APPENDIX A

Bridges Status Report

MD Bridges & Bridge Sized Culverts

Utilization / Levels of Service Review

September 19, 2023

MUNICIPAL DISTRICT
BONNYVILLE NO. 87

Bridge Inventory Review

Beaver River Trusses:	4
Single Span Bridges:	45
Multi Span Bridges:	6
Total Bridges:	55
Bridge Sized (>1.5m) Culverts:	62
Total Bridge Assets:	117

BF73660 - RR 485 Bridge Culvert, south of Hwy 28

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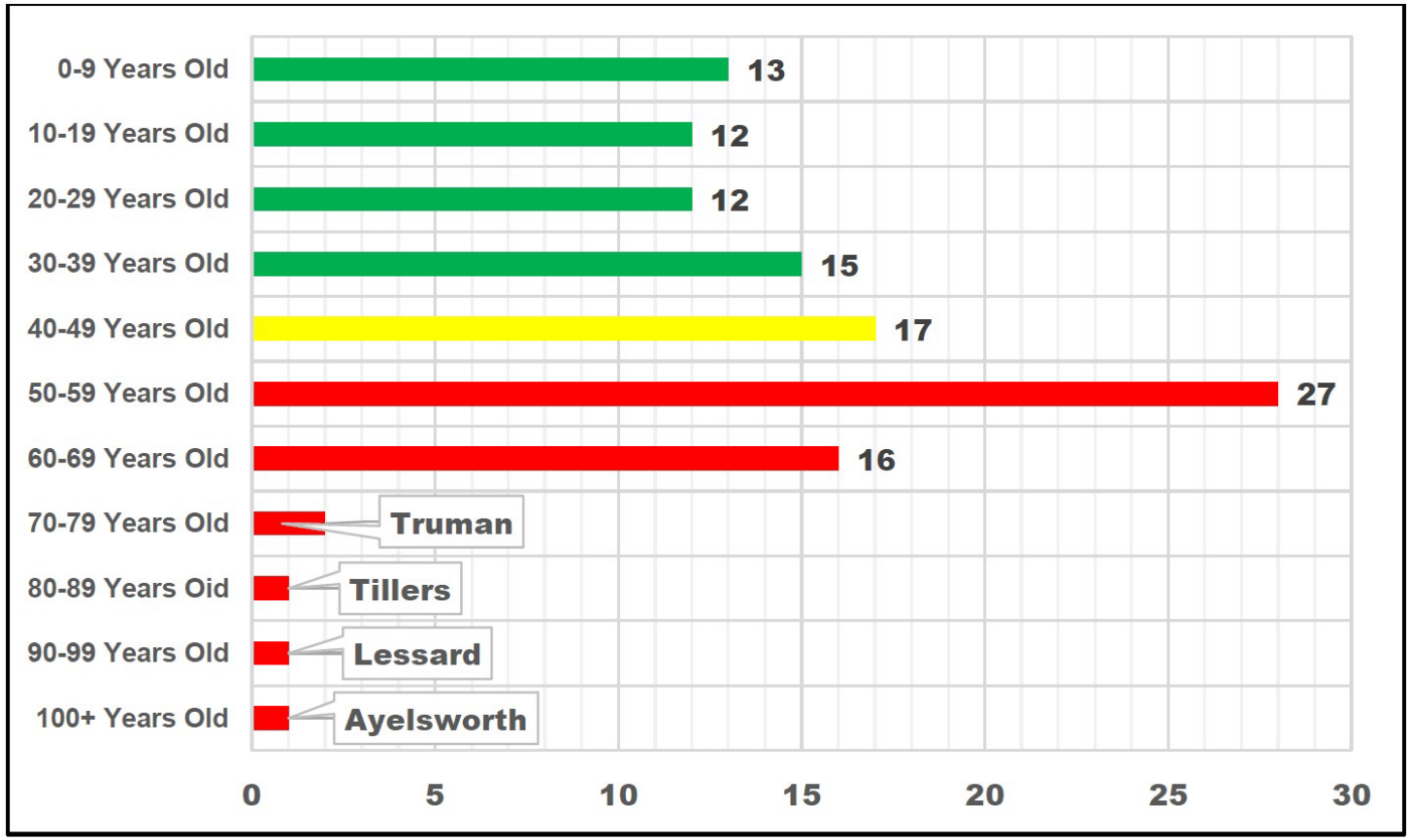

Figure 1 – MD Bridge Assets - Age Distribution

BF72115 - Twp 640 Bridge, east of RR 473

Service life has exceeded original 50-year design life

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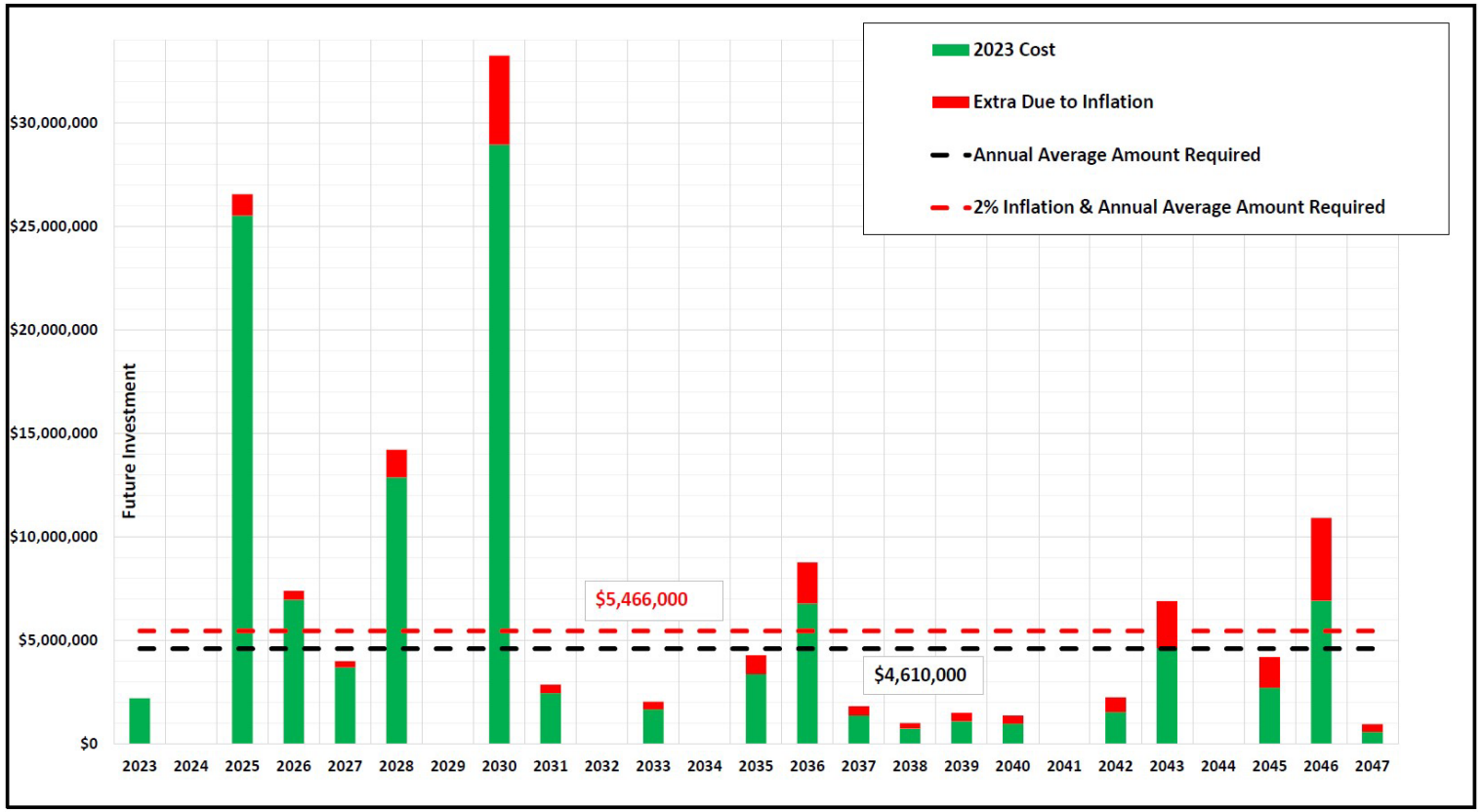
25 Year Projection – Annual Bridge Replacements Needed

(Bridge Inspection Reports – Estimated Replacement Year)



25 YEAR SCENARIO

LIFECYCLE BRIDGE REPLACEMENTS EXPECTED TO BE NEEDED AS PER BRIDGE INSPECTION REPORTS TO DEC 31, 2022

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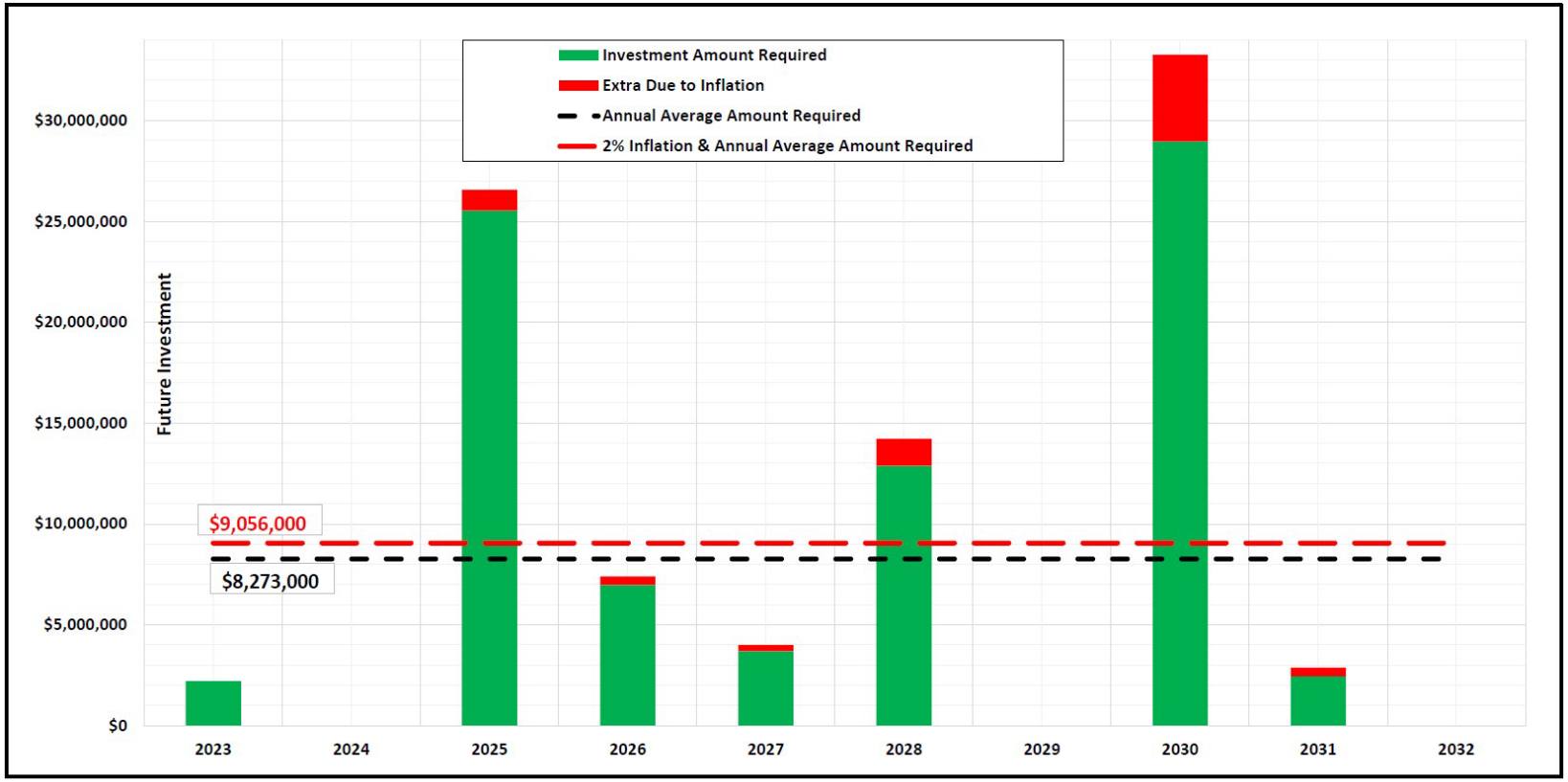
10 Year Projection – Annual Bridge Replacements Needed

(Bridge Inspection Reports – Estimated Replacement Year)



10 YEAR SCENARIO

LIFECYCLE BRIDGE REPLACEMENTS EXPECTED TO BE NEEDED AS PER BRIDGE INSPECTION REPORTS TO DEC 31, 2022

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Why Build Bridges?

1. To access land for use and development

2. To shorten distances between people and places

BF72746 - RR 434 Bridge, south of Hwy 28

Bridge Replacement Needs – 10 Year Forecast

1. End of Life Options
2. Utilization and Levels of Service Review
3. Cost Impacts

BF78069 - Twp Rd 615 (50 Ave) Bridge, east of Fort Kent

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1. End of Life Options

1. New / Replacement Bridge

   - Code improvements - new bridges:
     - can carry heavier vehicles
     - have wider lanes
     - have safer and more durable elements
     - are more resistant to flood damage
     - are more environmentally friendly
     - are designed to last for 75 years, not 50 (Culverts still designed for 50)

BF72902 - Twp 614 Bridge, east of RR 485

2. Bridge Rehabilitation

- Extends service life
- Lower short-term cost
- Salvages old bridge elements
- Functional issues often not addressed
- Can result in higher long-term costs
- Can be a missed opportunity to update infrastructure

BF9595 - Lessard Road Bridge over Beaver River

3. Downgrade

- Low-water crossings / low-water bridges / fords / vented fords - designed to flood and go out of service during water events.
- Local conditions may make these a challenge to maintain – more common in arid and mountainous regions.

Photo Ref: USDA Forest Service

4. Decommission

- Install jersey barriers and signage to close road
- Dig out bridge culverts to re-establish drainage channels
- Remove derelict bridges if/as required

Bridge Closures – Expected Process

Permanent bridge closures are expected to require:

- bylaws
- public hearings
- compensations for real property damages
- ministerial approval

Dispute resolution by:

- Land and Property Rights Tribunal (LPRT)

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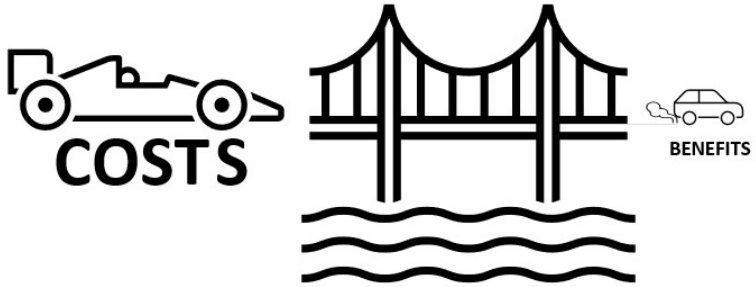
2. Utilization and Level of Service Review

Information Available	Source
Age and details	Provincial bridge database
Condition and remaining service life estimates	Bridge inspections
Estimated replacement costs	Comparison to previous MD projects
Usage - Average daily traffic	Radar traffic counts (MD owns 4 radar counters)
Alternate route length	Measured distance around bridge
Land and property values associated with having bridge access	Feedback from MD tax assessor - situational averages, tax assessments and typical land costs

Replacement Priorities & Closure Candidates

- 56 bridge structures expected to need replacement within 10 years assessed
- Cost-Benefit analysis was used to compare and rank structures
- Alternate route: benefit based on traffic counts and expected increases in travel distance
- No alternate route: benefit based on portion of land value related to bridge access



Closure Candidate

Benefit/Cost Ratio = Low

Replacement Priority

Benefit/Cost Ratio = High

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Net Replacement Cost

Net Replacement Cost = Replacement Cost – Cost of Closure

- Cheaper to leave derelict bridges in place
- May be nuisances and require removal in the future
- Assumed net savings for bridge closures = 100%

Photo Ref: www.vanderbiltcupraces.com

- Failing bridge culverts are expected to require significant work to decommission
- Assumed net savings for bridge culvert closures = 50%

BF78682 – Twp 634 Bridge Culvert, west of RR 424

Bridge Information Sheet
-Alternate Route Exists

BF72107 closure would impact:

-average 41 vehicles/day
-average 7 trucks/day

Resulting in:

-maximum 13km added travel distance
-assumed average 4.3km added travel distance (max/3)

<u>Estimated Annual User Value</u>

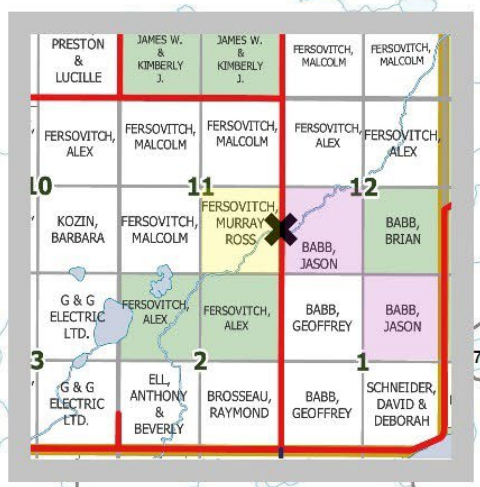
Total annual:
-64,970km reduced travel distance
-1083 hours reduced travel time
-10,950km reduced trucking distance
-183 hours reduced trucking time

Assume:
$20/hour vehicle time value
$40/hour trucker time value
$0.6/km vehicle cost
$1/km truck cost

Estimated 2023 Annual User Value = $68,644
Annuitized 2023 Bridge Replacement Cost = $13,779

Single Span Bridge:
Projected 2027 Replacement Cost (2% infl) = $1,118,628
Estimated Closure Cost = $5000 ($178,000 – optional 2027 bridge removal)

Category C Closure Candidate
Closure net savings: $1,113,628 ($940,628 including bridge removal)



BF72107 LIFECYCLE REPLACEMENT
BENEFIT/COST RATIO = 5.0

C: HIGH VALUE REPLACEMENT - HIGH IMPACT CLOSURE

BF7431 closure would impact:

-1 residence
-only ROW access to 1 developed residential property east of the Beaver River (48322 Twp Rd 624 – 2022 tax assessed value = $283,890)

-only ROW access to 5 largely undeveloped quarters east of the Beaver River with a likely land value of around $1.25M

-secondary light vehicle access to wellsites on east side of Beaver River

Estimated Annual User Value

2022 tax assessed value of residence inflated to 2023 = $300,000
50% of undeveloped land value associated with bridge access = $625,000
Annuitized for life of bridge = $12,333

Estimated 2023 Annual User Value = $12,333
Annuitized 2023 Bridge Replacement Cost = $42,379

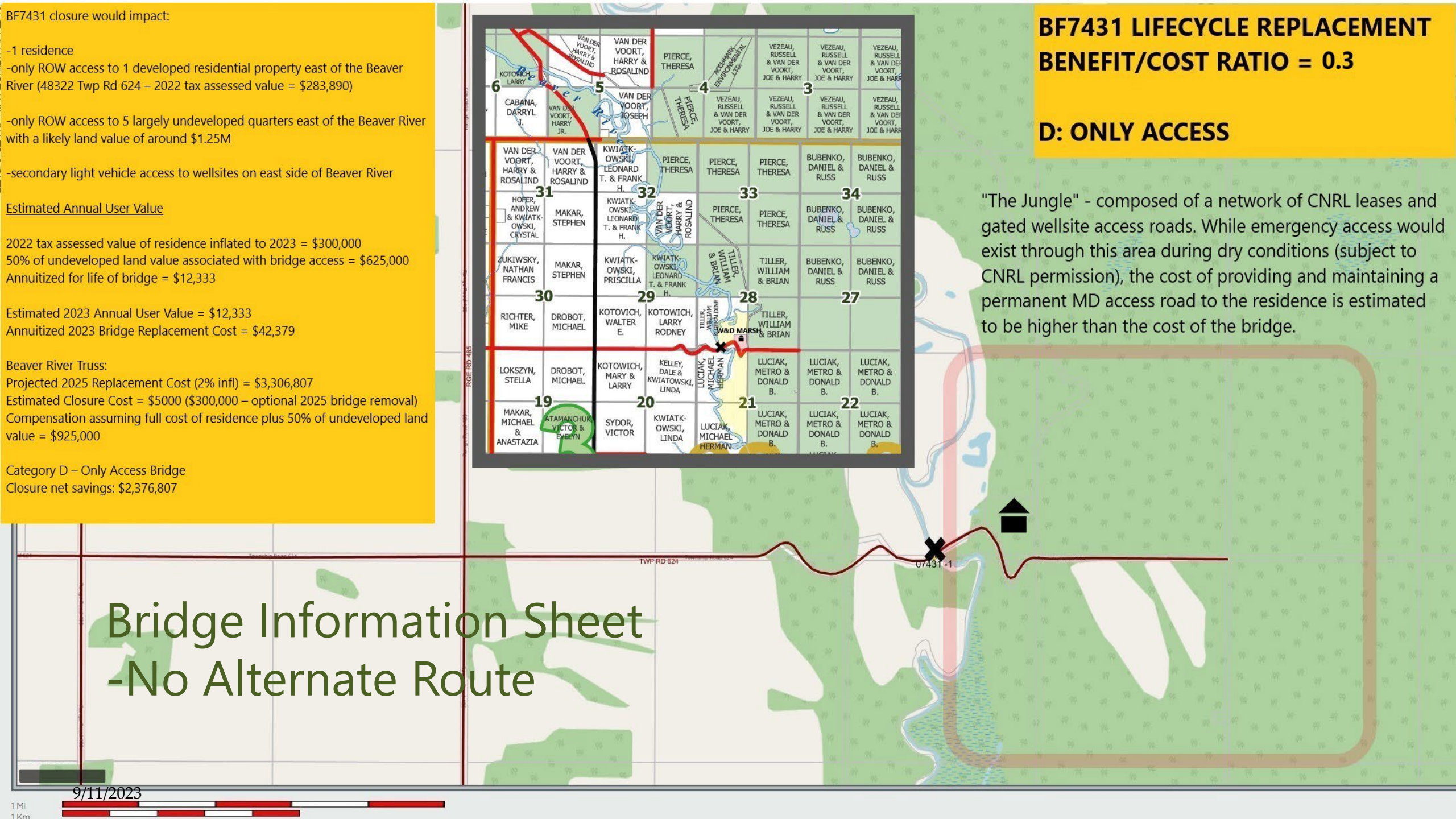
Beaver River Truss:
Projected 2025 Replacement Cost (2% infl) = $3,306,807
Estimated Closure Cost = $5000 ($300,000 – optional 2025 bridge removal)
Compensation assuming full cost of residence plus 50% of undeveloped land value = $925,000

Category D – Only Access Bridge
Closure net savings: $2,376,807

BF7431 LIFECYCLE REPLACEMENT BENEFIT/COST RATIO = 0.3

D: ONLY ACCESS

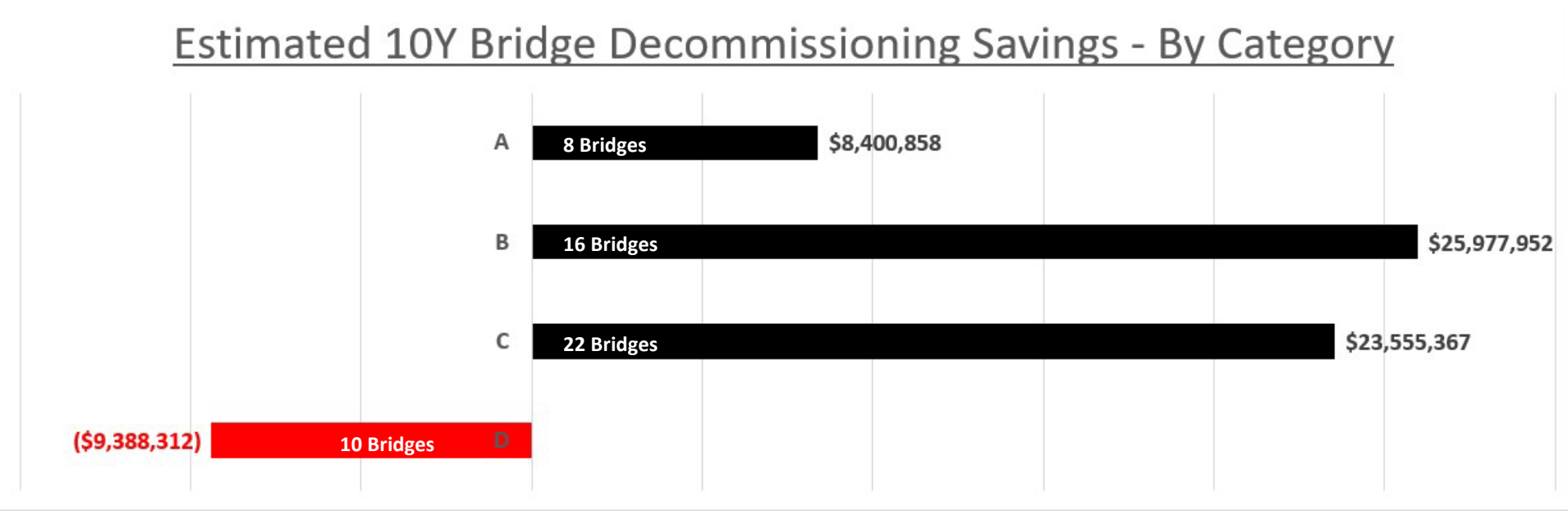
"The Jungle" - composed of a network of CNRL leases and gated wellsite access roads. While emergency access would exist through this area during dry conditions (subject to CNRL permission), the cost of providing and maintaining a permanent MD access road to the residence is estimated to be higher than the cost of the bridge.



Bridge Information Sheet -No Alternate Route

9/11/2023

3. Cost Impacts



A: LOW VALUE REPLACEMENT – LOW IMPACT CLOSURE
B: MEDIUM VALUE REPLACEMENT – MEDIUM IMPACT CLOSURE
C: HIGH VALUE REPLACEMENT – HIGH IMPACT CLOSURE
D: ONLY ACCESS BRIDGE

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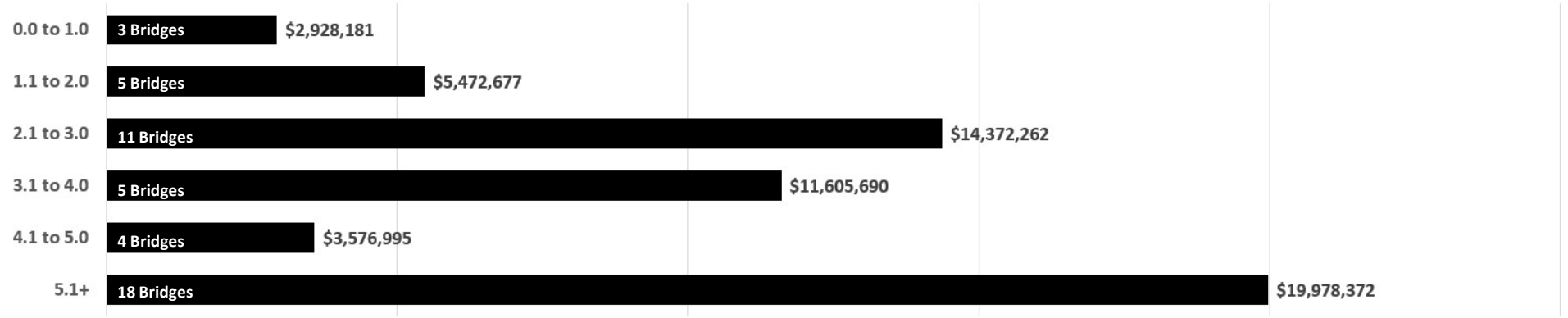
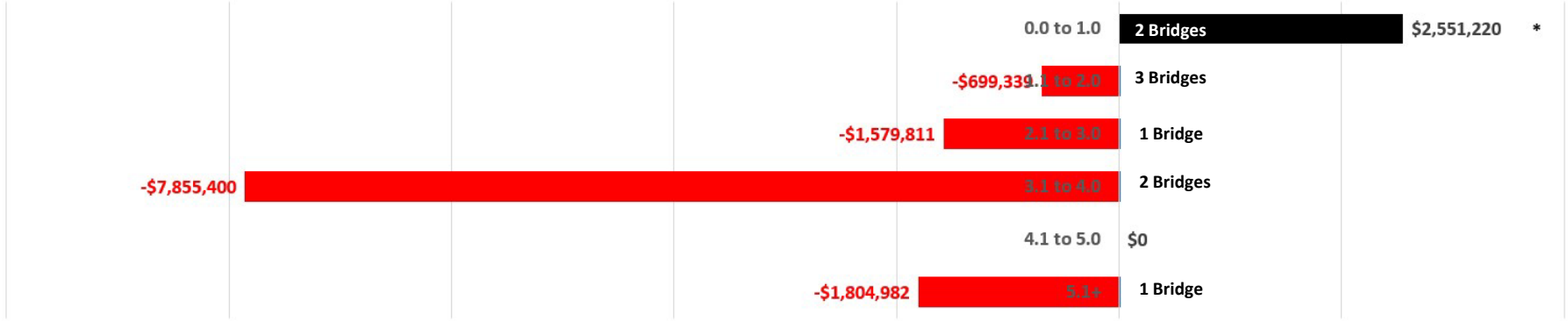
Estimated 10Y Bridge Decommissioning Savings - By Benefit/Cost Ratio(BCR)

Alternate Access Bridges (A-C)



Only Access Bridges (D)



1 Bridge not shown - Primrose weapons range access – no BCR calculated

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Questions?

BF73150 - RR 474 Bridge, north of Twp 635

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