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Item No. 5

Halifax Regional Council
February 26, 2008

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY:

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Paul Dunphy, Director, Community Development

DATE: February 19, 2008

SUBJECT: LiDAR Mapping Project and Sea Level Rise Modelling

INFORMATION REPORT

ORIGIN

1. Halifax Harbour Planning Initiative
2. Tender No. 07-033, LiDAR Data Acquisition for Halifax Harbour Drainage Basin and East Petpeswick Peninsula and Surrounds, March, 2007

BACKGROUND

As part of the Halifax Harbour Planning Initiative, Regional Council approved a data acquisition project called LiDAR (Light Detection and Ranging) for the Halifax Harbour drainage basin and a portion of the Eastern Shore. The area for which this data was acquired is shown on Map 1.

LiDAR is a relatively new air-borne laser beam technology that can very precisely map ground elevations and convert this information into a Digital Elevation Model (DEM). The DEM is a valuable tool for decision making on the part of staff, Council and other users. In concert with other GIS-compatible software, it can be used in applications such as watershed planning, floodplain analysis, forestry and agricultural management, 3-D modelling, transportation and infrastructure planning, and so on.

Of particular relevance to the Halifax Harbour Plan study is the use of LiDAR data to forecast future sea level rise and storm surge events on the shoreline areas of the harbour as a result of climate change. Using the DEM a predictive climate change model is applied which incorporates the best scientific knowledge available in determining future incremental rises in sea level and storm surge. The end product will be a graphic representation (mapping) that illustrates, on a site specific basis, the vulnerability of the shoreline to potential flooding.

In carrying out this project, HRM staff wish to acknowledge the valuable contributions that our partnering agencies are providing:

- Natural Resources Canada (NRCAN)
- Centre of Geographic Sciences, NSCC Annapolis Valley Campus
- NS Department of Energy
- Halifax Port Authority
- Dalhousie University

The project team has now received most of the LiDAR data and the DEM, and are now in the stage of superimposing the predictive climate change modelling.

Council was made aware that certain preliminary information and findings from the LiDAR project was provided to the Premier's Office for presentation at the Council of the Federation Climate Change Adaptation Forum, held in Vancouver this past month.

DISCUSSION

Members of the LiDAR project team will be making a presentation in early March at a Climate Change Conference hosted by the Environmental Services Association of Nova Scotia, where sample preliminary findings will be provided. The purpose of this report is to provide an update to Council in advance of the upcoming conference.

Highlights of the findings of the LiDAR data acquisition project and sea level rise modelling for

Halifax Harbour are presented as follows:

- The project is a work in progress, with HRM having only recently received the DEM. Work is now proceeding to superimpose sea level rise modeling and produce mapping that illustrates the degree of vulnerability for flooding for all shoreline areas in the Harbour.
- A number of scenarios will be modeled, including rates of sea level rise using varying global warming assumptions, storm surge scenarios and the geologic subsidence of the Nova Scotia land mass.
- The important end result of this LIDAR Mapping and Climate Change Modeling project for Halifax Harbour is that it will provide a reliable decision-making tool for Council, other levels of government, for property owners and stakeholders. It will enable decisions to be made with respect to adaptive measures for such things as:
 - land use planning policy
 - transportation planning
 - infrastructure retrofits
 - port development planning
 - emergency response programs, and so on.
- It is inevitable that sea level rise will result in physical impacts to the shorelines of the Harbour and other HRM coastal communities. In addition, climate change is predicted to bring more frequent storm events, increasing storm intensity and higher storm surges. There are risks to public safety, property and infrastructure.
- Vulnerability can be reduced markedly by implementing proactive measures aimed at reducing the susceptibility and exposure to sea level rise and storm surge. The LiDAR mapping/climate change modeling project will provide a sound basis on which to make informed decisions.

Next Steps in the Process:

To complete this LiDAR / Sea Level Rise project, the following program will be undertaken:

- (a) Complete the sea level rise modeling scenarios for the study area;
- (b) Consult with harbourfront property owners, stakeholders and the public;
- (c) Work with the Harbour Plan Steering Committee and Regional Plan Advisory Committee to determine an acceptable sea level rise benchmark;
- (d) Determine appropriate adaptation measures, which can be implemented over time, to minimize the future impacts of sea level rise/storm surge;
- (e) Present this information to Regional Council and seek its direction and approval of an Implementation Program, which may entail a combination of voluntary compliance and

policy/regulatory mechanisms.

BUDGET IMPLICATIONS

There are no budget implications.

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Capital and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Capital and Operating reserves, as well as any relevant legislation.

ATTACHMENTS

1. Map of LiDAR Data Collection Area

A copy of this report can be obtained online at <http://www.halifax.ca/council/agendasc/cagenda.html> then choose the appropriate meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

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