



**UPPER BOW RIVER HAZARD STUDY
ICE JAM FLOOD INUNDATION MAP LIBRARY**



Prepared for:



Alberta Environment and Parks



25 September 2018

NHC Ref. No. 3001178

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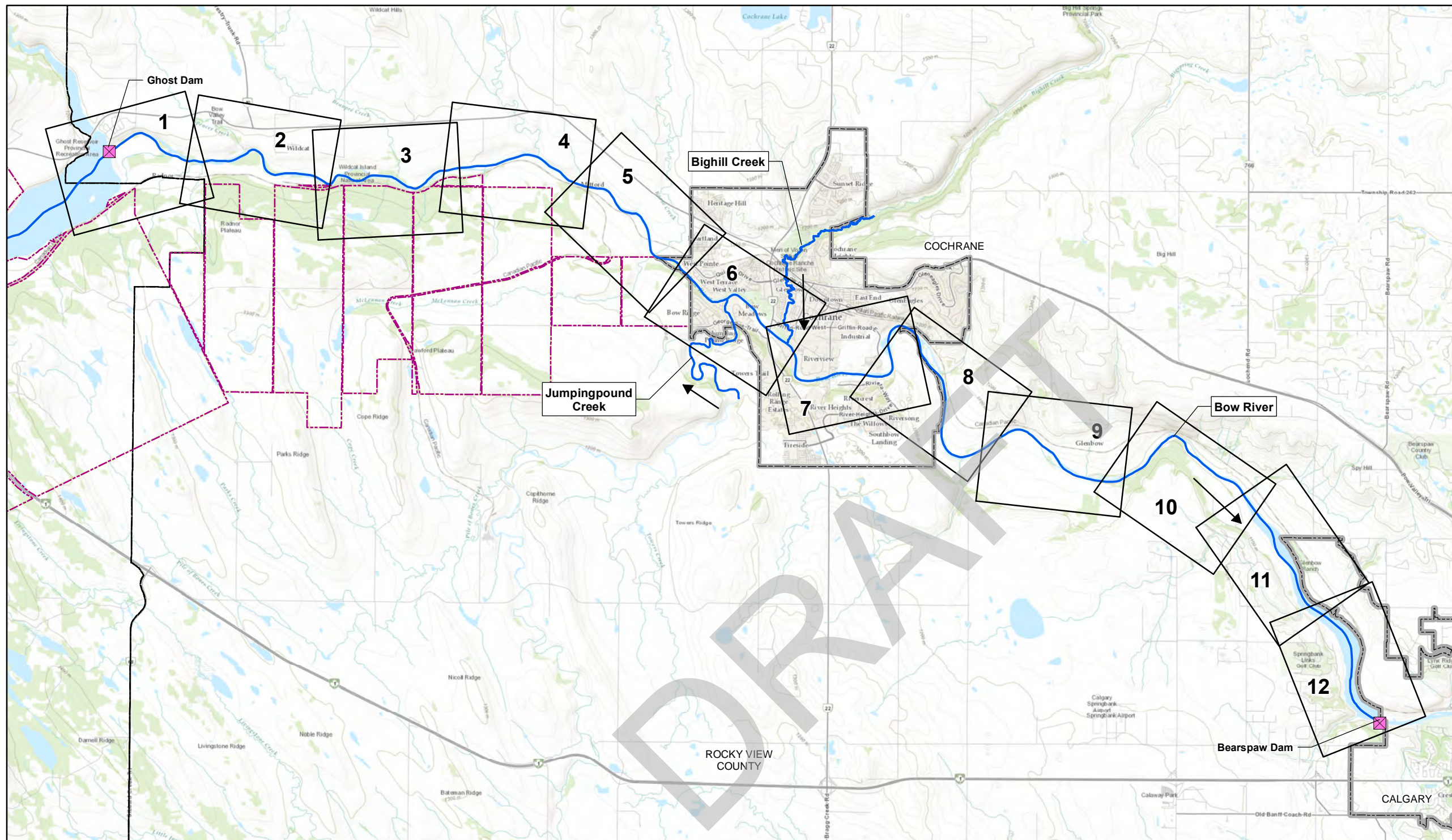
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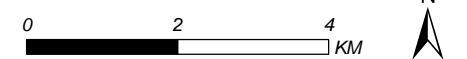
ICE JAM FLOOD INUNDATION INDEX MAP

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- ◆ Dam
- ▭ Summer Village
- ▭ Town
- ▭ City
- ▭ First Nation Reserve
- ▭ County or Municipal District

SCALE - 1:100,000



Coordinate System: NAD 1983 3TM 114
Units: METRES

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3001178	25-SEP-2018

UPPER BOW RIVER HAZARD STUDY

ICE JAM FLOOD INUNDATION INDEX MAP

INDEX MAP

Notes to Users:

- Please refer to the accompanying **Upper Bow River Hazard Study – Ice Jam Modelling Assessment and Flood Hazard Identification Report** (issued on 20 Sep 2018) for important information concerning these maps.
- Within the flood inundation areas shown on this map, there may be isolated pockets of high ground. To determine whether or not a particular site is subject to flooding, reference should be made to the computed flood levels in conjunction with site-specific surveys where detailed definition is required.
- Non-riverine and local sources of water have not been considered, and structures such as roads, railways or barriers such as levees can restrict water flow and affect local flood levels. Channel obstruction, local stormwater inflow, groundwater seepage or other land drainage can cause flood levels to exceed those indicated on the map. Lands adjacent to a flooded area may be subject to flooding from tributary streams not indicated on the maps.
- Backwater flood inundation along Bighill Creek and Jumpingpound Creek was determined using simulated water levels from the Bow River.
- Line work for bridges and flood control structures is shown above flood inundation areas, even in cases where bridges or flood control structures are inundated.

Definitions:

Flood Inundation Mapping - Delineates flood inundation areas, showing the extent of one or more flood scenarios under existing conditions. Depending on the particular flood scenario, the mapping may be divided into multiple zones. Flood inundation mapping is typically used for near real-time emergency response planning and operations.

Flood Inundation Area - The area inundated during a particular flood scenario under existing conditions. The flood inundation area may be divided into multiple zones, including areas inundated due to potential flood control structure failure and isolated areas that may become inundated due to groundwater seepage or other subsurface connections. Flood inundation areas may change as a result of future development or flow obstructions.

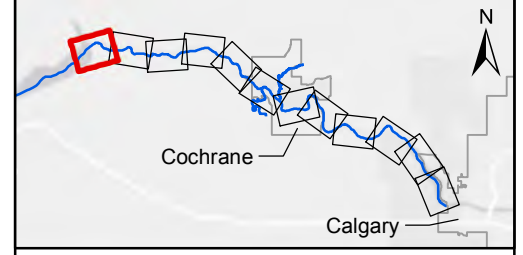
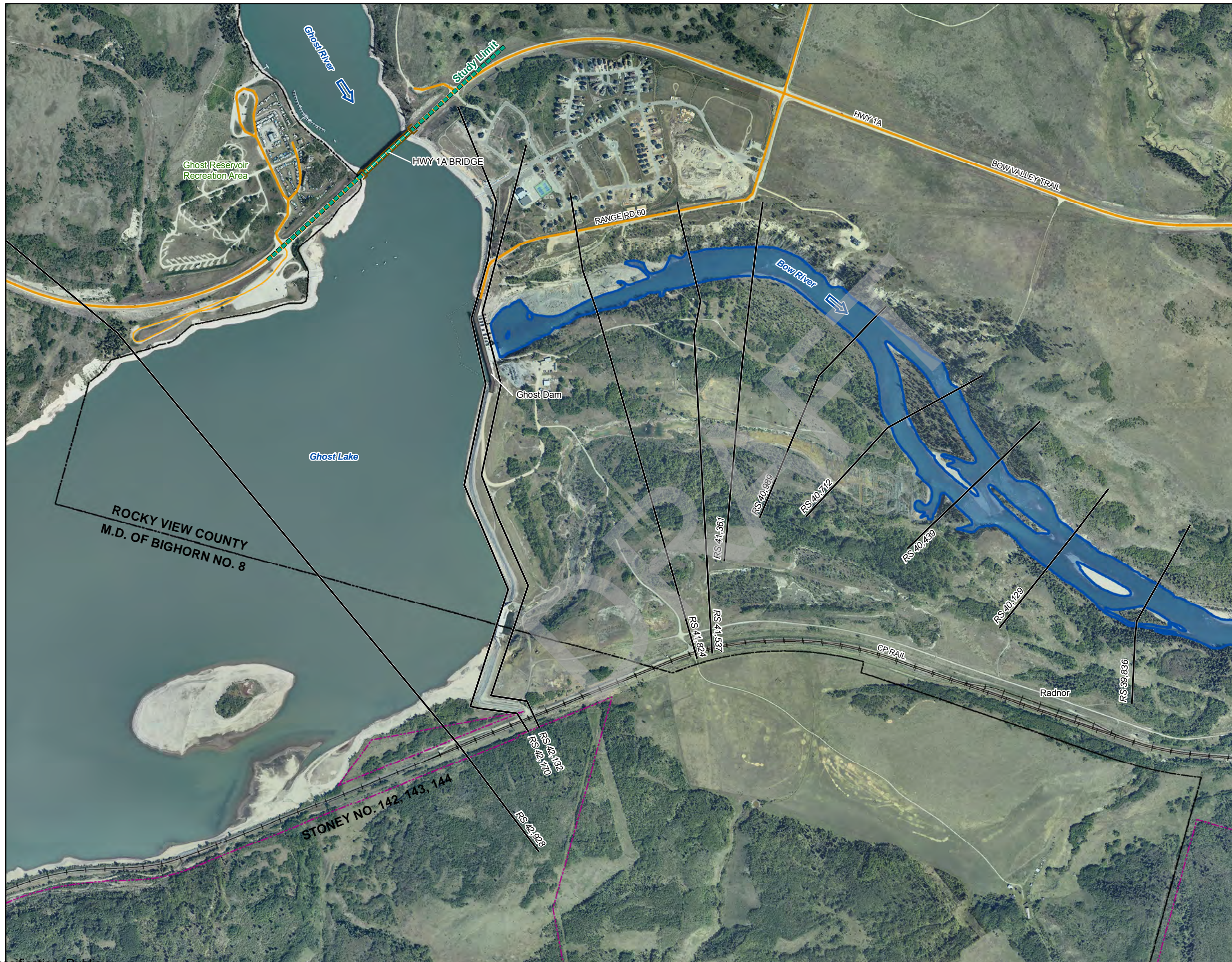
Flood Scenario - Water level conditions that describe a particular flood event. Flood scenarios under ice jam conditions represent a combination of discharge and ice jam conditions that produce water levels for a selected return period. The flood scenarios included with this map set include the 50-year, 100-year, and 200-year ice jam flood events.

Data Sources and References:

- Orthophoto imagery acquired by ORTHOSHOP Geomatics Ltd. (3 June 2016) for Alberta Environment and Parks.
- Base data from Town of Canmore, M.D. Bighorn, Town of Cochrane, Alberta Environment and Parks, AltaLIS and Natural Resources Canada.
- Additional base mapping from Esri.

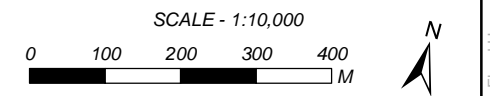
**50 - YEAR ICE JAM FLOOD INUNDATION MAPS
(SHEETS 1 TO 12)**

DRAFT



- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
- BRIDGE
- RAILWAY
- MAJOR ROAD
- LOCAL ROAD
- CITY
- TOWN
- SUMMER VILLAGE
- COUNTY OR MUNICIPAL DISTRICT
- FIRST NATION RESERVE
- STUDY LIMIT
- 50-YEAR FLOOD INUNDATION EXTENT
- 50-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

SHEET 2 ↓

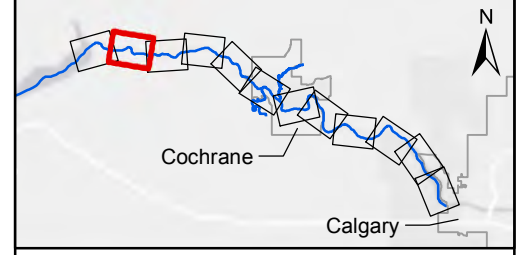
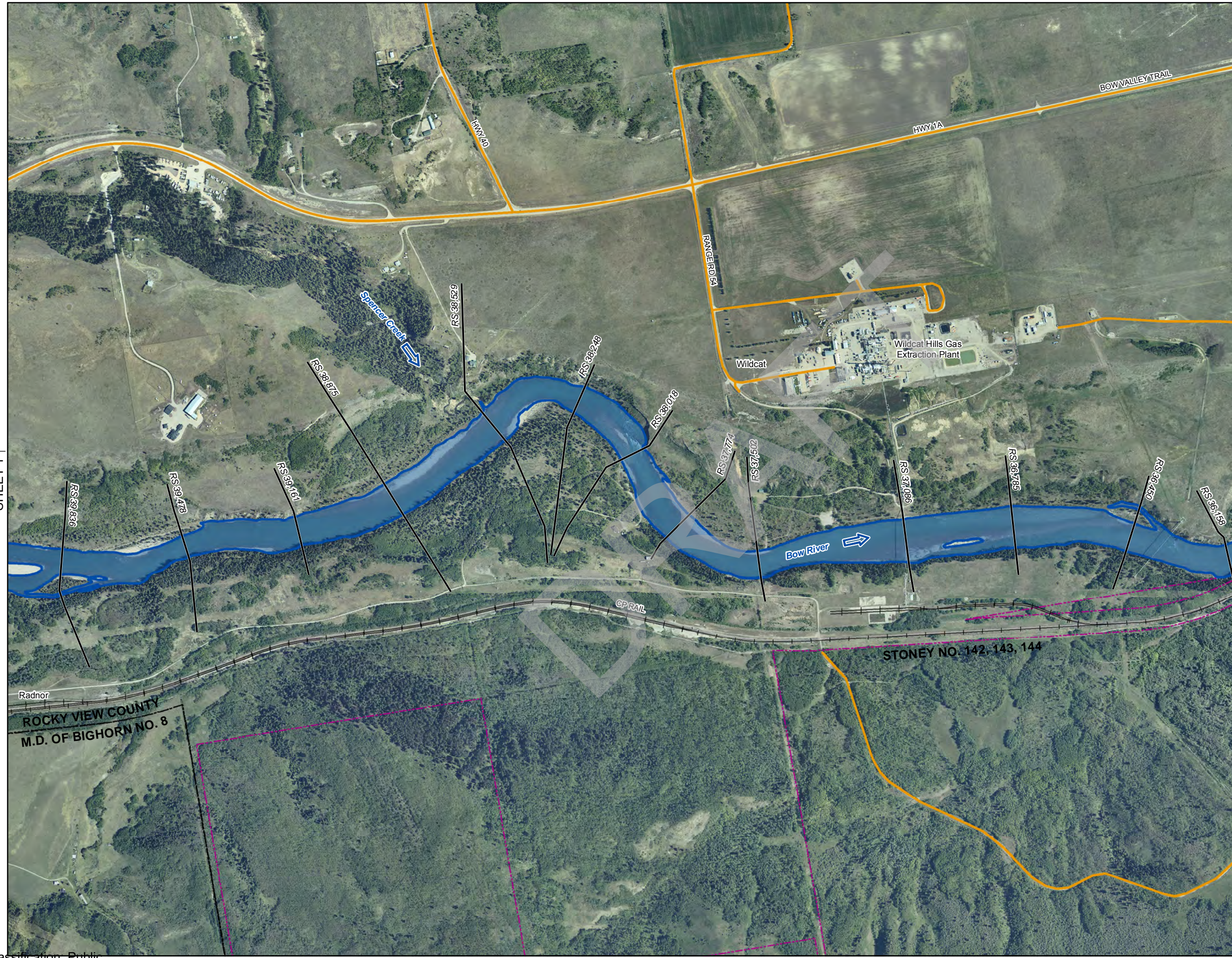


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Units: METRES

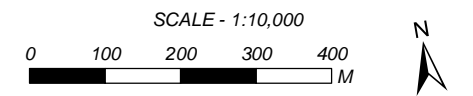
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Job Number	3001178		Date	09-APR-2018	

UPPER BOW RIVER HAZARD STUDY

**50-YEAR ICE JAM
FLOOD INUNDATION MAP**



- FLOW DIRECTION
- CROSS SECTION
- RS 12,345 RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
- BRIDGE
- RAILWAY
- MAJOR ROAD
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- CITY
- TOWN
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- FIRST NATION RESERVE
- STUDY LIMIT
- 50-YEAR FLOOD INUNDATION EXTENT
- 50-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



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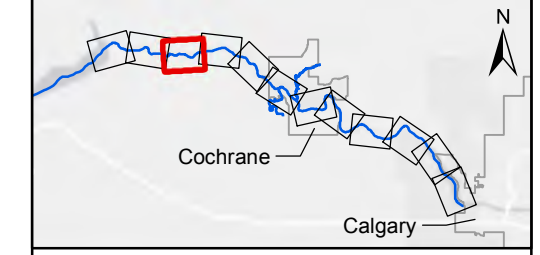
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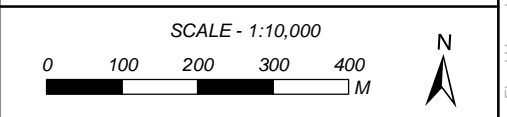
50-YEAR ICE JAM FLOOD INUNDATION MAP

SHEET 1 ↑

↑ SHEET 3



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UPPER BOW RIVER HAZARD STUDY

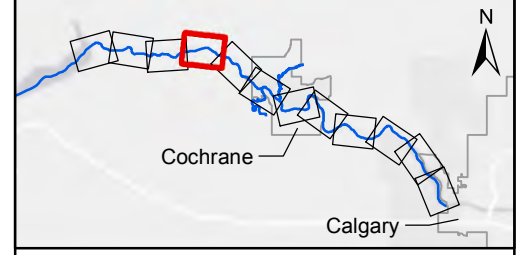
**50-YEAR ICE JAM
FLOOD INUNDATION MAP**



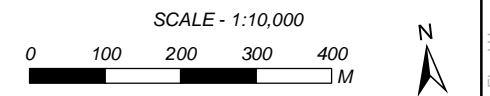


SHEET 3 ↑

↓ SHEET 5



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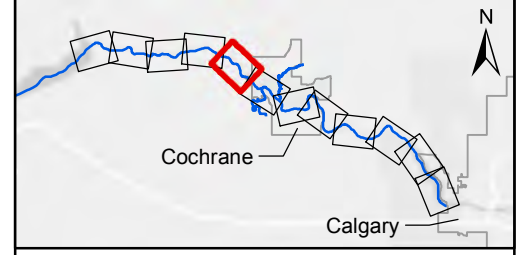
UPPER BOW RIVER HAZARD STUDY

50-YEAR ICE JAM FLOOD INUNDATION MAP

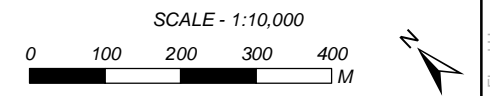


SHEET 4 ↑

↓ SHEET 6



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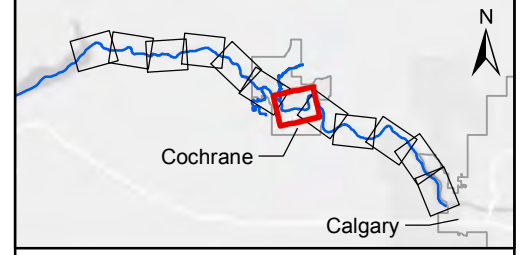
UPPER BOW RIVER HAZARD STUDY

50-YEAR ICE JAM FLOOD INUNDATION MAP

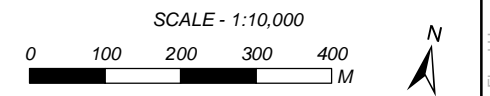


SHEET 6 ↑

↓ SHEET 8



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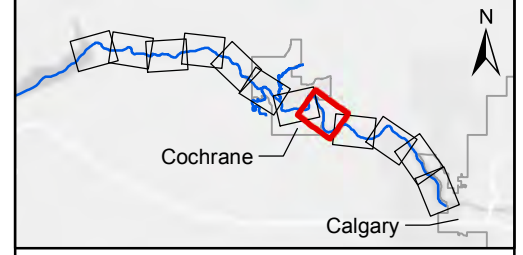
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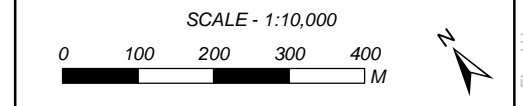
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50-YEAR ICE JAM FLOOD INUNDATION MAP

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- FLOW DIRECTION
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UPPER BOW RIVER HAZARD STUDY

**50-YEAR ICE JAM
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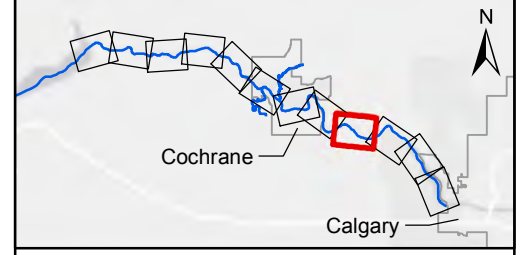
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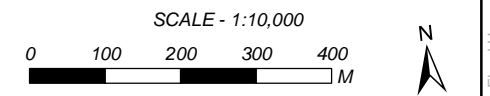


SHEET 8 ↑

↓ SHEET 10



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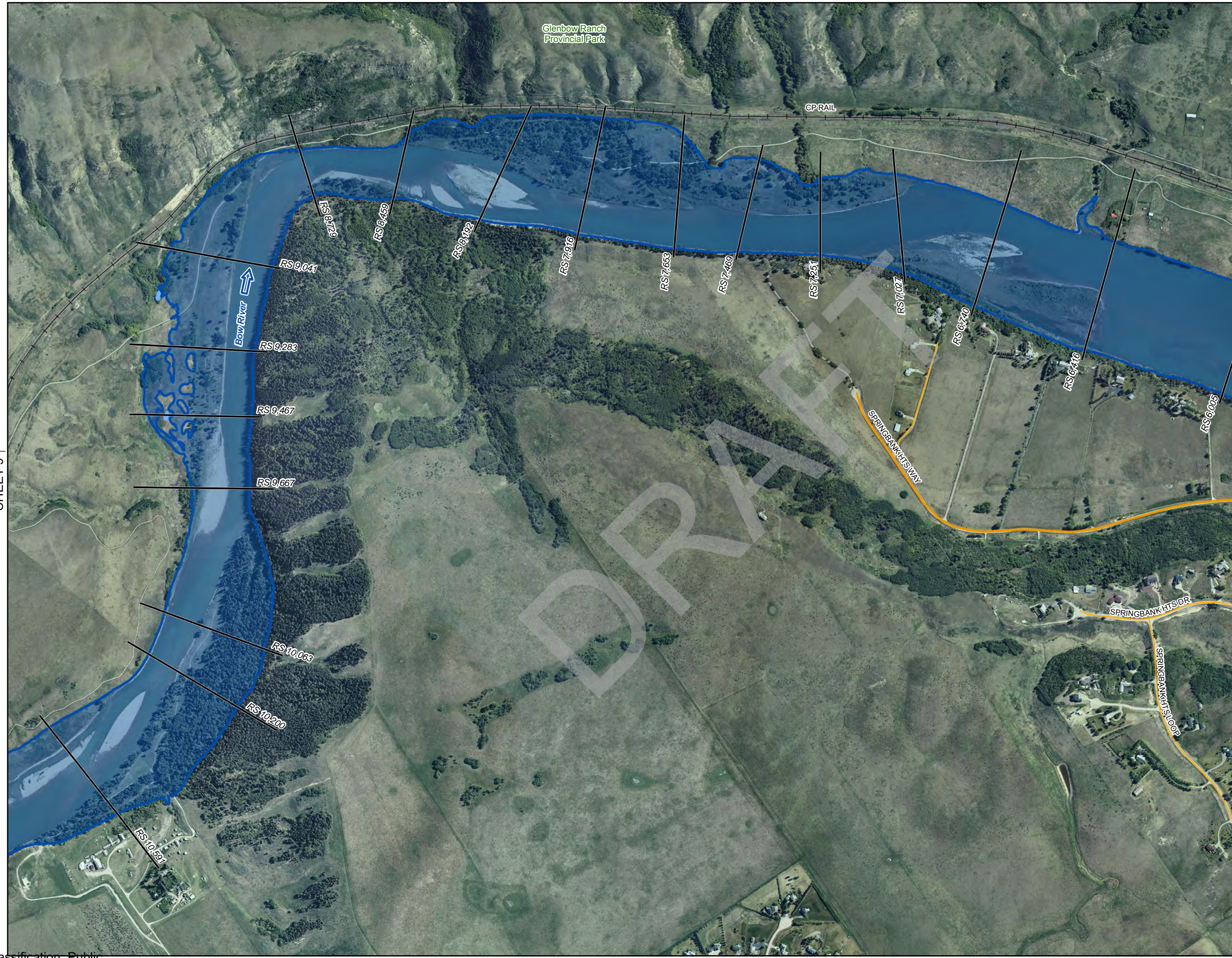
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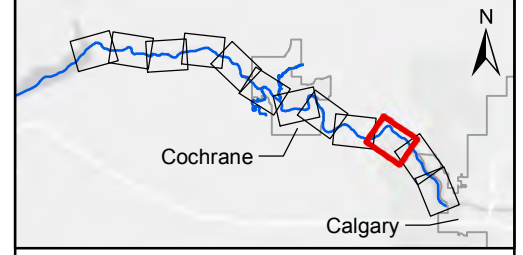
50-YEAR ICE JAM FLOOD INUNDATION MAP

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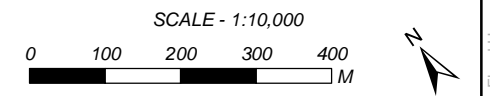


SHEET 9 ↑

↓ SHEET 11



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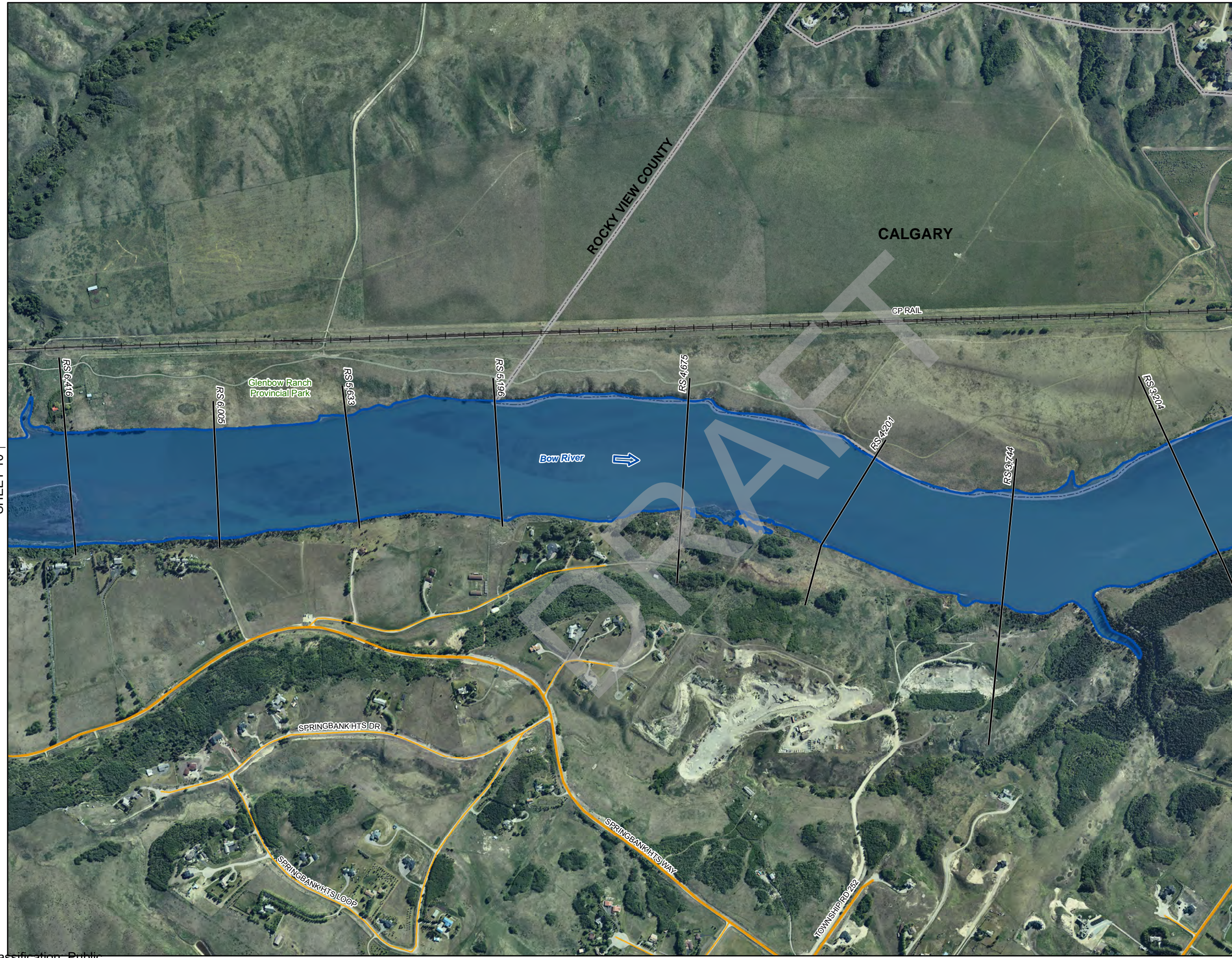


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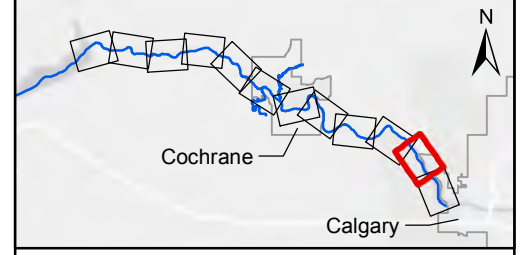
UPPER BOW RIVER HAZARD STUDY

**50-YEAR ICE JAM
FLOOD INUNDATION MAP**

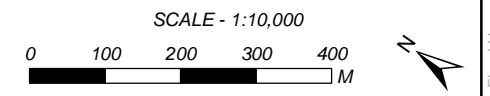


SHEET 10 ↑

↓ SHEET 12



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- 50-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

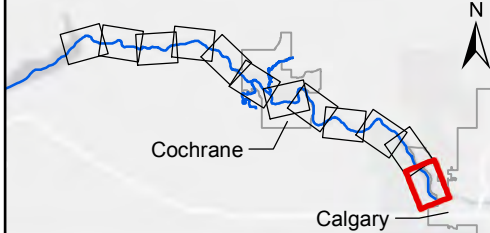
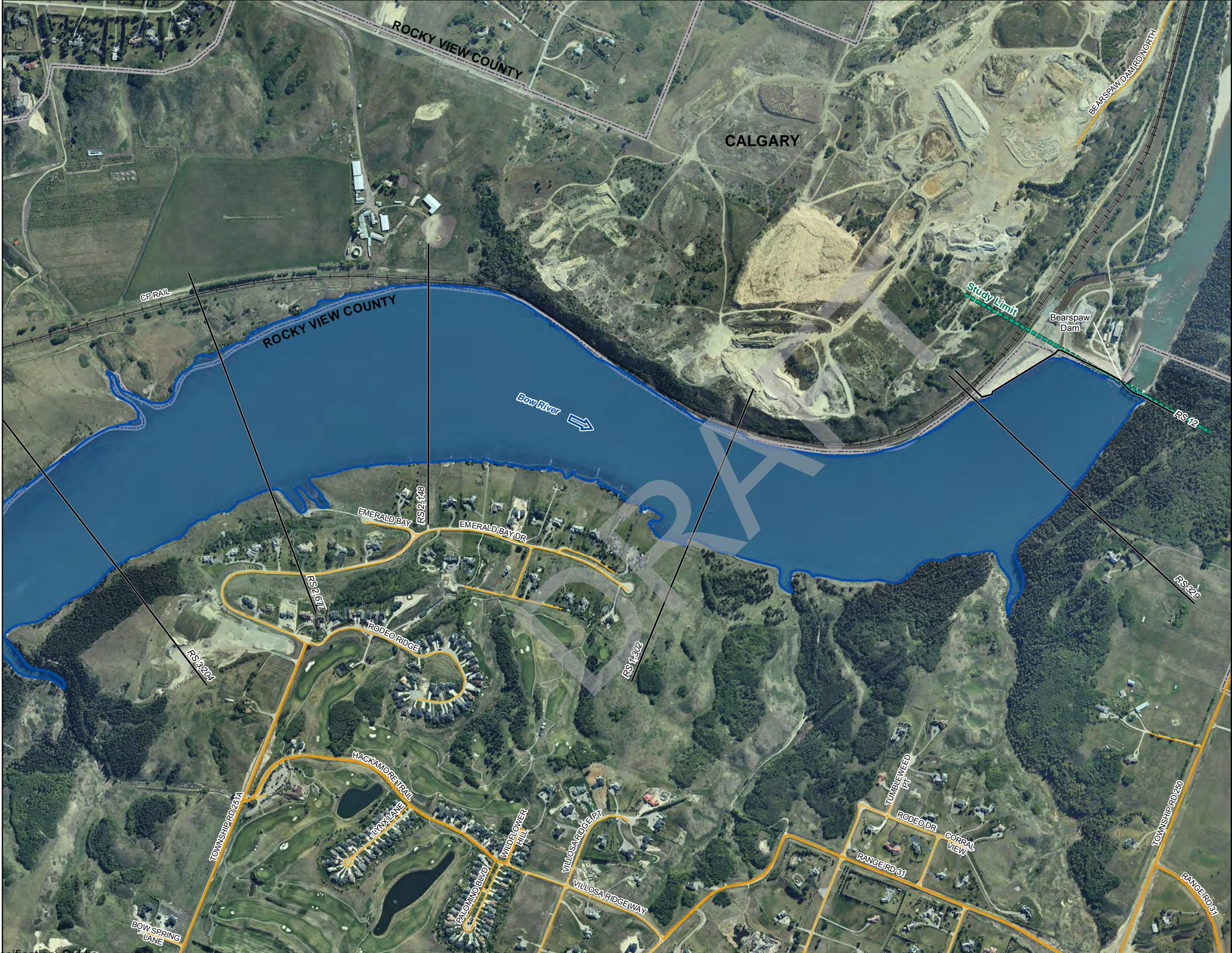


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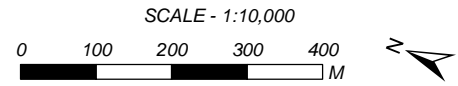
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UPPER BOW RIVER HAZARD STUDY

50-YEAR ICE JAM FLOOD INUNDATION MAP



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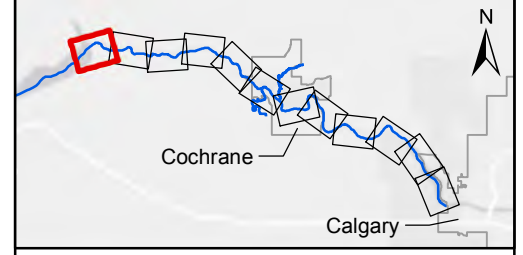
50-YEAR ICE JAM FLOOD INUNDATION MAP

SHEET 11 ↑

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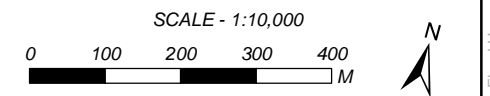
**100 - YEAR ICE JAM FLOOD INUNDATION MAPS
(SHEETS 1 TO 12)**

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- STUDY LIMIT
- 100-YEAR FLOOD INUNDATION EXTENT
- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

SHEET 2 ↓



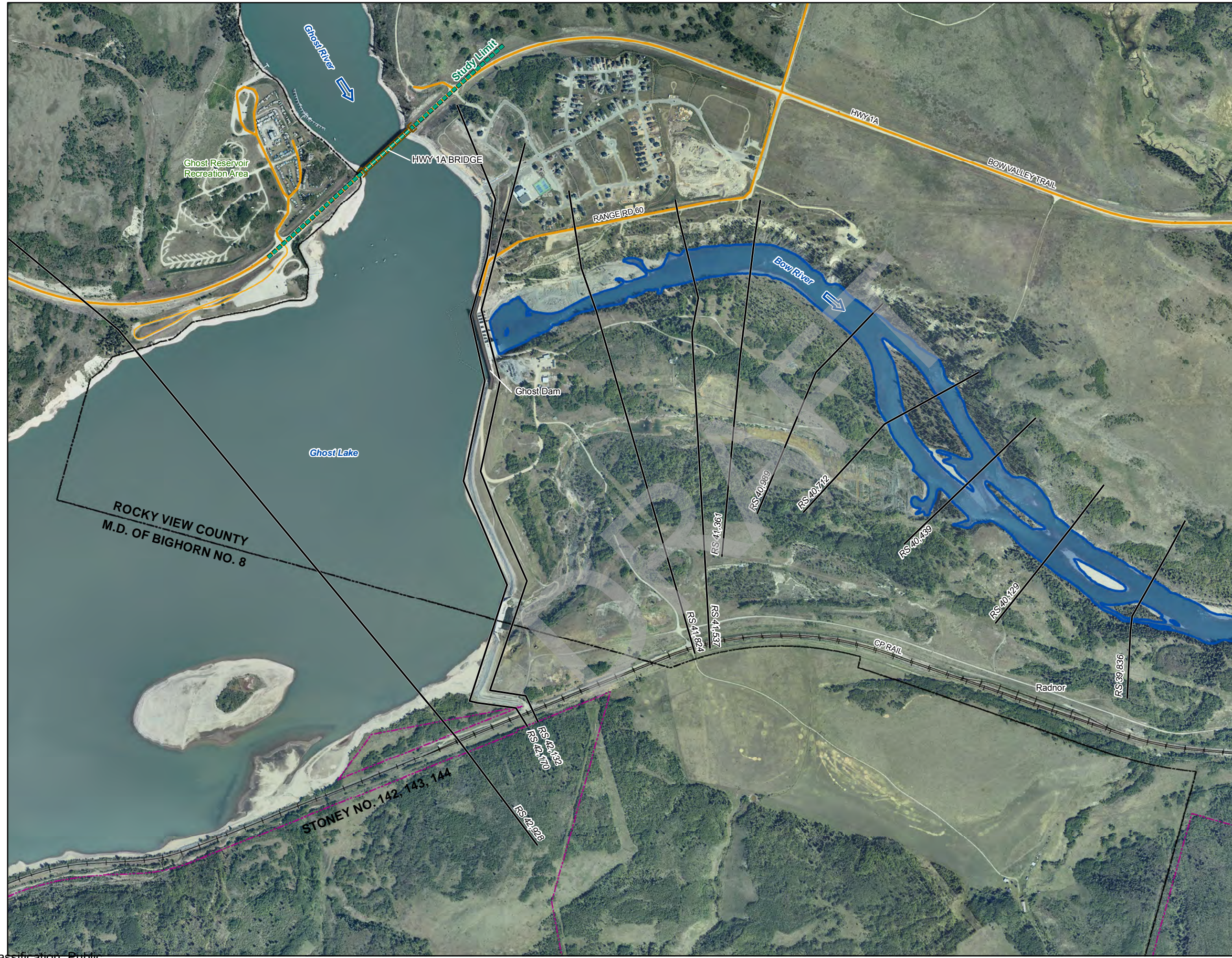
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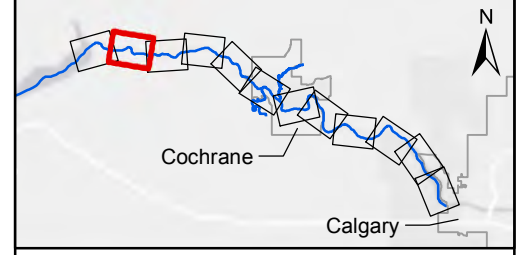
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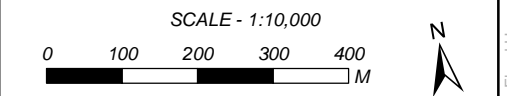
UPPER BOW RIVER HAZARD STUDY

**100-YEAR ICE JAM
FLOOD INUNDATION MAP**





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UPPER BOW RIVER HAZARD STUDY

**100-YEAR ICE JAM
FLOOD INUNDATION MAP**

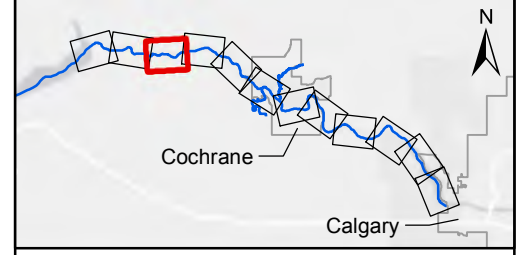
SHEET 1 1

SHEET 3 1

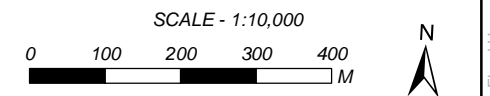


SHEET 2 ↑

↓ SHEET 4



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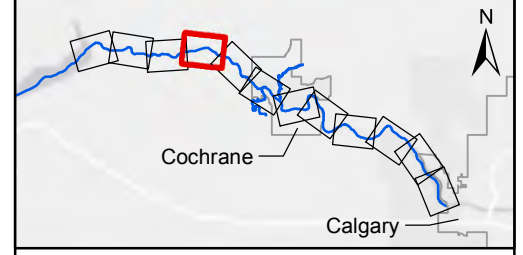
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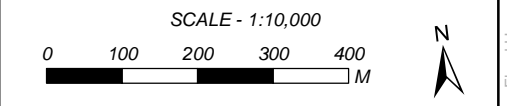
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100-YEAR ICE JAM FLOOD INUNDATION MAP

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- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



Coordinate System: NAD 1983 3TM 114
Units: METRES

Engineer	MB	GIS	MSN	Reviewer	MCM
Job Number	3001178		Date	09-APR-2018	

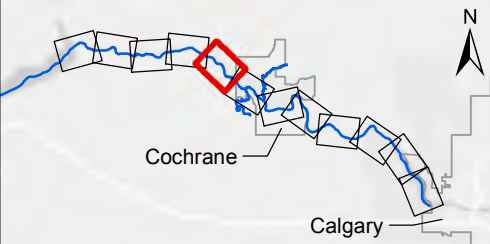
UPPER BOW RIVER HAZARD STUDY

**100-YEAR ICE JAM
FLOOD INUNDATION MAP**

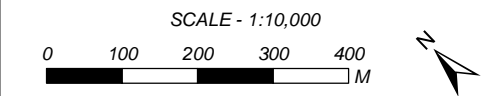


SHEET 4 ↑

↓ SHEET 6



- FLOW DIRECTION
- CROSS SECTION
- RS 12,345 RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
- BRIDGE
- RAILWAY
- MAJOR ROAD
- LOCAL ROAD
- CITY
- TOWN
- SUMMER VILLAGE
- COUNTY OR MUNICIPAL DISTRICT
- FIRST NATION RESERVE
- STUDY LIMIT
- 100-YEAR FLOOD INUNDATION EXTENT
- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



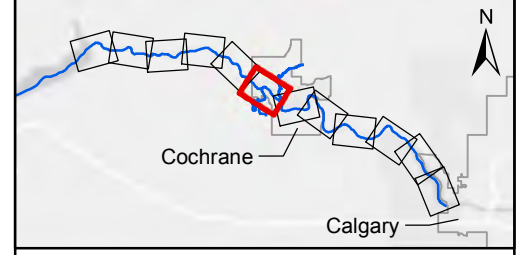
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Engineer	MB	GIS	MSN	Reviewer	MCM
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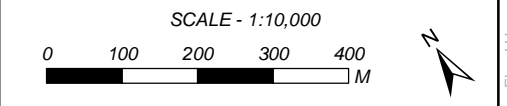
UPPER BOW RIVER HAZARD STUDY

100-YEAR ICE JAM FLOOD INUNDATION MAP

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- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
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- RAILWAY
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Coordinate System: NAD 1983 3TM 114
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Engineer	MB	GIS	MSN	Reviewer	MCM
Job Number	3001178		Date	09-APR-2018	

UPPER BOW RIVER HAZARD STUDY

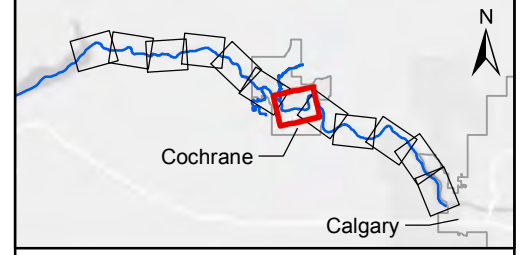
**100-YEAR ICE JAM
FLOOD INUNDATION MAP**

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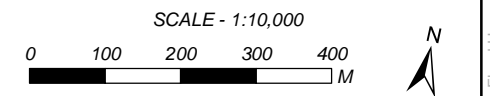


SHEET 6 ↑

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- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
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- STUDY LIMIT
- 100-YEAR FLOOD INUNDATION EXTENT
- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



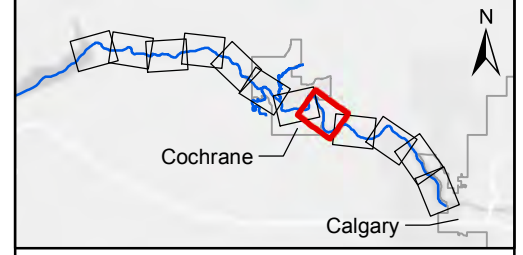
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Job Number	Date	
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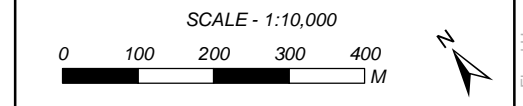
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100-YEAR ICE JAM FLOOD INUNDATION MAP

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- FLOW DIRECTION
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Coordinate System: NAD 1983 3TM 114
Units: METRES

Engineer	MB	GIS	MSN	Reviewer	MCM
Job Number	3001178		Date	09-APR-2018	

UPPER BOW RIVER HAZARD STUDY

**100-YEAR ICE JAM
FLOOD INUNDATION MAP**

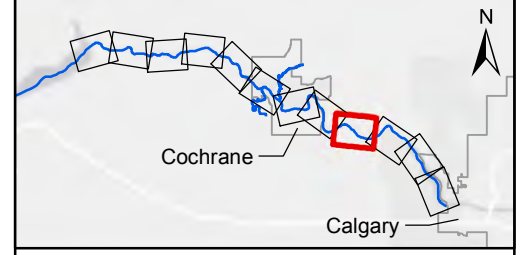
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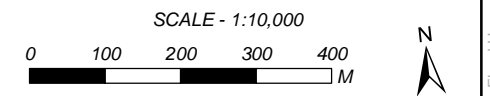


SHEET 8 ↑

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- FLOW DIRECTION
- CROSS SECTION
- RS 12,345 RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
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- FIRST NATION RESERVE
- STUDY LIMIT
- 100-YEAR FLOOD INUNDATION EXTENT
- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

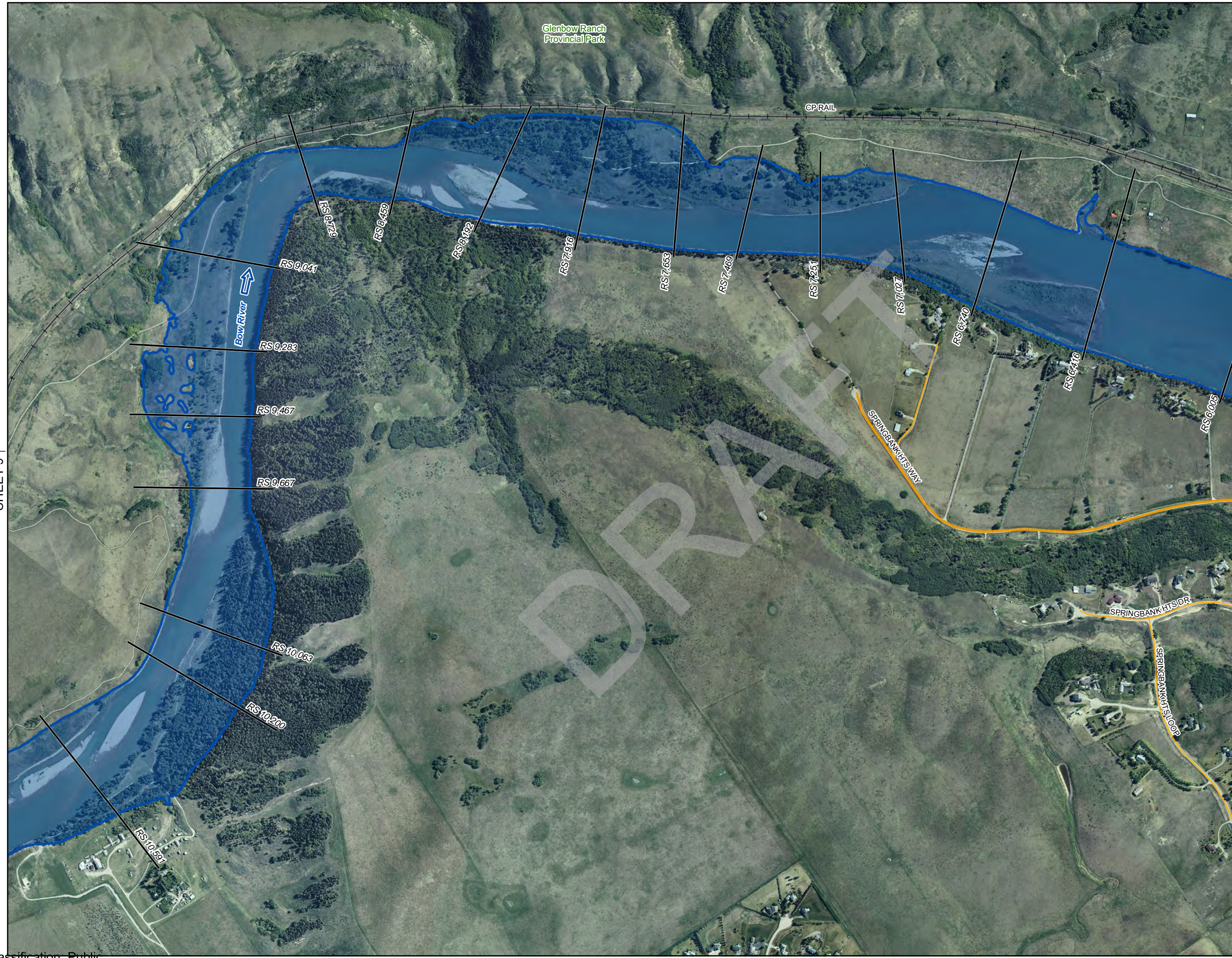


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Engineer	GIS	Reviewer
MB	MSN	MCM
Job Number	Date	
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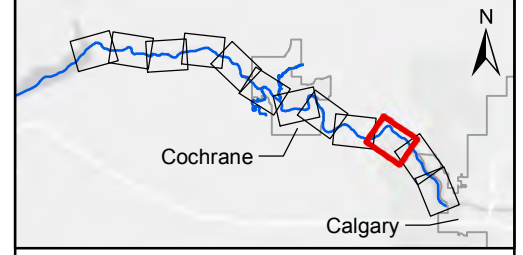
UPPER BOW RIVER HAZARD STUDY

100-YEAR ICE JAM FLOOD INUNDATION MAP

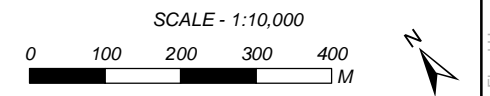


SHEET 9 ↑

↓ SHEET 11



- FLOW DIRECTION
- CROSS SECTION
- RS 12,345 RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
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- FIRST NATION RESERVE
- STUDY LIMIT
- 100-YEAR FLOOD INUNDATION EXTENT
- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

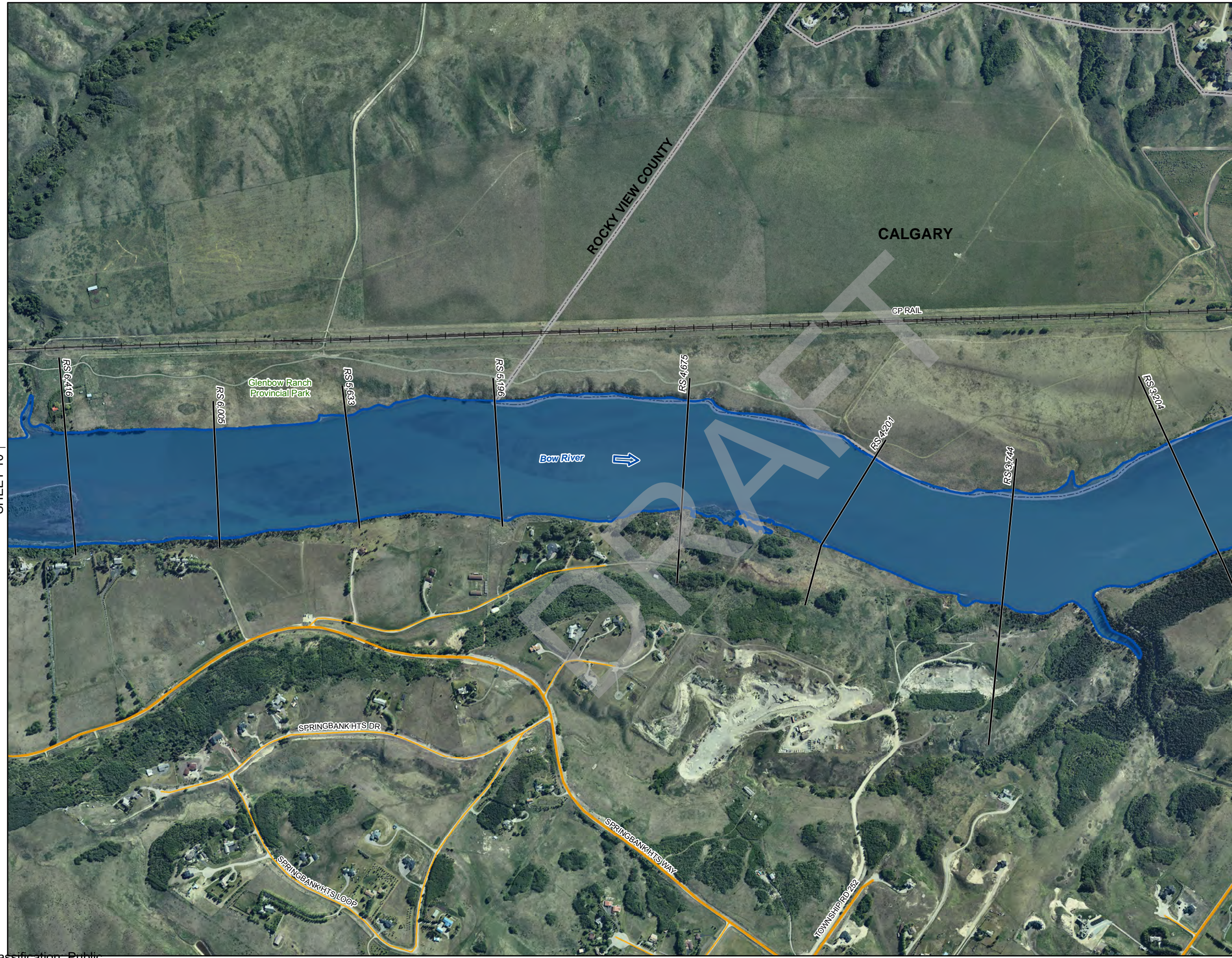


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Engineer	MB	GIS	MSN	Reviewer	MCM
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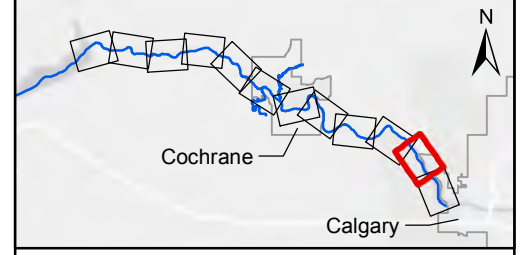
UPPER BOW RIVER HAZARD STUDY

100-YEAR ICE JAM FLOOD INUNDATION MAP

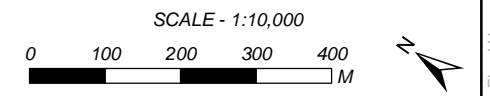


SHEET 10 ↑

↓ SHEET 12



- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
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- FIRST NATION RESERVE
- STUDY LIMIT
- 100-YEAR FLOOD INUNDATION EXTENT
- 100-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

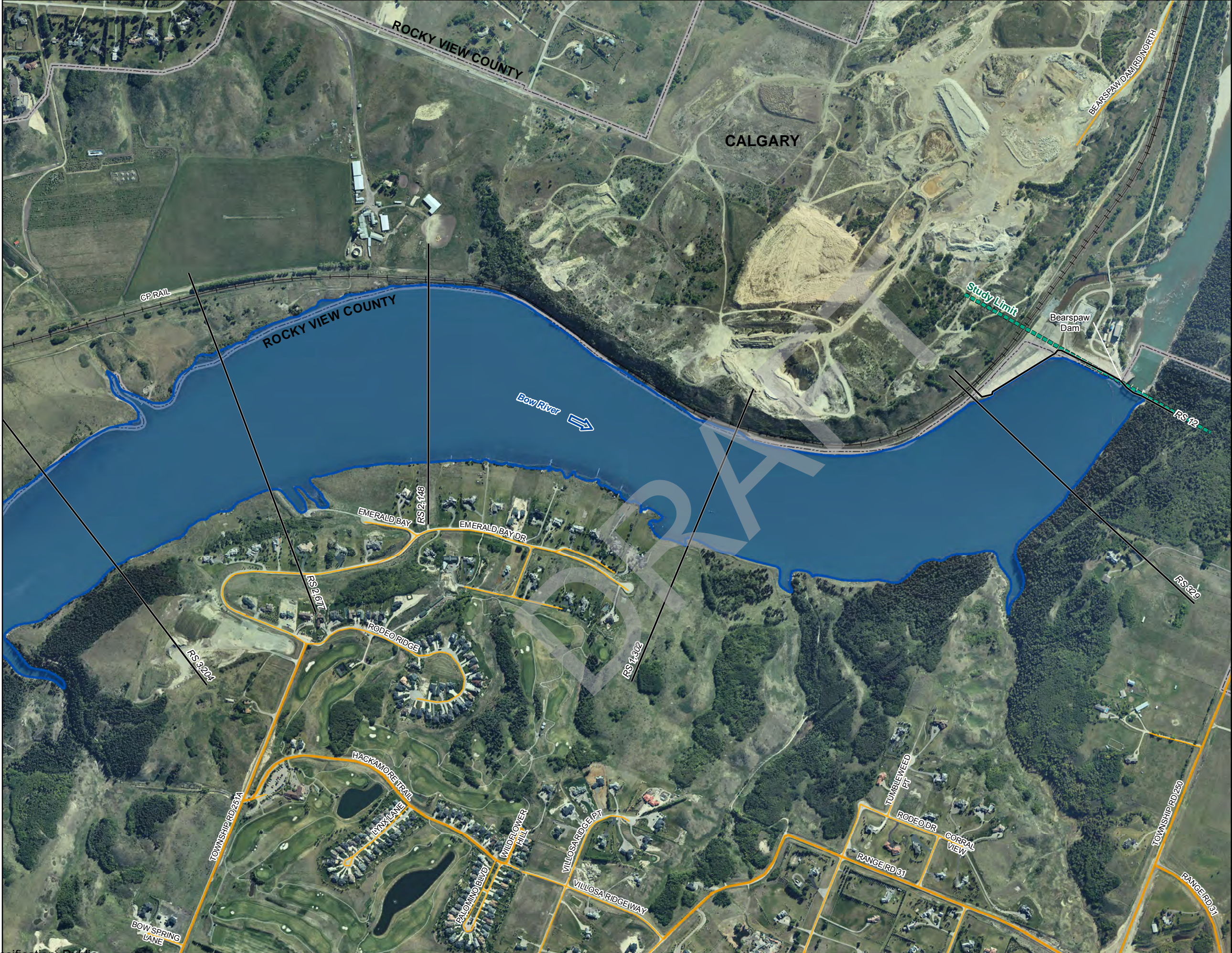


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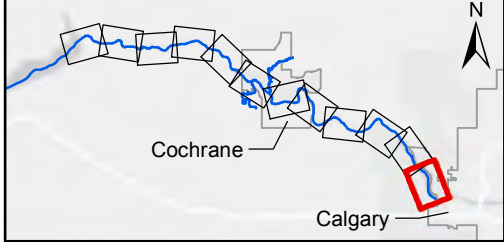
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UPPER BOW RIVER HAZARD STUDY

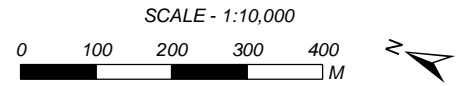
100-YEAR ICE JAM FLOOD INUNDATION MAP



SHEET 11 ↑



- FLOW DIRECTION
- CROSS SECTION
- RS 12,345 RIVER STATION
- FLOOD CONTROL STRUCTURE
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Coordinate System: NAD 1983 3TM 114
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Engineer	GIS	Reviewer
MB	MSN	MCM
Job Number	Date	
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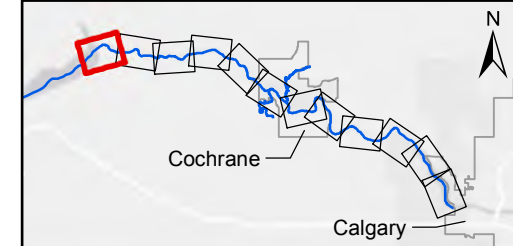
UPPER BOW RIVER HAZARD STUDY

100-YEAR ICE JAM FLOOD INUNDATION MAP

200 - YEAR ICE JAM FLOOD INUNDATION MAPS

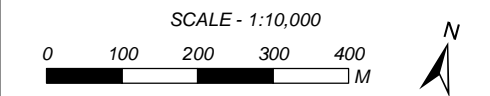
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- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
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- STUDY LIMIT
- 200-YEAR FLOOD INUNDATION EXTENT
- 200-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)

SHEET 2 ↓



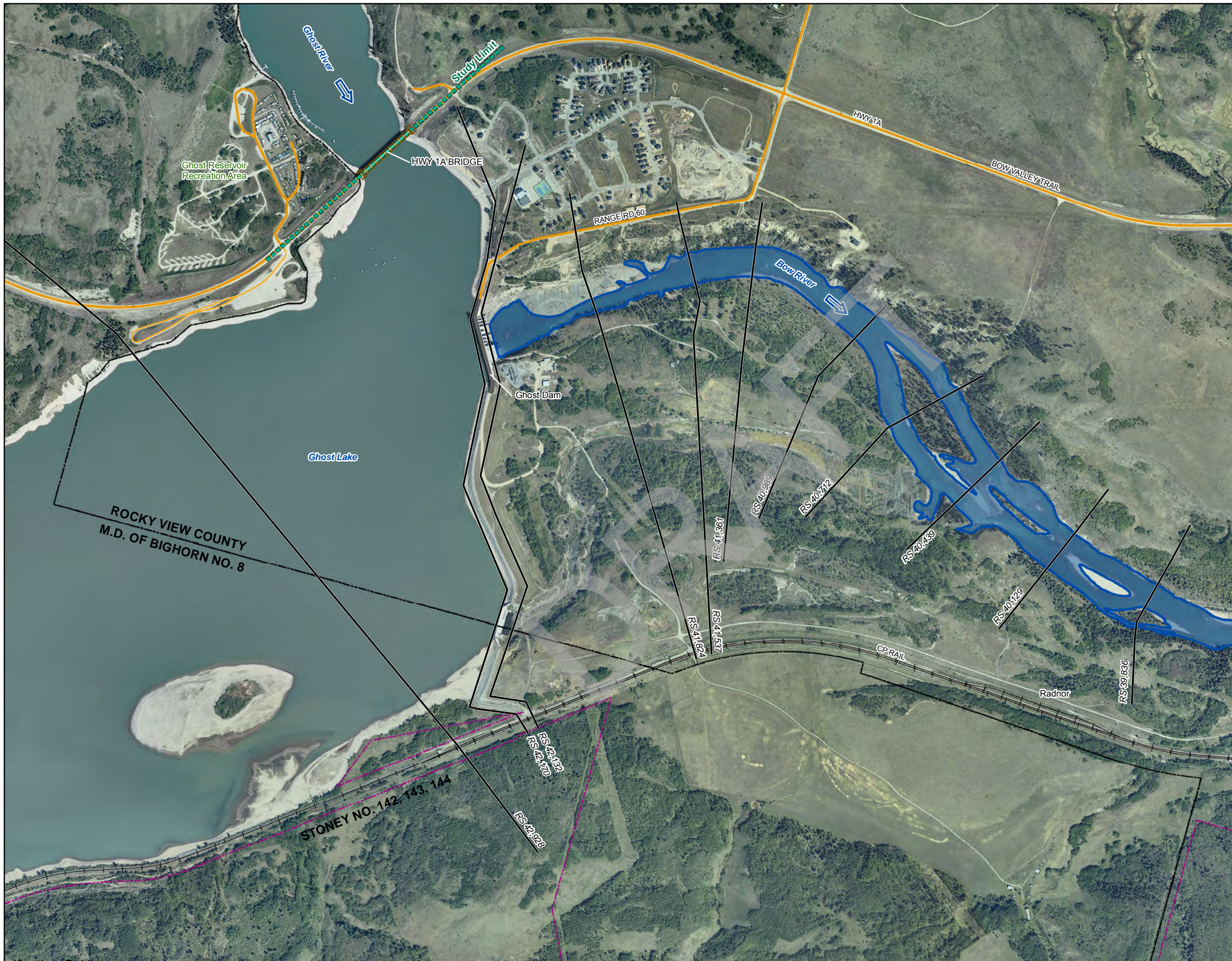
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Engineer	GIS	Reviewer
MB	MSN	MCM

Job Number	Date
3001178	09-APR-2018

UPPER BOW RIVER HAZARD STUDY

**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

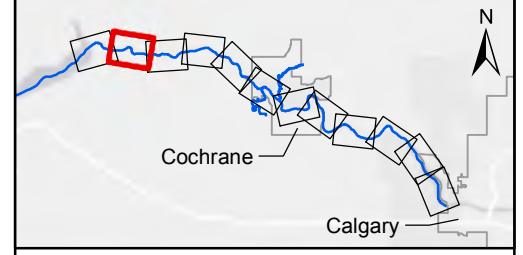


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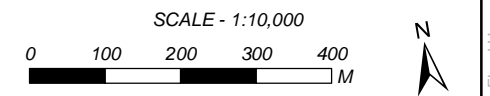


SHEET 1 ↑

↓ SHEET 3



- FLOW DIRECTION
- CROSS SECTION
- RS 12,345 RIVER STATION
- FLOOD CONTROL STRUCTURE
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- FIRST NATION RESERVE
- STUDY LIMIT
- 200-YEAR FLOOD INUNDATION EXTENT
- 200-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



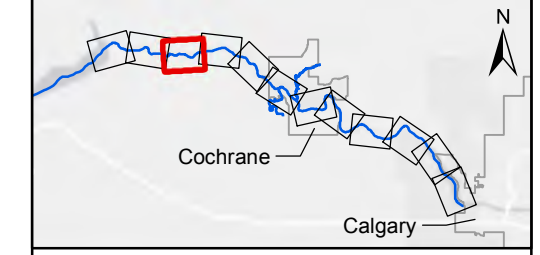
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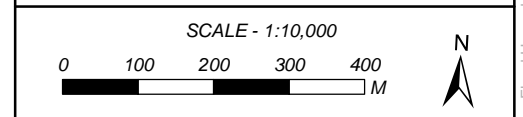
UPPER BOW RIVER HAZARD STUDY

200-YEAR ICE JAM FLOOD INUNDATION MAP

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- FLOW DIRECTION
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Coordinate System: NAD 1983 3TM 114
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Engineer	MB	GIS	MSN	Reviewer	MCM
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Job Number	3001178	Date	09-APR-2018
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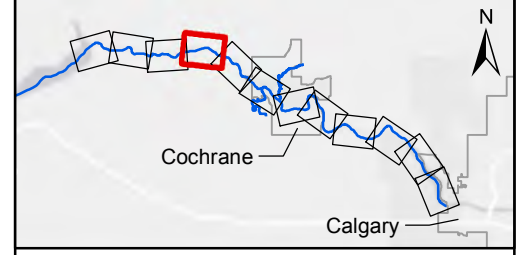
UPPER BOW RIVER HAZARD STUDY

**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

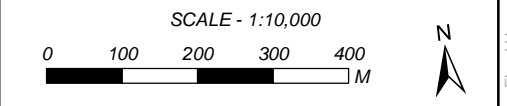


SHEET 2 ↑

↓ SHEET 4



- FLOW DIRECTION
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Coordinate System: NAD 1983 3TM 114
Units: METRES

Engineer	MB	GIS	MSN	Reviewer	MCM
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Job Number	3001178	Date	09-APR-2018
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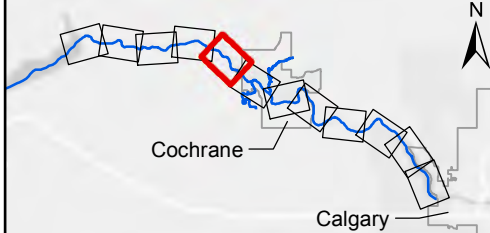
UPPER BOW RIVER HAZARD STUDY

**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

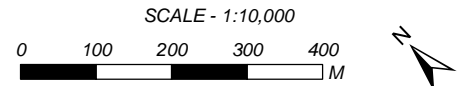


SHEET 3 ↑

↓ SHEET 5



- FLOW DIRECTION
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Coordinate System: NAD 1983 3TM 114
Units: METRES

Engineer	MB	GIS	MSN	Reviewer	MCM
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Job Number	3001178	Date	09-APR-2018
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UPPER BOW RIVER HAZARD STUDY

**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

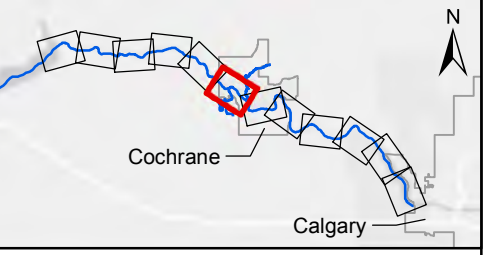
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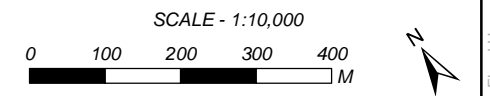


SHEET 5 ↑

↑ SHEET 7



- FLOW DIRECTION
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Engineer	MB	GIS	MSN	Reviewer	MCM
Job Number	3001178		Date	09-APR-2018	

UPPER BOW RIVER HAZARD STUDY

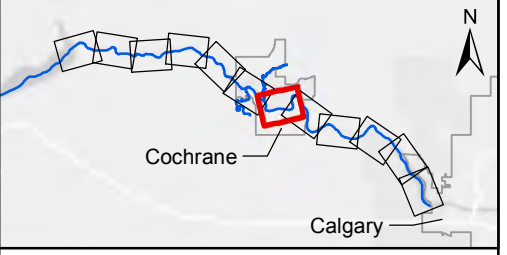
200-YEAR ICE JAM FLOOD INUNDATION MAP

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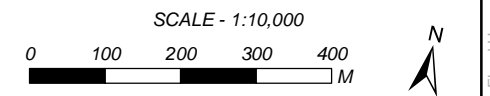


SHEET 6 ↑

↓ SHEET 8



- FLOW DIRECTION
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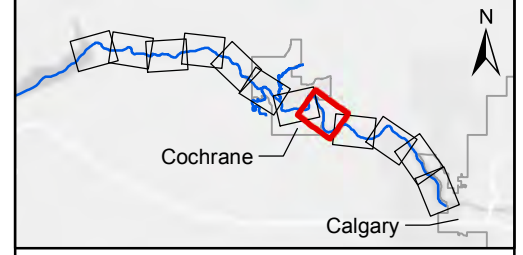
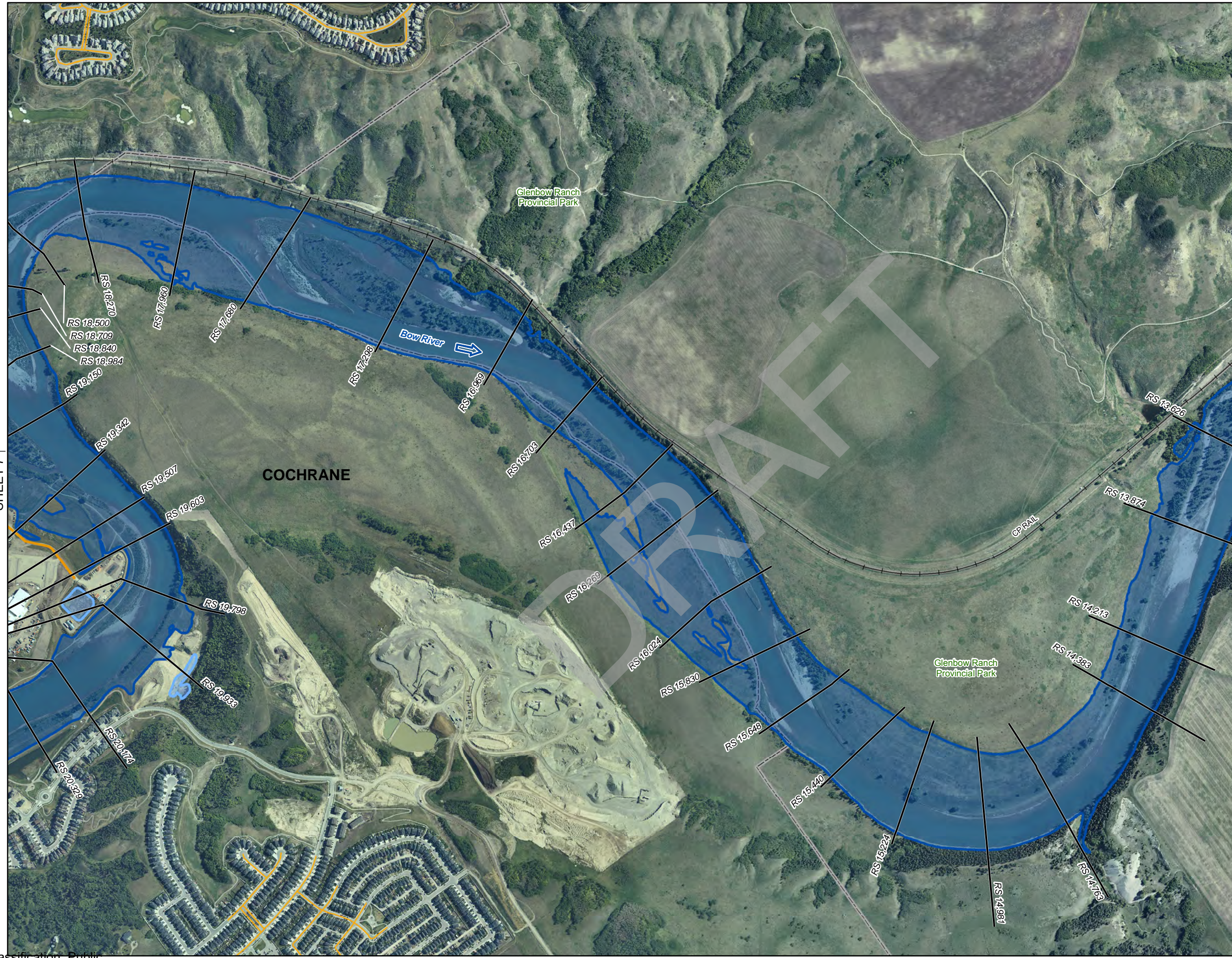
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Units: METRES

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MB	MSN	MCM
Job Number	Date	
3001178	09-APR-2018	

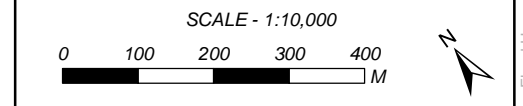
UPPER BOW RIVER HAZARD STUDY

200-YEAR ICE JAM FLOOD INUNDATION MAP

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- FLOW DIRECTION
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Coordinate System: NAD 1983 3TM 114
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Engineer	MB	GIS	MSN	Reviewer	MCM
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UPPER BOW RIVER HAZARD STUDY

**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

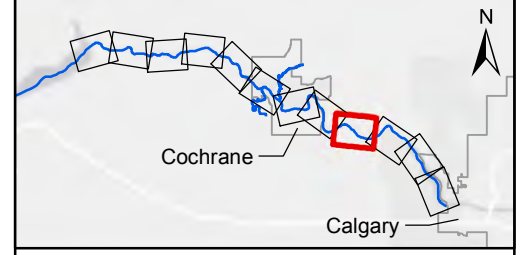
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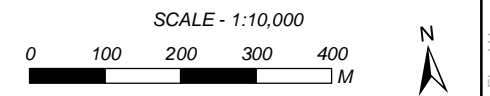


SHEET 8 ↑

↓ SHEET 10



- FLOW DIRECTION
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- FIRST NATION RESERVE
- STUDY LIMIT
- 200-YEAR FLOOD INUNDATION EXTENT
- 200-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



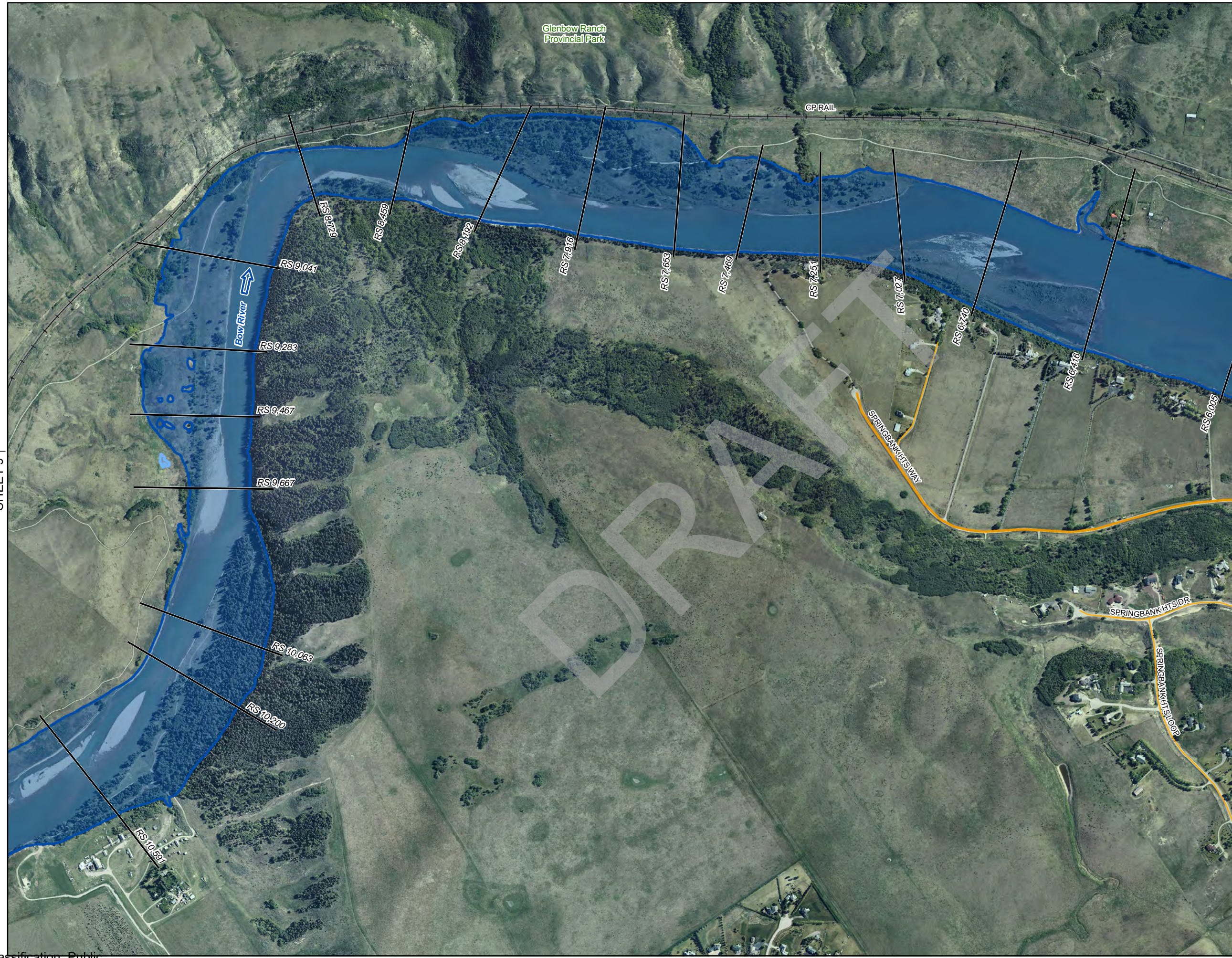
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Units: METRES

Engineer	GIS	Reviewer
MB	MSN	MCM
Job Number	Date	
3001178	09-APR-2018	

UPPER BOW RIVER HAZARD STUDY

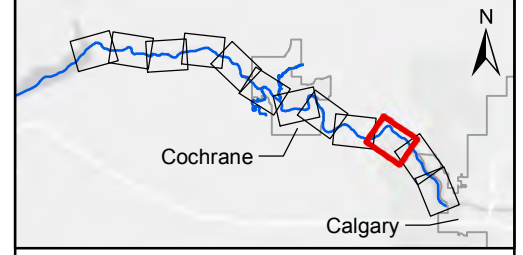
**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

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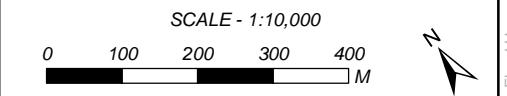


SHEET 9 ↑

↓ SHEET 11



- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
- BRIDGE
- RAILWAY
- MAJOR ROAD
- LOCAL ROAD
- CITY
- TOWN
- SUMMER VILLAGE
- COUNTY OR MUNICIPAL DISTRICT
- FIRST NATION RESERVE
- STUDY LIMIT
- 200-YEAR FLOOD INUNDATION EXTENT
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Coordinate System: NAD 1983 3TM 114
Units: METRES

Engineer	MB	GIS	MSN	Reviewer	MCM
Job Number	3001178		Date	09-APR-2018	

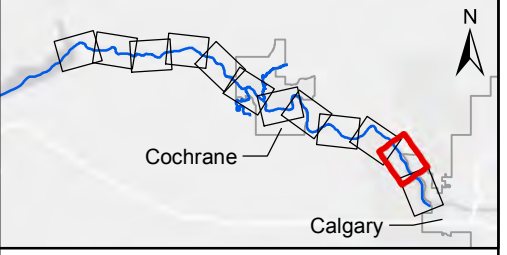
UPPER BOW RIVER HAZARD STUDY

**200-YEAR ICE JAM
FLOOD INUNDATION MAP**

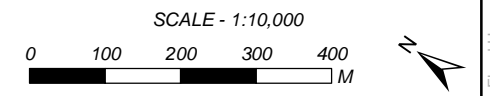


SHEET 10 ↑

↓ SHEET 12



- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
- DAM
- BRIDGE
- RAILWAY
- MAJOR ROAD
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- FIRST NATION RESERVE
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- 200-YEAR FLOOD INUNDATION EXTENT
- 200-YEAR FLOOD INUNDATION EXTENT (ISOLATED AREA)



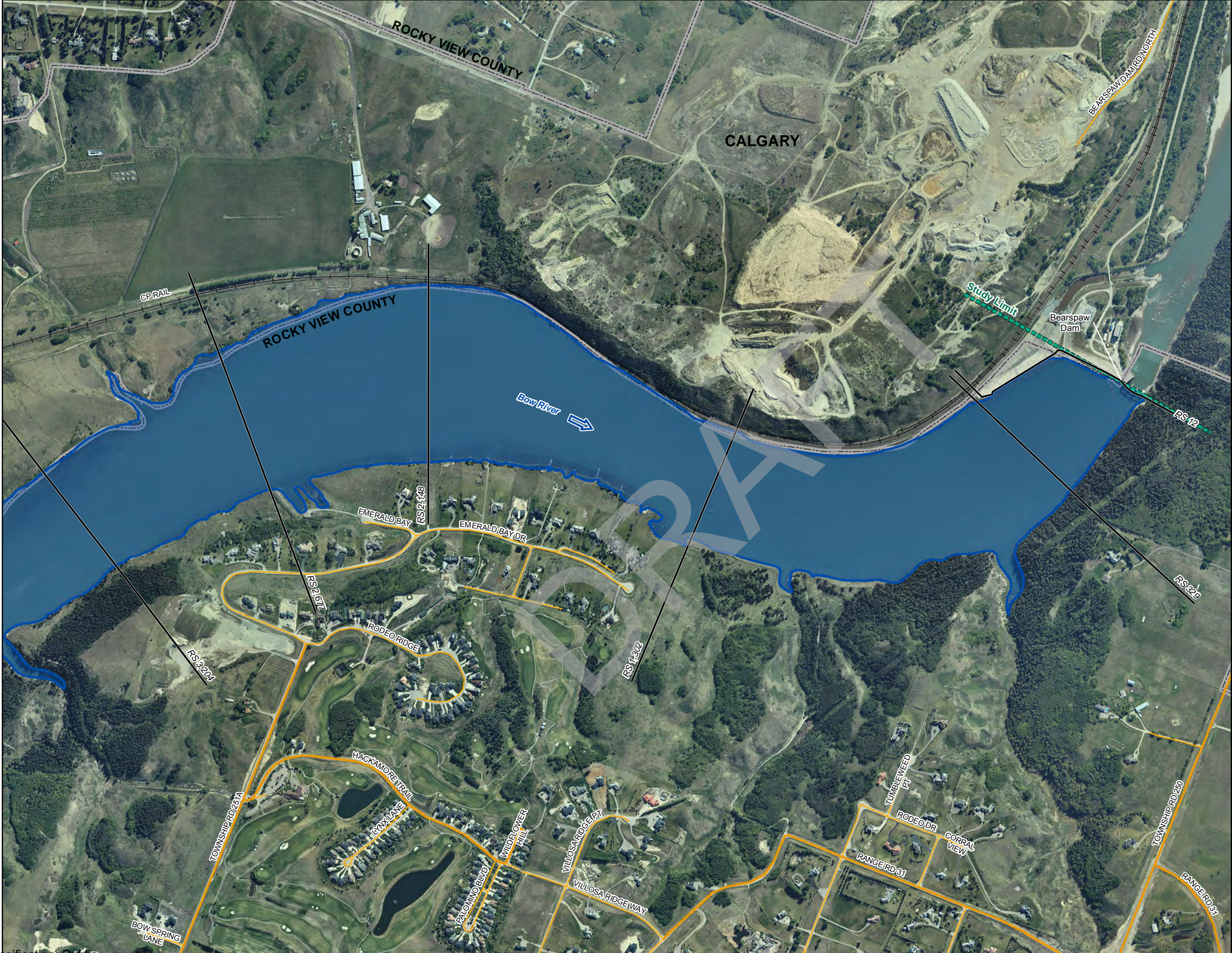
Coordinate System: NAD 1983 3TM 114
Units: METRES

Engineer	MB	GIS	MSN	Reviewer	MCM
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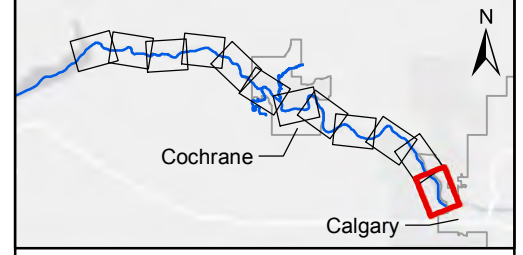
Job Number	3001178	Date	09-APR-2018
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UPPER BOW RIVER HAZARD STUDY

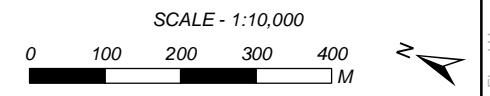
**200-YEAR ICE JAM
FLOOD INUNDATION MAP**



SHEET 11 ↑



- FLOW DIRECTION
- CROSS SECTION
- RIVER STATION
- FLOOD CONTROL STRUCTURE
- OTHER FEATURE
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Engineer	GIS	Reviewer
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Job Number	Date	
3001178	09-APR-2018	

UPPER BOW RIVER HAZARD STUDY

200-YEAR ICE JAM FLOOD INUNDATION MAP

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