

Request for Decision

CGS Flood Plan, Sandbagging Policy for the Protection of Private Property

Presented To:	Community Services Committee
Presented:	Monday, Dec 03, 2012
Report Date	Wednesday, Nov 21, 2012
Type:	Managers' Reports

Recommendation

THAT the City of Greater Sudbury adopts a policy for the protection of private property; and,

THAT the City of Greater Sudbury's primary responsibility in a flood event is to protect lives, mitigate flood damage, protect municipal critical infrastructure and ensure the continued delivery of essential municipal services such as clean drinking water, sewage treatment, Emergency Services (Police, Fire, EMS) etc.; and,

THAT the City of Greater Sudbury provides sandbags and sand to residents, when adequate supplies are available, and that Greater Sudbury personnel not be deployed for the protection of private property; and,

THAT the General Manager of Infrastructure Services investigates the feasibility of purchasing equipment specifically designed to expedite the process of filling sandbags required for the protection of municipal critical infrastructure.

Signed By

Report Prepared By

Lynn Fortin
Community Emergency Management
Co-ordinator
Digitally Signed Nov 21, 12

Recommended by the Department

Tim Beadman
Chief of Emergency Services
Digitally Signed Nov 21, 12

Recommended by the C.A.O.

Doug Nadorozny
Chief Administrative Officer
Digitally Signed Nov 21, 12

Background

During the development of the Community Flood Management Plan, staff identified the need to establish a policy for the protection of private property. The protection of private property during overland flooding is a major concern to homeowners in high risk flood areas. Currently, the City of Greater Sudbury does not have a policy describing the level of service it will consistently provide when private property is threatened by flooding.

Prior to amalgamation, the seven former municipalities provided varying levels of support to homeowners when their properties were threatened by rising water. The level of service provided ranged from delivering sand, sandbags and/or personnel, to providing no service at all. The City of Greater Sudbury's primary responsibilities in a flood event is to protect lives, mitigate flood damage, protect municipal critical infrastructure and ensure the delivery of critical services such as clean drinking water, sewage treatment,

Emergency Services (Police, Fire, EMS) etc.

With City personnel deployed to protect municipal critical infrastructure and perform the required daily tasks, regular staffing levels will be challenged. The City will not have adequate personnel to assist with the protection private property.

Discussion

Overland flooding is normally not widespread in Greater Sudbury and is usually limited to known low-lying hazard areas within the community. There are typically two scenarios that can cause overland flooding.

- Overland flooding is caused by the rapid melting of snow under the combined effect of sunlight, winds, rain and warmer temperatures and by snow and ice melt runoff during spring rainfalls.
- When the ground is frozen or paved over, the melting snow and/or rain are unable to penetrate and runoffs over the ground surface into streams and lakes resulting in flooding.

Urban flooding occurs when the rainfall exceeds the municipal storm drainage system’s ability to handle the volume of rain. This type of flooding occurs in urban areas because the ground surfaces are largely paved over, thereby decreasing the capability of the ground to absorb even small amounts of rainfall quickly enough. When urban flooding occurs, there is no value in dedicating resources for sandbagging.

Current Practices

Currently, if a resident calls 3-1-1 concerning the threat of flooding to their property, City staff will, when resources are available, provide sand and sandbags and instructions on how to build a sandbag dike. The City does not allocate personnel to assist with the filling of sandbags or the construction of a sandbag dike. Attached is a Fact Sheet which provides information on sandbags, sand, personnel, and equipment required to construct a sandbag dike.

3-1-1 records indicate that since 2006, there have been fifty (50) calls from residents requesting sandbags. Details with specific requests and actions taken by Greater Sudbury were not available from the database.

The City does not stockpile sand and sandbags at levels that allow for wide distribution to residents. The City carries a minimum supply that is allocated for the protection of municipal critical infrastructure. (i.e. water and sewage plants, lift station, wells, municipal roads, etc.).

When demand exceeds local supplies, the City of Greater Sudbury can contact the Provincial Emergency Operations Centre and request additional sandbags. Our request will be evaluated and weighted against other requests. If Provincial supplies are available, they will be shipped to Greater Sudbury.

Sampling of Service Levels in Ontario Municipalities

Of the fifteen Emergency Managers contacted in Ontario, none were aware of any formal policy for the protection of private property; however, they all indicated that their municipality does not provide personnel and only one indicated they would supply sand and sandbags for the protection of private property in flood events.

Municipalities contacted:

Region of Durham	Region of Halton	District of Muskoka
Region of Niagara	Region of Peel	Region of Waterloo
Region of York	Region of Hamilton	City of Kingston
City of London	City of Ottawa	City of Peterborough

Flood Response in Peterborough and Winnipeg

The City of Peterborough has experienced significant flooding in the last ten years (2002, 2004, 2012). Floods were caused by urban flooding when the city received significant rainfall in a very short period of time. The ground could not absorb the volume of rain. In these instances sandbagging was not required. Peterborough's practice is to deliver sandbags and sand to the property owner. The property owner is responsible for filling the sandbags, building the dike and removing it after the water recedes.

The City of Winnipeg, Manitoba, has experienced several floods where sandbagging was required. There are approximately 500 properties in one area of the city that are at risk when the Red River overflows its banks. Property owners are responsible for building the sandbag dike and coordinating volunteers on their property.

The City of Winnipeg does provide the following services to property owners:

- survey crew will set high water markers on the property,
- staff will deliver filled sandbags,
- staff will ensure the sandbag dike is built correctly.

Volunteers

In a municipally-declared emergency where Greater Sudbury requires volunteers to assist with sandbagging of municipal critical infrastructure, the Municipal Emergency Response Plan sets out the procedures for the recruitment, coordination and deployment of volunteers.

Conclusion

The municipal response to a flood event will require the coordination and cooperation of all City departments and our partner agencies. This proposed policy will provide clarity and clear direction to City staff. The policy provides residents with factual information that will assist them with preparing their properties for a potential flood event.

Fact Sheet — Sandbags, Sand, Personnel, Equipment

Sandbags

Engineers recommend building a dike with a width at the base that is three times the dike height. For example, a 4-foot-high dike would have a base width of 12 feet.

Each foot of finished dike length requires one bag, each foot of height requires three bags, and each 2.5 feet of width requires three bags.

The chart below calculates the **estimated** number of sandbags needed for 100 linear feet of dike;

Base width 3 times the height		Base width 2 times the height	
Height (feet)	Number of sandbags	Height (feet)	Number of sandbags
1	600	1	600
2	2100	2	1700
3	4500	3	3000
4	7800	4	5500

Source: U.S. Army Corps of Engineers; North Dakota State University, Fargo, North Dakota

Costs per Sandbag	Filled	Empty
	\$5.10	\$0.98

Source: Local supplier quote on September 7, 2012

Sand

One cubic yard of sand will fill approximately 100 - 14" x 26" sandbags with a weight of 30 lbs each. Every sandbag will hold about 0.4 cubic feet of sand.

The chart below calculates the **estimated** cubic yards of sand per 100 linear feet of dike:

Dike Height (ft)										
		1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Cubic Yards of Sand	Width 3 x h	7	15	25	38	54	73	95	119	145
	Width 2 x h	6	11	18	27	38	50	65	82	100

Source: U.S. Army Corps of Engineers; North Dakota State University, Fargo, North Dakota

Sand – per tonne	Delivery – per tonne	1 tonne = 3.70 cubic yards
\$3.50	\$3.40 to \$5.70 (depending on location)	

Example: 1 truckload (28 tonnes) delivered to St. Clair Depot — \$7.50/tonne \$210.00 + taxes

Source: Local supplier quote on September 7, 2012

Personnel

Filling sandbags by hand is labour intensive. Two people working together with a shovel and tying off the bag can fill approximately 12 sandbags per hour. It would take 2 people 50 hours to fill enough bags to build a dike that is one foot high with a recommended base of twice the width.

Greater Sudbury does not own any equipment to assist with the filling of sandbags however there are several products currently available on the market

Equipment

The **Sandbagger** is a large portable machine with twelve spouts that can fill 5000 bags per hour in a sand pit or in a large building during inclement weather. Sand is sent into the machine on a conveyer belt. One person stands at the end of the chute ready for a quick dump of sand, and quickly passes it down the assembly line consisting of bag tiers, bag passers and bag tossers. The **Sandbagger** sells for \$36,000.

ExpressBagger is designed to work with three or more individuals. One person with a shovel continuously throws sand into the funnels while others are alternating between filling, tying and removing bags. A team of three can fill 240 bags in an hour. The **ExpressBagger** ranges in cost from \$87 for a single funnel up to \$2253 for 30 funnels.