DRUMHELLER VALLEY

Drumheller Resiliency and Flood Mitigation Office

Downtown Dike & Riverside Drive Community Engagement Event

January 13, 2022

Agenda

Welcome everyone, I’m Kathryn Kolaczek the Communications Lead and event host. Today’s agenda is as follows:

- Land Acknowledgement
- Overview of event and format
- Introduce the team
- Introduce the speakers
- Presentation
- Question and answer period

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Land Acknowledgement

The Town of Drumheller respectfully acknowledges that we are on Treaty 7 territory, the ancestral and traditional territory of the Blackfoot Confederacy: Kainai, Piikani, and Siksika, as well as the Tsuut'ina First Nation, the Stoney Nakoda First Nation and Metis Nation Region 3. We recognize the land as an act of reconciliation and gratitude to those on whose territory we reside.

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Please Be Considerate

- Please respect your fellow neighbours and today's speakers. Abuse will NOT be tolerated. Any disrespectful behaviour will result in being removed from the meeting.
- The focus of today’s meeting is the Downtown Dike. Out of respect for the residents attending today to hear about Downtown Dike, we will not be covering questions or content on other projects. Stay tuned to our website for information on future open houses specific to other projects.
- The chat function has been disabled as all questions will be managed through the Q&A tool after the presentation.

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Today's Panelists

Deighen Blakely, P. Eng, Project Director

Julia Tarnowski, M. Eng, P. Eng, SweetTech Engineering

Eric Sweet, M. Eng, P. Eng, SweetTech Engineering

Darryl Drohomerski, CAO, Town of Drumheller

Kathryn Kolaczek, Communications Lead, Alchemy Communications

Greg Peters, Director of Emergency and Protective Services, Town of Drumheller

Jon Boyle, Planning & Permitting Manager, CCI Inc.

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Today's Speakers

Julia Tarnowski, M. Eng, P. Eng, SweetTech Engineering

Greg Peters, Director of Emergency and Protective Services, Town of Drumheller

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Julia Tarnowski, M. Eng, P. Eng, SweetTech Engineering

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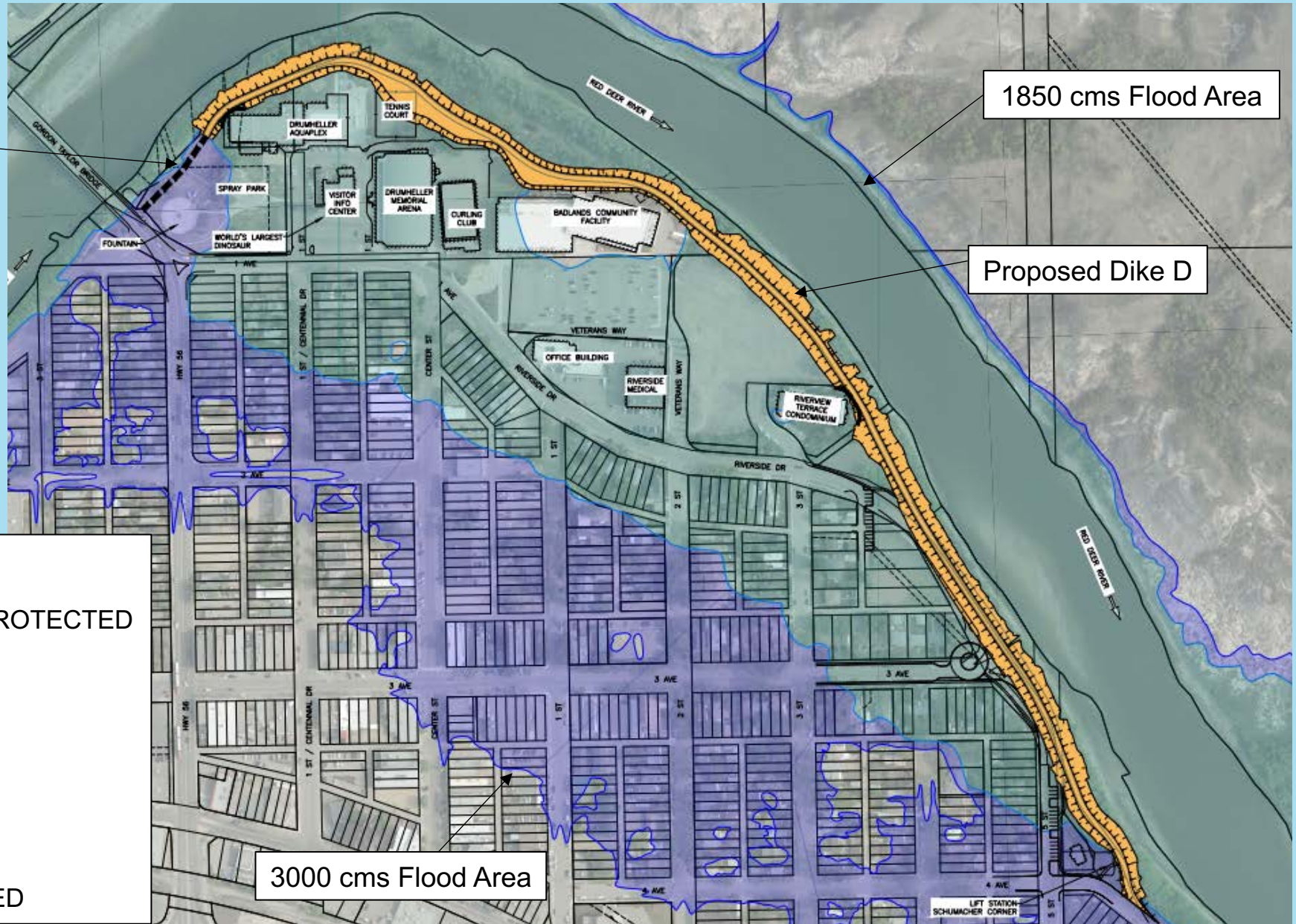
Downtown Dike Existing Dike Alignment

Downtown Dike Proposed Dike Alignment



PROTECTION AT 1850 CMS

70 HOMES PROTECTED
4 MULTI UNIT RESIDENTIAL BUILDINGS PROTECTED
2 COMMERCIAL BUILDINGS PROTECTED
5 COMMUNITY BUILDINGS PROTECTED
- BADLANDS COMMUNITY FACILITY
- CURLING CLUB
- DRUMHELLER MEMORIAL ARENA
- DRUMHELLER AQUAPLEX
- VISITOR INFORMATION CENTRE

PROTECTION AT 3000 CMS

ADDITIONAL **162** PROPERTIES PROTECTED

Downtown Dike – Timeline of Activities To-Date

- Contract Award & Kickoff – Mid February 2021
- Feasibility Study, Field Investigations & Lab Testing – February-April, 2021
- Tree Clearing in Anticipation of Summer 2021 Construction – March-May 2021
- Bird Nest and Wildlife Surveys to Support Tree Clearing – May 2021
- Project Pause and Reset – June 2021
- Public Open House – August 2021
- Tree Health Assessment – September, 2021
- Evaluate and Assess Dike Alignment Options – June-November, 2021
- Detailed Design – In Progress

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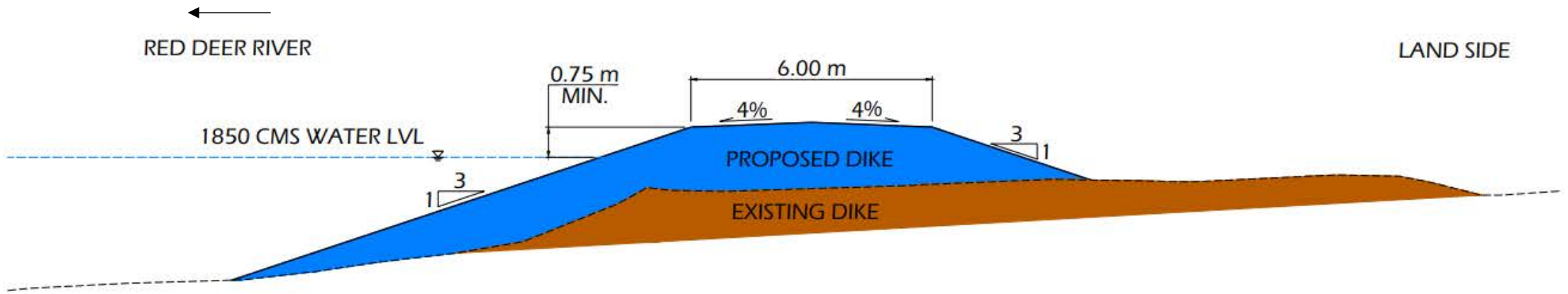
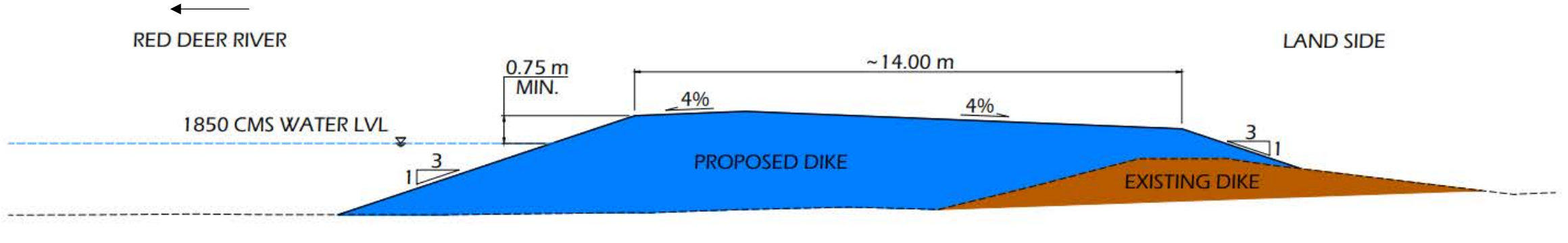
Downtown Dike – Gordon Taylor Bridge to BCF

Downtown Dike Typical Cross-Section

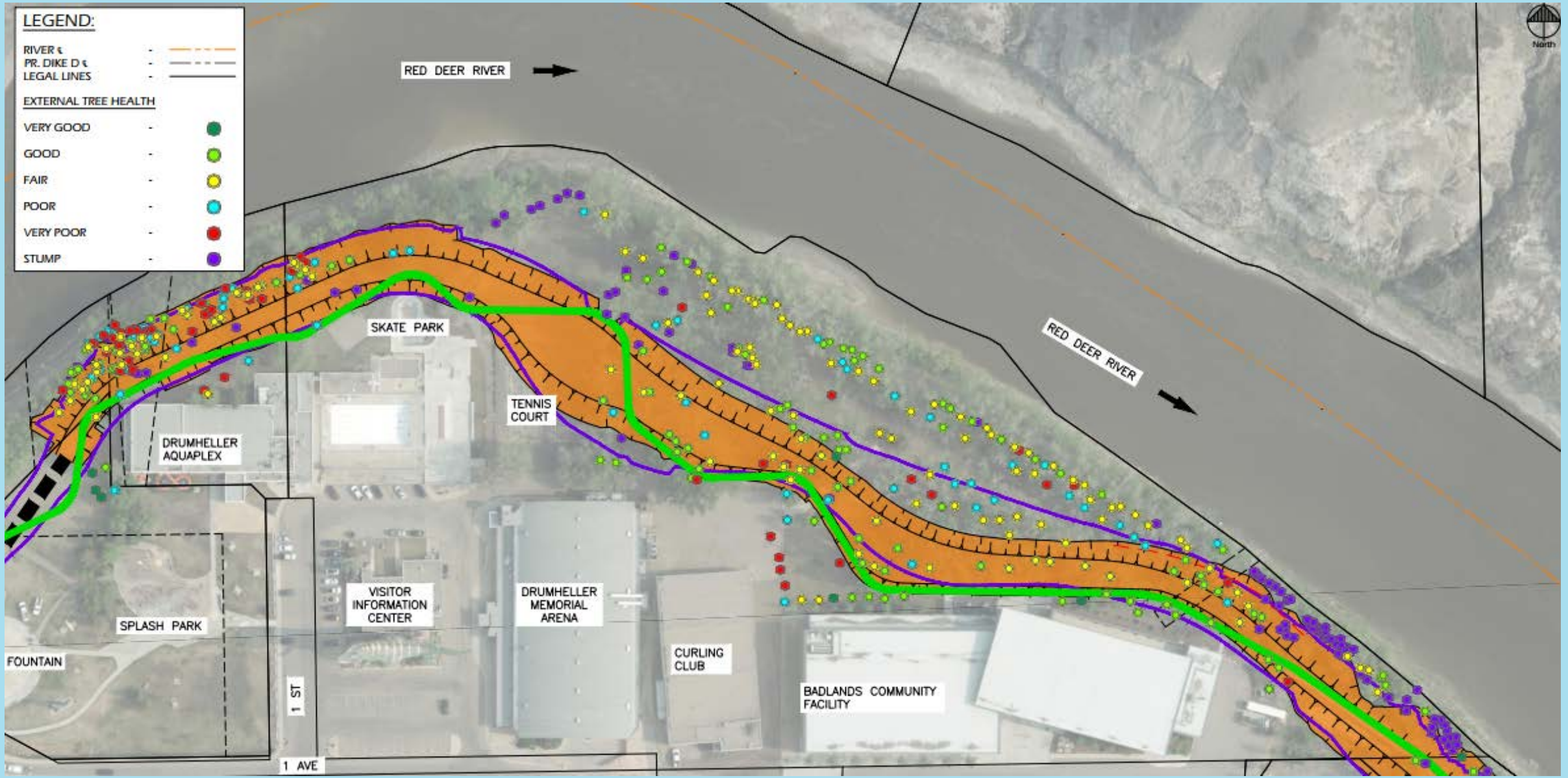


Downtown Dike Cross-Section
Centennial Park

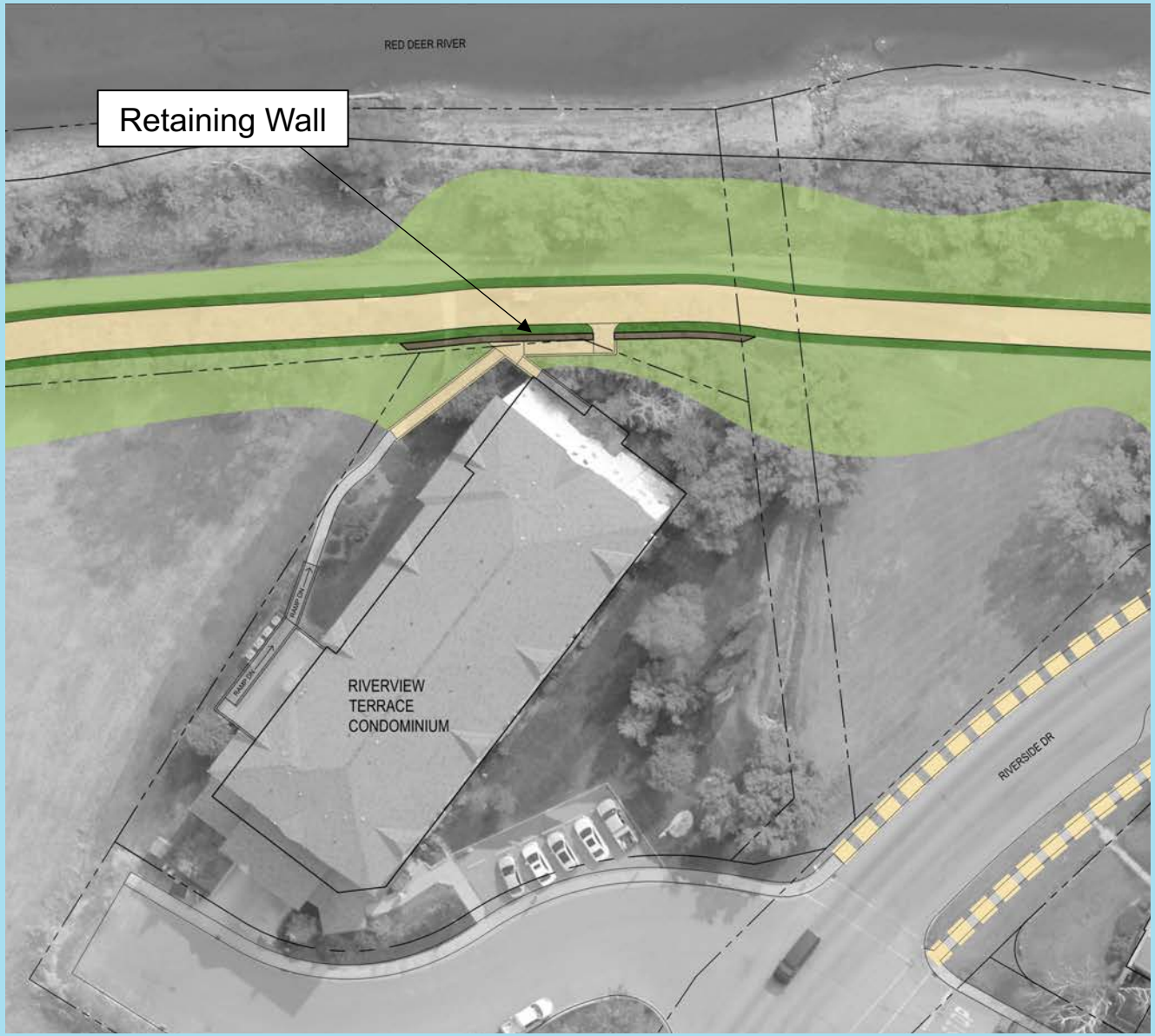


Downtown Dike – BCF to Riverview Terrace

Downtown Dike – Tree Health Assessment



Downtown Dike – Riverview Terrace



Riverside Dr Options Assessment

A detailed options assessment was undertaken for the Downtown Dike alignment along Riverside Dr that included the following options:

- Extend the Dike into the Red Deer River with no changes to Riverside Dr
- Modifications to the Dike cross-section to not extend into Red Deer River and no changes to Riverside Dr
- Modifications to the Dike cross-section and modifications to Riverside Dr, including:
  - Changes to Riverside Dr and 3rd Ave intersection
  - Reducing Riverside Dr to a one lane, one-way road
  - Closure of Riverside Dr (2 blocks) and cul-de-sac on 3rd Ave

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Riverside Dr Options Assessment Results

- Extension of the Downtown Dike into the Red Deer River with no changes to Riverside Dr
  - Dike would need to extend ~ 20m into the Red Deer River
  - Would cause significant environmental impact to aquatic habitat
  - DFO has indicated that authorization under the *Fisheries Act* would require justification that no other option feasible
  - Would constrict the flow of the Red Deer River

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Riverside Dr Options Assessment Results

- Modifications to the Downtown Dike cross-section to not extend into Red Deer River and no changes to Riverside Dr
  - Dike would require a retaining wall ~300 m long and over 3 m (10 ft) high
  - Retaining wall is ~5x more expensive than earth-fill berm
  - Preliminary cost estimate: ~$3.2 Million
  - This option would increase the cost of the Downtown Dike beyond the available budget

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Riverside Dr Options Assessment Results

- Modifications to the Downtown Dike cross-section and modification to intersection of Riverside Dr and 3rd Ave
  - Dike would require a retaining wall ~150 m long and over 3 m (10 ft) high
  - Retaining wall is ~5x more expensive than earth-fill berm
  - This option would require extensive roadwork to reconfigure the intersection
  - Preliminary cost estimate: ~$3.1 Million
  - This option would increase the cost of the Downtown Dike beyond the available budget

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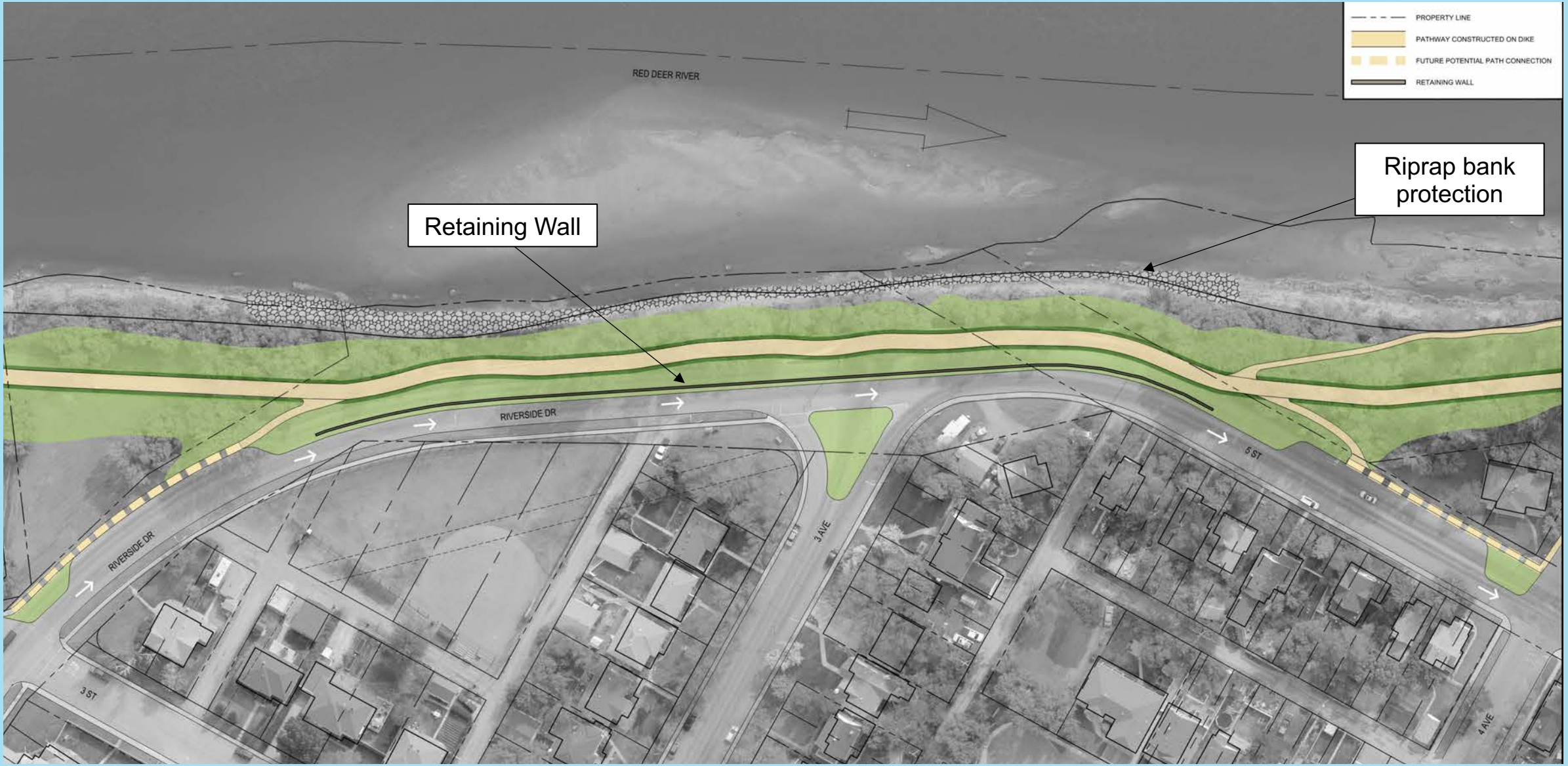
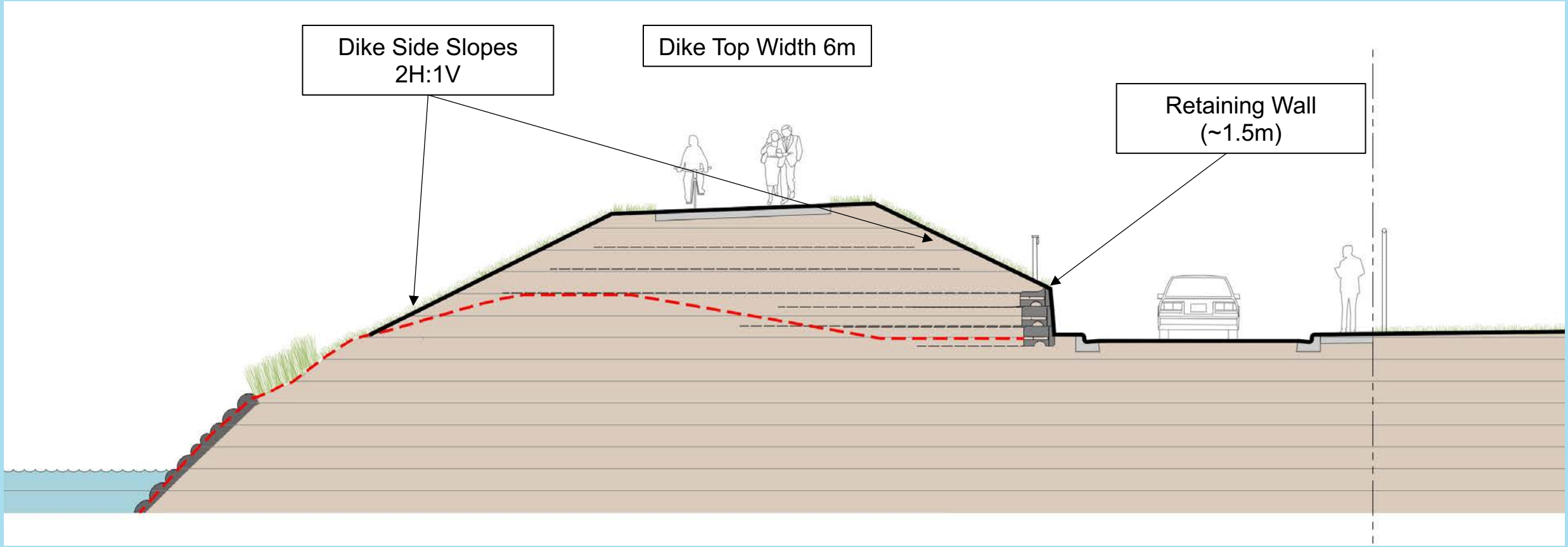
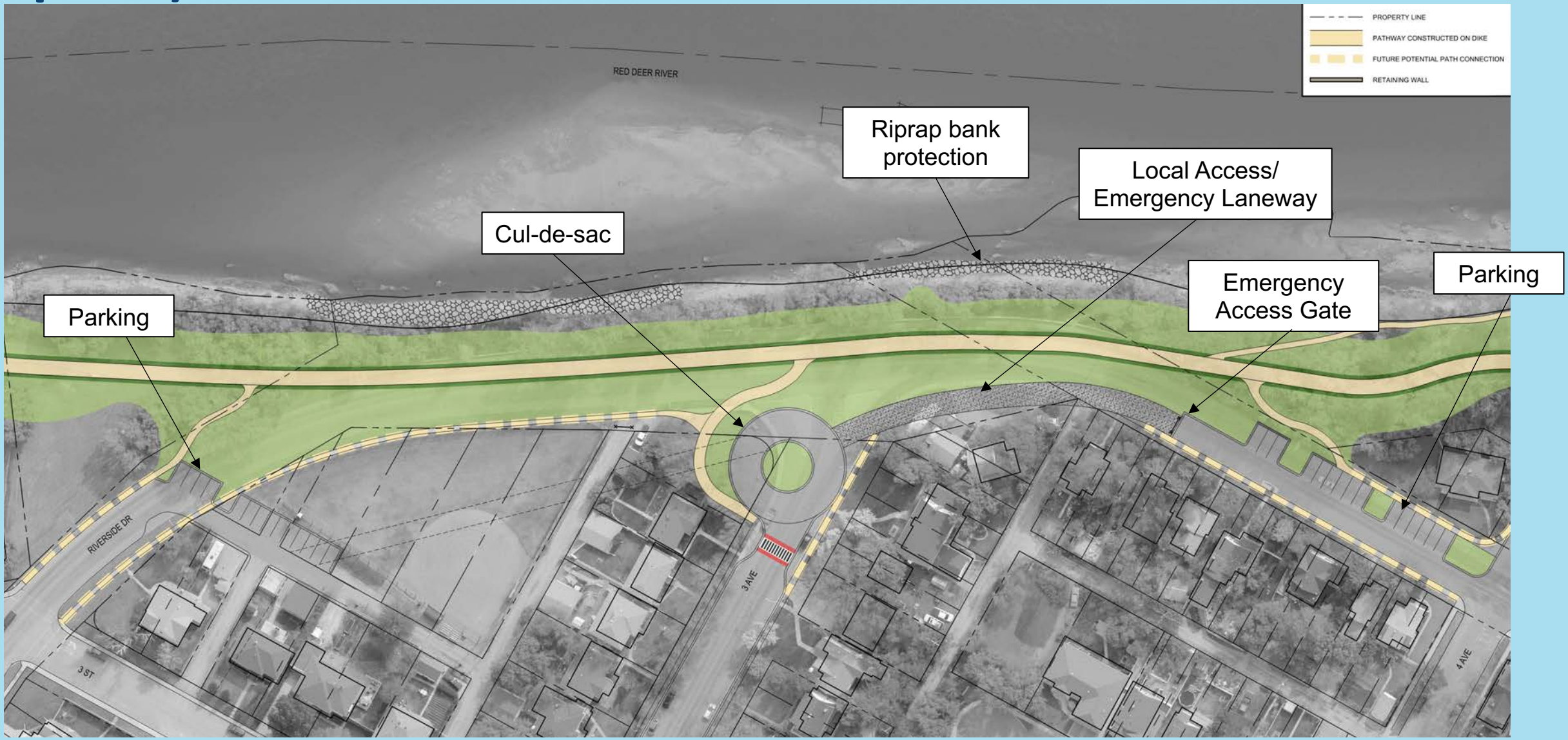
Downtown Dike – Riverside Dr. (One Lane Option)



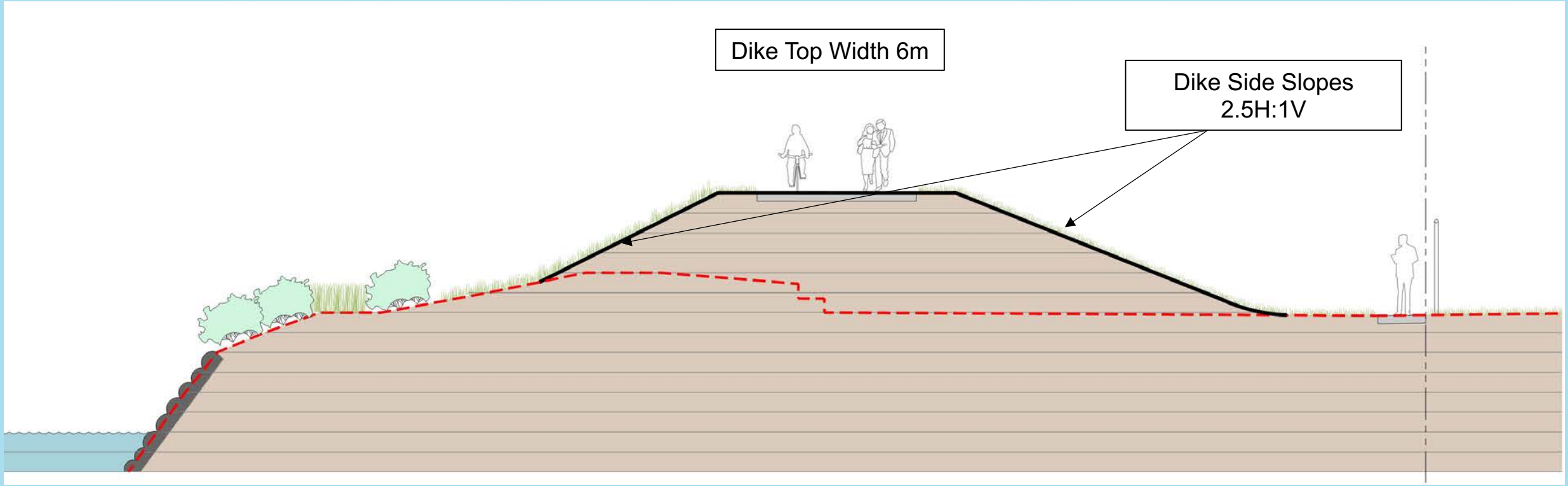
Downtown Dike – Riverside Dr. (One Lane Option)



Downtown Dike – Riverside Dr. (Recommended Option)



Downtown Dike – Riverside Dr. (Recommended Option)



Riverside Dr Options Assessment Results

- Modifications to the Downtown Dike cross-section and modification of Riverside Dr. to a one-lane, one-way road
  - Dike would require a retaining wall ~300 m long and ~1.5 m (5 ft) high
  - Dike requires substantial rip rap for stabilization of riverbank
  - Added safety concerns for adaptive fill placement on retaining wall
  - Preliminary cost estimate: ~$2.2 Million
  - Additional cost of at least $300k to the Downtown Dike with higher risk of increased costs

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Riverside Dr Options Assessment Results

- Closure of 2 blocks of Riverside Dr and cul-de-sac at 3rd Ave
  - Dike does not require a retaining wall
  - Less rip rap required for stabilization of riverbank
  - Provides additional green space and park area adjacent to Downtown and Centennial Park
  - Preliminary cost estimate: ~$1.9 Million
  - Maintains the Downtown Dike within available budget

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Riverside Dr Options Summary

Option	Retaining Wall Req'd	Preliminary Cost Estimate	Challenges
Closure of Riverside Dr. (3rd St to 4th Ave) **Recommended Option**	No	$1.9 Million	Mitigation of traffic impacts
Riverside Dr. one lane, one-way	Yes	$2.2 Million	Mitigation of traffic impacts, risk of higher cost
Modification to intersection of Riverside Dr. and 3rd Ave.	Yes	$3.1 Million	Large retaining wall, high cost, extensive roadwork
No change to Riverside Dr., not extend into Red Deer River	Yes	$3.2 Million	Large retaining wall, highest cost
No change to Riverside Dr., extend into Red Deer River	No	-	Significant environmental impact and regulatory approvals challenges

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Downtown Dike – Anticipated Timeline of Upcoming Activities

- Tendering – January to April, 2022
- Traffic Survey – December 2021 to January, 2022
- Traffic Impact Assessment – January to February, 2022
- Public Engagement – January to March, 2022
- Tree Clearing – March-April, 2022
- Construction of Dike D from Aquaplex to Riverview Terrace – April to July, 2022
- Centennial Park Available after June 30, 2022
- Construction of Dike D along Riverside Dr – June to October, 2022

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Downtown Dike – Traffic Impact Assessment

- Assess impacts of closure of Riverside Dr. on traffic flow throughout Downtown Drumheller
- Develop mitigation options to address impacts to traffic flow
- Assess emergency response times due to closure of Riverside Dr.
- Develop mitigations to address potential changes to emergency response times

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Greg Peters, Director of Protective and Emergency Services, Town of Drumheller

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Town of Drumheller Emergency Services

- Drumheller Emergency Services is in support of the Town's Flood Mitigation Program and believes that construction of structural mitigation is critical in reducing the required emergency response measures during a flood event and to protect numerous homes, commercial and community buildings in the downtown core.
- Drumheller Emergency Services and the Downtown Dike Design team have been working together over the past several months to better understand impacts from the Downtown Dike project and the potential impacts from the Riverside Drive road closure. To date, the design has been adjusted to better accommodate Fire response vehicles as well as committing to providing traffic light pre-emption equipment and additional fire hydrants.

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Traffic Implications

https://www.surveymonkey.com/r/DowntownDrumTraffic

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Questions?

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Questions?

Q: Has a Traffic Impact Assessment been considered to evaluate the potential outcomes or consequences of traffic flow changes resulting from proposed flood mitigation development? Will remaining transportation infrastructure be adequate to accommodate proposed changes?

A: Thus far, we have done a preliminary assessment on the traffic impacts directly adjacent to Riverside Dr to evaluate the 4 options being considered for the dike. This preliminary assessment was used in the selection of the preferred option (2-block closure of Riverside Drive). The formal Traffic Impact Assessment (TIA) will be completed in Q1 of 2022 and will drive the formal assessment of traffic impacts and flow changes that the closure of Riverside Drive will have on residential traffic and emergency vehicles and the implementation of potential mitigations.

Questions?

Q: Raising the existing road elevation to the equivalent height as the 1850 m3/s level and leaving both lanes open (building a road, not a dike - there are other locations where we fully depend on roads or a railbed, rather than a flood berm). Should additional fill be later required to protect to the 3000 m3/s level, it could temporarily be placed on the road. What would the actual costs of designing and building this road be?

A: Many options were considered early on for the dike along Riverside Drive; however, it was narrowed down to the 4 preferred options based on cost, environmental impacts, and regulatory acceptance. The option for designing the roadway on top of the berm is significantly more costly and was not evaluated further as a viable alternative. To give an actual cost for this option would run the Flood Office around $10,000 to investigate and then provide an answer. As this option has been deemed not viable, the Flood Office will not be undertaking this additional study. A few items that drive up the cost for this option are acquiring properties to accommodate the horizontal and vertical curvature design, additional safety requirements such as guardrails and other measures as traffic would now be adjacent to a steep and high drop off to the water. Furthermore, there could be significant additional costs for the highway specification road fill materials and construction.

Questions?

Q: Could the existing road be re-aligned to fit between the dike and the houses by encroaching on 2 or 3 lots (such as 335, 317, and 309 5 St, and then removing the boulevard between the ball diamond and the street). We are accepting encroachment in other places, why not here?

A: Encroachment along 5th Street would require full acquisition of these properties, not just encroachment (as the houses are fairly close to the road), and ultimately that's more expensive. It would also likely require acquisition of 5 properties, rather than the 3 mentioned. The additional 2 properties that would need to be acquired are 475 3rd Ave and 349 5th Street. To acquire these 5 properties would cost between $750,000 and $1,000,000. Furthermore, it would also result in incurring the cost of fully reconstructing this section of Riverside Drive. Since this portion of Riverside Drive is 300m and the cost of reconstructing 1 km of roadway is approx. $1,500,000, that's another ~$450,000 in road construction cost.

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Questions?

Q: If minor changes were made to the top of the existing berm (where the pathway currently is) to create a wider platform, would a temporary berm using the water filled tubes be sufficient to place on the berm top as a type of Adaptive Fill Alignment approach?

A: Unfortunately, we have no funds available for temporary mitigation measures for the Downtown Dike or any of the flood mitigation projects. Additionally, the footprint area required for temporary flood tubes is nearly the same as for the full height permanent berm (about 5.8m of space would be required for a 3m dike raise with temporary flood tubes, with room to move needed on either side. Additionally, flood tubes require indoor warehouse storage over the long term, and specialized training and equipment to deploy so can be costly to maintain, especially given that there is no Provincial or Federal funding for these.

Questions?

Q: What would the cost be to relocate the baseball diamond to make room for the roadway?

A: The area of the baseball diamond is not the area
that's most space constrained for the dike improvements construction, and thus moving the diamond doesn't address the pinch point. Moving the baseball diamond would still result in a section of Riverside Dr and 5th Street needing to be closed to allow sufficient space to construct the berm.

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Questions?

Q: For each of the alternatives that were considered, please provide more detailed information and cost estimates on what was considered and why they were rejected.

A: The preliminary evaluation of the 4 options yielded the following results:

Option	Retaining structure required	Preliminary Cost Estimate
Closure of Riverside Dr & 5th St E (from 3rd St. to 4th Ave) cul-de sac at end of 3rd Ave	No	$1.9M
Closure of Riverside Dr (from 3rd St. to 3rd Ave) maintain 3rd Ave	Yes	$2.3M
Reconfiguration of Riverside Dr and 3rd Ave intersection	Yes	$3.1M
Maintain Riverside Dr and 5th St E as one-lane, one-way	Yes	$2.2M
Maintain Riverside Dr and 5th St E as-is	Yes	$3.2M

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Questions?

Q: I have heard that the flooding in 2005 and 2013 was made worse by the operation of Dickson Dam, can you comment on that?

A: The Dickson Dam provides a significant level of flood protection to the Town of Drumheller. We have been able to reduce the Red Deer River 100-year design flood flow rate from 2260m^3/s to 1850m^3/s by taking into account the operation of Dickson Dam. The bar chart on the next slide shows how much Dickson Dam has reduced the peak flow each year since constructed.

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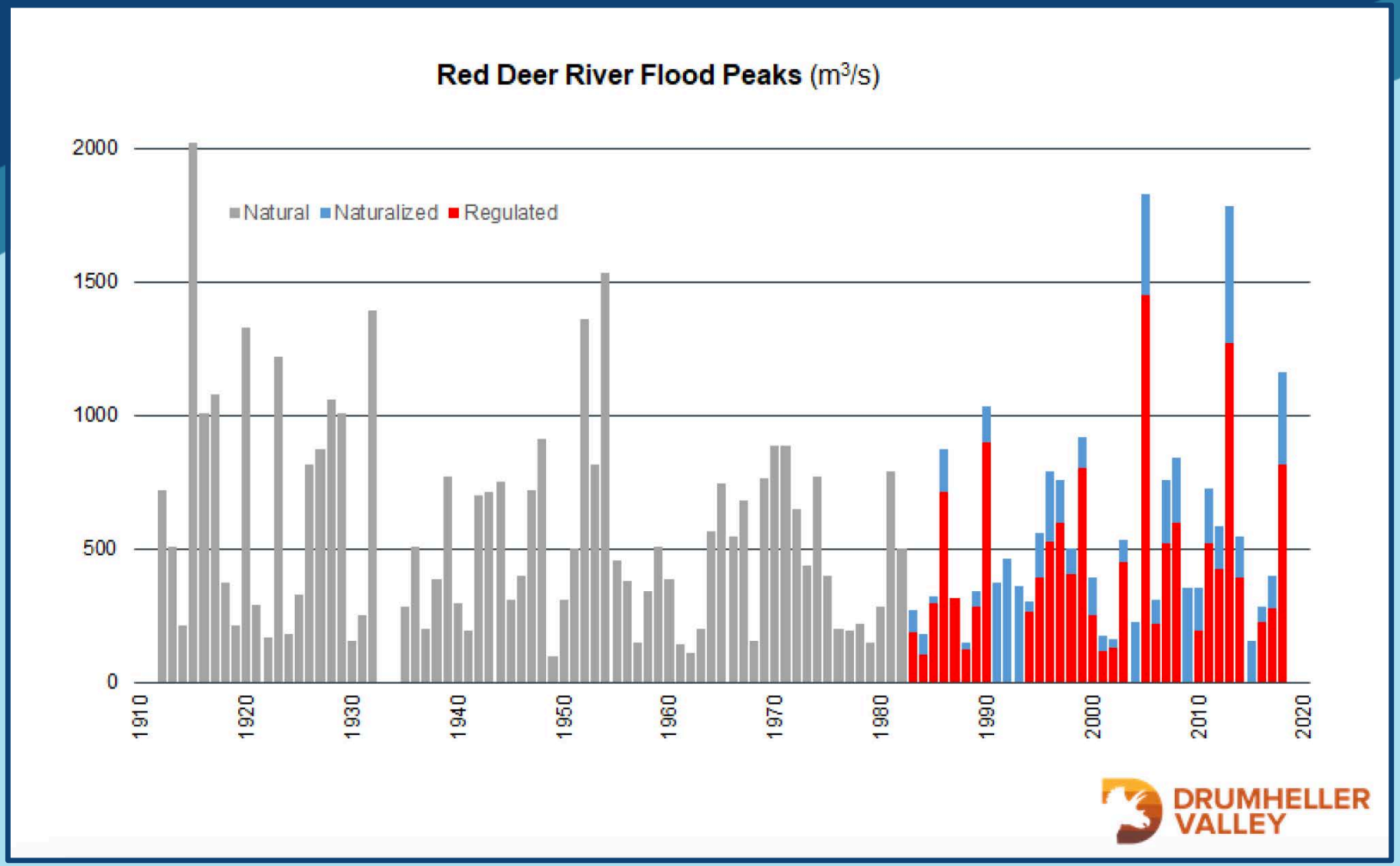
Questions?



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Questions?

Q: Why can’t we push the Downtown Dike out into the Red Deer River further and keep Riverside Drive Open?

A: The Flood Team has heard quite clearly from Fisheries and Oceans Canada and Alberta Environment and Parks that dike encroachment into the river will not be permitted if there is a viable alternate, like the option currently selected. Placing fill material in a river causes significant harm to the aquatic environment and takes away from the room for the river to flow, so that option was discounted.

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Questions?

Q: Were any alternates considered to closing Riverside Drive?

A: The design team considered a number of options, including a partial road closure (one way traffic), and leaving the road fully open but constructing a full height retaining wall. The selected option (full road closure for one block) was deemed the best alternate in terms of cost, constructability, leaving room for the river and limiting fisheries impacts.

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Questions?

Q: Why don’t we just put Riverside Drive on top of the berm?

A: To place the road on top of the berm would require that it be built to a much higher standard in terms of the fill, berm side slopes, roadway geometry, guardrails, etc. to meet roadway standards for vehicle loading, which would significantly increase the cost of the berm, so this option was discounted.

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Questions?

Q: **When will Centennial Park be reopened?**

A: The target date for construction completion in Centennial Park is June 30, 2022, barring any unforeseen circumstances which could lead to construction delays, such as a Red Deer River flood event during construction.

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Questions?

Q: Can I still have my event in Centennial Park as planned next summer?

A: The Badlands Community Facility staff have notified customers with events planned in Centennial Park in summer 2022 about the upcoming construction work. For events that were booked coinciding with construction, the Centennial Park booking has been cancelled, and an alternate location (Riverside Park) offered. Events booked for after construction is scheduled to be completed should be able to go ahead in Centennial Park; however, the Riverside Park area will be available as a contingency in the event that construction is delayed.

Questions?

Q: Will the trees that were cut down in Centennial Park be replaced? Where will the replaced trees go?

A: Any trees that were cut down last year will be replaced on a 5:1 basis with new trees and shrubs. Any trees that need to be cut down this year that are in very good, good or fair condition will also be replaced on a 5:1 basis with trees and shrubs. Any trees noted to be in poor or very poor condition will not be replaced as they are near the end of their life cycle. The Landscape Architect working on the Downtown Dike design team will identify locations for replacement trees and shrubs prioritizing placement to near where the trees were removed from, and trees and shrubs may also be placed at other locations in Downtown Drumheller, as identified in the Downtown Area Revitalization Plan.

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Questions?

Q: What will happen with the pathways in Centennial Park during construction?

A: Detour pathway routes will be identified and posted during the Downtown Dike construction, to safely get pedestrians to where they need to go adjacent Centennial Park and keep them away from on-going Downtown Dike construction.

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Questions?

Q: Why can't we just use adaptive fill for this section of berm, like in Midland and Newcastle?

A: One of the Drumheller Resiliency and Flood Mitigation Program's goals is to build as much permanent flood mitigation infrastructure as possible in the next three years, while we have funding available, thereby minimizing future emergency response efforts and costs. Building the full section of the Downtown Dike along Riverside Drive will help to meet this goal. Unlike the adaptive fill reaches for Newcastle and Midland which would have cut off access to homes fronting on Riverside Ave and North River Drive, respectively if a full berm was built there; the section of roadway being closed to accommodate the construction of the Downtown Dike will not cut off access to any private properties.

Questions?

Q: Will the road closure of Riverside Drive accommodate emergency services response times?

A: Access for emergency response vehicles to the neighbourhoods to the east of downtown will be maintained via a gravel alleyway connecting 3rd Ave E and 5th Street E. As well, provisions will be included in the project to implement emergency vehicle traffic light pre-emption for access to Highway 9/56, in addition to the existing Fire Department stop light at 2nd Ave and Highway 9/56 to mitigate impacts to emergency vehicle response times.

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Questions?

Q: What will happen to the memorial benches during construction?

A: Memorial benches will be moved during construction and returned once the berm has been completed. Our intention is to have these benches returned as close to their original location as possible.

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Questions?

Q: What will happen to the memorial benches in the event of a flood?

A: In the event of a flood, where adaptive fill is necessary, the affected benches will be moved by the Town and stored at a safe location before any fill material is hauled in. Once the flood waters have receded and adaptive fill has been removed, the benches will be returned as close to their original location as possible.

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