Date: April 16, 2012

To: Andrew Keim, Water Resources Officer
Aboriginal Affairs and Northern Development Canada

Re: Draft Report regarding water related incidents on January 12, 2012

1.0 Introduction

This report is a summary of the events that occurred on January 12, 2012 and continued until January 15, 2012 concerning a broken service connection to the High School, the resulting water leak, the temporary flooding in Lower Iqaluit, the resulting drop in water levels at the Water Treatment Plant, and a related issue at the Waste Water Treatment Plant.

2.0 Service connection at Inukshuk High School

On January 11, 2012, the water service connection to the Inukshuk High School was found to be frozen. Since the service connection is on private property, the responsibility for thawing the connection was left to workers of the High School and the Department of Community and Government Services (CGS) with the Government of Nunavut. The City's involvement in this matter was limited with the exception of providing some equipment to Baffin Building Systems, a private contractor hired to thaw the line. The High School was subsequently closed and the connection was worked on all day on January 12, 2012. The City understands that workers were working on the line until approximately 10 p.m. that night.

3.0 Water leak at High School connection

Shortly after workers had stopped working on the frozen connection, the City was made aware of a large leak at the connection and at the junction where the connection joined the City's water main. The City's Emergency Services Dispatch Log indicates that an alarm from the Water Treatment Plant was received at 8:57 p.m. The alarm was likely a high flow alarm which is set to trigger when output rate exceeds 8.5 million litres/day. This likely indicates that the break had occurred but was likely under snow cover and could not be visually detected. Further evidence of the leak was not detected until later when the Dispatch Log records a public citizen calling at 11:15 p.m. to report water running down the creek near DJ Specialties. At this time, the Dispatch Log indicates that Utilidor staff were advised.

The City's response was to try to isolate the leak through valves on the surrounding utilidor infrastructure. A valve at a nearby access vault was partially closed in order to limit the flow of water and to continue water service to the area.

The leak introduced a large amount of water in to a nearby creek that drains to Koojjessee Inlet. The partial flooding that resulted is described in Section 4.0. The leak also caused a large drop in water levels at the Water Treatment Plant and is covered in Section 5.0.

Through the night, workers from CGS, Baffin Building, and Canadrill attempted to find a solution to fix the water leak at the junction of the connection and City watermain. A solution was attempted at approximately 5:30 a.m. which reduced the overall flow of the leak but still continued to leak.

At approximately 10 a.m., the workers who had attempted the temporary solution began removing sections of material around the junction box in order to attempt a permanent fix. At this time, a more experienced Utilidor staffperson was able to isolate the leak and shut down the flow of water. By 4:30 p.m. on January 13, 2011, the junction had been capped and the leak was fully contained. It was understood that the service connection for the High School would need to be re-installed at a later time.

4.0 Temporary flooding in Lower Iqaluit

As a result of the leak, a large volume of water was introduced in to a drainage creek flowing towards Koojesse Inlet. When the volume of water reached frozen culverts, it pooled rapidly and flowed on to lots that were adjacent to the creek. Roads crews from the City were dispatched and began using heavy equipment to build berms using snow to direct the flow of water. At the same time, Utilidor crews began blasting frozen culverts in order to allow the water to flow. Blasting continued through the night and was successful in allowing a large amount of the water to flow normally. Once the snow berms were built, Roads crews began removing excess water and ice from affected lots. This continued through the morning of January 13, 2012. Municipal Enforcement Officers were on scene helping to shut down roads and direct public traffic as needed.

5.0 Water Treatment Plant

At approximately 2:00 a.m. on January 13, 2011, the Water Treatment Plant Operator was called in to check to see if the water leak at the High School connection had affected operations at the plant. The Operator confirmed that the plant's water tanks that hold treated water had lost a significant volume of water and that the plant was still measuring a large outflow of water. At approximately 3:00 a.m., the Operator began producing water using a manual chlorination process since the plant's automated gas chlorination system was not functional. The Operator was performing chlorine tests at regular intervals. At approximately 4:00 a.m., it was understood that water production could not replenish the storage tanks at a fast enough rate to meet the morning demand for water as people in the community woke up and began their day. At 4:30 a.m., the City issued notifications to the media and other key agencies to let them know that all essential services were shut down and that the City was encouraging people to stay home and conserve water. As the City's message spread that morning, water production continued.

At approximately 11:00 a.m. on the morning of January 13, 2012, the regular chlorine tests indicated that the chlorine levels in the treated water were at a level that was approaching the minimum territorial standards. In consultation with officials from the Government of Nunavut Public Health department, it was decided that a Boil Water Advisory would be issued by the Government of Nunavut. This was done as a precaution.

For January 14, 2012, the conserve water order and boil water advisory remained in effect. Public Health officials took a sample for testing and it was understood that the results would

not be available for another 24 hours and that the Boil Water advisory would remain in effect until the results were know.

The plant continued to produce water and the levels in the storage tanks slowly began to rise through the day. The conserve water advisory continued to be in effect throughout the day. It should be noted that no Truck Delivery services were operating in order to avoid the potential contamination of water tanks on the trucked routes.

At approximately 11:00 p.m. that night, the automated gas chlorination system was able to be started. Water levels had also reached a normal level.

At 12:30 p.m. on Sunday January 15, 2012, Public Health officials lifted the Boil Water Advisory since the test results indicated that the City's treated water met all health standards. Trucked services resumed immediately.

During the time when the conserve water order and boil water advisory was in effect, the City provided water to residents of the community using water trucks that had been filled on the evening before the incident.

6.0 Waste Water Treatment Plant

Further to discussion with the Water Resources Officer, it was brought to the City's attention that there was also an issue at the Waste Water Treatment Plant. The Officer stated that during, or shortly after the watermain leak, he was touring the WWTP and noticed that a discharge valve was open resulting in a direct discharge in to the Bay. When the Officer questioned the Utilidor Foreman on this, it was stated that another employee was responsible for leaving the valve open.

The city acknowledges that this was an unfortunate incident and has confirmed with utilidor staff that the valve shall remain closed at all times.

7.0 Discussion and Analysis

While there were no adverse effects on public health or serious damage to or loss of property, the City understands that the response to this crisis deserves to be reviewed and that preventative actions can be implemented to help prevent such an event from occurring in the future. The following discussion describes areas in which the City could have performed at a better level.

<u>Knowledge of Utilidor Infrastructure</u>

The City's utilidor infrastructure is complex and composed of several parts that have been installed over a number of decades. As such, it takes training and experience with the system to gain a level of understanding that allows for quick troubleshooting of issues that may arise. As described in Section 3, on-duty City staff had problems isolating the watermain leak at the high school and the initial capping solution was only able to partially stem the leak. It was not until later that a staffperson with more experience with the system

was able to isolate the leak to allow a repair to be made. It's likely that a quicker isolation of the valves to control the leak could have avoided a large loss of water at the treatment plant.

Operator Error at WWTP

The City acknowledges that a staff member was responsible for opening a valve at the WWTP that resulted in a direct discharge to the Bay. The City also acknowledges that due to staff statements, it is difficult to determine who was responsible for opening the valve and why they did so. The City can comment no further on this matter due to an ongoing internal investigation.

8.0 Preventative measures

This section describes the preventative measures that the City is undertaking to ensure that similar incidents do not occur in the future.

- More staff training on Utilidor systems

  The City has identified that staff training in the Utilidor department is a priorty. The City has developed courses with a private consultant that are targeted towards local systems. The course material will cover: Water treatment, Water distribution, UV disinfection (applicable to Iqaluit), Backflow prevention and cross-connection control, General drinking water regulations, and Wastewater collection and wastewater treatment. The City intends to deliver the course in May or June of 2012.

- Training on Emergency Plan procedures

  A review of the EMP is underway and a new draft EMP will soon be completed. Senior Management at the City have met in the last month in order to identify the need to update the EMP and to begin training staff. It is understood that training will be intensive and will require major time commitments from key staff. This will allow the City to involve more staff in emergency responses where they are prolonged.