Project Deliverable C: **Design Criteria**

GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

The Algonquin community has communicated their needs for an adequate year-round farming solution. Based on the requirements acquired from the client, a set of design criteria must be developed. The design criteria (Table 2.0) will aid in the selection of possible solutions and will give benchmarks and goals that the team will use in the selection of a suitable system. By examining, benchmarking and ranking available standalone solutions we can test what the market currently has to offer and set reasonable goals for ourselves.

The current hydroponic solutions available that meet the requirements of ease of use and those that are self-contained are outlined in the benchmarking table below (Table 2.1). Based on the values we assigned to the different criteria (Table 2.2), the Hydroponic Site Grow Kit was the strongest competitor, due in part to its low cost and high quantity of plant slots.

Our solution will aim to match the strong points of its competitors while surpassing them in other categories. It aims to offer similar benefits at a lower cost and to surpass these options in areas like reservoir size and climate control.

2.0 Translating Needs into Design Criteria

Number	Need	Design Criteria
1	Self-Contained	Power (Watts) solar
2	Climate Control	Temp (°C)
3	Cost efficient	Cost($)
4	Sustainable	Recycled materials
5	Portable/Modular	Weight (lbs) Length*width*height (m)
6	Water Supply	Volume (liters) Rainwater collection Storage tank (liters)
7	Eases of use	Simple maintenance and use

2.1 Benchmarking Data

Specifications	General Hydroponics EcoGrower Drip Hydroponic System	Hydroponic Site Grow Planting System Kit	General Hydroponics GH4720
Cost ($ CAD)	303.88	159.00	677.00
Weight (lbs)	30.8	25.8	46.3
Size (m)	.66x.58x.46	1.2x1.2	.62x.62x.62
Reservoir size (liters)	64.35	None	79.5
Plant Slots	6	72	8-12
Style	Drip	Ebb and Flow	Ebb and Flow
Modularity	No	Yes	Yes

2.2 Target Specification Benchmarking

Specifications	Importance (weight)	General Hydroponics EcoGrower Drip Hydroponic System	Hydroponic Site Grow Planting System Kit	General Hydroponics GH4720
Cost ($ CAD)	**4**	2	3	1
Weight (lbs)	**3**	2	3	1
Size (m)	**3**	2	1	3
Reservoir size (liters)	**4**	2	1	3
Plant Slots	**5**	1	3	2
Style	**2**	2	2	2
Modularity	**3**	1	3	3
Total		40	56	51

2.3 Engineering Design Specifications

#	Design Specifications	Relation (<, = or >)	Value	Units	Verification Method
	Functional Requirements				
1	Power	>	Yes	Watts	Solar Panels
2	Water Supply	>	Yes	liters	Rainwater Harvesting
3	Climate Control	>	10	^{o}C	Test
4	Reservoir	>	80	liters	Test
	Constraints				
1	Weight	>	25.8	lbs	Analysis

2	Cost	<	100	$	Budget
3	Size	>	1.2x1.2	Meters	Analysis
4	Weather Conditions	=	4 Seasons	^{o}C	Analysis
	Non functional				
1	Aesthetics	=	Yes	N/A	Test
2	Ease of use	=	Yes	N/A	Analysis
3	Product life	>	5	years	Test
4	Variety of crops	=	Yes	N/A	Test

Set of Design Criteria and Constraints

Functional Requirements

1. Power (watts)
2. Water Supply (liters)
3. Climate control (^{o}C)
4. Reservoir

Constraints

1. Weight (lbs)
2. Cost ($)
3. Size (m)
4. No water
5. No electricity
6. Weather conditions

Non-functional requirements

1. Aesthetics
2. Ease of use
3. Product life
4. Variety of crops