise a plan for increasing internet speeds while decreasing the costs to consumers.

The Region is prepared to invest between five to ten million dollars for each of the next three years in order to accomplish this. The benefit to the Region is that it can better tout itself as being the "tech capital of the North", and lure new businesses and residents (meaning more tax dollars) to the area.

Your group is to prepare a report that will lay out the issues with the current system, and propose the best way forward. Your plan may or may not include direct participation from all stakeholders.

**Some Guidance**

Go here: [http://wec.uwaterloo.ca/consulting\\_engineering.html](http://wec.uwaterloo.ca/consulting_engineering.html) to see how you will be judged ("Marking Scheme") and what you're supposed to be doing ("Deliverables").

It is highly recommended (as the marking scheme shows) to use a structured engineering design method to form the outline of the report and presentation.

Some questions that can get you started (but that do not necessarily have to be answered word-for-word; they are just meant to help you address the problem statement):

- What legislation is in place?
- What internet service providers (ISPs) are currently in the area?
- Do any ISPs currently benefit greatly over others?
- How many people use the internet in the Region?
- What is the projected growth of the Region in the long term?
- What technology is in place, what technology can be used?
- What role can consumers play, if any?
- What savings do you expect for the residents and businesses?
- Will this only affect urban usage, or will it benefit rural usage as well?

**Some Resources**

Map of the Region of Waterloo:

<http://www.graac.ca/admin/sources/editor/assets/RegionColourMunicipalities.jpg>

ISPs operating in the Region of Waterloo: <http://buyitcanada.com/Kitchener-Waterloo/Internet/ISP/>

CRTC Regulatory Policy: <http://www.crtc.gc.ca/eng/archive/2009/2009-657.htm>

Terms and rates approved for large cable carriers' higher speed access service

<http://www.crtc.gc.ca/eng/archive/2000/O2000-789.htm>

CRTC requires Internet service providers to be more transparent about their Internet traffic management practices <http://www.crtc.gc.ca/eng/com100/2009/r091021.htm>

Region of Waterloo Quick Facts

[http://www.prosperitywaterloo.com/about\\_waterloo\\_region.php](http://www.prosperitywaterloo.com/about_waterloo_region.php)

Region of Waterloo 2009 Year End Population and Household Estimates

[http://www.region.waterloo.on.ca/web/region.nsf/DocID/25A26ADFBFAC05638525760B00646754/\\$file/2009\\_Pop.pdf?OpenElement](http://www.region.waterloo.on.ca/web/region.nsf/DocID/25A26ADFBFAC05638525760B00646754/$file/2009_Pop.pdf?OpenElement)

Region of Waterloo: Population and Employment Forecasts 2006-2029

[http://www.region.waterloo.on.ca/web/region.nsf/DocID/25A26ADFBFAC05638525760B00646754/\\$file/Population\\_and\\_Employment\\_Forecasts.pdf?OpenElement](http://www.region.waterloo.on.ca/web/region.nsf/DocID/25A26ADFBFAC05638525760B00646754/$file/Population_and_Employment_Forecasts.pdf?OpenElement)

### **References**

For Competition Details and Marking Scheme; Deliverables; Permissible Tools please refer to [http://wec.uwaterloo.ca/consulting\\_engineering.html](http://wec.uwaterloo.ca/consulting_engineering.html).