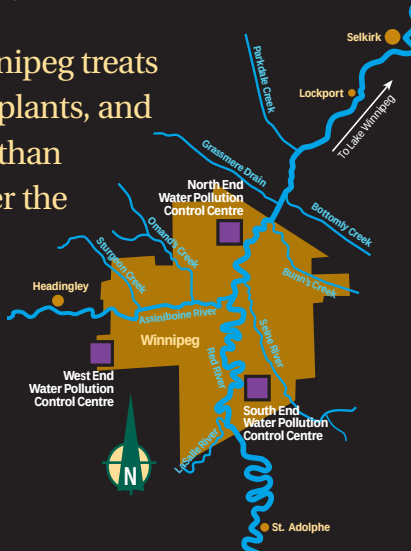
A Plan to Improve Wastewater Treatment



Winnipeg
Water and Waste Department

The quality of water in the Red River, the Assiniboine River, and Lake Winnipeg is affected by the way the City of Winnipeg collects and treats the sewage and land drainage produced by more than 600,000 residents.

The City of Winnipeg treats sewage at three plants, and has spent more than $200 million over the last 20 years to expand and improve these facilities.



Why Do We Need to Improve Wastewater Treatment?



- To protect public health
- To protect the water quality in the rivers and Lake Winnipeg:
  - for fish and other aquatic life
  - for the recreation and enjoyment of residents
- To respond to provincial environmental requirements



What Does Our Plan Include and How Much Could It Cost?



Capital Costs

Reducing nutrients in effluent	$670 million
Reducing combined sewer overflows	$450 million
Biosolids management	$63 million
Disinfecting effluent	$25 million
Other	$10 million
Total	$1.2 billion

There will also be operating and maintenance costs for new facilities.

- Implementing the proposed plan will increase the cost of sewer services in the future.
- The cost will be spread over the next 25 years.

Nutrients in Effluent



Which nutrients are a concern?

Nitrogen and phosphorus. These nutrients are in the treated wastewater (effluent) we release to the rivers.

Why are these nutrients a concern?

High levels of nutrients in Lake Winnipeg cause excessive algae and weed growth, which:

- lowers water quality
- harms fish and other aquatic life because oxygen levels are reduced
- affects the appearance and recreational enjoyment of our rivers and lakes

Sources of Nutrients



Only a small portion of nutrients comes from our effluent. Nitrogen and phosphorus get into our rivers and lakes from many other sources, such as urban and rural runoff, and agricultural and industrial operations.

Source of Nutrients	Nitrogen (% of total)	Phosphorus (% of total)
United States (Red and Souris Rivers)	20.9%	33.9%
Saskatchewan River	8.7%	5.0%
Ontario (Winnipeg and other rivers)	21.4%	13.9%
Land Sources in Manitoba outside of Winnipeg	25.6%	35.2%
Atmospheric and internal lake processes	19.6%	6.3%
City of Winnipeg wastewater *	3.8%	5.7%

Source: Lake Winnipeg Stewardship Board December 2006 Report
* Source: City of Winnipeg

What are We Doing to Reduce Nutrients in Effluent?



We will incorporate state-of-the-art biological nutrient removal processes into the three wastewater treatment plants:

West End Plant	by 2008
South end Plant	by 2012
North End Plant	by 2014

The total cost to lower nitrogen by 1.6% and phosphorus by 3.7% is about $670 million.



Combined Sewer Overflows



What are combined sewers?

Combined sewers are pipes that carry both wastewater (sewage from homes and businesses) and land drainage. During dry weather, and most light rainfalls, all wastewater in the combined sewers is carried to the treatment plants.

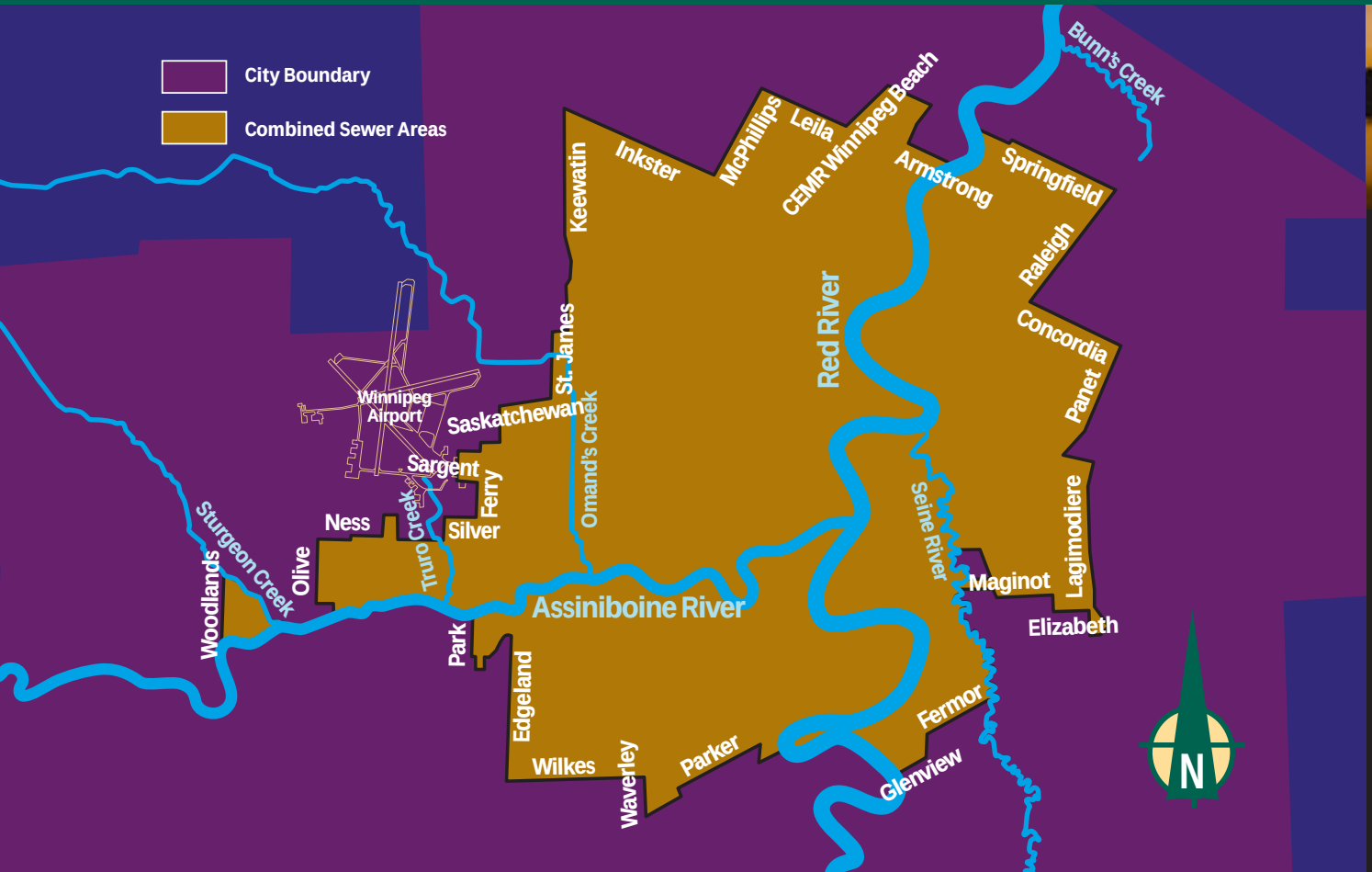
- Combined sewers were built in older areas of the city between 1880 and 1960.
- There are 1,280 kilometres of combined sewers.

What are combined sewer overflows?

Combined sewer overflows (CSOs) can occur during heavy rainstorms when the sewers cannot handle the large amount of runoff. Some of the rain/wastewater mixture flows directly into the rivers without reaching the treatment plants.

- CSOs happen an average of 18 times a year during the recreation season (May 1 - Sept. 30).
- There are 79 locations where combined sewers can discharge into the rivers.

Combined Sewer System





Combined Sewer Overflows



Why do we need to reduce the number of CSOs?

Every time there is an overflow, there is a temporary increase in the river water of:

- bacteria and floating debris
- organic material, which slightly reduces the dissolved oxygen levels in the river, but not enough to harm aquatic life
- common urban pollutants from land drainage, such as oils, and lawn/garden fertilizers
- odour



Combined Sewer Overflows

What have we done about CSOs?

We began a study in 1994 to:

- understand the effects of combined sewer overflows on river water quality
- develop options and costs to control combined sewer overflows

What do we propose to do about CSOs?

We propose to separate and use existing pipe storage, and add more if practical to reduce the number and volume of overflows. This improvement, which could take 25 years and cost about $450 million, would:

- collect and store the sewage until it can be pumped to the treatment plants
- reduce, on average, the overflows to a target of 4 or less per year where possible

