REGINA, SASKATCHEWAN

Bioeconomy Development Opportunity Zone

RATING GRADE: 'BBB'

Date of Issue: October 31, 2024

BBB
Good Quality

Rating Parameters:

Category	Rated Quantity	Delivered Price	BDO Zone Size
Canola Straw	**170,000 bdt/yr**	**$81-$123/bdt**	**120 km drive distance from the City of Regina**

BDO ZONE ASSETS

- Located within one of the highest canola production areas in Saskatchewan with 10-year average canola seed planted area of 1.8 million acres.
- No past and present commercial competing uses of canola straw in the BDO Zone.
- Unique 1,800-acre industrial site, known as the Global Transportation Hub, specifically designed to attract new industries.

BDO ZONE LIABILITIES

- Most crop growers prefer to use canola straw as soil cover and its removal is not common practice.
- Canola crushing facilities encourage crop growers to leave canola straw in the field to minimize the use of fertilizers in the production of canola seed.
- Lack of established experience among crop growers to harvest, collect, store, and transport commercial quantities of canola straw.
- No historical prices for canola straw are available in the BDO Zone, resulting in uncertainty in future expected prices, particularly the fertilizer replacement cost.
- Year-to-year canola straw production can vary significantly due to the weather conditions.

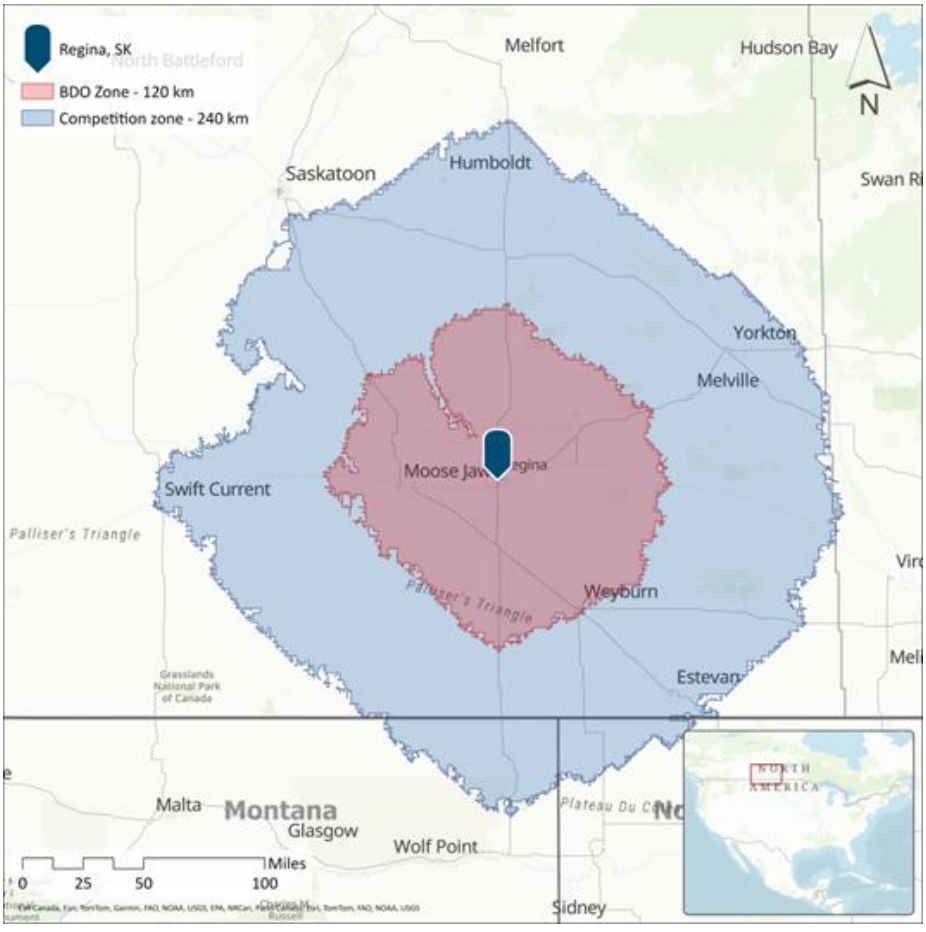
RATING GRADE

The City of Regina, Bioeconomy Development Opportunity Zone, is rated 'BBB', or 'low-moderate' 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).

'BBB' ratings denote good prospective viability of Feedstock Supply and Infrastructure and expectations of default risk are currently low-medium. The capacity to support new biobased plant operations is considered adequate but it is vulnerable to farmer participation rate, feedstock supply chain scale-up and adverse weather conditions. This is the limit of Investment Grade ratings.

CITY OF REGINA, SASKATCHEWAN BDO ZONE



ANALYST NOTES

In this risk rating assessment, we estimated the rated quantity and pricing of canola straw for the city of Regina Bioeconomy Development Opportunity (BDO) Zone, with the centre point of the city of Regina, Saskatchewan. The estimated rated quantity for future biomass projects is the low-risk availability after considering historical canola straw production and uses, supply chain constraints (e.g., equipment and labour availability, road capacity), and data/model uncertainty. The rated pricing is the expected price that future biomass projects are likely to pay to secure the rated quantity.

According to our feedstock availability analysis, about 170,000 bone-dry-tonnes (bdt)/yr of canola straw can be economically and technically sourced for a new project at low risk. We expect that the rated quantity will be available at a delivered price range of $81-$123/bdt.

The primary reasons for the wide range of canola straw prices are fertilizer replacement price paid to the crop growers for its nutrient value and the baling cost. There is no consensus among crop growers on the actual nutrient value of canola straw. In addition, baling cost depends on the bale size, density and shape and the baler operator's experience. By establishing long-term relationships with crop growers, involving independent agronomists to determine the nutrient value of canola straw and working with experienced custom harvest groups, we expect that the future price range will narrow and move toward the lower end of the estimated price range.

In addition to the rated quantity and pricing, the BDO Zone's suitability to accommodate future biomass projects was assessed against 10 supplier risks, 10 competition risks, 46 supply chain risks, 2 feedstock scale-up risks, and 20 infrastructure risks. The major risks for future biomass projects are related to the willingness of canola growers to harvest straw and production scale-up experience due to the lack of past and present commercial uses of canola straw in the BDO Zone. In addition, the year-to-year variability in canola straw production and availability due to the weather conditions impacting the planting, growing, and harvest seasons is another major risk in the BDO Zone. Most of these risks can be mitigated to some extent by executing practical measures such as hiring experienced custom harvest groups, storing additional bales, and contracting more farmers than needed in case of temporary supply shortages.

In contrast, a large number of risk indicators related to the suppliers, competitors, supply chains and infrastructure are very low and low, which can be considered as the BDO Zone assets. A summary of main assets (very low/low risks) and liability (medium/high risks) are discussed in the following sections.

BDO ZONE ASSETS

The BDO Zone is located within one of the highest canola production areas in the province. Most of the BDO Zone is located in Dark Brown and Black soil zones, which are highly productive soils used to grow a wide variety of agricultural crops. On average, 1,800,000 acres of canola seed were planted in the BDO Zone with an average yield of 0.85 tonne/ac in the last 10 years, resulting in average canola seed production of 1,530,000 tonnes per year. This quantity of canola seed produces about 3,060,000 tonnes of canola straw, equivalent to 2,600,00 bdt/yr by adjusting for 15% moisture content. The rated quantity of canola straw (170,000 bdt/yr) is less than 7% of the total canola straw production after the consideration of competing uses, harvest efficiency and a redundancy factor to capture unknown risks such as farmer participation rate and data/model uncertainty.

The traditional users of straw are livestock producers, accounting for an estimated 5% of the straw generated. However, the use of cereal straw is way more common than canola straw. With the improvement in canola yield, some farmers have been harvesting canola straw, but it is not yet a common practice in the BDO Zone. The preferred practice is to leave it in the field after canola harvesting to maintain the soil quantity and mitigate soil erosion. We did not find any indication of growth in using straw for livestock bedding and feed in the BDO Zone. We believe the risk of their geographical influence is low for future biomass projects.

BDO ZONE LIABILITIES

Removal of canola straw is not a common practice, and most crop growers in the BDO Zone prefer to use it as soil cover. Compared to cereal crops, canola seed produces less straw, and it decomposes quickly. For dryland

farming, leaving canola straw in the field is key to trap snow and retain moisture needed for the next planting season. In addition, due to the increasing global demand for canola oil as a feedstock for transportation biofuels, the carbon intensity of canola oil is a key factor in determining its market value. As a result, canola crushing companies owned by anchor agriculture companies have been working with canola seed producers to implement sustainable farming and emission reduction practices. One of these practices is to minimize the use of fertilizers in crop production. No/reduced tillage and leaving canola straw behind in the field after canola seed harvesting can reduce the use of fertilizers in the long term. Thus, any commercial use of canola straw will likely require the engagement of canola seed producers and canola crushing companies at the early stage of the project to demonstrate the sustainable removal of canola straw.

With the lack of established markets for canola straw, the existing straw supply chains need to scale up to support large-scale biomass projects. Due to the small capital required to purchase round balers, the existing harvesting, collection, and transportation equipment have been developed mainly for round bales. Thus, the existing straw logistics equipment will likely need to be upgraded to meet the quantity, quality, and cost of large commercial biomass projects. It is noteworthy that crop growers in the BDO Zone have fundamental experience with harvesting, collection, and storage of straw bales due to the use of cereal straw for animal bedding and feed, and we expect the future biomass project would be able to scale up the existing straw supply chain to meet their feedstock requirements with a combination of using the existing supply chain capacity and developing new logistics capacity.

To harvest, collect and store the rated quantity during the harvest season, about 25 balers, 15 bale collectors/movers, 40 tractors, 10 trucks and 50 operators are needed. This number of operators should be manageable to secure and train while the biomass facility reaches its full production capacity (2-3 years), but it requires close collaboration between crop growers, custom harvests, hauling companies and the biomass project developer.

In addition, due to the lack of established markets, there are no historical prices for canola straw in the BDO Zone. In our outreach to the local farmers in the BDO Zone, some of them did not know what the price of straw would be as they have not sold their straw in the past, and the price that they expect for fertilizer replacement cost (only material cost) varied significantly from as low as $7/bale to as high as $30/bale. This is a high risk for a new biomass project to reach an agreement on the price that they can afford to pay.

Similar to other crop residues, another potential medium to high risk is year-to-year variation in canola straw production and availability, mainly due to variability in weather conditions during the planting, growing, and harvest seasons, which impact the overall harvested area and crop yield. Both canola planted area and yield have experienced significant variability, resulting in canola seed production as low as 1,100,000 tonnes and as high as 1,850,000 tonnes in the last 10 years. Among weather-related risk factors, drought is the main concern among farmers, and it has a significant impact on crop yield. In 2021, Saskatchewan experienced a severe drought in the southern and some eastern regions of the province. Despite its severity, the occurrence of drought has not been very frequent.

In our rated quantity, we used the average canola production in the last 10 years to capture the canola production variability to some extent. In addition, we used a BAM (redundancy factor) of 4 in the calculation of the rated quantity, meaning that only 25% of available canola straw for harvesting will be available for future biomass projects to account for future uncertainties in parameters such as farmer participation rate, crop planted area and yield. Future biomass projects are expected to consider year-to-year variability factors in their canola straw supply system by storing additional bales and contracting more farmers than they need in case of temporary supply shortages.

INFRASTRUCTURE PROFILE

The industrial site is the Global Transportation Hub (GTH) in the city of Regina, an inland port facility with just over 1,800 acres. The GTH has been designed for new development and has industrial building sites available that are service-ready and have full utilities. It is ideally

located and designed to accept freight by truck and train. Products can be quickly shipped to domestic locations and the United States via road or rail. Efficient rail connections with deep-water shipping ports, such as Vancouver to the west and Montreal to the east, are also available.

SCORING & RATING METHODOLOGY

In assessing the biomass supply chain risk for the Bioeconomy 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 bone dry tonnes per year (bdt/yr), while feedstock costs are expressed in Canadian dollars (CAD). Maximum transport distance is based on a 120-kilometre driving distance from the centre point (City of Regina).

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 the City of Regina is ***23.02 out of 100, resulting in a 'BBB' 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. Loaded RI Scores for Each Risk Factor

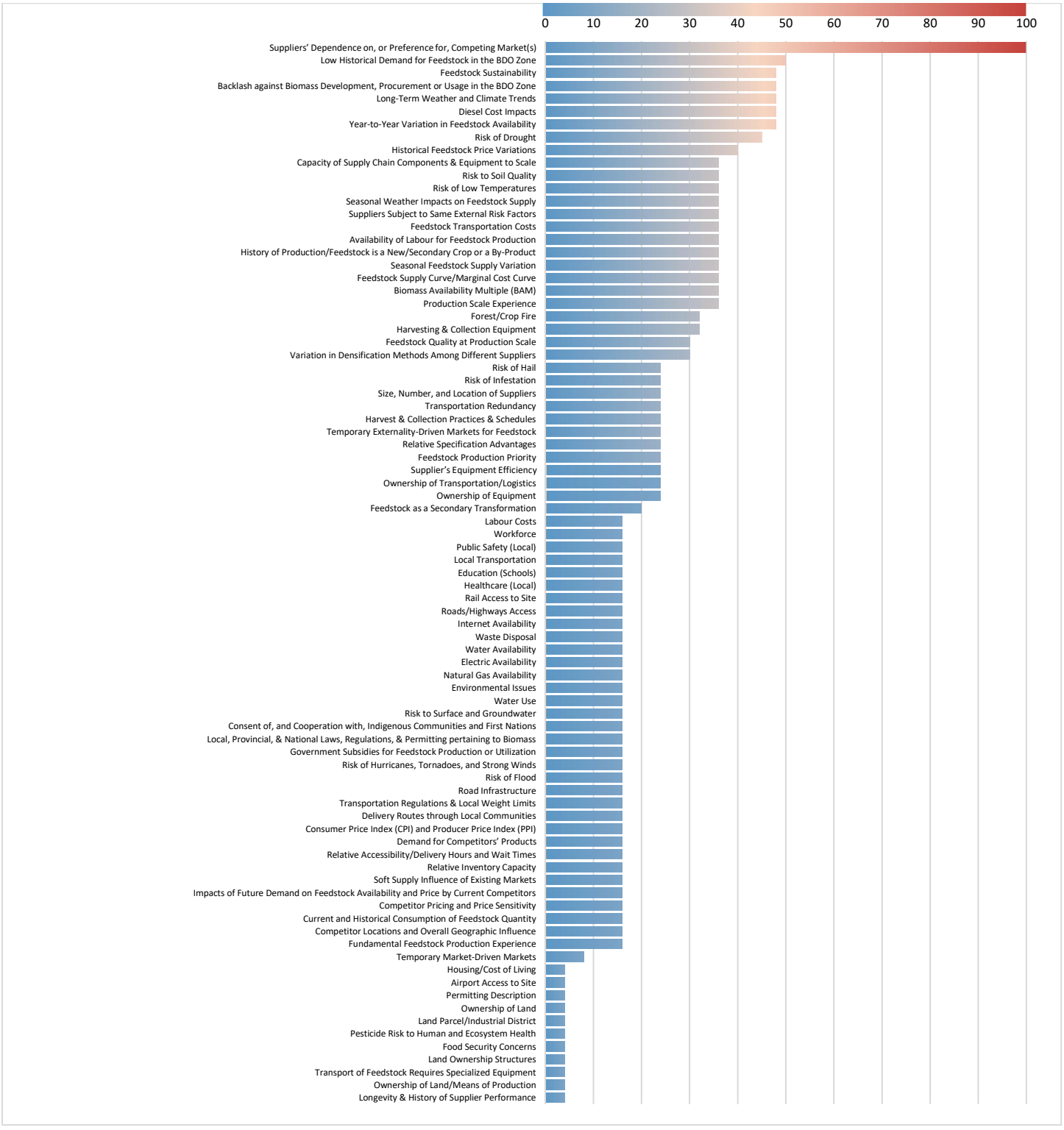


Table A-1. Risk Indicators and Associated Scores

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)	10	10	100	NN	100
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	6	4	24	NN	24
1.3.3 Ownership of Transportation/Logistics	6	4	24	NN	24
1.3.4 Feedstock as a Secondary Transformation	10	2	20	NN	20
1.4 Risk Factor: Supplier Experience					
1.4.1 Fundamental Feedstock Production Experience	4	4	16	NN	16
1.4.2 Production Scale Experience	8	6	48	25%	36
1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity					
1.5.1 Supplier's Equipment Efficiency	8	6	48	50%	24
1.6 Risk Factor: Supplier Motivation					
1.6.1 Feedstock Production Priority	6	8	48	50%	24
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	4	4	16	NN	16
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	4	4	16	NN	16
2.1.5 Soft Supply Influence of Existing Markets	4	4	16	NN	16
2.1.6 Temporary Market-Driven Markets	2	4	8	NN	8
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	4	4	16	NN	16
2.2.3 Relative Specification Advantages	6	4	24	NN	24
2.2.4 Demand for Competitors' Products	4	4	16	NN	16
Category 3.0: Supply Chain Risk					
3.1 Risk Factor: Feedstock Availability					
3.1.1 Biomass Availability Multiple (BAM)	6	6	36	NN	36
3.1.2 Feedstock Supply Curve/Marginal Cost Curve	6	6	36	NN	36
3.1.3 Seasonal Feedstock Supply Variation	6	6	36	NN	36
3.1.4 Year-to-Year Variation in Feedstock Availability	8	6	48	NN	48
3.2 Risk Factor: Historical Issues					
3.2.1 Historical Feedstock Price Variations	10	8	80	50%	40
3.2.2 Low Historical Demand for Feedstock in the BDO Zone	10	10	100	50%	50
3.2.3 History of Production/Feedstock is a New/Secondary Crop or a By-Product	6	6	36	NN	36
3.3 Risk Factor: Non-Weather Based Externalities					
3.3.1 Consumer Price Index (CPI) and Producer Price Index (PPI)	4	4	16	NN	16
3.3.2 Currency Risk	NR	NR	NR	NR	NR
3.3.3 Border Risk	NR	NR	NR	NR	NR
3.3.4 Temporary Externality-Driven Markets for Feedstock	6	4	24	NN	24
3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection					
3.4.1 Harvest & Collection Practices & Schedules	4	6	24	NN	24
3.4.2 Harvesting & Collection Equipment	8	4	32	NN	32
3.4.3 Variation in Densification Methods Among Different Suppliers	6	10	60	50%	30
3.4.4 Availability of Labor for Feedstock Production	6	6	36	NN	36
3.5 Risk Factor: Transportation					
3.5.1 Feedstock Transportation Costs	6	6	36	NN	36
3.5.2 Diesel Cost Impacts	8	6	48	NN	48
3.5.3 Transport of Feedstock Requires Specialized Equipment	2	2	4	NN	4
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	6	4	24	NN	24
3.6 Risk Factor: Supply Chain Resiliency					

3.6.1 Size, Number, and Location of Suppliers	6	4	24	NN	24
3.6.2 Suppliers Subject to Same External Risk Factors	6	6	36	NN	36
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	6	8	48	NN	48
3.7.3 Forest/Crop Fire	4	8	32	NN	32
3.7.4 Risk of Infestation	4	6	24	NN	24
3.7.5 Risk of Hail	6	4	24	NN	24
3.7.6 Risk of Flood	4	4	16	NN	16
3.7.7 Risk of Drought	6	10	60	25%	45
3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds	4	4	16	NN	16
3.7.9 Risk of Low Temperatures	6	6	36	NN	36
3.8 Risk Factor: Political and Social					
3.8.1 Government Subsidies for Feedstock Production or Utilization	4	4	16	NN	16
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	8	8	64	25%	48
3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations	4	4	16	NN	16
3.8.5 Food Security Concerns	2	2	4	NN	4
3.9 Risk Factor: Sustainability and Environmental Concern					
3.9.1 Feedstock Sustainability	6	8	48	NN	48
3.9.2 Risk to Soil Quality	6	6	36	NN	36
3.9.3 Risk to Surface and Groundwater	4	4	16	NN	16
3.9.4 Water Use	4	4	16	NN	16
3.9.5 Pesticide Risk to Human and Ecosystem Health	2	2	4	NN	4
3.9.6 Risk to Wildlife and Landscape	NR	NR	NR	NR	NR
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	6	10	60	50%	30
4.1.2 Capacity of Supply Chain Components & Equipment to Scale	6	6	36	NN	36
Category 5.0: Infrastructure					
5.1 Risk Factor: Physical Infrastructure					
5.1.1 Land Parcel/Industrial District	2	2	4	NN	4
5.1.2 Ownership of Land	2	2	4	NN	4
5.1.3 Permitting Description	2	2	4	NN	4
5.1.4 Environmental Issues	4	4	16	NN	16
5.2 Risk Factor: Utilities					
5.2.1 Natural Gas Availability	4	4	16	NN	16
5.2.2 Electric Availability	4	4	16	NN	16
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	4	4	16	NN	16
5.3.3 Airport Access to Site	2	2	4	NN	4
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	2	2	4	NN	4
5.5 Risk Factor: Labor					
5.5.1 Workforce	4	4	16	NN	16
5.5.2 Labor Costs	4	4	16	NN	16
				Average	**23.02**

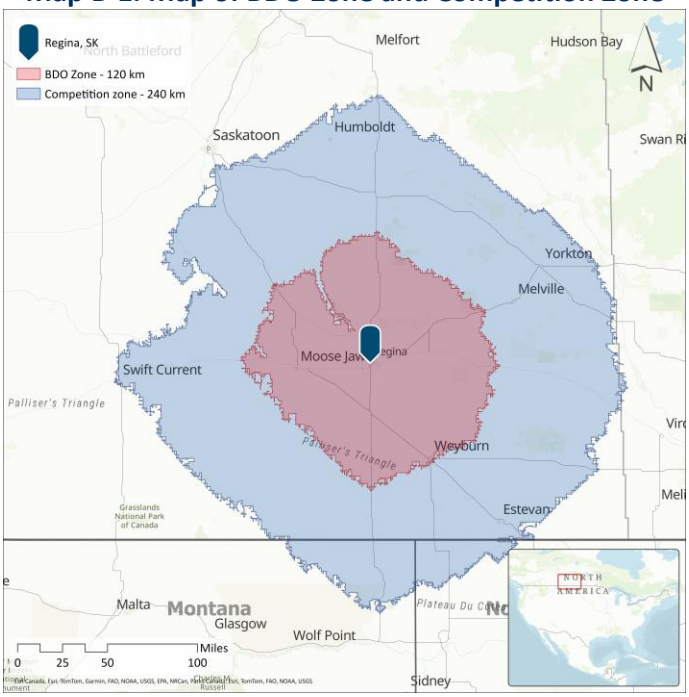
SECTION B: BIOMASS AVAILABILITY AND PRICING

OVERVIEW

This section of the risk rating assessment evaluates the rated quantity and pricing for canola straw as a feedstock for bioenergy, biofuels and other bioproducts within the BDO Zone region, with the centre point of the city of Regina, Saskatchewan (SK), Canada. We estimate the rated quantity for future biomass projects in the BDO Zone as the low-risk quantity after considering current competition, supply chain constraints (e.g., operational, accessibility, and market dynamics), and data/model uncertainty. The rated pricing is the expected price that future biomass projects are likely to pay to secure the rated quantity.

The city of Regina is the capital city of the province of Saskatchewan, the second-largest in the province after Saskatoon, and is a commercial centre for southern Saskatchewan. The Regina BDO Zone is delineated by a 120-km drive distance from Regina, SK, where canola straw availability is assessed. The Competition Zone refers to the geographic area from which the existing feedstock consumers can influence canola straw availability within a 240 km driving distance. Map B-1 below shows the overlay of the BDO Zone and Competition Zone.

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

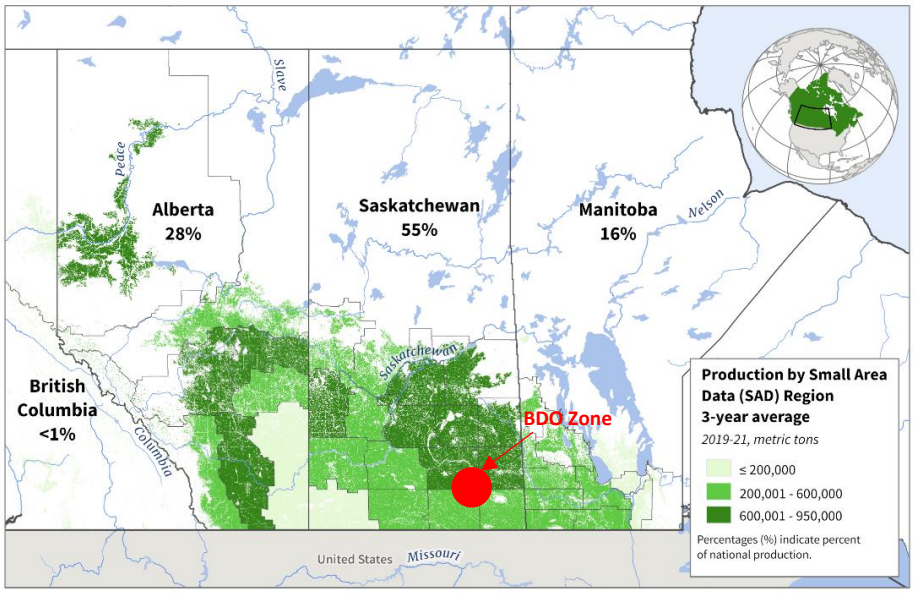


As shown in Map B-2, the province of Saskatchewan is Canada's largest canola producer, accounting for 55% of the total national production. Canola is the largest crop by acre grown in Saskatchewan. Map B-2 also indicates that the Regina BDO Zone is located in the part of the province with one of the highest canola production areas. Canola grows well on the Prairies because of the cool night temperatures which allows the plant to recover from the hot days. The plant is grown all over Saskatchewan, but the majority is grown in the Black and Dark Brown soil zones.[1] Map B-3 shows that most of the BDO Zone is located in Dark Brown and Black soil zones. Black soil zones are highly productive soils that are used to grow a wide variety of agricultural crops, followed by Dark Brown with less moisture available for cropping compared to Black

[1] Agricultural in the Classroom- Canola Overview

soil zones. Oilseed crops such as canola are part of a three-year crop rotation of cereal crops, oilseed crops, and pulse crops, as shown in Figure B-1.

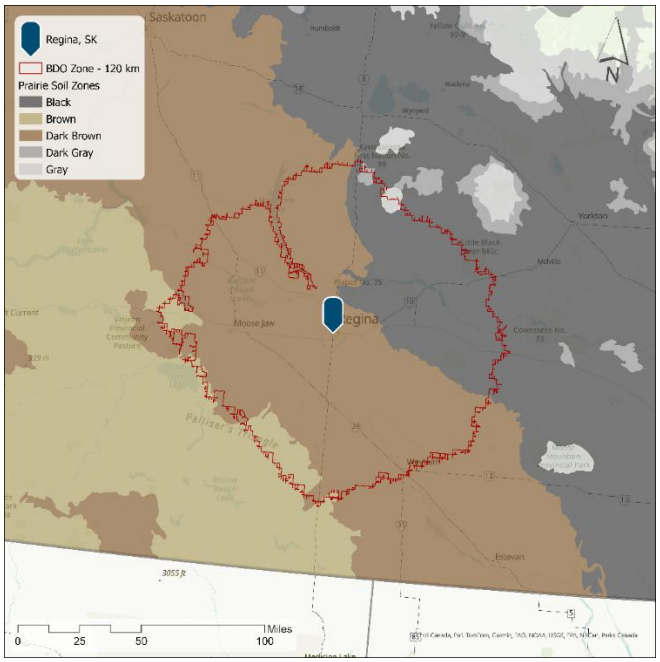
Map B-2. Canola Production in Canada[2]



USDA Foreign Agricultural Service
U.S. DEPARTMENT OF AGRICULTURE

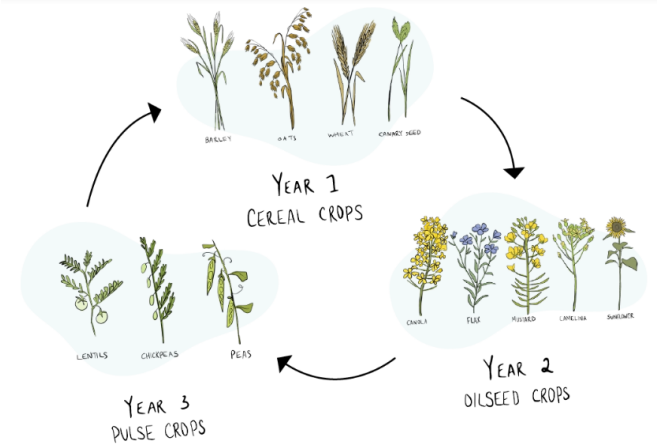
Sources: Statistics Canada, Estimated production by Small Area Data (SAD) Region; Agriculture and Agri-Food Canada (AAFC), Annual Crop Inventory 2021 Crop Mask

Map B-3. Soil Zones in the BDO Zone



[2] US Department of Agriculture, Foreign Agriculture Service

Figure B-1. Crop Rotation in the BDO Zone



EVALUATED FEEDSTOCKS

The evaluated feedstock for the BDO Zone is canola straw, produced as the byproduct of canola seed harvesting. Once canola seed is harvested, a portion of that is delivered to the local canola crushing facilities that convert canola seed into 44% oil and 56% meal.[3] The amount of waste produced in the canola crushing facilities is minimal and can not be considered as a source of biomass. Thus, the only residue produced in large quantities in the canola supply chain is canola straw.

SUPPLY ANALYSIS

To estimate the rated quantity of canola straw in the BDO Zone, we have developed a five-step methodology that accounts for factors such as competition, logistics, sustainability, farmer participation rate and operational constraints. Essentially, it serves as a conservative estimate of biomass availability for future ventures:

(1) **Average annual canola seed production**: This parameter relies on the historical canola planted and yield data in the last 10 years (2014-2023) collected from Annual Crop Inventory Database published by Government of Canada[4] and historical canola yield data published by Government of Saskatchewan[5]

(2) **Average annual canola straw production**: This parameter is estimated based on the average canola yield and the canola straw/seed ratio.

(3) **Current canola straw uses:** This parameter is estimated based on the outreach to the local crop growers and experts and the published documents. This quantity is subtracted from the total canola straw generation to determine the surplus, potentially available for other uses.

(4) **Collection Efficiency:** Collection Efficiency is the ratio of straw collected to the total above-ground residue excluding canola seed. Not all produced crop residue can be technically harvested by the baling machine, part of that is to avoid the soil pickup by adjusting the baler pickup height. In addition, the operator's experience and the baler configuration impact the collection efficiency.

(5) **Biomass Availability Multiple (BAM):** The BAM serves as a mechanism to account for unknown risks related to the future canola straw availability in the BDO Zone by discounting the available straw estimated in Step 4. It calculates a low-risk rated quantity, providing a more conservative estimate of available canola straw. In other

[3] Canola Council of Canada: About Canola
[4] Government of Canada- Annual Crop Inventory
[5] Government of Saskatchewan-Rural Municipality Yields

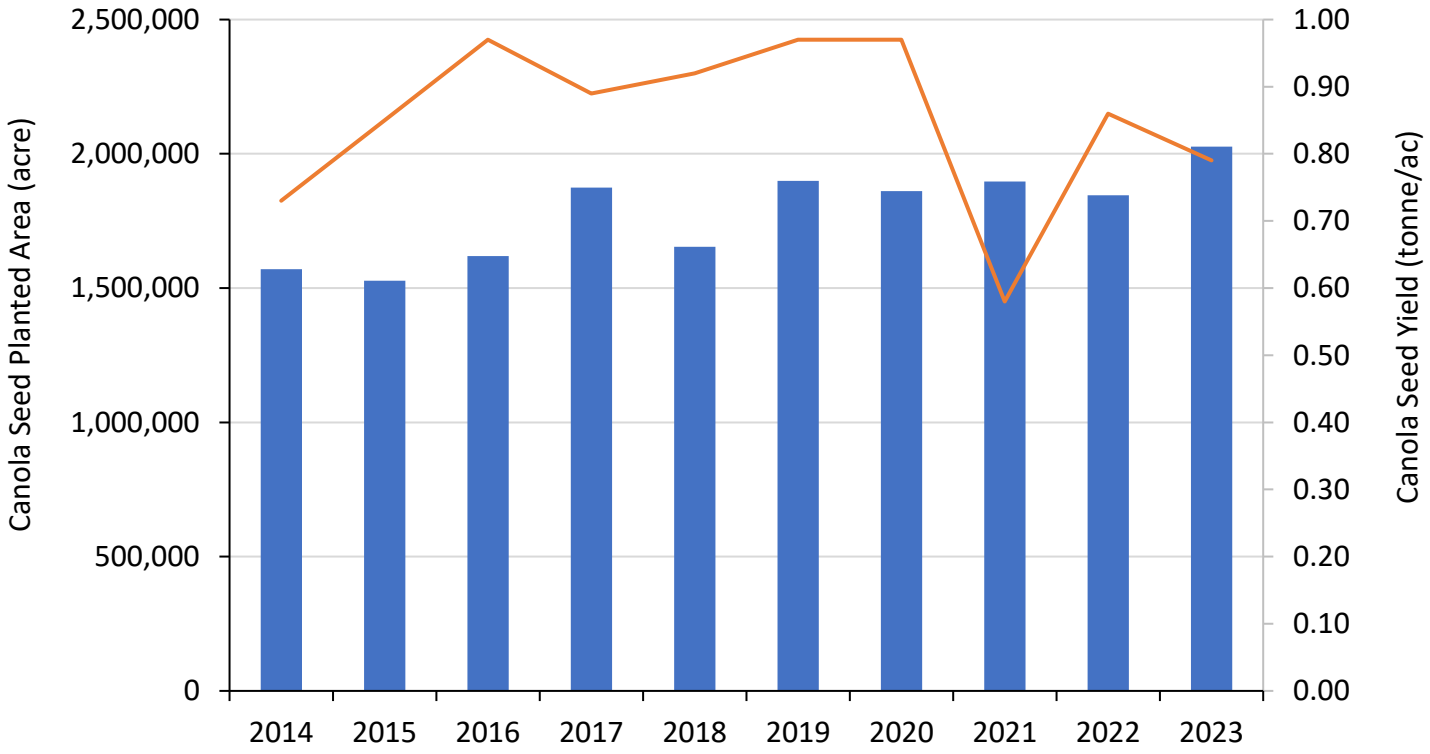
words, BAM indicates the degree of redundancy in biomass availability in relation to the rated quantity in the BDO Zone. The rated quantity is estimated by dividing the amount available to new projects (step 4) by BAM.

Detailed calculations for each parameter are presented below.

Average annual canola seed production

As illustrated in Figure B-2, the canola planted area has averaged 1,800,000 acres with an average yield of 0.85 tonne/ac in the last 10 years, resulting in an average canola seed production of 1,530,000 tonnes per year.

Figure B-2. Historical canola planted area and yield in the BDO Zone



Average annual canola straw production

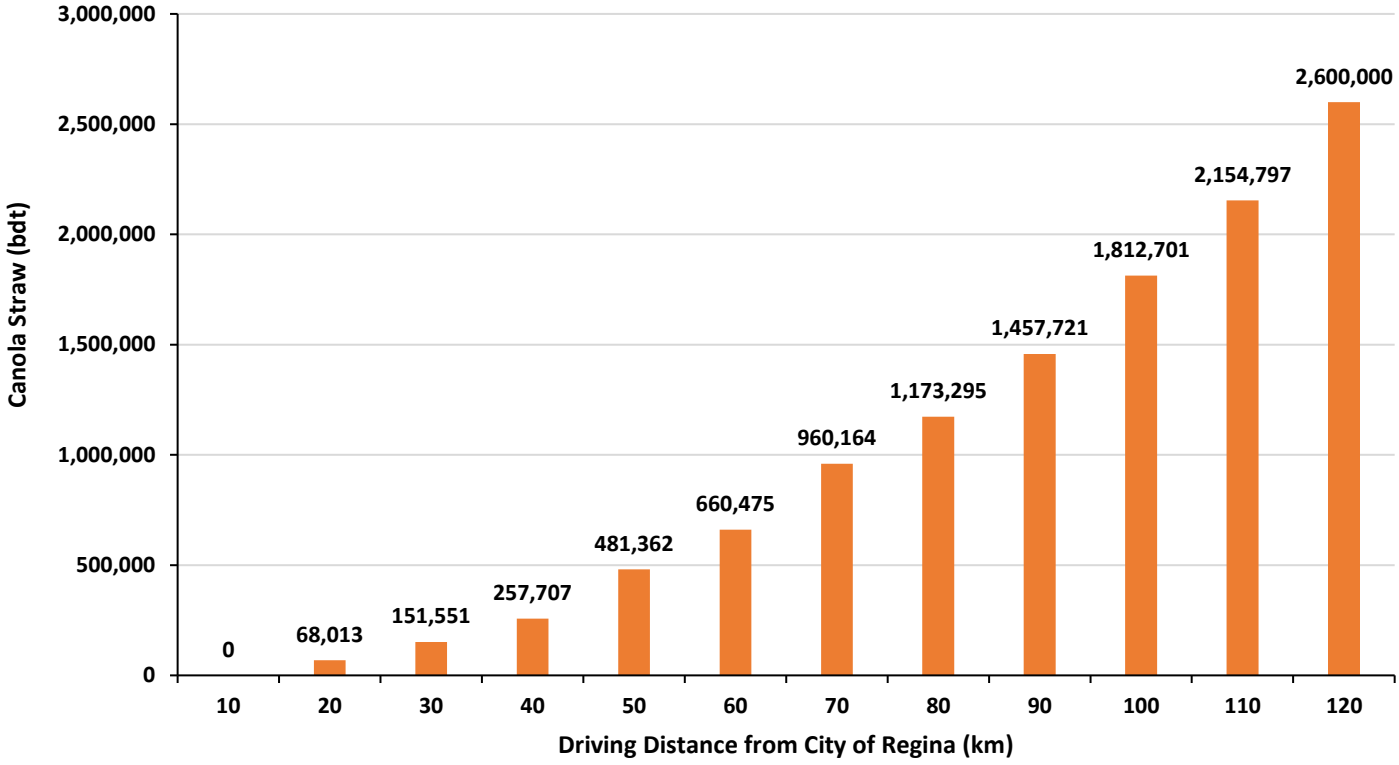
The average ratio of straw to seed for a canola crop is typically 2:1 (2 lb. of residue per lb. of canola seed harvested). This ratio can be as low as one lb. of residue per lb. of canola, to as high as three lb. of residue per lb. of canola seed.[6] We used the average ratio of 2 tonnes of straw to 1 tonne of canola seed. This results in an average canola straw yield of 1.70 tonne/acre. Thus, the average annual canola straw generation is estimated to be 3,060,000 tonnes, equivalent to 2,600,00 bone-dry-tonne (bdt) by adjusting for 15% moisture content.[7]

Figure B-3 presents the supply curve for the canola straw generated in the BDO Zone. Large portion of canola straw (70%) is produced in 100-km driving distance.

[6] Soil Management Guide- Tillage, Organic Matter and Crop Residue Management and outreach to local growers Government of Saskatchewan-Harvesting Surplus Cereal Straw

[7] 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

Figure B-3. Canola straw supply curve in the BDO Zone



COMPETITION ANALYSIS

There are two current uses of canola straw:

Fertilizer/Soil Cover: When left in the field, straw degrades over time, cycling nutrients back into the soil, adding to the soil's organic matter, maintaining soil moisture, and accommodating beneficial microbes. Canola straw left in the field over winter can also help prevent soil erosion by protecting the soil from wind and rain. Therefore, croplands require a certain amount of crop residue to maintain soil quality. On the other hand, excessive residue, which could occur with improved crop yields, would lead to slower soil warming in the planting season, difficulties in operating planting machinery, and increased emissions of greenhouse gases from the decay of residue. The optimum removal of crop residue is site-specific, depending on crop rotation and the soil management practices of individual farmers.

In the BDO Zone, this is the priority use of canola straw given the low canola yield (<1 tonne/acre). The scientific literature in North America suggests 40-60% of crop residue to be left behind in the field as ground cover.[8,9] We assume 60% of canola straw is not available for harvesting, to provide nutrients for the soil and to mitigate soil erosion. In other words, 40% of straw would be available for harvesting as the sustainable removal rate.

Animal feeds for ruminants and livestock bedding: Livestock producers are generally more interested in feed products such as hay, corn silage and cereal straw. Canola straw is mainly used in years with seasonal shortages and rising prices of

[8] Massey Ferguson- Utilizing corn stover as an alternative forage
[9] Government of Saskatchewan- Harvesting Surplus Cereal Straw

primary animal feed products. In our outreach to the crop growers and local experts, they stated that canola straw has been used recently as an alternative feed source when primary feed supplies have been tight. Based on our outreach, we conclude that less than 1% of the produced canola straw in the BDO Zone is used for animal feed and bedding application. Overall, using canola straw for animal feed and bedding is not yet a common practice in the BDO Zone due to the availability of cereal straw (wheat, barley and oats). To be conservative, we assume that 5% of canola straw is used annually as animal feed and bedding products.

Presently, there are no large-scale industrial facilities consuming canola straw within the Competition Zone. Deducting 60% to maintain soil quality and 5% consumed by the livestock in the BDO Zone, we estimate about 910,000 bdt/yr would be available annually for future biomass projects.

Straw Collection Efficiency: There is a wide range of collection efficiency for crop residue in the literature. The reported collection efficiency in the literature is a range of 30-95%.[10,11] This wide range is due to the type of baling equipment, the quality requirement (e.g. minimal ash introduction in the bales), combine equipment setting (which impacts the produced windrow), the operator's experience and weather conditions at the harvest time. With proper preparation at harvest time, as a result of the coordination between the biomass project developer, crop growers and custom harvest groups, it is expected that the average collection efficiency can reach 75%. Such collection efficiency rate reduces the technical and sustainable canola straw availability to 682,500 bdt/yr.

RATED QUANTITIES AND PRICING

The last parameter to estimate the rated quantity of canola straw is BAM. As explained before, BAM accounts for unknown risks related to future canola straw availability in the BDO Zone, such as new competition from existing users, farmer participation rate, and year-to-year variability due to weather conditions in planting, growing and harvest seasons. We used an average canola harvested area and canola yield in the estimation of total canola straw generation, which captures the year-to-year variability to some extent. In addition, it is unlikely that canola straw demand by the existing users (livestock producers) increase in the future due to the availability of feed products such as hay and cereal straw in the BDO Zone. We considered 5% of the total generated canola straw to be used for livestock bedding and feed, which is larger than what we found in the outreach.

Among these factors, the farmer participation rate is the major unknown parameter. Several factors, including straw price, supply contract terms, past experience with canola straw harvesting, removal rate (nutrient loss and soil erosion risk), distance from the biomass processing facility, harvest timeliness and crop rotation, impact farmers' decisions on whether to supply their straw to a new biomass project.[12,13,14,15,16] Among these factors, sustainable removal rate and straw price appeared to have the highest impact on the farmers' decision.

Local canola growers are selling their canola seed to multi-national agricultural companies that require local canola growers to meet certain sustainability criteria. Part of the sustainability criteria is to maintain soil health and improve canola yield by practicing no-tillage/reduced tillage and leaving canola straw in the field after harvesting canola seed. In

[10] University of Kentucky- Corn stover availability and collection efficiency using typical hay equipment
[11] US Department of Energy. 2023 Billion-Ton Report
[12] Corn stover as a biofuel feedstock in Iowa's bio-economy: An Iowa farmer survey
[13] Corn stover for bioenergy production: Cost estimates and farmer supply response
[14] Is Corn Stover Harvest Predictable Using Farm Operation, Technology, and Management Variables?
[15] Survey indicates farmers can supply corn stover biomass, but questions remain
[16] The "Stover Availability versus Supply" Puzzle and Contracting Options for Cellulosic Biomass

addition, due to the existence of cereal straw, many farmers use barley, oat and wheat straw. Overall, the majority of local farmers we talked to indicate a strong preference to leave canola straw in the field after harvest season.

Thus, we assume a high BAM of 4 meaning that 25% of the available straw for harvesting is expected to be available at low risk for future biomass projects (170,000 bdt/year). That is equivalent to about 7% of total produced canola straw in the BDO Zone (2,600,000 bdt/yr).

Table B-1 summarize the calculations for the rated quantity of canola straw in the BDO Zone.

Table B-1. Canola straw-rated quantity calculation

Parameter	Value
Average annual harvested area (ac)	1,800,000
Average annual canola yield (tonne/ac)	0.85
Average annual canola seed production (tonne)	1,530,000
Straw/Canola seed Ratio	2:1
Average canola straw moisture content (wet basis)	15%
Average annual canola straw production (bdt)	**2,600,000**
Competing uses	65%
Average annual canola straw available after competing uses (bdt)	**910,000**
Collection Efficiency	75%
Available annual canola straw after collection efficiency (bdt)	**682,500**
BAM	4
Annual Rated Quantity (bdt)	**170,000**
Rated Quantity/Annual canola straw production	**7%**

Note that canola straw quantities are rounded.

The delivered price of canola straw to a biomass processing plant is comprised of 7 components:

(1) Fertilizer replacement cost: Agricultural residue contains nutrients, and removal from the field means these nutrients are unavailable for the soil and the next crop. Nutrient replacement cost is the cost that is paid to the crop growers to compensate for the nutrients and minerals (N, P, K, S) lost due to the removal of straw from the fields. There is a wide range of fertilizer replacement costs in the literature and even two farms and often two years do not necessarily result in the same costs as the crop yield and fertilizer cost vary from year to year. In addition, different values of (N, P, K, S) per tonne of canola straw have been used in the literature.

A review of literature in Western Canada and the collected data from farmers shows a price of range of $20-45/bdt,[17,18,19] paid to crop growers for the removal of straw. The main reason for the wide range of straw removal price is the fertilizer market price. Figure B-4 shows the global fertilizers price index in the last five years. The COVID-19 pandemic and the global supply chain disruptions resulted in the increased fertilizers prices from mid-2020 to mid-2022 but similar to other commodities, these prices have been experiencing a downward trend in the last two years.

[17] Sask Wheat, Straw Management in Western Canada Wheat and Barley Cropping System, 2022
[18] Government of Alberta, Straw Manufacturing in Alberta
[19] Government of Alberta, The value of straw

Figure B-4. Fertilizers Price Index[20]

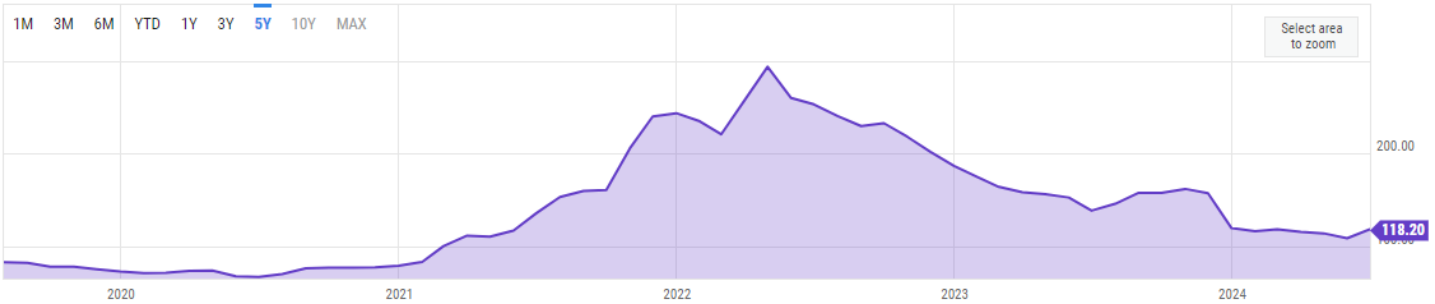


Table B-2 estimates the fertilizer replacement cost based on the price of fertilizers in 2024. Using the same fertilizer to straw ratio (second column) and the fertilizer market price in 2022, the fertilizer replacement cost is estimated to be double the cost in 2024. Thus, we use a range of $19-$38/bdt for the fertilizer replacement cost.

Table B-2. Fertilizer replacement cost calculation for canola straw based on the recent commodity price of fertilizers[21]

Fertilizer Type	lb/tonne of canola straw	Price ($/lb)	$/tonne of canola straw	$/bdt of canola straw
Nitrogen (N)	18.1	0.32	5.80	6.82
Phosphorus (P)	6.4	0.52	3.33	3.92
Potassium (K)	27.2	0.25	6.80	8.00
Sulphur (S)	3.6	0.03	0.2	0.24
	Total Fertilizer Replacement Cost		**16.13**	**18.98**

(2) Baling cost: Baling operation is the first field operation, taking place after harvesting canola seed. Baling cost varies depending on the type and size of bale (square vs. round; large vs. small bales) and the baling machine used.

(3) Bale collection and stacking cost: Both pull-type and sell-propelled bale collectors are used to collect 6-12 bales in each trip and stack them on the roadside of the crop field.

(4) Farmer/custom harvest group profit: Equipment owners (either farmers or custom harvest groups) incur capital costs to own the equipment and they usually charge 15% margin to cover unexpected incidentals or fluctuations in equipment costs.[20,22]

(5) Bale handling cost: it takes about one hour to load and unload bales from a flatbed trailer truck by a loader/telehandler. This cost is usually included in the hourly transportation rate provided by the trucking companies.

(6) Transportation cost: A local logistics company in Regina, provided the below transportation cost for a payload of 39 bales per truckload (17.55 bdt/truckload)[23] for a 53ft flatbed trailer truck.

- Hourly rate of $440 per truckload under 50 km

[20] YCharts, 2024. Work Bank's Fertilizers Price Index
[21] Government of Manitoba- Straw Cost Calculator - Based on Nutrient Removal
[22] Government of Saskatchewan, 2024-2025 Farm Machinery Custom and Rental Rate Guide
[23] Our farmer outreach indicated that the weight of large round and square bales vary from 1,000-1,300 lb with a moisture content of 14-18%. To estimate the average bale weight in bdt, we assumed an average bale weight of 1,150 lb and a moisture content of 15%, resulting in a bale weight of 0.45 bdt.

- Hourly rate of $515 per truckload, 50-100 km
- Hourly rate of $605 per truckload, 100-150 km
- Hourly rate of $700 per truckload, 150-200 km

With the average driving distance of 80 km in the BDO Zone to deliver bales from local suppliers to the gate of the biomass processing facility, the transportation cost is estimated to be $500 per truckload, $12.82/bale, $28.49/bdt ($6.25/loaded km).

(7) Bale storage cost: Large quantities of bales need to be stored after the harvest season to meet the annual demand of the biomass processing plant. The storage cost depends on the storage regime, such as open storage vs. tarp vs. building. Due to the dry harvest season in the Canadian Prairies (low moisture content of canola straw at the harvest season, 14-18%), low temperature in late fall and winter, and low value of canola straw compared to animal feed such as hay, the open storage is the most common storage regime in the region, resulting in a low storage cost of $3-$5/bdt.[24]

Table B-3 provides the summary of the estimated range for each price component. We estimate the rated price for canola straw would be in the range of $37-$55/bale or $81-$123/bdt.

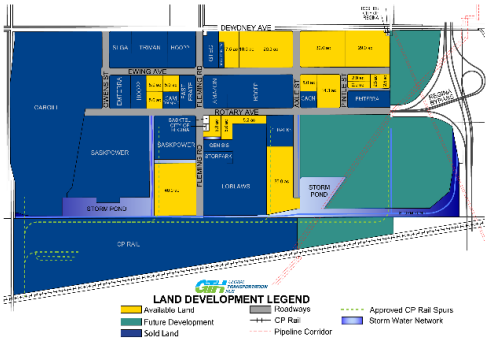
Table B-3 Detailed price range for the delivery of canola straw to a biomass processing facility

Price Component	$/bale	$/bdt
Fertilizer replacement	8.55-17.00	19.00-38.00
Baling	10.00-18.00	22.22-40.00[25,26]
Bale collection and stacking	1.80-2.25	4.00-5.00[4]
Farmer/custom harvest group profit	1.77-3.04	4.00-6.75
Farm-gate Price	**22.12-40.29**	**49.22-89.75**
Bale handling and transportation	12.82	28.49
Bale storage	1.35-2.25	3.00-5.00
Delivered Price	**37-55***	**81-123***

* Delivered prices are rounded.

[24] Evaluating the Economic Viability of Agricultural Pellets to Supplement the Current Global Wood Pellets Supply for Bioenergy Production (2021)
[25] Straw Manufacturing in Alberta
[26] Government of Saskatchewan, 2024-2025 Farm Machinery Custom and Rental Rate Guide

SECTION C: INFRASTRUCTURE



PROPERTY OVERVIEW

Address:	West Regina Bypass and Dewdney
City:	Regina
State:	Saskatchewan
County:	N/A
Acres:	300 Currently Serviced, 1,800 Total
Pricing Note:	$250K/acre
Topography:	Gently sloping - rough graded
Zoning:	Industrial-Light, Commercial

SITE CONTACTS

Global Transportation Hub Contact
Colliers International
2505 11th Avenue, Suite 200
Regina, SK S4P 0K6
P: 306.789.8300
E: donald.booth@colliers.com

ADDITIONAL NON-RATED SITES

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

PROPERTY PROFILE

The Global Transportation Hub (GTH) is an 1,800-acre (730-hectare) autonomous inland port operating at arm's length from the provincial government. All utilities (water, sewer, power, gas, telecommunications) are implemented in the GTH roadways and ditches. Clients simply connect to the most logical service location. Designed for large, heavy-volume transportation, the roads are highway grade, four-lane, undivided with large shoulders to support long combination commercial vehicles. The GTH is a Foreign Trade Zone offering duty deferrals, sales tax relief, and customs services. There are currently 700 greenfield acres and 300 serviced acres available for sale or lease.

Transportation

Nearest Highway: Trans Canada, SK 11
Nearest Interstate: N/A
Nearest Airport: Regina Int'l < 15km
Rail Served: Yes, CN and CP
Rail Accessible: Site dependent *<1 km*

Electric Service

Supplier: SaskPower
Ownership: Crown Investments Corp
Phone: 888-757-6937
Website: www.saskpower.com
All Utilities Extend to Site: No
Nearest Substation: ¼ km
Capability: 3-Phase overhead, 24,900 volts is available in the area but not stubbed to the site. 40 MWs of available capacity on existing lines.

Natural Gas

Supplier: SaskEnergy/Trans Gas
Ownership: Crown Investments Corp
Phone: 888-577-6937
Website: www.saskenergy.com
Size of Main: 6"-12"
Pressure: 50 psi
Capability: Gas is in the vicinity but not at the site

Water

Supplier: City of Regina
Ownership: Municipal
Phone: 306-777-7000
Website: www.regina.ca/home-property/water/
Size of Main: 10"-12"
Peak Capacity: 1,000,000 gals (max)

Wastewater

Supplier: City of Regina
Ownership: Municipal
Phone: 306-777-7000
Website: www.regina.ca/home-property/water/sewer/
Size of Main: 8"- 24"
Capability: Included in water system upgrade

Telecommunications

Supplier: SaskTel
Ownership: Provincial Government
Phone: 800-727-5835
Website: www.sasktel.com
Platforms: Fiber, wireless
Capability: Primary wireless 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: Canola was developed by breeders in Saskatchewan and Manitoba 50 years ago[27] and is now at the centre of a thriving industry with international reach. Canada's canola value chain is made up of growers, seed developers, processors, and exporters. Together, they generate $29.9 billion in economic activity in Canada each year.[28]

Although canola acreage has remained fairly steady over the past decade, total production has increased because of increases in average yield.

According to Statistics Canada, between 1986 and 2023, canola acreage has increased almost 5-fold in the BDO Zone. A five-year moving average yield per acre has increased from about 0.5 tonnes per acre to over 0.8 tonnes per acre during this time, with some years approaching 1.0 tonnes per acre. There are about 10,000 farmers in the BDO Zone.

With the increasing global demand for canola, we expect canola to remain a major crop in rotation for farmers in the BDO Zone.

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**

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.

[27] About Canola. https://www.canolacouncil.org/about-canola/industry. Accessed Mar 20, 2024.
[28] Statistics Canada. https://www150.statcan.gc.ca/n1/pub/96-325-x/2007000/article/10778-eng.htm#:~:text=The%20solution%20was%20canola%20(an,that%20yielded%20food%2Dgrade%20oil. Accessed Mar 20, 2024.

Risk Information: There are no large-scale canola straw consumers in the BDO Zone. The majority of canola growers prefer to leave canola straw in the field. Compared to cereal crops, canola seed produces less straw, and it decomposes quickly. For dryland farming, leaving canola straw in the field is key to trap snow and retain moisture needed for the planting season. A small number of crop growers remove canola straw only when there is a shortage of feed products and cereal straw. In our estimated rated quantity, we considered 5% of the produced canola straw used as livestock feed. Overall, there is not much interest in collecting canola straw in the BDO Zone. In addition, the canola seed buyers, which are multi-national agriculture companies, encourage canola growers to leave canola straw in the field to minimize the use of fertilizers for the next cropping season.

Overall, low appetite for removal of canola straw in the BDO Zone is a high risk for any future biomass projects aiming for canola straw as a its main feedstock.

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

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: Crop lands are either owned by crop growers/farmers (individuals or family businesses) or by private owners (individuals or investment companies) who lease farmland to dozens of farmers. Regardless of the land ownership, due to the value of the farmland for cash crop production such as cereal, canola and pulse crops, the land ownership is deemed to be very low risk in the BDO Zone as these farmlands will be used for crop production.

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**

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 residue 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: The existing fleet of field equipment in the BDO Zone, including balers, bale collectors, tractors, loaders, and trucks, are either owned by farmers (in particular cattle producers as they harvest cereal straw for their animals) or owned by custom harvest groups, some of them move their equipment across the province, providing harvesting and transportation services to the farmers who do not own such equipment. Regardless of the ownership structure of harvesting, collection, handling, and transportation equipment, they can be available for future biomass projects if the timing of harvest allows. However, the biomass projects need to specify in their supply contract agreements with farmers who will be in charge of field operations. Overall, this risk is deemed to be low to medium in the BDO Zone as farmers are familiar with straw harvesting operations and custom harvest services.
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)* **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**

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: Our outreach to local farmers indicated that a small portion of farmers have trucks to deliver straw bales to the biomass facilities in the BDO Zone. A majority of trucks are owned by local transportation and logistics companies that provide bale transportation services not only to the farmers in the BDO Zone but also across the province. Some of these logistics companies are based in Manitoba. Regardless of who owns the transportation

equipment, the ownership structure does not impose a risk on future biomass projects as long as proper combinations take place between the biomass projects, farmers and the logistics companies.

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**

1.3.4 Feedstock as a Secondary Transformation

Rationale: Secondary transformation is dependent upon the production of primary products. Forest residue, 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 residue.

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: Canola straw is the by-product of canola seed production. Despite the dependency of canola straw production on the canola seed yield and harvested area, large quantities of canola have been planted and produced in the BDO Zone, as shown in Figure B-2, whether there is a market for canola straw or not.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very high, therefore the RRL is 10 out of 10.	**10**
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 20 out of 100.	20
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 20 out of 100.	20

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: Crop growers in the BDO Zone have fundamental experience with harvesting, collection, and storage of straw bales due to the use of cereal straw for animal bedding and potential use for cattle feed as well.

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

1.4.2 Production Scale Experience

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

Risk Information: Canola straw has never been considered as feedstock for large industrial applications in the BDO Zone. However, cereal straw including wheat, barley and oat have been harvested in the BDO Zone. In recent years, some farmers have harvested canola straw when there is a demand from livestock producers. However, with the lack of history of large-scale canola straw harvesting and collection to be delivered to a central location with specific quality, the risk of scale-up experience is deemed to be medium to high.

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 medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**48**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* The engagement of custom harvest groups will likely mitigate the risk associated with the lack of farmers' experience in large-scale straw harvesting and collection operations. However, it may reduce the farmer participation rate as not all farmers will be supportive of having a company come to their fields with their own equipment fleet due to the concerns over soil-borne diseases movement, interference with canola seed harvesting and excess soil compaction. Thus, this risk impact is notched down by 25%. The Total Notch (RRL Notch) X (RRI Notch) is 25%.	**Notch** **25%**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

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: The recent use of canola straw has been for small applications and local markets (livestock uses). Due to the small capital required to purchase round balers, the existing harvesting, collection and transportation equipment have been developed mainly for round bales. Thus, the existing straw logistics equipment will likely need to be upgraded to meet the quantity, quality and cost of large commercial biomass projects. Depending on the size of the biomass project, this risk could be medium to high.

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 medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**48**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* The impact of this risk can be mitigated by hiring experienced custom harvest groups who have a fleet of harvest and collection equipment and skilled operators. The risk impact can be notched by 50% using this risk mitigation measure. The Total Notch (RRL Notch) X (RRI Notch) is 50%.	**Notch** **50%**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**24**

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 residue (e.g., pulpwood), supply may not be a top priority for a supplier.

Risk Information: Whether there are markets for canola straw or not, it is produced as the byproduct of canola seed production. However, its harvesting and collection mainly depend on the price the future biomass projects are willing to pay for canola straw and the timeliness of harvesting operations. Thus, this risk is medium to 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)* The timeliness of harvesting operations can be addressed through close communications with farmers. The use of an experienced custom harvest group can also help mitigate any possible delays in field operations. In addition, a 3–5-year supply contract with timely payment to farmers with compensation for straw removal can increase the participation of farmers in selling their canola straw. The risk impact is thus notched by 50%. The Total Notch (RRL Notch) X (RRI Notch) is 50%.	**50%**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 24 out of 100.	**24**

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: There has not been any regular use of canola straw in the BDO Zone region. The traditional users of straw have been cattle farms who prefer cereal straw over canola straw. Many of these cattle producers also grow canola and cereal crops, and harvest, and use their own straw, but we did not find any indication of growth in use of straw in the BDO Zone. We already deduced their consumption from 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 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

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: The historical and current consumption of straw is limited to cattle producers, who consume about 5% of the total straw generation in the BDO Zone with no indication of growing demand.

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

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: Cattle producers mainly use straw for animal bedding, which is not a premium product, and they only use straw for animal feed in case of a shortage of feed products such as alfalfa and forage. Overall, due to the small size of animal bedding and feed markets in the BDO Zone and the large production of straw in the BDO Zone, they do not dictate the market price, and they are not considered a threat to the future biomass projects in terms of pricing and 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 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**

2.1.4 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: Our outreach to the farmers and local experts did not indicate any future growth on the use of straw for livestock in the BDO Zone that can seriously threaten the canola straw availability for future biomass projects.

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**

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: The size of the existing markets compared to the total straw production in the BDO Zone is not significant. The existing markets consume less than 5% of total straw production in the BDO Zone, and with long-term supply contracts (2-5 years), future biomass projects can mitigate possible pressure from the cattle producers over local suppliers.

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**

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]

[29] Bergtold, 2018.

Risk Information: Our outreach confirmed that there has not been any alternative, non-traditional, market-driven competitors for straw that drive feedstock demand in unusual circumstances.
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 low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 8 out of 100. **8**
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 8 out of 100. **8**

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, 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: Due to the large space required and the risk of spoilage, rodents and fire, the current consumers of straw purchase bales based on their annual needs. Although they likely store a certain amount of straw bales to mitigate the risk of sudden future supply shortage, the quantity of stored bales is not significant due to the small size of the existing markets.
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**

2.2.2 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: We do not see any advantages that the existing straw users have in terms of accessibility and delivery hours that future biomass projects cannot have.

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**

2.2.3 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: Similar to livestock producers that are mainly concerned about soil contamination in the bales, ash content and soil contamination are also major concerns for future biomass projects. The main advantage of the existing markets could be their flexibility in accepting both round and square bales, while large-scale biomass projects will likely need large square bales to reduce the logistics costs. However, this depends on the size of the biomass project (their annual straw demand) and their technology, as they may be able to handle and process both round and square bales efficiently. This risk is deemed to be low-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 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**

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: Our outreach to the local experts and farmers confirmed that straw demand from local cattle producers is not expected to grow, which could cause a straw shortage in the BDO Zone. This risk is deemed to be 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**

CATEGORY 3.0: SUPPLY CHAIN RISK

3.1 Risk Factor: Feedstock Availability

3.1.1 Biomass Availability Multiple (BAM)

Rationale: Biomass Availability Multiple (BAM) indicates the degree of redundancy in an Issuer's supply chain in relation to the rated quantity in the BDO Zone. BAM is the mean ratio of biomass feedstock available to a project in relation to delivered cost, divided by the Issuer's mean rated quantity. BAM is a strong indicator of supply chain resilience when stressed by supply shortage and/or supplier breach. BAMs of 1.5 or higher are generally signals of lower feedstock risk for new projects in BDO Zones.

Risk Information: We developed and used a thorough methodology to estimate the rated quantity by considering factors including sustainable removal rate, harvest efficiency, competing uses and farmer participation rate, resulting in a high BAM of 4 (high straw redundancy due to unknown risks related to the future canola straw availability in the BDO Zone). Our rated quantity (170,000 bdt/yr) is 7% of total canola straw production of 2,600,000 bdt/yr.

Despite using a high BAM of 4, removing canola straw in large quantities have not been practiced in the BDO Zone, many farmers prefer to use canola straw as a soil cover. Thus, this risk is deemed to be 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 *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**

3.1.2 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: The canola straw supply curve (see Figure B-3) shows that a majority of straw produced in the BDO Zone (75%) is produced in the driving distance range of 70-120 km, meaning that the future biomass projects will likely need to collect straw bales from this distance range. However, this is still a reasonable distance for straw transportation.

A local logistics company in Regina, provided the below transportation cost for a payload of 39 bales per truckload (17.55 bdt/truckload) for a 53ft flatbed trailer truck. Increasing the driving distance from 50-100 km to 100-150 km adds $90/truckload (about $5/bdt), which is not a significant increase. However, an increase in transportation distance will increase the number of required trucks as it takes more time to deliver the same number of bales to the biomass facility. This is also uncertainty on the actual distribution of farmers in the BDO Zone who will participate in the canola straw supply chain. Thus, this risk is deemed to be medium.

- Hourly rate of $440 per truckload under 50 km
- Hourly rate of $515 per truckload, 50-100 km
- Hourly rate of $605 per truckload, 100-150 km
- Hourly rate of $700 per truckload, 150-200 km

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)	**Score**

The Gross Risk Indicator (RRL X RRI) is 36 out of 100.	**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**

3.1.3 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: Similar to other crop residues, canola straw is available to harvest and collect after the canola seed harvest, which takes place from mid-August to late October. The harvest window varies depending on the weather conditions during harvest season and the availability of harvest equipment. Once harvested, straw bales are stored and available for the remainder of the year. Overall, there is no significant seasonal supply variation if straw bales are maintained properly in the storage sites to minimize the risk of fire and bale spoilage.

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**

3.1.4 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: Canola and other agricultural crops experience year to year variability mainly due to the global supply and demand and weather conditions in planting, growing and harvest seasons, impacting the total harvested acreage and crop yield. As shown in Figures B-2 and E-6, both canola planted area and yield have experience significant variability, resulting in the canola production to as low as 1,100,000 tonne and as high as 1,842,000 tonnes.

[30] Golecha & Gan, 2016.

In our rated quantity, we used an average of canola production in the last 10 years to capture the canola production variability to some extent. In addition, we used a BAM of 4 to account for future uncertainties such as crop planted area and yield. In addition, future biomass projects are expected to consider year-to-year variability factors in their straw supply system by sorting additional bales and contracting more farmers that they need in case of temporary supply shortages.

Overall, this risk is thus deemed to be medium-high.

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 medium, therefore the RRI is 6 out of 10.	**6**
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**

3.2 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: Due to the lack of established markets, there are no historical prices for canola straw in the BDO Zone. In our outreach to the local farmers in the BDO Zone, some of them did not know what the price of straw would be as they have not sold their canola straw in the past, and the price that they expect for fertilizer replacement cost (only material cost) varied significantly from as low as $7/bale to as high as $30/bale. This is a high risk for a new biomass project to reach an agreement on the price that they can afford to pay.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed very high, therefore the RRL is 10 out of 10.	**10**
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 80 out of 100.	**80**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) Early outreach and town hall meetings are effective mitigation measures to understand and manage the farmers' expectations of straw prices. In particular, future biomass projects need to work closely with local farmers to agree on the value of their straw that is affordable for the biomass projects. Also, offering 3-5 years supply contracts and timely payments to farmers as soon as they make and store bales on their fieldside can	**50%**

build trust among farmers and the biomass projects and help in managing straw price in the long term. We expect such mitigation measures can reduce this risk by 50%. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is 50%.
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 40 out of 100. **40**

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 residue, 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: Historical demand for canola straw in the BDO Zone has been very low and limited to animal feed and bedding. Our estimation is that less than 1% of produced canola straw in the BDO Zone has been consumed, mainly by cattle producers. A majority of farmers are familiar with the fundamentals of straw harvesting, collection, and transportation, but a large-scale biomass project needs to upgrade the existing supply chains to deliver straw to its facility in a cost-efficient manner. In addition, as discussed in the previous risk indicator, the biomass projects also need to work closely with the local farmers on the long-term pricing of straw in the BDO Zone. This risk is deemed to be very high.

Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed very high, therefore the RRL is 10 out of 10. **10**
Raw Risk Impact (RRI) **Score** The risk impact is deemed very high, therefore the RRI is 10 out of 10. **10**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 100 out of 100. **100**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **50%** No adjustment. *RRI Mitigation (Notch)* As discussed in the previous risk indicator, early outreach and town hall meetings are an effective mitigation measure to manage the farmers' expectations of straw price due to the low historical demand. Hiring experienced custom harvest groups that have a proven track record of building strong relationships with local farmers can also mitigate the risks associated with supply chain scale-up. Thus, the risk impact can be notched by 50%. The Total Notch (RRL Notch) X (RRI Notch) is 50%.
Loaded RI Score **Score**

The Loaded RI Score ((1-Total Notch) X GRI Score) is 50 out of 100.	**50**

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: Although canola straw has not been regularly harvested in the BDO Zone, other crop residues in particular cereal straw has been harvested, collected, stored and transported in the BDO Zone in the past due to the local demands from cattle and mushroom producers. So, farmers are familiar with the fundamentals of straw logistics. However, canola straw is more difficult to harvest compared to cereal straw as canola straw left behind when harvesting canola would be too fine to bale and it needs adjustments to the combine that allow the straw to be more intact. This risk is deemed to be 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 *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 36 out of 100.	**36**

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: Consumer Price Index for Canada and Saskatchewan are depicted in Figure E-3 for the last 10 years (2014-2024), which have the same trend. Similar to other regions, overall CPI has been gradually increasing due to annual inflation. However, the CPI index for energy has experienced more volatility due to the global geo-political tensions and the recent COVID-19 pandemic, but the CPI index for energy in Saskatchewan has always been lower than national level.
Overall, no particular trends are observed for CPI in Saskatchewan that make this region stand out in terms of food, energy and other consumer products compared to the rest of Canada. Thus, the risk is deemed to be 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) 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**

3.3.2 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: This risk is irrelevant for this BDO Zone as canola straw is expected to be supplied from the Canadian side of the BDO Zone, and thus, no risk is associated with the currency.

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**

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: This risk is irrelevant to this BDO Zone as canola straw is expected to be supplied from the Canadian side of the BDO Zone.

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	Notch
The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	NR
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	NR

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: Due to the small size of the existing market (less than 5% of total straw production) and no indication of any growing trend for the existing markets in the BDO Zone, even in case of a temporary supply shortage, we do not expect the existing markets would have a significant impact on straw availability for future projects. Signing 3-5 supply agreements with local canola producers can mitigate the risks associated with temporary externality-driven markets. This risk is deemed to be low-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 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

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: Most farmers in the BDO Zone who own harvesting and collection equipment produce round bales due to the lower capital costs of round balers compared to square balers (2-4 times less expensive) and also the fact that farmers who have livestock purchase round balers for hay. Round bales of hay have a longer-lasting life than square if stored outside. It is an extra expense for farmers to have a large covered area for square bale storage versus being able to have round bales stacked outside. As a result, most farmers will not buy a second baler just to make their straw; they will use the round baler for straw as well.

Custom harvest groups who can serve several regions by moving their equipment around produce and handle square bales. Depending on the biomass conversion technology and the annual biomass demand of future biomass projects, these projects may be able to handle and consume both round bales and square bales.

Overall, this is the case for almost every agricultural region in the Canadian Prairies, and we do not see that as an advantage or a disadvantage for the BDO Zone but a reality about the availability of both round bales and square bales and we expect future projects take this into their consideration in the development of their straw logistics.

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**

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 discussed in the previous risk indicator, in almost every agricultural region in the Canadian Prairies, both round and square bales are produced, and we expect future projects to take this into consideration in the development of their straw logistics. In the case of a large biomass project (>100,000 bdt/year), square bales are more favourable due to their lower transportation and storage costs. Some of the farmers in the BDO Zone indicated that in case of established demand and long-term contracts, they would consider purchasing square bales. In addition, custom

harvest groups that serve the livestock market usually own a fleet of square balers. Thus, the likelihood of this risk is high for large-scale future biomass projects, but its impact is manageable.
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 low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 32 out of 100. **32**
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 32 out of 100. **32**

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: Bales are the only method of densification for straw, but their size, density, and weight vary. Depending on the annual biomass demand of the future biomass project, the difference between bale size, density and weight can have a significant impact on the delivered price.
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 very high, therefore the RRI is 10 out of 10. **10**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 60 out of 100. **60**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **50%** No adjustment. *RRI Mitigation (Notch)* Hiring an experienced custom harvest group with a fleet of baling and bale collection equipment can mitigate the impact of varying bale size, density and weight. Thus, this risk is notched down by 50%. The Total Notch (RRL Notch) X (RRI Notch) is 50%.
Loaded RI Score **Score**

[32] Huhnke, 2018.

The Loaded RI Score ((1-Total Notch) X GRI Score) is 30 out of 100.	**30**

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: Due to presently low market demands for straw and an underdeveloped supply chain, the number of logistics operators trained to harvest, collect, store and transport straw is low. This has generated concerns about the existing labour force's ability to meet the increased demand for straw, meaning that willing participants would need to be quickly trained during the relatively short harvesting season. To harvest, collect and store the rated quantity during the harvest season, about 25 balers, 15 bale collectors/movers, 40 tractors, 10 trucks and 50 operators are needed. This number of operators should be manageable to secure and train while the biomass facility reaches steady operation, but it requires close collaboration between crop growers, custom harvests, hauling companies and the biomass project developer.

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)* 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**

3.5 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: As shown in Figure B-3 (canola straw supply curve), the majority of canola straw (70%) is produced within 100 km driving distance, which is an economic distance for straw transportation.

As discussed in Risk Indicator 3.1.2, increasing the driving distance from 50-100 km to 100-150 km adds $90/truckload (about $5/bdt) to the cost of transportation, which is not a significant increase. However, an increase in transportation distance will increase the number of required trucks as it takes more time to deliver the same amount of bales to the biomass facility. This is also uncertainty on the actual distribution of farmers in the BDO Zone and who will participate in the straw supply chain. Thus, this risk is deemed to be 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**

3.5.2 Diesel Cost Impacts

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

Risk Information: Transportation companies usually add a fuel surcharge on top of the current rate when the cost of fuel exceeds a defined level (i.e., fuel price baseline). In the high price of diesel in 2021-2022 (see Figure E-4), a fuel surcharge of 15-40% was observed, resulting in a $3-$8/bdt increase in biomass transportation cost, which is considered a medium/high impact depending on the annual biomass demand future biomass projects and the price they can afford to pay. As shown in Figure E-4, the cost of diesel in Regina has been slightly lower than the average price in Canada.

Due to the relatively lower payload of trucks carrying straw bales (15-20 bdt) compared to other biomass resources such as sawmill residue (20-25 bdt), the transportation cost ($/bdt) is more sensitive to diesel price. However, this is not specific to canola straw and this BDO Zone and is the same case for agricultural biomass logistics in other agricultural regions. Thus, biomass projects usually consider the impact of lower payload and diesel prices in their financial models. Thus, the likelihood of this risk is high (volatility in diesel price), but its impact is medium.

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 medium, therefore the RRI is 6 out of 10.	**6**
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)*	**NN**

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 48 out of 100.	**Score** **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: Flatbed trailer trucks (53ft and Super-B) are used for the transportation of both round and square bales, and thus, no specialized equipment is required.	
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**

3.5.4 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: The BDO Zone is a hub in Canada for the transportation of various agricultural products for delivery to the local, regional and international markets (see Figure E-1). The centre of the BDO Zone (City of Regina) has superior access to markets: Two intermodal transport facilities (including a self-governing inland port) that provide access to North American and global markets via interconnected rail, air and road systems. This risk is deemed to be 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.	**Notch** **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 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: To support the agriculture industry and heavy industries such as mining and oil and gas and to maintain the transportation infrastructure, the Government of Saskatchewan has developed Truck Weight Classifications and Restrictions.[33] In discussions with the local logistics companies, none of them considered transportation regulations a limiting factor for the consistent delivery of straw bales to a biomass facility. With the proper management of bale delivery via trucks to the biomass facilities year-round, this risk is considered a low risk.

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**

3.5.6 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: As explained in Risk Indicator 3.5.4, the BDO Zone is a hub in Canada for the transportation of various agricultural products for delivery to the local, regional and international markets (see Figure E-1). Million tonnes of cereal and oilseed crops are produced annually in Saskatchewan and the BDO Zone, and they are transported via trucks. Map E-1 shows the extensive road network in the BDO Zone and the rest of the province.

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**

[33] Government of Saskatchewan, Truck Weight Classifications and Restrictions

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**

3.5.7 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: To transport the rated quantity to future biomass projects, 10-15 trucks are required depending on the truck type (53ft vs. Super-B).[34] In discussion with local transportation companies, they confirmed that this number of equipment is achievable in the BDO Zone. Some of these companies are already providing bale transportation services across the Canadian Prairies.

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)* 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**

3.6 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

[34] Assuming 330 days/year, average 3.3 hr cycle time including loading/unloading, and a payload of 15-18 bdt/truckload and 10 hours/working day

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: Map E-2 shows the canola planted area in coloured hexagons of about 26 hectares.[35,36] This map confirms that the most of the BDO Zone is located in high canola planted areas. Although there is no published/official data on the actual number and size of croplands and farmers in the BDO Zone, we expect that at least 100-150 local growers need to be contracted to meet the rated quantity (170,000 bdt), depending on the canola planted area and straw yield.

Despite the logistical pains of coordinating multiple supply sources, securing a larger number of growers will reduce the overall feedstock risk, as the unexpected failure of one or two growers would have less significant impacts on the overall supply chain. This risk is deemed to be low-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 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**

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 external risks that can impact all suppliers in the BDO Zone are weather-related, including drought in planting and growing seasons and rainy conditions in the harvest season, impacting the canola yield and harvested acreage, respectively and thus straw production and availability. The drought year in 2021 is a good example, resulting in the lowest production of canola in the last 10 years (see Figures B-2 and E-6).

The market price of canola also impacts farmers' decisions on how much canola seed they plant, but given the fact that there is an established global demand for canola produced in Saskatchewan, this factor will not impact all suppliers.

[35] Ecostrat modelling using GIS.
[36] Government of Canada- Annual Crop Inventory Database

Overall, the variability in canola straw production due to external risk factors is a known risk, and we expect that future biomass facilities will consider surplus bale inventory and contracting additional farmers to mitigate external risk factors.

This risk is deemed to be 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**

3.6.3 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: As explained in Risk Indicator 1.3.1, regardless of the land ownership (farmer ownership or corporate ownership), due to the value of the farmland for cash crop production such as cereal, canola and pulse crops, the land ownership structure does not impact the canola production in the BDO Zone.

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**

3.7 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: As explained in Risk Indicator 3.6.2, drought impacts the crop planting and growing seasons, resulting in low crop yield (see 2021 canola yield in Figure B-2) and rainy conditions in the harvest season impact harvested acreage as rain makes access to the field challenging and impacts the quality of harvested canola seed and straw.

However, as explained before, the variability in straw production due to weather conditions is a known risk, and we expect that future biomass facilities will consider surplus bale inventory and contracting additional farmers to mitigate weather-related risks.

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**

3.7.2 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: There are no specific climate trends to crop production in the BDO Zone. Similar to other agricultural regions in North America, rising temperatures and erratic weather patterns are predicted to make large cereal-producing regions less productive. Significant economic impact occurred in 2021 due to severe drought and very low crop yield. On the other hand, seed companies have been improving the crop genetics to counteract climate effects. We expect that climate change will continue to have negative effects on crop production in general and that improved varieties and growing practices will be needed over the long term to mitigate this risk. This risk is deemed to be medium to 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) The risk impact is deemed high, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**Score** **48**
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 48 out of 100.	**Score** **48**

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: The primary fire risk for canola straw is at the satellite storage yards, where hundreds of bales are stored after the harvest season. Due to the low moisture content of canola straw (<15%) and the low ambient temperature after the harvest season in the BDO Zone, the likelihood of fire is low. In addition, the biomass projects have to meet the fire code required by the authorities which usually ask for a reasonable space (>100ft) between bale stacks to minimize the spread of fires among stacks.

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 high, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 32 out of 100.	**Score** **32**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment.	**Notch** **NN**

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 32 out of 100. — **32**

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: Canola can be impacted by a number of pests. Common pests in the BDO Zone are blackleg and grasshoppers. These and other pests can be controlled by integrated pest management and using best agronomic practices. Effective chemical treatments are available, and breeders continue to make resistant varieties available.[37] Overall, this risk is deemed low-medium 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 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**

3.7.5 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.

[37] Personal Communication. Roger Chevraux, Canola Council of Canada.

Risk Information: Most regions in Saskatchewan receive between one and two days of hail every year. The BDO Zone is in an area with above average incidence of hail (low-medium severe hail events)[38] but the amount of potential damage varies with the stage of growth. Our outreach confirmed that hail is not a serious concern for crop growers in the BDO Zone, but it can cause damage in some years.
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)* **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**

3.7.6 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.
Risk Information: The risk of flooding in the BDO Zone is low.[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**

[38] Saskatchewan Flood and Natural Hazard Risk Assessment. Prepared for Saskatchewan Ministry of Government Relations. SRC Publication No. 14113-2E18. 2018.
[39] Ibid

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 case of agricultural residue 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: As discussed before, among weather-related risk factors, drought is the main concern among farmers that has a significant impact on the crop yield (see Figure E-5). In 2021, Saskatchewan experienced a severe drought in southern, and some eastern regions of the province. This can be seen in Figure B-2, which shows the lowest canola yield in 2021 compared to the last 10 years. Despite its severity, the occurrence of drought has not been very frequent (see Figure E-5).

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 very high, therefore the RRI is 10 out of 10.	**10**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 60 out of 100.	**60**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* Sorting additional straw bales (redundant inventory) and contracting with additional farmers that needed to meet the annual straw demand of the biomass facility can mitigate the supply shortage due to the drought to some extent. This risk impact is notched down by 25%. The Total Notch (RRL Notch) X (RRI Notch) is 25%.	**Notch** **25%**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 45	**45**

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 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: The southern part of Saskatchewan, where the BDO Zone is located, has between five and ten days with winds at least 63 km/h or stronger.[40] This risk is deemed low for crop production.	
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**

3.7.9 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: Canola quality and yield can be impacted by early frosts and occur to some degree every three to four years.[41]	
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**

[40] Saskatchewan Flood and Natural Hazard Risk Assessment. Prepared for Saskatchewan Ministry of Government Relations. SRC Publication No. 14113-2E18. 2018.
[41] Frost in Canola

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: There are no federal/provincial/local government subsidies for the production and use of canola straw. However, the demand for canola oil has been increasing globally in recent years mainly due to the biofuel policies that encourage the production and use of transportation biofuels such as renewable diesel from feedstocks such as canola oil. This has encouraged farmers in the BDO Zone to increase canola seed production which can result in increasing canola straw production. However, the impact of these policies on canola straw production has been insignificant.

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**

3.8.2 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: The two existing federal regulations (Carbon Pricing and Clean Fuel Regulations) discourage the use of fossil fuels by displacing them with low-carbon alternatives such as straw for heat, power or transportation biofuels. These regulations can potentially increase the demand for canola straw, but their impacts on increasing the use of biomass have been very limited.

There are no specific permits for the utilization of straw for biomass projects.

Raw Risk Likelihood (RRL)	**Score**

The risk likelihood is deemed low, therefore the RRL is 4 out of 10.	**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 Issuer's ability to procure, transport, trans-load, store, or utilize feedstock by affecting local policies, regulations, and Issuer's ability to obtain necessary permitting.

Risk Information: There is no history of backlash against biomass project development in the BDO Zone. In fact, Economic Development Regina has launched a campaign to attract new investment in biomass production and use. However, removing canola straw from croplands is not a common practice and is not recommended by agronomists. Large agricultural companies that buy canola seed require local canola growers to meet certain sustainability criteria. Part of the sustainability criteria is to maintain soil health and improve crop yield by practicing no-tillage/reduced tillage and leaving canola straw in the field after harvesting canola seed. Thus, removing large quantities of canola straw in the BDO Zone may trigger backlash by these companies depending on the size of the biomass project (annual demand for canola straw)

Raw Risk Likelihood (RRL) The risk likelihood is deemed high, therefore the RRL is 8 out of 10.	**Score** **8**
Raw Risk Impact (RRI) The risk impact is deemed high, therefore the RRI is 8 out of 10.	**Score** **8**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 64 out of 100.	**Score** **64**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* Future biomass projects need to work with canola producers and canola crushing facilities at the early stage of the project to exhibit the sustainable removal of canola straw that does not impact the canola seed yield and carbon intensity of canola oil as removal of straw may encourage the use of fertilizer to offset straw nutrient loss in the soil. The risk impact is notched by 25%. The Total Notch (RRL Notch) X (RRI Notch) is 25%.	**Notch** **25%**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**Score** **48**

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: First Nations own croplands in the BDO Zone, and they have been producing crops such as wheat and canola for decades. In fact, First Nations have been very progressive in the BDO Zone by investing in large scale renewable projects (wind and solar). This risk is deemed to be 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**

3.8.5 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: Canola straw is a by-product of canola production, and its use does not compete with the food market. Not only does its use not raise any food concerns, but it also helps put the food vs. fuel debate to rest.

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**

3.9 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: As explained in Section B, we considered 60% of canola straw to be left behind in the field to maintain soil nutrients and organic matter and to mitigate soil erosion. However, the removal of canola straw in large quantities may be pushed back by large agriculture companies that promote sustainable canola production practices through no/reduced tillage and leaving canola straw in the field (see Risk Indicator (3.8.3)).

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 *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 48 out of 100.	**48**

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 the previous risk indicator, we considered 60% of canola straw to be used as soil cover. However, the long-term impact of the straw removal needs to be revisited throughout the lifetime of the biomass project.

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 *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 36 out of 100.	**36**

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: Removal of only a portion of canola straw does not impact surface and groundwater.

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

3.9.4 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: No water is used in the production of canola straw. In addition, most of the canola production takes place in non-irrigated lands.

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**

3.9.5 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 for the production of canola straw.

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: Not rated.

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	**Score**

The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**NR**

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 rated.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**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: The primary quality parameters of concern for biomass projects are moisture content and ash content. The moisture content of canola straw is relatively low (15%) in the BDO Zone due to the dry weather conditions at harvest time. However, ash content is expected to vary from field to field. The introduction of soil contaminations during the baling operation is the main concern.

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 very high, therefore the RRI is 10 out of 10.	**10**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 60 out of 100.	**60**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch)	**50%**
Soil contamination in straw bales can be managed by developing best practices protocol for baling, collection and storage operations in collaboration with local farmers and custom harvest groups to minimize the introduction of dirt during these operations, for example, setting a minimum baler pickup height. Thus, the risk impact is notched down 50%.	
RRI Mitigation (Notch)	

No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is 50%.
Loaded RI Score — **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 30 out of 100. — **30**

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: Due to the limited size of market for canola straw in the BDO Zone, the current supply chain capacity is not sufficient to handle the rated quantity in the short-term future. However, crop growers in the BDO Zone have fundamental experience with harvesting, collection and storage of straw bales due to use of cereal straw for animal feed and bedding and thus we expect the future biomass project would be able to scale up the existing straw supply chain to meet their feedstock requirements with a combination of using the existing supply chain capacity and a new capacity by involving custom harvest groups, operating in other parts of the province and the Canadian Prairies. This requires a close collaboration with crop growers and custom harvest groups.

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)* 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**

CATEGORY 5.0: INFRASTRUCTURE RISKS

5.1 Risk Factor: Physical Infrastructure

5.1.1 Land Parcel/Industrial District

Risk Information: The land parcel highlighted here is an 1800-acre industrial development – The Global Transportation Hub. Located on the west side of Regina, it is designed to attract new development with extensive utility infrastructure, prime transportation access and quick permitting. There are currently 300 serviced acres for new bio-industries, with an additional 700 acres of greenfield land. This area is designed for industry and represents an asset to new industries.

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 The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

5.1.2 Ownership of Land

Risk Information: The Global Transportation Hub (GTH) is a Crown Corporation. As an autonomous government entity, the GTH operates much like a municipality. It is responsible for its own land-use planning and development regulations, governance structure, sub-division approvals, permitting, and enforcement services. This structure offers new industries more expedient transactions for purchase/lease, permitting, utility right of way and emissions certifications. This is considered an asset to new developers.

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**

5.1.3 Permitting Description

Risk Information: The Global Transportation Hub controls the applications and issuances of all permits. They currently provide an 18-day average permit approval schedule. This is very unique in industrial circles and is an asset to any new development.

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)*	**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**

5.1.4 Environmental Issues

Risk Information: There are emissions concerns throughout the Province, as Saskatchewan has the highest per capita emissions in Canada. At 55.9 tonnes of carbon dioxide equivalent, it is 216% above the national average. This is due primarily to oil and gas, agriculture, electricity generation, and transportation.

There are, however, no specific environmental issues in and around the GTH site that would be a concern for new development.

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 Risk Factor: Utilities

5.2.1 Natural Gas Availability

Risk Information: Sask Energy provides both pipeline and commodity delivery of natural gas to the GTH. The utility will connect to a new development parcel with either a 6" or 12" pipeline at a nominal 50psi. The industrial site is laid out with underground access (trenches) in place to support small or large parcels with minimal construction costs. This is a deregulated gas market area. Regular service is 4,000 GJ per day, with over 10,000 GJ per day available for high users. The cost of natural gas is $3.30/GJ (variable). This is competitive with the rest of the province and western Canada. This is a nominal risk item for new development.

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**

5.2.2 Electric Availability

Risk Information: SaskPower is the provider to most residential and industrial sites with distribution systems and higher voltage lines of 25KV/69KV (three phase). Recent grid notes show 40MWs of available capacity in the area. The utility has high voltage lines to the perimeter of the GTH parcel, with smaller distribution lines (24.5kv) in the serviced areas (300 acres). The cost of service is ¢11.987 for the first 16,750 kWh and ¢7.674/kWh for the balance. These rates reflect an average for the province. Risk is deemed low as electric power is at a reasonable price to new industries.

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**

5.2.3 Water Availability

Risk Information: The city of Regina's public, potable water supply infrastructure is robust and well-maintained, with a line construction age of less than five years and a projected life expectancy exceeding 40 years. Multiple purification operations across the city effectively support both residential and commercial sectors. The primary water source, Buffalo Pound Lake, located 57 kilometres to the north, ensures a consistent supply. The water infrastructure in the Global Transportation Hub (GTH) area is well-built and reliably maintained, posing no reasonable risk for new industries to commence service. This makes Regina an excellent choice for industry due to its dependable water infrastructure.

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**

5.2.4 Waste Disposal

Risk Information: Wastewater is managed by the City of Regina's Public Works Department. The GTH has sewer pipes encircling the parcel, with distribution lines to several currently occupied parcels. Waste Management is the primary handler of solid waste streams in the area. They provide both residential and commercial coverage and operate multiple landfills. Waste Management serves the GTH site well, as it is on the outskirts of the city. This represents a low-risk issue for new industries.

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**

5.2.5 Internet Availability

Risk Information: There are at least five primary internet service providers in the Regina area. Their services include wireless and high-speed hardwire connections for industrial customers, and they are currently serving the GTH industrial area. The number of available sources makes the pricing competitive. This is a low-risk item for new businesses coming into the 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.	**Notch** **NN**

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**

5.3 Risk Factor: Transportation/Logistics

5.3.1 Road/Highway Access

Risk Information: Regina and the GTH are located on the Trans-Canada Highway (1), which traverses the country from east to west. North/south access is via SK 11, a primary highway from Saskatoon to the US. This provides a high level of accessibility for commercial truck traffic shipping to either coast. The road infrastructure within the GTH area is complete for the currently occupied parcels. This is a low-risk item for new industries to site here.

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**

5.3.2 Rail Access

Risk Information: For national freight shipping, both CN and Canadian Pacific (CP) have loading hubs throughout the Regina area. The primary CP line runs adjacent to the GTH industrial district, providing spur access to those parcels near the line and transmodal loading at several nearby docks. The area is well served by rail transport services for both freight and passenger. This is an attractive item for many bio-economy industries.

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**

5.3.3 Airport Access

Risk Information: Regina International Airport is an exceptional asset for new industries considering a move to the Regina area. Situated just 11 km from the GTH industrial area, this full-service air center offers robust international freight handling capabilities. With service from 8 major commercial air carriers, including Qantas, Air Canada, and United Airlines, it ensures efficient and reliable transport options. Being the 16th busiest airport in Canada highlights its significant role in the nation's air traffic, further underscoring its value for businesses needing access to employees and industrial freight. Highly recommended for new industries seeking optimal logistics and connectivity.

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**

5.3.4 Water Freight Access

Risk Information: There is no water freight access in the Regina, SK area. With well-established road, rail and air networks, lack of access to water is not a risk for industries in this BDO Zone. This item is not rated.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed not relevant, therefore the RRL is not rated (NR).	**NR**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed not relevant, therefore the RRI is not rated (NR).	**NR**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is not rated.	**NR**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NR (Not Rated).	**NR**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is not rated.	**NR**

5.4 Risk Factor: Social Infrastructure

5.4.1 Healthcare (Local)

Risk Information: Two primary medical centers serve the GTH industrial area – Pasqua Hospital (218 beds) and Regina General Hospital with 426 beds. Both offer emergency (ambulance), major surgical and long-term care options. Additionally, there are over 20 Urgent Care and specialty care clinics throughout the city. This healthcare coverage is important to retain local employees and critical to new industries to attract staff from outside the 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**

5.4.2 Education (Schools)

Risk Information: Regina has one of the largest primary school districts in Canada. There are 44 public elementary schools, eight public high schools, and three faith-based associate schools within the city limits. The University of Regina, Luther College and First Nations University of Canada are three of the secondary education facilities. There are also 14 vocational and trade schools offering technical curriculums in forestry, mining, farming and environmental issues. Similar to healthcare, the availability of educational opportunities is critical to attracting and retaining staff within commercial and industrial operations.

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**

5.4.3 Local Transportation

Risk Information: Regina Transit operates a full system-wide bus/transit operation throughout the Regina area. They have recently extended their Route 1 out to the Global Transportation Hub industrial center. This low-cost mobility is attractive for securing a workforce within the urban area. Employee transportation accessibility is a primary target for developers when siting new industries. This represents low risk.

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**

5.4.4 Public Safety (Local)

Risk Information: Regina's crime rate is slightly above the Canadian average, but this is typical for a large city with a population exceeding 250,000. The Regina police force is well-equipped with over 500 officers providing comprehensive emergency and domestic services. The proximity of a new police station within 2km of the GTH industrial site adds an extra layer of security. Additionally, Regina houses the sole RCMP training academy, with over 1,000 new Mounties graduating each year. This strong law enforcement presence helps mitigate safety concerns, making it a low-risk consideration for new employees moving to the area.

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 cost of living in Regina is 4% lower than the Saskatchewan average and 11% lower than the Canadian national average. Housing and rent costs in Regina are 55% lower than the national average. These are attractive attributes to be considered by new industries looking to relocate to the Regina area. Housing availability is considered acceptable at 8%, which is the amount of the housing/rental market that is available to new owners. Overall, this is an asset to new industrial development.

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**

5.5 Risk Factor: Labour

5.5.1 Workforce

Risk Information: Saskatchewan has one of the youngest workforces in Canada. Over half of all employees in the province have post-secondary education or training. 68% of the available workforce is employed, supporting a 4.9% unemployment rate. Both of these percentages are ideal for new industries to consider when seeking new labour requirements. The mining, petroleum, and agricultural industries contribute significantly to the stability of employment in the region, with attractive pay scales, benefits, and growing economies. Saskatchewan presents a robust and educated workforce with significant employment stability and opportunities in key industries, making it an attractive location for new industries to establish operations.

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**

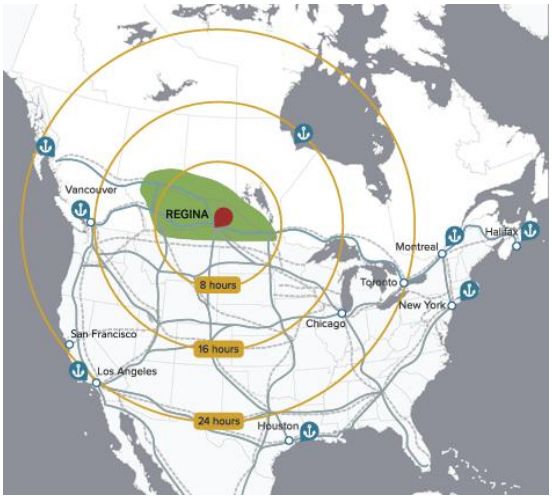
5.5.2 Labour Costs

Risk Information: The wage distribution in the Regina area reflects a mix of industries, with higher pay in sectors like mining and petroleum and lower pay in agriculture and services. The average hourly rate of pay in the Regina area is just above $14/hour, which is the current minimum wage. Semi-skilled and skilled workers garner up to $35/hour. These wage rates are average for the provinces in western Canada and represent a low risk to new industries.

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**

SECTION E: TABLES AND FIGURES

Figure E-1. Regina Location Advantage

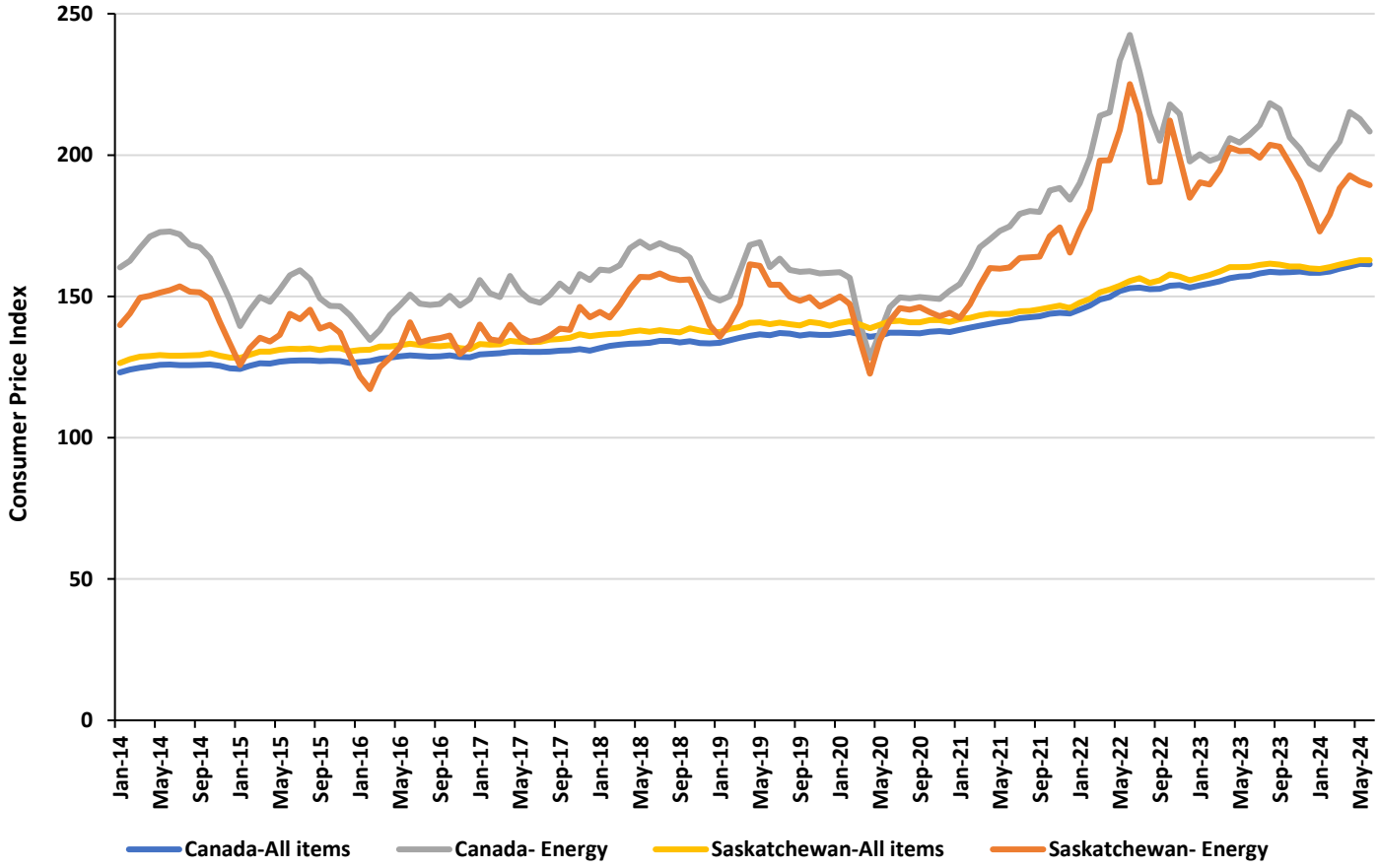


- Regina is surrounded by 80 million acres of cropland, creating unparalleled access to agricultural commodities.
- Superior access to markets: (1) Two intermodal transport facilities (including a self-governing inland port) that provide access to North American and global markets via interconnected rail, air and road systems; (2) Exporters can reach more than 60 million customers within 24 hours and 270 million in 48 hours.

Figure E-2. Global Transportation Hub Industrial Site – 1800 Acres



Figure E-3. Consumer Price Index, monthly, 2014-2024: Canada vs. Saskatchewan[42]



42 Statistics Canada, Consumer Price Index, monthly, not seasonally adjusted

Figure E-4. Canada vs. Regina Diesel Price, 2020 - 2024[43]

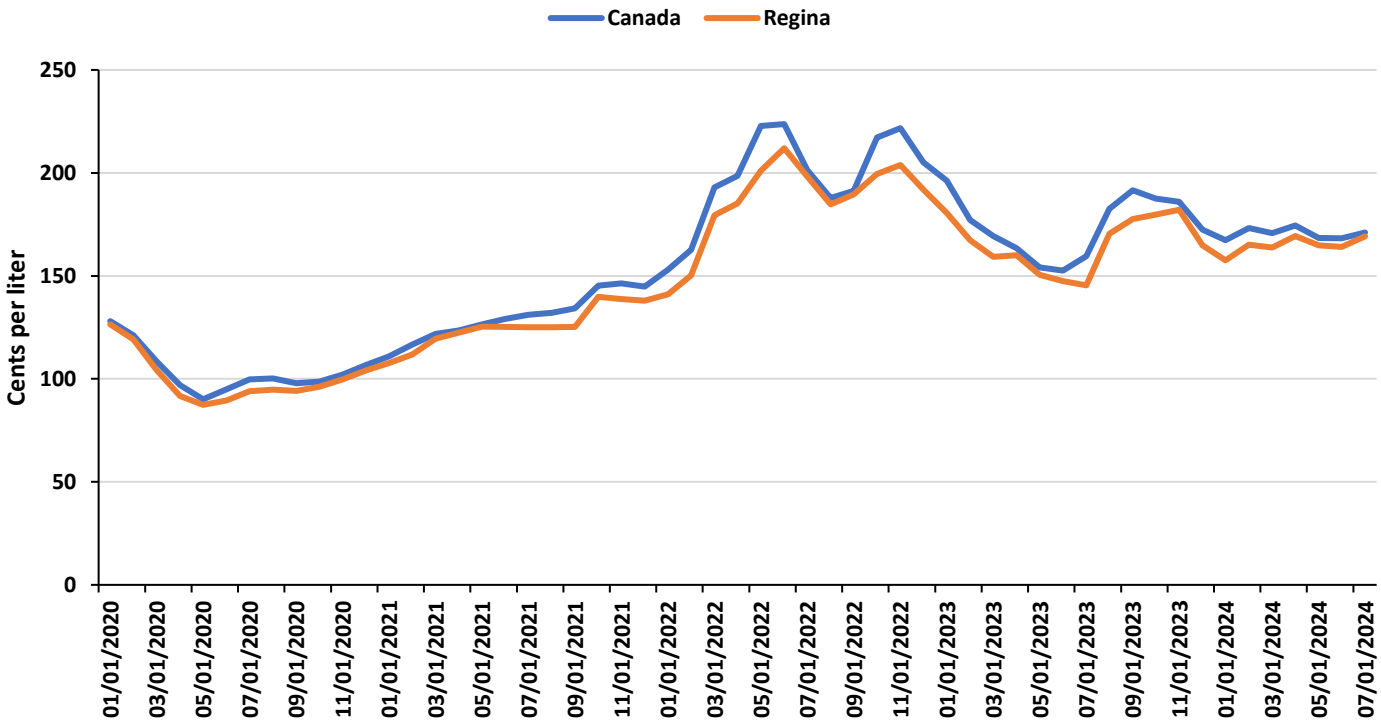
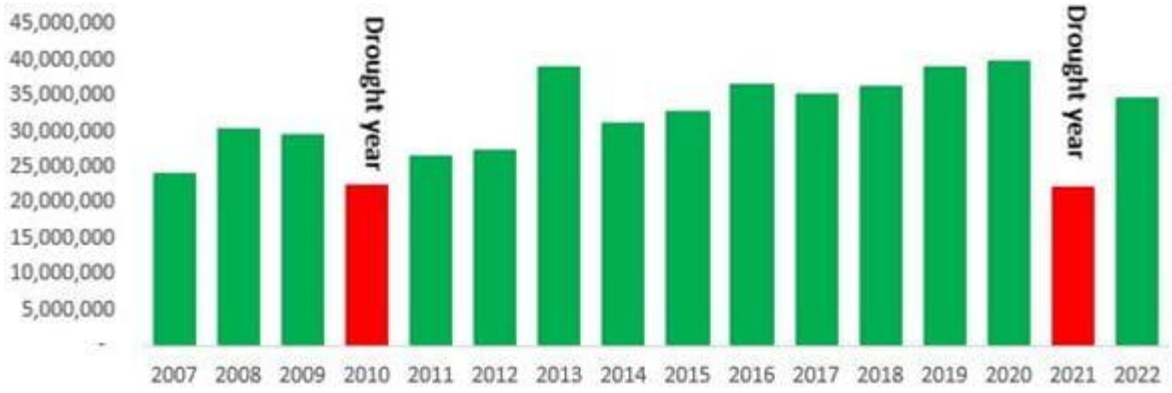
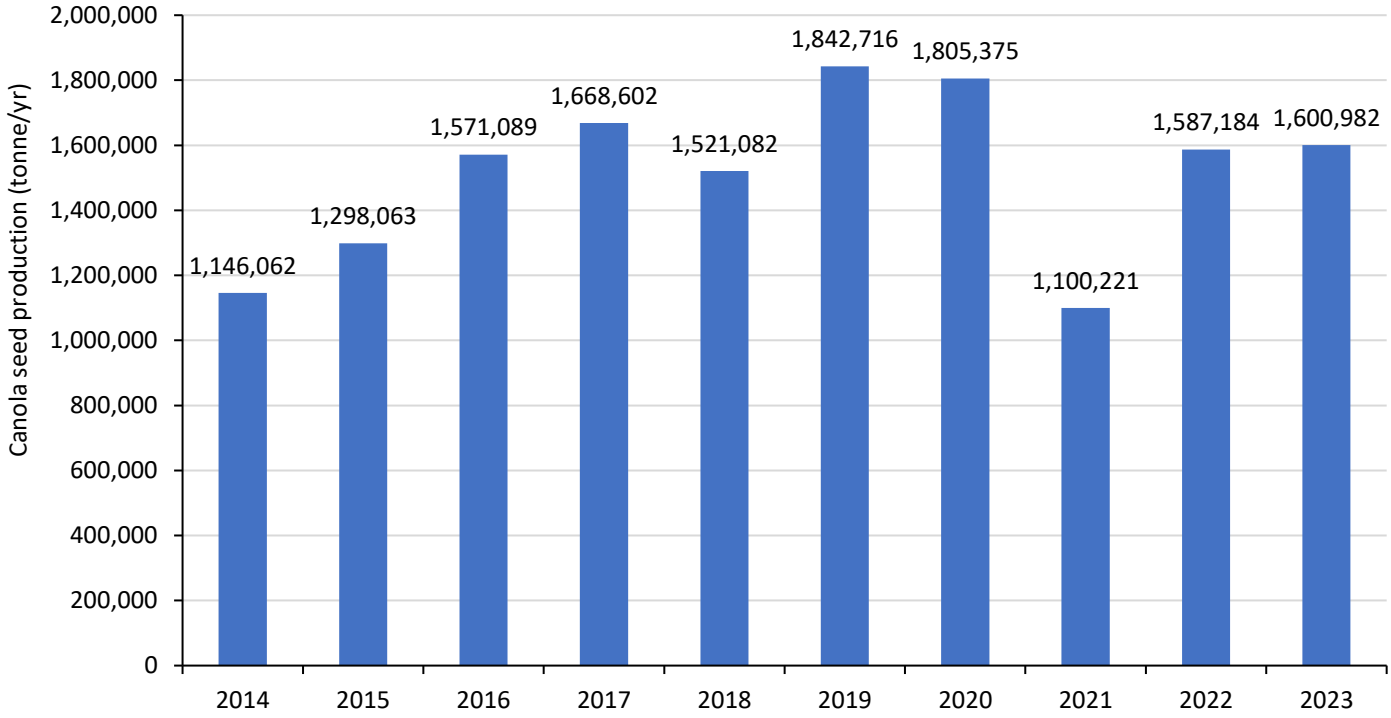


Figure E-5. Crop production (tonnes/year) in Saskatchewan with the drought year in red colour[44]

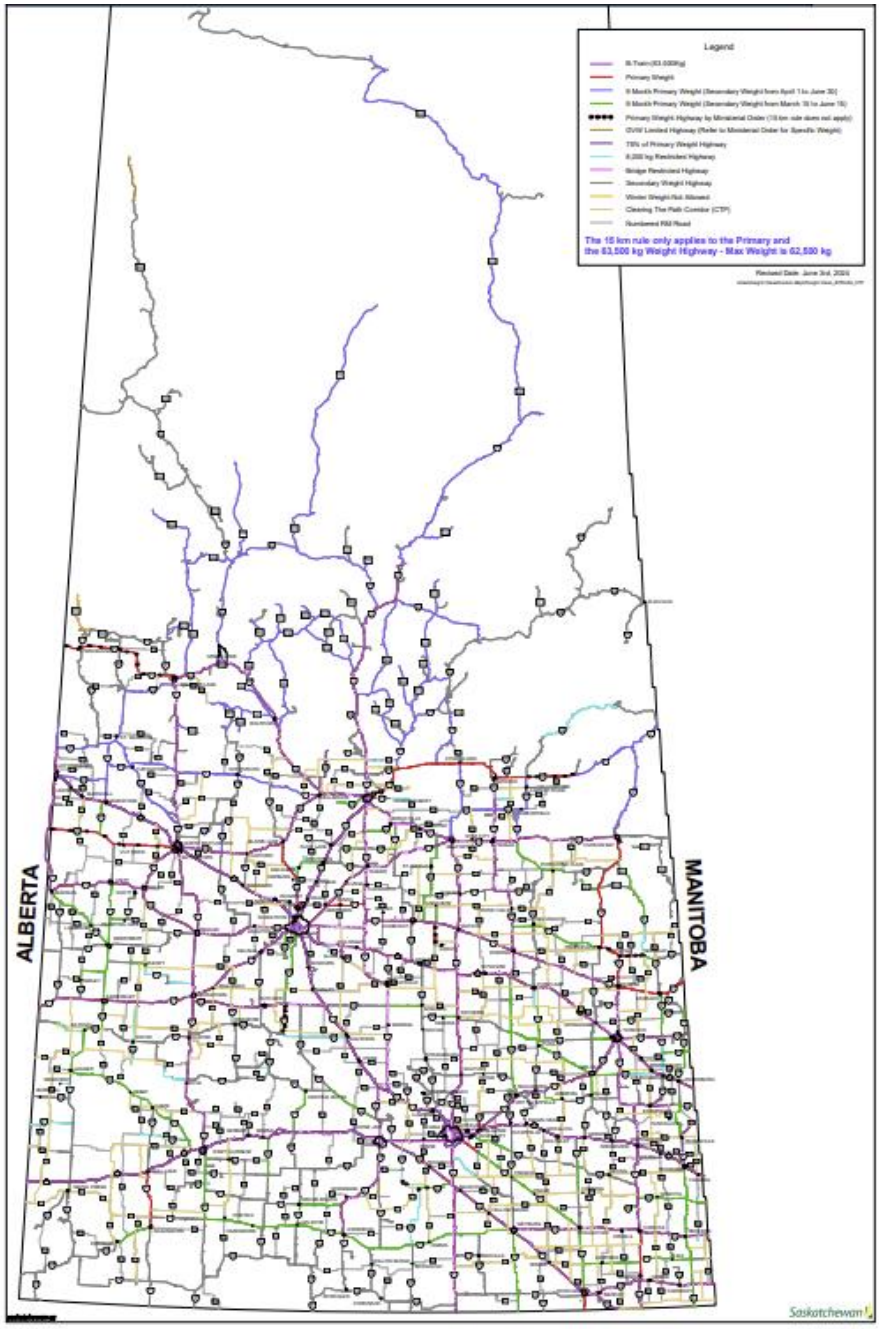


[43] Natural Resources Canada, Monthly Retail Prices for Diesel
[44] Government of Saskatchewan-History of drought impacts in Saskatchewan

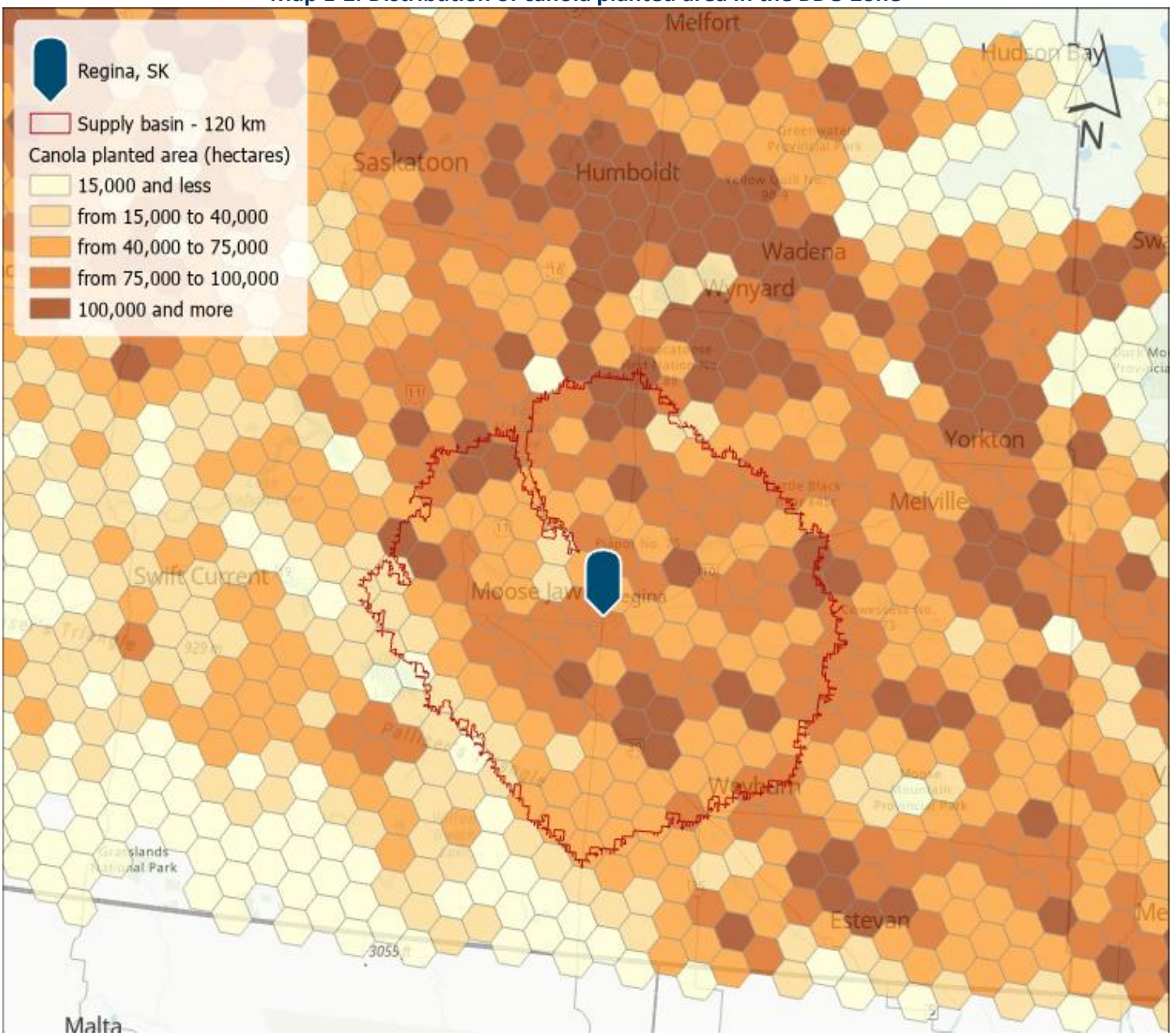
Figure E-6. Historical canola seed production in the BDO Zone, 2014-2023



Map E-1. Truck Weight Classification Map



Map E-2. Distribution of canola planted area in the BDO Zone



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