MASON CITY, IOWA

Bioeconomy Development Opportunity Zone

RATING GRADE: 'A'

Date of Issue: July 16, 2024

A
High Quality

Rating Parameters:

Category	Rated Quantity	Delivered Price	BDO Zone Size
Corn Stover	**1.4 million bdt/yr**	**$87-$99/bdt**	**75-mi drive distance from Mason City, IA**

BDO ZONE ASSETS

- Large quantities of low-risk corn stover available in the BDO Zone to new projects.
- High yielding corn region that warrants long-term corn stover supply.
- Corn producers willing to participate under mutually beneficial agreements.
- No significant competition for corn stover.
- Greenfield site in an industrial park with all utilities available capable of accommodating multiple projects.

BDO ZONE LIABILITIES

- Corn stover harvesting, collection and transportation equipment currently insufficient and unsuitable to supply the rated quantity.
- Limited experience of producers supplying the rated quantity.
- Severe droughts and Derechos can significantly impact grain yield.
- Prolonged rain periods in the fall can drastically restrict stover collection and storage logistics.

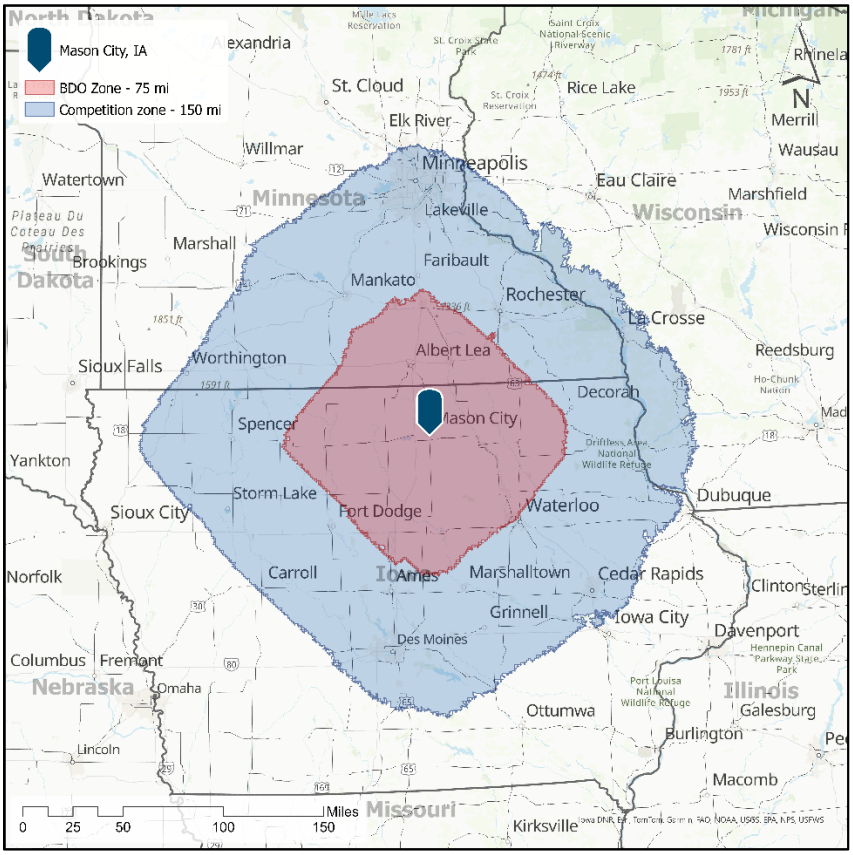
RATING GRADE

The Mason City, Iowa Bioeconomy Development Opportunity Zone, is rated 'A', or 'low' risk.

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

'A' ratings denote high prospective viability of Feedstock Supply and Infrastructure and low expectations of default risk in the Zone. Capacity to support new biobased plant operations is considered strong. This capacity may, nevertheless, be more vulnerable than higher ratings to severe weather events, insufficient high-efficiency collection and transportation equipment, and limited large-scale production experience.

MASON CITY, IOWA BDO ZONE



BD OZ BIOECONOMY DEVELOPMENT OPPORTUNITY ZONE INITIATIVE

ANALYST NOTES

We assess a low-risk availability of corn stover of 1.4 million bone dry tons (bdt) per year, or 10% of the total corn stover produced in the BDO Zone. The estimated rated quantity for future biomass projects is the low-risk quantity after the consideration of current competition, supply chain constraints (e.g., operational, accessibility, and market dynamics), and data/model uncertainty.

We also project the average delivered price range of corn stover bales between $87 and $99 per bone dry ton. The rated pricing is the expected price that future biomass projects are likely to pay to secure the rated quantity.

In addition, we assess the suitability of the BDO Zone to sustain a new bio-project by scoring supplier, competition, supply chain, feedstock scale-up, and infrastructure indicator risks. Highest-risk indicators are related to inadequate industrial-scale collection and transportation equipment availability. Medium risk indicators deal with limited production scale experience, suppliers' equipment efficiency/capacity to scale up, and weather events that negatively affect both yields and supply chains. Most of the low-risk indicators were associated with a lack of established competition, historical corn stover production and sustainability, seasonal supply variations, social and political backlash, and physical infrastructure.

BDO ZONE ASSETS

The BDO Zone is part of a well-established corn-producing region in the USA. The high average corn yields, around 200 bushels per acre, allow for sustainable corn stover removal without compromising soil health.

There is a long and dependable history of family-owned and operated farms in the BDO Zone, most of which are well acquainted with corn stover production and utilization projects. A reliable foundation of expertise exists on which industrial supply chains can be scaled up.

Outreach indicated that corn producers are willing to participate in new projects, granted that project proponents can guarantee fair compensation and timely stover removal, given the short harvest window of less than 2 months.

Lastly, the existing utilization of corn stover in the BDO Zone for animal bedding and biofuels/biomaterials poses no serious threat to the vast availability of corn stover generated here.

The proposed 145-acre greenfield site is another asset of the BDO Zone. It is located in an industrial park, with all utilities such as electricity, water, natural gas, sewage, and communications. The site is located close to major highways and railroad (details in Section C).

BDO ZONE LIABILITIES

While some corn stover collection and transportation equipment is available to serve the animal bedding and existing/planned biobased projects, a large-scale corn stover project would most likely require improved baling and transportation efficiency. Consequently, investments in high-density square baling equipment will be necessary to significantly increase this efficiency.

Producers communicated hesitancy to invest in large square balers due to a lingering memory of previously failed projects and the additional labor and expertise needed. However, they are generally in favor of project proponents organizing the collection, storing, and transportation of corn stover bales, especially if these are performed expeditiously after corn harvesting.

Large corn yield fluctuations like the ones in 2014 and 2020 indicate a high risk of severe weather droughts and powerful thunderstorms (Derechos), including hail, impacting the corn stover supply. Moreover, prolonged precipitations significantly reduce the stover baling season and impact the quality of the feedstock due to increased moisture content and subsequent material loss.

SCORING & RATING METHODOLOGY

In assessing the biomass supply chain risk for the Bioeconomy Development Opportunity (BDO) Zone, 88 Risk Indicators from the US 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 tons per year (bdt/yr), while feedstock costs are expressed in United States dollars (USD). Maximum transport distance

is based on a 75-mile driving distance from the center point, Mason City, Iowa.

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 Mason City, Iowa, is ***22 out of 100, resulting in an 'A' designation.***

All scoring and rationale for each Risk Indicator are provided in Section D.

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SECTION A: RISK INDICATOR SUMMARY

Figure A-1. Risk Indicators (Sorted by Risk Level)

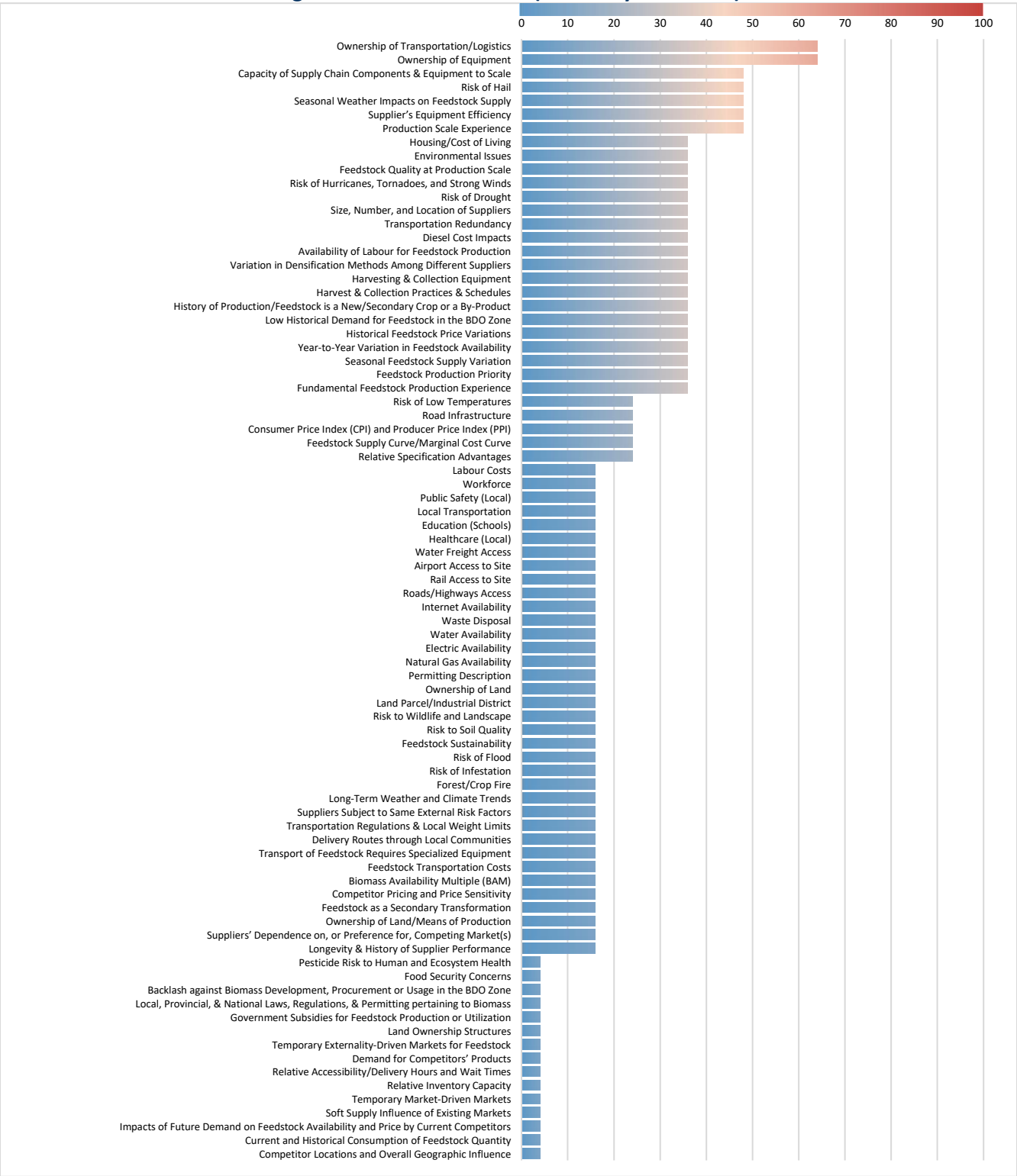


Table A-1. Risk Indicators and Associated Scores

Feedstock Supply Chain Risk Indicators	Raw Risk Likelihood	Raw Risk Impact	Gross Risk Indicator	Mitigation /Notching	Loaded RI Score
Category 1.0: Supplier Risk					
1.1 Risk Factor: Credit-Worthiness/Future Solvency of Suppliers					
1.1.1 Longevity & History of Supplier Performance	4	4	16	NN	16
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)	4	4	16	NN	16
1.3 Risk Factor: Supplier Control Over Production and Transportation					
1.3.1 Ownership of Land/Means of Production	4	4	16	NN	16
1.3.2 Ownership of Equipment	8	8	64	NN	64
1.3.3 Ownership of Transportation/Logistics	8	8	64	NN	64
1.3.4 Feedstock as a Secondary Transformation	4	4	16	NN	16
1.4 Risk Factor: Supplier Experience					
1.4.1 Fundamental Feedstock Production Experience	6	6	36	NN	36
1.4.2 Production Scale Experience	6	8	48	NN	48
1.5 Risk Factor: Supplier Harvesting/Collection/Processing Capacity					
1.5.1 Supplier's Equipment Efficiency	6	8	48	NN	48
1.6 Risk Factor: Supplier Motivation					
1.6.1 Feedstock Production Priority	6	6	36	NN	36
Category 2.0: Competitor Risk					
2.1 Risk Factor: Influence on Feedstock Supply of Existing Markets					
2.1.1 Competitor Locations and Overall Geographic Influence	2	2	4	NN	4
2.1.2 Current and Historical Consumption of Feedstock Quantity	2	2	4	NN	4
2.1.3 Competitor Pricing and Price Sensitivity	4	4	16	NN	16
2.1.4 Impacts of Future Demand on Feedstock Availability and Price by Current Competitors	2	2	4	NN	4
2.1.5 Soft Supply Influence of Existing Markets	2	2	4	NN	4
2.1.6 Temporary Market-Driven Markets	2	2	4	NN	4
2.2 Risk Factor: Specific Competitors' Competitive Advantage					
2.2.1 Relative Inventory Capacity	2	2	4	NN	4
2.2.2 Relative Accessibility/Delivery Hours and Wait Times	2	2	4	NN	4
2.2.3 Relative Specification Advantages	4	6	24	NN	24
2.2.4 Demand for Competitors' Products	2	2	4	NN	4
Category 3.0: Supply Chain Risk					
3.1 Risk Factor: Feedstock Availability					
3.1.1 Biomass Availability Multiple (BAM)	4	4	16	NN	16
3.1.2 Feedstock Supply Curve/Marginal Cost Curve	4	6	24	NN	24
3.1.3 Seasonal Feedstock Supply Variation	6	6	36	NN	36
3.1.4 Year-to-Year Variation in Feedstock Availability	6	6	36	NN	36
3.2 Risk Factor: Historical Issues					
3.2.1 Historical Feedstock Price Variations	6	6	36	NN	36
3.2.2 Low Historical Demand for Feedstock in the BDO Zone	6	6	36	NN	36
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)	6	4	24	NN	24
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	2	2	4	NN	4
3.4 Risk Factor: Risks Related to Feedstock Production, Harvest, and Collection					
3.4.1 Harvest & Collection Practices & Schedules	6	6	36	NN	36
3.4.2 Harvesting & Collection Equipment	6	6	36	NN	36
3.4.3 Variation in Densification Methods Among Different Suppliers	6	6	36	NN	36
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	4	4	16	NN	16
3.5.2 Diesel Cost Impacts	6	6	36	NN	36
3.5.3 Transport of Feedstock Requires Specialized Equipment	4	4	16	NN	16
3.5.4 Delivery Routes through Local Communities	4	4	16	NN	16
3.5.5 Transportation Regulations & Local Weight Limits	4	4	16	NN	16
3.5.6 Road Infrastructure	4	6	24	NN	24
3.5.7 Transportation Redundancy	6	6	36	NN	36
3.6 Risk Factor: Supply Chain Resiliency					

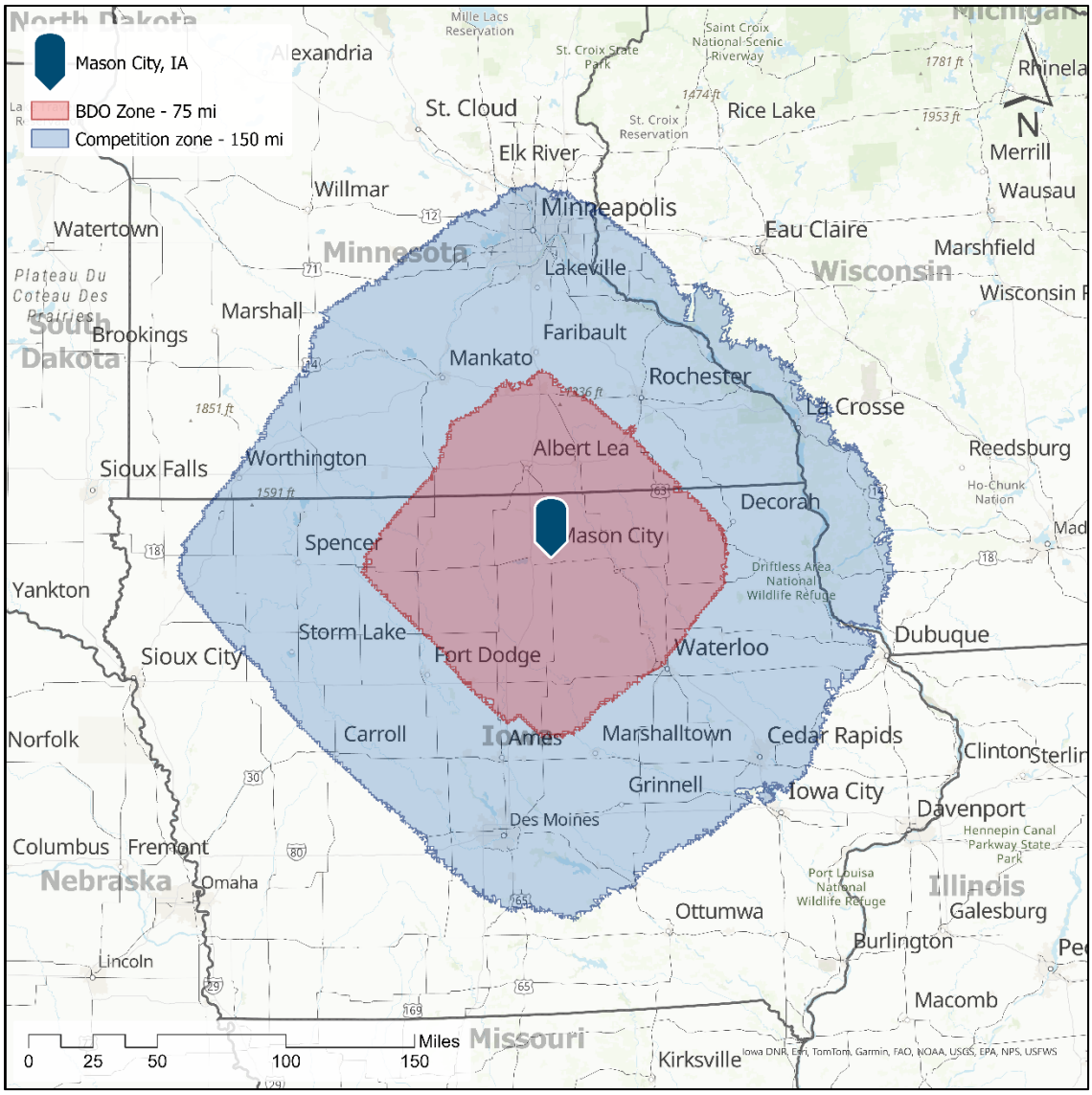
3.6.1 Size, Number, and Location of Suppliers	6	6	36	NN	36
3.6.2 Suppliers Subject to Same External Risk Factors	4	4	16	NN	16
3.6.3 Land Ownership Structures	2	2	4	NN	4
3.7 Risk Factor: Climate and Natural Risks					
3.7.1 Seasonal Weather Impacts on Feedstock Supply	6	8	48	NN	48
3.7.2 Long-Term Weather and Climate Trends	4	4	16	NN	16
3.7.3 Forest/Crop Fire	4	4	16	NN	16
3.7.4 Risk of Infestation	4	4	16	NN	16
3.7.5 Risk of Hail	6	8	48	NN	48
3.7.6 Risk of Flood	4	4	16	NN	16
3.7.7 Risk of Drought	6	6	36	NN	36
3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds	6	6	36	NN	36
3.7.9 Risk of Low Temperatures	4	6	24	NN	24
3.8 Risk Factor: Political and Social					
3.8.1 Government Subsidies for Feedstock Production or Utilization	2	2	4	NN	4
3.8.2 Local, Provincial, & National Laws, Regulations, & Permitting pertaining to Biomass	2	2	4	NN	4
3.8.3 Backlash against Biomass Development, Procurement or Usage in the BDO Zone	2	2	4	NN	4
3.8.4 Consent of, and Cooperation with, Indigenous Communities and First Nations	NR	NR	NR	NR	NR
3.8.5 Food Security Concerns	2	2	4	NN	4
3.9 Risk Factor: Sustainability and Environmental Concern					
3.9.1 Feedstock Sustainability	4	4	16	NN	16
3.9.2 Risk to Soil Quality	4	4	16	NN	16
3.9.3 Risk to Surface and Groundwater	NR	NR	NR	NR	NR
3.9.4 Water Use	NR	NR	NR	NR	NR
3.9.5 Pesticide Risk to Human and Ecosystem Health	2	2	4	NN	4
3.9.6 Risk to Wildlife and Landscape	4	4	16	NN	16
3.9.7 Biomass Classified as Genetically Modified Organism (GMO)	NR	NR	NR	NN	NR
Category 4.0: Feedstock Scale-up Risk					
4.1 Risk Factor: Feedstock Scale-Up					
4.1.1 Feedstock Quality at Production Scale	6	6	36	NN	36
4.1.2 Capacity of Supply Chain Components & Equipment to Scale	6	8	48	NN	48
Category 5.0: Infrastructure					
5.1 Risk Factor: Physical Infrastructure					
5.1.1 Land Parcel/Industrial District	4	4	16	NN	16
5.1.2 Ownership of Land	4	4	16	NN	16
5.1.3 Permitting Description	4	4	16	NN	16
5.1.4 Environmental Issues	6	6	36	NN	36
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	4	4	16	NN	16
5.3.4 Water Freight Access	4	4	16	NN	16
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)	6	6	36	NN	36
5.4.5 Housing/Cost of Living	4	4	16	NN	16
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	**22**

SECTION B: BIOMASS AVAILABILITY AND PRICING

OVERVIEW

BDO Zone Risk Indicators are scored with reference to rated quantities and prices. Firstly, we determined the rated corn stover quantity by estimating the potential quantity produced within the BDO Zone (Map B-1) defined by the 75-mi drive distance from Mason City, Iowa. Secondly, the potential quantity was reduced based on the expected/estimated demand for corn stover in the Competition Zone (150-mi drive distance from Mason City, IA). Thirdly, deductions were applied for sustainable retention, harvesting efficiency, and producer participation rate. Finally, a Biomass Availability Multiple (BAM) reduced the available amount based on producer feedback, supply chain constraints, and data/model uncertainties. The resulting rated corn stover quantity is a conservative, low-risk estimate of availability for a new project in Mason City. The price range associated with the rated quantity was determined through outreach and cost analysis in the BDO Zone. The price range reflects the expected price a new bio-project would have to pay to secure the rated quantity.

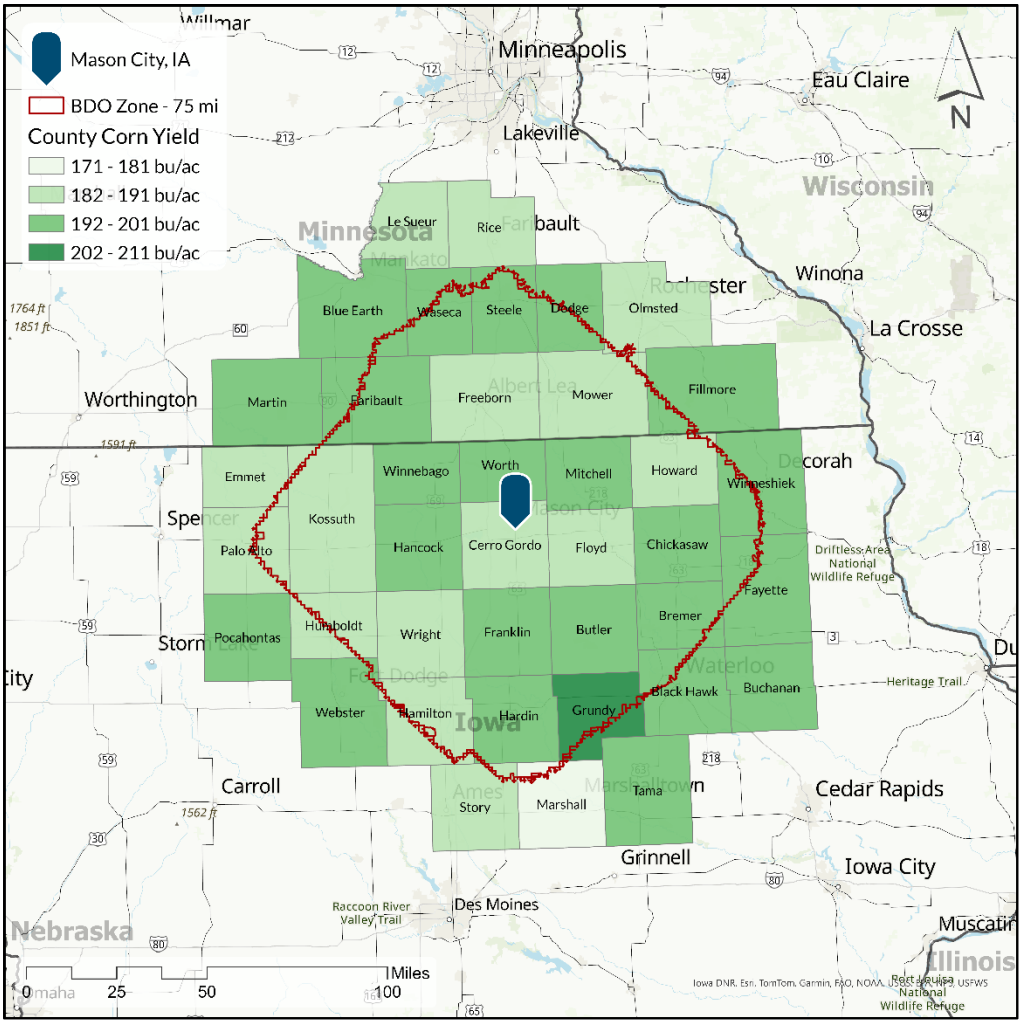
Map B-1. Map of BDO Zone and Competition Zone



SUPPLY ANALYSIS

The Mason City BDO Zone is located in the northern part of the State of Iowa and the southern part of Minnesota (Maps B-1, B-2), with the center point in Mason City, IA. The BDO Zone spans over 31 counties and contains, on average, 3.5 million acres of planted corn annually. High corn yields (180-210 bushels per acre) are obtained annually in the BDO Zone, with small variations between counties (Map B-2). Traditional crop rotations include corn-corn and corn-soybean. According to the latest 2022 USDA Census data,[1] there were 19,871 farms in the BDO Zone, with a total area of 7.1 million acres and an average size of 359 acres. The vast majority of the farms (80%) in the BDO Zone are below 500 acres, 11% between 500 and 1,000 acres, and 9 % above 1,000 acres. Since 2002, the number of large farms (above 2,000 ac) increased, the number of medium farms (180 ac - 500 ac) decreased, while the number of small farms (10 ac - 180 ac) remained fairly constant (Figure E-1 in Section E). Consequently, due to the geographical dispersion of farms of various sizes, coordinating harvesting, baling, transportation, and storage within 1-2 months after crop harvesting will require sound logistics.

Map B-2. Map of BDO Zone – Location and Corn Yield Values, by County[2]



[1] quickstats.nass.usda.gov
[2] Ibid.

Figure B-1 indicates that, while the total corn planted area in the BDO Zone decreased, the yield has remained between 182 and 191 bushels per acre in the past years.[3] Exceptions are years 2014 and 2021, in which severe weather events such as Derechos[4] and intense droughts decreased corn yields significantly.

Figure B-1. Historical Planted and Harvested Area and Average Corn Yield in the BDO Zone

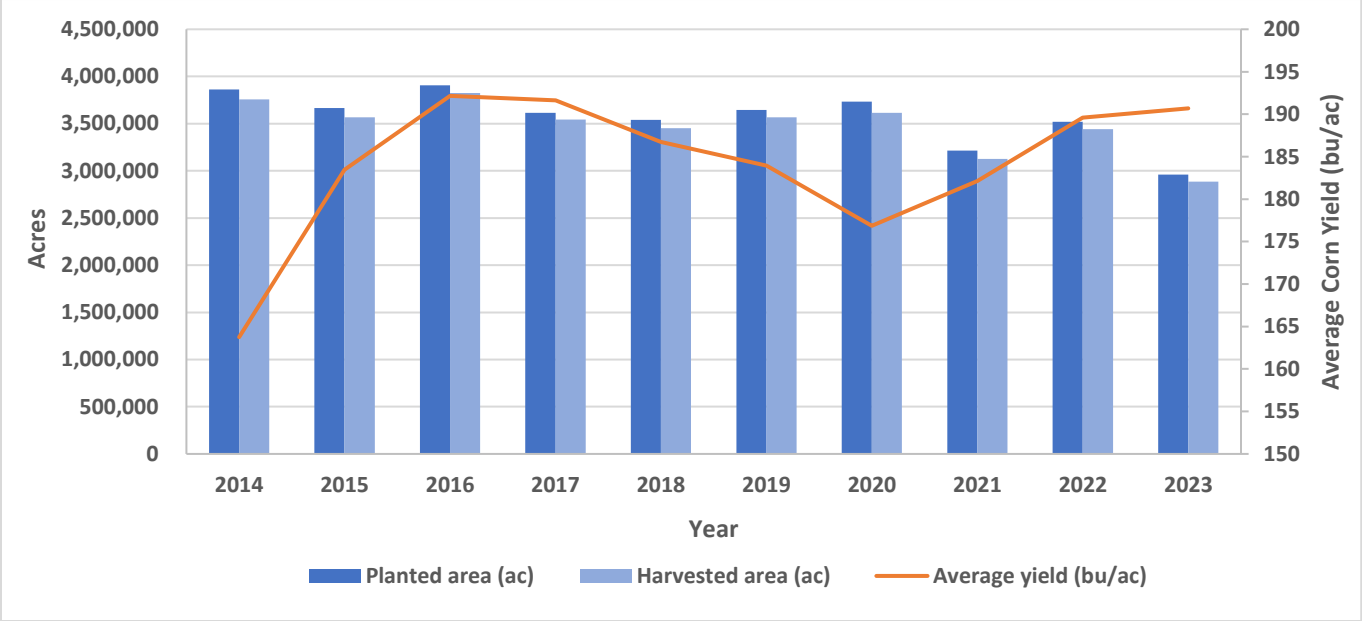


Table B-1 shows how the average corn stover production was calculated using the average annual corn harvested area and grain production presented above. By applying a 1:1 grain-to-stover ratio and 22% moisture content, the average annual corn stover production in the BDO Zone was estimated at **18 million green tons,** or **14 million bdt**. Removing a certain amount of corn stover from corn fields can be beneficial to future corn yield. Partial removal of corn stover can help with warming the soil at the time of planting, reduce tillage intensity, and reduce fuel consumption for corn production.[5] Consequently, Table B-1 further indicates how the annual corn stover availability in the BDO Zone is estimated considering cattle use (1%), sustainable removal (50%), harvester efficiency (82%), and producer participation (50%).

Table B-1. Annual Corn Stover Availability Calculation

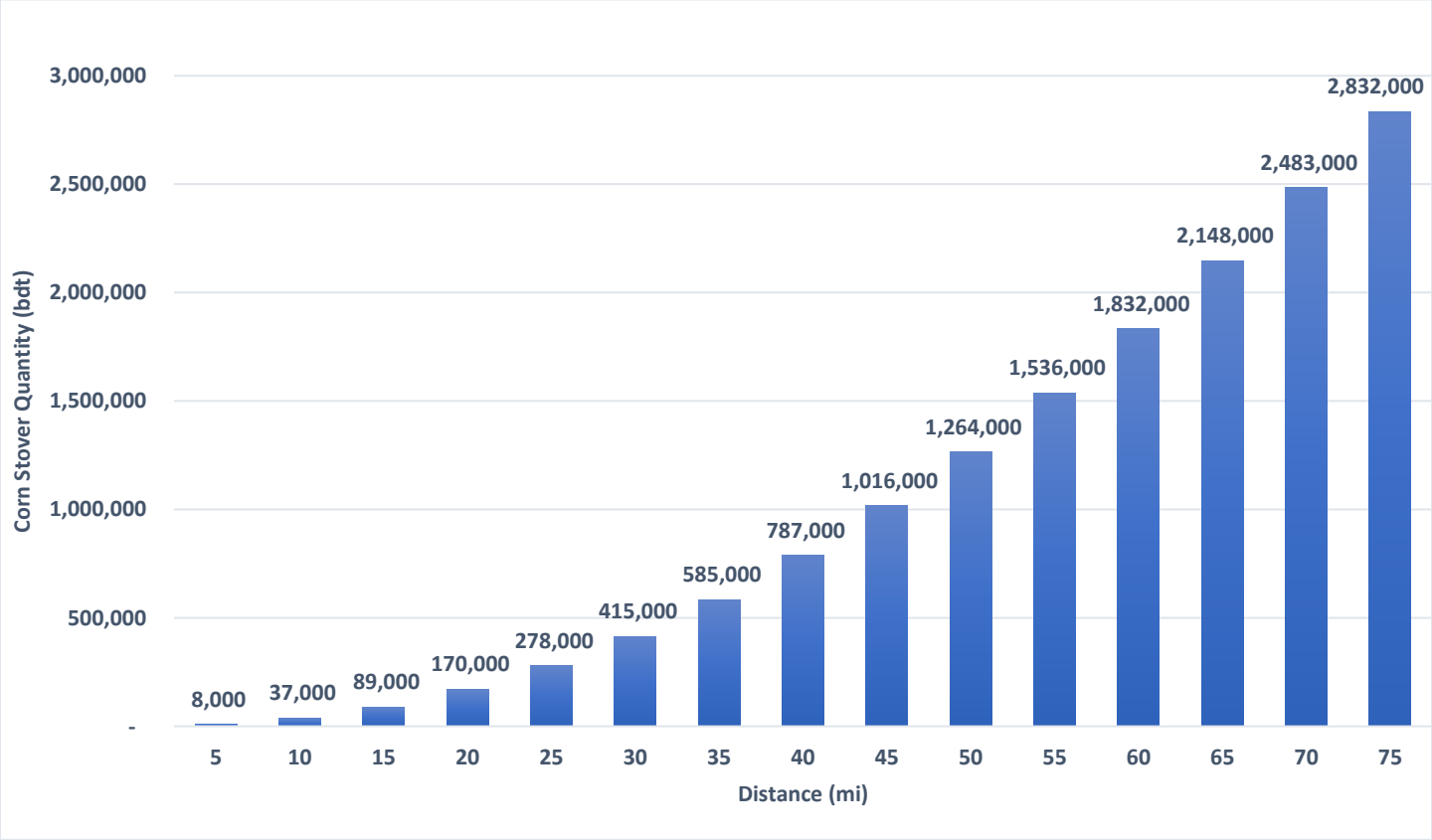
Average annual harvested area (ac)	3,478,039
Average annual grain production (bu/ac)	184
Average annual grain production (green tons)[6]	**17,889,684**
Stover/Grain Ratio[7]	1:1
Average corn stover moisture content (wet basis)[8]	22%
Average annual corn stover production (bdt)	**13,953,953**

[3] quickstats.nass.usda.gov
[4] Extreme weather events characterized by heavy thunderstorms, hail, and winds (www.extension.iastate.edu/agdm/articles/hart/HartOct20.html)
[5] store.extension.iastate.edu/product/14073
[6] A conversion factor of 0.0254 green ton/bu was applied (grains.org/markets-tools-data/tools/converting-grain-units/)
[7] www.extension.iastate.edu/stover/content/soil-quality
[8] store.extension.iastate.edu/product/14073

Cattle use[9]	1%
Available annual quantity after cattle use (odt)	**13,814,414**
Sustainable stover removal[10]	50%
Harvester efficiency[11]	82%
Sustainably removed quantity (odt)	**5,663,910**
Producer Participation[12]	50%
Annual corn stover availability (odt)	**2,831,955**

In conclusion, Table B-1 shows that approximately **2.8 million bdt/yr** would be available for harvesting. To better understand the availability of corn stover at 10-mile distance increments from Mason City, a supply curve was constructed for the total quantity (Figure B-2). The graph indicates that approximately half of the corn stover quantity is located up to a 50- and 55-mile drive distance from Mason City, IA.

Figure B-2. Estimated Corn Stover Availability by Distance from Mason City, IA

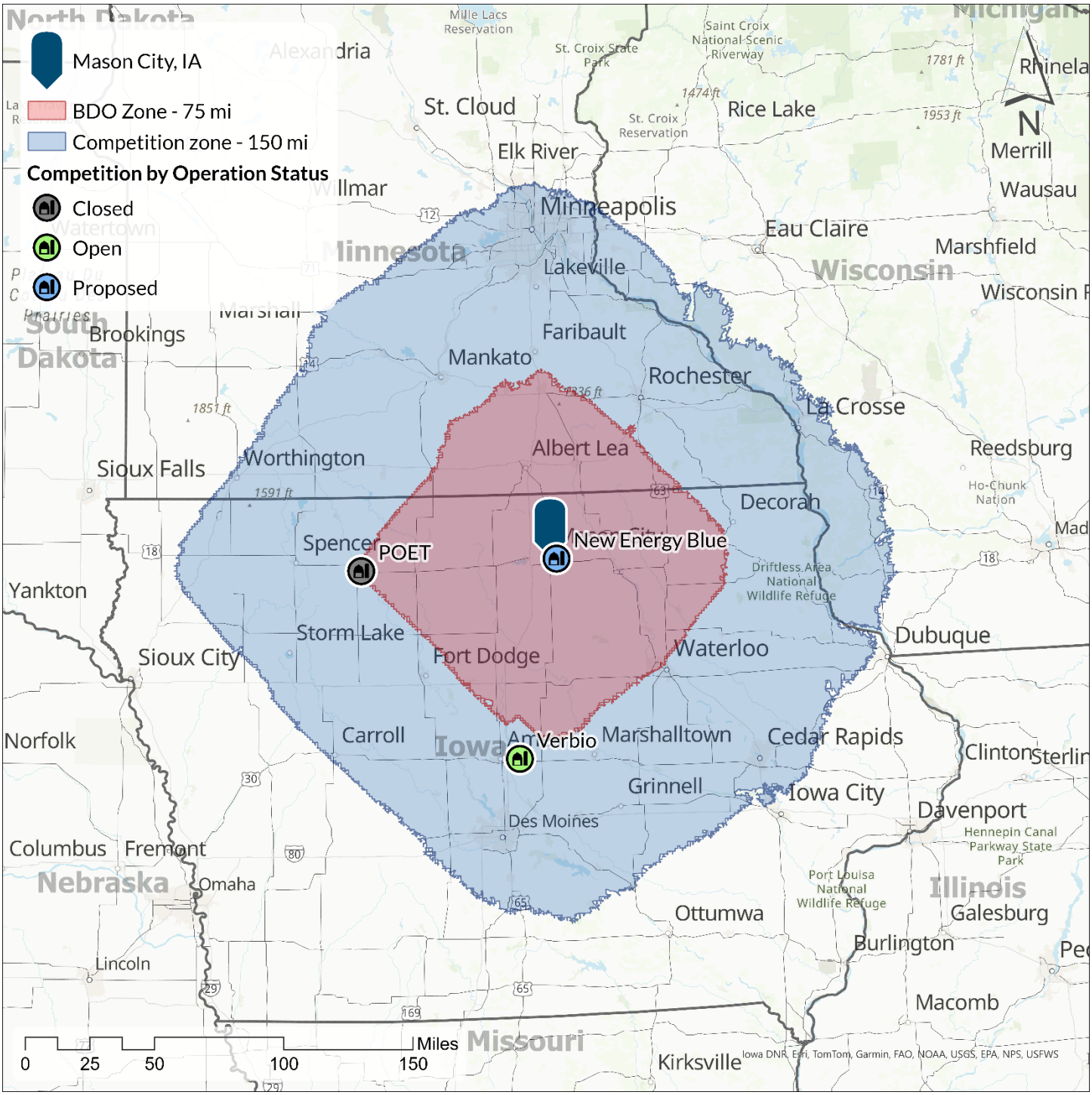


[9] Local producer and expert feedback
[10] Local producer and expert feedback and acsess.onlinelibrary.wiley.com/doi/full/10.1002/agj2.20724
[11] Region Nine, MN BDO Zone Rating
[12] Local producer and expert feedback

COMPETITION ANALYSIS

In addition to the 1% animal use presented above, three corn stover projects exist in the Competition Zone (Map B-3).

Map B-3. Map of Past, Current, and Proposed Competitors



1. New Energy Blue – Mason City, IA[13] has completed the engineering of the New Energy Freedom facility in Mason City, scheduled to break ground in spring 2025 to produce ethanol and lignin from corn stover. New Energy Farmers LLC is a biomass aggregation company jointly owned by Iowa farmers and New Energy Blue. The company plans in 2024 and 2025 to collect 275,000 bdt of corn stover to be delivered to the New Energy Freedom refinery. The company is still in the developmental stage and has been striving for the past two years to secure off-take agreements with local producers. Outreach indicated that no construction started at the proposed facility site in Mason City. Considering the sheer volumes of corn stover available in the BDO Zone and the current status of this project, **the risk associated with this project's competition over the rated quantity is low.**

2. POET Project Liberty Bioprocessing – Emmetsburg, IA[14] is a corn grain ethanol producer located 75-mi drive distance west of Mason City, which in 2014 added a bioprocessing facility to convert corn stover into cellulosic ethanol. Following POET's lead, two other companies built cellulosic ethanol plants — one in Kansas and one in Nevada in Central Iowa (i.e., DuPont, currently Verbio). The owners of these two plants ended up selling their facilities by the end of 2017.[15] According to local news outlets and outreach, POET-Project Liberty closed in 2020 and no plans of restarting the facility are known. Considering the status of this facility, **the risk associated with this project's competition over the rated quantity is low.**

3. Verbio (former DuPont) – Nevada, IA[16] is a subsidiary of Verbio Vereinigte BioEnergie AG in Germany, which bought the plant from DuPont in 2017 and began its conversion. The plant is located 90-mile drive distance south of Mason City. Since December 2021, Verbio converts corn stover to renewable natural gas (RNG) in its 16 grain-bin sized methane-digester tanks fed with bacteria from local cattle manure. The RNG is injected directly into the natural gas distribution and transmission grid and sold as a green fuel. The plant consumes approximately 135,000 bales/yr (70,000 bdt/yr) of corn stover. To collect the stover, the company provides 25 trucks and 18 balers, choppers, and accumulators to local producers. The bales are stored on site at the Nevada plant. Considering the location of the plant and the amount of stover it consumes compared to the large volume of stover available in the BDO Zone, **the risk associated with this project's competition over the rated quantity is low.**

RATED QUANTITY AND PRICING

Table B-2 shows the result of applying a Biomass Availability Multiple (BAM) to the corn stover estimate presented above. BAM allows for a conservative quantity redundancy that ensures confidence to investors that the project-ready estimates are realistic, credible, and achievable. A BAM value of 2.0 was selected to account for high uncertainty in producer participation, scale-up readiness of project proponents and producers, historical harvesting practices and volumes, data accuracy, and sudden changes in corn stover production and demand.

The resulting rated quantity of **1.4 million bdt/year** represents **10% of the total estimated corn stover production** in the BDO Zone. This percentage confirms a conservative rated quantity estimate in tune with local producers' feedback. However, this percentage is expected to increase once a mutually beneficial project is implemented. Producers indicated that the participation rate and delivered quantities will depend on the project proponent's supply chain readiness and pricing strategies, including the extra costs incurred at the farm level (i.e., wait time, storage), the nutrient replacement value, and a reasonable profit margin.

[13] newenergyblue.com
[14] poet.com/emmetsburg
[15] www.farmprogress.com/commentary/final-chapter-for-cellulosic-ethanol-
[16] www.verbio-north-america.com/locations/verbio-nevada-biorefinery

Table B-2. BAM and Rated Quantity of Corn Stover

Annual sustainable stover availability (bdt)[17]	2,800,000
BAM	2.0
Rated Quantity (bdt)	**1,400,000**
Removal % from total	**10%**

Table B-3 indicates how the delivered price range for the rated quantity of corn stover is estimated using various cost components. Each bale is assumed to weigh about 0.5 bdt.

Table B-3. Farm Gate and Delivered Price Ranges

Price Component	$/bdt[18]	$/bale[19]
Chopping/Windrowing[20]	$9.0-$9.5	$4.6-$4.8
Baling[21]	$26.8-$29.6	$13.6-$15.0
Moving/Stacking[22]	$6.4-$6.8	$3.2-$3.4
Nutrient Replacement Value[23]	$4.4-$10.3	$2.2-$5.2
Producer Markup (20%)[24]	$9.3-$11.2	$4.7-$5.7
Calculated price at farm gate	**$56-$67**	**$28-$34**
Loading/unloading cost[22]	$6.4-$6.8	$3.2-$3.4
Av. Transportation Cost (50-mile)[25]	$24.6	$12.5
Delivered Price	**$87-$99**	**$44-$50**

OPERATIONAL CONSIDERATIONS

In summary, the rated quantity of corn stover was 1.4 million bdt/yr (Table B-1), and the delivered price range was $87-$99/bdt, or $44-$50/bale (Table B-2).

If a new project located in Mason City utilized the rated quantity of corn stover, approximately 275 balers, 550 tractors,[26] and 70 trucks with 53-ft flatbed trailers[27] would be necessary. The 2022 Census reported approximately 53,800 tractors and 4,500 balers[28] in the BDO Zone. While the above equipment requirements seem achievable under the current equipment availability, a large-scale corn stover project would most likely require improved baling and transportation

[17] Rounded value
[18] 22% bale moisture content assumed (see above).
[19] Assumes a bale average weight (large square or round) of 1,300 lbs or 0.5 bdt
[20] 2024 Iowa Custom Rate Survey (www.extension.iastate.edu/agdm/crops/html/a3-10.html). Price range consists of median and average surveyed values. Price range is expressed in $/per acre and assumes 3 bales per acre.
[21] Ibid.
[22] Ibid.
[23] IST Extension calculator (www.extension.iastate.edu/agdm/crops/xls/a1-70cornstoverpricer.xlsx) using default ranges: 2 – 4 lbs/bdt and 8 – 20 lbs/bdt for P and K removal rates, respectively. Also, fertilizer current rates of Urea, DAP, and Potash were used.
[24] Outreach. Includes compensation for temporary bale storage at producers' site.
[25] Assumes $0.25/bale/loaded mile (2024 Iowa Custom Rate Survey), 53 ft flatbed trailer, 39 bales/load, 22% bale moisture content. For transportation costs at 10-mile drive distance increments see Figure E-2 in Section E.
[26] Assuming 2 tractors: one for the baler and one for the bale collector at 10-hr day x 40 harvest days per year x 25 bales/hr (www.extension.iastate.edu/agdm/crops/pdf/a3-24.pdf)
[27] Assuming 4 trips/day for 240 days/year
[28] Values adjusted by each county area within the BDO Zone (quickstats.nass.usda.gov)

efficiency. Consequently, investments in high-density square baling equipment may be necessary to significantly increase this efficiency. Verbio facility can serve as a relevant example as it deploys a fleet of large square balers to support its production.

Producers communicated their hesitation in investing in large square balers as this level of collection would require significant on-the-farm labor and expertise, which they do not currently have. However, they would be in favor of a project proponent organizing the collection, storing, and transportation of corn stover bales, especially if collection can be done expeditiously after corn harvesting. Producers' major concern was that project proponents would not make and collect the bales in time so they could proceed with the next agriculture works before frost.

Producers within the BDO Zone have had previous experiences supplying larger quantities of corn stover to the projects presented in the Competitor Section. Outreach indicated that the challenges that POET and DuPont projects had were not related to the supply chains but to conversion technologies and oil prices. However, these now closed or retrofitted projects left a lingering memory within the farming community. Producers and experts suggested that a new project in Mason City would need to progressively build trust by first demonstrating collection and transportation equipment and optimal supply chain and storage systems. On the project development side, outreach indicated that all the above concerns can be well addressed by a project proponent, and to a large degree, they have been addressed in previous and current projects.

SECTION C: INFRASTRUCTURE



PROPERTY OVERVIEW

Address:	43rd St SW & Pierce Ave
City:	Mason City
State:	IA
County:	Cerro Gordo
Acres:	145
Pricing Note:	$45,000/acre
Topography:	Gently sloping
Zoning:	Industrial-Light/Heavy

SITE CONTACT

Economic Development Contact
Chad Schreck
North Iowa Corridor Economic Development Co
641-426-0315
cschreck@northiowacorridor.com

ADDITIONAL NON-RATED SITES

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

PROPERTY PROFILE

Indianhead South is a 145-acre site conveniently located within one mile of the Avenue of the Saints (US 18/IA 27) and has easy access to Interstate 35, eight miles away. This certified shovel-ready site is located within the corporate limits of Mason City, and it has all major utilities with the necessary capacities to meet the requirements of major industrial, warehouse & distribution, food processing, etc. businesses. With all environmental and engineering studies completed, it makes for an ideal location for a number of relocation or expansion opportunities. The North Iowa Corridor is ready to work with any new businesses interested in making and calling the North Iowa Corridor region home, which includes businesses such as Golden Grain Energy, Bushel Boy, Cargill Kitchen Solutions, Smithfield Foods, ASSA ABLOY Curries, Stellar Industries, Masonite, Kraft-Heinz Foods, and many other well-respected businesses.

Transportation

Nearest Highway: US 18/IA27 (1.0 miles) **Rail Served**: Yes (200 yds)
Nearest Interstate: Interstate 35 (8.0 miles) **Rail Accessible:** Yes
Nearest Airport: Mason City Muni (9.0 mi)
Nearest Commercial Airport: Des Moines or Cedar Rapids (130 miles)

Electric Service

Supplier: Alliant Energy **Website:** www.alliantenergy.com
Ownership: Investor-Owned Utility **All Utilities Extend to Site:** Yes
Phone: 800-255-4268 **Nearest Substation:** ¼ mile
Capability: 3-Phase overhead, 24,900 volts running along west and south property lines. Nearest substation serving the site is 3/4 miles to the north and a new proposed substation due in early 2024 will be less than 1/4 mile to the south of the site.

Natural Gas

Supplier: Alliant Energy **Website:** www.alliantenergy.com
Ownership: Investor-Owned Utility **Size of Main:** 6"-12"
Phone: 800-255-4268 **Pressure:** 150 psi
Capability: 6" main along south ROW of site & 12" main along west ROW of site

Water

Supplier: City of Mason City **Website:** www.masoncity.net
Ownership: Municipal **Size of Main:** 10"-12"
Phone: 641-421-3605 **Peak Capacity:** 9,000,000 gals (maximum)
Capability: 10" main along west ROW of site & 12" main along south ROW of site. Total capacity of line(s) serving the site is approximately 3 Mil gallons per day

Wastewater

Supplier: City of Mason City **Website:** www.masoncity.net
Ownership: Municipal **Size of Main:** 8"- 24"
Phone: 641-421-3675
Capability: 8" main along south ROW of site; 18' - 24" main along west and north ROW of site; 12" main along east ROW of site. The capacity of the city sewer system is 21 MGD.

Telecommunications

Supplier: CLTel **Website:** www.cltel.com
Ownership: Cooperative **Platforms:** Fiber, wireless
Capability: Fiber running along the West and South sides

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: The BDO Zone is located in the most productive corn region of the USA. While currently only 1% of corn stover production is utilized for cattle feed/bedding, multi-generational corn producers have supplied corn stover bales reliably for decades.

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**

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

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

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

Risk Information: Compared to the rated quantity and total availability, there is minimal competition for corn stover in the BDO Zone from existing or planned projects or cattle use.

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.	**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**

1.3 Risk Factor: Supplier Control Over Production and Transportation

1.3.1 Ownership of Land/Means of Production

Rationale: Suppliers that own land or a production facility where feedstock is produced tend to have better control of supply chains and present lower degrees of supply risk.
Risk Information: All farmland in the BDO Zone is privately owned. While it is customary in the BDO Zone to lease land, ownership is maintained through legally binding lease agreements. Overall, the land ownership is not a risk for future biomass projects as regardless of the ownership structure, corn has been produced for decades as a major crop in the BDO Zone.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100. **16**

1.3.2 Ownership of Equipment

Rationale: In most cases, suppliers that own or lease equipment for harvest, collection, and processing feedstock are at lower risk than those that are not. For example, third-party harvesting equipment may not be available when required. Short harvest windows may be missed if a farmer and contractor cannot schedule convenient harvest times, and quantity shortages can result. However, in some circumstances, reliance on third-party equipment to harvest or produce feedstock can decrease supply chain risk. For example, when harvesting agricultural residues such as corn stover, using a third-party company with standard equipment specializing in harvesting, collection, and transportation may decrease quality variations (e.g., ash content) of the final feedstock.
Risk Information: Some producers in the BDO Zone own baling equipment, especially those that also own cattle farms. According to the 2022 Census, there are sufficient balers and tractors in the BDO Zone to supply the cattle sector, but the scale up will require significant investments in high efficiency square baling and transportation equipment. Producers prefer that the project proponents provide collection, transportation, and storage services. The risk is thus deemed 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) 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)* 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 64 out of 100.	**Score** **64**

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: Producers are currently using both their own transportation equipment (pickup trucks and trailers) or custom transportation companies in the region. These services are not currently at the level necessary for the rated quantity. The expectation is, however, that the project entrant would organize the transportation and storage logistics. The risk is high.

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)* 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 64 out of 100.	**Score** **64**

1.3.4 Feedstock as a Secondary Transformation

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

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

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

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

Risk Information: Corn stover is a by-product of corn production. There is a strong and reliable history of corn production in the BDO Zone and corn prices have supported this steady production (Figure E-3 in Section E). Two weather related yield variations occurred in the past ten years but the planted area remained stable in the BDO Zone (Figure B-1). Yield fluctuations due to weather events are expected to continue, thus affecting the sustainability of supply. In addition, in dry years, cattle producers may tap more into the stover supply for bedding and fodder. However, this situation can be easily mitigated by long-term storage and the large amount of corn stover available. This risk was deemed low.

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

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: See 1.1.1. Producers in the BDO Zone have a long, multi-generational history of corn stover production and collection. While crop producers are less experienced in harvesting stover than cattle producers who bail their own

stover, they are very familiar with the process. We foresee a medium risk associated with supplier corn stover harvesting experience.

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**

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: Scale-up will require increased equipment and labor levels, and significant improvements in harvesting and transportation efficiencies. Producers are familiar with two regional projects that have organized supply chains for collection, transportation, and storage of corn stover. A new project in Mason City could progressively build trust by demonstrating collection and transportation equipment and optimal supply chain and storage systems. Due to uncertainties regarding the implementation of optimal supply chains by project proponents and the low volume of baling in the region the risk is medium-high.

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

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: While the current round baling equipment availability seems capable to sustain a significant part of the scale-up efforts, a large-scale corn stover project would most likely require improved levels of baling and transportation efficiency. Consequently, investments in high-density square baling equipment will be necessary to double or even triple the baling and transportation efficiency. Producers communicated their skepticism to invest in large square balers due to farm labor shortages. The expectation was that project proponents, like with the existing two corn stover projects, would provide collection and transportation services. Due to significant scale-up equipment requirements, a medium-high risk was assigned to this indicator.

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

1.6 Risk Factor: Supplier Motivation

1.6.1 Feedstock Production Priority

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

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

Risk Information: Corn stover is a by-product of corn production, which has a very strict management schedule. Producers stressed that they will till their fields shortly after harvest to lower exposure to wet weather or frozen ground. This creates a very short window for harvesting corn stover (maximum of 40 days). However, the rated quantity represents only 10% of the total stover production, which alleviates any concerns of supply instability. Moreover, producers indicated that they were willing to participate in a project as long as project proponents guarantee an appropriate stover removal schedule and a financial benefit that included the nutritional value. Considering the above, the risk is deemed medium.

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

The risk impact is deemed medium, therefore the RRI is 6 out of 10.	**6**
Gross Risk Indicator (GRI) 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**

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: Although three stover projects are located or proposed in the Competition Zone (See Section B), they are not currently consuming significant amounts from the BDO Zone. Cattle use is below 1%. Risk is deemed very low.

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

2.1.2 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: As described in Section B – Operational Considerations, past, current, and proposed projects do not threaten the sustainability of corn stover availability for a new project in Mason City. Risk is very low.

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

2.1.3 Competitor Pricing and Price Sensitivity

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

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

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

Risk Information: The estimated delivered price range is conservative, similar to the range of the current local spot price (Section B – Rated Quantity and Pricing). There is currently no significant competitor for corn stover in the BDO Zone that could control pricing; this risk was deemed low.

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

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

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 signaling 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: As presented in Section B – Competition, there are no significant competitors for the corn stover in the BDO Zone. The risk is deemed very low.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. **2**
Raw Risk Impact (RRI) **Score** The risk impact is deemed very low, therefore the RRI is 2 out of 10. **2**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 4 out of 100. **4**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score** The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. **4**

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: No such influences were observed or communicated. In the calculation of the rated quantity, both the current competition and the BAM factor were considered. We expect that any temporary supply shortage would not have a significant impact on future projects. Consequently, a very low risk was assigned.
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) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

2.1.6 Temporary Market-Driven Markets

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

Risk Information: There are no non-traditional or market-driven markets for corn stover that could threaten its long-term availability. Risk is very low.

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

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

[29] Bergtold, 2018.

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: Corn stover projects located in the Competition Zone have significant storage capacity. However, their production capacities pose a very low risk to long-term availability of corn stover for a new project.
Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. **2**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10. **2**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100. **4**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.
RRI Mitigation (Notch)
No adjustment.
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. **4**

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 expect there will be an advantage among the existing and future end users of corn stover in terms of accessibility and delivery hours. A very low risk was attributed to this indicator.
Raw Risk Likelihood (RRL) **Score**
The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. **2**
Raw Risk Impact (RRI) **Score**
The risk impact is deemed very low, therefore the RRI is 2 out of 10. **2**
Gross Risk Indicator (GRI) **Score**
The Gross Risk Indicator (RRL X RRI) is 4 out of 100. **4**
Mitigation/Notching **Notch**
RRL Mitigation (Notch) **NN**
No adjustment.
RRI Mitigation (Notch)
No adjustment.
The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100. **4**

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: While there are no current large-scale competitors for corn stover in the BDO Zone, a new entrant most likely would target the following quality attributes: moisture content, soil contamination, and bale size/bulk density. Since the current practice of supplying round bales for animal use does not require strict quality standards, it will be necessary for the project proponent to implement a quality control (QC) program for harvesting and collection operations. Assuming a QC program was implemented, the likelihood risk of supplying low-quality corn stover bales was deemed low and the impact risk moderate.

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**

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, an increased demand for wood pellets due to high energy prices in Europe or for biofuels due to a favorable clean fuels policy can cause increased pellet/biofuel production by competing markets. Thereby driving demand for feedstock within a BDO Zone.

Risk Information: While the utilization of corn stover for biofuels and bio-products has been developing in the Competition Zone, the past, current, and proposed projects are not expected to increase the demand significantly, especially compared to the vast amounts of corn stover currently generated annually in the BDO Zone. Risk is deemed very low.

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

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

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: As presented in Section B – Rated Quantity and Pricing, a high BAM value of 2.0 was selected to account for high uncertainty in the producer participation, scale-up readiness of project proponents and producers, historical harvesting practices and volumes, data accuracy, and sudden changes in corn stover production and demand. The resulting rated quantity of 1.4 million bdt/year represents 10% of the total estimated technical corn stover production in the BDO Zone. This percentage confirms a conservative rated quantity estimate that is in tune with local producers' feedback. However, this percentage is expected to increase once a mutually beneficial project is implemented. The above considerations grant a low risk level for this indicator.

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

3.1.2 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: A supply curve (Figure B-2) was constructed for the total corn stover availability (after all deductions presented in Section B – Supply Analysis) to better understand the availability at 10-mi drive distance increments from Mason City, IA. The graph indicated that approximately half of the total corn stover quantity and the entire rated quantity (1.4 million bdt) is located up to 50-mi drive distance from Mason City. Project proponents will most likely attempt to capture the supply from within the 50-mi drive distance area to reduce transportation costs. As there is no certainty that project proponents will be able to access the rated quantity from this area, the risk is deemed low to moderate.

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**

3.1.3 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: Corn stover is only available after corn harvest, which occurs in late September through October, leaving a narrow window of opportunity for corn stover collection and baling (maximum of 40 days). Prolonged precipitations can reduce significantly this window and impact the quality of the feedstock due to increased moisture content and subsequent material loss. Figure E-7 shows an erratic, unpredictable precipitation trend for the month of October in the BDO Zone. However, large scale supply chains extend over large areas, capitalizing on optimally designed logistics of harvesting, storage, and transportation. Timely and proper bale storage prevents biomass deterioration and fire hazards. The above considerations and limitations triggered a medium risk assignment to this indicator.

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

[30] Golecha & Gan, 2016.

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

3.1.4 Year-to-Year Variation in Feedstock Availability

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

Risk Information: There is a strong and reliable history of corn production in the BDO Zone (Figure B-1) and corn prices have supported this steady production (Figure E-3). Two weather related yield variations occurred in the past ten years but the planted area remained stable in the BDO Zone (Figure B-1). Yield fluctuations due to weather events are expected to continue, thus affecting the sustainability of supply. In addition, in dry years, cattle producers may tap more into the stover supply for bedding and fodder. However, this situation can be easily mitigated by long-term storage and the large amount of corn stover available. The risk was deemed medium.

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

3.2 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: As a corn stover market has not been developed yet, historical corn stover prices are anecdotal and unreliable. There may be significant price variations that a new project will have to mitigate through proper inventory management and building long-term supply relationships with local corn producers. Thus, the risk score was elevated to medium.

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

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

3.2.2 Low Historical Demand for Feedstock in the BDO Zone

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

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

Risk Information: While the removal and utilization of corn stover in the BDO Zone is well established, it was primarily developed to meet the demands of the local animal bedding and feed markets. Producers are familiar with two regional projects that have organized supply chains for collection, transportation, and storage of corn stover. A new project in Mason City could progressively build trust by demonstrating collection and transportation equipment and optimal supply chain and storage systems. Due to uncertainties regarding the implementation of optimal supply chains by project proponents and the low volume of baling in the region the risk is medium.

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

The Loaded RI Score ((1-Total Notch) X GRI Score) is 36 out of 100.	**36**

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

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

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

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

Risk Information: There is a multi-generational experience growing corn and baling stover in the area. Corn stover projects have been in existence in the area and producers are familiar with their challenges, as described above. Overall, a medium risk was assigned.

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**

3.3 Risk Factor: Non-Weather Based Externalities

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

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

Risk Information: Biomass project developers consider changes in goods and services prices due to factors such as inflation and changes in interest rates in their business models. However, temporary significant rises in CPI and PPI, as seen in 2020-2022 due to the pandemic and global supply chain destructions, can have a medium impact on the biomass delivery prices, but we expect the CPI and PPI to reach a steady status as the economic situation is gradually improving. Figures E-5 and E-6 suggest a medium risk/low impact rating due to some fluctuations in both CPI and PPI in the past 5 years.

Raw Risk Likelihood (RRL)	**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 *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**

3.3.2 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: Not relevant.

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: Not relevant.

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**

3.3.4 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: Livestock farming is not significant sector in this region and no non-traditional and externality-driven markets for feedstock were identified 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**

3.4 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.

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: Corn stover has a short harvest window of up to 40 days that requires strict guidelines and logistics. Rain can reduce this window and affect the quality of the stored bales. Current stover projects have managed fairly well the collection and storage of corn stover bales but not at the scale of the rated quantity (1.4 million bdt/yr). Thus, a medium risk was assigned.

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

[31] Bergtold, 2018.

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**

3.4.2 Harvesting & Collection Equipment

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

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

Risk Information: As presented in RI 3.2.2, while the removal and utilization of corn stover in the BDO Zone is well established, it was primarily developed to meet the demands of the local animal bedding and feed markets. Producers are familiar with two regional projects that have organized supply chains for collection, transportation, and storage of corn stover. A new project in Mason City could progressively build trust by demonstrating collection and transportation equipment and optimal supply chain and storage systems. Due to uncertainties regarding the implementation of optimal supply chains by project proponents and the low volume of baling in the region, the risk is 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**

3.4.3 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 fiber 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: The current practice of baling is large round bales but significant improvements in baling and transportation efficiency will be required by a new project. Consequently, investments in high-density square baling equipment will be necessary to double or even triple the baling and transportation efficiency. Producers communicated their skepticism to invest in large square balers and suggested that project proponents would be more appropriate to provide that service in a timely manner. Risk is elevated to moderate to account for this uncertainty.

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

3.4.4 Availability of Labor for Feedstock Production

Rationale: Skilled labor shortages can be difficult to remedy in the short term. The availability of suitable labor in an area can impact the ability to procure sufficient feedstock quantities on required schedules. Labor 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 labor force.

Risk Information: During and after the corn harvest season the labor necessary to collect and transport stover is very limited. Outreach indicated that the farms have seen a decreasing number of available laborers. Producer expect that corn stover harvesting and transportation be provided by project proponents, thus reducing the risk of labor shortages. However, the risk is 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**

[32] Huhnke, 2018.

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 Risk Factor: Transportation

3.5.1 Feedstock Transportation Costs

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

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

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

Risk Information: Transportation cost accounts for 25% - 28% of the total corn stover delivered price (Section B – Rated Quantities and Pricing). Figure B-2 indicated that half of the corn stover production was located within 50-mi driving distance. Significant cost reductions can be achieved if the project can secure most of the corn stover volume from this 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

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: The price of diesel doubled during the pre and post COVID-19 years (Figure E-4), but fuel prices have stabilized in recent months to 2022 levels. While the current average transportation cost in the BDO Zone is approximately $0.20/bale/loaded mile (Figure E-2), this value may increase significantly due to fuel cost increases. In addition, climate change initiatives at all levels (global, national, and state) could lead to a steep increase in carbon taxes. The likelihood of diesel price increases and its effect on corn stover availability for a new project was deemed medium.

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

3.5.3 Transportation of Feedstock Requires Specialized Equipment

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

Risk Information: Bale transportation does not require specialized equipment. It is most commonly accomplished using 53 ft flat bed trailers and B trains. Thus, the risk was set to low.

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

3.5.4 Delivery Routes through Local Communities

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

Risk Information: Increased traffic will result if a project using the rated quantity was implemented in Mason City. However, the vast majority of routes are rural and through farming communities familiar with grain and bale hauling. Large quantities of corn are being transported through these routes. The risk is thus low.

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

3.5.5 Transportation Regulations & Local Weight Limits

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

Risk Information: Both Minnesota and Iowa States allow vehicles transporting agricultural goods to exceed the maximum permitted weight by up to 25%. Seasonal weight restrictions exist in both states, but are managed well by local agriculture traffic. Risk is deemed low.

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

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

3.5.6 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: Iowa and Minnesota transportation infrastructures rank 33 and 4, respectively, in the nation.[33] Investments are being made to improve road and bridge conditions. Appropriate roads (both paved and unpaved) exist for transporting bales from producers to Mason City. Risk is deemed low/medium.

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

3.5.7 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: Approximately 70 trucks and flatbed trailers would be required to transport the rated quantity, assuming an average haul distance of 50 miles and 4 trips per day. However, for a BDO Zone in which currently only a small amount of corn stover is baled, hauling from longer distances may be required to supply a new project and the availability of trucks and trailers may be problematic. This situation, of course, can be remedied over time with access to regional fleets and investments in new transportation equipment. Thus, the risk is set to medium.

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

[33] www.usnews.com/news/best-states/rankings/infrastructure

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 36 out of 100.	**Score** **36**

3.6 Risk Factor: Supply Chain Resiliency

3.6.1 Size, Number, and Location of Suppliers

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

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

Risk Information: As presented in Section B – Supply Analysis, according to the latest 2022 USDA Census data, there were 19,871 farms in the BDO Zone with a total area of 7.1 million acres and an average size of 359 acres. The vast majority of the farms (80%) in the BDO Zone are below 500 acres, 11% between 500 and 1,000 acres, and 9% above 1,000 acres. Since 2002, the number of large farms (above 2,000 ac) increased, the number of medium farms (180 ac - 500 ac) decreased, while the number of small farms (10 ac - 180 ac) remained fairly constant. Coordinating harvesting, baling, transportation, and storage within 1.5 months after crop harvesting will require significant logistical efforts. However, industrial corn stover projects exists that have developed fairly rigorous supply chains. Thus, the risk was deemed moderate.

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**

3.6.2 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: Farms are uniformly distributed across the BDO Zone with minor yield variations between counties (Map B-2). The main external risk factor that has been observed in the past ten years was Derecho and drought, which took place in 2014 and 2020 (Figure B-1). However, significant redundancy has been built into the model to address supply fluctuations. Single risk events can be mitigated within the geography of the BDO Zone by setting up satellite storage yards at optimal distances from each other and in Mason City. Risk was deemed low.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed low, therefore the RRL is 4 out of 10. **4**
Raw Risk Impact (RRI) **Score** The risk impact is deemed low, therefore the RRI is 4 out of 10. **4**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 16 out of 100. **16**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* No adjustment. **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**

3.6.3 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 fiber (i.e., the cost that one pays to a landowner for the right to cut and purchase their wood fiber), for example, is much higher in the US, where >90% of the land is private, and thus stumpage cost is determined on a competitive auction basis. Conversely, in Canada, >90% of the land is owned by the Crown, and stumpage is allocated by the government.
Risk Information: All agricultural lands in the BDO Zone are privately owned and the crop growers have managed their corn and stover production well. Risk was deemed very low.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed very low, therefore the RRL is 2 out of 10. **2**
Raw Risk Impact (RRI) **Score** The risk impact is deemed very low, therefore the RRI is 2 out of 10. **2**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 4 out of 100. **4**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* No adjustment. **NN** *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).
Loaded RI Score **Score**

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

3.7 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: Large yield fluctuations like the ones in 2014 and 2020 indicate a high risk of weather events, such as droughts and severe thunderstorms (Derechos), impacting the corn stover supply. However, this risk can be mitigated by increasing participation rates, sourcing from outside the BDO Zone at higher transportation costs, and building up bale storage yards across the BDO Zone. Considering the above factors, the risk level was set to medium-high.

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

3.7.2 Long-Term Weather and Climate Trends

Rationale: In certain BDO Zones, climatic trends and significant potential changes to future weather patterns can create feedstock risk.

Risk Information: No long-term weather trends or concerns were reported in this region to threaten the long-term availability of corn stover and the supply chains. No major average air temperature fluctuations were apparent (Figure E-8). Thus, risk for this indicator was deemed low.

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

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

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: According to the National Interagency Fire Center,[34] the total area affected by fires in the State of Iowa was between 2,168 ac in 2020 and 6 ac in 2023, the vast majority of fires being human caused. Considering the small percentage of fire affected areas, the risk is deemed low.

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

[34] www.nifc.gov/fire-information/statistics

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 vigor can lead to outbreaks of forest insects.

Risk Information: No infestation risks that have significantly impacted corn production were reported in the region. This is the most productive region in the nation and producers are well versed in managing for potential infestations. Farmers are also covered by crop insurance. A low risk was assigned for this indicator.

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

3.7.5 Risk of Hail

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

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

Risk Information: Extreme hail events have been reported, especially during Derechos, in which severe hail fall is a common occurrence and has a damaging effect on the crops. This risk can be mitigated by increasing participation rates, sourcing from outside the BDO Zone at higher transportation costs, and building up bale storage yards across the BDO Zone. Considering the above factors, the risk level was set to medium-high.

Raw Risk Likelihood (RRL)	**Score**
The risk likelihood is deemed medium, therefore the RRL is 6 out of 10.	**6**
Raw Risk Impact (RRI)	**Score**
The risk impact is deemed high, therefore the RRI is 8 out of 10.	**8**

Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 48 out of 100.	**48**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 48 out of 100.	**48**

3.7.6 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: No significant risk of flood was reported. However, flash floods occur during storms. Risk of flooding disrupting corn stover supply in the BDO Zone was deemed low.

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

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 residues and energy crops. Parts of Western Canada are experiencing more frequent and severe droughts, and scientists expect drought to affect new areas across Canada going forward.

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

Risk Information: Two large yield fluctuations in the past ten years indicate a high risk of droughts impacting the corn stover supply. However, this risk can be mitigated by increasing participation rates, buffer storage, and reaching out to farms outside the BDO Zone. A medium risk level was assigned.

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

3.7.8 Risk of Hurricanes, Tornadoes, and Strong Winds

Rationale: Hurricanes, tornadoes, and strong winds can destroy timber stands, crops, and feedstock piles. They can also delay forestry and agricultural operations. Hurricanes and tornadoes can indirectly cause temporary shortages of available transportation as available trucking moves to handle higher-value disaster-related contracts. For example, Katrina cleanup limited 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: As described above, Derecho occurs in the BDO Zone, which increases the chance of tornados and high winds. A medium risk was assigned.

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

3.7.9 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: Cold temperatures may reduce the already short window of opportunity to harvest, bale, and store corn stover even further. A low/medium risk was assigned.

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

3.8 Risk Factor: Political and Social

3.8.1 Government Subsidies for Feedstock Production or Utilization

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

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

Risk Information: No government subsidies for the production of corn stover were reported or found. Risk was therefore set at the very low level.

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**

3.8.2 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: No regulations for the production of corn stover were reported or found. Risk was therefore set at the very low level.

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**

3.8.3 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 are no reported backlashes against utilization of corn stover in the region.

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

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: Not relevant.	
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**

3.8.5 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: Corn stover is a by-product of corn production and not competing with food. A small portion is used mostly in animal bedding. Risk is very low.	
Raw Risk Likelihood (RRL) The risk likelihood is deemed very low, therefore the RRL is 2 out of 10.	**Score** **2**
Raw Risk Impact (RRI) The risk impact is deemed very low, therefore the RRI is 2 out of 10.	**Score** **2**
Gross Risk Indicator (GRI) The Gross Risk Indicator (RRL X RRI) is 4 out of 100.	**Score** **4**
Mitigation/Notching *RRL Mitigation (Notch)* No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**Notch** **NN**
Loaded RI Score The Loaded RI Score ((1-Total Notch) X GRI Score) is 4 out of 100.	**Score** **4**

3.9 Risk Factor: Sustainability and Environmental Concern

3.9.1 Feedstock Sustainability

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

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

Risk Information: The rated quantity was compiled by applying a 50% sustainable straw removal factor, which ensures that, on average, the annual removal of corn stover in the BDO Zone does not affect negatively the soil health in the long term. This value was obtained through literature review and outreach to producers and implies a low risk of supply disturbance as a result of unsustainable harvesting practices. A low risk was assigned based on these considerations.

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

3.9.2 Risk to Soil Quality

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

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

Risk Information: Removing appropriate amounts of corn stover from farm fields can potentially be beneficial for corn production. Large corn stover volumes left after harvest prevent warming and drying of the seed bed in early spring. Partial removal of corn stover can help with warming of the soil at the time of planting, reduced tillage intensity, and less fuel consumption for corn production. However, overharvesting (mining) corn stover can negatively affect soil quality. By applying a 50% sustainable removal factor (see RI 3.9) this risk can be minimized and/or controlled. Ultimately, it will be the responsibility of both producers and project developers to develop and implement sustainable

removal practices that match soil quality and nutrient composition at every participating farm. Consequently, a low risk level was assigned to this indicator.

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

3.9.3 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: Not relevant to corn stover production.

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**

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: Not relevant to corn stover production.

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 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**

3.9.5 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: As a by-product of grain production, sustainable corn stover removal practices do not add risks to human or ecosystem health.

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: The vast majority of farms in Iowa are family owned and thus responsibly and sustainably managed. Practices such as prairie strips[35] enhance and protect wildlife habitat while agriculture operations, including corn stover removal can take place without negative impact on wildlife habitats or landscape.

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**

[35] www.nrem.iastate.edu/research/STRIPS/content/what-are-prairie-strips

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**

3.9.7 Biomass Classified as Genetically Modified Organism (GMO)

Rationale: There are various risks associated with GMOs, such as migration or dispersion across the landscape, which can generate community backlash and create supply chain risk. GMOs can also be heavily regulated. If planning to grow or procure GMO feedstocks, especially purpose-grown energy crops, it is important to understand the risks.
Risk Information: Not applicable to corn stover.
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). **NN**
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: Corn stover quality is affected at every step in the harvesting, baling, transportation, and storing. A new corn stover project most likely would target the following quality attributes: moisture content, soil contamination, and bale size/bulk density. Since the current practice of supplying round bales for cattle bedding does not require strict quality standards, it will be necessary that the project proponent implement a quality control (QC) program for producers. Also, modified combine heads and strict collection practices will be needed. The risk was deemed medium.
Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. **6**
Raw Risk Impact (RRI) **Score** The risk impact is deemed medium, therefore the RRI is 6 out of 10. **6**
Gross Risk Indicator (GRI) **Score** The Gross Risk Indicator (RRL X RRI) is 36 out of 100. **36**
Mitigation/Notching **Notch** *RRL Mitigation (Notch)* **NN** No adjustment.

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

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: While the current round baling equipment availability seems capable to sustain a significant part of the scale-up efforts (Section B – Operational Considerations), a large-scale corn stover project would most likely require improved levels of baling and transportation efficiency. Consequently, investments in high-density square baling equipment will be necessary to double or even triple the baling and transportation efficiency. Producers communicated their skepticism to invest in large square balers due to farm labor shortages. The expectation was that project proponents, like with the existing two corn stover projects, would provide collection and transportation services. Due to significant scale-up equipment requirements, a medium-high risk was assigned to this indicator.

Raw Risk Likelihood (RRL) **Score** The risk likelihood is deemed medium, therefore the RRL is 6 out of 10. **6**
Raw Risk Impact (RRI) **Score** The risk impact is deemed 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)* **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 48 out of 100. **48**

CATEGORY 5.0: INFRASTRUCTURE RISKS

5.1 Risk Factor: Physical Infrastructure

5.1.1 Land Parcel/Industrial District

Risk Information: This 145-acre site in the Indianhead South industrial area (See Section C) is a prime asset for prospective new industries considering investing in the Mason City area. The site is fully prepared for development, with essential utilities in place and zoning that supports light to medium industrial use. The presence of adjacent industrial operations, coupled with a pro-business environment free of building restrictions, enhances its appeal. This site is highly recommended for e-commerce and industrial enterprises seeking a ready-to-develop location.

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) 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**

5.1.2 Ownership of Land

Risk Information: This parcel, situated within the corporate limits of Mason City, is owned privately, and promoted by the local Economic Development Department. The site boasts an excellent location and strong support from the local government, known for its pro-business stance. The potential for purchase or lease is promising, with the possibility of subdivision, though utility connections are slightly biased towards the west and southern borders of the parcel. Overall, this availability suggests a low impact rating on future projects, making it an attractive prospect for development.

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**

5.1.3 Permitting Description

Risk Information: Mason City has significantly streamlined its permitting process in recent years, enhancing its appeal to new industries. The availability of key permits online facilitates quicker processing, typically within 3-4 months for non-hazardous companies. The city's pro-business stance, characterized by easy access to necessary officials and collaborative efforts with developers, further supports efficient project progression. This makes Mason City a favorable location for industrial development.

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

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

5.1.4 Environmental Issues

Risk Information: Iowa faces significant environmental challenges, particularly agricultural pollution impacting groundwater and straining potable water supplies. The high frequency of tornadoes (average 45 per year) and occasional elevated levels of airborne PM-10[36] (dust/particulate) in Mason City due to farming practices and wind contribute to a medium risk environment for new industries. Prospective industries should consider these factors when evaluating potential locations in the region.

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**

5.2 Risk Factor: Utilities

5.2.1 Natural Gas Availability

Risk Information: The natural gas availability along the parcel's west side, supported by a robust 12" main and provided by Alliant Energy at up to 150 psi, is a significant asset for new project development. This capacity to meet the high demands of large industrial sites, combined with Iowa's mid-range gas cost and stable pricing, enhances the site's overall appeal. The accessibility and predictable cost structure are strong advantages for prospective industrial projects, positioning this site as highly favorable for new industrial development. Current Iowa industrial gas pricing is

[36] weather.com/forecast/air-quality/l/Mason+City+IA

$7.60/mcf,[37] ranking it in the middle (27th) among other states. Historical prices have varied no more than 4.1% (year-to-year) over the past decade.
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 Electricity Availability

Risk Information: Alliant Energy is the electric power provider to the site, which is supported by robust infrastructure. The primary 25kV three-phase, overhead lines along the south and west borders ensure reliable power delivery. Proximity to substations is another key strength: the nearest existing substation is only 3/4 mile to the north, and a new substation, slated for early 2024, will be less than 1/4 mile to the south. This new substation will significantly enhance power capacity, increasing it by over 25MW. Current industrial power rates in Iowa, at $6.01/KWh,[38] rank the state 8th in the country for the lowest prices, making it highly competitive. This low cost of electricity is a substantial asset for new industries considering this location, offering both affordability and reliability in power supply.
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**

[37] https://www.alliantenergy.com/accountandbilling/billmeterrates/ratesandtariffs/naturalgasratesiowa
[38] www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a

5.2.3 Water Availability

Risk Information: The Municipality of Mason City owns and manages the water supply to the site, providing enhanced and reliable infrastructure. The 10"-12" main pipelines running along the west and south right of ways of the parcel have a substantial capacity of 9,000,000 gallons per day.[39] Currently, less than 20% of this volume is committed, indicating significant available capacity for new industrial operations. The potable water pipelines are of newer construction, with a projected lifespan of 30-50 years, ensuring long-term reliability. This ample and dependable water supply ranks as a significant asset for new industry operations considering this location.

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.	**4**
Gross Risk Indicator (GRI)	**Score**
The Gross Risk Indicator (RRL X RRI) is 16 out of 100.	**16**
Mitigation/Notching	**Notch**
RRL Mitigation (Notch) No adjustment. *RRI Mitigation (Notch)* No adjustment. The Total Notch (RRL Notch) X (RRI Notch) is NN (No Notch).	**NN**
Loaded RI Score	**Score**
The Loaded RI Score ((1-Total Notch) X GRI Score) is 16 out of 100.	**16**

5.2.4 Waste Disposal

Risk Information: Mason City municipality provides comprehensive wastewater management services to the site, enhancing its attractiveness for industrial operations. The primary connection, located at the northeast corner of the parcel, offers a substantial capacity of 21 million gallons per day.[40] Additionally, the treatment facility capacity to handle 12,000 TSS (total suspended solids) per day indicates high efficiency and likely incorporation of recent technology. This advanced wastewater management capability is a notable asset for new industries considering the location, ensuring both environmental compliance and operational efficiency.

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**

[39] LocationOne.com/sites/Mason City – LOIS Platform
[40] https://www.masoncity.net/pview.aspx?id=18153&catid=0

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

5.2.5 Internet Availability

Risk Information: Fiber cable installation along the west and south right of ways, provided by CLTel, a local cooperative, ensures reliable telecommunications infrastructure. Full 5G wireless and hardwire services are currently available, meeting market pricing standards. While this level of accessibility is expected in modern developments and does not provide a significant competitive advantage, it ensures that new developments will have adequate telecommunications support without any negative impact. This contributes positively to the site's overall infrastructure readiness.

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 Choose	16

5.3 Risk Factor: Transportation/Logistics

5.3.1 Road/Highway Access

Risk Information: Mason City's strategic location on Interstate 35, a major north/south corridor from the Great Lakes to the Mexico border, offers significant logistical advantages. The additional access provided by State Highway 18 to the east and west enhances connectivity. These roads are well-maintained year-round, ensuring consistent and reliable transportation. The primary Iowa highways, with a weight limit of 80,000 lbs.,[41] align with national standards, effectively supporting general truck and transport traffic within the BDO Zone. This robust transportation infrastructure is a substantial asset for new industrial developments, facilitating efficient supply chain and distribution 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)*	NN

[41] Iowa Department of Transportation (iowadot.gov/mvd/motorcarriers/motorcarriers/osowpermits_determine#)

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

5.3.2 Rail Access

Risk Information: Mason City serves as the confluence of three major Class 1 railroads: Union Pacific, BNSF, and Norfolk Southern. Each railroad operates terminals and freight handling centers within the city and industrial centers, providing extensive connectivity. The highlighted site in this report is within close proximity, just 200 yards, of a Union Pacific loading dock located at the adjacent ethanol facility. This proximity to railroad infrastructure represents a significant asset for new developers, offering low risk and easy access to efficient freight transportation services.

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

5.3.3 Airport Access

Risk Information: The Mason City airport (MCW) offers limited commercial air service, primarily provided by United Express with daily direct flights to Chicago. Additionally, freight service by UPS and FedEx is available. The airport is well-equipped to handle most private jets and aircraft and is maintained year-round. While the commercial air service is limited, access to nearby full commercial air and freight services in Des Moines and Cedar Rapids, both approximately 130 miles away by road, mitigates any potential limitations. This accessibility ensures low risk for new industries, providing efficient options for moving personnel and goods.

Raw Risk Likelihood (RRL) The risk likelihood is deemed Choose	**Score** **4**
Raw Risk Impact (RRI) The risk impact is deemed Choose	**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)*	**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 16 out of 100.	**Score** **16**

5.3.4 Water Freight Access

Risk Information: Iowa is the only state in the nation bordered by two navigable rivers, the Mississippi and Missouri. While there is no water freight access within the immediate Mason City area, the presence of these navigable rivers on the eastern and western borders brings strategic advantages for transportation and logistics. Dubuque, located 175 miles to the southeast on the Mississippi River, serves as a significant port handling riverboat and barge traffic, in addition to being a convergence point for railroad and truck freight. Although river access is not directly within the BDO Zone, the availability of reasonably accessible water freight options in neighboring regions mitigates any potential impact, scoring as a low or no-impact risk for new developments in Mason City.

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 Risk Factor: Social Infrastructure

5.4.1 Healthcare (Local)

Risk Information: Mason City has two primary healthcare facilities, University of Iowa and Mercy One hospitals, both nationally renowned for their quality of healthcare services. Mercy One, with 233 beds in Mason City, serves as a comprehensive medical center catering to surgical, oncological, geriatric, and general medical needs for the region. The presence of full ambulance and EMT services further enhances the healthcare infrastructure in the area. Access to such high-quality healthcare facilities and services is paramount for developers seeking to attract and retain employees, significantly contributing to the appeal and viability of the location for new developments.

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	**Notch**

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

5.4.2 Education (Schools)

Risk Information: Mason City public schools, recognized as Blue Ribbon Schools of Excellence by the US Department of Education and earning an A+ rating on the Niche ranking, exemplify outstanding educational quality. The reputation of the district as one of the best in the nation enhances the area's appeal, particularly for families considering relocation. Furthermore, the abundance of educational opportunities extends beyond K-12 education, with seven colleges serving the area. These include three private colleges and universities, one public college or university, and three community colleges offering 2-year degrees in vocational and technical disciplines. This comprehensive educational ecosystem not only supports the local workforce with advanced studies but also signifies a positive attribute for new companies seeking to attract skilled professionals.

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: Mason City Transit operates Monday through Friday from 6 am to 6 pm, providing comprehensive coverage of all industrial areas within the city. With fares set at only 50 cents per trip, the public transit system offers an affordable and accessible transportation option for workers. Moreover, the presence of taxis, UBER, and Lyft operating within all residential and commercial areas further enhances transportation options for residents and employees. This available and affordable public network ensures a reliable transportation solution, contributing positively to the overall accessibility and convenience of the area for workers.

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

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

5.4.4 Public Safety (Local)

Risk Information: The property crime rate in Mason City is 27% higher than the national average. However, the violent crime rate is 21% lower than then national average. Mason City police department and Cerro Gordo County Sheriffs serve the area with emergency response services and law authority. Overall, Mason City ranks slightly higher (2.93 crimes/100k population) than the state average (2.87) for reported crimes. There is a mixed safety profile in Mason City with higher property crime rates but significantly lower violent crime rates and no reported murders in 2023. With effective emergency response services and law enforcement agencies, the city has a slightly higher than the state crime rate, representing a medium risk for new industries considering the area.

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

5.4.5 Housing/Cost of Living

Risk Information: Housing expenses in Mason City are 30% lower, utilities 11% higher, and groceries 6% lower than the national average.[42] Overall, the cost of living is 11% lower than similar sized cities in the US. The housing availability in the region is well balanced between the supply and demand of homes and apartments.[43] Mason City offers significantly lower housing expenses and overall costs compared to national averages and similar-sized cities. Despite slightly higher utility costs, the affordability in housing and groceries contributes to a lower overall cost of living, making it a desirable location for new employees seeking affordable living options.

[42] www.payscale.com/cost-of-living-calculator/Iowa-Mason-City
[43] www.realtor.com/realestateandhomes-search/Mason-City_IA/overview

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

5.5 Risk Factor: Labor

5.5.1 Workforce

Risk Information: Mason City presents a robust and flexible labor market, ideal for new industries seeking a well-educated and available workforce. With a significant portion of the workforce open to new opportunities and a substantial educational attainment, the region is well-positioned to attract and sustain new business ventures. Mason City currently has an unemployment rate of 2.4%, lower than last year (2.7%) and the long-term average (4.23%). These values are slightly lower than the average state unemployment rates of 2.8%, 2.9%, and 4.51%, respectively. [44] From the total workforce, 76.5% has a high school education and 33% a bachelor's degrees or above.[45]

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**

[44] ycharts.com/indicators/mason_city_ia_unemployment_rate
[45] www.iowalmi.gov/laborshed

5.5.2 Labor Costs

Risk Information: Mason City offers a competitive wage environment with a solid median hourly wage and annual salary. The dominance of key sectors like wholesale and retail trade, manufacturing, and healthcare & social services underscores the stability and capacity of the local workforce. These factors combine to provide a reliable foundation for new industries looking to establish and secure a skilled labor force. The minimum wage in Iowa is $7.25/hour as of January 2024. 58.8% of the Mason City workforce earn an hourly wage, with a median wage being $20.00/hour. 38.2% earn an annual salary with a median salary being $74,500/year.[46]

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**

[46] US Department of Labor statistics 2024

SECTION E: TABLES AND FIGURES

Figure E-1. Historical Number and Size of Farms in the BDO Zone[47]

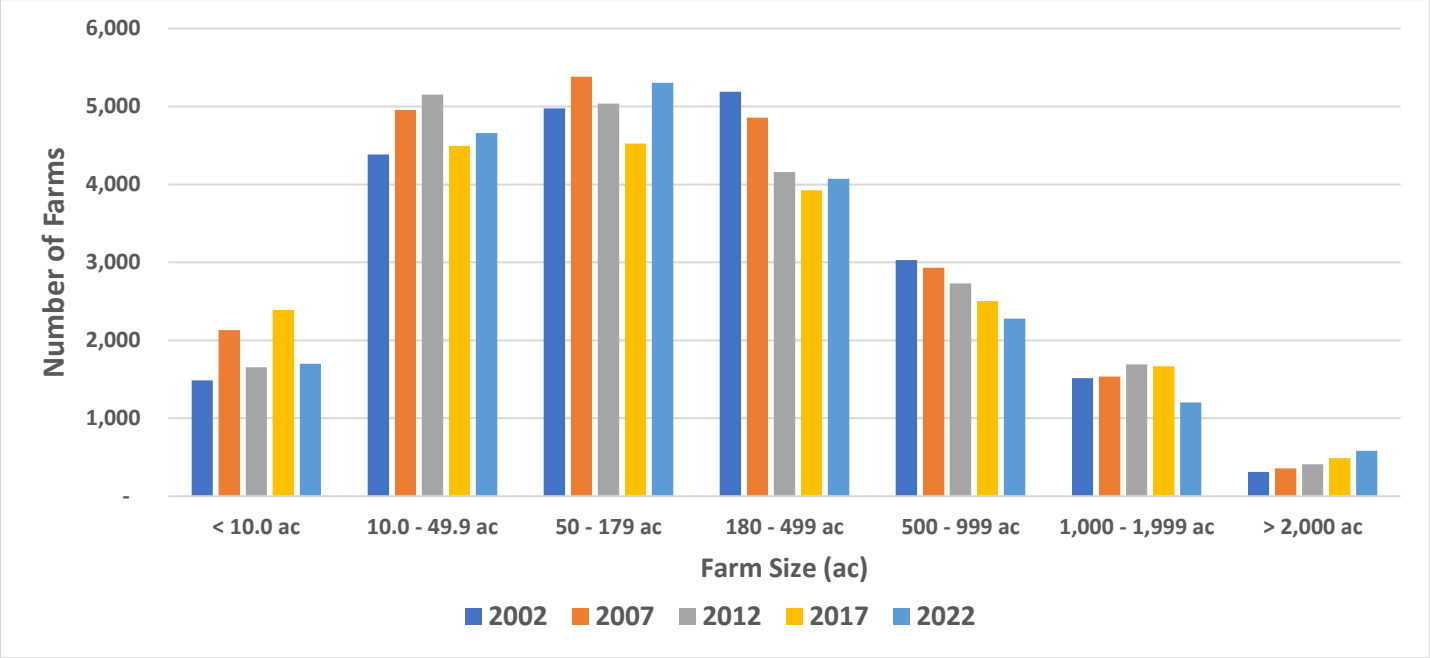
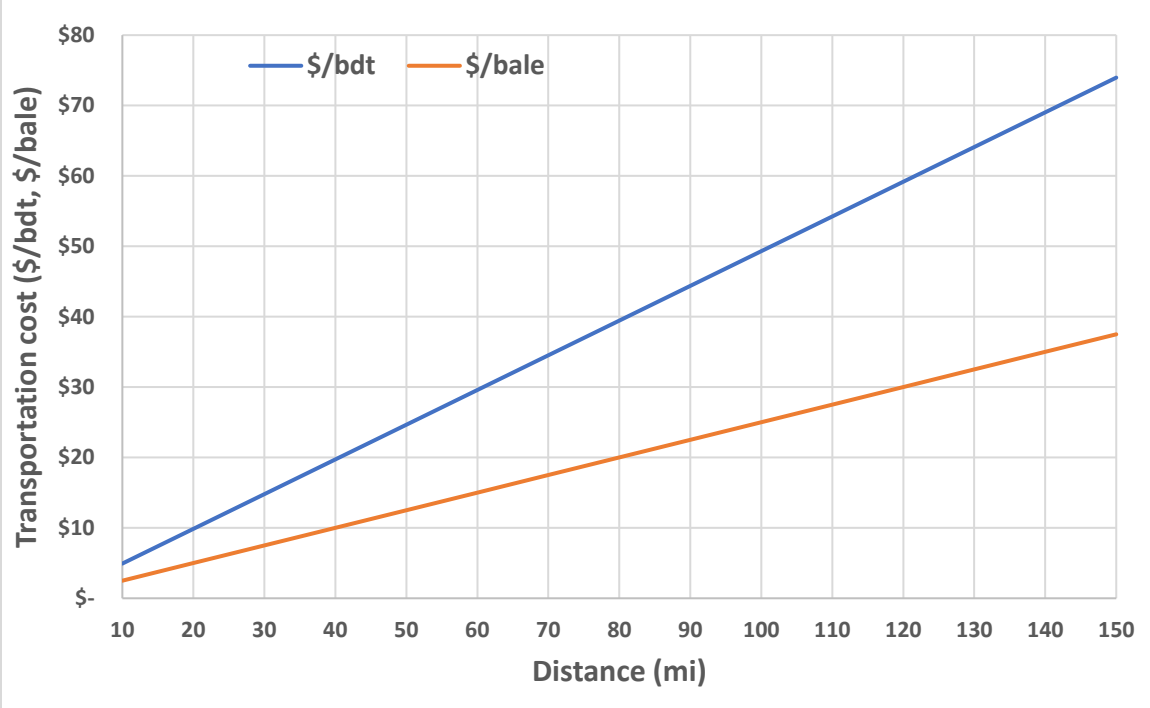


Figure E-2. Corn Stover Transportation Cost by Distance from Mason City, IA[48]



[47] quickstats.nass.usda.gov (Census data)
[48] Assumes $0.25/bale/loaded mile (2024 Iowa Custom Rate Survey), 53 ft flatbed trailer, 39 bales/load, 22% bale moisture content

Figure E-3. Historical Corn Prices[49]

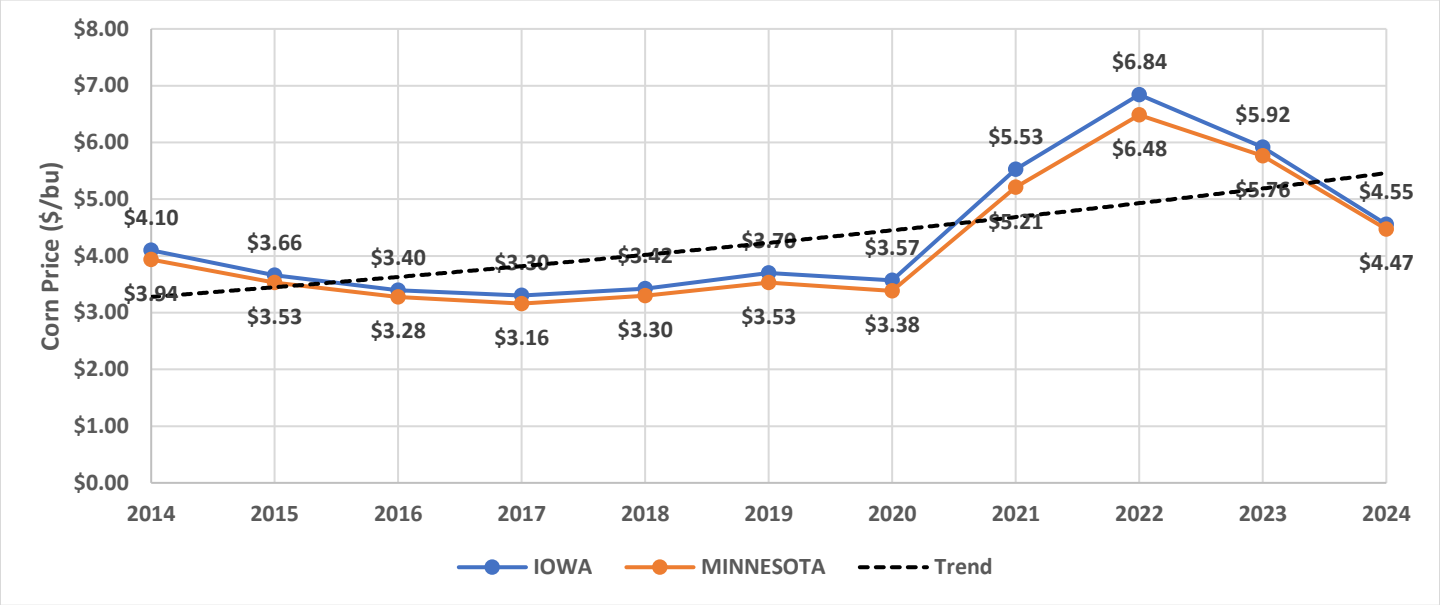
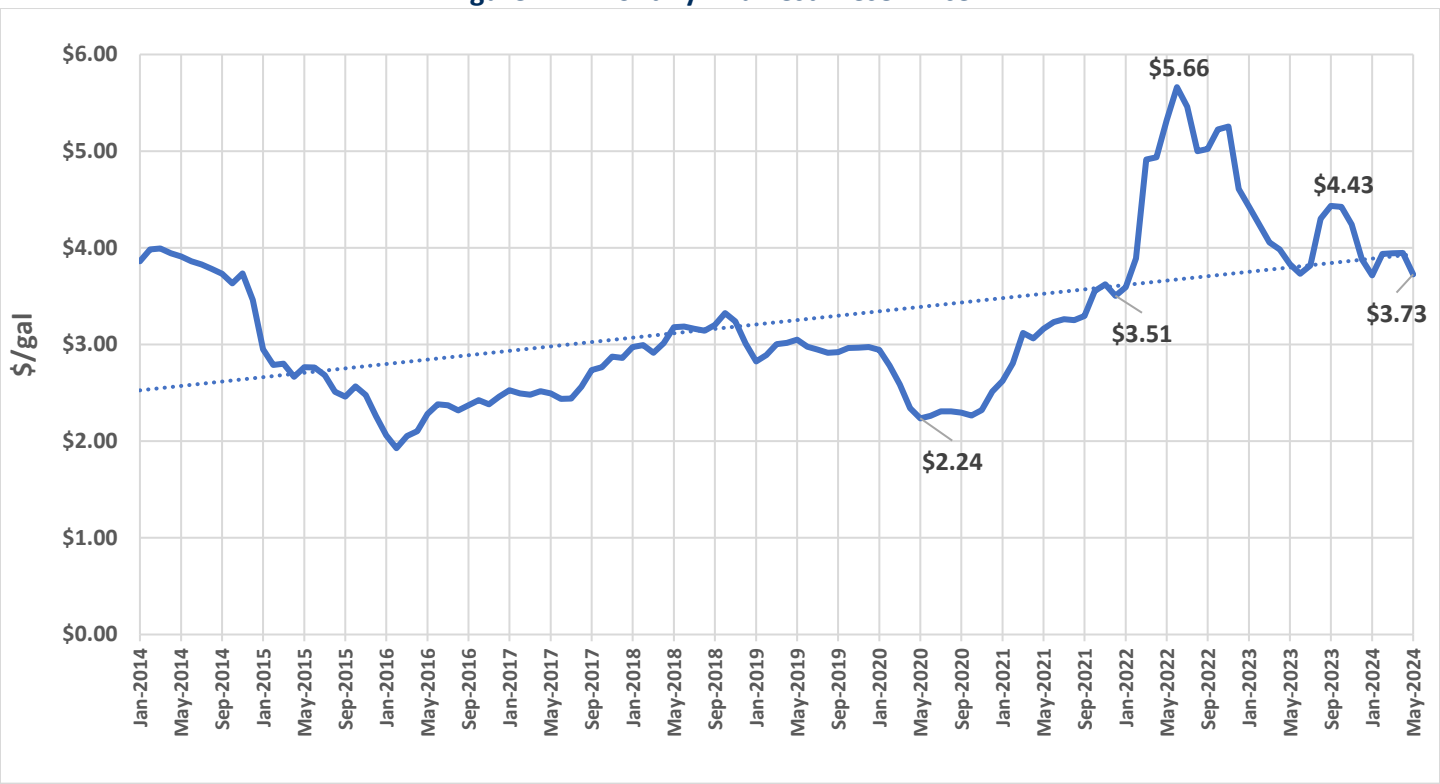


Figure E-4. Monthly Midwest Diesel Price[50]



[49] quickstats.nass.usda.gov
[50] www.eia.gov/dnav/pet/pet_pri_gnd_dcus_r20_w.htm

Figure E-5. Producer Price Index[51]

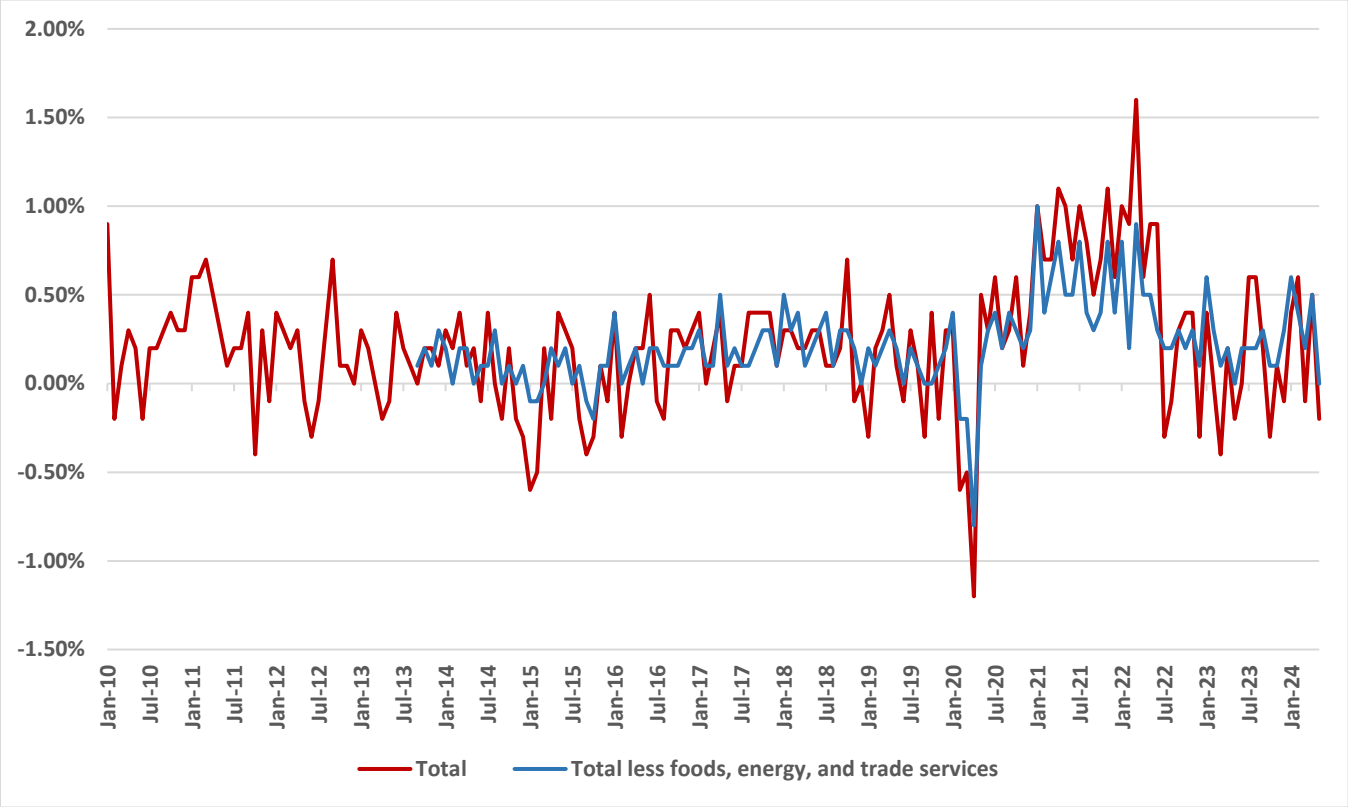
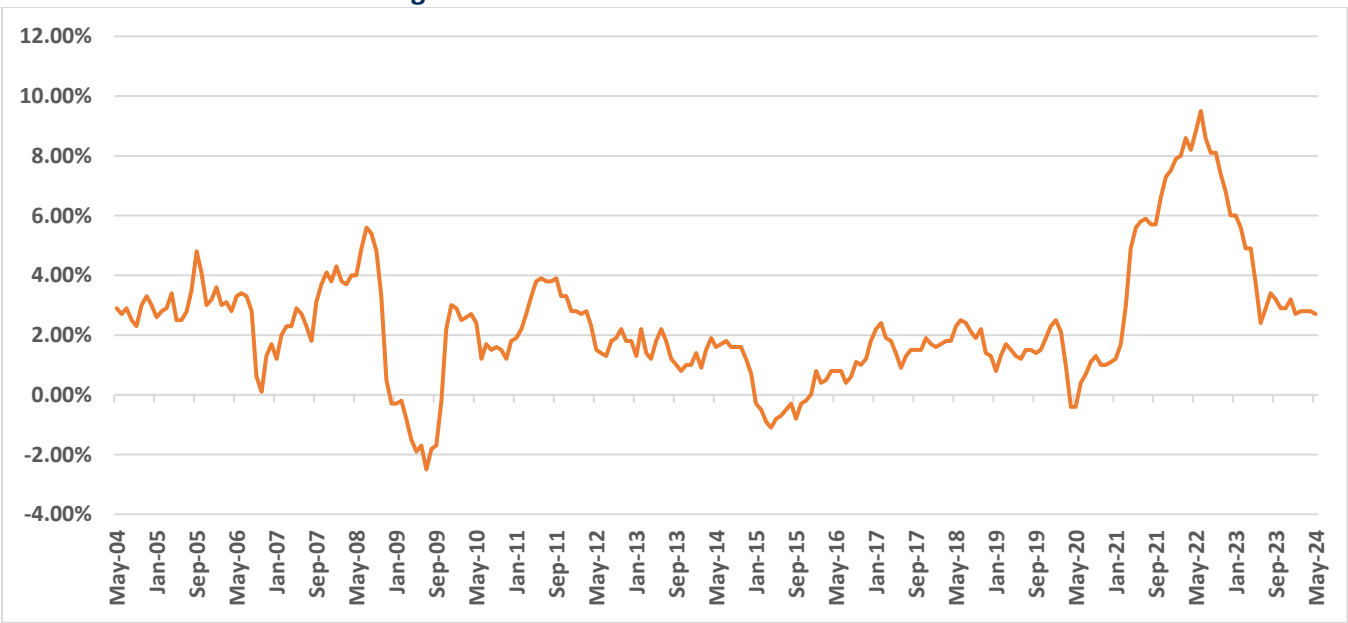


Figure E-6. Consumer Price Index - Midwest[52]



[51] www.bls.gov/charts/producer-price-index/final-demand-1-month-percent-change.htm#
[52] www.bls.gov/charts/consumer-price-index/consumer-price-index-by-region.htm

Figure E-7. Annual Precipitation in October[53]

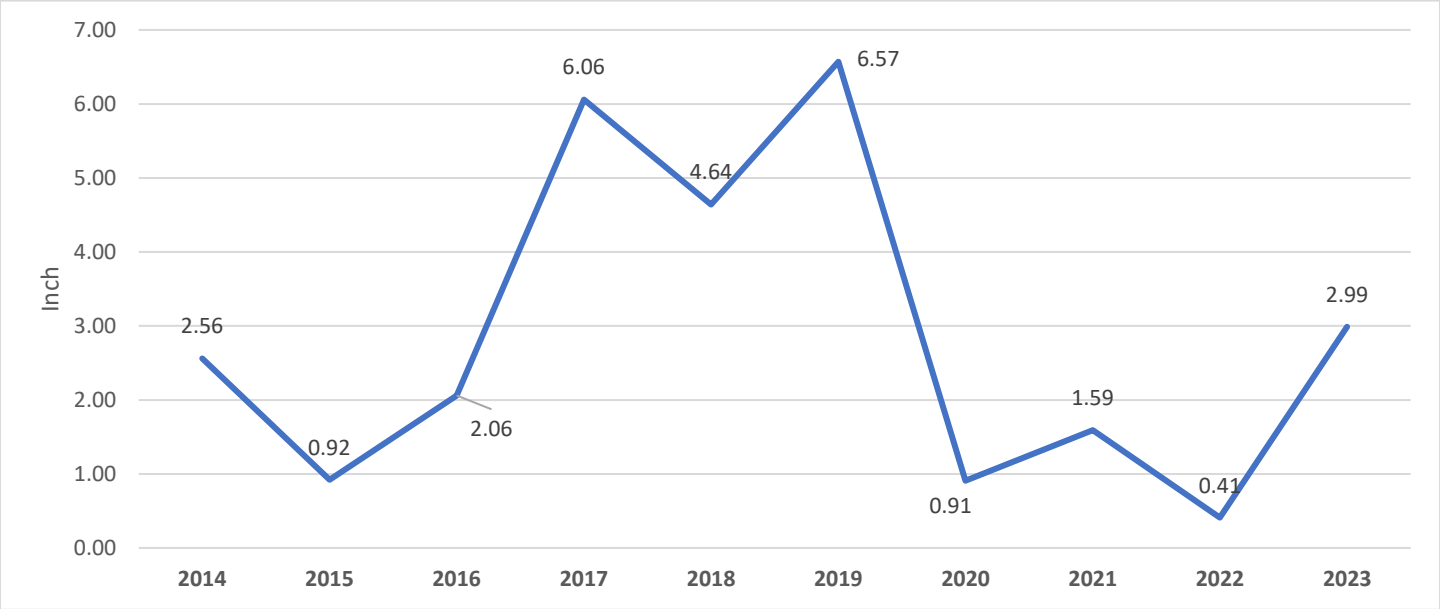
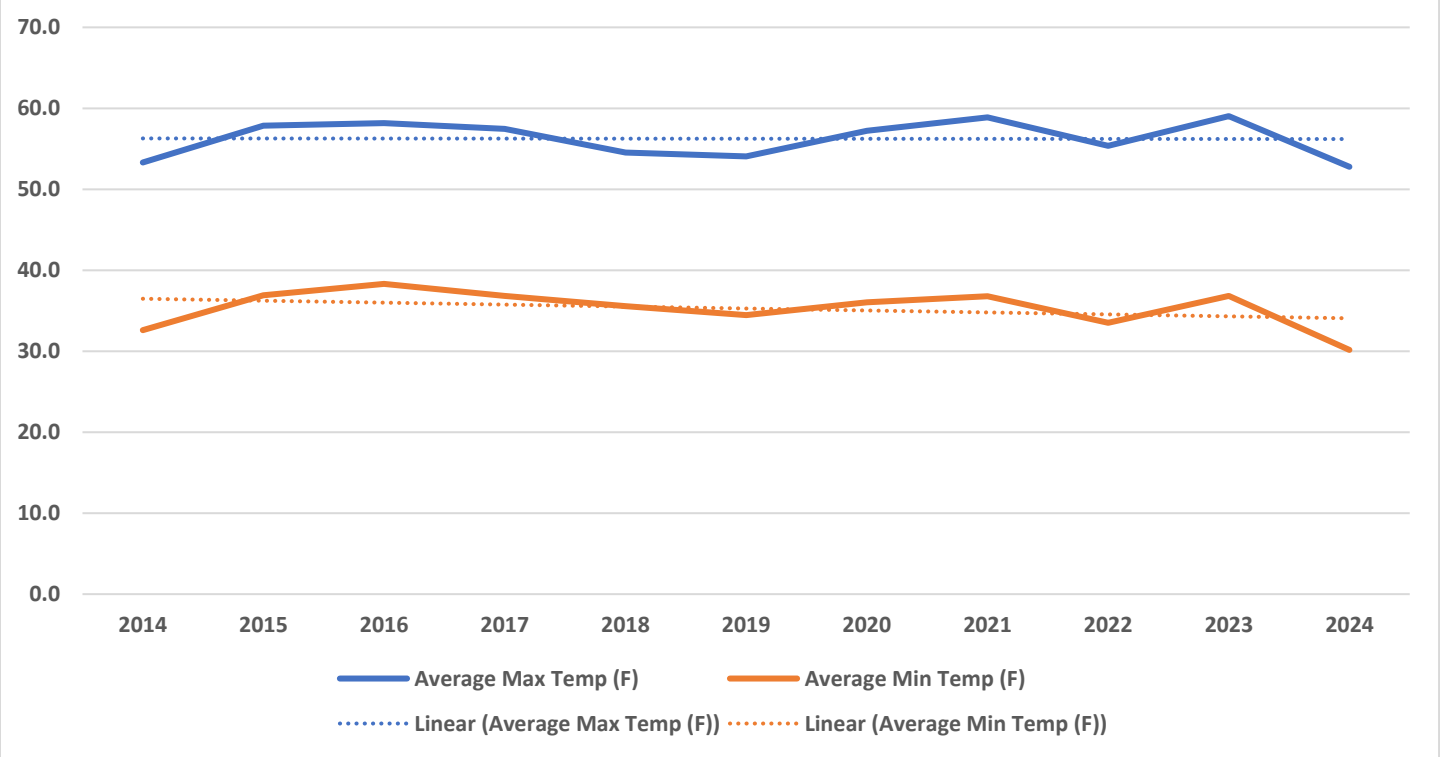


Figure E-8. Historical Average Max and Min Temperatures



[53] mesonet.agron.iastate.edu/rainfall/

SECTION F: LEGAL DISCLAIMER

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