BIODIVERSITY MANAGEMENT HANDBOOK

University of the Philippines Diliman

About the TWG on Biodiversity Management

The Technical Working Group on Biodiversity Management (TWGBM) was created by Chancellor Michael Tan in July 2018.

The TWGBM is a multidisciplinary group headed by Jelaine Gan (Institute of Biology) and Kristian July Yap (Diliman Environmental Management Office), with members Maureen Anne Araneta and Nappy Navarra (College of Architecture), Carmela Española (Institute of Biology), Allan Gil Fernando (Institute of Geological Sciences), Javier Angelo Camacho (Office of the Campus Architect), and James Christopher Buño (Campus Maintenance Office). Geoffrey Jules Solidum (B. Landscape Architecture Graduate) served as the Junior Research Associate of the TWGBM in the writing and conceptualization of the Handbook. One of the tasks of the TWGBM is to create a set of policies and guidelines to help administrative units of the University in managing and protecting the University's biodiversity

(cover: UP Diliman Carillon Tower viewed from Quezon Hall, 2020)

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University of the Philippines Diliman

FOREWORD

ON behalf of the University of the Philippines System, I congratulate the members of the UP Diliman Technical Working Group on Biodiversity Management on the launch of the UP Diliman Biodiversity Management Handbook.

An incident of wildlife killing on the campus in 2014 sparked a growing wave of awareness of the importance of sustainably managing and protecting the biodiversity and green spaces of the UP Diliman campus. Years later, we celebrate the launch of this Handbook as a product of this rising environmental consciousness. As a compendium of UP Diliman's policies on biodiversity management and protection in the campus, this Handbook will serve as a reference and guide for building administrators and the various units in UP Diliman, offering concrete, practical and specific guidelines for planning and management, for harmonizing the construction and infrastructure development on campus with the natural environment, for the use of space and mobility within the campus, and for waste management—all based on the ethics of biodiversity management and the principles of harmony, respect for all forms of life, and shared responsibility. Interweaving all these are stunning, full-color photographs of various landscapes and wildlife and land-use maps of the campus.

I congratulate the faculty, researchers, and administrative staff who worked on this Handbook, which promises to be a valuable reference and example for other UP campuses and institutions seeking to create their own set of guidelines to protect and sustainably manage their biodiversity and ecosystems. Indeed, this Handbook is one of UP Diliman's contributions to creating sustainable and resilient cities and human settlements. The protection, restoration, and promotion of sustainable use of terrestrial ecosystems, per the Sustainable Development Goals of the United Nations—beginning where we are and showcasing our own best practices to the country and the world.

Again, congratulations to the TWGBM and UPD administration on this valuable reference. Padayon, UP Diliman!

Danilo L. Concepcion
President
University of the Philippines

Message of the Chancellor

GROWING up on campus, and like other *batang-UP*, I was lucky to have been surrounded by such rich biodiversity. Back then, we could easily name all the plants, trees, and insects on campus, and even saw how nature's elements changed behavior with the wet and dry seasons. These days, to be near so many pockets of green is a welcome break, when me and my family could feel safe and free—a rarity in the middle of a cramped metropolis, especially in the midst of a raging pandemic.

I am happy that UP Diliman is finally putting together policies and programs for environmental sustainability that aim to promote environment-friendly practices and biodiversity protection. It was in July 2018 when former Chancellor Michael Tan created the Technical Working Group on Biodiversity Management (TWGBM), which has now produced this Biodiversity Management Handbook, one that "serves as a general reference for the management of biodiversity within the boundaries of the UPD campus." This document serves to guide UPD officials, administrators, and personnel as we consider all living components within and around the University's built and natural environments.

This Handbook is but one aspect of our efforts to preserve and protect the diverse species of plants and animals on campus. Allow me to quote from my 2020 Vision Paper: "Diliman is home not only to 25,00 students and employees, but also a diverse ecosystem of decades-old trees and hundreds of species of flora and fauna. We need to reiterate our commitment to the protection and revitalization of this environment, whose open green spaces define the overall visual image of the university community, making it unique in Metro Manila's urban landscape."

While the Handbook provides us with the necessary principles, this could only leave a long-term impact if they are consistently implemented and fully understood by our community. Each one of us has a role to play in ensuring that future generations also get to appreciate the rich landscape and ecosystem on campus. What we are able to accomplish now not only benefits those on campus, but also the larger community who trusts UP Diliman to provide that bit of solace under the trees, as they come to commune with nature or go on that weekly bike ride, jog, walk to escape the bustle of the city.

Fidel R. Nemenzo, DSc

Message of the Chancellor (2014-2020)

THE UP Diliman campus, the largest among tertiary educational institutions in Metro Manila with almost 500 hectares, is a green oasis in the National Capital Region, also sometimes described as the lungs for Metro Manila although in recent years, those who huff and puff while jogging around the iconic Academic Circle, can tell you Metro Manila's lungs aren't quite as healthy as we would like to imagine it to be.

Fortunately, our academicians, so many involved in tackling the nation's environmental problems, have seen the need to go beyond lofty rhetoric about saving the planet – Mother Earth will survive with or without humans – and deal with the problems in our own sprawling backyard, including unintended consequences of well-meaning environmental projects from the past.

Our graceful acacia trees best exemplify this unintended consequences dilemma. We are proud of those trees, planted by the pioneering UP Diliman faculty and students who moved to the new flagship campus in 1949 and planted trees through the early 1950s.

Alas, many of the acacia are dying and each strong typhoon topples a few more of the weakened trees. The reason is simple: the acacia trees are not indigenous, not quite adapted to our climate with its monsoon season and typhoons and have been rotting from the inside.

We learned this late, from our biologists and environmentalists, and also began to notice how, as we expanded the campus with more than a hundred academic buildings and even more residentials units, the campus' carrying capacity was being stretched to its limits. Again, we rely on older alumni and residents to bring back memories of a greener past, and the clash with "development". One story I never forgot, told by a utilities worker, was about deer once being found in Diliman, and how one stag once ended up bloodied as it tried to engage another male in battle, its competitor being in its own image in one of the new buildings' glass doors.

A green campus is essential for academic life. Every faculty, student and staff will have stories about how, in times of emotional upheaval, of stress, of anxieties and depression, we found comfort simply walking around the campus, taking in what nature could offer us depending on the time of the day, the season of the year.

Biodiversity is the key to conservation of the environment and its many bounties but the transdisciplinary team that produced this handbook recognized that we cannot limit ourselves to biology if we want a sustainable campus built on biodiversity. The three guiding principles that they propose reflect a comprehensive framework: (a) recognizing the campus as a culturally significant ecological patch; (b) aspiring for harmony of built and natural environments and (c) maintaining biodiversity and interdependent communities.

The principles bring to life the finer aspects of biodiversity, such as the protection and propagation of indigenous flora and fauna, and leaving no stone unturned with regard to environmental impact with architectural and landscaping designs. That, incidentally, might involve leaving stones unturned, leaving spaces empty.

The manual should be seen as a work in progress, to be expanded, I hope, from Good Practices that will be implemented now that we do have this manual. Let it be a guide for projects around infrastructure, maintenance and again development, this time without quotation marks.

The manual is UP Diliman's small contribution, produced with great pride and respect, toward concretizing aspirations for the nation and if we might be bold, for the planet.

Michael Lim Tan, DVM, PhD

PREAMBLE

We, the members of the University of the Philippines Diliman, pledge to strengthen the University's academic capabilities by harmonizing built and natural environments to achieve ecological integrity through improving, managing, and maintaining the existing processes and systems in relation to the activities within the University.

Photo by Patrick Gozon, 2013

Photo by Patrick Gozon, 2013

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PRINCIPLE III
THE UNIVERSITY NURTURES A BIODIVERSE AND INTERDEPENDENT COMMUNITY

"The soul of the University is in its green spaces. These are spaces wherein different kinds of life interact and influence one another. Everyone has a role in managing the University's biodiversity."

Dr. Carmela Española, 2019

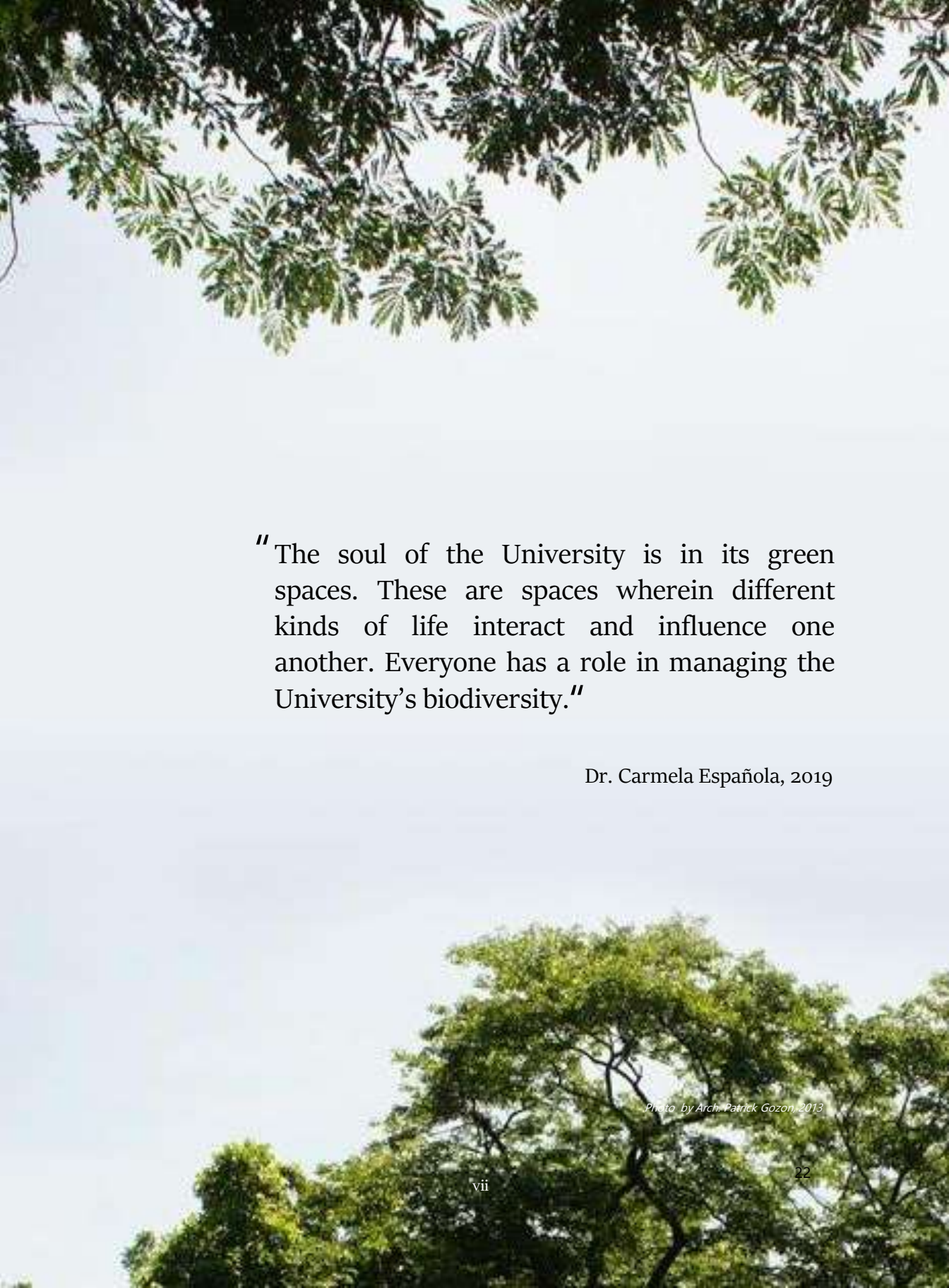


Photo by Arch. Patrick Gozon, 2013

PREFACE

Concerns on wildlife killings within the University of the Philippines Diliman (UPD) have stressed the importance of spreading awareness for the protection of the natural environment.

To maintain the ecological balance between the natural environment and humans, the Office of the Chancellor created the Technical Working Group on Biodiversity Management in 2018 composed of experts with the primary objective of formulating a Biodiversity Management Handbook.

The newly created Diliman Environmental Management Office (DEMO) is the primary agency of UPD to implement the policies indicated in the handbook. DEMO is responsible to oversee the University's environmental status and is tasked to properly manage and preserve its existing biodiversity.

INTRODUCTION

The University of the Philippines Diliman (UPD) acknowledges that the protection and conservation of the habitat, species, and genetic diversity within the campus are needed to create environmental stability. It is important to maintain the ecological balance of the campus in spite of the inevitable changes that are the result of human activities, as it is a vital element of the University's status as an institution. With this, the University vows to protect and manage its biodiversity.

As the National University, a public and secular institution of higher learning, and a community of scholars dedicated to the search for truth and knowledge as well as the development of future leaders, UPD shall perform its unique and distinctive leadership in higher education and development. The University is granted Institutional Autonomy as the National University.

As an academic institution and community of scholars, the UPD has created a set of policies specific to its needs as both a unique green space and an academic institution in managing its biodiversity. Relevant national and University policies for biodiversity management and environmental protection were considered in the creation of this Handbook.

The Handbook serves as a general reference for the management of biodiversity within the boundaries of the UPD Campus. It is an aid for University officials, building administrators, and maintenance personnel to ensure that the University fulfills its purpose as an academic institution while taking into consideration all existing life in the University's environments.

The Environmental Condition of the University

UPD is located in Quezon City (QC) with a topographical characteristic that favors growth of plants. UPD's landforms, creeks, and ridges create an optimum landscape for vegetation to thrive, making this academic institution a home to diverse species of plants and animals. This consequently creates a unique ecological patch within an urban area which carries a wide range of wildlife. The creation of an environment conducive to academic pursuit within the 493 hectares of the UP Diliman Campus requires the combination of built and natural environments. This unique biodiverse system poses a challenge for stakeholders to participate in the consistent and proper management of the environment within the University.

As a unique ecological patch, the University needs to address its biodiversity concerns contextually. In order to create a set of policies to address these concerns, a set of Ecological Principles were formulated to encompass the objectives of the University for a better environment.

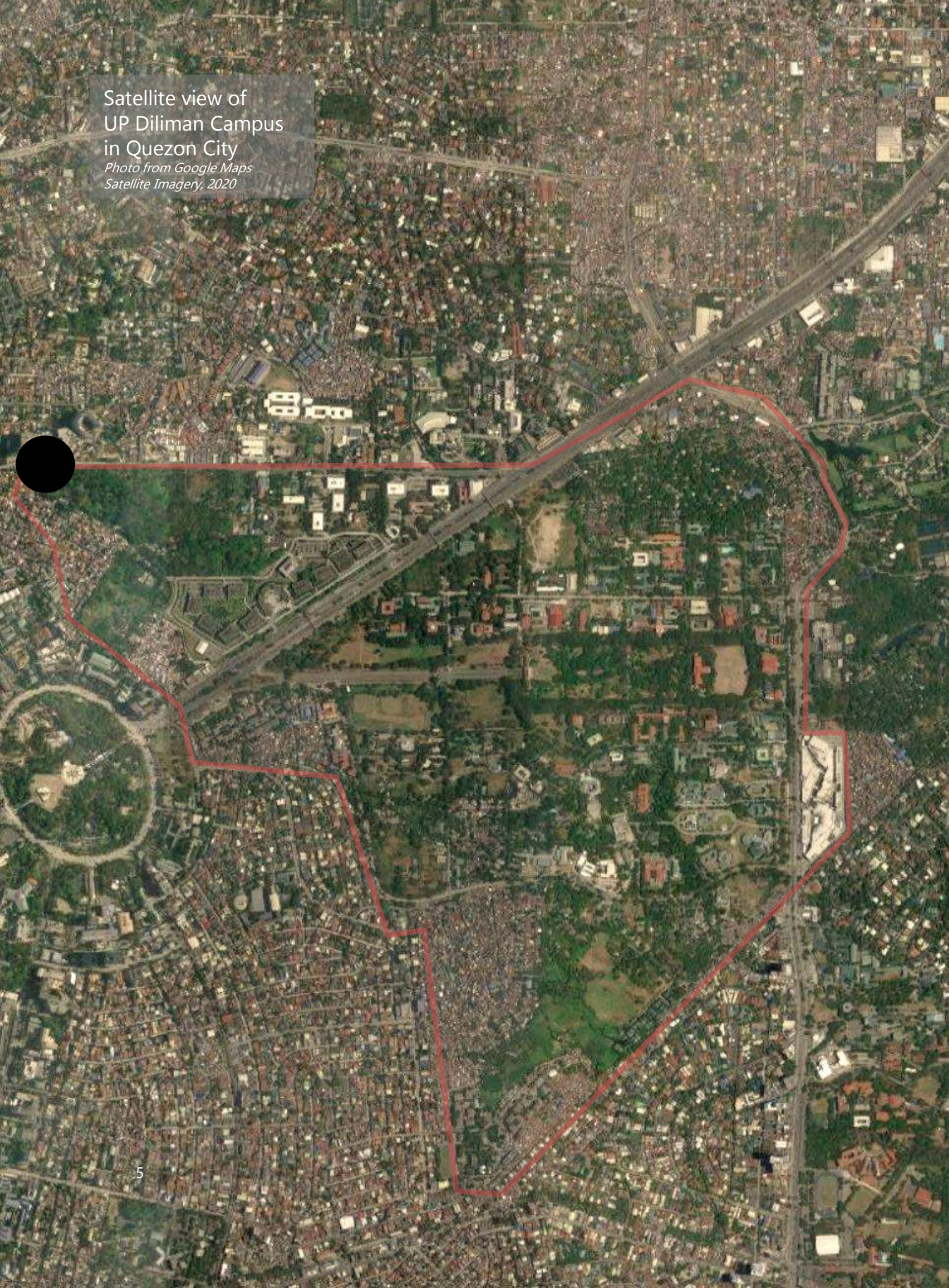
With the Ecological Principles in the Handbook as guides for all stakeholders of the University, it is encouraged that other units of the University Community engage in the creation of their own context-driven policies that ensure the protection and conservation of the University's biodiversity.

The policies for the University's biodiversity management were categorized under three Ecological Principles. These principles were created with the UPD's ecological, spatial, and social contexts in mind to ensure its appropriateness to the environment.

PRINCIPLE I

The University is a culturally significant ecological patch

The University of the Philippines Diliman is considered as one of the last green spaces of substantial size left in the whole of Metro Manila. It is unique with its relatively high biodiversity despite being part of an urban setting. Its green environments are closely integrated with the University's infrastructures wherein different types of life interact with each other. These environments are an aggregation of ecological units and are deemed to be self-regulating systems which need to be sustained. In order to do this, context-driven management must be implemented.



Satellite view of
UP Diliman Campus
in Quezon City
Photo from Google Maps
Satellite Imagery, 2020

A. PLANNING

The campus' built and natural environments feature unique characteristics that must be managed. Planning the use of spaces in a macro perspective ensures that biodiversity can be developed towards more sustainable ecological systems.

a) All developments shall comply with the 2012 Campus Land Use Plan of the University of the Philippines Diliman *(see Appendix A)*.

b) The University shall identify ecologically sensitive areas which support the 2012 Campus Land Use Plan to protect such areas from human activities.

c) All types of developments are expected to be non-destructive to the existing natural spaces of the University. An environmental impact assessment or a similar assessment shall be made prior to the start of any type of development which must be approved by the University.

d) Open spaces and other unbuilt areas are kept in their natural states (i.e. uncemented) as much as possible.

e) No structures are allowed to intervene with or destroy the physical and visual integrity of the University Carillon Tower.

d) Create a mosaic of habitats using a variety of native plants, trees and shrubs of different heights and flowering patterns. This will support as many animal, bird and insect species as possible throughout the year.

e) Spaces for wildlife interaction must be created and maintained. Areas where wildlife can engage in courtship, mating, and raising their young shall be undisturbed. These areas include mature trees, thick vegetation, meadows, streams, dense shrubs, ponds, or burrows, among others.

f) Old trees, trees with rot and dead wood, and existing rocks shall be retained unless they pose immediate danger to life and property. Nest sites and cover for wildlife should be provided by allowing some trees and shrubs to grow to maturity undisturbed.

B. HABITAT MANAGEMENT

a) Habitats shall be connected through ecological corridors and shall not be fragmented. Ecological corridors such as natural waterways and tree lines shall be preserved to promote habitat connectivity and shall not be fragmented.

b) Natural streams shall not be altered or removed especially if there are intact riparian vegetation.

c) Groundwater extraction is highly discouraged to protect the ecological integrity of the University's natural environment.

d) All wastewater must be treated before proper disposal. This reduces risk of contaminating water bodies that may be essential for wildlife and plants.

e) Grasslands, which are areas where grass naturally grows predominantly, shall not be disturbed consistent with the Open Spaces classification of the 2012 Campus Land Use Plan (see Appendix A).

f) All existing trees, whether native or non-native, shall be preserved as much as possible for ecological corridors.

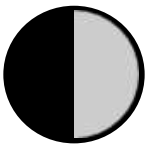
g) The use of native plants throughout the University is highly encouraged to promote biodiversity. This reduces fertilizer use and water consumption, preserving groundwater.

h) Conduct of construction activities shall consider natural behavior of identified species on the site.

Three migratory Black-winged Stilts (*Himantopus Himantopus*) foraging at the pond in Hardin ng Rosas

Photo by Jelaine Gan, 2019

Hardin ng Rosas
Photo by Giovanni Tapang



PRINCIPLE II

The University harmonizes its built and natural environments to maintain ecological integrity

The University of the Philippines Diliman as an academic institution is accountable for the status of its natural environments and its biodiversity. The University is responsible for guiding its people and communities for the betterment of both built and natural environments, and for further maintaining its ecological integrity.

UP Film Center and its greens.
Photo by Arland Mariano, 2009

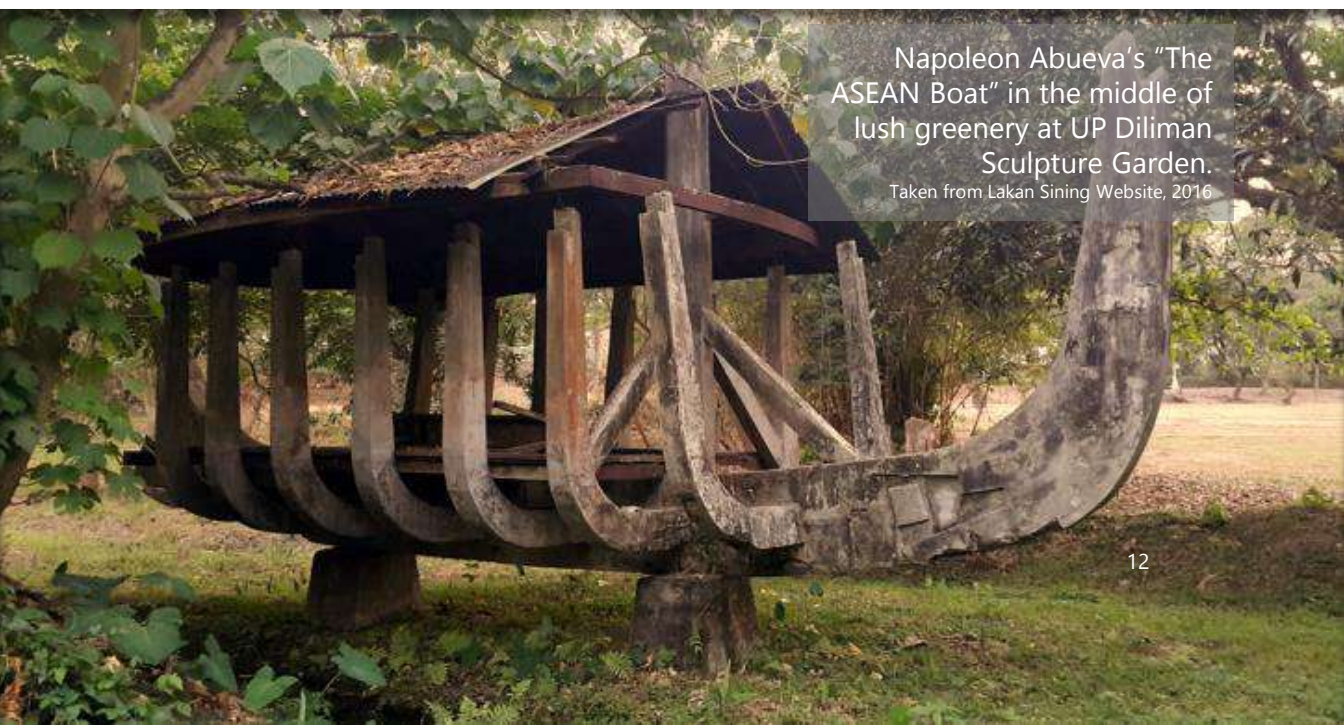
A. INFRASTRUCTURE

The links between built structures and natural spaces of the campus are part of what makes the University unique as an ecological patch. Proper management is important in this combination of built and natural environments.

a) The ecological and cultural significance of buildings, sites and their elements shall be considered at all times prior to the conduct of any activity related to new developments that may affect them.

b) With biodiversity being connected with the built environment, historic buildings, landscape features, objects of recognized value to a place, and archaeologically valuable sites shall not be disturbed as much as possible in the construction of new developments as these sites have established ecological values and could be critically relevant to the existing natural environment.

c) The sensitivity of the University to biodiversity shall be emphasized through prioritizing built-up areas and brown fields as sites for new developments.



Napoleon Abueva's "The ASEAN Boat" in the middle of lush greenery at UP Diliman Sculpture Garden.
Taken from Lakan Sining Website, 2016

B. MAINTENANCE

In managing the biodiversity within the University, it is important that existing infrastructure be maintained properly to harmonize with existing ecological systems with the built environment.

1. Built Structures Maintenance

a) All built structures must be thoroughly checked for the presence of existing wildlife. Maintenance activities, such as fumigations, and general building maintenance shall ensure that any wildlife species will not be affected.

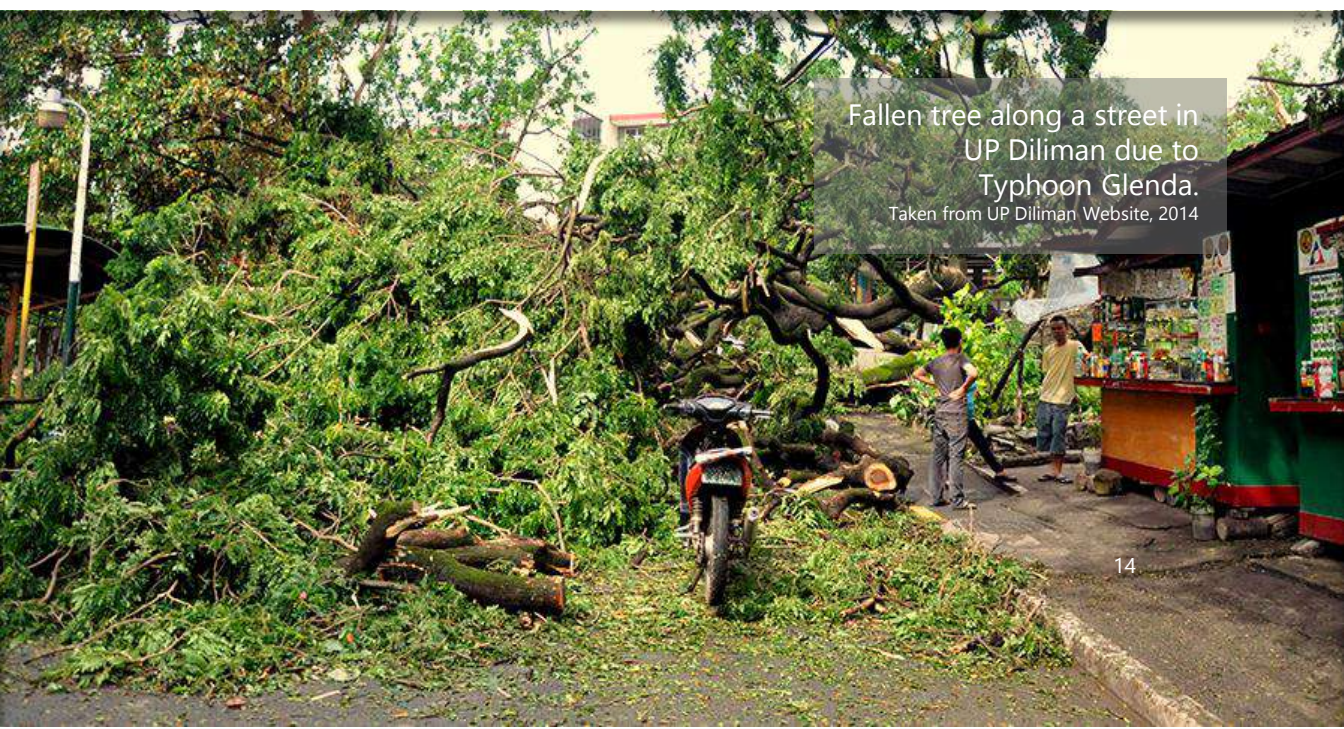
b) Existing habitats on built structures must be reported for the inventory of the University. Alterations including construction of temporary and permanent structures that may disturb such habitats shall be approved first by the University before implementation.

c) Wildlife on built structures shall be undisturbed unless health and safety of the campus community are compromised.

Red-eared Slider (*Trachemys scripta elegans*) at Palma Hall pond.
Photo by Donn Bernal, 2019

2. Landscape Maintenance

a) Landscapes shall be maintained in a manner that will benefit existing wildlife without compromising public safety.
b) Adopt a managed mowing schedule and ensure that lawns are allowed to grow at a certain height that will allow wildlife to thrive.
c) Dominant vegetation such as overgrown grass shall be reduced, but shall not be over-managed.
d) Employ measures to prevent the spread of invasive non-native species.
e) Favor natural regeneration of trees (e.g. self-seeding, suckering) by preserving wildlings.
f) Allow some time to pass before tidying up or reversing impacts of apparent catastrophes such as storm damage or disease incidents, unless these pose threats to human health and safety, which require prompt action.
g) Vegetation for removal shall be kept in situ within twenty-four (24) hours to allow for insects living in those cut vegetation to return to the habitat.
h) Integrated pest management strategies are highly recommended.



Fallen tree along a street in UP Diliman due to Typhoon Glenda.
Taken from UP Diliman Website, 2014

C. NEW DEVELOPMENTS

To enhance the capacity of the University as an academic institution, any development must be integrated with the natural environment to minimize ecological impacts.

1. BUILDINGS

Pre-construction / Design Phase

a) New developments shall undergo environmental impact assessments (subject to applicability and scope).

b) Building designs and construction are encouraged to use commercially available materials to reduce pollution.

c) The flexibility and adaptability of a building to multiple uses in terms of facilities are encouraged. This will maximize the utility of the space, thus helping in the preservation of existing natural environments.

d) The use of native or familiar materials is highly encouraged. This allows wildlife to more easily adapt to the new developments.

e) Enclosed spaces shall be provided with openings that are large enough for any wildlife to escape. Safety of wildlife shall be considered in any activity related to new developments.

f) The use of reflective and clear glass in any type of construction or infrastructure shall be minimized as this may appear to create clear passage, or reflect the outside environment causing injury to birds or other wildlife that fly into them. If use of such material cannot be avoided, it is recommended that the reflections be reduced. The use of visual markers with at least a 5x10 centimeter gap dimension can adequately prevent bird collisions. Such markers may include etching, fritting, sunshades, louvres, screens, blinds, and netting.

Construction

g) Construction equipment and structures that are to be built are recommended to have openings that allow wildlife to escape.

h) Sustainable construction strategies that limit waste shall be observed to minimize pollution.

i) Activities of reduction, reuse and recycling in construction are encouraged across various developments on campus. Potential waste and salvage materials from demolished structures may encroach upon and damage habitats.

j) Construct-and-demolish materials shall be minimized in construction.

k) Minimal use of fuel-operated machineries is encouraged to reduce smoke emissions.

l) Light-emitting devices shall be used strategically to avoid disturbance to wildlife. Light pollution can attract and disorient birds, bats, or other animals. Light spill shall be controlled through the use of targeted lighting and shielding.

m) Equipment that produces ground vibration shall be used only when necessary to reduce ground disturbance.

Benton Hall using window screens that can act as visual cues for wildlife
Photo by Ramon Velasquez, 2013

Post-Construction

n) Potential sources of toxic materials from existing facilities (e.g. paints, caulks and sealants, and asbestos) shall be regulated in terms of use and be disposed properly to protect the existing natural environment within the vicinity of a development. The use of materials that can be classified as pollutants or are toxic are highly discouraged. These include materials such as, but not limited to, asbestos and lead, paints, coatings and rubbers with flame retardants, and detergents.

o) All construction-related materials located over natural areas such as soil or grass must be removed immediately to prevent soil compaction. Once removed, such areas shall be aerated to allow for proper air and water flow.

Wastewater Treatment Plant of UP Diliman
Photo by Michael Gabriel, 2017

2. LANDSCAPES

Pre-construction / Design Phase

a) Cutting of trees is generally prohibited. The decision to cut trees shall be strongly justified and shall be approved by the University and the Department of Environment and Natural Resources (DENR).

b) Developments intending to introduce plants shall use native plant species to aid in the preservation of native wildlife habitats. Where feasible, vegetation which provide pollen, nectar, fruits, and seeds shall be used in landscaping.

c) A Protected Root Zone (PRZ) must be established to protect root systems of trees from soil compaction or damage from equipment. The root system of a tree is generally as wide as its canopy. This is where the PRZ must be designated with a safe zone of at least 1 meter around it.

d) Vegetated slope mitigation systems for any slope altered shall be used.

e) The use of porous materials for paved pathways is highly encouraged as this helps reduce surface water runoff.

Construction

f) Landscape construction activities shall be done with due consideration of their impacts to the environment.

g) Temporary construction-related structures such as, but not limited to, access roads, barracks, storehouses and motor pools, shall be placed with minimal impacts to existing biodiversity and be removed immediately after completion.

h) Soil compaction shall be avoided through proper designation of equipment routes in a construction. Soil can be compacted by heavy equipment frequently passing through an area in construction sites resulting to root damage of trees.

i) Appropriate root and trunk protection strategies for trees in construction sites such as establishing a protected root zone, protective cover, and trunk protection, shall be applied.

j) Buffer zones for ongoing construction must be established to protect natural vegetation and wildlife adjacent to the site.
k) Introduction of foreign soil material is highly discouraged.

Post-Construction

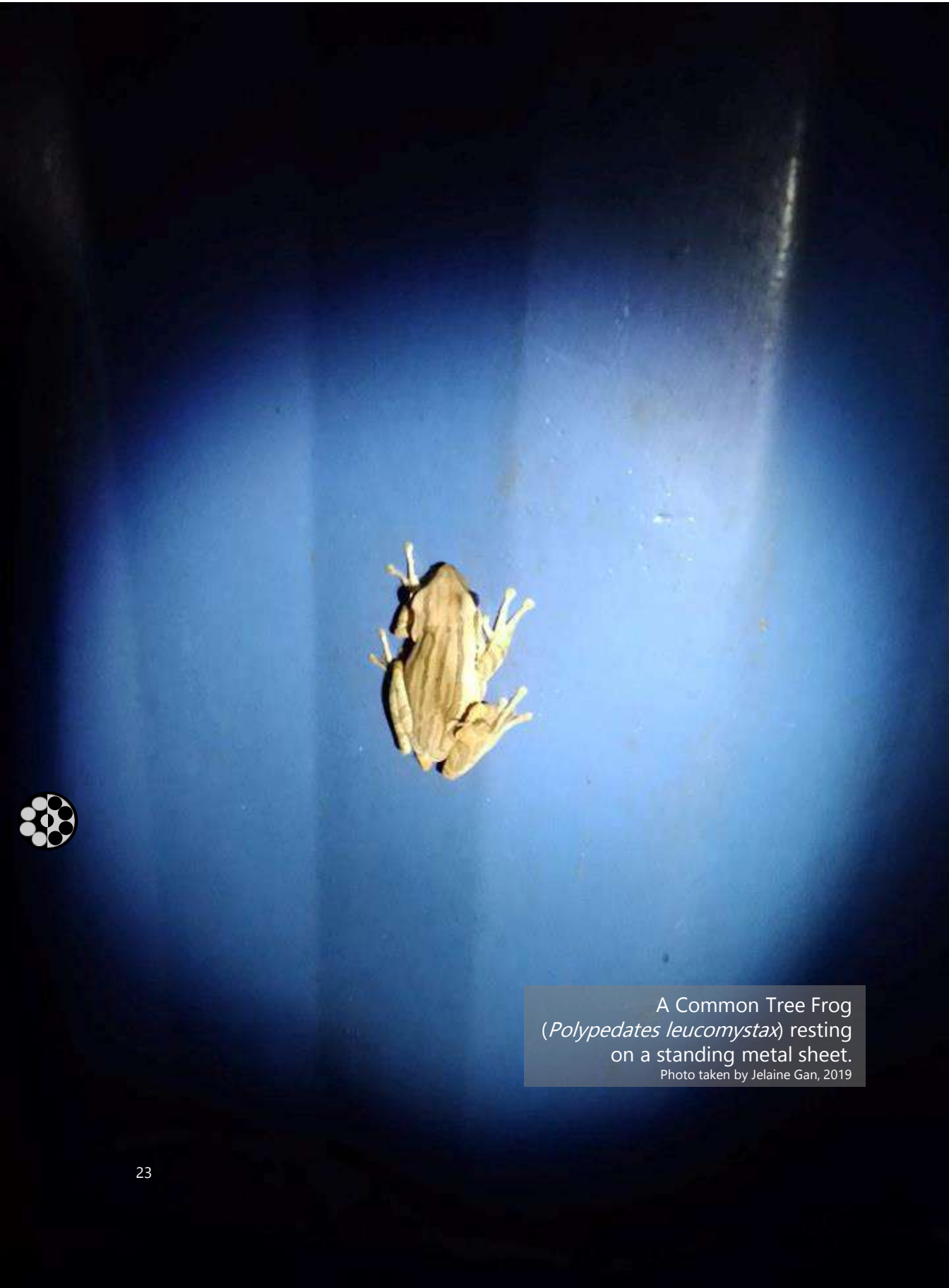
l) To prevent tree degradation, vertical mulching and aeration is highly encouraged after construction. Tree degradation due to construction may appear after a few months. Leaf wilts, slow growth, or general discoloration on trees may be indicators of construction damage.
m) All excavated soil must be returned to its original location. It is important to keep the layer position of the topsoil to preserve important nutrients inside.
n) Wastewater must always be treated before release.

3. ROAD CONSTRUCTION AND IMPROVEMENT

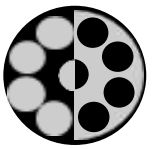
a) Access roads for construction shall be placed in areas where there will be minimal disturbances to the natural environment.
b) Constructing, placing, or maintaining any kind of road, trail, structure, fence, enclosure, communication equipment, and other facilities shall consider its impact on the existing wildlife within the vicinity during and after construction.
c) Affected areas and exposed soil as results of road construction shall be rehabilitated immediately.
d) Designs of all roads or passageways shall accommodate wildlife movement.
e) Road development shall not impede wildlife movement.

A Tailed Jay (*Graphium agamemnon*) inside the building of the Institute of Biology, UP Diliman
Photo by Teo Eugenio, 2019

A group of Greater Musky Fruit Bats (*Ptenochirus jagori)* huddled under a ceiling in Plaridel Hall.
Photo by John Pueblo and Paulo Kim, 2019



A Common Tree Frog (*Polypedates leucomystax*) resting on a standing metal sheet.
Photo taken by Jelaine Gan, 2019



PRINCIPLE III

The University nurtures a biodiverse and interdependent community

The University of the Philippines Diliman acknowledges that the protection and conservation of the genetic, species, and habitat diversity are needed to create environmental stability. All interactions between species of different environments create connections of varying strengths that are important in the creation of a biodiverse and interdependent community.

Narra tree (*Pterocarpus indicus*) in bloom around the buildings of the College of Architecture, UP Diliman
Photo by Patrick Gozon, 2013

A. USE OF SPACE

Spaces within the campus serve multiple purposes for the biotic population, which range from transitory habitats to breeding areas of multiple living organisms. Human activity in such areas shall consider all types of life.

1. GENERAL USE

a) We are a people-friendly university. Everyone is welcome to use the spaces of the University. A person or a group of persons shall only be asked to leave if their behavior presents threats to themselves or to others, and if their behavior is deemed to result in damage to property or disturbance to the environment.

b) All unauthorized structures and installations, whether of academic or non-academic nature, especially those which disturb the natural environment, are subject to prompt dismantling and removal.

c) Litter, waste, and refuse generated shall be properly disposed during and immediately after each activity.

d) Damaging and/or removing of any natural features, including streams, slopes, mounds, and any plant or animal species is not permitted.

e) Hunting, killing, confining, or deliberately interfering with the wildlife is prohibited unless a research permit for such activities with ethical proof is secured and granted.

f) Indiscriminate introduction of plants and animals as in the case of, but not limited to, random disposal of seeds and release of animals within the campus is not permitted.

g) The use of fire within the campus including campfires, open-fire cooking, lantern-flying, use of fireworks, or any activities which include the creation of fire shall be subject to University approval.

h) The University shall manage its free-roaming community animals through a Trap-Neuter-Vaccinate-Release (TNVR) Program.

2. ACCESS AND MOBILITY

a) Physical access to highly ecologically sensitive areas shall be subject to University approval.
b) Public transportation within the campus is encouraged to manage the number of vehicles on-campus.
c) Non-motorized transportation is highly encouraged given its little or no adverse environmental impact.

3. WILDLIFE PROTECTION

a) The University is home to a diversity of wildlife. If a person living within the University or its surrounding communities encounters or captures wildlife within their personal properties, that person must coordinate with the University for the safe return of said wildlife to its habitat.
b) Killing, hunting, or in any way deliberately disturbing wildlife in their natural habitat is strictly prohibited. Natural spaces must be left alone. Everyone is encouraged to report anyone who disturbs or destroys the natural spaces of the campus.
c) The conduct of academic activities is allowed provided that these do not disturb wildlife permanently and is given prior permission by the University.

4. EVENTS

a) Activities that propose changes, alterations, or additions to the natural environment, whether permanent, or temporary, shall be regulated. Proponents shall monitor and report observed impacts in connection with the use of natural space to the University.

b) The proponent must conduct and submit, as part of their proposal, assessments of the environmental impacts of the conduct of their event for approval of the University.

c) Events conducted in natural environments shall be non-destructive. Fieldworks, surveys, researches, and related activities must be conducted with proper consideration of its impact on the natural spaces of the University. Proponents of such activities must present a proposal which must be approved by their respective units.

d) Conduct of any event shall be limited to the physical extents and duration approved by the University.

e) Proposed changes, alterations, and/or additions to approved events shall bear no significant damage to the area.

f) Utilities and equipment to be used in any type of activity shall be energy-efficient and environment-friendly to minimize unnecessary disturbance to the existing ecological systems.

g) Materials which cover large areas for an extended period of time should allow an acceptable amount of sunlight, water flow, and air movement within its coverage to prevent damage to habitats.

h) Equipment which produce sound or vibrations must be regulated to minimize ground noise pollution and disturbance.

i) Light-emitting devices and lasers shall not disturb wildlife as much as possible.

j) Fossicking, where soil and vegetation is disturbed to find and collect minerals, gemstones and historical objects, is generally prohibited inside the University.

k) Archaeological excavations are only allowed for academic purposes. This should be coordinated and approved by the University prior digging activities.

l) The use of devices that may disturb existing wildlife shall be minimized. Unmanned vehicles such as drones, remote-controlled cars, boats, and other related devices for research or survey purposes must be approved by the University prior to operation.

m) Events involving large crowds such as concerts, fairs, and festivals, may only be conducted within areas with low ecological sensitivity.

n) Loud events such as concerts, parties, celebrations, and other related activities shall be held away from highly ecologically sensitive areas to reduce disturbance.

o) In tree-planting activities, it is highly recommended that only non-invasive native species shall be planted in areas designated by the University.

p) Single-use non-biodegradable items and easily flammable materials are highly discouraged. Such materials shall only be used if necessary.

q) Releasing of balloons, lanterns, or any objects which cannot be retrieved immediately is highly discouraged.

B. WASTE MANAGEMENT

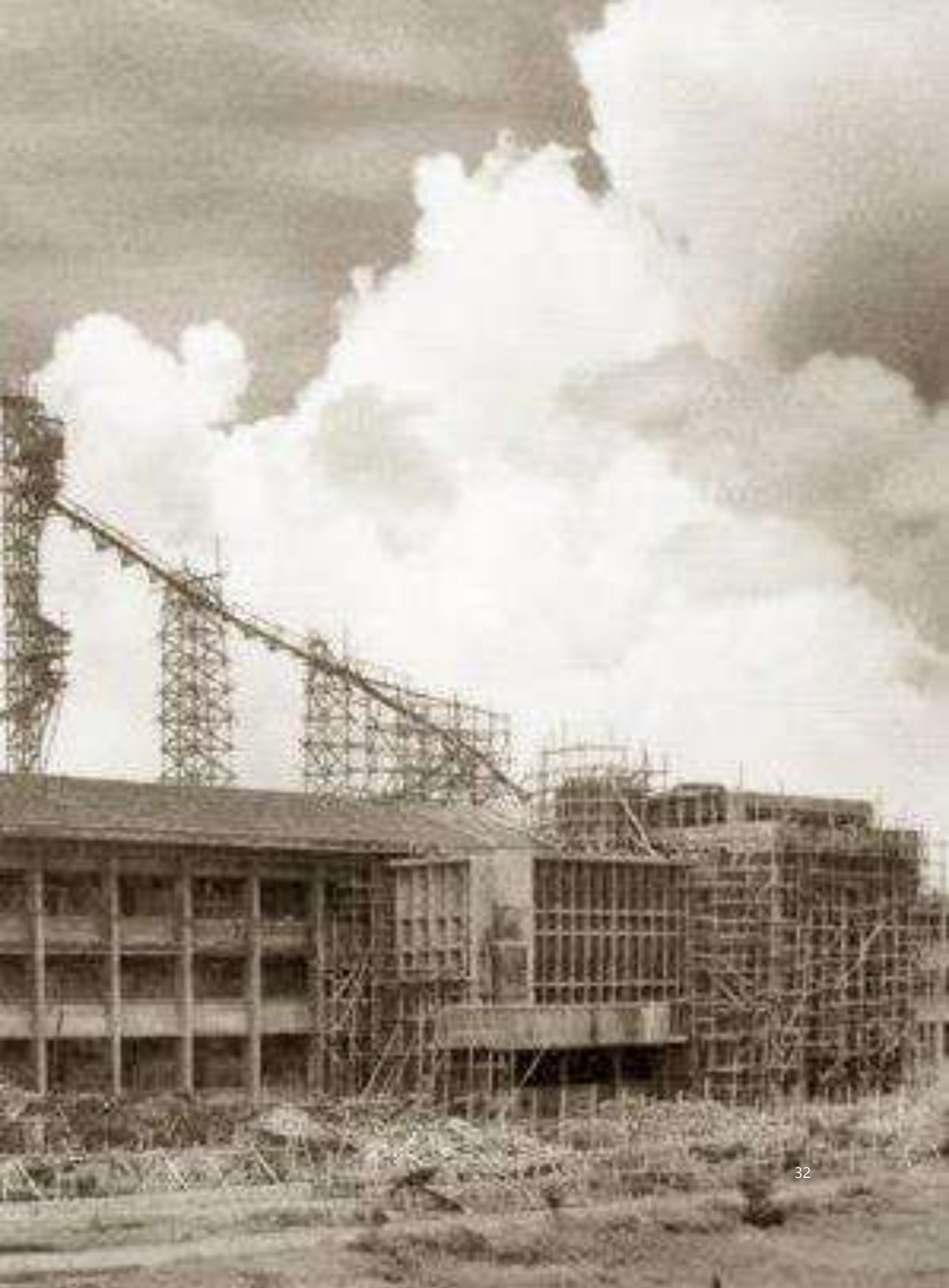
The University continuously generates wastes that must be managed. Proper waste management is important to maintain, if not improve, the status of the University's biodiversity.

a) The Waste Management Plan of the University shall encourage minimization, waste recycling, and proper disposal of wastes.

b) Hazardous wastes shall be properly labelled and safely stored until their collection by authorized toxic waste collectors.

c) Oils and other liquids shall be disposed properly. Oil traps and filters shall be installed at source.

The construction of the College of Arts and Sciences, Palma Hall.
Photo from the Office of the Campus Architect, UP Diliman



Pipes protruding along a canopy of Kalachuchi trees near the UP Lagoon.
Photo by Arland Mariano, 2009

ETHICS
IN BIODIVERSITY MANAGEMENT

Everyone is responsible in keeping harmony with all forms of life. The University must therefore uphold its academic mandate with due responsibility over the impact of its activities on the biodiversity of the campus.

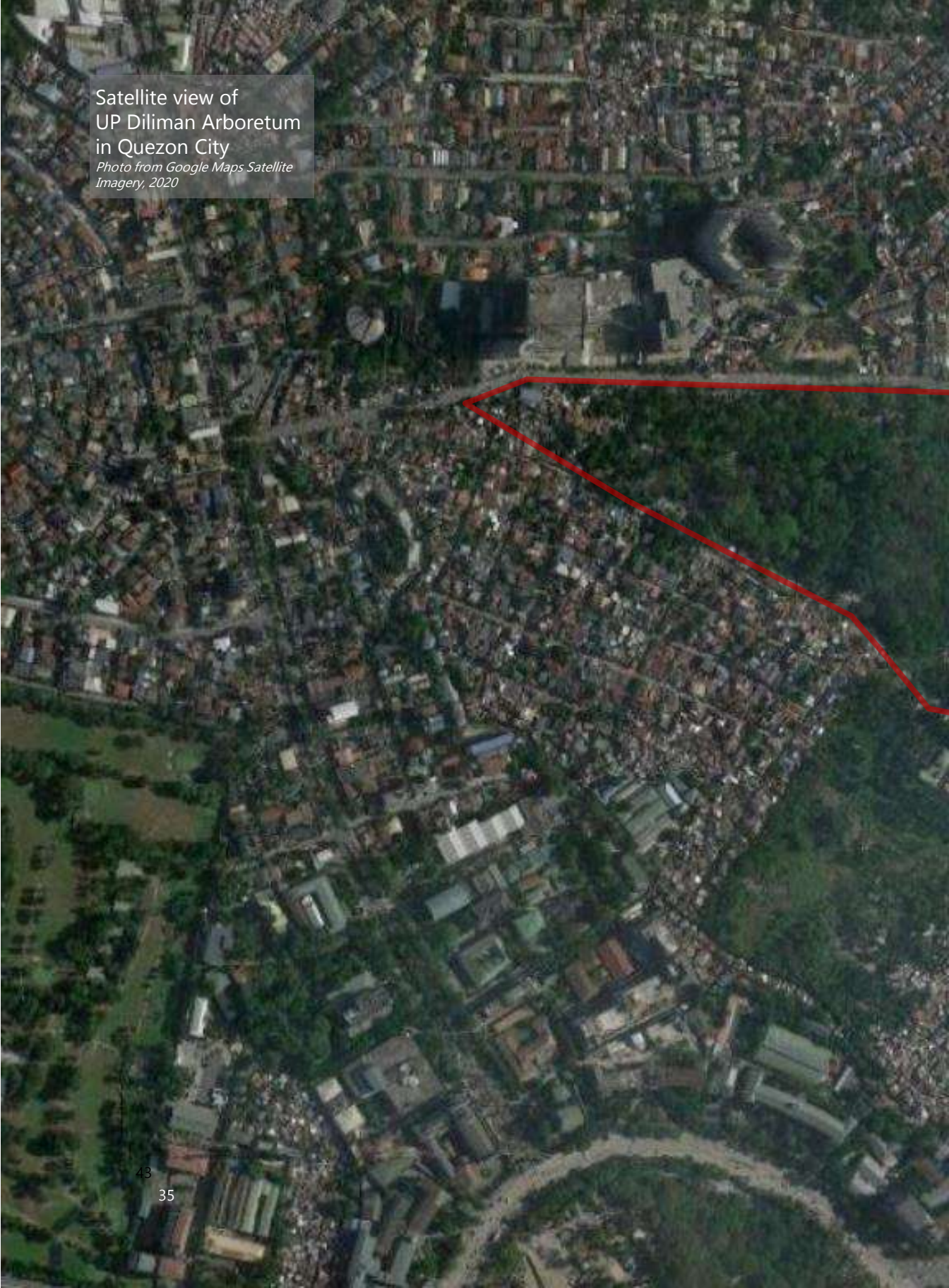
i. In any type of development, event, or activity, existing life inside the campus must be welcome to access natural spaces given that these spaces provide neutral spatial characteristics for both humans and wildlife.

ii. All species, ecosystems, and landscapes have innate values regardless of its relationship with the welfare of humans. All types of life or system shall be considered in making decisions.

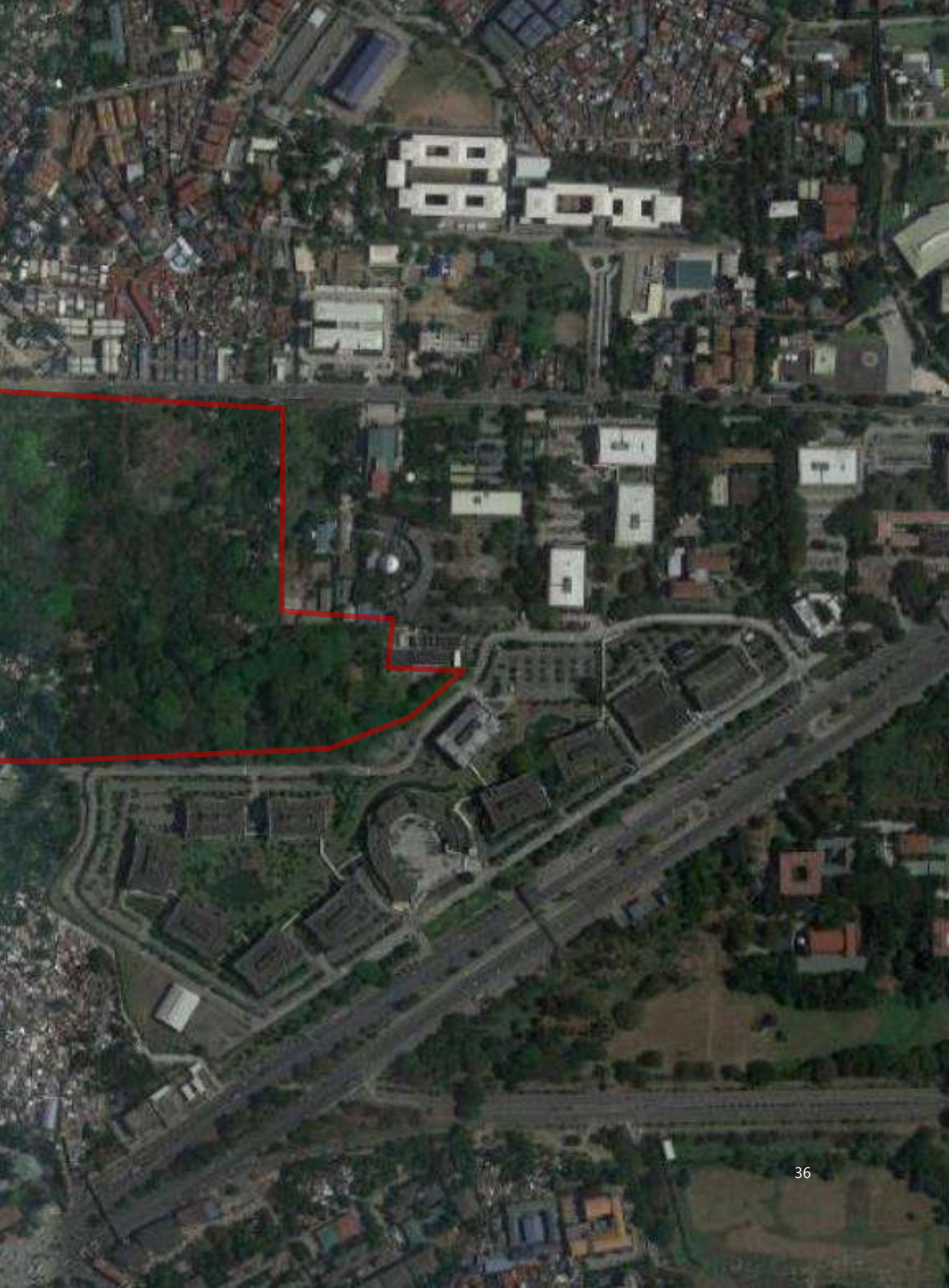
iii. All activities that impact the ecology of the University shall maintain, if not improve its current overall value. The potential benefits to the overall environment shall generally outweigh negative impacts caused by such activities.

iv. Planning of human activities shall include all existing life inside the campus. Careful planning must be done in order to assess the effects and repercussions of any event to the natural environment.

v. Human activities must respect the natural environment and its components in terms of the use of space and natural resources. Unnecessary activities shall be limited and regulated in order to maintain, if not improve, the current state of the natural environment.



Satellite view of
UP Diliman Arboretum
in Quezon City
Photo from Google Maps Satellite Imagery, 2020



A Collared Kingfisher (*Todiramphus chloris*) flies over campus
Photo by Adrian Constantino, 2019

GLOSSARY

biodiversity - *variability of living organisms in a given area*

built environment – *artificial / human-made structures, features, and facilities viewed collectively as an environment in which people live and work*

community - *the people living within the boundaries of the University*

ecological integrity - *the ability of an ecosystem to support and maintain ecological processes and a diverse community of organisms*

ecological patch - *an area of habitat differing from its surroundings, often the smallest ecologically distinct landscape feature in a landscape mapping and classification system*

ecological systems - *networks of different organisms that exist in nature, including anthropologic elements*

ecological units - *the ecosystem as its fundamental unit and can include subjects such as population, community, groups, and specifically the ecosystem as its fundamental unit*

ecologically sensitive areas – *natural spaces within the University that are vulnerable to human activities due to their unique environmental characteristics and composition*

ecosystem - *a dynamic complex of plant, animal, and microorganism communities and non-living elements, all interacting as a functional unit*

events – *activities done within the University that last for a maximum duration of one week*

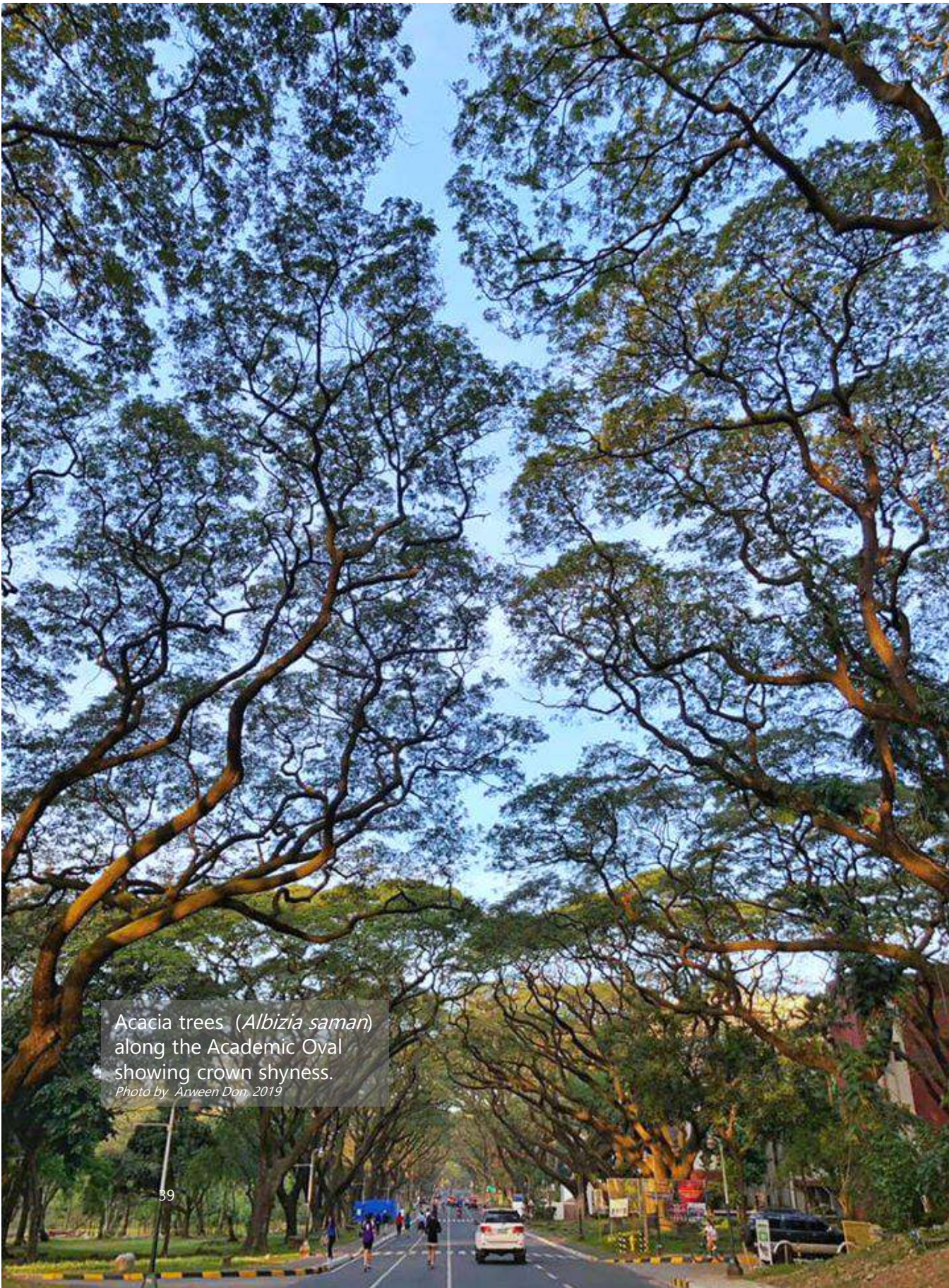
natural environment - *environments wherein living and non-living organisms occur or inhabit without the interference of humans*

riparian vegetation - *plant growth found at the banks of rivers and streams, serving as transition zones between aquatic and terrestrial habitats*

tree – *a woody perennial plant usually having one main stem with few or no branches on its lower part*

University - *the University of the Philippines Diliman as a place, and the community within its physical boundaries*

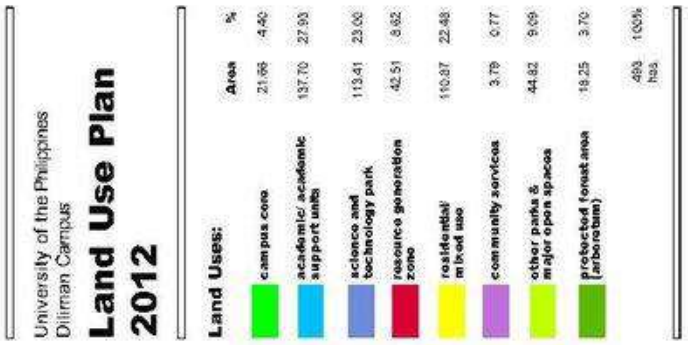
wastewater – *greywater or water that has been used and is for disposal*

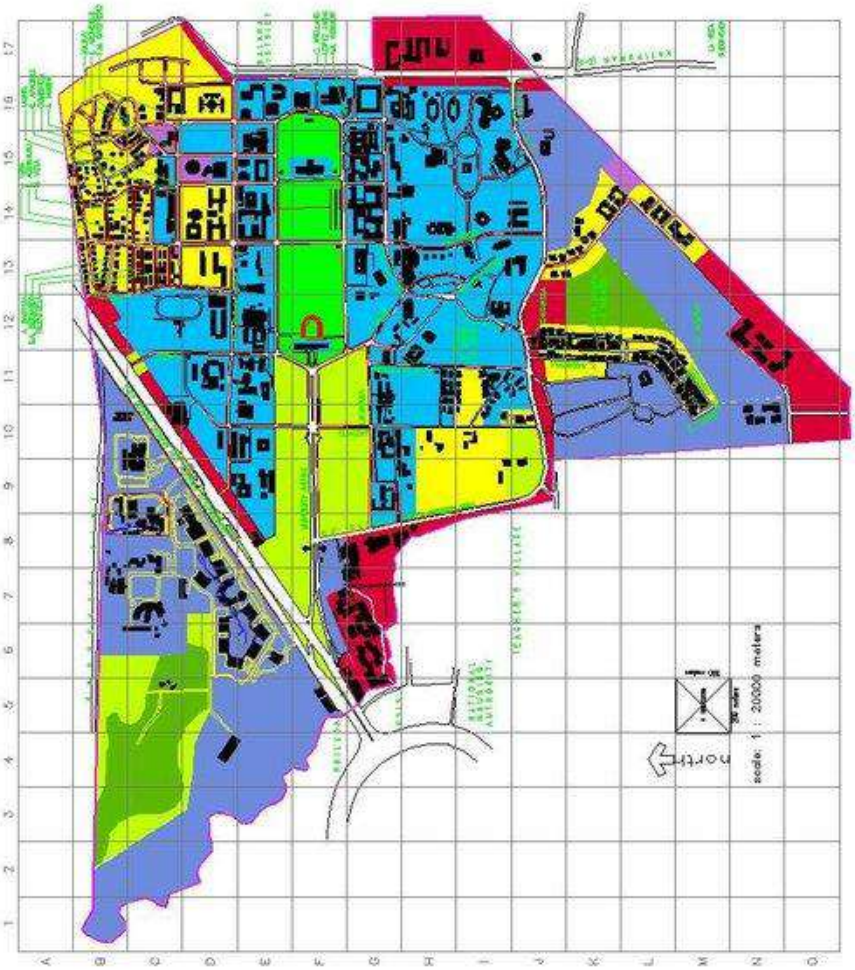


Acacia trees (*Albizia saman*) along the Academic Oval showing crown shyness.
Photo by Arween Don, 2019

Appendix A

UP Diliman Land Use Plan 2012 and Land Use Classifications Descriptions





LAND USE CLASSIFICATIONS DESCRIPTIONS

Campus Core (21.66 has.)
The historic and unifying center of the UP Diliman campus, wherein its pioneer buildings, heritage trees, and other campus elements shall be maintained and shall inspire all future developments on-campus.

Academic / Academic Support Units (137.70 has.)
Units and zones where the faculty, students, and staff of UP Diliman shall engage in the basic academic activities of instruction, research and extension, with the facilitation of basic activities, which shall collectively lead to academic excellence.

Although the entire 493-hectare area of the UP Diliman campus was designated by Manuel L. Quezon "to provide an adequate educational plan in an atmosphere conducive to moral and scholastic standard appropriate to our highest institution of learning" (Quezon City Public Library), the Academic Units contain the specific sites within the UP Diliman campus where academic infrastructure, such as classrooms, laboratories, libraries and exhibition areas, shall be located.

Academic Support Units, such as college-based administrative facilities and campus-wide administrative services, such as Quezon Hall, Gonzales Hall (Main Library) and the Office of the University Registrar, shall also be located within those areas designated as Academic / Academic Support Units, since the University's administrative personnel facilitate the academic activities of the faculty, students and staff of UP Diliman.

The creation of an environment conducive to academic pursuit requires the combination of built and green environment. The Academic / Academic Support Units shall therefore be comprised of both buildings and green spaces.

Science and Technology Park (113.41 has.)
Zones where UP Diliman, as the academic institution, links the business/industry, for the generation of the basic materials and technological innovations that shall drive the knowledge economy.

> Similar to the technopoles concept of Manuel Castells and Peter Hall (1994), which "describe cities or areas within cities devoted to research and innovation in high technology", Science and Technology Parks shall generally be planned developments manifesting the industry-academe linkage. According to Castells and Hall, a "significant number...have resulted from various kinds of cooperation or partnership between the public and private sectors. They are promoted by central or regional or local governments, often in association with universities, together with the private companies that occupy the resulting spaces... [More] than just plots to rent, [they] also contain significant institutions of a quasi-public or nonprofit type... which are specifically implanted there in order to help in the generation of new information [or knowledge]. For this is the function of the technopole [or Science and Technology Park]: it is also to generate the basic materials of the informational [or knowledge] economy."

Resource Generation Zone (42.51 has.)
Zones of the campus allowing for the generation of resources, both income and knowledge-based, the benefits of which shall rebound to UP Diliman and its faculty, students, and staff.

> One manner in which UP Diliman can generate resources is through land leases. RA 9500, or the University of the Philippines Charter of 2008, specifically Section 22c, allows this: "The Board may plan, design, approve and/or cause the implementation of land leases: *Provided,* That such mechanisms and arrangements shall sustain and protect the environment in accordance with the law, and be exclusive of the academic core zone of the campuses of the University of the Philippines: *Provided, further,* That such mechanisms and arrangements shall not conflict with the academic mission of the national university."

As opposed to Science and Technology Parks, in which the University is an active participant in the academe-business linkage, the University is instead a passive recipient of the benefits garnered from the Resource Generation Zone.

Faculty & Staff Housing (95.18 has.)
Areas on-campus designated for residential and related activity needs of students and faculty. It shall accommodate all the necessary amenities for supported on-campus living, such as dining halls, study halls, as well as the provision of basic goods and services.

Dormitories with Support Facilities (15.69 has.)
Zones which shall provide for the housing and related activity needs of students and faculty. It shall accommodate all the necessary amenities for supported on-campus living, such as dining halls, study halls, as well as the provision of basic goods and services.

Community Services (3.79 has.)
Zones designated for the sitting of community facilities such as the UP Health Service, the Parish of the Holy Sacrifice and the Church of the Risen Lord, that shall communally serve the University community, including the immediate families of faculty, students, and staff.

Other Parks and Major Open Spaces (44.82 has.)
The large tracts of green open spaces of the campus, allowing for a variety of undisturbed flora and fauna and the natural collection of surface run-off during heavy rains.

Protected Forest Area (18.25 has.)
The protected Forest Area, also known as the Arboretum, being the last natural forest of the University of the Philippines Diliman as well as Quezon City, shall remain untouched and protected in accordance with law. In relation to use by the faculty, students, and staff of UP Diliman, it shall be for academic purposes with minimum or no negative intervention.

Appendix B

The Arboretum : a Priority Protection Zone
(Development and Planning Committee Policies on Arboretum)

The Arboretum is a Priority Protection Zone, and as such, shall not be subject to any invasive development or other activities that will undermine its environmental integrity.

Consistent with the UP Diliman Land Use Plan, the following guidelines shall be strictly enforced in the Arboretum as an officially designated Priority Protection Zone within the 98.5-hectare North Science and Technology Park Zone, as well as other campus development projects and activities that may directly or indirectly impact on the Arboretum.

A. Development within the Arboretum

- The Arboretum Zone, as delineated, covers an area of seventeen (17) hectares, including its buffer zone.
- All developers undertaking development in the North S&T Park Zone shall assume the responsibility of serving as forest custodians under the direct supervision and control of the University.
- The location and design of particular facilities shall not create visual or noise disturbances that will compromise, impair or destroy the learning and park ambiance of the UP Diliman area.
- All development proponents shall catalogue the existing flora and fauna of the site and build a sanctuary for them should they be affected upon by the development. They shall also maintain the existing ground water quality and ensure that it will not be adversely affected by the proposed development.
- The existing air quality shall be improved through appropriate measures.

B. Preservation of the Arboretum

The DPC shall ensure that the following terms and conditions shall be enforced:

- The use of the area will have nature preservation as the major objective and nature appreciation as secondary. Development and Planning Policies for UP Diliman 2005 07.2

- The biodiversity and ecological features of the UP Arboretum shall be conserved and enhanced.
- Activities and facilities compatible or consistent with the preservation, public appreciation of the Arboretum, and water recycling may be allowed, with the prior consent of UP.
- Strict controls including provision for firebreaks and buffer zones from the developed areas shall be implemented in order to avoid disturbance and impairment of the area's natural conditions.

C. Access to the Arboretum

- The public may be provided reasonable access to the area for as long as this is exercised responsibly. The proper upkeep and maintenance of the area will be the responsibility of the developer.
- Harmful human intrusion shall be prevented.
- Vehicles with internal combustion engines shall not be allowed within the Arboretum.

D. Compliance with Environmental Protection Laws

- The proposed development scheme of the proponent should not adversely affect the water and air quality standards set for the area by the Environmental Management Bureau (EMB) under RA 8749, or The Philippine Clean Air Act of 1999, RA 9003, or The Ecological Solid Waste Management Act of 2000 and RA 9275, or The Philippine Clean Water Act of 2004. In general, the proponent is hereby required to adopt the standards for emission and discharge set by the Environmental Management Bureau of the Department of Environment and Natural Resources.
- For Noise Level Control, the proponent shall comply with the standards of the Department of Environment and Natural Resources, more particularly the Environmental Management Bureau.

Appendix C

Relevant National Policies

As of the publication of this Handbook, the following are relevant national policies for biodiversity management and environmental protection.

PRESIDENTIAL DECREE NO. 984 – THE POLLUTION CONTROL LAW
Pollution on the water, air, and land resources must be prevented, controlled, and abated.

PRESIDENTIAL DECREE NO. 1151 - PHILIPPINE ENVIRONMENTAL POLICY
Environmental quality optimum for any person's conducive living must be attained and maintained.

PRESIDENTIAL DECREE NO. 1152 - THE PHILIPPINE ENVIRONMENT CODE
Air quality must never harm public health. Plant, animal life, and related properties must be protected while promoting socio-economic development.

REPUBLIC ACT NO. 3571 - AN ACT TO PROHIBIT THE CUTTING, DESTROYING OR INJURING OF PLANTED OR GROWING TREES, FLOWERING PLANTS AND SHRUBS OR PLANTS OF SCENIC VALUE ALONG PUBLIC ROADS, IN PLAZAS, PARKS, SCHOOL PREMISES OR IN ANY OTHER PUBLIC GROUND.
Growing trees, flowering plants and shrubs or plants of ornamental value on any public ground must be cherished, protected, and conserved.

ACT NO. 3983 - AN ACT TO PROTECT WILD FLOWERS AND PLANTS IN THE PHILIPPINE ISLANDS AND TO PRESCRIBE CONDITIONS UNDER WHICH THEY MAY BE COLLECTED, KEPT, SOLD, EXPORTED, AND FOR OTHER PURPOSES
Any protected flowering plant, fern, orchid, lycopod, or club moss, or other wild plants shall not be collected, killed, mutilated, or have in possession, sold, or distributed.

REPUBLIC ACT NO. 8749 - PHILIPPINE CLEAN AIR ACT OF 1999

A balanced and healthy ecology is a right of the people. The global environment must be promoted and protected by the government to attain sustainable development. It is recognized that the cleaning of the habitat and environment is area-based.

REPUBLIC ACT 9003 - ECOLOGICAL SOLID WASTE MANAGEMENT ACT OF 2000

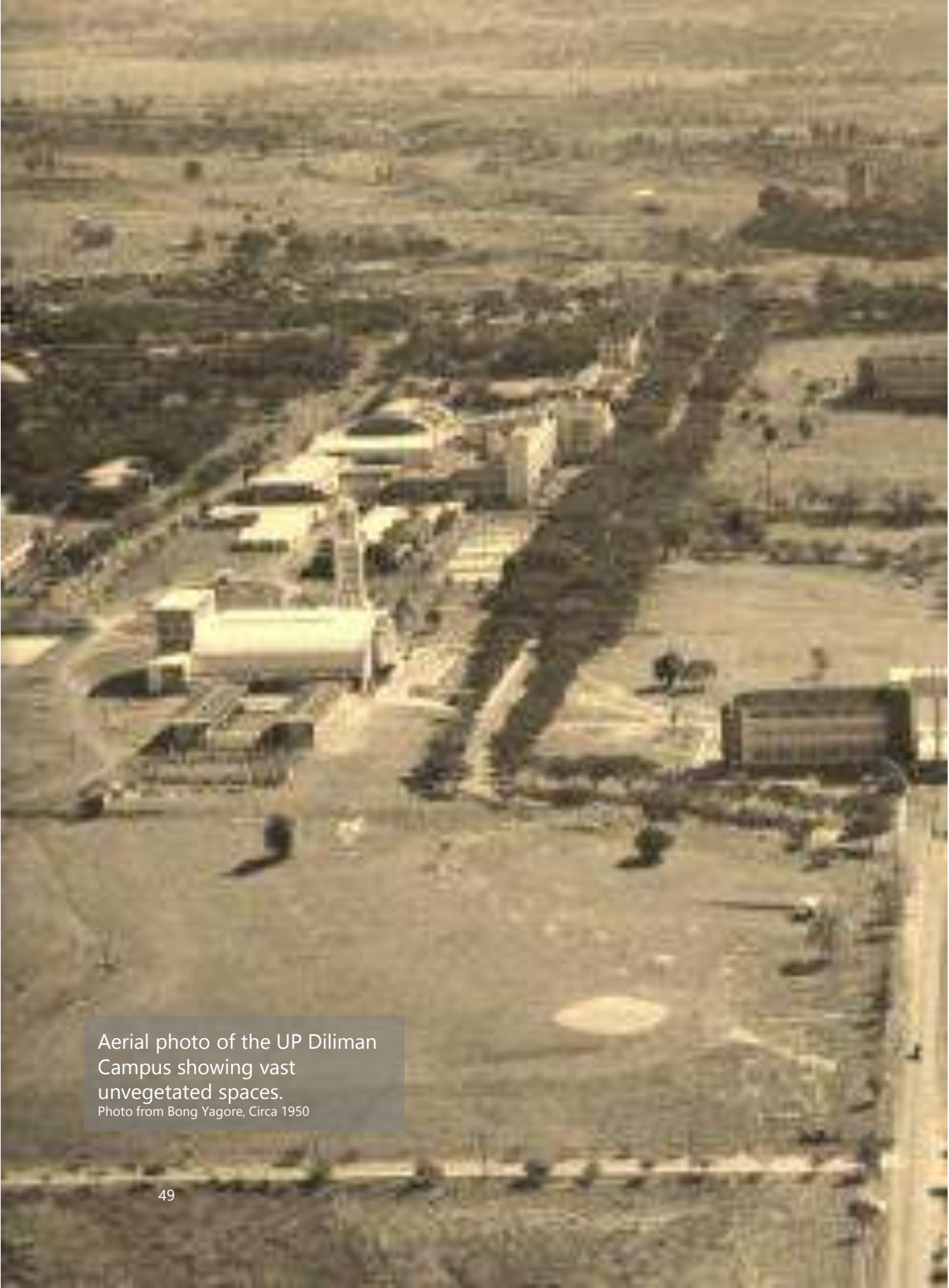
An ecological solid waste management program shall protect the public health and environment, and improve the environmental awareness and action among citizenry by enhancing the integration of ecological solid waste management and resource conservation and recovery into the national academic curriculum

REPUBLIC ACT NO. 9275 - PHILIPPINE CLEAN WATER ACT OF 2004

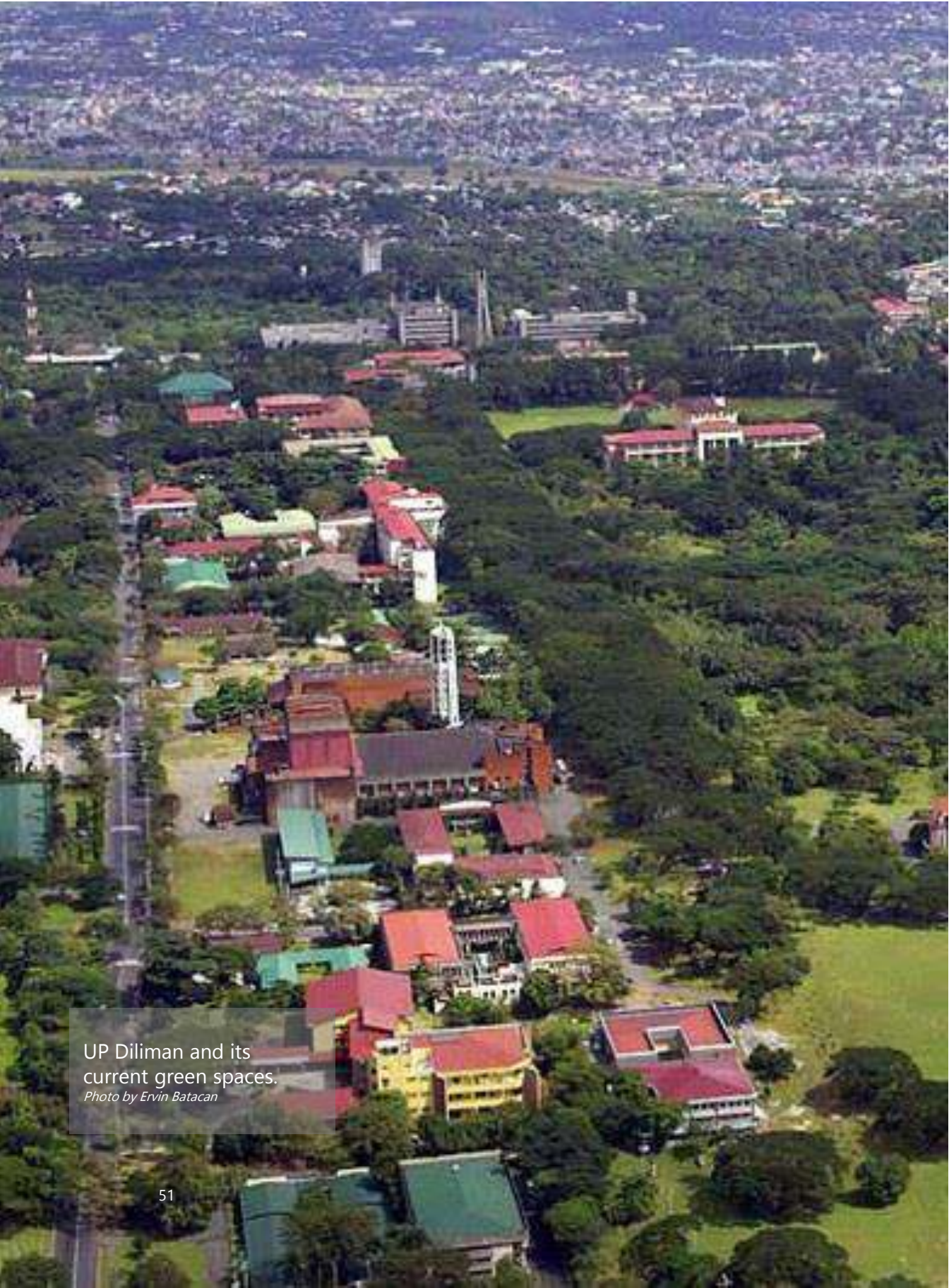
The act encourages the participation of the public in addressing environmental issues and problems by promoting public education, and use of market-based instruments and incentives

REPUBLIC ACT NO. 9147 - WILDLIFE RESOURCES CONSERVATION AND PROTECTION ACT

For sustainable conservation of wildlife resources and their habitats, ecological balance and biological diversity must be promoted and enhanced, collection and trade of wildlife must be regulated, and scientific studies on the conservation of biological diversity must be initiated or supported.



Aerial photo of the UP Diliman Campus showing vast unvegetated spaces.
Photo from Bong Yagore, Circa 1950



UP Diliman and its current green spaces.
Photo by Ervin Batacan

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