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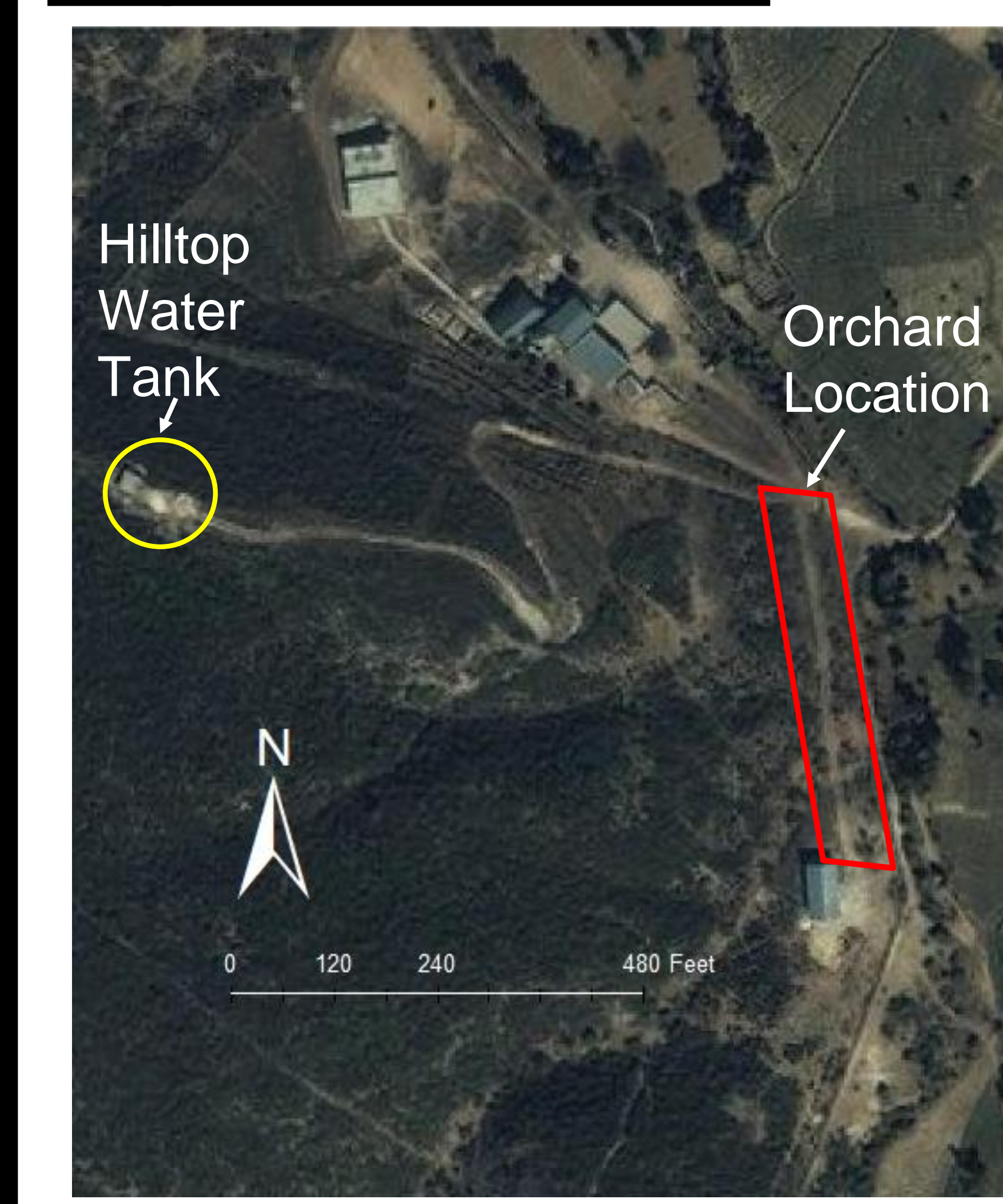
**Village of Hope Haiti**

- Village of Hope's 32-acre campus is located in Ganthier, Haiti, about 30 miles east of Port-au-Prince
- Features a school and medical clinic servicing 650 students and hundreds of community members
- Village of Hope desires an orchard that will diversify the diets of their students by providing them fruit for years to come

**Designing a Fruit Orchard**

- Recommend optimum fruit tree species for orchard
- Determine number of seedlings to plant and propose a layout of orchard
- Design a gravity-fed irrigation system from existing 6,000 gallon hilltop tank
- Estimate cost of materials from local Haitian vendors and stores
- Write a complete set of instructions for planting, watering, harvesting, etc.

**Proposed Orchard Site**



**Fruit Tree Selection**

Five fruit species that are native to Haiti were considered. This list was narrowed to three fruits based on the following criteria:

- Yield amount
- Adaptability to local soil
- Number of trees that can fit in an area
- Water consumption
- Economic potential
- Nutritional value and taste

Citrus fruits tend to not grow well in the Haitian climate, so they were not taken into consideration.

The three fruit tree species that most satisfied the criteria were:

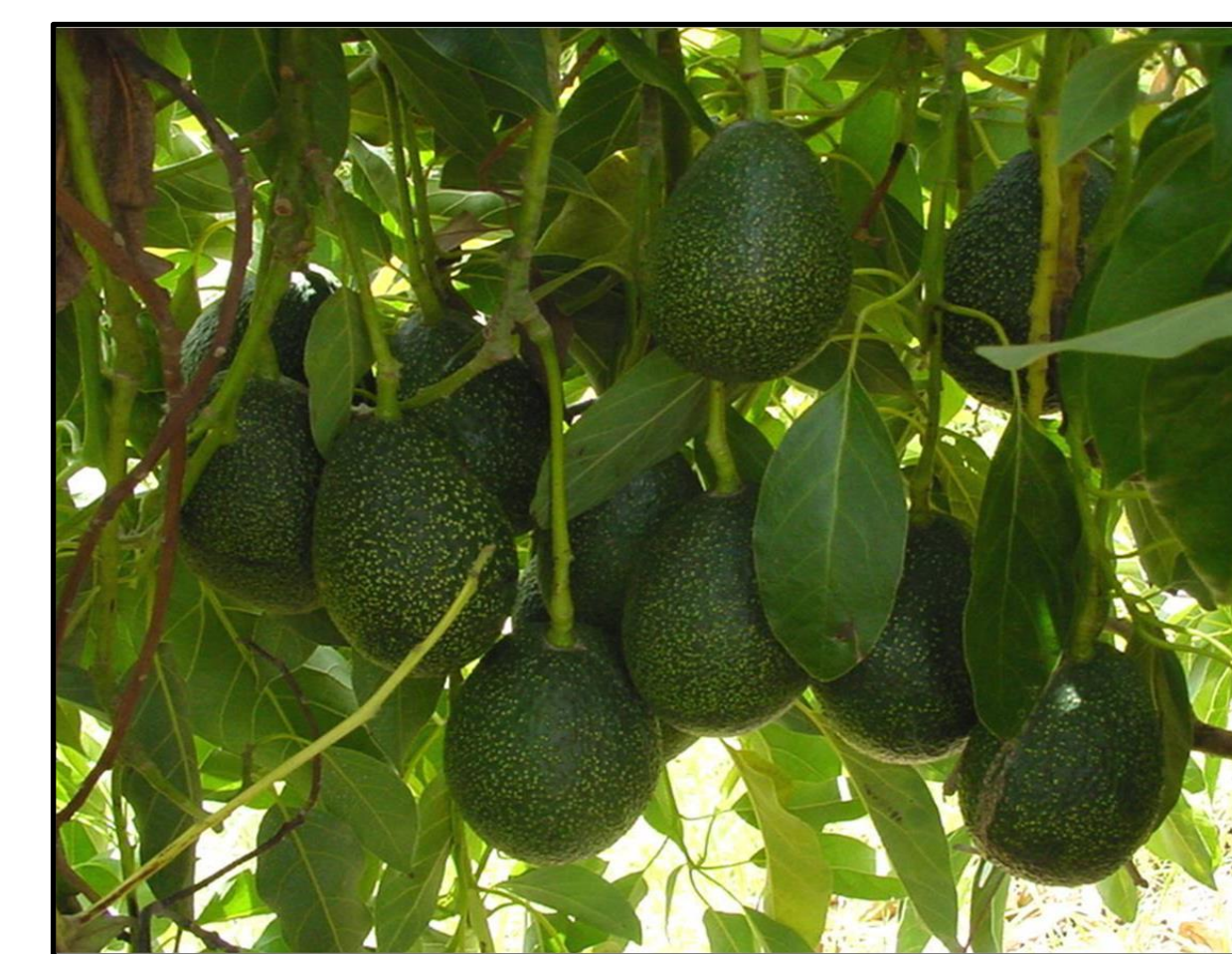
- **Bananas**
- **Papayas**
- **Avocados**



Banana Tree



Papaya Tree



Avocado Tree

**Orchard Layout**

- Rough sketch of the orchard site with dimensions and locations of key features provided by Village of Hope
- Site redrawn in AutoCAD Civil 3D with updated dimensions and seedling placements
- "Buffer" zone created around the burn pile area to ensure that the soil would be suitable for plant growth
- At least 8 feet allotted between rows of trees to allow harvesting equipment to maneuver

**Bananas (5' spacing)**

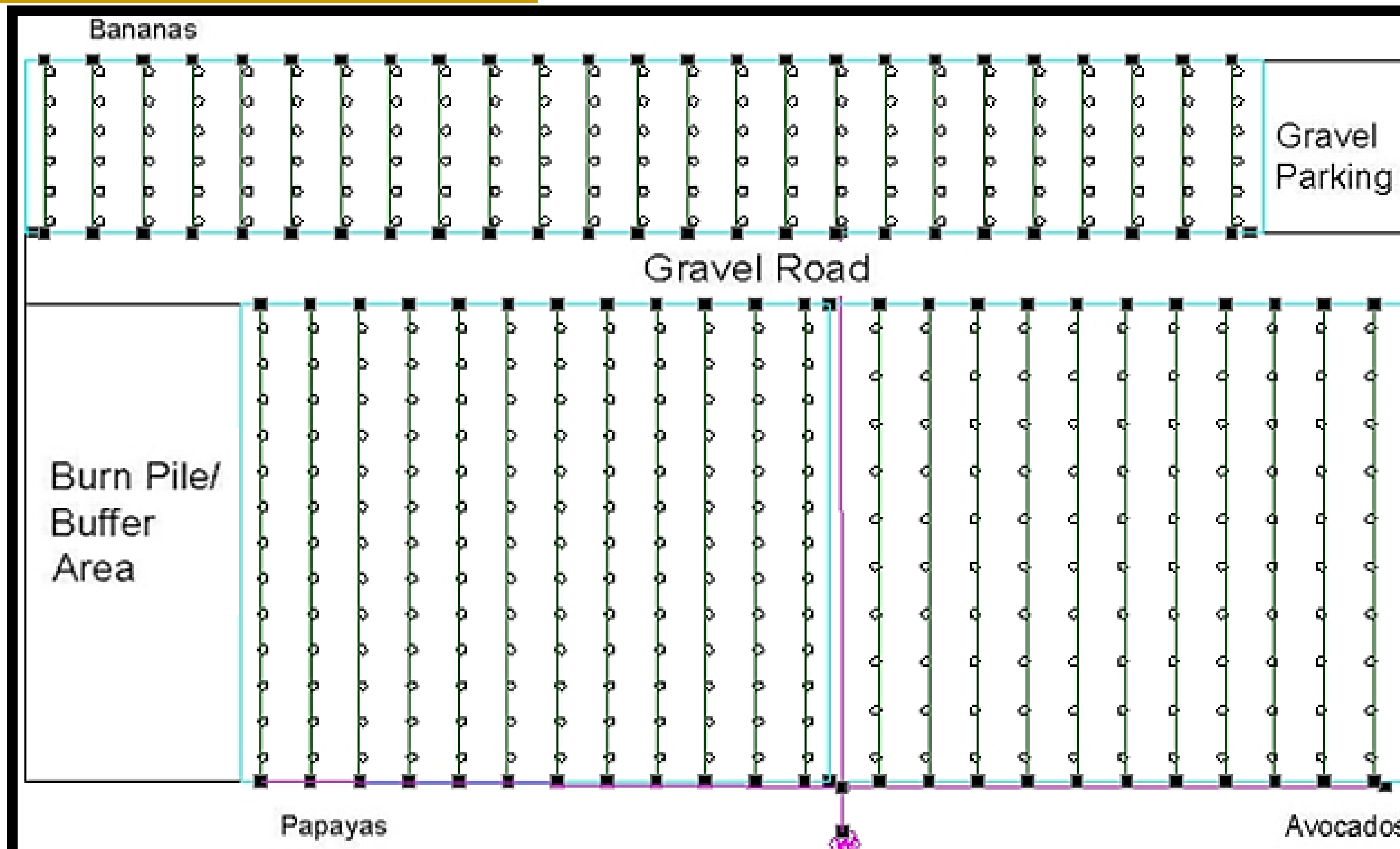
- 25 rows of 6 planting areas
- Each planting area has 2 banana trees
- **300 total trees** over 0.133 acres

**Papayas (6' spacing)**

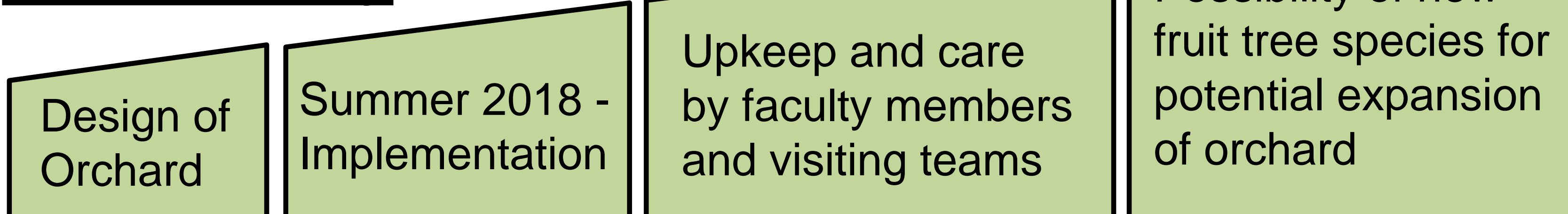
- 12 rows of 13 papaya trees
- **156 total trees** over 0.174 acres

**Avocados (8' spacing)**

- 11 rows of 10 avocado trees
- **110 total trees** over 0.174 acres



**Orchard Development and Sustainability**



**Irrigation Selection, Requirement, and Design**

- **Drip irrigation** chosen for increased efficiency and desirability for fruit trees
- Using Climwat and Cropwat, irrigation schedules for the fruit species were created using precipitation data from weather stations in Kenscoff and Mirebalais.

**Annual irrigation requirements:**

- Bananas (1<sup>st</sup> year): 50,958 gallons (192,000 liters)
- Bananas (2<sup>nd</sup> year): 83,136 gallons (315,000 liters)
- Papayas: 33,476.3 gallons (127,000 liters)
- Avocados: 5,439.7 gallons (21,000 liters)

- Using Irricad software, a rendering of the irrigation layout was created
  - Green lines indicate drip tubing
  - Pink lines indicate mainlines
  - A culvert pipe water pit will hold water brought from water tank

SCHEME SUPPLY												
ETo station: KENSCOFF Rain station: KENSCOFF												
Cropping pattern:												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precipitation deficit												
1. BANANA 1st year	20.9	13.4	12.7	0.0	0.0	0.0	25.9	0.4	0.0	0.0	41.2	15.7
2. avocado	72.6	47.8	47.5	0.0	0.0	0.0	1.7	0.0	0.0	0.0	20.6	43.2
3. PAPAAYA	0.0	0.0	14.8	0.0	0.0	5.8	59.3	16.9	0.0	0.0	29.4	0.0
Net scheme irr.req.												
in mm/day	1.0	0.7	0.8	0.0	0.0	0.1	0.9	0.2	0.0	0.0	1.0	0.6
in mm/month	32.0	21.0	26.0	0.0	0.0	2.1	29.2	6.2	0.0	0.0	29.6	19.9
in l/s/h	0.12	0.09	0.10	0.00	0.00	0.01	0.11	0.02	0.00	0.00	0.11	0.07
Irrigated area (% of total area)	64.0	64.0	100.0	0.0	0.0	36.0	100.0	64.0	0.0	0.0	100.0	64.0
Irr.req. for actual area (l/s/h)	0.19	0.14	0.10	0.00	0.00	0.02	0.11	0.04	0.00	0.00	0.11	0.12

**Economic Analysis**

Village of Hope Fruit Orchard Economic Analysis				
Category	Description	Quantity	Unit Price	Total Price
Irrigation Supplies	PVC Pipe 2 in.	800 ft	\$5.70/10 ft	\$456.00
	Tubing 1/2 in.	3000 ft	\$57.94/500 ft	\$347.64
	Culvert Pipe 8 in.	1	\$69.99	\$69.99
	End Cap 1/2 in.	60	\$1.55	\$93.00
	T-joint 1/2 in.	60	\$0.98	\$58.80
	Relief Valve	1	\$4.62	\$4.62
	Filter 3/4 in.	1	\$9.94	\$9.94
	Punch Tool	5	\$1.68	\$8.40
Village of Hope Fruit Orchard Economic Analysis				
Orchard Planting	Tree Stakes	600	\$4.02/12-pack	\$201.00
	Garden Twine	600 ft	\$3.27/200 ft	\$9.81
	Fertilizer	173 bags	\$9.99-\$19.99/bag	\$1,737.90
	Mulch	354 bags	\$2.97/bag	\$1,051.38
Miscellaneous	Seedlings	≈ 600	Donated	\$0.00
	Spades, pickaxes, other tools	As needed	Already acquired/donated	\$0.00
	Labor	As needed	Donated/TBD	TBD
Expected Life of Orchard	20+ years			
			Total Unadjusted Cost	\$4,048.48
			Adjustment Factor	10%
			<b>Total Adjusted Cost</b>	<b>\$4,453.33</b>

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Village of Hope

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