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PROJECT:

FORMER SOUTH BYRON  
STP TREATMENT PONDS  
**OPTIONS ASSESSMENT - DESIGN REPORT**

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DATE:

03 MAR 23

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AWC REF NO:

221573

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REVISION:

C

CLIENT:



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CARE OF:

**CAVVANBA**  
consulting

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PRODUCED BY:



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## REPORT OVERVIEW

This Report is a summary of the Site Analysis, Opportunities and Constraints Plans and Preferred Design Option and Costings. Key drivers from the project brief and stakeholder consultation have informed the design direction and Options Selection. The report is to help illustrate the design development process to stakeholders and used as a tool to move into detailed design.

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## REFERENCE DOCUMENT

Pond Environmental Assessment, Former South Byron Sewage Treatment Plant, Broken Head Road, Byron Bay, NSW 2483, Feb 2023, Cavanba Consulting. Ref. 22022 R01



## PROJECT OVERVIEW

The lower portion of the former South Byron STP site features two large former effluent treatment ponds. As large freshwater water bodies alongside a coastal estuary, these wetlands have high ecological value.

Pond sediments contain elevated concentrations of heavy metals and disturbance of the sediments is not recommended.

## KEY DRIVERS

- Enhance local biodiversity and habitat features
- Address public health and safety concerns
- Protect existing fauna from people and dogs
- Identify clear dog exclusion zones within site
- Identify designated pedestrian link for Byron Holiday Park users to access beach.
- Remove perimeter fence / curate public experience as a passive recreational space
- Improve water quality health
- Reduce the likelihood of algal blooms
- Explore opportunities for public education
- Weed control and rehabilitation

## SITE CONSTRAINTS

- Contaminated land and sediments
- Cape Byron Marine Park
- Acid Sulphate Soils
- Weed control and rehabilitation







INTERFACE WITH TALLOWES CREEK

Areas between Tallows Creek and ponds are currently mown. This mowing regime should be reviewed along with defining revegetation areas and dog exclusion zones.

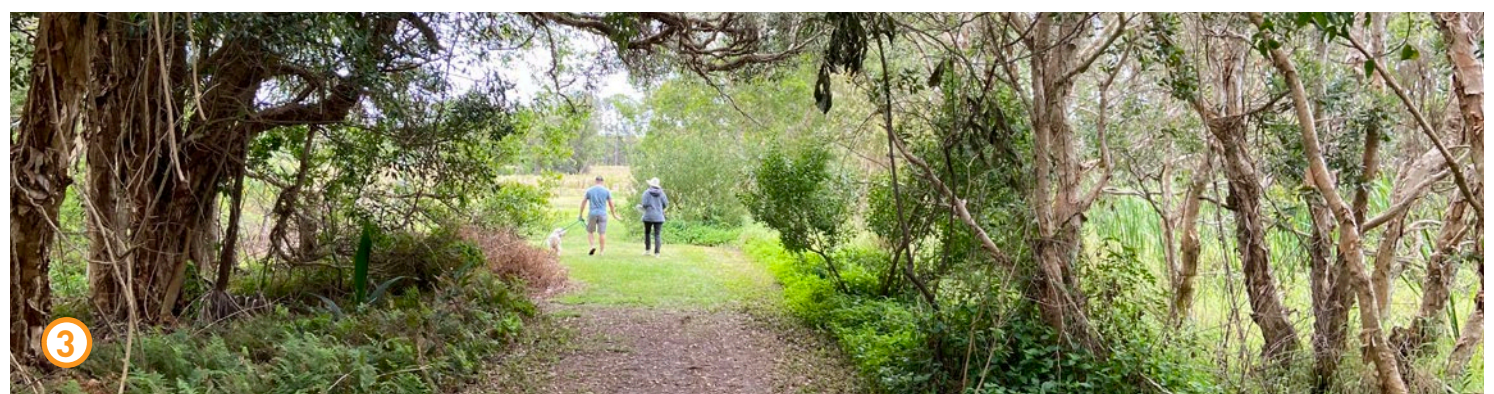


REMNANT INDUSTRIAL FEATURES

Upright pipes within the eastern cell could be retained as a reminder of the sites industrial past, Birds also frequent these pipes as perches, inclusion of more perches should be considered as a means of increasing habitat features.



IMAGE LOCALITY PLAN - NTS



PERIMETER ACCESS

Provide direct access from Holiday Park on the western side of cells and restrict access along south and eastern side of the ponds, enforcing a dog exclusion zone here.



SIGNIFICANT VIEW-LINES

Height restricted plantings to be used to maintain view-lines.



INTERFACE WITH EXISTING PATH

- Weed control
- Construct dog proof fence within vegetation
- Removal barb wire and retain posts as a feature
- Planting to strengthen vegetative barrier
- Construct safety bench
- Designated dog access point to Tallows Beach



CLIENT:



BYRON SHIRE COUNCIL

PROJECT:

## FORMER SOUTH BYRON STP TREATMENT PONDS

Site Investigation and Options Assessment

DRAWING:

POND RE-SHAPING OPTIONS 1 & 2

SHEET:

03

BY:



CO:



DATE:

03/03/23

### DESIGN CONCLUSION

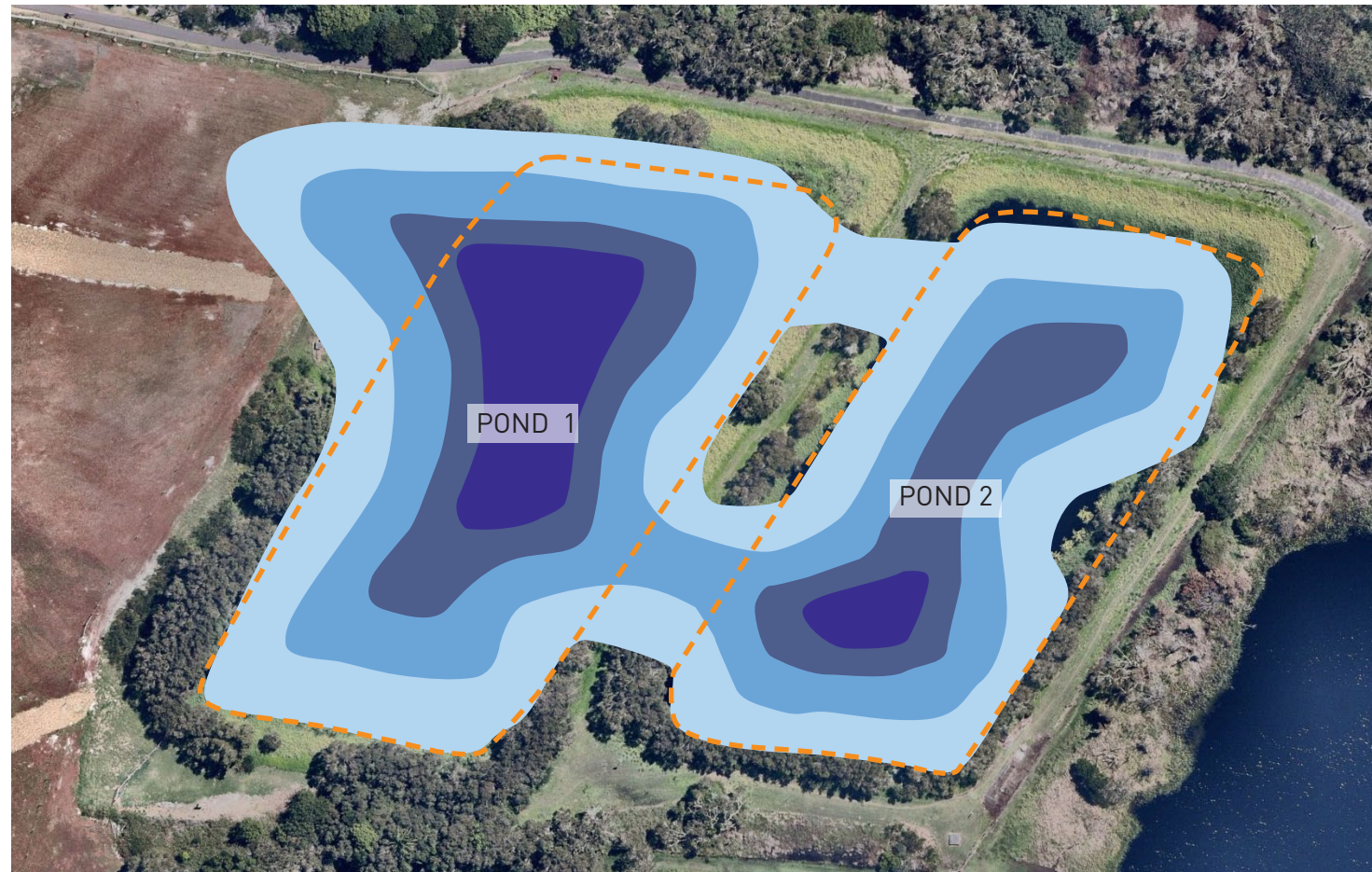
Reviewing options for reshaping the ponds, it became clear that massive impacts on fauna and flora and excessive costs for earthworks and imported material were not justifiable.

It was decided that in order to create a safer environment for the public, the waters edge identified as the most high risk would be addressed through safety benching and other means would be investigated to improve safety concerns e.g. dog exclusion fence and dense vegetation.

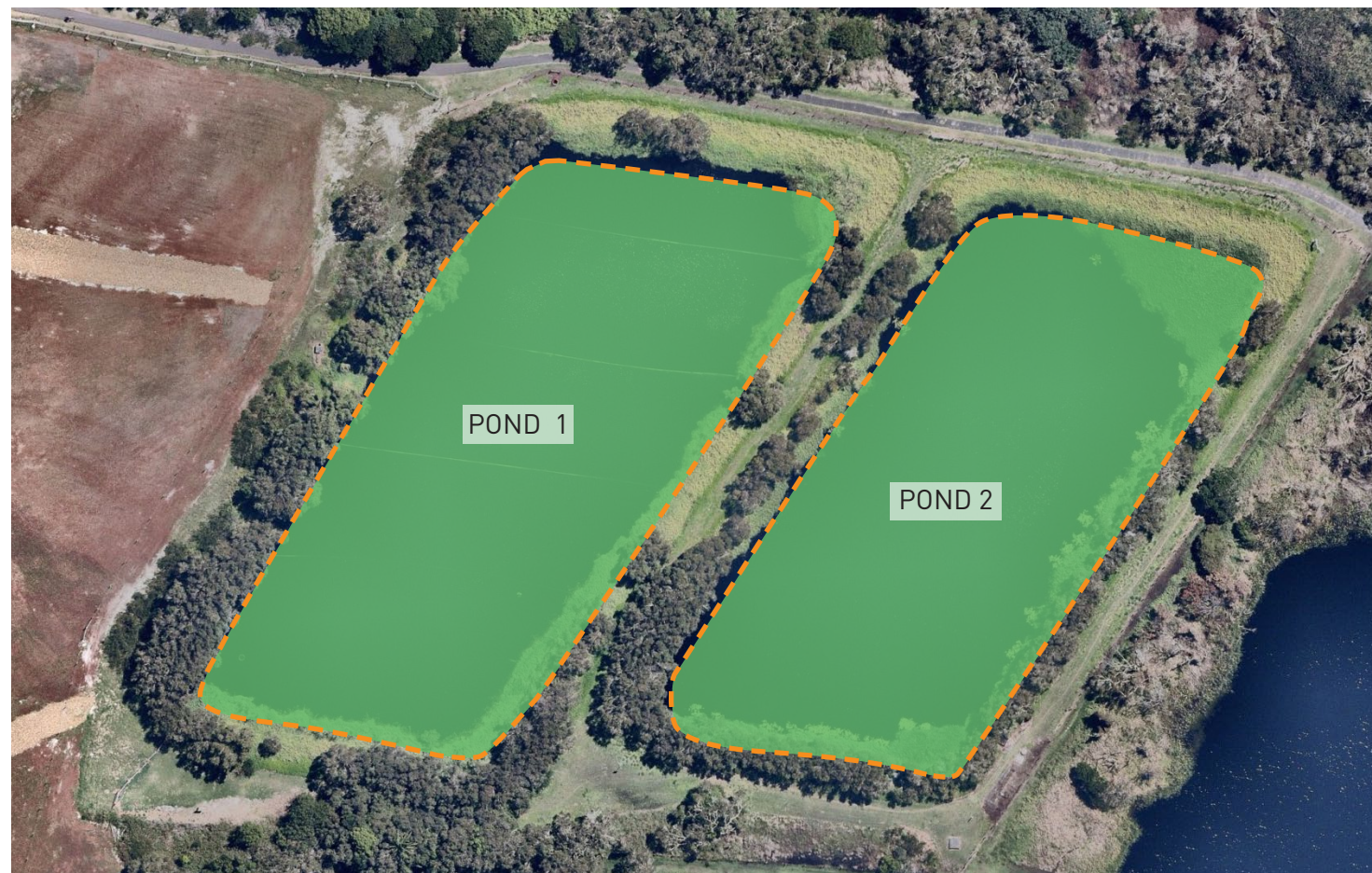
Consultation with stakeholders reinforced the option to retain the water bodies and focus on protecting wildlife from the dogs who pass by the site, walking from Broken Head Road and the neighbouring Holiday Park.

Cavvanba concurred with the concept of retaining the water bodies (refer to Section 11.2.2 of Cavvanba, 2022) stating "Remediation of the sediment in the ponds is not recommended based on the following aspects:

- It poses a direct impact by removing all existing benthic organisms that are currently in the area, and upon which higher organisms rely;
- Disturbing the sediments has the potential to spread contamination due to resuspension and desorption/absorption processes as material is moved around; and
- Disturbing the sediment is therefore the most likely activity to increase the risk posed by the sediments and porewater, and therefore is not recommended".



OPTION 1 - NATURALISATION OF PONDS PLAN



OPTION 2 - FILL POND AND RECLAIM LAND PLAN

### DESIGN INFLUENCES

Exploration of varying pond reshaping options was explored in the design process. The design options were driven by the following objectives

- Aesthetics - Water bodies appearance
- Landscape amenity
- Public Safety around water bodies
- Habitat creation
- Water quality remediation

### OPTION 1 - NATURALISATION OF PONDS

#### DESIGN INFLUENCES

The key drivers behind this option was to disguise the former treatment ponds into a more natural form, moving away from the unified form of the ponds.

#### ADVANTAGES

- A cut and fill neutral ratio could be achieved by expanding the ponds extent and removing parts of the central bund.

#### DISADVANTAGES

- The process of reshaping the ponds would stir up contaminants that are currently dormant in sediments.
- Have significant impacts on fauna currently living within the ponds.
- The construction of this design would be challenging working within the pond to minimise impacts to surrounding vegetation.

### OPTION 2 - FILL POND AND RECLAIM LAND

An option to fill the ponds entirely was discussed early on in the process. This land could then be re-purposed for potential public use, as per the previously rehabilitated site upslope.

#### ADVANTAGES

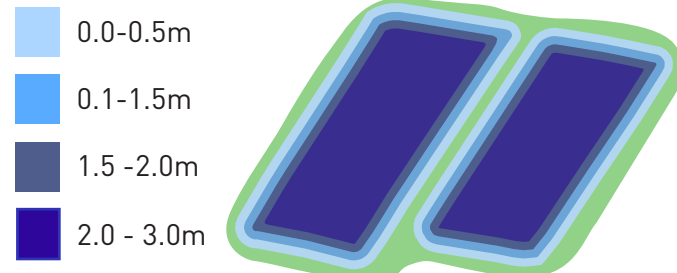
- Provide public space beside the Tallows estuary foreshore.
- Remove risk factor of people becoming sick from swimming in ponds.

#### DISADVANTAGES

- Massive impacts on fauna living in water bodies. Loss of a fresh water source for animals living in the vicinity.
- Impacts to the surrounding native vegetation.
- Extensive costs to truck and install fill from off site.
- Loss of bird viewing for local bird watching enthusiasts.



### WATERBODY BATHYMETRY

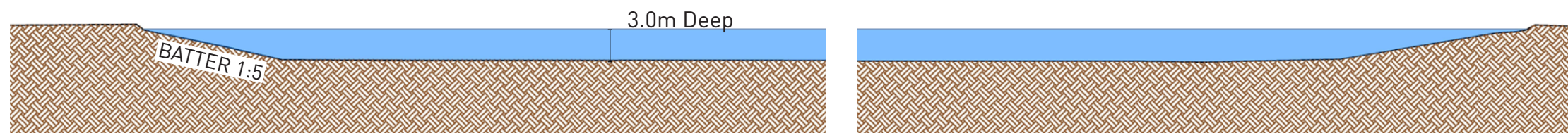


**Cell 1 - West**  
Area = 9600m<sup>2</sup>  
Volume = 24,000m<sup>3</sup>  
Calculation are approximate

**Cell 2 - East**  
Area = 8300m<sup>2</sup>  
Volume = 20,750m<sup>3</sup>  
Calculation are approximate



**POND 1 = 140m long**

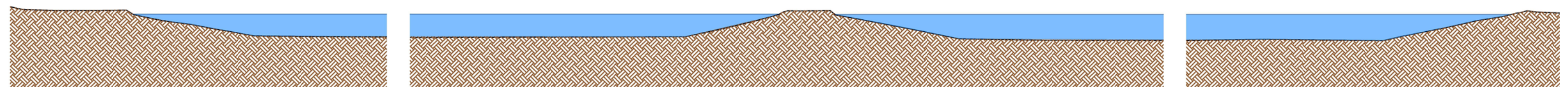


**SECTION AA- POND 1 - EXISTING**

**Cell 1 = 76m wide**

**Cell 2 = 73m wide**

**Central Bund  
10m wide**



**SECTION BB- POND 1 + POND 2 - EXISTING**

### OPTION 3 - RETAIN PONDS



#### BIRD HIDE

A bird hide is proposed on the central berm, providing sight lines to both cells. Positioning of the proposed bird hide on the Northern side, achieving passive surveillance by passing pedestrians. Consultation with Byron Bird Buddies has been undertaken to confirm location.



#### SIGNIFICANT VIEW-LINES

Restricting vegetation heights of future planting maintain and enhance view-lines.



#### EXISTING FENCE

Barbed wire fence doesn't stop people or dogs. To be removed and replaced with a dog exclusion fence alignment to be confirmed. Fence must consider fauna movement.



#### SAFETY BENCH

The northern batter is considered to present the greatest risk to visitors with access intended to be mainly at this end. In response a 4m wide safety bench is proposed.



#### CENTRAL ISLAND

A central island previously included in design iteration has been abandoned minimising disturbance to sediments and preventing bird degradation of overpopulating roosting birds, like the island within the Baywood Chases lakes island.



#### WATER BODY EXTENTS

Analysis of sediments within the ponds and confirmation of contaminants suggests the best option is to minimise disturbance of the ponds formation.



#### PROPOSED PEDESTRIAN LINK

Addressing the current link from Holiday Park to Beach by providing a formalised path on the western side of cells. Minimising pedestrian activity and creating a dog exclusion zone around the cells leading to Tallows Creek.



PROJECT:

FORMER SOUTH BYRON  
STP TREATMENT PONDS

Preferred Design Option

DRAWING:

SELECTED DESIGN PLAN

SHEET:

05

BY:

AWC



CO:


CAVVANBA

DATE:

03/03/23

LEGEND:

- CADASTRAL BOUNDARIES - APPROX
- UPGRADE EXISTING BITUMEN PATH
- EXISTING BARB WIRE FENCE
- UPGRADE EXISTING BARB WIRE FENCE TO BE DOG PROOFED
- PROPOSED DOG EXCLUSION FENCE
- PROPOSED BIRD HIDE - PRIX 5 x 4m
- EXISTING TREES TO RETAINED
- PROPOSED FEATURE / ROOSTING TREES
- STAGE TREE - OSPREY ROOSTING NEST
- SUNNING LOG AT WATER EDGE
- SUNNING ROCKS FOR REPTILES
- MACROPHYTE SAFETY BENCH = 430m<sup>2</sup>  
PLANT DENSITY 4/m<sup>2</sup>
- REMOVE VEG WITH EXCAVATOR = 655m<sup>2</sup>  
WEED CONTROL - PLANT DENSITY 1 PER 2m<sup>2</sup>
- HEIGHT RESTRICTED PLANTING = 4000m<sup>2</sup>  
PLANT DENSITY 4/m<sup>2</sup>
- ASSISTED NATURAL REGEN = 3400m<sup>2</sup>
- TREATMENT EXTENTS TO BE CONFIRMED IN DD

  
0 10 20 30 40 50M  
SCALE 1:1000 @ A3



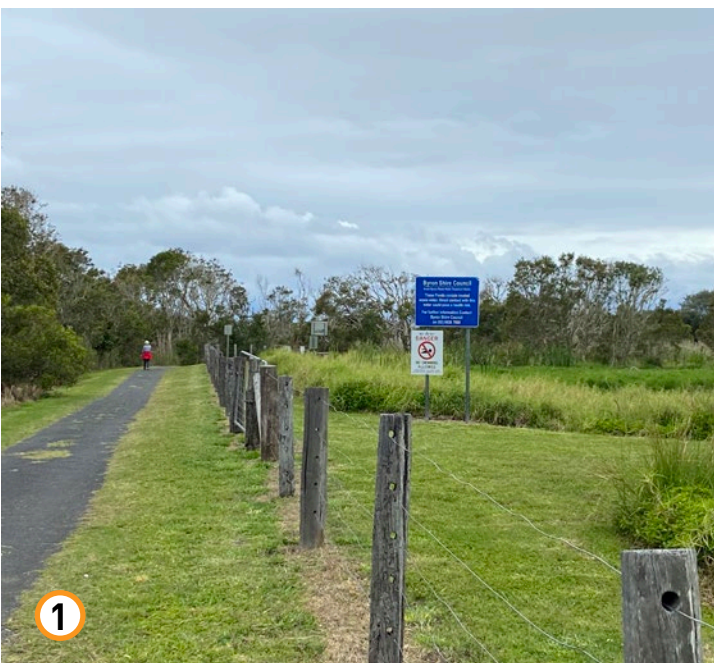


**BIRD HIDE LOCATION**

Following consultation with Byron Bird Buddies, a location for a Bird hide has been selected on the central bund between the two ponds.

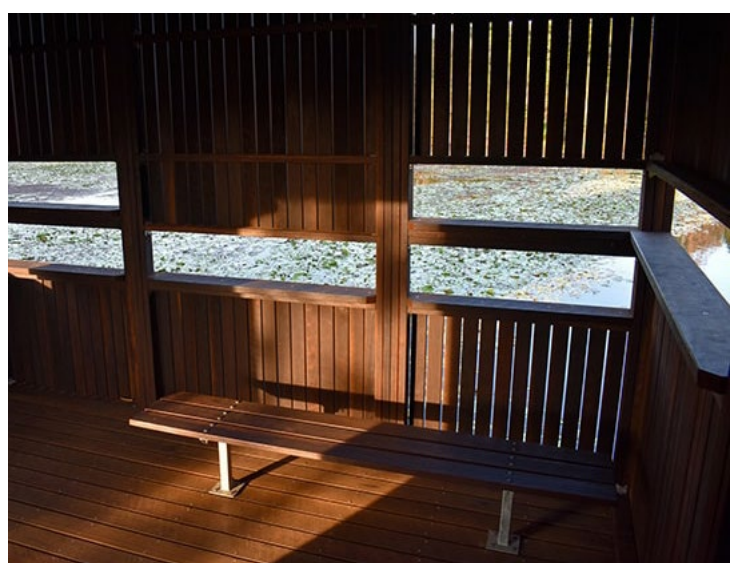
Located at the northern end of the berm, it's proximity to the shared cycle path will ensure pedestrians are aware of the bird hide and ensure its use.

Being close to the path will also provide passive surveillance of the hide, reducing the risk of vandalism or antisocial behaviour.



**BIRD HIDE PRECEDENT**

The Bird hide above and below was designed by Landmark for Sunshine Coast City Council.



**SCREENING EXAMPLE**

Stake and wire fencing is a simple natural looking material to screen users from birds when on the central bund.



## RECOMMENDED SAFETY DESIGN GUIDELINES

There is a lack of clear guidance on the design of water bodies to ensure public safety. Recommendations developed by Lake Macquarie Council are considered applicable to the site:

- Recommended batters below and above the water level to be gentle. Approx grade 1:6 to 1:8.
- Dense vegetation and or fencing should be provided to restrict access to waters edge.
- Integrate features like Boardwalks, viewing platform or bird-hides to enable interested users a controlled access point for viewing the water.
- Consider dense and spiky vegetation to limit public access to the water's edge
- Use advanced plants adjacent to public access areas to quickly prevent access
- Temporary fencing may be required whilst plant establishment occurs.

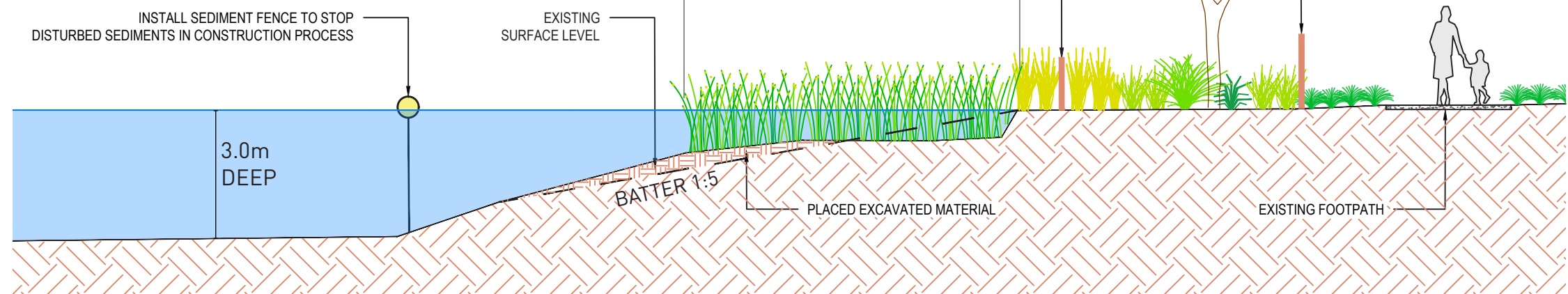
## SAFETY DESIGN SUMMARY

All recommended guideline steps are to be incorporated in the rectification of the ponds, with the exception of established plants. The use of dog exclusion fencing will eliminate the need for this.

## BATTER PROFILE / MACROPHYTE SAFETY BENCH

The ponds at the STP are approximately 3m deep. The average batter is a grade of 1:5. Due to the dense vegetation and fencing surrounding the ponds, the risk of a person accidentally falling into the waterbody is considered low

A macrophyte safety bench is proposed along the waters edge along the northern side of the ponds due to close proximity to the pedestrian path. This will require cutting into the batter and filling within the water body to create a 4m wide bench approx 0.2m deep.



## DECOMMISSION INFRASTRUCTURE

Redundant and degrading infrastructure will be removed in the rectification process. Consultation with councils water management team is required to confirm the items for removal.

Refer image right for an example of the redundant infrastructure in the south east corner of the site.

## WATER QUALITY

As this is a closed system with small, localised catchment, existing recycled water (RW) pipes from the current West Byron STP should be retained. In the event of an algal bloom it is proposed that recycled water can be used to flush the system.

See image right for recycled water valve housing.



## CPTED

Crime Prevention Through Environmental Design or CPTED has been considered in the following steps

- Positioning of the proposed bird hide on the northern side, achieving passive surveillance by passing pedestrians
- Proposed vegetation surrounding paths to be height restricted to maintain a clear line of sight.



CLIENT:



BYRON SHIRE COUNCIL

PROJECT:

## FORMER SOUTH BYRON STP TREATMENT PONDS

Preferred Design Option

DRAWING:

### PROPOSED HABITAT FEATURES

SHEET:

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BY:



CO:



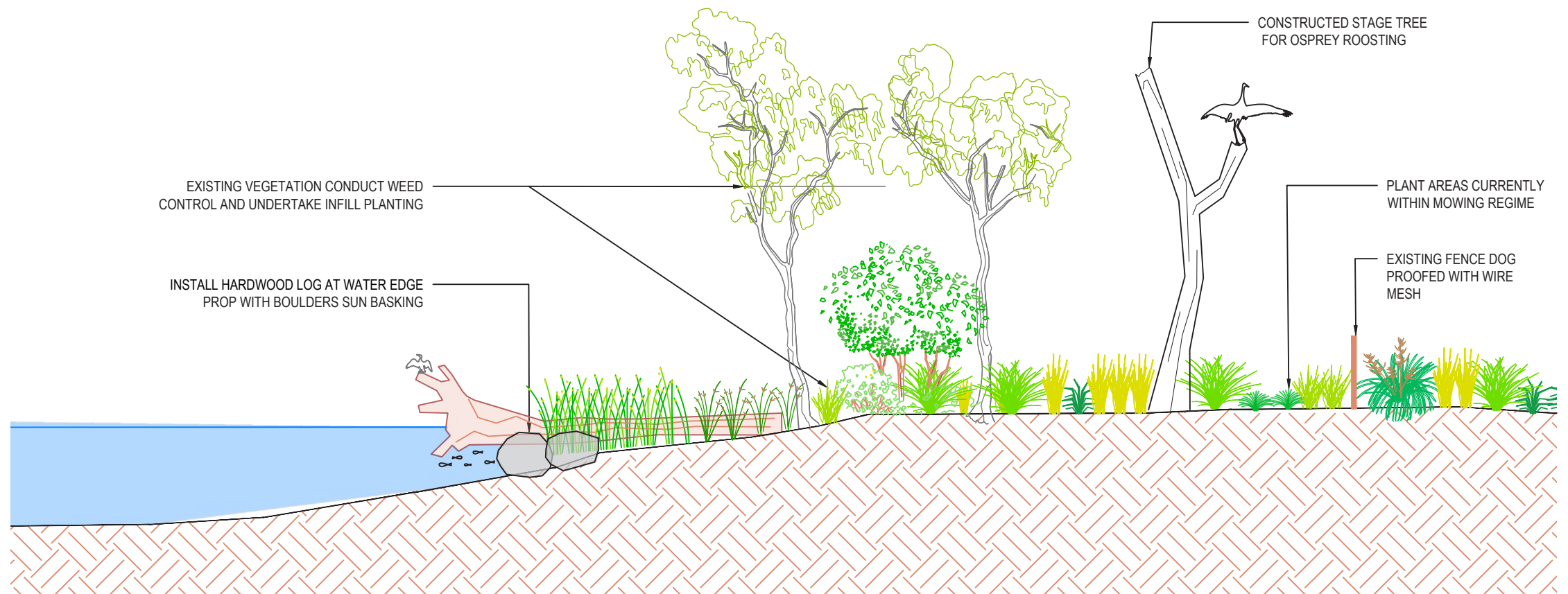
DATE:

03/03/23

### HABITAT FEATURE

There are a number of habitat features that could be introduced around the ponds including

- Additional feature / roosting trees
- Habitat logs at water edge
- Sunning rocks at waters edge
- Roosting stag trees



### SUN BASKING ROCKS

Source - <https://www.birdsinbackyards.net/forum/Eastern-Long-necked-Turtle>



### CONSTRUCTED OSPREY ROOST

Source - <https://ntraptors.wordpress.com/blog/>



### CONSTRUCTED STAG TREE

Seapeace - Ewingsdale



### DOG EXCLUSION FENCE

As a habitat protection measure a 1m high fence is proposed in order to keep dogs out of the ponds. This will be used in combination with the existing fence being upgraded with wire mesh as well.



### VEGETATION COMMUNITIES

Vegetation surrounding the ponds predominantly consists of Open forest (Broad-leaved paper-park. Close Forest Tuckaroo, Open Shrubland (Wallum Banksia) and reedland (Common Rush) communities.

Plant species should be selected from these indigenous plant communities to ensure consistency with the broader location and create an attractive public space. Suggested species selection for each zone are provided here.



Image of Open Shrub land (Wallum Banksia) Veg Community

### WEED CONTROL

Main species fringing ponds are Singapore Daisy and Para Grass. In order to control the weeds, the following methodology is recommended.

- Use small excavator to scrape banks back and place all material in dumptruck (for tip disposal).
- Retain stands of existing native trees.
- Follow up spot spray of weeds to be undertaken by a qualified bush regeneration specialist, as native regeneration of species will start to occur.
- Mulch exposed batter with tea tree mulch and plant with recommended pond edge and grassy area / pathway species.

### SUGGESTED PLANT SPECIES

Open forest (Broad-leaved paper-park. Close Forest Tuckaroo, Open Shrubland (Wallum Banksia) and reedland (Common Rush) surrounding.

#### POND EDGE

Eleocharis acuta (Common Spikerush)  
Schoenoplectus validus (River Club-rush)  
Baumea articulata (Jointed Twig-rush)  
Baumea rubiginosa (Soft Twig-rush)  
Telmatoblechnum indicum (Swamp Water Fern)

#### FORESHORE

Acacia longifolia (Coast wattle)  
Austromyrtus dulcis - (Midyim berry)  
Melaleuca quinquenervia (Swamp paperbark)  
Commersonia bartramia (Brown kurrajong)  
Banksia integrifolia (Coastal banksia)  
Banksia robur (Wallum banksia)  
Cupaniopsis anacardioides (Tuckeroo)  
Melaleuca nodosa (Prickly-leaved paperbark)  
Monotoca scoparia (Prickly broom heath)  
Lomandra longifolia (Matt rush)

### GRASSEY AREAS/ PATHWAYS

Wallum Banksia Heathland/Shrubland and Teatree Wet Shrubland Communities

Baurea rubioides (Dog rose bush)  
Dianella caerulea (Blue flax lily)  
Hibbertia scandens (Guinea flower)  
Lomandra longifolia (Matt rush)  
Patersonia sericea (Purple flag)  
Pimelia linifolia (Slender rice grass)  
Tetratheca thymifolia (Black eyed Susan)  
Gleichenia dicarpa (Coral Fern)  
Crinum pedunculatum (Crinum Lily)  
Melastoma affine (Blue Tongue) – wet areas  
Hibbertia scandens (Scrambling Guinea Flower) – dry areas

### SCREENING

Acmena smithii (Common lilly pilly)  
Backhousia myrtifolia (Grey myrtle)  
Melaleuca styphelioides (Prickly tea-tree)  
Cordyline petiolaris (Broad-leaved Palm Lily)  
Elaeocarpus reticulatus (Blueberry Ash)

### FEATURE PERCHING TREES

Eucalyptus robusta (Swamp Mahogany)  
Melicope elleryana (Pink-flowered Doughwood)  
Commersonia fraseri (Brown Kurrajong)



PROJECT:  
**FORMER SOUTH BYRON  
STP TREATMENT PONDS**  
Preferred Design Option

DRAWING:  
**EDUCATIONAL SIGNAGE**

SHEET:  
**10**

BY:  CO: 

DATE:  
03/03/23

**EDUCATIONAL SIGNAGE**

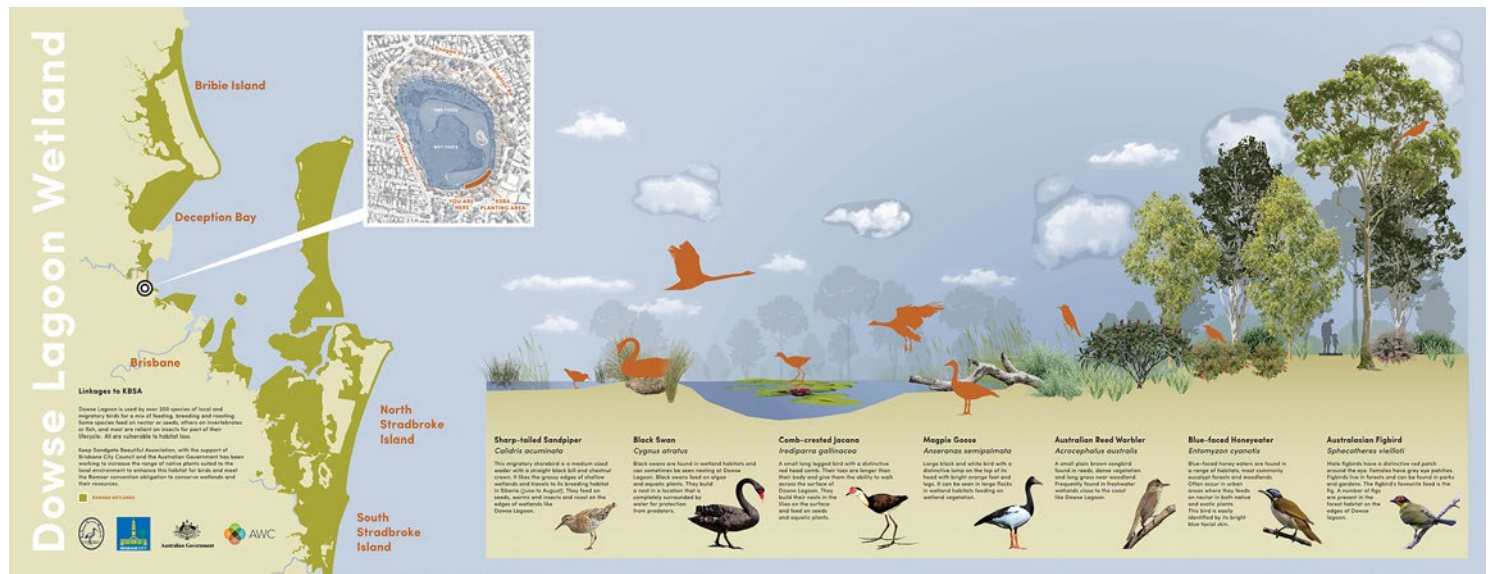
- Fresh water wetland
- Historical site sign

**SAFETY / RESTRICTION SIGNAGE**

- Dog exclusion zone
- No swimming / Dangerous Water



Dog restricted area sign mock-up



Precedent sign by AWC.



Historic aerial from google earth 2009, prior to remediation of site.



Images of the STP in 2012 post decommissioning of STP



**FRESH WATER WETLAND**

The ponds provide valuable habitat for a variety of birds and other fauna, making community education and awareness raising important. Information on migratory and resident birds that frequent the pond should be developed into educational signs.

**FORMER STP SITE HISTORY SIGN**

With the use of historic aerials and site photos of the Former STP a sign can be created, educating the public about the sites previous industrial use, the reasoning behind the cells creation and the hazards of swimming in the water bodies.

The objective is to create awareness to not swim in the ponds, rather than illustrating that the water is contaminated.

A search of Council archives to find historical images might be worthwhile to find images suitable for use on signage



CLIENT:



BYRON SHIRE COUNCIL

PROJECT:

FORMER SOUTH BYRON  
STP TREATMENT PONDS

Preferred Design Option

DRAWING:

PRELIMINARY COST ESTIMATE

SHEET:

11

BY:



CO:



DATE:

03/03/23

COSTING

Note: Costings are indicative only and require further consideration with development of detailed design and confirmation of design extents.

Preliminary Works						
NO.	Action	Description	Unit	Qty	Rate	Total
1.1	Site Preparation	Mobilisation of project, including works compound, site office, temporary fencing, power supply, traffic management plans, security surveillance etc)	item	1	\$ 5,000.00	\$ 5,000.00
1.2	Erosion and sediment control	Site access, sediment fences, floating boom and silt curtain, cattle grids, controlled stockpile areas, wheel wash water supply, etc)	each	1	\$ 2,000.00	\$ 2,000.00
1.3	Site set out	Allow for survey to set out datums and parameters of project	each	1	\$ 2,000.00	\$ 2,000.00
					Sub- Total	\$ 9,000.00
Earthwork's / Demo						
2.1	Vegetation removal	Scrape vegetation from macrophyte bench and area infested with Singapore Daisey (to be disposed of as per BSC instruction) 1085m2 @ 100mm depth	m²	109	\$ 10.00	\$ 1,085.00
2.2	Excavated safety bench	Cut material to be used to extend macrophyte bench into deeper water	m³	96	\$ 15.00	\$ 1,440.00
2.3	Decommission Infrastructure	Remove deteriorating decommission infrastructure (to be confirmed in DD)	nom	1	\$ 5,000.00	\$ 5,000.00
					Sub-Total	\$ 7,525.00
Hardscaping / Infrastructure						
3.1	Deco Sandstone Path	supply and install 150mm thick compacted decomposed sandstone	m²	900	\$ 35.00	\$ 31,500.00
3.2	Dog Exclusion Fence	1m high fence with timber posts at 3m spacings. 100 x 100x wire mesh applied	ln/m	230	\$ 35.00	\$ 8,050.00
3.3	Dog Exclusion gates	Self closing gates to stop wondering dogs entering dog exclusion area	each	3	\$ 500.00	\$ 1,500.00
3.4	Retro fit existing fence	Remove barb wire on existing fence and apply 100 x 100mm mesh	ln/m	460	\$ 15.00	\$ 6,900.00
3.5	Brush screening fence	Supply and install stake and wire screening fence	ln/m	15	\$ 300.00	\$ 4,500.00
3.6	Bird hide	Supply and install of Bird Hide by Landmark approx. 4x5m	each	1	\$ 75,000.00	\$ 75,000.00
					Sub-Total	\$ 127,450.00
Educational Signage						
4.1	Educational signage	Design and construct signs on fresh water wetland, fauna and former STP	each	3	\$ 3,000.00	\$ 9,000.00
4.2	Safety signage	dog exclusion zone, no swimming, dangerous water sign	each	4	\$ 500.00	\$ 2,000.00
					Sub-Total	\$ 11,000.00
Habitat Features						
5.1	Sunning Rocks	Supply and install 0.5 x 1..5 bush rock	m²	10	\$ 200.00	\$ 2,000.00
5.2	Stag tree	Supply and install Stage tree	each	2	\$ 5,000.00	\$ 10,000.00
5.3	Habitat Log	Hardwood Trunk with branches dia 700 length 6m approx.	each	3	\$ 2,000.00	\$ 6,000.00
					Sub-Total	\$ 18,000.00
Planting Feature Trees						
6.1	Assisted Natural Regen	Weed control and infill planting at 1 plant per 2m²	m²	3400	\$ 7.00	\$ 23,800.00
6.2	Plantings	Supply and install tubestock at 4/m²	m²	5000	\$ 16.00	\$ 80,000.00
6.3	Jute or Mulch	Depending on location apply jute or 100mm of tea tree mulch	m²	5000	\$ 7.00	\$ 35,000.00
6.4	Feature Trees	Supply and install 100L feature trees. Stake with 2 hardwood stakes to secure	ea	24	\$ 500.00	\$ 12,000.00
					Sub- Total	\$ 150,800.00
Maintenance & Reporting						
7.1	Establishment Period	Plant establishment and weed control. 2 people 1 day a mth	Month	3	\$ 1,600.00	\$ 4,800.00
7.2	Maintenance Period	Weed conrtol and plant replacment. 2 people 1 day a mth	Month	12	\$ 1,200.00	\$ 14,400.00
7.3	Reporting	Reporting to be completed at Practical Completion, End of Establishment Period and at 6mth intervals within maintenance period	Item	6	\$ 1,000.00	\$ 6,000.00
					Sub- Total	\$ 25,200.00
Total Cost						
					Total	\$ 341,450.00
					Contingency 25%	\$ 85,362.50
					Sub-Total	\$ 426,812.50
					GST	\$ 42,681.25
					Total	\$ 469,493.75



CLIENT:



BYRON SHIRE COUNCIL

PROJECT:

## FORMER SOUTH BYRON STP TREATMENT PONDS

Preferred Design Option

DRAWING:

DESIGN REPORT SUMMARY

SHEET:

12

BY:



CO:



DATE:

03w/03/23

### SUMMARY

The ponds at the Former Byron STP have been assessed to determine options for ecological rehabilitation and enhancement as a public space. Through an Investigation Assessments and Options Analysis, the following topics have been considered:

- Water quality
- Sediment contamination
- Ecological significance
- Fauna habitat threats
- Dog exclusion zones
- Public safety
- Public amenity
- Public education
- Pedestrian connectivity
- Vegetation management

The presence of contaminated sediments means minimal disturbance of the ponds is the recommended approach in light of potential risks and likely costs. Therefore minimal earthworks are proposed on the northern side of the ponds to address identified risk through the creation of macrophyte safety benches. This bench will partially be created from cut within the bank, further minimising disturbance to sediments. A silt curtain may be required as part of the sediment management of the process. The earthworks will continue toward the path scraping existing vegetation from the pond batter, controlling the presents of the noxious weed Singapore Daisy. In conjunction with weed control in the perimeter vegetation it is expected this species can be eradicated from site.

Dense, low plantings are proposed in the northern area interfacing the existing path and the ponds. Further planting will be installed around the perimeter track to stop current mowing regime undertaken by Ingenia Holiday Park. A formal access path running along the west side of the ponds will link the Holiday Park with the existing bitumen access track leading to Tallows Beach.

A secondary decomposed sandstone track will traverse the back of the ponds.

On the northern most high-profile side of the park, a small dog exclusion fence will be installed and screened by vegetation while the remaining perimeter fence will be retrofitted to make it dog proof. This will form a dog exclusion area surrounding the ponds. At each entrance to the ponds a self-closing gate will be installed and signage enforcing the dog exclusion / wildlife habitat area.

A bird hide is proposed on the internal berm toward the northern side, in a location to best view each pond, whilst minimising impacts to existing vegetation. A combination of screening, dog exclusion fencing and dense vegetation will be included in this area.

Water quality and depths have been stable through the prolonged dry periods around 2019, probably due to interaction with the water table. As this is a closed system with small, localised catchment, existing recycled water (RW) pipes from the current West Byron STP will remain. In the event of an algal bloom it is proposed that recycled water can be used to flush the system. Other redundant and degrading infrastructure will be removed in the rectification process.

The introduction of habitat features will also be included as part of the works, and include habitat logs within the water, installation of stag trees for Osprey nesting and sunning rocks for birds and reptiles. These features will be positioned in locations best viewed from the proposed bird hide. The existing pipes exposed irrigation pipes within Pond 1 are proposed to be retained for roosting and as a reminder of the sites former use.

This Design Report is a summary of the Site Analysis, Opportunities and Constraints Plans and Preliminary Concept design and Costings. The report is to help illustrate the design development process to stakeholders and used as a tool to move into detailed design.