

Grading Methodology

The following section describes how each question was graded and how the final grades were determined. The same methodology was used for each city in the report card.

APPROACH

The methodology design was based on the following considerations:

- **Inter-city Comparison:** The cities are compared with each other. Those featuring the best practices amongst the group receive higher grades than cities that have inadequate practices.
- **Ideal Standards:** An "A" grade is assigned to the ideal standard or best practice for each question.
- **Grade.** The grade is assigned (Ranging from A to F) according to the methodology established for each question as described below.
- **Weight.** Each question was assigned a weight reflecting the importance of that particular indicator. For example, the total volume of combined sewer overflows as a percentage of the total sewage has a higher weight than the response regarding final effluent testing because it is considered to be one of the most critical indicators affecting the water quality of the Great Lakes..
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- **Overall Grade Calculation.** The grade and weighting factor were multiplied for each question, and the results summed and averaged to get the overall city grade (similar to a grade point average calculation). The overall grade was calculated by taking the weight for each question and multiplying it by the grade point equivalent to the letter grade received. The overall grade was determined by converting the grade point average back into a letter grade using the following conversion between grade point average and letter grade.
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A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
4	3.7	3.3	3	2.7	2.3	2	1.7	1.3	1	0.3	0

INDICATORS

Population. Cities were not graded on this question it was asked to provide background information.

Treatment Type. (Weight 2) With the resources available to North American cities, and considering the effects of pollution that still exists in effluent after secondary treatment, for the purposes of this report secondary treatment is considered to be merely satisfactory. Tertiary treatment that includes additional BOD and SS removal is considered to be the ideal level of treatment. In addition, the grade was increased if the city reported to use non-chlorine based disinfection such as UV, dechlorination of final effluent and/or the removal nutrients such as phosphorus.

Treatment	Grade
Tertiary	A
Secondary to Advanced Secondary	C to B
Primary	F

Receiving Water. This information is included in the narrative but does not related to sewage management and therefore is not graded.

Raw sewage discharges. (Weight 1) We initially planned to give this question a weight of two but given we did not receive information regarding raw sewage discharges due to spills, bypasses or SSOs from several cities, and many cities do not differentiate between raw sewage discharges fro those occurrences and discharges due to CSOs, we decided to give this question a weight of only one. A city was not graded on this question if it did not provide information on raw sewage discharges or their response did not differentiate between raw sewage discharges due to spills and bypasses and CSOs.

Overflow Volume as Percentage of Total Flow	Grade
0	A
< 0.5% raw	C
< 0.5% partially treated	B
Any reported bypasses or partially treated releases (no volume given)	D
>1%	F

Sewage Overflow Frequency. (Weight 1) A high overflow frequency indicates that the system capacity cannot meet the flow demand on a more frequent basis. A greater frequency of overflows also result in more frequent impacts on the receiving environment. An "A" is best and indicates no overflows.

Frequency (Overflow events per year)	Grade
0	A
<5	B
5-10	C
10-20	D
>20	F

Overflow Volume.(Weight 2) Calculated as percentage of total sewage. An "A" indicates zero CSO volume as a percentage of total flow. Grades may have been slightly adjusted to reflect recent changes that have improved CSO control.

Volume as % of overall sewage	Grade
0	A
<0.5%	A-
<1%	B
<2.0%	C

<5.0%	D
>5%	F
No volume given but reports CSOs	D

Percentage of Combined Sewers. Ideally storm and sanitary systems should be separate. However, most old cities have some combination sewer systems. Rather than opt for expensive sewer separation some cities manage combined sewer overflows by installing control or capture structures at overflow points or within the sewer infrastructure. We decide not grade the response to this question given the different ways cities manage CSOs. The real issues to grade CSOs are the frequency of overflows and volume of overflows as a percentage of the total sewage volume. We do not want to penalize a city that has found other ways of managing CSOs that does not include separation of combined sewers.

Sludge Disposal. This is a highly controversial issue and at present there are environmental impacts associated with many of the disposal methods currently in use. We did not grade the response but provide the results in the narrative.

Final effluent testing.(Weight 1) The key factors with respect to final effluent testing are the frequency of testing and the number of different parameters tested. Cities that received high grades tested many different parameters on a more frequent basis than those that received lesser grades. Toronto has the most comprehensive testing and received a grade of "A" and was the de facto standard by which other cities were compared. The grade range reflects minimal to comprehensive testing in terms of the number of different parameters tested and frequency of testing (F to A).

Permits. This question was informational and since all the cities surveyed hold permits we did grade the response to this question.

Sewer-use by-laws. (Weight 1) We did not analyze the by-laws. A city was graded on how recently their by-law had been reviewed and/or updated. Sewer-use by laws or ordinances control the discharge of toxic substances into sewer systems and a city that has recently reviewed its by-law is more likely to have a comprehensive by law which sets standards for emerging toxic pollutants.

Sewer by-law	Grade
City has a recently updated sewer by-law	A
Yes, but if not updated in last 5 years	B
Yes, but if not updated in last 10 years	C
Yes, but if not updated in last 15 years	D
Yes, but not recently updated but under review	C
City does not have a sewer by-law	F

Sewage-related Pollution Charges. It is possible a city was charged for an offence a decade ago and subsequently the city has improved its infrastructure and treatment

processes. Also, a city may have no charges simply because the state/provincial government takes a lenient attitude to the issue of sewage pollution. Therefore we have decided to provide this information but not grade it.

Contact Information. This would have no bearing on the grade but is included in the city information sheet.

Future Plans. (Weight 1) Sustainability depends upon future planning. Cities with good plans would be given a high mark. The fact that a city has plans indicates they value the environment, have taken stock of the current situation and, are willing to invest towards a better environment.

Future Plan	Grade
Treatment plant and collection infrastructure upgrades	A/B
Treatment plant upgrade	B/C
Collection Infrastructure upgrade	B/C
New legislation only	D/C
Improved or expended effluent testing only	C/D
If already a well performing city making just minor investments	B
If already a well performing city making major investments	A

Additional Facts. In the final report information obtained from this question was incorporated into the response to the question regarding future plan where appropriate.

In an effort to save space not all the additional information provided and future plans are included in the final report.