BEAUSEJOUR-BROKENHEAD, MB

Biofuel Development Opportunity Zone

RATING GRADE: 'A'

Date of Issue: October 31, 2024

A
High Quality

Rating Parameters:

Category	Rated Quantity	Delivered Price	BDO Zone Size
Wheat Straw	**150,000 odt/yr**	**$125-$145/odt**	**120-km drive distance from Beausejour, MB**

BDO ZONE ASSETS

- High yield wheat production region.
- Multi-generational, locally established grain and cattle producers well-accustomed to wheat straw harvesting and utilization.
- Experienced custom baling capacity ready to scale-up production for a new project.
- No large-scale competition for wheat straw in the Competition Zone.

BDO ZONE LIABILITIES

- Increasing fuel costs and a narrow window of opportunity to harvest and transport straw.
- Weather events such as drought and hail can have a significant impact on straw availability.
- Infrastructure challenges associated with electrical connectivity, rail access, and local labour availability.

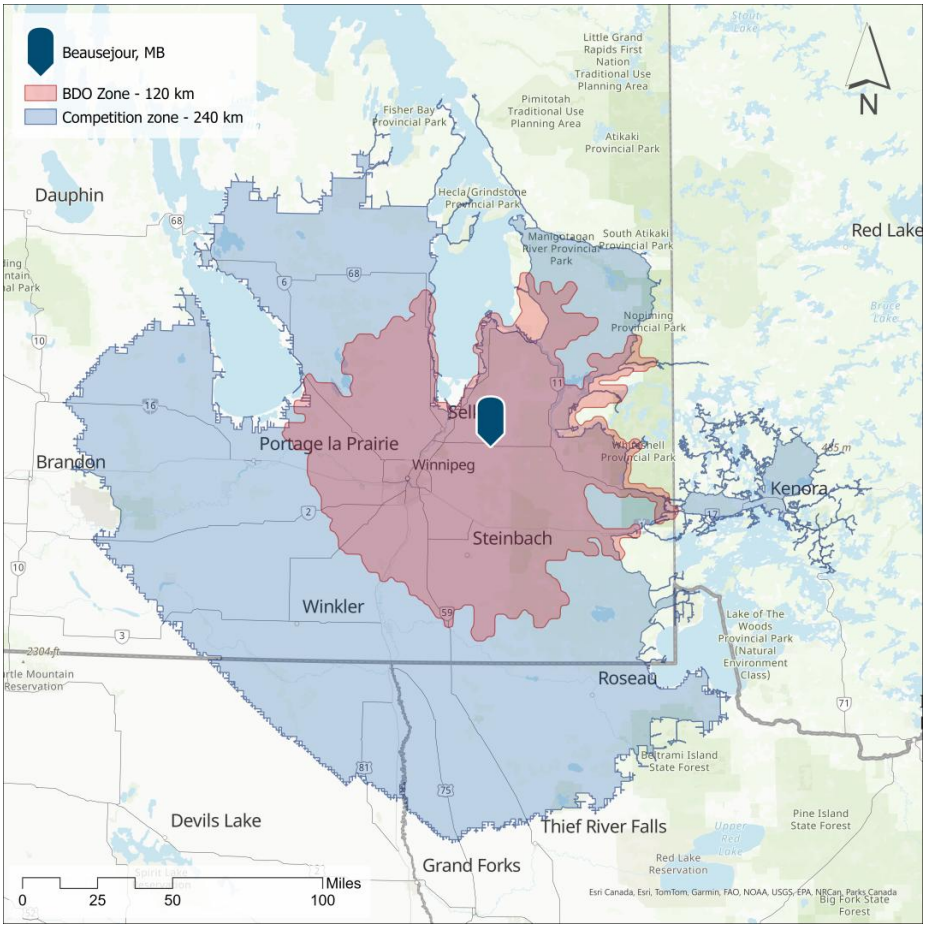
RATING GRADE

The Beausejour-Brokenhead Biofuel Development Opportunity Zone, is rated 'A', or 'low' risk.

Risk Rating Grades are defined as follows: AAA (extremely low), AA (very low), A (low), BBB (low-moderate), BB (moderate), B (moderate-high), and C (high).

'A' ratings denote high prospective viability of Feedstock Supply and Infrastructure and low expectations of default risk in the Zone. Capacity to support new biobased plant operations is considered strong. This capacity may, nevertheless, be more vulnerable to increased fuel costs, adverse weather, supply chain, and infrastructure conditions than is the case for higher ratings.

BEAUSEJOUR-BROKENHEAD BDO ZONE



BDOZ | THE BIOFUEL DEVELOPMENT OPPORTUNITY ZONE INITIATIVE

ANALYST NOTES

Our supply and competition analysis indicates that a low-risk quantity of **150,000 odt/year** of wheat straw is available for a delivered price to Beausejour of between **$125 and $145 per odt**. This rated quantity represents 13% of the total estimated wheat straw quantity generated in the BDO Zone. Wheat straw is currently used for animal bedding and soil amendment/nutrition.

BDO ZONE ASSETS

Hard Red Spring wheat is the major crop in the BDO Zone. Local producers have a century old experience in growing and adopting wheat varieties that best fit both local weather/soil conditions and grain market demands. Consequently, a substantial increase in grain yield has occurred in the past decade. Wheat grain yields in Manitoba are the highest of all Canadian Prairie Provinces.

The vast majority of farms in the BDO Zone date back to the first European settlers. Many farms have been kept in the original family ownership. Established local grain and cattle producers are well-accustomed to wheat straw harvesting and utilization.

Wheat producers in the BDO Zone often engage with high-efficiency custom baling companies. Outreach indicates that capacity exists to scale-up production for a new project.

Other than the current uses, no wheat straw projects exist or are planned in the Competition Zone. The rated quantity represents a conservative estimate to a new project. Once established, the project has plenty of room for expansion.

BDO ZONE LIABILITIES

A large portion of baling and transportation costs are attributed to diesel prices. While post-pandemic fuel prices have somewhat stabilized, they show an upward trend. Project proponents should secure the bulk of the rated quantity from within 30-km drive distance from Beausejour.

Severe weather events such as droughts and heavy rains could have a significant negative effect on both straw supply and collection. Due to the very narrow window of opportunity to harvest and transport straw, any delay related to inclement weather or faulty logistics can produce significant shortages. Rigorous harvesting and storage plans can successfully alleviate these shortcomings.

Project proponents need to be aware of moderate investment risks associated with electrical connection, rail access, and local labour availability at the proposed industrial site.

INFRASTRUCTURE PROFILE

The 70-acre parcel of industrial land near Beausejour, MB, offers a prime location for new bio-industries, supported by access to major highways, rail, utilities, and a lower cost of living. For more details see Section C and Section D (Category 5: Infrastructure Risk Indicators).

SCORING & RATING METHODOLOGY

In assessing the biomass supply chain risk for the Biofuel Development Opportunity (BDO) Zone, 88 Risk Indicators from the Canadian Standards for Biomass Supply Chain Risk (BSCR) were applied. These BDO Zone Risk Indicators are the subset of BSCR Risk Indicators applicable to evaluating feedstock risk within a BDO Zone.

Feedstock quantities are expressed in oven-dry tonnes per year (odt/yr), while feedstock costs are expressed in Canadian dollars (CAD). Maximum transport distance is based on a 120-km driving distance from the centre point (Beausejour, MB).

The BDO Zone rating is based on an aggregation of the scores assigned to each BDO Zone Risk Indicator (RI) assessed in this report. First, each BDO Zone Risk Indicator is given a **Raw Risk Likelihood (RRL)** score, which denotes the likelihood of a risk to future BDO Zone projects due to the Risk Indicator. RRL Scores are scaled as either very low (2), low (4), medium (6), high (8), or very high (10).

Each BDO Zone Risk Indicator is given a **Raw Risk Impact (RRI)** score, which denotes the impact on a future BDO Zone project due to the Risk Indicator. RRI scores are scaled as either very low (2), low (4), medium (6), high (8), or very high (10). Impact level scores are based on the impact level of a risk on the successful development and deployment of a BDO Zone project with no mitigation measures.

The **Gross Risk Indicator (GRI)** score is then calculated as the product of the RRL and the RRI scores. For example, if the 'Competitor Price and Price Sensitivity' is scored at an RRL of 2 and an RRI of 8, then the GRI for this risk indicator is 2 X 8 = 16.

If the analyst deems that a typical bio-based project could implement economically reasonable measures or best practices that mitigate the likelihood (RRL), the impact (RRI), or both, then the GRI will be notched accordingly.

The **Loaded RI** score for each Risk Indicator is the product of the GRI score and any notched scores. Loaded RIs are the final score for a Risk Indicator.

Loaded RI scores of 4 or less are deemed very low risk; scores between 5 and 16 are deemed low risk; scores between 17 and 36 are deemed medium risk; scores between 37 and 64 are deemed high risk; and scores of 65 and greater are deemed very high risk.

The total risk rating for the BDO Zone is the average of all Loaded RI scores and Infrastructure Indicators. The BDO Zone score for Beausejour, MB is ***16.33 out of 100, resulting in an 'A' designation.*** All scoring and rationale for each Risk Indicator are provided in Section D.

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SECTION A: RISK INDICATOR SUMMARY

Figure A-1. All Risk Indicators Sorted by Risk Level

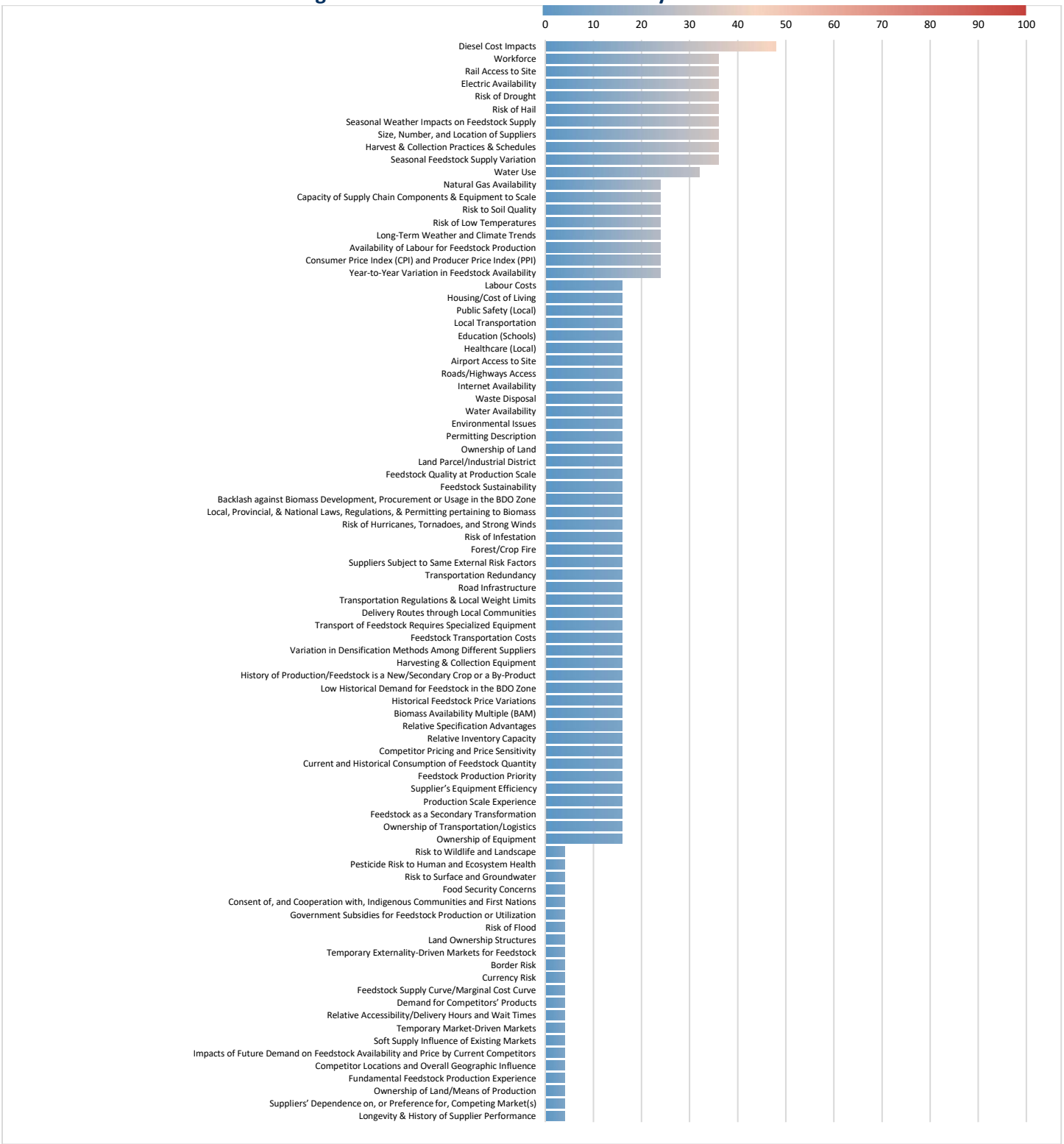


Table A-1. Risk Indicators and Associated Scores

Feedstock Supply Chain Risk Indicators	Raw Risk Likelihood	Raw Risk Impact	Gross Risk Indicator	Mitigation /Notching	Loaded RI Score
Category 1.0: Supplier Risk					
1.1 Risk Factor: Credit-Worthiness/Future Solvency of Suppliers					
1.1.1 Longevity & History of Supplier Performance	2	2	4	NN	4
1.2 Risk Factor: Conflicts of Interest/Vested Interest with Competing Market(s)					
1.2.1 Suppliers' Dependence on, or Preference for, Competing Market(s)	2	2	4	NN	4
1.3 Risk Factor: Supplier Control Over Production and Transportation					
1.3.1 Ownership of Land/Means of Production	2	2	4	NN	4
1.3.2 Ownership of Equipment	4	4	16	NN	16
1.3.3 Ownership of Transportation/Logistics	4	4	16	NN	16
1.3.4 Feedstock as a Secondary Transformation	4	4	16	NN	16
1.4 Risk Factor: Supplier Experience					
1.4.1 Fundamental Feedstock Production Experience	2	2	4	NN	4
1.4.2 Production Scale Experience	4	4	16	NN	16
1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity					
1.5.1 Supplier's Equipment Efficiency	4	4	16	NN	16
1.6 Risk Factor: Supplier Motivation					
1.6.1 Feedstock Production Priority	4	4	16	NN	16
Category 2.0: Competitor Risk					
2.1 Risk Factor: Influence on Feedstock Supply of Existing Markets					
2.1.1 Competitor Locations and Overall Geographic Influence	2	2	4	NN	4
2.1.2 Current and Historical Consumption of Feedstock Quantity	4	4	16	NN	16
2.1.3 Competitor Pricing and Price Sensitivity	4	4	16	NN	16
2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors	2	2	4	NN	4
2.1.5 Soft Supply Influence of Existing Markets	2	2	4	NN	4
2.1.6 Temporary Market-Driven Markets	2	2	4	NN	4
2.2 Risk Factor: Specific Competitors' Competitive Advantage					
2.2.1 Relative Inventory Capacity	4	4	16	NN	16
2.2.2 Relative Accessibility/Delivery Hours and Wait Times	2	2	4	NN	4
2.2.3 Relative Specification Advantages	4	4	16	NN	16
2.2.4 Demand for Competitors' Products	2	2	4	NN	4
Category 3.0: Supply Chain Risk					
3.1 Risk Factor: Feedstock Availability					
3.1.1 Biomass Availability Multiple (BAM)	4	4	16	NN	16
3.1.2 Feedstock Supply Curve/Marginal Cost Curve	2	2	4	NN	4
3.1.3 Seasonal Feedstock Supply Variation	6	6	36	NN	36
3.1.4 Year-to-Year Variation in Feedstock Availability	4	6	24	NN	24
3.2 Risk Factor: Historical Issues					
3.2.1 Historical Feedstock Price Variations	4	4	16	NN	16
3.2.2 Low Historical Demand for Feedstock in the BDO Zone	4	4	16	NN	16
3.2.3 History of Production/Feedstock is a New/Secondary Crop or a By-Product	4	4	16	NN	16
3.3 Risk Factor: Non-Weather Based Externalities					
3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)	6	4	24	NN	24
3.3.2 Currency Risk	2	2	4	NN	4
3.3.3 Border Risk	2	2	4	NN	4
3.3.4 Temporary Externality-Driven Markets for Feedstock	2	2	4	NN	4
3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection					
3.4.1 Harvest & Collection Practices & Schedules	6	6	36	NN	36
3.4.2 Harvesting & Collection Equipment	4	4	16	NN	16
3.4.3 Variation in Densification Methods Among Different Suppliers	4	4	16	NN	16
3.4.4 Availability of Labour for Feedstock Production	4	6	24	NN	24
3.5 Risk Factor: Transportation					
3.5.1 Feedstock Transportation Costs	4	4	16	NN	16
3.5.2 Diesel Cost Impacts	6	8	48	NN	48
3.5.3 Transport of Feedstock Requires Specialized Equipment	4	4	16	NN	16
3.5.4 Delivery Routes through Local Communities	4	4	16	NN	16
3.5.5 Transportation Regulations & Local Weight Limits	4	4	16	NN	16
3.5.6 Road Infrastructure	4	4	16	NN	16
3.5.7 Transportation Redundancy	4	4	16	NN	16

3.6 Risk Factor: Supply Chain Resiliency					
3.6.1 Size, Number, and Location of Suppliers	6	6	36	NN	36
3.6.2 Suppliers Subject to Same External Risk Factors	4	4	16	NN	16
3.6.3 Land Ownership Structures	2	2	4	NN	4
3.7 Risk Factor: Climate and Natural Risks					
3.7.1 Seasonal Weather Impacts on Feedstock Supply	6	6	36	NN	36
3.7.2 Long-Term Weather and Climate Trends	4	6	24	NN	24
3.7.3 Forest/Crop Fire	4	4	16	NN	16
3.7.4 Risk of Infestation	4	4	16	NN	16
3.7.5 Risk of Hail	6	6	36	NN	36
3.7.6 Risk of Flood	2	2	4	NN	4
3.7.7 Risk of Drought	6	6	36	NN	36
3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds	4	4	16	NN	16
3.7.9 Risk of Low Temperatures	4	6	24	NN	24
3.8 Risk Factor: Political and Social					
3.8.1 Government Subsidies for Feedstock Production or Utilization	2	2	4	NN	4
3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting pertaining to Biomass	4	4	16	NN	16
3.8.3 Backlash against Biomass Development, Procurement or Usage in the BDO Zone	4	4	16	NN	16
3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations	2	2	4	NN	4
3.8.5 Food Security Concerns	2	2	4	NN	4
3.9 Risk Factor: Sustainability and Environmental Concern					
3.9.1 Feedstock Sustainability	4	4	16	NN	16
3.9.2 Risk to Soil Quality	4	6	24	NN	24
3.9.3 Risk to Surface and Groundwater	2	2	4	NN	4
3.9.4 Water Use	8	8	64	50%	32
3.9.5 Pesticide Risk to Human and Ecosystem Health	2	2	4	NN	4
3.9.6 Risk to Wildlife and Landscape	2	2	4	NN	4
3.9.7 Biomass Classified as Genetically Modified Organism (GMO)	NR	NR	NR	NR	NR
Category 4.0: Feedstock Scale-up Risk					
4.1 Risk Factor: Feedstock Scale-Up					
4.1.1 Feedstock Quality at Production Scale	4	4	16	NN	16
4.1.2 Capacity of Supply Chain Components & Equipment to Scale	4	6	24	NN	24
Category 5.0: Infrastructure					
5.1 Risk Factor: Physical Infrastructure					
5.1.1 Land Parcel/Industrial District	4	4	16	NN	16
5.1.2 Ownership of Land	4	4	16	NN	16
5.1.3 Permitting Description	4	4	16	NN	16
5.1.4 Environmental Issues	4	4	16	NN	16
5.2 Risk Factor: Utilities					
5.2.1 Natural Gas Availability	6	4	24	NN	24
5.2.2 Electric Availability	6	6	36	NN	36
5.2.3 Water Availability	4	4	16	NN	16
5.2.4 Waste Disposal	4	4	16	NN	16
5.2.5 Internet Availability	4	4	16	NN	16
5.3 Risk Factor: Transportation/Logistics					
5.3.1 Roads/Highways Access	4	4	16	NN	16
5.3.2 Rail Access to Site	6	6	36	NN	36
5.3.3 Airport Access to Site	4	4	16	NN	16
5.3.4 Water Freight Access	NR	NR	NR	NR	NR
5.4 Risk Factor: Social Infrastructure					
5.4.1 Healthcare (Local)	4	4	16	NN	16
5.4.2 Education (Schools)	4	4	16	NN	16
5.4.3 Local Transportation	4	4	16	NN	16
5.4.4 Public Safety (Local)	4	4	16	NN	16
5.4.5 Housing/Cost of Living	4	4	16	NN	16
5.5 Risk Factor: Labour					
5.5.1 Workforce	6	6	36	NN	36
5.5.2 Labour Costs	4	4	16	NN	16
				Average	**16.33**

SECTION B: BIOMASS AVAILABILITY AND PRICING

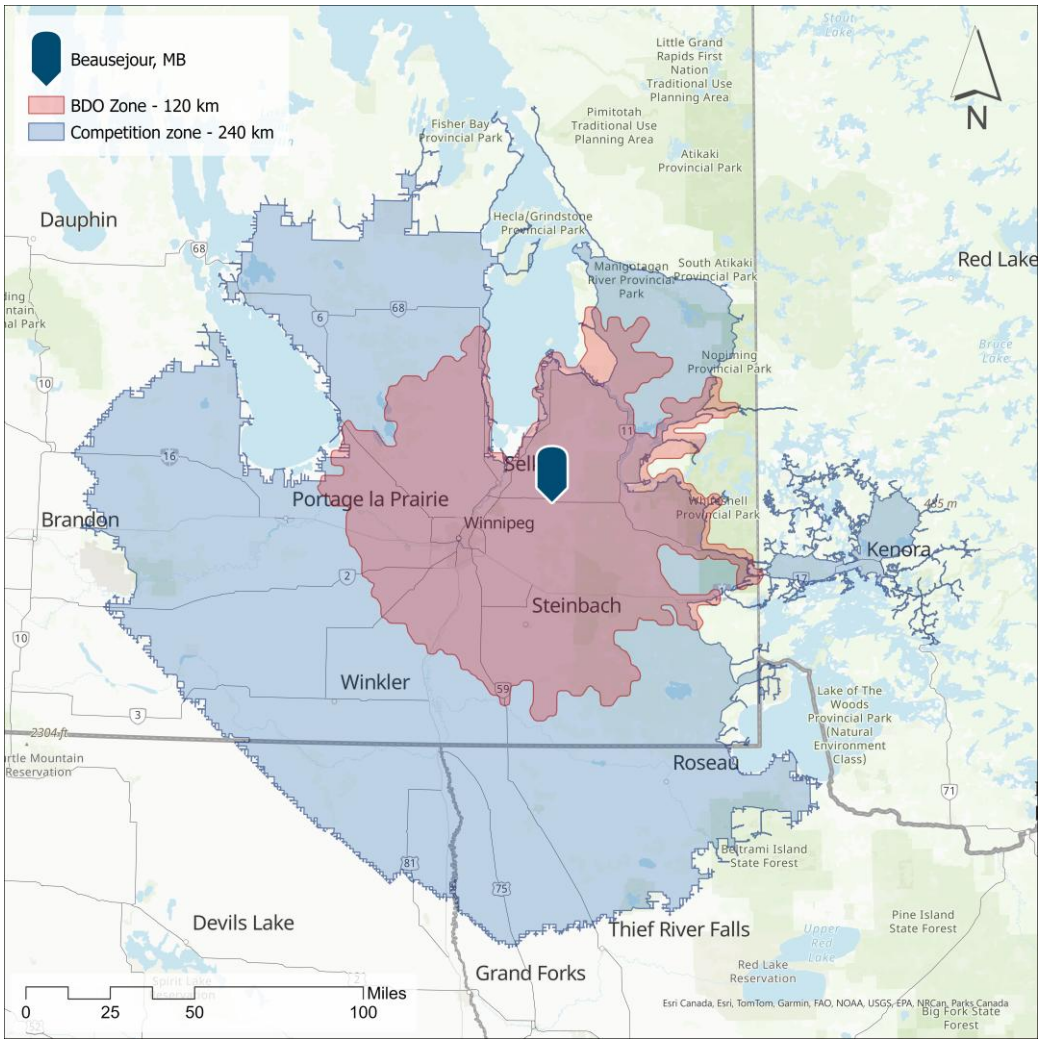
OVERVIEW

BDO Zone Risk Indicators are scored with reference to rated quantities and prices. The rated wheat straw quantity is determined by estimating the potential quantity produced within the BDO Zone, defined by the 120-km drive distance from Beausejour, MB (Map B-1).

To estimate biomass availability for new projects, the current demand for wheat straw in the Competition Zone (240-km drive distance from Beausejour, MB) is subtracted from the estimate of potential production. The rated quantity is determined by dividing the availability estimate by a Biomass Availability Multiple (BAM) of between 1.5 and 4.0. The BAM is applied to account for uncertainty in underlying data, models, assumptions, and future operating conditions for new bio-projects. The resulting rated quantity is a conservative, low-risk estimate of wheat straw availability for a new project. However, once the project supply chains are fully developed, additional quantities may become available.

The price range associated with the rated quantity is determined through outreach and market analysis in the Competition Zone and reflects the expected delivered price a new bio-project would need to pay to secure the rated quantity.

Map B-1. Map of BDO Zone and Competition Zone



SUPPLY ANALYSIS

The Beausejour-Brokenhead BDO Zone is located in the Southeastern part of the Province of Manitoba, Canada. The centre point of the BDO Zone, Beausejour, is located 60 km northeast of Winnipeg, the capital of Manitoba. The BDO Zone has a total area of 2 million hectares and spans over 30 rural municipalities, which include several small and rural farming communities. According to the 2021 agriculture census,[1] there were approximately 2,700 farms in the BDO Zone, approximately 40% of them cultivating grain crops. The most important crops produced in the BDO Zone are wheat (41% of farms in the BDO Zone), canola (29%), oats (25%), barley, flax, soybeans, corn, and sunflower. Cattle production is also well represented in the BDO Zone (670 cattle farms, or 25% of all farms). The vast majority of farms date back to the first European settlers and many are still in the original family ownership.

Hard Red Spring wheat is the major crop in the BDO Zone and is cultivated with no-irrigation under both no-till and till practices. Local producers have vast experience in growing and adopting wheat varieties that best fit both local weather/soil conditions and grain market demands. Wheat yields in Manitoba are the highest of all Canadian Prairie Provinces.[2] Wheat is planted in the BDO Zone on approximately 500,000 acres annually, on a rotation basis with other crops, depending on market prices. Most of the wheat is planted in the southwestern part of the BDO Zone (Map E-1), which is justified by the higher soil productivity in that region (Maps E-2 and E3). As of September 15, 2024, the farms in the Eastern Region of Manitoba reported yields averaging 75 bu/ac.[3] However, yield varies throughout the BDO Zone depending on soil quality (Map E-3). Thus, some municipalities recorded low yields, below 50 bu/ac (see Map E-2).

Wheat straw is a byproduct of wheat production that has traditionally been used for animal bedding and soil amendment/nutrition. In dry years, wheat straw is used as fodder mix, but other more nutritional choices like barley and oat straw are preferred. According to local outreach, approximately 90% of the wheat straw is chopped and either spread or incorporated into the soil to provide soil stability, humidity retention, and nutrition. Burning of wheat straw has been reported in the BDO Zone, but it is not a popular choice among producers. As approximately 45% of the planted area is located in high-yield, clayey soils (Maps E-2 and E-3), local experts suggest that producers located in these areas are more likely to participate in a wheat straw collection program than those in lower yielding areas.

Figure B-1 indicates that the total wheat planted area in the BDO Zone slightly increased in the past 10 years and the average yield has increased from low 52 to high 62 bushels per acre. Notable exceptions are years 2016 and 2021 in which severe droughts decreased significantly the average yields. Table B-1 presents how the average wheat straw generation was calculated from the total average area and average grain yield. According to our estimates, an average quantity of **1.13 million odt of wheat straw** can be generated annually in the Beausejour-Brokenhead BDO Zone.

[1] www.gov.mb.ca/agriculture/markets-and-statistics/ag-census/index.html
[2] www.dtnpf.com/agriculture/web/ag/blogs/canada-markets/blog-post/2023/12/07/look-prairie-spring-wheat-yields
[3] 85% spring wheat harvested by September 14, 2024

Figure B-1. Historical Planted Area[4] and Wheat Yield[5] in the Beausejour-Brokenhead BDO Zone

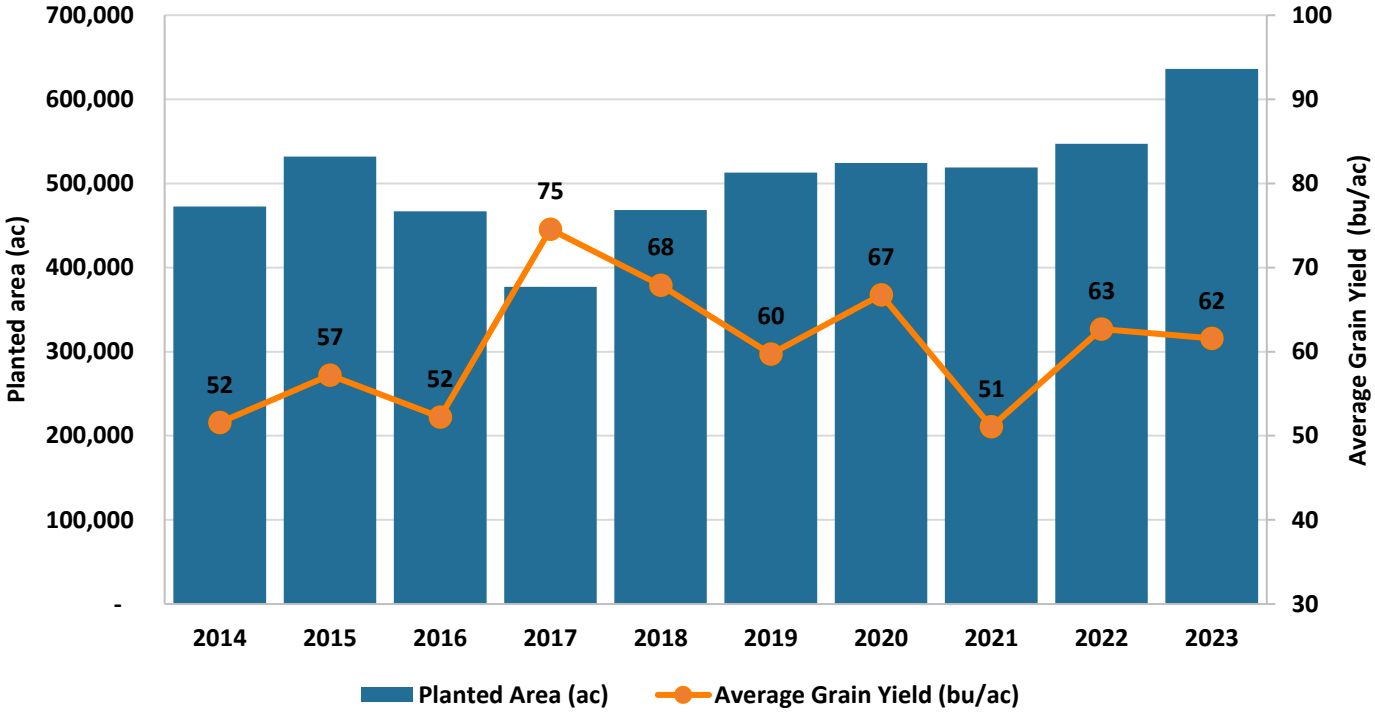


Table B-1. Annual Average Wheat Straw Generation

Wheat Straw Generation Factors	Values
Average annual planted area (ha)	204,618.7
Average annual planted area (ac)	505,621.6
Average annual grain yield (bu/ac)	60.5
Average annual grain production (tonnes)[6]	832,898
Straw/Grain Ratio[7]	1.6
Average straw moisture content (wet basis)[8]	15%
Average annual straw generation (odt)	**1,132,741**

[4] open.canada.ca/data/en/dataset/ba2645d5-4458-414d-b196-6303ac06c1c9/resource/328b7503-ed8f-44fa-a60b-0a369cf584b5;
[5] www.masc.mb.ca/masc.nsf/mmpp_browser_soil_types.html
[6] A conversion factor of 36.74 bu/tonne was applied (www.farmbooks.ca/Converter.html)
[7] www.sciencedirect.com/science/article/abs/pii/S1364032112001062
[8] Ebadian, M.; Sokhansanj, S.; Lee, D.; Klein, A.; Townley-Smith, L. Evaluating the Economic Viability of Agricultural Pellets to Supplement the Current Global Wood Pellets Supply for Bioenergy Production. Energies 2021, 14, 2263. https://doi.org/10.3390/en14082263).

COMPETITION ANALYSIS

One of the two major uses of wheat straw in the BDO Zone are **soil quality management/protection** and **cattle bedding/feed** (Table B-2). Occasionally, some quantities of straw cross the border into the US states of Minnesota and North Dakota. However, due to the prohibitive cost of transportation to distances beyond 200 km, the US straw markets do not pose a threat to the local supply.

Canadian Prairies agronomists recommend maintaining sufficient crop residue on the land to protect the soil from erosion by keeping the stubble standing, particularly after seeding. Experts agree that approximately 60% of wheat straw produced should be left in the field for soil management.[9]

Outreach revealed that an estimated 10% of wheat straw produced in the BDO Zone is used for cattle bedding and, occasionally, for feed. This is an average conservative value estimated through personal communications with local producers and experts. The actual value will vary depending on wet or dry years, as more straw is retained for cattle in dry years than in wet years. However, this value assumes rare cases in which local cattle farmers would require large amounts of wheat straw to supplement for lack of barley or oat straw and/or for bedding.

Table B-2. Current Wheat Straw Uses in the BDO Zone

Wheat Straw Use Factors	Values
Soil quality management/protection	60%
Livestock bedding and feed	10%
Average annual use	**70%**

RATED QUANTITY AND PRICING

Table B-3 indicates the rated, low-risk wheat straw quantity of **150,000 odt/year** available for a new project in Beausejour.

A **BAM of 1.5** was selected to account for uncertainty in the accuracy of existing data, scale-up readiness, historical harvesting practices and volumes, farmer participation, and annual changes in wheat straw generation and demand. Among these factors, scientists and experts recognize that farmer participation is the most challenging to estimate and quantify. A review of literature reveals that several factors impact producers' decision to participate in a new biomass project, such as: straw price, contract terms, straw harvesting experience, straw removal rate, nutrient loss, soil erosion risk, distance to the biomass processing facility, harvest timeliness, crop rotation, and others.[10,11,12,13,14] Literature suggests that, among these factors, removal rate and straw price appear to have the highest impact on producers' participation.

Our rated quantity accounts for both a removal rate that ensures appropriate soil protection and a price that includes the nutrient replacement cost paid to the producers. A BAM of 1.5 ensures a realistic rated quantity representing **13% of the total** estimated wheat straw generation in the BDO Zone, in agreement with local producers' expectations for a new project located in Beausejour. This percentage is expected to increase once a mutually beneficial project is implemented.

[9] www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/crops-and-irrigation/field-crops/cereals-barley-wheat-oats-triticale/harvesting-surplus-cereal-straw
[10] Corn stover as a biofuel feedstock in Iowa's bio-economy: An Iowa farmer survey
[11] Corn stover for bioenergy production: Cost estimates and farmer supply response
[12] Is Corn Stover Harvest Predictable Using Farm Operation, Technology, and Management Variables?
[13] Survey indicates farmers can supply corn stover biomass, but questions remain
[14] The "Stover Availability versus Supply" Puzzle and Contracting Options for Cellulosic Biomass

Table B-3. Annual Wheat Straw Availability and Rated Quantity Calculation

Wheat Straw Availability Factors	Values
Average annual straw generation (odt)	1,132,741
Average annual demand (odt)	792,919
Straw collection efficiency[15]	70%
Potential annual straw availability	237,876
BAM	1.5
Rated Quantity (odt) [16]	**150,000**
Removal % from total	**13%**

Table B-4 shows the various cost components that participate in estimating the delivered price range. Note that the **farm gate price range** of **$84-$103/odt**, or **$32-$40/bale** is compatible with the current spot market prices of $78-$104/odt, or $30-$40/bale.[17] However, historical straw prices (Figures E-3 and E-4) indicate significant seasonal price fluctuations currently driven by seasonal demand from the cattle sector. A straw project would most likely stabilize these price fluctuations by securing straw quantities at a set price that includes the nutrient replacement value and producer's markup.

Table B-4. Farm Gate and Delivered Price Ranges[18]

Price/Cost Component	$/odt	$/bale[19]
Baling/Moving/Stacking [20]	$41 - $50	$16 - $19
Nutrient Replacement Value[21]	$32 - $39	$12 - $15
Overhead/Markup (10%)[22]	$11 - $13	$4 - $5
Price at farm gate	**$84 - $103**	**$32 - $40**
Av. Transportation Cost (80-km) [23]	$42	$16
Delivered Price	**$125 - $145**	**$48 - $56**

[15] Optimal straw collection ensures a high-quality straw for vast majority of straw projects (e.g., biofuels, bioenergy, etc.).
[16] Rounded value
[17] Facebook - Manitoba Hay and Feed for Sale
[18] Price ranges assume +/-10% variation form the average value
[19] Assumes large square bales (3x4x8 ft) with an average weight of 1,000 lbs or 0.4 odt (15% moisture content)
[20] www.gov.mb.ca/agriculture/farm-management/cost-production/pubs/calculator-farm-machinery-custom-and-rental-guide.pdf
[21] This is a cost paid by project proponents to producers. It includes a 15% producer markup. Nutrient replacement value was calculated using an in-house calculator with the most current fertilizer prices (www.manitoba.ca/agriculture/farm-management/cost-production/pubs/cop-crop-production.pdf) and straw nutrient contents (www.albertagrains.com/files/2022/09/straw_management_in_western_canada_wheat_and_barley_cropping_systems.pdf).
[22] Includes compensation for temporary bale storage at producers' site.
[23] Assumes $150/hr transportation rate (local baling /transportation operation) on a flatbed truck, 42 x 1,000 lb bales/load, 1 hr. loading/unloading, 60 km/hr average speed, 15% straw moisture content. Includes $3/bale or $9/odt loading/unloading cost. For transportation costs at 10-km drive distance increments see Figure E-2.

OPERATIONAL CONSIDERATIONS

If a new project located in Beausejour, MB, utilized the rated quantity of wheat straw, approximately **32 balers, 65 tractors**,[24] and 10 flatbed trucks[25] would be necessary. According to the 2021 Agricultural Census, approximately 17,000 tractors and 2,500 harvesters/balers[26] were reported in the BDO Zone. While the equipment requirement for the rated quantity seems achievable through local resources, a large-scale wheat straw project would require increased custom baling and transportation efficiency. At this time, this high efficiency can be partially provided by the existing custom baling companies operating in the Beausejour area. Outreach indicated their capability to secure up to a third of the rated quantity. However, engaging with local producers and investments by project proponents in high-density square baling equipment and transportation will still be necessary to scale up.

Producers communicated that they would be in favour of the project proponent organizing the collection, storing, and transportation of straw bales, especially if collection can be done expeditiously, immediately after crop harvesting. Producers' major concern was that project proponents would not make and collect the bales in time so they could proceed with soil preparation for the next cropping season before heavy rains or frost occur. Some local producers expressed some disappointment regarding instances in which custom baling was not performed in time and bales were left in the field.

While not directly involving the producers in the BDO Zone, local producers and experts mentioned the former Isoboard strawboard plant in Elie, MB, a straw project that was operational for 7 years (1998-2005).[27] A group of 375 farmers within a 50-mile radius of the plant formed the Straw Board Producers Co-op of Manitoba Limited. Isoboard employees would come onto their fields after harvest, bale the straw, and haul the bales to three straw yards located near the plant. When running at full capacity, the plant consumed 400,000 round bales per year (approximately 200,000 tonnes/year). The plant closed on 31 December 2005. The abandoned straw left in the three straw yards turned out to be a long-term issue, unresolved to this day. Outreach indicated that the straw supply was not the cause of the project's failure. On the contrary, local producers demonstrated that forming a cooperative could successfully supply a large-scale straw project. A new project in Beausejour could build on that positive experience and avoid the negative aspects presented above.

Another important operational consideration relevant to a future straw project is that of increasing interest among local producers in regenerative agriculture.[28] Practices include no-till/minimum tillage techniques, the use of cover crops, crop rotations, compost, and animal manures, the inoculation of soils with composts or compost extracts to restore soil microbial activity, and managed grazing. Project proponents should be aware that these practices could impact the straw supply.

[24] Assuming 2 tractors: one for the baler and one for the bale collector at 10-hr day x 30 harvest days per year x 40 bales/hr (publications.saskatchewan.ca/#/products/76527)
[25] Assuming 4 trips/day for 240 days/year
[26] Values adjusted for each agricultural census region within the BDO Zone (www.statcan.gc.ca/en/census-agriculture)
[27] www.mhs.mb.ca/docs/sites/eliestrawboardplant.shtml
[28] https://mfga.net/regenerative-ag

SECTION C: INFRASTRUCTURE



PROPERTY OVERVIEW

Address:	SW10-13-60E
City:	Garson
Province:	Manitoba
County:	Rural Municipality of Brokenhead
Acres:	70 acres
Pricing Note:	$20,000/acre
Lease Available:	No
Topography:	Gently rolling
Zoning:	M-Industrial

SITE CONTACT

Dan Bushuk
Colliers Canada
Associate Vice President
P: 204-954-1796
dan.bushuck@colliers.com

ADDITIONAL NON-RATED SITES

Infrastructure Sites Contact
Bob Buckingham
BDO Zone Infrastructure
bob@ecostrat.com

PROPERTY PROFILE

Property located just north of Garson, MB, in close proximity to Beausejour, MB, and approximately 20 minutes from the Perimeter Highway (101 Beltway around Winnipeg).

The property has been zoned for industrial use and has some infrastructure services available, allowing users and investors the opportunity to develop the site for their specific use.

Transportation

Nearest Highway: Highway 44
Nearest Interstate: Hwy 44 is four lanes
Nearest Airport: Winnipeg, MB, 72 km
Rail Served: Canadian Pacific
Rail Accessible: Yes
Rail Infrastructure in Place: No

Electric Service

Supplier: Manitoba Hydro
Ownership: Publicly Owned
Phone: 204-480-5900
Website: www.hydro.mb.ca
All Utilities Extend to Site: Yes
Nearest Substation: 2 miles
Capability: 3-Phase overhead, 12.5kv distribution lines, 69kv med voltage

Natural Gas

Supplier: Manitoba Hydro
Ownership: Publicly Owned
Phone: 204-480-5900
Website: www.hydro.mb.ca
Size of Main: 12"
Pressure: 50 psi
Capability: Pipelines available along Rd 33 (adjacent to site)

Water

Supplier: Town of Beausejour, MB
Ownership: Municipal
Phone: 204-268-7551
Website: www.townofbeausejour.com
Size of Main: 12"
Peak Capacity: 1,000,000 gal/day
Capability: 1500 m^3/day

Wastewater

Supplier: Town of Beausejour, MB
Ownership: Municipal
Phone: 204-268-7551
Website: www.townofbeausejour.com
Size of Main: 6-12"
Capability: 1200 cubic m/day

Telecommunications

Supplier: CIK Telecom
Ownership: Private
Phone: 416-848-1517
Website: www.ciktel.com
Platforms: Fiber, wireless
Capability: Primary wireless and fibre optics available

SECTION D: RISK INDICATOR SCORING METRICS

CATEGORY 1.0: SUPPLIER RISK

1.1 Risk Factor: Credit-Worthiness/Future Solvency of Suppliers

1.1.1 Longevity & History of Supplier Performance

Rationale: Number of years in business is a positive indicator of future solvency. Historical performance is an indicator of future performance.

Risk Information: Wheat farming in the BDO Zone dates back to the first European settlers and farms are multi-generational. According to the 2021 agriculture census, there were approximately 2,700 farms in the BDO Zone, approximately 40% of them growing grain crops. The most important crops produced in the BDO Zone are wheat (41% of farms in the BDO Zone). Approximately 17,000 tractors and 2,500 harvesters/balers were reported in the BDO Zone. Thus, risk is deemed very low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**4**

1.2 Risk Factor: Conflicts of Interest/Vested Interest with Competing Market(s)

1.2.1 Suppliers' Dependence on, or Preference for, Competing Markets

Rationale: Suppliers may have a vested interest or preference in supplying specific competitors with biomass feedstock. Preferences may be due to historical, long-term, or personal relationships, less stringent feedstock quality requirements, more flexible operating hours by competing markets, or suppliers' dependence on competing markets to accept or purchase other products/by-products. During periods of feedstock shortage, such suppliers may be more likely to allocate the scarce supply to competitors, resulting in supply disruptions for the Issuer.

Risk Information: Producers do not have a vested interest or preference in supplying specific competitors with straw as long as they are paid fairly and in a timely manner.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch)	**NN**

No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score — **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. — **4**

1.3 Risk Factor: Supplier Control Over Production and Transportation

1.3.1 Ownership of Land/Means of Production

Rationale: Suppliers that own land or a production facility where feedstock is produced tend to have better control of supply chains and present lower degrees of supply risk.
Risk Information: All agricultural lands in the BDO Zone are privately owned, and the crop growers manage their own wheat straw generation and use. The risk is therefore deemed very low.
Raw Risk Likelihood (RRL) — **Score** The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. — **2**
Raw Risk Impact (RRI) — **Score** The risk impact is deemed very low, therefore the RRI is 2 out of 10. — **2**
Gross Risk Indicator (GRI) — **Score** The Gross Risk Indicator (RRL X RRI) is 4 out of 100. — **4**
Mitigation/Notching — **Notch** *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch). — **NN**
Loaded RI Score — **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. — **4**

1.3.2 Ownership of Equipment

Rationale: In most cases, suppliers that own or lease equipment for harvest, collection, and processing feedstock are at lower risk than those that are not. For example, third-party harvesting equipment may not be available when required. Short harvest windows may be missed if a farmer and contractor cannot schedule convenient harvest times, and quantity shortages can result. However, in some circumstances, reliance on third-party equipment to harvest or produce feedstock can decrease supply chain risk. For example, when harvesting agricultural residues such as corn stover, using a third-party company with standard equipment specializing in harvesting, collection, and transportation may decrease quality variations (e.g., ash content) of the final feedstock.
Risk Information: Approximately 17,000 tractors and 2,500 harvesters/balers were reported in the BDO Zone, being owned by local producers. A large-scale wheat straw project would still require increased custom baling and transportation efficiency; which, at this time, can be partially addressed by the custom baling companies operating in the Beausejour area. Outreach indicated their capability to secure in the short term up to a third of the rated quantity. Investments in high-density square baling equipment will still be necessary to scale up. Grain producers communicated that they would be in favour of a project proponent organizing the collection, storing, and transportation of straw bales, especially if collection can be done expeditiously after crop harvesting. The expectation is that the project entrant would

organize straw collection with current baling equipment available and will invest in new equipment if/as needed. Risk is deemed low.
Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.
RRI Mitigation (Notch)
No adjustment.
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

1.3.3 Ownership of Transportation/Logistics

Rationale: In most cases, suppliers that own or lease transportation equipment necessary to transport biomass from forests or fields are at lower risk than those that do not. However, in some circumstances, reliance on third parties to transport biomass is common practice and does not contribute to risk.
Risk Information: The BDO Zone has been a well-organized agriculbortural network of producers, custom baling, and transportation operations. Outreach indicated no challenges for producers continuing to use custom baling and transportation companies in the region that own their transportation equipment. The expectation is that the project entrant would organize the transportation and storage logistics within the existing network and will invest in new equipment if/as needed. Risk is low.
Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.
RRI Mitigation (Notch)
No adjustment.
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

1.3.4 Feedstock as a Secondary Transformation

Rationale: Secondary transformation is dependent upon the production of primary products. Forest residues, corn stover, bark, and sawmill chips (unless from a dedicated chip mill) are all secondary transformations of a primary product.

Risks are higher if the feedstock is a secondary transformation of a primary, more valuable product. In the absence of markets for the primary product, it may not be economical for suppliers to produce biomass on their own. For example, a supplier may produce dimensional lumber as its primary product and wood chips as a by-product, therefore relying on the health of the housing market for production levels. If the demand for dimensional lumber drops, so can the availability of sawmill residues.

In the case of agricultural feedstocks, such as corn stover, the feedstock is a by-product of a primary crop. Since the primary crop is significantly more lucrative than the residue, it will be a priority for the producer. If the production of the primary crop requires resources to be taken away from the production of the secondary crop (e.g., shorter harvesting windows due to weather), the secondary feedstock supply will suffer. In times of stretched resources, suppliers may also perceive the harvest and collection of the feedstock as a nuisance, potentially decreasing production levels.

Understanding the economic drivers for suppliers' primary products can help gauge risk levels for secondary transformation biomass products.

Risk Information: Wheat straw is a by-product of wheat production which has a strong and reliable history in the BDO Zone supported by favourable grain prices (Figure E-5). Also, no major variations occurred in wheat-planted areas over the past ten years (Figure B-1). The wheat yields, however, experienced two significant drops in year 2016 and 2021 due to drought. Yield fluctuations due to weather events are expected to continue. However, the rated quantity can be supplied with no significant cost increases from the BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

1.4 Risk Factor: Supplier Experience

1.4.1 Fundamental Feedstock Production Experience

Rationale: Risk is higher when suppliers have limited experience with planting, growing, harvesting, processing, and/or collecting biomass. Limited experience may be common for stover or forest residue supply chains where farmers or forestry producers may have no previous experience.

Risk Information: Due to the existence of livestock bedding and feed markets, farmers have fundamental straw harvesting and collection experience. Risk is deemed very low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**4**

1.4.2 Production Scale Experience

Rationale: Scale-up entails risk. Risk is higher when suppliers have limited experience producing the required quantity of feedstock.

Risk Information: A large-scale wheat straw project would require increased custom baling and transportation efficiency. At this time, this efficiency can be partially addressed by the custom baling companies operating in the Beausejour area. Outreach indicated their capability to secure in the short term up to a third of the rated quantity. Investments in high-density square baling equipment will still be necessary to scale up but achievable in the short term, especially if support from project proponents is available. Thus, scaling up to the rated quantity is deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**

The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity

1.5.1 Supplier's Equipment Efficiency

Rationale: Equipment efficiency significantly influences the supplier's feedstock production capacity. Understanding the supplier's equipment capability enables understanding of their ability to produce feedstock of suitable quality.

Risk Information: Baling capacity exists in the BDO Zone for both large round and square bales. Both producers and custom baling is available. A scale-up period of investment in higher-efficiency baling and transportation equipment will be necessary but achievable in the short term. Risk is low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

1.6 Risk Factor: Supplier Motivation

1.6.1 Feedstock Production Priority

Rationale: When biomass feedstock is a secondary or non-core line of business, a by-product, or a residual from a more valuable product, suppliers may not put in sufficient effort for consistent production. The risk of breach increases when feedstock production and/or delivery compromise a supplier's ability to make a primary product.

When biomass feedstock is a by-product of another main higher margin or main product such as corn stover (e.g., corn) or forest residues (e.g., pulpwood), supply may not be a top priority for a supplier.

Risk Information: Several factors affect a producer's likelihood of participating in a straw project, such as severe weather events, cattle use, and soil protection. However, the rated quantity represents only 13% of the total straw generation, which alleviates any concerns of supply instability. Moreover, producers indicated increased interest if the nutritional value and a profit margin were available (included in the rated wheat straw pricing). The risk was deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**

RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

CATEGORY 2.0: COMPETITOR RISK

2.1 Risk Factor: Influence on Feedstock Supply of Existing Markets

2.1.1 Competitors' Locations and Overall Geographical Influence

Rationale: Competitors' locations relative to siting locations within a BDO Zone can affect the viability of procuring feedstock and the cost of that feedstock. Accurate and detailed competitor mapping provides an understanding of a competitor's geographical influence on new plants within a BDO Zone, including competitive advantages such as short hauling.

Risk Information: A conservative 50% competition allowance for cattle use and soil protection/nutrition was applied. No other competing uses were identified in the Competition Zone. The remaining straw availability leaves significant room for growth. Therefore, the risk is low for this indicator.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

2.1.2 Current and Historical Consumption of Feedstock Quantity

Rationale: Clear understanding of feedstock consumption by key competitors for each rated feedstock type in the BDO Zone is essential to quantifying competitor risk.

Understanding current consumption and historical trends of feedstock utilization can provide valuable information about feedstock price elasticity during shortages and insight into events that may impact future supply conditions. It can enable more accurate estimates of the sensitivity of feedstock availability to potential future consumption levels or the impact of external events (e.g., weather events, structural economic changes, seasonality, or policy change).

Risk Information: Cattle use (mostly for bedding) and soil protection/amendment have been the main uses of straw. No other major uses exist or have been announced. No major historical demand increases other than the normal, seasonal fluctuations exist; thus, the risk is deemed low.
Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.
RRI Mitigation (Notch)
No adjustment.
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

2.1.3 Competitor Pricing and Price Sensitivity

Rationale: Understanding how much competitors pay (or receive) for different feedstock types is essential in determining the Issuer's competitiveness and accurately assessing the delivered cost range in the BDO Zone rating.

Current and historical prices paid/received by competitors provide insight into their procurement behaviors and exert pressure on suppliers in the BDO Zone, such as the ability/willingness to pay premiums for feedstock during times of feedstock shortage or reduce prices (or cut-off deliveries) during gluts. Competitors that have the ability to offer higher prices for feedstock during feedstock shortages can pose a significant risk to the Issuer.

Knowledge of competitor pricing and price sensitivity is also an essential prerequisite to formulating a feedstock cost curve, which can enable predictions of feedstock redundancy, i.e., how much feedstock could become available at different pricing levels (see Category 3–Supply Chain Risk 3.1.3).

Risk Information: The estimated farm gate price range of $84-$103/odt or $32-$40/bale is in tune with the current spot market prices of $78-$104/odt or$30-$40/bale. Historical straw prices (Figures E-2 and E-3) indicate seasonal price fluctuations driven mostly by the seasonal demand from the cattle sector. A straw project would most likely stabilize these price fluctuations by securing straw quantities at a set price that included the nutrient replacement value and producer's markup. Risk was deemed low.
Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.

RRI Mitigation (Notch) No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors

Rationale: Feedstock utilization in a BDO Zone can change over time. Expansion of feedstock demand by current competitors can put additional pressure on feedstock and lead to higher prices, feedstock disruptions, shortages, supplier breaches, or other types of supply chain disruption.

If current markets for feedstock have been publicly signalling the potential for increased demand for feedstock (in the case of a sawmill adding a shift or pulp mill potentially expanding into the production of renewable chemicals, for example), high interest in a supply zone can make suppliers overconfident, leading to a supplier-controlled market where short-term contracting becomes the norm and supply chain reliability is compromised for the Issuer. If and when it occurs, increased demand on feedstock may decrease availability and increase cost for new plants within the BDO Zone.

Risk Information: Outreach indicated a decrease in demand from the cattle sector. No projects exist or are announced. Thus risk of increased demand from current competitors is deemed very low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

2.1.5 Soft Supply Influence of Existing Markets

Rationale: In some cases, existing markets for feedstock may be able to exert high degrees of pressure over local suppliers, effectively enabling control of feedstock, especially during times of shortage. This control can derive from qualitative or "soft" factors, such as long previous relationships between local suppliers and existing markets for feedstock.

Risk Information: Outreach indicated that no such pressures exist or are foreseen. A very low risk was assigned to this indicator.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI)	**Score**

The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

2.1.6 Temporary Market-Driven Markets

Rationale: Alternative, non-traditional, market-driven competitors for feedstock can drive feedstock demand in unusual circumstances. A BDO Zone Rating Issuer based on corn stover as a feedstock, for example, would not typically compete with higher-end animal feed markets due to quality issues. However, in times of significant hay shortage (e.g., during drought), farmers use corn stover in place of hay, driving the price of feedstock and decreasing availability for bio-projects.[29]

Risk Information: While seasonal price fluctuations exist (see 2.1.3), they are easily foreseeable and addressed by the local producers. Moreover, a new straw project would most likely stabilize these price fluctuations by securing straw quantities at a set price that included the nutrient replacement value and producer's markup. Risk was deemed very low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

2.2 Risk Factor: Specific Competitors' Competitive Advantage

2.2.1 Relative Inventory Capacity

Rationale: The more inventory a competing biomass facility is able to store, the more competitive pressure it can exert on supply. Ability to store large inventories allows competitors to purchase inventory when the prices are low,

[29] Bergtold, 2018.

potentially giving it an economic advantage. Additionally, the ability to store inventory during feedstock supply surpluses can enable competitors to continue to intake feedstock when the Issuer's plant (with lesser inventory capacity) may be forced to put suppliers on quota. Larger inventory capacity on the part of competing markets creates supplier loyalty and can make it more difficult for new projects to secure supply without paying a significant premium.

Risk Information: While livestock producers can, in times of scarcity, decide to store larger amounts of straw, a new project can easily mitigate such a risk by storing sufficient quantities of wheat straw in satellite storage sites (which is the normal practice for large straw projects). Consequently, the risk was deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

2.2.2 Relative Accessibility/Delivery Hours and Wait Times

Rationale: The value attributed by suppliers to local competing markets for biomass is often directly related to the degree of flexibility the market provides in terms of delivery hours, and the more efficient discharge can occur.

Risk Information: No alternative market exists for wheat straw. Thus, we do not expect there will be an advantage among the existing and future end users of wheat straw in terms of accessibility and delivery hours. A very low risk was attributed to this indicator.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**4**

2.2.3 Relative Specification Advantages

Rationale: When choosing a market for biomass feedstock, suppliers not only look at price, but also at relative quality requirements or specifications. It is important to understand feedstock quality specifications for competing markets within the BDO Zone, in order to accurately quantify the risk that competitors can exert on the Issuer's supply chain.

Risk Information: There are no current competitors for wheat straw in the BDO Zone that could set a high-quality standard. A new project would generally control the following quality attributes: moisture content, soil contamination, and bale size/bulk density. The current practice of supplying round bales for cattle bedding does not require strict quality standards. Thus, it will be necessary that the project proponent implement a quality control (QC) program for harvesting, collection, and storage. However, such a program is unlikely to add a significant burden on crop producers to remove their wheat straw. Moreover, a 70% optimal straw removal was assumed in order to ensure a high-quality feedstock for a new project. Under the above conditions, the risk of supplying low-quality wheat straw bales was deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

2.2.4 Demand for Competitors' Products

Rationale: Increased demand for the competitor's final product can cause an increased demand for feedstock by the competitor. For example, increased demand for wood pellets due to high energy prices in Europe or biofuels due to a favourable clean fuels policy can cause increased pellet/biofuel production by competing markets. Thereby driving demand for feedstock within a BDO Zone.

Risk Information: No large-scale competitors exist in the BDO Zone. Risk was deemed very low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)*	**NN**

No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. **4**

CATEGORY 3.0: SUPPLY CHAIN RISK

3.1 Risk Factor: Feedstock Availability

3.1.1 Biomass Availability Multiple (BAM)

Rationale: This Risk Indicator quantifies the risk that the analysts' selected Biomass Availability Multiple (BAM) value underestimates the uncertainty associated with underlying data, models, assumptions, and future operating conditions for new bio-projects. The rated quantity is estimated by dividing the amount available to new projects after accounting for total generation and competition by a Biomass Availability Multiple (BAM). The BAM is a value between 1.5 and 4.0 that is selected based on the analyst's judgement of the level of uncertainty associated with the information used in the analysis of supply, competition, and availability, and future operating conditions. While the application of the BAM provides assurances of feedstock supply redundancy, there is risk that this methodology does not provide an accurate estimate of the amount of biomass that could be available to a new project in future years.

Risk Information: Section B presented how the resulting rated quantity of 150,000 odt/year represents 13% of the total estimated wheat straw generation in the BDO Zone. This percentage indicates a conservative estimate that is in agreement with local producers' feedback. It is expected, however, that this percentage will increase once a mutually beneficial project is implemented. Consequently, the above considerations led to assigning a low-risk score to this indicator.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.1.2 Feedstock Supply Curve/Marginal Cost Curve

Rationale: The greater the feasible transport distance, the more feedstock is accessible to the Issuer, but at a higher delivered cost. The feedstock supply curve, sometimes referred to as the marginal cost curve, is a function of feedstock availability over its cost, which is primarily, but not exclusively, a function of distance. The feedstock supply curve is used to determine the availability of redundant feedstock at various price points, and the cost of replacing feedstock with substitutes located at different distances.

Feedstock cost curves are useful in determining supply chain resilience; they provide information about the cost of feedstock availability in times of supply disturbance. Biomass supply chains are prone to supply disturbances over time; suppliers can become insolvent, or weather events can temporarily disrupt feedstock availability. When a disturbance occurs, the Issuer may need to source replacement feedstock from different suppliers at different locations and costs. A biomass supply curve indicates quantities of feedstock available at various price levels from suppliers generally located further away than the core supplier.

Risk Information: To better understand the availability of wheat straw at 10-km distance increments from Beausejour, MB, a supply curve was constructed for the total generated straw quantity (Figure E-1). The graph indicates that the vast majority of available straw is located in the vicinity of Beausejour, MB (up to 30-km drive distance), which is a great benefit to a potential straw project due to low transportation costs and flexibility of supply in periods of scarcity. Thus, the risk is deemed very low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**2**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**4**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**4**

3.1.3 Seasonal Feedstock Supply Variation

Rationale: Biomass supply can present significant seasonal supply variations. Seasonal supply variations combined with limitations associated with longer-distance transportation and storage can lead to BDO Zone biomass supply imbalances[30] and can manifest in shortages and higher costs for Issuers.

Risk Information: On average, the straw harvesting/baling season could span up to a maximum of approximately 30 days in the fall, and it can be drastically reduced by extended periods of rain and inclement weather. However, a well designed and implemented supply chain can expand the supply area with limited efforts and costs. Also, timely and proper bale storage prevents biomass deterioration and fire hazards. The above considerations and limitations triggered a medium risk assignment to this indicator.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**

[30] Golecha & Gan, 2016.

RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

3.1.4 Year-to-Year Variation in Feedstock Availability

Rationale: Biomass can have significant year-to-year supply variations due to variability in yield from biomass harvesting operations, particularly with agricultural biomass.

Risk Information: The BDO Zone experienced two yield drops in the past decade due to droughts. These weather events can affect straw supply significantly. However, proper logistics and storage practices can be implemented to avoid these shortages. Moreover, the rated quantity represents only 13% of the total generated straw in the BDO Zone; thus, the risk was deemed low to medium.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**Score** **24**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**Score** **24**

3.2 Risk Factor: Historical Issues

3.2.1 Historical Feedstock Price Variations

Rationale: If the historical feedstock price shows volatility, then the risk of future price fluctuation is elevated. If feedstock prices have historically exceeded the price at which the Issuer would have to cease operations or breach a financial covenant (i.e., the "red line" feedstock cost), then mitigation measures should be put in place.

Risk Information: Large straw price fluctuations have been recorded within each year in the past few years (see 2.1.3), driven mostly by the seasonal demand from the cattle sector. A straw project would most likely stabilize these price fluctuations by securing straw quantities at a set price that included the nutrient replacement value and producer's markup. Risk was deemed low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.2.2 Low Historical Demand for Feedstock in the BDO Zone

Rationale: If Issuer BDO Zone does not have a history of developed large-scale feedstock procurement, suppliers may not have sufficient expertise in feedstock production to ensure reliable supply, especially in the early years. This can be particularly true for forest residues, where typically, the infrastructure for collection, processing, and delivery is immature.

Where supply chains are not well-established, risk can be mitigated when new bio-based plants control a higher degree of feedstock processing. For example, if a BDO Zone rating is issued for clean wood chips and the historical demand in the Zone has been exclusively for pulpwood, then supply chain risk will be decreased for new bio-based plants that intake pulpwood and manage log debarking and chipping internally. Rather than requiring inexperienced suppliers to deliver debarked wood chips.

Risk Information: Straw harvest is well established in the BDO Zone. A large-scale wheat straw project would require increased custom baling and transportation efficiency. At this time, this efficiency can be partially addressed by the custom baling companies operating in the zone. Investments in high-density square baling equipment will still be necessary to scale up, but achievable in the short term. Thus, risk is deemed low.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.2.3 History of Production/Feedstock is a New/Secondary Crop or By-Product

Rationale: If feedstock is a new/secondary crop or a by-product, suppliers may either lack sufficient experience to mitigate risk or be unable to react to such risk. Secondary crop or by-product producers may be less likely to prioritize production.

For new crop types, inexperience in planting, harvest, collection, and yield data may pose higher levels of risk.

If feedstock is a secondary transformation (i.e., wheat straw, corn stover, or forest residue), then production can be subject to variables beyond suppliers' control (e.g., changing demand for sawtimber, or primary crop prices).

Risk Information: There is a multi-generational experience growing wheat crops and baling straw in the area. Some challenges may exist with scale-up, as described above. Overall, a low risk is assigned.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.3 Risk Factor: Non-Weather Based Externalities

3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)

Rationale: CPI and PPI can impact feedstock cost of harvest and collection over time. Sensitivities to worst-case scenarios should be run.

Risk Information: Biomass project developers consider changes in goods and services prices due to factors such as inflation and changes in interest rates in their business models. However, temporary significant rises in CPI and PPI, as seen in 2020-2022 due to the pandemic and global supply chain destructions, can have a medium impact on the biomass delivery prices, but we expect the CPI and PPI to reach a steady status as the economic situation is gradually improving. Figures E-7 and E-8 suggest a medium risk/low impact rating due to some fluctuations in both CPI and PPI in the past 5 years.

Raw Risk Likelihood (RRL) The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**Score** **24**
Mitigation/Notching *RRL Mitigation (Notch)*	**Notch** **NN**

No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100. — **24**

3.3.2 Currency Risk

Rationale: Where feedstock is purchased in a currency different than that which a new bio-based plant will locate in a BDO Zone, currency exchange rates and volatility can constitute risk exposure. BDO Zones that cross the US-Canada border, for example, which intake feedstock from both countries, are exposed to such currency risk.
Risk Information: US straw suppliers are located more than 400 km from Beausejour and do not have a significant impact on local supply. Thus, the risk associated with currency is very low.
Raw Risk Likelihood (RRL) — **Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. — **2**
Raw Risk Impact (RRI) — **Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10. — **2**
Gross Risk Indicator (GRI) — **Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100. — **4**
Mitigation/Notching — **Notch**
RRL Mitigation (Notch) No adjustment. — **NN** *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. — **4**

3.3.3 Border Risk

Rationale: Where feedstock is transported cross-border to another country, risk exposure to border closures and crossing delays becomes present. The availability of trucks willing to do cross-border runs is limited, which can decrease supply chain flexibility and resilience. Plants near the US-Canada border, which intake feedstock from both countries, are exposed to these risks.
Risk Information: See 3.3.2 above. While occasional transborder shipment may occur, they will very unlikely affect the local supply.
Raw Risk Likelihood (RRL) — **Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. — **2**
Raw Risk Impact (RRI) — **Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10. — **2**
Gross Risk Indicator (GRI) — **Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100. — **4**
Mitigation/Notching — **Notch**
RRL Mitigation (Notch) — **NN**

No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.3.4 Temporary Externality-Driven Markets for Feedstock

Rationale: Alternative, non-traditional, externality-driven competitors for feedstock can drive feedstock demand (and cost) in unusual circumstances. For example, an Issuer using corn stover as a feedstock would not typically compete with the higher-end animal feed market. However, in times of significant hay shortage (e.g., during drought), farmers may use corn stover as hay replacement, driving the price of stover feedstock and decreasing its availability for bio-projects.[31]

Risk Information: Wheat straw is not the first choice for animal feed in the BDO Zone; cattle producers prefer barley straw, which is softer and has a higher nutritional value than wheat straw. Risk of significant substitution for the rated quantity is very low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection

3.4.1 Harvest & Collection Practices & Schedules

Rationale: Differences in harvest timing and practices used can create risk to both the quantity and quality of feedstock. For example, feedstock harvested by different suppliers in different windows can undergo varying levels of exposure to sun, wind, and moisture, leading to variations in delivered feedstock quality.

For example, agricultural feedstocks and energy crops have optimal harvesting windows to ensure minimal moisture content. In certain BDO Zones, these harvesting windows may coincide with heightened weather risks, such as frost or rain.

[31] Bergtold, 2018.

For forestry biomass, unsightly clear-cuts and slash piles (even on plantation forests and especially when located near communities) can provoke unwanted public backlash even when suitable and sustainable replanting regimes are followed.

Risk Information: Unpredictable severe weather events have occurred, but harvesting wheat straw has followed a consistent schedule, which normally takes place during and after grain harvesting. However, producers have complained about custom baling being severely delayed, which drastically affected their capability to undertake conventional agricultural practices. Thus, the risk was set to medium for this indicator.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.4.2 Harvesting & Collection Equipment

Rationale: Different types of harvesting and collection equipment used by suppliers in a BDO Zone can have a significant impact on the quality and availability of feedstock. Using different types and combinations of harvesting, collection, and processing equipment among suppliers can lead to non-homogeneous feedstock. Equipment that is not designed specifically for biomass cultivation, harvesting, and collection can increase feedstock quality risks.

Relevant equipment should be specified for the sake of product consistency and risk reduction.

Risk Information: As presented in 3.2.2, straw harvest is well established in the BDO Zone. A large-scale wheat straw project would require increased custom baling and transportation efficiency. At this time, this efficiency can be partially addressed by the custom baling companies operating in the zone. Investments in high-density square baling equipment will still be necessary to scale up, but achievable in the short term. Thus, risk is deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)*	**NN**

No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

3.4.3 Variation in Densification Methods Among Different Suppliers

Rationale: The shape and density of the unit in which feedstock is supplied can impact feedstock cost and quality. Standard feedstock densification modes for biomass consist of round or square bales, pellets, cubes, chips, or grindings. The size of wood fibre processed in a grinder is less homogenous than if a chipper is used.

Bales of different densities can absorb moisture at different rates. In certain cases, round bales have been viewed as problematic due to their uneven moisture content distribution.[32]

Risk Information: Producers in the BDO Zone are familiar with the production and transportation of large square baling, which is most likely the preferred densification method for a new project. While some investments in equipment will be necessary; it will affect the custom balers or project proponents. Thus, the risk is set to low.

Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

3.4.4 Availability of Labour for Feedstock Production

Rationale: Skilled labour shortages can be difficult to remedy in the short term. The availability of suitable labour in an area can impact the ability to procure sufficient feedstock quantities on required schedules. Labour risks are higher where supply chains are not yet active or for Issuers for whom large feedstock requirements or the development of new (or expanded) supply chains demand significant additions to the local labour force.

Risk Information: To bale and transport the rated quantity, approximately 66 employees would be necessary. Producers communicated that securing farm labour is problematic, and they would be in favour of a project proponent organizing the collection, storing, and transportation of straw bales, especially if collection can be done expeditiously after crop harvesting. Currently, most of the baling is performed by custom baling companies, which could provide an adequate level of employment. Thus, the risk is set to low-medium.

Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**

[32] Huhnke, 2018.

Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**Score** **24**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**Score** **24**

3.5 Risk Factor: Transportation

3.5.1 Feedstock Transportation Costs

Rationale: Transportation can be one of the most significant cost components of biomass supply chains. The average transport cost and percentage of total feedstock cost attributable to transport should be known.

Transport distances of 80-120 km for biomass feedstocks are typical, but larger distances can be common. Where the average transport distance from suppliers to Issuers is high, the supply chain is subject to greater sensitivities to risks, such as increases in diesel cost, weather impacts, mechanical breakdown, and the demand for scarce feedstock from competitors closer to the source.

Understanding average transport distance can help flag higher-risk BDO Zones where transport distance materially exceeds the average.

Risk Information: Transportation cost accounts for 23-27% of the total wheat straw delivered price (Table B-3). Figure E-1 indicates that the rated quantity is located within a 30 km driving distance from Beausejour. Significant cost reductions can be achieved if the project can secure most of the wheat straw volume from this area.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.5.2 Diesel Cost Impacts

Rationale: Changes in diesel costs impact transport costs over time. Sensitivities to worst-case scenarios should be run.

Risk Information: Diesel prices have increased considerably in the post-pandemic years (Figure E-6). While prices have dropped to $1.62/L in 2024, an upward trend is evident. This trend is expected to continue in the next few years; thus, the risk is deemed medium/high.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**48**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**48**

3.5.3 Transportation of Feedstock Requires Specialized Equipment

Rationale: Requirements for specialized transport equipment (e.g., walking-floor trailers) can increase supply chain risk. Where there is low availability of required transportation equipment, equipment owners have increased leverage over transportation prices, and supply chain resiliency can be lower.

Risk Information: Bale transportation does not require specialized equipment. B trains, flatbed trucks and trailer are available in the region. Thus, the risk was set to low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.5.4 Delivery Routes through Local Communities

Rationale: Transportation of biomass can become a nuisance to local communities, especially if a large number of trucks pass through residential and school areas. Local communities often have the power to force regulations regarding truck transport, impeding the ability of BDO Zone suppliers to transport feedstock.

Risk Information: To deliver the rated annual quantity of wheat straw to the industrial site will require approximately 40 truckloads per day (10 trucks x 4 truckloads/day). However, the proposed industrial site provides an adequate distance from the village of Garson, MB. In addition, rural communities in the BDO Zone are familiar with bale transportation on their highways. The increased traffic to haul the rated quantity is not significant; thus, the risk is low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.5.5 Transportation Regulations & Local Weight Limits

Rationale: In many BDO Zones, transportation is regulated based on seasonal road conditions. These regulations (e.g., "frost laws") often take the form of weight restrictions or limits on the number of trucks allowed on roads. Such regulations can impede the project's ability to source sufficient feedstock or increase the cost of doing so at certain times of the year.

Risk Information: Periodic weight restrictions are imposed but are managed well by local agriculture-related traffic. The estimated number of annual truck trips will not be affected by road conditions and restrictions significantly. Consequently, the risk level is set to low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**

Loaded RI Score	Score
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.5.6 Road Infrastructure

Rationale: Feedstock cost and availability can be a function of road infrastructure, in particular the accessibility the infrastructure provides to feedstock. Issues with road networks will translate directly to risks to feedstock supply.

Risk Information: An appropriate road network of both paved and gravel roads exists. A low-risk level is considered appropriate for this indicator.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.5.7 Transportation Redundancy

Rationale: Transport equipment redundancy is important for dealing with seasonally variable feedstock supplies as well as the risk of equipment breakdowns.

Risk Information: Redundancy exists to supply the rated quantity in difficult times through both custom transportation and local small/medium scale transportation equipment (i.e., pickup trucks and trailers). Risk is deemed low.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

3.6 Risk Factor: Supply Chain Resiliency

3.6.1 Size, Number, and Location of Suppliers

Rationale: In general, a supply portfolio involving multiple suppliers of various sizes (and from multiple BDO Zones) is important for ensuring steady and uninterrupted feedstock supply with minimal price fluctuations. If a small number of large suppliers provides a high proportion of total feedstock, a disruption or supplier breach will have greater impact on the supply chain. In such cases the risk of disruption is lower, but the impact of those disruptions is higher. Conversely, many small suppliers are less likely to have the capacity to withstand internal disruptions and thus may be more likely to breach. Here, risk of disruption is higher, but their likely impact is lower. The number of suppliers as well as the ratio of small to large suppliers should be optimized.

There is no pre-determined number or optimal ratio of suppliers, although having too many or too few can both pose higher degrees of risk.

Risk Information: According to the 2021 agriculture census, there were approximately 2,700 farms in the BDO Zone and approximately 40% of them cultivate grain crops. While the project proponents will try to secure feedstock from the largest farms located close to the project site, coordinating harvesting, baling, transportation, and storage within one month after crop harvesting will require significant logistical efforts. Thus, the risk is deemed medium.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.6.2 Suppliers Subject to Same External Risk Factors

Rationale: When a single risk event can impact the feedstock production ability of all (or most) suppliers, then feedstock risk is higher and supply chain resiliency is lower. Resilience is maximized when biomass supply chains exhibit diversity in spatial location (i.e., geography), production practices and other elements of supply chain structures such that the impact of single high-risk events have varying impacts on suppliers.

Risk Information: The primary external risk factor observed in the past decade was drought. However, significant redundancy has been built into the model to address supply fluctuations. Single high-risk events can be mitigated by satellite yards placed at optimal distances from collection point(s). Risk is deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**

The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.6.3 Land Ownership Structures

Rationale: The ownership (or control) of the land base on which feedstock is produced can have a significant impact on the Issuer's feedstock risks. Risk of long-term variation in stumpage cost for wood fibre (i.e., the cost that one pays to a landowner for the right to cut and purchase their wood fibre), for example, is much higher in the US, where >90% of the land is private, and thus stumpage cost is determined on a competitive auction basis. Conversely, in Canada, >90% of the land is owned by the Crown, and stumpage is allocated by the government.

Risk Information: All agricultural lands in the BDO Zone are privately owned. Risk was deemed very low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.7 Risk Factor: Climate and Natural Risks

3.7.1 Seasonal Weather Impacts on Feedstock Supply

Rationale: Seasonal weather impacts are defined as those deriving from natural weather variations (i.e., spring thaws, rainy seasons, or dry seasons – as opposed to from singular weather events like fires, droughts, or hurricanes). Seasonal weather changes can be a significant risk factor affecting feedstock availability, quality, and price.

Given the major influence that weather has on multiple aspects of growing, harvesting, and transporting biomass, it is difficult to predict the availability of biomass at a specific location at different points in the future with a high degree of certainty. However, it is still possible, using past data and statistical models, to generate reasonable upper/lower bound estimates of biomass production in any given year in a wider supply zone. Such estimates are important in assessing feedstock risk and enable accurate assessment of the efficacy of Issuer's mitigation methods.

Risk Information: Two significant yield drops were recorded in the past 10 years (Figure B-1), both due to prolonged drought periods. Large yield fluctuations can drastically reduce the wheat straw supply. However, this risk can be mitigated by reaching out to farms further away in the BDO Zone and building up storage yards across the BDO Zone. Considering the above factors, the risk level is set to medium.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. **6**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 36 out of 100. **36**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

3.7.2 Long-Term Weather and Climate Trends

Rationale: In certain BDO Zones, climatic trends and significant potential changes to future weather patterns can create feedstock risk.
Risk Information: No long-term weather trends or concerns were reported that could threaten the long-term availability of the rated quantity. No abnormal average annual air temperature fluctuations were recorded (see Figure E-9). Average annual precipitation has been stable, with the exception of a spike in 2022 (Figure E-10). Thus, risk for this indicator is deemed low/medium.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 24 out of 100. **24**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100. **24**

3.7.3 Forest/Crop Fire

Rationale: Forest/crop fires, especially when occurring on a large scale, destroy feedstock and create shortages.

Fire-prone conditions are predicted to increase across Canada. This could potentially result in a doubling of the amount of area burned by the end of this century compared with amounts burned in recent decades. Boreal forests, which have been historically greatly influenced by fire, will likely be especially affected by this change.

Other climate change impacts that could add damaged or dead-wood to the forest fuel load (e.g., as a result of insect outbreaks, ice storms, or high winds) may increase the risk of fire activity. New research is aimed at refining these climate change estimates of fire activity and investigating adaptation strategies and options to deal with future fire occurrences. There is growing consensus that as wildfire activity increases, fire agency suppression efforts will be increasingly strained. However, analyses of fire history suggest that the effect of climate variability on precipitation regimes is the primary reason for the decreasing fire activity in the southern BDO Zone of Canada.

Risk Information: No field/crop fires were reported.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.7.4 Risk of Infestation

Rationale: Risk of future infestation, including its estimated consequences on feedstock supply, should be calculated into the overall risk profile.

Since forest insect populations are influenced by environmental conditions, future changes in climate can be expected to significantly alter the outbreak dynamics of certain forest insect species. In some cases, larger and more frequent insect outbreaks may occur, but in other cases, recurring outbreaks may be disrupted or diminished. As climate continues to change, we can expect more situations, particularly at the margins of tree ranges, where sub-optimal conditions for tree growth and reduced tree vigour can lead to outbreaks of forest insects.

Risk Information: No infestations were reported in the region. Producers are also covered by crop insurance. A low-risk is assigned.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**

Mitigation/Notching	Notch
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.7.5 Risk of Hail

Rationale: Hail has negligible impact on forestry biomass but is one of the principal destroyers of agricultural crops in North America.

There is much uncertainty about the effects of anthropogenic climate change on the frequency and severity of extreme weather events like hailstorms and their subsequent economic losses. Some studies indicate a strong positive relationship between hailstorm activity and hailstorm damage, as predicted by minimum temperatures using simple correlations. This relationship suggests that hailstorm damage may increase in the future if global warming leads to further temperature increases.

Risk Information: Producers in Manitoba expect an average of three hail days per year.[33] Severe thunderstorm season between mid-June to late-August often includes serious hail storms that can devastate growing crops, with golf ball-sized hailstones falling at speeds up to 130km/h. Manitoba Agricultural Services Corporation (MASC) has offered hail insurance to Manitoba producers since 1970, and the program has since become a reliable mainstay of Manitoba's crop risk management. Due to increased risk of hail in the past years, this indicator is deemed medium risk.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

3.7.6 Risk of Flood

Rationale: Floods can cause catastrophic disruption and delay in feedstock supply. Where there is high risk of flood and thus negative impact to feedstock supply, the BDO Zone rating should account for this risk.

[33] www.masc.mb.ca/masc.nsf/program_hail.html

Risk Information: No risk of flood was reported in the BDO Zone.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.7.7 Risk of Drought

Rationale: Droughts can cause significant disruptions to feedstock supplies across entire BDO Zones for extended periods of time, especially in the case of agricultural residues and energy crops. Parts of Western Canada are experiencing more frequent and severe droughts, and scientists expect drought to affect new areas across Canada going forward.

Tree species are adapted to specific moisture conditions. Having less water available through drought has a range of negative impacts on the health of forest ecosystems. Direct impacts include reduced growth, increased tree mortality, and failure to regenerate. Indirect impacts include reduced ability to defend against insects and disease and increased fire risk. These impacts can affect the availability of wood fibre for an Issuer.

Risk Information: See RI 3.7.1. Risk of drought set to medium.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**Score** **36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds

Rationale: Hurricanes, tornadoes, and strong winds can destroy timber stands, crops, and feedstock piles. They can also delay forestry and agricultural operations. Hurricanes and tornadoes can indirectly cause temporary shortages of available transportation as available trucking moves to handle higher-value disaster-related contracts. For example, Katrina cleanup limited the availability of live-bottom trailers in the North and South-East of the US for several months as truckers shifted operations to handle more lucrative government contracts.

Although scientists are uncertain whether climate change will lead to an increase in the number of hurricanes, warmer ocean temperatures and higher sea levels are expected to intensify their impacts.

Recent analyses conclude that the strongest hurricanes occurring in some BDO Zones, including the North Atlantic, have increased in intensity over the past two to three decades.

Risk Information: While occasional heavy storms occur in the BDO Zone, average maximum wind speeds recorded in Winnipeg vary between 26 and 39 km/h.[34] Risk is deemed low.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.7.9 Risk of Low Temperatures

Rationale: Low temperatures can cause crop failure, leading to shortages of biomass. Additionally, low temperatures can have adverse impacts on the operations of feedstock processing equipment in Northern BDO Zones.

Risk Information: The 10-year historical daily lowest temperatures in Winnipeg ranged between -26C and -35C.[35] No crop failures as a result of these low temperatures were reported, as crops are planted in mid-late spring and harvested in the fall. However, the risk was slightly elevated to low-medium to account for sudden temperature variations that may affect wheat straw supply logistics/transportation.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**

[34] weatherstats.ca based on Environment and Climate Change Canada data.
[35] Ibid.

The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**24**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**Score** **24**

3.8 Risk Factor: Political and Social

3.8.1 Government Subsidies for Feedstock Production or Utilization

Rationale: Feedstock that is directly subsidized through government programs can pose greater long-term risk than feedstock that is not. Subsidies may be subject to amendment or repeal, sometimes with minimal notice.

NOTE: This risk indicator refers to direct feedstock subsidies only; it does not apply to government subsidies that pertain indirectly to the Issuer's operations, such as Loan Guarantees, or to the markets for products produced by the Issuer.

Risk Information: No government subsidies for the production and utilization of wheat straw were reported or found. Risk was, therefore, set at a very low level.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting Pertaining to Biomass

Rationale: Feedstock whose production is directly dependent on local, provincial, or national laws or government regulations can pose greater long-term risk than feedstock that is not, since laws and regulations may be subject to amendment or repeal.

If biomass utilization requires specific permits (e.g., percentage removal of forest residues or corn stover, allowable cut limits, air emission, storage permits, rights-of-way, overweight permits for trucks, cross-border permitting for shipment of biomass, chain of custody, or certification of sustainability), the likelihood of obtaining such permits and/or complying with permitting requirements should be examined.

Risk Information: Local and provincial agronomists encourage no-till and regenerative agriculture practices (see Section B – Operational Considerations). However, it is unlikely that these practices will negatively affect the supply of rated quantity. Straw harvesting and utilization, when done in a sustainable manner, can be integrated into these practices. Risk is deemed low.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.8.3 Backlash Against Biomass Development, Procurement, or Usage in the Region

Rationale: Public backlash against biomass development in the Issuer BDO Zone can directly impact the Issuer's ability to procure, transport, trans-load, store, or utilize feedstock by affecting local policies, regulations, and the Issuer's ability to obtain necessary permitting.	
Risk Information: No opposition toward a straw project was observed in the outreach. Producers are open to business ideas as long as they are discussed and demonstrated by project proponents. Risk is low.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations

Rationale: Where new project development on or near Indigenous or First Nation land, or where near Indigenous or First Nations exert influence over feedstock producing areas, consent of, and cooperation with, Indigenous communities and First Nations decreases Issuer risk.

Risk Information: No Indigenous land claims exist in the BDO Zone.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.8.5 Food Security Concerns

Rationale: Despite the fact that any significant correlation between food prices and biofuel production is unclear, claims that biofuel production has driven up food prices, taken food from communities or had a negative impact on land use can fuel public backlash. For example, the removal of biomass may raise public concerns relating to food security if Issuer feedstock requires the use of land that would otherwise be used for growing food.

Risk Information: Wheat straw is rarely mixed in cattle feed and involves small quantities already discounted from the total available wheat straw generation. Moreover, better feed choices exist, such as barley and oats straw. Thus, the risk was set to very low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.9 Risk Factor: Sustainability and Environmental Concern

3.9.1 Feedstock Sustainability

Rationale: Public concerns about the sustainability of feedstock production can jeopardize biomass feedstock operations. Sustainability certification schemes should be utilized where applicable to ensure that feedstock comes from sustainable sources.

Canada leads all countries with 166 million hectares of certified forests, a figure that is nearly four times more than second-place United States at 47 million hectares.

Risk Information: The total wheat straw generation was discounted by a 40% soil protection factor drawn from the scientific literature. The rated quantity represents only 13% of the total straw generation. Thus, harvesting the rated quantity poses a low risk to the sustainability of feedstock production in the BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

3.9.2 Risk to Soil Quality

Rationale: Soil sustainability can be defined as the management of soil in a way that does not exert any negative or irreparable effects either on the soil itself or any other systems. There is a diversity of approaches to soil sustainability in jurisdictional guidelines for forest biomass harvesting and production. For different feedstock types, there are also different thresholds at which feedstock removal causes significant negative consequences on the soil.

Poor soil quality that negatively impacts the long-term sustainability of the feedstock can entail long-term feedstock risk. Sub-optimal soil management can leave exposed soil post residue-harvest, which can lead to soil wash-off and soil carbon loss from precipitation and wind. Over-harvesting of biomass also depletes the carbon stock in the soil and creates a negative feedback loop that can degrade the soil and its nutrients.

Risk Information: As mentioned in RI 3.9.1, a 40% soil protection factor was applied to the total straw generated in the BDO Zone to ensure soil sustainability. It will be the responsibility of both producers and project developers to devise and implement sustainable straw removal practices that match the soil quality and nutrient composition of every participating farm. Consequently, a low to medium risk level was assigned to this indicator.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	24
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**24**

3.9.3 Risk to Surface and Groundwater

Rationale: Excessive nutrient runoff from biomass feedstock production can accumulate in surface waters and result in algal blooms and hypoxia, which can lead to habitat loss for aquatic species higher up the food chain and alter aquatic ecosystem food webs. Damage to aquatic ecosystems can cause social and regulatory backlash. Water intake issues can also increase risk.

Risk Information: No issues reported.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	2
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10.	2
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	4
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	4

3.9.4 Water Use

Rationale: Biomass feedstock operations can have significant impacts on the hydrological flux (infiltration, groundwater recharge, interception, and transpiration) of ecosystems. This can lead to water shortages, lower yields, and backlash from regulatory bodies if management plans are not properly instituted.

Risk Information: Wheat straw removal equipment can contribute to soil compaction and reduced permeability. Also, straw removal may lead to soil moisture loss, especially during droughts.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	8
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	8
Gross Risk Indicator (GRI)	**Score**

The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**64**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* These situations can be mitigated through sustainable harvest removals and adapting harvesting schedules to soil conditions to reduce compaction. The Total Notch (RRL Notch) X (RRI Notch) is 50%.	**Notch** **50%**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 32 out of 100.	**Score** **32**

3.9.5 Pesticide Risk to Human and Ecosystem Health

Rationale: Application of pesticides (i.e., herbicides, fungicides, and insecticides) on agricultural and forest landscapes can result in adverse health effects for humans and ecosystems. If pesticide application is required in feedstock production, the impact must be considered in the BDO Zone rating.

Risk Information: No pesticides are used during wheat straw production and storage, especially as a portion of them are used for livestock and the remainder is currently used for soil nutrition and protection.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.9.6 Risk to Wildlife and Landscape

Rationale: Biomass production and supply chain operations with negative impacts on wildlife and landscape are at a greater long-term risk of encountering project setbacks and disruptions.

Risk Information: According to the Canadian Wheat Grower's Association,[36] farmers employ sustainability practices and concerns every day as their farmland has been their livelihood for generations. These considerations triggered a very low-risk score for this indicator.

Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI)	**Score**

[36] wheatgrowers.ca/public-policy/

The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.9.7 Biomass Classified as Genetically Modified Organism (GMO)

Rationale: There are various risks associated with GMOs, such as migration or dispersion across the landscape, which can generate community backlash and create supply chain risk. GMOs can also be heavily regulated. If planning to grow or procure GMO feedstocks, especially purpose-grown energy crops, it is important to understand the risks.

Risk Information: Not applicable to wheat straw.

Raw Risk Likelihood (RRL) The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**Score** **NR**

CATEGORY 4.0: FEEDSTOCK SCALE-UP RISK

4.1 Risk Factor: Feedstock Scale-Up

4.1.1 Feedstock Quality at Production Scale

Rationale: The physical and chemical properties of feedstock used in lab, pilot and field testing can fail to be representative of feedstock generated by large-scale operations.

It is important to conduct tests on feedstock representative of that which will be produced by large-scale operations. Failure to adequately test the full range of parameter values can result in severe problems during scale-up.

Risk Information: An optimal removal factor of 70% (pickup heigh on the baler) was applied to ensure good quality of straw is delivered to a new project. Assuming that the new project will be able to implement and maintain a rigorous Quality Control program, this risk is deemed low.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

4.1.2 Capacity of Supply Chain Components & Equipment to Scale

Rationale: Scale-up risk increases if supply chain components or underlying feedstock infrastructure necessary for these components cannot scale to handle Issuer feedstock requirements and throughput capacity. Capacity to scale should be demonstrated.

Risk Information: A large-scale wheat straw project would require increased custom baling and transportation efficiency; which, at this time, can be only partially addressed by the custom baling companies operating in the Beausejour area. Outreach indicated their capability to secure up to a third of the rated quantity in the short term. Investments in high-density square baling equipment will still be necessary to scale up. Grain producers communicated that they would be in favour of a project proponent organizing the collection, storing, and transportation of straw bales, especially if collection can be done expeditiously after crop harvesting. Risk is deemed low-medium for the rated quantity.

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	6
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	24
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	24

CATEGORY 5.0: INFRASTRUCTURE RISKS

5.1 Risk Factor: Physical Infrastructure

5.1.1 Land Parcel/Industrial District

Risk Information: The 70-acre parcel near Beausejour, MB (Maps E-4 and E-5) is an excellent opportunity for industrial development, especially in emerging and environmentally friendly sectors. The combination of favourable industrial zoning, access to major highways, and community support makes it an appealing choice for businesses in the biofuel

industry. The gently rolling terrain and available infrastructure further enhance its attractiveness. This represents a low risk to developers seeking a site within the BDO Zone.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.1.2 Ownership of Land

Risk Information: The 70-acre parcel is owned privately and managed by Colliers International (Section C), which allows for a streamlined and consistent approach to land transactions, reducing potential complications and ensuring that businesses can secure the property they need with greater ease and reliability. This arrangement is beneficial for new and developing industries, as it simplifies negotiations and provides a clear framework for land acquisition, contributing to a more efficient set-up process within the park.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.1.3 Permitting Description

Risk Information: Beausejour follows provincial regulations and local bylaws, ensuring that all projects comply with safety, environmental, and zoning standards. While the framework is comprehensive, it can accommodate unique or innovative projects, provided they meet the necessary requirements. The permitting process in Beausejour is generally

straightforward, taking an average of 60-90 days, and designed to accommodate the needs of both residents and businesses. The town's administration is accessible, and they provide clear guidelines for obtaining necessary permits.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.1.4 Environmental Issues

Risk Information: Air quality in Beausejour is generally good, with few significant industrial sources of pollution. However, localized air quality concerns can arise from agricultural activities, wood burning during winter, and transportation emissions. Beausejour faces several additional environmental concerns, typical of a small town with a mixed urban and rural setting. Water management, waste disposal, and sustainable development are key areas requiring ongoing attention. While current practices are generally effective, future growth and environmental pressures will require continued efforts to maintain and protect the town's environmental health.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.2 Risk Factor: Utilities

5.2.1 Natural Gas Availability

Risk Information: There is a natural gas service line along the western edge of the industrial parcel. A meter and connection line would be needed to support a new industry. The existing natural gas infrastructure in Beausejour is

adequate to meet current demands. However, for significant industrial expansion or new developments, additional infrastructure may be required to extend service or increase capacity. While Manitoba Hydro has the potential to expand natural gas services to support future growth, this would likely require investment in additional infrastructure. The current setup supports existing needs, but large-scale industrial developments might necessitate further development. Manitoba Hydro offers large industrial consumers a rate of $77/month plus 7.85 cents per cubic meter gas commodity price and 8.87 cents per cubic meter for delivery.[37]

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 24 out of 100.	**24**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**24**

5.2.2 Electric Availability

Risk Information: Electric power in Beausejour is generally reliable, with a stable supply provided by Manitoba Hydro. The town experiences minimal outages, and the local infrastructure supports consistent power delivery. The electric power capacity in Beausejour meets the needs of residential, commercial, and light industrial users. There is sufficient capacity to support the town's current demands, though future growth may require additional infrastructure. The cost of industrial electricity in Beausejour by Manitoba Hydro includes an energy charge of $0.042/KWh and a demand charge of $10.35/kVA.[38]

Existing infrastructure includes three-phase power lines along the western border of the industrial site. Additional infrastructure, such as new substations and distribution lines (12.5KV), would be needed to fully support increased industrial activity and additional electric customers. This increases the risk to developers.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**36**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment.	**NN**

[37] www.hydro.mb.ca/account/billing/rates/commercial/#ng-hvf-ss
[38] www.hydro.mb.ca/account/billing/rates/commercial/

RRI Mitigation (Notch) No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

5.2.3 Water Availability

Risk Information: Beausejour has a reliable and consistent water supply, sourced primarily from groundwater wells. The town's water system is well-maintained, ensuring that residents and businesses have access to clean and safe water. The water distribution infrastructure in Beausejour is adequate for current demands. However, as with many smaller towns, aging infrastructure may require updates or improvements over time to maintain service levels and accommodate future growth. Current water rates charged by the Town of Beausejour are $28/quarter service charge plus $1.68/cubic meter use charge. The town charges $1/cubic meter for wastewater.[39]

Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

5.2.4 Waste Disposal

Risk Information: Beausejour offers solid waste disposal and landfill services, with reliable collection and a strong recycling program. While the local landfill is sufficient for current needs, future growth or increased waste could challenge its capacity. Hazardous waste disposal requires additional consideration, but overall, the town's waste management efforts are effective and environmentally conscious. Waste can be hauled to the Libau landfill in St. Clements, or the transfer station in Springfield.[40]

Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch**

[39] www.townofbeausejour.com/p/water-sewer
[40] www.townofbeausejour.ca/p/garbage-and-recycling

RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.2.5 Internet Availability

Risk Information: Valley Fiber offers high-speed fiber business internet services.[41]	
Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.3 Risk Factor: Transportation/Logistics

5.3.1 Road/Highway Access

Risk Information: Beausejour is well-connected by major highways. It is situated on Highway 44, a 4-lane thoroughfare, which provides a direct route to Winnipeg and other surrounding areas. The town's access to major highways ensures good connectivity to nearby cities and regions. The proximity to Winnipeg, about 60 kilometres away, makes Beausejour accessible for residents and businesses travelling to and from the larger urban centre. Traffic congestion in Beausejour is minimal, typical of smaller towns. Overall, the town's transportation infrastructure supports efficient travel and accessibility.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)*	**Notch** **NN**

[41] valleyfiber.ca/business-fiber/#contact

No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.3.2 Rail Access

Risk Information: Beausejour is served by the Canadian National (CN) Railway network, providing some level of railroad freight connectivity. The town is located near the main rail line, which supports regional freight movement. Beausejour has limited dedicated freight facilities compared to larger rail hubs. While rail access is available, the town may not have extensive infrastructure for handling large volumes of freight, potentially requiring coordination with nearby rail terminals or logistics centers. Integration of freight with other transport modes (such as road transport) in Beausejour is functional but may require additional coordination.

Raw Risk Likelihood (RRL) The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**Score** **36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**Score** **36**

5.3.3 Airport Access

Risk Information: Beausejour does not have its own airport; the nearest major airport is James Armstrong Richardson International Airport in Winnipeg, located approximately 60 kilometres away. This airport provides a range of domestic and international flights, making it accessible for residents and business professionals. The drive from Beausejour to Winnipeg Airport typically takes about 45 minutes to an hour, depending on traffic and road conditions. This travel time is reasonable for accessing a major airport and its facilities.

Beausejour has a small local airfield, which may accommodate smaller aircraft for private or recreational use. However, it does not support commercial airline services, limiting its utility for regular passenger travel.

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI)	**Score**

The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.3.4 Water Freight Access

Risk Information: Not applicable.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**Score** **NR**
Raw Risk Impact (RRI) The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**Score** **NR**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is not rated.	**Score** **NR**
Mitigation/Notching The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**Notch** **NR**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**Score** **NR**

5.4 Risk Factor: Social Infrastructure

5.4.1 Healthcare (Local)

Risk Information: Beausejour has basic healthcare facilities, including a local clinic and a hospital (Beausejour District Hospital). These facilities provide essential medical services adequate for routine and emergency care. For specialized care or advanced medical treatments, residents travel to Winnipeg.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.4.2 Education (Schools)

Risk Information: The Beausejour-Brokenhead region has two new early years' schools; Beausejour Early Years' School and École Edward Schreyer School are both located within the town of Beausejour. Adult education needs are serviced through the Agassiz Adult Education Centre, also located in Beausejour.[42] The Town of Beausejour and the Rural Municipality of Brokenhead are home to the Sunrise School Division. Beausejour offers a graduating bilingual program whose graduating students with bilingual diplomas have received the prestigious Governors General Awards.

As part of the Sunrise School Division, learning opportunities for the children of Beausejour-Brokenhead are among the very best available anywhere. With an average 13.6 pupil per educator ratio, students are sure to receive the care, time and attention they deserve in order to earn the very best education possible. Post-secondary education is offered by the University of Manitoba and Red River College in Winnipeg.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.4.3 Local Transportation

Risk Information: The most popular mode of transportation in Beausejour is private vehicles; 80% of residents use this form of transportation. The rest either carpool or walk.[43] Approximately half of the commuting destinations are outside the community but within the province. Beausejour Handivan Inc. is a non-profit organization that provides supportive transportation services to clients in the Town of Beausejour and the Rural Municipality of Brokenhead. It provides door-to-door rides to older adults and anyone with a temporary or permanent impairment that limits their mobility. Operations are funded by the Province of Manitoba, Town of Beausejour, RM of Brokenhead, Sponsors, User Fees and Community Donations.[44] The Beausejour community has also focused on promoting Active Transportation (AT)[45] as a primary means of commuting, which reflects a commitment to encouraging residents to use active and healthy methods such as walking and cycling to reach their destinations.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**4**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	**4**

[42] rmofbrokenhead.ca/p/education
[43] https://advanceruralmanitoba.ca/communities/town-of-beausejour/
[44] www.townofbeausejour.ca/p/beausejour-handivan
[45] www.townofbeausejour.ca/m/beausejour-active-transportation

Gross Risk Indicator (GRI)	Score
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

5.4.4 Public Safety (Local)

Risk Information: The total crime rate in Beausejour is 13% higher than the national rate but half the rate of the Province.[46] The town is served by RCMP and fire departments. The Town of Beausejour has a Citizens on Patrol program (COPP) that works to help Police reduce criminal activity in town. Currently, there are 28 volunteers who are paid on-call members of the fire department. Members are trained as NFPA standard level 1 firefighters accredited through the Manitoba Emergency Services College and have five accredited instructors on staff.[47]

Raw Risk Likelihood (RRL)	Score
The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	4
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10.	4
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	16
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	NN
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	16

5.4.5 Housing/Cost of Living

Risk Information: The town has a mix of older and newer single-family homes, with prices ranging from $180,000 to $625,000. Building lots range in price between $63,00 and $979,000. Apartments are also available with prices around $200,000. An 18-apartment building is also available for sale for $3.2 million[48], which could be an opportunity for a new project entrant to secure housing for its employees. Rentals exist in abundance in the nearby city of Winnipeg. More than 75% of residents are homeowners, while the rest rent. Average housing costs are $974/month to own and $952/month to rent. The median household income is $76,000.[49]

[46] www.areavibes.com/beausejour-mb/crime/
[47] www.townofbeausejour.ca/p/fire-department
[48] Realtor.ca
[49] advanceruralmanitoba.ca/communities/town-of-beausejour/

Raw Risk Likelihood (RRL) The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed low, therefore the RRI is 4 out of 10.	**Score** **4**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**Score** **16**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**Score** **16**

5.5 Risk Factor: Labour

5.5.1 Workforce

Risk Information: Beausejour has a population of 3,500 people, with a labour force participation rate of 69.3 and an unemployment rate of 3.9%.[50] The town's workforce is characterized by a mix of employers: health care, social assistance, public administration, retail, construction, and education services. The workforce is highly educated, with 50% having a post-secondary certificate, diploma or degree and 11 % with a Bachelor's degree or higher. Top occupations are in sales, trades, transportation, education, law, business and finance, and health.

A notable portion (approximately half) of Beausejour's workforce commutes to Winnipeg for employment, benefiting from the proximity to the larger urban job market. This commuting trend may impact local businesses, as some residents choose to work and shop in the city rather than within the town.

Beausejour faces several challenges typical of small-town labour markets, including a limited pool of skilled workers, youth migration, and competition with larger cities for talent. Attracting and retaining young workers and professionals is an ongoing concern. Thus, a medium risk was assigned to this indicator.

Raw Risk Likelihood (RRL) The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**Score** **6**
Raw Risk Impact (RRI) The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**Score** **6**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**Score** **36**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment.	**Notch** **NN**

[50] advanceruralmanitoba.ca/communities/town-of-beausejour/

The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100. **36**

5.5.2 Labour Costs

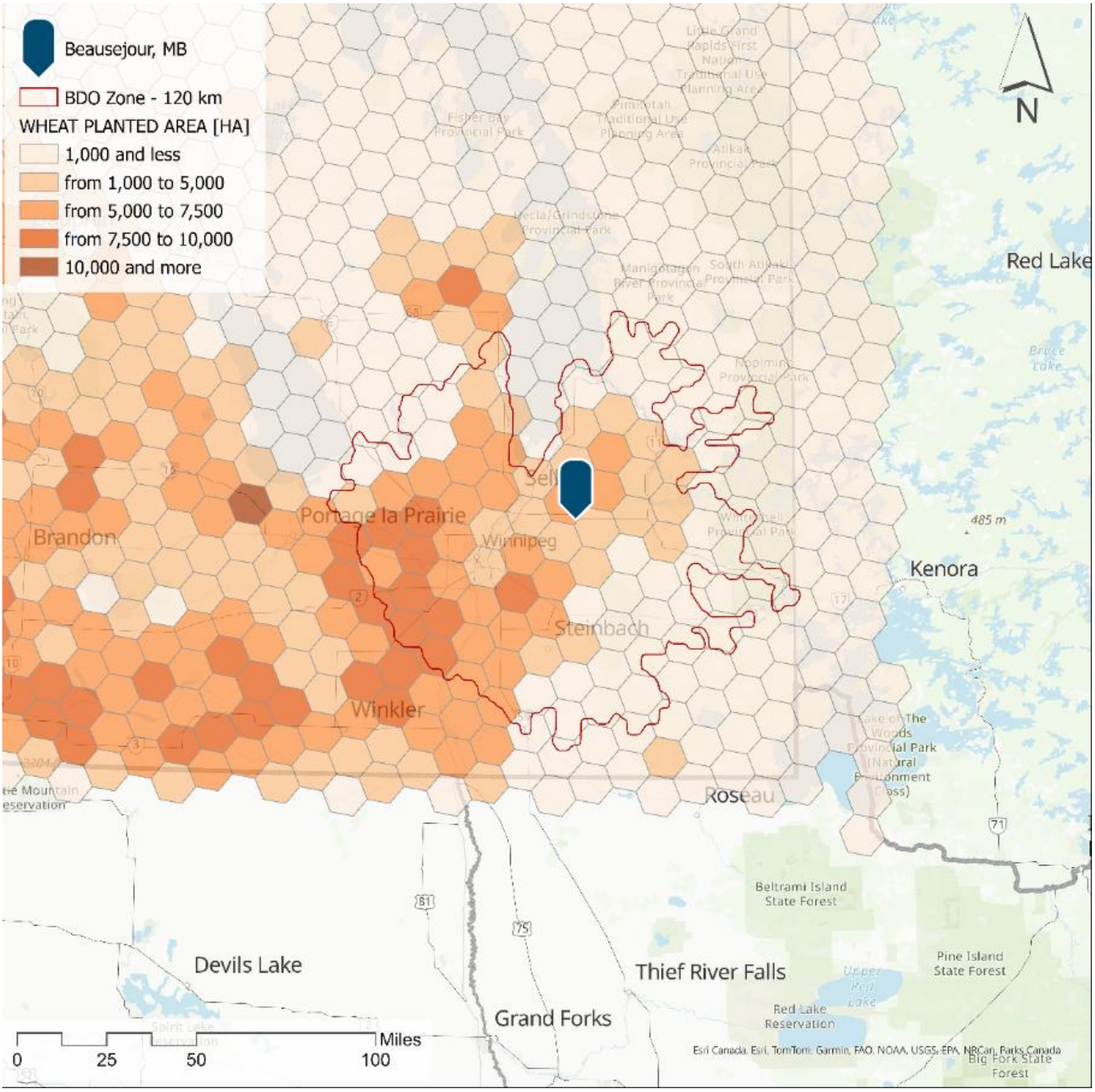
Risk Information: As of October 1, 2024, the minimum wage in Manitoba, Canada is $15.80 per hour.[51] Processing and manufacturing labour wages range between the minimum wage and $23/hr, similar to the national wage ($23.50/hr) but higher than the provincial wage ($22/hr).[52] The median household income is $76,000.[53] These are costs that pose no significant risk to a potential project; thus, the risk was deemed low.

Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.
RRI Mitigation (Notch)
No adjustment.
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

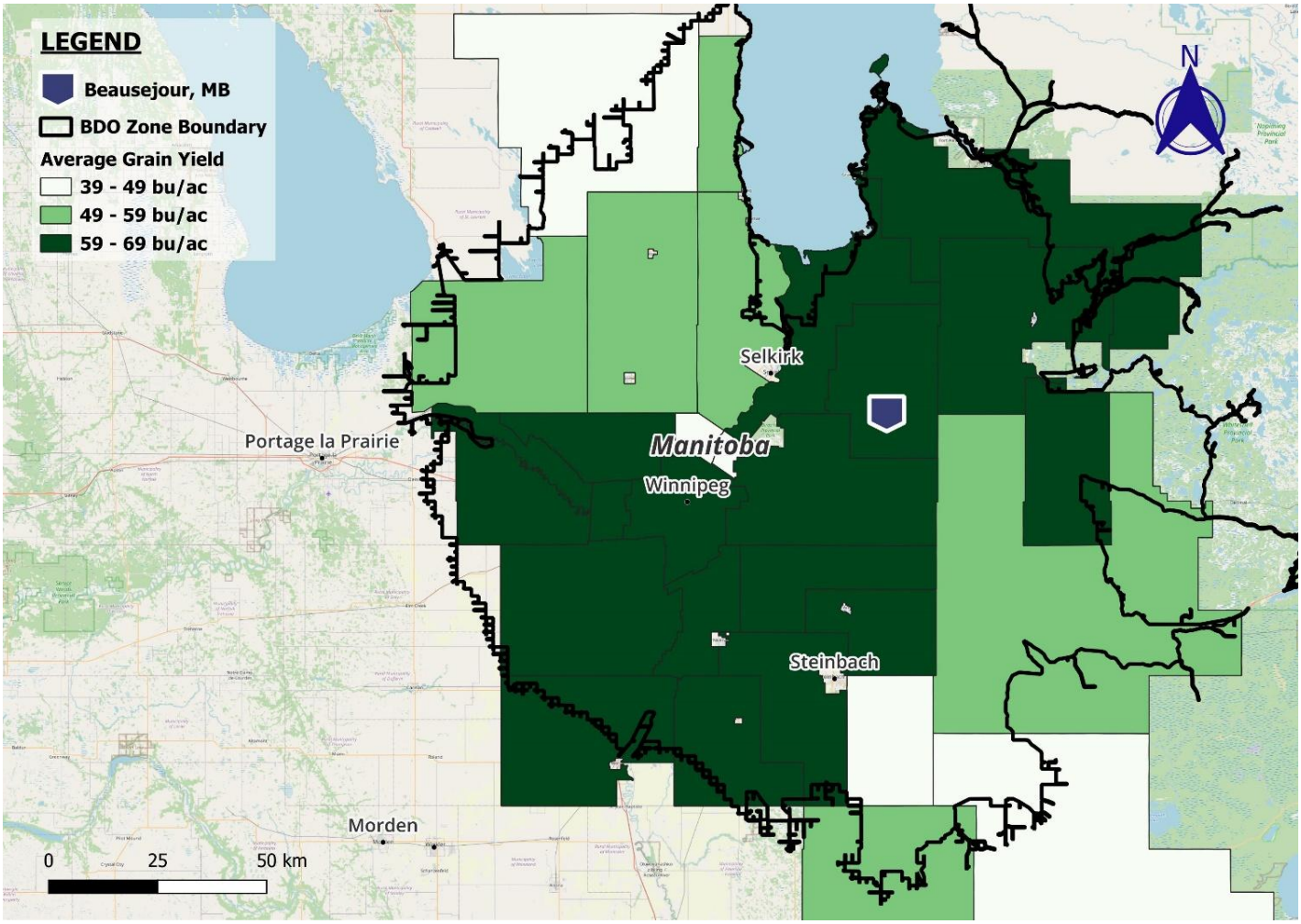
[51] www.cfib-fcei.ca
[52] www.jobbank.gc.ca/wagereport/location/22801
[53] advanceruralmanitoba.ca/communities/town-of-beausejour/

SECTION E: TABLES AND FIGURES

Map E-1. Map of Wheat Planted Area

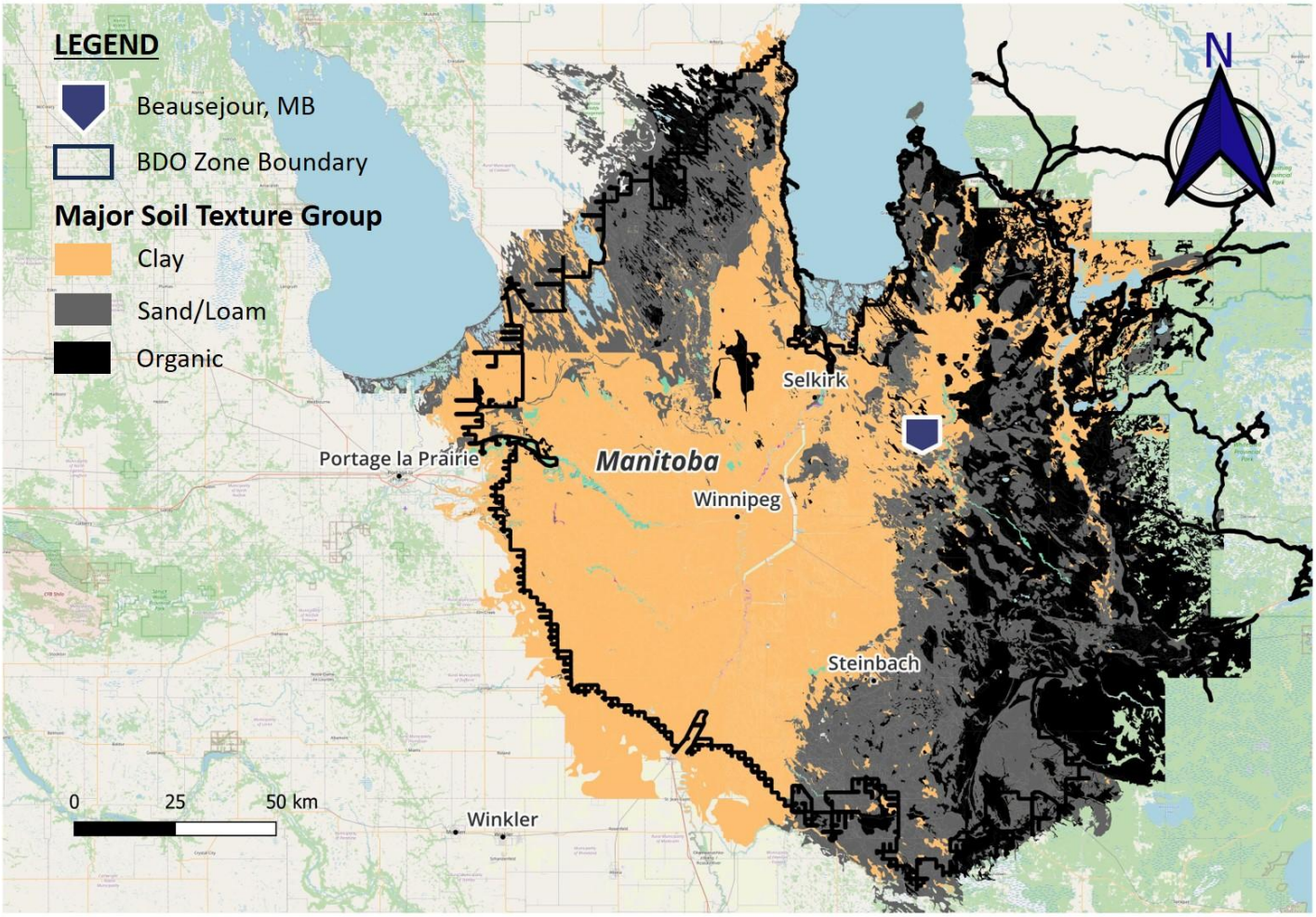


Map E-2. Map of Average Wheat Yield (bu/ac) by Municipality [54]



[54] www.masc.mb.ca/masc.nsf/mmpp_browser_soil_types.html

Map E-3. Map of Major Soil Texture Groups[55]



[55] geoportal.gov.mb.ca/datasets/manitoba::soil-survey-manitoba/explore

Figure E-1. Estimated Wheat Straw Quantities by Distance from Beausejour, MB

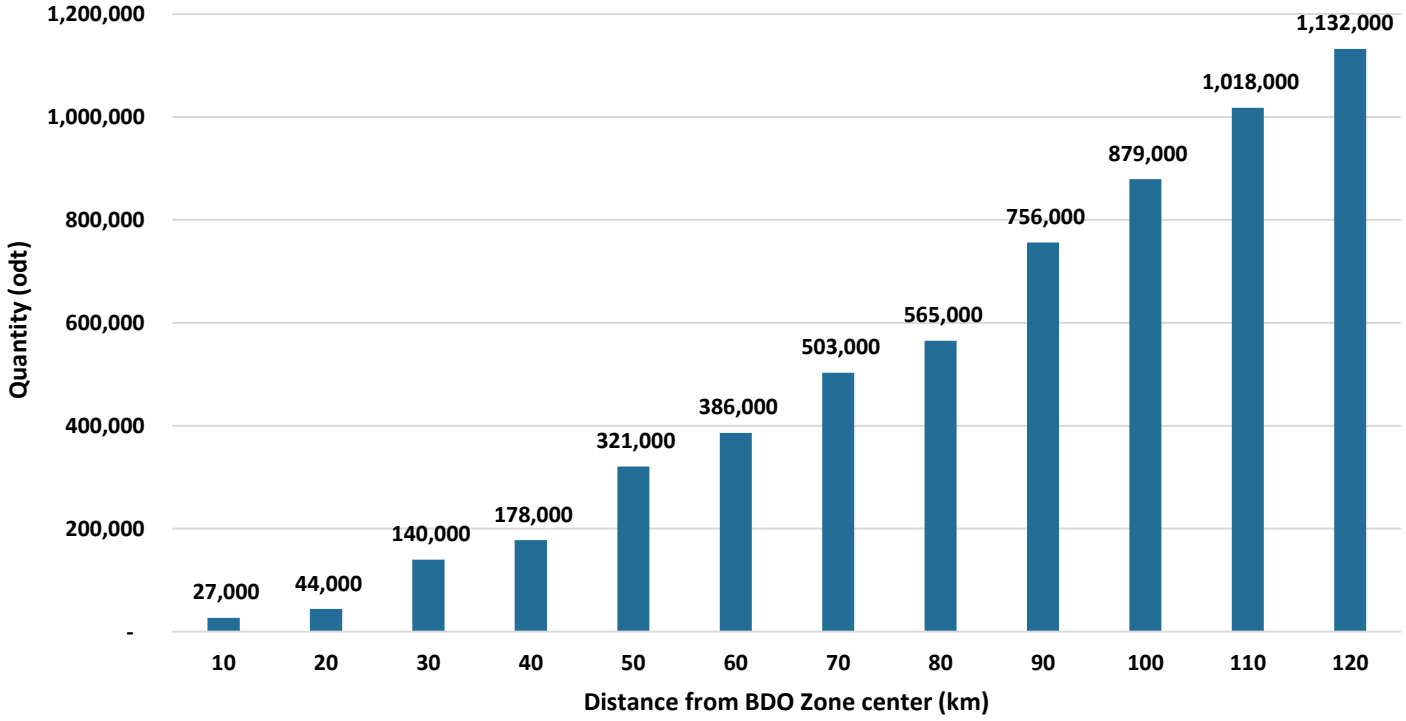


Figure E-2. Wheat Straw Transportation Cost by Distance from Beausejour, MB

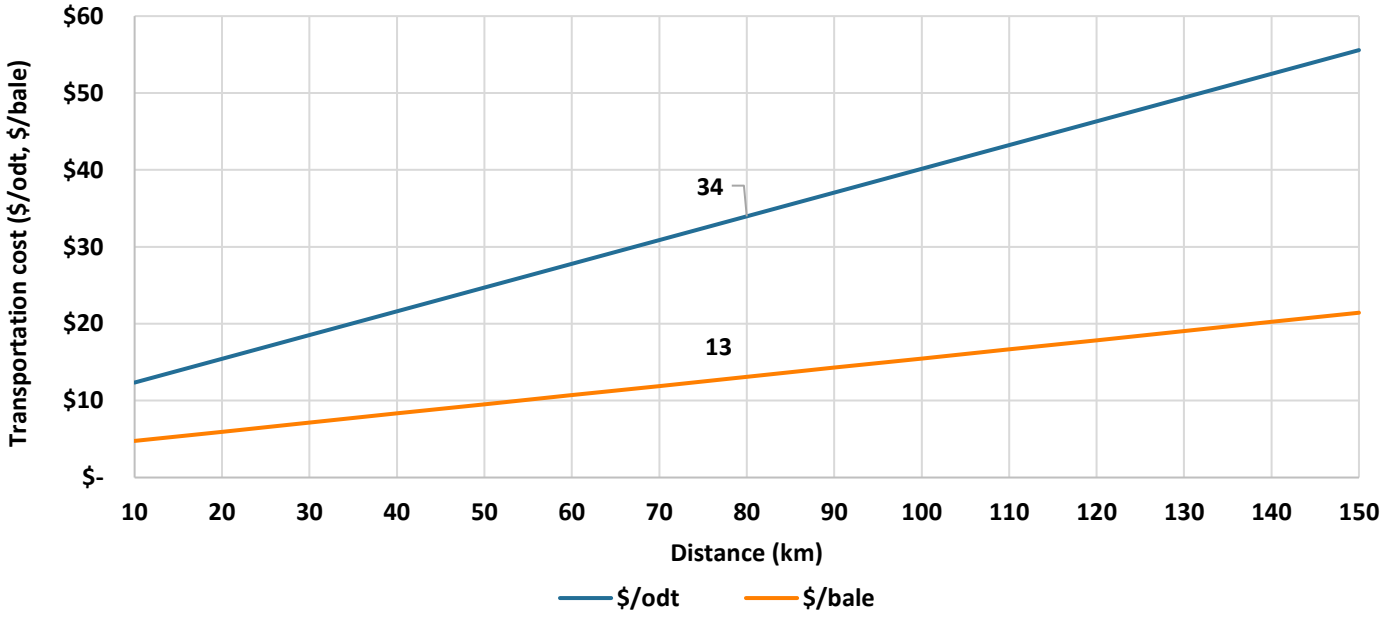


Figure E-3. Historical Wheat Straw Prices ($/odt) [56]

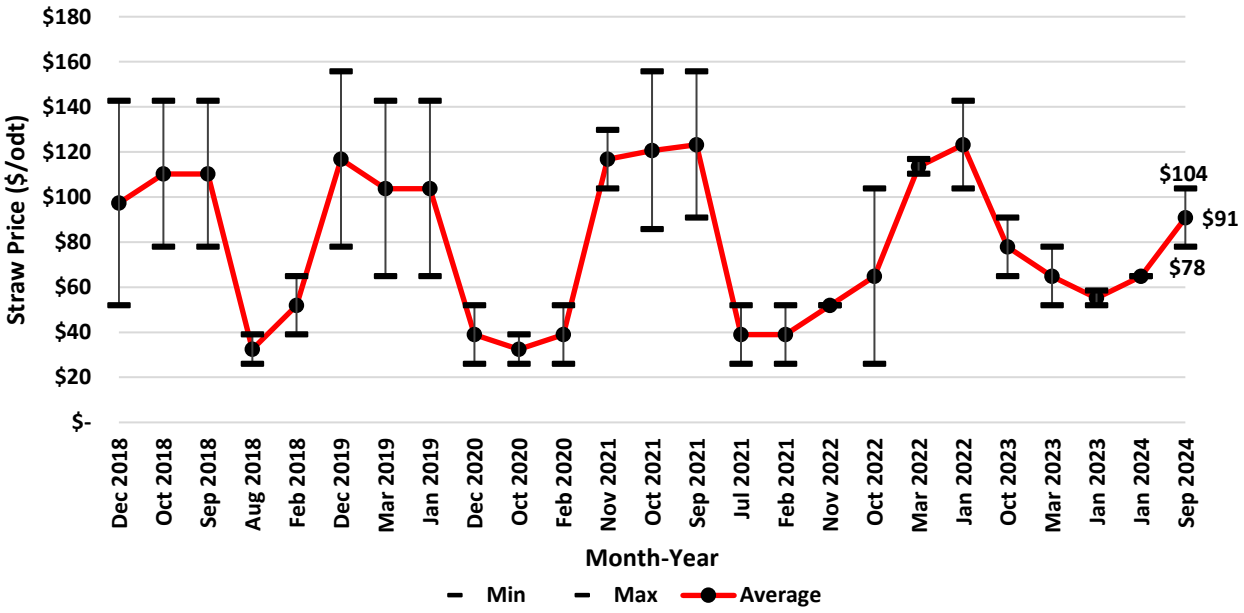
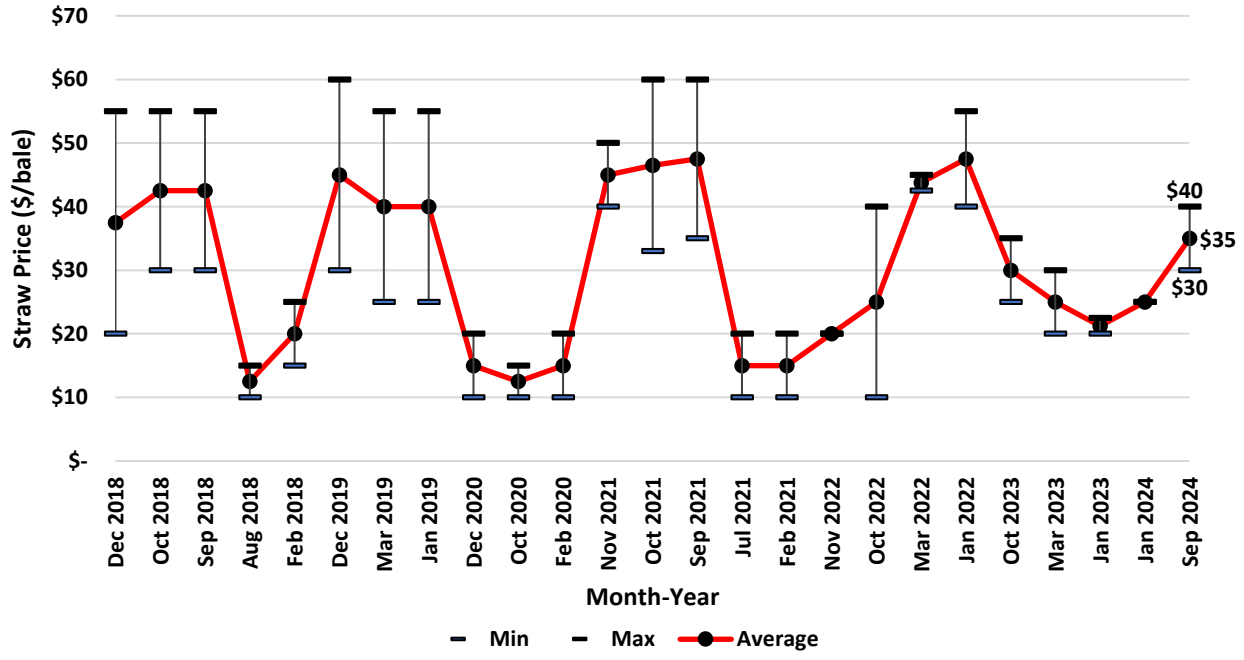


Figure E-4. Historical Wheat Straw Prices ($/bale) [57]



[56] mfga.net/newsletters; Manitoba Hay and Feed for Sale Facebook (Sept 2024 prices only)
[57] Ibid.

Figure E-5. Historical Wheat Grain Prices[58]

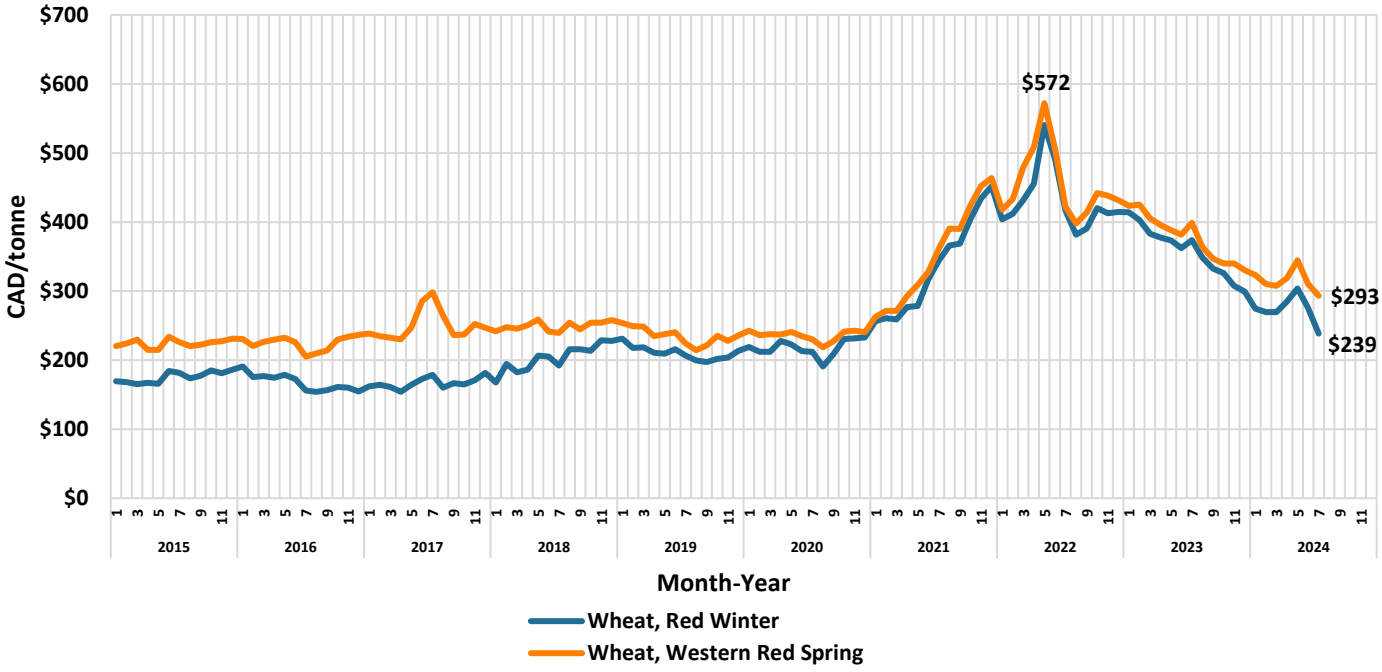
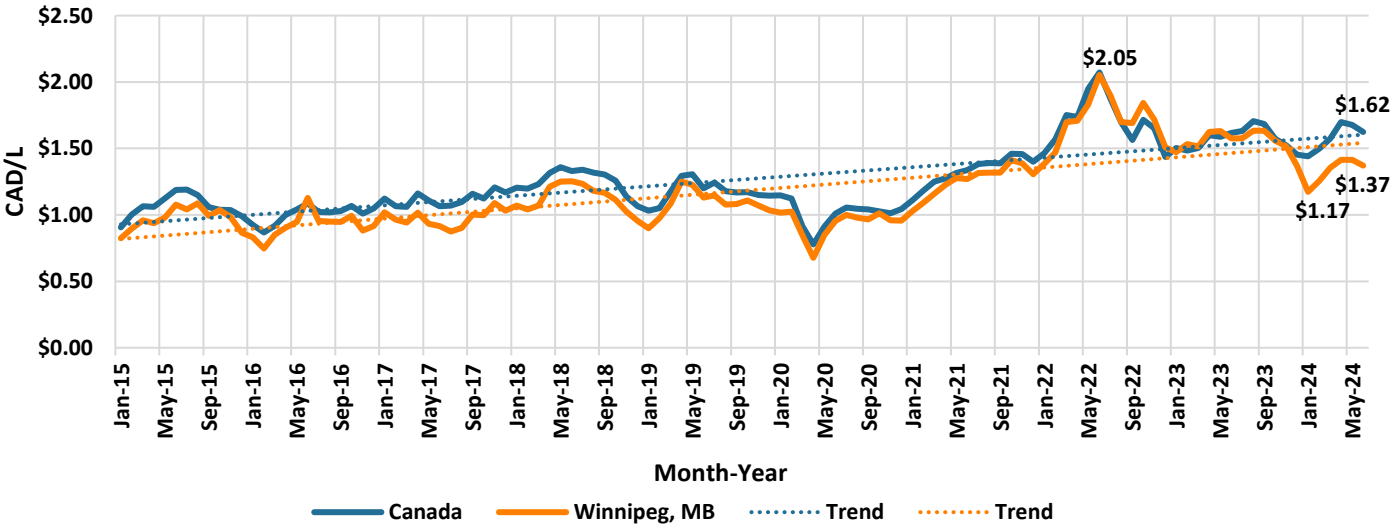


Figure E-6. Historical Prices of Diesel in Winnipeg MB[59]



[58] geoportal.gov.mb.ca/datasets/manitoba::manitoba-crop-prices-historical/explore
[59] Statistics Canada. Table 18-10-0001-01 Monthly average retail prices for gasoline and fuel oil, by geography (www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000101)

Figure E-7. Consumer Price Index - Manitoba (2014-2024)[60]

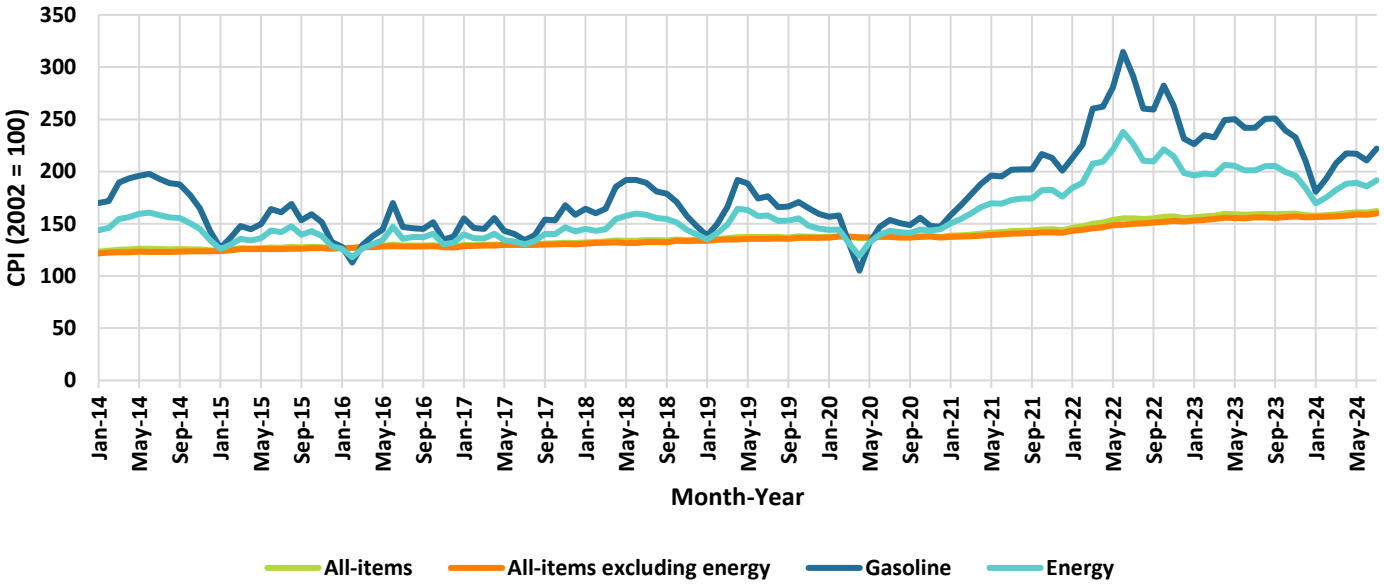
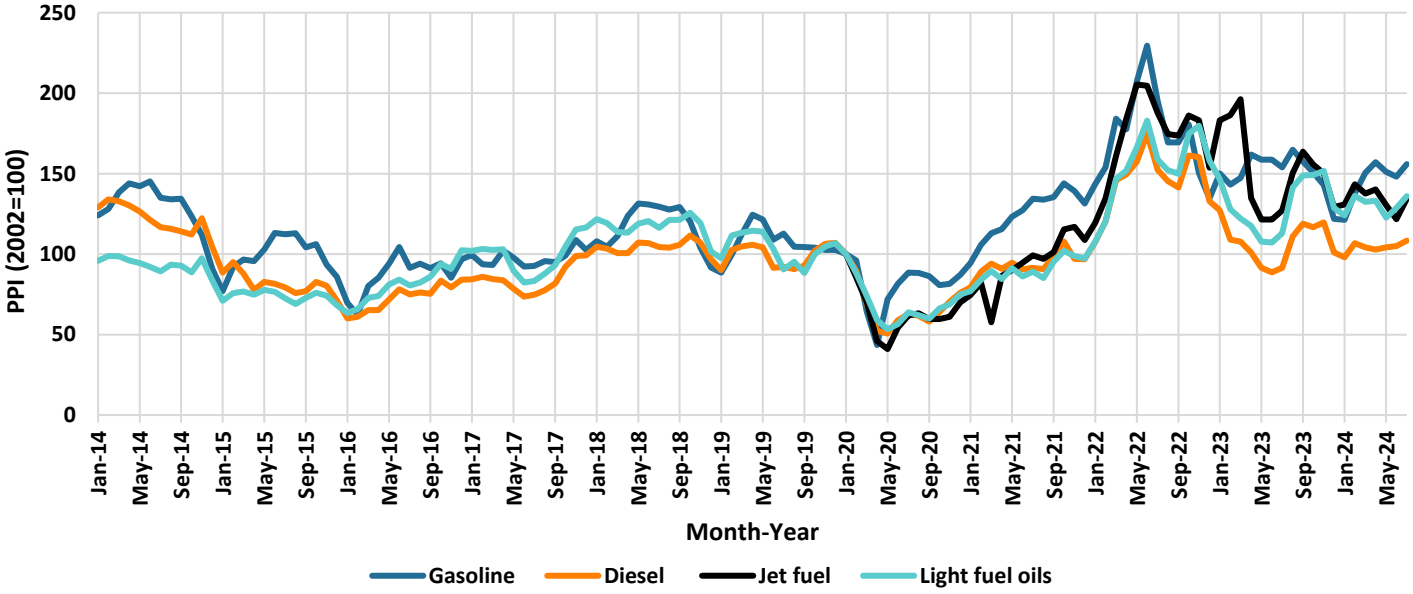


Figure E-8. Industrial Product Price Index - Prairie Provinces (2014-2024)[61]



[60] www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000401
[61] www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810027201

Figure E-9. Average Annual Temperatures in Winnipeg MB (2014-2024)[62]

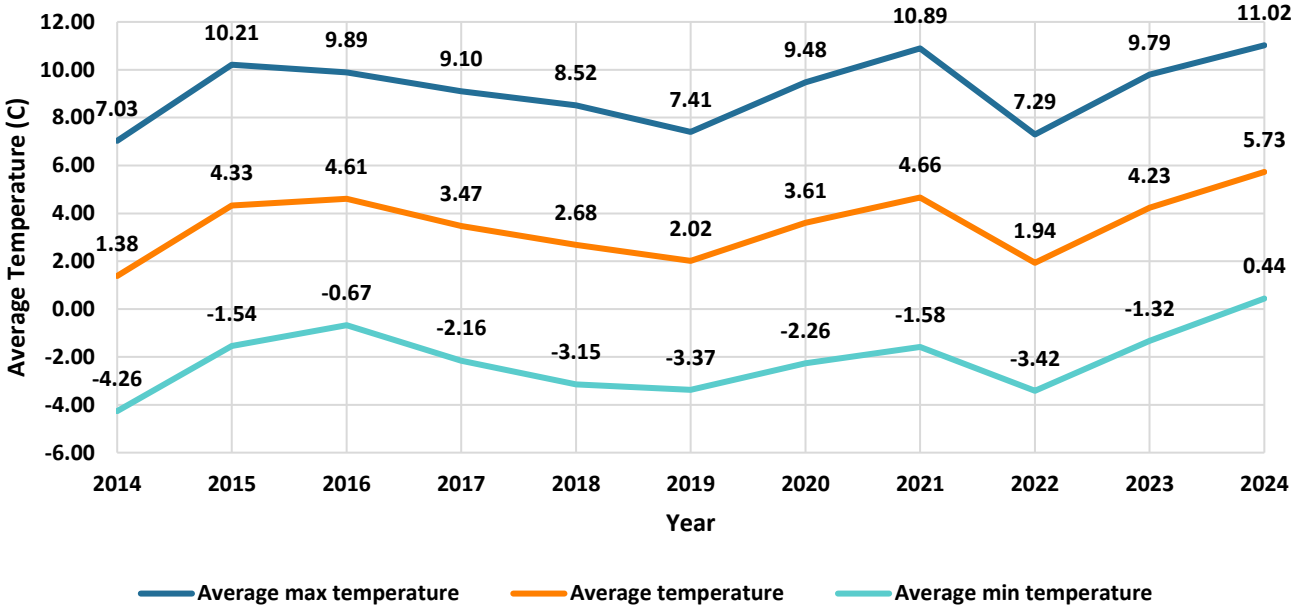
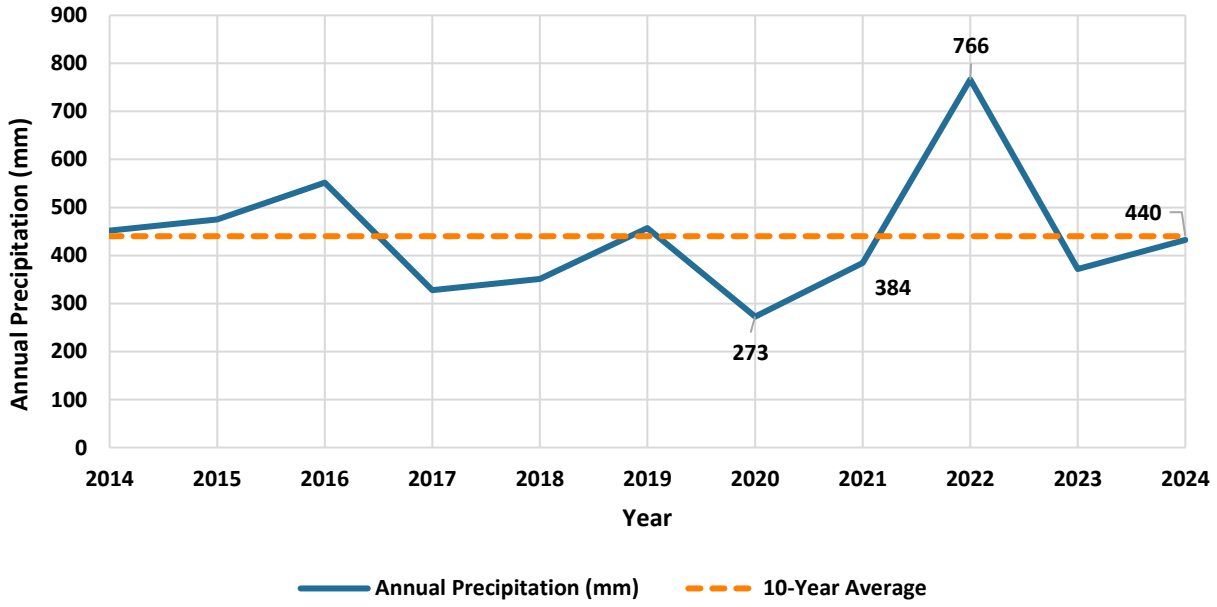
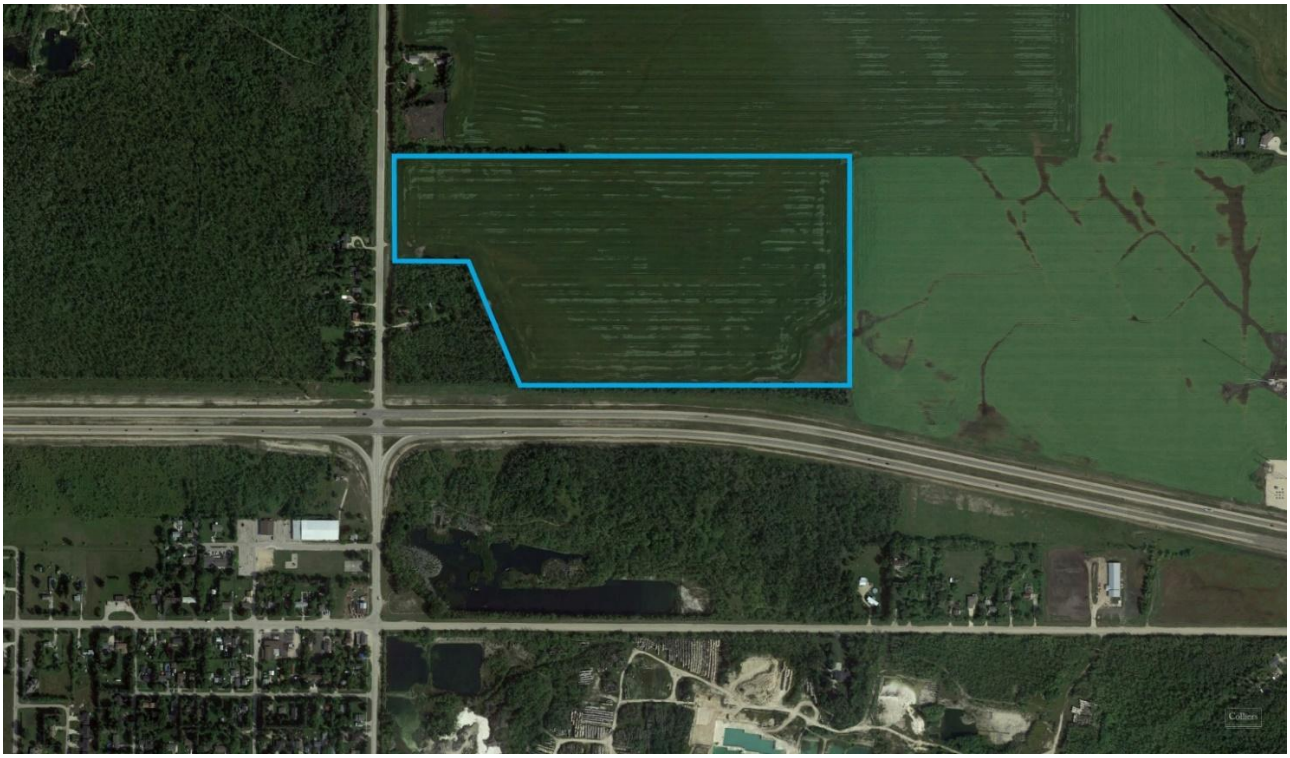


Figure E-10. Annual Precipitation in Winnipeg MB (2014-2024)[63]



[62] weatherstats.ca based on Environment and Climate Change Canada data
[63] Ibid.

Map E-4. 70-Acre Industrial Parcel West of Beausejour, MB



SECTION F: LEGAL DISCLAIMER

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