Summary of Rainfall Analysis Completed for the August 19th, 2005 Storm Event

FINAL REPORT

For: Toronto and Region Conservation Authority

Our File: TR01-0026

Date: June 2006

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Water Resources and Environmental Consulting

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1 INTRODUCTION

This report summarizes the general storm conditions within Toronto and Region Conservation's (TRCA) jurisdiction measured using rain gauges operating during the afternoon of Friday, August 19th, 2005. In addition to presenting the rainfall distribution over the study area, the study compared the intensities and durations during the storm to the 'Intensity-Duration-Frequency' (IDF) values at Environment Canada's Toronto City (Bloor Street) rain gauge (ONT 6158359) which has historically been used by a number of municipalities located within jurisdiction of TRCA for the purposes of designing drainage infrastructure.

The results of this study should be useful for evaluating the performance of drainage systems as compared with current design criteria. The analysis generally answers the questions as to whether the storm exceeded municipal design criteria in areas experiencing high-intensity rain over a particular storm duration. The results may also be used as input to more detailed hydrologic analysis to estimate flows and assess the performance of hydraulic structures (i.e., sewers, channels, culverts, bridges) that experienced severe flood and/or erosion damage as a result of the August 19th, 2005 storm event. Furthermore, the compiled data may be useful, together with previously recorded storm data, to assist TRCA municipalities in developing up-to-date IDF parameters for use in the design of new municipal drainage infrastructure. This would ensure that the desired levels of service and flood protection are consistent with current municipal and provincial objectives.

It is known that point measurements of rainfall using rain gauges have both random and systematic errors[1] (Sevruk, 1986). Precipitation measurement errors may include wind, wetting, evaporation, condensation and/or rain splash. Although systematic errors are considered relatively small in heavy rainfall regimes such as the August 19th, 2005 storm event, systematic errors are possible with background literature suggesting a range of error anywhere from a minimum of 3% up to a maximum of 30%[2]. In light of the above, a coarse screening of total rainfall depth was carried out for each rain gauge in comparison to surrounding stations to identify significant anomalies (i.e., high or low values). Suspect gauges were confirmed with TRCA and removed from further analysis as necessary. Notwithstanding, the results of this analysis should be interpreted carefully in light of the limited quality control completed as part of this study. In order to confirm any additional rain gauge measurement errors that may have occurred during the August 19th storm event, a further detailed error analysis would be required which is considered beyond the scope of

[1] Sevruk, B. (1990) "Correction of precipitation measurements – a summary report." Correction of Precipitation Measurements, B. Sevruk. Ed., Zurcher Geographische Schriften No. 23, Geneva, Switzerland, 251-256.
[2] ASCE, 1996 "Hydrology Handbook." Second edition. P. 34.

this study.

1.1 Study Area

The study area includes lands covered by rain gauge data (point data) supplied by TRCA during the August 19th, 2005 storm event. The area extends from approximately the west boundary of the cities of Brampton and Mississauga to approximately the middle of the Town of Ajax. The north-south boundary is roughly from the north watershed boundary of the TRCA to Lake Ontario to the south. **Figure 1,** located at the back of the report, illustrates the study area.

1.2 Tasks Completed

In addition to this brief report, the following tasks were completed as part of this study:

1. Collect and summarize rainfall data from 94 rain gauges operating during the August 19th, 2005 storm event.
2. Develop Intensity-Duration curves and compare these with current design IDF values.
3. Plot isohyets[3] over the study area to establish the area covered by the storm and the relative distribution of rain.
4. Provide recommendations for future studies.

2 DATA

Most of the rain gauge data from the 94 stations was compiled by TRCA from various sources and supplied to Clarifica Inc. for the analysis. Data from 3 of these 94 sites was supplied by Clarifica Inc. It should be noted that a preliminary screening of rain gauge total depths and comments provided by TRCA and MSC resulted in the removal of one (1) gauge operated by the City of Toronto (Emery Yard) from the analysis given the low rainfall total (i.e., 12 mm) as compared to surrounding gauges.

2.1 Data Sources

The sources cited as supplying data to the analysis included:

- City of Toronto = 33 gauges (32 used)
- Clarifica Inc. = 3 gauges
- Environment Canada (MSC) = 6 gauges

[3] Isohyet = Lines of equal value of precipitation for a given time interval.

- Peel Region = 17 gauges
- Town of Markham = 2 gauges
- Town of Richmond Hill = 1 gauge
- TRCA = 29 gauges
- York Region = 3 gauges

Data source providers and station owner information has also been included in **Appendix A**.

2.2 Data Format

As shown in **Appendix A**, the rain gauges in operation during the August 19th, 2005 storm event collected data at various time steps, including:

- Time-of-Tip (variable time stepping)
- 1-minute
- 5-minute
- Hourly
- Daily

Time of tip represents lowest possible time step that can be recorded by a tipping bucket rain gauge and gives the most flexibility for the analysis of precipitation. The time of the tip can be converted to a volume of precipitation over a fixed time which in turn can be used to analyze the rainfall time distribution over part or the entire storm duration. This information is used to construct return period based Intensity-Duration-Frequency (IDF) tables/curves (mm/hr) and can be utilized by municipalities to evaluate the performance of existing drainage systems and as input into the design of new drainage infrastructure (i.e., storm sewers, hydraulic structures, etc.) [4]. Of the 94 rain gauges providing input to the analysis, 82 gauges had data resolution of 5 minutes or less, 8 gauges recorded rainfall depths on an hourly basis and 4 gauges provided daily rainfall totals.

2.3 Rain Gauge Density

Figure 2, located at the back of the report, shows the rain gauge distribution over the study area. The rain gauge density in square kilometre has been calculated and is presented for each TRCA watershed in **Table 1** below. On average, a rain gauge density of 0.33 units per square kilometre was available during the August 19th, 2005 storm event.

[4] Maximum five and/or ten minute time rainfall intensities (mm/hr) are typically utilized by municipalities as a minimum 'inlet time' (Ti) in the calculation of design flows for hydraulic structures and storm drainage systems.

Table 1: Rain Gauge Densities in TRCA Watersheds during the August 19th, 2005 Storm Event

Watershed	Units/sq. km.
Humber River	0.24
Mimico Creek	0.26
Etobicoke Creek	0.47
Don River	0.56
Rouge River	0.27
Highland Creek	0.49
Petticoat Creek	0.37
Duffins Creek	0.21
Carruthers Creek	0.00
Frenchman's Bay	0.00

This information may be used in the future to help interpret the storm distribution results (beyond the scope of this study) and also to identify optimal location of new permanent rain gauge stations in the area. Further analysis may be possible to identify gaps within watersheds, accounting for the rain gauge type, data format, and status of the gauge (permanent versus temporary stations).

2.4 Radar Data

Doppler radar images were obtained from Meteorological Service of Canada (MSC) at their King City Radar station. Doppler radar is a system that sends out a series of rapid microwave pulses and measures the movement of precipitation droplets in the interval between the pulses. Normally, this enables the computer to reconstruct the internal air motion within and around the area of precipitation, and often provides vital clues about the nature and strength of the weather system. Radar reflectivity values are displayed on screen by assigning colours to indicate precipitation intensity ranges.

The Doppler radar images is useful to assess the rainfall pattern during a storm event. The radar data may also be used to estimate rainfall patterns in areas with low or no rain gauge information. In this case, because of concerns over the calibration of the King City radar and subsequently, the accuracy of the reported rainfall intensities[5], the King City Doppler radar was used only to interpret the rainfall pattern and coverage during the August 19th, 2005 storm event.

King City radar images are included in Appendix B and as an animated presentation in a separate CD in the back of this report. As shown in these images, the August 19th, 2005 storm included two separate storm cells in close proximity to each other. The radar images confirm the large system traversing the GTA at the locations shown in Section 3.

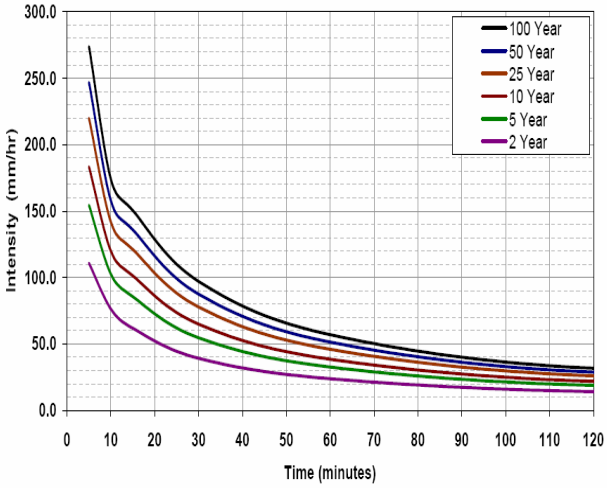
[5]Radar limitations of Doppler radar include attenuation through severe or heavy rain and radar dome wetting. Further analysis are being undertaking by MSC.

2.5 Design IDF

The results of the Intensity-Duration analysis for the August 19th, 2005 storm event were compared with historic Intensity-Duration-Frequency (IDF) values derived from Environment Canada's long term Toronto City (Bloor Street) rain gauge station. Return period rainfall rates (mm/hr) as shown in Table 2 were computed from station data collected from 1940 to 2003.

Table 2: Bloor Street Gauge IDF Values (1940 to 2003)

Duration (min)	Return Period (Year) Intensities "I" (mm/hr)					
	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
5	110.8	154.4	183.3	219.8	246.8	273.3
10	76.3	102.5	119.8	141.7	157.9	174.0
15	61.8	85.5	101.2	121.1	135.8	150.4
30	39.1	54.6	64.9	77.8	87.5	97.0
60	23.8	32.6	38.5	45.9	51.4	56.9
120	14.1	18.8	21.9	25.9	28.8	31.7
360	5.8	7.7	9.0	10.6	11.7	12.9
720	3.4	4.5	5.1	6.0	6.6	7.2
1440	1.9	2.5	2.8	3.3	3.6	4.0



Additional Intensity-Duration-Frequency values can be computed using the following interpolation equation:

$$R = A \times T^{B}$$

Where, R is the desired return period rainfall rate (mm/hr) and T is the duration in hours. "A" is a coefficient and "B" is an exponent both derived from the data presented in Table 2. Values for parameter values A and B have been summarized in Table 3 below.

Table 3: Toronto City (Bloor Street) IDF Parameters

Return Period Storm (yr)	Coefficient A	Exponent B
2-yr	21.4	- 0.726
5-yr	29.0	- 0.740
10-yr	33.9	- 0.746
25-yr	40.2	- 0.751
50-yr	44.9	- 0.754
100-yr	49.5	- 0.756

3 RESULTS

3.1 General Storm Pattern

The storm pattern tracked from West to East as shown in the radar images in **Appendix B**. **Figure 3**, located at the back of the report, illustrates the total precipitation volume isohyets within the study area. High intensity and high volume precipitation occurred along an West-East band roughly through the middle of the major TRCA watersheds. The high precipitation band straddled the north municipal boundary of the City of Toronto.

Appendix C summarizes the rainfall volumes and intensities recorded in all rain gauges in the study area. The following lists the 10 rain gauges recording the highest volumes. These gauges are located near the north municipal boundary of the City of Toronto.

Table 4: Maximum Storm Volumes

Gauge ID	Gauge Name	Watershed	Total Rainfall (mm)	Maximum Hourly Rainfall (mm)
92	Nashdene Yard	Highland Ck	153.4	116.6
91	McNicoll and Kennedy	Highland Ck	148.4	115.0
40	Toronto North York	Don River	132.8	78.4
1	York University Green Roof	Humber River	122.6	99.0
79	Finch Yard	Don River	120.8	81.6
70	Sandalwood Parkway	Etobicoke Ck	120.0	73.2
86	Mitchell Field CC	Don River	119.2	87.8
2	Dufferin Reservoir	Don River	115.4	89.8
31	Armadale Community Centre	Rouge River	114.6	78.0
42	Leslie Pumping Stn	Don River	112.6	79.2

Figures 4 through 7, located in the back of the report, shows the maximum rainfall intensities over 10, 30, 60 and 120 minutes. The results are generally consistent with the maximum recorded precipitation.

3.2 Rainfall Distribution within Individual TRCA Watersheds

The average total rain volume within each TRCA watershed, as shown in Table 3, has been estimated using the total rainfall depth surface plotted over the individual watershed area.

Table 5: Average Rainfall Depth in TRCA Watersheds

Watershed	Rainfall (mm)
Humber River	71
Mimico Creek	77
Etobicoke Creek	69
Don River	88
Rouge River	61
Highland Creek	107
Petticoat Creek	86
Duffins River	51
Carruthers Creek	28
Frenchman's Bay	88

Highland Creek received the greatest rainfall volume when averaged over the entire watershed area. The Don River and Frenchman's Bay received the second highest amount at 88 mm.

This GIS approach, which involves the creation of a rainfall depth surface layer using collected rainfall point data, can be used for detailed hydrologic analysis to estimate and distribute rainfall volumes over individual sub-watersheds or any discrete area. This approach can also be useful for hydrologic model calibration given that it better accounts for areal distribution of observed rainfall.

3.3 Areas Receiving Rainfall in Excess of 1:100 year Storm Event

Figure 8, located in the back of the report, illustrates the areas receiving rainfall in excess of the 1:100 year storm event when compared to the Toronto City (Bloor Street) gauge location. These areas have been determined by superimposing rainfall volumes for each duration (i.e., 5 min, 10 min, 30 min, etc.) that exceed the 1:100 year IDF values as noted in Table 2. The outside envelope of all durations represents the areas experiencing rain in excess of the 1:100 year storm.

4 Conclusions

When compared to the Environment Canada's Toronto City (Bloor Street) rain gauge, the August 19th, 2005 storm event produced rainfall amounts in excess of the 1:100 year return period across a large area within TRCA's jurisdiction. The actual return period in areas that exceeded the 1:100 year storm event values were not determined as part of this study given the need to compete a detailed frequency analysis using historical rainfall records.

Based on a review of **Figures 3 to 8**, located at the back of the report, areas most notably affected by the August 19th, 2005 storm event, as indicated above, were located along an West-East band across TRCA's jurisdiction and included the following:

- The rural headwater area of the Etobicoke Creek Watershed within the City of Brampton and Town of Caledon;
- The rural and urban mid-basin area of the West Humber River Watershed located within the City of Brampton and Town of Caledon (to Claireville Dam), upper portions of the East Humber Watershed within the City of Vaughan and King Township as well as the entire Black Creek Tributary area located within the City of Vaughan;
- The middle and upper reaches of the Don River Watershed within the City of Vaughan and northern limit of the City of Toronto (to G. Ross Lord Dam) as well as the upper East Don River Watershed within portions of the Town of Richmond Hill and Markham, City of Vaughan and northern limit of the City of Toronto;
- The entire Highland Creek watershed north of approximately Highway 401 within the City of Toronto; and
- The mid-portion of the Rouge River Watershed within the Town of Markham and City of Toronto.

Areas within the eastern TRCA watersheds (i.e., Petticoat, Frenchman's Bay and Duffin's watersheds) also appear to have experienced elevated rainfall amounts.

Further to the above, a detailed review of the these notable areas indicated that the Highland Creek Watershed received the largest rainfall volume and highest intensities as compared with the other watersheds within TRCA's jurisdiction. Over 50% of the watershed received rainfall in excess of 130 mm within a period of approximately 2.5 hours.

5 Recommendations

Recommendations based on the findings of this report include the following:

1. TRCA and its municipal partners should consider establishing protocols to record, analyze and report on rainfall information collected from the current rain gauge networks located across the TRCA jurisdiction. The protocols should address issues such as coordination between the various agencies/owners of rain gauges to achieve a consistent quality of instruments, maintenance and operation, and data analysis and reporting. A review of the type of rain gauges, their location, and operation would be useful to plan future enhancements to the existing rain gauge networks.

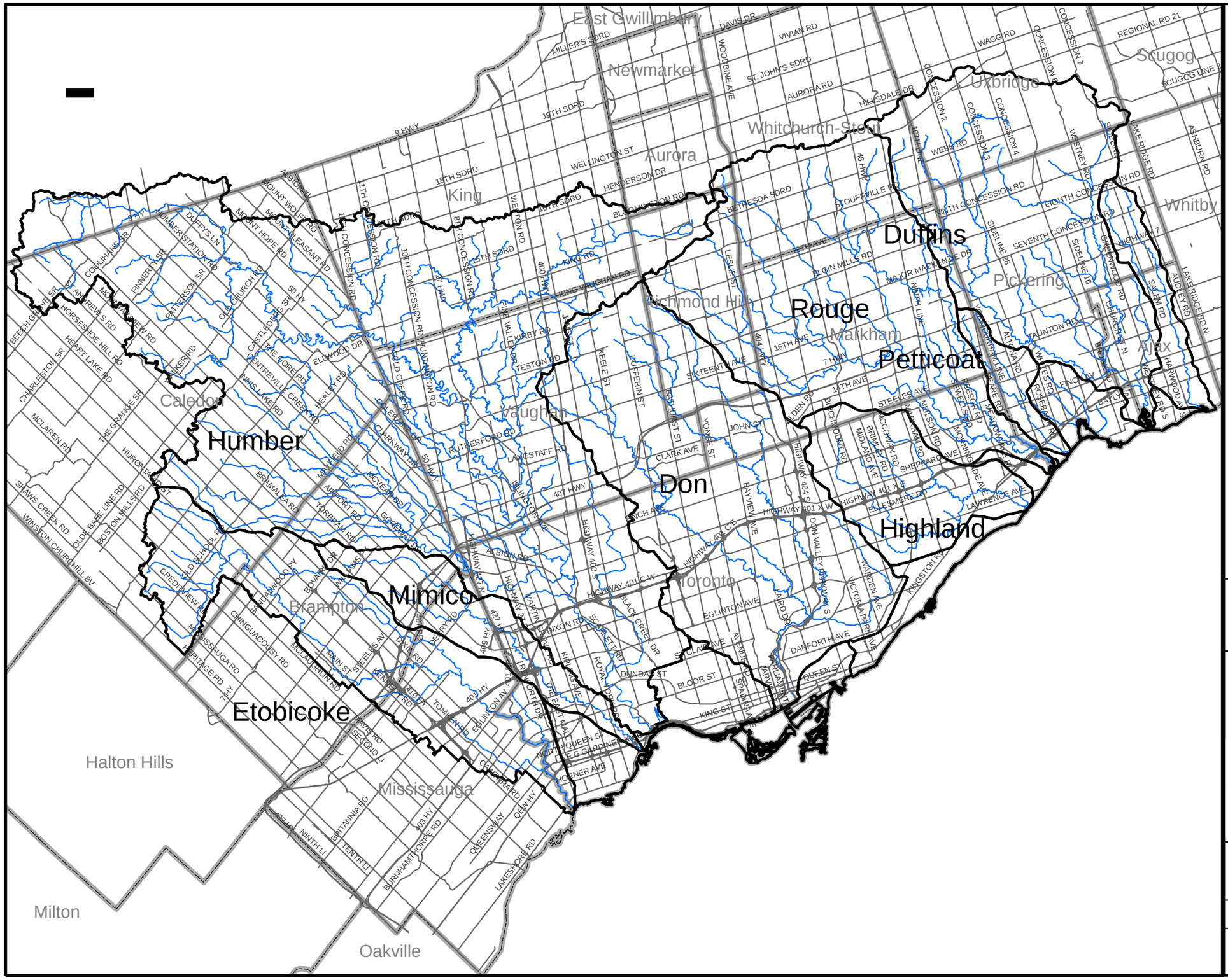
2. A GIS-based management system should be developed to store, manage, and present rainfall data collected from the various sources as noted above. The functional capabilities of GIS would permit analyses of collected data and the ability to assess storm event characteristics including spatial and orographic effects and trends/patterns associated with extreme rainfall events that occur within the GTA. For example, the August 19th, 2005 event exhibited a distinctive west-to-east linear pattern which, when compared with previous records, may provide an indication of the type and distribution of rainfall that may be expected to occur during future heavy rainfall events. The results of these future analyses could also be used to formulate storm event input into TRCA's Flood Forecasting Model to assist with flood flow prediction at critical locations throughout the jurisdiction.

3. TRCA, in conjunction with Environment Canada and partner municipalities should consider completing a further detailed review of Intensity Duration Frequency (IDF) information available within the TRCA jurisdiction. The primary purpose of the assessment would be to confirm the applicability of current municipal design criteria (i.e., IDF values) used to assess existing drainage system performance as well as provide input to the design of new infrastructure (i.e., storm sewers, hydraulic structures, etc.). Where appropriate, the integration of new storm event data, results from GIS analyses (i.e., predicted trends etc.) and use of available climate change information should be considered as part of the review to ensure new drainage infrastructure is sized to accommodate future conditions.

4. Improvements to the calibration of Environment Canada's Doppler radar data through the use of collected rain gauge information should be considered in order to provide an improved tool for the prediction and interpretation of extreme rainfall events. The use of real-time rain gauge information could assist Environment Canada with the prediction and tracking of rapidly changing storm events such as August 19th, 2005. Moreover, improved tracking of extreme weather and rapid updates regarding changing storm conditions based

on an integrated approach such as this could benefit TRCA by increasing "lead" time required to complete required Flood Forecasting and Warning activities. The use of radar data may also serve to improve the calibration of TRCA's watershed hydrology models in areas with limited rain gauge information. Revised flood flow information from these models could then be used to help improve the accuracy of Regulatory Flood levels within TRCA's watercourses.

5. Given the potential for future events similar to the August 19th, 2005 storm event to occur within TRCA's jurisdiction it is important for TRCA to continue to provide technical support and direction to local municipalities in the completion of Flood Emergency Response Plans (FERP's). The primary intent of the Flood Emergency Response Plan is to ensure that municipalities respond effectively to flood messages issued by TRCA using a properly developed pre-determined plan. It is anticipated that a FERP would define the roles and responsibilities of emergency responders (i.e., fire, police, ambulance, etc.) as well as other key municipal departments, provide a prioritized ranking of flood susceptible sites based on various TRCA flood stages (i.e., 1 to 5) and outline required resources and procedures to address general and site specific flood conditions during each stage of flooding.



Legend

- Watersheds
- Roads
- Rivers
- Municipalities

PRELIMINARY

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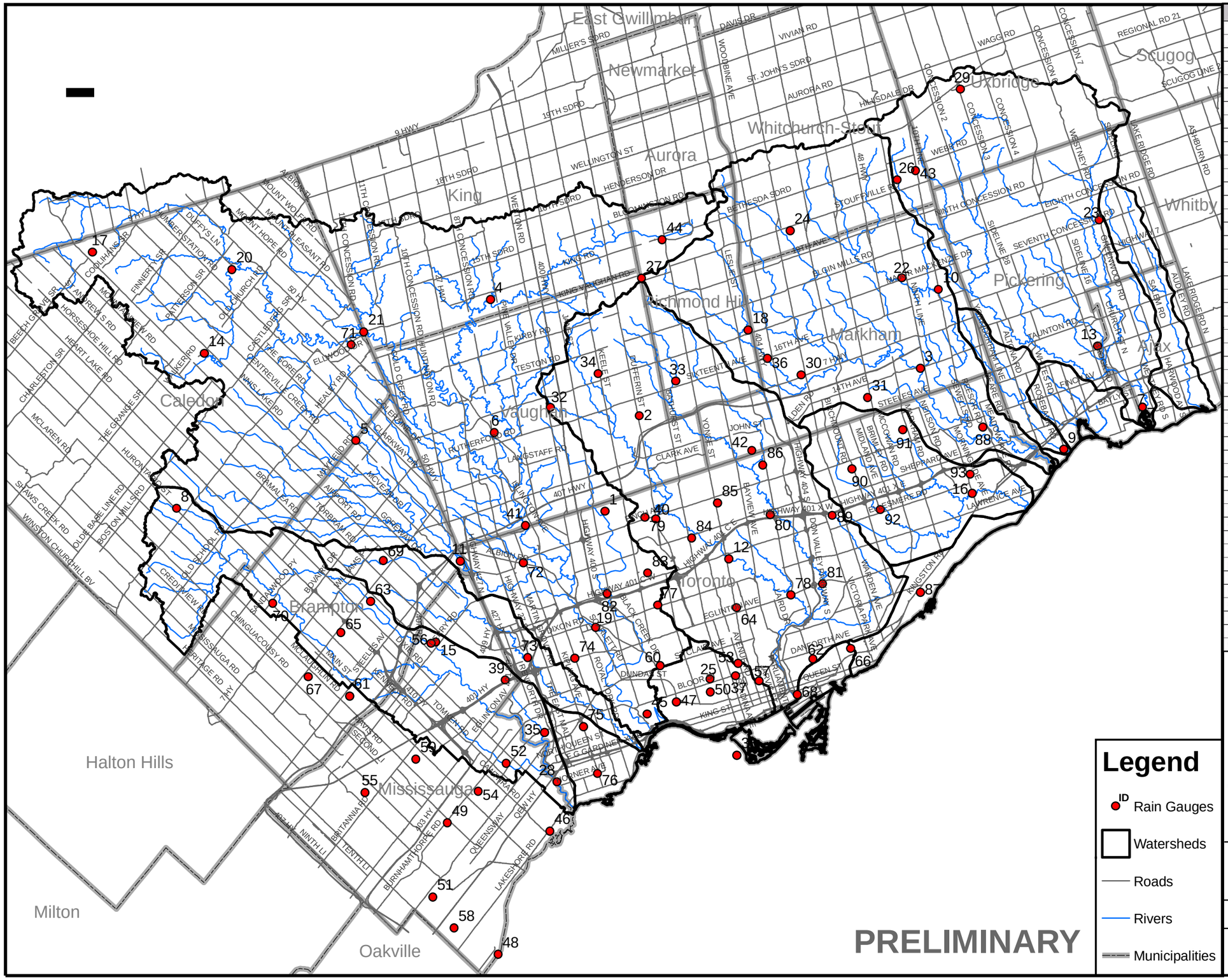
Figure 1: Study Area

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters



ID	Station Name	V(mm)
1	York University Greenroof	123
2	Dufferin Reservior	115
3	Rouge River at 14th	112
4	King Creek	43
5	Laidlaw Bus Depot	107
6	Boyd Field Centre	99
7	Ajax Works Yard	98
8	Sue Grange Farm	90
9	Petticoat Creek CA	83
10	Reesor Creek near Hwy 7	82
11	Claireville Dam	81
12	Don River at York Mills	75
13	St. Wilfred School	75
14	Town of Caledon pumping station	74
15	Mississauga Works Yard	67
16	Morningside Works Yard	62
17	Glenn Haffey CA	61
18	York Region Works Yard	61
19	Lawerence Ave and Weston Rd	56
20	Albion Hills CA	56
21	King and Albion-Vaughan Siderosd	50
22	Lloyd Ham Farm	47
23	Claremont CA	37
24	Bruce's Mill CA	36
25	Alex Duff Memorial Pool	31
26	Stouffville Dam	30
27	York Pumping Station	29
28	Etobicoke Creek near QEW	28
29	Goodwood Pumping Station	17
30	Markham Town Centre	90
31	Armadale Community Centre	115
32	Vellore Woods Public School	111
33	Richvale Community Centre	97
34	Maple Community Centre	97
35	Toronto Burnhamthorpe	26
36	Toronto Buttonville A	55
37	Toronto City	32
38	Toronto Island A	19
39	Toronto Lester B. Pearson Intl A	41
40	Toronto North York	133
41	Humber	91
42	Leslie Pumping Stn	113
43	Stouffville Works	31
44	Yonge and King Rd	28
45	Swansea	35
46	East Avenue	28
47	Howard	35
48	Lakeshore Road	7
49	Wolfedale Road	21
50	Central	35
51	South Common	24
52	Dixie Road	32
53	Brown	46
54	Mississauga Valley Blvd	26
55	Britannia Road West	25
56	Fir Tree	63
57	Church	33
58	Truscott	18
59	Falbourne Street	27
60	Old Weston	31
61	Hurontario Road	50
62	Greenwood	19
63	Bramalea Road	63
64	North Toronto	49
65	Orenda Road	80
66	Kimberly	23
67	Queen St.	71
68	Booth	31
69	Williams Prkwy	106
70	Sandalwood Prkwy	120
71	Old King Road	46
72	Albion	63
73	Martin Grove	66
74	Richview	48
75	Bering	25
76	Kipling	38
77	Castlefield	39
78	Thorncliffe	44
79	Finch Yard	121
80	Oriole Yard	106
81	Bermondsey Yard	38
82	Downsview Arena	5
83	Ancaster CC	72
84	Earle Bales CC	94
85	Mitchell Field CC	119
86	Cummer Arena	92
87	St Augustine Seminary	108
88	Toronto Zoo	83
89	Maryvale Public School	104
90	Mc Nicoll and Kennedy	148
91	Nashdene Yard	153
92	Ellesmere Yard	97
93	Morningside Yard	60

Legend

- ID Rain Gauges
- Watersheds
- Roads
- Rivers
- Municipalities

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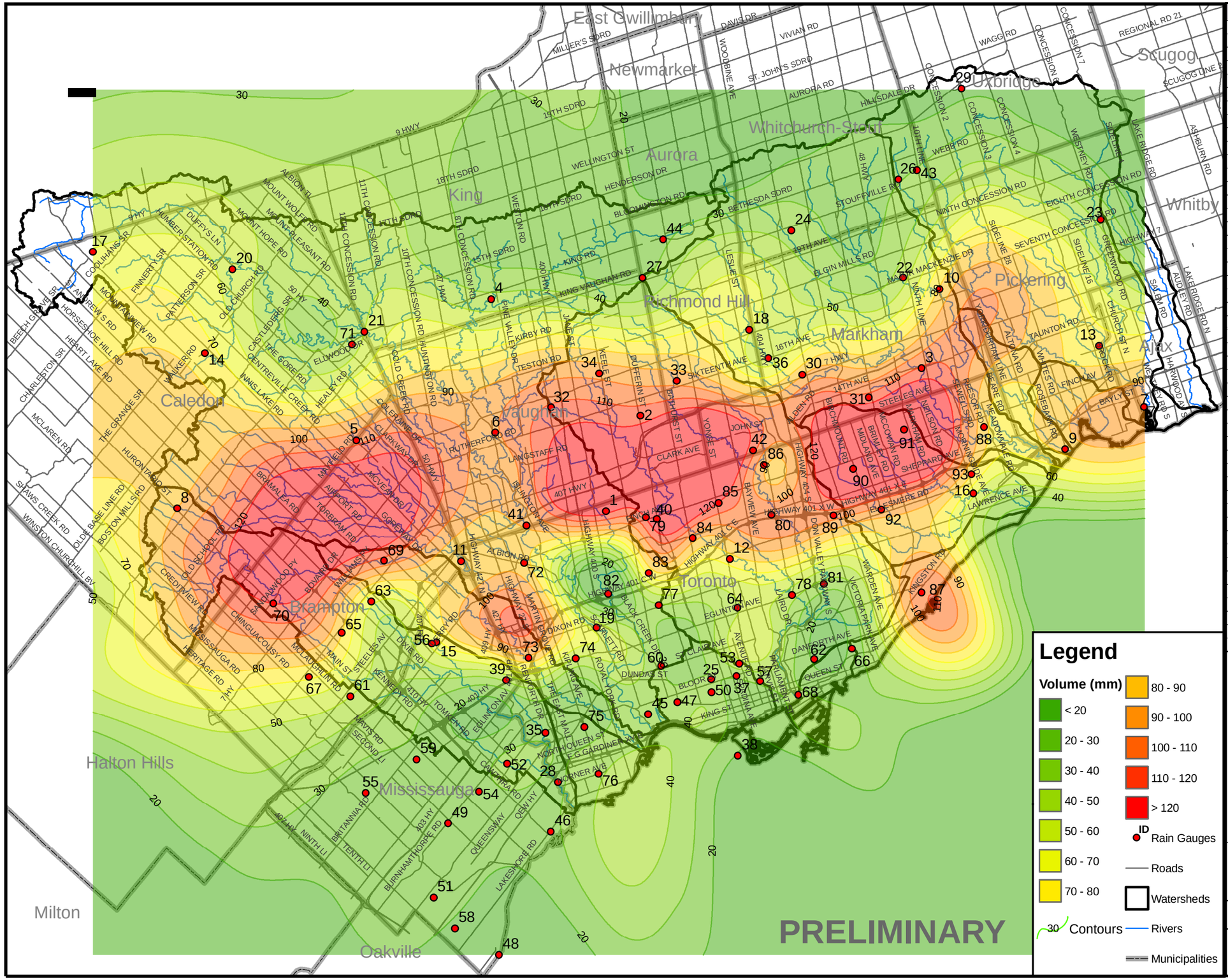
Figure 2: Rain Gauges

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters



ID	Station Name	V(mm)	ID	Station Name	V(mm)
1	York University Greenroof	123	48	Lakeshore Road	7
2	Dufferin Reservior	115	49	Wolfedale Road	21
3	Rouge River at 14th	112	50	Central	35
4	King Creek	43	51	South Common	24
5	Laidlaw Bus Depot	107	52	Dixie Road	32
6	Boyd Field Centre	99	53	Brown	46
7	Ajax Works Yard	98	54	Mississauga Valley Blvd	26
8	Sue Grange Farm	90	55	Britannia Road West	25
9	Petticoat Creek CA	83	56	Fir Tree	63
10	Reesor Creek near Hwy 7	82	57	Church	33
11	Claireville Dam	81	58	Truscott	18
12	Don River at York Mills	75	59	Falbourne Street	27
13	St. Wilfred School	75	60	Old Weston	31
14	Town of Caledon pumping station	74	61	Hurontario Road	50
15	Mississauga Works Yard	67	62	Greenwood	19
16	Morningside Works Yard	62	63	Bramalea Road	63
17	Glenn Haffey CA	61	64	North Toronto	49
18	York Region Works Yard	61	65	Orenda Road	80
19	Lawerence Ave and Weston Rd	56	66	Kimberly	23
20	Albion Hills CA	56	67	Queen St.	71
21	King and Albion-Vaughan Siderosd	50	68	Booth	31
22	Lloyd Ham Farm	47	69	Williams Prkwy	106
23	Claremont CA	37	70	Sandalwood Prkwy	120
24	Bruce's Mill CA	36	71	Old King Road	46
25	Alex Duff Memorial Pool	31	72	Albion	63
26	Stouffville Dam	30	73	Martin Grove	66
27	York Pumping Station	29	74	Richview	48
28	Etobicoke Creek near QEW	29	75	Bering	25
29	Goodwood Pumping Station	17	76	Kipling	38
30	Markham Town Centre	90	77	Castlefield	39
31	Armadale Community Centre	115	78	Thorncliffe	44
32	Vellore Woods Public School	111	79	Finch Yard	121
33	Richvale Community Centre	97	80	Oriole Yard	106
34	Maple Community Centre	97	81	Bermondsey Yard	38
35	Toronto Burnhamthorpe	26	82	Downsview Arena	5
36	Toronto Buttonville A	55	83	Ancaster CC	72
37	Toronto City	32	84	Earle Bales CC	94
38	Toronto Island A	19	85	Mitchell Field CC	119
39	Toronto Lester B. Pearson Int'L A	41	86	Cummer Arena	92
40	Toronto North York	133	87	St Augustine Seminary	108
41	Humber	91	88	Toronto Zoo	63
42	Leslie Pumping Stn	113	89	Maryvale Public School	104
43	Stouffville Works	31	90	Mc Nicoll and Kennedy	148
44	Yonge and King Rd	28	91	Nashdene Yard	153
45	Swansea	35	92	Ellesmere Yard	97
46	East Avenue	28	93	Morningside Yard	60
47	Howard	35			

Legend

Volume (mm)

- < 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- 90 - 100
- 100 - 110
- 110 - 120
- > 120

ID Rain Gauges
Roads
Watersheds
Rivers
Municipalities
30 Contours

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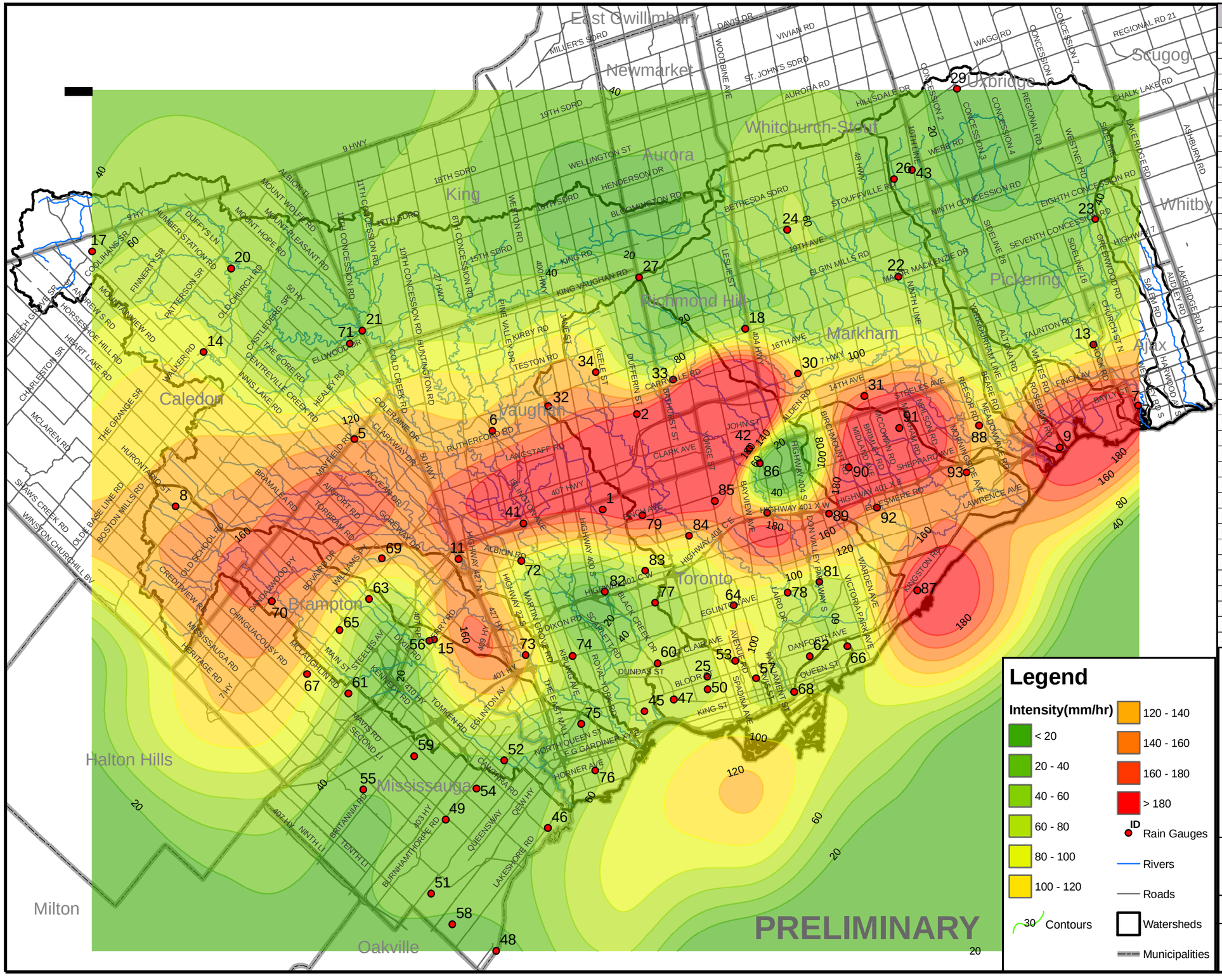
Figure 3: Total Storm Volume

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters



Legend

Intensity(mm/hr)

- < 20
- 20 - 40
- 40 - 60
- 60 - 80
- 80 - 100
- 100 - 120
- 120 - 140
- 140 - 160
- 160 - 180
- > 180

ID Rain Gauges

Rivers

Roads

Watersheds

Municipalities

30 Contours

ID	Station Name	Intensity (mm/hr)
1	York University Greenroof	188
2	Dufferin Reservior	186
5	Laidlaw Bus Depot	136
6	Boyd Field Centre	136
7	Ajax Works Yard	184
8	Sue Grange Farm	133
9	Petticoat Creek CA	211
11	Claireville Dam	156
13	St. Wilfred School	95
14	Town of Caledon pumping station	89
15	Mississauga Works Yard	97
17	Glenn Haffey CA	53
18	York Region Works Yard	67
20	Albion Hills CA	59
21	King and Albion-Vaughan Sideroad	41
22	Lloyd Hann Farm	55
23	Claremont CA	41
24	Bruce's Mill CA	60
25	Alex Duff Memorial Pool	71
26	Stouffville Dam	30
27	York Pumping Station	28
29	Goodwood Pumping Station	14
30	Markham Town Centre	123
31	Armadale Community Centre	169
32	Vellore Woods Public School	145
33	Richvale Community Centre	134
34	Maple Community Centre	119
41	Humber	170
42	Leslie Pumping Stn	191
43	Stouffville Works	25
45	Swansea	66
46	East Avenue	44
47	Howard	69
48	Lakeshore Road	10
49	Wolfedale Road	24
50	Central	75
51	South Common	26
52	Dixie Road	37
53	Brown	99
54	Mississauga Valley Blvd	23
55	Britannia Road West	22
56	Fir Tree	63
57	Church	81
58	Truscott	16
59	Fallbourne Street	31
60	Old Weston	70
61	Hurontario Road	52
62	Greenwood	68
63	Bramalea Road	74
64	North Toronto	94
65	Orenda Road	89
66	Kimberly	67
67	Queen St.	107
68	Booth	79
69	Williams Prkwy	130
70	Sandalwood Prkwy	160
71	Old King Road	38
72	Albion	97
73	Martin Grove	120
74	Richview	49
75	Bering	38
76	Kipling	54
77	Castlefield	52
78	Thorncliffe	60
79	Finch Yard	188
80	Oriole Yard	142
81	Bermondsey Yard	76
82	Downsview Arena	19
83	Ancaster CC	74
84	Earle Bales CC	122
85	Mitchell Field CC	193
86	Cummer Arena	31
87	St Augustine Seminary	203
88	Toronto Zoo	126
89	Marywale Public School	174
90	Mc Nicoll and Kennedy	209
91	Nashdene Yard	238
92	Ellesmere Yard	151
93	Morningside Yard	142

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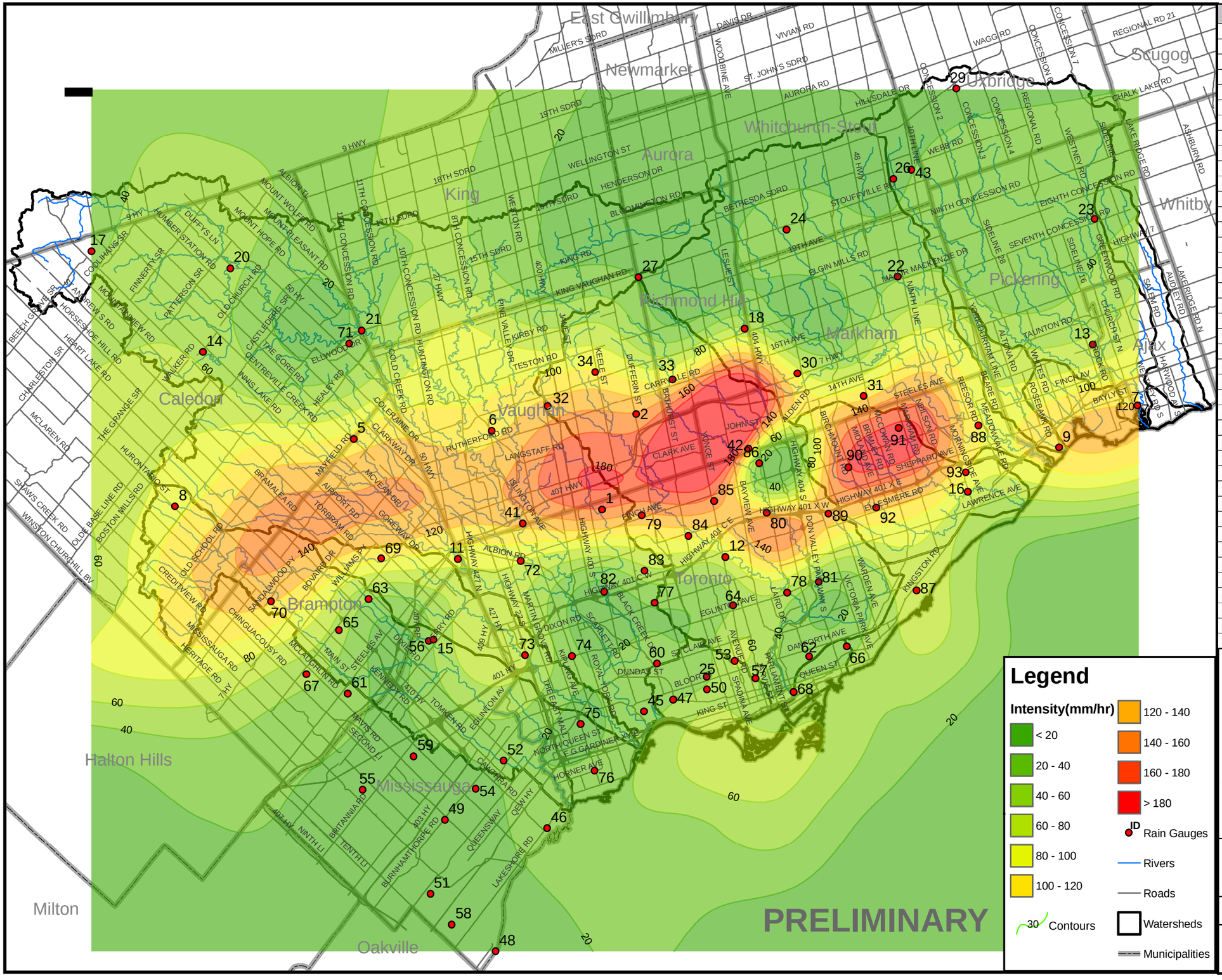
Figure 4: Maximum 10 Minutes Intensity

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters



ID	Station Name	Intensity (mm/hr)
1	York University Greenroof	156
2	Dufferin Reservior	142
5	Laidlaw Bus Depot	107
6	Boyd Field Centre	114
7	Ajax Works Yard	120
8	Sue Grange Farm	93
9	Petticoat Creek CA	110
11	Claireville Dam	87
12	Don River at York Mills	79
13	St. Wilfred School	86
14	Town of Caledon pumping station	56
15	Mississauga Works Yard	41
16	Morningside Works Yard	80
17	Glenn Haffey CA	36
18	York Region Works Yard	63
20	Albion Hills CA	44
21	King and Albion-Vaughan Sideroad	29
22	Lloyd Ham Farm	38
23	Claremont CA	35
24	Bruce's Mill CA	32
25	Alex Duff Memorial Pool	36
26	Stouffville Dam	17
27	York Pumping Station	18
29	Goodwood Pumping Station	11
30	Markham Town Centre	90
31	Armadale Community Centre	115
32	Vellore Woods Public School	126
33	Richvale Community Centre	109
34	Maple Community Centre	104
41	Humber	125
42	Leslie Pumping Stn	133
43	Stouffville Works	20
45	Swansea	34
46	East Avenue	26
47	Howard	39
48	Lakeshore Road	7
49	Wolfedale Road	12
50	Central	45
51	South Common	18
52	Dixie Road	23
53	Brown	63
54	Mississauga Valley Blvd	16
55	Britannia Road West	14
56	Fir Tree	36
57	Church	44
58	Truscott	14
59	Fallbourne Street	16
60	Old Weston	32
61	Hurontario Road	27
62	Greenwood	32
63	Bramalea Road	42
64	North Toronto	42
65	Oranda Road	60
66	Kimberly	35
67	Queen St.	46
68	Booth	43
69	Williams Prkwy	102
70	Sandalwood Prkwy	122
71	Old King Road	24
72	Albion	81
73	Martin Grove	64
74	Richview	25
75	Bering	14
76	Kipling	26
77	Castlefield	22
78	Thorncliffe	53
79	Finch Yard	136
80	Oriole Yard	130
81	Bermondsey Yard	36
82	Downsview Arena	9
83	Ancaster CC	54
84	Earle Bales CC	105
85	Mitchell Field CC	150
86	Cummer Arena	31
87	St Augustine Seminary	70
88	Toronto Zoo	101
89	Maryvale Public School	130
90	Mc Nicoll and Kennedy	170
91	Nashdene Yard	186
92	Ellesmere Yard	123
93	Morningside Yard	100

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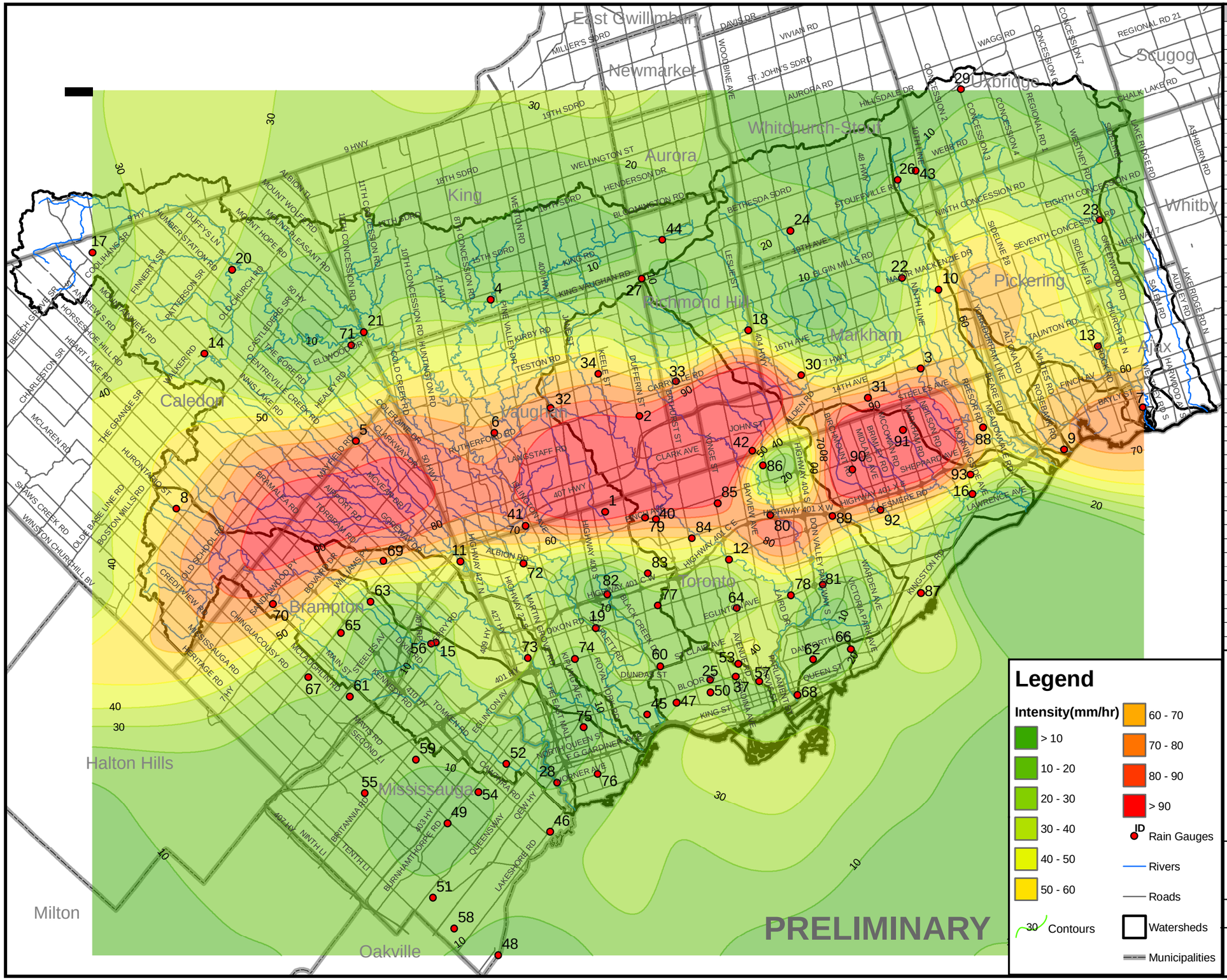
Figure 5: Maximum 30 Minutes Intensity

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters



ID	Station Name	Intensity (mm/hr)
1	York University Greenroof	99
2	Dufferin Reservior	90
3	Rouge River at 14th	63
4	King Creek	19
5	Laidlaw Bus Depot	77
6	Boyd Field Centre	74
7	Ajax Works Yard	75
8	Sue Grange Farm	59
9	Petticoat Creek CA	84
10	Reesor Creek near Hwy 7	51
11	Claireville Dam	50
12	Don River at York Mills	40
13	St. Wilfred School	50
14	Town of Caledon pumping station	33
15	Mississauga Works Yard	21
16	Morningside Works Yard	29
17	Glenn Haffey CA	24
18	York Region Works Yard	38
19	Lawerence Ave and Weston Rd	21
20	Albion Hills CA	29
21	King and Albion-Vaughan Sideroad	19
22	Lloyd Ham Farm	29
23	Claremont CA	23
24	Bruce's Mill CA	18
25	Alex Duff Memorial Pool	19
26	Stouffville Dam	12
27	York Pumping Station	11
28	Etobicoke Creek near QEW	10
29	Goodwood Pumping Station	6
30	Markham Town Centre	58
31	Armadale Community Centre	78
32	Vellore Woods Public School	79
33	Richvale Community Centre	68
34	Maple Community Centre	64
37	Toronto City	22
40	Toronto North York	78
41	Humber	75
42	Leslie Pumping Stn	79
43	Stouffville Works	14
44	Yonge and King Rd	12
45	Swansea	17
46	East Avenue	15
47	Howard	20
48	Lakeshore Road	4
49	Wolfedale Road	7
50	Central	23
51	South Common	11
52	Dixie Road	13
53	Brown	33
54	Mississauga Valley Blvd	9
55	Britannia Road West	11
56	Fir Tree	18
57	Church	22
58	Truscott	12
59	Falbourne Street	11
60	Old Weston	17
61	Hurontario Road	18
62	Greenwood	16
63	Bramalea Road	25
64	North Toronto	24
65	Orenda Road	27
66	Kimberly	18
67	Queen St.	24
68	Booth	23
69	Williams Prkwy	66
70	Sandalwood Prkwy	73
71	Old King Road	17
72	Albion	46
73	Martin Grove	32
74	Richview	16
75	Bering	7
76	Kipling	14
77	Castlefield	14
78	Thorncliffe	29
79	Finch Yard	82
80	Oriole Yard	76
81	Bermondsey Yard	20
82	Downsview Arena	5
83	Ancaster CC	31
84	Earle Bales CC	58
85	Mitchell Field CC	88
86	Cummer Arena	28
87	St Augustine Seminary	35
88	Toronto Zoo	61
89	Maryvale Public School	73
90	Mc Nicoll and Kennedy	115
91	Nashdene Yard	117
92	Ellesmere Yard	68
93	Morningside Yard	55

Legend

Intensity(mm/hr)

- > 10
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- > 90

ID Rain Gauges

Rivers

Roads

Watersheds

Municipalities

30 Contours

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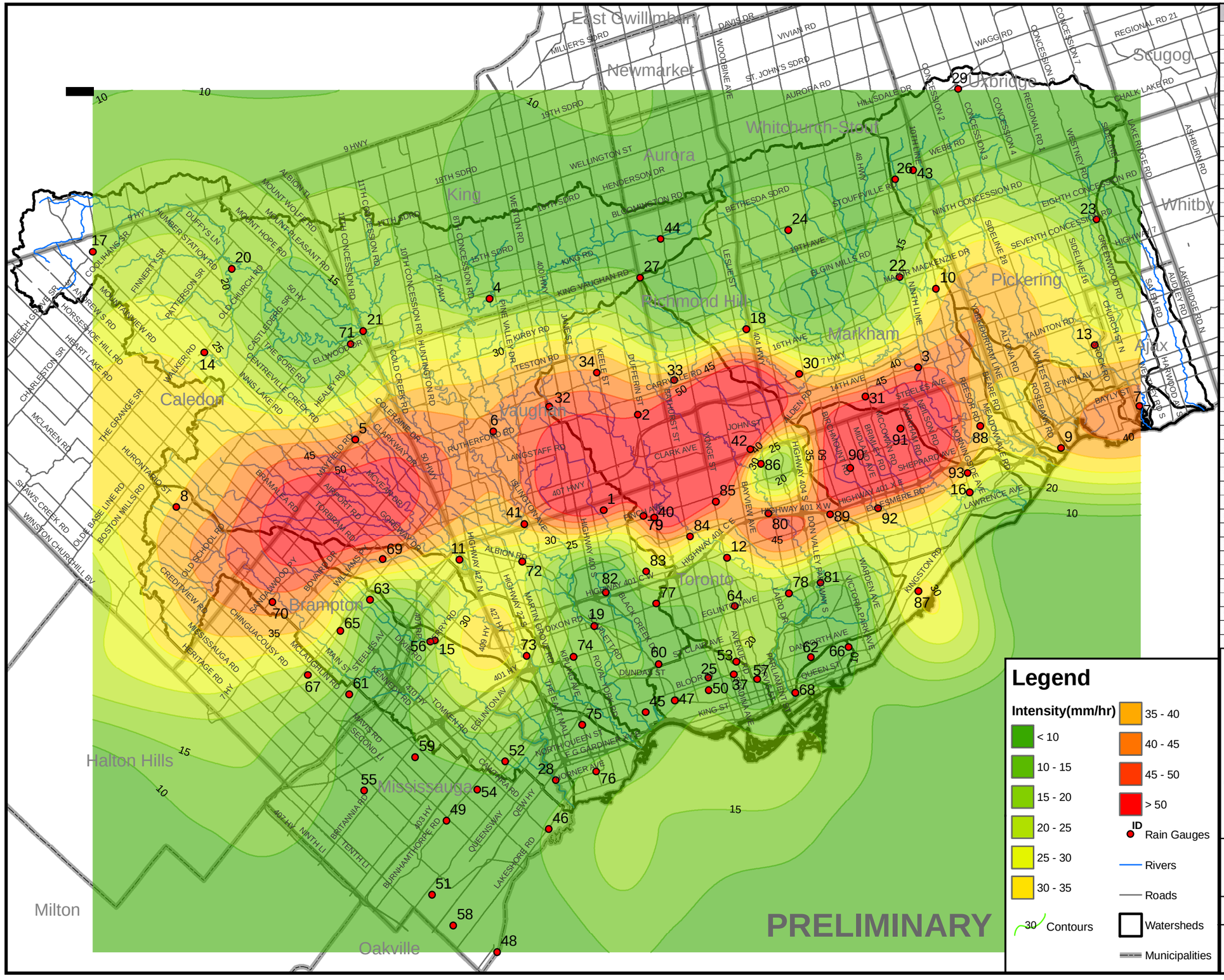
Figure 6: Maximum Hourly Intensity

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters



ID	Station Name	Intensity (mm/hr)
1	York University Greenroof	50
2	Dufferin Reservior	50
3	Rouge River at 14th	45
4	King Creek	15
5	Laidlaw Bus Depot	43
6	Boyd Field Centre	41
7	Ajax Works Yard	43
8	Sue Grange Farm	36
9	Petticoat Creek CA	35
10	Reesor Creek near Hwy 7	32
11	Claireville Dam	29
12	Don River at York Mills	25
13	St. Wilfred School	32
14	Town of Caledon pumping station	27
15	Mississauga Works Yard	20
16	Morningside Works Yard	25
17	Glenn Haffey CA	19
18	York Region Works Yard	25
19	Lawerence Ave and Weston Rd	11
20	Albion Hills CA	19
21	King and Albion-Vaughan Sideroad	17
22	Lloyd Ham Farm	18
23	Claremont CA	13
24	Bruce's Mill CA	13
25	Alex Duff Memorial Pool	9
26	Stouffville Dam	10
27	York Pumping Station	10
28	Etobicoke Creek near QEW	9
29	Goodwood Pumping Station	5
30	Markham Town Centre	38
31	Armadale Community Centre	49
32	Vellore Woods Public School	46
33	Richvale Community Centre	41
34	Maple Community Centre	40
37	Toronto City	11
40	Toronto North York	53
41	Humber	36
42	Leslie Pumping Stn	48
43	Stouffville Works	11
44	Yonge and King Rd	9
45	Swansea	8
46	East Avenue	10
47	Howard	9
48	Lakeshore Road	2
49	Wolfedale Road	7
50	Central	11
51	South Common	8
52	Dixie Road	11
53	Brown	16
54	Mississauga Valley Blvd	9
55	Britannia Road West	9
56	Fir Tree	18
57	Church	11
58	Truscott	7
59	Falbourne Street	9
60	Old Weston	8
61	Hurontario Road	11
62	Greenwood	8
63	Bramalea Road	17
64	North Toronto	17
65	Orenda Road	24
66	Kimberly	9
67	Queen St.	22
68	Booth	11
69	Williams Prkwy	40
70	Sandalwood Prkwy	43
71	Old King Road	15
72	Albion	27
73	Martin Grove	26
74	Richview	12
75	Bering	6
76	Kipling	11
77	Castlefield	11
78	Thorncliffe	16
79	Finch Yard	47
80	Oriole Yard	43
81	Bermondsey Yard	12
82	Downsview Arena	2
83	Ancaster CC	21
84	Earle Bales CC	34
85	Mitchell Field CC	49
86	Cummer Arena	23
87	St Augustine Seminary	30
88	Toronto Zoo	36
89	Maryvale Public School	44
90	Mc Nicoll and Kennedy	65
91	Nashdene Yard	67
92	Ellesmere Yard	40
93	Morningside Yard	33

TORONTO AND REGION Conservation for The Living City

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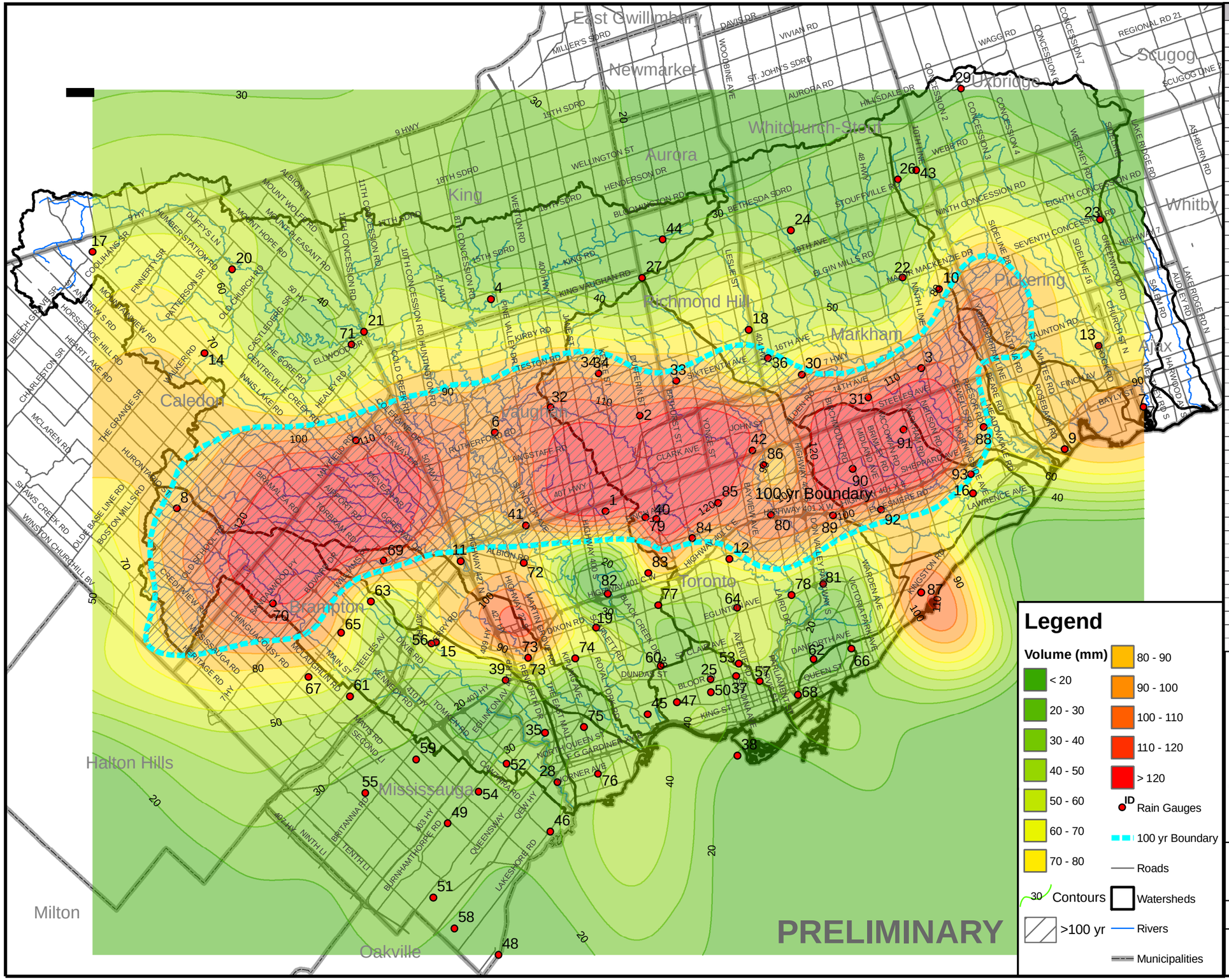
Figure 7: Maximum 2 Hours Intensity

Drawn By: R.H. Date: Apr. 07, 2006

0 2,550 5,100 10,200 15,300 Meters



ID	Station Name	V(mm)	ID	Station Name	V(mm)
1	York University Greenroof	123	48	Lakeshore Road	7
2	Dufferin Reservior	115	49	Wolfedale Road	21
3	Rouge River at 14th	112	50	Central	35
4	King Creek	43	51	South Common	24
5	Laidlaw Bus Depot	107	52	Dixie Road	32
6	Boyd Field Centre	99	53	Brown	46
7	Ajax Works Yard	98	54	Mississauga Valley Blvd	26
8	Sue Grange Farm	90	55	Britannia Road West	25
9	Petticoat Creek CA	83	56	Fir Tree	63
10	Reesor Creek near Hwy 7	82	57	Church	33
11	Claireville Dam	81	58	Truscott	18
12	Don River at York Mills	75	59	Falbourne Street	27
13	St. Wilfred School	75	60	Old Weston	31
14	Town of Caledon pumping station	74	61	Hurontario Road	50
15	Mississauga Works Yard	67	62	Greenwood	19
16	Morningside Works Yard	62	63	Bramalea Road	63
17	Glenn Haffey CA	61	64	North Toronto	49
18	York Region Works Yard	61	65	Orenda Road	80
19	Lawerence Ave and Weston Rd	56	66	Kimberly	23
20	Albion Hills CA	56	67	Queen St.	71
21	King and Albion-Vaughan Siderosd	50	68	Booth	31
22	Lloyd Ham Farm	47	69	Williams Prkwy	106
23	Claremont CA	37	70	Sandalwood Prkwy	120
24	Bruce's Mill CA	36	71	Old King Road	46
25	Alex Duff Memorial Pool	31	72	Albion	63
26	Stouffville Dam	30	73	Martin Grove	66
27	York Pumping Station	29	74	Richview	48
28	Etobicoke Creek near QEW	28	75	Bering	25
29	Goodwood Pumping Station	17	76	Kipling	38
30	Markham Town Centre	90	77	Castlefield	39
31	Armadale Community Centre	115	78	Thorncliffe	44
32	Vellore Woods Public School	111	79	Finch Yard	121
33	Richvale Community Centre	97	80	Oriole Yard	106
34	Maple Community Centre	97	81	Bermondsey Yard	38
35	Toronto Burnhamthorpe	26	82	Downsview Arena	5
36	Toronto Buttonville A	55	83	Ancaster CC	72
37	Toronto City	32	84	Earle Bales CC	94
38	Toronto Island A	19	85	Mitchell Field CC	119
39	Toronto Lester B. Pearson Int'L A	41	86	Cummer Arena	92
40	Toronto North York	133	87	St Augustine Seminary	108
41	Humber	91	88	Toronto Zoo	63
42	Leslie Pumping Stn	113	89	Maryvale Public School	104
43	Stouffville Works	31	90	Mc Nicoll and Kennedy	148
44	Yonge and King Rd	28	91	Nashdene Yard	153
45	Swansea	35	92	Ellesmere Yard	97
46	East Avenue	28	93	Morningside Yard	60
47	Howard	35			

TORONTO AND REGION Conservation for The Living City

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Figure 8: 100 Year Storm Boundary

Drawn By: R.H. Date: Apr. 07, 2006

0 2,500 5,000 10,000 15,000 Meters

Appendices

APPENDIX A – Rain Gauge Information

Gauge ID	Gauge Name	Location	Easting*	Northing*	Source Data Provider	Owner	Source Data File Name	Time Step
1	York University Greenroof	Near to TRCA Head Office	619848.58	4847630.86	TRCA	TRCA	Aug 19rain.xls	1-min
2	Dufferin Reservior	Dufferin north of Langstaff south of Rutherford	622278.00	4854337.00	TRCA	TRCA	Aug 19rain.xls	5-min
3	Rouge River at 14th	14th, west of Markham Rd	641960.00	4857663.00	TRCA	TRCA	Aug 19rain.xls	hourly
4	King Creek	King Sideroad and Mill Rd	611843.55	4862495.42	TRCA	TRCA	Aug 19rain.xls	hourly
5	Laidlaw Bus Depot	Airport Road and Mayfield Road	602406.06	4852585.97	TRCA	TRCA	Aug 19rain.xls	5-min
6	Boyd Field Centre	Field Centre Garage	612107.82	4853153.41	TRCA	TRCA	Aug 19rain.xls	5-min
7	Ajax Works Yard	Ajax Works Yard	657515.84	4854936.38	TRCA	TRCA	Aug 19rain.xls	5-min
8	Sue Grange Farm	Hwy 10 and King Road	589843.00	4847840.00	TRCA	TRCA	Aug 19rain.xls	5-min
9	Petticoat Creek CA	Foot of Whites Rd	652007.13	4851981.18	TRCA	TRCA	Aug 19rain.xls	5-min
10	Reesor Creek near Hwy 7	Reesor Creek streamguage and north of Hwy 7	643223.00	4863190.00	TRCA	TRCA	Aug 19rain.xls	hourly
11	Claireville Dam	Finch Ave and Steeles	609730.12	4844153.61	TRCA	TRCA	Aug 19rain.xls	5-min
12	Don River at York Mills	Mill St	628536.85	4844295.02	TRCA	TRCA	Aug 19rain.xls	15-min
13	St. Wilfred School	Brock Rd and 3rd Concession	654364.36	4859211.16	TRCA	TRCA	Aug 19rain.xls	5-min
14	Town of Caledon pumping station	Airport Rd (just south of Old Church)	591792.63	4858705.43	TRCA	TRCA	Aug 19rain.xls	5-min
15	Mississauga Works Yard	Fir Tree Drive	608003.00	4838480.00	TRCA	TRCA	Aug 19rain.xls	5-min
16	Morningside Works Yard	Morningside,south of Ellesmere	645576.45	4848894.68	TRCA	TRCA	Aug 19rain.xls	15-min
17	Glenn Haffey CA	Highway 9 and Second Line	583956.38	4865786.52	TRCA	TRCA	Aug 19rain.xls	5-min
18	York Region Works Yard	Major MacKenzie Dr,. and Hwy 404	629882.93	4860348.76	TRCA	TRCA	Aug 19rain.xls	5-min
19	Lawerence Avenue and Weston Road	Humber R. streamgauge at Lawerence	619215.00	4839500.00	TRCA	TRCA	Aug 19rain.xls	hourly
20	Albion Hills CA	Highway 50 south of Palgrave	593722.46	4864589.36	TRCA	TRCA	Aug 19rain.xls	5-min
21	King and Albion-Vaughan Sideroad	Albion Vaughan Rd and King Rd	602958.04	4860217.04	TRCA	TRCA	Aug 19rain.xls	5-min
22	Lloyd Ham Farm	Major MacKenzie Dr. and Ninth Line	640642.85	4863995.49	TRCA	TRCA	Aug 19rain.xls	5-min
23	Claremont CA	Claremont CA	654490.00	4868058.00	TRCA	TRCA	Aug 19rain.xls	5-min
24	Bruce's Mill CA	Stouffville Sideroad	632834.80	4867299.42	TRCA	TRCA	Aug 19rain.xls	5-min
25	Alex Duff Memorial Pool	750 Bloor St. W. at Christie St	627227.00	4835871.00	TRCA	TRCA	Aug 19rain.xls	5-min
26	Stouffville Dam	Stouffville Dam, Millard St	640348.00	4870867.00	TRCA	TRCA	Aug 19rain.xls	5-min
27	York Pumping Station	Bathurst St. and Jefferson Sdrd.	622426.21	4863962.80	TRCA	TRCA	Aug 19rain.xls	5-min
28	Etobicoke Creek near QEW	Etobicoke Creek streamgauge	616511.00	4828663.00	TRCA	TRCA	Aug 19rain.xls	5-min
29	Goodwood Pumping Station	Regional Road 21 and Front St./Conc. 3	644763.66	4877208.78	TRCA	TRCA	Aug 19rain.xls	hourly
30	Markham Town Centre	Markham Town Centre	633592.00	4857195.00	Clarifica Inc	Town of Markham	Monitoring Data	0.25 mm tips
31	Armadale Community Centre - Markham	Armadale Community Centre - Markham	638264.00	4855618.00	Clarifica Inc	Town of Markham	Monitoring Data	0.25 mm tips
32	Vellore Woods Public School - Vaughan	Vellore Woods Public School - Vaughan	616020.00	4854908.00	Clarifica Inc	Clarifica Inc	Monitoring Data	0.25 mm tips
33	Richvale Community Centre - Richmond Hill	Richvale Community Centre - Richmond Hill	624808.00	4856759.00	Clarifica Inc	Clarifica Inc	Monitoring Data	0.25 mm tips
34	Maple Community Centre - Vaughan	Maple Community Centre - Vaughan	619386.00	4857285.00	Clarifica Inc	Clarifica Inc	Monitoring Data	0.25 mm tips

Gauge ID	Gauge Name	Location	Easting*	Northing*	Source Data Provider	Owner	Source Data File Name	Time Step
35	Toronto Burnhamthorpe		615622.16	4832147.35	Environment Canada	Environment Canada	Web Site	daily
36	Toronto Buttonville A		631244.68	4858360.52	Environment Canada	Environment Canada	Web Site	daily
37	Toronto City		628995.38	4836095.09	Environment Canada	Environment Canada	Weather Centre CD	hourly
38	Toronto Island A		629102.43	4830541.95	Environment Canada	Environment Canada	Web Site	daily
39	Toronto Lester B. Pearson Int'L A		612870.79	4835803.55	Environment Canada	Environment Canada	Web Site	daily
40	Toronto North York		623415.05	4847100.00	Environment Canada	Environment Canada	Weather Centre CD	hourly
41	Humber	Islington And Steeles	614285.00	4846657.00	TRCA	York Region	082405 Humber.xls	5-min
42	Leslie Pumping Stn	Steeles and Leslie	630165.53	4851895.31	TRCA	York Region	082405 Leslie St.xls	5-min
43	Stouffville Works	Bethesda and 10th Line	641612.83	4871520.05	TRCA	York Region	082605 Stouffvile.xls	5-min
44	Yonge and King Rd	Yonge and King Rd	623859.74	4866677.21	TRCA	Town of Richmond Hill	S01aug05.xls	hourly
45	Swansea	207 Windermere Ave- Community Centre	622803.18	4833428.62	TRCA	City of Toronto	S01AUG24.PRN	0.25 mm tips
46	East Avenue	920East Ave	616003.28	4825235.13	TRCA	Peel Region	S01AUG25.PRN	0.2 mm tips
47	Howard	89 Howard Park Ave-school	624855.73	4834274.65	TRCA	City of Toronto	S02AUG23.PRN	0.25 mm tips
48	Lakeshore Road	2307 Lakeshore Road	612378.51	4816585.91	TRCA	Peel Region	S02AUG25.PRN	0.2 mm tips
49	Wolfedale Road	3515 Wolfedale Road	608812.92	4825808.38	TRCA	Peel Region	S03AUG25.PRN	0.2 mm tips
50	Central	570 Shaw St.-school	627251.06	4834978.22	TRCA	City of Toronto	S04AUG23.PRN	0.25 mm tips
51	South Common	3566 South Common Court	607798.36	4820615.47	TRCA	Peel Region	S04AUG25.PRN	0.2 mm tips
52	Dixie Road	3450 Dixie Road	612953.68	4829981.02	TRCA	Peel Region	S05AUG25.PRN	0.2 mm tips
53	Brown	454 Avenue Rd-school	629178.68	4836987.90	TRCA	City of Toronto	S06AUG23.PRN	0.25 mm tips
54	Mississauga Valley Blvd	1235 Mississauga Valley Blvd	610979.17	4828011.43	TRCA	Peel Region	S06AUG25.PRN	0.2 mm tips
55	Britannia Road West	84 Britannia Road West	603044.00	4827932.75	TRCA	Peel Region	S07AUG25.PRN	0.2 mm tips
56	Fir Tree	7100 Fir Tree Drive	607679.73	4838382.87	TRCA	Peel Region	S08AUG25.PRN	0.2 mm tips
57	Church	83 Alexander St-School	630651.33	4835745.04	TRCA	City of Toronto	S09AUG23.PRN	0.25 mm tips
58	Truscott	2475 Truscott Drive	609298.85	4818451.76	TRCA	Peel Region	S09AUG25.PRN	0.2 mm tips
59	Falbourne Street	5845 Falbourne Street	606606.96	4830281.92	TRCA	Peel Region	S10AUG25.PRN	0.2 mm tips
60	Old Weston	425 Old Weston Rd-Yard	623731.43	4836822.00	TRCA	City of Toronto	S11AUG24.PRN	0.2 mm tips
61	Hurontario Road	7880 Hurontario Road	601976.23	4834688.03	TRCA	Peel Region	S11AUG25.PRN	0.2 mm tips
62	Greenwood	450 Greenwood Ave-TTC Yard	634437.22	4837308.63	TRCA	City of Toronto	S12AUG22.PRN	0.25 mm tips
63	Bramalea Road	280 Bramalea Road	603432.97	4841331.70	TRCA	Peel Region	S12AUG25.PRN	0.2 mm tips
64	North Toronto	17 Broadway Ave-school	629063.60	4840879.64	TRCA	City of Toronto	S13AUG23.PRN	0.2 mm tips
65	Orenda Road	115 Orenda Road	601368.37	4839154.58	TRCA	Peel Region	S13AUG25.PRN	0.2 mm tips
66	Kimberly	50 Swanwick Ave_school	637072.90	4838011.27	TRCA	City of Toronto	S14AUG23.PRN	0.2 mm tips
67	Queen St.	657 Queen St.W	599065.17	4836048.08	TRCA	Peel Region	S14AUG25.PRN	0.2 mm tips
68	Booth	433 Eastern Ave-Works Yard	633339.04	4834809.08	TRCA	City of Toronto	S15AUG22.PRN	0.2 mm tips

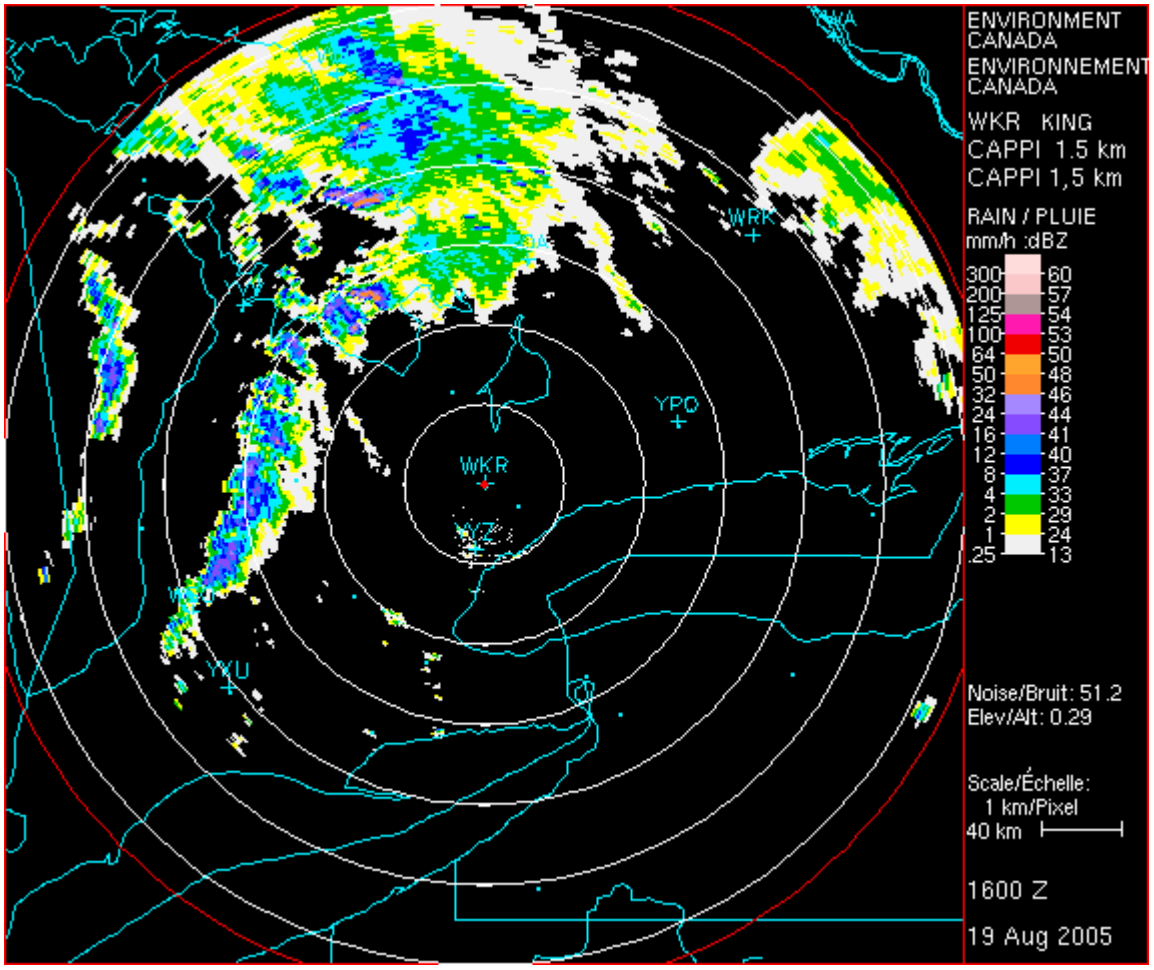
Gauge ID	Gauge Name	Location	Easting*	Northing*	Source Data Provider	Owner	Source Data File Name	Time Step
69	Williams Prkwy	1945 Williams Parkway	604342.62	4844193.64	TRCA	Peel Region	S15AUG25.PRN	0.2 mm tips
70	Sandalwood Prkwy	95 Sandalwood Parkway	596585.02	4841188.60	TRCA	Peel Region	S16AUG25.PRN	0.2 mm tips
71	Old King Road	25 Old King Road	602083.81	4859300.61	TRCA	Peel Region	S21AUG25.PRN	0.2 mm tips
72	Albion	1515 Albion Rd-pool	614137.22	4844028.63	TRCA	City of Toronto	S21AUG26.PRN	0.1 mm tips
73	Martin Grove	947 Martin Grove Rd-fire hall	614452.29	4837390.70	TRCA	City of Toronto	S22AUG26.PRN	0.25 mm tips
74	Richview	1806 Islington-library	617738.81	4837339.70	TRCA	City of Toronto	S23AUG24.PRN	0.1 mm tips
75	Bering	320 Bering Ave-yard	618353.40	4832546.85	TRCA	City of Toronto	S24AUG25.PRN	0.1 mm tips
76	Kipling	435 Kipling-yard	619346.66	4829267.97	TRCA	City of Toronto	S25AUG25.PRN	0.25 mm tips
77	Castlefield	1401 Castlefield Ave- Yard	623545.65	4841056.80	TRCA	City of Toronto	S26AUG24.PRN	0.2 mm tips
78	Thorncliffe	48 Thorncliffe Park-library	632870.41	4841782.99	TRCA	City of Toronto	S27AUG26.PRN	0.25 mm tips
79	Finch Yard	Dufferin and Finch	622658.34	4847208.89	TRCA	City of Toronto	100aug22.txt	0.2 mm tips
80	Oriole Yard	Sheppard and Leslie	631427.80	4847403.08	TRCA	City of Toronto	102aug22.txt	0.2 mm tips
81	Bermondsey Yard	Eglinton and Don Valley Pkwy	635104.74	4842538.16	TRCA	City of Toronto	103aug19.txt	0.2 mm tips
82	Downsview Arena	Jane and Wilson	620021.37	4841863.19	TRCA	City of Toronto	104aug25.txt	0.2 mm tips
83	Ancaster CC	Keele and Wilson	622852.54	4843314.60	TRCA	City of Toronto	105aug22.txt	0.2 mm tips
84	Earle Bales CC	Sheppard and Bathurst	625949.44	4845767.69	TRCA	City of Toronto	106aug22.txt	0.2 mm tips
85	Mitchell Field CC	Yonge and Finch	627738.09	4848231.00	TRCA	City of Toronto	107aug22.txt	0.2 mm tips
86	Cummer Arena	Leslie and Finch	630916.76	4850888.52	TRCA	City of Toronto	108aug22.txt	0.2 mm tips
87	St Augustine Seminary	SW Brimley & Kingston	641969.06	4841953.09	TRCA	City of Toronto	S02aug24.txt	0.2 mm tips
88	Toronto Zoo	SW Meadowvale & Old Finch	646330.16	4853543.93	TRCA	City of Toronto	S03aug22.txt	0.2 mm tips
89	Maryvale Public School	SE Pharmacy & 401	635790.20	4847340.00	TRCA	City of Toronto	S04aug24.txt	0.2 mm tips
90	Mc Nicoll and Kennedy	2006 McNicoll- Community Centre	637171.74	4850605.64	TRCA	City of Toronto	S06aug22.txt	0.2 mm tips
91	Nashdene Yard	Markham Rd, N of Finch	640713.70	4853367.90	TRCA	City of Toronto	S08aug22.txt	0.2 mm tips
92	Ellesmere Yard	NW Midland & Ellesmere	639148.96	4847751.93	TRCA	City of Toronto	S09aug24.txt	0.2 mm tips
93	Morningside Yard	839 Morningside Ave and 401	645440.16	4850240.98	TRCA	City of Toronto	S10aug22.txt	0.2 mm tips

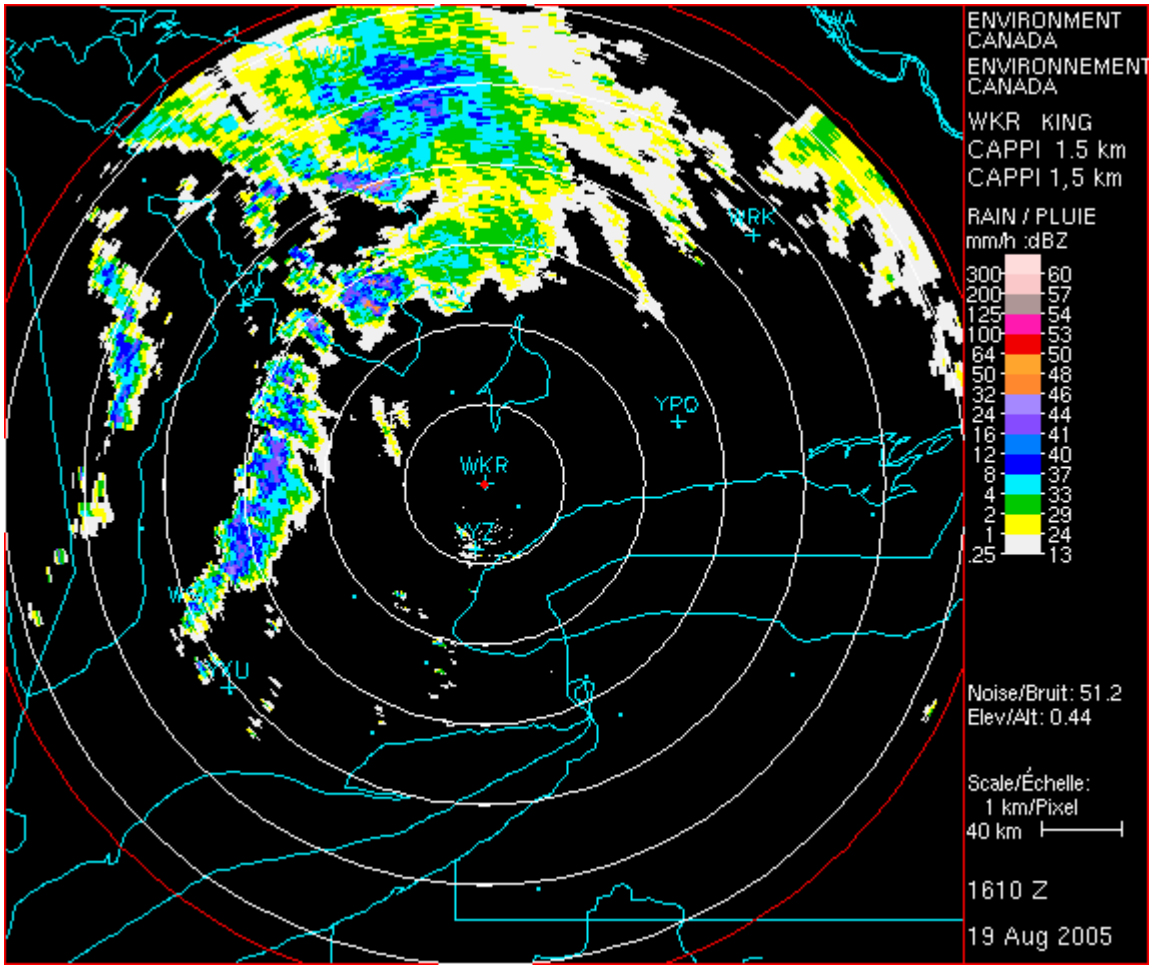
* --- Datum is NAD 1983 UTM Zone 17N

APPENDIX B – Meteorological Services of Canada (MSC) King City Doppler

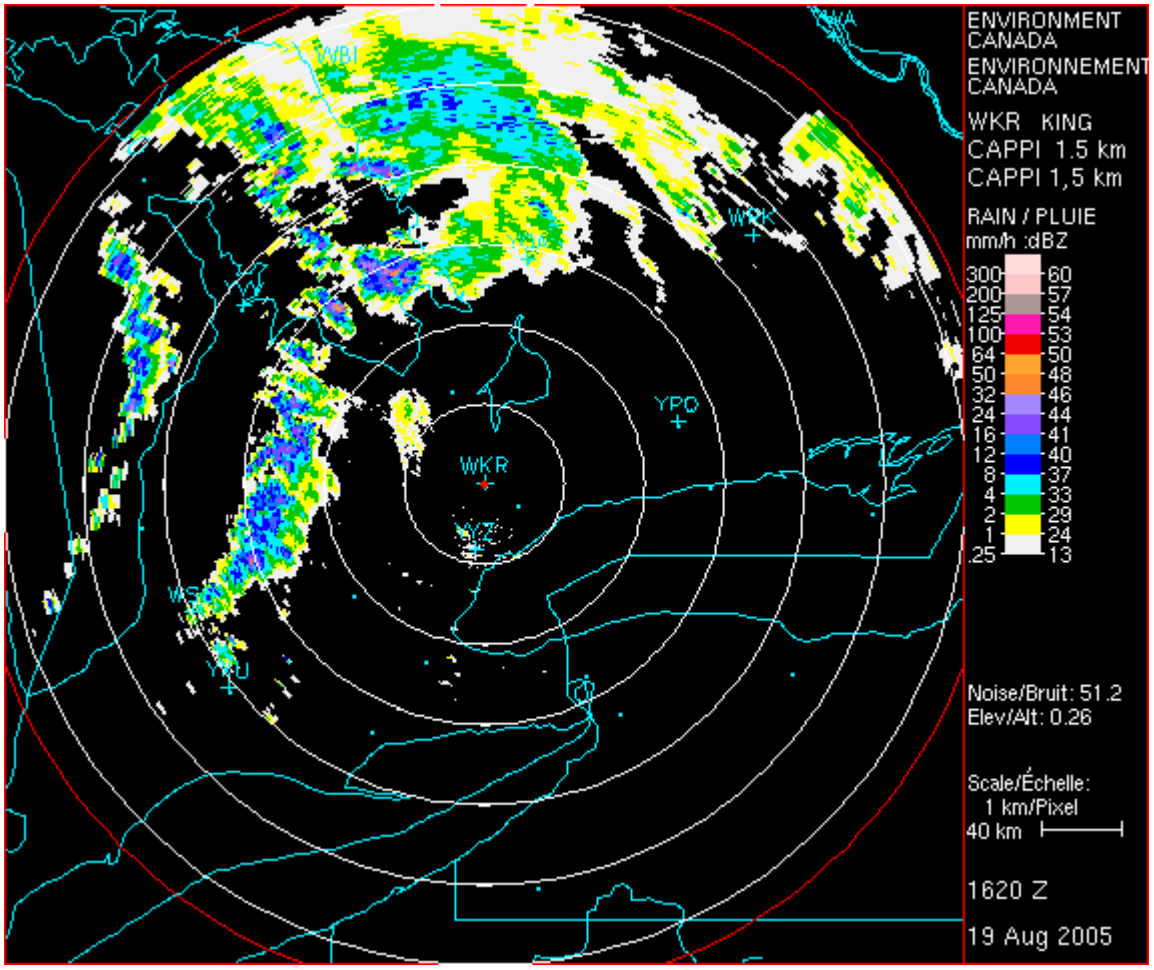
Radar Images of August 19, 2005 Storm Event Over the GTA

Data Source: Environment Canada

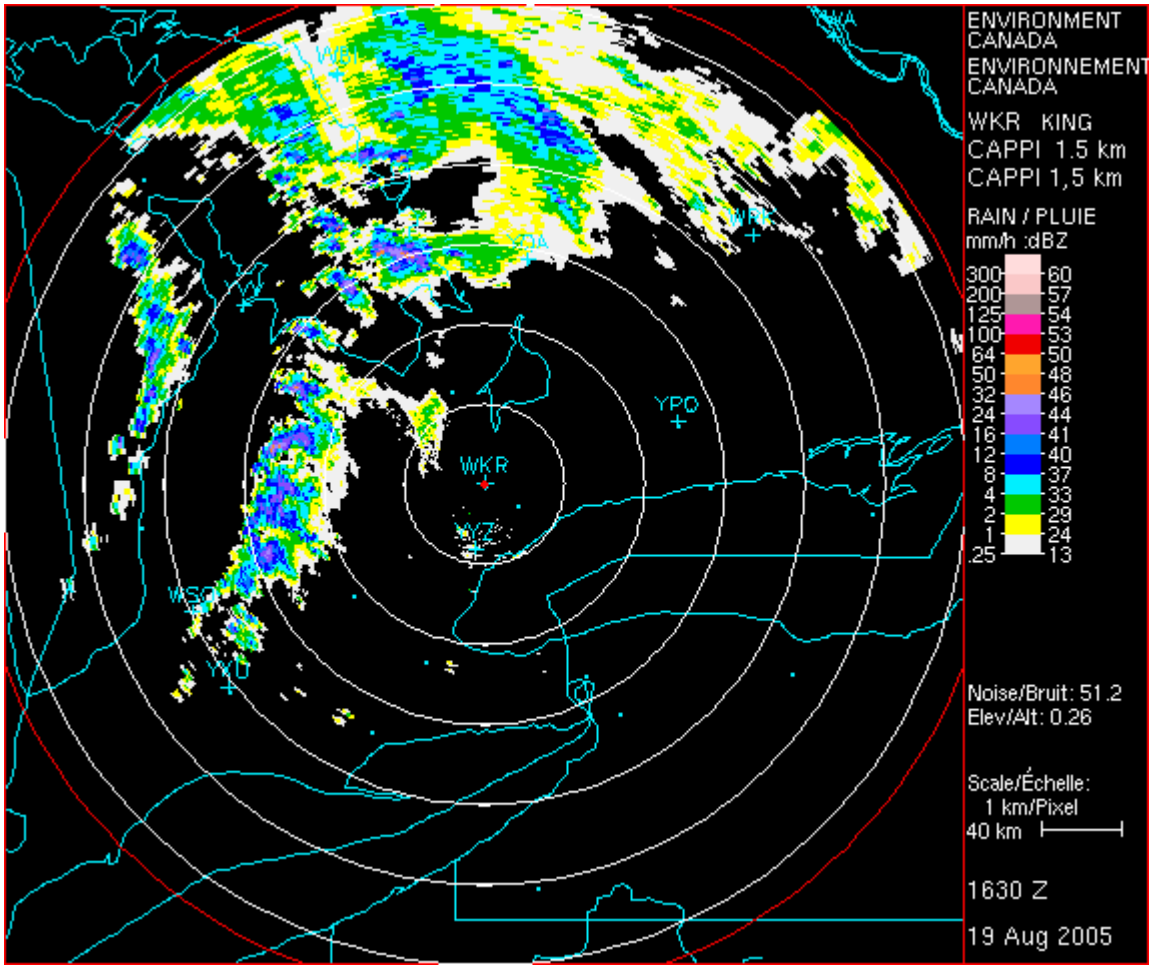

ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
Noise/Bruit: 51.2
Elev/Alt: 0.29
Scale/Échelle:
1 km/Pixel
40 km
1600 Z
19 Aug 2005
WRK
YPC
WKR
YKU

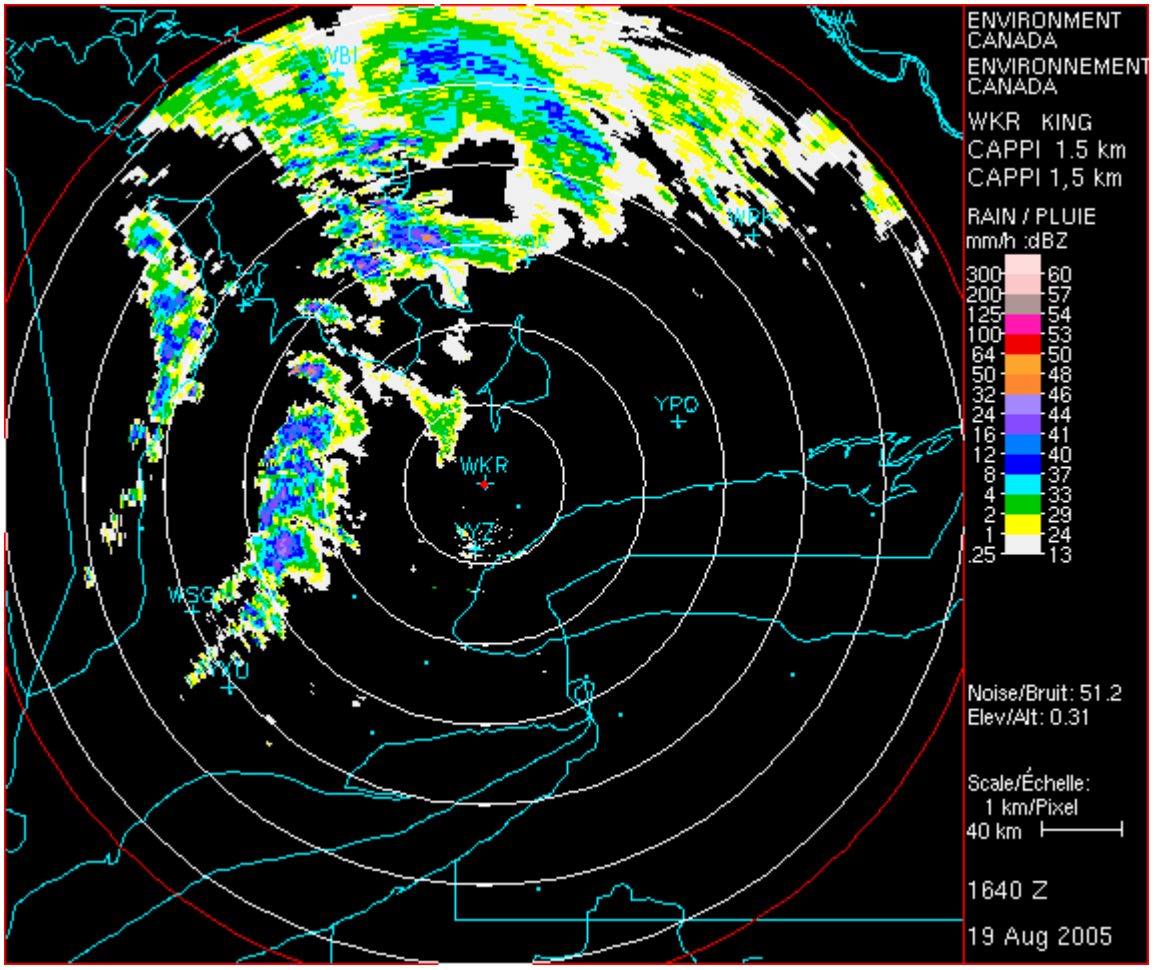


August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)



August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)


ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
Noise/Bruit: 51.2
Elev/Alt: 0.26
Scale/Échelle:
1 km/Pixel
40 km
1630 Z
19 Aug 2005
WKR
YPD



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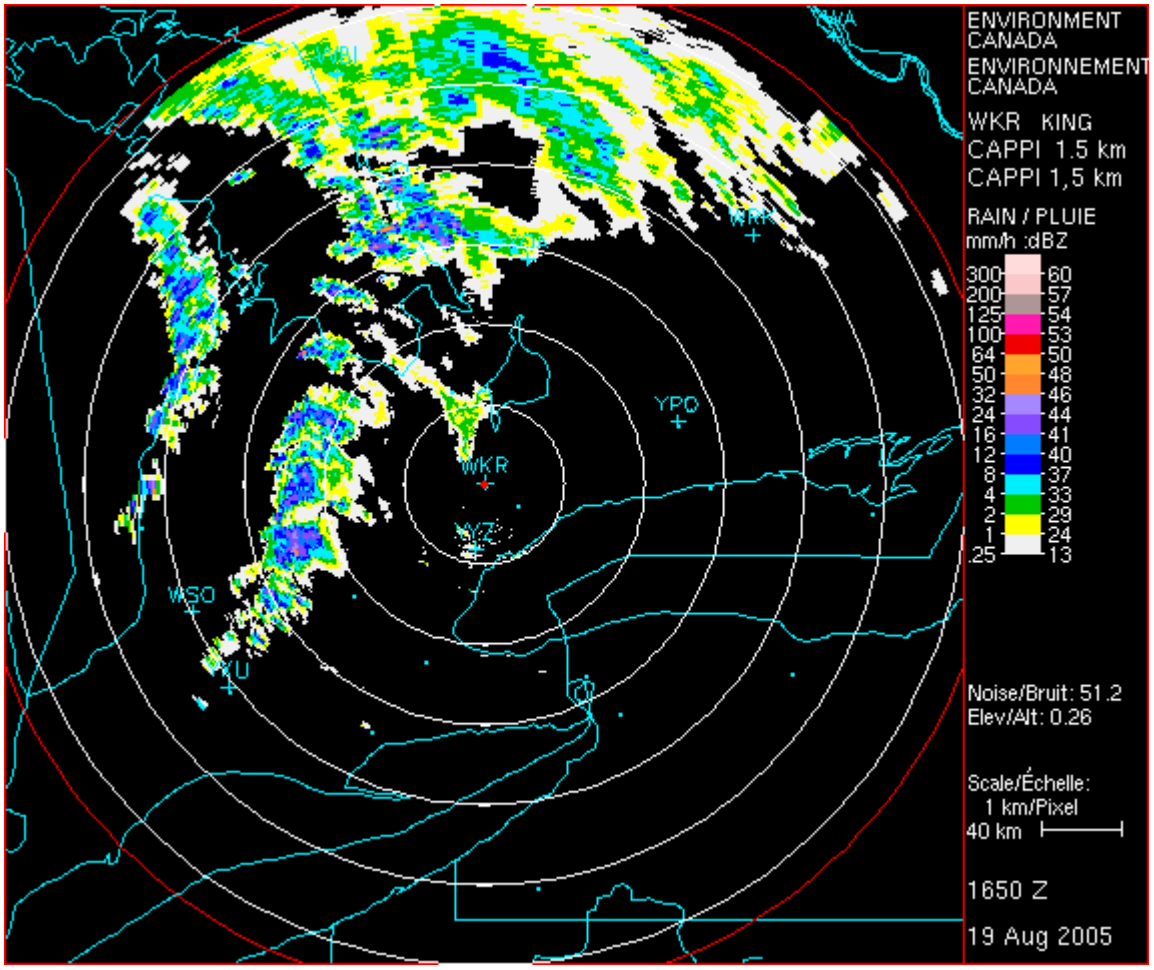
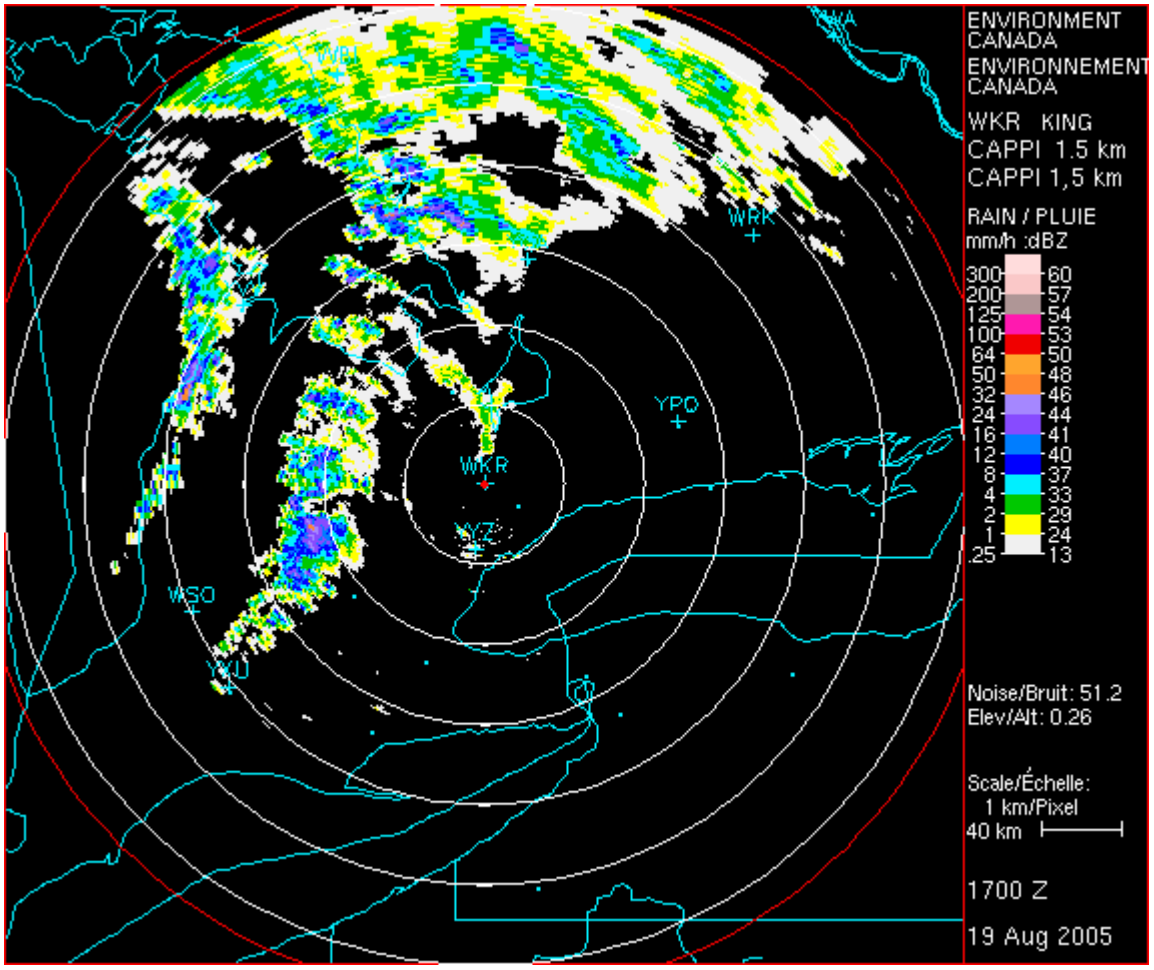


August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)



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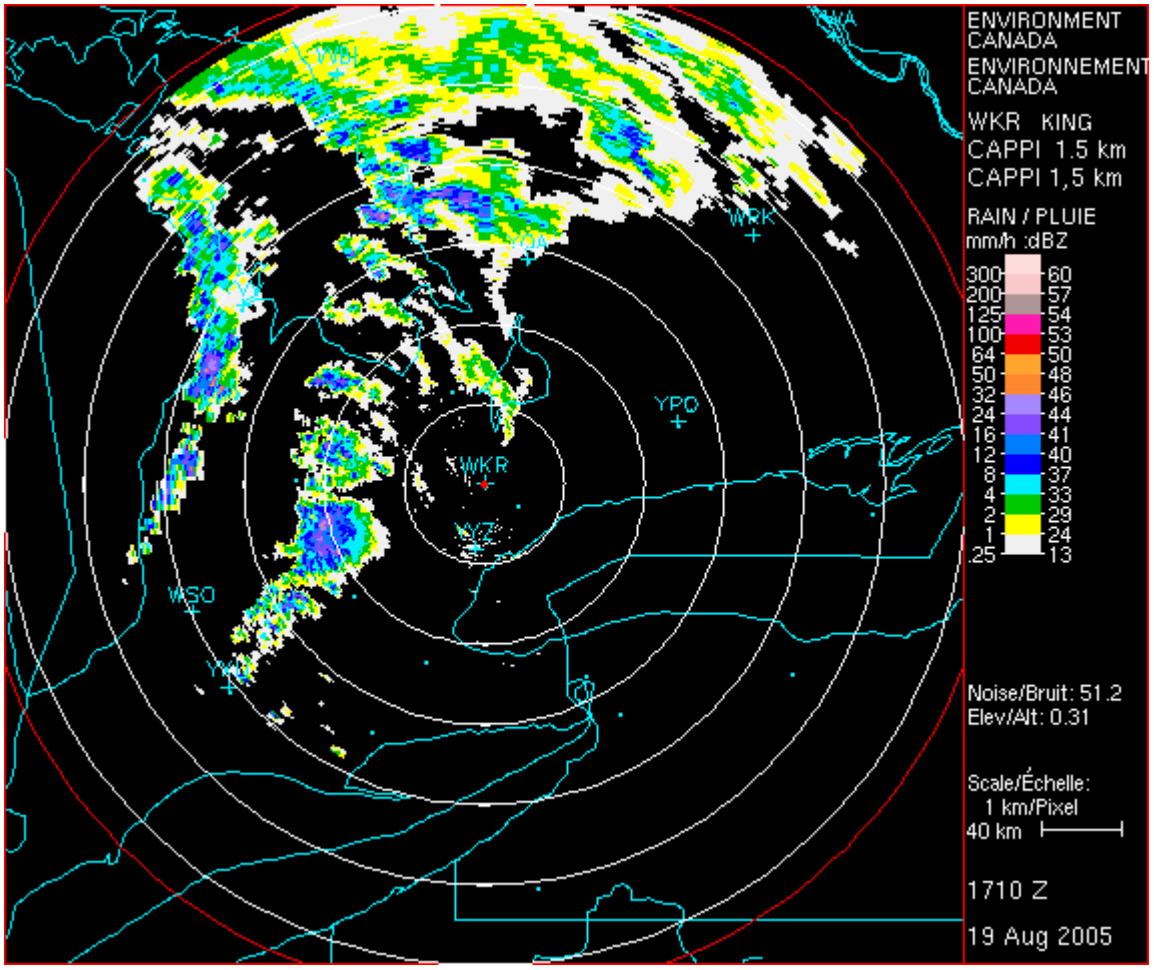

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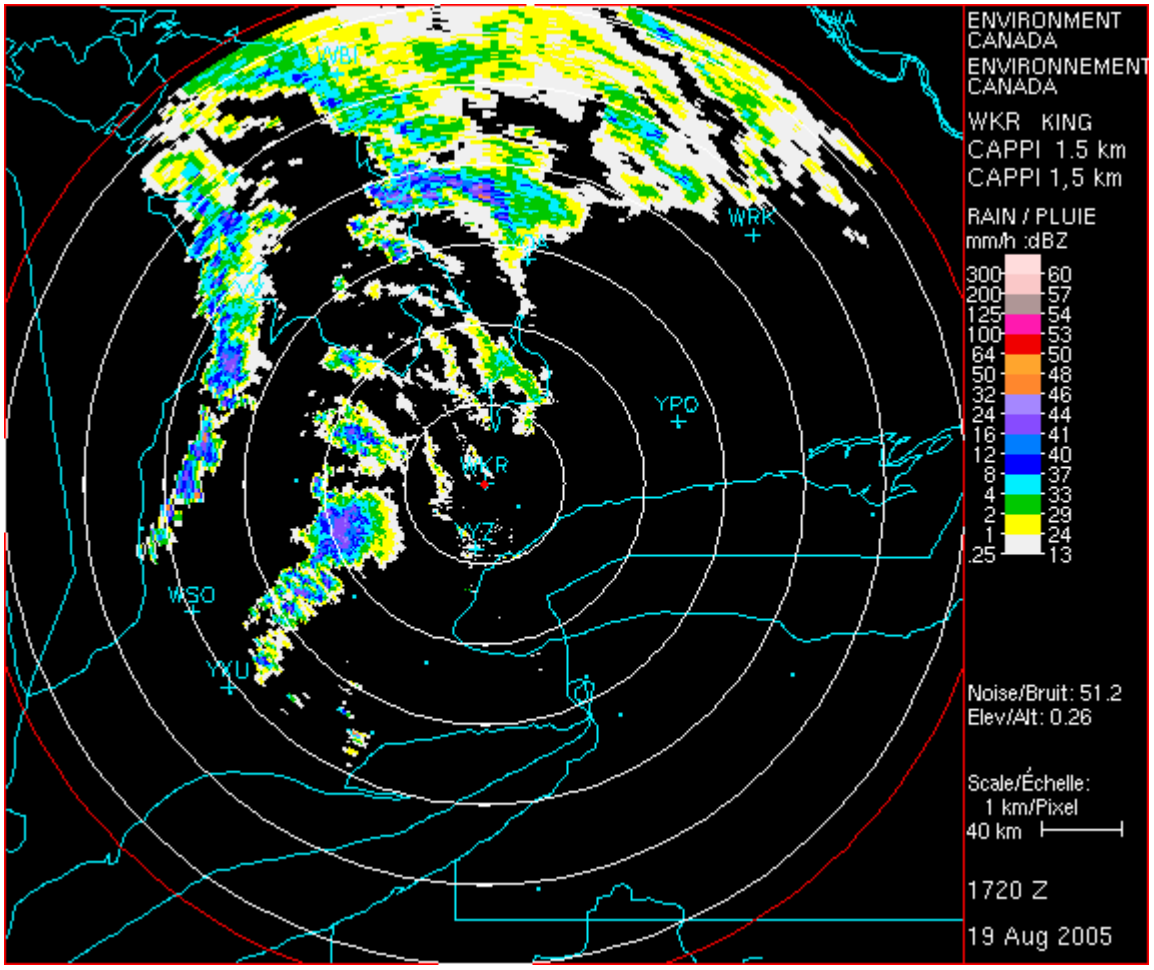

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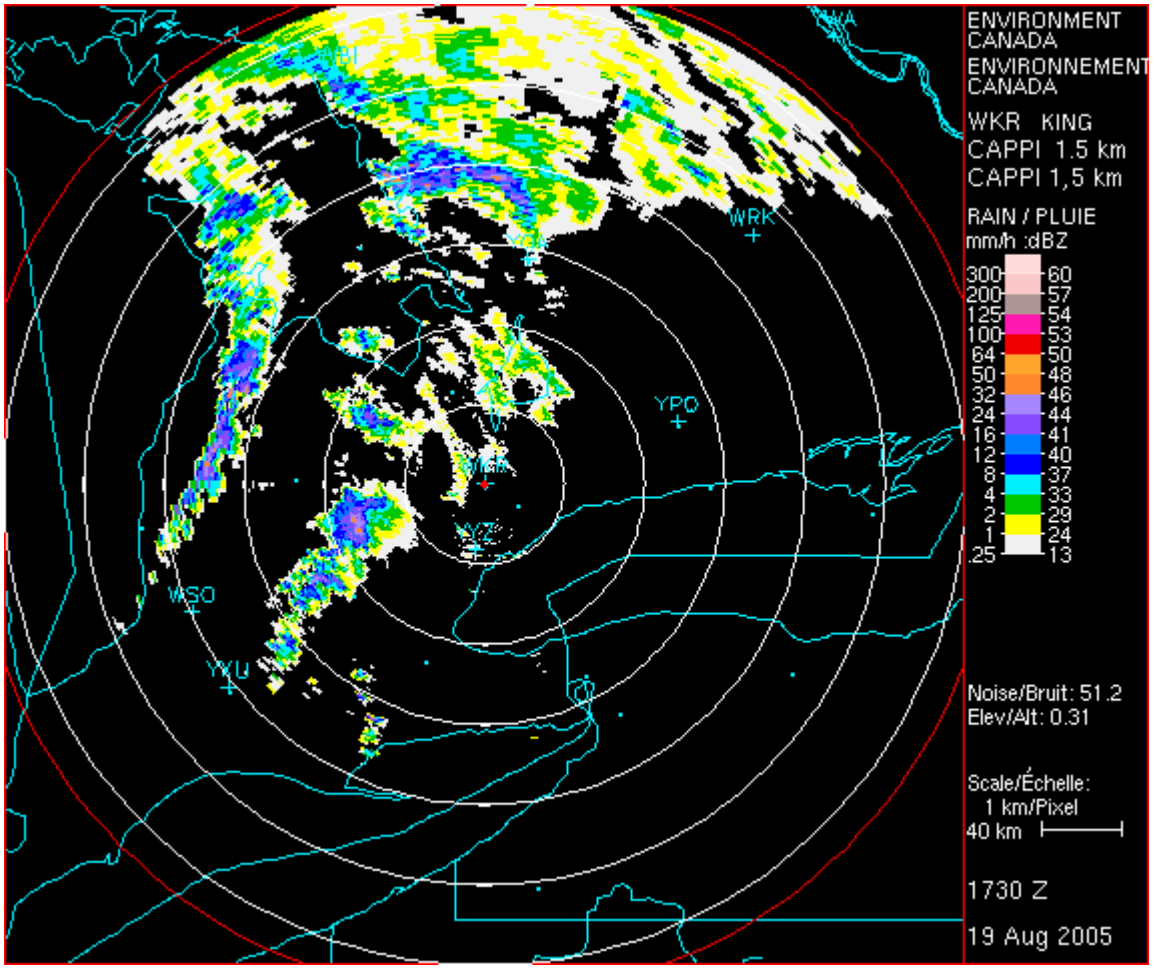
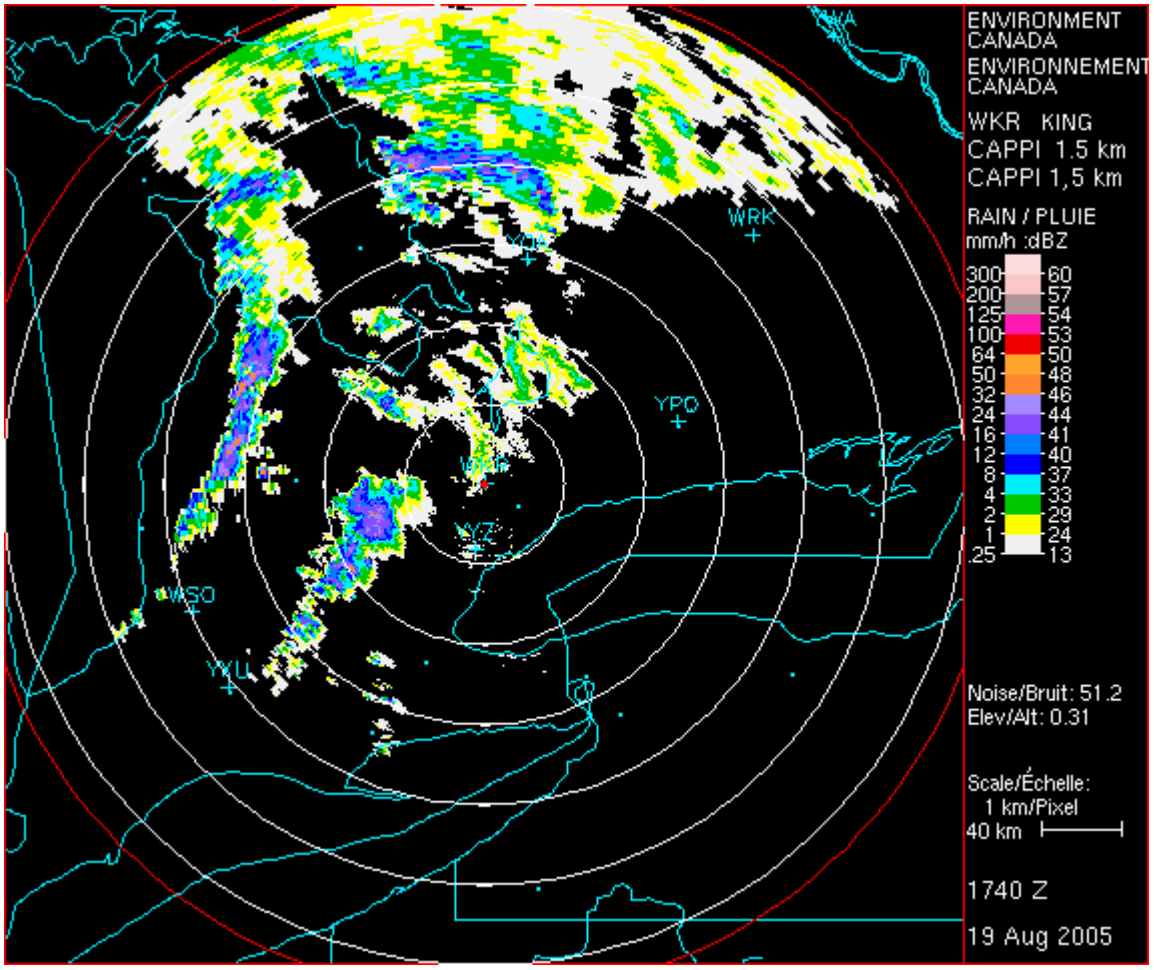
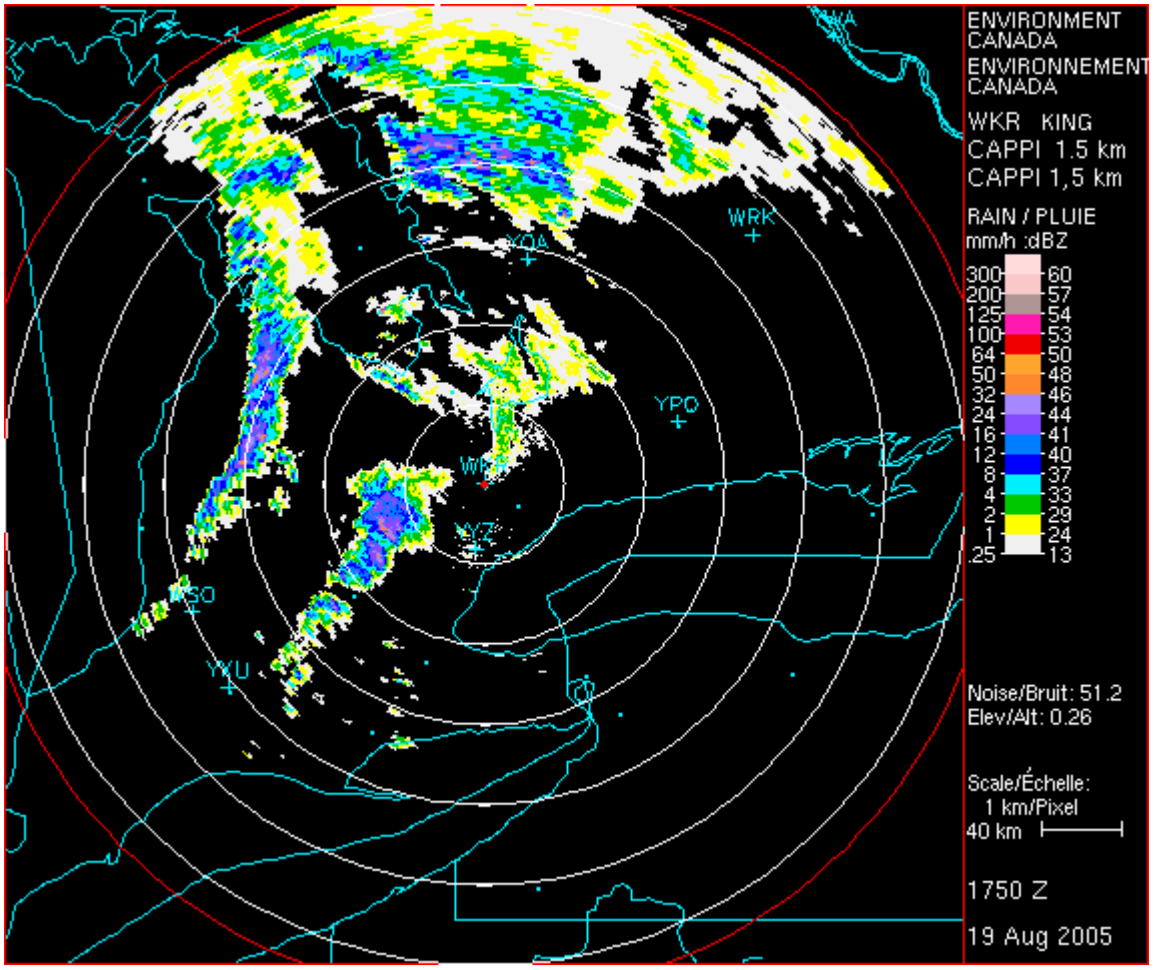
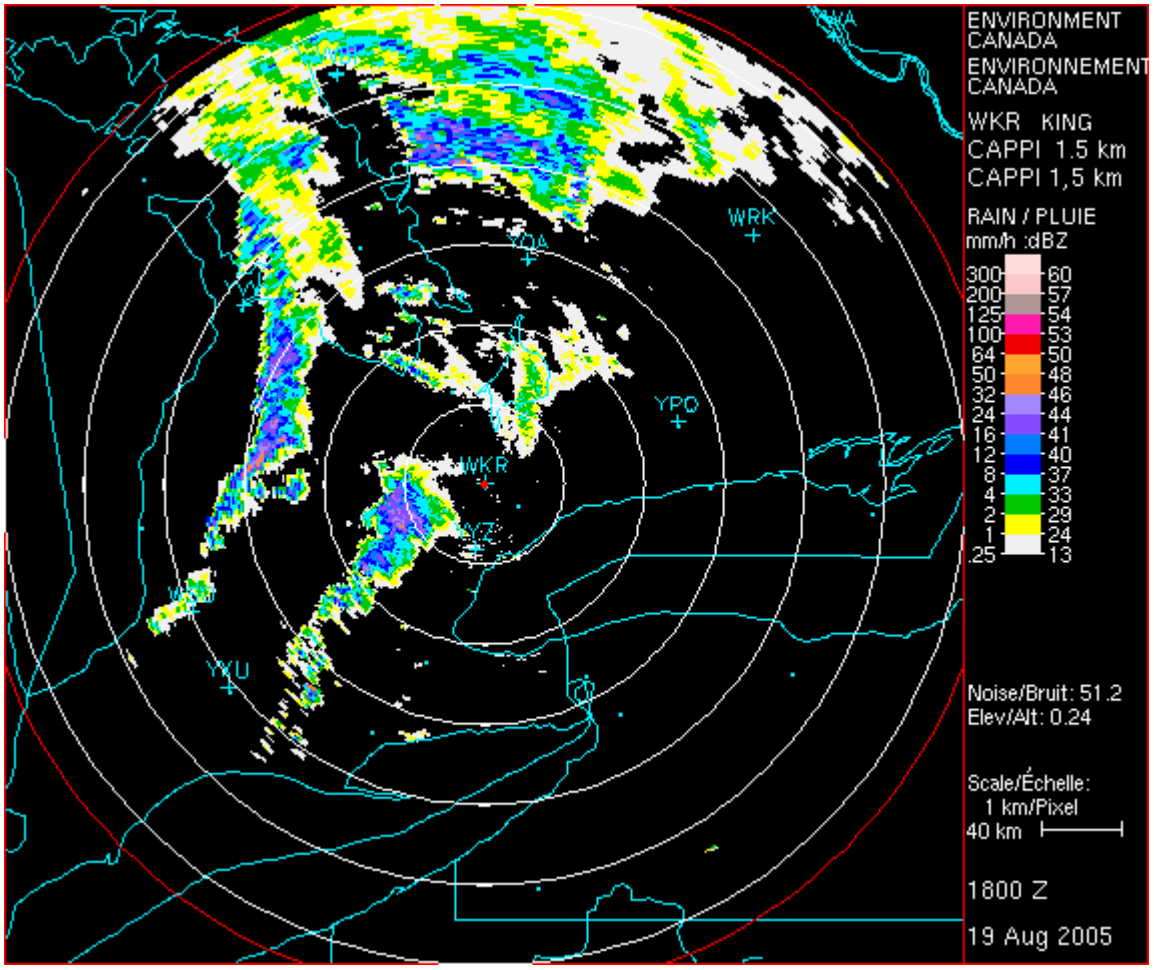

ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
WRK
YPO
WSO
YXU
Noise/Bruit: 51.2
Elev/Alt: 0.31
Scale/Échelle:
1 km/Pixel
40 km
1730 Z
19 Aug 2005



August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)


ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
WRK
YPO
YXU
Noise/Bruit: 51.2
Elev/Alt: 0.26
Scale/Échelle:
1 km/Pixel
40 km
1750 Z
19 Aug 2005



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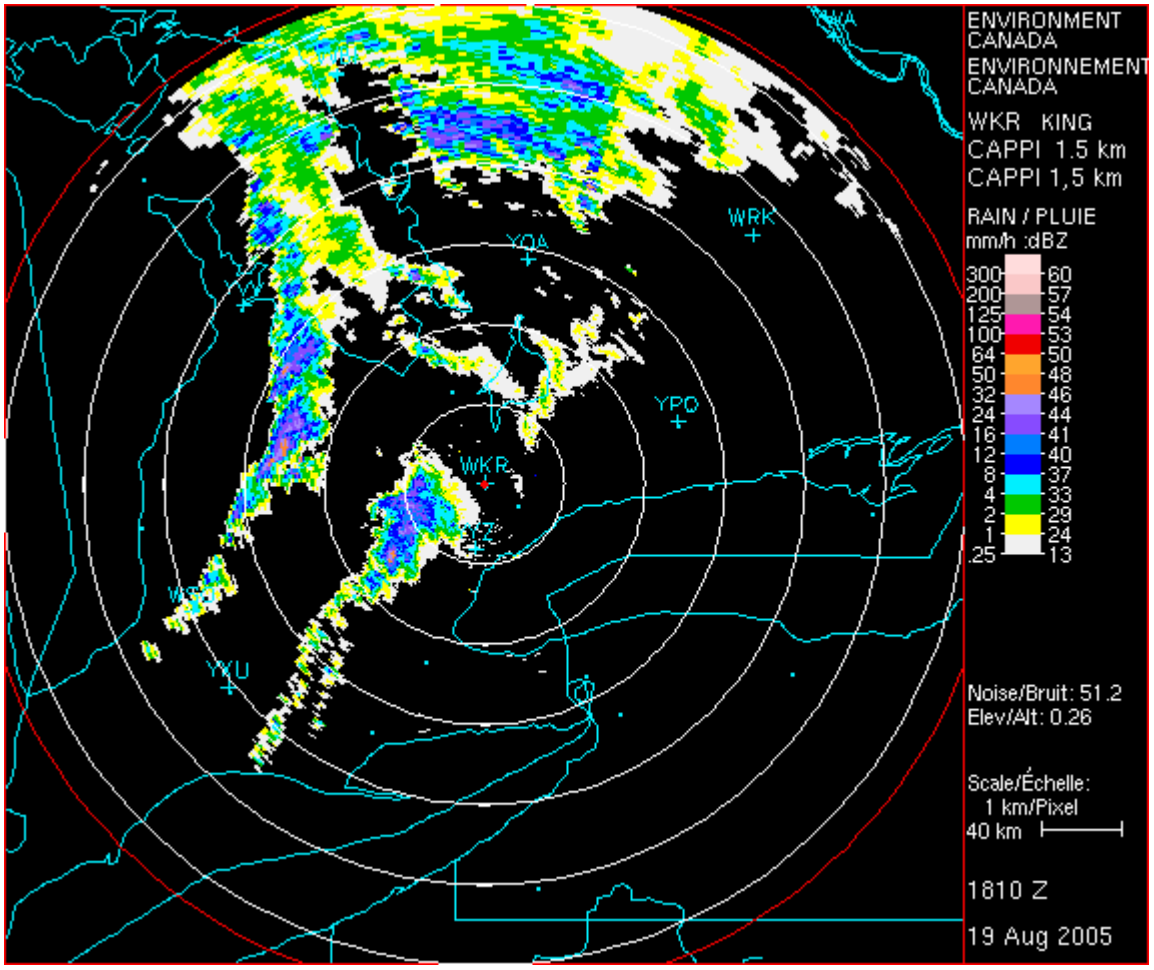

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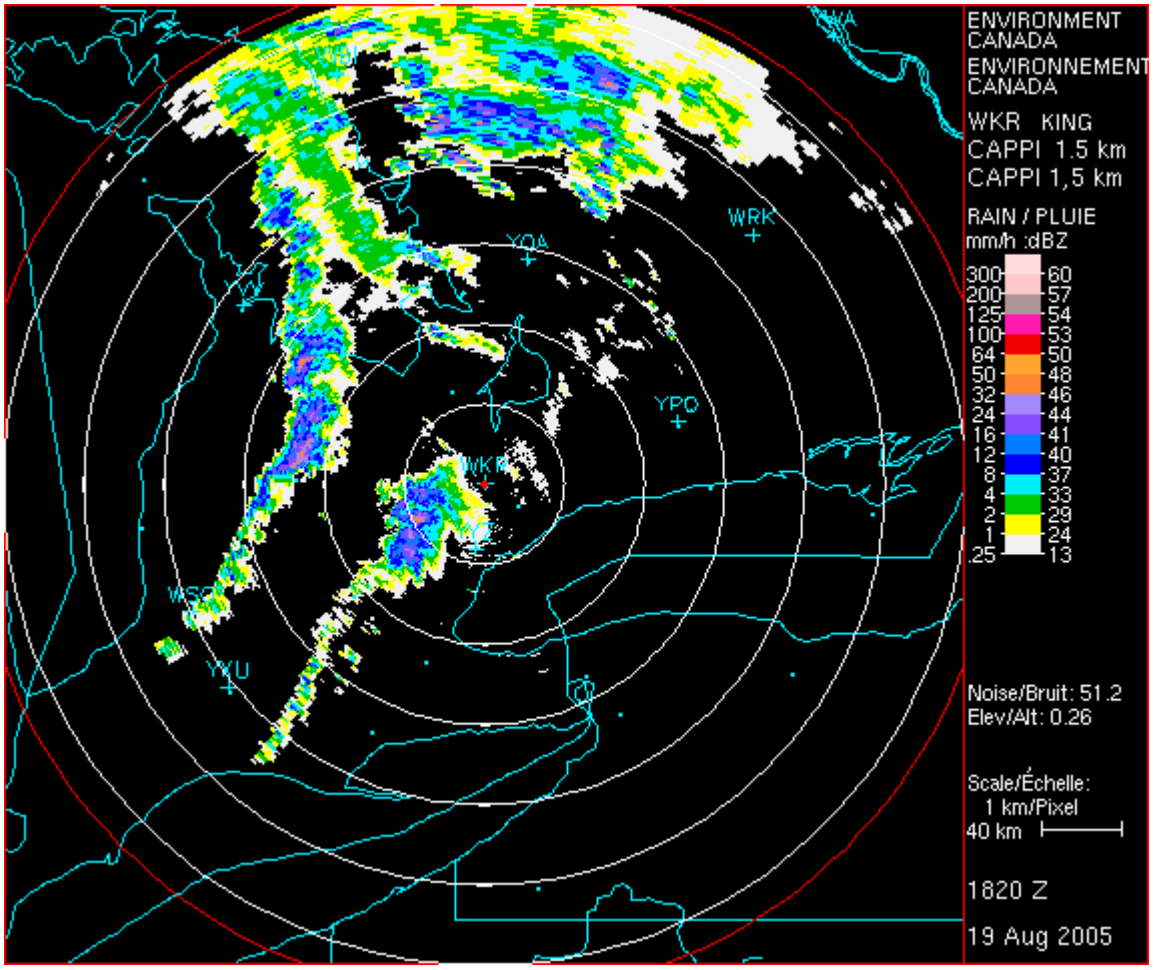
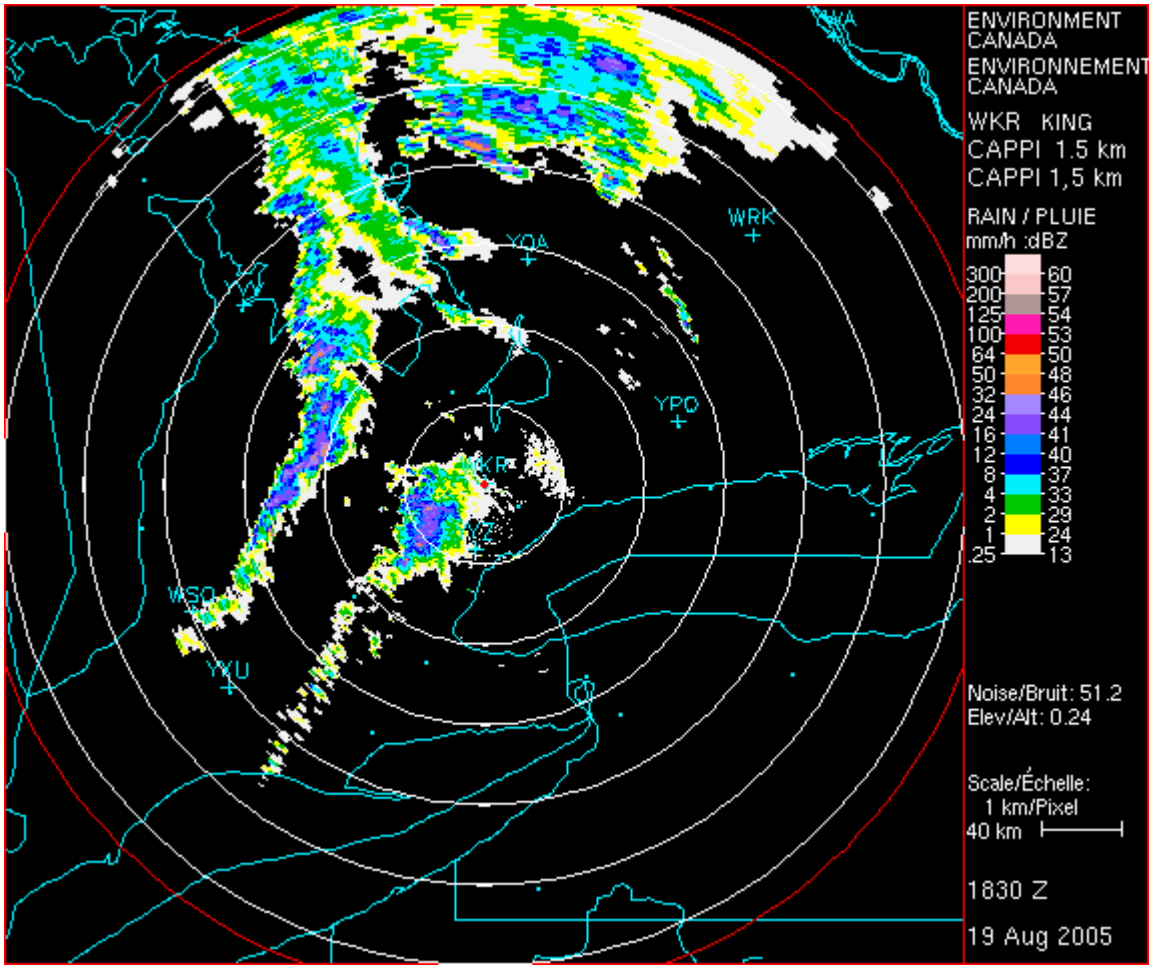


August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)


ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
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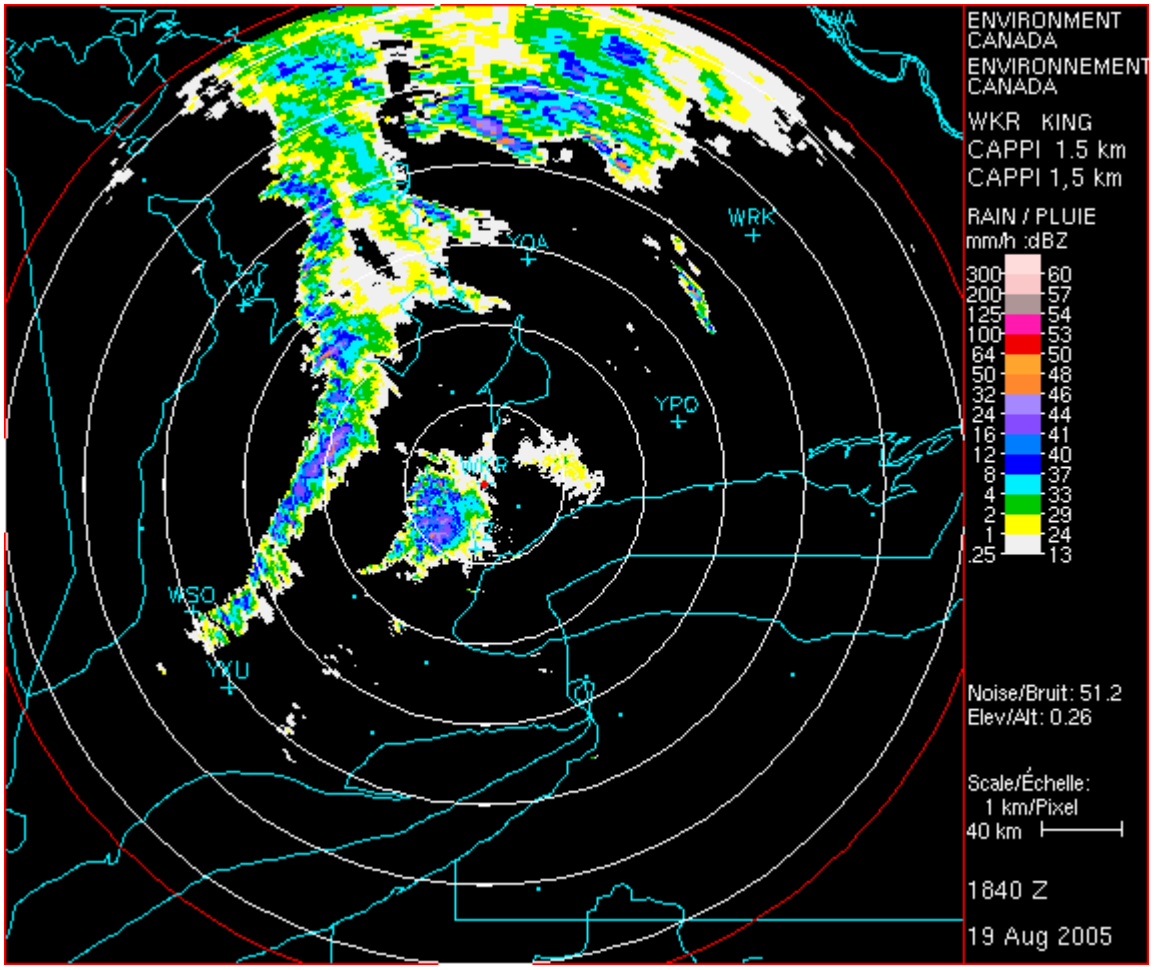
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
Noise/Bruit: 51.2
Elev/Alt: 0.24
Scale/Échelle:
1 km/Pixel
40 km
1830 Z
19 Aug 2005
WRK
YOA
YPO
WSO
YKU



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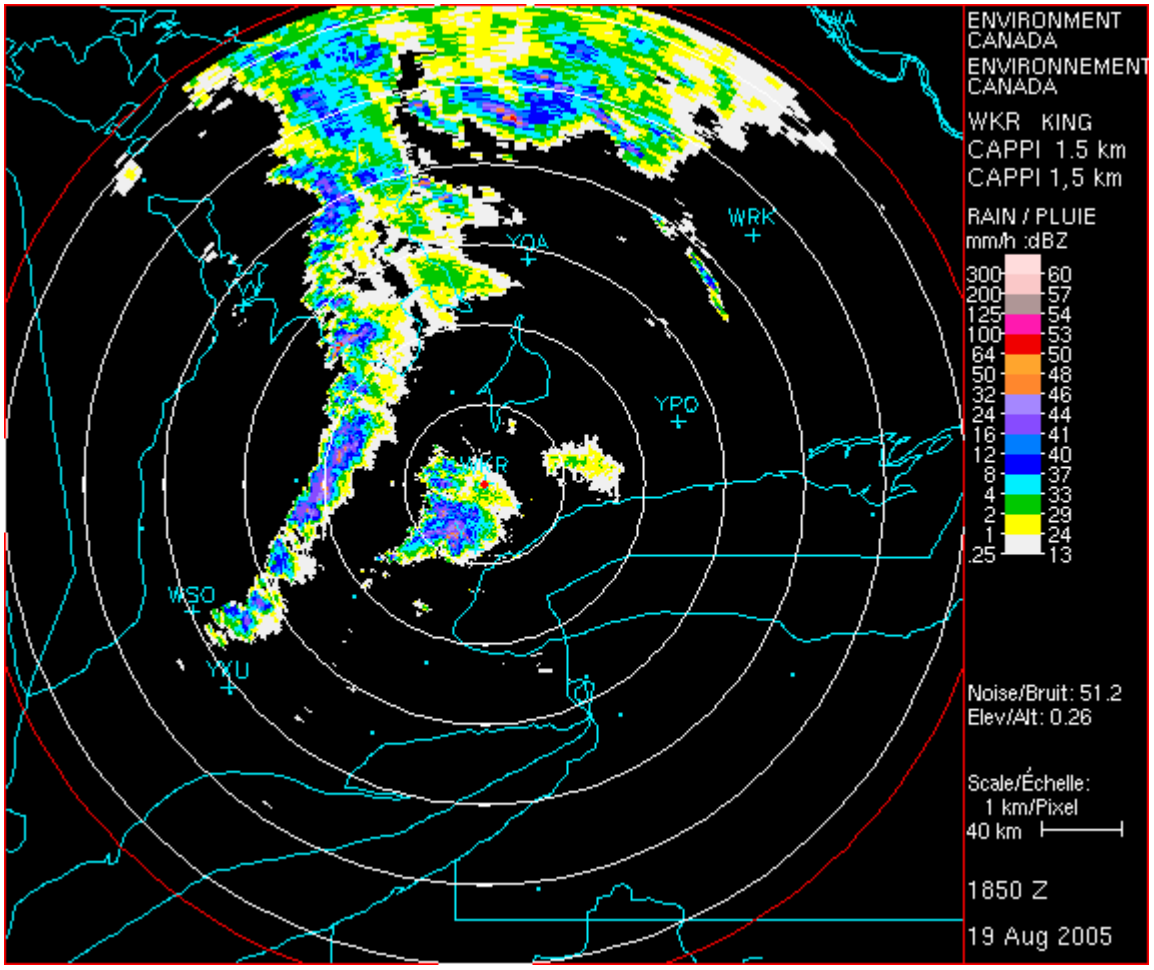

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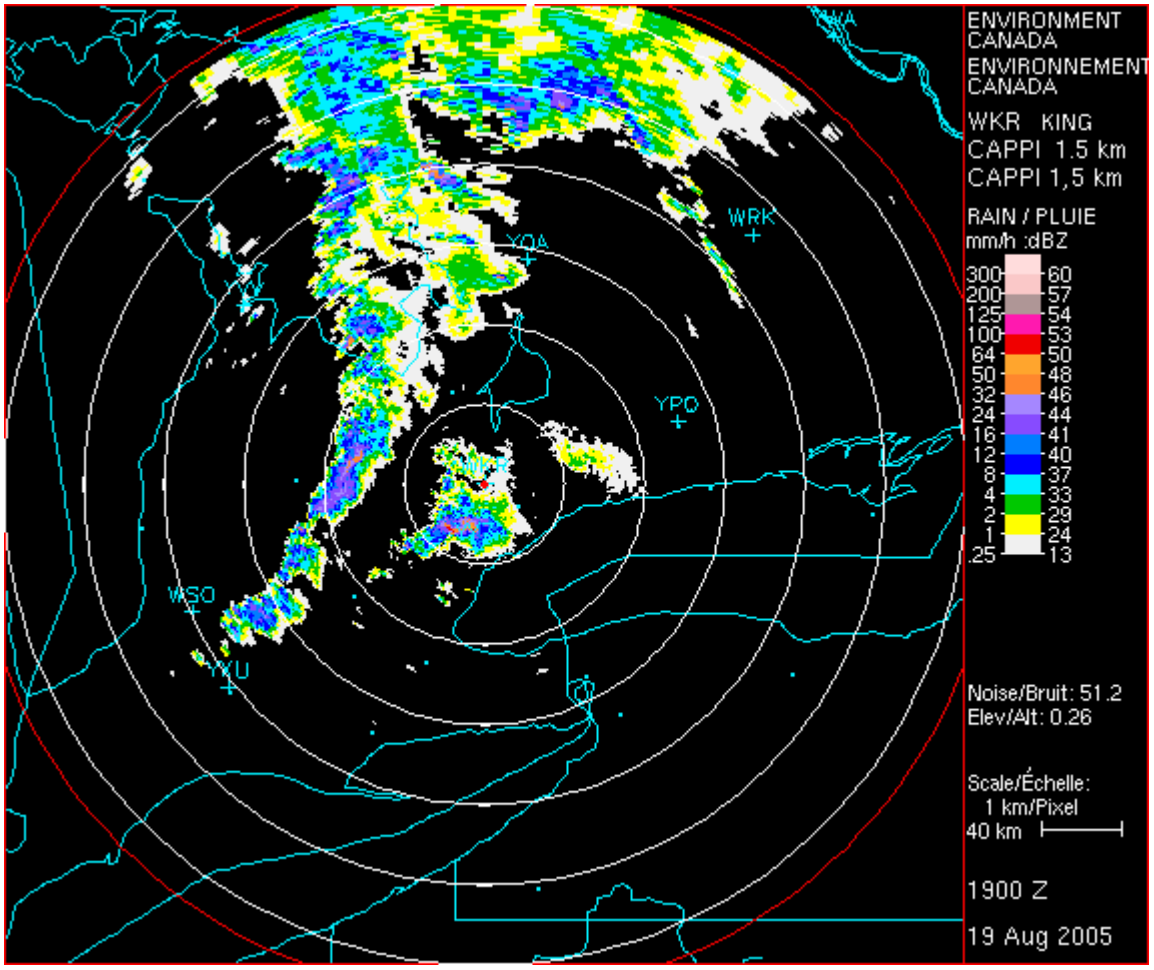
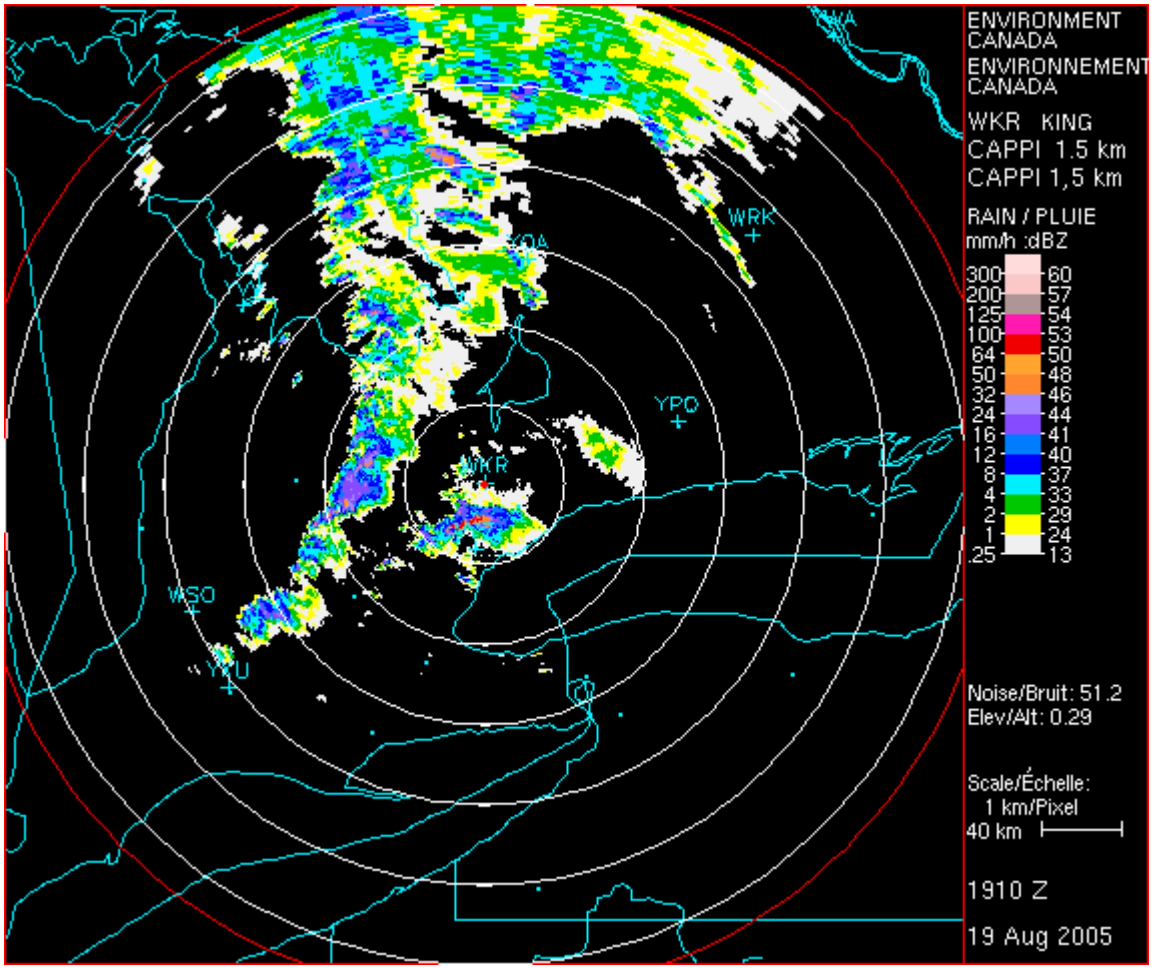

ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
Noise/Bruit: 51.2
Elev/Alt: 0.26
Scale/Échelle:
1 km/Pixel
40 km
1900 Z
19 Aug 2005
WRK
YOA
YPO
WSO
YXU



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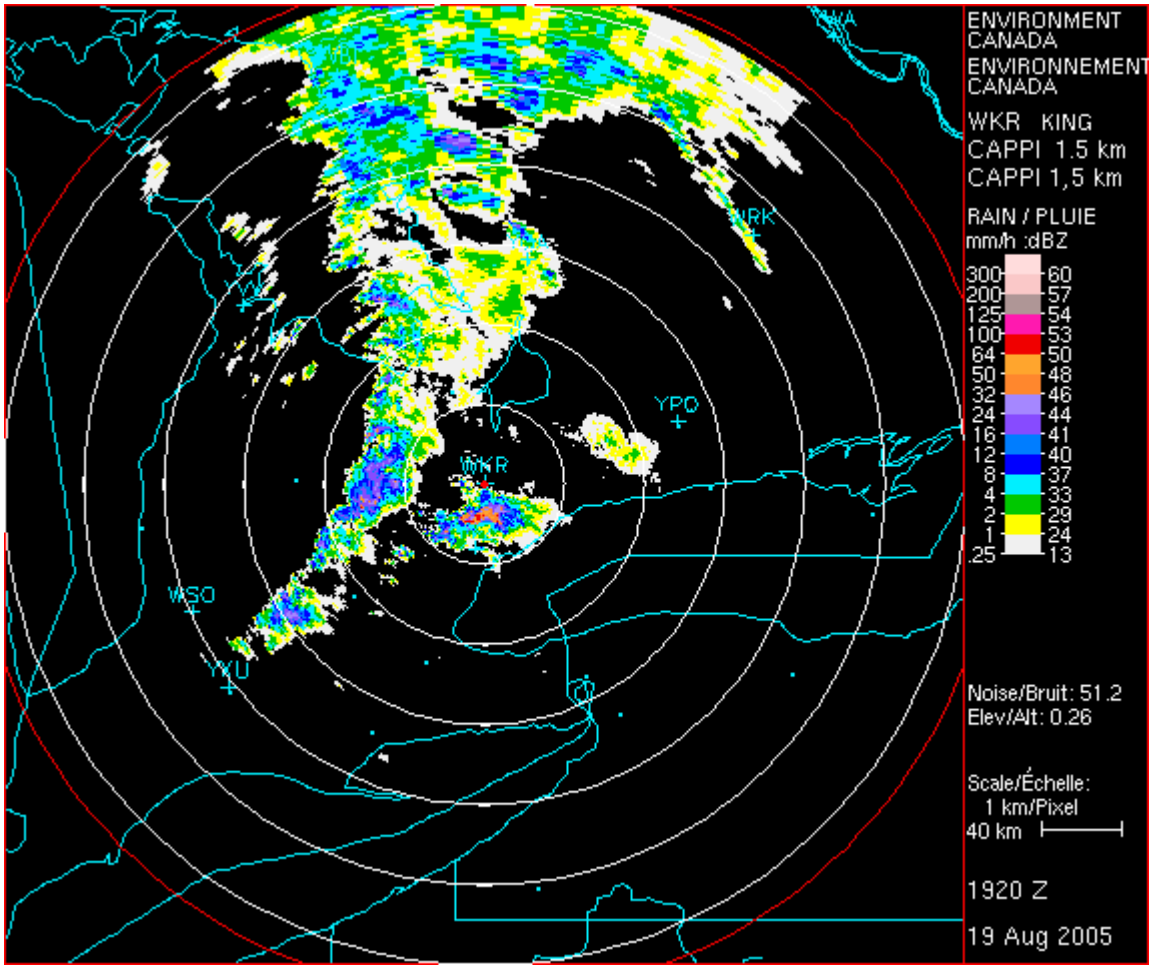

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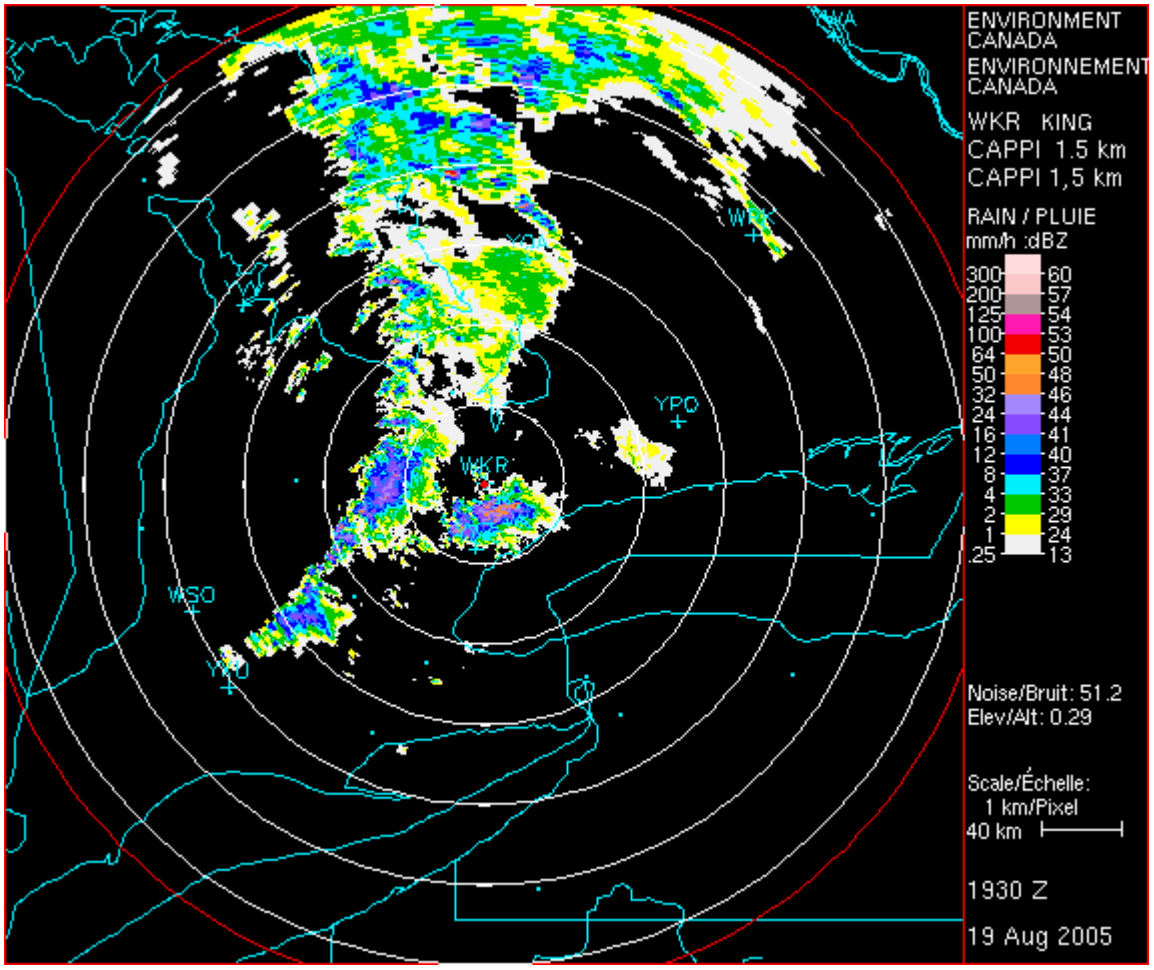

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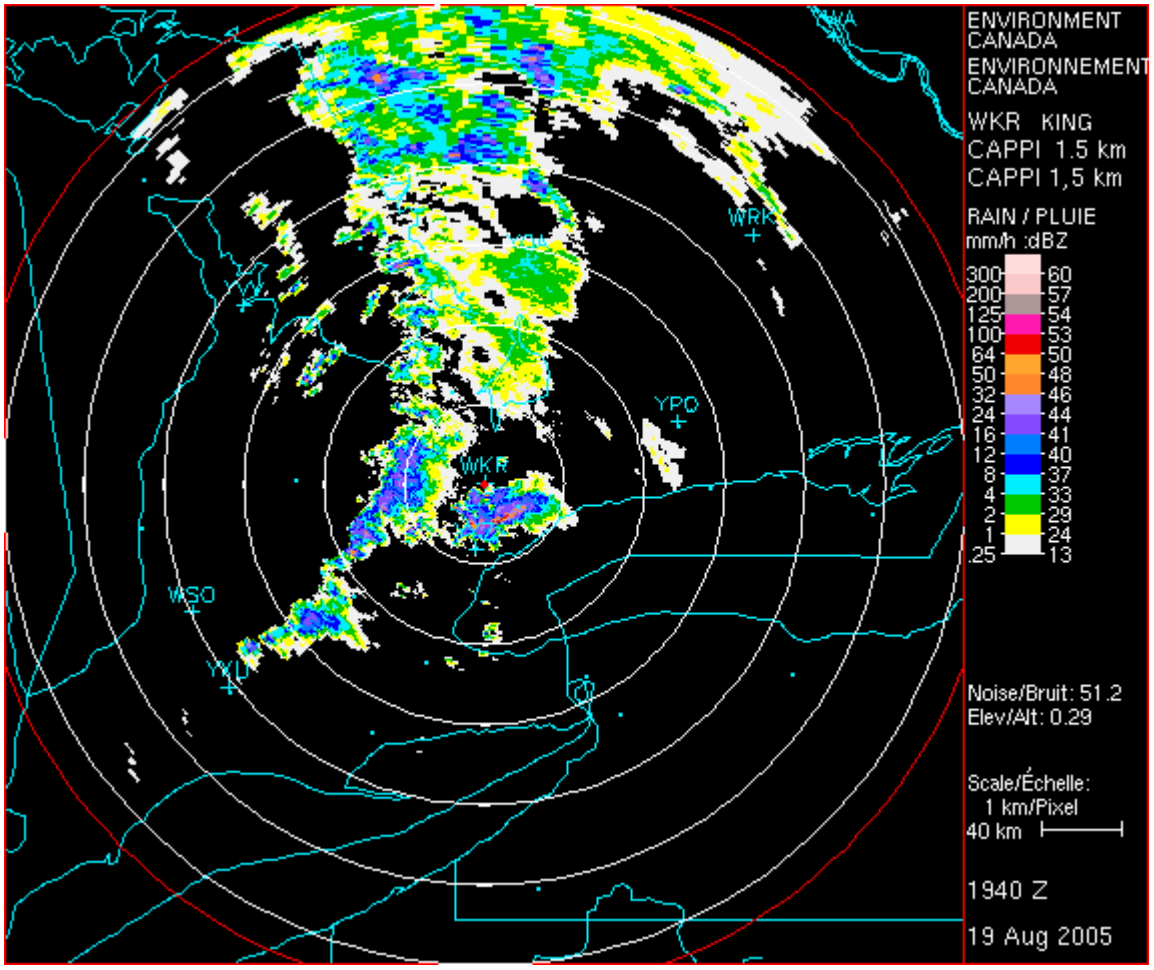

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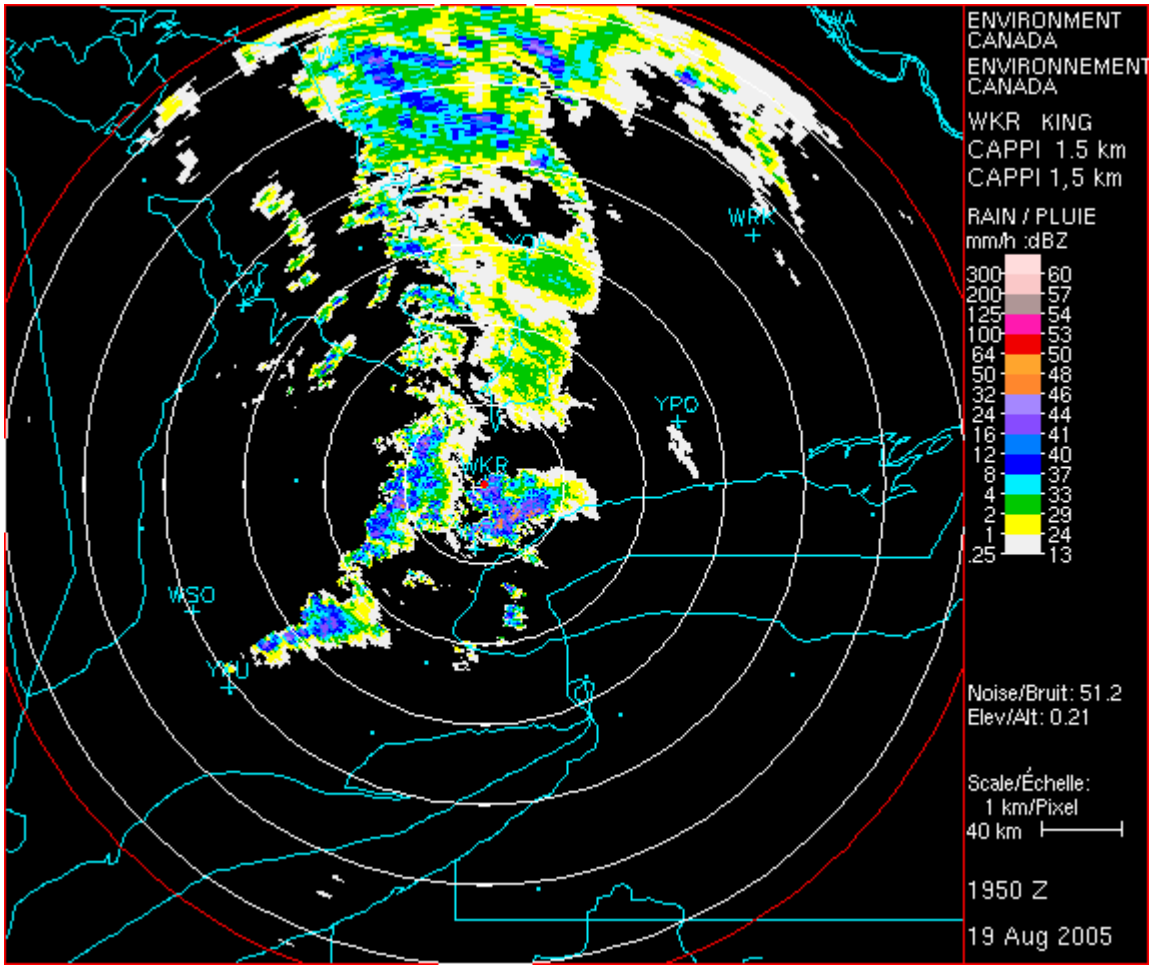
ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
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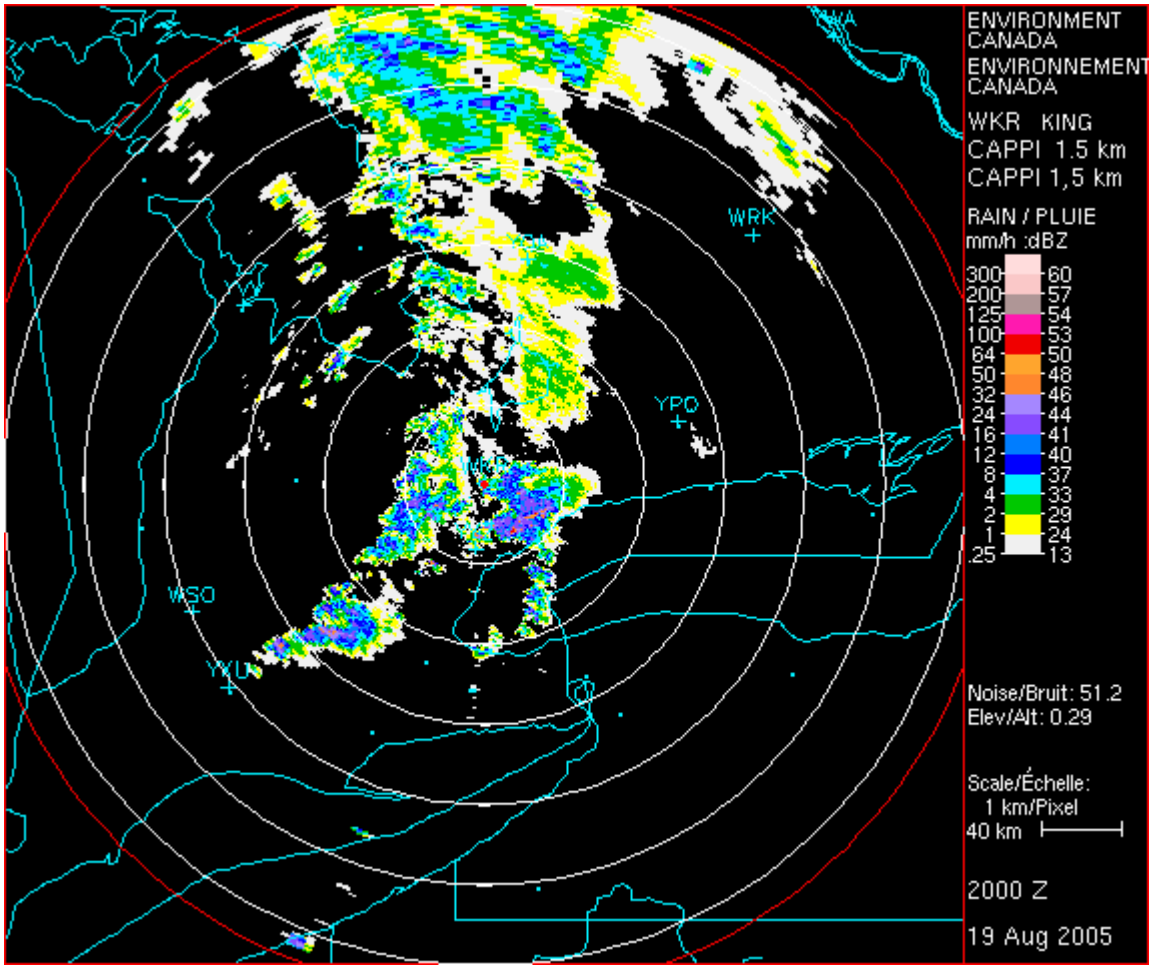
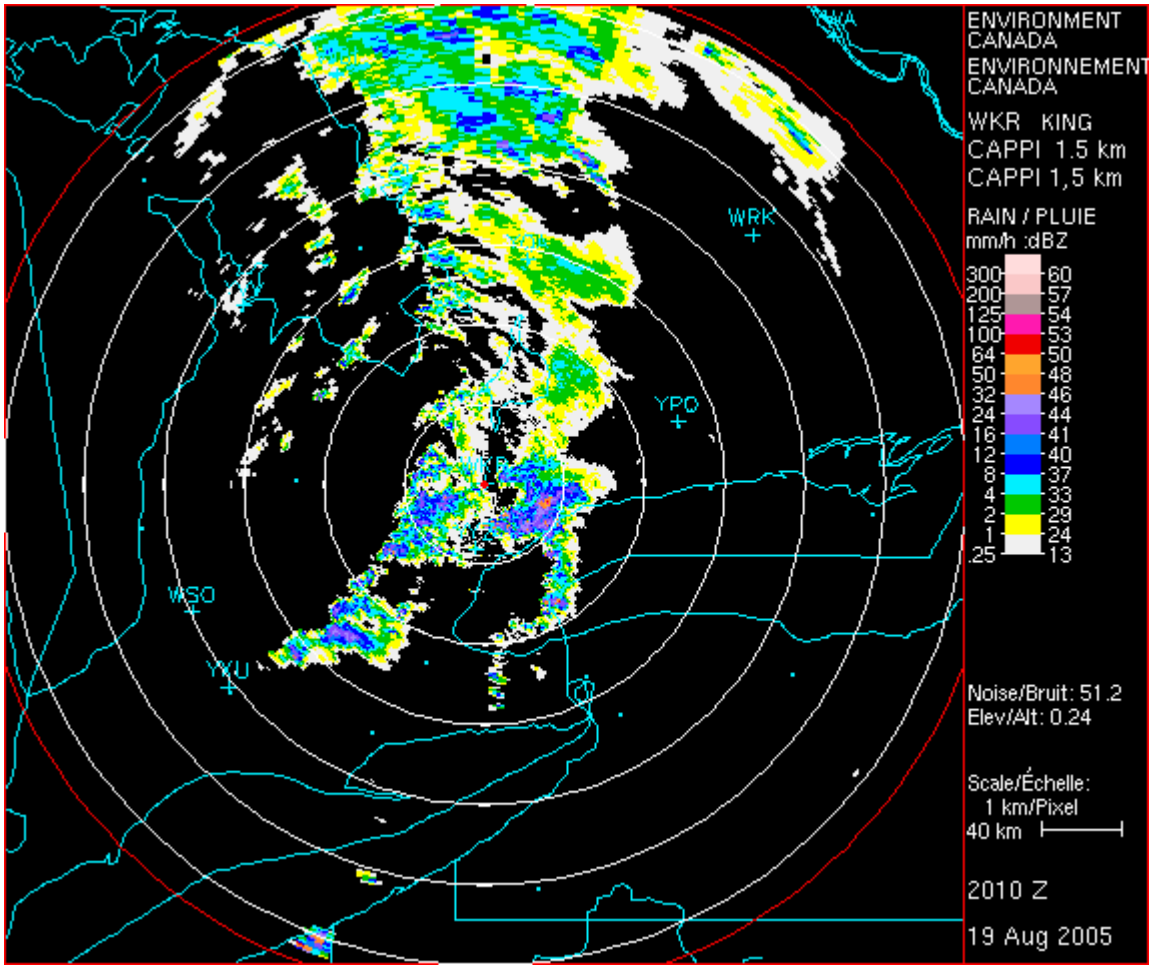
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
Noise/Bruit: 51.2
Elev/Alt: 0.21
Scale/Échelle:
1 km/Pixel
40 km
1950 Z
19 Aug 2005
WKR
YPO
WSO
YPU


ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
WRK
YPO
WSO
YKU
Noise/Bruit: 51.2
Elev/Alt: 0.29
Scale/Échelle:
1 km/Pixel
40 km
2000 Z
19 Aug 2005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ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
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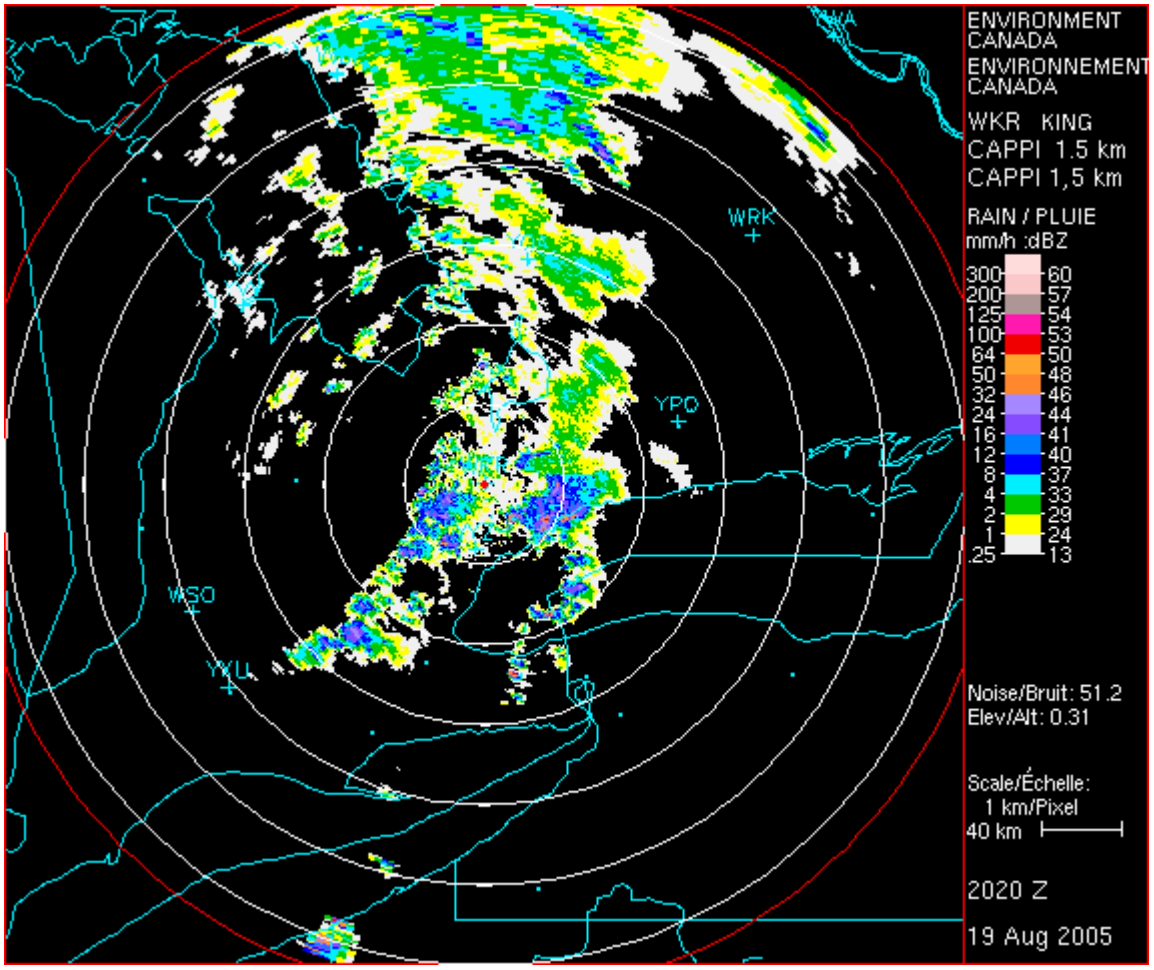
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
Noise/Bruit: 51.2
Elev/Alt: 0.24
Scale/Échelle:
1 km/Pixel
40 km
2010 Z
19 Aug 2005
WRK
YPO
WSO
YKU



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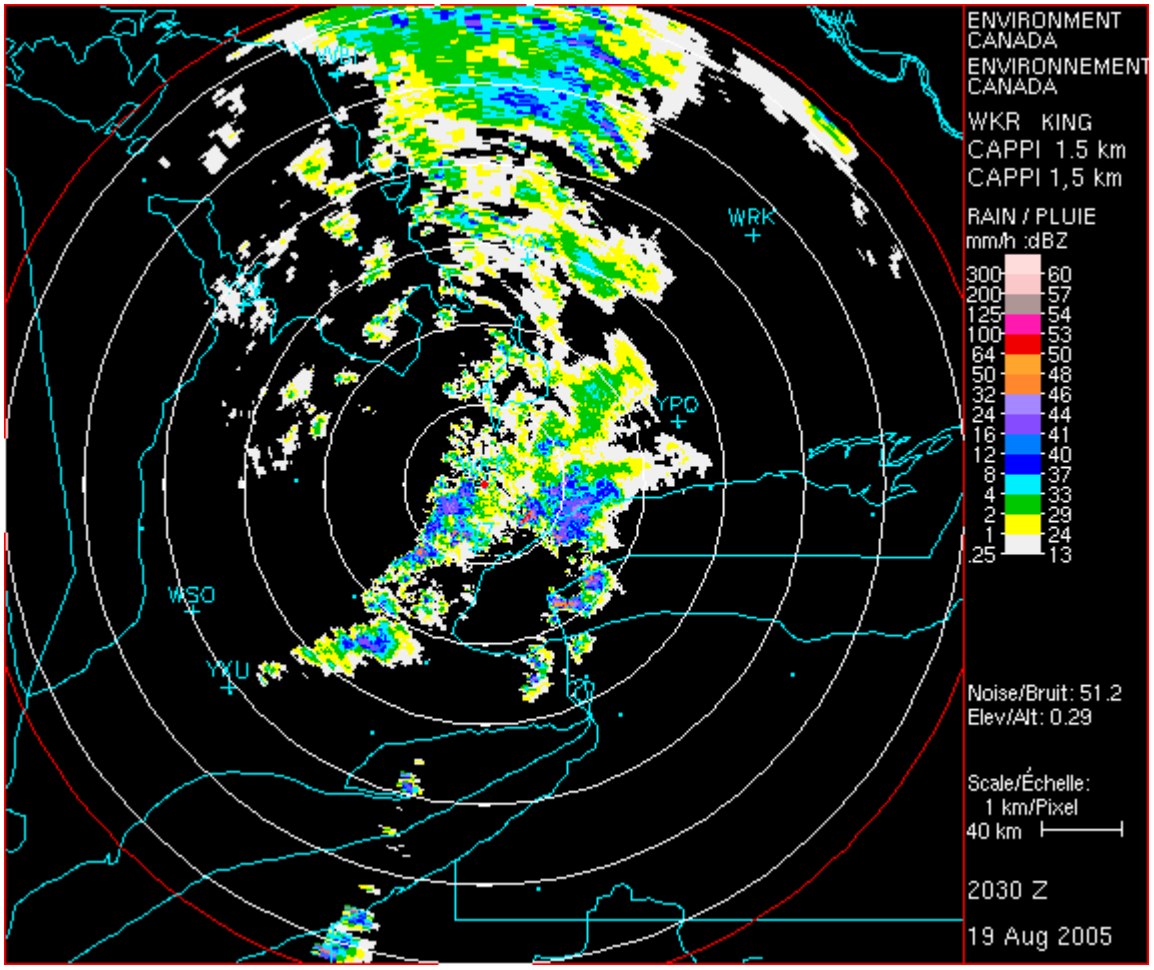
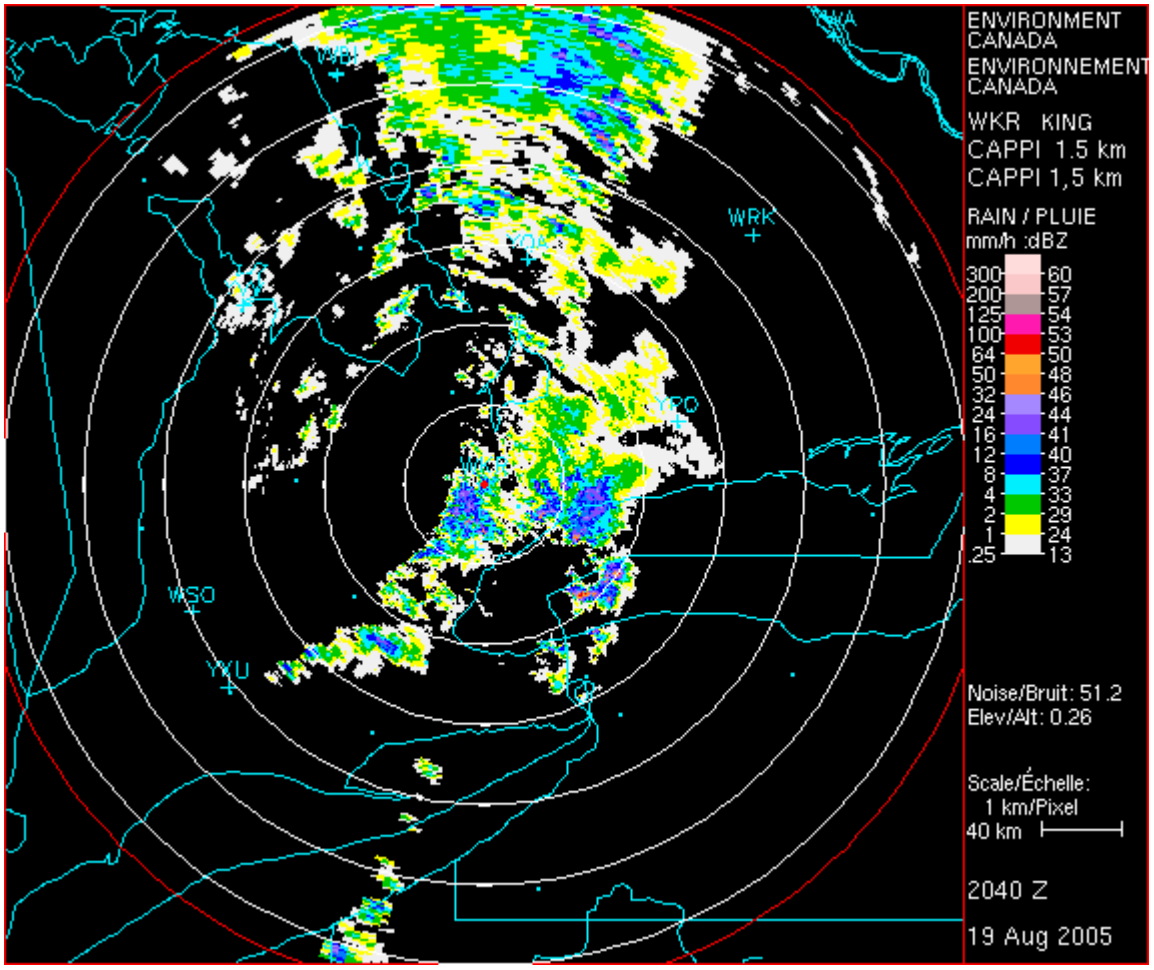
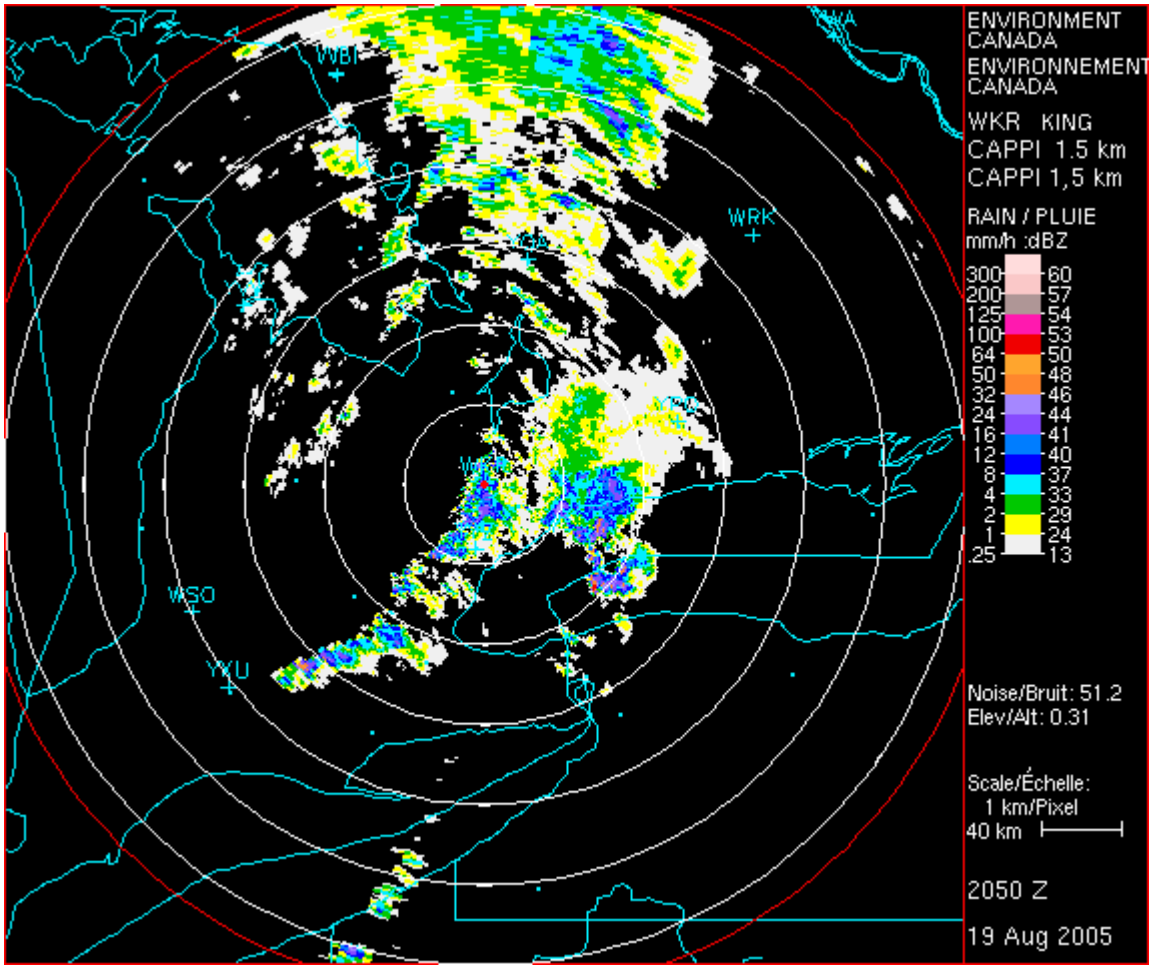
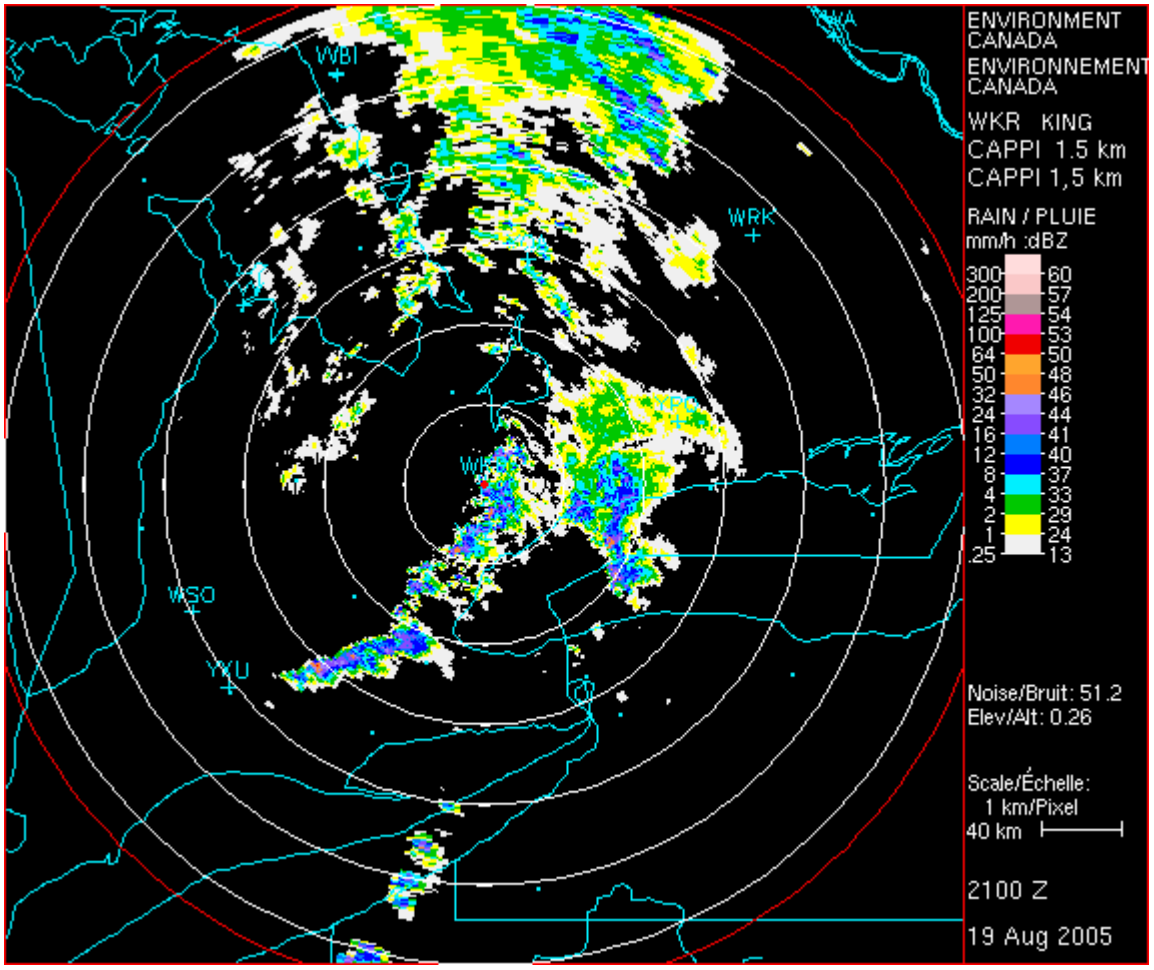

ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
WRK
YPO
WSO
YXU
Noise/Bruit: 51.2
Elev/Alt: 0.29
Scale/Échelle:
1 km/Pixel
40 km
2030 Z
19 Aug 2005


ENVIRONMENT CANADA
ENVIRONNEMENT CANADA
WKR KING
CAPPI 1.5 km
CAPPI 1,5 km
RAIN / PLUIE
mm/h :dBZ
300 60
200 57
125 54
100 53
64 50
50 48
32 46
24 44
16 41
12 40
8 37
4 33
2 29
1 24
.25 13
WRK
WSO
YXU
Noise/Bruit: 51.2
Elev/Alt: 0.26
Scale/Échelle:
1 km/Pixel
40 km
2040 Z
19 Aug 2005



August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)



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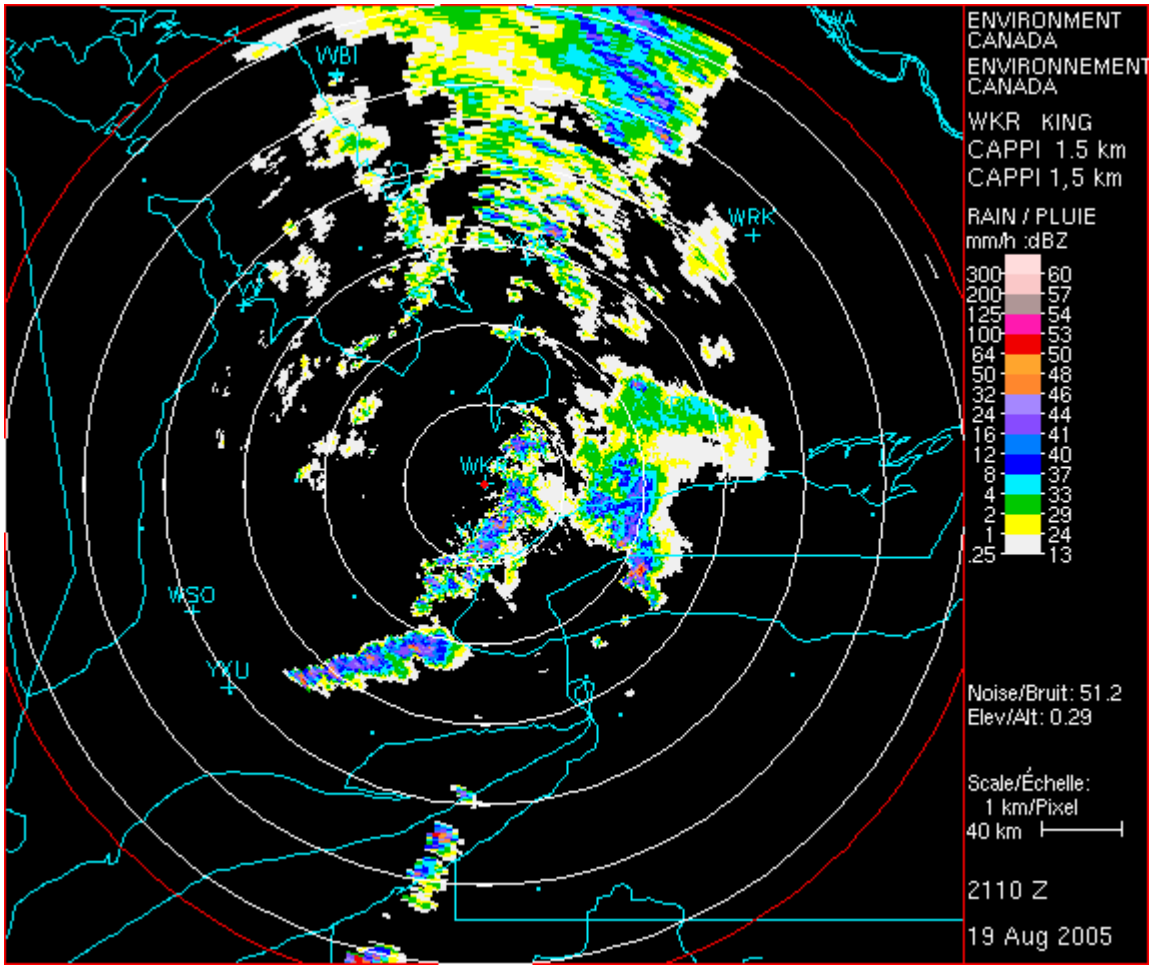

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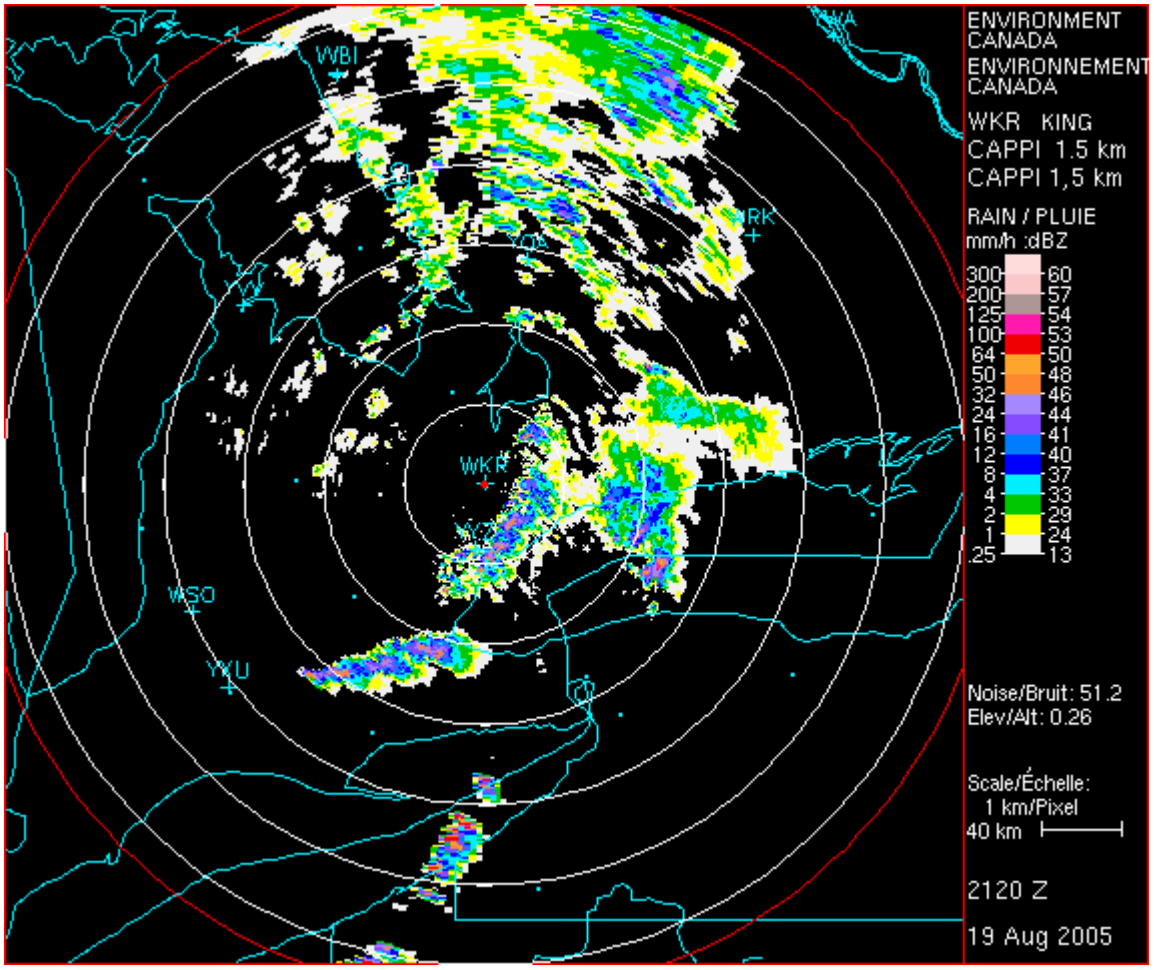

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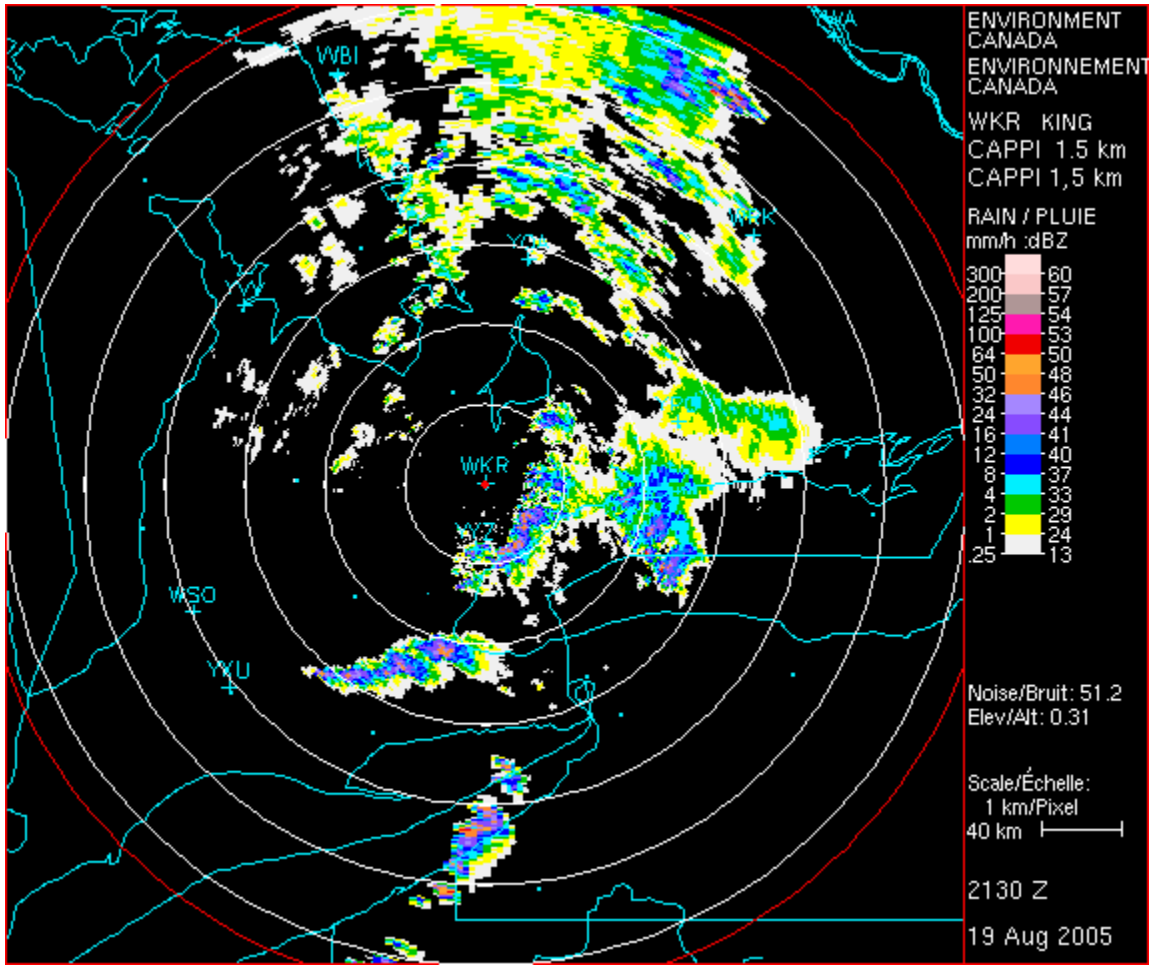

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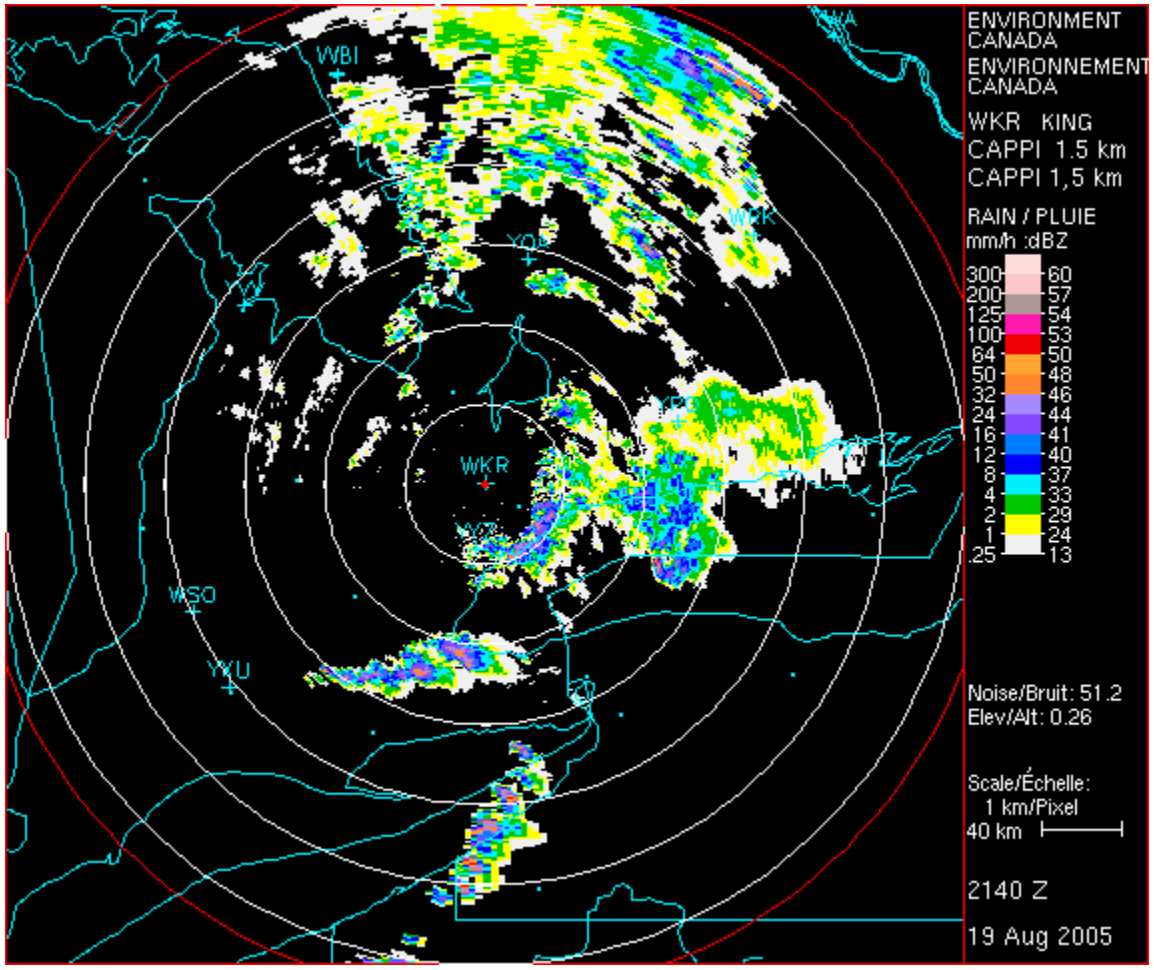

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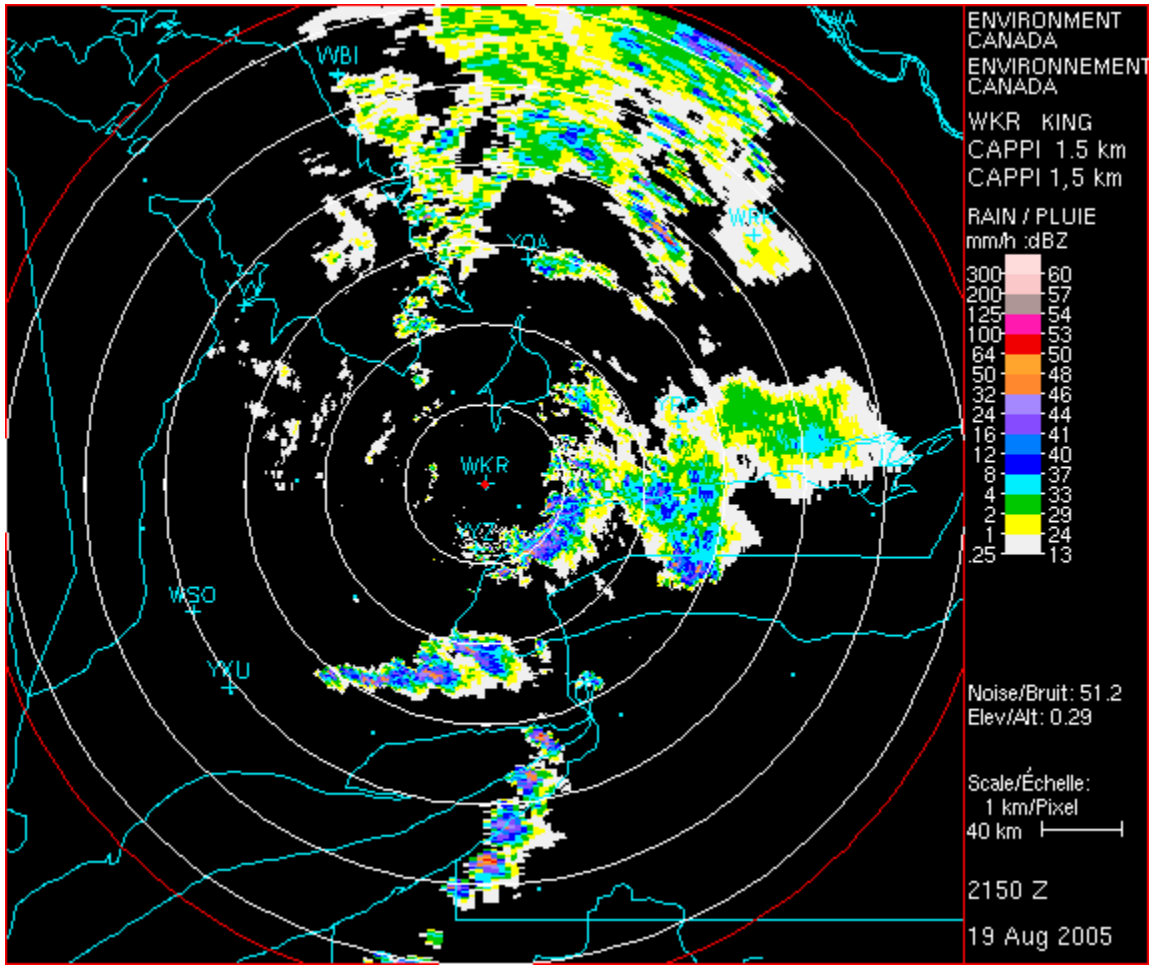

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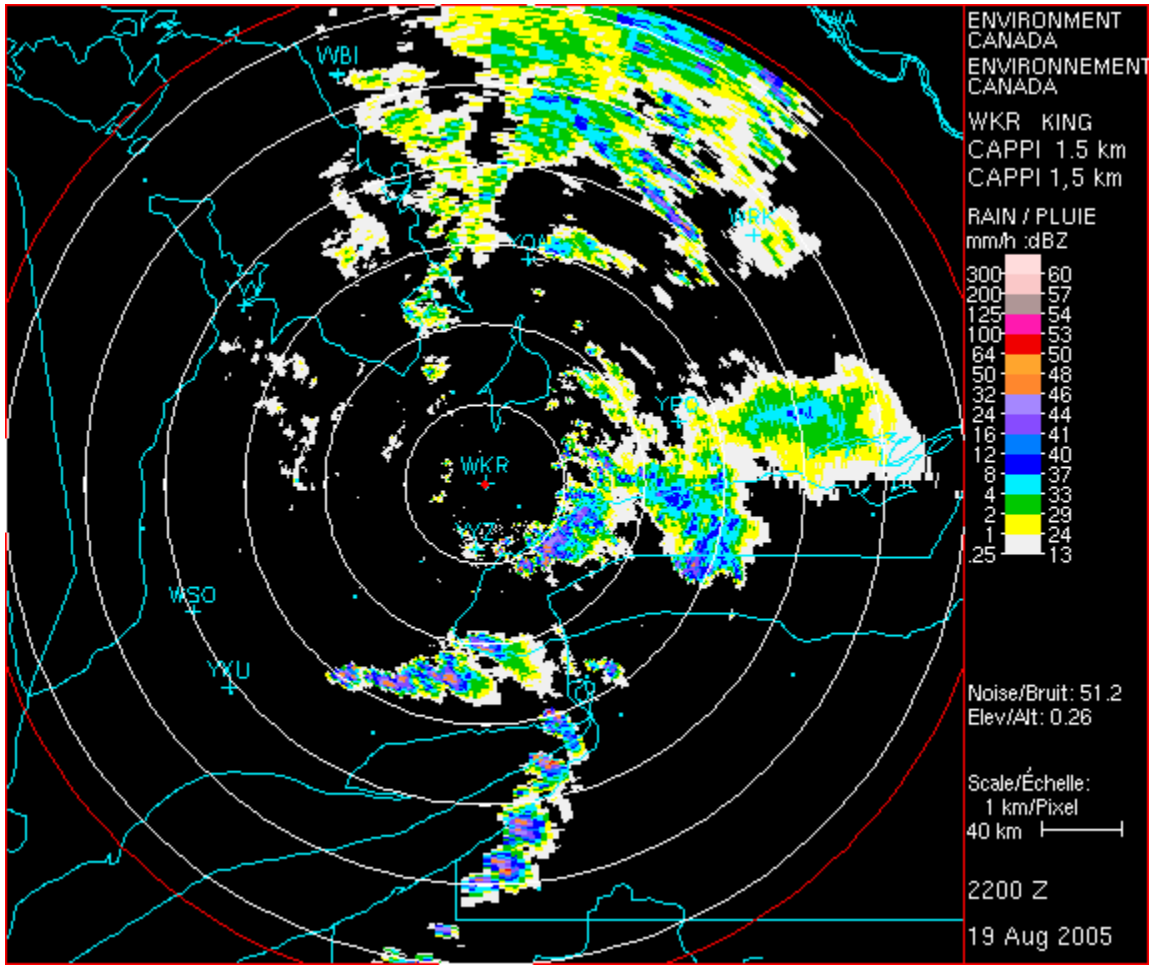

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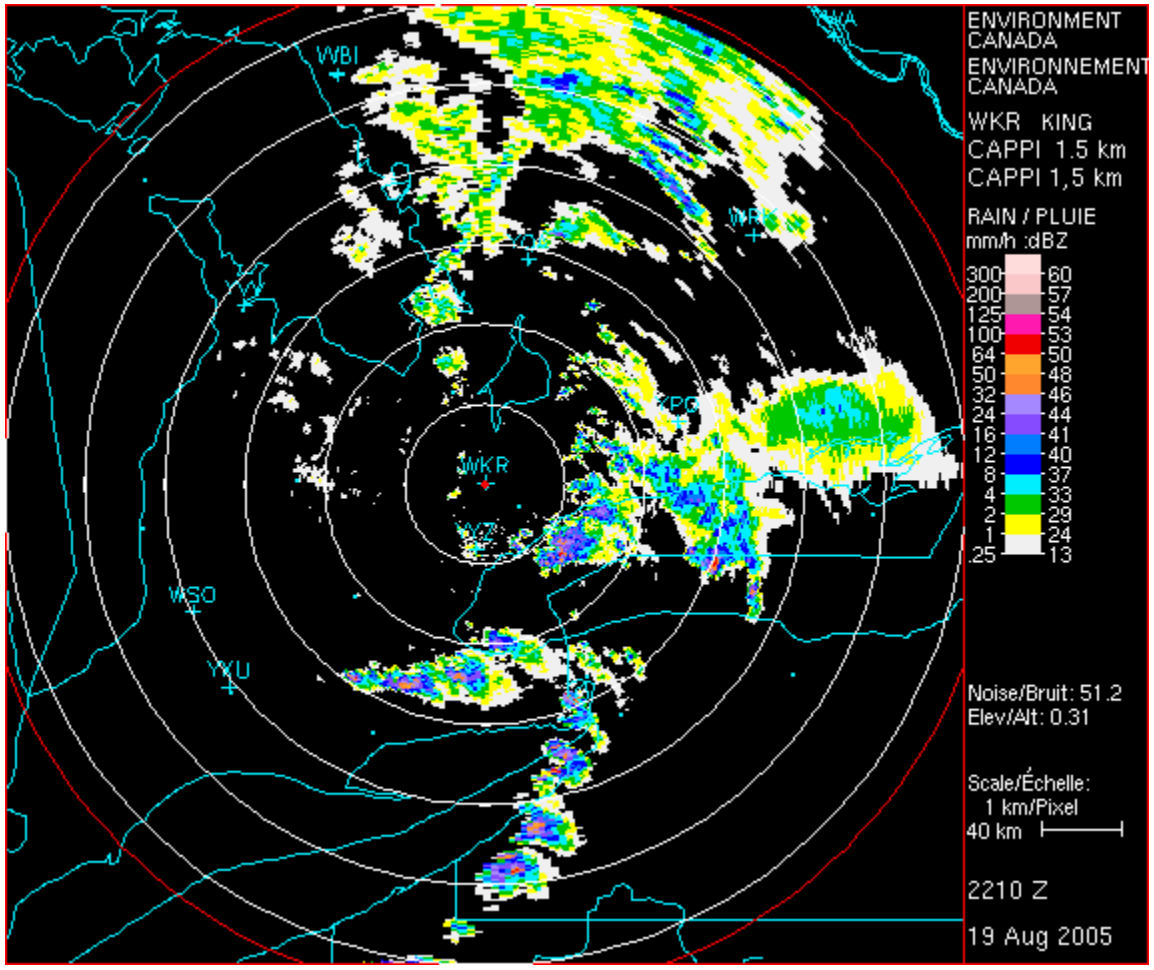

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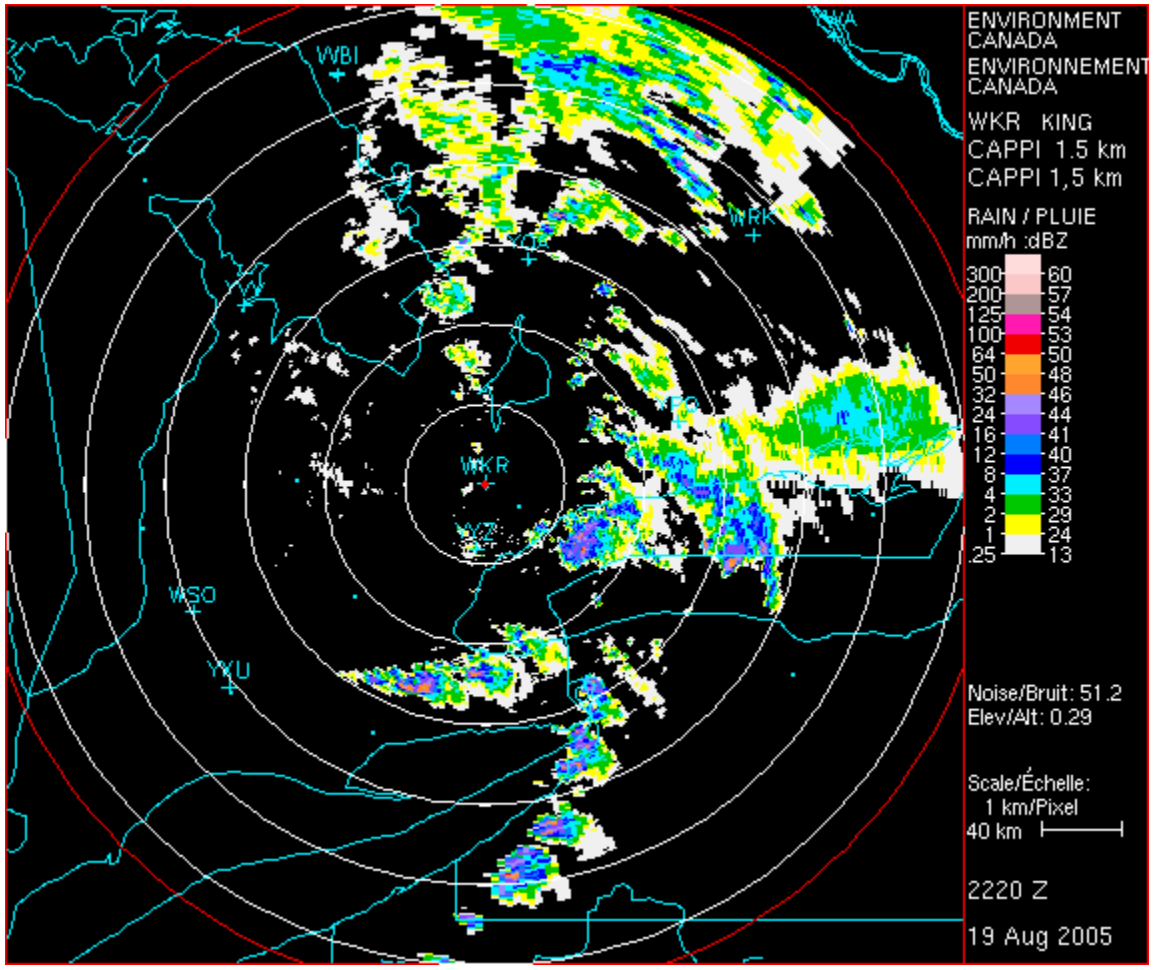

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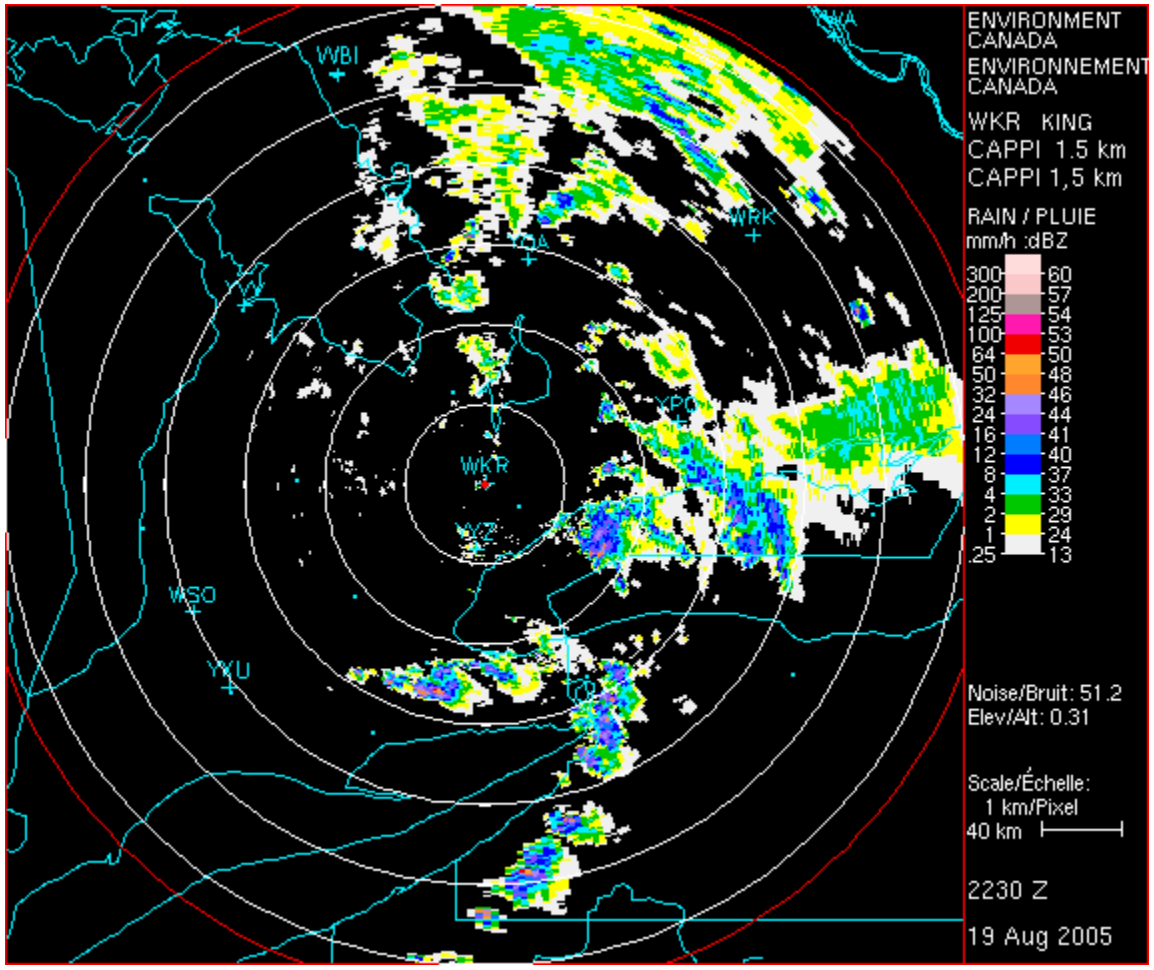

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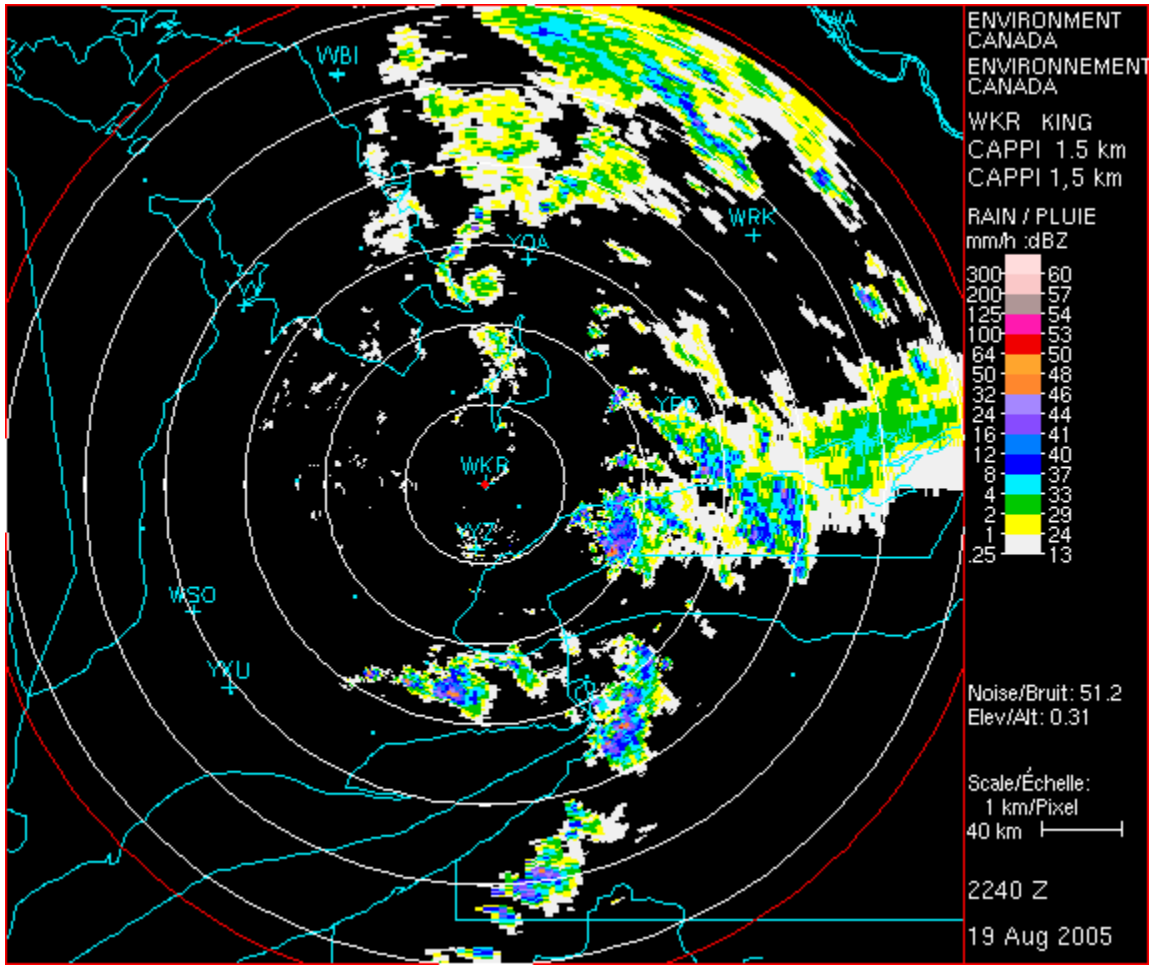

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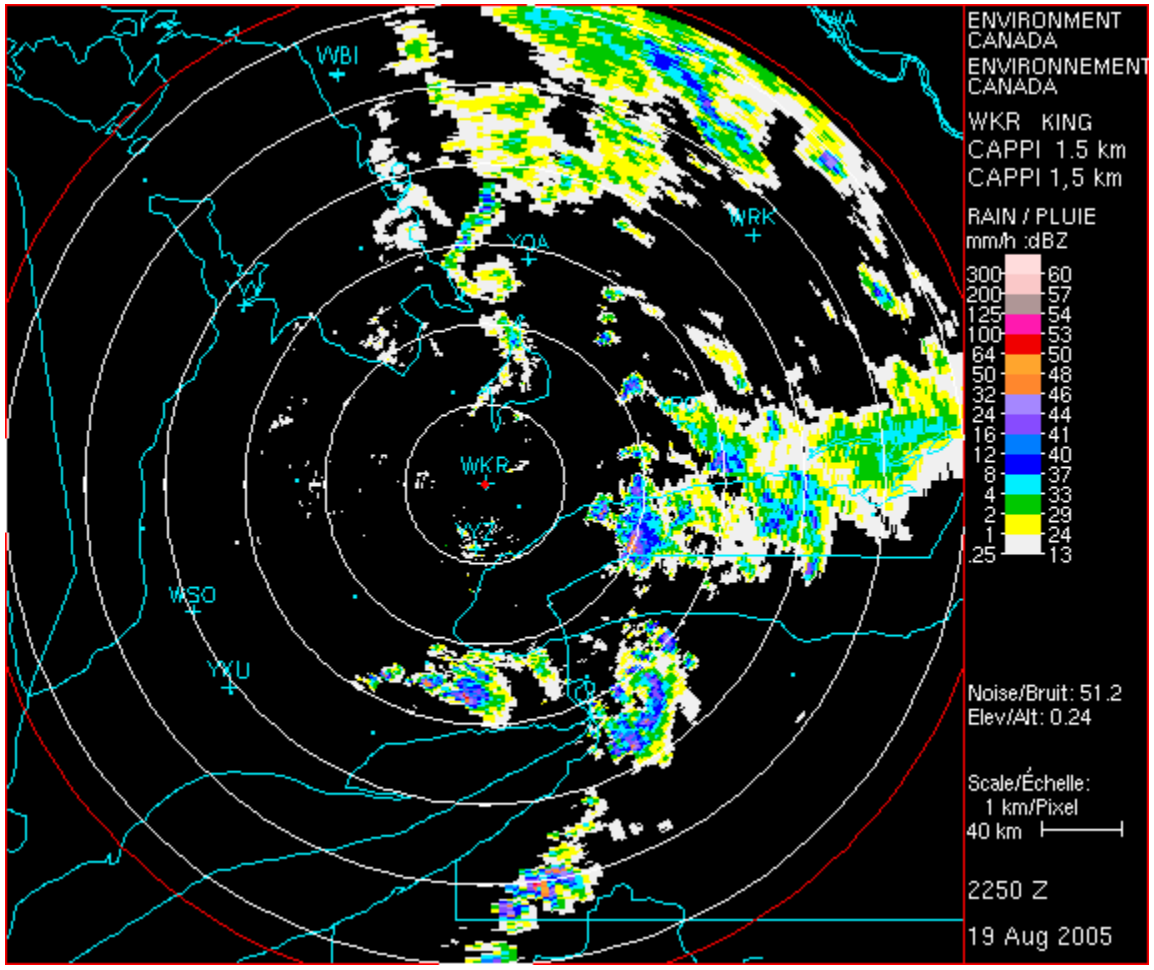

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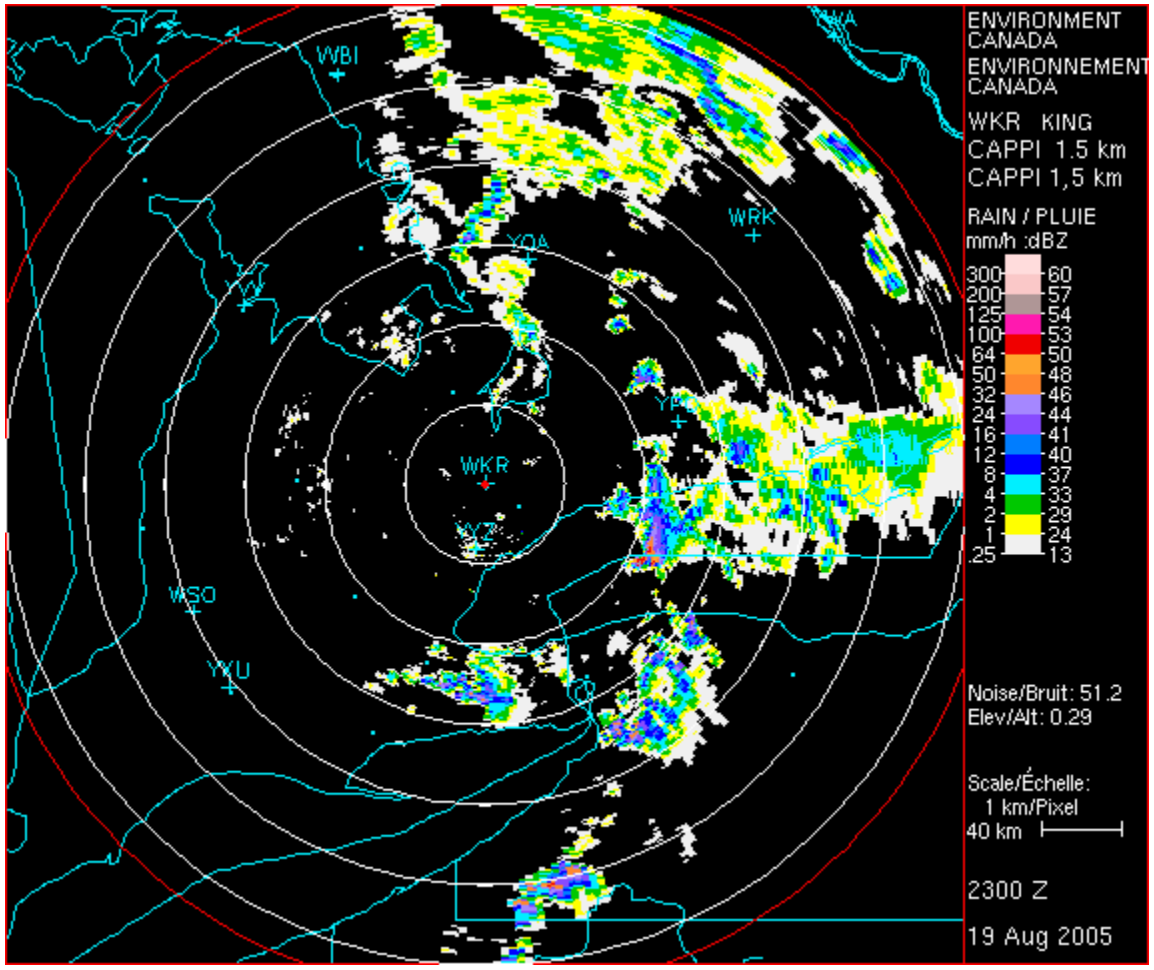

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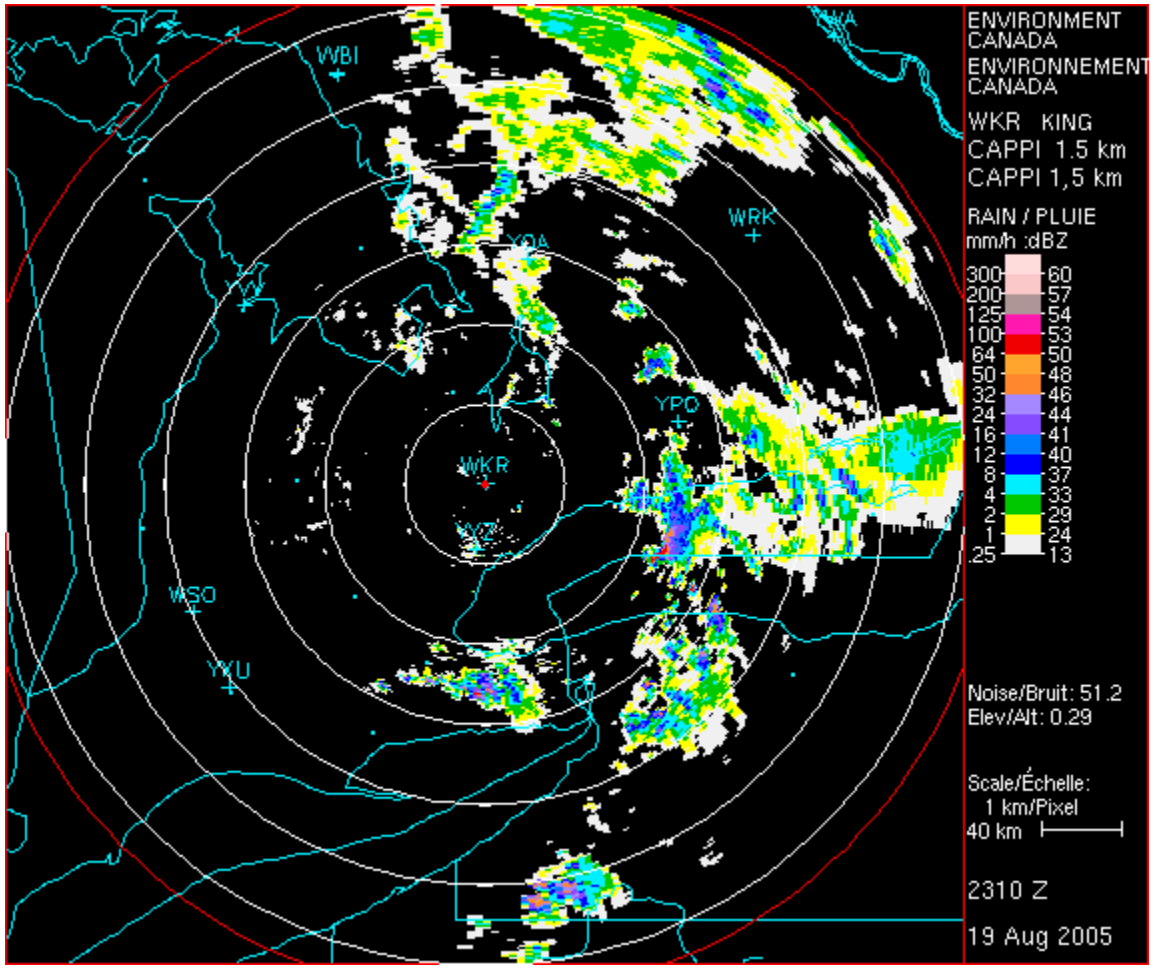


August 19, 2005 Storm Analysis Report by Clarifica Consulting (October 2005)

APPENDIX C – Measured Precipitation

Gauge ID	Gauge Name	Total Rainfall (mm)	Maximum Hourly Rainfall (mm)	Max Intensity (mm/hr) - 5min	Max Intensity (mm/hr) - 10min	Max Intensity (mm/hr) - 15min	Max Intensity (mm/hr) - 20min	Max Intensity (mm/hr) - 30min	Max Intensity (mm/hr) - 60min	Max Intensity (mm/hr) - 120min	Max Intensity (mm/hr) - 180min	Max Intensity (mm/hr) - 360min	Max Intensity (mm/hr) - 720min
1	York University Greenroof	122.6	99.0	206.4	188.4	181.6	181.8	157.6	99.0	50.2	33.9	17.2	10.1
2	Dufferin Reservior	115.4	89.8	216.0	186.0	167.2	156.0	142.4	89.8	49.8	34.4	17.5	9.5
3	Rouge River at 14th	111.6	63.2						63.2	44.5	35.0	17.5	9.3
4	King Creek	43.4	19.1						19.1	15.4	11.1	8.4	3.6
5	Laidlaw Bus Depot	107.4	77.0	158.4	138.0	124.8	123.0	107.2	77.0	42.6	29.7	15.1	8.8
6	Boyd Field Centre	99.2	73.6	158.4	135.6	132.0	124.2	113.6	73.6	41.4	28.4	14.4	8.2
7	Ajax Works Yard	97.8	75.4	208.8	183.6	172.0	160.8	119.6	75.4	42.6	29.9	15.2	8.1
8	Sue Grange Farm	90.0	59.0	144.0	133.2	120.0	108.0	92.8	59.0	35.5	25.2	12.8	7.4
9	Petticoat Creek CA	83.4	63.6	237.6	211.2	188.0	158.4	117.6	63.6	35.2	25.1	12.7	6.9
10	Reesor Creek near Hwy 7	81.6	51.0						51.0	31.5	24.1	12.2	6.7
11	Claireville Dam	80.8	49.8	160.8	156.0	134.4	115.2	86.8	49.8	28.5	20.0	10.1	6.7
12	Don River at York Mills	75.4	39.6			84.8		78.8	45.8	24.9	20.5	9.9	6.0
13	St. Wilfred School	74.6	49.8	108.0	94.8	93.6	82.8	66.4	49.8	32.2	22.2	11.3	6.2
14	Town of Caledon pumping station	74.0	33.4	110.4	88.8	79.2	72.0	56.0	33.4	27.1	20.2	10.3	6.1
15	Mississauga Works Yard	67.0	21.0	120.0	97.2	80.8	61.8	41.2	21.0	20.0	13.7	6.9	5.4
16	Morningside Works Yard	62.0	28.8			104.8		80.4	43.2	25.2	18.5	8.9	5.0
17	Glenn Haffey CA	60.8	23.8	81.6	52.8	49.6	41.4	36.4	23.8	19.0	15.4	7.8	4.9
18	York Region Works Yard	60.6	38.4	69.6	67.2	68.0	64.2	63.2	38.4	24.7	17.1	8.6	5.0
19	Lawerence Avenue and Weston Road	56.4	21.2						21.2	11.0	11.9	6.0	4.5
20	Albion Hills CA	56.0	28.6	79.2	58.8	49.6	45.0	44.4	28.6	18.9	14.4	7.3	4.6
21	King and Albion-Vaughan Sideroad	50.2	18.6	52.8	40.8	40.0	37.2	28.8	18.6	17.5	12.8	6.5	4.1
22	Lloyd Ham Farm	46.6	29.2	67.2	55.2	48.0	43.2	38.4	29.2	17.9	12.2	6.2	3.8
23	Claremont CA	37.2	23.0	45.6	40.8	40.8	39.6	35.2	23.0	13.4	9.8	5.0	3.0
24	Bruce's Mill CA	35.6	18.3	79.2	60.0	44.4	37.8	32.0	18.3	12.8	8.8	4.4	2.9
25	Alex Duff Memorial Pool	31.0	18.6	76.8	70.8	58.4	52.2	36.4	18.6	8.9	6.0	3.1	2.5
26	Stouffville Dam	29.6	12.2	38.4	30.0	27.2	21.6	16.8	12.2	10.4	7.1	3.6	2.4
27	York Pumping Station	29.4	11.2	38.4	27.6	28.8	25.2	18.0	11.2	10.0	6.9	3.5	2.4
28	Etobicoke Creek near QEW	29.2	9.6						9.6	8.6	6.4	3.6	2.3
29	Goodwood Pumping Station	17.2	6.0	19.2	14.4	13.6	13.2	10.8	6.0	5.3	3.6	1.8	1.4
30	Markham Town Centre	89.7	58.4	131.1	123.4	115.8	107.4	89.9	58.4	37.7	26.1	13.2	7.4
31	Armadale Community Centre - Markham	114.6	78.0	173.7	169.2	144.3	143.3	114.8	78.0	49.1	34.2	17.3	9.5
32	Vellore Woods Public School - Vaughan	111.3	78.7	161.5	144.8	147.3	143.3	126.5	78.7	46.5	31.9	16.2	9.2
33	Richvale Community Centre - Richmond Hill	97.0	68.3	143.3	134.1	127.0	119.6	108.7	68.3	40.8	28.0	14.2	8.0
34	Maple Community Centre - Vaughan	96.8	63.5	121.9	118.9	115.8	112.8	104.1	63.5	40.5	28.0	14.2	8.0
35	Toronto Burnhamthorpe	28.4											
36	Toronto Buttonville A	54.8											
37	Toronto City	31.8	22.2						22.2	11.1	7.4	3.7	2.6
38	Toronto Island A	19.0											
39	Toronto Lester B. Pearson Int'L A	41.4											
40	Toronto North York	132.8	78.4						78.4	52.9	42.8	23.3	12.7
41	Humber	91.2	75.4	187.2	170.4	163.2	148.8	125.2	75.4	36.4	24.7	12.6	7.5
42	Leslie Pumping Stn	112.6	79.2	196.8	190.8	179.2	172.2	132.8	79.2	48.0	33.1	16.8	9.2
43	Stouffville Works	30.6	14.4	28.8	25.2	23.2	21.0	19.6	14.4	10.8	7.4	3.7	2.5
44	Yonge and King Rd	27.8	12.0						12.0	8.5	6.7	3.4	2.3
45	Swansea	35.3	17.0	90.0	66.0	60.0	50.3	33.5	17.0	8.2	5.6	3.0	2.7
46	East Avenue	27.6	15.0	55.2	44.4	33.6	33.6	25.6	15.0	10.4	7.0	3.9	2.1
47	Howard	34.5	19.5	78.0	69.0	66.0	57.0	38.5	19.5	9.4	6.3	3.2	2.7
48	Lakeshore Road	7.4	4.4	14.4	9.6	9.6	8.4	7.2	4.4	2.5	1.8	1.1	0.6
49	Wolfedale Road	21.2	7.4	26.4	24.0	17.6	13.2	12.4	7.4	6.6	4.7	2.7	1.6
50	Central	35.0	22.8	111.0	75.0	80.0	66.0	45.0	22.8	10.9	7.4	3.7	2.8
51	South Common	23.8	11.4	36.0	26.4	24.0	22.2	18.0	11.4	8.4	5.7	3.2	1.8
52	Dixie Road	32.4	12.8	60.0	37.2	28.0	28.2	23.2	12.8	10.6	7.6	4.3	2.5
53	Brown	45.8	32.8	123.0	99.0	90.0	80.3	62.5	32.8	15.8	10.7	5.4	3.7
54	Mississauga Valley Blvd	26.4	9.2	31.2	22.8	18.4	15.0	15.6	9.2	8.9	6.5	3.7	2.0
55	Britannia Road West	25.0	11.4	24.0	21.6	20.0	16.2	13.6	11.4	8.9	6.7	3.9	2.0
56	Fir Tree	62.8	18.4	84.0	82.8	71.2	54.0	36.0	18.4	17.6	12.1	6.1	5.1
57	Church	32.5	22.0	111.0	81.0	71.0	59.3	43.5	22.0	10.6	7.1	3.6	2.6
58	Truscott	18.2	11.6	19.2	15.6	16.0	14.4	13.6	11.6	6.7	4.7	2.6	1.4

Gauge ID	Gauge Name	Total Rainfall (mm)	Maximum Hourly Rainfall (mm)	Max Intensity (mm/hr) - 5min	Max Intensity (mm/hr) - 10min	Max Intensity (mm/hr) - 15min	Max Intensity (mm/hr) - 20min	Max Intensity (mm/hr) - 30min	Max Intensity (mm/hr) - 60min	Max Intensity (mm/hr) - 120min	Max Intensity (mm/hr) - 180min	Max Intensity (mm/hr) - 360min	Max Intensity (mm/hr) - 720min
59	Falbourne Street	27.0	10.8	43.2	31.2	26.4	20.4	15.6	10.8	9.2	6.9	4.0	2.1
60	Old Weston	30.6	17.4	86.4	69.6	52.8	43.2	31.6	17.4	8.4	6.0	3.1	2.4
61	Hurontario Road	49.8	17.6	72.0	51.6	44.0	37.8	26.8	17.6	11.1	8.0	4.1	4.0
62	Greenwood	18.5	15.8	87.0	67.5	55.0	47.3	31.5	15.8	7.6	5.1	2.6	1.4
63	Bramalea Road	63.0	25.2	76.8	74.4	71.2	60.6	41.6	25.2	17.5	12.6	6.4	5.2
64	North Toronto	49.2	24.0	108.0	93.6	77.6	60.0	41.6	24.0	16.6	12.0	6.1	3.9
65	Orenda Road	80.2	26.6	98.4	88.8	81.6	71.4	50.0	26.6	23.9	16.7	8.5	6.6
66	Kimberly	22.6	17.8	74.4	67.2	51.2	48.0	34.8	17.8	8.6	6.0	3.0	1.8
67	Queen St.	71.4	23.8	134.4	106.8	85.6	69.0	46.4	23.8	21.7	14.9	7.5	5.9
68	Booth	31.2	22.8	84.0	79.2	67.2	57.6	43.2	22.8	10.9	7.4	3.7	2.5
69	Williams Prkwy	105.8	66.2	146.4	129.6	113.6	107.4	102.4	66.2	39.8	28.3	14.4	8.8
70	Sandalwood Prkwy	120.0	73.2	165.6	159.6	160.0	139.2	121.6	73.2	43.0	30.2	15.3	9.9
71	Old King Road	46.4	16.6	50.4	38.4	33.6	30.6	24.0	16.6	15.5	11.7	5.9	3.8
72	Albion	83.2	46.1	104.4	97.2	95.2	95.4	81.4	46.1	26.6	19.0	9.6	6.8
73	Martin Grove	86.0	32.0	135.0	120.0	113.0	93.0	64.0	32.0	25.6	20.0	10.2	6.9
74	Richview	48.4	15.6	64.8	48.6	39.6	32.4	25.4	15.6	11.9	9.3	4.7	3.8
75	Bering	25.4	7.4	45.6	38.4	27.2	20.7	14.2	7.4	6.2	4.8	2.9	1.9
76	Kipling	38.3	13.8	69.0	54.0	43.0	36.0	25.5	13.8	11.4	7.9	4.4	3.0
77	Castlefield	38.6	13.8	69.6	51.6	40.0	31.2	22.4	13.8	10.6	7.7	3.9	3.1
78	Thorncliffe	44.0	28.8	84.0	79.5	72.0	67.5	52.5	28.8	15.6	11.0	5.6	3.6
79	Finch Yard	120.8	81.6	237.6	188.4	175.2	166.2	136.4	81.6	46.8	32.4	16.4	9.8
80	Oriole Yard	105.8	76.4	141.6	141.6	140.0	138.0	129.6	76.4	43.3	29.7	15.1	8.7
81	Bermondsey Yard	35.8	20.4	96.0	78.0	60.8	49.8	36.0	20.4	12.4	8.6	4.3	2.9
82	Downsview Arena	4.6	4.6	24.0	19.2	18.4	13.8	9.2	4.6	2.2	1.5	0.8	0.4
83	Ancaster CC	72.4	30.6	93.6	74.4	75.2	69.0	53.6	30.6	21.3	15.8	8.1	5.8
84	Earle Bales CC	94.2	58.4	151.2	122.4	112.0	112.2	105.2	58.4	34.1	23.6	12.0	7.6
85	Mitchell Field CC	119.2	87.8	223.2	193.2	176.8	173.4	150.0	87.8	48.8	33.6	17.0	9.7
86	Cummer Arena	92.0	28.0	33.6	31.2	31.2	31.2	30.8	28.0	23.1	20.2	13.2	6.6
87	St Augustine Seminary	107.6	35.0	290.4	202.8	136.0	104.4	69.6	35.0	30.0	21.9	11.9	8.9
88	Toronto Zoo	83.2	61.4	136.8	126.0	127.2	114.6	100.8	61.4	36.3	24.9	12.6	6.9
89	Maryvale Public School	103.8	72.6	180.0	174.0	168.0	149.4	130.4	72.6	43.8	29.8	15.1	8.6
90	Mc Nicoll and Kennedy	148.4	115.0	230.4	208.8	203.2	193.8	178.0	115.0	65.1	44.6	22.6	12.2
91	Nashdene Yard	153.4	116.6	259.2	237.6	244.0	220.8	186.0	116.6	66.9	45.9	23.3	12.7
92	Ellesmere Yard	97.0	67.8	163.2	151.2	142.4	135.0	123.2	67.8	39.6	27.7	14.0	8.0
93	Morningside Yard	80.0	55.0	177.6	141.6	135.2	127.8	100.4	55.0	33.0	23.3	11.8	6.6

APPENDIX D – 5-minute Intensity Hyetographs

Rainfall Intensity (mm/hr)

Time interval	York University Greenroof	Dufferin Reservior	Laidlaw Bus Depot	Boyd Field Centre	Ajax Works Yard	Sue Grange Farm	Petticoat Creek CA	Claireville Dam	St. Wilfred School
08/19/05 03:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:15:00.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0
08/19/05 04:20:00.0	0.0	0.0	2.4	0.0	0.0	2.4	0.0	0.0	0.0
08/19/05 04:25:00.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0
08/19/05 04:30:00.0	0.0	0.0	2.4	0.0	0.0	2.4	0.0	0.0	0.0
08/19/05 04:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:40:00.0	0.0	0.0	4.8	0.0	0.0	4.8	0.0	0.0	0.0
08/19/05 04:45:00.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:55:00.0	2.4	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:00:00.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:05:00.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	7.2	0.0
08/19/05 05:10:00.0	4.8	0.0	0.0	2.4	0.0	0.0	0.0	2.4	0.0
08/19/05 05:15:00.0	7.2	2.4	0.0	0.0	0.0	2.4	0.0	7.2	0.0
08/19/05 05:20:00.0	4.8	7.2	2.4	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:25:00.0	7.2	4.8	2.4	4.8	0.0	7.2	0.0	0.0	0.0
08/19/05 05:30:00.0	0.0	4.8	0.0	4.8	0.0	2.4	0.0	0.0	0.0
08/19/05 05:35:00.0	0.0	2.4	4.8	0.0	0.0	4.8	0.0	0.0	0.0
08/19/05 05:40:00.0	0.0	0.0	2.4	0.0	0.0	2.4	0.0	0.0	0.0
08/19/05 05:45:00.0	2.4	0.0	0.0	2.4	0.0	7.2	0.0	2.4	0.0
08/19/05 05:50:00.0	0.0	0.0	7.2	0.0	0.0	4.8	2.4	4.8	0.0
08/19/05 05:55:00.0	2.4	0.0	2.4	0.0	0.0	7.2	0.0	4.8	0.0
08/19/05 06:00:00.0	4.8	2.4	14.4	2.4	0.0	7.2	0.0	4.8	0.0
08/19/05 06:05:00.0	2.4	0.0	12.0	0.0	0.0	2.4	0.0	7.2	2.4
08/19/05 06:10:00.0	2.4	4.8	9.6	0.0	0.0	7.2	0.0	2.4	0.0
08/19/05 06:15:00.0	4.8	2.4	4.8	7.2	0.0	14.4	0.0	0.0	0.0
08/19/05 06:20:00.0	4.8	2.4	9.6	2.4	0.0	7.2	0.0	2.4	0.0
08/19/05 06:25:00.0	4.8	4.8	9.6	2.4	0.0	4.8	0.0	2.4	0.0
08/19/05 06:30:00.0	2.4	2.4	9.6	7.2	0.0	4.8	0.0	7.2	0.0
08/19/05 06:35:00.0	4.8	7.2	9.6	7.2	0.0	9.6	0.0	2.4	0.0
08/19/05 06:40:00.0	9.6	2.4	9.6	2.4	0.0	4.8	0.0	7.2	0.0

Rainfall Intensity (mm/hr)

Time interval	York University Greenroof	Dufferin Reservior	Laidlaw Bus Depot	Boyd Field Centre	Ajax Works Yard	Sue Grange Farm	Petticoat Creek CA	Claireville Dam	St. Wilfred School
08/19/05 06:45:00.0	14.4	2.4	7.2	7.2	0.0	7.2	0.0	2.4	0.0
08/19/05 06:50:00.0	7.2	7.2	14.4	4.8	0.0	9.6	0.0	0.0	0.0
08/19/05 06:55:00.0	4.8	7.2	19.2	12.0	0.0	2.4	0.0	7.2	0.0
08/19/05 07:00:00.0	4.8	2.4	9.6	9.6	0.0	4.8	2.4	4.8	2.4
08/19/05 07:05:00.0	9.6	7.2	2.4	4.8	0.0	0.0	0.0	0.0	0.0
08/19/05 07:10:00.0	7.2	4.8	4.8	7.2	0.0	0.0	4.8	9.6	0.0
08/19/05 07:15:00.0	4.8	7.2	0.0	7.2	0.0	0.0	0.0	4.8	2.4
08/19/05 07:20:00.0	14.4	2.4	2.4	16.8	0.0	0.0	0.0	7.2	2.4
08/19/05 07:25:00.0	4.8	4.8	0.0	9.6	4.8	0.0	0.0	4.8	2.4
08/19/05 07:30:00.0	4.8	4.8	0.0	7.2	0.0	0.0	0.0	14.4	0.0
08/19/05 07:35:00.0	2.4	4.8	0.0	0.0	0.0	0.0	2.4	26.4	0.0
08/19/05 07:40:00.0	9.6	0.0	0.0	0.0	0.0	0.0	2.4	9.6	0.0
08/19/05 07:45:00.0	9.6	2.4	0.0	2.4	2.4	2.4	2.4	2.4	2.4
08/19/05 07:50:00.0	19.2	0.0	0.0	0.0	4.8	0.0	4.8	7.2	7.2
08/19/05 07:55:00.0	7.2	0.0	0.0	4.8	2.4	0.0	7.2	0.0	2.4
08/19/05 08:00:00.0	2.4	0.0	0.0	0.0	7.2	0.0	9.6	26.4	4.8
08/19/05 08:05:00.0	2.4	0.0	0.0	0.0	4.8	0.0	7.2	33.6	4.8
08/19/05 08:10:00.0	2.4	0.0	0.0	0.0	9.6	0.0	4.8	2.4	7.2
08/19/05 08:15:00.0	4.8	0.0	0.0	0.0	7.2	0.0	7.2	0.0	4.8
08/19/05 08:20:00.0	2.4	0.0	0.0	0.0	9.6	0.0	2.4	0.0	4.8
08/19/05 08:25:00.0	2.4	0.0	0.0	0.0	7.2	0.0	7.2	0.0	9.6
08/19/05 08:30:00.0	2.4	0.0	0.0	0.0	2.4	0.0	0.0	0.0	7.2
08/19/05 08:35:00.0	0.0	0.0	0.0	0.0	2.4	0.0	2.4	0.0	2.4
08/19/05 08:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:45:00.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 08:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0
08/19/05 09:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
08/19/05 09:25:00.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)

Time interval	York University Greenroof	Dufferin Reservior	Laidlaw Bus Depot	Boyd Field Centre	Ajax Works Yard	Sue Grange Farm	Petticoat Creek CA	Claireville Dam	St. Wilfred School
08/19/05 09:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0
08/19/05 11:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)									
Time interval	York University Greenroof	Dufferin Reservior	Laidlaw Bus Depot	Boyd Field Centre	Ajax Works Yard	Sue Grange Farm	Petticoat Creek CA	Claireville Dam	St. Wilfred School
08/19/05 12:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:05:00.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0	0.0	0.0
08/19/05 14:10:00.0	0.0	0.0	2.4	0.0	0.0	4.8	0.0	0.0	0.0
08/19/05 14:15:00.0	0.0	0.0	4.8	0.0	0.0	2.4	0.0	0.0	0.0
08/19/05 14:20:00.0	0.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0
08/19/05 14:25:00.0	0.0	0.0	0.0	0.0	0.0	16.8	0.0	0.0	0.0
08/19/05 14:30:00.0	0.0	0.0	2.4	0.0	0.0	28.8	0.0	0.0	0.0
08/19/05 14:35:00.0	0.0	0.0	12.0	0.0	0.0	40.8	0.0	0.0	0.0
08/19/05 14:40:00.0	0.0	0.0	28.8	0.0	0.0	72.0	0.0	0.0	0.0
08/19/05 14:45:00.0	0.0	0.0	48.0	0.0	0.0	93.6	0.0	0.0	0.0
08/19/05 14:50:00.0	0.0	0.0	72.0	0.0	0.0	144.0	0.0	0.0	0.0
08/19/05 14:55:00.0	0.0	0.0	79.2	0.0	0.0	122.4	0.0	12.0	0.0
08/19/05 15:00:00.0	2.4	9.6	127.2	2.4	0.0	67.2	0.0	12.0	0.0
08/19/05 15:05:00.0	14.4	16.8	88.8	9.6	0.0	57.6	0.0	14.4	0.0
08/19/05 15:10:00.0	12.0	21.6	158.4	21.6	0.0	31.2	0.0	9.6	0.0

Rainfall Intensity (mm/hr)									
Time interval	**York University Greenroof**	**Dufferin Reservior**	**Laidlaw Bus Depot**	**Boyd Field Centre**	**Ajax Works Yard**	**Sue Grange Farm**	**Petticoat Creek CA**	**Claireville Dam**	**St. Wilfred School**
08/19/05 15:15:00.0	12.0	28.8	117.6	38.4	0.0	26.4	0.0	7.2	0.0
08/19/05 15:20:00.0	36.0	110.4	52.8	50.4	0.0	7.2	0.0	45.6	0.0
08/19/05 15:25:00.0	45.6	122.4	76.8	108.0	0.0	0.0	0.0	160.8	0.0
08/19/05 15:30:00.0	108.0	129.6	62.4	100.8	0.0	0.0	0.0	151.2	0.0
08/19/05 15:35:00.0	110.4	156.0	4.8	124.8	0.0	0.0	0.0	91.2	2.4
08/19/05 15:40:00.0	206.4	216.0	0.0	112.8	0.0	0.0	0.0	57.6	2.4
08/19/05 15:45:00.0	170.4	120.0	0.0	158.4	0.0	2.4	0.0	14.4	2.4
08/19/05 15:50:00.0	168.0	52.8	0.0	76.8	0.0	0.0	0.0	14.4	4.8
08/19/05 15:55:00.0	182.4	33.6	2.4	76.8	0.0	0.0	4.8	19.2	2.4
08/19/05 16:00:00.0	62.4	31.2	0.0	4.8	2.4	0.0	4.8	9.6	12.0
08/19/05 16:05:00.0	24.0	45.6	0.0	4.8	2.4	14.4	4.8	4.8	28.8
08/19/05 16:10:00.0	55.2	31.2	4.8	0.0	28.8	9.6	52.8	0.0	31.2
08/19/05 16:15:00.0	19.2	9.6	4.8	0.0	127.2	19.2	237.6	0.0	50.4
08/19/05 16:20:00.0	2.4	0.0	4.8	0.0	158.4	28.8	184.8	0.0	108.0
08/19/05 16:25:00.0	0.0	2.4	24.0	0.0	208.8	60.0	141.6	2.4	81.6
08/19/05 16:30:00.0	2.4	0.0	19.2	0.0	148.8	62.4	69.6	9.6	91.2
08/19/05 16:35:00.0	0.0	2.4	36.0	0.0	45.6	4.8	19.2	4.8	36.0
08/19/05 16:40:00.0	7.2	4.8	52.8	2.4	28.8	0.0	7.2	0.0	19.2
08/19/05 16:45:00.0	12.0	12.0	9.6	0.0	26.4	0.0	7.2	0.0	21.6
08/19/05 16:50:00.0	2.4	12.0	2.4	9.6	19.2	0.0	2.4	16.8	52.8
08/19/05 16:55:00.0	0.0	19.2	0.0	31.2	48.0	0.0	19.2	14.4	60.0
08/19/05 17:00:00.0	0.0	7.2	0.0	60.0	52.8	0.0	16.8	12.0	16.8
08/19/05 17:05:00.0	0.0	60.0	0.0	19.2	12.0	0.0	0.0	52.8	4.8
08/19/05 17:10:00.0	0.0	9.6	0.0	33.6	2.4	0.0	0.0	2.4	0.0
08/19/05 17:15:00.0	0.0	4.8	0.0	2.4	0.0	0.0	0.0	0.0	2.4
08/19/05 17:20:00.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	2.4
08/19/05 17:25:00.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	7.2
08/19/05 17:30:00.0	0.0	0.0	0.0	0.0	4.8	0.0	2.4	0.0	4.8
08/19/05 17:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	24.0
08/19/05 17:40:00.0	0.0	4.8	0.0	0.0	9.6	0.0	9.6	0.0	12.0
08/19/05 17:45:00.0	0.0	0.0	0.0	0.0	24.0	0.0	7.2	0.0	24.0
08/19/05 17:50:00.0	0.0	0.0	0.0	0.0	33.6	0.0	38.4	0.0	50.4
08/19/05 17:55:00.0	0.0	0.0	0.0	0.0	43.2	0.0	28.8	0.0	55.2
08/19/05 18:00:00.0	0.0	0.0	0.0	0.0	33.6	0.0	12.0	0.0	7.2

Rainfall Intensity (mm/hr)									
Time interval	**York University Greenroof**	**Dufferin Reservior**	**Laidlaw Bus Depot**	**Boyd Field Centre**	**Ajax Works Yard**	**Sue Grange Farm**	**Petticoat Creek CA**	**Claireville Dam**	**St. Wilfred School**
08/19/05 18:05:00.0	0.0	0.0	0.0	0.0	4.8	0.0	14.4	0.0	2.4
08/19/05 18:10:00.0	0.0	0.0	0.0	0.0	2.4	0.0	4.8	0.0	0.0
08/19/05 18:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0	2.4
08/19/05 18:20:00.0	0.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	0.0
08/19/05 18:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:30:00.0	0.0	0.0	0.0	0.0	2.4	0.0	14.4	0.0	0.0
08/19/05 18:35:00.0	0.0	0.0	0.0	0.0	24.0	0.0	7.2	0.0	0.0
08/19/05 18:40:00.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 18:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)

Time interval	Town of Caledon pumping station	Mississauga Works Yard	Glenn Haffey CA	York Region Works Yard	Albion Hills CA	King and Albion-Vaughan Sideroad	Lloyd Ham Farm	Claremont CA	Bruce's Mill CA
08/19/05 03:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:00:00.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:10:00.0	2.4	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:15:00.0	0.0	0.0	0.0	0.0	4.8	0.0	0.0	0.0	0.0
08/19/05 04:20:00.0	0.0	0.0	2.4	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 04:25:00.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:30:00.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:35:00.0	0.0	0.0	4.8	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 04:40:00.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:45:00.0	4.8	0.0	2.4	0.0	4.8	2.4	0.0	0.0	0.0
08/19/05 04:50:00.0	0.0	2.4	4.8	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 04:55:00.0	0.0	2.4	2.4	0.0	0.0	2.4	0.0	0.0	0.0
08/19/05 05:00:00.0	0.0	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:05:00.0	2.4	4.8	7.2	0.0	2.4	2.4	0.0	0.0	0.0
08/19/05 05:10:00.0	2.4	2.4	2.4	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 05:15:00.0	4.8	0.0	7.2	0.0	7.2	4.8	0.0	0.0	0.0
08/19/05 05:20:00.0	0.0	0.0	7.2	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 05:25:00.0	2.4	0.0	2.4	0.0	2.4	2.4	0.0	0.0	0.0
08/19/05 05:30:00.0	2.4	0.0	4.8	0.0	7.2	0.0	0.0	0.0	1.2
08/19/05 05:35:00.0	4.8	4.8	2.4	0.0	2.4	2.4	0.0	0.0	0.0
08/19/05 05:40:00.0	0.0	4.8	2.4	0.0	2.4	2.4	2.4	0.0	0.0
08/19/05 05:45:00.0	2.4	2.4	0.0	0.0	0.0	2.4	0.0	0.0	1.2
08/19/05 05:50:00.0	2.4	2.4	4.8	4.8	4.8	4.8	0.0	2.4	1.2
08/19/05 05:55:00.0	4.8	7.2	7.2	0.0	2.4	2.4	0.0	0.0	1.2
08/19/05 06:00:00.0	4.8	2.4	2.4	0.0	2.4	4.8	4.8	0.0	0.0
08/19/05 06:05:00.0	9.6	0.0	7.2	0.0	4.8	4.8	0.0	0.0	0.0
08/19/05 06:10:00.0	7.2	2.4	7.2	0.0	7.2	0.0	0.0	0.0	0.0
08/19/05 06:15:00.0	7.2	2.4	9.6	2.4	7.2	2.4	0.0	0.0	0.0
08/19/05 06:20:00.0	4.8	7.2	4.8	0.0	9.6	4.8	0.0	0.0	1.2
08/19/05 06:25:00.0	4.8	7.2	4.8	0.0	4.8	4.8	0.0	0.0	1.2
08/19/05 06:30:00.0	9.6	2.4	2.4	2.4	7.2	4.8	0.0	0.0	1.2
08/19/05 06:35:00.0	4.8	2.4	7.2	0.0	9.6	9.6	4.8	0.0	2.4
08/19/05 06:40:00.0	7.2	2.4	7.2	4.8	4.8	2.4	0.0	0.0	3.6
08/19/05 06:45:00.0	7.2	4.8	4.8	2.4	7.2	4.8	0.0	2.4	6.0
08/19/05 06:50:00.0	2.4	0.0	7.2	4.8	4.8	4.8	7.2	2.4	6.0

Rainfall Intensity (mm/hr)

Time interval	Town of Caledon pumping station	Mississauga Works Yard	Glenn Haffey CA	York Region Works Yard	Albion Hills CA	King and Albion-Vaughan Sideroad	Lloyd Ham Farm	Claremont CA	Bruce's Mill CA
08/19/05 06:55:00.0	2.4	2.4	2.4	2.4	2.4	9.6	4.8	0.0	3.6
08/19/05 07:00:00.0	0.0	2.4	4.8	7.2	2.4	7.2	4.8	4.8	4.8
08/19/05 07:05:00.0	4.8	7.2	2.4	4.8	0.0	9.6	4.8	2.4	4.8
08/19/05 07:10:00.0	2.4	14.4	0.0	4.8	2.4	2.4	2.4	2.4	4.8
08/19/05 07:15:00.0	7.2	19.2	0.0	4.8	4.8	2.4	4.8	4.8	3.6
08/19/05 07:20:00.0	2.4	19.2	0.0	4.8	0.0	2.4	4.8	2.4	4.8
08/19/05 07:25:00.0	2.4	19.2	2.4	7.2	2.4	4.8	0.0	0.0	4.8
08/19/05 07:30:00.0	0.0	33.6	2.4	7.2	0.0	2.4	4.8	0.0	3.6
08/19/05 07:35:00.0	4.8	14.4	0.0	2.4	2.4	2.4	4.8	2.4	4.8
08/19/05 07:40:00.0	0.0	43.2	0.0	9.6	0.0	2.4	12.0	4.8	6.0
08/19/05 07:45:00.0	0.0	28.8	0.0	2.4	0.0	0.0	4.8	4.8	6.0
08/19/05 07:50:00.0	0.0	0.0	0.0	2.4	0.0	4.8	7.2	7.2	6.0
08/19/05 07:55:00.0	0.0	0.0	0.0	4.8	0.0	0.0	9.6	4.8	6.0
08/19/05 08:00:00.0	0.0	0.0	0.0	2.4	0.0	0.0	2.4	7.2	4.8
08/19/05 08:05:00.0	0.0	0.0	0.0	2.4	0.0	0.0	4.8	7.2	2.4
08/19/05 08:10:00.0	0.0	0.0	0.0	2.4	0.0	0.0	4.8	4.8	3.6
08/19/05 08:15:00.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	7.2	1.2
08/19/05 08:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0	1.2
08/19/05 08:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0
08/19/05 08:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:35:00.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:40:00.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	2.4	0.0
08/19/05 08:45:00.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:55:00.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:00:00.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)									
Time interval	Town of Caledon pumping station	Mississauga Works Yard	Glenn Haffey CA	York Region Works Yard	Albion Hills CA	King and Albion-Vaughan Sideroad	Lloyd Ham Farm	Claremont CA	Bruce's Mill CA
08/19/05 09:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0
08/19/05 11:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)									
Time interval	Town of Caledon pumping station	Mississauga Works Yard	Glenn Haffey CA	York Region Works Yard	Albion Hills CA	King and Albion-Vaughan Sideroad	Lloyd Ham Farm	Claremont CA	Bruce's Mill CA
08/19/05 12:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:55:00.0	2.4	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:00:00.0	7.2	0.0	14.4	0.0	2.4	0.0	0.0	0.0	0.0
08/19/05 14:05:00.0	12.0	0.0	14.4	0.0	7.2	0.0	0.0	0.0	0.0
08/19/05 14:10:00.0	12.0	0.0	21.6	0.0	12.0	0.0	0.0	0.0	0.0
08/19/05 14:15:00.0	16.8	0.0	48.0	0.0	14.4	2.4	0.0	0.0	0.0
08/19/05 14:20:00.0	16.8	0.0	38.4	0.0	14.4	2.4	0.0	0.0	0.0
08/19/05 14:25:00.0	48.0	0.0	16.8	0.0	9.6	4.8	0.0	0.0	0.0
08/19/05 14:30:00.0	38.4	0.0	24.0	0.0	19.2	4.8	0.0	0.0	0.0
08/19/05 14:35:00.0	36.0	0.0	21.6	0.0	40.8	9.6	0.0	0.0	0.0
08/19/05 14:40:00.0	38.4	0.0	38.4	0.0	16.8	7.2	0.0	0.0	0.0
08/19/05 14:45:00.0	57.6	0.0	40.8	0.0	4.8	16.8	0.0	0.0	0.0
08/19/05 14:50:00.0	21.6	0.0	0.0	0.0	26.4	19.2	0.0	0.0	0.0
08/19/05 14:55:00.0	26.4	0.0	0.0	0.0	4.8	16.8	0.0	0.0	0.0
08/19/05 15:00:00.0	9.6	2.4	2.4	0.0	4.8	12.0	0.0	0.0	0.0
08/19/05 15:05:00.0	4.8	0.0	0.0	0.0	9.6	16.8	0.0	0.0	0.0
08/19/05 15:10:00.0	0.0	0.0	0.0	0.0	2.4	38.4	0.0	0.0	0.0
08/19/05 15:15:00.0	0.0	48.0	0.0	0.0	0.0	21.6	0.0	0.0	0.0
08/19/05 15:20:00.0	0.0	120.0	0.0	0.0	0.0	7.2	0.0	0.0	1.2
08/19/05 15:25:00.0	0.0	74.4	0.0	0.0	0.0	2.4	0.0	0.0	1.2
08/19/05 15:30:00.0	0.0	4.8	4.8	7.2	0.0	9.6	0.0	0.0	3.6
08/19/05 15:35:00.0	0.0	0.0	2.4	4.8	0.0	28.8	4.8	0.0	7.2
08/19/05 15:40:00.0	0.0	0.0	12.0	19.2	0.0	9.6	21.6	0.0	20.4
08/19/05 15:45:00.0	2.4	2.4	26.4	57.6	2.4	16.8	33.6	2.4	20.4
08/19/05 15:50:00.0	33.6	0.0	12.0	64.8	21.6	2.4	28.8	7.2	20.4

Rainfall Intensity (mm/hr)									
Time interval	Town of Caledon pumping station	Mississauga Works Yard	Glenn Haffey CA	York Region Works Yard	Albion Hills CA	King and Albion-Vaughan Sideroad	Lloyd Ham Farm	Claremont CA	Bruce's Mill CA
08/19/05 15:55:00.0	24.0	0.0	16.8	52.8	14.4	0.0	28.8	4.8	10.8
08/19/05 16:00:00.0	26.4	0.0	43.2	69.6	38.4	12.0	28.8	9.6	79.2
08/19/05 16:05:00.0	21.6	0.0	24.0	64.8	79.2	14.4	33.6	26.4	40.8
08/19/05 16:10:00.0	50.4	0.0	81.6	69.6	31.2	7.2	67.2	36.0	13.2
08/19/05 16:15:00.0	60.0	0.0	7.2	38.4	31.2	12.0	43.2	45.6	1.2
08/19/05 16:20:00.0	67.2	2.4	45.6	9.6	33.6	12.0	14.4	31.2	0.0
08/19/05 16:25:00.0	110.4	4.8	9.6	2.4	33.6	12.0	28.8	45.6	1.2
08/19/05 16:30:00.0	4.8	0.0	0.0	4.8	57.6	28.8	12.0	26.4	1.2
08/19/05 16:35:00.0	0.0	0.0	0.0	4.8	0.0	52.8	9.6	14.4	3.6
08/19/05 16:40:00.0	0.0	2.4	0.0	4.8	0.0	28.8	21.6	2.4	1.2
08/19/05 16:45:00.0	0.0	9.6	0.0	0.0	0.0	38.4	7.2	19.2	1.2
08/19/05 16:50:00.0	0.0	7.2	0.0	2.4	0.0	4.8	2.4	14.4	0.0
08/19/05 16:55:00.0	0.0	48.0	0.0	0.0	0.0	0.0	0.0	4.8	1.2
08/19/05 17:00:00.0	0.0	60.0	0.0	4.8	0.0	0.0	2.4	0.0	1.2
08/19/05 17:05:00.0	0.0	74.4	0.0	2.4	0.0	0.0	0.0	2.4	4.8
08/19/05 17:10:00.0	0.0	40.8	0.0	9.6	0.0	2.4	4.8	2.4	25.2
08/19/05 17:15:00.0	0.0	0.0	0.0	24.0	0.0	0.0	14.4	0.0	30.0
08/19/05 17:20:00.0	0.0	0.0	0.0	36.0	0.0	0.0	14.4	2.4	24.0
08/19/05 17:25:00.0	0.0	2.4	0.0	40.8	0.0	0.0	16.8	2.4	4.8
08/19/05 17:30:00.0	0.0	2.4	0.0	19.2	0.0	0.0	7.2	9.6	3.6
08/19/05 17:35:00.0	0.0	0.0	0.0	7.2	0.0	0.0	0.0	7.2	1.2
08/19/05 17:40:00.0	0.0	0.0	0.0	7.2	0.0	0.0	2.4	2.4	0.0
08/19/05 17:45:00.0	0.0	0.0	0.0	2.4	0.0	0.0	2.4	0.0	0.0
08/19/05 17:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.8	0.0
08/19/05 17:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4	0.0
08/19/05 18:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	0.0
08/19/05 18:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	0.0
08/19/05 18:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0
08/19/05 18:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0
08/19/05 18:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)									
Time interval	**Town of Caledon pumping station**	**Mississauga Works Yard**	**Glenn Haffey CA**	**York Region Works Yard**	**Albion Hills CA**	**King and Albion-Vaughan Sideroad**	**Lloyd Ham Farm**	**Claremont CA**	**Bruce's Mill CA**
08/19/05 18:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)

Time interval	Alex Duff Memorial Pool	Stouffville Dam	York Pumping Station	Goodwood Pumping Station	Markham Town Centre	Armadale Community Centre - Markham	Vellore Woods Public School - Vaughan	Richvale Community Centre - Richmond Hill	Maple Community Centre - Vaughan
08/19/05 03:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 04:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:05:00.0	2.4	0.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0
08/19/05 05:10:00.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
08/19/05 05:15:00.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
08/19/05 05:20:00.0	2.4	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 05:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0
08/19/05 05:30:00.0	0.0	0.0	2.4	0.0	3.0	0.0	6.1	0.0	0.0
08/19/05 05:35:00.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0
08/19/05 05:40:00.0	0.0	0.0	0.0	2.4	0.0	3.0	0.0	9.1	0.0
08/19/05 05:45:00.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0
08/19/05 05:50:00.0	0.0	2.4	0.0	0.0	3.0	3.0	3.0	3.0	0.0
08/19/05 05:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
08/19/05 06:00:00.0	0.0	2.4	2.4	0.0	0.0	0.0	0.0	0.0	6.1
08/19/05 06:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.1
08/19/05 06:10:00.0	0.0	0.0	2.4	0.0	0.0	0.0	3.0	0.0	9.1
08/19/05 06:15:00.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	3.0
08/19/05 06:20:00.0	0.0	0.0	2.4	0.0	6.1	0.0	3.0	0.0	6.1
08/19/05 06:25:00.0	2.4	0.0	4.8	2.4	0.0	3.0	6.1	3.0	6.1
08/19/05 06:30:00.0	0.0	0.0	4.8	0.0	0.0	0.0	9.1	3.0	6.1
08/19/05 06:35:00.0	0.0	2.4	0.0	0.0	6.1	0.0	9.1	6.1	9.1
08/19/05 06:40:00.0	0.0	2.4	4.8	0.0	3.0	3.0	3.0	0.0	9.1
08/19/05 06:45:00.0	0.0	2.4	7.2	2.4	3.0	0.0	6.1	6.1	6.1
08/19/05 06:50:00.0	0.0	4.8	7.2	2.4	6.1	3.0	3.0	3.0	6.1

Rainfall Intensity (mm/hr)

Time interval	Alex Duff Memorial Pool	Stouffville Dam	York Pumping Station	Goodwood Pumping Station	Markham Town Centre	Armadale Community Centre - Markham	Vellore Woods Public School - Vaughan	Richvale Community Centre - Richmond Hill	Maple Community Centre - Vaughan
08/19/05 06:55:00.0	0.0	4.8	4.8	2.4	6.1	6.1	6.1	6.1	6.1
08/19/05 07:00:00.0	4.8	2.4	4.8	4.8	3.0	3.0	21.3	6.1	9.1
08/19/05 07:05:00.0	0.0	4.8	4.8	4.8	12.2	6.1	6.1	6.1	6.1
08/19/05 07:10:00.0	2.4	2.4	2.4	2.4	0.0	3.0	6.1	9.1	6.1
08/19/05 07:15:00.0	4.8	4.8	7.2	0.0	3.0	3.0	9.1	6.1	0.0
08/19/05 07:20:00.0	7.2	2.4	4.8	2.4	9.1	3.0	15.2	6.1	3.0
08/19/05 07:25:00.0	7.2	2.4	4.8	2.4	3.0	3.0	12.2	6.1	3.0
08/19/05 07:30:00.0	2.4	2.4	4.8	4.8	6.1	6.1	3.0	6.1	0.0
08/19/05 07:35:00.0	2.4	4.8	4.8	2.4	9.1	9.1	3.0	9.1	3.0
08/19/05 07:40:00.0	14.4	4.8	2.4	0.0	6.1	6.1	3.0	3.0	0.0
08/19/05 07:45:00.0	7.2	7.2	2.4	2.4	3.0	9.1	3.0	9.1	0.0
08/19/05 07:50:00.0	7.2	9.6	2.4	2.4	6.1	6.1	0.0	6.1	0.0
08/19/05 07:55:00.0	7.2	7.2	2.4	7.2	0.0	6.1	3.0	3.0	0.0
08/19/05 08:00:00.0	0.0	2.4	2.4	7.2	3.0	3.0	0.0	3.0	0.0
08/19/05 08:05:00.0	2.4	4.8	2.4	4.8	3.0	3.0	0.0	0.0	0.0
08/19/05 08:10:00.0	4.8	4.8	0.0	4.8	0.0	6.1	0.0	0.0	0.0
08/19/05 08:15:00.0	0.0	2.4	0.0	2.4	0.0	6.1	0.0	0.0	0.0
08/19/05 08:20:00.0	0.0	2.4	0.0	2.4	0.0	3.0	0.0	0.0	0.0
08/19/05 08:25:00.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
08/19/05 08:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:50:00.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 08:55:00.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:00:00.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:10:00.0	31.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:15:00.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:20:00.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 09:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)

Time interval	Alex Duff Memorial Pool	Stouffville Dam	York Pumping Station	Goodwood Pumping Station	Markham Town Centre	Armadale Community Centre - Markham	Vellore Woods Public School - Vaughan	Richvale Community Centre - Richmond Hill	Maple Community Centre - Vaughan
08/19/05 09:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 10:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:40:00.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0
08/19/05 11:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 11:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 12:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)

Time interval	Alex Duff Memorial Pool	Stouffville Dam	York Pumping Station	Goodwood Pumping Station	Markham Town Centre	Armadale Community Centre - Markham	Vellore Woods Public School - Vaughan	Richvale Community Centre - Richmond Hill	Maple Community Centre - Vaughan
08/19/05 12:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 13:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 14:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
08/19/05 14:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0
08/19/05 14:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.1
08/19/05 14:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.3
08/19/05 14:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	27.4
08/19/05 15:00:00.0	0.0	0.0	2.4	0.0	0.0	0.0	3.0	0.0	54.9
08/19/05 15:05:00.0	0.0	0.0	2.4	0.0	0.0	0.0	6.1	0.0	97.5
08/19/05 15:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3	0.0	103.6
08/19/05 15:15:00.0	0.0	0.0	9.6	0.0	6.1	0.0	30.5	3.0	121.9
08/19/05 15:20:00.0	0.0	0.0	7.2	0.0	3.0	0.0	45.7	18.3	115.8
08/19/05 15:25:00.0	0.0	0.0	12.0	0.0	12.2	0.0	79.2	15.2	109.7
08/19/05 15:30:00.0	0.0	0.0	24.0	0.0	39.6	3.0	131.1	30.5	76.2
08/19/05 15:35:00.0	0.0	0.0	16.8	0.0	54.9	3.0	152.4	94.5	21.3
08/19/05 15:40:00.0	0.0	2.4	12.0	0.0	82.3	12.2	128.0	97.5	0.0
08/19/05 15:45:00.0	0.0	4.8	14.4	0.0	115.8	18.3	161.5	125.0	6.1
08/19/05 15:50:00.0	0.0	19.2	21.6	2.4	131.1	33.5	106.7	143.3	0.0

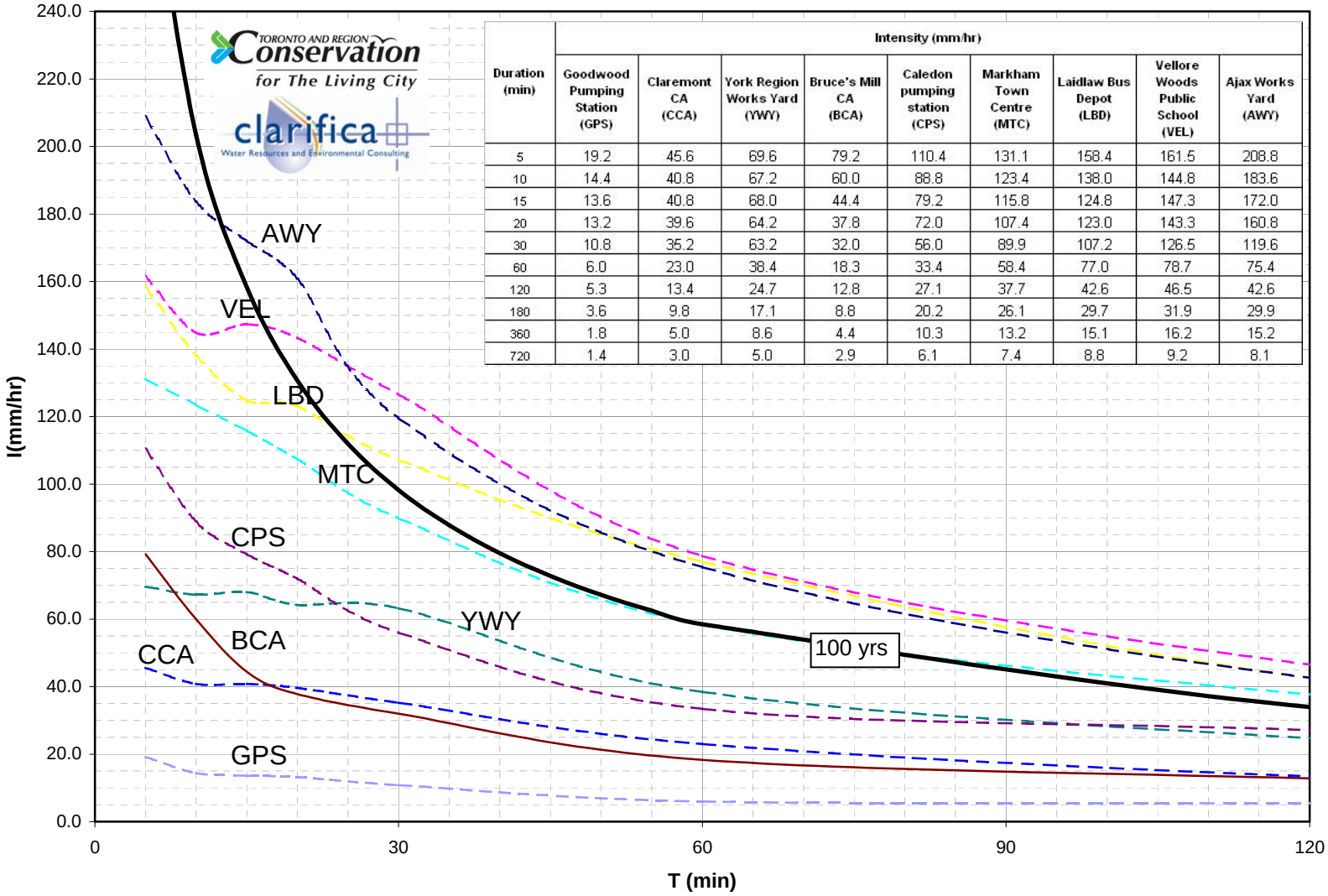
Rainfall Intensity (mm/hr)

Time interval	Alex Duff Memorial Pool	Stouffville Dam	York Pumping Station	Goodwood Pumping Station	Markham Town Centre	Armadale Community Centre - Markham	Vellore Woods Public School - Vaughan	Richvale Community Centre - Richmond Hill	Maple Community Centre - Vaughan
08/19/05 15:55:00.0	0.0	14.4	12.0	2.4	100.6	33.5	64.0	112.8	0.0
08/19/05 16:00:00.0	0.0	9.6	2.4	7.2	54.9	140.2	21.3	79.2	0.0
08/19/05 16:05:00.0	0.0	19.2	0.0	7.2	27.4	94.5	3.0	70.1	6.1
08/19/05 16:10:00.0	0.0	19.2	0.0	4.8	9.1	164.6	0.0	21.3	0.0
08/19/05 16:15:00.0	0.0	19.2	0.0	7.2	21.3	173.7	3.0	12.2	3.0
08/19/05 16:20:00.0	0.0	2.4	0.0	9.6	30.5	76.2	0.0	15.2	3.0
08/19/05 16:25:00.0	0.0	2.4	0.0	2.4	33.5	39.6	0.0	15.2	9.1
08/19/05 16:30:00.0	0.0	2.4	2.4	4.8	9.1	45.7	0.0	9.1	24.4
08/19/05 16:35:00.0	0.0	9.6	2.4	2.4	3.0	27.4	3.0	0.0	61.0
08/19/05 16:40:00.0	0.0	24.0	4.8	2.4	0.0	64.0	3.0	3.0	57.9
08/19/05 16:45:00.0	0.0	2.4	2.4	2.4	6.1	42.7	0.0	6.1	82.3
08/19/05 16:50:00.0	0.0	0.0	14.4	7.2	0.0	15.2	12.2	0.0	9.1
08/19/05 16:55:00.0	0.0	0.0	31.2	0.0	3.0	6.1	33.5	3.0	9.1
08/19/05 17:00:00.0	0.0	0.0	16.8	0.0	6.1	3.0	27.4	12.2	0.0
08/19/05 17:05:00.0	0.0	4.8	38.4	0.0	15.2	3.0	54.9	39.6	0.0
08/19/05 17:10:00.0	0.0	4.8	4.8	0.0	24.4	3.0	82.3	27.4	0.0
08/19/05 17:15:00.0	7.2	21.6	0.0	2.4	12.2	3.0	3.0	33.5	0.0
08/19/05 17:20:00.0	2.4	38.4	0.0	2.4	33.5	6.1	3.0	36.6	0.0
08/19/05 17:25:00.0	76.8	21.6	0.0	12.0	82.3	3.0	3.0	12.2	0.0
08/19/05 17:30:00.0	64.8	0.0	0.0	12.0	45.7	12.2	0.0	0.0	0.0
08/19/05 17:35:00.0	33.6	4.8	0.0	9.6	3.0	27.4	0.0	0.0	0.0
08/19/05 17:40:00.0	33.6	12.0	0.0	19.2	0.0	73.2	0.0	0.0	0.0
08/19/05 17:45:00.0	4.8	2.4	0.0	7.2	0.0	94.5	0.0	0.0	0.0
08/19/05 17:50:00.0	0.0	0.0	0.0	4.8	0.0	42.7	0.0	0.0	0.0
08/19/05 17:55:00.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0
08/19/05 18:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:25:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:30:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:35:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:40:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:45:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 18:50:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Rainfall Intensity (mm/hr)									
Time interval	**Alex Duff Memorial Pool**	**Stouffville Dam**	**York Pumping Station**	**Goodwood Pumping Station**	**Markham Town Centre**	**Armadale Community Centre - Markham**	**Vellore Woods Public School - Vaughan**	**Richvale Community Centre - Richmond Hill**	**Maple Community Centre - Vaughan**
08/19/05 18:55:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:00:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:05:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:10:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:15:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/19/05 19:20:00.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

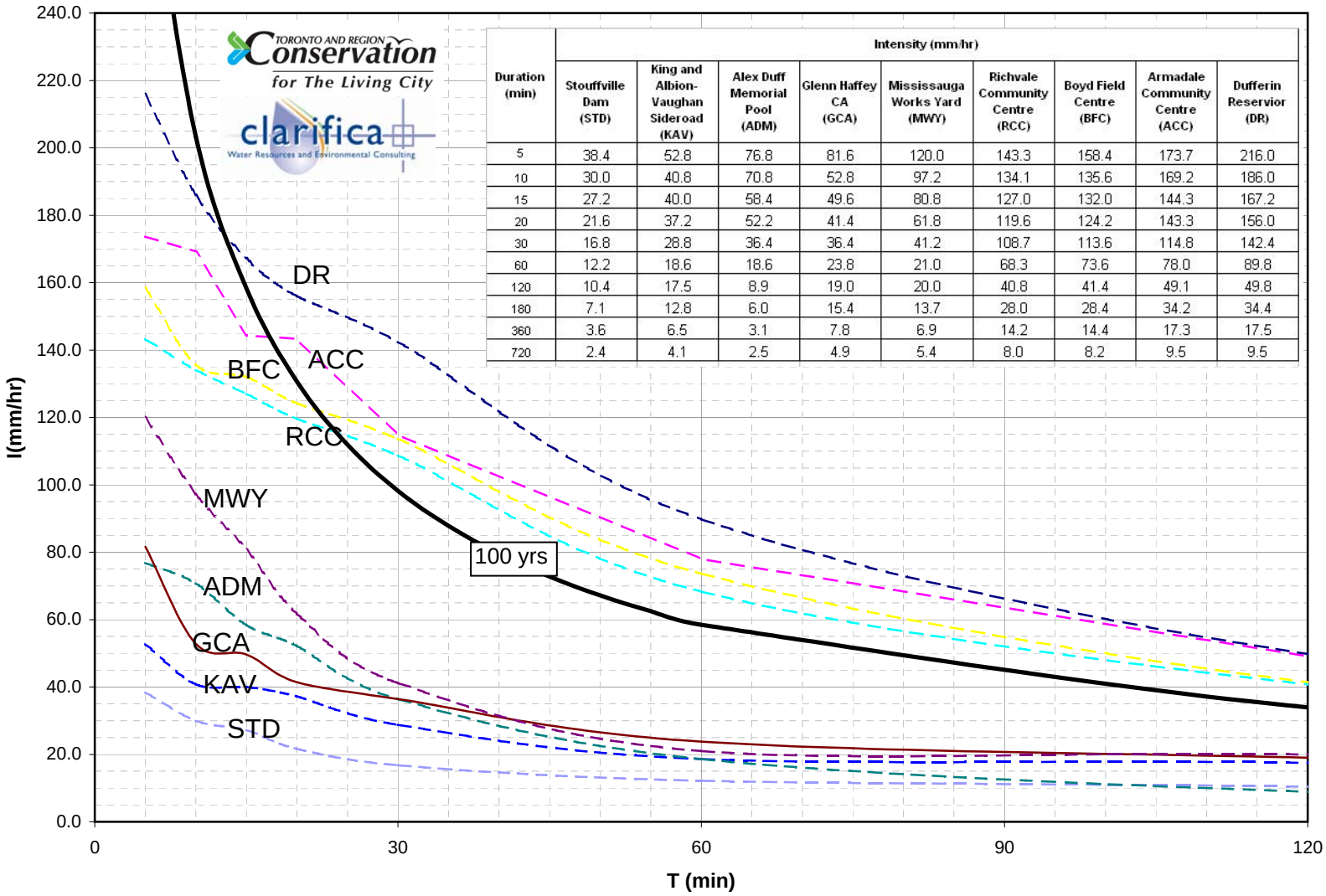
APPENDIX E – Design IDF and Measured ID Comparisons

August 19 2005 Storm Intensity and Duration



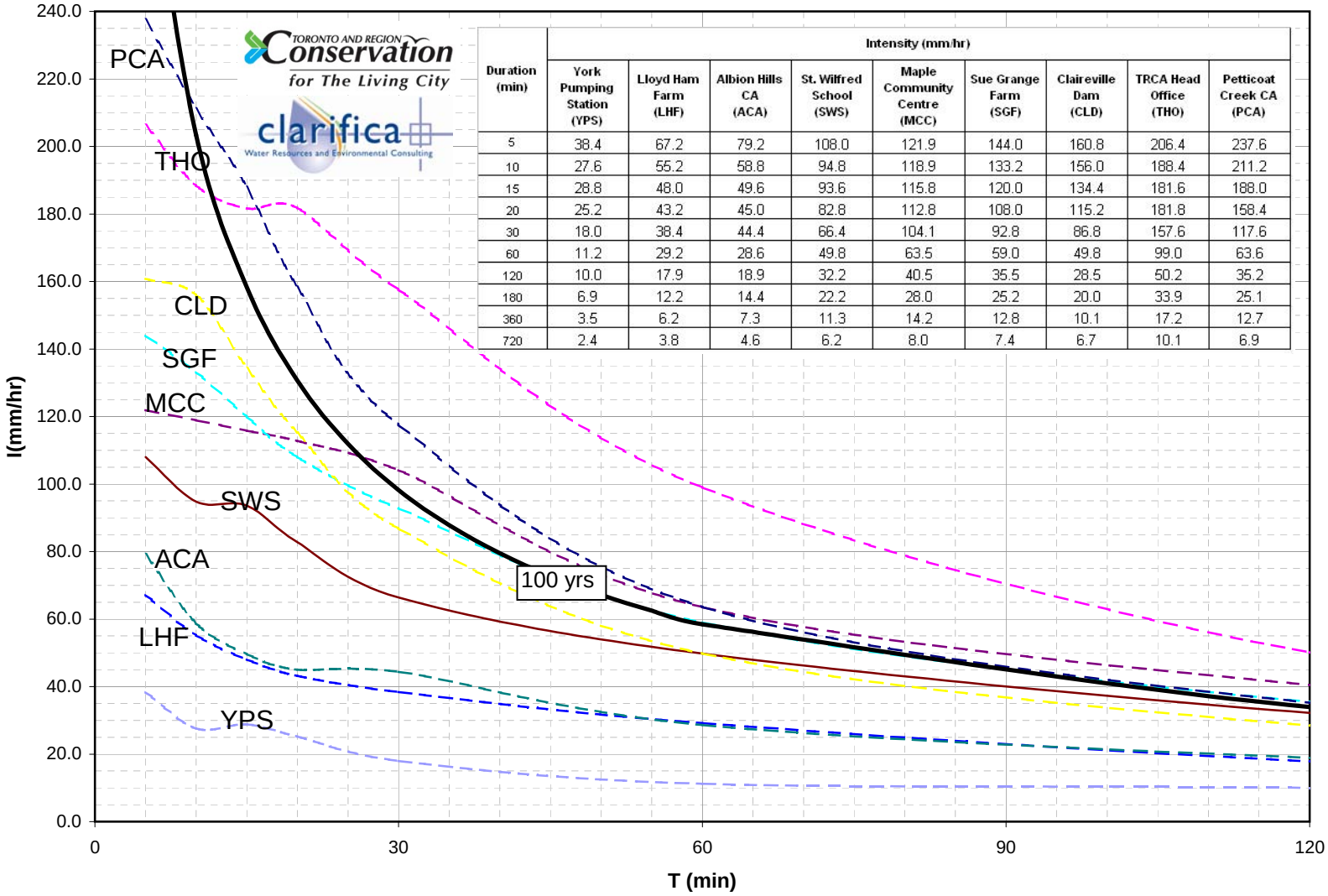
Duration (min)	Intensity (mm/hr)								
	Goodwood Pumping Station (GPS)	Claremont CA (CCA)	York Region Works Yard (YWY)	Bruce's Mill CA (BCA)	Caledon pumping station (CPS)	Markham Town Centre (MTC)	Laidlaw Bus Depot (LBD)	Vellore Woods Public School (VEL)	Ajax Works Yard (AWY)
5	19.2	45.6	69.6	79.2	110.4	131.1	158.4	161.5	208.8
10	14.4	40.8	67.2	60.0	88.8	123.4	138.0	144.8	183.6
15	13.6	40.8	68.0	44.4	79.2	115.8	124.8	147.3	172.0
20	13.2	39.6	64.2	37.8	72.0	107.4	123.0	143.3	160.8
30	10.8	35.2	63.2	32.0	56.0	89.9	107.2	126.5	119.6
60	6.0	23.0	38.4	18.3	33.4	58.4	77.0	78.7	75.4
120	5.3	13.4	24.7	12.8	27.1	37.7	42.6	46.5	42.6
180	3.6	9.8	17.1	8.8	20.2	26.1	29.7	31.9	29.9
360	1.8	5.0	8.6	4.4	10.3	13.2	15.1	16.2	15.2
720	1.4	3.0	5.0	2.9	6.1	7.4	8.8	9.2	8.1

August 19 2005 Storm Intensity and Duration



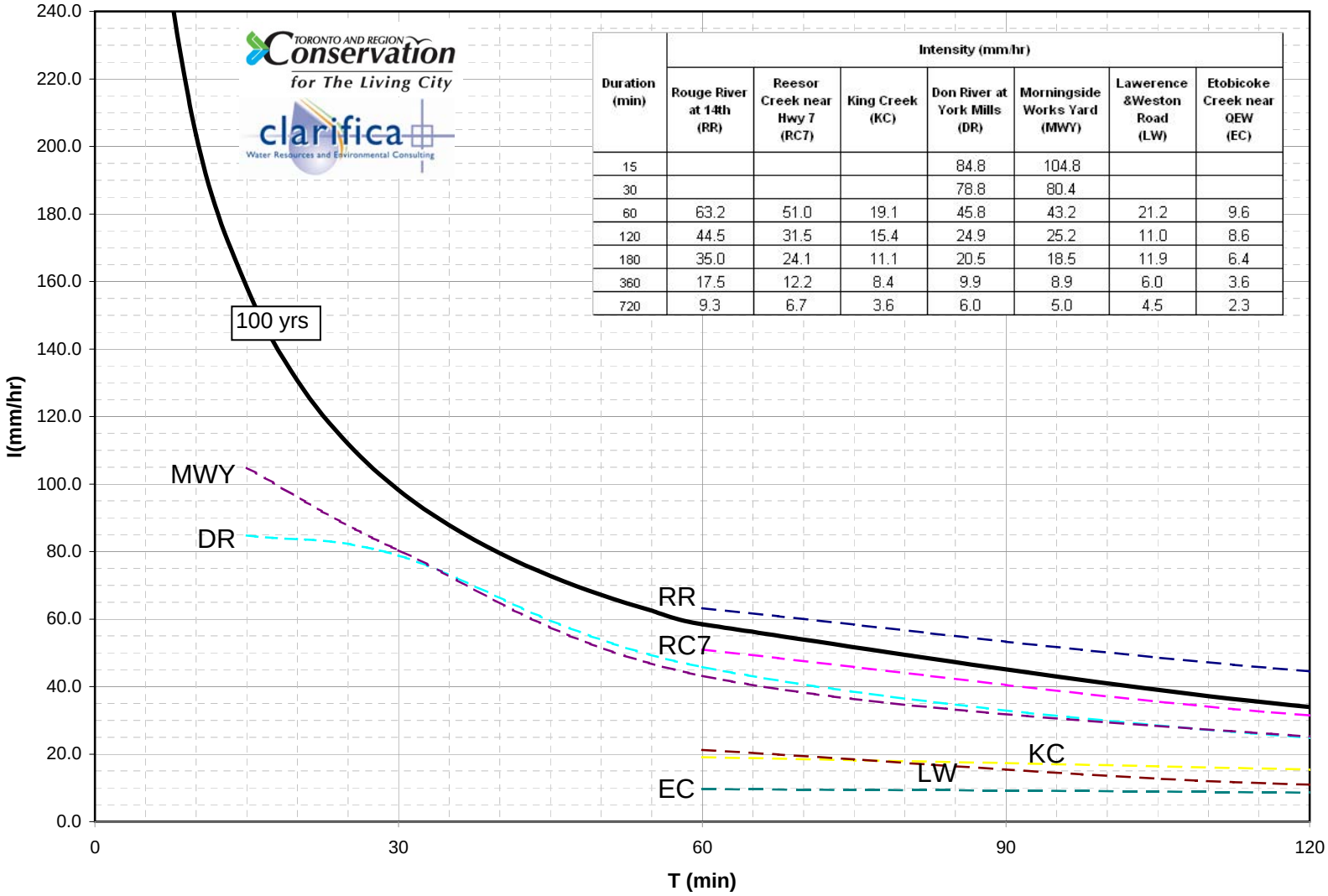
Duration (min)	Intensity (mm/hr)								
	Stouffville Dam (STD)	King and Albion-Vaughan Sideroad (KAV)	Alex Duff Memorial Pool (ADM)	Glenn Haffey CA (GCA)	Mississauga Works Yard (MWY)	Richvale Community Centre (RCC)	Boyd Field Centre (BFC)	Armadale Community Centre (ACC)	Dufferin Reservior (DR)
5	38.4	52.8	76.8	81.6	120.0	143.3	158.4	173.7	216.0
10	30.0	40.8	70.8	52.8	97.2	134.1	135.6	169.2	186.0
15	27.2	40.0	58.4	49.6	80.8	127.0	132.0	144.3	167.2
20	21.6	37.2	52.2	41.4	61.8	119.6	124.2	143.3	156.0
30	16.8	28.8	36.4	36.4	41.2	108.7	113.6	114.8	142.4
60	12.2	18.6	18.6	23.8	21.0	68.3	73.6	78.0	89.8
120	10.4	17.5	8.9	19.0	20.0	40.8	41.4	49.1	49.8
180	7.1	12.8	6.0	15.4	13.7	28.0	28.4	34.2	34.4
360	3.6	6.5	3.1	7.8	6.9	14.2	14.4	17.3	17.5
720	2.4	4.1	2.5	4.9	5.4	8.0	8.2	9.5	9.5

August 19 2005 Storm Intensity and Duration



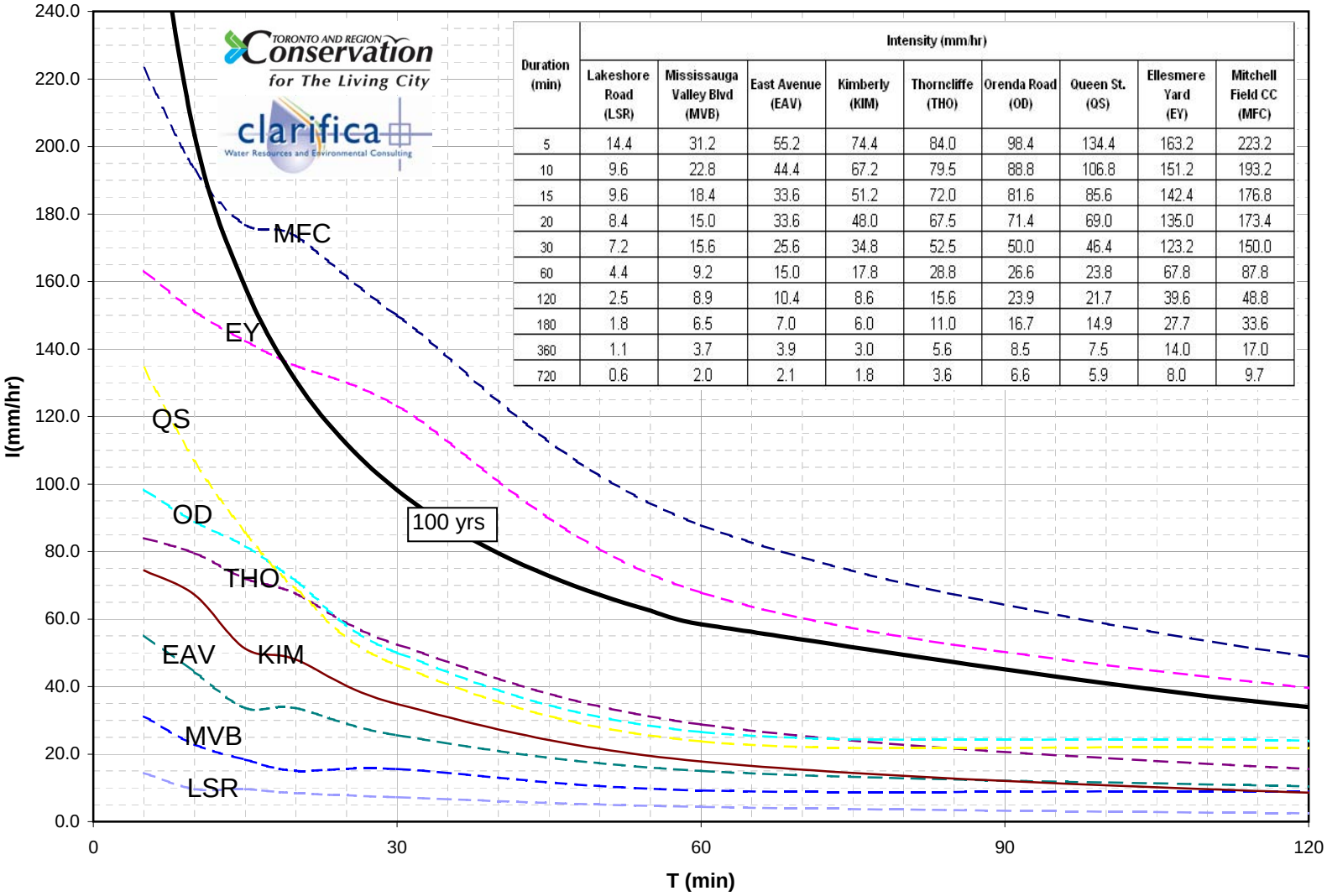
Duration (min)	Intensity (mm/hr)								
	York Pumping Station (YPS)	Lloyd Ham Farm (LHF)	Albion Hills CA (ACA)	St. Wilfred School (SWS)	Maple Community Centre (MCC)	Sue Grange Farm (SGF)	Claireville Dam (CLD)	TRCA Head Office (THO)	Petticoat Creek CA (PCA)
5	38.4	67.2	79.2	108.0	121.9	144.0	160.8	206.4	237.6
10	27.6	55.2	58.8	94.8	118.9	133.2	156.0	188.4	211.2
15	28.8	48.0	49.6	93.6	115.8	120.0	134.4	181.6	188.0
20	25.2	43.2	45.0	82.8	112.8	108.0	115.2	181.8	158.4
30	18.0	38.4	44.4	66.4	104.1	92.8	86.8	157.6	117.6
60	11.2	29.2	28.6	49.8	63.5	59.0	49.8	99.0	63.6
120	10.0	17.9	18.9	32.2	40.5	35.5	28.5	50.2	35.2
180	6.9	12.2	14.4	22.2	28.0	25.2	20.0	33.9	25.1
360	3.5	6.2	7.3	11.3	14.2	12.8	10.1	17.2	12.7
720	2.4	3.8	4.6	6.2	8.0	7.4	6.7	10.1	6.9

August 19 2005 Storm Intensity and Duration



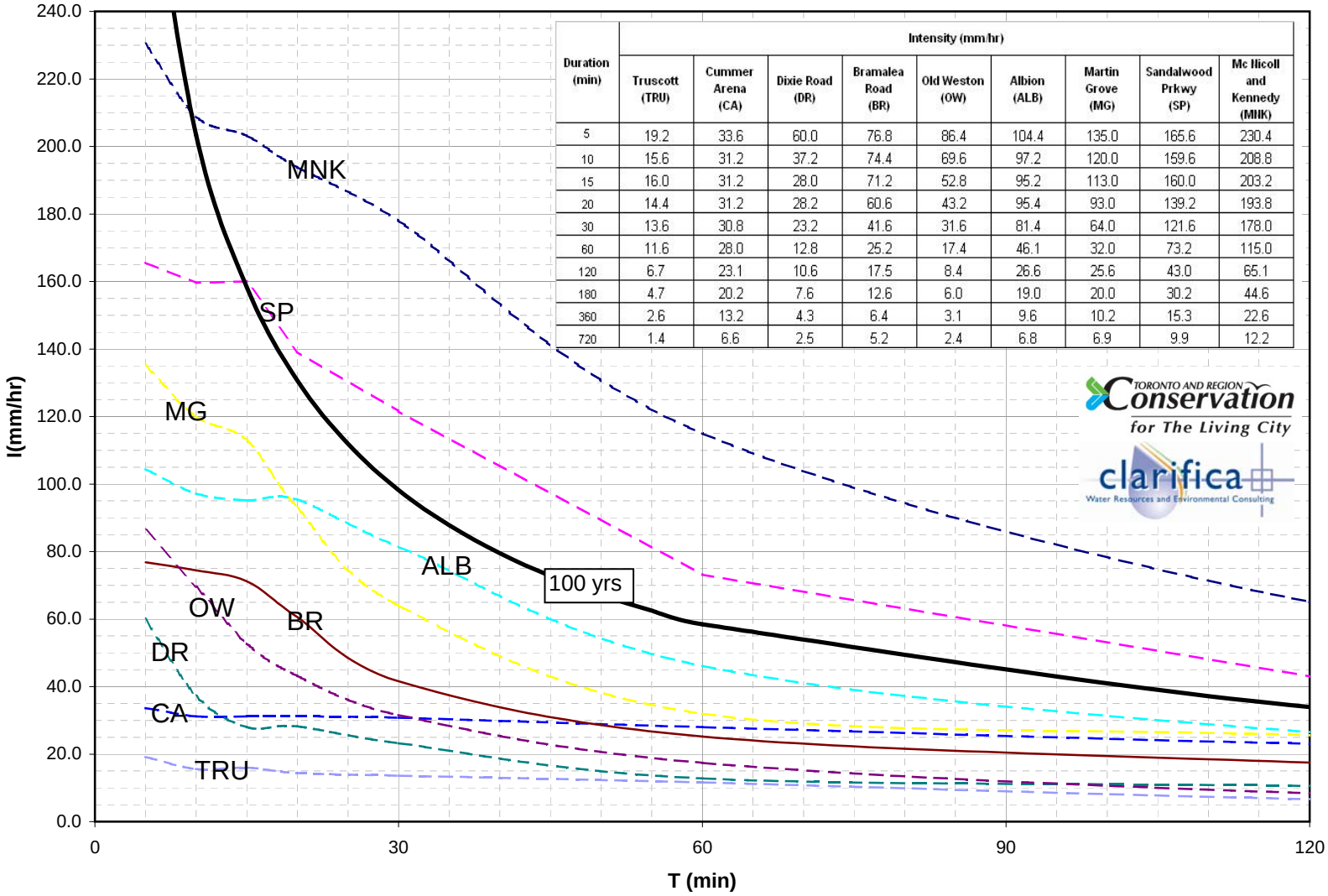
Duration (min)	Intensity (mm/hr)						
	Rouge River at 14th (RR)	Reesor Creek near Hwy 7 (RC7)	King Creek (KC)	Don River at York Mills (DR)	Morningside Works Yard (MWY)	Lawerence &Weston Road (LW)	Etobicoke Creek near QEW (EC)
15				84.8	104.8		
30				78.8	80.4		
60	63.2	51.0	19.1	45.8	43.2	21.2	9.6
120	44.5	31.5	15.4	24.9	25.2	11.0	8.6
180	35.0	24.1	11.1	20.5	18.5	11.9	6.4
360	17.5	12.2	8.4	9.9	8.9	6.0	3.6
720	9.3	6.7	3.6	6.0	5.0	4.5	2.3

August 19 2005 Storm Intensity and Duration



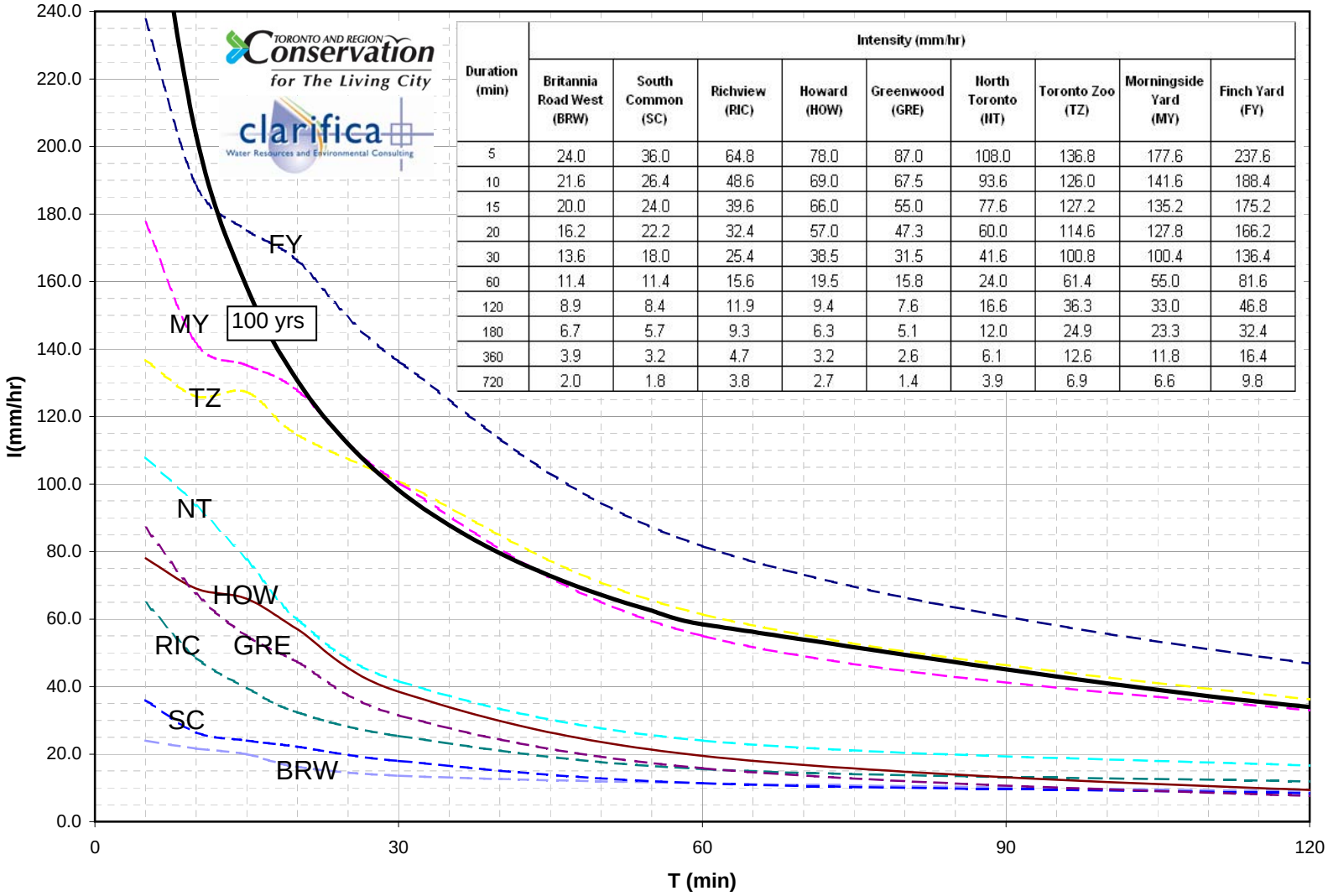
Duration (min)	Intensity (mm/hr)								
	Lakeshore Road (LSR)	Mississauga Valley Blvd (MVB)	East Avenue (EAV)	Kimberly (KIM)	Thorncliffe (THO)	Orenda Road (OD)	Queen St. (QS)	Ellesmere Yard (EY)	Mitchell Field CC (MFC)
5	14.4	31.2	55.2	74.4	84.0	98.4	134.4	163.2	223.2
10	9.6	22.8	44.4	67.2	79.5	88.8	106.8	151.2	193.2
15	9.6	18.4	33.6	51.2	72.0	81.6	85.6	142.4	176.8
20	8.4	15.0	33.6	48.0	67.5	71.4	69.0	135.0	173.4
30	7.2	15.6	25.6	34.8	52.5	50.0	46.4	123.2	150.0
60	4.4	9.2	15.0	17.8	28.8	26.6	23.8	67.8	87.8
120	2.5	8.9	10.4	8.6	15.6	23.9	21.7	39.6	48.8
180	1.8	6.5	7.0	6.0	11.0	16.7	14.9	27.7	33.6
360	1.1	3.7	3.9	3.0	5.6	8.5	7.5	14.0	17.0
720	0.6	2.0	2.1	1.8	3.6	6.6	5.9	8.0	9.7

August 19 2005 Storm Intensity and Duration



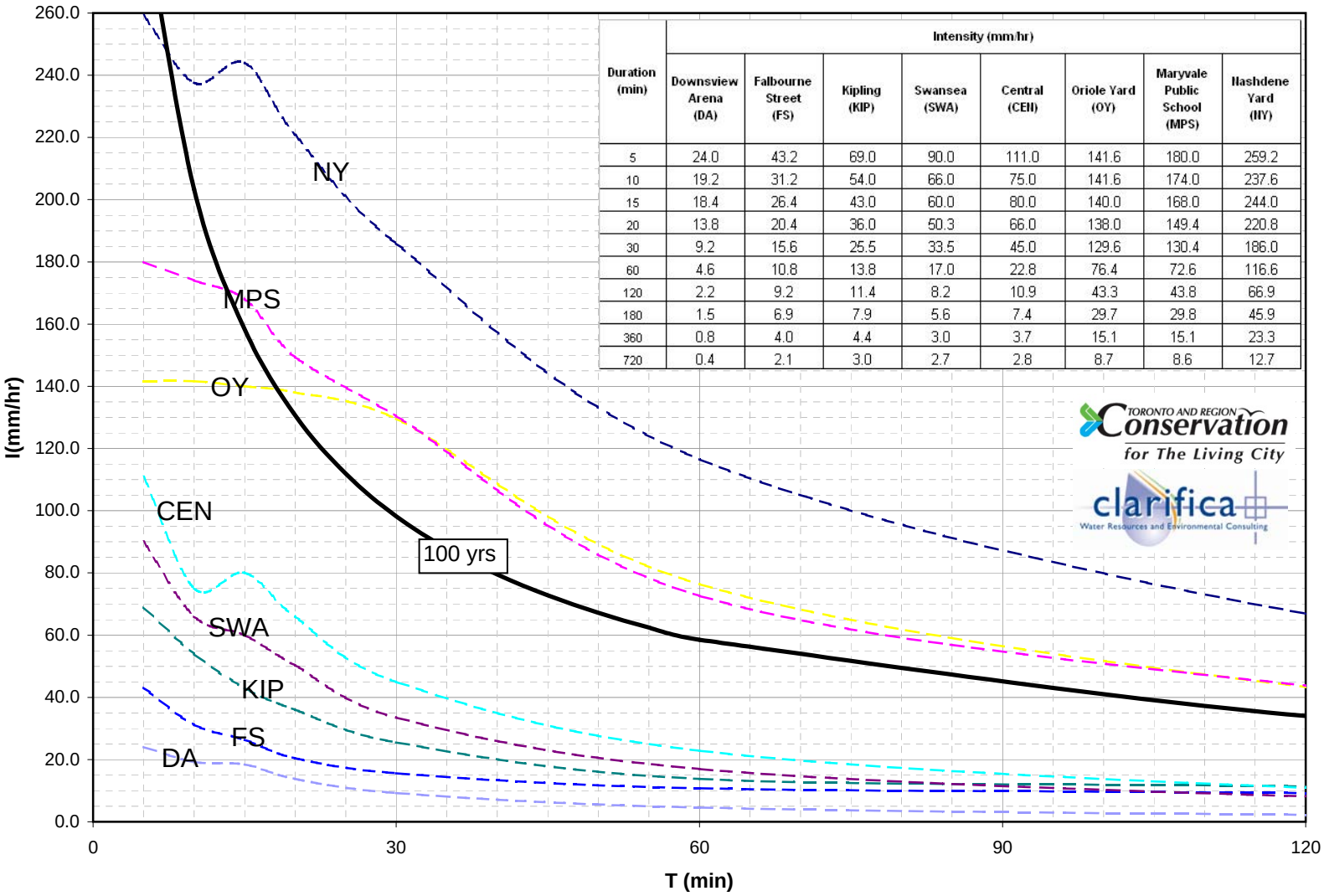
Duration (min)	Intensity (mm/hr)								
	Truscott (TRU)	Cummer Arena (CA)	Dixie Road (DR)	Bramalea Road (BR)	Old Weston (OW)	Albion (ALB)	Martin Grove (MG)	Sandalwood Prkwy (SP)	Mc Nicoll and Kennedy (MNK)
5	19.2	33.6	60.0	76.8	86.4	104.4	135.0	165.6	230.4
10	15.6	31.2	37.2	74.4	69.6	97.2	120.0	159.6	208.8
15	16.0	31.2	28.0	71.2	52.8	95.2	113.0	160.0	203.2
20	14.4	31.2	28.2	60.6	43.2	95.4	93.0	139.2	193.8
30	13.6	30.8	23.2	41.6	31.6	81.4	64.0	121.6	178.0
60	11.6	28.0	12.8	25.2	17.4	46.1	32.0	73.2	115.0
120	6.7	23.1	10.6	17.5	8.4	26.6	25.6	43.0	65.1
180	4.7	20.2	7.6	12.6	6.0	19.0	20.0	30.2	44.6
360	2.6	13.2	4.3	6.4	3.1	9.6	10.2	15.3	22.6
720	1.4	6.6	2.5	5.2	2.4	6.8	6.9	9.9	12.2

August 19 2005 Storm Intensity and Duration



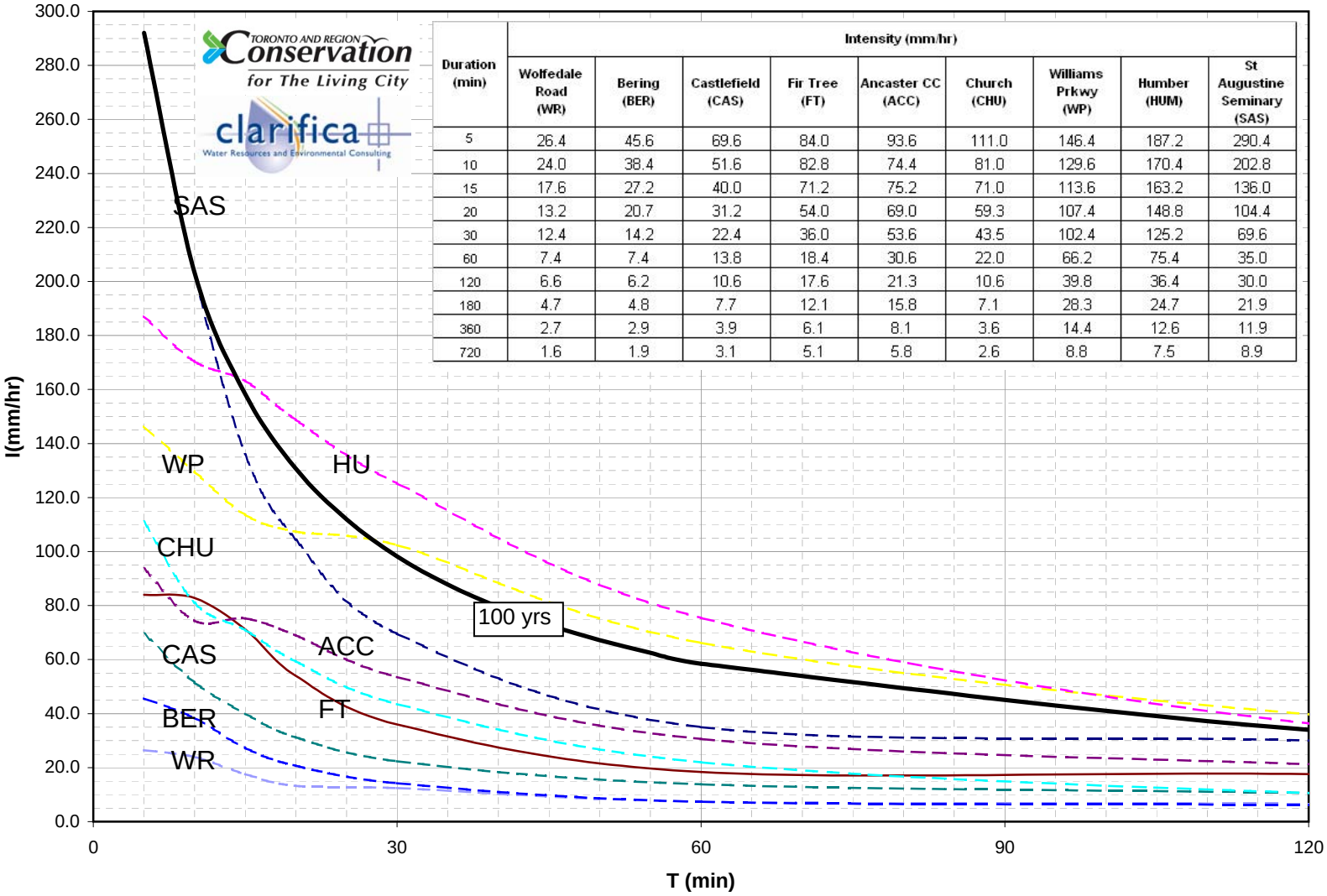
Duration (min)	Intensity (mm/hr)								
	Britannia Road West (BRW)	South Common (SC)	Richview (RIC)	Howard (HOW)	Greenwood (GRE)	North Toronto (NT)	Toronto Zoo (TZ)	Morningside Yard (MY)	Finch Yard (FY)
5	24.0	36.0	64.8	78.0	87.0	108.0	136.8	177.6	237.6
10	21.6	26.4	48.6	69.0	67.5	93.6	126.0	141.6	188.4
15	20.0	24.0	39.6	66.0	55.0	77.6	127.2	135.2	175.2
20	16.2	22.2	32.4	57.0	47.3	60.0	114.6	127.8	166.2
30	13.6	18.0	25.4	38.5	31.5	41.6	100.8	100.4	136.4
60	11.4	11.4	15.6	19.5	15.8	24.0	61.4	55.0	81.6
120	8.9	8.4	11.9	9.4	7.6	16.6	36.3	33.0	46.8
180	6.7	5.7	9.3	6.3	5.1	12.0	24.9	23.3	32.4
360	3.9	3.2	4.7	3.2	2.6	6.1	12.6	11.8	16.4
720	2.0	1.8	3.8	2.7	1.4	3.9	6.9	6.6	9.8

August 19 2005 Storm Intensity and Duration



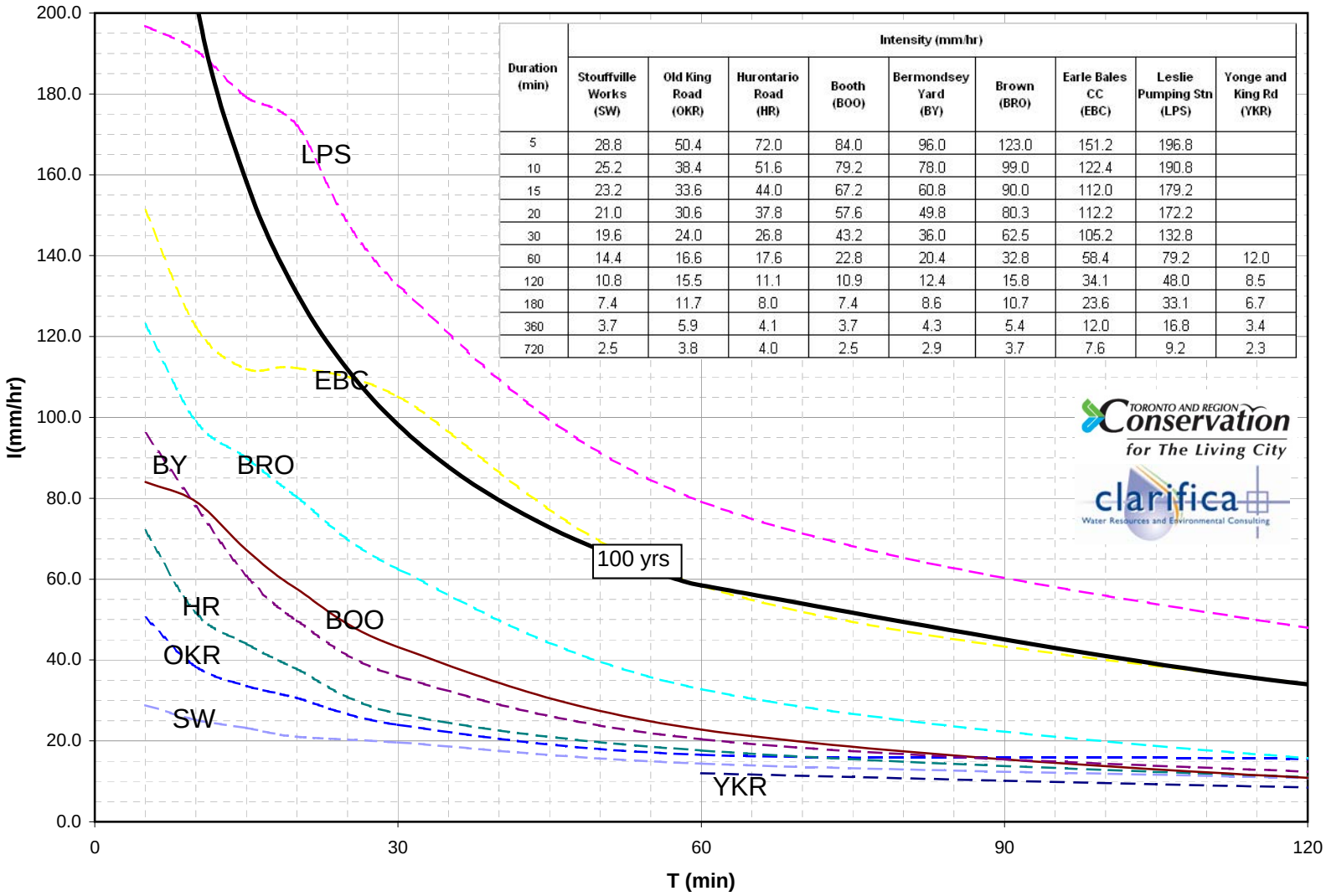
Duration (min)	Intensity (mm/hr)							
	Downsview Arena (DA)	Falbourne Street (FS)	Kipling (KIP)	Swansea (SWA)	Central (CEN)	Oriole Yard (OY)	Maryvale Public School (MPS)	Nashdene Yard (NY)
5	24.0	43.2	69.0	90.0	111.0	141.6	180.0	259.2
10	19.2	31.2	54.0	66.0	75.0	141.6	174.0	237.6
15	18.4	26.4	43.0	60.0	80.0	140.0	168.0	244.0
20	13.8	20.4	36.0	50.3	66.0	138.0	149.4	220.8
30	9.2	15.6	25.5	33.5	45.0	129.6	130.4	186.0
60	4.6	10.8	13.8	17.0	22.8	76.4	72.6	116.6
120	2.2	9.2	11.4	8.2	10.9	43.3	43.8	66.9
180	1.5	6.9	7.9	5.6	7.4	29.7	29.8	45.9
360	0.8	4.0	4.4	3.0	3.7	15.1	15.1	23.3
720	0.4	2.1	3.0	2.7	2.8	8.7	8.6	12.7

August 19 2005 Storm Intensity and Duration



Duration (min)	Intensity (mm/hr)								
	Wolfedale Road (WR)	Bering (BER)	Castlefield (CAS)	Fir Tree (FT)	Ancaster CC (ACC)	Church (CHU)	Williams Prkwy (WP)	Humber (HUM)	St Augustine Seminary (SAS)
5	26.4	45.6	69.6	84.0	93.6	111.0	146.4	187.2	290.4
10	24.0	38.4	51.6	82.8	74.4	81.0	129.6	170.4	202.8
15	17.6	27.2	40.0	71.2	75.2	71.0	113.6	163.2	136.0
20	13.2	20.7	31.2	54.0	69.0	59.3	107.4	148.8	104.4
30	12.4	14.2	22.4	36.0	53.6	43.5	102.4	125.2	69.6
60	7.4	7.4	13.8	18.4	30.6	22.0	66.2	75.4	35.0
120	6.6	6.2	10.6	17.6	21.3	10.6	39.8	36.4	30.0
180	4.7	4.8	7.7	12.1	15.8	7.1	28.3	24.7	21.9
360	2.7	2.9	3.9	6.1	8.1	3.6	14.4	12.6	11.9
720	1.6	1.9	3.1	5.1	5.8	2.6	8.8	7.5	8.9

August 19 2005 Storm Intensity and Duration



Duration (min)	Intensity (mm/hr)								
	Stouffville Works (SW)	Old King Road (OKR)	Hurontario Road (HR)	Booth (BOO)	Bermondsey Yard (BY)	Brown (BRO)	Earle Bales CC (EBC)	Leslie Pumping Stn (LPS)	Yonge and King Rd (YKR)
5	28.8	50.4	72.0	84.0	96.0	123.0	151.2	196.8	
10	25.2	38.4	51.6	79.2	78.0	99.0	122.4	190.8	
15	23.2	33.6	44.0	67.2	60.8	90.0	112.0	179.2	
20	21.0	30.6	37.8	57.6	49.8	80.3	112.2	172.2	
30	19.6	24.0	26.8	43.2	36.0	62.5	105.2	132.8	
60	14.4	16.6	17.6	22.8	20.4	32.8	58.4	79.2	12.0
120	10.8	15.5	11.1	10.9	12.4	15.8	34.1	48.0	8.5
180	7.4	11.7	8.0	7.4	8.6	10.7	23.6	33.1	6.7
360	3.7	5.9	4.1	3.7	4.3	5.4	12.0	16.8	3.4
720	2.5	3.8	4.0	2.5	2.9	3.7	7.6	9.2	2.3

TORONTO AND REGION Conservation for The Living City

clarifica Water Resources and Environmental Consulting