



# Proposed Dam Development Lot 2280 Bramley River Rd, Osmington





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## Executive Summary

[REDACTED] and Kent Crane “the client” purchased Lot 2280 Bramley River Rd, Osmington in 2021. The property has an existing dam which was not cored to modern standards and has been leaking significantly, to a point where it does not hold stored water. The dam spillway was also not constructed correctly and is eroding the downstream side of the wall, compromising its structural integrity. There is a shallow soak immediately downstream of the dam but given its limited depth, it is not meeting current stock and domestic needs, resulting in the client carting water over the past 2 summers to provide stock and garden water and storage for fire-fighting.

The proposed dam repair works detailed within this report aim to stabilise the dam by re-coring the wall immediately downstream of the existing wall and constructing a stable spillway. In addition, the existing soak is proposed to be de-silted to improve water quality and enable a more reliable supply.

# SW HYDROLOGY



## 1. Site Details

Lot 2280 Bramley Rive Rd, Osmington has a total land area of 48.5056Ha of which 26.4575 Ha is retained with native vegetation the remaining 22.0481Ha is arable land, including 0.4 Ha of gardens and infrastructure (houses/sheds). The property is predominantly bordered by private freehold land with the southern boundary adjoining Bramley River Rd dividing freehold land to the south.

A main tributary flows in a southerly direction along the eastern boundary where it meets the main tributary of the Margaret River just over 500m downstream of the property boundary. A secondary watercourse originates within the NE section of the property and flows in a SW direction where it joins the larger tributary in the SW corner of the property.

## 2. Existing landuse and water supplies

The property has three existing water sources including an existing dam, soak, and pond (*Figure 1*).

### *Existing Dam*

The existing dam has an existing storage capacity of ~2,067kL and is the closest water source to the existing dwelling, however, due to poor wall construction the dam is not retaining stored water. The dam wall was not constructed to modern standards with a compacted core above and below ground. Essentially excavated material from the dam footprint appears to have been piled/pushed up to provide a barrier/embankment.

Perpendicular cracks are present within the wall and regrowth stands of *Taxandria linearifolia* (Common teatree) are present along and below the downstream embankment, likely contributing to the dam leakage.

Existing Dam Dimensions	
Surface Area (m <sup>2</sup> )	1,531
Wall Length (m)	65
Wall Height (m)	2.75
Dam Depth (m)	2.25
Tailwater (m)	53
<b>Volume (kL)</b>	<b>2,067</b>
<b>Available Water (kL)</b>	<b>1,060</b>

*Table 1. Existing dam dimensions*

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The existing spillway is a poorly constructed 0.2m (D) x 1m (W) x 2m (L) not capable of diverting peak winter flows. Erosion along the dam crest further indicates the spillway bypass rate has been exceeded causing erosion of multiple locations along the downstream dam wall. In addition, the spillway was established in the centre of the dam wall with the highest elevation without any protective rock pitched riffles with geotextile base or stilling ponds to prevent erosion. The winter flows from the spillway have subsequently caused significant undercutting at the base of the dam wall, creating a risk to wall integrity.

Aerial photographs confirm the dam does not hold water during summer and the client has confirmed there is no usable stored water by mid-December. No underwall bypass or provision to bypass flows were established during original construction.

## *Existing Soak*

The existing soak is located immediately downstream of the existing dam and has become the default water supply for the property during summer and autumn, due to the up-stream dam not holding water.

However, it's shallow depth of 2.5m limits its reliability by not accessing the lower areas of the watertable in late summer and autumn, *Table 1* details the existing soak dimensions. Given the existing upstream dam is not holding water the soak has become the sole water supply for stock demands, irrigating ~0.2 Ha of gardens surrounding the dwelling and emergency water supply for fire-fighting purposes (*Table 2*). Due to lack of available water the client has to consider de-stocking the property during summer/autumn or cart water to meet stock and garden water demand.

Existing Soak	
Surface Area (m <sup>2</sup> )	1,437
Dam Depth	2.50
Volume (kl)	1,339

*Table 2. Existing soak volume and dimensions*

Erosion from the up-stream dam has resulted in sedimentation of the downstream soak reducing its storage capacity and water quality. The shallow depth of the soak has experienced algal growth during summer and autumn when sun exposure creates increased photosynthesis and warm surface water temperature facilitating algal growth.

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Irrigation Demand	
Use	Total (kL)
Garden	1,500
Stock	200
Fire Fighting	500
<b>Total</b>	<b>2,200</b>

*Table 3. Existing water demand*

The property had a historic 0.65Ha table grape orchard close to the existing dwelling, the infrastructure for the orchard (post/wires/irrigation) remains, the vines have been removed (*Figure 1*).

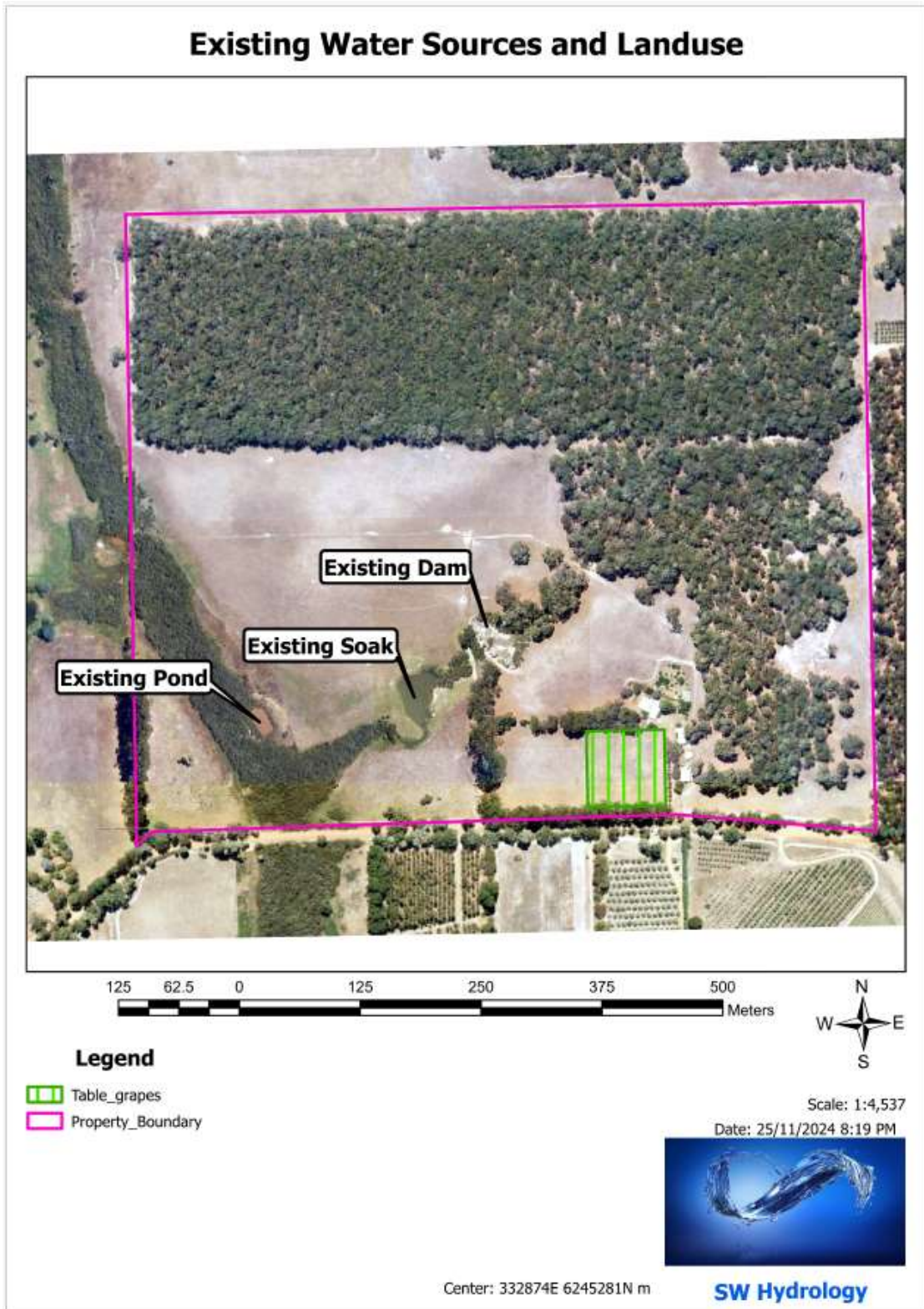


Figure 1. Existing Water Supply Lot 2280 Bramley River Rd



## Existing Pond

A third water source is a pond located on the main tributary flowing south along the eastern boundary. This water source is <1.5m deep, silted from livestock and high in tannins. This pond may have been the first stock water supply for the property and is not used for any water supply purposes due to water quality issues.

## 3. Proposed dam development and soak de-silting

The proposed dam has a total storage capacity of 5,310kL and a surface area of 2,160m<sup>2</sup> (Table *Figure 2*), slightly larger than the existing footprint of 1,531m<sup>2</sup> due the dam wall being moved slightly downstream.

Proposed Dam Dimensions	
Surface Area (m <sup>2</sup> )	2,188
Wall Length (m)	90
Wall Height (m)	2.75
Dam Depth (m)	5
Tailwater (m)	57
<b>Volume (kL)</b>	<b>5,310</b>
<b>Available Water (kL)</b>	<b>2,655</b>

*Table 4. Proposed dam dimensions*

## Dam Core and Wall

The proposed dam core will be located immediately downstream of the existing dam embankment to ensure the core is constructed within undisturbed in-situ ground conditions. The base of the core should extend well below ground level into impermeable clays likely to occur at 5-6m depth. This core will then be filled with good quality clays at optimum moisture content with maximum lift of 500mm before being compacted with 15t vibrating pad foot roller until top of crest height has been achieved. An underwall pipe will be installed at the base of the dam wall with a t-piece with gate valves to enable the bypass of low flows and for connecting to pump infrastructure. HDPE seepage collars will be welded to the underwall pipe to prevent tunnelling effects around the pipe.



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## *Spillway and Stilling Ponds*

The spillway has been cited on the northern side of the dam wall to utilise the lowest land gradient to reduce flow velocity, potential erosion and sedimentation of the downstream soak, it also minimises clearing of native vegetation. Stilling ponds have been located within the spillway to regulate flow leaving the dam and entering the watercourse. The spillway channel will be contoured to 3m wide by 0.5m depth to ensure flows do not escape the channel. Rock pitching can be used to stabilise the banks and within the channel to further slow and oxygenate the water.

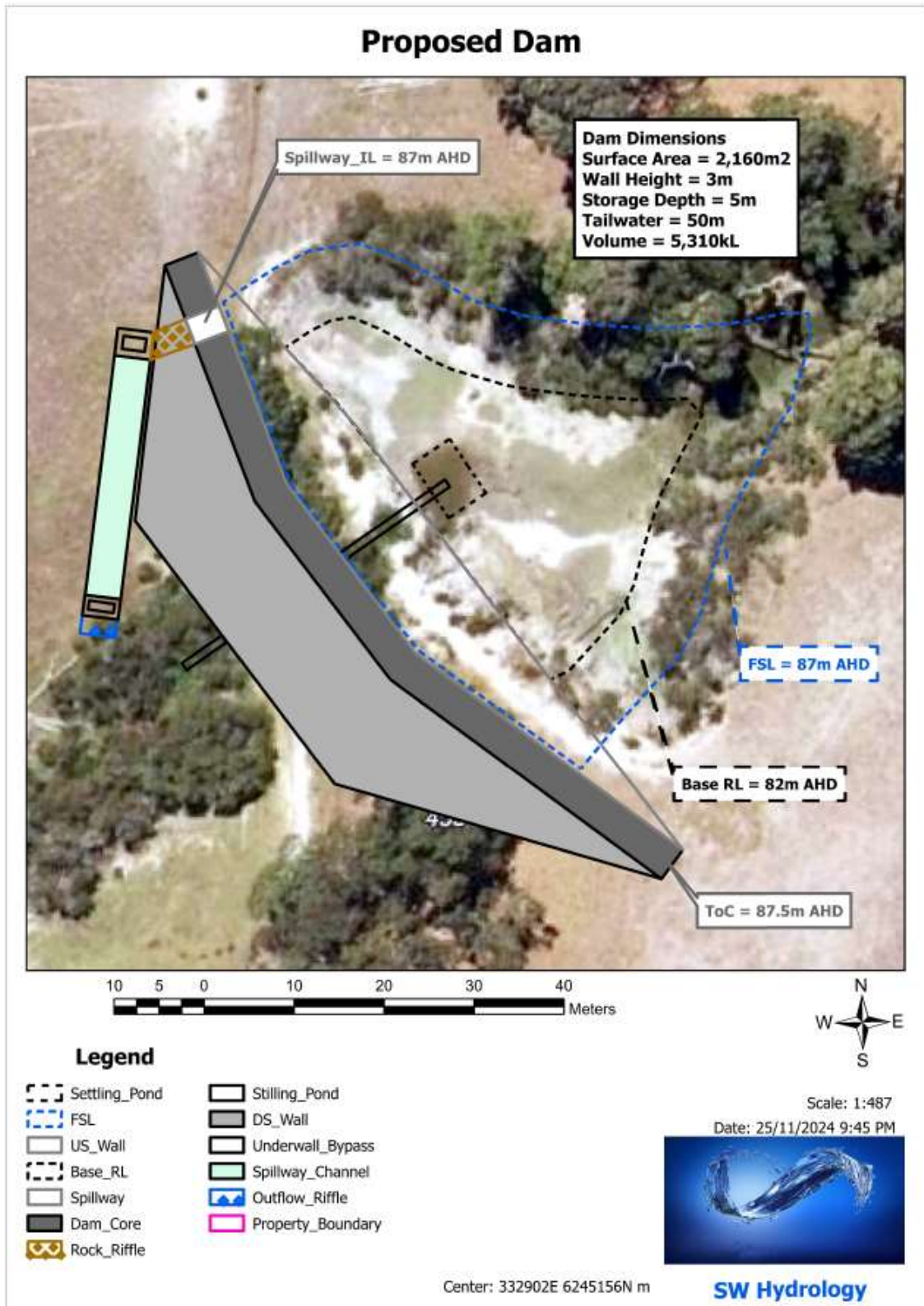


Figure 2. Proposed dam design, Lot 2280 Bramley River Rd

## SW HYDROLOGY



### *Soak De-silting*

The existing soak is proposed to be de-silted to improve access to recharge during summer months and improve water quality by removing built up silt and reduce the chance of algal blooms by having a deeper storage. The existing FSL will remain unchanged and the spillway will be retained (*Figure 3*). The soak depth will be slightly increased from 2.5m to 4m depth. Excavated material will be used within the proposed dam wall or along the existing downstream side of the soak bund.

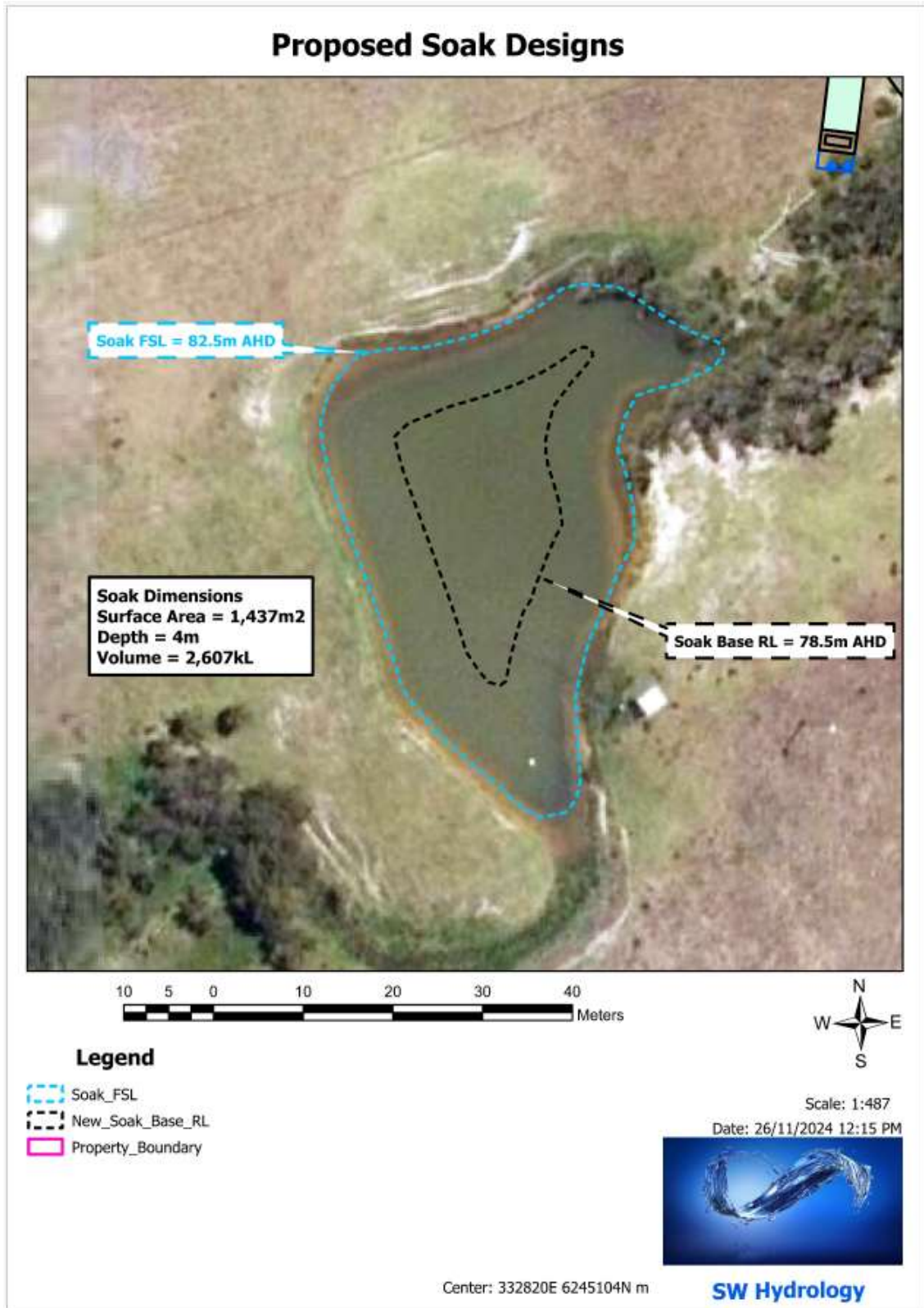


Figure 3. Proposed soak designs



## 4. Sediment control measures

The following actions and contingency plans are proposed to prevent sediment export from the property.

### *Sediment Management During Construction*

The proposed dam construction and soak de-silt are proposed to commence early 2025 as soon as development approval from AMRSC and permits from DWER have been granted, the proposed works are planned to be completed by 31 May 2025, prior to any significant overland flow expected to occur. The primary works will be focussed on the dam construction followed by de-silt of the soak. Square hay bales, geotextile rolls and star pickets will be stored on-site. If rainfall is forecast to exceed 10mm within a 12-hour period three days ahead of existing works, the hay bales and geotextile cloth will be installed above and below potential erosion areas and re-enforced with star pickets

Small square haybales overlain with geotextile cloth and re-enforced with star pickets are similar to a natural pool/riffle system albeit semi-permanent. The benefits include their quick installation and having geotextile cloth overlying the packed hay creates additional filtration of sediment and nutrients, to minimise downstream export during summer and autumn thunderstorm events.

All material associated with the proposed dam works will be stockpiled in areas where the risk of erosion is minimised. Topsoil will be stored in a specific point for re-use to assist revegetation, provide planting medium and retain native seed bank.

Clays removed will be used within the dam core if suitable otherwise used in the up-stream and downstream wall as appropriate. Rock will also be stockpiled and re-used for riffle and pool construction. Small square hay bales will be placed downgradient of the stockpiles to prevent any sediment dispersal from summer or autumn thunderstorm events.

Cleared vegetation will be mulched and stockpiled ready to provide a soil cover to minimise weed generation and moisture retention, to assist with revegetation.



## *Dam Designs and Sediment Management Controls*

The proposed dam has a surface area of 2,160m<sup>2</sup> a design depth of 5m with a 57m tailwater. The designed dam area, length and depth of the dam will provide sufficient storage capacity to enable sediment that may enter the dam, to drop out of suspension prior to flows leaving the dam. In addition, stilling ponds have been included in the spillway design to create additional capture of any suspended sediment and to reduce flow velocity. Rock riffles will also reduce flow velocity and oxygenate the water.

The dam and soak will be planted with native sedges and reeds to create a living wetland and assist with filtering nutrients and sediment. Native sedges and reeds will be planted along a bench 0.5m below FSL and 0.5m above FSL to stabilise the banks. Mulch from native trees cleared during construction will be used to control weeds and facilitate sedge/reed establishment.

## 7. Regulatory Approvals

### *Rights in Water and Irrigation Act 1914*

#### *Surface Water*

The property is located within the Busselton-Coast, Margaret River and Tributaries, Middle Margaret subarea which has water available for allocation under the Whicher Areas surface water allocation plan 2009 and the Departments Water Register. The proposed dam and soak are not located within a proclaimed tributary according to the gazetted map of the resource therefore no s17 permit under the *Rights in Water and Irrigation Act 1914 (RiWI)* is required. In addition, the proposed water supplies are for stock and domestic use consistent with a riparian right and therefore do not require a s5C RiWI licence to take water, the proposed storage volume is under 8,000kL as detailed in the Whicher Plan for stock and domestic use.

### *Environmental Protection Act 1986*

#### *Clearing permit*

The proposed dam development will require a clearing permit under s51E of the Environmental Protection Act 1986 for the 0.21Ha of native vegetation surrounding the FSL and proposed dam wall. NSA Associates



have completed a flora fauna report and IBSA data packages to support the clearing application currently under assessment.

## *Shire of Augusta Margaret River*

Application for development approval has been submitted for approval by the client.

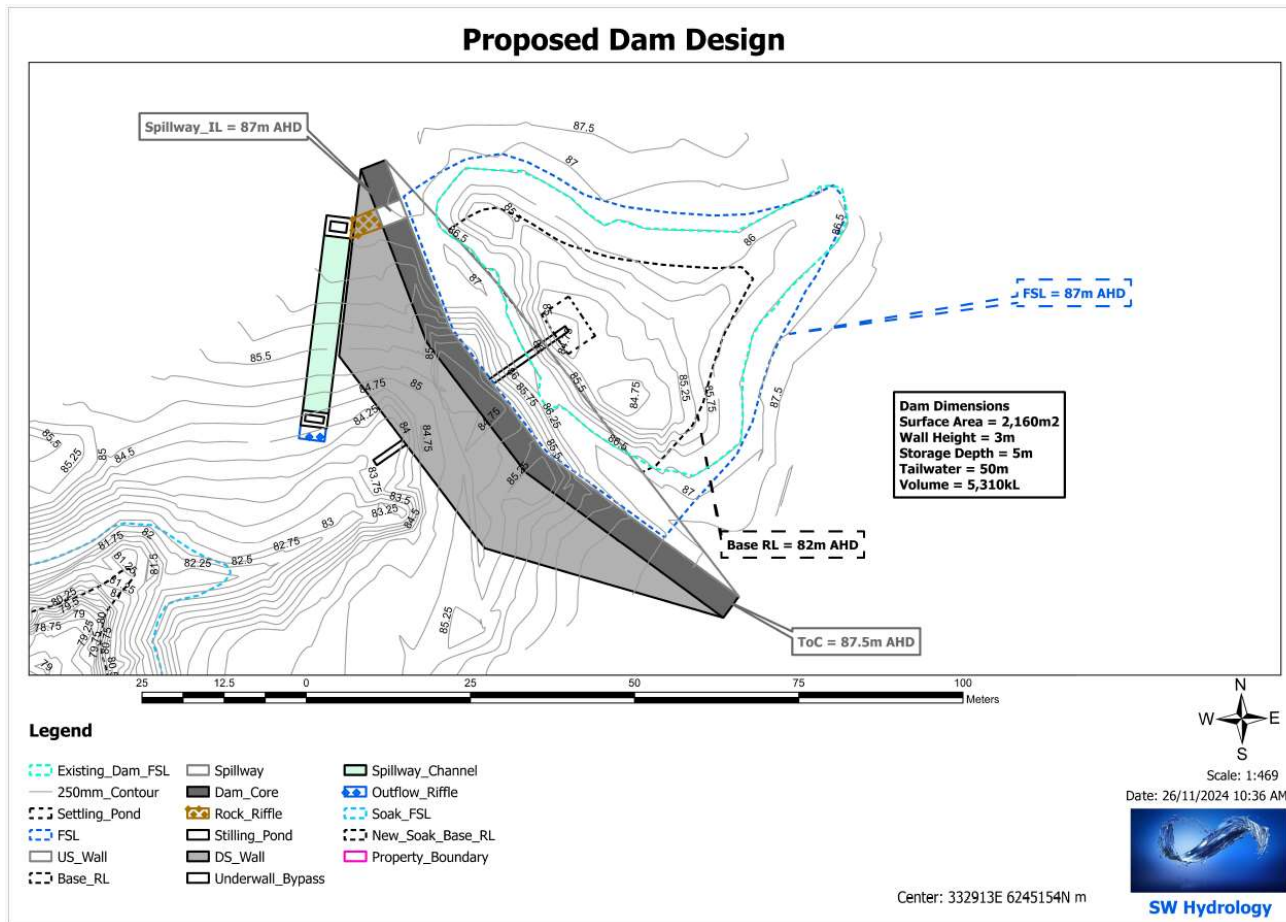
## Summary

The proposed development is vital to ensure the structural integrity of the existing dam to prevent downstream impacts from dam failure. It is also critical to ensure the client has sufficient water for stock and domestic garden irrigation and fire-fighting purposes.

# SW HYDROLOGY



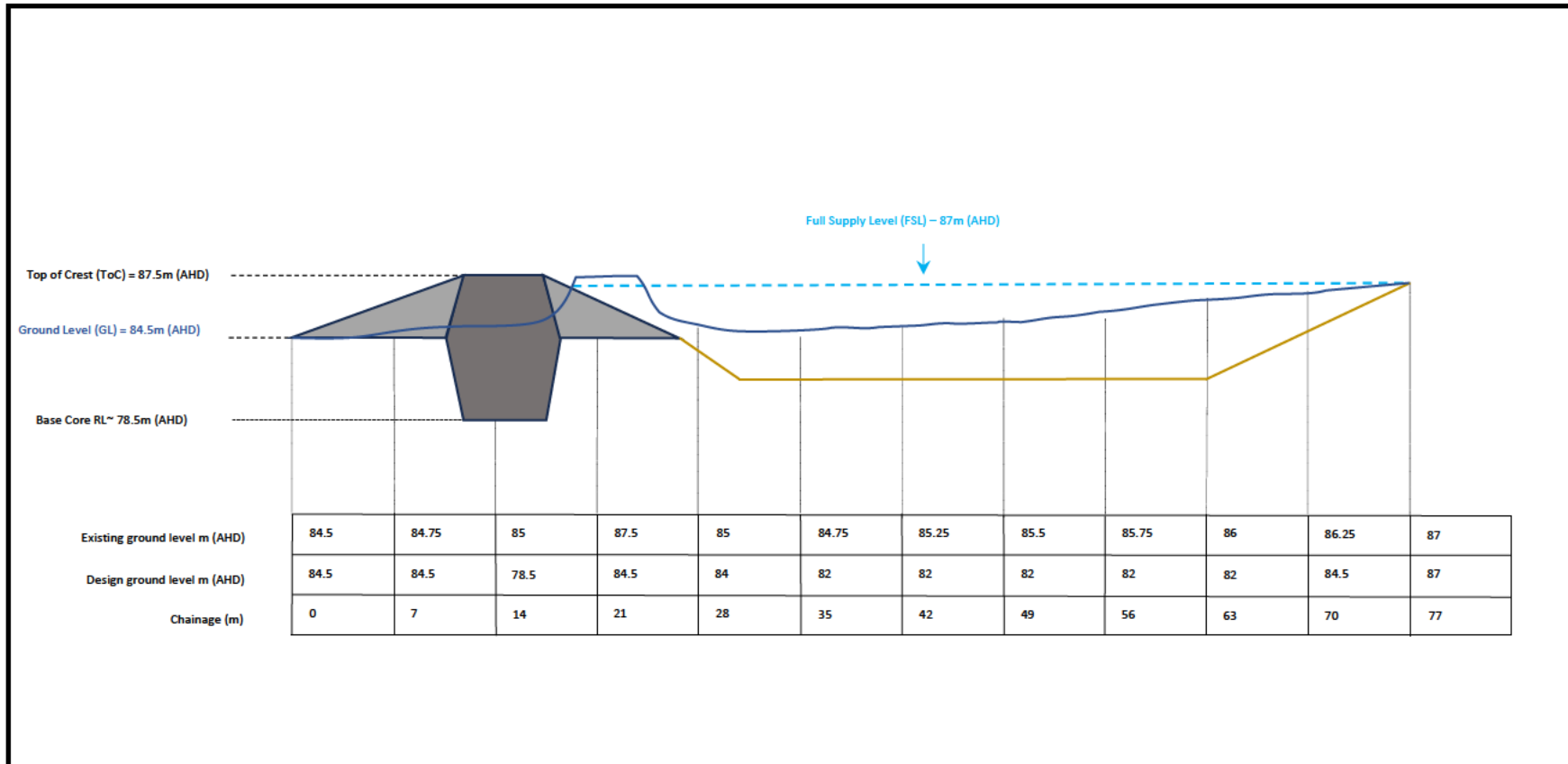
## Appendix 1. Detailed Dam Designs



Plan 1. Proposed dam and specifications



# SW HYDROLOGY

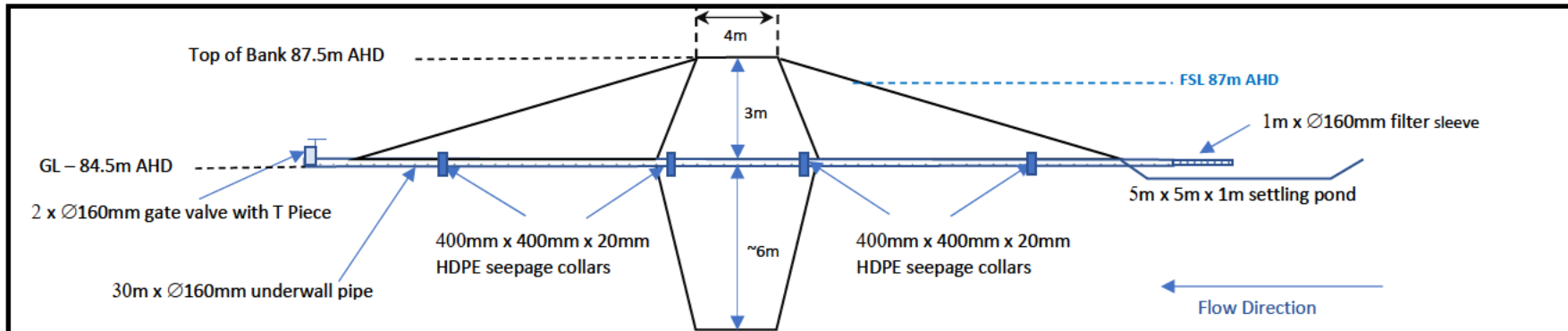


## Plan 1.1 Proposed Dam – Cross Section

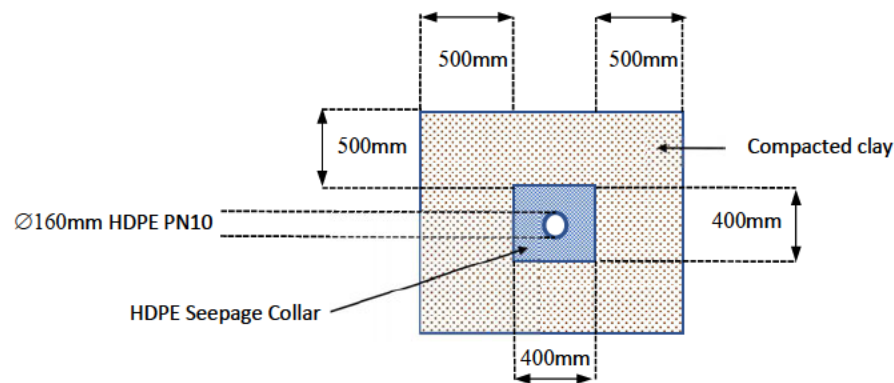
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 Drawn by: CM  
 Date: 26-11-2024



# SW HYDROLOGY



**Plan 1.2.1. Underwall bypass and scour valve**



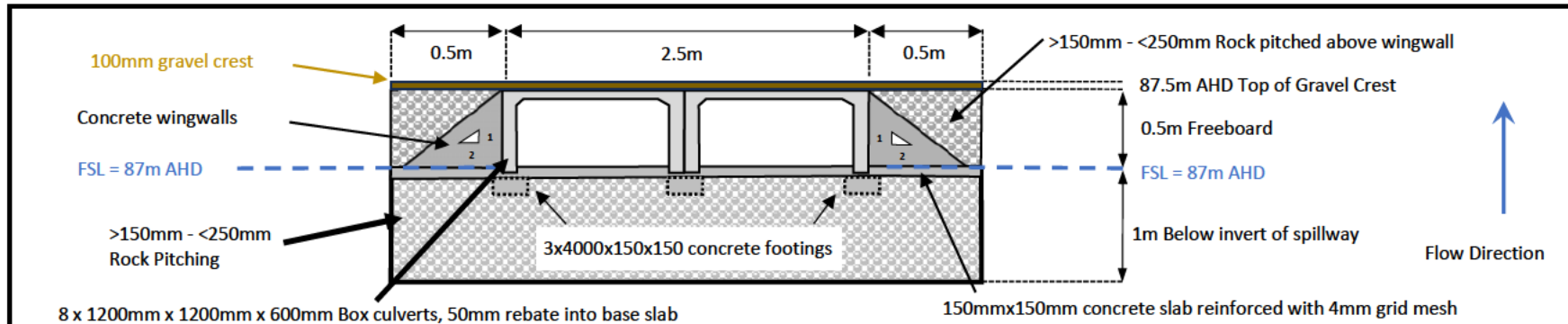
**Plan 1.2.2. HDPE seepage collars**

**Plan 1.2**  
**Underwall bypass design**

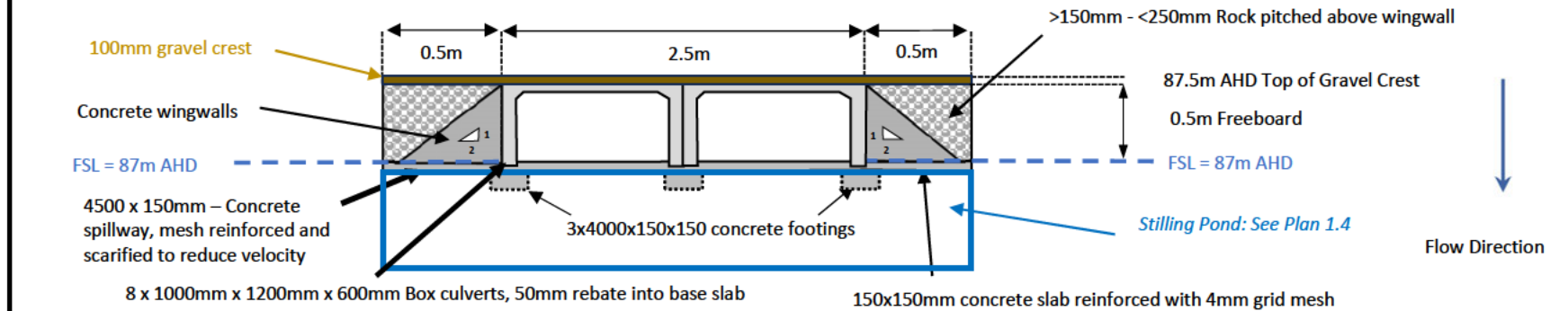
SW Hydrology  
Drawn by: CM  
Date: 26-11-2024



# SW HYDROLOGY



**Plan 1.3.1. Spillway inflow – cross section**



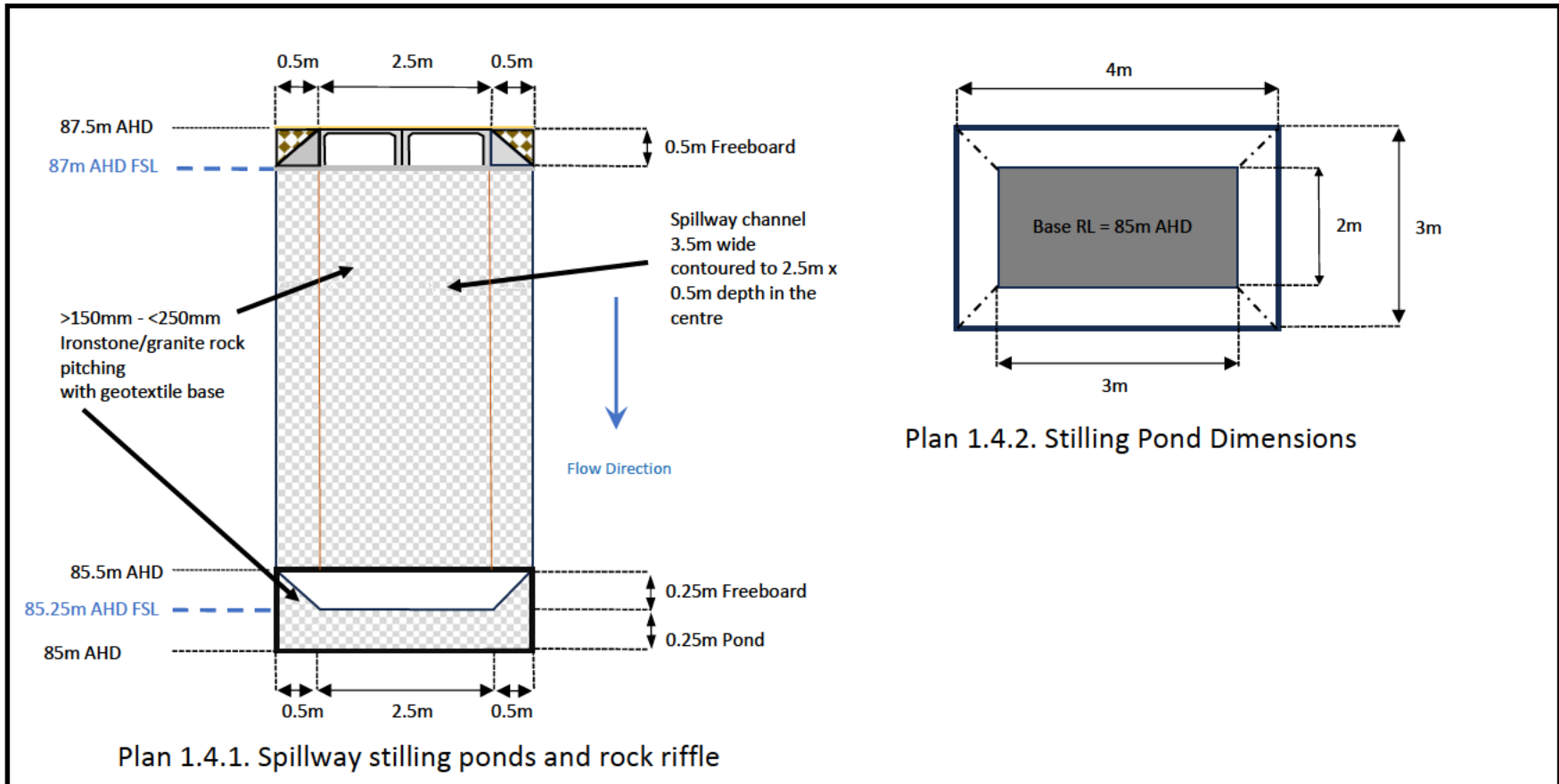
**Plan 1.3.2. Spillway outflow – cross section**

## Plan 1.3 Spillway design

SW Hydrology  
 Drawn by: CM  
 Date: 26-11-2024



# SW HYDROLOGY



## Plan 1.4 Spillway stilling pond and riffle design

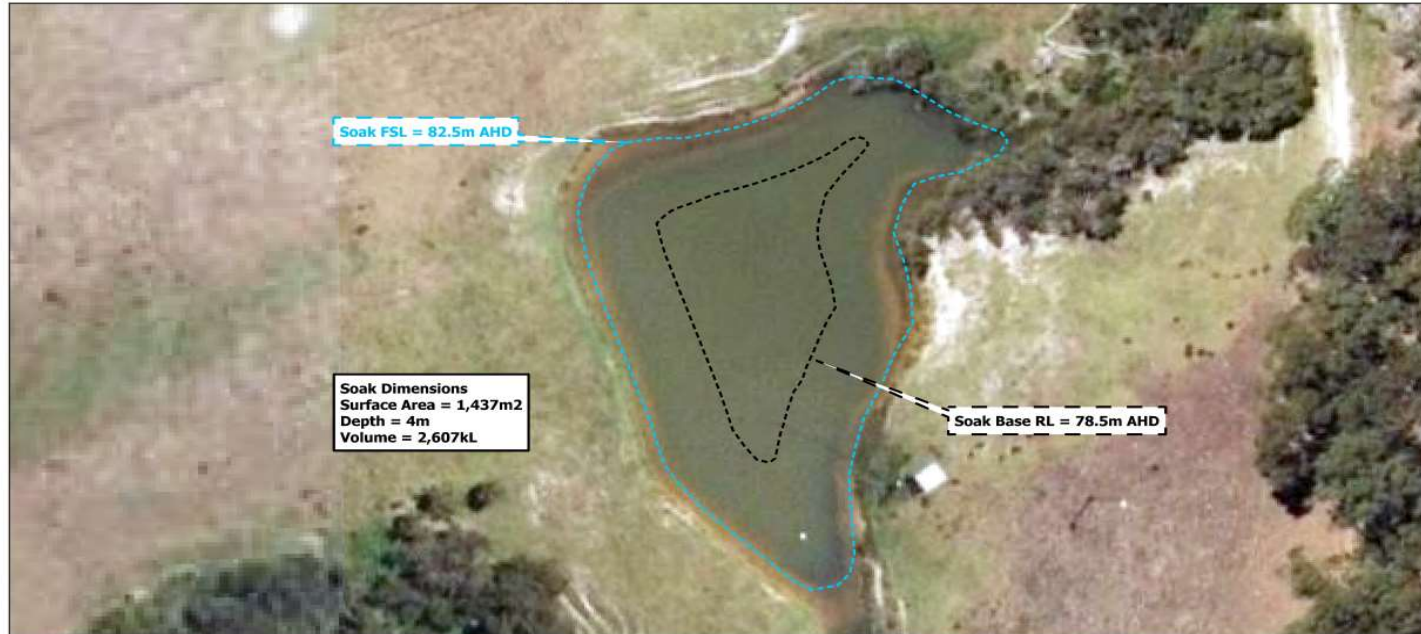
SW Hydrology  
Drawn by: CM  
Date: 26-11-2024





## Appendix 2. Detailed Soak Designs

### Proposed Soak Design



#### Legend

- Soak\_FSL
- New\_Soak\_Base\_RL
- Property\_Boundary



Scale: 1:367  
Date: 26/11/2024 11:16 AM

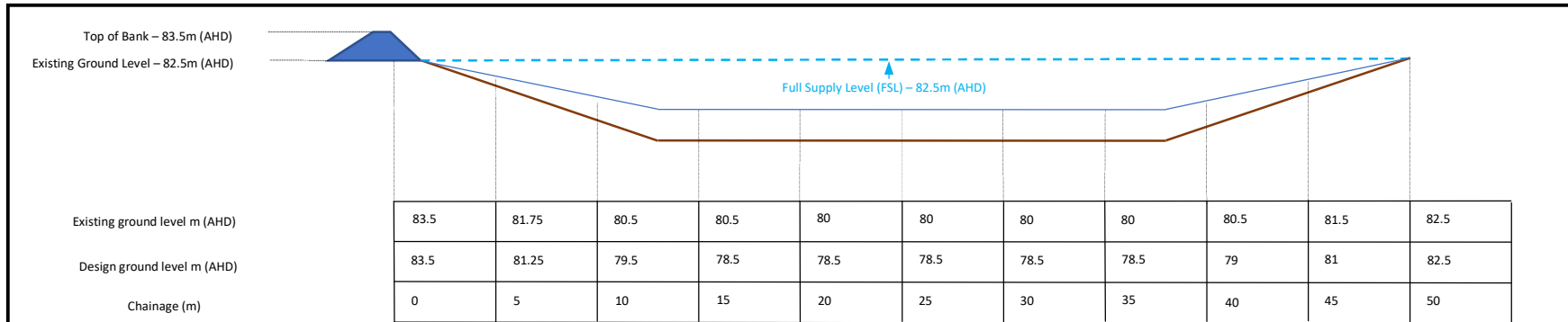


Center: 332819E 6245103N m

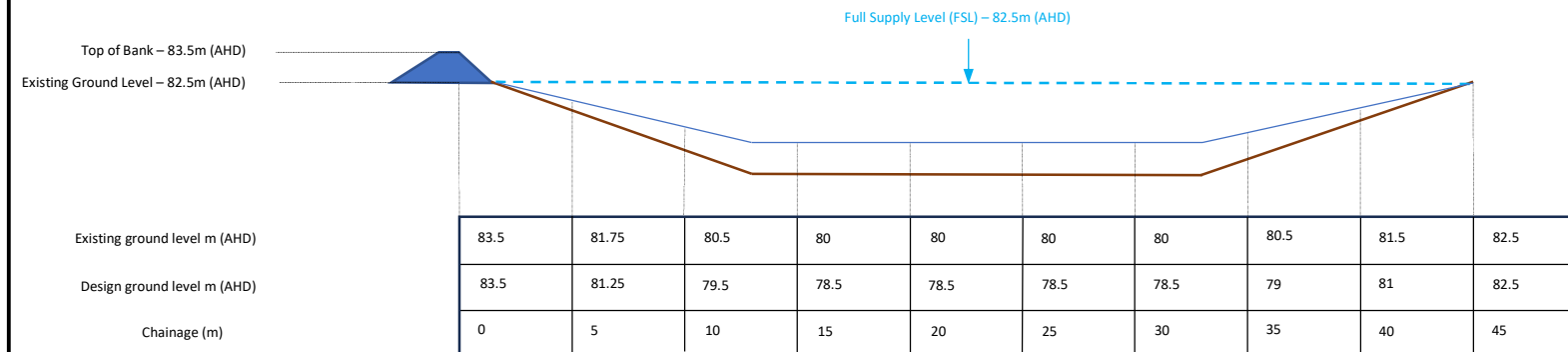
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Plan 2. Proposed soak -dimensions

# SW HYDROLOGY



Plan 2.1.1 Proposed Soak 2 - Cross Section 1, North (L) – South (R)



Plan 2.1.2. Proposed Soak 2 - Cross Section 2, South-South West (L) – North-North East

**Plan 2.1**  
**Proposed Soak 2 – Cross Section**

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Date: 26-11-2024

