Dam Dewatering Plan: 215 Badgerys Creek Road, Bradfield (Lot 3101 DP 1282964)



Site	Location	Estimated maximum depth when full	Surface area when full	Volume (when full) (0.4 x Depth x Surface Area / 1000)	Catchment size	Slope of irrigation area	Water quality analytes that did not meet guidelines (see table to left for full results)
Dam East	-33.927665, 150.737016	3.0 m	4191 m²	5.03 ML	144 ha	1:29	Total Nitrogen, Total Phosphorus, Dissolved Oxygen, Conductivity
Dam West	-33.927102, 150.732338	2.0 m	5932 m ²	4.75 ML	128 ha	1:29	Copper, Zinc, Ammonia, Total Nitrogen, Total Phosphorus, Reactive Phosphorus, pH, Dissolved Oxygen, Turbidity

Water quality

Water testing and a brief field survey occurred on 19 March 2024, using a calibrated water quality meter and samples analysed at ALS Laboratories Smithfield. Water quality analytes that did not meet the adopted ANZ guidelines are summarised above, including minor exceedance of some heavy metals and major exceedance of nutrients. Faecal Coliform count met the guidelines, therefore, the water is suitable for secondary human contact during dewatering. Sediment from the base of dam after dewatering is to be reviewed by the geotechnical consultant prior to onsite re-use. The contractor's unexpected finds protocol is to be used to ensure suitability for re-use or classification for waste disposal

Dewatering method

The works could be completed at any time of the year, provided that daytime temperature does not exceed 36°C during the final stages (to prevent stress to fauna and ecologists). Water should be pumped and slowly irrigated across the adjacent grassland prior to the removal of any vegetation. The intake pipe should be caged or shielded to minimise injury to aquatic fauna. Pumped water should be released at the highest ground and allowed to infiltrate the soil with minimal overland flow, using AS/NZS 1547:2012 Onsite domestic wastewater management as a guide to calculate flow rate. The contractor would be required make this calculation, considering soil permeability (including saturation from recent rain), pump size, hose length, slope and area. The flow rate and position of hoses would need monitoring and adjusting if soils become saturated in the irrigation area. As a guide, but not necessarily suited here, other dewatering in the Sydney-Illawarra start at a maximum of 36 mm/hr and adjust as suited to prevent runoff into the local watercourses. A large irrigation area would reduce soil saturation and minimise concentrated application of contaminants into the soil. Silt fences are recommended to filter sediments from inadvertent overland flow during pumping. Hay bales are suited to deflect and slow water across a broader irrigation area, rather than filter sediments. The bottom sludge material and any remaining turbid water should be excavated and dried onsite. All turbid water and sediment must be prevented from entering other waterbodies. Breaching the wall is not recommended as water collects clays and fines from the wall structure, resulting in turbid flows offsite.

ine of fauna relocation to be coordinated with Dam Decommissioning Work Method Procedure (or similar) and Project Aquatic Ecologist

Day 1	Day 2 - 5 (or longer)	Day 6	Day 7 - 8	Ongoing
Install erosion controls, such as silt fence	Pump water and irrigate	During final 0.3 m of dewatering allow Project Aquatic Ecologist	Leave	Remove
(see map on left), hay bales and/or geotextile	overland at a rate allowing	to rescue fauna in one day. Contractor must be able to pump	escape ramp	sediment and
fabric, and prepare flat pump pad near the	infiltration to the soil.	all remaining water that day. Ecologist will instruct excavator	for fauna	wall and
deepest end. The pump intake head is best	Check sediment controls if	operator to dig a solid surface around pump pit and carve steps	trapped	commence
positioned on a floating device above the	irrigation saturates soil	for safe access up the bank. A suitable pump, excavator and	overnight	construction.
deepest part of dam, held in position with	causing surface runoff.	communication with site staff is essential.	(minimum	
ropes spanning the dam. It is difficult to	Adjust pumping rate to	Water will become turbid as it lowers and when ecologists trample	two nights).	
move the pipe when the water is low, so it's	slow runoff.	sediment. This water should be discharged overland and away from		
easiest to install when dam is full. Test	Update Project Aquatic	drainage lines. To allow rapid fauna rescue, the pump inlet needs to		
discharge to ensure no	Ecologist and send	be large enough to suck sediment (e.g. 4 - 6 inch). Earthworks		
erosion/sedimentation occurs. Avoid	photos of water level to	machinery can push sediment across the dam to assist final fish		
disturbing vegetation (grass) where water	coordinate timing of	capture (adjusted to suit conditions and ecologist's instructions).		
will travel. Notify Project Aquatic	fauna relocation.	Grade escape ramp for fauna hidden in bottom sediment overnight.		
Ecologist to explain type of equipment in		Project Aquatic Ecologist to advise on ramp design (slope and		
place and likely dewatering timeframe.		location).		

Approvals and permits

This dam removal is part of a Review of Environmental Factors (REF). This plan should be included in the approval documents and/or referenced in the conditions of consent that a trained ecologist or licensed wildlife handler is present to relocate fauna. This will only be performed by a person with a s.37 license under the Fisheries Management Act 1994 (for fish), which approves handling methods and gear used. Care for animals during relocation, or dispatching sick, injured or feral fish species is to follow procedures expected by the NSW Secretary's Animal Care & Ethic Committee. If there is no development approval or condition of consent specifying an ecologist or licensed wildlife handler be present, then a Biodiversity Conservation Licence (Part 2 Permit to Harm) under the Biodiversity Conservation Act 2016 is required to relocate turtles, frogs and wetland birds. If the dam is licensed with Water NSW, the land owner can remove it from the register: https://waterregister.waternsw.com.au/water-register-frame

Biodiversity

During a brief field survey, the following fauna species were observed: Ardea pacifica (White-necked Heron), Chelodina longicollis (Eastern Long-necked Turtle), Crinia signifera (Common Eastern Froglet), Limnodynastes peronii (Striped Marsh Frog) and Porphyrio porphyrio (Purple Swamphen). Based on dewatering activities nearby, the following native aguatic fauna could inhabit the site: Anguilla australis (Shortfin Eel), Anguilla reinhardtii (Longfin Eel) and Philypnodon grandiceps (Flathead Gudgeon). Pest species may also occur, including Carassius auratus (Wild Goldfish), Cyprinus carpio (European Carp) and Gambusia holbrooki (Eastern Gambusia). Dominant native macrophytes and sedges included: Azolla pinnata (Azolla), Bolboschoenus fluviatilis (Marsh Clubrush), Eleocharis sphacelata (Tall Spikerush), Juncus sp. (Juncus), Ludwigia peploides subsp. montevidensis (Water Primrose), Persicaria decipiens (Slender Knotweed), Philydrum lanuginosum (Frogsmouth), Ranunculus inundatus (River Buttercup), Schoenoplectus validus (River Clubrush) and Typha orientalis (Broadleaf Cumbungi). Two significant aquatic weeds were observed: Eichhomia crassipes (Water Hyacinth) and Juncus acutus (Sharp Rush), which are best removed mechanically and dried on site at least 50 m from a waterway. Water Hyacinth is a regional priority weed for asset protection within Greater Sydney. As such, land managers should mitigate the spread of the plant from their land.

Aquatic fauna handling procedure

- NOTICE: The Aquatic Ecologist is to notify DPI Fisheries of the activity 48 hours prior to fish relocation (unless an agreement is in place), including locations of dewatered and relocation clearly showing licence number (if working in public areas, especially when releasing fauna to local creek).
- PLANNING: The dewatering schedule should allow time for fish rescue, especially during the final 0.3 m water depth or as advised by Aquatic Ecologist. Fauna should be captured in one temporary refuge during dewatering, or works may need to be postponed.
- CAPTURE: Fish are to be collected by hand nets during the final day of dewatering. This is most effective when the water is <0.3 m deep. Dissolved Oxygen concentration will drop rapidly protocols are to be followed and each frog stored in a separate bag. For safety, at least two people are required when wading and handling heavy tubs of water/fish up banks (excavator should dig access steps/ramp).
- RELOCATE: Native fish healthy enough for relocation are to be contained and transported in an aerated tub/tank to an appropriate waterbody. DPI Fisheries advise that the host location placed inside for moisture and support during transport. Frogs can be transported in an inflated freezer/snap-lock bag containing leaves moistened with bottled water or dam water adpoles can be transported in small buckets with dam water
- RELEASE: Water from the receiving waterbody should be mixed slowly over 5 10 minutes with the tank water to allow fish to acclimatise to the new water guality. Eels are less susceptible shade alongside water in the nearest protected riparian corridor
- from the ecologist.
- hould notify the Project Aquatic Ecologist if stranded fish or turtles are observed post-dewatering.
- Photographic evidence of various steps in the procedure should be included.

1:25,000 waterway mapping (DPE Water)
Contours (2 m)

Recommended erosion control



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sites (see regional office contacts https://www.dpi.nsw.gov.au/contact-us/local-office. Fisheries require permits to be carried by the licensed ecologist, who should also display a sign

day, so pumps need to be of an adequate size and placed in an area free from mud and debris (e.g. inside excavator bucket or screened sump pit). If wetland birds are observed nesting, or young birds (chicks) are using the dam, advise the Aquatic Ecologist immediately for advice. Depending on species and age, birds may be able to relocate themselves. Chicks will need

as water volume decreases, especially in warm water or if lots of fish are present. Larger bodied fish should be targeted first. Wetland birds will scavenge for small fish in the shallows (e.g. Gambusia). Most small fauna will likely remain uncaptured in the dam until the water becomes very shallow (especially eels and turtles). Eels are best captured by large hand nets in water < 0.3 m deep, although they burrow into mud. When the water is extremely low, turtles and fish may head towards the intake pump (placed in deepest part). This area should be monitored to intercept fauna (stand in water next to intake on hard surface). Turtles will burrow into mud and may require observation and rescue the following morning but can also move themselves to suitable nearby habitat if an escape ramp is graded. Frogs can be collected by hand using a freezer/snap-lock bag if observed or heard around the fringe. Hygiene

should be large enough to accommodate additional fish, especially predatory eels. Additional release sites may be needed. Do not overstock tubs or leave in direct sun for extended periods. Aeration can be provided by battery aquarium pumps or manual turbulence if only stored for a short period. Turtles can be transported in a shaded tub with a wet hessian bag

to changes in water quality. Care should be taken when releasing fauna not to also transfer weeds or invasive species (e.g. Carp eggs and Gambusia). Transfer animals via hand nets, rather than tipping the tub with water in the host waterbody. Eels can be released on land a few metres from the edge and pointed towards the water. Frogs are to be released in dense

PESTS: Exotic fish (e.g. Carp, Gambusia) are to be intercepted, euthanised and disposed of in accordance with methods endorsed by the NSW Secretary's Animal Care & Ethic Committee Exotic Trachemys scripta elegans (Red-eared Slider Turtle) are to be contained humanly and DPI immediately notified (Biosecurity Line - 1800 680 244). They will collect the live turtle

POST-DEWATERING: An escape ramp should be graded to allow trapped fauna to escape overnight. The Project Aquatic Ecologist will advise on ramp design (slope and location) on the day. Sediment should be left up to two nights to allow hidden fauna to emerge, unless the ecologist confirms there are no fauna remaining (site specific assessment). Earthworks staff

REPORTING: The Project Aquatic Ecologist should prepare a summary report suitable for submission to Council within 7 days of completing the aquatic fauna relocation works. The report would detail that the works have been completed according to this aquatic fauna handling procedure, and would include information relating to the location of the dam, the licences held by the staff involved in the works, the number and type of native species relocated, location of release point/s for native fauna and the number and type of exotic species dispatched