



# NORTH SASKATCHEWAN RIVER HAZARD STUDY

## FLOOD RISK ASSESSMENT AND INVENTORY FINAL REPORT



Prepared for:



30 November 2022

NHC Ref. No. 1003870

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**FINAL REPORT**

Prepared for:

**Alberta Environment and Parks**  
Edmonton, Alberta

Prepared by:

**Northwest Hydraulic Consultants Ltd.**  
Edmonton, Alberta

30 November 2022

NHC Ref No. 1003870

APEGA Permit to Practice - P654

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**DISCLAIMER**

This report has been prepared by Northwest Hydraulic Consultants Ltd. (NHC) in accordance with generally accepted engineering practices, for the benefit of Alberta Environment and Parks for specific application to the North Saskatchewan River Hazard Study in Alberta. The information and data contained herein represent the best professional judgment of NHC, based on the knowledge and information available to NHC at the time of preparation.

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## EXECUTIVE SUMMARY

Alberta Environment and Parks retained Northwest Hydraulic Consultants Ltd. in June 2018 to complete a river hazard study for the North Saskatchewan River. The 111 km long study reach includes the Town of Devon, the City of Edmonton, the City of Fort Saskatchewan and surrounding areas of Parkland County, Leduc County, Strathcona County, and Sturgeon County. The study is being conducted under the provincial Flood Hazard Identification Program; the overall objectives are to enhance public safety and to reduce future flood damages and disaster assistance costs.

The North Saskatchewan River Hazard Study is comprised of eight major project components and this report summarizes the work of the seventh component – **Flood Risk Assessment & Inventory**. This component included the compilation and interpretation of available spatial data, infrastructure inventory and categorization, and flood risk statistics assessment.

The goal of this study component is to provide quantitative information on those infrastructure, property, and populated areas impacted under the various flood scenarios in order to help define flood risks in the project study area. Flood risks in the study area are identified by combining the flood extent information for the various scenarios with the spatial inventory data. The spatial data are denoted in this report as receptors and they include: land parcels, buildings and facilities, roadways and railway, bridges, and census block data. Statistics were generated for each of these receptors for various flood scenarios including the 13 open water flood frequency scenarios (2-year through 1000-year open water floods) and the open water design flood. The statistics are summarized according to administrative boundaries for municipalities and neighbourhoods.

## CREDITS AND ACKNOWLEDGEMENTS

Northwest Hydraulic Consultants Ltd. would like to express appreciation to Alberta Environment and Parks for initiating this project, making extensive background information available, and providing the project team with valuable technical input throughout the project. Mr. James Choles managed and directed the North Saskatchewan River Hazard Study on behalf of Alberta Environment and Parks.

NHC would also like to thank the Province of Alberta, Town of Devon, City of Edmonton, Parkland County, Strathcona County and the OpenStreetMap collaborative project for providing the spatial data required in this study.

The following NHC personnel were part of the study team and participated in this study component:

- Dan Healy (Project Manager) provided the overall direction of the hazard study, advised on the methodology for spatial analysis, and authored this report.
- Rebecca Himsl (GIS Analyst) assisted in the spatial analysis, created the mapping products, and developed the associated digital asset deliverables.
- Juan Upegui (Project Engineer) compiled and interpreted data sets.
- Mary Bachynsky (Coop Student) assisted in tabulating and summarizing the spatial analysis results.
- Gary Van Der Vinne (Technical Reviewer) provided technical review.

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## 1 INTRODUCTION

### 1.1 Study Background

The North Saskatchewan River Hazard Study was initiated by Alberta Environment and Parks (AEP) to identify and assess river and flood hazards along the North Saskatchewan River, within the Town of Devon, City of Edmonton, City of Fort Saskatchewan, and surrounding areas of Parkland County, Leduc County, Strathcona County, and Sturgeon County. This study was undertaken as part of the Flood Hazard Identification Program (FHIP). The goals of FHIP include the enhancement of public safety and reduction of future flood damages through the identification of river and flood hazards. Project stakeholders include the provincial government, local authorities, and the public.

This flood hazard study is larger in scope and scale than the three previous studies of the North Saskatchewan in and near Edmonton by Philips Planning & Engineering Limited (1994), I.D. Group (Alberta) Inc. and CartoLogix Corporation (1995), and Northwest Hydraulic Consultants Ltd. (2007). The first study reach extended from the city limits of Fort Saskatchewan upstream to the High Level Bridge in Edmonton. The second study extended from the High Level Bridge upstream to the southwest boundary of Edmonton. The third study included these two reaches plus an additional 17 km upstream to Devon and an additional 18 km through Fort Saskatchewan.

Reporting and associated deliverables were prepared separately for each:

- |   |   |
|---|---|
| 1) Survey and Base Data Collection            | 5) Open Water Flood Hazard Identification |
| 2) Open Water Hydrology Assessment            | 6) Governing Flood Hazard Map Production  |
| 3) Hydraulic Model Creation and Calibration   | 7) Flood Risk Assessment and Inventory    |
| 4) Open Water Flood Inundation Map Production | 8) Channel Stability Investigation        |

Reporting and associated deliverables were prepared separately for each study component.

### 1.2 Objectives

This report summarizes the work of the seventh component: **Flood Risk Assessment and Inventory**. The following primary tasks, services, and deliverables are associated with this report.

- Compilation and interpretation of available spatial data.
- Infrastructure inventory and categorization.
- Computation of flood risk assessment statistics for various flood scenarios.



The main goal of this component is to determine the flood risks within the study area. This was achieved by combining the open water flood inundation and design flood hazard maps with the available spatial data to compute flood risk statistics for land parcels, buildings, infrastructure and population at risk.

### 1.3 Study Area and Reach

**Figure 1** depicts the location and boundaries of the river hazard study area and the upstream watershed. The study reach includes 111 km of the North Saskatchewan River from the western edge of quarter section boundary 32-50-26-W4 to the eastern edge of 35-56-21-W4. The study reach extends along the Town of Devon, City of Edmonton, City of Fort Saskatchewan, Parkland County, Leduc County, Strathcona County, and Sturgeon County. Additional river cross sections were surveyed beyond the study boundaries to facilitate hydraulic modelling and inundation mapping near the study area limits.

The contributing watershed covers a total area of about 32,900 km<sup>2</sup>, extending from the headwaters of the North Saskatchewan River in the Rocky Mountains to the downstream boundary of the river hazard study area. High flows along this reach are typically dominated by snowmelt in the spring and early summer. Larger floods typically occur when snowmelt coincides with major rainfall events in the foothills.

The following characterization of the study reach is based on prior investigation by Kellerhals, Neill, and Bray (1972). The main channel of the North Saskatchewan River through the study reach can be characterized as an entrenched channel that cuts through a moderately forested valley of lacustrine origin. At the upstream end of the study reach between the Devon and Fort Saskatchewan, the channel has an irregular meandering pattern. Downstream of Fort Saskatchewan, the channel pattern is relatively straight. Throughout the study reach, point bars and side bars are observed within the active channel. The river has an overall slope of 0.00035 m/m. River bed material consists of a shallow gravel layer over easily erodible shale. The channel banks consist of silt over gravel on erodible bedrock.

## 2 AVAILABLE SPATIAL DATA

The available spatial data is summarized below. Additional details on the information provided with the spatial data is listed in **Appendix A**.

### 2.1 Cadastral

Cadastral data for this study was acquired from two different sources. The cadastral data within the City of Edmonton were obtained from the City's GIS/Mapping department (Edmonton 2020a). Outside of the City of Edmonton, cadastral information was obtained from Altalis (2020) – a commercial provider of spatial data in Alberta. The cadastral dataset used for this study were land parcels derived from title of ownership polygon features which were attributed with information on the plan number, block number, and lot number information.

### 2.2 Infrastructure

Roadway and railway data sets were obtained from the National Road Network (Statistics Canada 2018) and National Railway Network (Natural Resources Canada 2018a) databases, respectively. The Valley Line LRT railway data was obtained from City of Edmonton's Open Data Portal (<https://data.edmonton.ca>). The roadway and railway alignments were adjusted by removing line segments crossing the North Saskatchewan River. The remaining alignments were then treated as being at grade elevation for the spatial analysis.

Bridge infrastructure was represented by alignments of the bridge deck centrelines. The bridge deck elevation data was determined from bridge design drawings and deck survey data collected by NHC. Bridge data is summarized in the *Survey and Base Data Collection* study report (NHC 2020).

### 2.3 Census

The census boundaries and population values were obtained from Statistics Canada (2019). The smallest geographic area for which population and dwelling counts are disseminated are termed census dissemination blocks. The census dissemination blocks are "bounded on all sides by roads and/or boundaries of standard geographic areas" (Statistics Canada 2019). These blocks were used to identify the total population at risk under different flood scenarios. Statistics Canada adjusts population counts less than 15, to ensure confidentiality, by rounding the population count to a base of 5.

### 3 INTERPRETED SPATIAL DATA

#### 3.1 Aerial Photography

2019 aerial imagery was provided to NHC by AEP. The imagery data was acquired under a separate project by Airborne Imaging in the spring of 2019 and then orthorectified (Airborne Imaging 2019). This imagery was used for mapping and to assist in the visual interpretation of the various spatial data sets.

#### 3.2 Residential and Non-Residential Structures

Residential and non-residential structures were defined by a set of polygons, with each polygon representing the footprint of an individual structure. Polygons were then assigned attributes to facilitate classification according to the structure classification scheme listed in **Table 1**. The approach for developing the footprints and associated attributes differed for structures within Edmonton and for those outside of Edmonton.

Within Edmonton, the features were developed from spatial data obtained through the City of Edmonton’s Open Data Portal (<https://data.edmonton.ca>). The spatial data sets that were acquired included structure footprints, neighbourhood boundaries, land use areas, and zoning. The extent of the data sets was reduced to those found within the computed 1000-year flood extent. The structures were then assigned attributes according to the land use, zoning, and neighbourhood data sets. Structures were also categorized as being an accessory building (e.g. garage, shed, or other secondary building) through visual comparison to the 2019 aerial imagery. In some instances, Google Maps images were also referenced. Accessory buildings were included in the structure feature data set although they were not counted during the inventory assessment.

**Table 1 Structures classification scheme**

Category	Sub-Category
Residential Buildings	Residence
	Retirement home
	Multi-unit residential building
Non-residential Buildings	Hospital
	School
	Government building
	Water treatment facility
	Wastewater treatment facility
	Other major non-residential building

Structures outside of Edmonton (e.g. Devon, Parkland County, Fort Saskatchewan, Strathcona County, and Sturgeon County) were digitized manually by inspection of the 2019 aerial imagery, since spatial

data sets for these areas were not available. Land use and zoning attributes were assigned by inspection of land use bylaw maps available from the regional municipalities. Accessory buildings were not digitized for areas outside of Edmonton.

### 3.3 Administrative Areas

Administrative areas data was collected to assist in the organization and presentation of the summary statistics on the various data sets. The administrative area data were obtained from the following sources:

- City of Edmonton (City of Edmonton 2020b, 2020c, 2020d) – neighbourhood boundary polygons, land use and zoning boundary polygons.
- City of Fort Saskatchewan (City of Fort Saskatchewan 2020) – neighbourhood boundary polygons and land use boundary polygons.
- Town of Devon (Town of Devon 2020) – land use boundary polygons.
- Leduc County (Leduc County 2019) – land use map.
- Strathcona County (Strathcona County 2020a, 2020b) – neighbourhood boundary polygons and land use boundary polygons.
- Sturgeon County (Sturgeon County 2017a, 2017b) – county divisions map and land use map.

Municipal areas were defined for Devon, Edmonton, Fort Saskatchewan, Strathcona County, and Sturgeon County. Sub-areas of these municipal areas included neighbourhoods, parks, and other natural areas. The sub-areas did not overlap each other and nested within the municipal boundaries such that sub-area boundaries did not cross municipal boundaries.

## 4 FLOOD RISK ASSESSMENT AND INVENTORY

### 4.1 Methodology

Inventory data for the flood risk assessment were assembled into a geodatabase with the following feature classes: administrative boundaries, bridges, buildings, cadastral data, census dissemination blocks, rail network, and road network. A description of these data, their spatial attributes, and relevant digital file information is provided in **Appendix A**.

Flood risk statistics were computed for thirteen flood frequency scenarios (2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750-, and 1000-year return period open water floods) and the design flood scenario. Statistics for the design flood scenario are provided for the floodway, flood fringe, high hazard flood fringe, and flood hazard area extents. The flood fringe includes the high hazard flood fringe area.

The inventory data were overlaid with the extent of inundation for each respective flood scenario to quantify the following statistics:

- Number of land parcels at risk.
- Number of residential buildings at risk.
- Number of non-residential buildings at risk.
- Length of roadway at risk.
- Length of railway at risk.
- Population at risk.
- Number of bridges at risk.

Land parcel polygons along the river were modified to exclude those portions extending into the channel. The extent of the channel was adopted from the river features defined in the National Hydrographic Network (NHN) (Natural Resources Canada 2018b) database. A land parcel was deemed to be at risk if it was fully or partially covered by the corresponding flood extent polygon.

Buildings were considered at risk if the building footprint overlapped the corresponding flood extent polygon. Results were classified by primary category (i.e. residential or non-residential) and sub-category (e.g. single-family, multi-family, commercial, industrial). Accessory structures, such as garages and storage sheds, or structures considered to be temporary, such as trailers, construction offices, and recreational trailers, were not included in the statistics.

Bridges were considered at risk if the water level was greater than the bridge's low chord elevation.

The risk of inundation for roadways and railways was calculated by determining the total length within the extent of inundation for each flood scenario. Those segments of the road or rail crossing the river over bridges were not included in the total length.

The population at risk was estimated by multiplying the total population within each census dissemination block by the percentage of the area of the block that falls within the flood extent. Those portions of census blocks that extended into the river were removed from each census block. The river extents used to remove these areas were based on the hydrographic features defined in the NHN dataset (NRCan 2018b).

## 4.2 Results

This section presents the risk assessment results for the various inventory data. The results were aggregated for each flood scenario and are grouped according to municipality. For the City of Edmonton results were further divided into those neighbourhoods with the highest number of land parcels and structures at risk (Rossdale, Cloverdale, and Riverdale).

The remaining neighbourhoods, parks, private, and public lands were all grouped under the *Other Areas* category. Other areas included Anthony Henday Clareview, Anthony Henday South West, Canon Ridge, Clover Bar, Donsdale, Edmonton South West, Fraser, Keswick Area, Marquis, River's Edge, Riverview Area, Fort Edmonton, Goldbar Wastewater Treatment Centre, WTP, E.L. Smith Water Treatment Plant, and the Edmonton River Valley alongside Cameron, Capitol Hill, Fort Edmonton, Glenora, Gold Bar, Hermitage, Highlands, Kinnaird, Laurier, Lessard, Mayfair, Oleskiw, Riverside, Rundle, Terwillegar, Victoria, Walterdale, Whitemud, River Valley Windermere, Rural North East South Sturgeon, University of Alberta Farm, Whitemud Creek Ravine North, Whitemud Creek Ravine South, and Windermere Area.

### 4.2.1 Land Parcels

Each land parcel was assigned to a single administrative sub-area. For those instances where a land parcel resided in more than one sub-area, the land parcel was assigned to the sub-area occupying the largest percentage area of the land parcel. **Table 2** and **Figure 2** illustrate the number of land parcels at risk of inundation for the various flood scenarios. Land parcels along the river are at risk for the 2-year and higher return periods. As the magnitude of the flood scenario increases so does the number of land parcels at risk. This is most evident for the City of Edmonton where the highest number of land parcels at risk were identified. **Table 3** summarizes the number of land parcels at risk in the City of Edmonton by neighbourhood. The land parcels listed in the table are further divided into residential and non-residential. In the Cloverdale, Riverdale, and Rossdale neighbourhoods, most of the land parcels at risk are residential. Conversely, outside of these neighbourhoods (the *other areas*) most of the land parcels at risk are non-residential.

Statistics for the design flood scenario are essentially the same as the 100-yr flood frequency scenario. Together, the floodway and flood fringe make up the whole of the design flood extent (flood hazard area). The sum of the floodway and flood fringe statistics may be slightly larger than those for the design flood extent. This may be attributed to those land parcels straddling the floodway and flood fringe since these parcels are included in both the floodway and flood fringe statistics. Also, the floodway includes "dry" areas that are otherwise not included in the 100-yr inundation extents.

**Table 2 Land parcels at risk of inundation by municipality**

Flood Scenario	City of Edmonton	Fort Saskatchewan	Leduc County	Parkland County	Strathcona County	Sherwood Park	Sturgeon County	Town of Devon	Total
2-yr	268	29	4	32	54	9	76	9	481
5-yr	333	33	4	33	62	11	87	10	573
10-yr	365	34	4	35	70	13	90	12	623
20-yr	402	35	4	35	73	13	93	13	668
35-yr	438	35	4	36	73	13	93	13	705
50-yr	473	35	4	36	74	13	96	14	745
75-yr	632	35	4	37	75	13	98	14	908
100-yr	743	36	4	37	75	13	99	14	1021
200-yr	1030	36	5	37	77	13	108	14	1320
350-yr	1299	36	5	39	78	13	118	14	1602
500-yr	1437	36	5	39	78	13	129	15	1752
750-yr	1479	36	5	39	79	13	135	15	1801
1000-yr	1498	36	5	39	79	13	138	15	1823
Floodway	397	35	4	36	73	12	91	13	661
Flood Fringe	563	20	3	18	37	12	44	5	702
High Hazard Flood Fringe	235	13	1	7	16	12	20	1	305
Flood Hazard Area	743	36	4	37	75	13	99	14	1021

Notes: Sum of floodway and flood fringe larger than flood hazard area due to land parcels straddling floodway and flood fringe.

**Table 3 Land parcels at risk of inundation in Edmonton for residential and non-residential areas**

Flood Scenario	Cloverdale		Riverdale		Rossdale		Other Areas		Total Res.	Total Non-Res.	Total
	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.	Res.	Non-Res.			
2-yr	0	15	0	8	0	7	9	229	9	259	268
5-yr	0	22	0	13	0	7	13	278	13	320	333
10-yr	0	29	0	14	0	7	13	302	13	352	365
20-yr	0	30	21	14	0	7	14	316	35	367	402
35-yr	0	43	32	14	1	8	15	325	48	390	438
50-yr	0	54	37	14	9	8	16	335	62	411	473
75-yr	1	69	102	14	75	9	16	346	194	438	632
100-yr	2	81	147	14	123	11	16	349	288	455	743
200-yr	77	83	245	41	177	30	19	358	518	512	1030
350-yr	153	85	351	88	197	40	19	366	720	579	1299
500-yr	159	99	368	144	222	52	21	372	770	667	1437
750-yr	165	99	373	161	225	54	23	379	786	693	1479
1000-yr	169	99	377	164	225	57	24	383	795	703	1498
Floodway	0	40	0	14	1	9	16	317	17	380	397
Flood Fringe	2	80	147	9	123	8	0	194	272	291	563
High Hazard Flood Fringe	0	40	33	8	2	3	0	149	35	200	235
Flood Hazard Area	2	81	147	14	123	11	16	349	288	455	743

Notes: Sum of floodway and flood fringe larger than flood hazard area due to land parcels straddling floodway and flood fringe.

## 4.2.2 Buildings and Infrastructure

### Residential Buildings

**Table 4** lists the number of residential buildings at risk of inundation by municipality. Except for one building in Parkland County, residential buildings at risk are mostly in Edmonton with some in Sturgeon County. Within Edmonton the first instance of buildings being identified as at risk occurred for the 20-year flood in Riverdale. **Table 5** lists the residential buildings at risk for Cloverdale, Riverdale, Rosedale and other areas according to single family and multi-family units. **Figure 3** provides a chart of the data listed in the table. The majority of residential buildings at risk are in Riverdale with the remaining roughly split between Cloverdale and Rosedale.

As was the case for the land parcel statistics, the sum of the floodway and flood fringe statistics are larger than those for the flood hazard area. This is attributed to those buildings straddling the floodway and flood fringe since these buildings are included in both the floodway and flood fringe statistics.

**Table 4 Residential buildings at risk of inundation by municipality**

Flood Scenario	City of Edmonton	Fort Saskatchewan	Leduc County	Parkland County	Strathcona County	Sherwood Park	Sturgeon County	Town of Devon	Total
2-yr	0	0	0	0	0	0	0	0	0
5-yr	0	0	0	0	0	0	0	0	0
10-yr	0	0	0	0	0	0	0	0	0
20-yr	1	0	0	0	0	0	0	0	1
35-yr	6	0	0	0	0	0	0	0	6
50-yr	17	0	0	0	0	0	0	0	17
75-yr	88	0	0	0	0	0	0	0	88
100-yr	177	0	0	0	0	0	0	0	177
200-yr	426	0	0	0	1	0	1	0	428
350-yr	632	0	0	0	1	0	4	0	637
500-yr	707	0	0	1	1	0	8	0	717
750-yr	773	0	0	1	1	0	22	0	797
1000-yr	783	0	0	1	1	0	25	0	810
Floodway	0	0	0	0	0	0	0	0	0
Flood Fringe	177	0	0	0	0	0	0	0	177
High Hazard Flood Fringe	11	0	0	0	0	0	0	0	11
Flood Hazard Area	177	0	0	0	0	0	0	0	177

Notes: Sum of floodway and flood fringe larger than flood hazard area due to buildings straddling floodway and flood fringe.



**Table 5 Residential buildings at risk in Edmonton for single family and multi-family units**

Flood Scenario	Cloverdale		Riverdale		Rossdale		Other Areas		Total Single Family	Total Multi-Family	Total
	Single Family	Multi-Family	Single Family	Multi-Family	Single Family	Multi-Family	Single Family	Multi-Family			
2-yr	0	0	0	0	0	0	0	0	0	0	0
5-yr	0	0	0	0	0	0	0	0	0	0	0
10-yr	0	0	0	0	0	0	0	0	0	0	0
20-yr	0	0	1	0	0	0	0	0	1	0	1
35-yr	0	0	6	0	0	0	0	0	6	0	6
50-yr	0	0	17	0	0	0	0	0	17	0	17
75-yr	6	2	47	0	33	0	0	0	86	2	88
100-yr	10	3	85	0	79	0	0	0	174	3	177
200-yr	80	9	185	1	149	0	2	0	416	10	426
350-yr	158	9	290	2	168	1	4	0	620	12	632
500-yr	168	9	349	2	174	1	4	0	695	12	707
750-yr	175	9	405	2	176	1	5	0	761	12	773
1000-yr	179	9	411	2	176	1	5	0	771	12	783
Floodway	0	0	0	0	0	0	0	0	0	0	0
Flood Fringe	10	3	85	0	79	0	0	0	174	3	177
High Hazard Flood Fringe	1	1	9	0	0	0	0	0	10	1	11
Flood Hazard Area	10	3	85	0	79	0	0	0	174	3	177

Notes: Sum of floodway and flood fringe larger than flood hazard area due to buildings straddling floodway and flood fringe.

### Non-residential Buildings

**Table 6** lists the number of non-residential buildings at risk by municipality for the various flood scenarios. **Figure 4** provides a chart of the data listed in the table. The total number of non-residential buildings within the flood hazard area are slightly larger than for the 100-yr flood scenario because the flood hazard area also includes “dry” areas within the floodway. As was the case for the residential buildings, the sum of the floodway and flood fringe statistics are larger than those for the flood hazard area. This is attributed to those buildings straddling the floodway and flood fringe since these buildings are included in both the floodway and flood fringe statistics. As for residential buildings, most of the non-residential buildings at risk of inundation are in Edmonton. **Table 7** lists the number of non-residential buildings in Edmonton. Most of the non-residential buildings in Edmonton at risk of inundation are not in neighbourhoods. Many of these buildings are in parks, natural areas, or at the water treatment facilities. For example, for the for the 500-year extent: 52 buildings are for Fort Edmonton Park and the John Janzen Nature Centre, 15 are for the E.L. Smith Water Treatment Plant, and 19 are for the Goldbar Wastewater Treatment Plant. A detailed summary of statistics for non-residential buildings at risk is provided in **Appendix B**.

**Table 6 Non-residential buildings at risk of inundation by municipality**

Flood Scenario	City of Edmonton	Fort Saskatchewan	Leduc County	Parkland County	Strathcona County	Sherwood Park	Sturgeon County	Town of Devon	Total
2-yr	3	0	0	0	1	0	0	0	4
5-yr	3	0	0	0	1	0	0	0	4
10-yr	5	1	0	0	2	0	0	1	9
20-yr	5	1	0	0	2	0	0	2	10
35-yr	7	2	0	1	2	0	1	2	15
50-yr	8	2	0	1	2	0	1	2	16
75-yr	12	3	0	1	2	0	1	2	21
100-yr	17	3	0	1	2	0	1	2	26
200-yr	55	3	0	1	3	0	2	2	66
350-yr	100	3	0	1	4	0	4	2	114
500-yr	139	4	0	1	4	0	6	2	156
750-yr	175	4	1	2	4	0	9	2	197
1000-yr	204	4	1	2	4	1	10	2	228
Floodway	9	2	0	1	2	0	4	2	20
Flood Fringe	12	1	0	0	0	0	0	0	13
High Hazard Flood Fringe	0	0	0	0	0	0	0	0	0
Flood Hazard Area	17	3	0	1	2	0	4	2	29

Notes: Totals for flood hazard area slightly larger than 100-yr since floodway includes “dry” areas. Sum of floodway and flood fringe larger than flood hazard area due to buildings straddling floodway and flood fringe.

**Table 7 Non-residential buildings at risk of inundation in Edmonton**

Flood Scenario	Cloverdale	Riverdale	Rossdale	Other Areas	Total
2-yr	0	0	2	1	3
5-yr	0	0	2	1	3
10-yr	0	0	2	3	5
20-yr	0	0	2	3	5
35-yr	0	0	2	5	7
50-yr	0	0	2	6	8
75-yr	0	0	2	10	12
100-yr	1	0	2	14	17
200-yr	4	3	6	42	55
350-yr	5	4	11	80	100
500-yr	6	5	16	112	139
750-yr	6	5	19	145	175
1000-yr	6	5	25	168	204
Floodway	0	0	2	7	9
Flood Fringe	1	0	0	11	12
High Hazard Flood Fringe	0	0	0	0	0
Flood Hazard Area	1	0	2	14	17

Notes: Sum of floodway and flood fringe larger than flood hazard area due to buildings straddling floodway and flood fringe.

### 4.2.3 Roadway, Railway, and Bridges

There is no CN or CPR railway at risk for any of the flood scenarios, up to and including the 1000-year flood scenario. A small segment of the LRT railway was identified to be at risk in Edmonton’s Cloverdale neighbourhood. The length of LRT line at risk ranges from 30 m at the 5-year flood scenario up to 500 m for the 1000-year scenario.

**Table 8** lists the length of roadway at risk for the various flood scenarios and **Figure 5** provides a chart of the data listed in the table. The length of road within the flood hazard area is slightly larger than for the 100-yr flood scenario because the flood hazard area also includes “dry” areas within the floodway.

**Table 8 Length of roadway at risk by municipality (in km)**

Flood Scenario	City of Edmonton	Fort Saskatchewan	Leduc County	Parkland County	Strathcona County	Sherwood Park	Sturgeon County	Town of Devon	Total
2-yr	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
5-yr	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
10-yr	0.42	0.00	0.00	0.00	1.47	0.00	0.05	0.00	1.94
20-yr	0.56	0.00	0.11	0.00	2.29	0.00	0.07	0.08	3.11
35-yr	1.30	0.14	0.15	0.02	2.60	0.00	0.09	0.15	4.45
50-yr	2.73	0.18	0.16	0.08	2.77	0.00	0.10	0.16	6.18
75-yr	6.04	0.23	0.17	0.10	3.13	0.00	0.11	0.16	9.94
100-yr	8.35	0.26	0.17	0.11	3.27	0.00	0.12	0.17	12.45
200-yr	15.07	0.33	0.19	0.15	3.39	0.00	0.50	0.22	19.85
350-yr	22.35	0.37	0.19	0.25	3.86	0.00	1.99	0.36	29.37
500-yr	25.77	0.45	0.20	0.28	4.01	0.00	2.79	0.43	33.93
750-yr	28.49	0.49	0.31	0.33	4.25	0.00	3.51	0.59	37.97
1000-yr	30.63	0.57	0.36	0.35	4.60	0.00	4.07	0.78	41.36
Floodway	1.85	0.13	0.15	0.11	3.11	0	0.67	0.16	6.18
Flood Fringe	6.5	0.13	0.02	0	0.16	0	0	0.01	6.82
High Hazard Flood Fringe	0.71	0.02	0	0	0.01	0	0	0	0.74
Flood Hazard Area	8.35	0.26	0.17	0.11	3.27	0	0.67	0.17	13

Note: Totals for flood hazard area are slightly larger than 100-yr since floodway includes “dry” areas.

A bridge was defined to be at risk when the flood level reached the low chord elevation. By this definition, there are no bridges at risk for flood level frequencies equal to or smaller than the 200-year flood magnitude. This includes the design flood scenario. **Table 9** provides a summary of the flood level clearance (elevation of the low bridge chord above the flood level) for flood frequency scenarios of 200-yr magnitude and larger. The flood level clearance is the elevation difference between the bottom chord and the flood level. When the clearance is zero the flood level has reached the bottom chord.

Negative values indicate flood levels above the low chord. Three bridges were considered to be at risk for flood frequency magnitudes of the 350-year or larger.

**Table 9 Bridges at risk for various flood scenarios**

Bridge	River Station (m)	Flood Level Clearance below Bottom Chord (m)				
		200-yr	350-yr	500-yr	750-yr	1000-yr
Devon Bridge SB	110023.00	10.68	10.17	9.87	9.53	9.29
Devon Bridge NB	109998.20	10.66	10.15	9.85	9.52	9.28
<i>SW Henday Bridge SB*</i>	<i>88248.69</i>	5.86	5.30	4.98	4.62	4.38
SW Henday Bridge NB	88202.25	14.59	14.04	13.71	13.35	13.12
Terwillegar Park Footbridge	81947.70	2.43	1.84	1.51	1.13	0.88
Ft. Edmonton Park Footbridge	79858.22	2.24	1.65	1.31	0.92	0.66
Quesnell Bridge	77536.41	6.29	5.70	5.36	4.97	4.71
Laurier Park Footbridge	74442.40	1.91	1.31	0.97	0.56	0.29
Groat Bridge	71467.34	3.80	3.17	2.83	2.41	2.14
<i>Menzies Bridge*</i>	<i>69503.73</i>	3.25	2.61	2.26	1.84	1.57
High Level Bridge	69433.41	20.04	19.40	19.05	18.64	18.36
Walterdale Bridge	68781.72	1.04	0.42	0.08	-0.33	-0.60
James MacDonald Bridge	67076.04	2.33	1.74	1.40	0.99	0.72
Low Level Bridge	66821.10	1.19	0.62	0.30	-0.11	-0.37
<i>Tawatina Bridge*</i>	<i>66112.31</i>	1.94	1.39	1.08	0.72	0.48
Dawson Bridge	64108.25	0.05	-0.50	-0.82	-1.18	-1.42
Capilano Bridge	61510.46	4.85	4.33	4.04	3.69	3.46
Capilano Park Footbridge	59939.45	2.50	2.00	1.70	1.36	1.12
Ainsworth Dyer Footbridge	58164.93	1.65	1.15	0.86	0.53	0.30
Rundle Park Footbridge	55733.80	1.59	1.09	0.80	0.46	0.23
Beverly Bridge	54764.91	11.14	10.64	10.34	10.01	9.79
Cloverbar Bridge	54619.54	12.01	11.53	11.25	10.92	10.71
CN Rail Cloverbar Bridge	54488.64	20.94	20.46	20.18	19.85	19.64
<i>NE Henday Bridge SB*</i>	<i>49842.51</i>	1.16	0.74	0.49	0.21	0.03
NE Henday Bridge NB	49798.61	8.02	7.59	7.35	7.07	6.89
Highway 15 Bridge	28920.56	5.25	4.79	4.51	4.19	3.98
CN Ft. Saskatchewan Bridge	21168.86	12.73	12.28	12.01	11.70	11.49
Vinca Bridge	231.02	4.15	3.71	3.45	3.15	2.95

Notes: Highlighted cells indicate bridges at risk and the negative values indicate that the flood level is above the low chord elevation. For those bridges denoted with an asterisk (\*) the flood level clearance is referenced to the low chord of the pedestrian bridge, which is some meters below the low chord elevation of the roadway deck.

#### 4.2.4 Estimated Population

The estimated population at risk values were based on the fraction of inundated area within each census block. This fraction was then multiplied by the total population value associated with the whole census block. This method implies an assumption that the population within a census block is uniformly distributed over the entire census block, while, in reality, the population is not evenly distributed. Thus, the reported values for population at risk should be considered as very approximate. Also, the estimated population at risk within the flood hazard area is slightly larger than for the 100-yr flood scenario because the flood hazard area also includes “dry” areas within the floodway. **Table 10** provides a summary of the population at risk by municipality for the various flood scenarios. **Figure 6** provides a chart of the data listed in the table. The vast majority of the estimated population at risk is within the City of Edmonton and Fort Saskatchewan.

**Table 10** Estimated population at risk by municipality

Flood Scenario	City of Edmonton	Fort Saskatchewan	Leduc County	Parkland County	Strathcona County	Sherwood Park	Sturgeon County	Town of Devon	Total
2-yr	165	7	0	3	2	0	1	0	178
5-yr	320	26	0	6	6	0	2	0	360
10-yr	635	37	0	8	35	0	5	7	727
20-yr	817	50	0	9	43	0	6	23	948
35-yr	991	63	1	10	46	0	8	26	1145
50-yr	1161	70	1	13	48	0	8	27	1328
75-yr	1520	258	1	15	50	0	11	28	1883
100-yr	1904	280	1	16	51	0	11	29	2292
200-yr	3270	342	1	21	53	0	13	31	3731
350-yr	4565	431	1	23	56	0	22	33	5131
500-yr	5204	531	1	26	58	0	26	34	5880
750-yr	5707	569	1	29	58	0	31	35	6430
1000-yr	5903	629	1	32	59	0	32	36	6692
Floodway	858	307	1	15	43	0	9	28	1264
Flood Fringe	1024	6	0	0	8	0	1	0	1039
High hazard Flood Fringe	280	2	0	0	6	0	0	0	288
Flood Hazard Area	1882	313	1	15	51	0	10	28	2303

Note: Totals for flood hazard area are slightly larger than 100-yr since floodway includes “dry” areas.

## 5 CONCLUSIONS

The objectives of this study were to assess river flood-related hazards along the North Saskatchewan River. Municipalities affected by flooding in the study area include Devon, Parkland County, Edmonton, Strathcona County, Sturgeon County, and Fort Saskatchewan. This report summarizes the work of the **Flood Risk Assessment and Inventory** study component.

Inventory data for the flood risk assessment were assembled including administrative boundaries, bridges, buildings, cadastral data, census dissemination blocks, rail network, and road network. Flood risk statistics were computed for thirteen flood frequency scenarios (2-, 5-, 10-, 20-, 35-, 50-, 75-, 100-, 200-, 350-, 500-, 750-, and 1000-year return period open water floods) and the design flood scenario. Statistics for the design flood scenario were provided for the floodway, flood fringe, high hazard flood fringe, and flood hazard area extents. These data were overlaid with the extent of inundation for each respective flood scenario to quantify the following statistics:

- Number of land parcels at risk.
- Number of residential buildings at risk.
- Number of non-residential buildings at risk.
- Length of roadway at risk.
- Length of railway at risk.
- Population at risk.

The data were tabulated, grouped, and presented according to municipality. Most of the inventory data identified as being at risk resides in the City of Edmonton so risk data for land parcels and buildings were also presented according to those neighbourhoods most affected by inundation (Rossdale, Cloverdale, and Riverdale).

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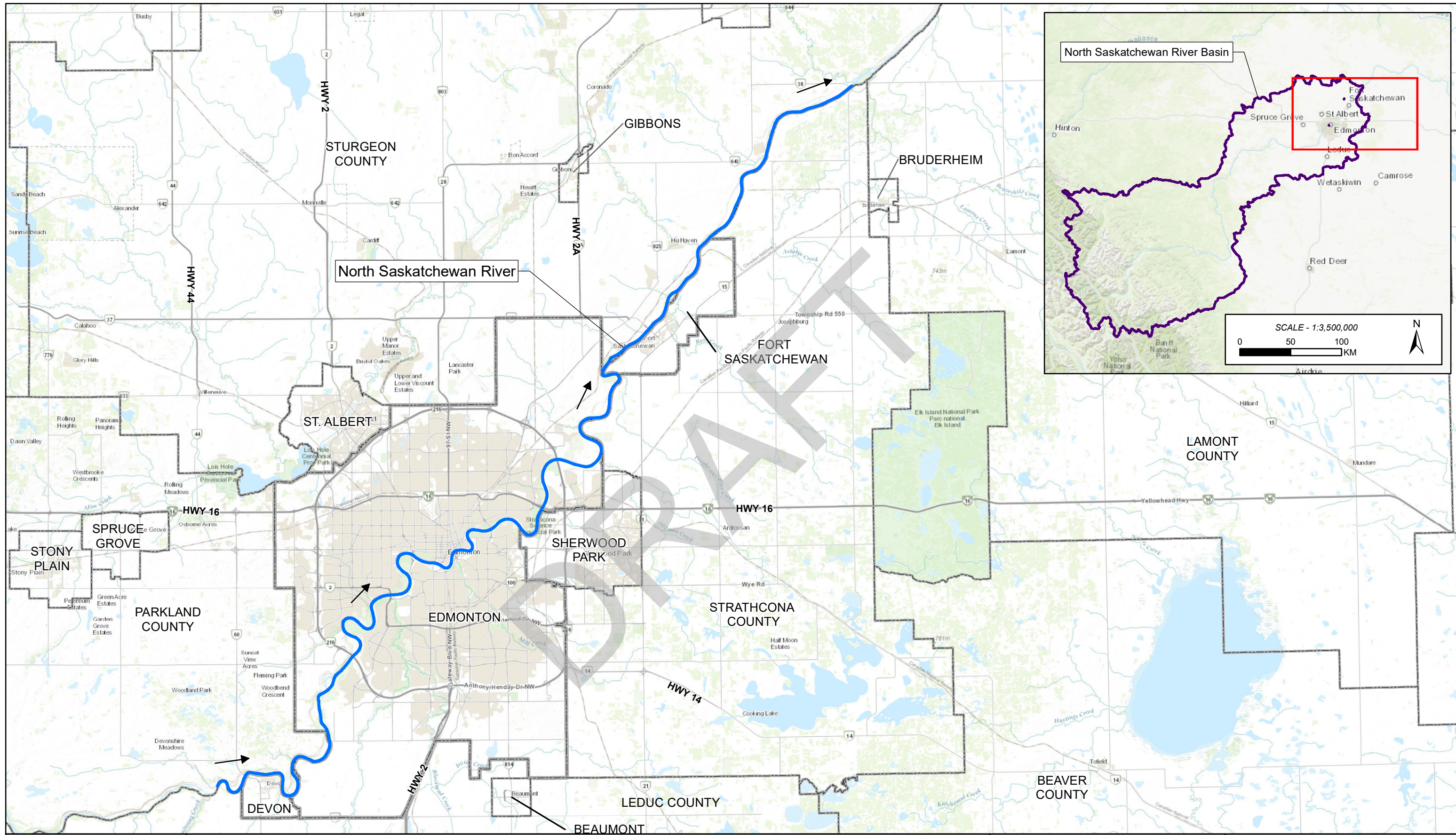
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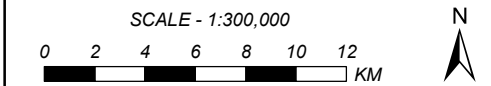
**FIGURES**

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- ➔ FLOW DIRECTION
- STUDY REACH
- ▭ MUNICIPAL BOUNDARY

DATA SOURCES: Basemap from Esri & NRCAN.

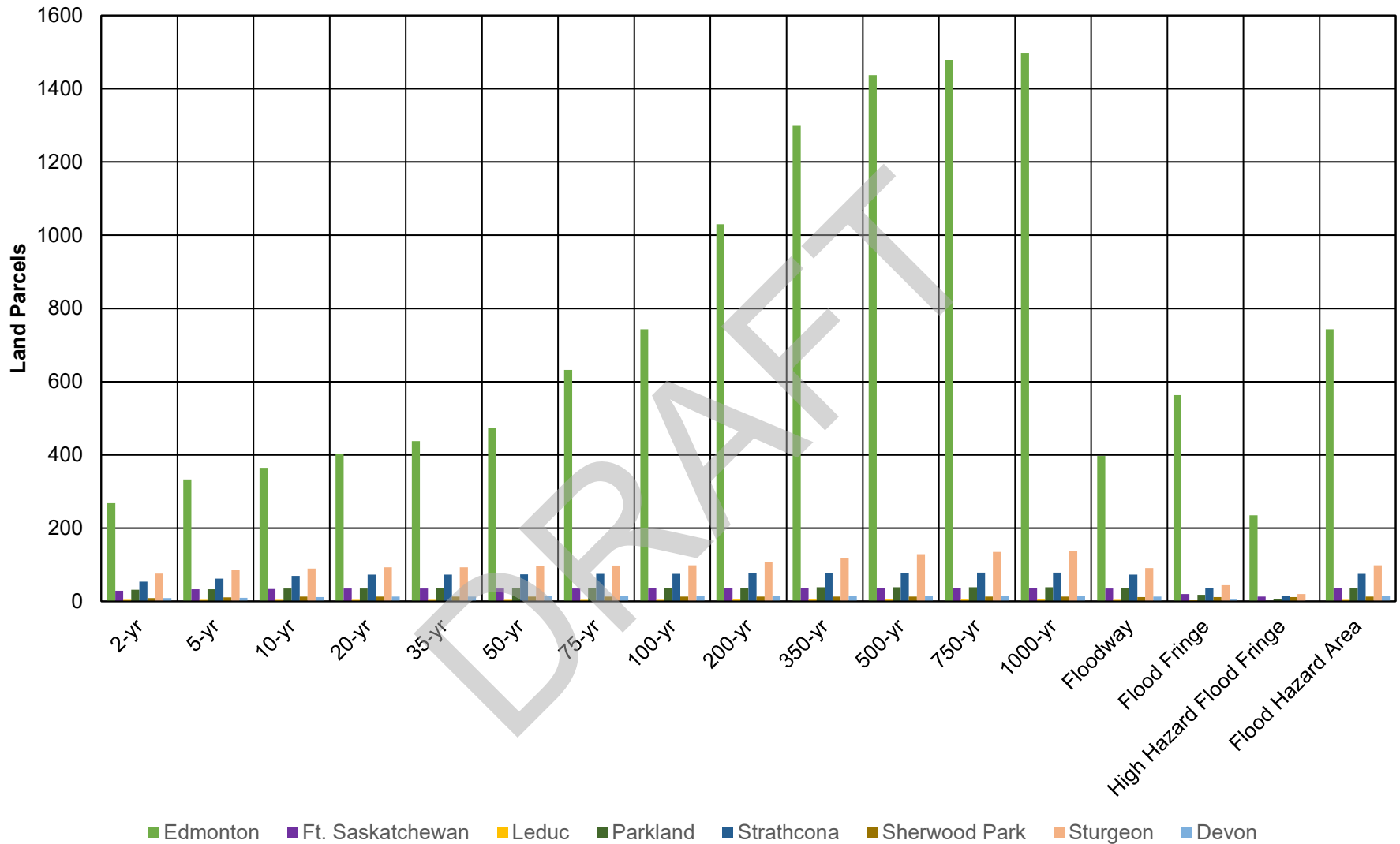


Coordinate System: NAD 1983 CSRS 3TM 114;  
Vertical Datum: CGVD28 HTv2.0; Units: Metres

Job: 1003870      Date: 24-APR-2020

**NORTH SASKATCHEWAN RIVER  
HAZARD STUDY  
FLOOD RISK ASSESSMENT  
AND INVENTORY  
STUDY AREA**

**FIGURE 1**

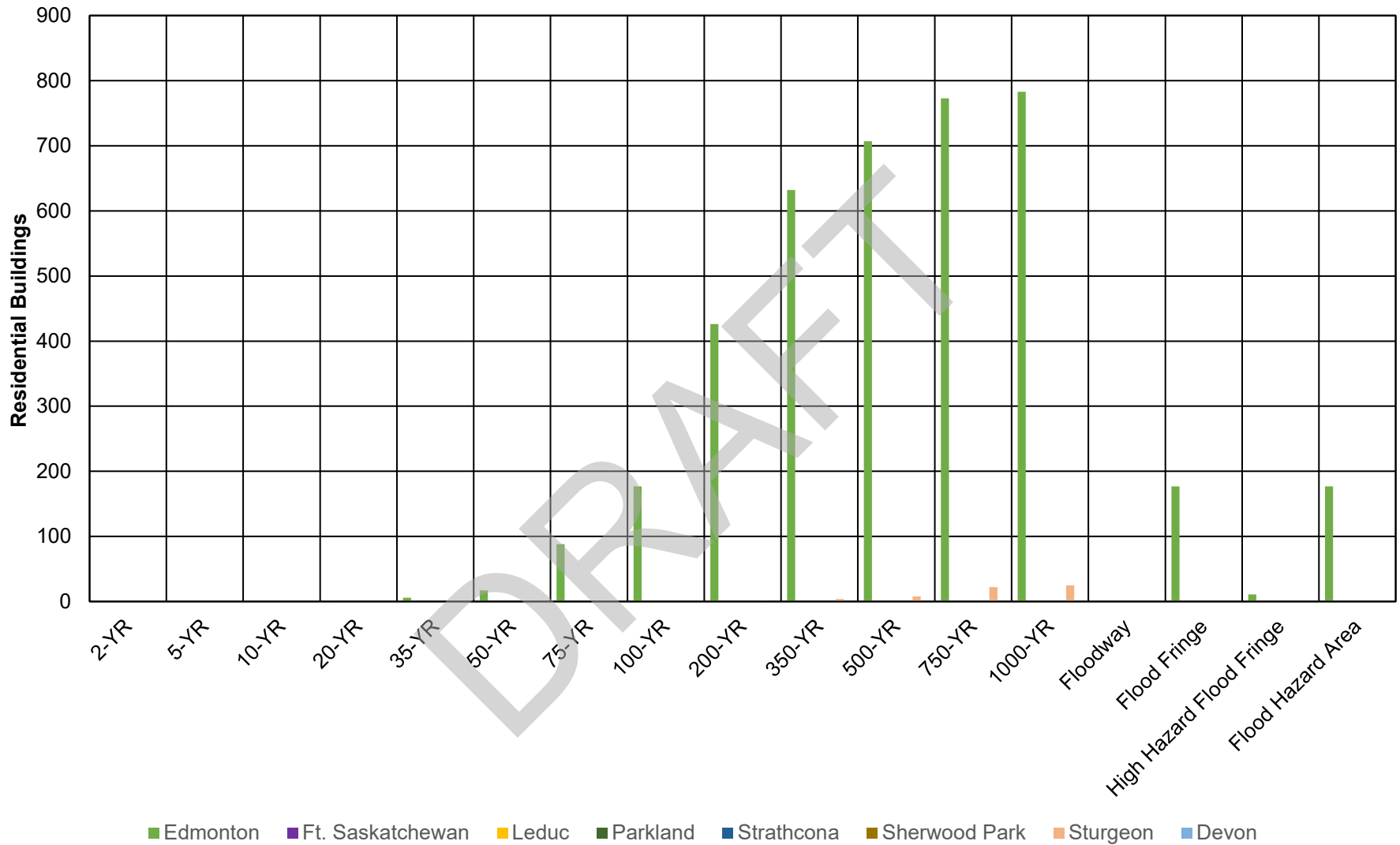


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NORTH RIVER HAZARD STUDY  
 FLOOD RISK ASSESSMENT AND INVENTORY  
 LAND PARCELS AT RISK OF INUNDATION  
 BY MUNICIPALITY

FIGURE 2

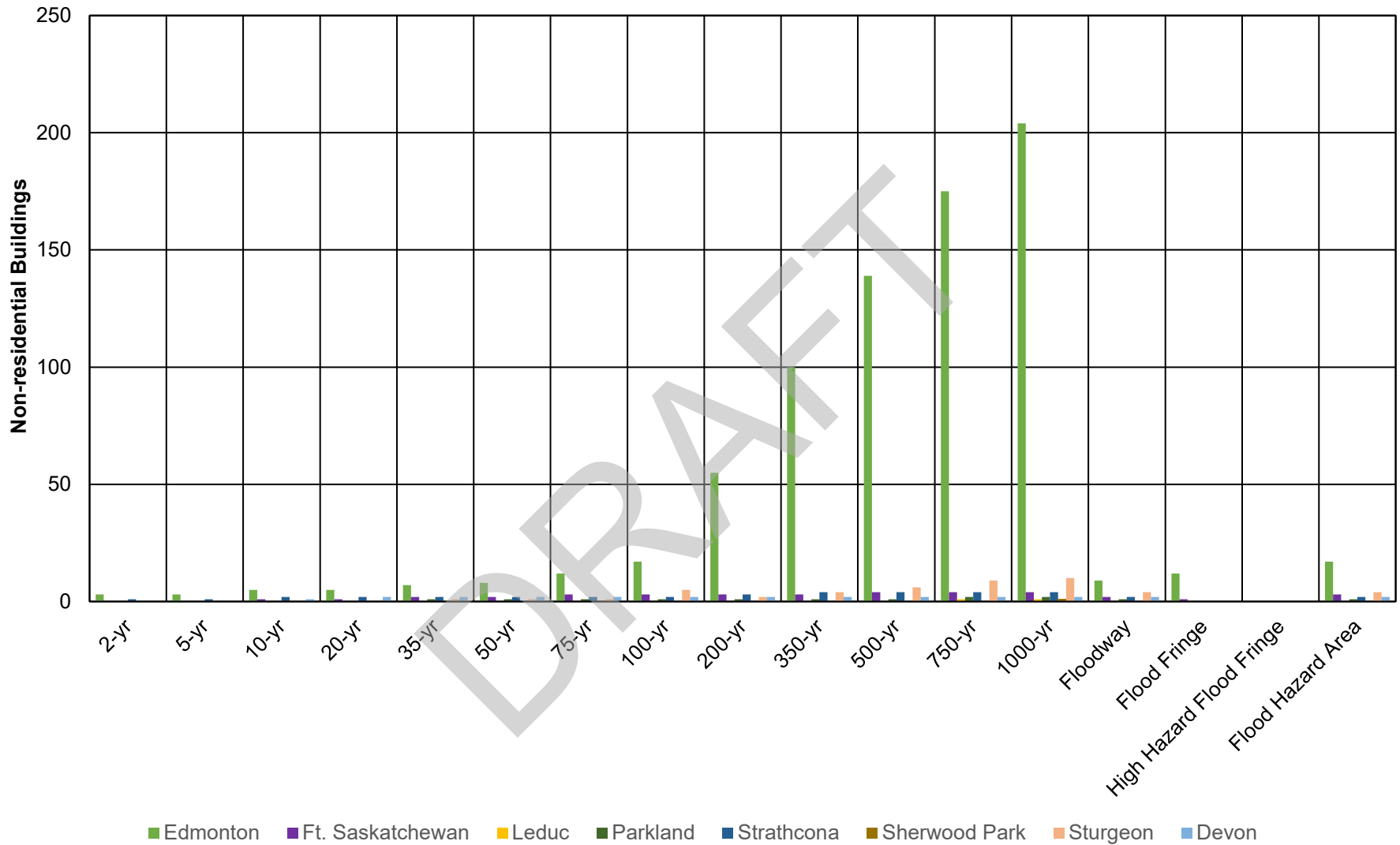


Project No.: 1003870

Date: 30-NOV-2022

**NORTH RIVER HAZARD STUDY  
FLOOD RISK ASSESSMENT AND INVENTORY  
RESIDENTIAL BUILDINGS AT RISK OF INUNDATION  
BY MUNICIPALITY**

**FIGURE 3**

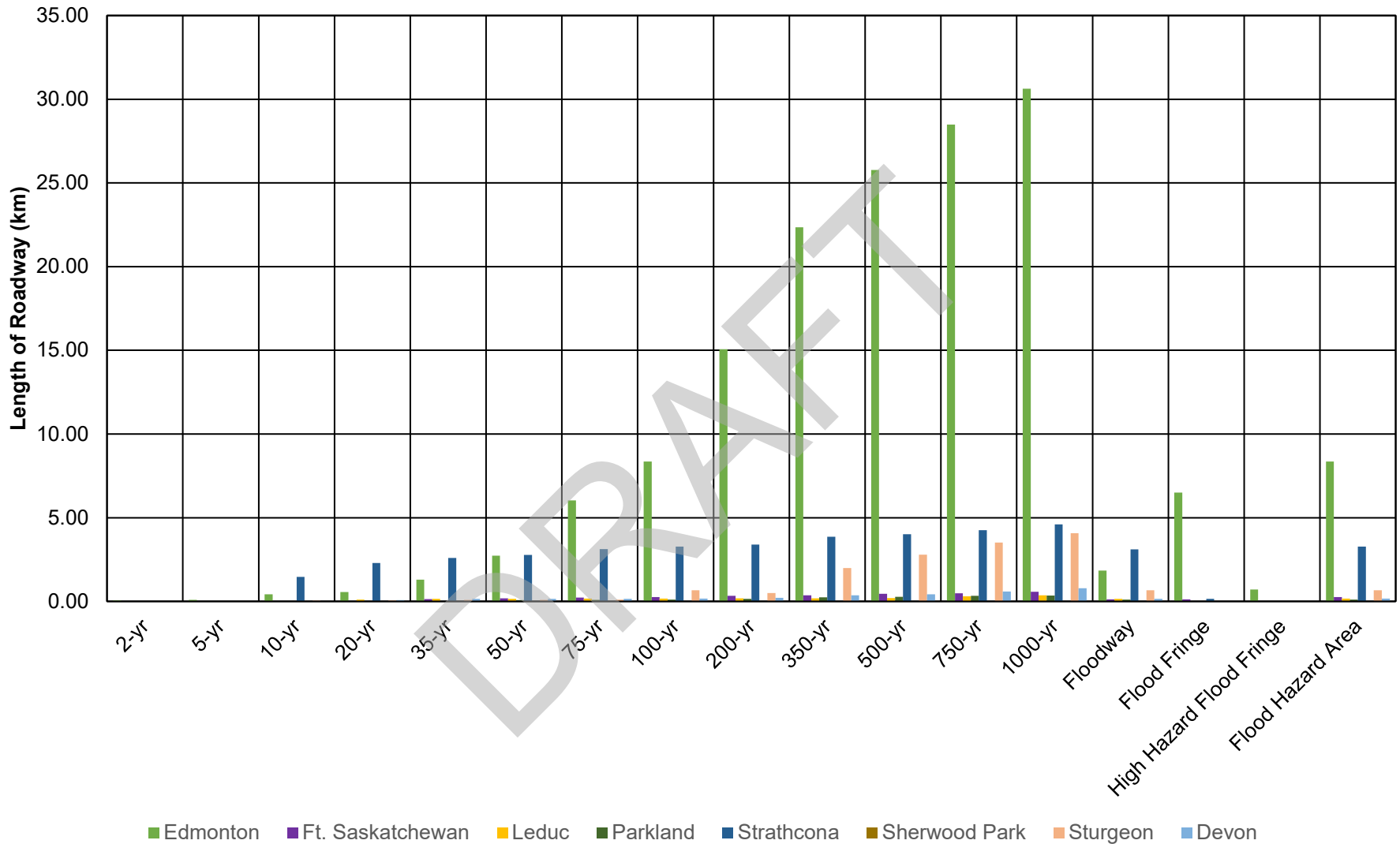


Project No.: 1003870

Date: 30-NOV-2022

**NORTH RIVER HAZARD STUDY  
FLOOD RISK ASSESSMENT AND INVENTORY  
NON-RESIDENTIAL BUILDINGS AT RISK OF  
INUNDATION BY MUNICIPALITY**

**FIGURE 4**

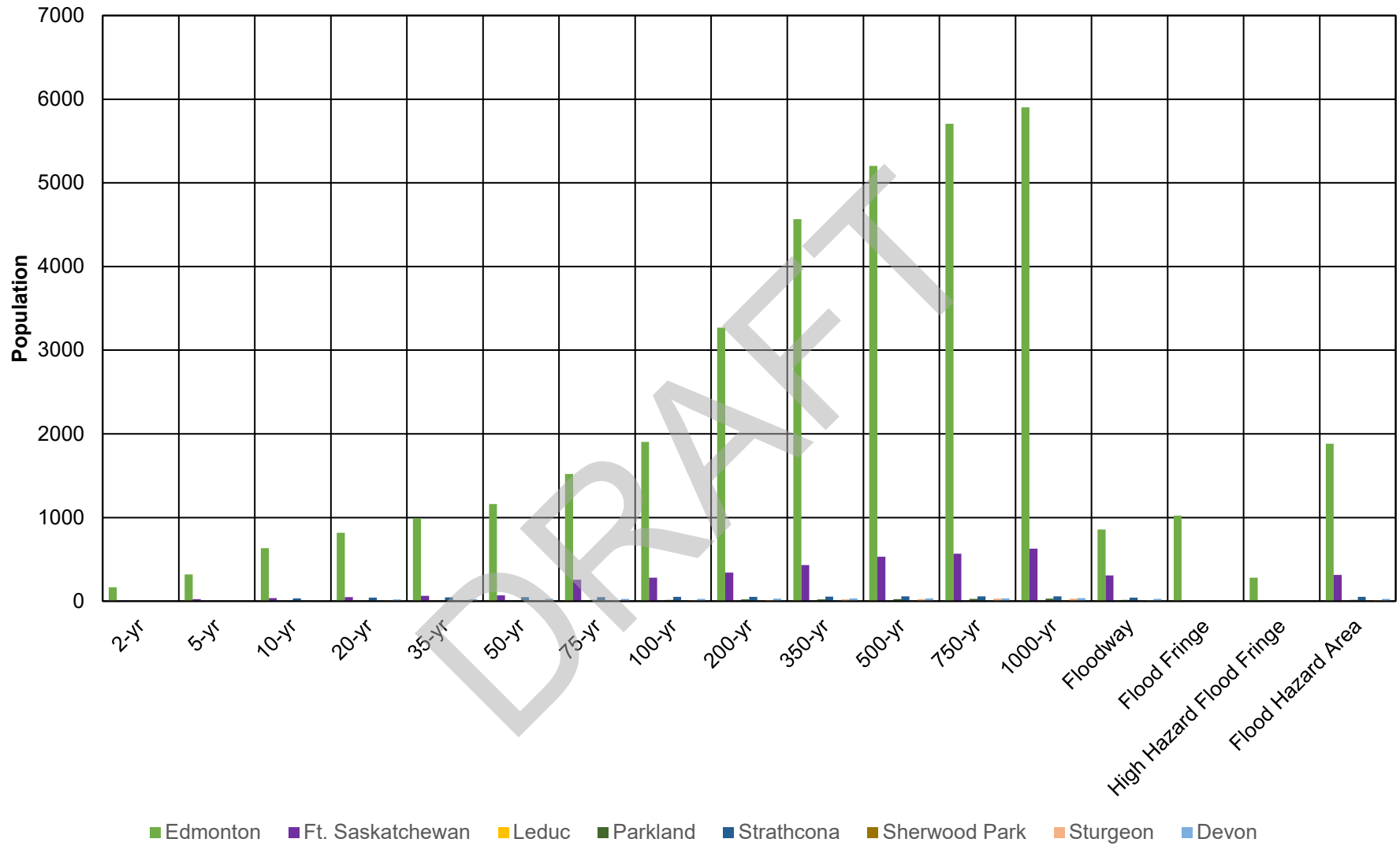


Project No.: 1003870

Date: 30-NOV-2022

**NORTH RIVER HAZARD STUDY  
FLOOD RISK ASSESSMENT AND INVENTORY  
LENGTH OF ROADWAY AT RISK OF INUNDATION  
BY MUNICIPALITY**

**FIGURE 5**



Project No.: 1003870

Date: 30-NOV-2022

**NORTH RIVER HAZARD STUDY  
FLOOD RISK ASSESSMENT AND INVENTORY  
ESTIMATED POPULATION AT RISK OF INUNDATION  
BY MUNICIPALITY**

**FIGURE 6**

**APPENDIX A  
SPATIAL DATA DIGITAL FILES**

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**Table A1 Inventory Data**

Feature Class	File Name	Attributes			Supporting Feature Class
		Name	Description	Value Assignment	
Cadastral	Cadastral	Source	Data source	From original sources	Title of ownership data from Altalis, cadastral data for City of Edmonton, masked with NHN data
		PID	Parcel identification number	From original source (for City of Edmonton only)	Title of ownership data from Altalis, cadastral data for City of Edmonton
		PLAN_NO	Legal description	From original source (for City of Edmonton only)	Title of ownership data from Altalis, cadastral data for City of Edmonton
		BLOCK_NO	Legal description	From original source (for City of Edmonton only)	Title of ownership data from Altalis, cadastral data for City of Edmonton
		LOT_NO	Legal description	From original source (for City of Edmonton only)	Title of ownership data from Altalis, cadastral data for City of Edmonton
		Zoning_Description	Description of zoning	From original source (for City of Edmonton only)	Title of ownership data from Altalis, cadastral data for City of Edmonton
		Zoning	Zoning of parcel on which structure is located	From original source (for City of Edmonton only)	Title of ownership data from Altalis, cadastral data for City of Edmonton
		Community	Name of sub-administrative area in which feature is located	NHC assigned based on administrative sub boundaries	
Municipality	Name of administrative area in which feature is located	NHC assigned			
Structures	Structures	Source	Data source	From original source (for noted administrative areas). Others were manually digitized from aerial imagery.	City of Edmonton buildings, Strathcona County buildings, Fort Saskatchewan buildings, Aerial imagery
		Accessory	0 for main building, 1 for accessory	NHC assigned	
		Subclass_1	Residential or Non-residential	NHC assigned	
		Subclass_2	Use of building (Government, Multi-unit residential, Other non-residential, Single family, School, Commercial, Industrial, Wastewater treatment facility, Water treatment facility)	NHC assigned	
		Remarks	Name or use of significant structure, including Fire Station	NHC assigned	
		Zoning	Zoning of parcel on which structure is located	NHC assigned based on Cadastral data	City of Edmonton Cadastral data
		Zoning_Description	Description of zoning	NHC assigned based on Cadastral data	City of Edmonton Cadastral data
		Land_Use	Land use	NHC assigned based on Cadastral data	City of Edmonton Cadastral data
		Community	Name of sub-administrative area in which feature is located	NHC assigned based on sub-admin areas	Administrative sub-boundaries
		Municipality	Name of administrative area in which feature is located	NHC assigned based on sub-admin areas	Administrative sub-boundaries

Feature Class	File Name	Attributes			Supporting Feature Class
		Name	Description	Value Assignment	
Census Dissemination Blocks	CensusBlocks	DBUID	Unique ID # of dissemination block	From original source (filtered by location and above 0 pop, NHN waterbodies removed, islands and unpopulated opposite banks manually removed)	StatsCan: Boundary Files
		FedName	Federal electoral district name	From original source	StatsCan: Boundary Files
		DBpop2016	2016 Census dissemination block population	From original source	StatsCan: 2016 Census Results
		DBtdwell20	2016 Census dissemination block total private dwellings	From original source	StatsCan: 2016 Census Results
		DBurdwell2	2016 Census private dwellings occupied by usual residents	From original source	StatsCan: 2016 Census Results
		Municipality	Name of administrative area in which feature is located	From original source	StatsCan: Boundary Files
Roadways	Roadways	StreetName	Name of street	From original source (filtered by location and intersected at sub-admin boundaries)	NRCan: National Road Network
		Municipality	Name of administrative area in which feature is located	From original source	NRCan: National Road Network
		Community	Name of sub-administrative area in which feature is located	NHC assigned	Administrative sub-boundaries
		CommunityType	Type of sub-admin area where road section is located	NHC assigned	Administrative sub-boundaries
Railways	LRT_and_Rail	TrackName	Name of track section	From original source (filtered by location, intersected at sub-admin boundaries). Assigned as "LRT" for LRT portion	NRCan: National Railway Network City of Edmonton LRT
		TrackClass	Class of track	From original source	NRCan: National Railway Network City of Edmonton LRT
		Owner	Track owner	From original source. Assigned as City of Edmonton for LRT	NRCan: National Railway Network City of Edmonton LRT
		Community	Name of sub-administrative area in which feature is located	from Sub-Admin Areas	Administrative sub-boundaries
		CommunityType	Type of sub-admin area where track section is located	from Sub-Admin Areas	Administrative sub-boundaries
		Municipality	Name of admin area where track section is located	from Sub-Admin Areas	Administrative sub-boundaries
Bridges	Bridge	BridgeName	Bridge name	From original source	Bridges
		Description	Name of road which crosses bridge	From original source	Bridges
		RS	River station	From original source	Bridges
		WIDTH	Width of bridge	From original source	Bridges
		BF_No	AT identification number	From original source	Bridges
		LeftMunicipality	Administrative area of left side of bridge	NHC assigned based on sub-admin boundaries. If on the border between boundaries, assigned to upstream area	Administrative sub-boundaries
		RightMunicipality	Administrative area of right side of bridge	NHC assigned based on sub-admin boundaries. If on the border between boundaries, assigned to upstream area	Administrative sub-boundaries
		RightCommunity	Sub-administrative area of right side of bridge	NHC assigned based on sub-admin boundaries. If on the border between boundaries, assigned to upstream area	Administrative sub-boundaries
LeftCommunity	Sub-administrative area of left side of bridge	NHC assigned based on sub-admin boundaries. If on the border between boundaries, assigned to upstream area	Administrative sub-boundaries		

**Table A2 Administrative Areas**

Feature Class	File Name	Attributes			Supporting Feature Class
		Name	Description	Value Assignment	
Administrative boundaries	Municipalities	Municipality	Name of administrative area	From original source	Administrative Boundaries
		AdminType	Type of administrative area	From original source	Administrative Boundaries
Administrative sub-boundaries	Communities	Community	Name of sub-administrative area. Blank for un-named areas	From original source	Strathcona Sub-admin Areas, Parkland County Subdivisions, Edmonton Sub-admin Areas, Fort Saskatchewan Sub-Admin Areas
		Type	Residential, Industrial, Park, Other, or blank for area surrounding Anthony Henday	NHC assigned based on name and visual inspection	
		Municipality	Name of administrative area	NHC assigned based on Municipalities boundaries	

**Table A3 Supporting Feature Classes**

Dataset	Description	Source
Strathcona County Sub-admin Areas		Strathcona County
Parkland County Subdivisions	Un-named subdivisions in Parkland County	Parkland County
Edmonton Sub-admin Areas		City of Edmonton
Fort Saskatchewan Sub-admin Areas		City of Fort Saskatchewan
City of Edmonton buildings	Obtained from Edmonton Open Data Portal	City of Edmonton
Strathcona County buildings	Obtained from Strathcona County Open Data Portal	Strathcona County
Fort Saskatchewan buildings	Obtained from Fort Saskatchewan Planning Department	City of Fort Saskatchewan
Aerial Imagery	Used to manually digitize structures data for buildings outside of Edmonton, Fort Saskatchewan and Strathcona County	OGL Engineering Ltd.
Administrative Boundaries	Compiled from Municipal Districts, Cities, and Towns shapefiles acquired from Altalis; updated Edmonton boundary (annexed territory from Leduc County) provided by City of Edmonton	Altalis, City of Edmonton
Outside of Edmonton Cadastral	cadastral data for area outside of City of Edmonton, no zoning information available	Altalis
Edmonton Cadastral	Cadastral data for City of Edmonton purchased from their mapping group, combined with zoning and land use information obtained from the Edmonton Open Data Portal	City of Edmonton
Roads	National Road Network; minor edits made by NHC to ensure data is accurate and up-to-date	NRCan - National Road Network
Rail	National Railway Network; minor edits made by NHC to ensure data is accurate and up-to-date	NRCan - National Railway Network
Bridges	Bridges surveyed by NHC in Task 100 - Survey and Base Data Collection	NHC
Dissemination Boundary File, 2016 Census Results	Delivered as a dissemination boundary shapefile and separate excel table with 2016 census results; joined by NHC	Statistics Canada
NHN waterbodies from 05DF000 and 05EB000	Waterbodies used to exclude unpopulated areas from census blocks and cadastral data	NRCan - National Hydrographic Network

**APPENDIX B**  
**DETAILED SUMMARY STATISTICS FOR NON-RESIDENTIAL BUILDINGS AT RISK**

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**Table B Detailed Summary Statistics for Non-residential Buildings at Risk**

Flood Scenario	Number of Non-residential Buildings at Risk of Inundation by Municipality																								By Total Inundated Area																													
	Edmonton					Fort Saskatchewan					Leduc County					Parkland County					Strathcona County					Sherwood Park					Sturgeon County					Town of Devon																		
<b>200-yr</b>	SCH 0	GOV 25	WT 13	WWT 2	OTH 15	Total 55	SCH 0	GOV 0	WT 0	WWT 1	OTH 2	Total 3	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 1	OTH 2	Total 3	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 25	WT 13	WWT 2	OTH 15	Total 55	SCH 0	GOV 25	WT 13	WWT 5	OTH 23	Total 66
<b>100-yr</b>	SCH 0	GOV 2	WT 4	WWT 1	OTH 10	Total 17	SCH 0	GOV 0	WT 0	WWT 1	OTH 2	Total 3	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 2	WT 4	WWT 2	OTH 10	Total 17	SCH 0	GOV 2	WT 4	WWT 2	OTH 18	Total 26
<b>75-yr</b>	SCH 0	GO 2	WT 3	WW 1	OTH 6	Total 12	SCH 0	GO 0	WT 0	WW 1	OTH 2	Total 3	SCH 0	GO 0	WT 0	WW 0	OTH 0	Total 0	SCH 0	GO 0	WT 0	WW 0	OTH 1	Total 1	SCH 0	GO 0	WT 0	WW 0	OTH 2	Total 2	SCH 0	GO 0	WT 0	WW 0	OTH 1	Total 1	SCH 0	GO 2	WT 3	WW 2	OTH 14	Total 21	SCH 0	GO 2	WT 3	WW 2	OTH 14	Total 21						
<b>50-yr</b>	SCH 0	GOV 1	WT 3	WWT 1	OTH 3	Total 8	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 1	WT 3	WWT 1	OTH 11	Total 16	SCH 0	GOV 1	WT 3	WWT 1	OTH 11	Total 16						
<b>35-yr</b>	SCH 0	GOV 1	WT 3	WWT 1	OTH 2	Total 7	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 1	WT 3	WWT 1	OTH 10	Total 15	SCH 0	GOV 1	WT 3	WWT 1	OTH 10	Total 15						
<b>20-yr</b>	SCH 0	GOV 1	WT 2	WWT 0	OTH 2	Total 5	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 1	WT 2	WWT 0	OTH 7	Total 10	SCH 0	GOV 1	WT 2	WWT 0	OTH 7	Total 10
<b>10-yr</b>	SCH 0	GOV 1	WT 2	WWT 0	OTH 2	Total 5	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 1	WT 2	WWT 0	OTH 1	Total 1	SCH 0	GOV 1	WT 2	WWT 0	OTH 6	Total 9	SCH 0	GOV 1	WT 2	WWT 0	OTH 6	Total 9
<b>5-yr</b>	SCH 0	GOV 0	WT 2	WWT 0	OTH 1	Total 3	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 2	WWT 0	OTH 2	Total 4	SCH 0	GOV 0	WT 2	WWT 0	OTH 2	Total 4
<b>2-yr</b>	SCH 0	GOV 0	WT 2	WW 0	OTH 1	Total 3	SCH 0	GOV 0	WT 0	WW 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WW 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WW 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WW 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WW 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WW 0	OTH 0	Total 0	SCH 0	GOV 0	WT 2	WW 0	OTH 2	Total 4	SCH 0	GOV 0	WT 2	WW 0	OTH 2	Total 4

Flood Scenario	Number of Non-residential Buildings at Risk of Inundation by Municipality														By Total Inundated Area																																							
	Edmonton			Fort Saskatchewan			Leduc County			Parkland County			Strathcona County			Sherwood Park			Sturgeon County			Town of Devon																																
350-yr	SCH 2	GOV 55	WT 19	WWT 2	OTH 22	Total 100	SCH 0	GOV 0	WT 0	WWT 1	OTH 2	Total 3	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 2	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 1	OTH 3	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 2	GOV 55	WT 19	WWT 6	OTH 32	Total 114
500-yr	SCH 3	GOV 71	WT 21	WWT 19	OTH 25	Total 139	SCH 0	GOV 1	WT 0	WWT 1	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 2	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 1	OTH 5	Total 6	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 3	GOV 72	WT 21	WWT 23	OTH 37	Total 156
750-yr	SCH 0	GOV 0	WT 2	WWT 0	OTH 1	Total 3	SCH 0	GOV 1	WT 0	WWT 1	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 2	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Total 0	SCH 0	GOV 0	WT 0	WWT 1	OTH 8	Total 9	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 1	WT 2	WWT 4	OTH 18	Total 25
1000-yr	SCH 3	GOV 97	WT 33	WWT 46	OTH 25	Total 204	SCH 0	GOV 1	WT 0	WWT 1	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 0	GOV 0	WT 0	WWT 2	OTH 2	Total 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Total 1	SCH 0	GOV 0	WT 0	WWT 1	OTH 9	Total 10	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Total 2	SCH 3	GOV 98	WT 33	WWT 50	OTH 44	Total 228
Floodway	SCH 0	GOV 1	WT 3	WWT 1	OTH 4	Σ 9	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Σ 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Σ 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Σ 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 4	Σ 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Σ 2	SCH 0	GOV 1	WT 3	WWT 1	OTH 15	Σ 20
Flood Fringe	SCH 0	GOV 2	WT 2	WWT 0	OTH 8	Σ 12	SCH 0	GOV 0	WT 0	WWT 1	OTH 0	Σ 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 2	WT 2	WWT 1	OTH 8	Σ 13						
High Hazard	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0						
Design Flood	SCH 0	GOV 2	WT 4	WWT 1	OTH 10	Σ 17	SCH 0	GOV 0	WT 0	WWT 1	OTH 2	Σ 3	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 1	Σ 1	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Σ 2	SCH 0	GOV 0	WT 0	WWT 0	OTH 0	Σ 0	SCH 0	GOV 0	WT 0	WWT 0	OTH 4	Σ 4	SCH 0	GOV 0	WT 0	WWT 0	OTH 2	Σ 2	SCH 0	GOV 2	WT 4	WWT 2	OTH 21	Σ 29