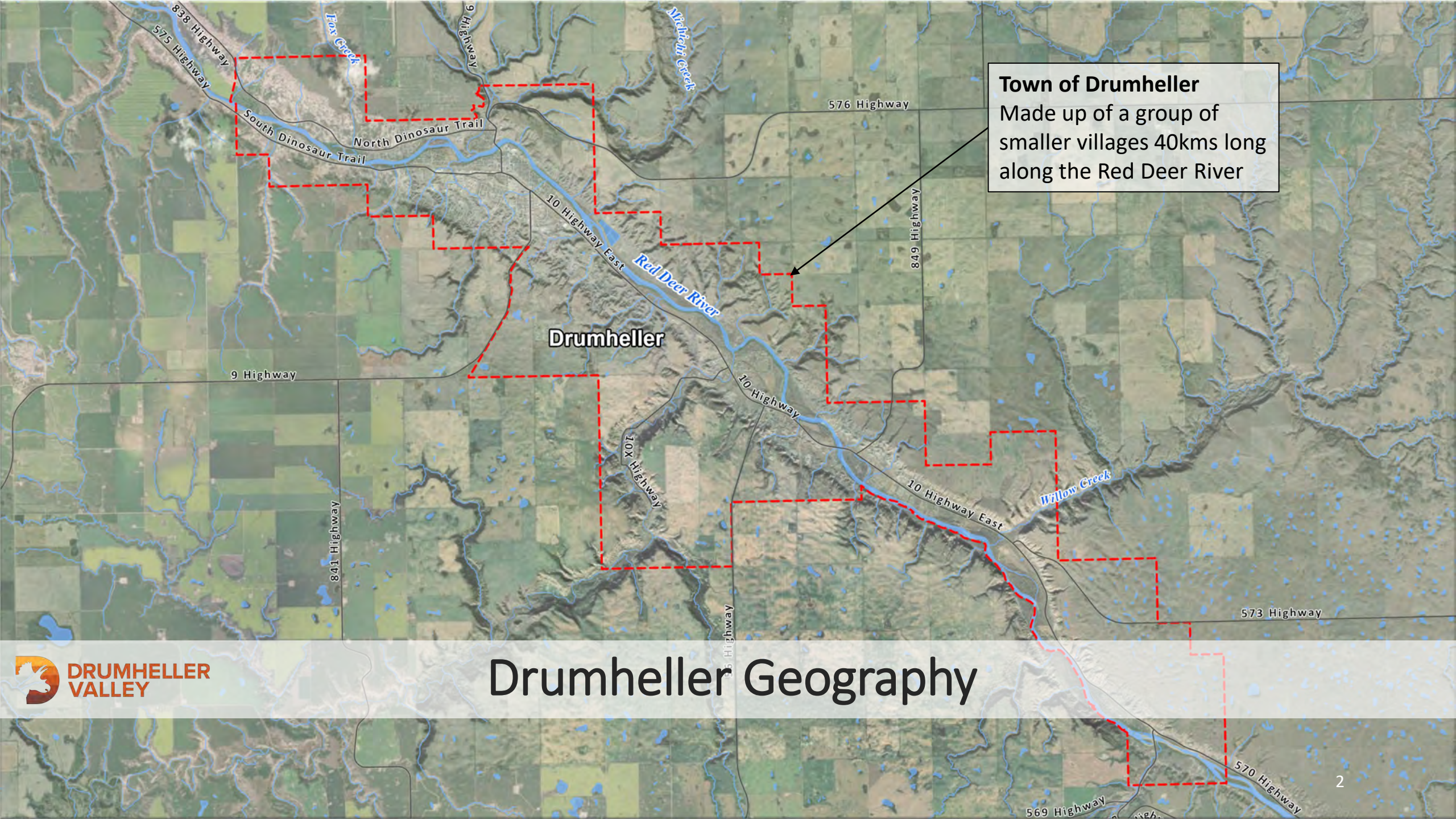




The History of Drumheller Valley

- Originally settled over 100 years ago, in the heyday of coal mining.
- Over 100 coal mines operation in the valley.
- Communities sprung up to support the work near the river where the coal deposits were. These locations are also in the zone of highest flood risk.
- Tourism dominates Drumheller's economy today.
- Much of the developed area still remains in flood fringe and floodway areas.





Town of Drumheller
Made up of a group of smaller villages 40kms long along the Red Deer River

Drumheller

Drumheller Geography

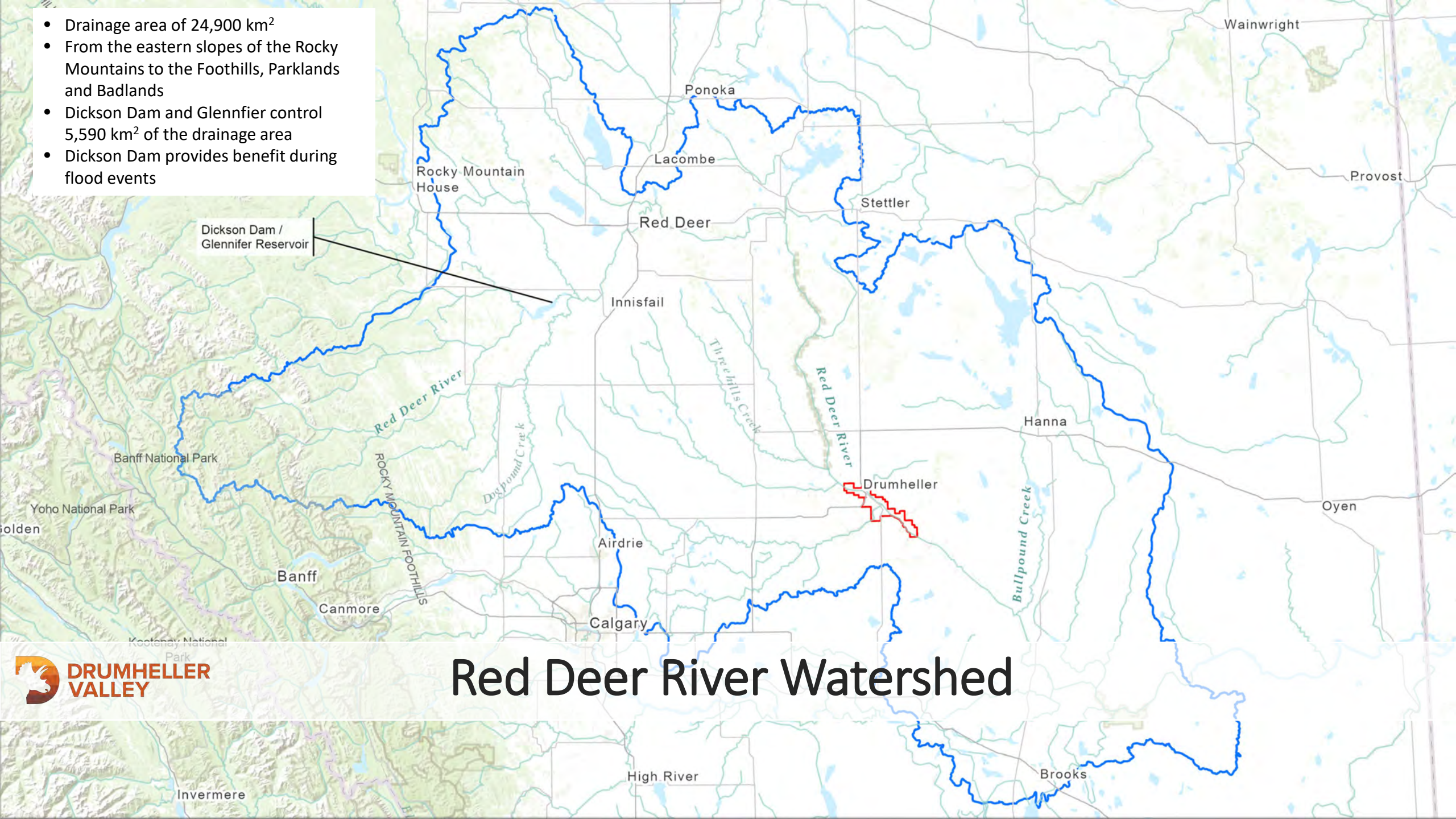




Future flooding of Drumheller without the Flood Program

Image from: floods.alberta.ca

- Drainage area of 24,900 km²
- From the eastern slopes of the Rocky Mountains to the Foothills, Parklands and Badlands
- Dickson Dam and Glennfier control 5,590 km² of the drainage area
- Dickson Dam provides benefit during flood events



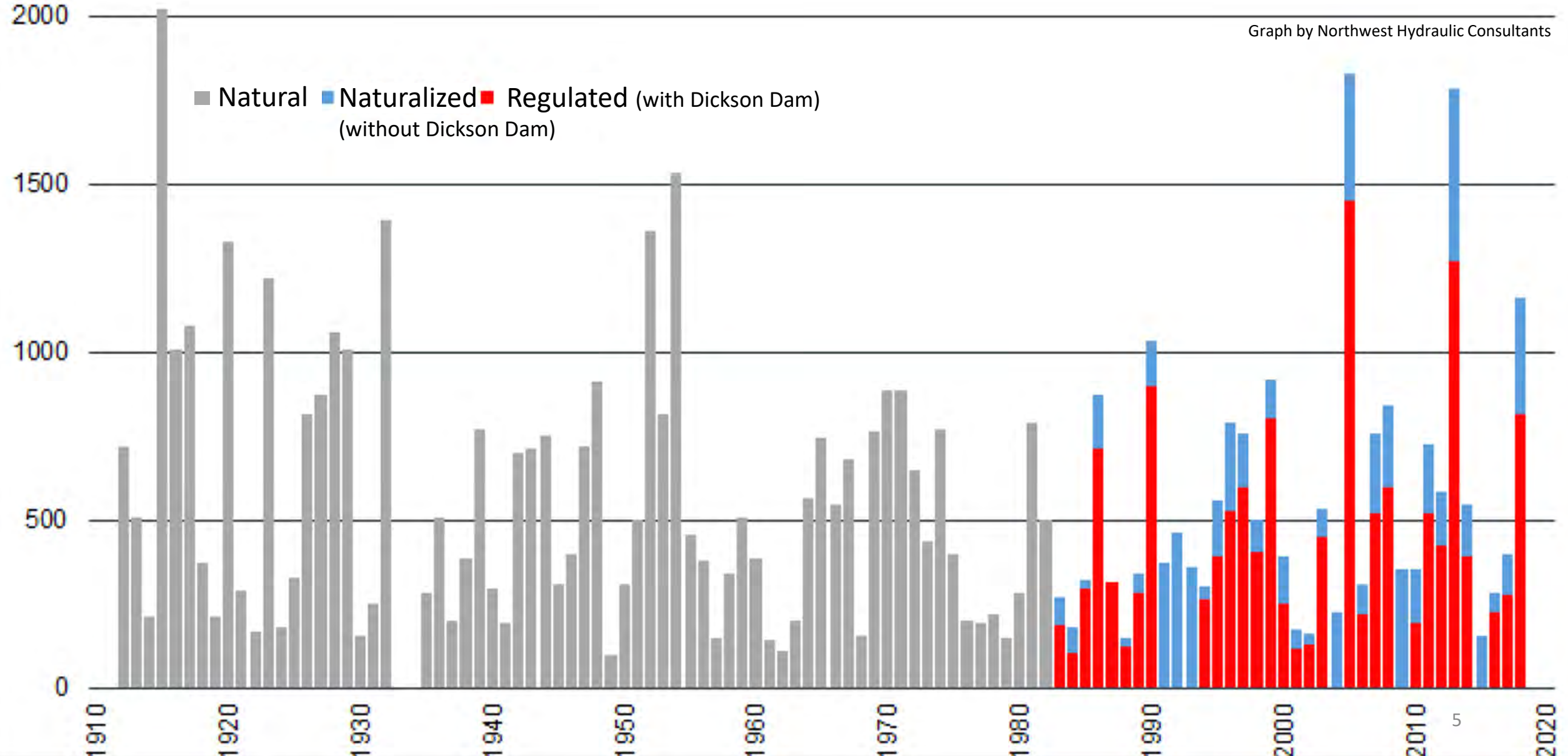
Dickson Dam /
Glennfier Reservoir

Red Deer River Watershed

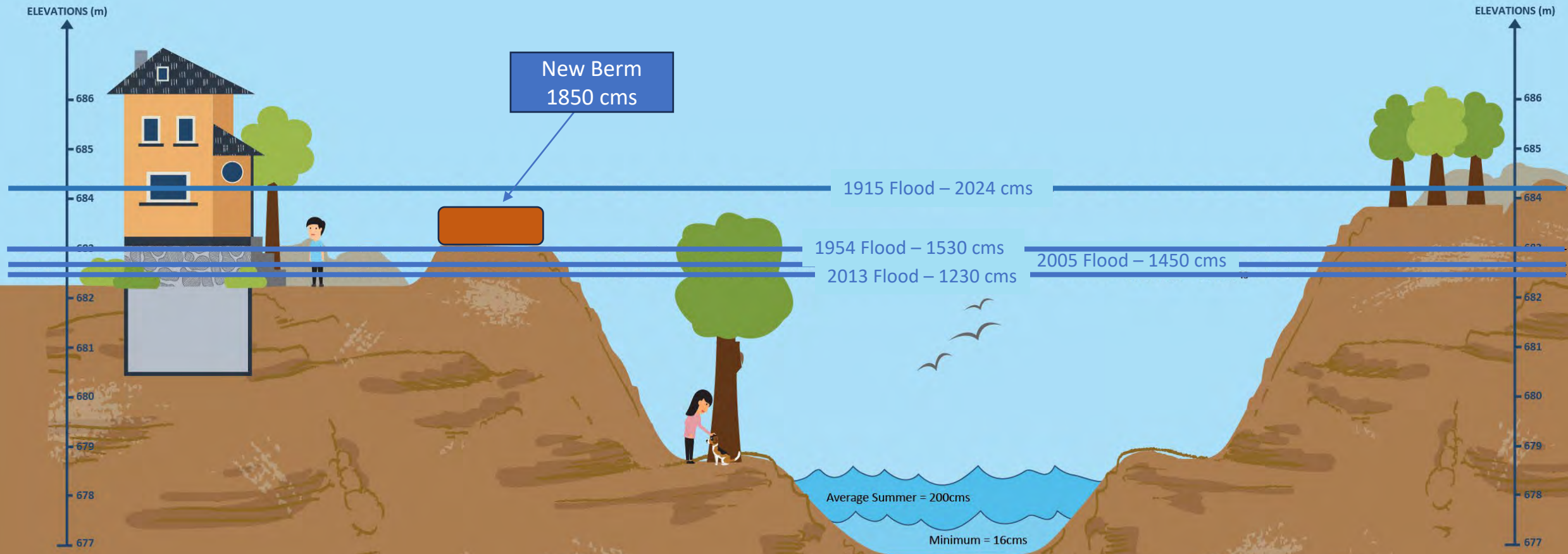


History of Flooding - Dickson Dam Storage

Red Deer River Flood Peaks (m³/s)



TOWN OF DRUMHELLER - HISTORY OF FLOODING



Drumheller Valley History of Flooding



Nacmine - June 2005 flood peak – 1,450 m³/s



CN Rail Bridge - June 2005 - flood peak – 1,450 m³/s
20 6:05 PM



Newcastle - June 2005 - flood peak – 1,450 m³/s

- Recent flooding occurred in 2005 with a peak of 1450m³/s and 2013 at 1230m³/s
- 2013 Provincial exemption – development regulations to the regulated 100-year flood level
- New regulatory and berm design flow rate set in 2021 is 1850m³/s



Rural Drumheller - June 2013 - flood peak – 1,230 m³/s



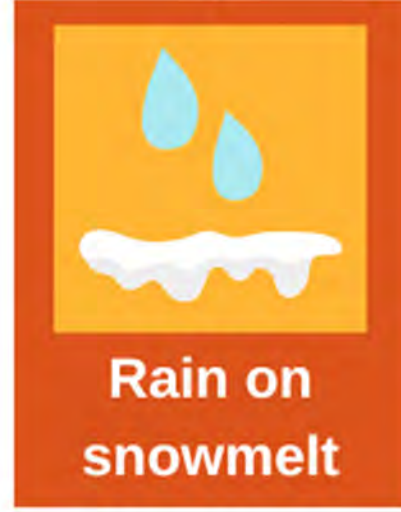
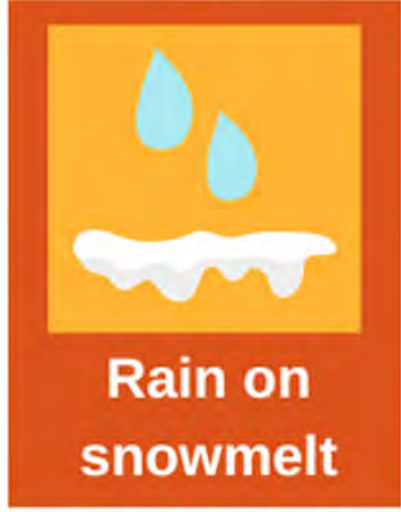
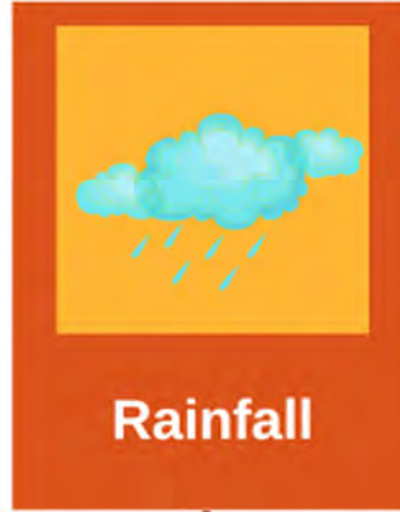
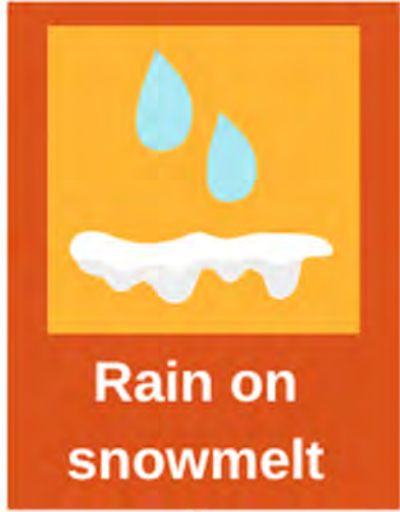
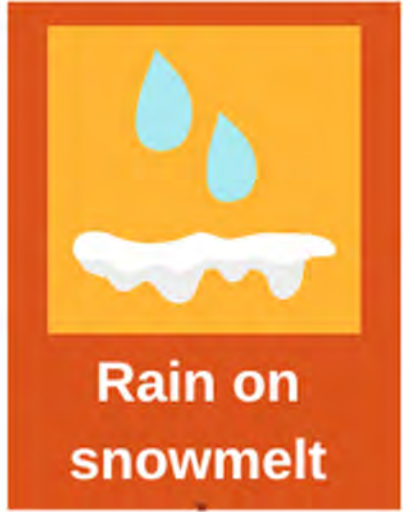
Nacmine - June 2005 flood peak – 1,450 m³/s

1915

1931

1948

1954



1997

2005

2013

2018

FIND YOUR FLOOD RISK

floods.alberta.ca

Alberta 

Program Initiation & Funding

The Town began applying for grant funding for the Flood Resiliency and Mitigation program shortly after the June 2013 flood event, and starting in 2016 were successful in receiving funding commitments from:

- Government of Alberta - Alberta Community Resiliency Program ACRP (\$6.4M)

Further funding announced in 2018 and 2019

- Government of Canada - Disaster Mitigation and Adaptation Fund DMAF (\$22M)
- Town of Drumheller (\$5M)
- Government of Alberta – Buyout Program (\$20M)

Through our lobbying efforts and recent funding applications, the program has very recently been committed:

- Government of Alberta - Watershed Resiliency and Restoration Program WRRP (\$75K)
- Government of Alberta Community Resiliency Program (\$27.3M)



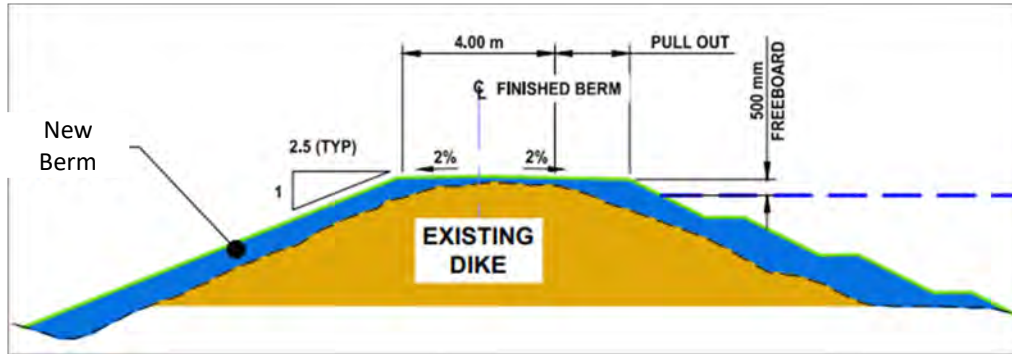
Watershed Resiliency and Restoration Program

Cattle Fencing – Fish Habitat Restoration



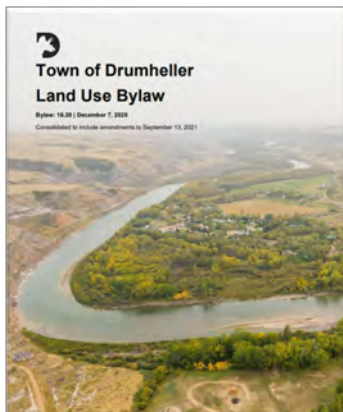
Drumheller's Flood Resiliency Program

Focus & Process



Structural Mitigation

Buyouts in Floodway



Policy



Flood & Emergency Preparedness



Education



Benefits the Flood Program Brings to the Whole Valley

- Protecting the people, property and the infrastructure of the Valley
- Building a resilient community and protecting future generations
- Future development opportunities and economic growth
- Making it easier for residents and newcomers to get mortgages & insurance
- Disaster recovery
 - The DRP funding now has a “One and Done” policy which means it can only be claimed 1 time per address
 - The Town of Drumheller spent between \$1M and \$2M with 90% of the funds covered by State of Emergency Government funds in both the 2005 and 2013 floods.



Riverwood Close Berm
TBD

East Nacmine
Buyouts

North Drumheller
Michichi Creek Berm
Construction 2024

Grove Plaza Berm -
Complete

Nacmine Berm
Construction 2025

Midland Berm
Complete

Downtown Drumheller Berm
Construction 2023

Willow Estates Berm
Complete

Newcastle Berm
Complete

Hospital Berm
Extension
Construction 2024

West and Central Rosedale
Buyouts

West Rosedale
Scarlett Berm
Construction 2026

Rosedale Berm
Construction 2026

Rosedale Highway 10x
TBD

North Cambria Berm
TBD

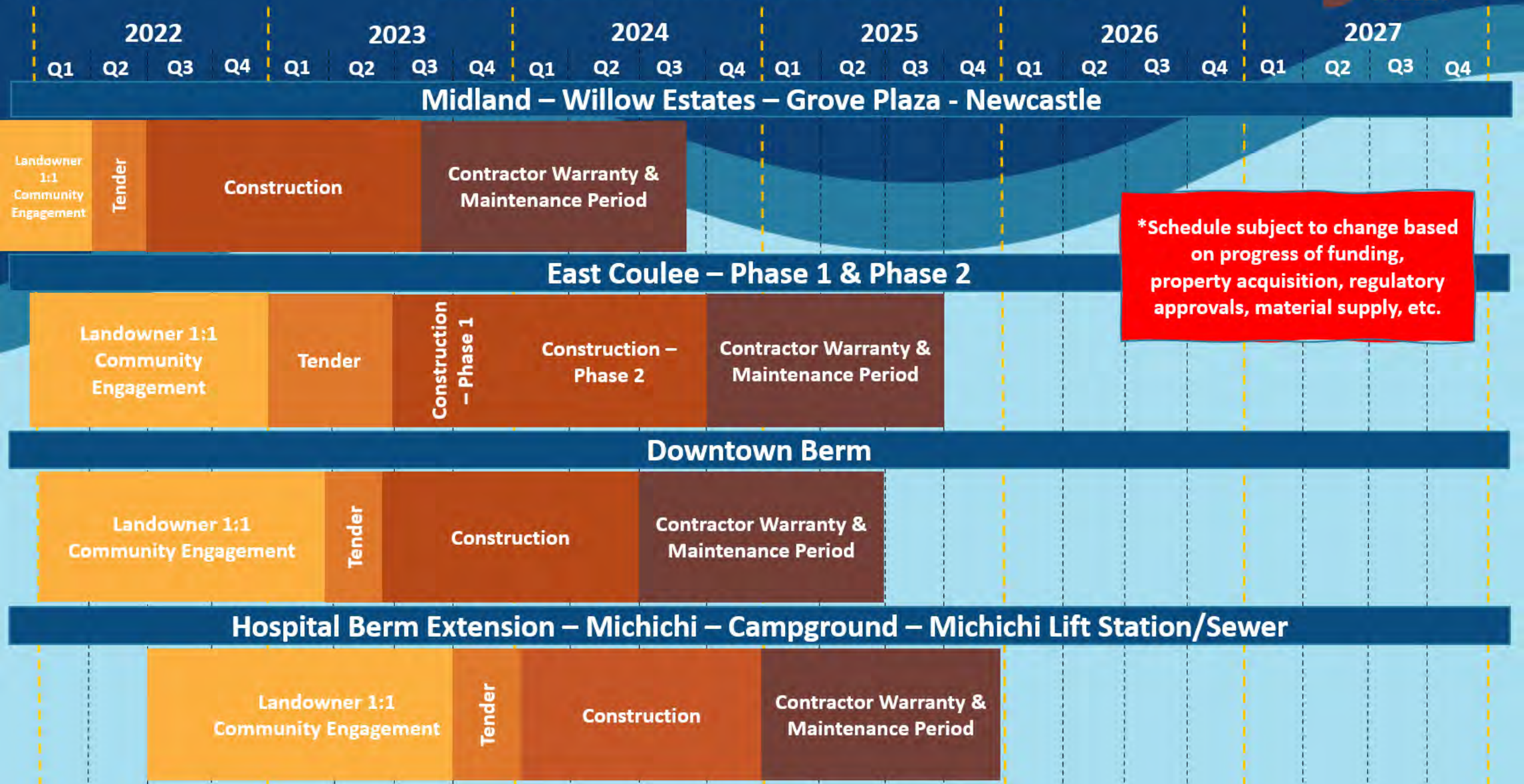
Lehigh
Buyouts



Proposed Program Work Locations

East Coulee Berm
Construction 2023/2024

DRFMO – Preliminary Program Schedule*



*Schedule subject to change based on progress of funding, property acquisition, regulatory approvals, material supply, etc.

DRFMO – Preliminary Program Schedule*



2022 2023 2024 2025 2026 2027

Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4 Q1 Q2 Q3 Q4

Alberta Transportation – Michichi Creek – North Dinosaur Trail Bridge

¹UNFUNDED BERMS
 North Cambria
 Hwy 10x
 Riverwood Close

TBD if more funding becomes available

Landowner 1:1
 Community Engagement
 Regulatory Approvals

TBD – Based on:
 Alberta Transportation
 Funding Approval

Contractor Warranty &
 Maintenance Period

Nacmine Berm

Landowner
 1:1
 Community
 Engagement

Phase 2 – Land
 Acquisition
 Community
 Engagement

Tender

Construction

Contractor Warranty &
 Maintenance Period

Rosedale Berm / West Rosedale Scarlett Berm

Landowner 1:1
 Community Engagement

Tender

Phase 1
 Construction

Phase 2
 Construction

Contractor Warranty &
 Maintenance Period

Lehigh

Negotiations

Expropriations

Remediation

***Schedule subject to change based on progress of funding, property acquisition, regulatory approvals, material supply, etc.**

Environmental and Regulatory Compliance

from

- in-stream works and *Water Act* approvals

to

- Fish & Fish Habitats, Nesting Birds, and Wildlife Sweeps

and, from

- Forest Rehabilitation and Aquatic Vegetation

to

- Soils & Groundwater Sediment and Temporary Field Authorizations

Our Environmental & Regulatory Team is putting in the work to make sure regulations are followed.



Beware of Construction Zones



URGENT MESSAGE FROM THE FLOOD OFFICE!

We want to remind everyone of the risks associated with entering construction work sites.

Construction sites are hazardous areas, and unauthorized entry can result in serious injury or harm to oneself and others.

The Town of Drumheller and its contractors prioritize safety and have implemented strict safety protocols to ensure the well-being of workers and visitors on the site. These safety measures include the use of safety gear, installation of barricades, and prominent warning signs.

We ask all residents to respect and adhere to these safety protocols. Unauthorized entry into the construction site without proper authorization is strictly prohibited. By doing so, you not only put yourself at risk but also jeopardize the safety of others.

If you have any questions or concerns regarding the Flood Mitigation Project or the safety protocols in place, please feel free to contact us at floodreadiness@drumheller.ca.

Your safety is our utmost priority, and we appreciate your cooperation in ensuring a secure work environment for everyone.

VIBRATION MONITORING

Flood Mitigation & Climate Adaptation



BERM CONSTRUCTION
a temporary structure

VIBRATION MONITORING



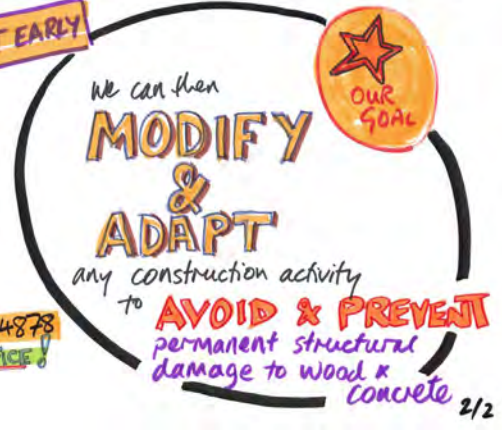
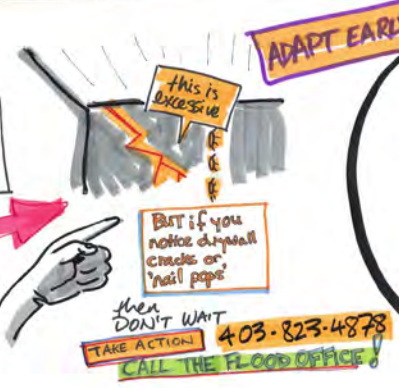
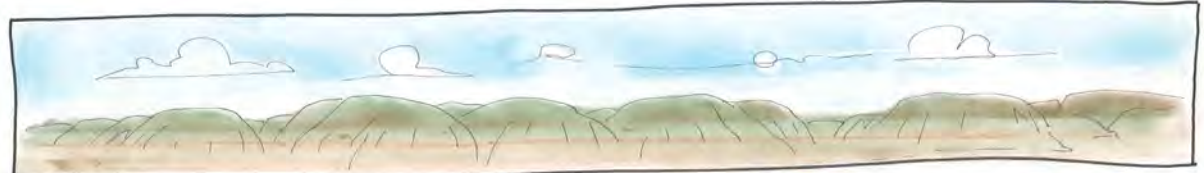
Flood Mitigation & Climate Adaptation



MONITORS are placed NEAR where WORK is happening



VIBRATION MONITORING





Willow Estates Berm – Construction Complete



Willow Estates Berm – Construction Complete





Willow Estates Berm – Construction Complete





Newcastle Berm – Construction Complete





Newcastle Berm – Construction Complete





Newcastle Berm – Construction Complete



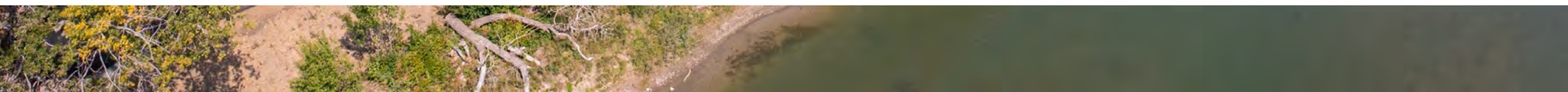


Newcastle Berm – Construction Complete





Midland Berm – Construction Complete





Midland Berm – Construction Complete



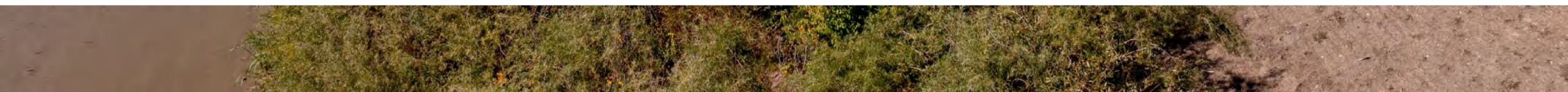


Midland Berm – Construction Complete



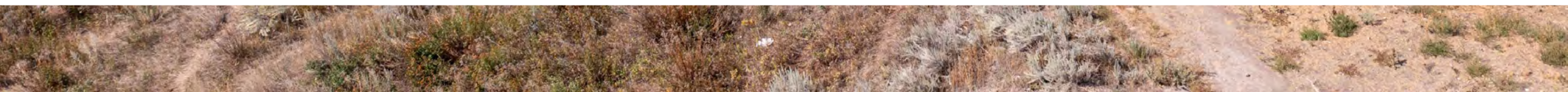


Grove Plaza Berm – Construction Complete





Grove Plaza Berm – Construction Complete





Grove Plaza Berm – Construction Complete

East Coulee Berm – Phase 1



East Coulee Berm – Phase 1



East Coulee Berm – Phase 1



Downtown Berm – Construction



Downtown Berm – Construction



Downtown Berm – Construction



Downtown Berm – Construction





Riverside Drive – Rendering of Retaining Wall – Looking North

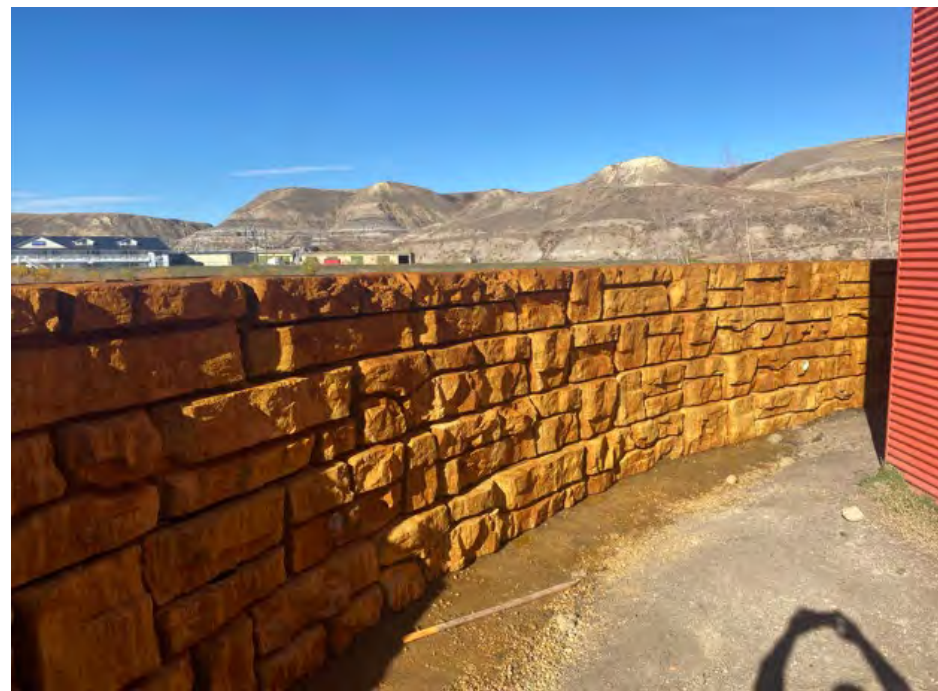


Riverside Drive – Rendering of Retaining Wall – Looking South



We Asked
You Answered

Citizens of the Town were asked what they would like to see the retaining wall look like in Downtown Drumheller and the message was received.





PROPOSED BERM ALIGNMENT WITH 3.0m ASPHALT PATH

RAMPS FROM BERM TO PARK AREA

TWO BRICK WALL MEMORIALS AND PETRIFIED WOOD ROCK - RELOCATED

CONCRETE STEPS AND HANDRAIL - CENTERED ON WALKWAY AND MEMORIALS

POWWOW AREA

RIVER OUTLOOK - ROCK BOULDER EDGER / BENCH WALL

PETRIFIED WOOD CAIRN - RELOCATED

POTENTIAL FUTURE PERGOLA/TRELLIS LOCATION

OPEN LAWN AREAS (EVENTS & CEREMONIES)

CONCRETE STEPS AND HANDRAIL - STEPS BLEND INTO BENCH WALLS

MAIN PATHWAY ON BERM

RED DEER RIVER

DRUMHELLER MEMORIAL ARENA

CURLING CLUB

Centennial Park – Event Space

RADI ANDS COMMUNITY FACILITY

CONCRETE STEPS AND HANDRAIL AT MAIN ENTRY

CONCRETE STEPS AND HANDRAIL AT MAIN ENTRY



Centennial Park

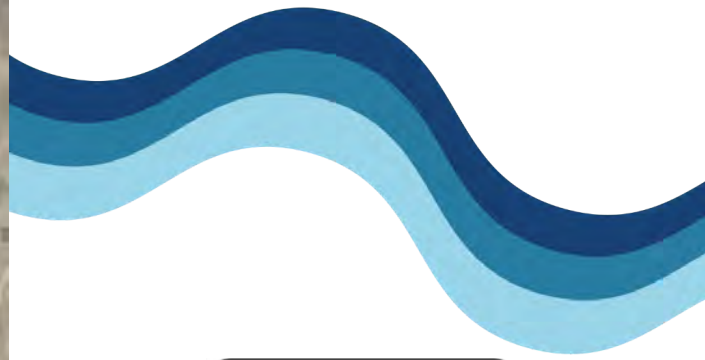
Event Space Upgrade (under construction)





**Downtown - Pathway Detour
November 2023 - June 2024**

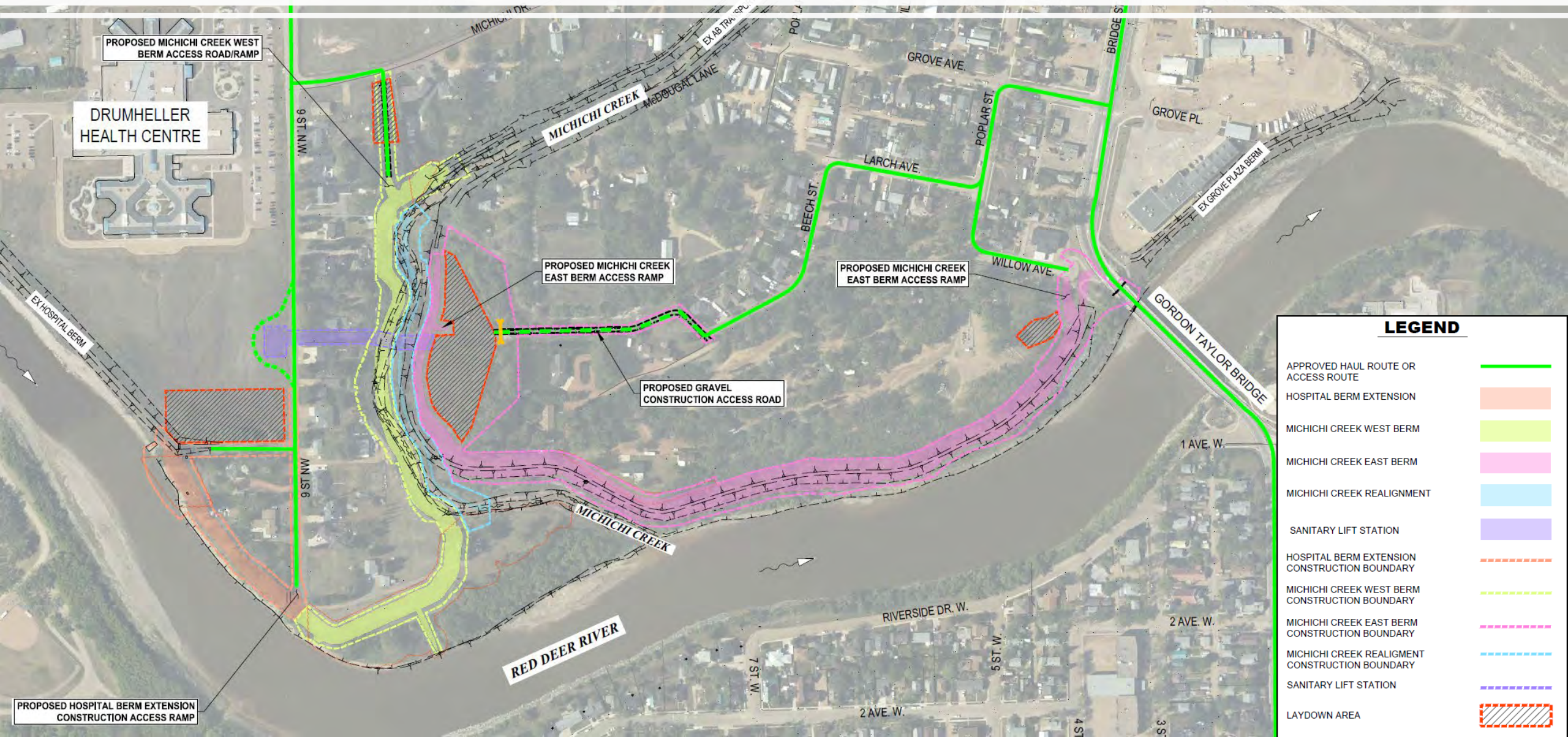
Detour route along south sidewalk on Riverside Dr





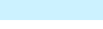









Downtown
Drumheller
Pathway
Detour for
Riverside Dr



North Drumheller Flood Improvements



LEGEND	
APPROVED HAUL ROUTE OR ACCESS ROUTE	
HOSPITAL BERM EXTENSION	
MICHICHI CREEK WEST BERM	
MICHICHI CREEK EAST BERM	
MICHICHI CREEK REALIGNMENT	
SANITARY LIFT STATION	
HOSPITAL BERM EXTENSION CONSTRUCTION BOUNDARY	
MICHICHI CREEK WEST BERM CONSTRUCTION BOUNDARY	
MICHICHI CREEK EAST BERM CONSTRUCTION BOUNDARY	
MICHICHI CREEK REALIGNMENT CONSTRUCTION BOUNDARY	
SANITARY LIFT STATION	
LAYDOWN AREA	

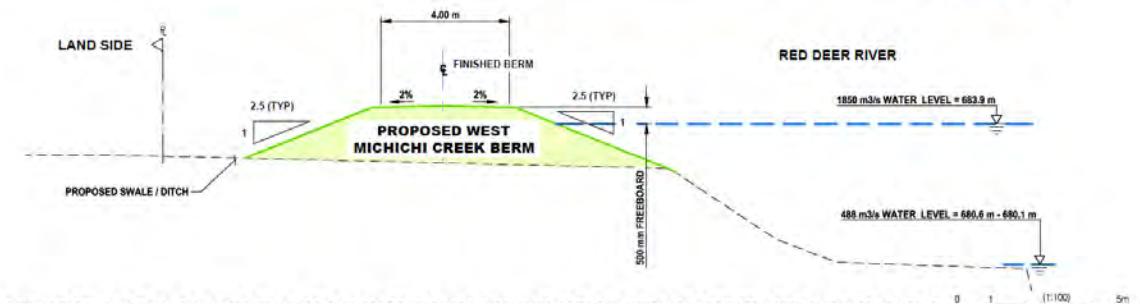
Typical Berm Cross-Section at Michichi Creek



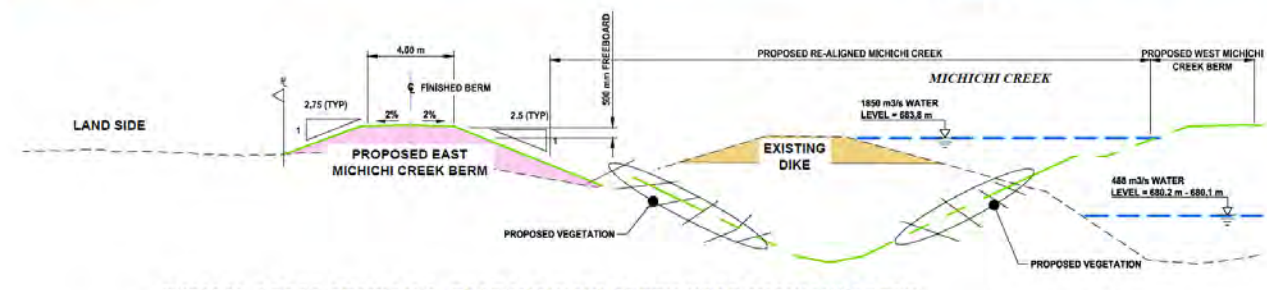
TYPICAL SECTION AT WEST MICHICHI CREEK



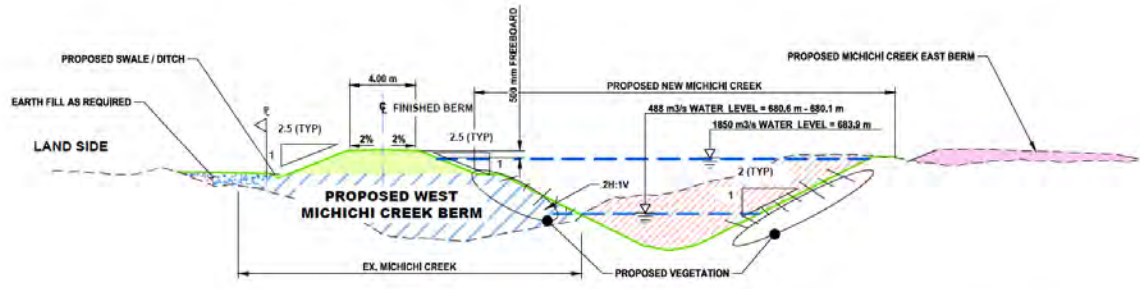
TYPICAL SECTION AT MICHICHI CREEK



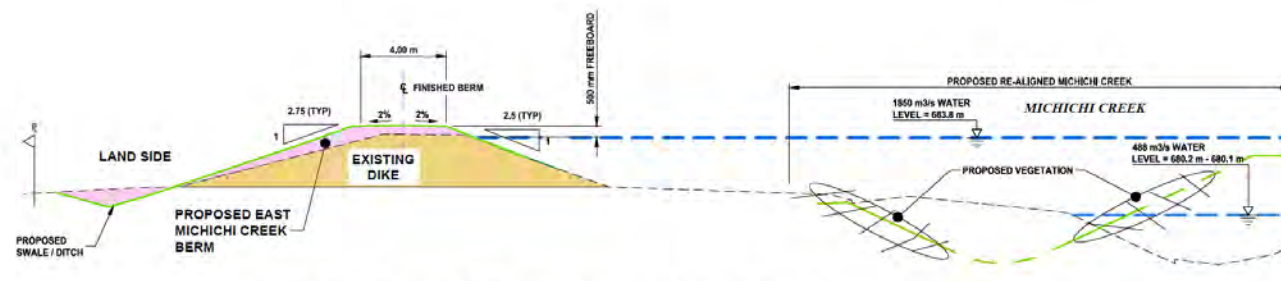
TYPICAL CROSS-SECTION C: HOSPITAL BERM EXTENSION & WEST MICHICHI CREEK BERM
Scale 1:100 (STA 0+140 TO 0+410 AND 0+680 TO END)



TYPICAL CROSS-SECTION A: EAST MICHICHI CREEK NEAR MICHICHI CREEK
Scale 1:150 (STA 3+000 TO 3+200)



TYPICAL CROSS-SECTION D: WEST MICHICHI CREEK BERM
Scale 1:200 (STA 0+410 TO 0+680)



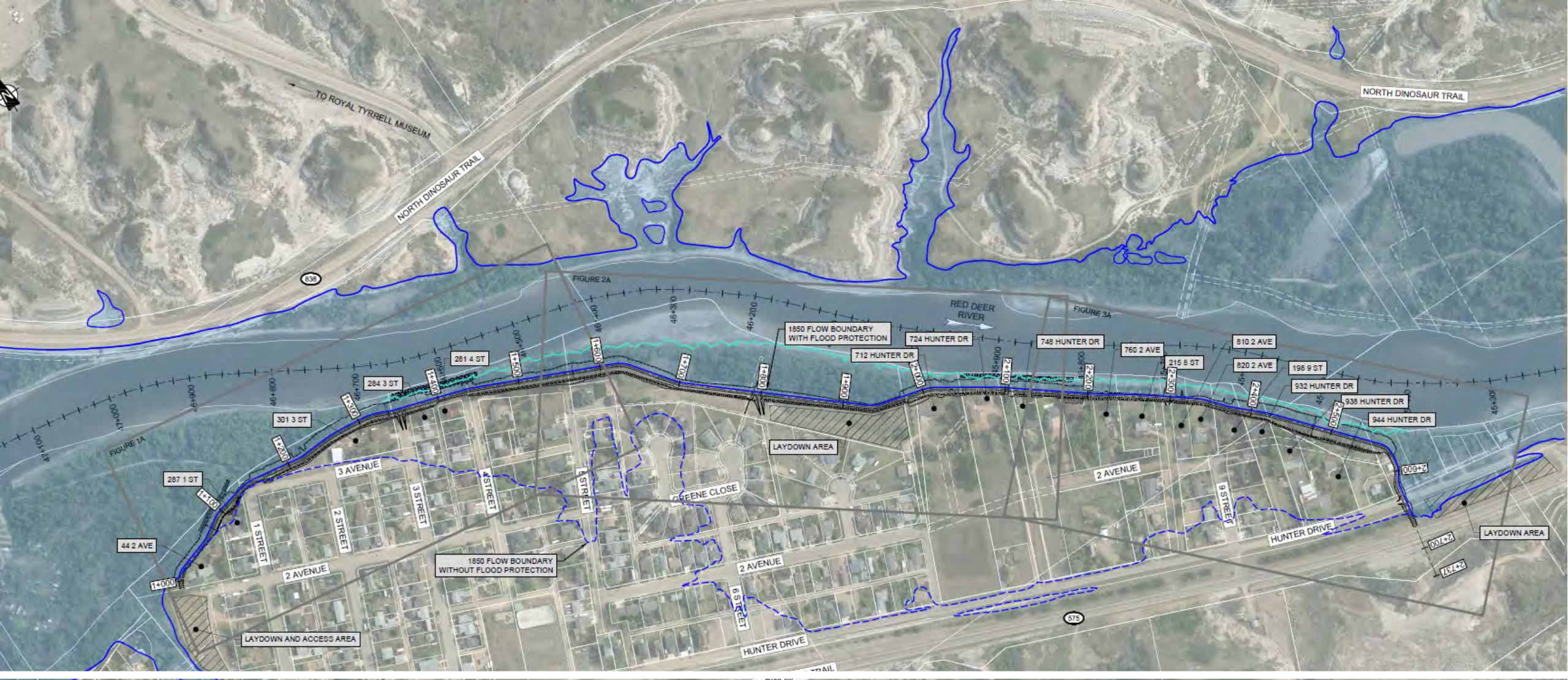
TYPICAL CROSS-SECTION B: EAST MICHICHI CREEK NEAR MICHICHI CREEK
Scale 1:150 (STA 3+200 TO 3+420)

Historic Creek Centerlines for Michichi Creek

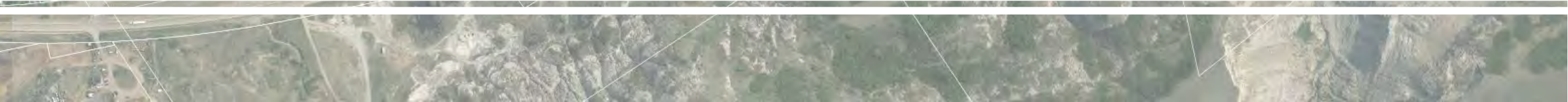
Legend

- Proposed Michichi Creek Centerline
- 1950 (1,312m)
- 1963 (1,042m)
- 1976 (1,047m)
- 2019 (1,001m)



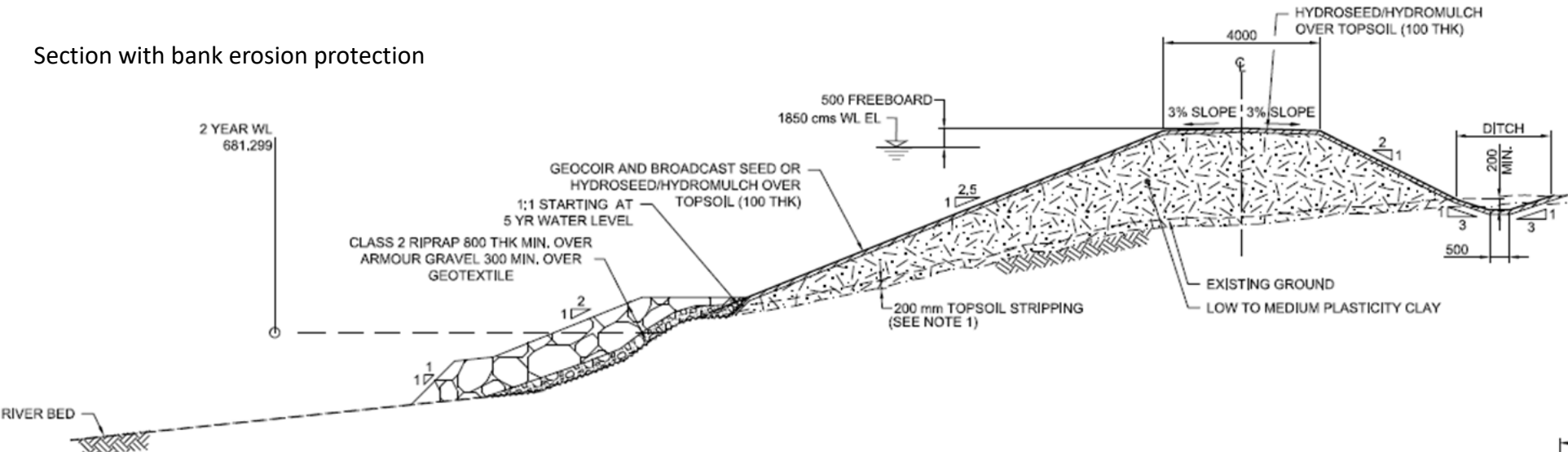


Nacmine Berm - Overall Site Plan



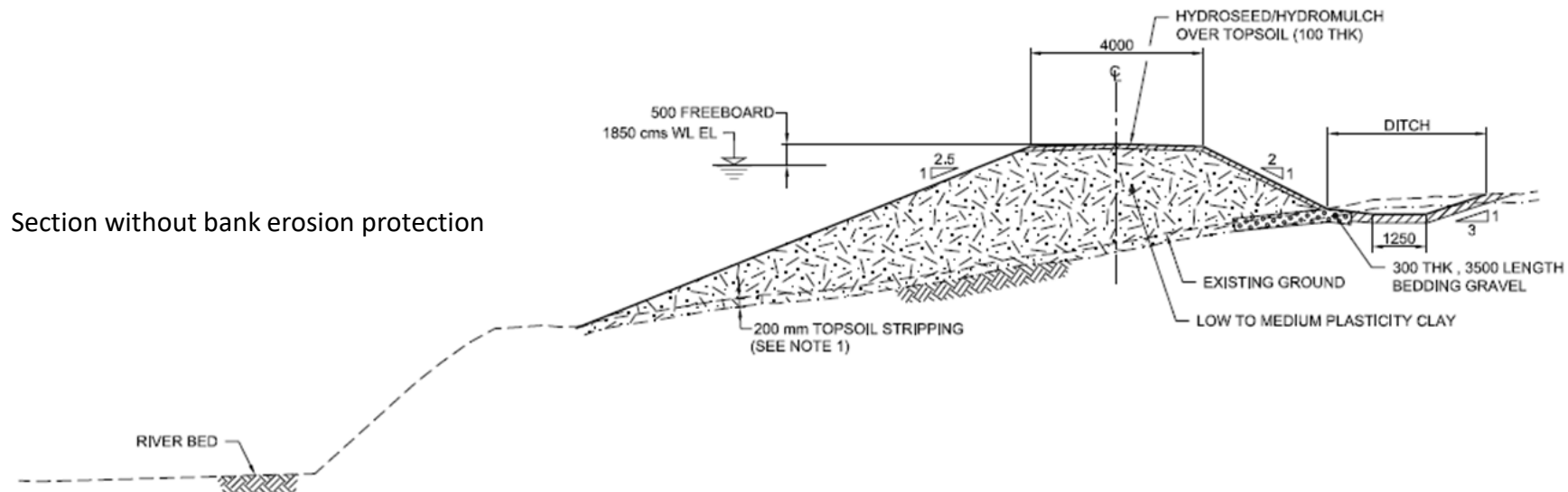
Typical Berm Cross-Sections at Nacmine Berm

Section with bank erosion protection



NOTE: no pathway will be installed on the Nacmine Berm

Section without bank erosion protection



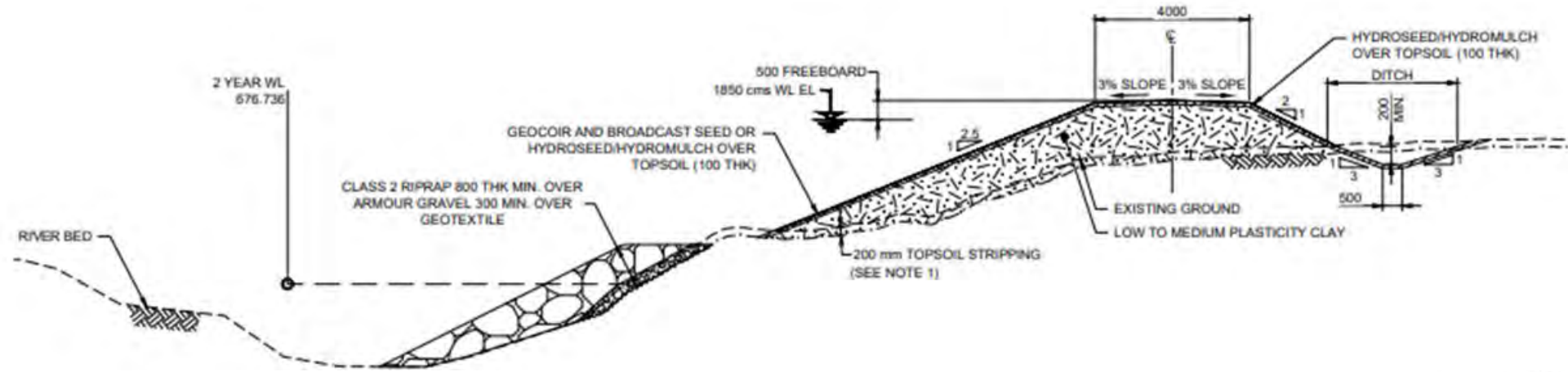


Rosedale Berm - Overall Site Plan

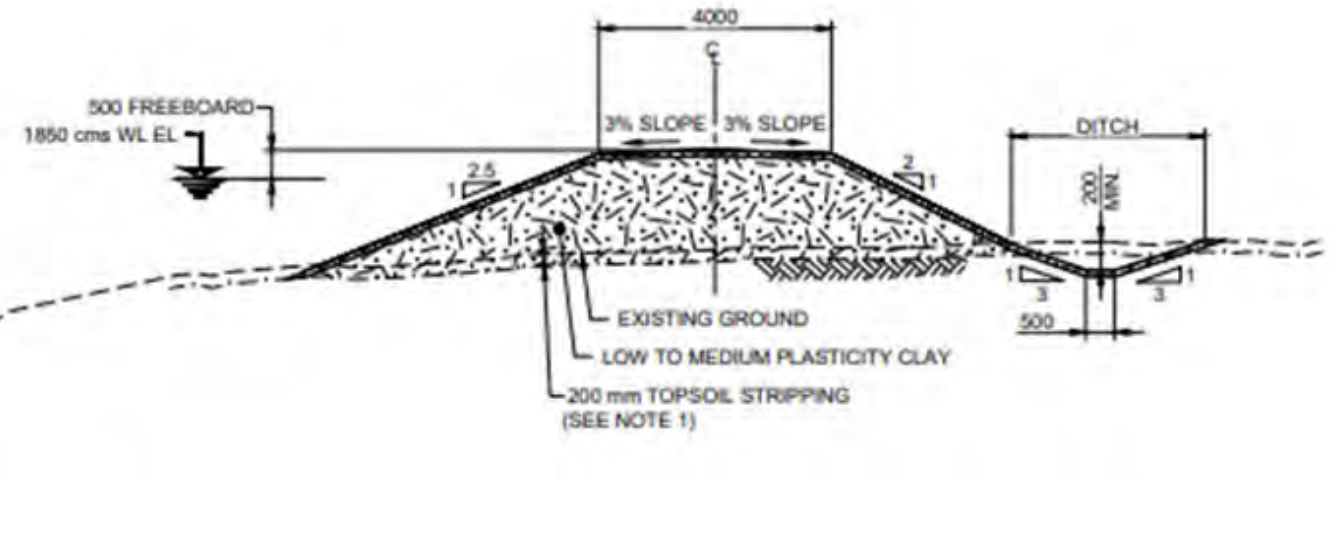


Typical Berm Cross-Sections at Rosedale Berm

Typical Cross Section along the Rosebud River

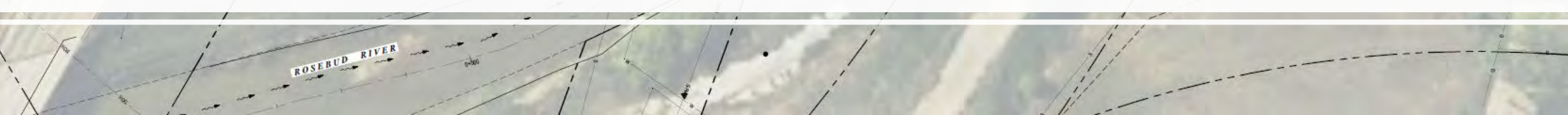


Typical Cross Section along Red Deer River

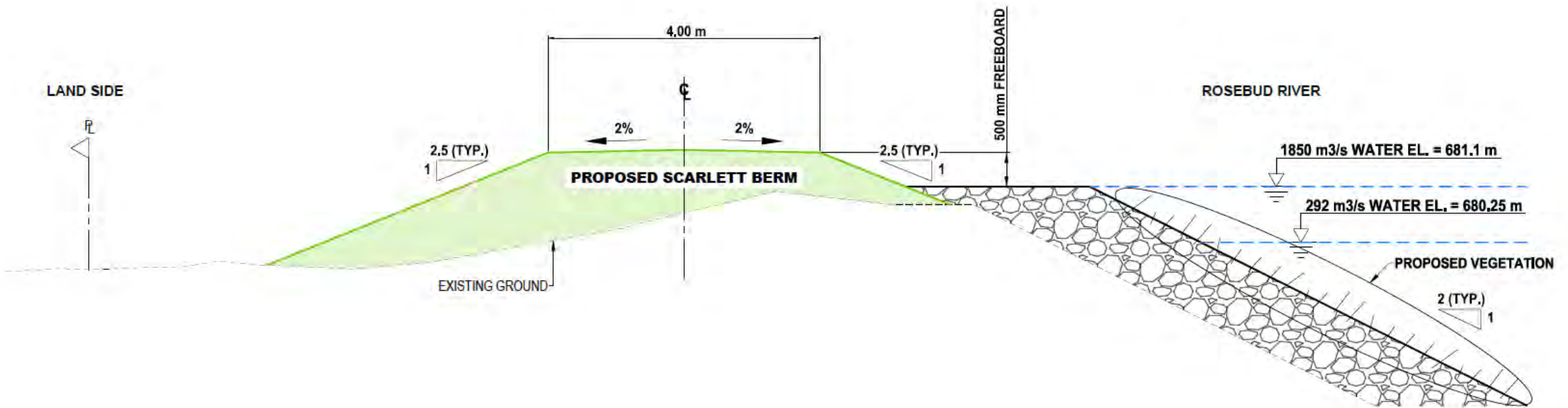




West Rosedale Scarlett Berm - Overall Site Plan



Typical Berm Cross-Section at West Rosedale Scarlett Berm



TYPICAL CROSS-SECTION: SCARLETT BERM

Scale 1:30

0 0.25 0.50 1.0 m

Tree Replacement Strategy

To preserve the Drumheller Valley urban tree canopy, healthy trees removed for berm construction will be replaced according to the following guidelines: pg 1 of 2

ENHANCE THE URBAN FOREST

5 new trees or shrubs will be planted for each healthy tree removed

1 x REMOVED

5:1



5 x REPLACED

DESIGN FOR BIODIVERSITY

plant a range of species to promote long-term success and resiliency



ENHANCE EXISTING PLANT COMMUNITIES

prioritize species that are similar to those that are currently thriving in the local area



ENHANCE THE URBAN FOREST

prioritize revegetation near the berm, where feasible, and in public areas within the local community



Tree Replacement Strategy

To preserve the Drumheller Valley urban tree canopy, healthy trees removed for berm construction will be replaced according to the following guidelines: pg 2 of 2

PRIVATE TREES

for healthy trees removed from private property, we will work with the affected owner to provide one replacement tree to be located on the affected property and four trees on public lands

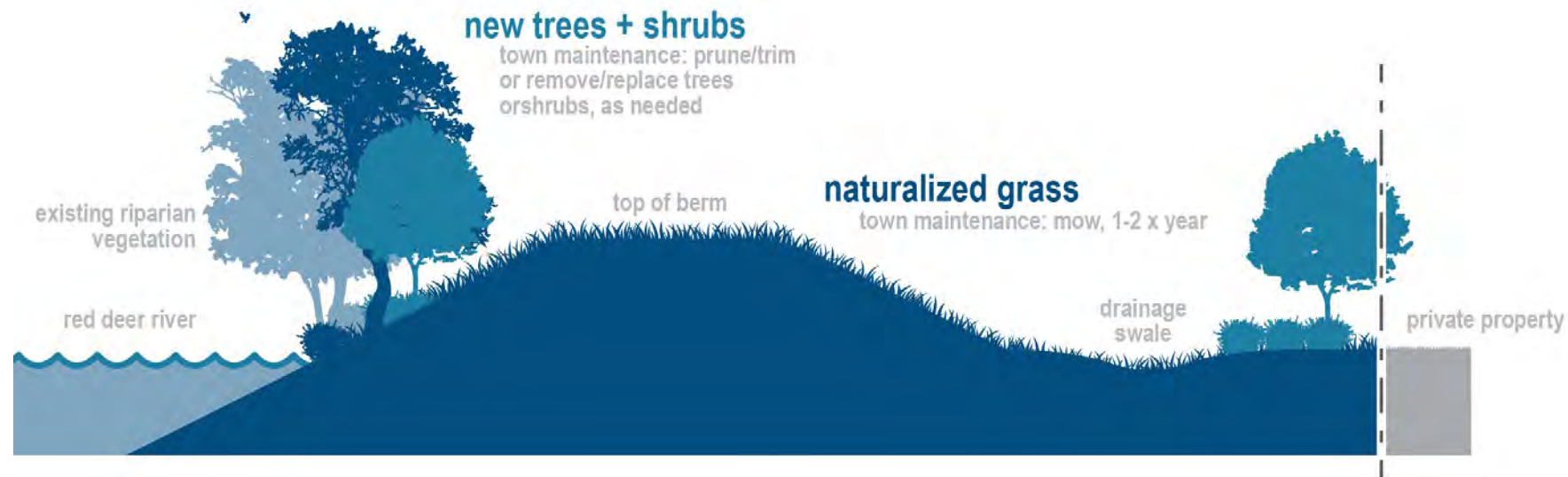
1 x removed
1 x replaced

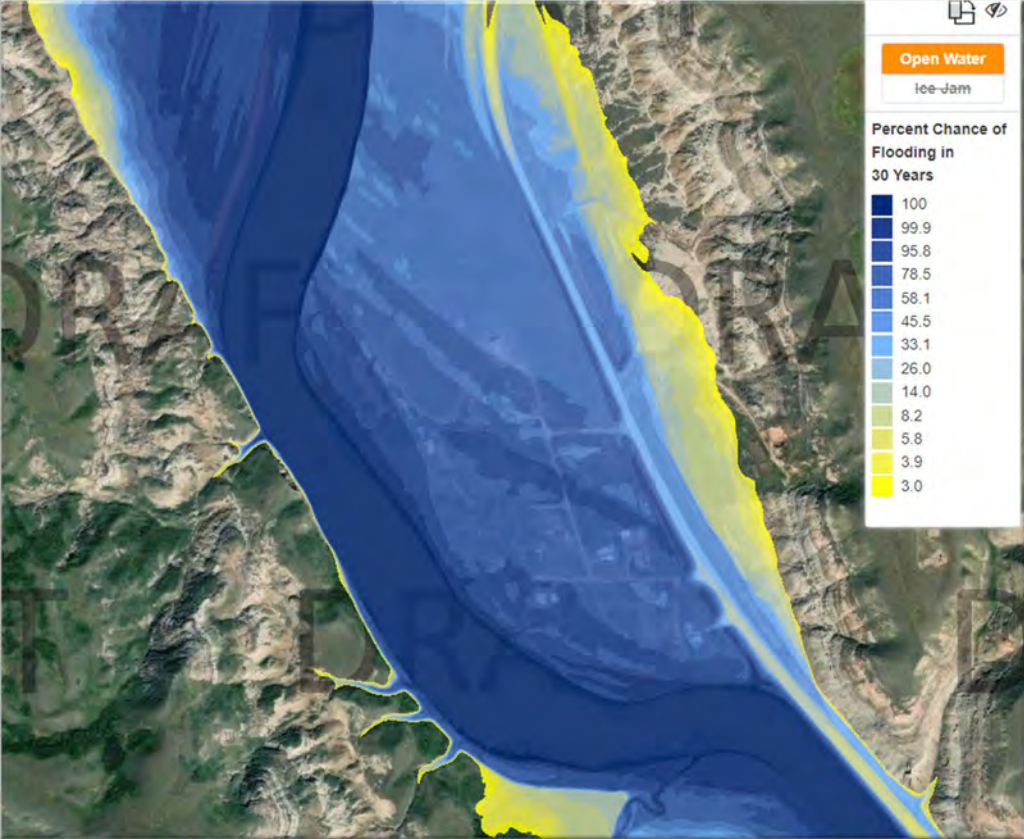


LONG-TERM BERM DESIGN INTENT



Examples of naturalized grass





Floodway Buyouts

Floodway buyouts are taking place for properties in significant flood risk locations with no protection



Blessings of the Trees

We bless the trees still standing and say goodbye to the trees that must be removed with a beautiful ceremony.





Updated Information

Find the most updated information on the Flood Mitigation on the boards at the BCF by the wooden dinosaur.



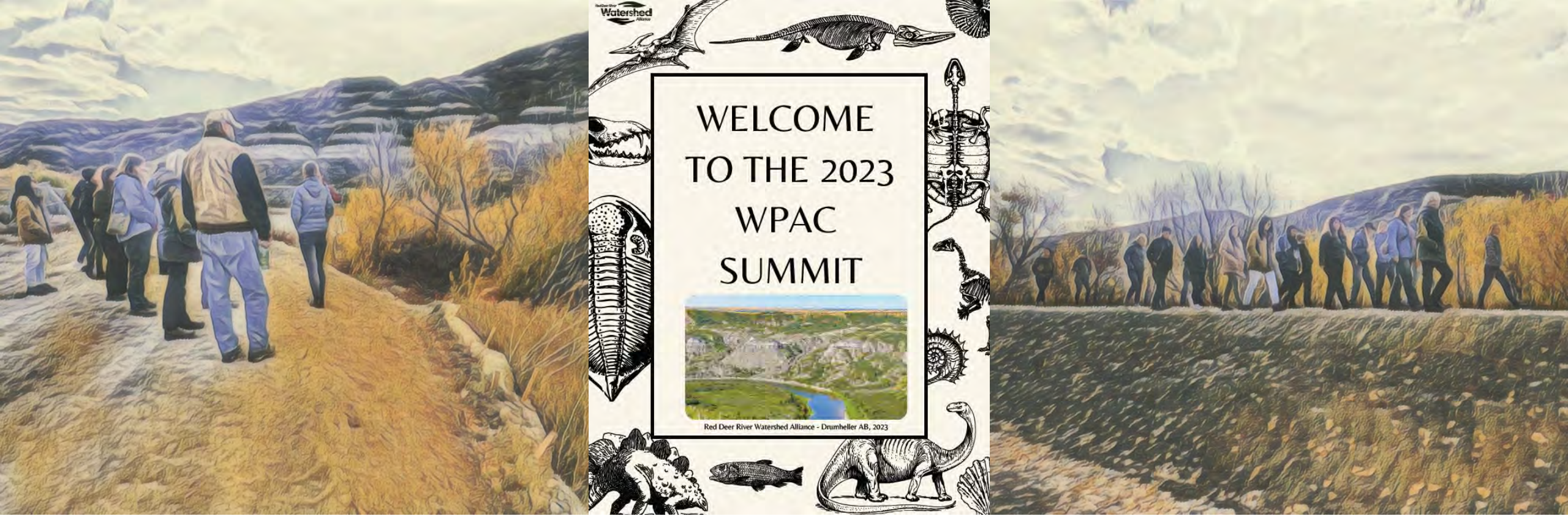
Tree Carving Events

- September 2022
- May 2023
- Looking forward to the next event in May 2024!



Community Collaboration

The Town of Drumheller and The Flood Office work with Greentree School and their students on their proposal for some new trees.



Community Collaboration

The Red Deer River Watershed Alliance held their annual summit in Drumheller. The Flood office had the privilege of presenting on the overall Resiliency & Flood Mitigation program along with a walking tour of the newly constructed berm in East Coulee.

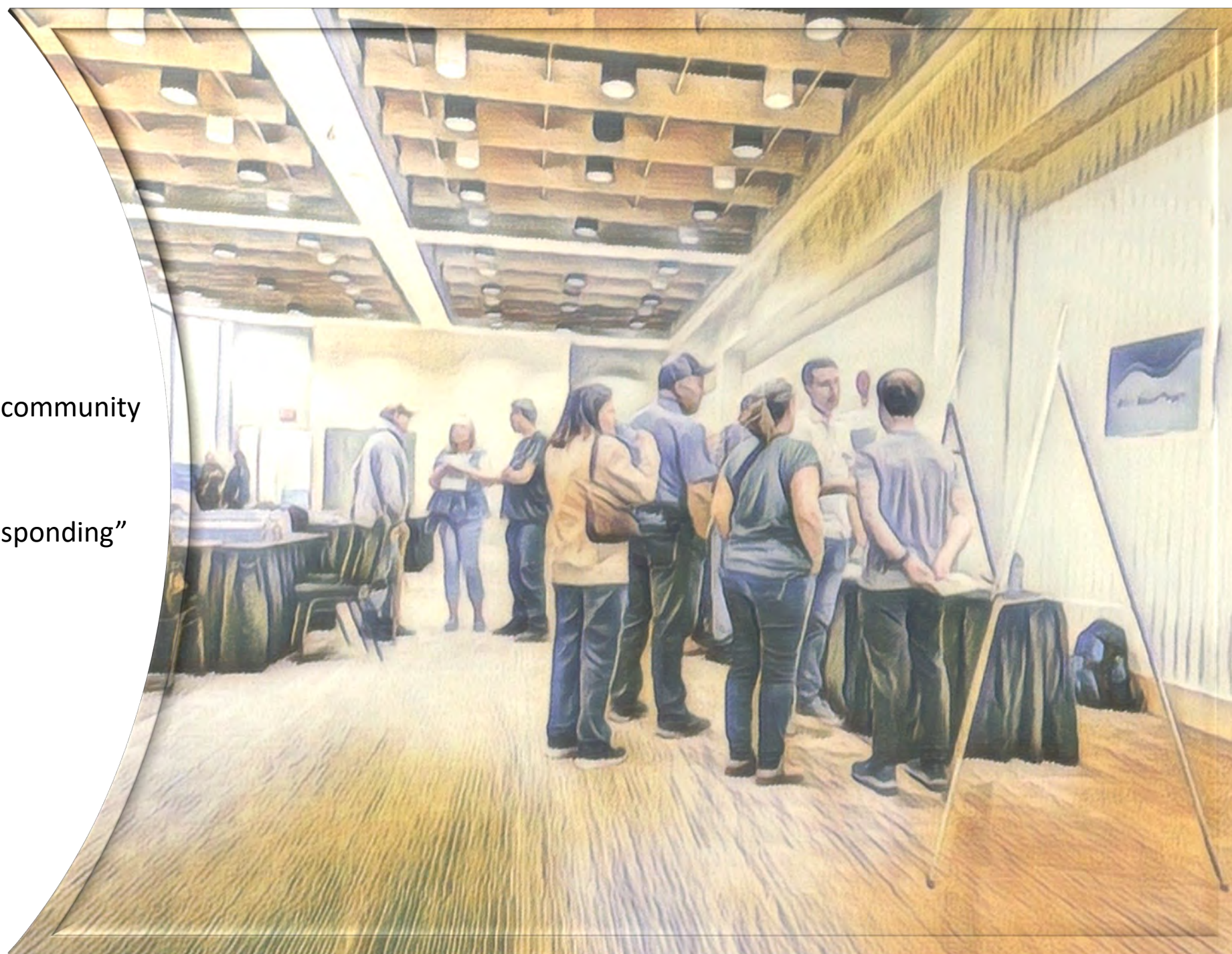
Berm Walking Tours

Prior to construction come out and visualize what the berm in your community is going to look like.



Public Engagement

- Receive feedback from the community
- Detailed explanation
 “What We’ve Heard &
 How We’re Responding”
- Citizen concerns
- Clear Messaging
- Scheduling Updates
- Flood Readiness





September 2022

Calgary Zoo's endangered Sage Grouse benefit from Drumheller's Flood Mitigation Program



<https://calgary.ctvnews.ca/calgary-zoo-grouse-benefit-from-drumheller-s-flood-mitigation-program-1.6077373>

Groundbreaking Ceremony

August 27, 2022





The Flood Team



Community Advisory Committee

Email:
floodcommittee@drumheller.ca

MAIN CAUSES OF FLOODING

These result from accumulation of ice fragments that build up to restrict the flow of water causing a temporary obstruction. They form during the freeze-up and break-up periods, the latter having the greater flooding potential in Drumheller valley.

ICE JAMS (frozen water)



RAIN ON SNOWMELT (flowing water)



Most of the precipitation in winter is stored as snow or ice on the ground. During the spring melt, huge quantities of water are released causing a freshet, which is heavy spring runoff and flooding. When the ground is frozen, melting snow is unable to penetrate and runs off over the ground surface into the Red Deer and Rosebud Rivers and Michichi Creek. Flooding is a greater concern when rising snowmelt is compounded by runoff from heavy rainfall. The later the thaw, the more likely flooding can occur. This type of flooding in Drumheller typically occurs in late June.

Flash floods usually happen on small watersheds as a result of a torrential downpour, often caused by heavy thunderstorm activity. They are characterized by the occurrence of the peak of the flood within six hours of the onset of rainfall and can be extremely dangerous. The flood conditions develop rapidly because the rainfall is so heavy the ground is incapable of absorbing the water quickly enough, resulting in a very high runoff rate.

RAINFALL (falling water)



TYPES OF FLOODING

OVERLAND

Overland flooding happens when water overflows the Red Deer River, Rosebud River or Michichi Creek banks due to rain or extensive volumes of melted snow. This is a type of flood that results from the level of water outside of your dwelling rising, allowing water to enter your home.



STORMWATER

When the Red Deer River, Rosebud River or Michichi Creek rise, water can flow back into the stormwater pipe system. Water may spill back onto streets or basements through stormwater drains.

WASTEWATER

Water on flooded streets or high groundwater may drain into the sanitary sewer system. This overloads the sanitary sewer pipes and can force sewage back through the sewer line and into your basement.



Helpful Resources

Get the **FIRST AID APP!**

The official Canadian Red Cross First Aid app puts lifesaving advice in your hands. The app helps maintain your first aid skills and respond to everyday emergencies.



<https://emergencyalert.alberta.ca>

<https://www.alberta.ca/flood-preparedness.aspx>

<https://www.albertealthahservices.ca/news/page14387.aspx>

<https://floodreadiness.drumheller.ca>

www.aema.alberta.ca/be-prepared

www.getprepared.gc.ca

Resources

Resource Page



Community Input Page



Latest Updates Page



FAQ Page



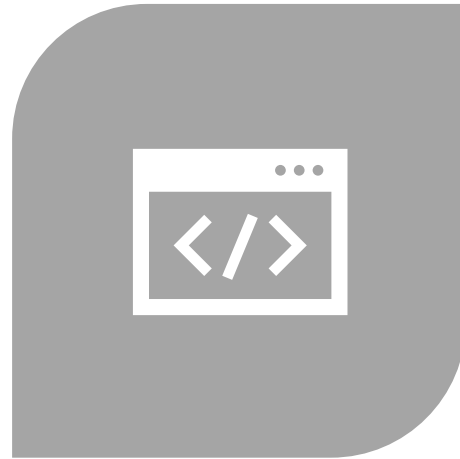
News Page



Contact Us



EMAIL – FLOOD OFFICE:
FLOODREADINESS@DRUMHELLER.CA



WEB:
FLOODREADINESS.DRUMHELLER.CA



EMAIL - COMMUNITY ADVISORY
FLOODCOMMITTEE@DRUMHELLER.CA



Find Us

floodreadiness.drumheller.ca



Drumheller Flood Info



@DRMFloodInfo



@DRMFloodInfo

DRUMHELLER FLOOD OFFICE IS FUNDED BY:



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VALLEY

Alberta 