

YongChunPi Wetland Park Environmental Construction Project



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Designer : Classic Design and Planning Co., Ltd.(經典工程顧問有限公司)

Supervisor: Chan's Engineering Consultants Co., Ltd.(安笙工程顧問有限公司)

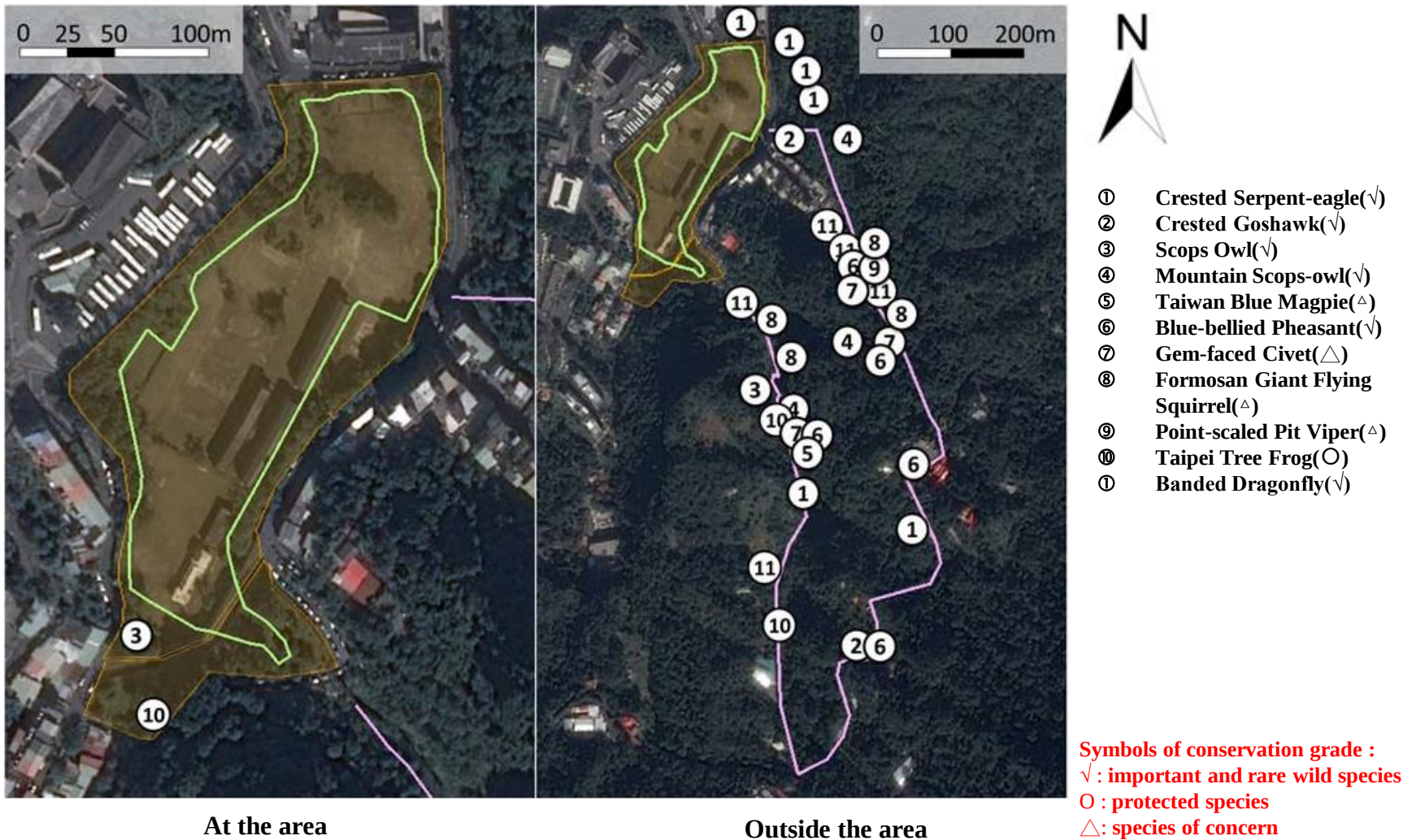
Contractor : Yu Dong Construction Co., Ltd. (郁東營造有限公司)

September 25, 2020.

- A wetland from a military site • A stepping stone • A century-old park



• Distribution map of protected species and species of concern at and around the project area



• Conducting an ecological survey in advance



大冠鷲
Crested Serpent-eagle



鳳頭蒼鷹
Crested Goshawk



領角鴞
Scops Owl



黃嘴角鴞
Mountain Scops-owl



● 台灣藍鵲
Taiwan Blue Magpie



● 藍腹鵲(雄)
Blue-bellied Pheasant (male)



● 藍腹鵲(雌)
Blue-bellied Pheasant (female)



白鼻心
Gem-faced Civet



大赤鼯鼠
Formosan Giant Flying Squirrel



龜殼花
Point-scaled Pit Viper

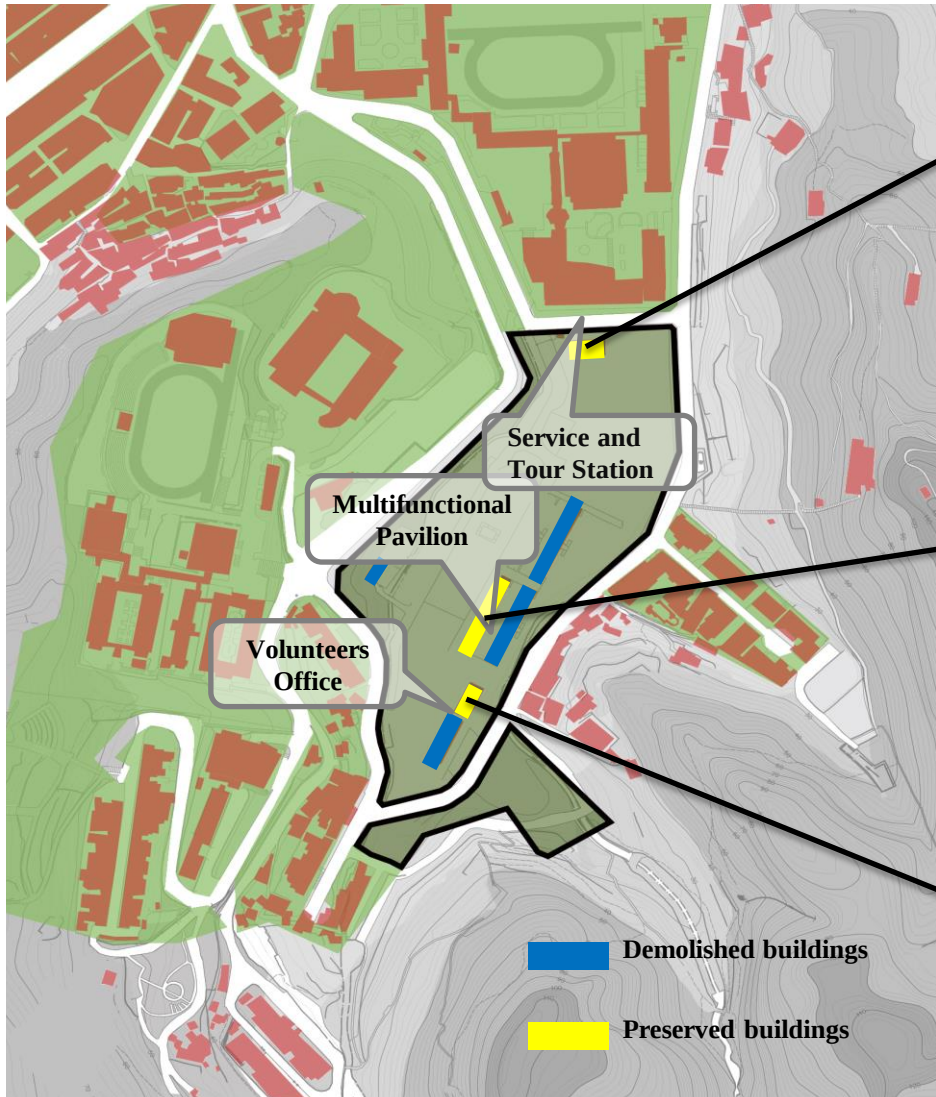


● 台北樹蛙
Taipei Tree Frog



無霸勾蜓
Banded Dragonfly

- **A wetland from a military site**

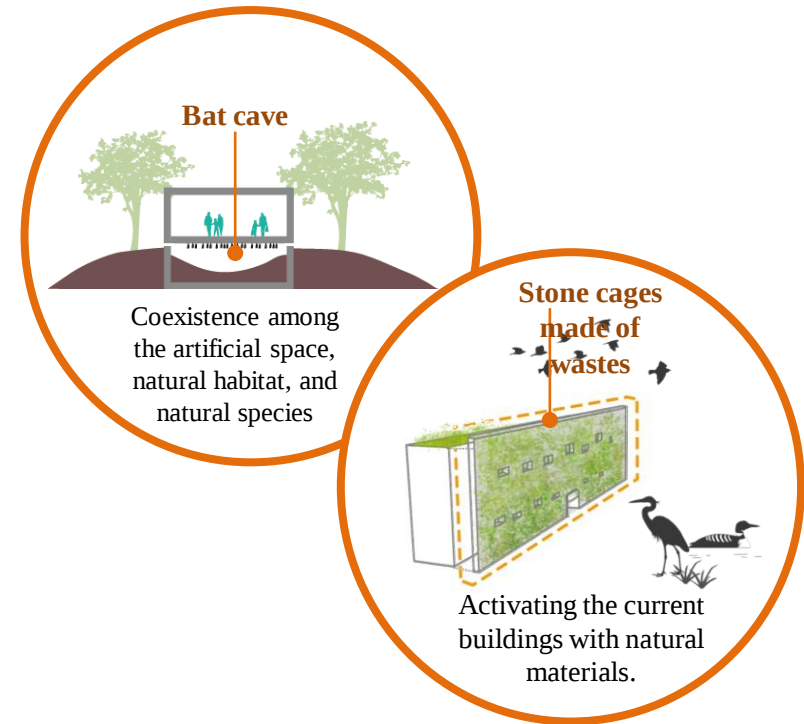


Original Buildings



• A wetland from a military site

- There are seven buildings, and three of them will be used for information and tour service station, multifunctional service center, and volunteer offices.



A wetland ecological stepping stone from a military site

- During park construction, the white-bellied crakes, kingfishers, whistling thrushes, and black bulbul were observed.
- People joined in constructing the artificial floating island, thus creating more habitats for wading birds and amphibians.



翠鳥(雌)

Kingfish (female)



翠鳥(雄)

Kingfish(male)



紫嘯鵯

Whistling Thrushes



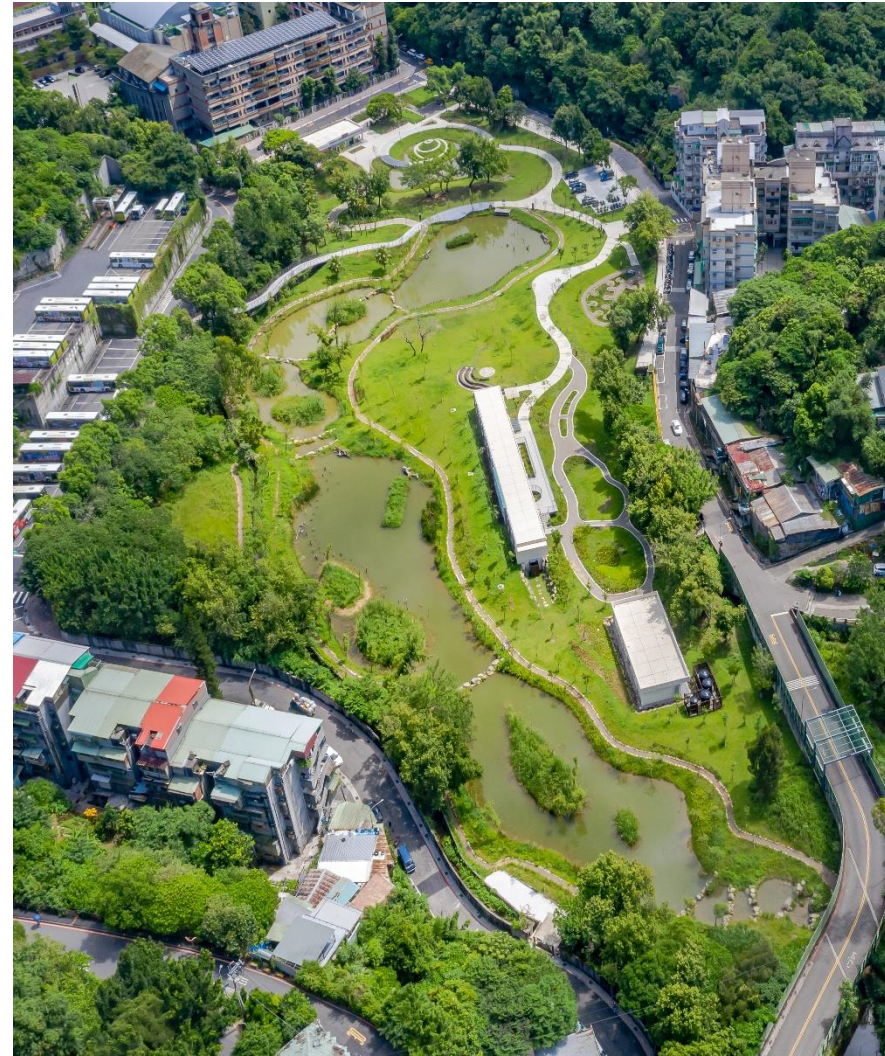
紅嘴黑鵯

Black Bulbul

Before construction (military site)



Completion of project



Difficulty in land acquisition

☑ City-owned land

Through **urban planning**, the NT\$ 38.9 billion residential area was changed to a park area °

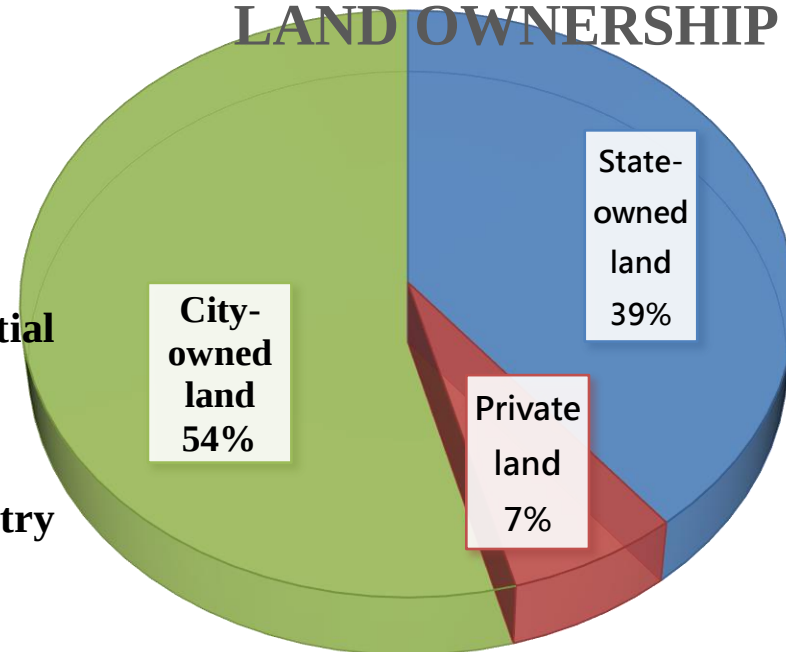
☑ State-owned land

Establishing a cooperative relationship with the Ministry of Defense by signing a **MOU of bulk transfer** °

☑ Private land

Acquisition of the private land of Liugong Irrigation Association by paying NT\$ 447,955,401.

PROPORTION OF LAND OWNERSHIP



Difficulty in land acquisition

- Visiting the Ministry of Defense



Vision Workshop

Local
residents and
schools



NGOs



Experts



Vision Workshop



永春陂

生態濕地公園 YongChunPi Wetland Park

Features

Using materials on site



Fallen woods for flood protection



Backfilling with on-site soil



Pebble walls

A wetland from a military site



Ecological wetland



Artificial floating islands



Bird stands and microhabitat

Activating original buildings



Service and tour station



Multifunctional Pavilion



Volunteer office

Lively scenery



Cypress trails



Crape myrtles



Kapoks

Integration of wetland, life, and scenery

Yongchunpi Wetland Park layout

Location: No.657, Songshan Road, Xinyi District

Total area: 3.98 ha

Green space area: 26,077 m²

Water area: 6,873 m²

86.3% of total area

Total green coverage ration 117%

Observation room

Phase 1

Entrance of Baoshan River

觀察教室

林緣濕地

濱水平台

Entrance of Wuming River

Vine tunnel

Windows on the walls

Entrance square

Phase 2

服務導覽站

林間教室

環型步道

雨水花園

觀水平台

高架棧道

圍牆局部開窗

汽機車停車場

開放式水域

活動廣場

蕨園

多功能館

志工辦公室

遮光爬藤隧道

既有亭出入口

淺水區林澤

開放式水域

Shared area between life and ecology



Total construction cost

Start date

Completion date

Phase 1	NT\$ 3,820,649	2017/05/08	2017/09/28
Phase 2	NT\$ 82,396,232	2018/06/23	2019/12/27

Shared area between life and ecology

Life



Wetland

Combining ecology and water conservation

- **High capacity of water detention**

According to “Taipei City base development standard for runoff discharged into stormwater sewer,” the minimum water detention capacity:

$$39,832\text{m}^2 \times 0.078\text{m}^3/\text{m}^2 = 3,107\text{m}^3$$

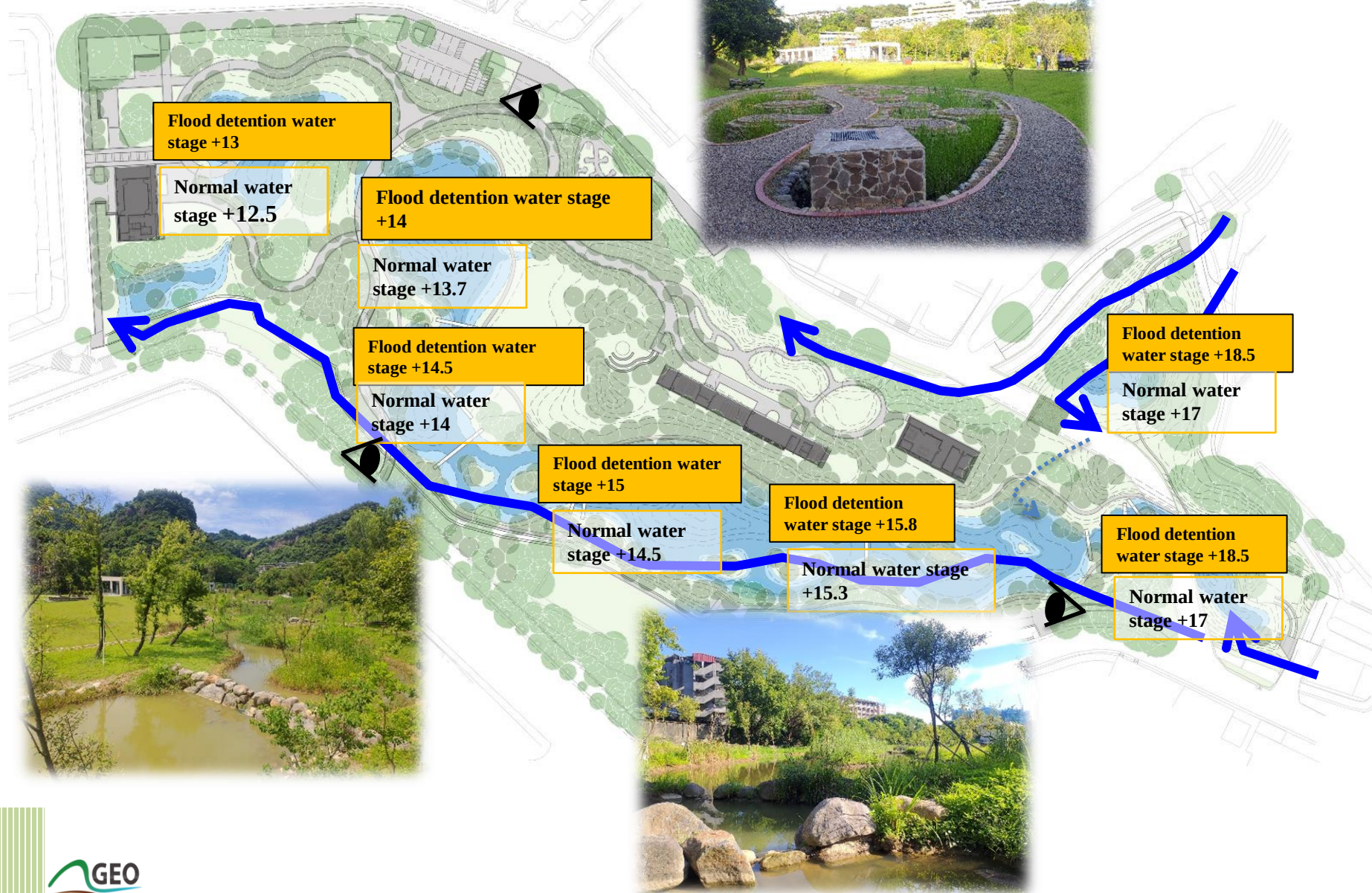
Designed water detention capacity=4895.32m³

- **Stationary of instant heavy rain could last 8.77 hours.**

According to “Regulation of soil and water conservation,” hydraulic calculation of detention facilities is based on the rainfall intensity of 92.7mm/1hr (Nangang station).



Elevation of drainage



Flowing scenery (functional and landscaping)

Attracting birds and butterflies



紫薇樹
Crape myrtle



木棉
Kapok



蜘蛛百合
Spider lily

Purifying with grit



濕地沙洲
Sandbar wetland



落瀑
Falling water



濕地植物
Wetland plants

Purifying with landscape



落雨松
Cypress



穗花棋盤腳
Small-leaved Barringtonia



香蒲
Cat-tail

Great landscapes



水丁香
Lantern Seedbox



台灣百合
Taiwan lily



平戶杜鵑
Hirado Azalea

Integration of wetland, life, and landscape

Greening ecology(functional and landscaping)

Conserving the existing plants

About 215 trees including mulberry, common garcinia, paper mulberry, banyan, sweet gum, etc.

✓ Conserving the existing arbors for **67.4%.**



Growing extra plants

439 strands and 34 species of arbors; 15,650 strands and 25 species of shrubs; 25 species and 32,128 strands of aquatic plants ; green space area:

26,077 m²



Integration of wetland, life, and landscape

Plants representing changes of seasons

Changes of weathers, plants, and forests in four seasons.

Changes of Nature
Feel the changes of seasons from the changes of 24 solar terms.

Spring

From Feb. to April

Taiwan Cherry, Sweet gum, and Salix kusanoi.



Summer

From May to September

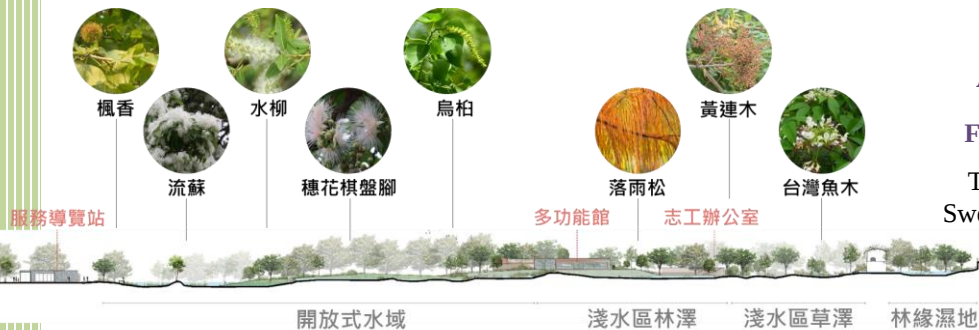
Crape myrtle, tassel, Formosan Ash, Small-leaved Barringtonia, Buttonbush, and Cat-tail.



Autumn and Winter

From October to November

Taiwan Sapium, Tallow tree, Sweet gum, soap berry, and cypress.



Main arbors in Yongchunpi Wetland Park



楓香
Sweet gum
Taiwan native species
Flowering stage: from February to April
Fruiting stage: from April to June



流蘇
Tassel
Taiwan native species
Flowering stage: from March to July
Fruiting stage: from June to November



臺灣魚木
Spider tree
Taiwan native species
Flowering stage: from April to June
Fruiting stage: from September to November



水社柳
Kusano Willow
Taiwan native species
Flowering stage: From December to February

Source: Internet



Main arbors in Yongchunpi Wetland Park



穗花棋盤腳
/水茄苳
**Small-leaved
Barringtonia**
Taiwan native
species
Flowering stage:
from July to
September
Fruiting stage:
from January to
February



黃連木
**Chinese
Pistache**
Taiwan native
species
Flowering stage:
from March to
April
Fruiting stage:
from September
to October



落雨松
Cypress
Alien species
Flowering stage: late
April
Fruiting stage: October



烏柏
**Chinese
Tallow**
Alien species
Flowering
stage: from
June to July
Fruiting stage:
from August to
October

Source: Internet

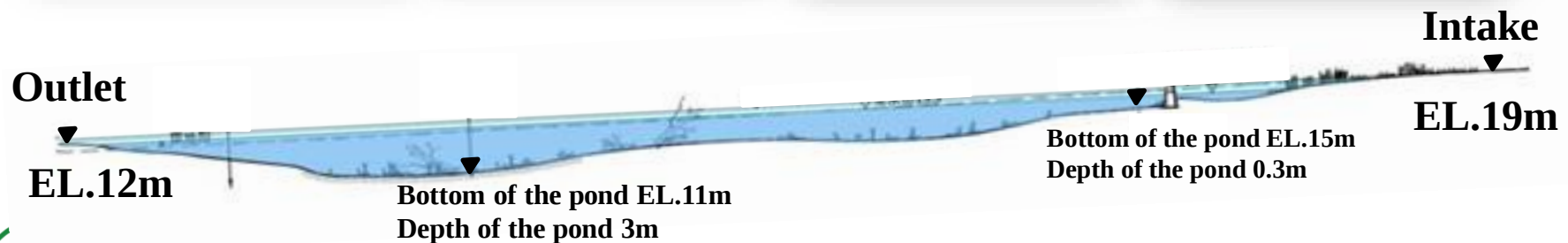
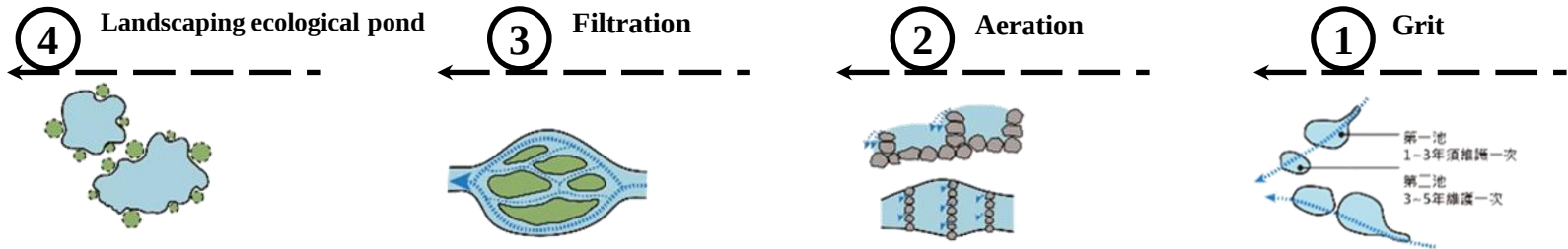
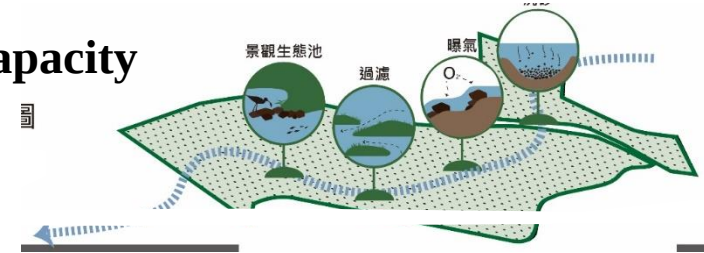


Purifying with plants-arbor species(functional and landscaping)

(Source: The Society of Wilderness, Environmental Protection Administration of Executive Yuan, Environment Protection Bureau, Pingtung County , Weng Jinwu (2015), Zhu Minhua, etc. (2018))

	Waterfront arbor		
	Cypress 落羽松	Small-leaved Barringtonia 穗花棋盤腳	Kusano Willow 水社柳
Taiwan native species 臺灣原生種		●	●
Nitrogen氮	●	●	●
Phosphorus磷	●	●	●
Nutrients營養鹽	●	●	●
Conserving trees with slope protection護坡水土保持樹種	●	●	●
Flood-tolerant trees耐水淹樹種	●	●	●

Purifying water and enhancing water detention capacity

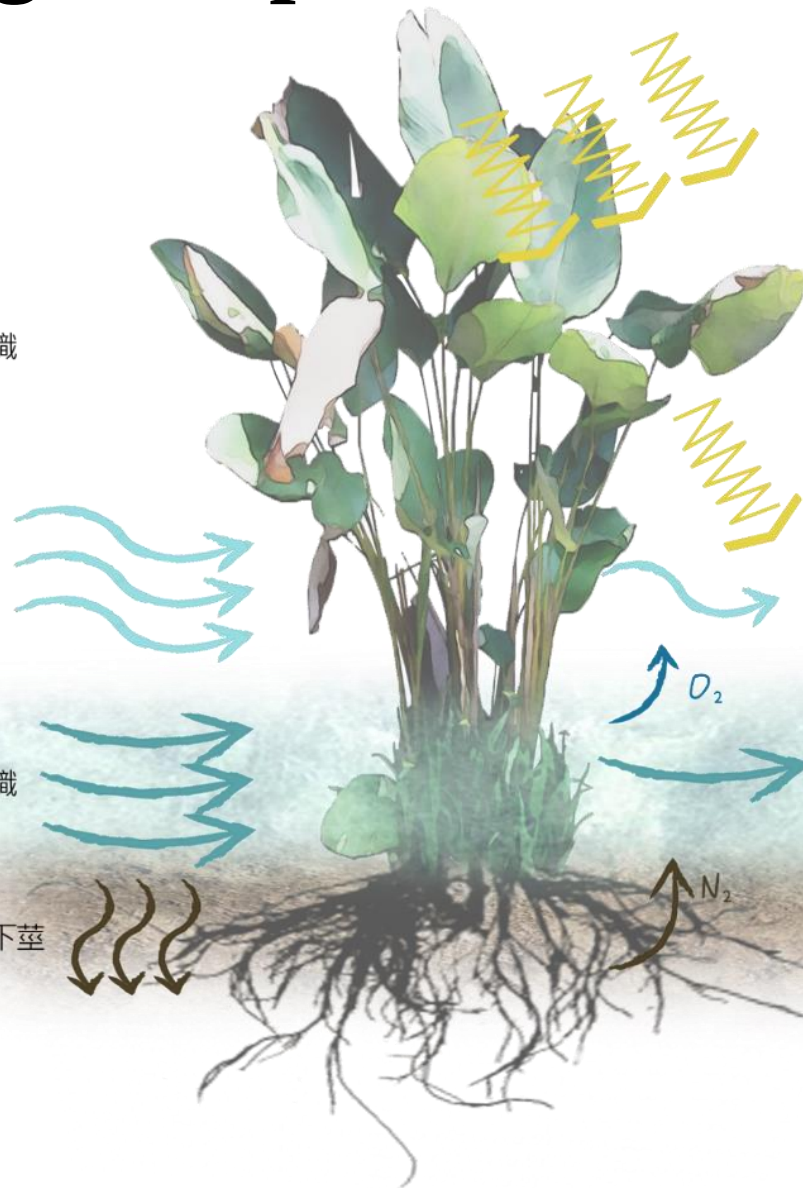


Purifying with plants

水面上的植物組織

水中的莖及葉組織

底泥中的根及地下莖



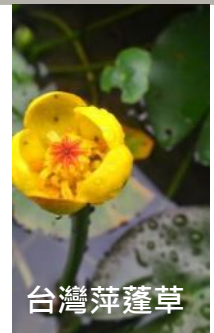
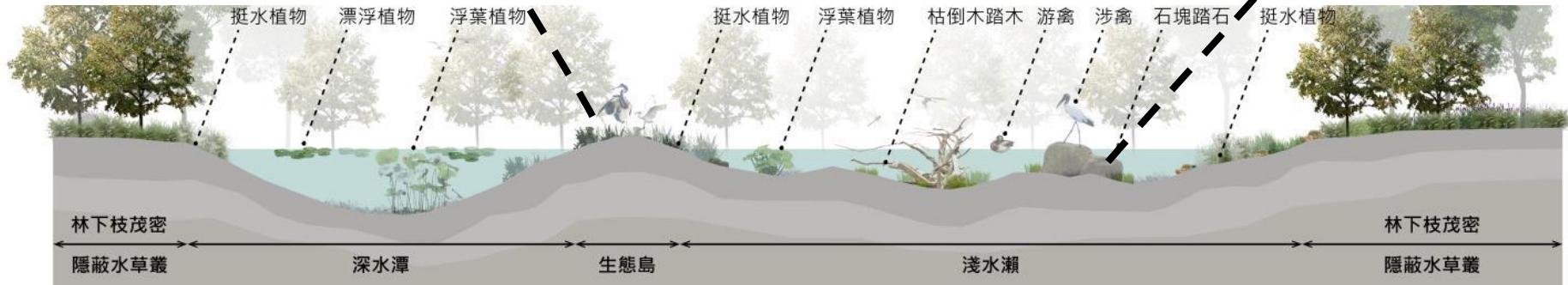
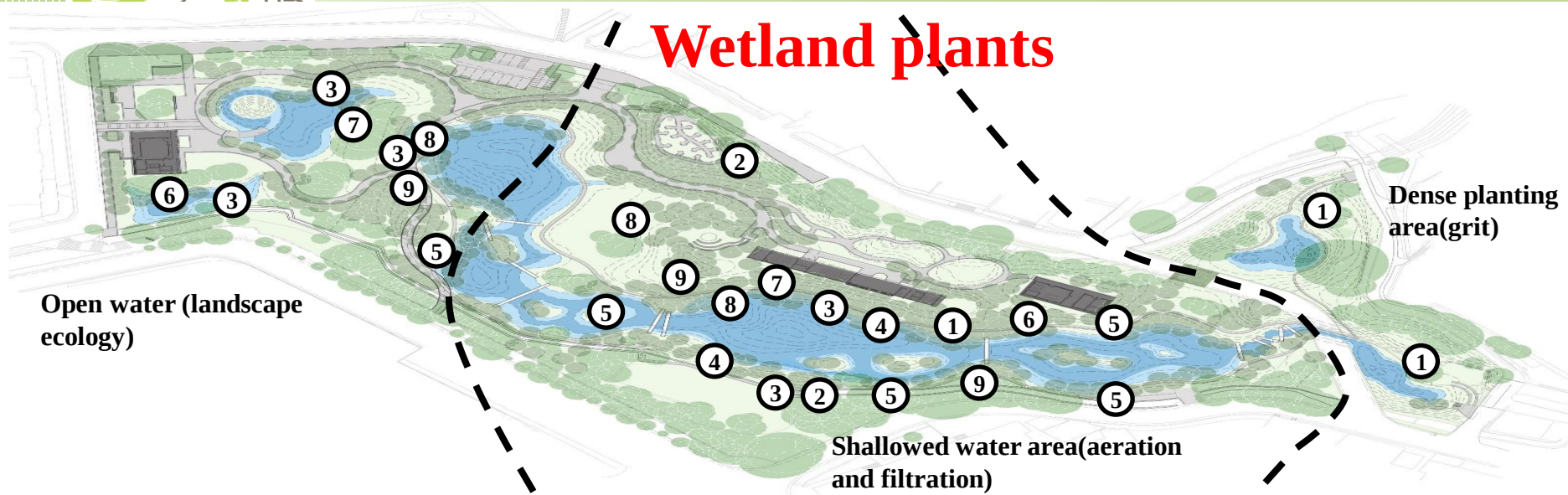
光線衰減→抑制植物性浮游生物的生長

影響微部氣候→對溫度的隔絕作用
降低水面風速→避免顆粒再懸浮

排出光合作用產生的氧→增進好氧分解

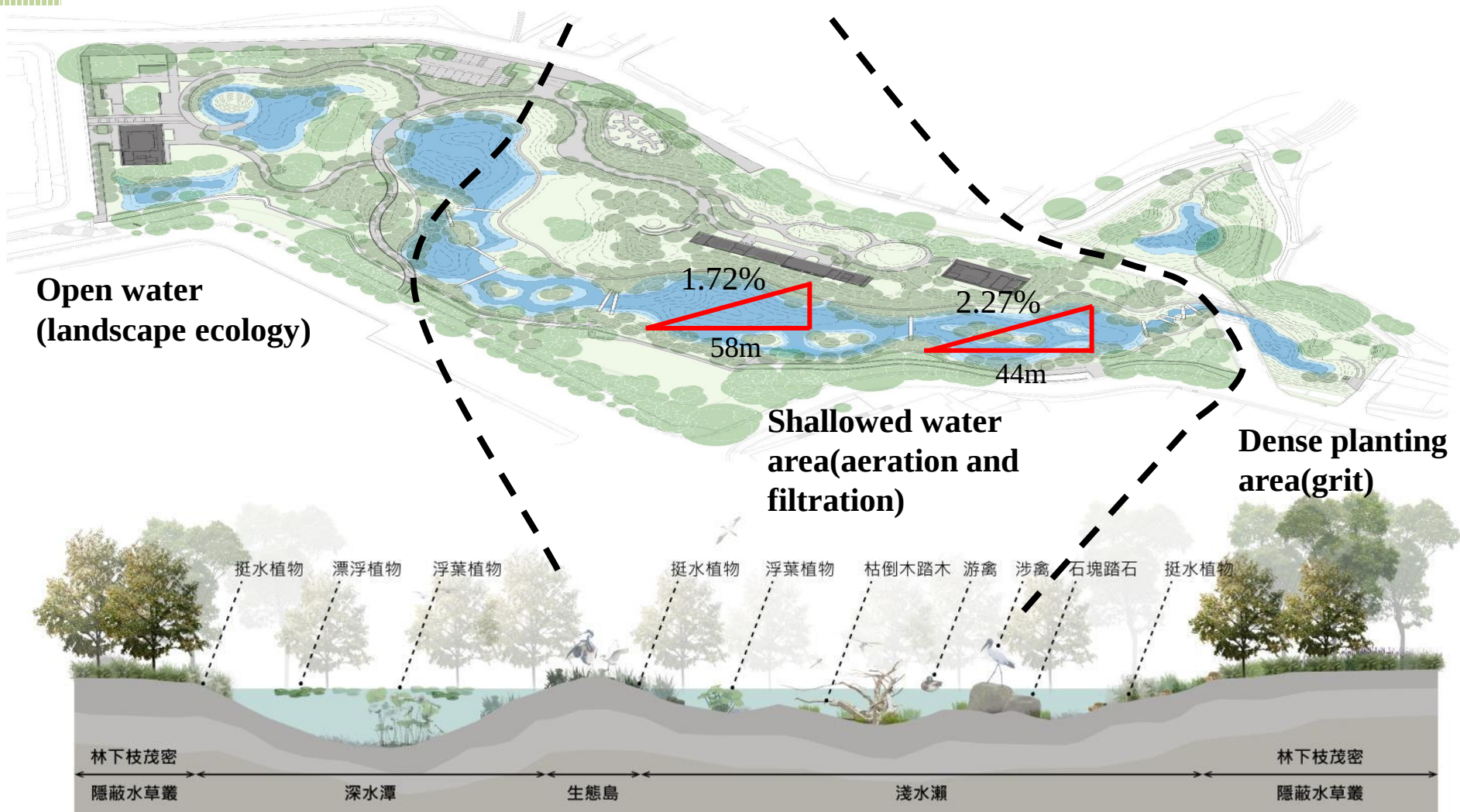
過濾效應→過濾大的顆粒殘骸
降低水流速度→增進沉降效果、避免顆粒再懸浮

底泥表層穩定化→減少受侵蝕
防止濕地中礫石間隙的堵塞
營養物的攝取
釋出有機物→促進脫硝作用



- | | | | | | | | | |
|----------------|------------------|----------------|-----------------------|-----------------------|----------------------|-----------|--------------|-----------------------------|
| ① Reed | ② Vegetable fern | ③ Cat-tail | ④ Yellow Water Lily | ⑤ Oldworld Arrow-head | ⑥ Wild ginger flower | ⑦ Cypress | ⑧ Buttonbush | ⑨ Small-leaved Barringtonia |
| Perennial herb | Aquatic fern | Emergent plant | Floating-leaved plant | Emergent plant | Perennial herb | | | |

Ground grading level



Purification by plants – Aquatic plants (functional and landscaping)

(Source: The Society of Wilderness, Meuleman(1994), Lai Enhua(2003) 、 Environmental Protection Administration, and Compilation of natural water purification methods(2006))

	Aquatic plants			
	Reed蘆葦 (blooming from September to October)	Wild ginger flower野薑花 (blooming from May to November)	Oriental Cat- tail香蒲 (blooming on June)	Cress水芹 (blooming from July to August)
Suspended solids(SS) 懸浮固體	● (99%)		● (58%)	
Biochemical oxygen demand(BOD)生化需養量	● (95%)		● (78%)	
Ammonia氨氮	● (97%)		● (32%)	● (66.67%)
Total phosphorus總磷	● (57%)		● (52%)	● (73.70%)
Promoting sedimentation of the particles促進入流顆粒 沉降		●		

Eutrophication

On Feb.25, 2019, Professor Wu Junzong, Hou Wenxiang, etc. held meetings for eutrophication.



**Status of
eutrophication**



**Site survey of
eutrophication**

Total phosphorus tests

Associate inspection unit: Taipei Fent
sui Reservoir Administration



8 inspection points

Total phosphorus tests

According to “**Surface Water Classification and Water Quality Standards**” ruled by Environmental Protection Administration – discharge to non-ocean surface water bodies: Bellow 2.0(mg/L) of total phosphorus

- Start of construction: 2018/6/23
- Completion of construction: 2019/12/27

• **Up to emission standard**

Test items		Total phosphorus (mg/L)	
Sampling date	Confluence (point 3)	Outflow (point8)	Removal efficiency (%)
2019.3.21	0.034	0.025	26%
2019.4.22	0.044	0.061	-
2019.5.28	0.159	0.216	-
2019.6.21	0.153	0.101	34%
2019.7.24	0.098	0.124	-
2019.8.28	0.137	0.166	-
2019.9.25	0.278	0.076	73%
2019.10.21	0.187	0.352	-
2019.11.21	0.456	0.056	88%
2019.12.20	0.259	0.028	89%
2020.6.19	0.082	0.067	18%
2020.7.14	0.052	0.039	25%

Construction phases

Completion

6 months after completion

7 months after completion

- **BOD: < 10 (Surface Water Classification and Water Quality Standards)**

Soils on the site cannot be used for planting

On Nov.20, 2018, invited Professor Zhang Yusen to perform site survey of soil



On April 17, 2019, the site survey of soil along the Shuangxi section of the Keelung River with Hydraulic Engineering Office.



The soils on the site cannot be used for planting

On October 3, 2019, the soils from Shuangxi section of the Keelung River were sent to National Taiwan University Department of Horticulture and Landscape Architecture for soil analysis .

- The analysis result: great for plants.**

土壤物理性狀調查			
1. 土壤質地分析	砂粒 (%)	粉粒 (%)	粘粒 (%)
	76	11	13
2. 粒徑：土壤顆粒與石粒的比例 (%)	土壤顆粒 (%)		石礫 (%)
	70		30

土壤質地為 砂質壤土(Sandy Loam)，為良好的綠美化土壤，>2 mm 之土壤顆粒（石礫）佔土壤體積之 30%。

土壤現況照片

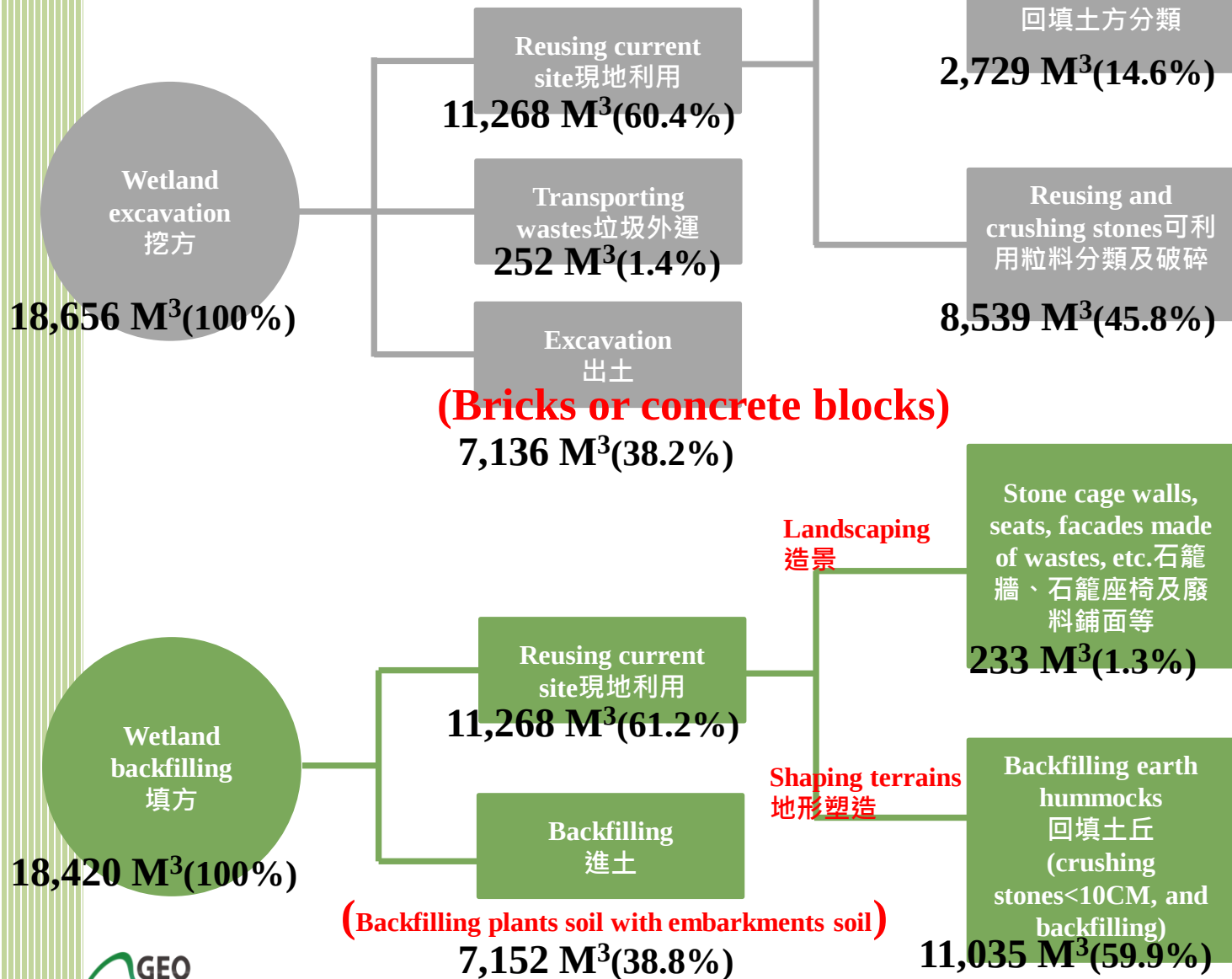


圖.原土目視為黃棕色之土壤，無植物根系；圖為風乾後的狀況（未經過篩處理。）。



圖.土壤顆粒（原土樣<2 mm 的顆粒）

Utilize the existing resources for sustainable use of materials



Utilize the existing resources for sustainable use of materials

Classifying the backfilling soil



Classifying and crushing backfilling materials



Utilize the existing resources for sustainable use of materials

- **Filling construction site with building wastes**

Classifying reusable materials and crushing them to the size less than 10 cm. Backfilling site with building wastes, thus reducing amount of wastes transportation.

- **Making wastes reusable and using them for construction**

The excavated pebbles, concrete blocks, thinned woods, etc. reused for construction.

Reusing thinned woods



Thinned woods for sawdust trails



Pebble walls-Multifunction Pavilion



Reusing pebbles and concretes

Difficult to construct landscape

Topographic measurement and application of aerial photography

◆ Drones used for aerial photography



The eco-friendly habitat---kingfisher earth embankment



kingfisher earth
embankment



Kingfisher
(female)



Kingfisher
(male)

Kingfishers reappear

The eco-friendly habitat---microhabitat and bird stands



Birds on wood stands



Microhabitat for aquatic animals

Environmental education---tree planting

◆ On November 14, 2019, Mr. Chen Hung-Kai taught tree planting.



Environmental education---making artificial floating islands

On August 11 and 18, Mr. Chen Te-Hung from the Society of Wilderness and people made artificial floating islands.



Environmental education---Removing invasive species

- On May 30 and 31, 2020, Mr. Chen Te-Hung and some enthusiastic people removed invasive species such as mile-a-minute weeds and apple snails.



mile-a-minute weeds
(invasive specie)



Apple snails (invasive species)

The beautiful Yongchunpi Wetland Park







Night Views at Yongchunpi Wetland Park



Night Views at Yongchunpi Wetland Park



The Sawdust Trails



The Spiral Landscape



Landscape of Stones and River



The Beautiful Sawdust Trails and Cypresses



Service and Tour Station



Multifunctional Pavilion



Volunteer Office



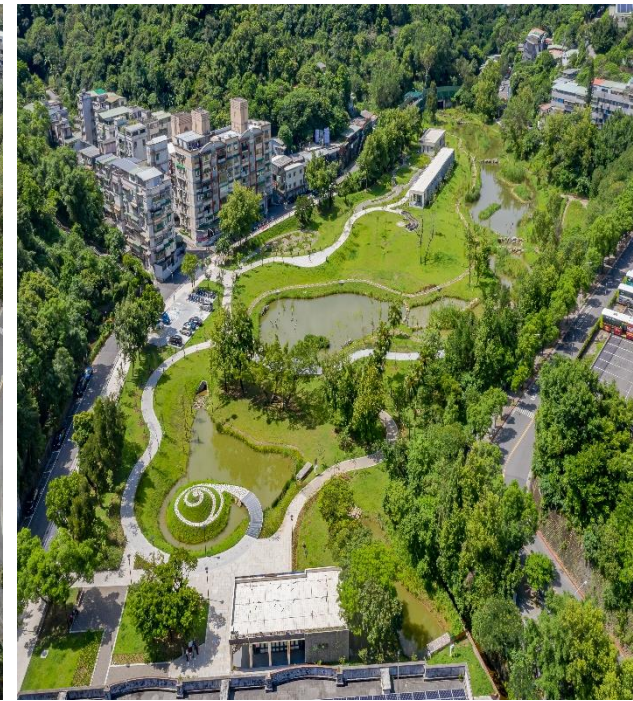
Changes Come True



**Before
Construction**



**During
Construction**



**After
Completion**



臺北的生態棲地保護區