

DRUMHELLER FLOOD MITIGATION AND CLIMATE ADAPTATION SYSTEM



September 2020

Remembering the Past

Drumheller is a Flood Community

Drumheller has a dramatic history that has been carved into the valley through weather and environmental changes. The defining moments of the last 100 years have all centered around the river. With no less than eight major flooding events since 1915, flooding has taken its toll on the financial and social fabric of the community. Let's put our past into perspective with flow rates which is how we measure floods. Many of you were around for the floods in

2005 (1,450 cubic metres/second cms) and 2013 (1310 cms). Maybe some were around to experience the flood in 1954 (1530 cms). You may be saying, we didn't experience damage during those floods, why worry now. **Let's go back a bit further to 1915 when the town experienced 2,000 cms. If we experienced those flow rates today, the town would be devastated. This is what we are protecting to and beyond.**



Wayne, 1931



Drumheller, 1948

The Red Deer River

Our Greatest Asset and Largest Threat

How the river flows impacts everything and everyone in the valley. When it flows easily, life is easy, and the river is a place of celebration and recreation. When the river rises and races, it becomes a serious risk for the entire community.

While some people believe flooding only impacts those who live closest to the river, this is simply not true. We have to look back to the events of the past to realize that flooding impacts the entire community.

It's time to recognize that while the river is one of Drumheller's greatest assets it is also by far its greatest threat. Weather patterns have become increasingly volatile and extreme and the financial landscape is experiencing massive fluctuations. The next flood is not a matter of if, it's a matter of when and unfortunately, **we can't rely on government and insurance companies to bail us out. The money won't be there. We need to face the facts that our environmental and financial landscapes are changing and the time to act is now.**



Drumheller, 2013



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The Opportunity

Protecting Drumheller from Devastation

Fortunately, today we have a once in a lifetime opportunity to make change that will protect Drumheller from potential devastation. With the funding commitment from three orders of government (\$22M Canada, \$28M Alberta, \$5M Drumheller), The Town is poised to implement a massive multi-hazard solution to protect and reinvent itself.

The Drumheller Flood Mitigation and Climate Adaptation system will rethink how we use the land in the valley, establishing zones for river conveyance, protected zones around the river and growth zones in elevated areas. The project is focused on making room for the river and creating berms in the valley to protect residents, homes, businesses, schools and health care institutions from the financial and social losses caused by flooding. The town will be further enhanced through this project with enhanced walking trails and recreation areas reestablishing the river as a place of celebration, discovery, and education, rather than devastation.

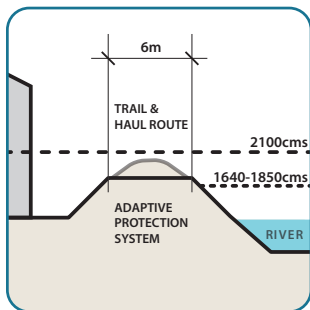
What Does This Mean?

Living Next to the River

We recognize that people who live along the river have questions. For many homeowners, they have been awaiting this day. They understand the perils of the river and the opportunity to relocate. Others are saddened at the prospect of losing their homes, views and maybe their privacy. The bottom line is that some properties along the river will be impacted. The berms being considered are meant to protect a neighbourhood from flooding, not just the few homes along the river. Where an engineering solution can't be found, properties or portions of properties within the conveyance zone will need to be purchased at a fair price. This is not a step the Town takes lightly but with confidence and compassion believes it is the best strategy to protect the community at large. The ultimate design will not be determined until the Resiliency and Flood Mitigation Office conducts an analysis on the homes closest to the river, a step that is currently underway.

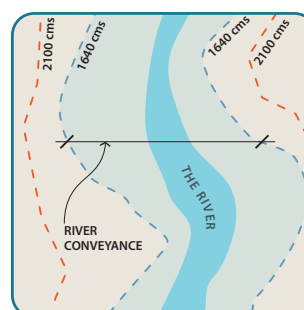
8 Steps to Change the Channel

1 DESIGN BASIS



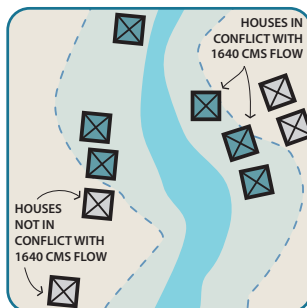
We start by **establishing a design basis**. Here, we identify the conditions that drive the design of our flood protection system. An adaptable system needs to protect to a range of flow-rates that will protect people and property in a variety of flood scenarios. We use berms that are designed to help us raise the barriers when the river rises.

2 CONVEYANCE CAPACITY



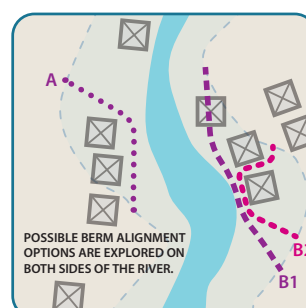
We use our target flow rates to map where the river wants to go. **The conveyance map shows us where the river needs this room to flow.** In Drumheller, there are two lines of defense: (i) 1640-1850 cms, and (ii) 2100 cms. These two lines both play important and separate roles in the multi-barrier protection system.

3 KNOW YOUR FLOW



Using the conveyance map, we can start to Know Your Flow. **Knowing Your Flow means understanding what flow rate threatens your safety and property.** Floods like those experienced in 1915 (2000 cms), 2005 (1450 cms), and 2013 (1310 cms) showed how vulnerable we can be. Knowing Your Flow helps us all prepare for the next event.

4 ALIGNMENT REVIEW



Once we know where existing development is threatened by the river, **we review potential berm alignments to understand where and what type of structural measures are feasible.** This analysis has two key goals: (i) make room for the river by keeping the channel as wide as possible, and (ii) protect existing property and assets.





Drumheller, 2005

The Foundation for the Future

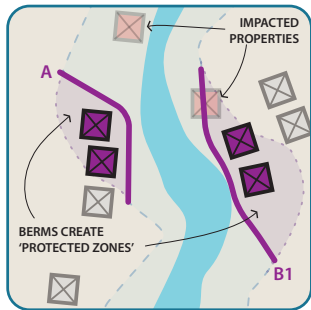
Putting the River at the Heart of our Planning Process

To do this right, we need to put the river at the heart of our planning process. That starts with revamping the Town's foundational planning documents, the Municipal Development Plan (MDP) and the Land Use Bylaw (LUB).

The river is at the heart of our community and it needs to be at the heart of these documents as well so that all the decisions that flow from them support the vision for a safe and prosperous Drumheller.

It's time to change the channel, get our house in order and secure the future of our town together. Town Council gave first reading on September 14th to the new MDP and LUB bylaws. Below are 8 steps that demonstrate the flow of change you can expect.

5 PROTECTED ZONE



Most properties can be protected by structural measures like berms, but **some are in conflict for reasons of river capacity, berm height, geotechnical considerations, cost, or operational complication.** In the figure, one house is not feasibly protected by a berm. Another house is in the path of the berm alignment that protects the most properties.

6 GROWTH AREAS



In the coming decades, Drumheller needs to move out of the river's path. This means that **new growth will happen outside of the 2100 cms line.** Limited infill below the 2100 cms line will be subject to additional conditions that make it more flood-resilient while this gradual migration occurs.

7 CONVEYANCE ZONE

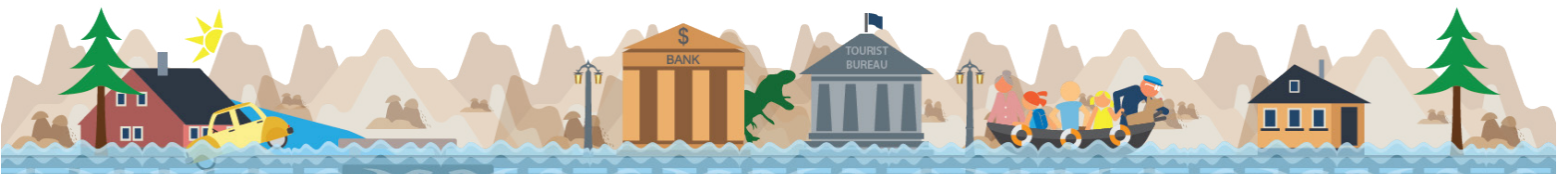


The area left to the river is called the conveyance zone. **In a flood, this zone provides space for the river to expand.** The rest of the time, it is home to natural spaces, recreational amenities, and low-impact uses that invite the river back into everyday life. This zone also enhances Drumheller's climate adaptation, helping store carbon and regulate micro-climates.

8 TRAILS AND OPEN SPACE NETWORK



As it is completed, **flood protection will be leveraged as an amenity.** The 2100 line will become a valley-wide regional trail. This trail will tie-in to local paths that will link residents to the river and the rest of the Valley's destinations. Educational pavilions along the trail will teach visitors about the history of our valley and its changing climate.



What is Changing in the new Municipal Development Plan (MDP) and Land Use Bylaw (LUB)?



Places the river at the heart of planning in Drumheller

The new MDP and LUB helps protect us from the river when it misbehaves and celebrates it as an amenity when it is not flooding. An understanding of the river informs where we choose to grow and where we protect our valuable natural areas along the river for public enjoyment.



Protects and celebrates our badlands landscapes

The dramatic badlands landscape is Drumheller's "secret sauce". The immersive experience of this landscape is celebrated and protected by the new MDP and LUB. It is also made more accessible to visitors and residents through the creation of a regional trail network.



Enhances and protects the Valley's unique neighbourhoods

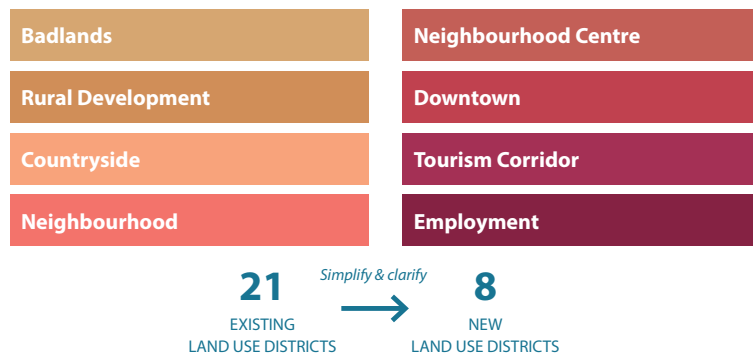
Drumheller is made up of unique neighbourhoods, each with their own stories, character, and history. The MDP and LUB recognize the importance of this diversity and celebrate it as part of the overall Valley experience. These places are also linked through the open space and trails network.



Harnesses opportunities for growth

The MDP and LUB enable Drumheller to live up to its full potential by identifying areas with the highest opportunity for new development and making it easier to build there. The new planning approach, based on the river, also inspires investor confidence that these areas adequately respond to flood risk.

Encouraging new development by removing 'red tape'.



With its modernized Land Use Bylaw, Drumheller will be leading the way for land use planning in Alberta. It focuses on form, rather than use. This means less administrative hassle when starting a new business in a house, and more control over heights and densities in neighbourhoods.

A key outcome of this approach is the consolidation of land use districts. **Currently there are 21 highly prescriptive districts** that can be a barrier

to the type of Town we want to build. **The new bylaw presents 8 open, flexible districts**, clear and simple enough to adapt to changing needs over time.

The new LUB knows when to step aside and let the development community and residents determine what's best. For instance, minimum parking requirements are removed from the bylaw, instead allowing parking supply to be dictated by individual project needs.

Leveraging flood works to create a trail network that links the entire Valley.

The MDP leverages flood protection efforts to create an incredible amenity for residents and visitors alike: a regional open space and trail network. This network will connect the Royal Tyrrell Museum all the way to the Atlas Coal Mine, connecting communities and amenities through the valley. It will also provide

additional access to the river and the breathtaking badlands landscapes. Educational pavilions and plazas throughout the network will teach people about flooding, natural and human history, climate adaptation, and our unique neighbourhoods like East Coulee, Wayne, and Bankview.

Trail Network Precedents



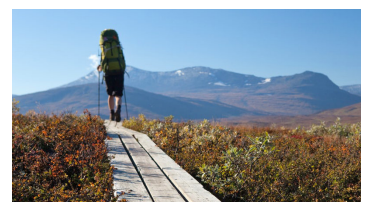
Integrated mapping and amenities.



Signage for wayfinding and education.



Adventurous routes for all types of activity.



Light footprint trails.