

URBAN FORESTRY AS A SUSTAINABLE DESIGN APPROACH IN A FOREST  
HILL DEVELOPMENT

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## **DEDICATION**

### **All praise to Allah.**

I am so grateful for whatever Allah has planned for me, the endless blessings and favors that He has bestowed upon *me*. May my knowledge, experience, and skills benefit mankind and bring me closer to Him.

### **To my father and mother**

Thank you for always being there; your endless love, faith, and encouragement never fail to strengthen me

### **To my siblings, and family-in laws,**

Your continuous help, care, motivation, and support can never be repaid

### **To my beloved wife, Nurrulhidayah Bte Salamun,**

Thank you for always standing next to me, lifting me up whenever I couldn't reach

### **To my children**

May this dissertation inspire you to become a better version of yourself

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## **ABSTRACT**

Urban development is often at the expense of reducing trees or completely neglecting them. It is a common practice, especially in a developed country. This leaves negative impact and poses a threat to the living surroundings and the environment. Urban Forestry Approach solves this problem and it is considered an effective Nature-Based Solution to achieve sustainable urban development. Innovative design, planning, and management of tree population in an urban setting could permit the coexistence of urban fabric and nature which consequently benefit the physical, social, and economical aspects of the community while improving the environment in the area. The research is to propose a nature-living laboratory that accentuates the avian ecosystem in Technovation Park Hill Forest of UTM through architectural design intervention as sustainable urban development in the regeneration of Jalan Pontian Lama. As part of Nexus Masterplan, it is expected to strengthen the presence of UTM institutions (Innovative, Entrepreneurial, and Global) to the surrounding community.

## ABSTRAK

Pembangunan bandar selalunya mengorbankan dan mengurangkan pokok atau mengabaikannya sepenuhnya. Ia adalah satu amalan biasa terutamanya di negara maju. Ini meninggalkan kesan negatif dan menimbulkan ancaman kepada persekitaran hidup dan alam sekitar. Kaedah ‘Urban Forestry’ menyelesaikan masalah ini dan ia dianggap sebagai Penyelesaian Berasaskan Alam Semula Jadi (NBS) yang berkesan untuk mencapai pembangunan bandar yang mampan. Reka bentuk, perancangan dan pengurusan populasi pokok yang inovatif dalam persekitaran bandar boleh membenarkan kewujudan bersama fabrik dan alam semula jadi bandar yang seterusnya memberi manfaat kepada aspek social, ekonomi dan fizikal masyarakat sambil menambah baik persekitaran di kawasan tersebut. Penyelidikan adalah untuk mencadangkan makmal hidupan alam semula jadi yang menonjolkan ekosistem burung di Technovation Park Hill Forest UTM melalui intervensi reka bentuk seni bina sebagai pembangunan bandar mampan dalam penjanaan semula Jalan Pontian Lama. Sebagai sebahagian daripada Pelan Induk Nexus, ia dijangka mengukuhkan kehadiran institusi UTM (Inovatif, Keusahawanan, dan Global) kepada masyarakat sekeliling.

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## LIST OF ABBREVIATIONS

ANN	-	Artificial Neural Network
GA	-	Genetic Algorithm
PSO	-	Particle Swarm Optimization
MTS	-	Mahalanobis Taguchi System
MD	-	Mahalanobis Distance
TM	-	Taguchi Method
UTM	-	Universiti Teknologi Malaysia
XML	-	Extensible Markup Language
ANN	-	Artificial Neural Network
GA	-	Genetic Algorithm
PSO	-	Particle Swarm Optimization

## LIST OF SYMBOLS

$\delta$	-	Minimal error
$D, d$	-	Diameter
$F$	-	Force
$v$	-	Velocity
$p$	-	Pressure
$I$	-	Moment of Inertia
$r$	-	Radius
Re	-	Reynold Number

# CHAPTER 1

## INTRODUCTION

### 1.1 Problem Background

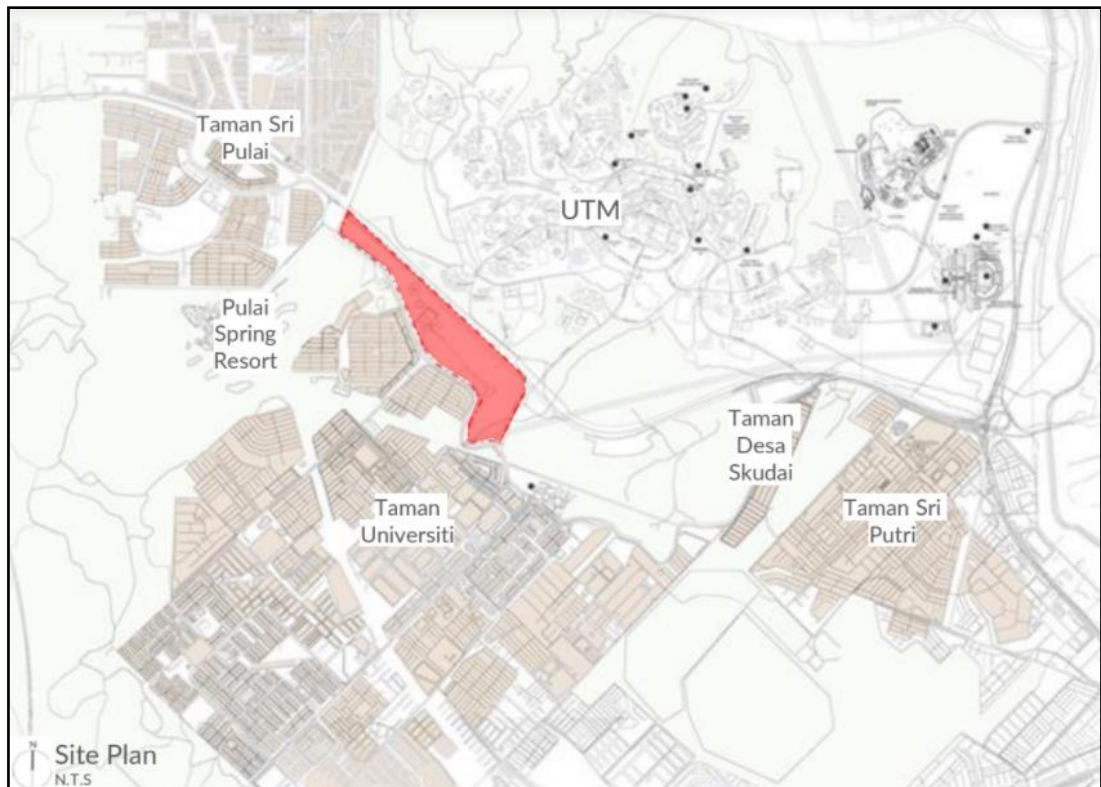


Figure 1 Research Site

The research study focused on UTM Technovation Park which is located in Skudai, Johor Bahru, Johor. UTM Technovation Park is owned by University Technology Malaysia, UTM, and managed by Innovation & Commercialization Centre, ICC UTM. It currently houses over 40 technological companies. UTM Technovation Park offers a conducive environment for incubation and start-up.

## 1.2 Problem Statement

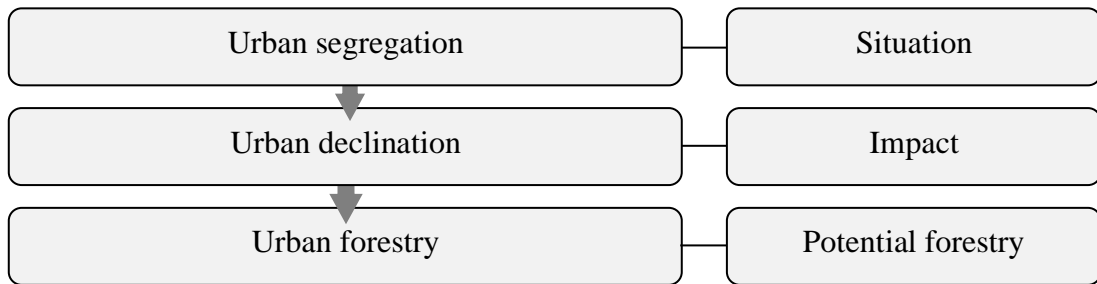


Figure 2 Issues on site

### Urban Segregation

Since the existence of the Skudai-Pontian Highway, it was separated into two. Since then, there is no initiatives to connect both a such as road, street, or path, it later becomes segregated in terms of land-use. The main UTM campus area



Figure 3 Jalan Pontian-Skudai Highway

### Urban declination

One way to notice urban declination is that when the particular area of development indicates or show a decrease in term of:

- People coming in the area
- Building began decaying.
- Maintenance of such building is no longer efficient.



Figure 4 Poor condition of road at UTM Technovation Park

### **Urban forestry**

Urban forestry is the management of a tree network or green area or forest. It is obvious that the area has potential as it has a huge green forest hill that can lift up the area. However, people give less attention to a green area or forest due to its condition such as politic, management, and etc.



Figure 5 Urban forestry issue

### **1.3 Research Aim**

The research is to propose a nature-living laboratory that accentuates avian ecosystem in Technovation Park Hill Forest of UTM as architectural design intervention to achieve sustainable urban development.

### **1.4 Research Questions**

- (a) What are the principal aspects in a Sustainable Urban Development?
- (b) What are the primary measures in the implementation of Urban Forestry Approach?
- (c) How to improve social, economic and environmental aspect in an Urban Forestry Approach?

### **1.5 Research Objectives**

- (a) To explore the principal aspect in a Sustainable Urban Development.
- (b) To identify and categorize social, economic and environmental aspect as primary measures in the implementation of urban Forestry Approach.
- (c) To accentuates Avi-culture that improves social, economic and environmental aspect in Urban Forest.



## 1.6 Thesis Framework

Figure 2 shows the framework of the thesis, which progresses from objectives to data collection, data analysis and finally expected outcomes.

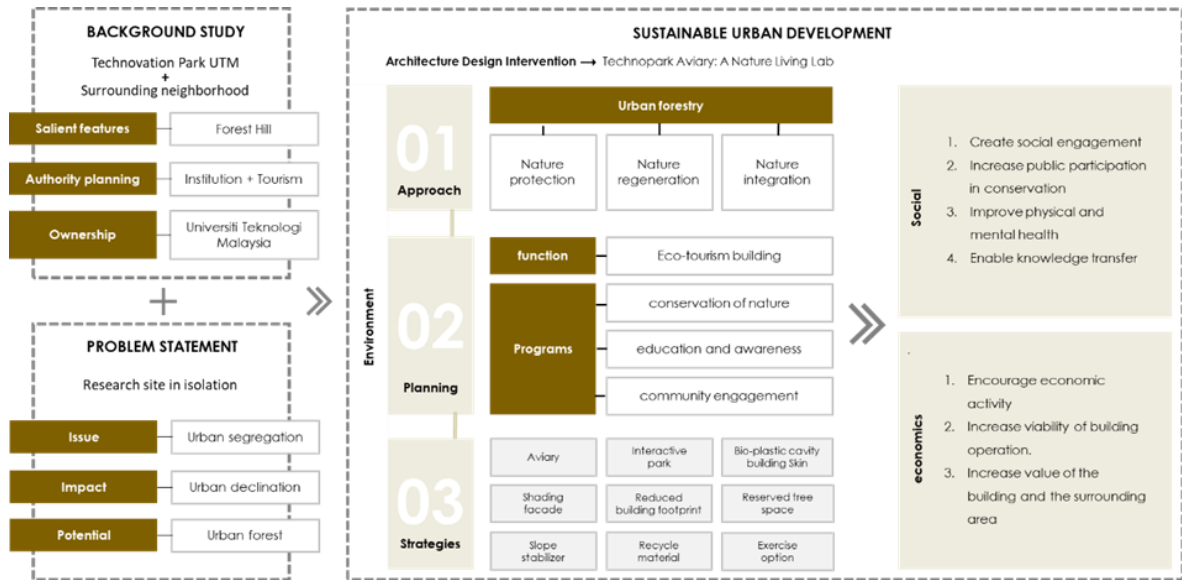


Figure 6 Thesis Framework

## **1.7 Significant of Research**

This thesis will serve as a design guideline for architects, planners and local authority, establishing a standard and framework for constructing aviary park that benefit the social and economic aspect of the surrounding community while giving less impact to the environment. The research's findings contribute to a better understanding of the spatial experience, which enhances the use spaces of all types. The study further expands on the concept of a perceptual system in an architectural setting, utilizing a combination of senses to perceive space and capture the mood of users in spaces and use visibility analysis to simulate and examine the overall spatial configuration.

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