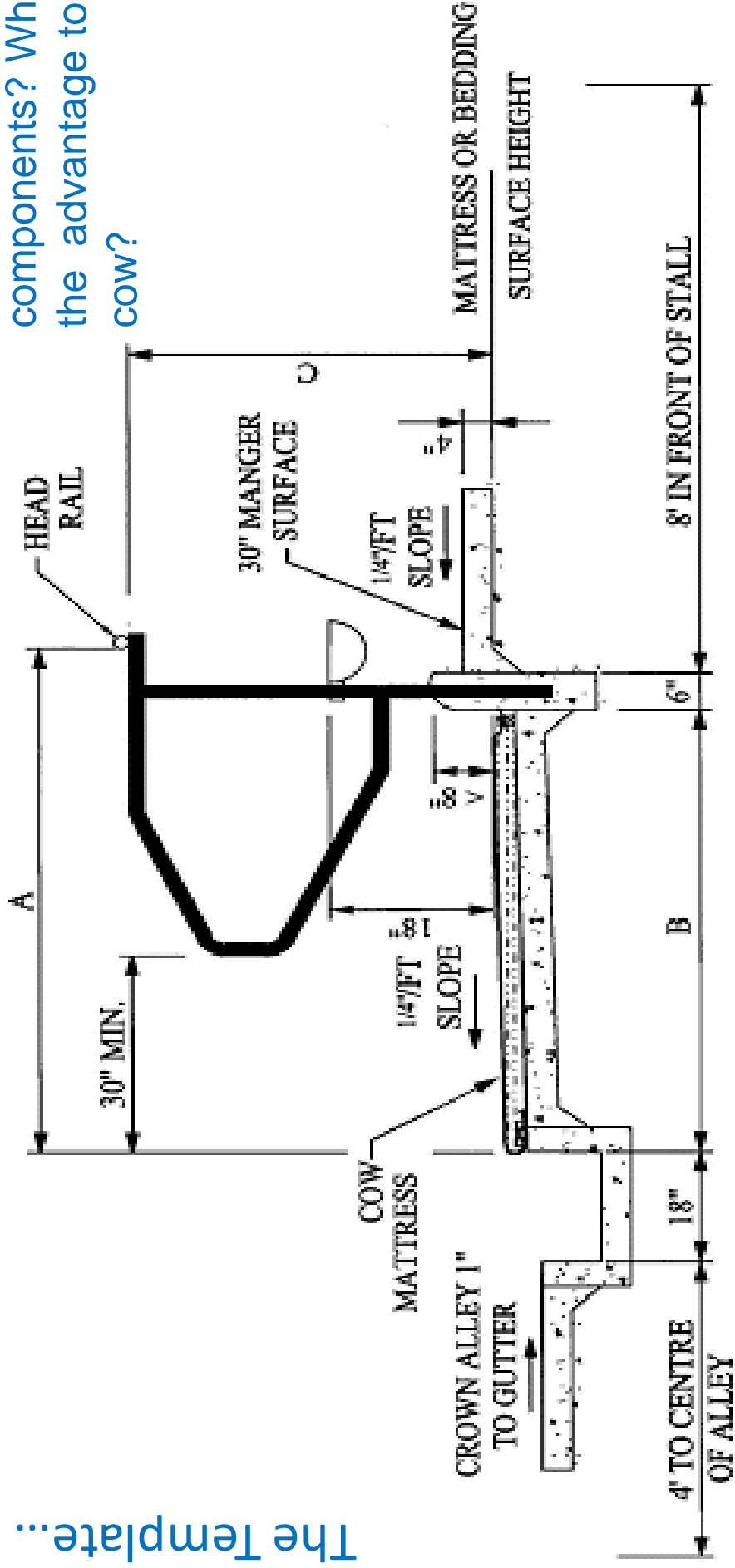


**Figure 13.** The diagram shows a tie stall with a head rail. The table shows variations in stall dimensions for Holstein cows - First Lactation, Milking and Dry Cows. Nonetheless, it's good advice to measure your cows before deciding on stall sizes.

Why these relative components? What's the advantage to a cow?

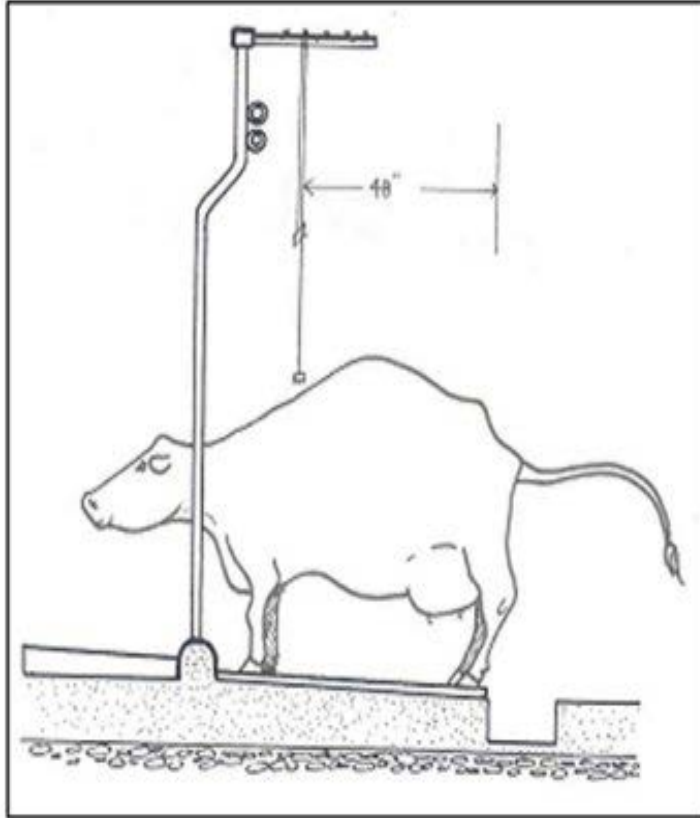


The Template...

Holstein Cows	Dimension (in)				Chain Length
	A	B	C	Width	
First Lactation	84	70	46	54	C - 8
Milking	86	72	48	54	C - 8
Dry Cow	86	72	48	60	C - 8

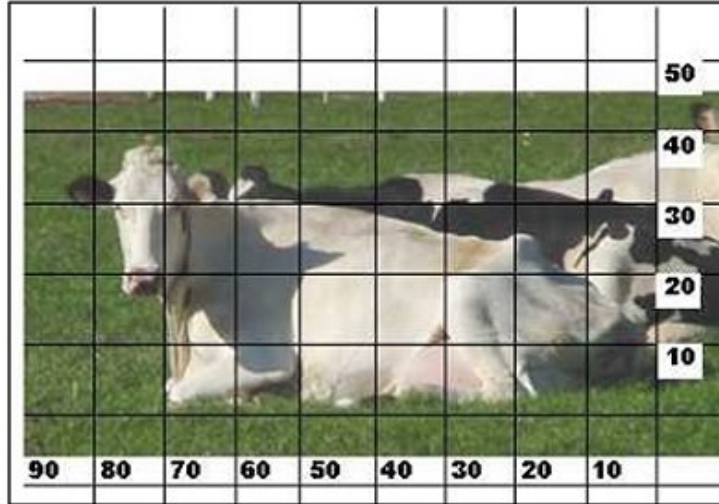
**Figure 12.** The trainer is located at the chine and slightly ahead of the point where the back begins to arch when a cow defecates or urinates. The trainers should be located at least 2 inches (five-cm) above the chine and 48" from the back of the stall platform. Varying will more than likely result in either agitated (too far back) or dirty (too far forward) cows.

The Template, continued...



Lots and lots of Homework...

Figure 3. Imprint length extends from the folded foreknee to the tail. **This length defines the bed length of a stall.** Pushed decision to jackhammer mangers and go to 72" beds



◇Nose-to-tail length describes the measurement from the tail to the nose of a cow standing with her head forward. A cow has a normal crook in her neck when lying and her nose-to-tail length is less than while standing.

◇Imprint length describes the length from folded foreknee to tail while lying in the narrow position. It defines the bed length needed for resting with all body parts on the stall. Imprint length is greater when the cow extends her front legs forward in normal resting positions.

Figure 4. For the rear view of the cow in the photo, imprint width extends from the left hock to the right abdomen - a distance of about 52 inches for this cow. It increases when the rear legs extend outwards or the cow reclines in wide resting positions. **Barn layout and cow dimensions meant a section of 54" wide stalls, a majority of 48" stalls and a total loss of 6 stalls (80 → 74)**

Lots and lots of Homework...

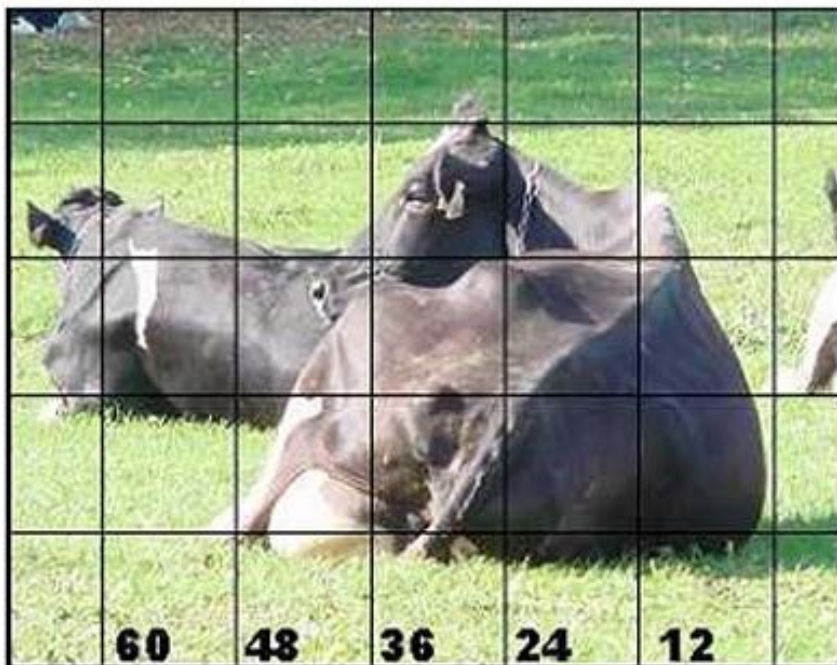
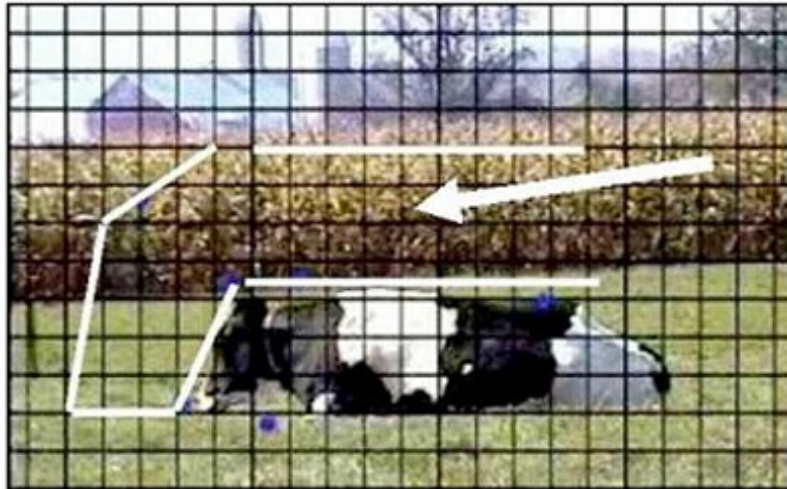


Figure 5. While rising freely on pasture, a cow uses the forward, downward and vertical space outlined by the white lines in the photograph. While rising, this cow lunged forward about 22% of her resting nose-to-tail length. **Why they gave in to 48" rail height set 7" beyond curb center.**

Lots and lots of Homework...



- 👉 Side
- 👉 Front
- 👉 Rear

The space needed for lying and rising motions (lunging) extends forward, downward and upward forehead lunge and bob, vertically and forward for standing and laterally for hindquarter movements. Knowledge of this space is essential for properly sizing the opening at the front of tie stalls, positioning tie rails, choosing the shape and dimensions of stall dividers and avoiding hazards when turning out of stalls.

Figure 2. Four normal resting positions include long, short, wide and narrow. The fifth is lateral recumbency. Stall characteristics affect total lying time, time spent resting in one position and resting positions. (Illustration G. Rietveld) **“Cow Comfort” means accommodating all of these natural positions with a very low probability of striking steel at any time!**

Lots and lots of Homework...

## Normal Resting Positions

long



short



wide



narrow



## Lots and lots of Homework...

Table 1. Body dimensions, example measurements for mature Holsteins, and estimated ratios to rump height and hook-bone width

Body Dimension	Inches	Proportions
<b>Nose-to-tail length</b>	102 (range 96-110)	1.6 x rump height
<b>Imprint length - resting</b>	72 (68-76)	1.2 x rump height
<b>Imprint width</b>	52 (48 - 54)	2 <sup>+</sup> x hook bone width
<b>Forward lunge space</b>	24 (23 - 26)	0.4 x rump height
<b>Stride length when rising</b>	18	0.3 x rump height
<b>Rump height - mature</b>	Median 60 (range 58-64)	
<b>Rump height - Lactation 1</b>	Median 58, top 25% - 59	
<b>Stance - front-to-rear feet</b>	60 (range 58-64)	1.0 x rump height
<b>Withers (shoulder) height</b>	60 (range 58-64)	1.0 x rump height
<b>Hook-bone width</b>	26 (range 24-27)	

UBC research showed a 1350 lb cow uses 118 in longitudinal space and 43 in lateral space when lying.

## Lots and lots of Homework...

### Cow Space Requirements Translated to Tie Stalls

Table 2. Stall dimensions, estimated relationships to body dimensions and example calculations for mature Holsteins in a study herd. **Note that Howlands' cows tended to be proportionally longer and not quite as wide as their Canadian "Sisters"**

Stall Dimension	Ratio and Reference Body Dimension	An Example a median cow
<b>Bed length = imprint length</b>	1.2 x rump height	1.2 x 60 = 72 in.
<b>Tie rail height above cow's feet</b>	0.80 x rump height	0.80 x 60 = 48 in.
<b>*Stall width = imprint width +</b>	2.0 x hook bone width	2 x 26 = 52 in.

\* Producers are building most new tie stalls wider than this minimum width. The most common minimum width is 54 inches.

# Meeker Cows Relative Measurements – 7/6/11

BarnName	Lact#	Hip Height	Length Imprint	Hip Width	Width Imprint
413	1	57	<b>68.4</b>	19.5	39
414	1	55	66	19	38
BETTY	1	59	<b>70.8</b>	22.75	45.5
DAFFY	1	55	66	20	40
EV2	1	54	64.8	18.75	37.5
F-FACE	1	57.25	68.7	20.75	41.5
GENIE	1	59.5	<b>71.4</b>	22.5	45
GW17	1	59	<b>70.8</b>	24.25	<b>48.5</b>
GW458	1	54.25	65.1	21	42
JAM	1	56	67.2	19.5	39
JEWEL	1	54.75	65.7	18.75	37.5
KASSIE	1	60.5	<b>72.6</b>	18.5	37
KATRINA	1	56	67.2	19.5	39
LOUANN	1	57	68.4	20.75	41.5
PATTY	1	55	66	19.25	38.5
RENEE	1	55.25	66.3	19.5	39
WS249	1	59	<b>70.8</b>	23.25	46.5
BRUISER	2	54.25	65.1	20.75	41.5
COMET	2	56.5	67.8	21.5	43
DING	2	56.25	67.5	22.25	44.5
DOC	2	57	<b>68.4</b>	23.5	47
DOOZY	2	60	72	23.75	<b>47.5</b>
FOXY	2	55.5	66.6	20.5	41
GW452	2	55.25	66.3	21.25	42.5
JANICE	2	57.5	<b>69</b>	23.5	47
MAUDE	2	55	66	20.75	41.5
PETUNIA	2			24	<b>48</b>
POLLY	2	56	67.2	21.75	43.5
KRISTY	3	57.5	<b>69</b>	22.5	45
LOU	3	56.25	67.5	21.5	43
SPOT	3	56.5	67.8	23.25	46.5
FOX12	4	58	<b>69.6</b>	23.75	<b>47.5</b>
GERRY	4	58.25	<b>69.9</b>	22.75	45.5
KATIE	4	57	<b>68.4</b>	22.5	45
APRIL	5	57.75	<b>69.3</b>	20.5	41
JEAN	6	56	67.2	24.25	<b>48.5</b>

**Bolded** numbers are cows needing wider and/or longer stalls

# Why?



## *Renovation project:*

Do it for the Money?

Do it for the Cows?

← (maybe not this one!)

Do it for Yourself – Physically?

Do it for Yourself – Psychologically?

Do it for Yourself – Emotionally?

Almost 4 years later and many, many dollars to the better...  
Rob and Darlene Howland would say "you can have it all"!

What got the Howlands' attention?



May 25, 2005

*How does your farm rate on cow comfort?*

*by Kathy Zurbrigg, OMAF (someone cares about us tie-barns!)*

...as well as:

- \*Stalls rusting off
- \*Production ceiling hit
- \*Possibility of getting all of the benefits without full concrete bust-out and re-pour.

## SCORE YOUR FARM for COW COMFORT

Count all the milking cows on your farm with each problem listed below. Turn the count of affected cows for each problem into a percent value by dividing the number of affected cows by the total number of milking cows scored. For each problem area, find which group your farm fits into. For example, if the percentage of cows that have hock wounds is 3%, then you would be in group 2 for hock wounds.

*\*Boxes that are shaded indicate values that are considered too high for that problem.*

Problems	Best 20% of Farms	2 <sup>nd</sup> Best 20% of Farms	Middle 20% of Farms	2 <sup>nd</sup> Worst 20% of Farms	Worst 20% of Farms
Swollen hocks	0 - 3.8%	3.9 - 8.8%	8.9 - 15.4%	15.5 - 25.7%	25.8 - 60.8%
Hock hair loss	0 - 14.8%	14.9 - 26.9%	27 - 41.7%	41.8 - 53.1%	53.2 - 81.1%
Hock wounds	0 - 1%	1.1 - 3.4%	3.5 - 6.9%	7 - 12.2%	12.3 - 100%
Neck lesions	0%	0%	0 - 1%	1.1 - 4.1%	4.2 - 47.8%
Broken tails	0%	0%	0 - 1%	1.1 - 5%	5 - 50%
Rotated hind claws	0 - 6.7%	6.8 - 14.6%	14.7 - 22%	22.1 - 34.2%	34.3 - 73.7%
Arched backs	0%	0 - 1%	1.1 - 2.6%	2.7 - 5.6%	5.7 - 21.4%
Dirty udders	0%	0 - 1%	1.1 - 2.7%	2.8 - 6.9%	7 - 48%
Dirty hind limbs	0 - 2.9%	3 - 8.7%	8.8 - 18.2%	18.3 - 36.1%	36.2 - 94.4%

Measure 1 or 2 of your milking cow stalls. Identify risks to your cows by finding which group your farm fits into for each measurement.

Stall Sizes	Worst 20% of Farms	2 <sup>nd</sup> Worst 20% of Farms	Middle 20% of Farms	2 <sup>nd</sup> Best 20% of Farms	Best 20% of Farms
Stall length	54 - 64 in	65 - 68 in	69 - 70 in	71 - 72 in	73 - 86 in
Stall width	36 - 44 in	45 - 46 in	47 - 48 in	49 - 51 in	52 - 57 in
Tie-rail height	30 - 35 in	36 - 37 in	38 - 39 in	40 - 42 in	43 - 52 in
Tie-chain length	14 - 18 in	19 - 20 in	21 - 22 in	23 - 26 in	27 - 45 in

## Change Equation...

$$C = D \times V \times F > R$$

**C**hange occurs when **D**issatisfaction with the status quo *times* **V**ision of something better *times* the energy to take the **F**irst step *is greater than* the **R**esistance.

Borrowed from Dr. Ken Sanderson, DVM

## Lots and lots of Homework...

Where did the comfort standards come from?



Dr. Neil Anderson (DVM)  
Ontario Ministry of Agriculture Food and Rural Affairs (OMAFRA)

Dr. Anderson and others in the Animal Behavior/Cow Comfort arena at Univ. of British Columbia did the industry a big favor by applying video and other technologies to determine what cow comfort truly is. Dr. Anderson applied this knowledge to the tiestall as well as the freestall.



Ouch! Neck Compression

Results...

Junction of old and new – front view. Note height and forward position of neck rail



Results...

World of difference – steel relative to bone, cartilage and soft tissue!

## Costs after all the dust settled:

Stalls/Hardware	-	\$12,327
Labor (Histand's)	-	11,540
Concrete/Sand/Gravel	-	2,870
Steel/I-Beams	-	684
Nuts/Bolts	-	405
Mattresses	-	10,080
		<hr/>
Results...	Total	\$37,929

A Possibility for Meekers?





# Barn Renovation Payback Estimator

Howland (7/'06)

Howland (11/'09)

	Before Renovation	After Renovation	
<b>Annual Milk Income</b>			
Milking Cows	80	74	← Actual with Cow Reduction
Av Daily Production	70	85	
Milk Price less Hauling/Adver	\$ 12.00	\$ 12.45	← Credit for Qual. Premium
	\$ 245,280	\$ 285,833	
<b>Involuntary Cull Rate</b>	32%	15%	
Cull Price	\$ 600	\$ 600	
Dairy Price	\$ 1,600	\$ 1,600	
Average Days Cows are Dry	60	60	
Calving Interval (months)	13.50	13.50	
Heifer Age to Freshen (months)	25.00	25.00	
Heifer Cull Rate/Death Loss (% / year)	5.0%	5.0%	
<b>Milking and Dry Cows on Farm</b>	94	87	
Involuntarily Culled	30	13	
Heifers Entering Barn Each Year	36	33	
Dairy Cows Sold	6	20	
Cull Income	\$ 17,988	\$ 7,800	
Dairy Cow Income	\$ 9,754	\$ 32,595	
<b>Total Income</b>	\$ 273,022	\$ 326,228	
<b>Change in Income with Renovations</b>		\$ 53,205	2009 Feed Prices ↓
Daily Feed Cost	\$ 5.53	\$ 6.72	Feed Cost per cwt \$ 7.90
Machine and Overhead Cost per Cow	\$ 1.00	\$ 1.00	Cost per cow per day
Additional Heifers on Farm	\$ 4,870		Heifer Raising Cost \$ 1,800
Additional Labor	\$ 1,916		Labor Rate \$ 15.00
<b>Total Cow Variable Costs</b>	\$ 197,462	\$ 208,382	
<b>Change in Expenses</b>		\$ 10,920	
<b>Net Change in Farm Income</b>		\$ 42,285	
<b>Years to Pay Back Investment</b>		0.95	Investment Cost \$ 40,000
<b>Labor Saved</b>	<b>Minutes/Day</b>		
Milking	(7.83)	2.41 minutes/cow plus .11 x lbs of milk	
Barn Chores	18.00	Average Minutes Spent on Chores per Cow	3.00
Heifers	10.82	Average Minutes Spent on Chores per Heifer	2.00
Total	20.99		
<b>Rate</b>	\$ 15.00		
Annual Savings	\$ 1,915.62		



# Barn Renovation Payback Estimator

Howland (7/'06)

Howland (11/'09)

	Before Renovation	After Renovation	
<b>Annual Milk Income</b>			
Milking Cows	100	100	← Scaled to 100 Cows
Av Daily Production	70	85	
Milk Price less Hauling/Adver	\$ 12.00	\$ 12.45	← Credit for Qual. Premium
	\$ 306,600	\$ 386,261	
<b>Involuntary Cull Rate</b>	32%	15%	
<b>Cull Price</b>	\$ 600	\$ 600	
<b>Dairy Price</b>	\$ 1,600	\$ 1,600	
<b>Average Days Cows are Dry</b>	60	60	
<b>Calving Interval (months)</b>	13.50	13.50	
<b>Heifer Age to Freshen (months)</b>	25.00	25.00	
<b>Heifer Cull Rate/Death Loss (% / year)</b>	5.0%	5.0%	
<b>Milking and Dry Cows on Farm</b>	117	117	
<b>Involuntarily Culled</b>	37	18	
<b>Heifers Entering Barn Each Year</b>	45	45	
<b>Dairy Cows Sold</b>	8	28	
<b>Cull Income</b>	\$ 22,486	\$ 10,540	
<b>Dairy Cow Income</b>	\$ 12,192	\$ 44,047	
<b>Total Income</b>	\$ 341,278	\$ 440,848	
<b>Change in Income with Renovations</b>		\$ 99,570	2009 Feed Prices ↓
<b>Daily Feed Cost</b>	\$ 5.53	\$ 6.72	Feed Cost per cwt \$ 7.90
<b>Machine and Overhead Cost per Cow</b>	\$ 1.00	\$ 1.00	Cost per cow per day
<b>Additional Heifers on Farm</b>	\$ -		Heifer Raising Cost \$ 1,800
<b>Additional Labor</b>	\$ (2,509)		Labor Rate \$ 15.00
<b>Total Cow Variable Costs</b>	\$ 235,836	\$ 281,598	
<b>Change in Expenses</b>		\$ 45,762	
<b>Net Change in Farm Income</b>		\$ 53,808	
<b>Years to Pay Back Investment</b>		0.74	Investment Cost \$ 40,000
<b>Labor Saved</b>	<b>Minutes/Day</b>		
Milking	(27.50)	2.41 minutes/cow plus .11 x lbs of milk	
Barn Chores	-	Average Minutes Spent on Chores per Cow	3.00
Heifers	-	Average Minutes Spent on Chores per Heifer	2.00
<b>Total</b>	(27.50)		
<b>Rate</b>	\$ 15.00		
<b>Annual Savings</b>	\$ (2,509.38)		



Albano (1/'10)      Howland (11/'09)

	Before Renovation	After Renovation	
<b>Annual Milk Income</b>			
Milking Cows	100	100	← Scaled to 100 Cows
Av Daily Production	68	85	
Milk Price less Hauling/Adver	\$ 12.00	\$ 12.65	← Credit for Qual. Premium
	\$ 297,840	\$ 392,466	
<b>Involuntary Cull Rate</b>	44%	15%	
Cull Price	\$ 600	\$ 600	
Dairy Price	\$ 1,600	\$ 1,600	
Average Days Cows are Dry	60	60	
Calving Interval (months)	13.50	13.50	
Heifer Age to Freshen (months)	25.00	25.00	
Heifer Cull Rate/Death Loss (% / year)	5.0%	5.0%	
<b>Milking and Dry Cows on Farm</b>	117	117	
Involuntarily Culled	52	18	
Heifers Entering Barn Each Year	45	45	
Dairy Cows Sold	(6)	28	
<b>Cull Income</b>	\$ 30,918	\$ 10,540	
<b>Dairy Cow Income</b>	\$ (10,293)	\$ 44,047	
<b>Total Income</b>	\$ 318,464	\$ 447,053	
<b>Change in Income with Renovations</b>		\$ 128,589	2009 Feed Prices ↓
<b>Daily Feed Cost</b>	\$ 5.37	\$ 6.72	Feed Cost per cwt \$ 7.90
<b>Machine and Overhead Cost per Cow</b>	\$ 1.00	\$ 1.00	Cost per cow per day
<b>Additional Heifers on Farm</b>	\$ -		Heifer Raising Cost \$ 1,800
<b>Additional Labor</b>	\$ (2,844)		Labor Rate \$ 15.00
<b>Total Cow Variable Costs</b>	\$ 229,734	\$ 281,598	
<b>Change in Expenses</b>		\$ 51,863	
<b>Net Change in Farm Income</b>		\$ 76,725	
<b>Years to Pay Back Investment</b>		0.52	Investment Cost \$ 40,000
<b>Labor Saved</b>	<b>Minutes/Day</b>		
Milking	(31.17)	2.41 minutes/cow plus .11 x lbs of milk	
Barn Chores	-	Average Minutes Spent on Chores per Cow	3.00
Heifers	-	Average Minutes Spent on Chores per Heifer	2.00
<b>Total</b>	<b>(31.17)</b>		
<b>Rate</b>	\$ 15.00		
<b>Annual Saving</b>	\$ (2,843.96)		



Albano (7/'10)      Howland (11/'09)

	Before Renovation	After Renovation		
<b>Annual Milk Income</b>				
Milking Cows	100	100	←	Scaled to 100 Cows
Av Daily Production	74	85		
Milk Price less Hauling/Adver	\$ 12.00	\$ 12.65	←	Credit for Qual. Premium
	\$ 324,120	\$ 392,466		
<b>Involuntary Cull Rate</b>	35%	15%		
Cull Price	\$ 600	\$ 600		
Dairy Price	\$ 1,600	\$ 1,600		
Average Days Cows are Dry	60	60		
Calving Interval (months)	13.50	13.50		
Heifer Age to Freshen (months)	25.00	25.00		
Heifer Cull Rate/Death Loss (% / year)	5.0%	5.0%		
Milking and Dry Cows on Farm	117	117		
Involuntarily Culled	41	18		
Heifers Entering Barn Each Year	45	45		
Dairy Cows Sold	4	28		
Cull Income	\$ 24,594	\$ 10,540		
Dairy Cow Income	\$ 6,571	\$ 44,047		
<b>Total Income</b>	\$ 355,284	\$ 447,053		
<b>Change in Income with Renovations</b>		\$ 91,769		2009 Feed Prices ↓
Daily Feed Cost	\$ 5.85	\$ 6.72	Feed Cost per cwt	\$ 7.90
Machine and Overhead Cost per Cow	\$ 1.00	\$ 1.00	Cost per cow per day	
Additional Heifers on Farm	\$ -		Heifer Raising Cost	\$ 1,800
Additional Labor	\$ (1,840)		Labor Rate	\$ 15.00
<b>Total Cow Variable Costs</b>	\$ 248,039	\$ 281,598		
<b>Change in Expenses</b>		\$ 33,559		
<b>Net Change in Farm Income</b>		\$ 58,210		
<b>Years to Pay Back Investment</b>		0.69	Investment Cost	\$ 40,000
<b>Labor Saved</b>	<b>Minutes/Day</b>			
Milking	(20.17)	2.41 minutes/cow plus .11 x lbs of milk		
Barn Chores	-	Average Minutes Spent on Chores per Cow		3.00
Heifers	-	Average Minutes Spent on Chores per Heifer		2.00
Total	(20.17)			
<b>Rate</b>	\$ 15.00			
Annual Saving	\$ (1,840.21)			



# Barn Renovation Payback Estimator

Albano (7/'11)

Howland (11/'09)

	Before Renovation	After Renovation		
<b>Annual Milk Income</b>				
Milking Cows	100	100	←	Scaled to 100 Cows
Av Daily Production	87.3	85		
Milk Price less Hauling/Adver	\$ 12.00	\$ 12.65	←	Credit for Qual. Premium
	\$ 382,374	\$ 392,466		
<b>Involuntary Cull Rate</b>	33%	15%		
<b>Cull Price</b>	\$ 600	\$ 600		
<b>Dairy Price</b>	\$ 1,600	\$ 1,600		
Average Days Cows are Dry	60	60		
Calving Interval (months)	13.00	13.50		
Heifer Age to Freshen (months)	24.00	25.00		
Heifer Cull Rate/Death Loss (% / year)	5.0%	5.0%		
<b>Milking and Dry Cows on Farm</b>	118	117		
<b>Involuntarily Culled</b>	39	18		
<b>Heifers Entering Barn Each Year</b>	49	45		
<b>Dairy Cows Sold</b>	10	28		
<b>Cull Income</b>	\$ 23,342	\$ 10,540		
<b>Dairy Cow Income</b>	\$ 16,323	\$ 44,047		
<b>Total Income</b>	\$ 422,039	\$ 447,053		
<b>Change in Income with Renovations</b>		\$ 25,014		2009 Feed Prices ↓
<b>Daily Feed Cost</b>	\$ 6.90	\$ 6.72	Feed Cost per cwt	\$ 7.90
<b>Machine and Overhead Cost per Cow</b>	\$ 1.00	\$ 1.00	Cost per cow per day	
<b>Additional Heifers on Farm</b>	\$ 7,216		Heifer Raising Cost	\$ 1,800
<b>Additional Labor</b>	\$ 1,848		Labor Rate	\$ 15.00
<b>Total Cow Variable Costs</b>	\$ 297,294	\$ 281,598		
<b>Change in Expenses</b>		\$ (15,696)		
<b>Net Change in Farm Income</b>		\$ 40,710		
<b>Years to Pay Back Investment</b>		0.98	Investment Cost	\$ 40,000
<b>Labor Saved</b>	<b>Minutes/Day</b>			
Milking	4.22	2.41 minutes/cow plus .11 x lbs of milk		
Barn Chores	-	Average Minutes Spent on Chores per Cow		3.00
Heifers	16.04	Average Minutes Spent on Chores per Heifer		2.00
Total	20.25			
<b>Rate</b>	\$ 15.00			
Annual Saving	\$ 1,848.03			



# Barn Renovation Payback Estimator

Meeker (8/11)

Howland (11/09)

Before Renovation

After Renovation

**Annual Milk Income**

Milking Cows	100	100
Av Daily Production	64	85
Milk Price less Hauling/Adver	\$ 12.00	\$ 12.65
	\$ 280,320	\$ 392,466

← Scaled to 100 Cows  
← Credit for Qual. Premium

**Involuntary Cull Rate**

<b>Cull Price</b>	\$ 600	\$ 600
<b>Dairy Price</b>	\$ 1,600	\$ 1,600
<b>Average Days Cows are Dry</b>	60	60
<b>Calving Interval (months)</b>	13.50	13.50
<b>Heifer Age to Freshen (months)</b>	25.00	25.00
<b>Heifer Cull Rate/Death Loss (% / year)</b>	5.0%	5.0%

**Milking and Dry Cows on Farm**

<b>Involuntarily Culled</b>	56	18
<b>Heifers Entering Barn Each Year</b>	45	45
<b>Dairy Cows Sold</b>	(11)	28

<b>Cull Income</b>	\$ 33,728	\$ 10,540
<b>Dairy Cow Income</b>	\$ (17,789)	\$ 44,047

<b>Total Income</b>	\$ 296,260	\$ 447,053
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<b>Change in Income with Renovations</b>		\$ 150,793
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<b>Daily Feed Cost</b>	\$ 5.06	\$ 6.72
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Feed Cost per 2009 Feed Prices ↓

<b>Machine and Overhead Cost per Cow</b>	\$ 1.00	\$ 1.00
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Cost per cow per day

<b>Additional Heifers on Farm</b>	\$ -	
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Heifer Raising Cost \$ 1,800

<b>Additional Labor</b>	\$ (3,513)	
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Labor Rate \$ 15.00

<b>Total Cow Variable Costs</b>	\$ 217,531	\$ 281,598
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<b>Change in Expenses</b>		\$ 64,067
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<b>Net Change in Farm Income</b>		\$ 86,727
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**Years to Pay Back Investment**

0.46

Investment Cost \$ 40,000

**Labor Saved**

**Minutes/Day**

Milking	(38.50)	2.41 minutes/cow plus .11 x lbs of milk
Barn Chores	-	Average Minutes Spent on Chores per Cow
Heifers	-	Average Minutes Spent on Chores per Heifer
<b>Total</b>	<b>(38.50)</b>	

3.00  
2.00

<b>Rate</b>	\$ 15.00
<b>Annual Savings</b>	\$ (3,513.13)



Howland (11/09)    Howland (7/10)

	Before Renovation	After Renovation	
<b>Annual Milk Income</b>			
Milking Cows	100	100	← Scaled to 100 Cows
Av Daily Production	85	92	
Milk Price less Hauling/Adver	\$ 12.65	\$ 12.65	← Credit for Qual. Premium
	\$ 392,466	\$ 424,787	
<b>Involuntary Cull Rate</b>	15%	15%	
<b>Cull Price</b>	\$ 600	\$ 600	
<b>Dairy Price</b>	\$ 1,600	\$ 1,600	
Average Days Cows are Dry	60	60	
Calving Interval (months)	13.50	13.50	
Heifer Age to Freshen (months)	25.00	25.00	
Heifer Cull Rate/Death Loss (% / year)	5.0%	5.0%	
<b>Milking and Dry Cows on Farm</b>	117	117	
Involuntarily Culled	18	18	
Heifers Entering Barn Each Year	45	45	
Dairy Cows Sold	28	28	
<b>Cull Income</b>	\$ 10,540	\$ 10,540	
<b>Dairy Cow Income</b>	\$ 44,047	\$ 44,047	
<b>Total Income</b>	\$ 447,053	\$ 479,374	
<b>Change in Income with Renovations</b>		\$ 32,321	2009 Feed Prices ↓
<b>Daily Feed Cost</b>	\$ 6.72	\$ 7.27	Feed Cost per cwt \$ 7.90
<b>Machine and Overhead Cost per Cow</b>	\$ 1.00	\$ 1.00	Cost per cow per day
<b>Additional Heifers on Farm</b>	\$ -		Heifer Raising Cost \$ 1,800
<b>Additional Labor</b>	\$ (1,171)		Labor Rate \$ 15.00
<b>Total Cow Variable Costs</b>	\$ 280,426	\$ 301,782	
<b>Change in Expenses</b>		\$ 21,356	
<b>Net Change in Farm Income</b>		\$ 10,965	
<b>Years to Pay Back Investment</b>		3.65	Investment Cost \$ 40,000
<b>Labor Saved</b>	<b>Minutes/Day</b>		
Milking	(12.83)	2.41 minutes/cow plus .11 x lbs of milk	
Barn Chores	-	Average Minutes Spent on Chores per Cow	3.00
Heifers	-	Average Minutes Spent on Chores per Heifer	2.00
<b>Total</b>	<b>(12.83)</b>		
<b>Rate</b>	\$ 15.00		
<b>Annual Saving</b>	\$ (1,171.04)		

# Herd Demographic, Production and Economic Changes over Time

Current Herd Makeup	<u>Howland</u> (7/'06)	<u>Howland</u> (7/'10)	<u>Meeker</u> (8/'11)	<u>Albano</u> (1/'10)	<u>Albano</u> (7/'10)	<u>Albano</u> (6/'11)
Lactation 1	44%	→ 33%	48%	44%	→ 35%	→ 33%
Lactation 2	27%	24%	27%	31%	36%	→ 30%
Lactation 3+	29%	→ 43%	25%	25%	→ 29%	→ 37%
<hr style="border-top: 1px dashed #000;"/>						
<b>Herd Turnover</b>	(80 cows)	(74 cows)	(41 cows)	(115 cows)	(133 cows)	(138 cows)
<b>Lactation 1</b>						
Entered Herd	42	39	15	61	53	50
Total Left Herd	13	18	7	7	12	9
Dairy Sales	5	→ 10				
Low Production Culls				1	4	
Reproduction Culls	3	2		1	3	2
Injury/oth Culls	2	→	6	1	3	2
(Died)	2	1	1	2	2	3
Mastitis Culls	1	5		2		1
Feet and Leg Culls						1
<b>Lactation 2</b>						
Entered Herd						1
Total Left Herd	9	12	5	11	12	12
Dairy Sales		→ 9				→ 2
Low Production Culls				2	2	1
Reproduction Culls	3	→		1	1	3
Injury/oth Culls	4	→	4	2	2	
(Died)			1	6	7	5
Mastitis Culls	2	3				
Feet and Leg Culls						1
<b>Lactation 3+</b>						
Entered Herd						
Total Left Herd	21	→ 13	10	24	24	28
Dairy Sales	2	→ 4				1
Low Production Culls				2	1	0
Reproduction Culls	5	→		4	4	6
Injury/oth Culls	5	→ 1	10	2	1	5
(Died)		2		14	18	12
Mastitis Culls	9	5		1	1	4
Feet and Leg Culls		1		1	1	

## Herd Demographic, Production and Economic Changes over Time

	<u>Howland</u> (July '10)	<u>Howland</u> (July '06)	<u>Meeker</u> (Aug. '11)	<u>Albano</u> (Jan. '10)	<u>Albano</u> (July '10)	<u>Albano</u> (June '11)
<b>Production</b>						
Energy Corrected Milk (ECM)	92.3 lbs. ←	69.9 lbs.	64.0 lbs.	68.0 lbs. →	74.5 lbs. →	87.3 lbs.
150 Day Corrected ECM	95.2 lbs.	78.6 lbs.	65.4 lbs.	70.2 lbs.	75.8 lbs.	91.2 lbs.
Somatic Cell Count (SCC)	50,000	185,000	338,000	476,000	384,000	418,000
<b>Unrealized Net Operating Income/100 milking cows basis</b> (money left on table compared with Howland 11/09)						
<b>Total</b>	\$10,965	(\$53,808)	(\$86,727)	(\$76,725)	(\$58,210)	(\$40,710)
<b>Due to Net Cow Sales</b>	-----	(\$19,909)	(\$38,648)	(\$33,962)	(\$23,422)	(\$14,922)
<b>Due to Quality Premium</b>	-----	(\$13,961)	(\$20,166)	(\$16,133)	(\$17,556)	(\$20,711)
<b>Due to ECM Production</b>	\$10,965	(\$19,938)	(\$27,913)	(\$26,630)	(\$17,232)	-----

\*More milk (87.3 lbs.) than the 11/09 Howland base comparison (85 lbs.). The \$5077 differential not accounted for is extra expense.

Only glimpse into “new stall” effect separate from the “improved dry cow program” effect at Albanos:

	Old Stalls			New Stalls			(New - Old) 150 Day Milk Difference
	Milk Lbs.	DIM	Milk Lbs.	Milk Lbs.	DIM	Milk Lbs.	
Jan.	67.6	202	75.4	78.5	155	79.3	3.9
Feb.	67.6	192	73.9	77.4	159	78.8	4.9
March	70.5	154	71.1	70.5	190	76.5	5.4
May	73.8	162	75.6	78.6	171	81.8	6.2
June	77.5	165	78.4	85.3	160	86.8	8.1
July	70.0	161	71.7	74.7	147	74.4	2.7
Aug.	76.6	165	76.6	80.6	177	84.6	8.0
Sept.	68.3	189	74.1	70.9	210	79.9	5.8
Oct.	67.1	207	75.6	70.9	214	80.5	4.9
Nov.	62.8	209	71.6	71.1	189	77.0	5.4
Dec.	68.1	209	77.0	75.4	200	82.9	5.9
							Avg. 5.6
							Stan. Dev. 1.6

All stalls renovated by February 2011. Same numbers as above for the entire milking herd:

**May 2011** 92.1 Lbs Milk 176 DIM 96.0 Lbs. 150 Day Milk

**June 2011** 87.3 Lbs Milk 176 DIM 91.2 Lbs. 150 Day Milk

Other interesting numbers stumbled into...

Albano 7-10

PRODUCTION BY LACTATION SUMMARY

	Number of Cows	Age	Summit Milk	Peak Milk	Projected ME 305 Day			Difference From		
					Milk	Fat	Protein	Milk	Fat	Protein
1st Lact	55	26.0	75	80	↑ 24590	1120	743	+1089	+0	+40
2nd Lact	55	40.0	94	100	24005	1138	716	+699	+31	+20
3rd+ Lact	45	65.0	95	101	22229	1077	661	-1085	-42	-37
All Lacts	155	42.3	88	93	23685	1114	709	+308	-2	+10

Albano 6-11

PRODUCTION BY LACTATION SUMMARY

	Number of Cows	Age	Summit Milk	Peak Milk	Projected ME 305 Day			Difference From		
					Milk	Fat	Protein	Milk	Fat	Protein
1st Lact	53	26.0	83	90	#2 27978	1230	828	+1143	+9	+35
2nd Lact	45	40.0	98	107	#1 28762	1269	852	+1927	+28	+53
3rd+ Lact	57	65.0	111	120	#3 26833	1185	789	-347	-67	-12
All Lacts	155	44.4	98	106	27796	1226	821	+838	-12	+23

Howland 7-10

PRODUCTION BY LACTATION SUMMARY

43% of herd doing this

	Number of Cows	Age	Summit Milk	Peak Milk	Projected ME 305 Day			Difference From		
					Milk	Fat	Protein	Milk	Fat	Protein
1st Lact	30	27.0	83	88	27108	963	823	-751	-50	-7
2nd Lact	18	41.0	107	111	29780	1052	897	+1672	+36	+56
3rd+ Lact	38	67.0	118	125	30116	1082	883	+2448	+71	+59
All Lacts	86	47.6	103	109	28981	1034	864	+1142	+20	+35

PRODUCTION BY LACTATION SUMMARY

Meeker 8-11

	Number of Cows	Age	Summit Milk	Peak Milk	Projected ME 305 Day			Difference From		
					Milk	Fat	Protein	Milk	Fat	Protein
1st Lact	19	23.0	69	73	#1 24459	914	707	+3973	+161	+127
2nd Lact	13	39.0	70	74	#3 20771	781	578	-233	-19	-30
3rd+ Lact	8	65.0	91	98	#2 21963	858	611	+2499	+35	+49
All Lacts	40	36.6	74	78	22853	863	649	+2150	+72	+55

# Albano Farms Lameness Scores 6/28/11

## Legend

R = Rotated Foot (if coded "R" only, not considered lame)

S = Shifting weight from foot to foot

P – Perching claw on curb

FF = Foot Forward (resting with weight off)

PT = Push Test (to see want to unevenly redistribute weight when moved side-to-side)

### Old Barn

800 – S

855 – R

*Judo* – R

1031 – R

1128 – R

831 – P

766 – R

659 – S

883 – R

901 – S

941 – R, S

973 – Injured/deformed hoof

### New Barn Southeast

916 – remained on knees

980 – S

1001 – could not readily rise... front end 1<sup>st</sup>

1022 – R

948 – R

903 – S, R

675 – S

797 – R, S

696 – R, S

921 – R

867 – S

968 – R, S

760 – S

### New Barn Northeast

*Jorja* – R

92A – FF

693 – S, FF

924 – R

956 – S, R (injured?)

1008 – FF

942 – R

755 – R

986 – R

976 – S, R

872 – Front legs crossed

1053 – swollen

824 – R

902 – R

455 – S

1064 – S

772 – R, S

844 – R

• I put in all of the individuals coded for "R" or rotated foot. If only rotated and no other problem, they are not considered lame currently. Rotation may be evidence of a past problem. They are in *italics* for easy viewing

Total = 26 of 141 – 18%

# Albano Farms Lameness Scores 1/28/10

## Legend

R = Rotated Foot (if coded "R" only, not considered lame)

S = Shifting weight from foot to foot

P = Perching claw on curb

FF = Foot Forward (resting with weight off)

PT = Push Test (to see want to unevenly redistribute weight when moved side-to-side)

### Old Barn South - 7 of 21

867 - S,R

902 - S

800 - S

Cow left of 859 - S,PT,FF

Cow "Treated" - front left knee injury

980 - S

962 - S,R

-----

Cow right of 936 - R

824 - R

### Old Barn North - 8 of 21

797 - S,R

781 - FF,S,R

888 - FF,S

797 - S,FF

881 - S

693 - S,FF

737 - FF

727 - injured right rear

-----

887 - R

862 - R

### New Barn Southeast - 10 of 49

932 - S,FF

772 - S,R

898 - S,R

766 - S, FF,R

760 - S,R

814 - S

899 - S (holding leg up - heel wart?)

846 - R++ (standing on back of claw)

885 - FF

-----

778 - R

892 - R

839 - R

696 - R

808 - refused to stand up

### New Barn Northeast - 8 of 34

901 - FF

871 - S

861 - S

512 - S, FF

677 - FF

825 - FF,R

838 - S, P, R

942 - R++, both rear feet

-----

196 - R

861 - R

840 - R

Cow right of 978 - R

615 - R

966 - R

Total = 33 of 125 - 26%