MUNICIPALITY OF ARRAN-ELDERSLIE
Bridge Infrastructure Master Plan

Public Meeting

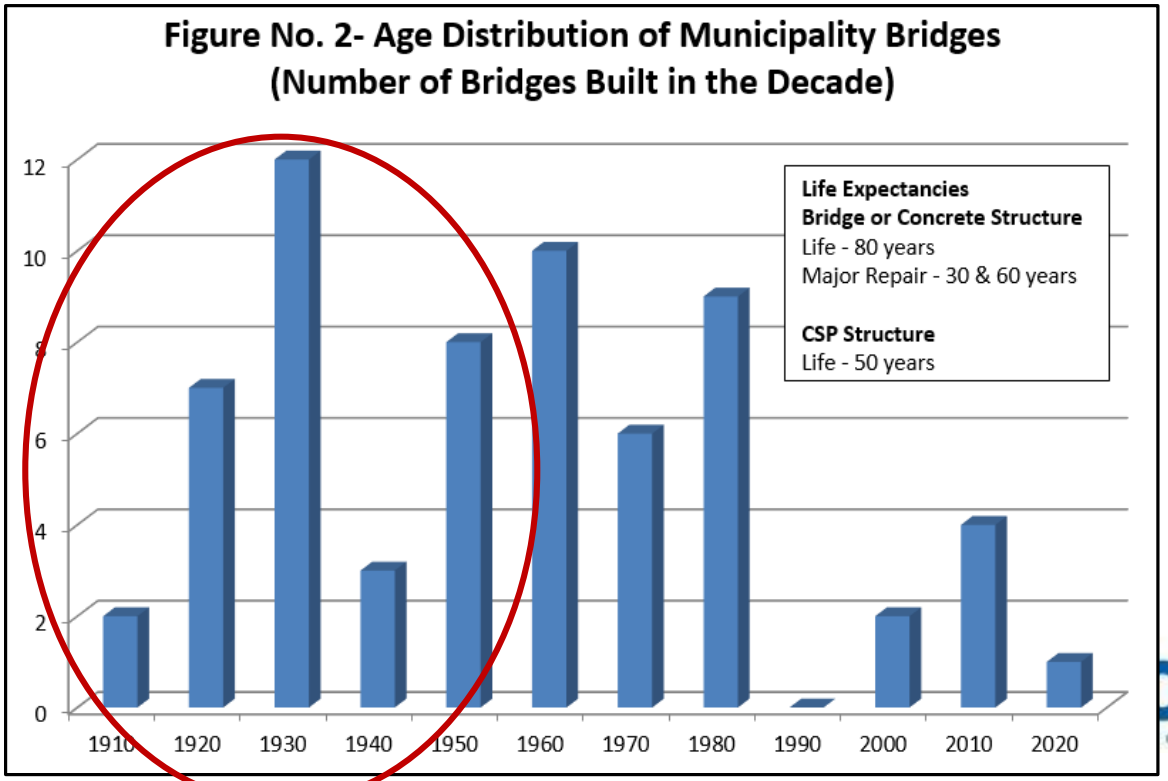
September 19, 2023

Agenda

- Project Background
- Master Plan Process
- Alternatives
- Evaluation Approach
- Additional Considerations
- Next Steps

Project Background

- Arran-Elderslie maintains 64 Bridges (>3m in length)
- In 2013 a similar study was completed in Bruce County that included structures in Arran-Elderslie
- The Infrastructure Master Plan is considering outcomes for only 17 of the oldest crossings in the Municipality



Bridge Economics

- Arran-Elderslie maintains 64 Bridges (>3m span)
- Bridges are inspected every 2 years as per OSIM
- Bridge Needs Report prepared in 2020 listed repair or replacement needs to 30 structures over next 1-5 years
  - Sopers replaced in 2022
  - Young Bridges By-Passed with new road
- Priority Repairs – 1 to 5 years - $3,167,600
  (Includes some of the study bridges)
- Priority Repairs – Amount/year $633,520
- Current annual capital contribution for bridges $150,000

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Economics cont'd

- Typically assume bridges have a life span of 75-80 years
- 17 Study bridges have an average age of 98
- Replacement Cost of 17 Study Bridges - $24 Million (2023$)
- Don't need to be replaced all immediately – likely occur over the next 10-25 years – ongoing repairs can extend life
- With inflation, replacement costs will go up over time

Although Arran-Elderslie doesn't want to close bridges, they may be forced to close some crossings due to lack of funds

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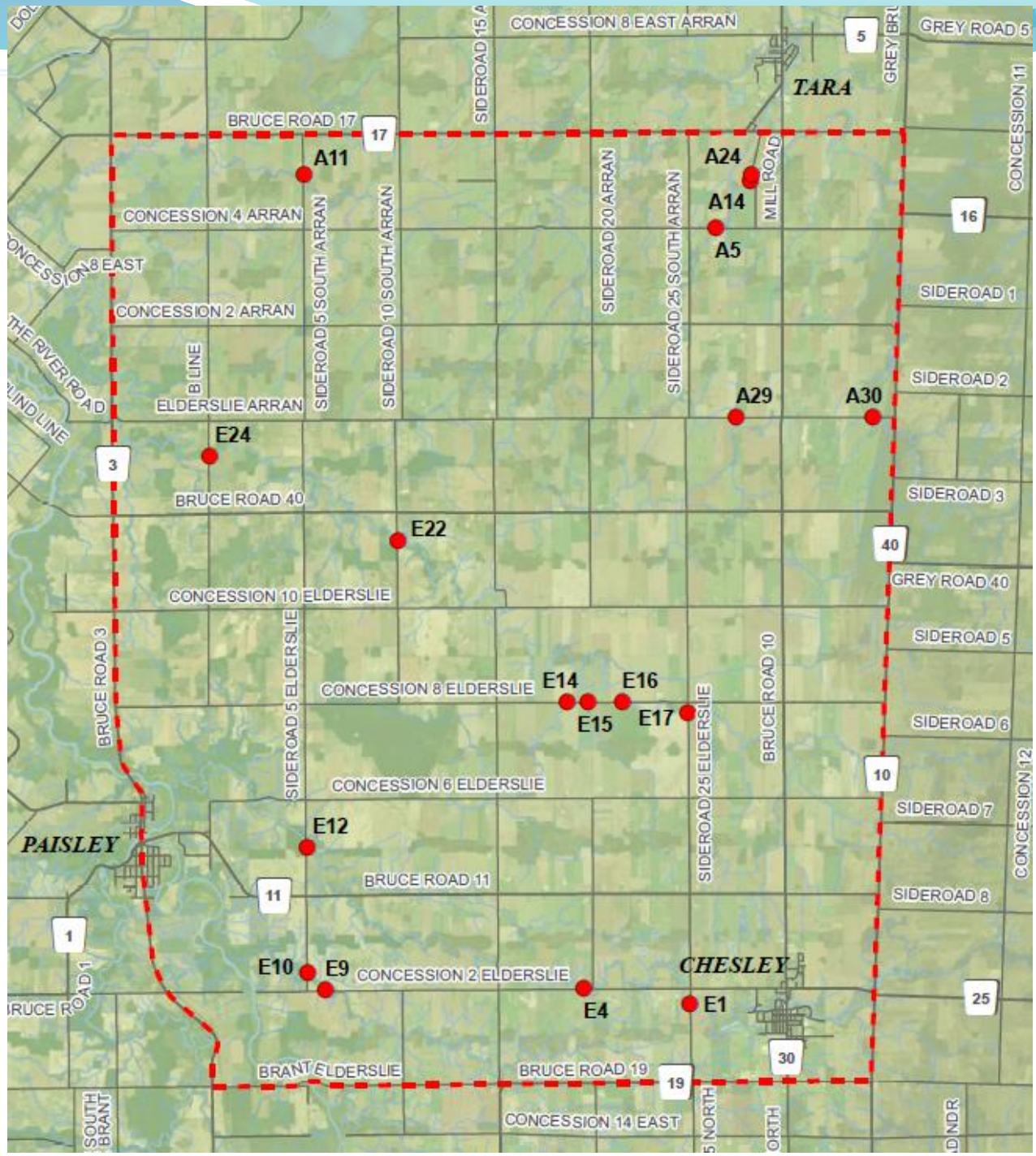
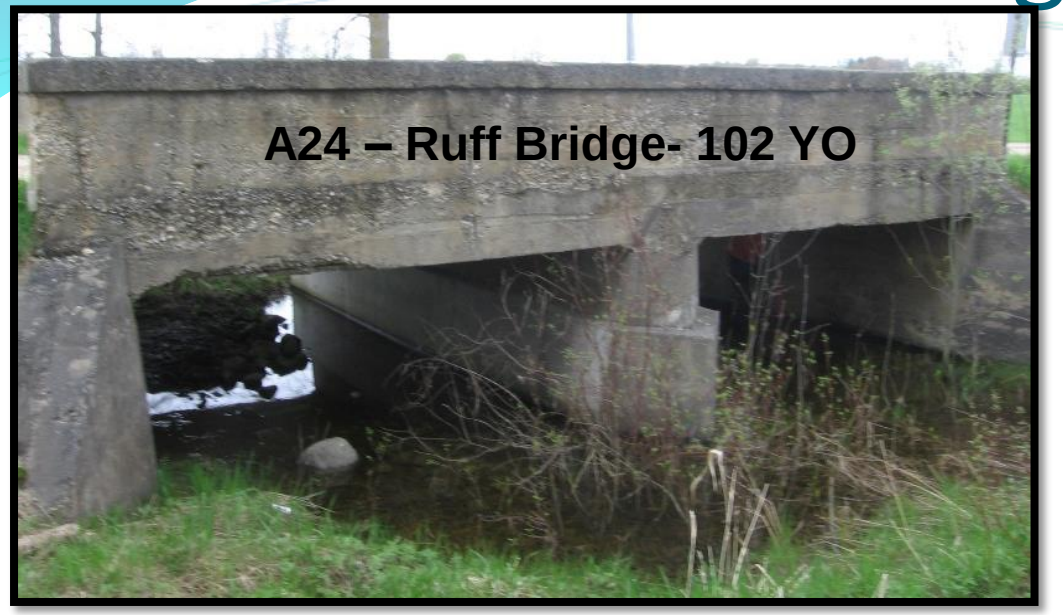
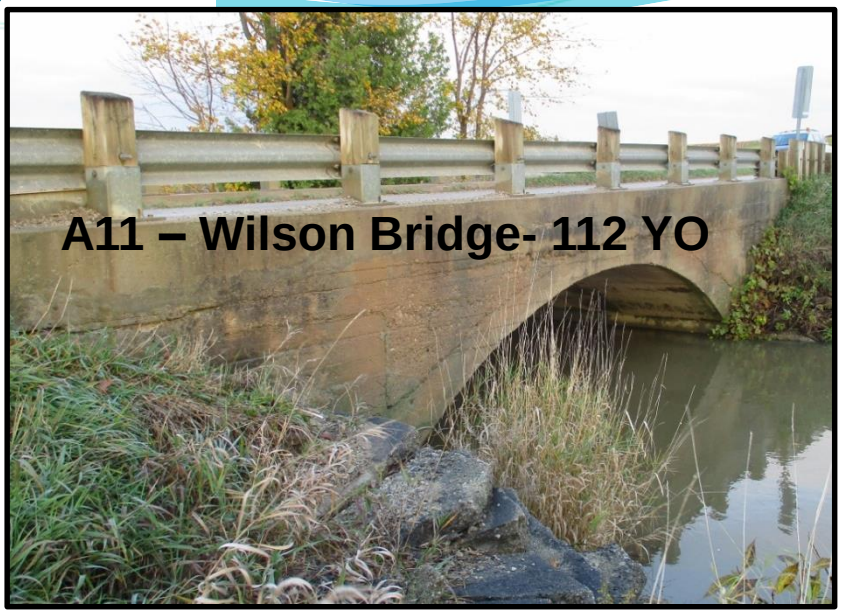
Study Bridges

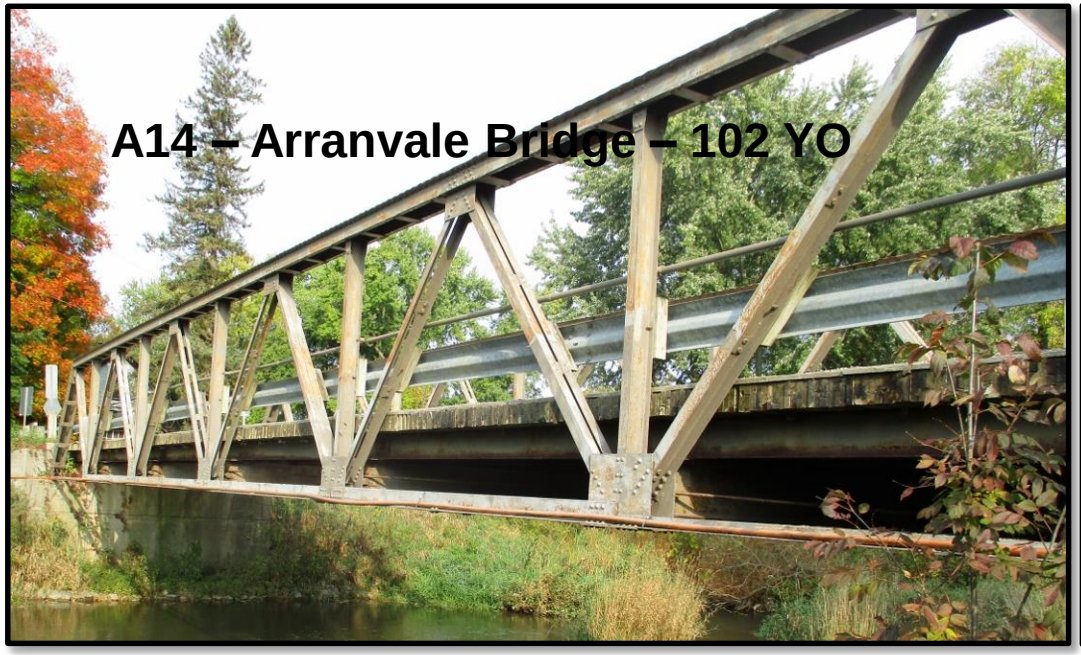
A11-Wilson
A24-Ruff
A14-Arranvale
A5-Hunts
A29, A30
E22, E24
E14, E15, E16, E17
E12-Pearces
E9, E10
E4-Allens
E1-Priebe



Bridges

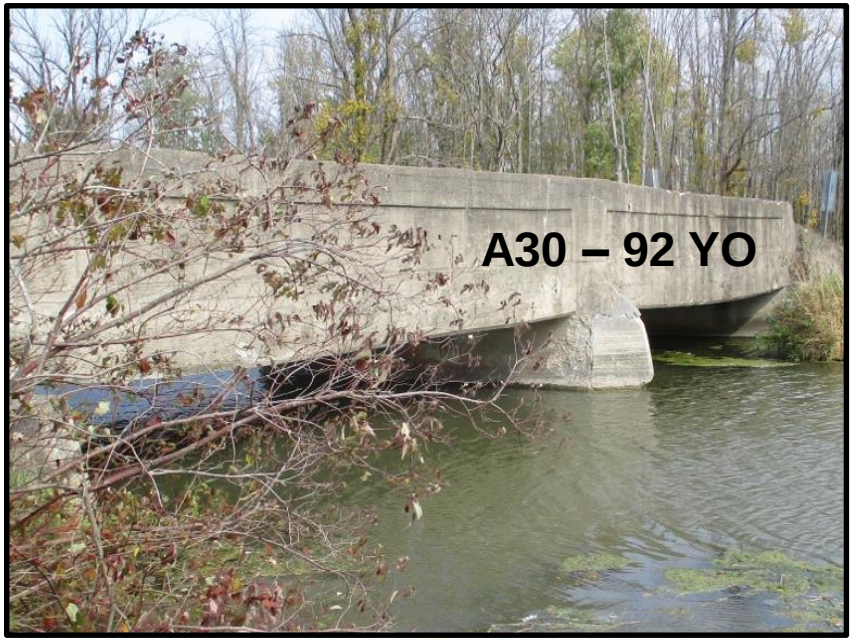

A24 – Ruff Bridge- 102 YO


A11 – Wilson Bridge- 112 YO


A14 – Arranvale Bridge – 102 YO


A5 – Hunts Bridge – 112 YO
10/09/20

Bridges



Bridges

Bridges

Bridges

E12 - Pearces Bridge – 92 YO

Master Plan Timeline

- Initial Notice/Agency & FN Consult — September 2019
- Cultural Heritage Evaluation Report — March 2020
- Engineering Evaluation of Crossings — 2021
- Evaluation of Bridges — 2021
  - Traffic Counts, Detour Options, BCI, Road Connectivity, Road Surface Condition, Load Limit
- Develop Possible Closure Recommendations — 2022
- Council Presentation — February 2023
- Public Meeting — September 2023

What are Master Plans

- Master Plans take a System Wide Approach to Planning which relates Infrastructure either Geographically or by Function
- Recommends projects to be implemented over an extended period
- Addresses at minimum the First Two Phases of the MEA Class EA which can be Implemented through separate individual projects

SCOPE OF MASTER PLAN STUDY

- Review a number of older bridges in Arran-Elderslie, complete required studies and provide recommendations for future
- Consult with Residents, Review Agencies and First Nations
- Develop a phasing plan for implementation of recommendations
- Consider possible closures

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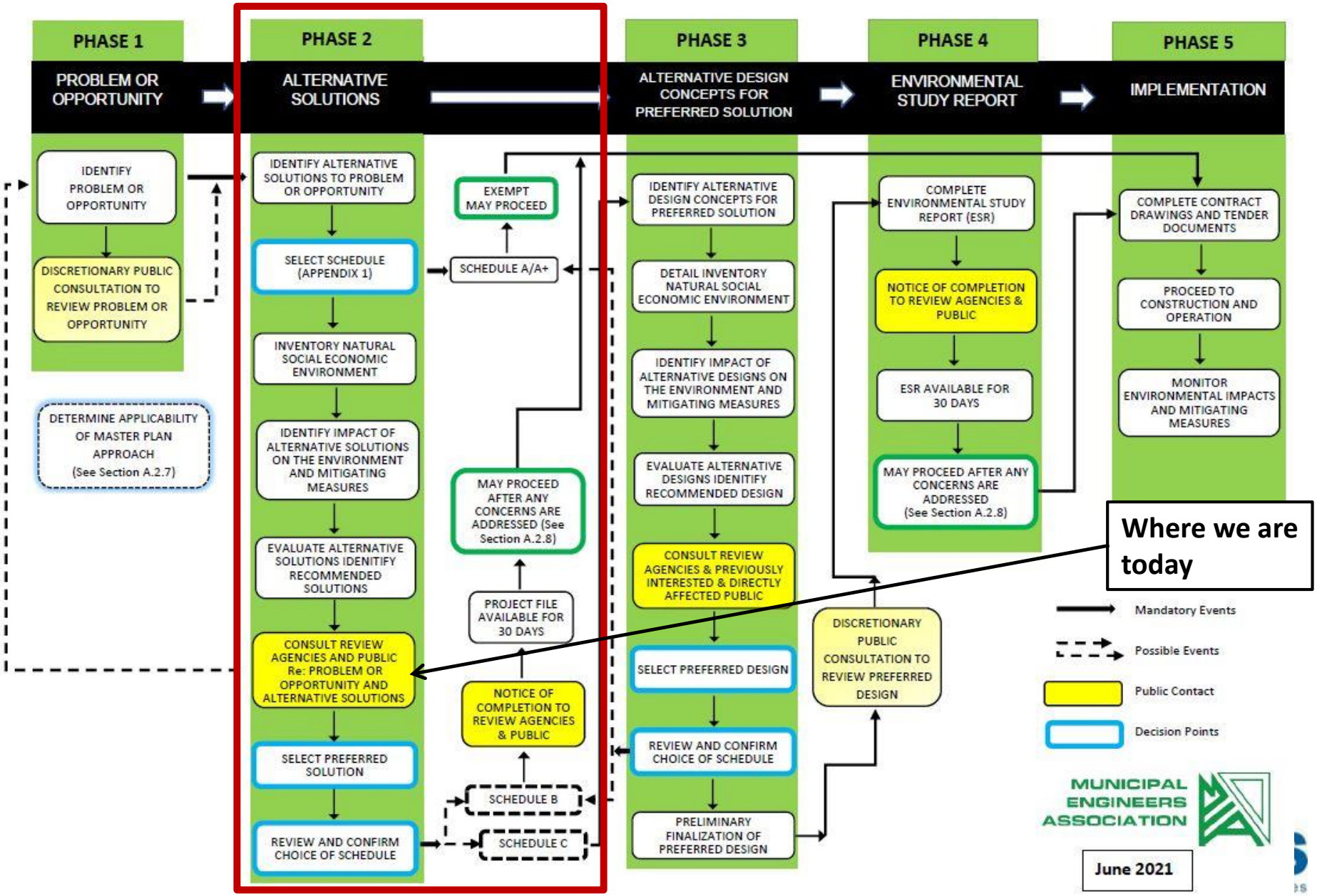
MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



Master Plan Alternatives

- **Alternative 1** – Replace or repair all of the crossings, as required. This option means that each crossing would be either repaired or replaced, and none would be retired (closed).
- **Alternative 2** – Close some crossings and either replace or repair the remaining crossings. This option means that several bridges will be repaired as long as feasible and then eventually closed to traffic and removed, while the remaining crossings will be either repaired as required or replaced.
- **Alternative 3** – Do Nothing. The do nothing option, is a consideration during any Master Plan Class EA process. This option would propose that no commitment is made either way and improvements or changes to address problems will continue to be made on a case by case basis.

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Background Investigations

- A number of investigations completed in support of the MP
- Engineering review completed to evaluate the condition of the 17 identified crossings
- Based on the reviews and our professional opinion, completed evaluation to determine if it would be more practical to repair or replace each of the structures
- Based upon current condition, tried to predict when repairs and/or replacements would be necessary
- Probable replacement costs and repair costs, when practical, were calculated for each structure
- Developed methods to compare the value of each crossing relative to the other crossings.
- Summarized the Results

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Additional Information

- **Traffic Counts** – Provided by Arran-Elderslie (Avg. of last 2)
- **Detour Options** – Shortest Route around if Bridge Closed
- **BCI** – Bridge Condition Index (Condition Score)
- **Road Surface** – Gravel/Pavement
- **Load Limit** – Based on Engineering Review
- **Road Connectivity** – Connection to County Roads or corridors through the Municipality
- **Cost Estimates** – Replacement/Repair

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Evaluation of Alternatives

- Cost to Replace All Crossings > $24 Million
- Two Main Evaluation Approaches were Identified
- Approach #1
  - Approach #1 utilizes BCI, Load Limit, Traffic Counts, Road Types, Detour Lengths (if closed), Road Connectivity and Replacement Costs, to identify bridges for Closure.
- Approach #2
  - Approach #2 removes the BCI and Load Limit Scores and just focuses on Traffic Counts, Road Types, Detour Lengths (if closed) and Road Connectivity, to identify bridges for Closure. With this approach you are focusing more on the location and function of the bridges, rather than their current condition.

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Evaluation of Alternatives

- With both Approaches, 4 Bridges were initially identified for Closure (Option A), then an additional 4 bridges were identified for closure (Option B) – 8 Total
- Bridges identified for closure would remain open until required repair costs exceeded a pre-determined threshold or the condition of the bridge threatened public safety
- Ultimately, Arran-Elderslie will determine how many crossings it wants to permanently close and the timeline for closure
- A long range plan that identifies crossings that will eventually be closed will be helpful in making other infrastructure decisions (road work) and for the agricultural industry and Mennonite communities.

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Scoring System

- An evaluation matrix with a scoring system was developed to evaluate the crossings. Highest scores are recommended for future closure.

BCI: <30 = 20
31-40 = 15
41-50 = 10
> 50 = 5

Load Limit: < 10 = 15
11-20 = 10
> 20 = 5

Traffic X 2: < 100 = 15
100-250 = 10
> 250 = 5

Road: Gravel = 15
LCB = 10
HCB = 5

Detour: < 8km = 15
9-10 = 10
> 11 = 5

Replace X2 $: < 1mil = 5
1-2mil = 10
> 2mil = 15

Road Connection: None = 15
Some = 10
Yes = 5

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Approach #1

Replace All Crossings
> $24 Million

Option A Closures

- E12, E22, E17, A14

$15.3 Million

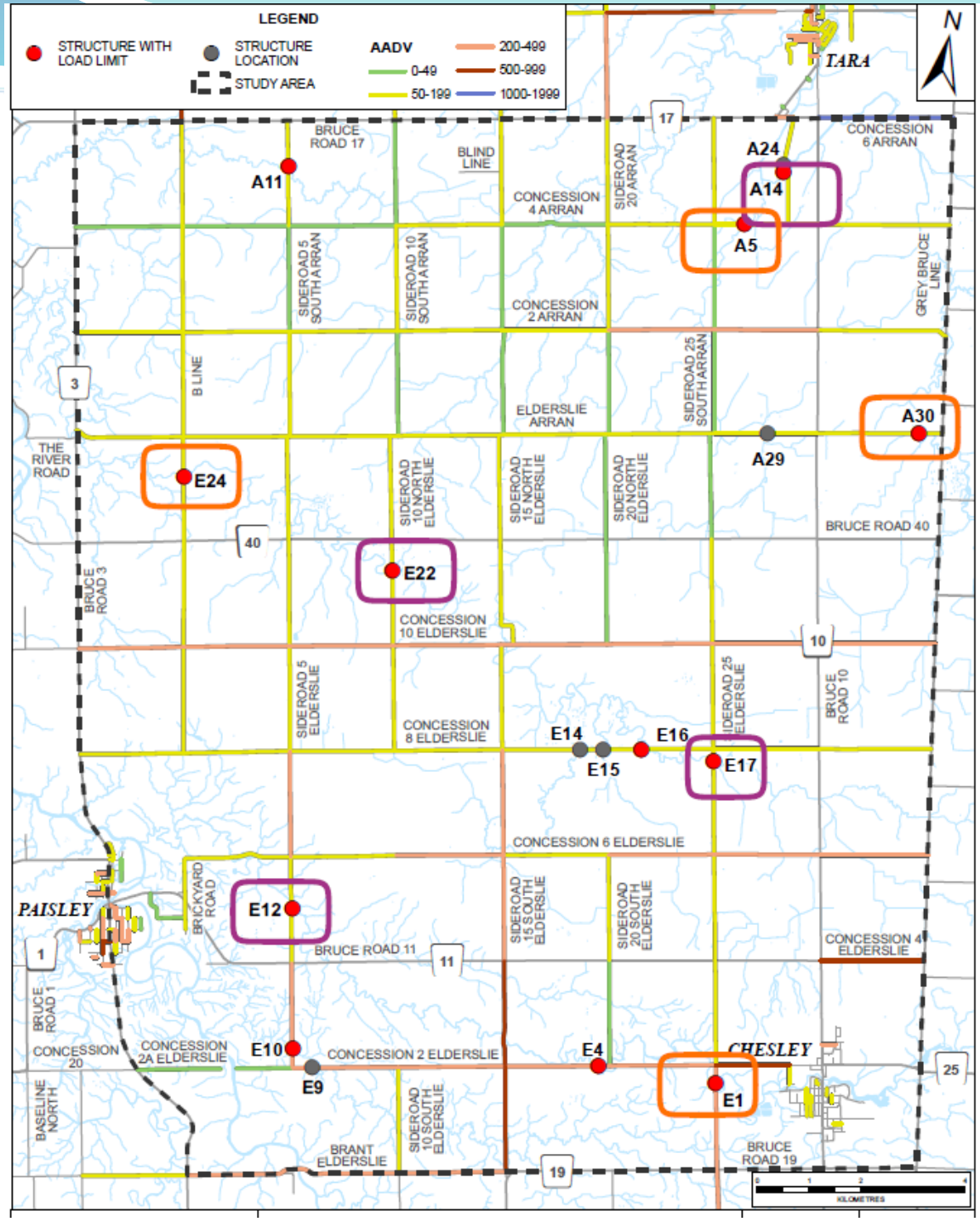
Saves $8.7 Million

Option A&B Closures

- E1, A5, E24, A30
- E12, E22, E17, A14

$8.7 Million

Saves $15.3 Million



Approach 1 – Matrix Results

Approach #1

Initial approach to identifying bridge closures, which utilizes BCI, Load Limit, Traffic Counts, Road Types, Detour Lengths (if closed), Road Connectivity and Replacement Costs, to identify bridges for Closure. Table 1.1 is the matrix used to identify the bridges. Table 1.2 is a proposed timeline for implementation of either closures, repairs or replacements.

Table 1.1: Potential Bridge Closure Assessment Matrix – Recommended Closures Option A - **Option B -** +

Structure ID	Type & Age	BCI	Score	Load Limit	Score	Avg. Traffic Counts	Score X 2	Road Type[1]	Score	Detour	Score	Replace$	Score x 2	Road Connectivity	Score	Total
E4 - Allens	Truss-1920	50	10	18/29/36	10	459	10	HCB	5	8.2km	10	$2,018,040	30	Yes	5	80
E9	Beam-1930	26	20	25	5	280	10	LCB	10	12.2km	5	$875,850	10	Yes	5	65
E1 – Priebe	Truss-1938	40	15	10	15	216	20	Gravel	15	8.1km	10	$2,194,590	30	Yes	5	110
E10	T-Beam-1930	48	10	11	10	162	20	LCB	10	12.2km	5	$1,015,710	20	Yes	5	80
E12– Pearces	Truss-1930	46	10	8	15	162	20	Gravel	15	7.6km	15	$2,544,240	30	Some	10	125
A11 – Wilson	Conc. Arch-1910	45	10	12	10	112	20	Gravel	15	8.1km	10	$689,370	10	None	15	90
A29	Conc. slab-1930	56	5	25	5	100	20	Gravel	15	7.9km	15	$829,230	10	Some	10	80
A14–Arranvale	Truss-1920	45	10	14	10	99	30	Gravel	15	5.2km	15	$2,529,780	30	Yes	5	115
A24 – Ruff	Conc. slab-1920	29	20	25	5	99	30	Gravel	15	5.2km	15	$673,830	10	Yes	5	100
E24	Truss-1920	53	5	10	15	98	30	Gravel	15	8.2km	10	$1,614,000	20	None	15	110
A5 – Hunts	Conc. Arc-1910	63	5	9	15	84	30	Gravel	15	7.1km	15	$1,155,570	20	Some	10	110
A30	Conc. slab-1930	38	10	12	10	77	30	Gravel	15	8.8km	10	$1,598,460	20	Some	10	105
E22	Truss 1920	46	10	3	15	68	30	Gravel	15	8.1 km	10	$1,691,700	20	None	15	115
E16	T-Beam-1930	31	15	15	10	67	30	Gravel	15	12.2km	5	$875,850	10	Yes	5	90
E17	Truss-1930	38	15	11	10	53	30	Gravel	15	8.2km	10	$1,963,650	20	None	15	115
E14	T-Beam-1930	34	15	25	5	50	30	Gravel	15	12.2km	5	$899,160	10	Yes	5	85
E15	T-Beam-1920	41	10	25	5	50	30	Gravel	15	12.2km	5	$875,850	10	Yes	5	80

Scoring System: [1]LCB – Low Class Bituminous, HCB – High Class Bituminous

BCI: <30 = 20, 30-40 = 15, 41-50 = 10, >50 = 5

Load Limit: <10 = 15, 11-20 = 10, > 20 = 5

Traffic: <100 = 15, 100-250 = 10, > 250 = 5

Road Type: Gravel = 15, LCB = 10, HCB = 5

Detour Length: < 8 = 15, 8-10= 10, >10 = 5

Replace Cost: < 1 mil = 5, 1–2 mil = 10, > 2 mil = 15

Road Connection: none = 15, some = 10, yes = 5

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Approach #1 Timelines

Table 1.2: Recommended Outcomes for Approach #1 – Option #A - 4 Bridge Closures **Option #B– 4 additional closures**

Structure ID	Type & Age	Avg. Traffic Counts	BCI	Recommended Outcome	Repair Costs	Repair Timeline	Replacement Costs	Replacement Timeline
E4 - Allens	Truss-1920	459	50	**Replace**	No Immediate Repairs	**N/A**	$2,018,040	15-20 Years
E9	Beam-1930	280	26	**Replace**	$170,000 (N/A)	**N/A**	$875,850	1-5 Years
E1 – Priebe	Truss-1938	216	40	**Repair then Closure**	No Immediate Repairs	**N/A**	N/A	20-25 Years
E10	T-Beam-1930	162	48	**Replace**	No Immediate Repairs	**N/A**	$1,015,710	15-20 Years
E12– Pearces	Truss-1930	162	46	**Repair then Closure**	No Immediate Repairs	**N/A**	N/A	15-20 Years
A11 – Wilson	Conc. Arch-1910	112	45	**Replace**	No Immediate Repairs	**N/A**	$689,370	15-20 Years
A29	Conc. slab-1930	100	56	**Repair then Replace**	$65,000	**1-5 Years**	$829,230	20-25 Years
A14–Arranvale	Truss-1920	99	45	**Repair then Closure**	No Immediate Repairs	**N/A**	N/A	15-20 Years
A24 – Ruff	Conc. slab-1920	99	29	**Replace**	N/A	**N/A**	$673,830	1-5 Years
E24	Truss-1920	98	53	**Repair then Closure**	$12,000	**1-5 Years**	N/A	20-25 Years
A5 – Hunts	Conc. Arc-1910	84	63	**Repair then Closure**	$65,000	**1-5 Years**	N/A	20-25 years
A30	Conc. slab-1930	77	38	**Repair then Closure**	$136,000	**1-5 Years**	N/A	20-25 Years
E22	Truss 1920	68	46	**Repair then Closure**	$16,000	**1-5 Years**	N/A	15-20 Years
E16	T-Beam-1930	67	31	**Repair then Replace**	$130,000	**1-5 Years**	$875,850	10-15 Years
E17	Truss-1930	53	38	**Repair then Closure**	$90,000	**1-5 Years**	N/A	10-15 Years
E14	T-Beam-1930	50	34	**Repair then Replace**	$65,000	**1-5 Years**	$899,160	10-15 Years
E15	T-Beam-1920	50	41	**Replace**	No Immediate Repairs	**N/A**	$875,850	10-15 Years

*Timelines and anticipated work are preliminary and will change based on the results of annual inspections and other bridge priorities

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Approach #2

Replace All Crossings
> $24 Million

Option A Closures

- A5, A14, E17, E22

$16.7 Million

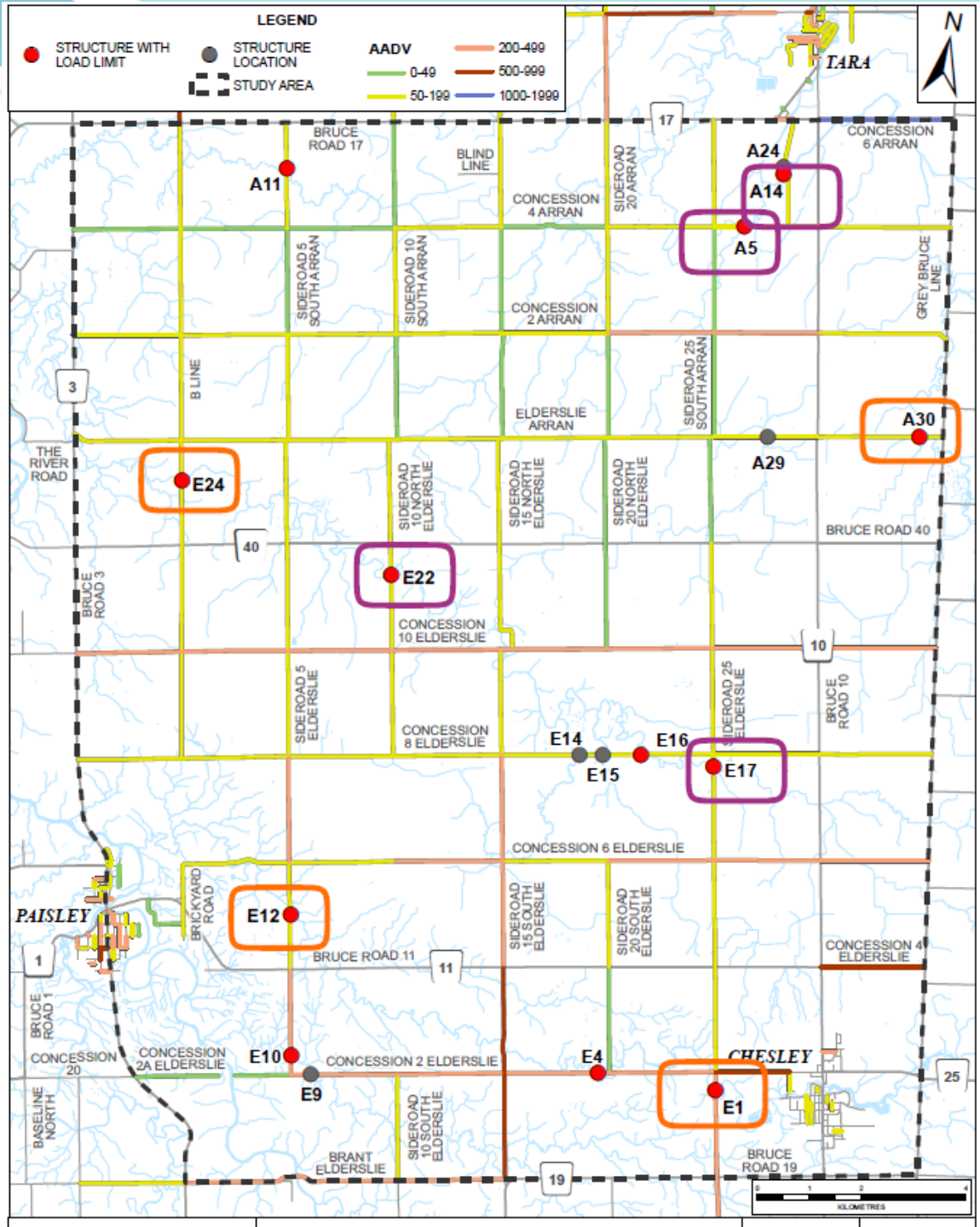
Saves $7.3 Million

Option A&B Closures

- E1, E12, E24, A30
- A5, A14, E17, E22

$8.7 Million

Saves $15.3 Million



Approach 2 – Matrix Results

*Evaluate based only on location; remove bridge condition components

Table 2.1: Potential Bridge Closure Assessment Matrix – Recommended Closures Option A - Option B - +

Structure ID	Type & Age	Avg. Traffic Counts	Score X 2	Road Type[1]	Score	Detour	Score	Replace$	Score x 2	Road Connectivity	Score	Total
E4 - Allens	Truss-1920	459	10	HCB	5	8.2km	10	$2,018,040	30	Yes	5	60
E9	Beam-1930	280	10	LCB	10	12.2km	5	$875,850	10	Yes	5	40
E1 – Priebe	Truss-1938	216	20	Gravel	15	8.1km	10	$2,194,590	30	Yes	5	80
E10	T-Beam-1930	162	20	LCB	10	12.2km	5	$1,015,710	20	Yes	5	60
E12– Pearces	Truss-1930	162	20	Gravel	15	7.6km	15	$2,544,240	30	Some	10	90
A11 – Wilson	Conc. Arch-1910	112	20	Gravel	15	8.1km	10	$689,370	10	None	15	70
A29	Conc. slab-1930	100	20	Gravel	15	7.9km	15	$829,230	10	Some	10	70
A14–Arranvale	Truss-1920	99	30	Gravel	15	5.2km	15	$2,529,780	30	Yes	5	95
A24 – Ruff	Conc. slab-1920	99	30	Gravel	15	5.2km	15	$673,830	10	Yes	5	75
E24	Truss-1920	98	30	Gravel	15	8.2km	10	$1,614,000	20	None	15	90*
A5 – Hunts	Conc. Arc-1910	84	30	Gravel	15	7.1km	15	$1,155,570	20	Some	10	90
A30	Conc. slab-1930	77	30	Gravel	15	8.8km	10	$1,598,460	20	Some	10	85
E22	Truss 1920	68	30	Gravel	15	8.1 km	10	$1,691,700	20	None	15	90
E16	T-Beam-1930	67	30	Gravel	15	12.2km	5	$875,850	10	Yes	5	65
E17	Truss-1930	53	30	Gravel	15	8.2km	10	$1,963,650	20	None	15	90
E14	T-Beam-1930	50	30	Gravel	15	12.2km	5	$899,160	10	Yes	5	65
E15	T-Beam-1920	50	30	Gravel	15	12.2km	5	$875,850	10	Yes	5	65

* If scores are tied for one or more structures, the structure with the highest traffic count is moved to the lower category

Scoring System: [1]LCB – Low Class Bituminous, HCB – High Class Bituminous

Traffic: <100 = 15, 100-250 = 10, > 250 = 5

Road Type: Gravel = 15, LCB = 10, HCB = 5

Detour Length: < 8 = 15, 8-10 = 10, >10 = 5

Replace Cost: < 1 mil = 5, 1–2 mil = 10, > 2 mil = 15

Road Connectivity: none = 15, some = 10, yes = 5

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Approach #2 Repair Timelines

Table 2.2: Recommended Outcomes for Approach #2 – Option #A - 4 Bridge Closures **Option #B – 4 more closures**

Structure ID	Type & Age	Avg. Traffic Counts	BCI	Recommended Outcome	Repair Costs	Repair Timeline	Replacement Costs	Replacement Timeline
E4 - Allens	Truss-1920	459	50	**Replace**	No Immediate Repairs	**N/A**	$2,018,040	15-20 Years
E9	Beam-1930	280	26	**Replace**	$170,000 (N/A)	**N/A**	$875,850	1-5 Years
E1 – Priebe	Truss-1938	216	40	**Repair then Closure**	No Immediate Repairs	**N/A**	N/A	20-25 Years
E10	T-Beam-1930	162	48	**Replace**	No Immediate Repairs	**N/A**	$1,015,710	15-20 Years
E12– Pearces	Truss-1930	162	46	**Repair then Closure**	No Immediate Repairs	**N/A**	N/A	20-25 Years
A11 – Wilson	Conc. Arch-1910	112	45	**Replace**	No Immediate Repairs	**N/A**	$689,370	15-20 Years
A29	Conc. slab-1930	100	56	**Repair then Replace**	$65,000	**1-5 Years**	$829,230	20-25 Years
A14–Arranvale	Truss-1920	99	45	**Repair then Closure**	No Immediate Repairs	**N/A**	N/A	15-20 Years
A24 – Ruff	Conc. slab-1920	99	29	**Replace**	N/A	**N/A**	$673,830	1-5 Years
E24	Truss-1920	98	53	**Repair then Closure**	$12,000	**1-5 Years**	N/A	20-25 Years
A5 – Hunts	Conc. Arc-1910	84	63	**Repair then Closure**	$65,000	**1-5 Years**	N/A	20-25 years
A30	Conc. slab-1930	77	38	**Repair then Closure**	$136,000	**1-5 Years**	N/A	20-25 Years
E22	Truss 1920	68	46	**Repair then Closure**	$16,000	**1-5 Years**	N/A	15-20 Years
E16	T-Beam-1930	67	31	**Repair then Replace**	$130,000	**1-5 Years**	$875,850	10-15 Years
E17	Truss-1930	53	38	**Repair then Closure**	$90,000	**1-5 Years**	N/A	10-15 Years
E14	T-Beam-1930	50	34	**Repair then Replace**	$65,000	**1-5 Years**	$899,160	10-15 Years
E15	T-Beam-1920	50	41	**Replace**	No Immediate Repairs	**N/A**	$875,850	10-15 Years

*Timelines and anticipated work are preliminary and will change based on the results of annual inspections and other bridge priorities

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Additional Considerations

- Connectivity and low replacement costs resulted in lower scores for structures E14, E15, and E16. Need to repair at least two to provide access to properties between them.
- May not want to close A14 and A5, creates dead ends.
- Structure E1 location recorded a relatively high volume of traffic crossing it. If assigned traffic score changed at 200 instead of at 250, it might not be on the Option B lists.
- May put a higher preference on replacing, instead of repairing bridges that Township decides are needed.

Next Steps

- Collect Input from Residents, Agencies & FN following the public meeting
- Prepare a Summary of Feedback for Council
- Based on Feedback, Establish a Preferred Approach and/or Bridges to be slated for future closure
- Finalize Master Plan Report
- Develop a Phasing Timeline
  - Can be Modified as Bridge Conditions Change over Time
- Publish Notice of Master Plan Completion

Questions?

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