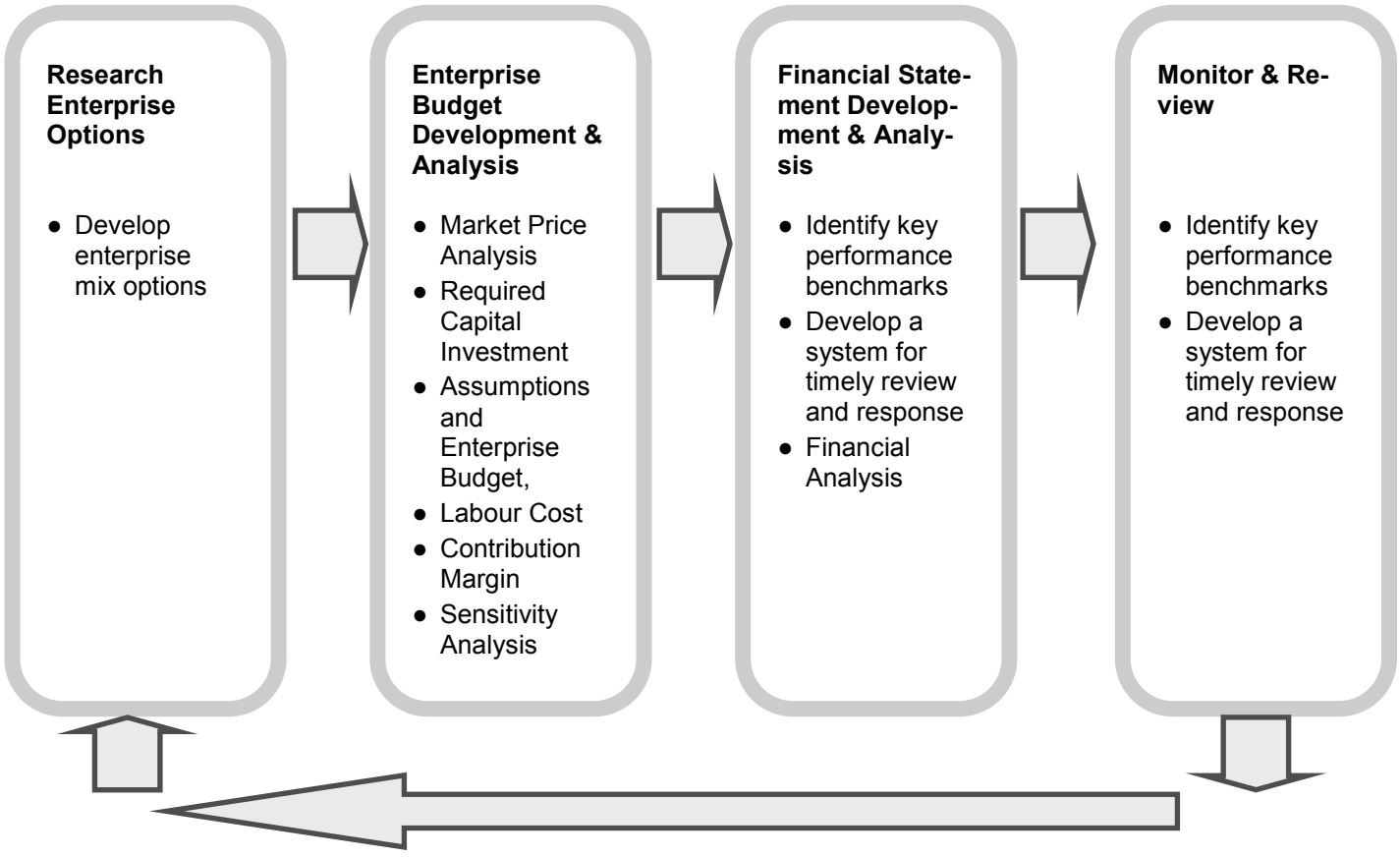
BUILDING BUSINESS SUCCESS

Cider Apples—Establishment to Full Production (Nursery Tree)

1 Acre | **Okanagan Valley** | **Spring 2017**

The **BUILDING BUSINESS SUCCESS** enterprise budget series were developed to provide information to assist producers in projecting costs and returns for British Columbia farm enterprises. These budgets are one part of the overall financial planning process that assists in decision making, monitoring and reviewing the whole farm business. This information is provided as a tool for projecting costs and returns for specific farm enterprises and as a general guide for preparing individual financial plans. This sample budget is only a guide and is not intended as an in depth study of the cost of production for this industry. Interpretation and utilization of this information is the responsibility of the user. If assistance is required to develop your individual budget, consult your own accountant, lawyer or an agrologist to address your specific circumstance. Producers should develop their own budget to reflect individual production goals, costs and market prices. Additional financial planning information and farm enterprise budgets can be found at the Ministry website or obtained from a local B.C. Ministry of Agriculture office.

Overview of the Financial Planning Process



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Key Success Factors

British Columbia has seen an increased interest in planting cider apples in the past couple of years, as a result of the need for cider apples by farm crafted cideries to meet consumer demand for apple cider. This section provides a summary of key points resulting from this study.

- It is imperative to identify and secure a market for cider apples before investing in a new cider apple planting. Establish a relationship with cider makers to determine current and forecasted markets for the various cider apple varieties. There are no other markets for cider apples.
- Varietal selection is based on several factors including demand from cider makers, available scion wood, growth characteristics and rootstocks, site selection, personal preferences and grower experience. Choosing the varieties to plant is a key decision and requires detailed analysis.
- Identify the dwarfing rootstock best suited to the cider apple variety being considered. There are differences in characteristics between varieties which should be assessed. Cider apples have a greater tendency to biennial bearing. It is important to manage it in order to maintain production and profitability.
- This budget uses a farm gate price of $0.40/lb. and marketable yield of 95%. Cider apple prices can vary in concert with changing supply and demand conditions.
- Planting density will depend on the rootstock selected.
- Availability of rootstocks and cider apple variety bud wood can be limited. Find a supply source and plan ahead.
- Identify labour requirements. Timely access to good, skilled labour is an important component in establishing and managing the orchard to produce consistent yields of good quality apples. Consider hiring labour in groups to get key jobs done in a timely manner.
- Yields, prices and expenses can vary greatly between farms given management practices, rootstocks, density, varieties, growing conditions, soil type, etc. The number of years required to reach full production can vary.
- Good horticultural knowledge and husbandry is important in terms of establishing and sustaining a healthy and productive cider apple orchard.
- As with other apples, cider apples need to get light into the tree to encourage newer wood and maintain productivity and crop load management.
- Control pests and diseases to get growth and yields.
- Tannins and sugars are important to get the best cider. Manage the planting to meet buyer requirements.

Budget Scope—Using this Information

This document has been developed as a general guide to support farmers in preparing a budget to assess the potential income and expenses to establish a 1 acre cider apple planting in the Okanagan Valley of British Columbia. It is intended to assist in making a decision on whether or not to plant cider apples.

This study is not a complete financial or economic analysis. It is an enterprise budget that ***only*** addresses direct income and expenses and projects a contribution margin. It does not include indirect expenses such as interest, accounting, legal, bank and insurance fees, utilities, office supplies, depreciation and owner/operator salary. The total of the margins from the cider enterprise plus other farm enterprises should provide the funds to cover these indirect expenses and other items such as debt servicing, income tax, living expenses, return to management and investment. These items are not included in this study.

A ***whole farm financial plan*** should be developed for individual situations to evaluate the orchard's financial feasibility and potential profitability. This plan should also include a risk assessment. The key is to establish measures to identify those parts of the business that are critical to generating a profit at the end of the year and implement strategies to manage them.

Fundamental questions to ask in this process include:

Is there a market for my cider apples?

Is it technically feasible (e.g. site suitability, labour, resources, etc.)?

Is it economically sound?

Is it financially feasible?

Assumptions — Establishment and Production

General
Information for the development of this study has been obtained through selected cider apple growers, farm cideries, industry horticulturists, consultants, farm input suppliers and specialists at the BC Ministry of Agriculture.

This budget is based on the assumption that a 10 acre orchard operation is removing 1 acre of an existing old dessert apple crop and replanting to cider apples. The investment in machinery, buildings and other capital items represents this 10 acre farm.

The capital and other requirements to establish a farm cidery are not addressed in this analysis. All cider apples produced are presumed sold to an apple cider producer separate from the orchard.

Deer Fencing
The investment of a perimeter fence to mitigate deer damage is included in the capital investment for this orchard. The deer fence cost is based on a 10 acre square (660 ft. x 660 ft.= 2,640 linear ft. or 805 meters). A fencing contractor is hired to install at a total cost of $29.12/meter. The perimeter deer fence investment is $23,442.

Land Preparation/Planting Density/ Support System
Land preparation includes cutting and removing old trees, cultivation and application of soil amendments. A mix of custom operations and hired labour is used for land preparation, trellis system installation and tree planting.

Two year old commercial nursery trees (mixed cider apple varieties) grafted to an M26 rootstock (semi-dwarf), are planted at a spacing of 4 ft. x 10 ft. resulting in a density of 1,089 trees/acre. The trees and scion wood are ordered from a commercial nursery 2 years prior to planting in the orchard at a cost of $8.80 for a 1/4 inch tree. Growers may consider growing their own trees or consider a partner nursery.

Trees are managed using a Central Leader system and a trellis structure is installed to support the trees.

The selection of rootstock should be made in consultation with a tree fruit horticulturist, due to the range in growth and production characteristics between cider apple varieties.

This budget also includes projections for the option of grafting over cider apple varieties onto existing rootstocks in the orchard. The type of rootstock and age and health of older trees are factors in assessing this option.

Horticulture Management/Crop Protection
Cider producers generally prefer to obtain apples grown on a low-input, sustainable basis. As such, this budget model has adjusted the horticultural management practices for apples with respect to the application of fertilizer, herbicides, foliar nutrients, insecticides, fungicides, thinning and growth regulator sprays. There is an increase in labour hours from conventional orchards associated with weed control for this study. The detailed operations tables show the cider apple production practices and costs for cider apples from planting through to full production.

See the BC Tree Fruit Production Guide at http://www.bctfpg.ca, for detailed apple production management information.

Marketing
Recent strong prices have spurred interest in planting cider apple varieties in BC. However, prices will vary in tune with changing supply and demand conditions. As such, ***it is imperative to identify and secure a market for cider apples before investing in a new cider planting***.

Marketing is a key factor in determining which cider apple variety to plant and maybe even whether to plant. If you don't have a market (buyer) for your cider apples (the bitter sweet and bitter sharp) then don't invest the money. ***There is no alternate market for these cider apple varieties.***

Income projections in this budget are based on a marketable yield of 95% and an F.O.B. price of $0.40/lb. which reflects the recent prices paid by BC Cideries. Prices will likely vary depending on variety, quality and other factors. It is important to assess the risk factors associated with expected yields and returns from marketing cider apples.
Varietal selection is based on several factors including demand from cider makers, available scion wood, growth characteristics and rootstocks, site selection, personal preferences and grower experience. Choosing the varieties to plant is a key decision and requires detailed analysis.

The BC Farm Crafted Cider Association Website has a list of members you can connect with to identify potential buyers and what specific cider apple varieties they want.

Yield and Price Projections — Planting to Full Production

The first table below summarizes the yield and price projections in this study. They are based on a density of 1,089 trees/acre planting 2 year old feathered trees on an M26 rootstock, purchased from a commercial nursery. As well, it is assumed that good horticultural management is practiced to maintain healthy, productive trees. The cider apple variety, rootstock and density selected and the tendency to biennial bearing may impact these projections. Nursery trees from a commercial nursery would need to be ordered at least 2 years in advance of expected planting.

A $0.40/lb. F.O.B. price estimate reflects the recent prices paid by BC Cideries. Prices may vary depending on demand, variety, quality and other factors. It is assumed that 95% of the yield is marketable.

To reduce the cost of trees, some producers grow their own trees in a home nursery and then transfer and plant them into the orchard. In all cases, it's important to plan well ahead to secure the required rootstock and cider apple variety scion and bud wood. While un-grafted rootstocks can be ordered in October of the year prior to planting and scion wood in the early spring, it may be prudent to secure these earlier. Depending on suppliers, labour fees and tree loss, it is estimated that a current cost of a 1 year old home grown nursery tree is around $5.00/tree.

Some growers plant 1 year whips or freshly grafted rootstocks in the year of planting. These younger trees will take longer to come into production and to reach full average production levels. The second table below shows potential yield estimates from planting to year 8 for 3 types of trees planted in the orchard. Yield projections should be adjusted to account for the type and age of tree, rootstock, variety, density, biennial bearing tendencies and horticulture management.

Density:	1,089 trees/ac	**YIELD & PRICE ESTIMATES SUMMARY**					**Fall 2016**
System:	Central Leader/Trellis	***Cider Apple Establishment- Mixed Varieties***					
Rootstock:	M26						
Tree Type:	Nursery Tree (2 Yr.)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6 *
Yield per Tree (lb.)		0.0	0.0	6.0	12.5	17.0	20.0
Pounds per Acre		0	0	6,534	13,613	18,513	21,780
Bins per Acre (800 lb. bin)		0	0	8	17	23	27
Average Price ($/lb.)		0.40	0.40	0.40	0.40	0.40	0.40
** Average Full Production Year*							
Note: Cider Apples have a tendency to biennial bearing (see Sensitivity Analysis)							

Density:	1,089 trees/ac		**YIELD ESTIMATES SUMMARY ***					**Fall 2016**
System:	Central Leader/Trellis		**Different Tree Types at Planting**					
Rootstock:	M26		***Cider Apple Establishment***					
Tree Type		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Nursery Tree (2 Yr.)									
	Pounds/Tree	0.0	0.0	6.0	12.5	17.0	20.0	20.0	20.0
	800 lb. Bins/Acre	0	0	8	17	23	27	27	27
1 Year Whips									
	Pounds/Tree	0.0	0.0	0.0	6.0	12.5	17.0	20.0	20.0
	800 lb. Bins/Acre	0	0	0	8	17	23	27	27
Freshly Grafted Rootstocks									
	Pounds/Tree	0.0	0.0	0.0	0.0	6.0	12.5	17.0	20.0
	800 lb. Bins/Acre	0	0	0	0	8	17	23	27
** Note: Cider Apples have a greater tendency to biennial bearing which may impact production levels.*									

Cider Apple Varieties

Cider apples are categorized into four areas; Sweets, Sharps, Bitter Sweet and Bitter Sharp. The bitter sweet and bitter sharp varieties generally go into the craft cider market with most cideries looking for bitter sweet.

A listing of the many cider varieties available from the Summerland Varieties Corporation.

Bitter Sweet

Harry Masters Jersey	Bulmers Norman	Dabinett	Michelin	Muscadet De Dieppe
Porters Perfection	Yarlington Mill	Bedan des Parts	Banane Amere (NVF)	Bilodeau (NVF)
Binet Rouge	Brown Snout (BSW)	Chisel Jersey	Domaine	Ellis Bitter
Frequin Rouge	Fox Whelp	Marechal	Douce de Charlevoix (NVF)	
Harry Masters Jersey	Medaille d'Or	Noel Deschamps	Somerset Redstreak	Stembridge Jersey
White Jersey	Trembletts Geneva Bit-			

Bitter Sharp

Kingston Black	Cap of Liberty	Stoke Red

Sweets

Calville Blanc	Golden Russet	Miki Life (Apple #21)	Sweet Coppin	Roxbury Russet
Ambrosia	Salish			

Sharps

Bramley's Seedling	Burgundy	Winesap	Harrison (NVF)	Granny Smith

Specific details on these varieties can be found on the Summerland Varieties Corporation website.

Crab Apple Varieties

Wixon	Mancherion	Dolgo	John Downey

Cash Flow Timing — Year 6 (Average Full Production)

Managers need to recognize the difference in the timing of cash inflows and outflows in order to determine if any short term financing is required to cover production expenses as well as other cash flow needs.

The table below is an estimate of the timing of the cash flow for an average full production year for a cider apple orchard. It is important to note that, for this orchard, most operating costs are incurred before income is received. There is no inflow of cash until October when the crop is sold to an apple cider maker.

A cash flow projection is key to good financial planning and will need to include both expenses and other cash disbursements such as loan payments (both principle and interest), overhead and indirect expenses such as accounting and professional fees, insurance, office expenses, travel, operator living, and general utilities, income taxes, debt servicing, etc. It will also need to include beginning cash available, loans and other sources of farm and non-farm income.

Cash Flow Timing– Cider Apples												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
% of Total Income	0	0	0	0	0	0	0	0	0	10	75	15
% of Total Direct Costs	0	0	20	15	10	25	5	0	0	25	0	0

Cash Flow from Planting to Full Establishment

This table below shows details of the capital investment for the 10 Acre orchard model used in estimating the direct expenses for the establishment and production for 1 acre of cider apples.

The values of these capital items will vary for individual farms as they may be purchased new or used. It is important to note that the level of investment in depreciable assets on a per acre basis has a significant impact on overall profitability. Consider rental or custom hire as an option to reduce capital investment costs and improve profit potential.

Depreciable capital assets are expensed over their useful lives and accounted for as an amortization expense shown on a net farm income statement. Depending on the asset and the preference of the manager there are several acceptable methods of determining amortization, the most common is straight- line.

Capital costs of land, housing, clearing, road building, water development, power installation, utilities construction and landscape improvements are not included in this enterprise analysis.

CAPITAL INVESTMENT
Machinery, Equipment & Buildings
10 Acre Orchard Operation
Fall 2016

Machine List		New Value	Years Life	Salvage Value
#				
1	Tractor 70 HP	42,000	15	4,500
2	Rear Forks/Bin Loader	4,900	15	500
3	Power Pruner	1,000	10	100
4	Weed Sprayer 600 liters	3,600	10	300
5	Orchard Sprayer 600 liters	19,000	10	4,000
6	Fertilizer Spreader	2,800	15	250
7	Rotovator 60 Inch	4,000	15	200
8	Flail Mower 80 Inch	9,000	15	500
9	Mechanical Ladder (used)	6,900	15	810
10	Pick-Up 1/2 Ton Used	9,500	5	1,000
11	Irrigation Sytem (Drip+Fltr)	25,000	15	0
12	3 pt.Hitch/Post Auger	1,500	10	200
Subtotal (Hourly Equipment)		129,200	0	12,360
13	Small Tools	2,500	10	100
14	Ladders	1,000	10	100
15	Picking Bags (16)	400	10	20
16	Deer Fence (10 ac. perimeter)	23,442	15	2,300
17	Machine Shed (16 x 32)	25,000	20	2,500
TOTAL		**181,542**		

Labour Requirements and Costs—Planting Year to Full Production

The estimated labour hours from planting through to year six (average full production year) of the cider apple planting are summarized in the first table below.

The second table shows the times for pruning, training and hand thinning in minutes per tree. These estimates will vary due to differences in rootstock, density, variety, growing conditions, yields, etc. Consulting a tree fruit horticulturist and cider apple growers can assist in fine tuning these labour hour estimates for individual situations.

For this budget, it is assumed that all labour is hired at a total cost of $15.25/hr. (including C.P.P, E.I., W,C,B, and Holiday pay). While these hours may be manageable if spread over a whole year, they are required at certain times of the year resulting in potential challenges in getting labour. Timely access to good, skilled labour is an important component.

Density:	**1,089 trees/ac**		**LABOUR TIME ESTIMATES SUMMARY**					**Fall 2016**
System:	**Central Leader/Trellis**		**Annual Hours/Acre- Various Operations**					
	Nursery Tree (2 Yr.)	M26	***Cider Apple Establishment***					
								(Full Prod'n)
Labour Operation			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac
Tree Removal/Land Prep. *			33.8					
Support System Install *			17.7					
Tree Planting/Heading			79.6	1.9				
Fertilizer Application			1.0	1.0	1.0	1.0	1.0	1.0
Weed Whack/Hand Hoeing			6.0	5.5	4.5	4.0	4.0	4.0
Herbicide Spray			3.8	4.0	3.0	3.0	3.0	3.0
Pruning/Training			6.4	9.1	14.5	25.4	25.4	25.4
Hand Thinning			0.0	1.8	10.9	14.5	16.3	18.2
Mowing			3.0	3.0	3.0	3.0	3.0	3.0
Spraying (Foliar to Growth)			7.0	11.0	11.0	11.0	12.0	11.0
General Orchard Work			2.7	1.2	1.2	1.2	1.2	1.2
Irrigation Work			2.8	2.8	2.8	2.8	2.8	2.8
Pickup Truck Operation			5.0	5.0	6.0	7.0	7.0	7.0
Bin Hauling/Yarding **			0.0	0.0	0.8	1.7	2.3	2.7
Total Hours/Acre			168.6	46.3	58.7	74.6	78.1	79.3
Hired Labour Cost ($/Acre)			2,571	706	895	1,138	1,190	1,209
** Includes cutting, stump removal, burning, and cultivation.*								
*** Picking labour is paid $20/bin and is not included in these estimates.*								

Density:	1,089 trees/ac		**LABOUR TIME ESTIMATES SUMMARY**					**Fall 2016**
System:	Central Leader/Trellis		**Pruning, Training and Hand Thinning**					
	Nursery Tree (2 Yr.)	M26	**Minutes per Tree**					
			Cider Apple Establishment					
Labour Operation			Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Minutes/ Tree	Minutes/ Tree	Minutes/ Tree	Minutes/ Tree	Minutes/ Tree	Minutes/ Tree
Pruning/Training			0.35	0.50	0.80	1.40	1.40	1.40
Hand Thinning			0.00	0.10	0.60	0.80	0.90	1.00
** There may be a significant range of labour hours for hand thinning*								

Enterprise Analysis—Contribution Margin Summary Years 1-6

The table below summarizes the projected contribution margins for cider apple establishment and average full production years. The direct income and expenses in this table provide a general indication of the financial requirements for establishing and producing Cider Apples in the Okanagan. It is important to assess these variables for your specific situation, and expectations. Indirect and fixed costs are NOT included in this summary.

The contribution margin must provide funds for overhead, interest, and other fixed costs as well as for living expenses.

CUMULATIVE CONTRIBUTION MARGIN SUMMARY
Cider Apple Establishment and Production (Nursery Tree)

DENSITY: **1,089 t/ac** **$/Acre** **October 2016**
System: **Central Leader/Trellis**
Tree Type: **Nursery Tree (2 Yr.)** Rootstock: **M26** Variety: **Mixed Cider**

		Planting						
INCOME		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	TOTAL
							(Full Prod'n.)	
Apples	Gross Yield (lb.)	0	0	6,534	13,613	18,513	21,780	60,440
	(800 lb. bins)	0	0	8	17	23	27	76
	Marketable Yield (%)	95%	95%	95%	95%	95%	95%	95%
	Price ($/lb.)	0.40	0.40	0.40	0.40	0.40	0.40	0.40
	Returns ($)	0	0	2,483	5,173	7,035	8,276	22,967
TOTAL INCOME		0	0	2,483	5,173	7,035	8,276	22,967
DIRECT EXPENSES								
Tree Removal/Land Prep.		961						961
Soil Amendments(Tests/Applic.)		1,223						1,223
Tree Cost*	$8.80 /tree	9,583	287					9,871
Prep/Planting(Labour/Materials)		1,340						1,340
Support System/Install *		3,200						3,200
Irrigation System/Install *		2,500						2,500
Fertilizer/ (Cover Crop- Yr.1)		269	138	57	76	76	76	692
Labour	Pruning/Training	97	138	221	387	387	387	1,619
	Hand Thinning	0	28	166	221	249	277	941
	General Orchard	476	540	495	503	518	503	3,037
Sprays:	Herbicides	63	90	73	73	73	73	2,870
Foliar Nutrient/Insect./Fung./Growth		144	535	535	535	588	535	3,070
Mach. Operation (Fuel/R&M)		646	455	463	494	516	495	3,070
Irrigation		200	200	200	200	200	200	1,200
Harvesting/Bin Yard & Haul		0	0	176	366	498	586	1,626
Other & Miscellaneous		546	72	144	158	165	166	1,251
TOTAL DIRECT EXPENSES		21,248	2,484	2,530	3,013	3,271	3,298	35,844
CONTRIBUTION MARGIN		-21,248	-2,484	-47	2,160	3,764	4,979	-12,877
Beginning Cash Balance		0	-21,248	-23,732	-23,780	-21,620	-17,856	
ACCUMULATED MARGIN		-21,248	-23,732	-23,780	-21,620	-17,856	-12,877	

** May be considered capital items and depreciated annually over useful life.*

Detailed Operations

The tables in the following pages summarize the specific operations and machinery, labour and material expenses from planting year through to the average full production in year 6 for 1 acre of cider apples in the Okanagan Valley of BC. Additional details on the basis of these estimates are provided in the assumptions section of this publication. As noted, these numbers are intended to be a guide in assisting growers to prepare a budget reflecting their own circumstances and expectations.

1,089 trees/ac Central Leader/Trellis Nursery Tree (2 Yr.) M26	DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN Cider Apple Establishment- Year 1 (Planting)									Fall 2016
				Machinery Items			Labour		Other	Total Direct
Operation Description	Machinery Number *		Times Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel $/Acre	Hrs/Ac	$/Acre	Materials $/Acre	Expenses $/Acre
Cut/Stump Removal/Burn							30.0	457.38	400.00	857.38
Grnd Rip/Discing (Rental)	1		1	2.50	2.50	35.21	2.5	38.12	31.25	104.58
Cultivate (Harrow Rental)	1		1	1.25	1.25	17.61	1.3	19.06	15.63	52.29
Soil Test/Soil Amendments	1	7	2	1.75	3.50	51.11	4.0	60.98	1,162.08	1,274.18
Staking and stakes			1	2.00	2.00		2.0	30.49	67.31	97.81
Augering (Auger Rent&Bits)	1		1	9.60	9.60	135.23	9.6	146.39	120.02	401.64
Tree Cost/ Planting	1	2	1	1.50	1.50	21.18	64.0	975.74	9,583.20	10,580.13
Post Install (Custom Oper. $85/hr)									138.19	138.19
System Cost/ Install	1		1	2.00	2.00	28.17	17.7	269.57	2,792.52	3,090.26
Fertilizer Application (Ground)	1	6	1	1.00	1.00	14.39	1.0	15.25	180.80	210.43
Seed Cover Crop (Hand Seeding)			1	1.50	1.50		1.5	22.87	87.95	110.82
Weed Whacking/ Herbicide Spray	1	4	3	1.25	3.75	54.77	9.8	148.65	62.52	265.94
Prune/Training (Spreaders, etc)		3	1	6.35	6.35	1.56	6.4	96.85		98.41
Hand Thinning										
Mowing	1	8	4	0.75	3.00	49.35	3.0	45.74		95.09
Sprays: (Foliar Nutrients)	1	5	7	1.00	7.00	150.71	7.0	106.72	48.19	305.62
(Insecticides/Fungicides)									82.84	82.84
(Thinning & Growth Regulator)	1	5	0	1.00	0.00					
Irrigation System Installation									2,500.00	2,500.00
Irrigation System (Maint./H2o Taxes)	11		34	10.00	340.00	13.55	2.8	42.69	200.00	256.24
Mouse Guards			1	0.00	0.00					
Ramik Brown Application (Rodent Bait)			1	0.00	0.00		1.2	18.30	12.52	30.81
Use of pickup	10		1	5.00	5.00	73.10	5.0	76.23		149.33
Miscellaneous Expenses									546.06	546.06
TOTALS						645.95	168.6	2,571.02	18,031.08	21,248.04
Projected Income per Acre	Gross Yield (lb./acre): 0				Price ($/lb.): 0.4000				Total Direct Income	0.00
	Marketable Yield: 95%								Total Direct Expenses	21,248.04
* *See Capital Investment Table for Description*									CONTRIBUTION MARGIN	**-21,248.04**

Cider Apples: Detailed Operations—Establishment Years 2-3

1,089 trees/ac Central Leader/Trellis Nursery Tree (2 Yr.) M26	DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN Cider Apple Establishment- Year 2								Fall 2016	
				Machinery Items			Labour		Other	Total Direct
Operation Description	Machinery Number *		Times Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel $/Acre	Hrs/Ac	$/Acre	Materials $/Acre	Expenses $/Acre
Tree Replacement (% loss) 3.0%	1		1	0.50	0.50	7.04	1.9	29.27	287.50	323.81
Fertilizer Application	1	6	1	1.00	1.00	0.04	1.0	15.25	138.27	167.90
Weed Whacking/ Herbicide Spray	1	4	4	1.00	4.00	0.11	9.5	144.84	90.31	293.57
Prune/Training (Spreaders, etc)		3	1	10.89	10.89	0.05	9.1	138.36		141.03
Hand Thinning							1.8	27.67		27.67
Mowing	1	8	4	0.75	3.00	0.13	3.0	45.74		95.09
Pollination										
Sprays: (Foliar Nutrients)	1	5	9	1.00	9.00	0.34	9.0	137.21	67.93	398.91
(Insecticides/Fungicides)									321.46	321.46
(Thinning & Growth Regulator)	1	5	2	1.00	2.00	0.08	2.0	30.49	132.66	206.21
Irrigation System (Maint./H2o Taxes)	11		34	10.00	340.00	0.19	2.8	42.69	200.00	256.24
Ramik Brown Application (Rodent Bait)			1	1.20	1.20		1.2	18.30	12.52	30.81
Use of pickup	10		1	5.00	5.00	0.06	5.0	76.23		149.33
Harvesting $20/Bin										
Bin Hauling/ Yarding	1	2	1	0.00	0.00					
Miscellaneous Expenses									72.36	72.36
TOTALS						8.03	46.3	706.04	1,323.01	2,484.41
Projected Income per Acre	Gross Yield (lb./acre): 0			Price ($/lb.): 0.4000				Total Direct Income		0.00
	Marketable Yield: 95%							Total Direct Expenses		2,484.41
* See Capital Investment Table for Description								CONTRIBUTION MARGIN		-2,484.41

1,089 trees/ac Central Leader/Trellis Nursery Tree (2 Yr.) M26	DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN Cider Apple Establishment- Year 3								Fall 2016	
				Machinery Items			Labour		Other	Total Direct
Operation Description	Machinery Number *		Times Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel $/Acre	Hrs/Ac	$/Acre	Materials $/Acre	Expenses $/Acre
Fertilizer Application	1	6	1	1.0	1	14.39	1.0	15.25	57.09	86.72
Weed Whacking/ Herbicide Spray	1	4	3	1.0	3	43.82	7.5	114.35	72.68	230.84
Prune/Training (Spreaders, etc)		3	1	25.4	25.41	6.23	14.5	221.37		227.60
Hand Thinning							10.9	166.03		166.03
Mowing	1	8	4	0.8	3	49.35	3.0	45.74		95.09
Pollination									70.00	70.00
Sprays: (Foliar Nutrients)	1	5	9	1.0	9	193.77	9.0	137.21	67.93	398.91
(Insecticides/Fungicides)									321.46	321.46
(Thinning & Growth Regulator)	1	5	2	1.0	2	43.06	2.0	30.49	132.66	206.21
Irrigation System (Maint./H2o Taxes)	11		34	10.0	340	13.55	2.8	42.69	200.00	256.24
Ramik Brown Application (Rodent Bait)			1	1.2	1.2		1.2	18.30	12.52	30.81
Use of pickup	10		1	6.0	6	87.72	6.0	91.48		179.20
Harvesting $20/Bin									163.35	163.35
Bin Hauling/ Yarding	1	2	1	0.8	0.8	11.53	0.8	12.45		23.99
Miscellaneous Expenses									73.69	73.69
TOTALS						463.42	58.7	895.35	1,171.39	2,530.15
Projected Income per Acre	Gross Yield (lb./acre): 6,534			Price ($/lb.): 0.4000				Total Direct Income		2,482.92
	Marketable Yield: 95%							Total Direct Expenses		2,530.15
* See Capital Investment Table for Description								CONTRIBUTION MARGIN		-47.23

Cider Apples: Detailed Operations—Establishment Years 4-5

1,089 trees/ac Central Leader/Trellis Nursery Tree (2 Yr.) M26	DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN Cider Apple Establishment- Year 4									Fall 2016
				Machinery Items			Labour		Other	Total Direct
Operation Description	Machinery Number *		Times Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel $/Acre	Hrs/Ac	$/Acre	Materials $/Acre	Expenses $/Acre
Fertilizer Application	1	6	1	1.0	1.0	14.39	1.0	15.25	76.12	105.75
Weed Whacking/ Herbicide Spray	1	4	3	1.0	3.0	43.82	7.0	106.72	72.68	223.22
Pruning/Training		3	1	39.9	39.9	9.79	25.4	387.40		397.19
Hand Thinning							14.5	221.37		221.37
Mowing	1	8	4	0.8	3.0	49.35	3.0	45.74		95.09
Pollination									70.00	70.00
Sprays: (Foliar Nutrients)	1	5	9	1.0	9.0	193.77	9.0	137.21	67.93	398.91
(Insecticides/Fungicides)									321.46	321.46
(Thinning & Growth Regulator)	1	5	2	1.0	2.0	43.06	2.0	30.49	132.66	206.21
Irrigation System (Maint./H2o Taxes)	11		34	10.0	340.0	13.55	2.8	42.69	200.00	256.24
Ramik Brown Application (Rodent Bait)			1	1.2	1.2		1.2	18.30	12.52	30.81
Use of pickup	10		1	7.0	7.0	102.34	7.0	106.72		209.07
Harvesting $20/Bin									340.33	340.33
Bin Hauling/ Yarding	1	2	1	1.7	1.7	24.03	1.7	25.94		49.97
Miscellaneous Expenses									87.77	87.77
TOTALS						494.10	74.6	1,137.83	1,381.47	3,013.40
Projected Income per Acre	Gross Yield (lb./acre): 13,613			Price ($/lb.): 0.4000				Total Direct Income		5,172.94
	Marketable Yield: 95%							Total Direct Expenses		3,013.40
* See Capital Investment Table for Description								CONTRIBUTION MARGIN		2,159.54

1,089 trees/ac Central Leader/Trellis Nursery Tree (2 Yr.) M26	DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN Cider Apple Establishment- Year 5									Fall 2016
				Machinery Items			Labour		Other	Total Direct
Operation Description	Machinery Number *		Times Done	Hrs/Oper /Acre	Hrs/Ac	R&M/Fuel $/Acre	Hrs/Ac	$/Acre	Materials $/Acre	Expenses $/Acre
Fertilizer Application	1	6	1	1.0	1.0	14.39	1.0	15.25	76.12	105.75
Weed Whacking/ Herbicide Spray	1	4	3	1.0	3.0	43.82	7.0	106.72	72.68	223.22
Pruning/Training		3	1	41.7	41.7	10.23	25.4	387.40		397.63
Hand Thinning							16.3	249.04		249.04
Mowing	1	8	4	0.8	3.0	49.35	3.0	45.74		95.09
Pollination									70.00	70.00
Sprays: (Foliar Nutrients)	1	5	9	1.0	9.0	193.77	9.0	137.21	67.93	398.91
(Insecticides/Fungicides)									321.46	321.46
(Thinning & Growth Regulator)	1	5	3	1.0	3.0	64.59	3.0	45.74	185.84	296.16
Irrigation System (Maint./H2o Taxes)	11		34	10.0	340.0	13.55	2.8	42.69	200.00	256.24
Ramik Brown Application (Rodent Bait)			1	1.2	1.2		1.2	18.30	12.52	30.81
Use of pickup	10		1	7.0	7.0	102.34	7.0	106.72		209.07
Harvesting $20/Bin									462.83	462.83
Bin Hauling/ Yarding	1	2	1	1.7	1.7	24.03	2.3	35.28		59.31
Miscellaneous Expenses									95.27	95.27
TOTALS						516.07	78.1	1,190.09	1,564.64	3,270.80
Projected Income per Acre	Gross Yield (lb./acre): 18,513			Price ($/lb.): 0.4000				Total Direct Income		7,034.94
	Marketable Yield: 95%							Total Direct Expenses		3,270.80
* See Capital Investment Table for Description								CONTRIBUTION MARGIN		3,764.14

Cider Apples: Detailed Operations—Year 6 (Average Full Production)

Detailed Operations

The table below summarizes the specific operations and machinery, labour and material costs in an average full production year for 1 acre of cider apples in the Okanagan Valley of BC. Additional details on the basis of these estimates are provided in the assumptions section of this publication. As noted previously, these numbers are intended to be a guide in assisting growers to prepare a budget reflecting their own circumstances and expectations.

The sensitivity analysis section illustrates the impact of changes in prices, yields and labour costs on the contribution margin.

1,089 trees/ac Central Leader/Trellis Nursery Tree (2 Yr.) M26	DETAILED OPERATIONS / ESTIMATED CONTRIBUTION MARGIN Cider Apple Establishment- Year 6 (Average Full Production)								Fall 2016	
				Machinery Items			Labour		Other	Total Direct
Operation Description	Machinery		Times	Hrs/Oper		R&M/Fuel			Materials	Expenses
	Number *		Done	/Acre	Hrs/Ac	$/Acre	Hrs/Ac	$/Acre	$/Acre	$/Acre
Fertilizer Application	1	6	1	1.0	1.0	14.39	1.0	15.25	76.12	105.75
Weed Whacking/ Herbicide Spray	1	4	3	1.0	3.0	43.82	7.0	106.72	72.68	223.22
Pruning/Training		3	1	43.6	43.6	10.68	25.4	387.40		398.08
Hand Thinning							18.2	276.71		276.71
Mowing	1	8	4	0.8	3.0	49.35	3.0	45.74		95.09
Pollination									70.00	70.00
Sprays: (Foliar Nutrients)	1	5	9	1.0	9.0	193.77	9.0	137.21	67.93	398.91
(Insecticides/Fungicides)									321.46	321.46
(Thinning & Growth Regulator)	1	5	2	1.0	2.0	43.06	2.0	30.49	132.66	206.21
Irrigation System (Maint./H2o Taxes)	11		34	10.0	340.0	13.55	2.8	42.69	200.00	256.24
Ramik Brown Application (Rodent Bait)			1	1.2	1.2		1.2	18.30	12.52	30.81
Use of pickup	10		1	7.0	7.0	102.34	7.0	106.72		209.07
Harvesting $20/Bin									544.50	544.50
Bin Hauling/ Yarding	1	2	1	1.7	1.7	24.03	2.7	41.51		65.54
Miscellaneous Expenses									96.05	96.05
TOTALS						494.99	79.3	1,208.74	1,593.92	3,297.65
Projected Income per Acre	Gross Yield (lb./acre): 21,780			Price ($/lb.): 0.4000				Total Direct Income		8,276.40
	Marketable Yield: 95%							Total Direct Expenses		3,297.65
** See Capital Investment Table for Description*								**CONTRIBUTION MARGIN**		**4,978.75**

Sensitive Analysis—Cider Apple Production

The tables below show the impact on the contribution margin (income less direct expenses) resulting from changes in price and yield projections and the cost of hired labour in an average full production year for cider apples. The bold values reflect the base projections in this budget.

Differences in the projected price have a significant impact on income and profitability. This sensitivity analysis shows that a 25% decline in price at a 27.2 bin yield , results in a 42% decline in the contribution margin, reducing the capacity of the farm to cover indirect costs, depreciation and return to owner/manager.

On the yield side, cider apples have a tendency to biennial bearing which could have a major impact on income should it occur. Other variables associated with thinning practices, pests and climate may also contribute to production variability in the orchard. As with price, reduction in yields will impact income projections. The table below shows that a 20% reduction in yield at a $0.40 price, decreases the contribution margin by 31%.

A decrease in both price and yield has a big impact on the contribution margin as can be seen through the range of values in the table below.

This budget assumes that all operations are carried out by hired labour which comprises about 36% of direct expenses in an average full production year for cider apples. The second table below shows the impact of changes to labour costs on the contribution margin. Changes in labour cost has significantly less impact on contribution margin than price or yield changes. A 20% increase in labour cost decreases the contribution margin by only 4.6%. A possible take-away here is don't skimp on labour. Make sure that good horticulture management is done in a timely and accurate manner to maximize yields, quality and tree health. In some cases, labour is done by the owner/operator. In such cases the cash outlay would come from overall farm profit.

It is important to assess the risks associated with these variables for individual situations in order to make the best decision on investing in and managing a cider apple planting.

Density:	1,089 trees/ac				**SENSITIVITY ANALYSIS**					
System:	Central Leader/Trellis				***Impact of Price & Yield Changes on Contribution Margin***					
Rootstock:	M26				*Cider Apple Production- Average Full Production Year*					**Fall 2016**
Tree Type:	Nursery Tree (2 Yr.)					*$/Acre*				
	Gross Yield					Price ($/pound)				
	800 lb. bins/ac.	lb./tree	lb./ac.	0.20	0.25	0.30	0.35	**0.40**	0.45	
	6.8	5.0	5,445	-1,810	-1,552	-1,293	-1,034	-776	-517	
	10.9	8.0	8,712	-1,280	-866	-453	-39	375	789	
	16.3	12.0	13,068	-573	47	668	1,289	1,910	2,530	
	21.8	16.0	17,424	134	961	1,789	2,617	3,444	4,272	
	27.2	**20.0**	**21,780**	841	1,875	2,910	3,944	**4,979**	6,013	
	34.0	25.0	27,225	1,724	3,017	4,311	5,604	6,897	8,190	
	40.8	30.0	32,670	2,608	4,160	5,712	7,263	8,815	10,367	
					SENSITIVITY ANALYSIS					
					Impact of Labour Costs on Contribution Margin					
					Cider Apple Production- Average Full Production Year					
						$/Acre				
			% Change in Hired Labour Cost from Base Assumptions							
			75%	80%	**100%**	110%	120%	130%		
	Contribution Margin		5,740	5,668	**5,430**	5,307	5,183	5,059		

Assessing and Managing Risk

Risk assessment forms the foundation of an effective enterprise risk management program. A risk is defined as a possible event or circumstance that can have negative or positive influences on the enterprise in question; in this case a new cider apple planting in the Okanagan Valley.

There are critical success factors that make an investment profitable. The financial projections in this study assume good management and outcomes supporting a profitable and successful venture. Assessing the various sources of risk, their severity or impact, and the probability of occurrence is important in developing strategies to mitigate and manage risk.
This section discusses potential sources of risk on the orchard and ideas on the process to evaluate them in preparing a risk management plan as part of an overall farm business plan and financial projections.

Risk impacting a cider apple enterprise can come from numerous sources; both internal and external. They all could potentially have an impact on the key variables of price, yield and costs (including labour), and the contribution margin projections for this enterprise. The following list of factors is intended as a guideline to ask questions for specific orchards. It is not exhaustive.

Markets/marketing	Varietal Selection	Apple Quality (Tannins, etc.)
Cider Producer Requirements	Weather/Climate	Financial
Bud Wood/Rootstock	Soil	Business
Land Suitability	Disease/Pests	Supply of Cider Apples
Water	Yield Variability/Biennial Bearing	Political
Crop Protection	Labour (skill & availability)	Government Policy
Pest Control	Environment	Taxation

As each location and situation varies, it is important that an individual risk assessment be conducted. To assist in establishing the sources of risk for individual operations, take each factor and identify potential issues resulting from it that would result in some degree of risk that could impact the financial projections. From that, assess what the level of impact and probability of occurrence would be. Then determine the level of control you have and identify potential options to manage or mitigate the risks. As an example, consider diversifying the farm's enterprise mix to offset the risk of price and yield reductions in the cider apple enterprise. It is one of many strategies that farm managers can incorporate into their risk management plan.

Looking at the potential prices for cider apples may point to some variation between buyers resulting from a reduction in demand could indicate a significant degree of price risk. Strategies to secure markets and prices and production practices to produce a consistent volume of high quality cider apple varieties that are in demand need to be established to meet the projected revenues in the cider orchard.

It can also be useful to rank the risks into those with high impact and high probability and those with low probability and low impact. This can help in making a more informed decision on whether or not to invest in a cider apple planting as well as putting a focus on managing risks with the greatest likelihood of occurrence and impact on the success of the cider enterprise and overall orchard business.

Grafting—Over Option: Cider Apple Establishment Years 1-6

This table summarizes the estimated contribution margins for cider apple establishment and average full production years for grafting-over onto existing rootstocks. They are provided as a comparison to replanting using a 2 yr. nursery tree (see page 8).

Grafting-over costs are based on using 2 scion wood sticks ($0.50) per tree with grafting at $1.50 per graft and a loss of 5%. Tree cutting and debris removal is done by custom work. An updated drip irrigation system is included. Other operations and costs are similar to the nursery tree option.

Yield estimates for this option are based on input from growers and horticulturists and assume good bud take, growth and management practices. Grafting over may have higher risks associated with existing rootstock (type, age, condition) which should be considered when looking at this option.

CUMULATIVE CONTRIBUTION MARGIN SUMMARY
Cider Apple Establishment and Production (Grafting Over)

DENSITY: **272 t/ac** **$/Acre** **October 2016**
System: **Central Leader/Trellis**
Tree Type: **Grafting-Over** Rootstock: **M4** Variety: **Mixed Cider**

		Planting							
INCOME		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6		TOTAL
						(Full Prod'n.)			
Apples	Gross Yield (lb.)	0	4,085	16,338	19,061	21,784	21,784		83,052
	(800 lb. bins)	0	5	20	24	27	27		104
	Marketable Yield (%)	95%	95%	95%	95%	95%	95%		95%
	Price ($/lb.)	0.40	0.40	0.40	0.40	0.40	0.40		0.40
	Returns ($)	0	1,552	6,208	7,243	8,278	8,278		31,560
TOTAL INCOME		0	1,552	6,208	7,243	8,278	8,278		31,560
DIRECT EXPENSES									
Tree Cutting/Remove Debris		600							600
Soil Amendments(Tests/Applic.)		776							776
Grafting Over Costs		1,089	54						1,144
Irrigation System/Install *		1,000							1,000
Fertilizer		205	138	57	76	76	76		629
Labour	Pruning/Training	83	104	138	346	346	346		1,363
	Hand Thinning	0	55	166	194	208	221		844
	General Orchard	446	488	488	503	518	503		2,946
Sprays:	Herbicides	63	90	73	73	73	73		2,870
Foliar Nutrient/Insect./Fung./Growth		144	535	535	535	588	535		2,859
Mach. Operation (Fuel/R&M)		405	459	476	499	521	500		2,859
Irrigation		200	200	200	200	200	200		1,200
Harvesting/Bin Yard & Haul		0	110	440	513	586	586		2,235
Other & Miscellaneous		120	265	360	160	166	163		1,234
TOTAL DIRECT EXPENSES		5,131	2,499	2,932	3,098	3,281	3,203		20,144
CONTRIBUTION MARGIN		-5,131	-947	3,277	4,145	4,997	5,075		11,416
Beginning Cash Balance		0	-5,131	-6,078	-2,801	1,344	6,341		
ACCUMULATED MARGIN		-5,131	-6,078	-2,801	1,344	6,341	11,416		

** May be considered a capital item and depreciated annually over useful life.*

Labour Estimates: Grafting– Over Option (Cider Apple Establishment)

The following tables show the estimated labour hours for the grafting-over option of establishing cider apples. The first table is a summary of all the labour operations from the initial year of grafting over to the estimated full production year.

The second table shows the times for pruning, training and hand thinning in minutes per tree. The times per tree for this option are higher due to the lower density (larger tree size) and different rootstock from the nursery tree projections shown earlier, but result in similar per acre times. It should be noted that these estimates will vary due to differences in rootstock, variety, growing conditions, yields, etc. and should be adjusted for specific situations. Consulting a tree fruit horticulturist and cider apple growers can assist in fine tuning these.

While these hours may be manageable if spread over a whole year, they are required at specific times of the year resulting in potential challenges in getting labour. Timely access to good, skilled labour is an important component in managing the orchard and producing consistent yields of required quality.

Density:	**272 trees/ac**	**LABOUR TIME ESTIMATES SUMMARY**					**Fall 2016**
System:	**Central Leader/Trellis**	**Annual Hours/Acre- Various Operations**					
Rootstock:	M4	***Cider Apple Establishment: Grafting-Over***					
Labour Operation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac	hr/Ac
Tree Cutting/Remove Debris *						*(Full Production)*	
Grafting-Over Work *							
Soil Test/ Apply Amendments		4.0					
Fertilizer Application		1.0	1.0	1.0	1.0	1.0	1.0
Weed Whack/Hand Hoeing		4.0	4.0	4.0	4.0	4.0	4.0
Herbicide Spray		3.8	4.0	3.0	3.0	3.0	3.0
Pruning/Training		5.4	6.8	9.1	22.7	22.7	22.7
Hand Thinning		0.0	3.6	10.9	12.7	13.6	14.5
Mowing		3.0	3.0	3.0	3.0	3.0	3.0
Spraying (Foliar to Growth)		7.0	11.0	11.0	11.0	12.0	11.0
General Orchard Work		2.7	1.2	1.2	1.2	1.2	1.2
Irrigation Work		2.8	2.8	2.8	2.8	2.8	2.8
Pickup Truck Operation		5.0	5.0	6.0	7.0	7.0	7.0
Bin Hauling/Yarding **		0.0	0.5	2.0	2.4	2.7	2.7
Total Hours/Acre		38.7	42.9	54.0	70.8	73.0	72.9
Hired Labour Cost ($/Acre)		590	655	823	1,079	1,113	1,112
** These operations were done by Custom Work.*							
*** Picking labour is paid $20/bin and is not included in these estimates.*							

Density:	272 trees/ac	**LABOUR TIME ESTIMATES SUMMARY**					**Fall 2016**
System:	Central Leader/Trellis	**Pruning, Training and Hand Thinning**					
Rootstock:	M4	**Minutes per Tree**					
		Cider Apple Establishment: Grafting-Over					
Labour Operation		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Minutes/ Tree	Minutes/ Tree	Minutes/ Tree	Minutes/ Tree	Minutes/ Tree	Minutes/ Tree
Pruning/Training		1.20	1.50	2.00	5.00	5.00	5.00
Hand Thinning		0.00	0.80	2.40	2.80	3.00	3.20
** There may be a significant range of labour hours for hand thinning*							