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Ms. Nelson:

Re: **FINAL RESULTS** - COP 2020

The following outlines our results from the analysis as outlined in our LOE dated September 21st, 2020. We have incorporated the elements that were identified upfront as well as any feedback following the presentation of preliminary results on November 26, 2020. This work continues to maintain the link to the Alberta COP approach other than the fact that we do a survey of the whole population in Alberta vs. a statistically valid sample for British Columbia (27 producers).

This report provides a detailed summary of the process that has been used to generate the COP for broiler breeders in BC as of October 31, 2020. Specific Results of the COP Study are then presented, and an analysis of individual cost elements provided.

The report follows a four-part approach to the presentation:

1. The first section provides a discussion of the valuation methodology recommendations from Serecon on several key areas. The methodologies were proposed because we were tasked to perform analysis on several COP components in what we refer to as the COP Study Protocol which is the protocol developed out of the LOE.
2. The next section outlines the results of the fieldwork and discusses the data weighting, demographics, and data validation. This section provides an outline of the validation process used to ensure that the data is accurate and reflective of the participant's input.
3. Section 3 of the main report provides a detailed summary of the results from the process.
4. The final section of the report provides a detailed updating process so that the COP can be implemented and kept current. We have assumed that you would be continuing to update this every A period.

Project Context

The BCHEC is looking at moving from a pricing model based on the Linkage System Model initially developed in 2006 to a pricing approach based wholly on their own COP alone[1]. As part of this process, there is a need to collect up to date cost information from hatching egg producers to validate both the variable and fixed costs of production.

One of the key drivers is the extent of equivalence with pricing in Alberta, and it is understood that the BCHEC Board wants to collect enough data to allow for a detailed assessment of options to be consistent with their approach.

As a result of this request, we assessed the results of previous analysis in BC. In those results it was determined that the coefficient of variation in the results was approximately .08 which means that with approximately 28 surveys you would have a statistically valid sample at a 95% level of confidence at a 3% margin of error. We have used this as the basis for the selection of the sample.

One final comment relates to the approach to data collection. We have always conducted one-on-one interviews at the farm sites previously. This has enabled us to view the facilities and facilitate the development of an opinion on the relative age of the structures and associated equipment. As a result of COVID 19 precautions, we could not visit the facilities as part of this review. On the other hand, we did meet with all the farmers face-to-face at your offices. The only exception were 3 producers who could not meet in person due to concerns about the need to physically distance as a result of a potential contact with COVID 19.

It is critical to note that while these exceptions created significant inconvenience, they do not have a material impact on the results in our opinion. We spent a significant amount of time with these farmers using various type of technology and were able to validate their results remotely.

Engagement Specifics

Serecon was engaged as an **independent valuator** and contracted under a consulting services engagement. We have provided an expression of value for the costs of production incurred by hatching egg producers in BC.

We were not hired as advocates for the BCHEC and remain advocates only for our own opinion as developed under the terms specified in this document. Our remuneration was in no way based on the results of the valuation.

We understand that we may be asked to defend our approach and results as part of legal proceedings. We also understand that you may request that the accumulated raw data be provided to another third party. While we would protect the individual participants, we have agreed to release the data to an accounting/consulting-type firm as directed by you.

[1] The linkage model uses equivalent costing model approaches for both broiler and breeder production and calculates a breeder price that provides the same cost recovery for both categories of production. Given that the live price in BC is a fixed number per kg based off Ontario, and the fact that breeder prices are part of the broiler costing model, an iterative calculation is used to ensure cost recovery equivalency is achieved.

Project Objectives

The specific objective of the engagement was to:

> ***Use a stratified, structured survey process, whose size is statistically valid at a 95% LOS at a 3% margin of error, to update and validate costs of producing hatching eggs in BC. The model would consider all costs faced by producers – both cash and opportunity costs. This model needs to be replicable, defendable, and easily understood by all parties if it is challenged by hatcheries and/or the BCCMB.***

Project Scope

The calculated costs have been based on a survey of 27 hatching egg producers of various sizes and from various locations, recognizing the limited geographical area that is covered by the production base. Producers have been advised that their data would potentially be discoverable should the costing model be challenged. Confidentiality concerns have been limited to this potential issue. This is a critical point, as the information we use must be made available to opposing experts in the event of a dispute, otherwise the model will be justifiably criticized. We are strongly of the opinion that if the raw data used in the development of the model is provided to other valuation experts, their interpretation could not vary significantly from ours.

Cost Basis & Statistical Validity

Calculated costs are based on a survey of a statistically valid number of farms currently registered as hatching egg producers. These costs consider both pullet and layer operations. We have used market information unless it is not available.

Need for Verifiable Data & Transparency

One of the key principles used in the development of the methodology was the need for full transparency while ensuring clarity and simplicity in the approach. As a result, we collected specific and detailed data from the producers and this enables the model to be broken down into a significant number of cost elements – ultimately aggregated to a more macro level for reporting purposes, but available at the detailed level for anyone wanting to audit the process and/or conduct sensitivity or scenario analysis on given variables.

This ability to identify and outline specific data elements is necessary if the results from BC are to be compared to those in other provinces. There is a need for a full normalization of cost elements to ensure that a fair and valid comparison is made. Only when the data is normalized can comparisons be used, otherwise they result in inaccurate assessments and are not useful in terms of motivating appropriate behavior.

As discussed with the Board we have included validation and documentation that outlines how labour costs have been calculated and why the Activity Based Costing Approach would be most appropriate for the COP. This practice of justifying our approach has also been applied to other elements where the raw data was not used to produce results – equipment, buildings, etc.

Flexibility in Approach in Order to Facilitate Decisions & Inform Discussion

Finally, we have used best valuation practices in the calculation and presentation of results. It is our opinion that the treatment of depreciation used in previous models has little or no influence on the relative pricing if an appropriate rate of return on producers' equity is considered when using an adjusted book value to depreciation approach. This approach is even more important given the fact that we are not able to physically visit the farms.

A similar approach would also be taken when looking at labour costs, where we will both collect information directly from the farmers but will add additional context based on a "greenfield" labour approach[2] using typical time in motion information based on typical work/activity patterns used in the production process.

Ultimately it is our opinion that this model is robust enough to enable a scenario analysis on any one of the cost elements.

Project Schedule and Activity Summary

We completed this project in four steps:

1. **Planning, Preparation, and Documentation** – the first phase began with development and refinement of the overall project plan and schedule. Data collection materials were developed including the survey interview instrument and questionnaire, and a set of introductions and data requirements that would be sent to the sample that was selected.
2. **Sample Selection & Fieldwork** – BCHEC provided a list of producers from which we were able to segregate them into three size categories and determine the selection protocol – described in detail later in this document. We initiated the calling and arranged to meet the farmers in the BCHEC offices following a strict physical distance protocol.
3. **Data Compilation, Analysis, and Follow-up** - survey results were compiled, validated, and analyzed to calculate the COP. We used a validation process that included considerable common sizing and data mining in order to ensure correct interpretation. It is important to note that no data had to be removed. The data was then brought up to the valuation date of October 31, 2020 by adjusting the cost basis to current values.
4. **Reporting** – A preliminary report was provided and discussed and reviewed with the Board in November 2020. The need for additional context and/or explanation has been incorporated into this final report.

Critical Considerations & Validation of Approach

There were a few elements where market information was not consistently available and/or reflective of the actual cost of production – most specifically labour and capital. In all cases we followed a basic set of principles in determining how they should be applied.

In summary, Serecon followed a structured approach to the task of making recommendations to the BCHEC. Serecon was guided by our professional opinion that the COP must accurately measure all costs incurred by a producer to produce the commodity and these should be included, except for any costs related to quota value. These costs are to be based on a Free on Board (FOB) farm gate basis and measured as the net expenditures related specifically to the production of the commodity after accounting for any rebates or cash discounts. Serecon used statistical theory to obtain a statistically valid sample that accurately reflected the eligible population of breeder producers in BC. The data collected from this representative sample was then extrapolated to the population based on the expected weighed average COP for a typical farm which is defined based on the average farm size in the province.

[2] A greenfield approach means that labour costs are calculated based on what a reasonable person would expect to incur given the activities that have to be conducted and the current market price for labour. Essentially it starts fresh without any restrictions or dependences on existing arrangements.

The basic criteria that guide the development of the questionnaire is that the survey approach must:

- Use survey values where and when possible;
- Use appropriate substantive equivalents where this is not possible; and,
- Test these substantive equivalent's vs fair market values and validate any differences.

The Data Itself

Producers provided significant detail regarding cycle production information (e.g., eggs sold, eggs set, chicks hatched, mortality, Mt of feed used, price of feed used, feed conversion, etc). Operating costs other than chick and feed costs were generally reported for the most recent fiscal year (2019 in most cases). All costs were updated to October 31, 2020 pricing by indexing costs vs. actual pricing. In some cases this was done using CPI, but in the majority of cases we were able to compare actuals – as an example we have been tracking utility costs etc. - over time so were able to index the reported pricing vs. what current costs are.

All costs were calculated on a $ per hen and per dozen hatching egg basis. The "hen" currently used is the chick placed and paid for equivalent (vs hens housed). Weighted averages were then calculated based on quota size.

Analysis concepts used were based on generally accepted business valuation principles, including accrual accounting and historic cost valuation with provision for including capital improvements and depletions. Only costs that are directly attributed to the hatching egg and pullet enterprises were used in generating the costing model. It was accepted that quota value was not to be included in the costing process.

Sampling

The sampling process followed a structured approach to ensure that a valid random distributed sample generated. There are several critical elements that have to be considered as part of this and the following definitions are critical to the process.

- **Variance (σ^2)** – the average of squared differences from the mean. It can also be described as the expected value of the squared deviation from the mean and essentially provides a measure of how spread out a set of numbers are.
- **Standard Deviation (σ)** – is the square root of the variance and has the advantage of being expressed in the same units as the mean. As a result, itis a more intuitive descriptive statistic.
- **Margin of Error (MoE)** – is a statistic that provides an assessment of the amount of random sampling error in the survey's results. The larger the MoE the less confidence you have that the sample results truly represent the population results. It is calculated by multiplying the critical value (from the Z or T distribution) by the standard deviation divided by the square root of the number of sample observations.
- **Confidence Interval (CI)** – A confidence interval gives an estimated range of values which is likely to include an unknown population parameter, the estimated range being calculated from a given set of sample data. They essentially provide a range of plausible values that one would expect in a given sample.
- **Coefficient of Variation (CV)** – this is really a normalized measure of dispersion and calculated as the ratio of the standard deviation to themean.

At its most basic form, the key determinant of the sample size is the MoE that is desired. The MoE essentially provides the user of the information with an indication of how confident they can be that the mean of the information collected reflects the population. This is usually expressed in the form of a confidence interval (as mentioned in the CI definition above) – providing a range within which the result could be expected to fall.

Sample Selection

The total population of 54 quota holders was segregated into four different categories:

- Those with under 2,500 annualized quota (were excluded due to a concern that they are not reflective of a going concern operation);
- Category 1: Those with between 6,000 and 7,500 annualized quota (3 producers in total);
- Category 2: Those with between 7,500 and 15,000 annualized quota (18 producers in total); and
- Category 3: Those with greater than 15,000 annualized quota (25 producers in total).

We used this distribution to determine how many producers from each category we needed to interview in order to get a weighted average representative COP with a target of 30 producers. This included:

- 2 in Category 1;
- 12 in Category 2;
- 16 in Category 3.

Each quota holder from those categories was allocated a random number using a random number generator, which was used to identify the specific producers to be targeted. We proceeded to contact each producer within each of the categories in the order that they were given by the random number generator. This ensured that the sample was valid and reflective of the population.

While we were targeting 30 producers, we were able to collect data from 27 producers. We had to substitute 4 producers in Category 2 and 2 in category 3. Only 2 producers absolutely refused to participate. The others had significant issues that precluded their participation – family death and COVID.

The summary survey demographics are:

Table 1: Summary of Quota Numbers

Quota Holders		
Actual	Sample	% of Total
54	27	50%

The sample represented 50% of total producers and 58% of total production. Table 2 presents a summary of the demographics of the survey sample. Note that quota has been annualized in the table below. It is our opinion that the individual production units selected for the survey are representative of the production units in the province.

Table 2: Summary of Sample Demographics – Quota Information

	Average	**Median**	**Minimum**	**Maximum**
Population	17,996	15,034	2,500	57,413
Original Sample	18,466	15,172	6,000	57,413
Final Result	18,809	15,310	6,003	57,413

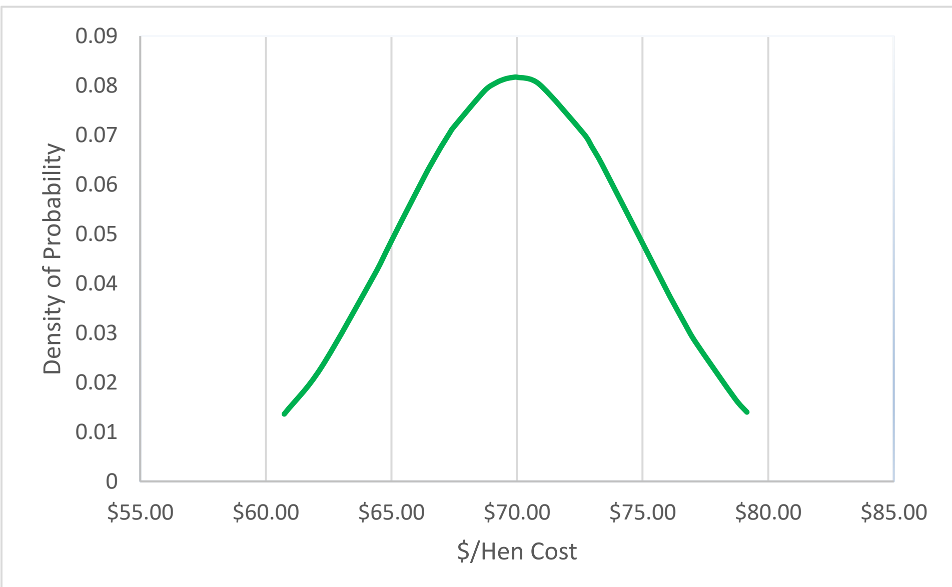
Statistical Validity

Survey results from the 27 producers have a weighted average cost of production of $69.56/hen ($69.98 simple average) with an associated standard deviation of 4.9. Table 3 presents a distribution of the $/Hen results while Figure 1 illustrates the probability density of the results which closely resemble a normal curve. These results have a 95% level of confidence with 2.6% margin of error. This margin of error means that the calculated COP will be within 2.6% percentage points of the real population value 95% of the time.

Table 3: Summary of Results - $/Hen

	Weighted Average	Median	Minimum	Maximum
Survey Results	$69.56	$69.40	$60.73	$79.15

Figure 1: Distribution Density ($/Hen)



Description of Cost Components

Operating Costs

• **Chick** costs are based on the average of the survey sample and indexed to October 31, 2020 based on receipts received from individual producers for their most recent flocks, validated with the information collected by BCHEC as of A-166. Service and vaccine costs for the day-old chick were separated based on invoiced figures. These have also been reported separately in the results. Farm labour for the vaccine application has also been collected and reported separately. This provides useful information as the various hatcheries have different vaccination protocols and provide various levels of service and the survey information provides insight on how this impacts the cost to the producer.

• **Feed** costs are based on the average of the survey sample with feed costs and Mt used reported by each participant for the periods provided. Feed prices used were the actual weighted averages of all feed types used in the reported cycles after all discounts received by the grower.

These prices have been updated to October 31, 2020 pricing by creating indexes between the reported pricing from the feed survey and the price actually paid for that period for the production timeframe used in the survey. This procedure was used for both the pullet and grower costs and uses the information for the various feed companies that Serecon has been tracking since 2000.

• **Veterinary and Medicine** costs were separated from the cost of vaccines. In most cases this cost was associated with lab testing, but there were a few situations where costs were allocated to a flock in production.

• **Utilities Costs** include power, water, gas, and telephone costs and is based on the weighted average of the survey sample on an annual basis. While a few of the growers surveyed reported all utilities as one value without a breakdown, most were able to provide specific hydro and gas prices for the flock being used in the analysis. Telephone costs were included with administrative and office costs in some cases having the impact of reducing the average telephone cost with a resultant increase in the office costs.

• **Vehicle and Equipment Operating** costs (fuel, oil and maintenance) are based on the average of the survey sample on a flock cycle length basis and include the cost of operating all trucks, tractors and other motorized equipment. Vehicle and equipment operating costs were included with repairs and maintenance by several survey participants, thereby reducing the average vehicle and equipment operating costs and increasing the average cost of repairs and maintenance.

• The cost of **Repairs and Maintenance** includes building repairs and maintenance, equipment repairs, and maintenance, alarm and security systems and barn supplies reported on an annual basis. Most of the growers surveyed were able to separate equipment and building repair and maintenance costs. We excluded all capital additions that would typically be capitalized vs. expensed. These additions to the building would be captured in the aged life approach used to estimate depreciation and are discussed in greater detail below.

• **Bedding** costs for most of the survey sample were based on the production cycles provided for the survey and validated with receipts from the farm records.

• **Administrative, Office Costs, and Professional fees** include the cost of legal and accounting services and office supplies and services. Some of the operators included telephone cost with office costs.

• **Insurance** costs include the cost of insurance for buildings, vehicles and equipment as well as business interruption and farm liability costs. These were typically reported by producers surveyed on an annual basis from their annual financial statements or their insurance policies.

• **Custom Charges** were related to the cost of catching spent fowl in the lay flock and the cost of catching for vaccination and moving in the pullet flock. Virtually every farm did their own cleaning and disinfection.

• **Levies** include board levies reported by all producers. Quota lease costs were not included as part of the survey as this is related to quota which cannot be included in the COP.

Labour

The COP needs to reflect the reality that there will typically be more than a single type of labour on a farm. This fact was addressed in our approach where different classes of work required different rates of pay – in this study there are two labour categories: management and skilled. In determining the most appropriate wage rate to be paid, the following must be considered:

- Complexity/judgement;
- Education;
- Experience;
- Initiative;
- Character of supervision; and,
- Scope of supervision.

As per the criteria outlined in the introduction to this section, survey information was used when arm's length labour transactions occur (i.e. the arm's length transaction information as provided by survey participants). In cases where there was non-arm's length labour involved in egg production a different approach had to be taken. Generally, family labour constitutes a large proportion of farm labour in BC. It is our experience that it is common for family labour to be overlooked, underpaid, or not tracked in accounting records on farms.

As suggested above, there was a decision that there would be two main labour categories: management and skilled labour. Given this, the key questions that had to be addressed by Serecon were for non-arm's length labour, and these were:

- How many hours should be allocated by task;
- What category of labour should be used as the basis for compensation; and,
- At what rate do these categories get paid?

Serecon attempted to address the first two issues by providing a matrix of on-farm activities to the farmers for their review and consideration. While the items were vast, there was a consensus that providing more details to participants when addressing non-arm's length labour was an important consideration.

The justification of considering non-arm's length labour was developed in consideration of the precedence (jurisprudence) on how this has been addressed for family and non-arm's length labour in Canadian law. Essentially, how to establish proxy values when market values do not exist

A review of the court rulings clearly illustrated how the BCHEC needs to deal with many of the issues around non-arm's length labour in developing its COP:

1) **Value for Family Labour is Equivalent to Arm's-Length Labour (based on activity)** – Three court cases clearly illustrated that family members need to be "appropriately" compensated for their contributions to a farm operation. The rulings were clear that it is important to either estimate a substantive equivalent wage rate OR incorporate non-monetary forms of compensation when considering the cost of labour.

2) **Non-Monetary Forms of Compensation** - Although these costs do not show up on the accounting statements, they do have an intrinsic cost and benefit to an individual farm operation. Non-monetary forms of compensation are included in court rulings and settlements where fair compensation must be determined. This is especially the case when family labour is used for on-farm activities. These law cases prove that all benefits, both monetary and non-monetary, are recognized as a cost/benefit in the eyes of Canadian law and need to be estimated when determining the cost of labour. <u>Non-Monetary adjustments would be required for both arm's length and non-arm's length labour calculations as discussed below.</u>

The findings from the jurisprudence above had an implication on the questions asked in the field work. There was a need to determine if non-monetary forms of compensation are being used by the participants. It was critical that the questions facilitate the collection of any and all compensation paid by participants, including any potential benefit from providing housing, providing meals, supplying transportation to and from the farm, paying for any education not directly related to on-farm training, and/or any other potential compensation that might offset salary costs. These issues were addressed with the survey participants during the fieldwork.

After a significant amount of analysis & consideration, Serecon came to several conclusions regarding the labour element (specifically non-arm's length labour) of the study. These have been included in the calculation of the COP and can be summarized as:

- Serecon provided the full labour worksheet to all participants as part of the pre-survey package so that they could ensure they have considered all the relevant labour components – even those with arm's length labour, since the labour updating would require this in the future. As a result, all participants – with both arm's length and non-arm's length were able to provide information on the breakdown of labour.
- For those with arm's length labour Serecon asked how many full vs. part time employees they have as well as the number of hours per week they work.
- For those with non-arm's length labour, Serecon discussed the hours spent by activity and had them specify the approximate percentage of each that is accomplished by a full-time staff or part-time staff. Respondents were also given the option of giving total labour hours and costs by aggregate category if they preferred but we then needed the part-time vs. full-time breakdown
- In cases where a farm has both arm's length and non-arm's length labour Serecon ended up using the reported arm's length labour cost as the proxy for non-arm's length labour for equivalent tasks on that farm.
- As part of the survey, we also collected information on the actual amount paid on a per hour basis from those with arm's length labour ensuring that any "in-kind" elements are considered and normalized for. These types of adjustments for non-arm's length labour were already made when applying the proxy
- In cases where there was a significant amount of non-monetary compensation with arm's length labour, we used a proxy. This involved asking questions that captured the non-financial compensation (e.g., housing, meals, transportation, etc.).

Ultimately, we spent significant time discussing labour with producers. While this is a difficult area for the producers to fully record their activities, in general the labour matrix that was provided helped focus the discussion on the specific activities undertaken and provide a relatively accurate estimate of the time required.

In terms of family and management labour we considered activity-based labour application with (where valid):

- 12 different categories of activity for pullet production: brooding; 2-8 weeks; 9-20 weeks; water vaccinations; subcutaneous vaccinations; cockerel transfer and vaccination; pullet transfer and vaccination; pullet barn cleanout; cockerel barn cleanout; pullet barn setup; cockerel barn setup; and flock placement.
- 7 categories for layer production: from transfer to 24 weeks; 25 to peak production; 31 to 45 weeks; 46 to 51 weeks; 52 to 60 weeks; flock ship out; and layer barn cleanout.
- 3 general activity categories: non-flock specific related to lay; non flock specific related to pullet; and non-flock specific related to overall farm operations.

The full details of the labour matrix are provided in the Appendix.

Capital Costs

The appropriate return on and of capital were approached in a systematic way. Ultimately, we have used a straight-line depreciation where a deemed cost of the assets less the salvage value is divided by the years of useful life of the respective assets. One of the issues that we face is that the cost and age of barns and associated equipment varies dramatically between operations as does the method of calculating the cost and reporting this on their financial statements (e.g., replacement cost, insured value, market value, book values). While we have a statistically valid sample, the reality is that using accounting statements alone to capture the cost of capital does not accurately capture the true economic cost.

As a result, we considered three approaches:

1. The extent of **net book value** reported on the financial statements – in this case we have had to normalize the financial statements to ensure that we are considering all relevant additions to capital. Farming operations typically expense barn additions vs. adding it to the capital base. They also typically do not include the value of unpaid owner and/or neighbor labour in this cost. This typically means going through historical operating statements and moving components of R&M into the fixed asset base.

   We have also had to work through the financials with the producer to ensure that quota costs have not been included as part of the capital base. This involves assessing the value of quota in the year purchased and ensuring that the value reported on the financial statements was consistent with this figure.

   Opinion: Virtually all the producers could provide specific examples of capital expenditures on buildings and/or equipment that was expensed vs. capitalized. Other producers provided recent appraisals where the book value reported was significantly different from the appraised value. As a result, it is our opinion that the book value does not reflect an accurate true cost to the producer and should not be used to estimate the economic depreciation to be charged in the cost of production.

2. **The aged life approach** to get an accurate estimate of the market value of the assets in place – as outlined above, the problems inherent with the use of reported net book value are significant. A more accurate option would be to obtain an appraisal of the market value of assets in place and use this as the basis to determine the effective depreciation and return on investment required. While full appraisals for each survey location were beyond the scope of this study, our experience in appraisal work would typically enable us to provide an opinion on the aged life value of the buildings based on the current conditions of the assets in place and records of maintenance and upgrades.

   This information can then used to determine the extent of useful life remaining and thus determining an appropriate depreciation and return on investment required based on an historical cost. It is important to note that this historical cost would essentially equal the adjusted net book value of the asset had capital upgrades been capitalized vs. expensed.

   Opinion: This approach is commonly used in valuations and appraisals to get an estimate of the fair economic value of an asset. This is an accurate way to determine the necessary return of and return on equity. Unfortunately, the situation with COVID does not allow us to visually inspect the barns so as a result we are not confident using this approach.

3. **The Modelled Approach -** this approach is like the cost approach often used by valuators and appraisers. Essentially, information on the cost to build that is publicly available is used to estimate what the cost to replace the facilities use to produce the flocks assessed as part of the COP. This cost is then normalized to

reflect the cost to build the facility at a halfway point in its useful life. In other words, what would it have cost to build the barn 20 years ago (assuming a 40-year life of buildings)? In this way the remaining equity and associated deprecation cost can be determined.

Opinion: In our opinion this approach is the preferred way, not only because we were unable to view the facilities, but also because it most closely reflects the approach being used in other jurisdictions and this thus more comparable and easier to defend. Ultimately, using the approach is consistent with the development of a sustainable industry since it captures the necessary costs to ensure that on average the capital structure is an average age – halfway through its useful life.

Some of the main assumptions used in generating the capital costs included:

• **Barns & Associated Equipment** - The standard current cost that was discounted to the appropriate age life was estimated based on the size of the operation. We split the surveys into the three categories described above (6,000 to 7,5000 annualized quota, 7,500 to 15,000 annualized quota and >15,000 annualized quota). Based on the surveyed data, we determined the averaged annualized flock size for each of the three groups (Table 4). Based on the annualized flock sizes, we estimated the build costs (Table 5).

Table 4: Weighted Average Annualized Flock Sizes

Operation Size Category (Annualized Quota)[3]	Weighted Average Birds Placed Per Year
6,000 to 7,500	6,000
7,500 to 15,000	11,732
>15,000	25,039

Table 5: Build Costs by Operation Size

Operation Size Category (Annualized Quota)	Pullet Barn ($/ft^2)		Lay Barn ($/ft^2)	
	Barn	Equipment	Barn	Equipment
6,000 to 7,500	$48.17	$9.10	$44.18	$33.58
7,500 to 15,000	$44.18	$9.10	$42.01	$33.58
>15,000	$39.74	$9.10	$39.74	$33.58

The Douglas Cost Guide was used to determine build costs. Information from Marshall Swift was then used to adjust current cost to the effective cost given the aged life of the barn. Barns were depreciated over 40 years assuming a 10% salvage value. A standard equipment cost of $33.58 per square foot was used for associated equipment including computer automation, generators, feed bins, and electrical and mechanical equipment in the lay barns. In the pullet barns equipment costs were fixed at $9.10 per square foot. Associated equipment was depreciated over 15 years for 75% of it and 5 years for 25% of it. For the spiker barns, costs were fixed at $52.12 per square foot for barns and $15.05 per square foot for equipment. Seven of the producers sampled had spiker barns.

The costs identified above were increased by $3 per square foot for facilities with automatic egg collection – a corresponding reduction in labour associated with egg collection was also considered.

• **Other Buildings** included manure storage facilities, machine sheds, tool sheds, other small storage buildings, and office space. Unlike the main barns, accounting records were used to capture the cost of these buildings. Care was taken to ensure that they were specific to the production of breeders. Capital costs as reported for other buildings were depreciated over 40 years.

[3] Quota size categories are based on the total quota, which is over a two-year period. The annualized quota is based on one year.

• **Tractors and Vehicles** included all motorized equipment, bobcats, trucks and other vehicles used in the poultry enterprise. These elements were itemized and then their market value was estimated by looking at recent sales reported in western Canada at auctions. These estimates of market value were depreciated over 10 years. A breakdown of the total motorized equipment estimates used for the calculations can be found in the Appendix.

• **Other Equipment** costs included manure spreaders, sawdust blowers, incinerators, pressure washers, and other equipment. The capital costs reported for other equipment were depreciated over 5 years.

• **Trucks/Automobiles** were normalized to account for a single farm vehicle with an estimated market value of $32,000. We determined the cost for a 3-year-old 4x4 and allocated this rather than using the actual farm vehicle reported by producers.

• **Taxes** were the weighted averages based on the annual property taxes reported by the survey participants and were adjusted to reflect actual production cycle length.

• **Return on Equity –** the discussion above relates how the value of physical assets was determined. The next step was to establish an appropriate return on equity. Considerations for capital items and the return on invested capital (ROI) are a critical part of the Study and resulting COP. While determining the ROI is not without its challenges, the Canadian court system and the valuation community in Canada have been very clear on the starting point in relation to calculating costs of production.

A number of Court Decisions on this issue have been summarized in *The Valuation & Pricing of Privately Held Business Interests* by Ian R. Campbell/Robert B. Low/Nora Murrant and Canadian Valuation Services, The Student Edition 2015, where costs are clearly defined to be:

- "the total sum of money needed to produce a particular quantity of output"; and,
- "Production Costs are the costs which should be essentially received by resource owners so as to presume that they will continue to supply them in a specific period of time"; and finally,
- They are defined to "signify the money costs which are to be incurred for acquisition of the factors of production."

These examples clearly indicate the basic valuation principle that money has value regardless who provides it, and ultimately that producers should not be penalized because they have invested capital into breeder production. This principle extends to both the costs incurred and the necessary return required in order to convince the producer to continue to cover them.

The following section outlines and discusses three key components necessary when determining what the ROI is composed of and how it is measured:

1. **Types of Capital** – in this case operating, land, as well as buildings and equipment. Each of these is defined and the implications of that definition are explained.
2. **Cost and allocation of Equity and Debt** – in this section we identify how the cost of equity and debt are calculated and how they are combined using a weighted average cost of capital (WACC) to get an effective return on investment figure that is applied to buildings and equipment.
3. **Valuing the relevant capital items** – in this section we outline how the assets were valued.

In accordance with the basic principles of this study, it is important that the capital differentiates between three main groups of assets reflecting all aspects of producer investment including:

- Buildings and Equipment (B&E) – barns and other buildings plus equipment. It is a long-term investment: its value depreciates with time and it is important to consider operating reality.
- Operating capital – pullets, feed inventory, accounts payable for labour etc. Short-term, typically financed with a Line of Credit.
- Land - Long-term, its value typically appreciates with time, farmland hasa lower risk than other farm asset classes.

As a result, we developed three different methods for calculating and updating ROI for each of the asset classes that are discussed below.

Category 1: Operating Capital

The final formula for the cost of operating capital for the Conventional and Enriched COP Study, as follows:

(Feed cost/52 + Skilled Labour/52 + Pullet costs/2) * (Prime + 2%)

The approach to determining the cost of operating capital was based on the principle that money has value regardless who spends it and where it comes from. The key with determining the appropriate cost, is to find a substantively equivalent source of capital

Serecon contacted resources across Canada to assess the cost of operating capital. It is important to state that these costs:

- Are rarely posted publicly, and when done so it is only a starting point for the negotiation with producers; and
- Are almost all secured in some way either through having a mortgage and/or other business with the institution or having some form of General Security Agreement (GSA) in place.

When approaching the financial institutions, we requested information on what an established farm operation with a medium risk profile would be charged for an operating line of credit (LOC) used to pay for pullets, feed, and skilled labour. As expected, results varied across institutions. On the other hand, contacts were able to narrow the range as they determined what the line would be used for and engaged in further discussion with Serecon.

The contacts from the four institutions all had significant involvement in agricultural lending portfolios and represented:

- The Royal Bank of Canada (RBC);
- The Bank of Montreal (BMO);
- The Toronto Dominion Bank; and,
- Alberta Treasury Branches.

All four respondents provided input that fell within a range of between Prime + 0.5% to Prime +3%. The most frequently quoted price in the discussion was between Prime + 1.5% and Prime +2.5%. This would appear to be a reasonable range given the fact that consideration for quota and land needs to be removed from the COP process. Producers typically sign a General Security Agreement with the lending institution which is not as secure for the bank as a loan backed by specific assets, which is one of the reasons LOC rates are higher than those for mortgage.

It is obvious that different farms would have access to different costs of capital. As part of this process, it is important to consider what a typical farm would pay for its operating line.

After careful consideration, it is our opinion that the figures provided by the four commercial financial institutions that are involved in providing conventional lines of credit should be the basis for the development of the ROI on the LOC. We would not use the information provided by FCC since they are not typically involved in providing lending and LOC outside of land-based financing. This approach would provide the strongest and most defendable substantive equivalent calculation for incorporation in the COP.

Given the work completed, it is our opinion that the most appropriate cost of operating capital would be Prime + 2% which is the mid-point between the low and the high figures most frequently cited by the contacts. While some producers who are deemed to have a lower risk would be able to obtain capital on the lower end of this, there would be others who would be forced to pay the higher cost due to perceived risk to the financial institution. As a result, the mid-point is the most defendable and realistic figure to be used in the context of the

Category 2: Land

The return on land uses the following approach:

1) Determine the land required based on the acres / layers ratio as per what was agreed to in the Alberta COP development since it was agreed to in the development by all stakeholders in the pricing process and has been tested in the hearings with the Farm Products Council;
2) Calculate a current market value for the lower mainland in BC (FCC reports). This value is then adjusted to estimate what that price would have been 20 years ago to be consistent with the treatment of other long-term assets;
3) A Rental Rate of 1% is used to calculate the Annual Cost;
4) The medium-term cost of borrowing of Prime + 1% is used for calculations (which is the midpoint between Line of Credit and Mortgage rates based on FCC mortgage rate for producers from supply managed industry); and,
5) The cost of borrowing is then applied to the 1% rental rate.

There is an obvious difference with the appropriate opportunity cost of land compared to other asset classes because it is not equivalent in terms of its risk attributes: land is not a depreciating asset, and it represents a lower risk to producers than their other operating and capital expenditures. The reality is that land will retain its market value regardless of the poultry operation. It does not have to be replaced and while there are some maintenance issues, most of those would be expensed vs. capitalized.

Given these facts, a reasonable person may expect that the ROI applied to land assets should be lower than that for other asset classes. On the other hand, this assumes that land is valued accurately. In our opinion, based on analysis conducted for numerous clients and as part of appraisal work done across Canada over the past 25 years, rental rates for land are directly correlated to land values since typical land purchase decisions are based on the rental cost of land in the area. In addition, Serecon also conducted a correlation between available values and rental rates to validate this assumption. While the data was from appraisal client's information and therefore cannot be presented, it confirmed the relative rental rates assumed for this project.

We used the expected prime + 1% for financing cost based on the discussion with Farm Credit Canada (FCC), which is a major agricultural land financier in Canada. FCC also has published annual financial statements and Agricultural Land appreciation value reports, which makes the update process easily manageable.

The average investment cost or opportunity cost of land ownership was also included in calculating the investment costs. While producers reported a very wide range of land values and acres required for their operations, we have followed the sizes as agreed to from the Alberta study which were consistent with how you have be dealing with it in previous studies as well:

- 10 acres of land was used for operations with 6,000 to 7,500 annualized quota;
- 20 acres of land for operations with between 7,500 to 15,000 annualized quota, and
- 30 acres of land was used for producers with more than 15,000 annualized quota.

The value of land was based on our assessment of the value of AGRICULTURAL land in various regions of production. Our contacts suggested that the weighted average current market value was $86,000/acre. As per the discussion above this figure needs to be adjusted to reflect this value in 2000 (20 years ago) and then used to estimate the appropriate rental rate.

Category 3: Buildings & Equipment

The ROE for this category has undergone a significant adjustment in terms of how it is calculated so that it is more robust and transparent. As a result, the calculation now must consider the debt equity ratio, the actual return on both equity and debt along with several additional factors as outlined below.

To summarize, the return on buildings and equipment uses the following approach:

1) Return on Equity: The return on equity will be based on a capital asset pricing model (CAPM).
2) Return on Debt: the cost of borrowing will be established as Prime +
3) Debt/Equity ratio: The final ROI for B&E will be calculated using the weighted average cost of capital (WACC) with:
    a. 10:90 debt to equity ratio (which excludes land and quota)

The final formula for the return on building and equipment for the COP Study is:

ROE = [Cost of Equity x 90%] + [Cost of Debt x 10%]
Cost of Debt = Prime + 1.06%
Cost of Equity = Risk-Free Rate + Beta of Security (Expected Market Return – Risk Free Rate)

The approach follows equity market (entrepreneurs and investors) rather than creditors market (Prime +), which is less volatile. On the other hand, it provides much higher level of clarity, logic transparency and objectivity in its calculation.

As mentioned in the beginning, the Cost of Equity component reflects the combination of risks associated with entrepreneurship in egg farming. We present below the overview and effect of the various elements along with their historical values. We will then discuss each component in detail.

We used the Capital Asset Pricing Model (CAPM) presented as a "Building Blocks" method for a structured approach to find the B&E ROI required:

$$\boldsymbol{CAPM = rf + \beta(rm - rf)}$$

$$\boldsymbol{rf = risk\ free\ rate\ of\ return}$$
$$\boldsymbol{\beta = Beta\ of\ Security}$$
$$\boldsymbol{rm = expected\ market\ return}$$

Long-term risk-free rate

Represents the Bank of Canada bonds with over 10 years to maturity, which reflects the investment horizon faced by producers in making barn and equipment spending decisions. Current Benchmark Bond Yields for 10-year bonds from the Bank of Canada are 1.25%.[4]

Implied Equity Premium

Investors need to be compensated for undertaken risk that is commonly represented by the required return more than the risk-free rate. Since there is a chance that an investor may lose money on an investment (risk of default), there needs to be significant enough incentive for an investor to be willing to take on the risk.

The general risk premium is an indicator of a society's tolerance towards risk at any given point in time. It increases as economic outlook becomes better and decreases during the beginning of a slowdown. In theory, the general risk premium should encompass all kinds of investments including real estate, commercial debt, equity and other instruments. In practice, this premium is almost always calculated based on S&P 500 as the most liquid, well known and controlled index-type equity instrument. Many investors would argue that it is the best available practical alternative since it represents geared equity in a lot of industries.

We recommended to calculate general risk premium based on S&P 500 as well since the Canadian inflation and long-term risk-free growth is accounted for in Bank of Canada's securities. The high liquidity of CAD, easiness and openness to investments in the USA are enough to assume the same level of risk tolerance.

There are several ways in calculating the general risk premium, including historical values, implied return models (also called dividend models), cross-industry regressions (like the one we have described in the CAPM model), expert surveys and others. The range of expectations usually varies within the 3.5-8.5% corridor. We used one of the implied return models that has both a sound underlying set of assumptions and has exhibited better predictability in the past. An implied return Calculation of a general risk premium may by complicated, we therefore used the model developed by the New York University[5] that reported **5.23%** as an Implied Equity Risk Premium for 2020. We expect the probable outcomes to be within the 4% to 6.5% range in the future.

The overall market risk for larger businesses traded on a stock exchange, an average return an investor should expect can then be calculated by adding the long-term risk-free rate to the Implied Equity Risk Premium: **1.25% + 5.23% = 6.48%.**

Small Size Premium

This block reflects the fact that smaller entities such as farms are less diversified and therefore bear a higher

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[4] Bond yields updated December 11, 2020.
[5] Country Default Spreads and risk Premiums update July 1, 2020 (New York University).

systematic risk compared to larger firms that form the general Implied Equity Risk Premium in practical calculations.

We used the small size premium calculated and reported publicly by the Tuck School of Business, which reported **4.44%.**[6]

Expected Market Return

Together, the overall average market risk (*rm*) for the year 2020 for smaller businesses may be found by adding the risk-free rate, implied equity premium and small size premium:

$$\boldsymbol{Expected\ Market\ Return\ (rm) = 10.92\%_{rm} = 1.25\%_{rf} + 5.23\%_{Implied\ Equity\ Premium} + 4.44\%_{Small\ Size\ Premium}}$$

The Beta of Security

A **Beta** is an industry adjustment to the overall market risk level. Some industries tend to be more volatile and therefore are considered riskier than other. A beta of 1 represents an average market risk while 0.9 suggests that the industry is less risky than average.

We used a 5-year moving average unlevered beta that is a midpoint between Farming/Agriculture of **0.61** and regulated Water Utilities of **0.45**.[7] It is a common practice in valuation field to use 3- or 5-year moving averages in applying comparable level of risks due to the fact that other industries taken as comparable may experience significant outstanding events in any given year.

As an example, we could use the unlevered beta for Farming/Agriculture of **0.61**. This could be used to calculate what ROI for a farming operation in a non-regulated environment using the CAPM model:

$$\boldsymbol{CAPM = rf + \beta\ (rm - rf)}$$

$$\boldsymbol{7.15\% = 1.25\%_{rf} + 0.61_{\beta}\ x\ (10.92\%_{rm} - 1.25\%_{rf})}$$

However, this may over represent the risk associated with a regulated agricultural sector like broiler hatching egg producers. At the same time, it is important to point out that while there is limited price risk in the supply managed industry, producers do have significant production risk given they are working with the issues associated with animal husbandry and the management of a biological system. This is totally consistent with the precedence for regulated utilities and other regulated areas where the oversight body has been clear that there are risks even when pricing is set. As a result, the precedential evidence clearly indicates that risk does exist for regulated industries. More importantly, given the fact that there is probably more risk with biological systems vs engineered systems, one could make an argument that egg production would be riskier than that of the regulated utilities (such as Water Utilities). This reality needs to be considered in the development and application of the CAPM.

As a result, we adopted an element of regulated Water Utilities as a comparable industry for breeder farms because of the close level of regulations and some similar risks associated with biological systems. Still, we believe

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[6] Current Research Returns from Kenneth R. French, Tuck School of Business.

[7] Unlevered Betas are obtained from New York University Stern School of Business. Betas are available by Sector for the United States. We have taken U.S. unlevered betas for farming/agriculture and water utilities as measures the market risk of broiler hatching egg operations in British Columbia. While obtaining unlevered betas specific to BC's poultry industry would be preferrable, there are no readily available unlevered betas at this time.

that breeders have slightly higher production risks than water utilities, therefore, we decided to use a midpoint between Water Utilities and Farming Agriculture.

$$\boldsymbol{Midpoint\ unlevered\ beta = 0.53 = \frac{0.61_{Farming} + 0.45_{Utilities}}{2}}$$

The midpoint unlevered beta of 0.53 is used to calculate the expected return for a broiler hatching egg operation in a regulated environment using the CAPM model:

$$\boldsymbol{6.38\% = 1.25\%_{rf} + 0.53_{\beta}\ x\ (10.92\%_{rm} - 1.25\%_{rf})}$$

Summary

When all this is considered the process of generating a reasonable return on equity involves the following for Category 3 assets (building and equipment): The Bank of Canada long-term rate on its bonds with over 10 years of maturity (1.25%), the general market risk (5.23%), and the small-size premium (4.44%), which brought the combined rate for smaller enterprises to 10.92%. The midpoint volatility between the Farming/Agriculture and regulated Water utilities industries used in the CAPM model was 0.53. Working this data into the CAPM formula above produces 6.38%. Current Bank of Canada Prime Rate is 2.45%. Cost of Debt in the calculation is Prime + 1.06%, equaling 3.51%.

The final building block is determining the weighted average cost of capital, which has been carefully considered for this work. Statistics Canada indicates that all BC farms are carrying around 17% debt.[8] While this may reflect farming operations in general, we do not feel it is reflective of the poultry sector. Portfolio data from Farm Credit Canada (FCC) reveals that the median debt-to-equity ratio is about 1.1 for poultry operations.[9] This ratio is more in line with our experience in the sector. We have applied this normalized leverage ratio for broiler hatching egg producers in BC:

ROE = [Cost of Equity x 90%] + [Cost of Debt x 10%]

$$6.09\%_{ROE} = (6.38\%_{Cost\ of\ Equity}\ x\ 90\%) + (3.51\%_{Cost\ of\ Debt}\ x\ 10\%)$$

The ROE for Buildings and Equipment has been calculated in a robust and transparent manner using the methodology described above. The calculation has considered the debt equity ratio, the actual return on both equity and debt along with several additional factors outlined above. The final ROI for Building and Equipment has been calculated using the weighted average cost of capital (WACC) of 6.09%.

Results

Breeder Demographics and Production

Table 6 shows the comparison of breeder demographics and production. In comparison with the previous sampling taken to produce A-166, the weighted average annualized quota size is smaller. This is driven by the larger stratified sampling of producers used for the 2020 survey, which provides a more even distribution across producer size

[8] Sourced from the Balance sheet of the agricultural sector as at December 31st (Statistics Canada).
[9] Article: "Balance sheet of agriculture - debt increased faster than equity in 2019" (FCC).

categories.[10] The Sampling section provides more detail on this process. The average quota females placed per cycle from the 2020 survey is 8,758 birds, compared with 9,503 in A-166. However, the key indicators of productivity below are saleable eggs per hen, percent hatchability and saleable chicks per hen. A-166 is based off average length of production of 59.4 weeks, whereas the weighted average length of production cycle from the survey in 2020 is 56.1 weeks. A-166 is reflective of an additional 3.3 weeks of production. Total barn space/quota bird placed is in line with the requirements of 1.6ft^2/pullet and 1.8ft^2/breeder.

Table 6: Comparison of Breeder Demographics and Production

Key Production Elements	2020	A-166
Weighted Average Annual Quota	24,442	32,821
Average Quota Females Placed per Cycle	8,758	9,503
Production as a % of Quota	105.3%	96.1%
Age at Transfer to Layer Barn (Weeks)	18.5	18.6
Length of Production Cycle (Weeks)	56.1	59.4
Female Mortality (Life of Flock)	3.74%	2.14%
Saleable Eggs per Hen	133.5	142.7
% Hatchability	82.7%	80.6%
Saleable Chicks Per Hen	110.4	115.1
Pullet Barn Space/Quota Bird (Ft^2/bird)	1.65	N/A
Lay Barn Space/Quota Bird (Ft^2/bird)	1.95	N/A

Note: Pullet Barn Space and Lay Barn Space for A-166 are industry standards, not reflective of a previous COP survey.

Breeder Results

Table 7 below provides the breeder results ($/hen & $/chick) from the 2020 survey and compares them to A-166. Before factoring in spent hen revenue and salvage egg revenue, the Total Cost of Production in 2020 is $70.46/hen compared with A-166 at $70.82/hen. This works out to a $0.36/hen difference. Once spent hen revenue and salvage egg revenue are accounted for the total COP is $69.56/hen in 2020, compared to $69.44/hen in A-166. This is a $0.12/hen increase in the 2020 COP compared with A-166.

Regarding cost of production in a $/dozen saleable egg format, the difference is $0.25/dozen. As Table 6 above shows, there are differences in the saleable eggs per hen due to the different production cycle lengths. Using 133.5 saleable eggs per hen for 2020 and 142.7 saleable eggs per hen for A-166, we get $6.25/dozen for the 2020 COP and $6.50/dozen for A-166.

Operating Costs for 2020 are $48.34/hen, which is a $1.04/hen increase on A-166 ($47.30/hen). This is driven primarily by the cost of raising pullets. Pullet costs are driven primarily by chick prices, feed, and vaccination costs. Out of the 27 producers surveyed, the lowest Operating Costs were $39.23/hen, and the highest were $55.98/hen. Viewed independently of the remaining costs (labour and capital costs), Operating Costs have a standard deviation of $3.9/hen at a 95% level of confidence with 3% margin of error. The results indicate that with a 95% level of confidence, the true Operating Costs are between $44.44/hen and $52.20/hen.

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[10] A-166 is based on a sample of 14 producers with a weighted average of 32,821 annualized quota. The sampling for A-166 included more weighting from larger operations. The 2020 survey results are based on a sample of 27 producers with a weighted average annualized quota of 24,442. The weighted average has come down because the 2020 sampling is more evenly distributed across the three size categories, whereas A-166 had a larger weighting given to larger producer size categories. For example, the largest producer in A-166 accounted for nearly 20% of the total weighting, whereas in the 2020 survey the same producer accounts for closer to 10%. The same effect is present with the average quota females placed per cycle.

Labour Costs in the 2020 COP are $8.95/hen or $0.80/dozen saleable eggs. It is important to recognize that the labour costs in Table 7 show only the labour costs for raising breeders. The labour costs for raising pullets are included in the weighted average $/hen cost of pullets ($27.56/hen). While there has been a shift in the breakdown of labour costs when compared with A-166, total labour costs are within $0.40/hen. The shift in the breakdown of labour costs can be attributed to the methodology that has been adopted to model labour, which breaks down each phase involved in raising pullets and lay birds as well as the unallocated labour elements. A full breakdown of labour can be found in the Appendix. We have applied the most recent hourly labour rates for farm labour in British Columbia to 2020 COP.

Overall capital costs in the 2020 COP are $13.17/hen, down from $14.17/hen in A-166. We have explained in detail in the previous section (Capital Costs) how we have dealt with capital costs in the survey. For depreciation and amortization of buildings and equipment we have used a weighted average cost of capital of 6.09%. This has been used to calculate ROE on buildings and equipment. Our approach to dealing with operating capital and land have also been explained in detail throughout the previous sections.

The changes in the ROE from $6.44/hen in A-166 to $4.91/hen in the 2020 COP are a direct result to two main adjustments: (1) a much more robust calculation of the weighted average cost of capital including a revision in the benchmark risk free rate (vs the A-Period adjustments) and (2) a more reflective barn space allocation approach and cost to build.

ROE is calculated using the weighted average cost of capital (WACC) of 6.09% as indicated in the previous section and is much more robust than the more simplistic approach of adding a risk element to the risk-free rate. One of the key factors in the weighted average cost of capital are Bank of Canada's long-term rates of 1.25%, which has contributed to the overall drop in the return on equity for hatching egg producers in BC.

In addition, we added 3 size categories to the building cost estimate calculation. As a result, the cost to build more accurately reflects what a reasonable person would expect to pay for the necessary barn space. As a result, this approach includes gains to scale that were not considered in the previous approach. This adds significant validity to the calculation of physical asset cost in our opinion.

Another noticeable shift comes in the spent hen revenue when comparing the 2020 survey results to A-166. The decrease in payment from $0.40/kg to $0.20/kg has led to a drop in spent hen revenue. The spent hen revenue and salvage egg revenue are subtracted from the Total Cost of Production.

Overall, the $69.56/hen result from the 2020 COP presented in Table 7 is based on data from stratified sampling of 27 producers (58% of total production in BC). The results have a 95% level of confidence with a 2.6% margin of error. At a 95% confidence level, the true population parameter ($/Hen Cost of Production) has a standard deviation of $4.90/hen and lies between $65.10/hen and $74.86/hen.

Table 7: Breeder Results ($/hen & $/chick) From 2020 vs. A-166

Cost of Production - $ per Hen	2020	A-166	Diff ($/Hen)	Diff ($/Chick)
A) Operating Costs				
Pullets	$27.56	$26.31	$1.25	$0.011
Feed	$15.82	$16.08	($0.25)	($0.002)
Veterinary & Medicines	$0.10	$0.11	($0.01)	($0.000)
Utilities	$1.15	$1.33	($0.18)	($0.002)
Vehicle & Equipment Operation (Fuel & Oil)	$0.26	$0.31	($0.05)	($0.000)
Repairs & Maintenance	$1.29	$1.27	$0.01	$0.000
Bedding	$0.13	$0.12	$0.01	$0.000
Administrative & Office Costs	$0.84	$0.47	$0.36	$0.003
Insurance	$0.62	$0.66	($0.04)	($0.000)
Custom Charges	$0.57	$0.62	($0.05)	($0.000)
Operating Costs ($/hen)	**$48.34**	**$47.30**	**$1.04**	**$0.009**
B) Labour				
Full-Time Hired Labour	$6.92	$4.43	$2.48	$0.022
Owner/Manager Labour	$2.04	$4.92	($2.88)	($0.026)
Labour Costs ($/hen)	**$8.95**	**$9.35**	**($0.40)**	**($0.004)**
C) Capital Costs				
Depreciation & Amortization	$6.90	$7.04	($0.15)	($0.001)
ROE	$4.91	$6.44	($1.53)	($0.014)
Operating Interest	$0.86	$0.45	$0.41	$0.004
Taxes	$0.50	$0.23	$0.27	$0.002
Capital Costs ($/hen)	**$13.17**	**$14.17**	**($1.00)**	**($0.009)**
Total Cost of Production ($/hen)	**$70.46**	**$70.82**	**($0.36)**	**($0.003)**
Less:				
Salvage Egg Revenue	**$0.181**	**$0.179**	**$0.002**	**$0.000**
Spent Hen Revenue	**$0.720**	**$1.202**	**($0.482)**	**($0.004)**
Cost of Production ($/hen)	**$69.56**	**$69.44**	**$0.12**	**$0.001**

Appendix

Labour Cost Identification by Activity

Activity-based labour application was separated into pullet production, lay production and general activity. The following breakdown provides a description of the hours of labour used in the labour model to determine labour costs in the COP. Each section is broken up into daily activities and periodic activities as well as specific one-off tasks such as "ten-week vaccination".

Cost Identification by Activity	
Labour – Grow Operation	
Brooding	
Daily Activities	Refill feeder flats
	Clean & Refill Supplemental Drinkers
	Monitor Birds eating/drinking/crop fill and the environment (heating & Vent)
	Gradually remove Feeder Flats/Drinkers & operationalize regular feeders
One Time Activity	At 14 days disassemble & remove Brooding Pen
Total Brooding Labour: 65	
Two to 8 Weeks	
Daily Activities	determine feed amount (evaluate uniformity weight gains and targets etc.)
	raise feed lines & dump debris from pans
	Prep feed for next day - ensure equal distribution of feed at all hoppers
	Check water system (filters and line pressure) - flush lines, adjust water line and feedline height as required, Monitor birds & environment (heating ventilating), cull birds. maintain records
Periodic Activity	At 14 days disassemble & remove Brooding Pen
Total – 2 to 8 weeks Labour: 132	
Nine to 20 Weeks	
Daily Activities	determine feed amount (evaluate uniformity weight gains and targets etc.)
	Prep feed for next day - ensure equal fill distribution of feed at all hoppers
	Check water system (filters and line pressure) - flush lines, adjust water line and feedline height as required, Monitor birds & environment (heating ventilating), cull birds. maintain records
One Time Activity	At 14 days disassemble & remove Brooding Pen
Total Nine to 20 Weeks: 174	
Water Vaccinations	
Periodic Activity	Vaccination Prep (day before a vaccination) - Switch water source to non chlorinated - flush lines - shut off water 2 hours before end of day – fill batching tank
	Vaccinations - determine /select vaccines required - premix then blend into batching tank - lower water lines - flush vaccine into lines
Total – Water Vaccinations; 11	
Subcutaneous Vaccination	
Ten Week Vacc.	Wash & disinfect catching gates - raise all feed and water lines, push birds, set up catching gates
	Labour to Vaccinate - (2 people) NB does not include contract labour
	Reassemble and operationalize water & Feeding Equipment

Total – Ten Week Vaccination: 11	
Cockerel Transfer & Vaccinations	
Transfer at 18 wks.	Wash & disinfect catching gates - raise all feed and water lines, push birds, set up catching gates
	Labour to catch, vaccinate & transfer Males to lay house (3 people). NB - does not include contract labour
Total – Male Transfer: 8	
Pullet Transfer & Vaccination	
Transfer at 20 wks.	Wash & disinfect catching gates - raise all feed and water lines, push birds, set up catching gates
	Labour to catch, vaccinate & transfer pullets to lay house (3 people). NB - does not include contract labour or second skid steer operator
Total – Pullet Transfer: 15.5	
Pullet Barn Cleanout	
Pullet Barn Cleanout	Blow down dust - clean furnaces - remove blackout units
	Hot water wash - building interior and equipment
	Remove and stockpile manure
	Soap and wash building interior and equipment
	Scrape down/sweep floor
	Complete disinfect
	Apply pesticide for beetle control (debantic)
Total for Pullet Barn Cleanout: 35	
Cockerel Barn Cleanout	
Cockerel Barn Cleanout	Blow down dust - clean furnaces - remove blackout units
	Hot water wash - building interior and equipment
	Remove and stockpile manure
	Soap and wash building interior and equipment
	Scrape down/sweep floor
	Complete disinfect
	Apply pesticide for beetle control (debantic)
Total for Cockerel Barn Cleanout: 10	
Pullet Barn Set-up	
Pullet Barn Set-up	Wash and reinstall Blackouts
	Place, level and compact shavings, reseal and insulate back door
	Disinfect and flush water lines & batching tank, lower and level water lines
	Prepare vitamins & 4-way acid pack in batching tank, preheat water
	Set up brooding pen walls
	Wash and disinfect supplemental drinkers
	Assemble, place and fill feeder flats and supplemental drinkers
Total for Cockerel Barn Cleanout: 16	
Cockerel Barn Set-up	
Cockerel Barn Set-up	Wash and reinstall Blackouts
	Place, level and compact shavings, reseal and insulate back door
	Disinfect and flush water lines, lower and level water lines
	Set up brooding pen walls
	assemble, place and fill feeder flats and supplemental drinkers

Total for Cockerel Barn Cleanout: 4.5	
Flock Placement	
Flock Placement	Check/monitor floor temp consistency, relative humidity (RH), air movement
	Water down litter outside of brooding pen to raise RH as required
	Unload & place chicks, remove chick pads, stack, and reload chick trays
Total for Flock Placement: 4	
Totals for Pullet Operation	
Total per Flock Labour during Grow: 485	
General Labour: 372.8	
Management: 112	
Labour – Lay Operation	
From Transfer to 24 Weeks	
Feeding -1st 3 days	Manually run feeders, push birds up on slats (2 hours per day)
Hand weighing Birds	Both males and females each week
Culling/Monitoring	Walk Barn, cull small, injured, underdeveloped and birds with abnormalities, inspect and flesh male condition
Nest Set-up	Lower nests, install nest passageways install belts, service/adjust egg table
Monitor/measure/manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption etc.), decide on feed increases to achieve target weights and optimal male/female synchronization & determine when to photostimulate
Total for Transfer to 24 Weeks: 61	
25 Weeks to Peak Production (approximately 30 weeks)	
Monitor/Measure/Manage	Daily – record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time, egg production, egg weights, percent double yolks, etc.), decide/adjust feeder run times and feed increase to optimize egg production and achieve body weight and fleshing.
	Four times daily – walk barns (scratch and slat areas) and pick-up floor egg
	Weekly – Hand weight and flesh males – cull all glossy over/under weight
Remove/Transfer/Spike Males	Daily starting at week 25 and through week 27, select and weigh heavier males - if properly fleshed and sexually mature - transfer to older flock – approx. 5 males daily
Egg Collection	Week 25 & 26 - run egg collection system 3 times daily (2 persons) – sort smalls and double yolks and discard to manure storage area Week 27 through 30 - run egg collection system 5 times daily (2 persons), - sort smalls and double yolks and discard to manure storage area
Feed and Water Systems	Monitor and adjust water line pressure and height - administer vitamins monthly, flush lines, monitor bird eating activity and adjust feeder height as males and females mature
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
Total for 25 Weeks to Peak Production: 256.65	
31 weeks to 45 Weeks	
Monitor/Measure/Manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time , egg production, egg weights, percent double yolks etc.), manage feed allocation to optimize egg production & achieve target Body weight and male fleshing
	Three times daily – walk barns (scratch and slat areas) and pick-up floor egg
Egg Collection	Run Egg collection system 5 times daily (2 persons)

Feed and Water Systems	Monitor and adjust water line pressure - administer vitamins monthly, flush lines, monitor bird eating and drinking activity
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
	Remove cull eggs to manure storage area, clean and sanitize egg pails
Total for 31 to 45 weeks: 480.5	
46 to 51 Weeks	
Monitor/Measure/Manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time , egg production, egg weights, percent double yolks etc.), manage feed allocation to optimize egg production & achieve target Body weight and male fleshing
	Three times daily – walk barns (scratch and slat areas) and pick-up floor egg
Egg Collection	Run Egg collection system 4 times daily (2 persons)
Feed and Water Systems	Monitor and adjust water line pressure - administer vitamins monthly, flush lines, monitor bird eating and drinking activity
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
	Remove cull eggs to manure storage area, clean and sanitize egg pails
Total for 46 to 51 weeks: 213.5	
52 to 60 weeks	
Monitor/Measure/Manage	Daily - record flock data (body weight, uniformity, fleshing, water consumption, feed clean-up time , egg production, egg weights, percent double yolks etc.), manage feed allocation to optimize egg production & achieve target Body weight and male fleshing
	Three times daily – walk barns (scratch and slat areas) and pick-up floor egg
Egg Collection	Run Egg collection system 4 times daily (2 persons)
Feed and Water Systems	Monitor and adjust water line pressure - administer vitamins monthly, flush lines, monitor bird eating and drinking activity
End of Day Shutdown	Spread 2 pales of scratch feed in litter, inspect nest pads & clean as required, close nests
	Remove cull eggs to manure storage area, clean and sanitize egg pails
Total for 52 weeks to 60 weeks: 337	
Flock Shipout	
	Disassemble and remove feed hopper bags, raise all feed lines, remove egg belts and connecting egg belt passageways, raise nests, raise water lines, push birds to the back of the barn and set up catching gates
	Set up change area for catchers in Service hallway, clean-up and disinfect area upon completion of ship out
	Supervise/Monitor/Assist Catching Crew - Periodically push up birds
Total for Flock Shipout: 12	
Layer Barn Cleanout	
	Blow down dust - clean furnaces - remove blackout units
	Hot water wash - building interior and equipment including nests and nest bottoms
	Supervise/Monitor/Assist Catching Crew - Periodically push up birds
	Remove slats and trusses
	Remove and stockpile manure
	Soap and wash building interior and all equipment
	Wash slats and trusses
	Reinstall slat and trusses

	Wash and reinstall blackouts
	Complete disinfect including walls floors and equipment
	Spray walls, slats, and floors with (pesticide) debantic
	Install and compact shavings
	Disinfect and flush watering system and lines
Total for Layer Barn Cleanout: 79.5	
Totals for Lay Operation	
Total per Flock Labour during Lay: 1140 **General Lay: 1276** **Management Lay: 163.75**	
Non-Flock Specific tasks that Relate to the Ongoing Operation of the Lay Facility	
Water Treatment System	Monitor Water Quality, weekly - test chlorine and water PH, adjust injectors as required, replenish Chlorine & acetic acid as required
Egg Loading	Assist Loading Eggs
Service Egg Packer	Clean & Lubricate Packer components as per Manufacturer
Cleaning/Sanitization	Sweep Service Area Floors Daily
	Clean/Sanitize Egg Collection Tables Daily
	Wash/Disinfect Egg conveyors and floors Monthly
OFFSP Activity Re lay Op	Inspect and replenish mouse bait stations (4 Lay barns)
	Maintain OFFSAP records, Review and adjust SOPs, complete audits as required
Total Non-Flock for Lay Facility: 350	
Non-Flock Specific tasks that Relate to the Ongoing Operation of the Grow Facility	
Water Treatment System	Monitor Water Quality, weekly - test chlorine and water PH, adjust injectors as required, replenish Chlorine & acetic acid as required
Cleaning/Sanitization	Sweep/Clean/Disinfect Barn Service Area
OFFSP Activity Re lay Op	Inspect and replenish mouse bait stations (4 Lay barns)
	Maintain OFFSAP records, Review and adjust SOPs, complete audits as required
Total Non-Flock for Grow Facility: 207.9	
Service/Maintenance/Administration Tasks Relating to Overall Farm Operations	
Clearing/Removal of Snow	Clear Roads as per Hatchery and Feed Company Requirements - Eggs are picked up twice per week, two loads of feed delivered per week NB - the labour varies from winter to winter - The hours indicated are based on winter conditions over the past 3 years
Maintaining Road Systems	Grade and Maintain Roads
Maintain Clear Zone	Maintain/Cut Grass around barns
	Spray Herbicide for weed control
	Maintain/Replenish/Grade gravel strip around perimeter of all barns
Building & Equipment R&M	Maintain/Service/Repair all farm equipment including skid steers, two stand-by generators, mowers. trimmers, sprayers etc.& maintain logs
	Maintain/Service/Repair/ Replace production related equipment including feeding & nesting systems, furnaces, fans, lighting, water supply and treatment & electronic controls
	Maintain all farm Buildings including eavestroughs, soffits, facia, siding, insulation, and electrical systems. NB - In recent years our insurance company has completed several inspections of the electrical (Panels and Wiring) in our barns. In each case they have identified concerns, most of which have/will require substantial corrective actions

Administration	Banking, paying bills, filing, payroll, Tax Prep, Telephone and email correspondence with suppliers, hatchery Processor, AHEP board, Veterinarian, nutritionist, Aviagen Breeder Tech
	Order Feed

Totals for Non-Flock Specific Tasks

Total Tasks Related to Overall Farm Operations: 478
Total Annual Non-Flock Specific Labour: 1036
Management: 400.8

Totals for Pullet, Lay and Non-Flock Specific Tasks

Total Hours (Lay + Pullet + Non-Flock Specific): 2960
Total Management Hours: 676.60
Total General Labour Hours: 2283.60

Capital Cost of Other Equipment

Based on consultation with producers during the data collection for the 2020 COP, we were able to produce average estimates of the capital costs of other equipment by operation size. We received detailed information from 60% of producer in the sample. We received estimates of capital costs from all producers in the 6,000-7,5000 annualized quota category, 55% of the 7,500-15,000 annualized quota category, and 60% of the producers in the >15,000 annualized quota category. The estimates varied considerably by size of operation, with the larger operations having more equipment on site for their poultry operations.

Size Category (Annualized Quota)	Number of Producers Providing Data	Percent of Total in Size Category	Estimate of Average Capital Costs (Without Truck)
6,000 to 7,5000	1	100%	$26,500
7,500 to 15,000	6	55%	$66,833
>15,000	9	60%	$93,722

The estimates of average capital costs include all other equipment in addition to a truck, which has been valued at $32,000. The equipment included in this category includes tractors, bobcats, spreaders, and lifts, etc. We were careful to consult with producers to determine if any of the equipment was used primarily for another segment of their operation (e.g., haying), in which case it was not included in the above list (unless it was a key element of the poultry operation.