



Brookdale Fruit Farm

Irrigation & Row Crop Supply

Hollis NH (603) 465 2240

Orchard Irrigation



By Trevor Hardy
Brookdale Fruit Farm Inc



Hollis NH (603) 465 2240

-
- A circular wooden sign with a weathered, yellowish-brown surface. The text "Brookdale Fruit Farm" is arched across the top in a dark, serif font. Below this, the words "CRISP APPLES" are printed in a smaller, sans-serif font. In the center of the sign is a detailed illustration of a woven basket filled with several green apples, some with leaves. Below the basket, the text "C. E. HARDY & SON" is printed in a small, sans-serif font. The bottom of the sign features the text "HOLLIS, NEW HAMPSHIRE" in a large, arched, serif font. The sign is mounted on a light-colored wall.



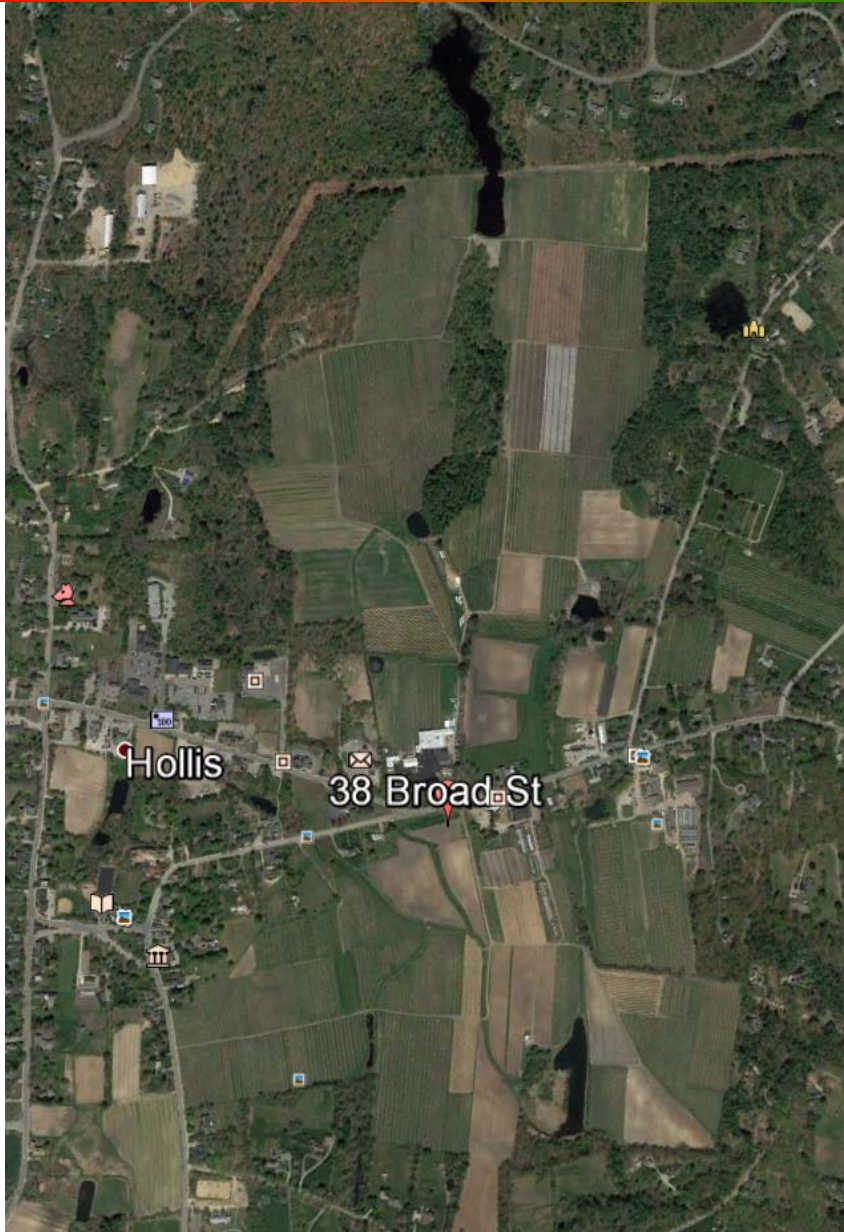


Brookdale

Brookdale Fruit Farm

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Brookdale Supplies

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Types of drip Systems

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- Permanent systems (Left outside all year)
 - Ram Tubing or Orchard Tubing
 - Installed below and above ground
 - Used on apples, blueberries, cherries, peaches...
- Annual systems (Pick up before winter)
 - Drip Tape
 - Yearly application (Tomatoes or Vegetables)
 - Above ground system
 - Ability to drive over lines Does Not Restrict Field Access



Why Drip

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- Delivers water directly to plant
 - Consistent amounts throughout field
 - Not weather dependant
- Incorporate fertilizers and chemicals into system
- 1 time set up per year
- Start it and leave it operating design
- Only waters plant, not weeds
- Conserves water uses $\frac{1}{4}$ amount of water compared to overhead
- Requires less pump capacity and fuel to operate
Saves \$\$\$\$\$\$



Orchard Irrigation

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Need to know

- # acres to irrigate at once
- Water source
- Max Row length
- Elevation and distance from source
- 10 year view

1 acre of high density orchard 12' rows

2 foot tubing approx. 20 gpm

Size Pipe Inches	Flow Gal per Minut
1/2	3
3/4	9
1	15
1 1/2	30
2	80
3	150
4	450

1/2

3

3/4

9

1

15

1 1/2

30

2

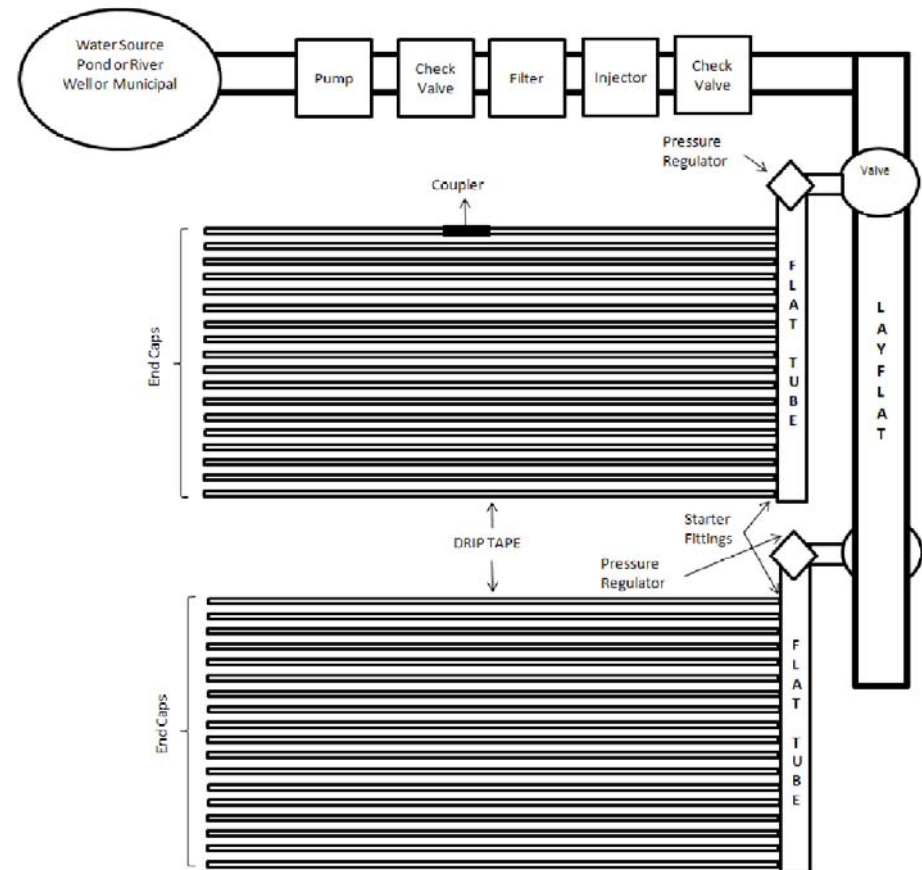
80

3

150

4

450





System Design







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Brookdale Fruit Farm Irrigation and Row Crop Supplies					Date	12/27/2016
38 Broad St PO Box 389 Hollis NH 03049 603 465 2240						
Customer Irrigation Sales Slip					Prepared by	
Name					Trevor Hardy	
Address					603 860 1657	
Contact						
	Quantity	Units	Description	Unit Price	Total	
1					\$0.00	
2	3400	feet	2 inch poly pipe 100 psi	\$0.97	\$3,298.00	
3	filter	1 assembly	2 inch single disc filter built to backflush on cam locks	\$490.00	\$490.00	
4	injector	1 assembly	2 x 3/4 fertilizer injector	\$305.00	\$305.00	
5	fittings	30 feet	2 inch red layflat hose connect filter and injector well	\$1.25	\$37.50	
6		4 each	2 inch cam lock c	\$7.50	\$30.00	
7		5 each	2 inch cam lock e	\$4.50	\$22.50	
8		60 each	2 inch super clamps 56-59	\$5.00	\$300.00	
9		12 each	dravity drain assembly	\$38.00	\$456.00	
10		15 each	2 inch insert caps	\$2.25	\$33.75	
11		20 each	2 inch couplers	\$1.55	\$31.00	
12		10 each	2 inch eblows	\$1.85	\$18.50	
13		5 each	2 inch barbed tee	\$4.00	\$20.00	
14					\$0.00	
15	39	coils	24 inch o.53 spacing orchard tubing	\$155.00	\$6,045.00	
16	200	each	xpando starter with grommet	\$1.60	\$320.00	
17	200	each	figure 8 end cap	\$0.20	\$40.00	
18	100	each	ram coupler	\$0.35	\$35.00	
19					\$0.00	
20	3	assembly	2 way pvc valve tower with pressure gauge and air vent	\$175.00	\$525.00	
21	1	assembly	3 way pvc valve tower with pressure gauge and air vent	\$225.00	\$225.00	
22	1	assembly	2 way flow diverter with zone b threaded	\$110.00	\$110.00	
23					\$0.00	
24					\$0.00	
25					\$0.00	
26					\$0.00	
27					\$0.00	
28					\$0.00	
29					\$0.00	
30					\$0.00	
31					\$0.00	
32					\$0.00	
33					\$0.00	
34					\$0.00	
35					\$0.00	
36					\$0.00	
Notes:				Total	\$12,342.25	



	3 way valve tower	crop	FIELD	# rows	LENGTH	ROW FT	spacing	flow	gpm
	2 way valve tower	apples	A	6	420	2520	2	0.53	11.1
		apples	B	11	210	2310	2	0.53	10.2
		apples	C1	8	500	4000	2	0.53	17.7
	well	apples	C2	10	300	3000	2	0.53	13.3
		apples	D1	10	450	4500	2	0.53	19.9
	main line	apples	D2	10	360	3600	2	0.53	15.9
		xmas	E	42	100	4200	2	0.53	18.6
	sub main	xmas	F	40	150	6000	2	0.53	26.5
		apples	G	7	250	1700	2	0.53	7.5
	gravity drain	xmas	H	42	160	6720	2	0.53	29.7
				186 totals		38550			



Pressure Pump

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Filter assemblies

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1 2 inch disc filter on 2 inch system	\$490.00	1.5acres
2 2inch disc filters on 2 inch system	\$1,200.00	3 acres
2 3inch disc filters on 3 inch system	\$1,500.00	5 acres
3 3inch disc filters on 3 inch system	\$2,200.00	8 acres





Filter System

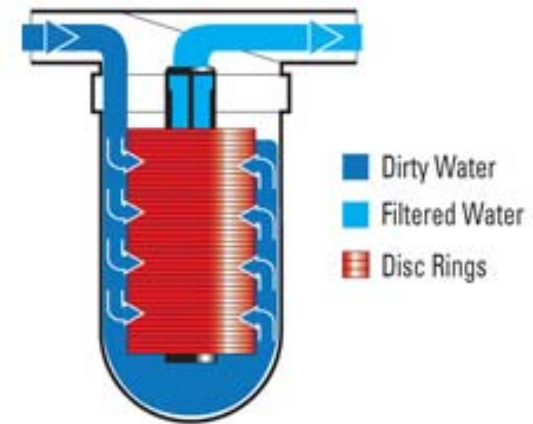
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Orchard tubing requires filtering to 100 micron or 150 mesh to prevent clogging. Disc filters are best option even from well or city water





Fertilizer Injectors

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- Mazzei injector
 - Venturi action
 - Regulated by flow of water
- Mix Rite or Dosatron
 - Pump Style
 - Varying flow rates, Constant feed, precise measure
- Only use WATER SOLUBLE FERTILIZER





Fertilizer Injection

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Assembly comes with:
camlocks, pressure gauge,
gate valve on and off,
fertilizer barrel mixing valve on
garden hose fitting, injector
isolation valves

Pipe	Injector Size	Flow GPM
1"	1/2 inch	2 to 9
2"	3/4 inch	9 to 50
2"	1 inch	16 to 80
3"	1 inch	16 to 180
3"	1.5 inch	34 to 350



Mazzei Injectors work off of FLOW RATE

NEED CORRECT FLOW TO MAKE INJECTOR WORK

Note: 24 inch orchard tubing 0.61 gph per dripper

24 inch 12 foot row spacing is 18 GPM per acre



Terminology

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- Main line
 - High pressure line pushes water to field
- Valve or zone station
 - Taps into main line
 - Reduces water pressure with regulator
 - Directs water to specific location of field
- Header pipe
 - Low pressure line that all drip lines connect into





Orchard Tubing

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Black poly pipe is sub main that is connected to valve station pictured on the right. The orchard tubing for tall spindle applications hanging from a wire requires a CNL (check valve dripper) That way all drippers emit the same amount of water and work better with fertigation for feeding the trees fertilizer. The 3rd insert fitting pictured will be used to install tube into poly header. Use a $\frac{3}{4}$ inch drill bit to make hole. Insert rubber gromet in hole, and push tubing on barb. This fitting can handle 80 PSI



Orchard Tubing

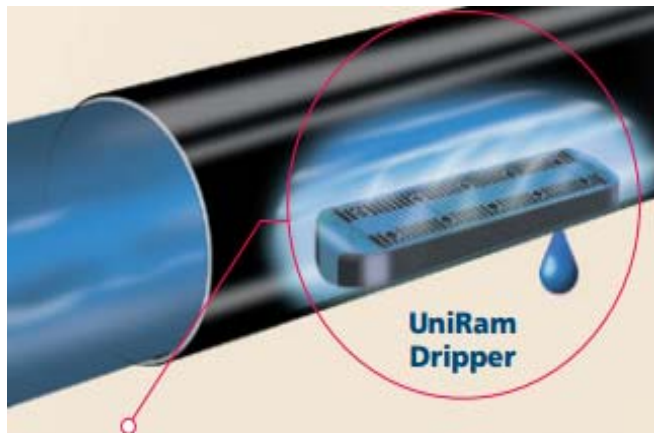
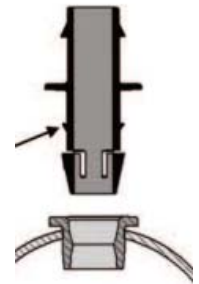
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Ag Irrigation



Planting Spacing	Row Length	Dripper Spacing	GPM per Acre
3' x 12'	<500	12 inch spacing	36 gpm
3' x 12'	500+	24 inch spacing	18 gpm
4' x 12'	<500	24 inch spacing	18 gpm
4' x 12'	500 +	24 inch spacing	18 gpm
4' x 14'	<500	24 inch spacing	18 gpm
4' x 14'	500+	24 inch spacing	18 gpm
6' x 14'	500+	36 inch spacing	11 gpm



Field Layout

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Field Valve Station

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Trench prep Flat

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Drip line lead

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Gravity Drain

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Orchard Tubing

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Water can be hooked up on surface temporarily prior to burying the header pipe with flat tube. This allows for water to be hooked up just after transplant. This temporary system can be used for a few years as planting blocks fill in



Temp hook up

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Note that on tall spindle or tight dwarf plantings tubing can be woven between trees to help keep in place from mowers etc or tie it to trellis poles.

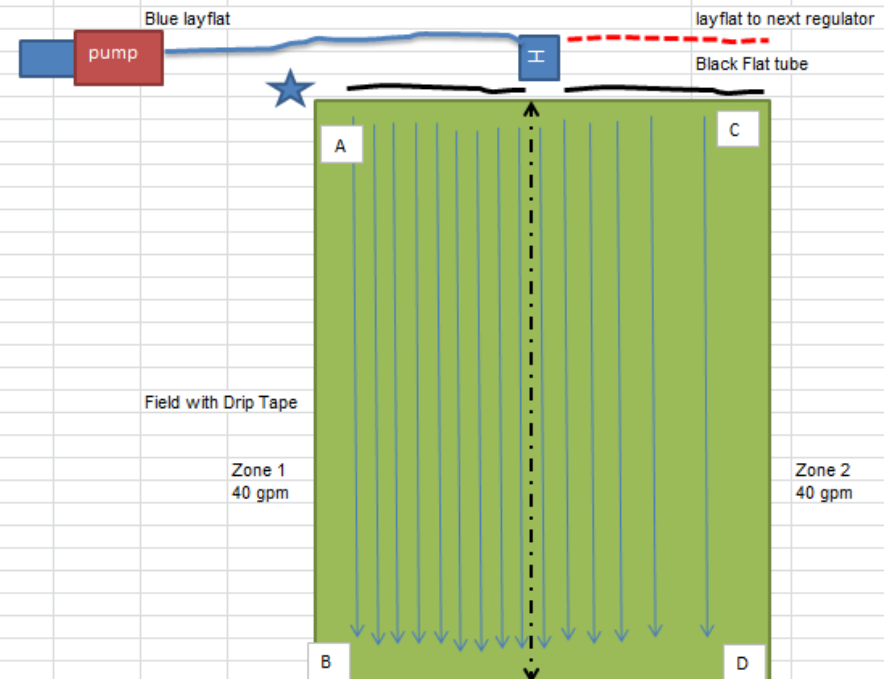
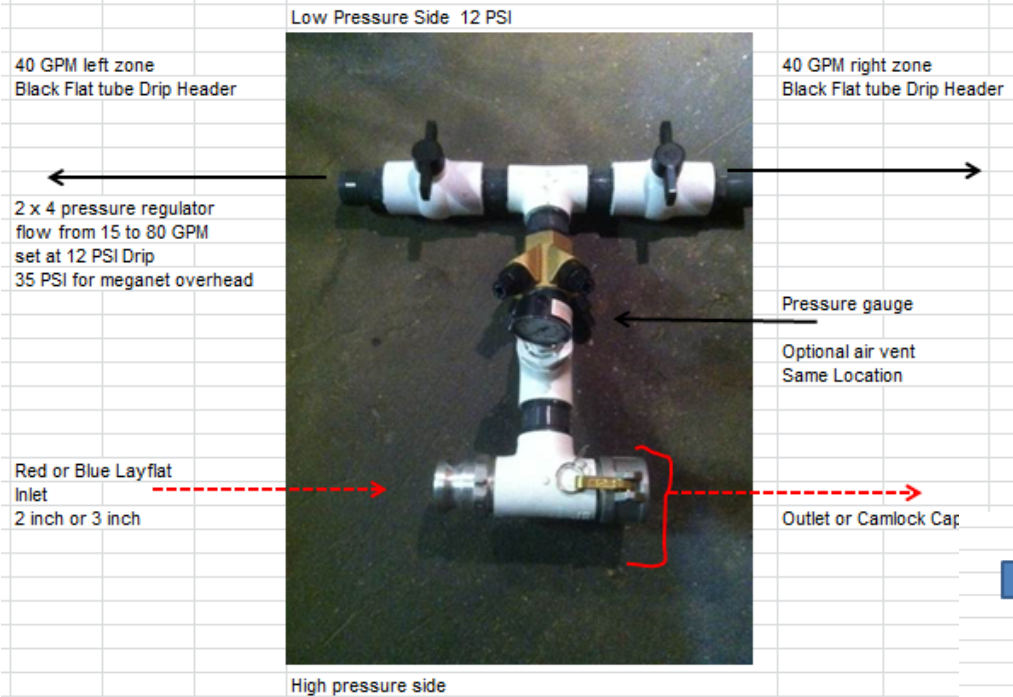


H valves

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Temporary Surface Hook UP
 Water quick to plantings
 Allows easy expansion as trees become available
 Can be installed same day when transplanted
 Operates at 35 psi



Tool & Fittings

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Curlie vs clip

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The curlie holder on the left picture has 4x the surface area gripping the wire than the grape vine clip pictured on the right. They also don't break in the cold and are a lot easier to put on with your hands than the vine clips. Case of 1000 curlies is \$50.00 Case 1000 vine clips \$90.00



First year TS

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- Tubing High Side
- Poles every 25 feet
- H braces at end
- Temp Feed inside trellis
- Tie to poles



Water Application

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- Right Time Right Pressure Right Amount
 - Group crop families
 - Gauges before regulators or point application
 - Moisture sensors to turn on
 - More important when to Turn OFF



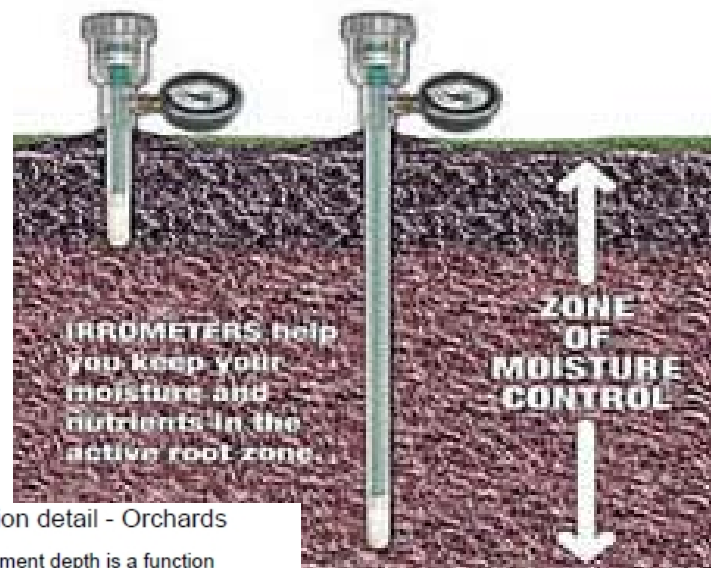


Moisture Meters

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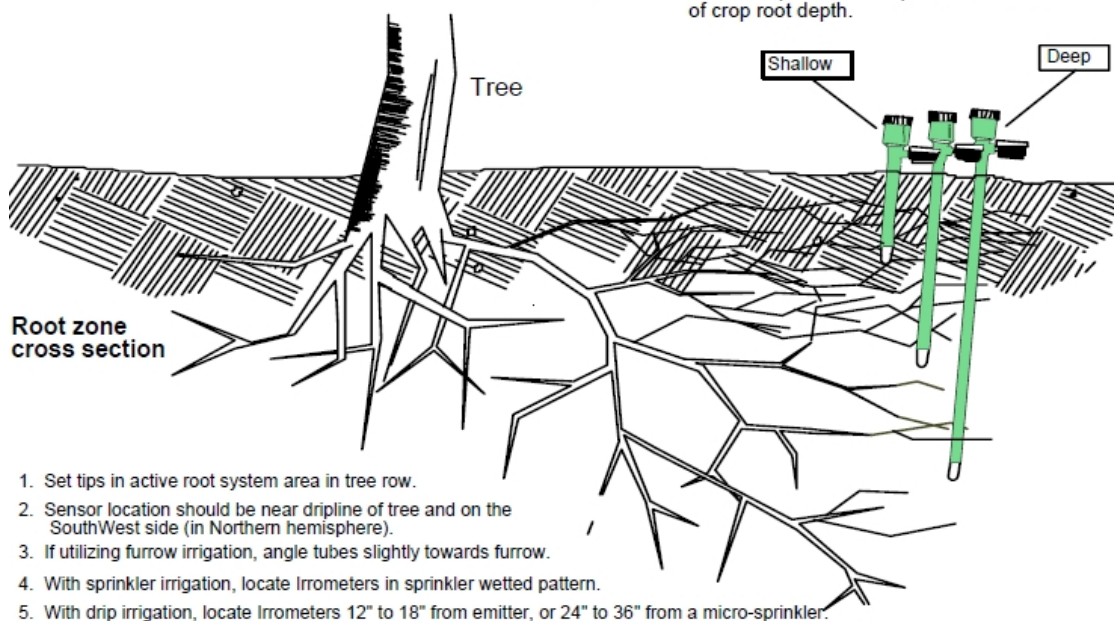
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Irrrometer installation detail - Orchards

NOTE: Irrrometer placement depth is a function of crop root depth.



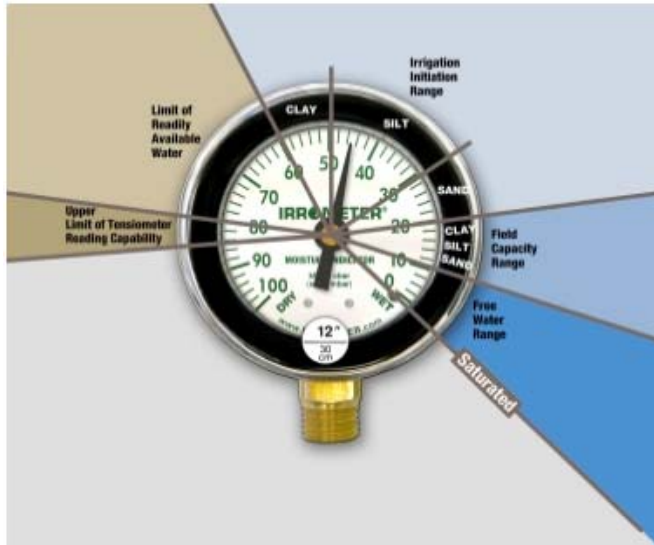


Sensor Information

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- **0-10 Centibars** = Saturated soil
- **10-30 Centibars** = Soil is adequately wet (except coarse sands, which are beginning to lose water)
- **30-60 Centibars** = Usual range for irrigation (most soils)
- **60-100 Centibars** = Usual range for irrigation in heavy clay

CROP	SHALLOW INSTRUMENT (INCHES)	DEEP INSTRUMENT (INCHES)	FOR EXTRA DEPTH, SET AT (INCHES)	CROP	SHALLOW INSTRUMENT (INCHES)	DEEP INSTRUMENT (INCHES)	FOR EXTRA DEPTH, SET AT (INCHES)
ALFALFA	18-24	36-48	60-70	MELONS	18	36	
ALMONDS	24	48	72	MILO	24	48	
APPLES	20	40	60	MINT	12	24	
APRICOTS	24	48	72	MONTEREY PINES, FIRS	12	24	
ARTICHOKES	18	36		MUMS	4-6		
ASPARAGUS	18-24	36-48		MUSTARD	18	36	
AVOCADOS	12	24	36	NECTARINES	18	36	
BANANAS	12	24		OATS	18	36	
BARLEY	18	36		OKRA	18	36	
BEANS (bush)	10		18	OLIVES	24	48	60
BEANS (Lima)	18	36		ONIONS	12		
BEANS (Pole)	18	36		PAPAYA	12	24	
BEETS (sugar)	18	36		PARSNIPS	18	36	
BEETS (table)	12-18	24-36		PEACHES	18	36	60
BLUEBERRIES	12	24		PEANUTS	12	24	
BROCCOLI	12	20		PEARS	18	36	48
CABBAGE	12	20		PEAS	18	36	
CANAIGRE	18	36	48	PECANS	18	36	48
CANTALOUPE	18	36		PEPPERS	15	30	
CARNATIONS	4-6			PERMANENT PASTURES	8-15		24-30
CARROTS	12	24		PERSIMMONS	18	36	
CAULIFLOWER	12	24		PINEAPPLE	15	30	
CELERY	10	20		PISTACHIO NUTS	24	48	60
	12	24		POMEGRANATES	18	36	
	24	48		POTATOES (Irish)	8-10	18	
	12	24		POTATOES (sweet)	18	36	
	18	36		PLUMS	24	48	72
	18-24	36-48		PRUNES	24	48	72
	12	30		PUMPKIN	18	36	48
	18	36		RADISHES	12		
	18	36	48	RASPBERRIES	18	36	
	18	36		SORGHUM	18	36	
CUCUMBERS	18	36		SOY BEANS	18	36	60
DATE PALM	24	48	60	SPINACH	12	24	
EGGPLANT	12	24		SQUASH (Summer)	15	30	
FIGS	18	36		STRAWBERRIES	6	12	
GARLIC	12	24		SUDAN GRASS	18-24	36-48	
GRAIN and FLAX	18	36		SUGAR CANE	18	36	
GRAPES	24	48	60	SUNFLOWERS	24	48	60
HOPS	24	48	60	TEA	12	24	
JOJOBA	18	36		TOBACCO	8-15	30	
KIWI	18	36	48	TOMATOES	18	36	
LADINO CLOVER	10	20		TURNIPS	18	36	
LETTUCE	12			WALNUTS	24	48	72
MACADAMIAS	12	24	36	WATERMELON	18	36	48
MAIZE	18	36		WHEAT, HAY	18	36	

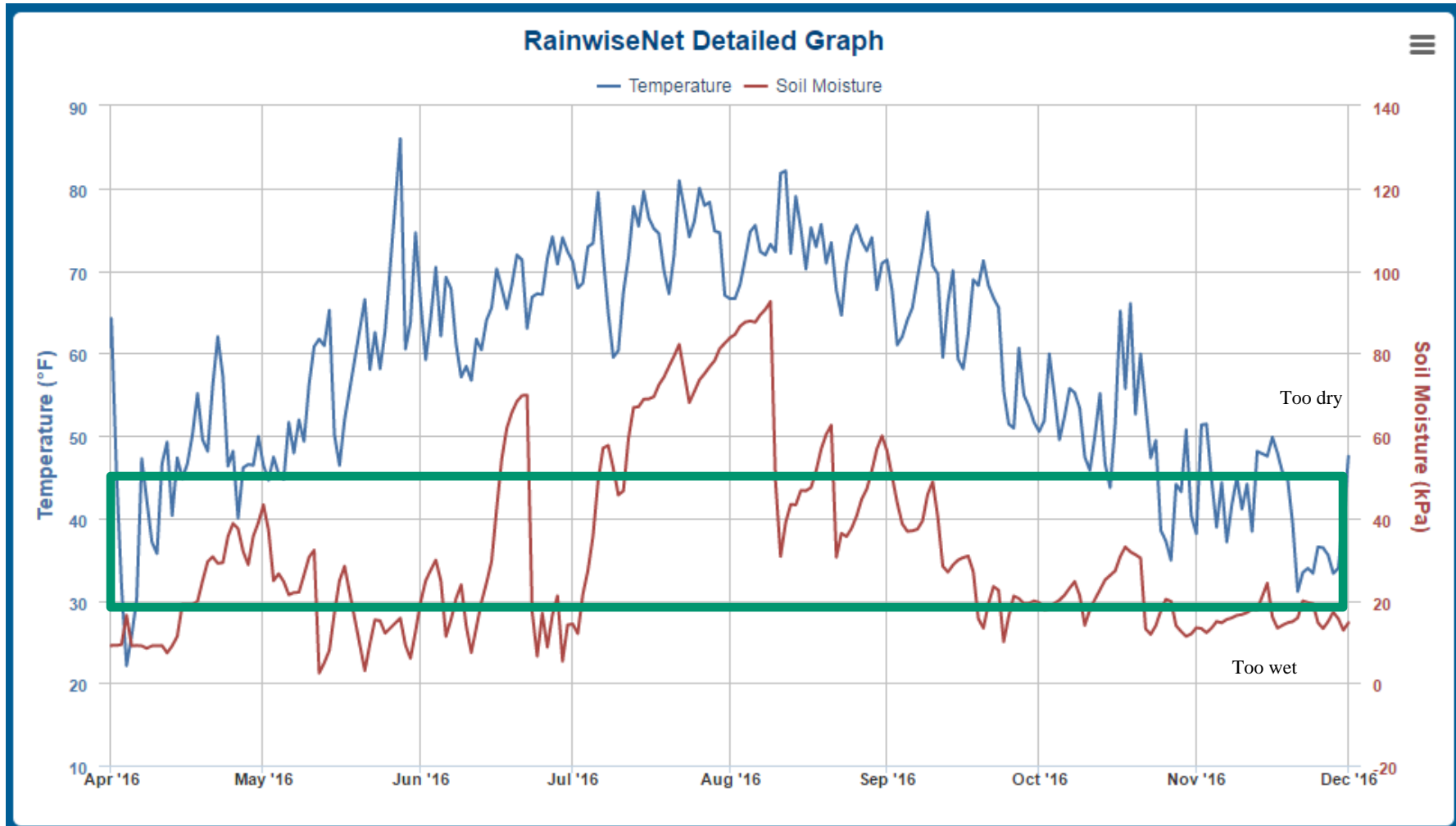


Temp vs Soil Moisture

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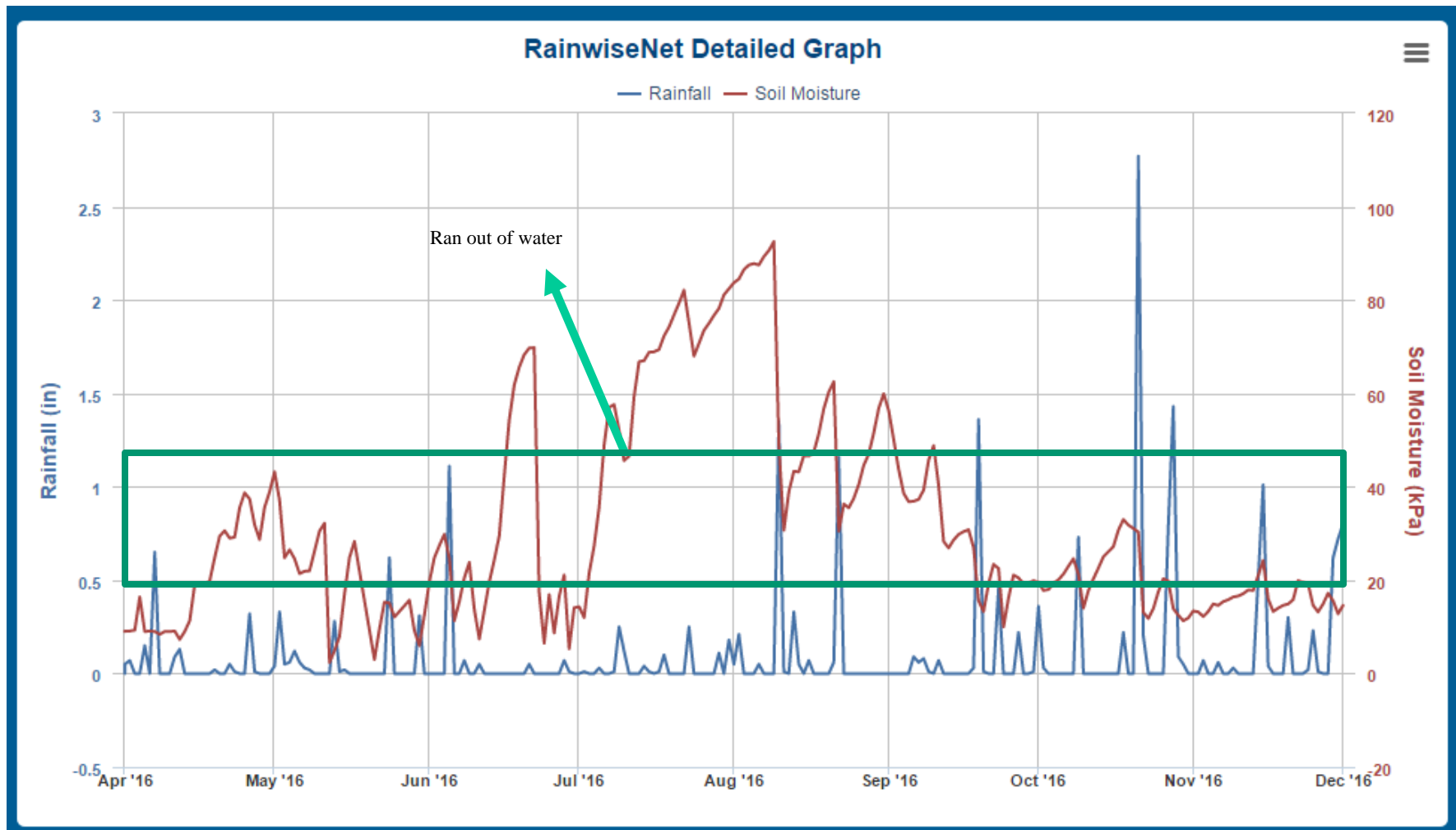


Rainfall vs Soil Moisture

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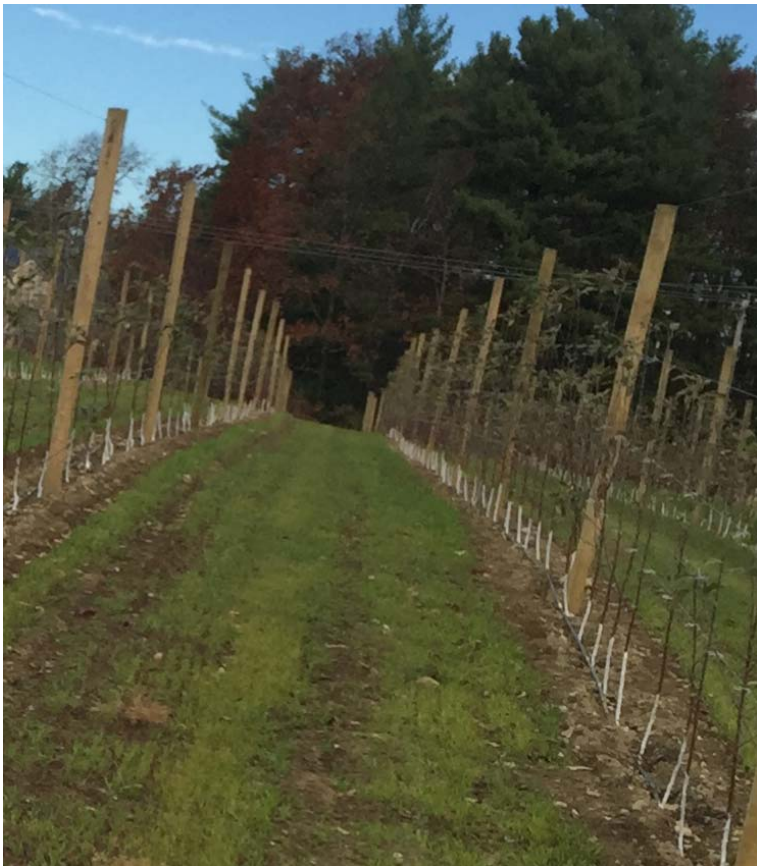
Goal with Apples

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- High Density get trees to top wire End of year 2.
- Feed to promote growth and branching





Fertigation

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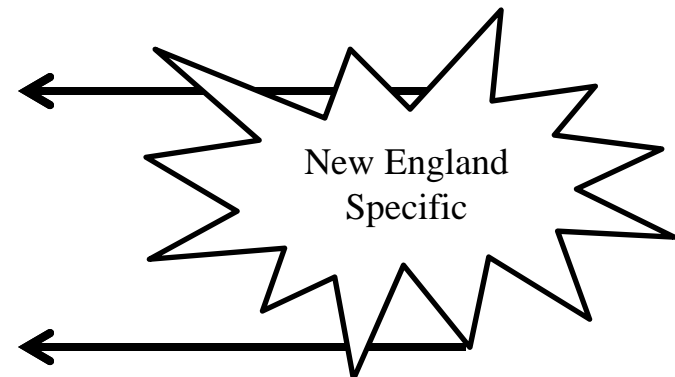
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Vegetable Specific Nutriculture Water soluble Fertilizer 25 lb Bags

Plant Starter	12-45-10	\$51.00
General Purpose	20-20-20	\$41.00
Cal Mag	14-4-14	\$38.00
Veg Grow Special	12-5-19	\$40.00
Calcuim Nitrate	15-0-0	\$31.00
K Mag Fruit Size	15-5-30	\$42.00
Potassium Nitrate	13-0-44	\$44.00
Tree Fruit Starter	18-6-15	\$38.00

Tree fruit starter is specific for transplants and designed for new england use. Also can inject calcium nitrate for early growth. Barney at sunrise had great success using this on new planting last year





Low Pond Problems

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Sediment build up

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Low water problems

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- Dirty Filters
- Reduced operating pressure
- Clogged impellers in pumps
- Muck build up main lines
- Clogged drippers in tubing

TO DO BEFORE 2017 Growing season
Perform Maintenance on equipment and
Flush Irrigation Lines



Disc Filter System

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Create low sump point

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Floats or cages

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Flow over Foot Valve

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Too much suction

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Trellis Work

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Questions

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Contact

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