

## **Team Ate**

Deliverable B - Needs Identification and Problem Statement

GNG1103 C – Introduction to Engineering Design

Lab Section CO2 – Group 8

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### Abstract

Empathizing with the client's needs to create an interpreted list based on the given statements in the interview. To fully understand the client's needs the list is organized and prioritized, to inevitably create a problem statement. To ensure that the problem is being solved correctly, the list of needs is reflected on by the team.

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List of Client Needs:

- tracker for the entry and/or exits in bat box.
- usable for one species of bats in Ontario (big brown bats or little brown bats)
- usable for both bat species
- require minimal maintenance (once per month)
- live access to data
- protect bats from predators
- maintain comfortable temperature for bats from April to October (>45 degrees)
- low cost (\$150)
- Weatherproof.

Needs	Group	Priority	Reason
tracker for the entry and/or exits in bat box.	Data collection	5	The whole point of this project is to collect data on the effectiveness of bat houses in Canada, so the tracker is essential.
usable for one species of bats in Ontario (big brown bats or little brown bats)	Livability of house	5	The house needs to be suitable for at least one of these species or else it will not be used by bats, so data about the effectiveness of bat houses cannot be collected.
usable for both bat species	Livability of house	2	It would be nice if both species could use the bat house, but that is not necessary, and data from one species is enough to find the effectiveness of bat boxes.
require minimal maintenance (once per month)	Feasibility	4	If it requires too much work to maintain it will likely not be used for a long time, since it will not be worth the work, but it is not the highest priority because it could still help to track the effectiveness of bat houses.
live access to data	Data collection	2	This is not required since the data could be recovered during maintenance. However, live data could be helpful for the company as it is data they can use immediately to demonstrate the effectiveness of bat boxes.
protect bats from predators	Livability of house	5	This is essential because if bats are not safe from predators, they will not use the box and data cannot be collected.

maintain comfortable temperature for bats from April to October (>45 degrees)	Livability of house	5	Essential because bats will not use the box if it is too cold or hot, therefore data cannot be collected.
Low cost (\$150)	Feasibility	3	Bat box prototype has a low budget, but this is not as important as the actual function of bat house.
Weatherproof	Livability of house & Data collection	5	The bat box must be weatherproof so it does not get destroyed and can be used throughout season by bats and tracker must be weatherproof so data can continue to be collected.

## Problem Statement

Tiree, a company that is analyzing the effectiveness of bat boxes, needs bat boxes with a device that can monitor bat entry and exits to track their effectiveness in Canada. The bat box and device will be easy to maintain, weatherproof, suitable for one of the bat species in Ontario to roost in and cost effective.

## User Benchmarking

Functionality	Bat Boxes		
	Canadian Bat Houses (Nursery)	Canadian Bat Houses (Motel)	Canadian Bat Houses (Hotel)
Capacity	300 bats	600 bats	900 bats
Dimensions	47cm x 104.1cm x 8.9cm	47cm x 104.1cm x 14cm	47cm x 104.1cm x 17.8cm
Price	\$300CAD	\$400CAD	\$500CAD
Chambers	2	4	6
Maintenance-free	Yes	Yes	Yes
Tracking device	No	No	No

Comparison of bat boxes that have been made by the Canadian Bat Houses to the user's needs. Prices of the bat boxes do not fall into the user's budget. None of these boxes include a tracker, which is a necessity for the user.

Functionality	Trail Camera iG200	Driveway Sensor	Bat Detector SM4BAT	BatRack
Company	iZEEKER	HTZSAFE	Wildlife Acoustics	GitHub
Weatherproof	Yes	Yes	Yes	Yes
Cost	\$49.99CAD	\$39.99CAD	\$1,619.91CAD	1,174.93CAD
Type of Detection	Motion, Camera	Motion	Acoustic	Acoustic, Video, Radio telemetry sensors
Power Source	Battery	Battery	Battery	Solar
Live Access to Data	No	No	Yes	Yes

## Conclusion

The next step with the design criteria should focus on solving the highest priority user needs, particularly ones that are hardest to design.

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