


Coastal Floodplain Drainage Project - Options Report - Attachments

Attachments to Options Report

December 2023



Acknowledgement of Country

The Department of Planning and Environment acknowledges that it stands on Aboriginal land. We acknowledge the Traditional Custodians of the land and we show our respect for Elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

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Attachment A – Examples of drainage infrastructure, works and impacts

Floodgates vary considerably in their size, location and material construction, however, they all function passively to drain water from the floodplain when the downstream water levels are lower than the upstream water levels. The lowest a drainage system can drain to is set by the lowest point of the floodgate, called the floodgate invert. Different types of floodgates are shown in Figures 1 to 10.

Figure 1. Large floodgate barrage incorporating a road



Photo: NSW Department of Primary Industries

Figure 2. Multi-cell floodgate barrage across a natural creek



Photo: NSW Department of Primary Industries

Figure 3. Deep narrow drains, fibreglass floodgate flaps



Photo: NSW Department of Primary Industries

Figure 4. Major floodgates set into a flood mitigation levee



Photo: NSW Department of Primary Industries

Figure 5. Moderate sized culverts with stainless steel floodgates



Photo: NSW Department of Primary Industries

Figure 6. Homemade concrete fibre sheet floodgate



Photo: NSW Department of Primary Industries

Figure 7. Moderate sized headwall and floodgate structure with winches, orange stained from acid-released iron floc



Photo: NSW Department of Primary Industries

Figure 8. Small scale single pipe culvert with fibreglass floodgate flap



Photo: NSW Department of Primary Industries

Figure 9. Small precast concrete headwall and floodgate flap



Photo: NSW Department of Primary Industries

Figure 10. Variations in 'home-made' floodgates and headwalls



Photo: NSW Department of Primary Industries

Floodgate modifications that can help improve flushing, water quality and fish passage

A variety of modifications and management techniques can be applied to floodgates to improve water quality outcomes and fish passage. Generally, this involves allowing a controlled, limited amount of estuarine water to flow upstream beyond the floodgates through a small hole (orifice) in the main floodgate flap during non-flood periods, or retaining higher groundwater levels in the drain behind them. Figures 11-20 show examples of these mechanisms.

Figure 11. Floodgate fitted with an auto-tidal gate. Float opens the orifice at low tide and closes at a pre-set high water level



Photo: NSW Department of Primary Industries

Figure 12. Floodgates fitted with swing gates that swing open and close and pre-set downstream water levels, but with less drag than an auto-tidal gate



Photo: NSW Department of Primary Industries

Figure 13. Floodgate fitted with a manually operated sluice gate. The mechanism allows a cover over an orifice to be wound up and down to adjust to size of the opening

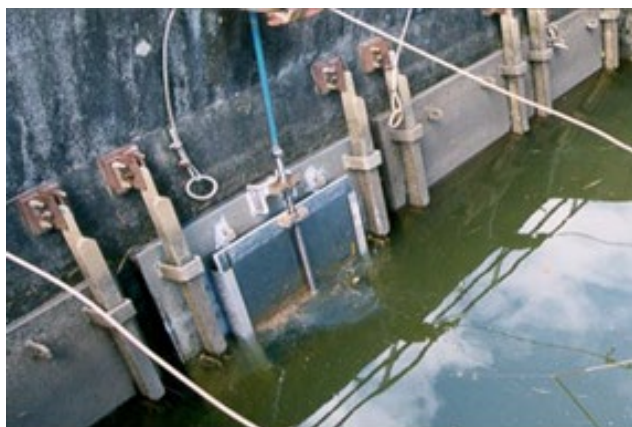


Photo: NSW Department of Primary Industries

Figure 14. Floodgates fitted with 'Smartgates' that use sensors on upstream water levels to automatically open and close gates at pre-set water levels



Photo: NSW Department of Primary Industries

Figure 15. A lay-flat gate. The weir-like barrier can be raised or tilted over to control upstream water levels and volume of discharge, often automated



Photo: NSW Department of Primary Industries

Figure 16. Large box culvert floodgate raised with winches to allow connectivity during non-flood periods



Photo: NSW Department of Primary Industries

Figure 17. Wooden drop-boards retrofitted to precast concrete headwall to retain higher ground water upstream



Photo: NSW Department of Primary Industries

Figure 18. Purpose built drop board/removable weir structure to retain higher ground water in dry periods



Photo: NSW Department of Primary Industries

Figure 19. Overhead winches and adjustable floodgate flaps used to raise floodgates slightly during non-flood periods



Photo: NSW Department of Primary Industries

Figure 20. Examples of closed auto-tidal gate and winch structure during high water levels



Photo: NSW Department of Primary Industries

Drain clearing either side of floodgates

Drainage managers generally wish to clear both up and downstream of floodgates. This is usually done with an excavator fitted with a reed bucket to minimise the further expansion of the drainage channels. Liming of the works site and spoil (dredged material) is often necessary to neutralise acid sulfate soils that may be exposed to air during the works. Examples of drain clearing are shown in Figures 21-26.

Figure 21. Drain clearing using a reed bucket to minimise deepening or widening of drain profile



Photo: NSW Department of Primary Industries

Figure 22. In-drain vegetation removed but minimal sediment disturbed (note that this should still be limed)



Photo: NSW Department of Primary Industries

Figure 23. Drag line style dredge



Photo: NSW Department of Primary Industries

Figure 24. Poor practice of drain being incrementally widened when cleaned, with minimal lime spread on soil (removed sediment)



Photo: NSW Department of Primary Industries

Figure 25. Best practice on-site drainage cleaning treatment with lime



Photo: Rous County Council

Figure 26. Best practice on-site outlet works treatment with lime



Photo: Rous County Council

Upstream drainage systems

Drainage systems across coastal floodplains can be an extensive network of smaller drains that cross the floodplain all feeding into a major trunk drain and exiting via a single point, or smaller scale systems where drainage at a paddock scale flows through numerous smaller floodgates directly into the estuary. Figures 27-34 show examples of drainage networks and different types of drains.

Figure 27. Example of extensive drainage network in Richmond catchment

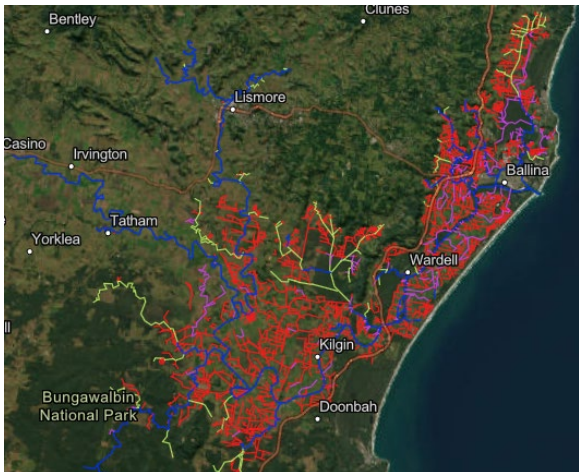


Photo: NSW Department of Primary Industries

Figure 28. Example of sub-catchment drainage network

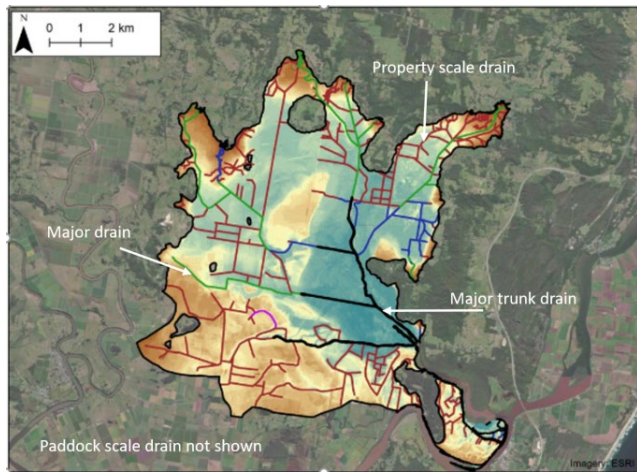


Photo: NSW Department of Primary Industries

Figure 29. A major trunk drain across a broad floodplain



Photo: NSW Department of Primary Industries

Figure 31. Major drain servicing multiple properties



Photo: NSW Department of Primary Industries

Figure 33. Paddock scale shallow drain



Photo: NSW Department of Primary Industries

Figure 30. Major infrastructure in place to accommodate drainage systems



Photo: NSW Department of Primary Industries

Figure 32. Property scale drain



Photo: NSW Department of Primary Industries

Figure 34. Paddock scale shallow drain



Photo: NSW Department of Primary Industries

Marine vegetation impeding floodgate function

Marine vegetation, such as mangroves and their roots, growing in drainage outlet channels is common when floodgate outlet maintenance is carried out infrequently. This vegetation can completely block the floodgate flap, preventing it from opening and encouraging sediment build-up. Some floodgates are set deep into the mangrove forest, making clearing the full length of the channel difficult to do without causing harm to considerable areas of sensitive habitat. Examples are shown in Figures 35-38.

Figure 35. Mangrove roots and sedimentation significantly restricting the floodgate functioning



Photo: NSW Department of Primary Industries

Figure 36. Downstream drainage constrained by mangrove and sediment build up, but floodgate is still able to function



Photo: NSW Department of Primary Industries

Figure 37. Long-term lack of maintenance causing floodgate to no longer function



Photo: NSW Department of Primary Industries

Figure 38. Long distances through dense mangroves can be challenging to maintain without significantly impacting important habitat

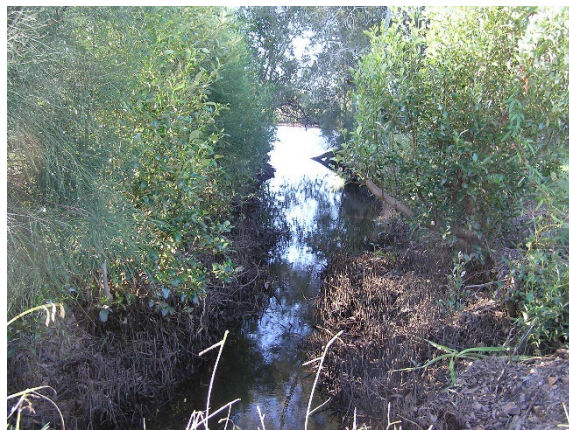


Photo: NSW Department of Primary Industries

Water quality impacts from coastal floodplain drainage

Coastal floodplain drainage and its associated landscape changes can cause a number of unintended environmental impacts. Most notable is the oxidisation of acid sulfate soils, which can also release heavy metals, and the release during rainfall of large volumes of deoxygenated 'blackwater' into the river system. This also allows monosulfidic black ooze (MBOs) to form, which strips oxygen from water very rapidly. These water quality conditions can cause both chronic and episodic impacts. Figures 39-46 show some of these water quality impacts.

Figure 39. De-oxygenated blackwater entering the estuary from upstream and adjacent floodplain areas



Photo: NSW Department of Primary Industries

Figure 40. Large floodgates releasing a high volume of de-oxygenated blackwater into the river, overwhelming the downstream capacity to dilute the impacts



Photo: Rous County Council

Figure 41. Acidic conditions creating iron floc in shallow drains where acid sulfate soils are near the ground surface



Photo: NSW Department of Primary Industries

Figure 42. Not mud, but huge quantities of iron floc flowing from a large drainage system that will smother downstream aquatic habitat



Photo: NSW Department of Primary Industries

Figure 43. Lilies in drains are an indicator of acidic water conditions



Photo: NSW Department of Primary Industries

Figure 44. Green plume of aluminium dissolved in acidic drainage water, highly toxic to aquatic life



Photo: Rous County Council

Figure 45. Monosulfidic black ooze in a drained, degraded wetland



Photo: NSW Department of Primary Industries

Figure 46. Monosulfidic black ooze in the base of a drain



Photo: NSW Department of Primary Industries

Attachment B – Current approvals

The approvals required for coastal floodplain drainage activities depend on the type and location of the proposed work and the type of applicant. This section outlines the main approvals administered by NSW Government agencies or local councils under the current regulatory framework.

Environmental Planning & Assessment Act approvals

A planning approval – known as **development consent** – is for local development if a local environmental plan (LEP) or state environmental planning policy (SEPP) states that development consent is required before development can take place. This approval is administered by local councils.

The level of environmental assessment required to be provided with a local development application (DA) will differ depending on the likely impacts of the development. The procedures for applying for development consent, the level of environmental assessment required, the notification required, and appeal rights will differ depending on how the development is categorised. There are additional requirements for local development in the following categories:

Designated development

- High-impact developments e.g. likely to generate pollution, or located in or near an environmentally sensitive area e.g. coastal wetland and littoral rainforest areas.
- There are two ways a development can be categorised as ‘designated development’:
 - the class of development can be listed in Schedule 3 of the EP&A Regulation as being designated development, or
 - a LEP or SEPP can declare certain types of development to be designated.
- Requires Secretary environmental assessment requirements followed by an environmental impact statement.

Integrated development

- Requires general terms of approval from other public authorities before consent can be granted.
- Generally requires a statement of environmental effects, unless the development is also designated development in which case an environmental impact statement would be required.
- Relevant approvals are listed in section 4.46 of the EP&A Act and include:
 - Fisheries permits for dredging or reclamation, harming marine vegetation, and obstruction of fish passage

- Water management work approval¹ and activity approval² under Part 3 of Chapter 3 of the *Water Management Act 2000*.

Advertised development

- Requires public notice of the development. This includes integrated development if it requires approval under the *Water Management Act 2000* and development affecting threatened species which requires a species impact statement.

Development without consent

- If a LEP or SEPP states that development is permitted without consent and another approval (e.g. permit, licence) from a public authority is required, the development may need an environmental assessment such as a review of environmental factors (known as a REF) before the approval can be given.
- Development without consent can also apply to activities undertaken by government departments or agencies as part of their everyday responsibilities (e.g. water supply infrastructure being constructed by a water utility). Many of these activities are allowed to be carried out under the Transport and Infrastructure SEPP following an assessment via a REF.

Development controls

Environmental planning instruments can also include development controls, requiring consent authorities to consider certain matters before granting development consent. For example, the Primary Production SEPP 2021 requires consent authorities to consider the impacts of a development on oyster aquaculture development or a priority oyster aquaculture area. If any impacts are suspected, notice must be given to the Fisheries Secretary and their comments must be considered. A consent authority may also refuse to grant development consent if a development adversely affects oyster aquaculture. The NSW Oyster Industry Sustainable Aquaculture Strategy (OISAS) must also be taken into consideration by the consent authority and the Fisheries Secretary. The aim of OISAS is that water quality, tidal range and flow in oyster growing areas is maintained and where possible improved.

Crown Lands Management Act approvals

Under the *Crown Land Management Act 2016* Crown Lands approvals (usually a licence) are required for any activities on Crown land that may impact on its condition, value, uses and accessibility. In assessing an application Crown Lands must also consider any Indigenous interests, under the

¹ 'Water management work approvals' include drainage work approvals, however the provisions of the *Water Management Act 2000* that require a drainage work approval to be held have not been switched on, so are not operational.

² 'Activity approvals' include controlled activity approvals and these provisions are operating.

Commonwealth Native Title Act 1993 and *Aboriginal Land Rights Act 1983*, and where works are proposed on a Crown road, it must be approved under the *Roads Act 1993*.

Landowner's consent

Proponents of works that are wholly or partially on Crown land must generally obtain 'landowner's consent' from Crown Lands before lodging a DA with a consent authority such as a local council. Landowner's consent does not authorise the work and a separate Crown Lands' licence is required once development consent has been granted before work can commence.

Short-term licences

These may be granted for up to 12 months for the temporary use and/or occupation of Crown land for a range of low-impact purposes. It is not an option, however, if the work includes dredging or reclamation, where a general licence is required. See the [short-term licence guidelines](#) for more information.

General (term) licences

Where the works do not meet the criteria for a short-term licence a general licence is required (including, but not limited to, works conducted over more than 12 months, works with potential for moderate to high impacts and works involving dredging and reclamation or harm to marine vegetation). See the information on [general licences](#) on the Crown Lands website.

Streamlining Crown Lands approvals

Options for streamlining Crown Lands approvals are somewhat limited under existing legislation. Where a Crown licence is held the requirement to hold a controlled activity approval under the *Water Management Act 2000* or a DPI Fisheries dredging and reclamation permit is not required, for the part of the work on Crown land. However, these permits and approvals may still be required for the part of the work on any adjacent non-Crown land. Other streamlining mechanisms (detailed below) may be available to local councils or private drainage boards.

'Head' licences

Under the CLM Act, it is possible to apply for a licence that authorises multiple activities and works at multiple locations. For example, a 'head' licence could apply to a suite of drainage works relating to a particular drainage area. Holding a head licence can reduce time, cost and complexity as the approvals process and statutory rent for the licence applies to multiple sites and works. This option relies on there being a single applicant (entity) to be the licensee, such as a local council, county council or private drainage board.

Power of entry and easements

Under section 191 of the *Local Government Act 1993* (LG Act), a local council can exercise its functions for works for water supply, sewerage or stormwater drainage on Crown land without authorisation under the *Crown Land Management Act 2016*. The *Local Government Act 1993* provides a specific definition of stormwater drainage works and possibly some coastal floodplain drainage would meet this definition. Where a local council is exercising its powers of entry under section 191 of the LG Act, section 5.50 of the CLM Act requires a local council to apply for an easement as soon as it becomes aware of an ongoing need for access.

Fisheries Management Act permit/s

A **Fisheries permit** (Part 7) is issued for:

- **harm marine vegetation** (seagrass, mangroves, saltmarsh) on public water land³ below the astronomical high tide mark or the foreshore⁴ of such land (which may include private land). Harm to marine vegetation can occur as a result of routine maintenance activities of a floodgate or drain and machinery access. A permit is required to harm marine vegetation under s. 204 and 205 of the FM Act. Where harm to marine vegetation is approved, a management plan may be required as a condition of consent.
- **dredging and/or reclamation**. Generally, a Fisheries permit is required to undertake dredging and/or reclamation works within key fish habitat areas of the floodplain. Key fish habitat is generally the length of the 'drain channel' downstream of the most downstream (end-of-system) floodgates but may also extend upstream of a floodgate where the floodgate is located on a natural waterway.

The requirement to hold a Fisheries dredging and/or reclamation permit depends on who is doing the work and what other approvals are required, in an effort to not duplicate approvals across the various legislative requirements. This is summarised below.

³ Under section 4 of the FM Act:

public water land means land submerged by water (whether permanently or intermittently), being –

- (a) Crown land, or
- (b) land vested in a public authority, or
- (c) land vested in trustees for public recreation or for any other public purpose, or
- (d) land acquired by the Minister under Division 1 of Part 8,

but does not include land which is the subject of an aquaculture lease or land of which a person has exclusive possession under a lease under any other Act.

⁴ Under section 204 of the FM Act:

foreshore means any land adjacent to public water land, or adjacent to an area that is the subject of an aquaculture lease, that is below the highest astronomical tide level of the waters by which the land or area is submerged.

- If a public authority other than local government is doing work they do not require a Fisheries dredge and reclamation permit, however they need to refer the proposal to Fisheries (under section 199 of the FM Act).
- If a public authority other than local government is authorising work (such as issuing a controlled activity approval under the WM Act or a licence under the Crown Land Management Act) a Fisheries dredge and reclamation permit is not required, however they need to refer the application to Fisheries (under section 199 of the FM Act).
- If a council is doing the work a Fisheries dredge and/or reclamation permit is required unless works are authorised by a public authority (other than a council), for example through an authorisation under the Crown Land Management Act.
- If a person is doing the work and development consent is needed a Fisheries dredge and/or reclamation permit is required through integrated development. However, if the proposal receives development consent and the works are subsequently authorised by a public authority (other than a council), for example a controlled activity approval under the WM Act, then no Fisheries dredge and/or reclamation permit is needed.
- **obstruct fish passage.** A permit is required to obstruct the free passage of fish under section 218 of the FM Act, including constructing, altering or modifying a floodgate and major repair (where the floodgate has deteriorated and fish passage is occurring). Public authorities are required to notify Fisheries before they approve a DA under Part 4 of the EP&A Act for these works that could obstruct fish passage. Fisheries **does not** require fish passage notification for minor maintenance, such as for repairs related to accidental damage, vandalism, or where gates are blocked by material such as logs, rocks or dead stock. Long term maintenance permits, best practice works agreements and the issuing of Fisheries permits prior to landowner's consent are all opportunities currently available to proponents that can reduce the cost, time, number and frequency of Fisheries permit applications.

Marine Estate Management Act permit

Similar to the regulatory requirements under the FM Act, the Department of Primary Industries – Fisheries – Marine Parks manages permits and referrals by consent and determining authorities, for works in, or in the locality of, Marine Parks and Aquatic Reserves under Part 5 of the *Marine Estate Management Act 2014* (MEM Act) and relevant Regulations. This typically applies to all activities that damage or interfere with habitats within marine parks, or that are contrary to the provisions of the aquatic reserve.

To be eligible for a Marine Parks permit, the works being done (such as maintenance or replacement) must have the same or less environmental impact than the original works and be

capable of safe and ecologically sustainable use. The impacts of the proposed works are considered on a case- by-case basis.

Water Management Act 2000 approvals

The Water Group and WaterNSW are jointly responsible for issuing approvals required under the *Water Management Act 2000* (WM Act). The two approvals in operation that are particularly relevant to coastal floodplain drainage works are the controlled activity approval and flood work approval. The WM Act also provides for drainage work approvals, but these provisions have not been switched on and are described in the main body of this report.

Controlled activity approval

A controlled activity approval is issued by the Water Group. Controlled activities are actions carried out on waterfront land. Waterfront land is defined in the WM Act as the bed of any river, lake or estuary, and the land on each side within 40 metres of the river bank, lake shore or estuary's mean high water mark. A controlled activity approval is required to carry out activities on waterfront land unless an exemption applies.

Controlled activities are:

1. erecting a building
2. carrying out works
3. removing material from waterfront land, such as plants or rocks
4. depositing material on waterfront land, such as gravel or fill
5. any activity which affects the quantity or flow of water in a water source.

For coastal floodplain drainage works, a controlled activity approval is required where any works, such as removal of sediment, are proposed in or within 40 metres of a river or estuary, as defined under the WM Act. This definition applies to some existing drainage channels where the drain is a natural channel or a natural channel artificially altered.

Approvals contain conditions to minimise the impact of the activity or works on the waterway and adjoining land. Under s. 97(4) of the *Water Management Act 2000*, *a controlled activity approval is not to be granted unless the Minister is satisfied that adequate arrangements are in force to ensure that no more than minimal harm will be done to any waterfront land as a consequence of the carrying out of the proposed controlled activity.*

Flood work approval

A 'flood work' is defined in the WM Act⁵. A flood work approval allows for the construction and use of a specified flood work at a specified location. The Water Group and WaterNSW share responsibility for issuing flood work approvals. The requirement to hold a flood work approval technically applies across large parts of the State. However, flood work approvals have generally only been issued in areas where floodplain management plans apply across northern inland parts of NSW. Due to the nature of coastal drainage, a drainage work approval is considered more appropriate than a flood work approval for regulating coastal drainage works, including floodgates.

⁵ In the Dictionary to the WM Act:

flood work means a work (such as a barrage, causeway, cutting or embankment) —

(a) that is situated —

- (i) in or in the vicinity of a river, estuary or lake, or
- (ii) within a floodplain, and

(b) that is of such a size or configuration that, regardless of the purpose for which it is constructed or used, it is likely to have an effect on —

- (i) the flow of water to or from a river, estuary or lake, or
- (ii) the distribution or flow of floodwater in times of flood,

and includes all associated pipes, valves, metering equipment and other equipment, but does not include any work declared by the regulations not to be a flood work.

Attachment C – Examples of approval costs

The below scenarios are hypothetical examples to illustrate approval costs. They do not represent legal advice. The required approvals would be determined on a case-by-case basis and depend on the type of works and their impacts, their location, their scale, who is undertaking the works and the environmental sensitivity of the location.

Table 1. Scenario 1 - A private landholder growing sugar cane wants to do maintenance work on a drain

Scenario 1	A private landholder growing sugar cane wants to do maintenance work on a drain
Scenario type	<ul style="list-style-type: none"> • Low regulatory complexity • Common scenario
Site characteristics	<ul style="list-style-type: none"> • The drain is: <ul style="list-style-type: none"> – on private land used for sugar cane farming* – not a major drain identified on the Acid Sulfate Soils Map – in a high risk (Class 2) acid sulfate soils mapped area*. • The drain is NOT on or in: <ul style="list-style-type: none"> – a Resilience and Hazards SEPP coastal wetland – Crown land – key fish habitat – waterfront land.
Approvals decision tree	<pre> graph TD A[SEPP wetland?] -- No --> B[Acid sulfate soils?] B -- Yes --> C([Yes, however LEP development consent not required]) C --> D[Crown waterway?] D -- No --> E[Key fish habitat?] E -- No --> F[Waterfront land?] F -- No --> G[No approvals required] </pre>
Approvals required	<p>Nil</p> <p>*The site in this scenario is mapped as high risk of acid sulfate soils under the relevant local government LEP. For many developments, this acid sulfate soil risk would trigger a requirement to submit a DA to local council for assessment before being able to carry out the works. However, in this scenario (which is the case in most local government areas where sugar cane farming is prevalent) a DA is not required to be submitted as long as the sugar cane farmer follows plans of management and best practice, administered by the Sugar Milling Co-operative.</p>
Approval cost	Nil

Table 2. Scenario 2 - A private landholder who is a grazier or a macadamia farmer wants to do maintenance work on a drain

Scenario 2		A private landholder who is a grazier or macadamia farmer wants to do maintenance work on a drain	
Scenario type	<ul style="list-style-type: none"> • Medium regulatory complexity 		
Site characteristics	<ul style="list-style-type: none"> • The drain is on : <ul style="list-style-type: none"> – private land used for grazing or farming macadamias – a high risk (Class 2) acid sulfate soils mapped area[◇]. • The drain is NOT on or in: <ul style="list-style-type: none"> – a Resilience and Hazards SEPP coastal wetland – Crown land – key fish habitat – waterfront land. 		
Approvals decision tree	<pre> graph LR A[Acid sulfate soils?] --> B((Yes)) B --> C[Development consent from local council] </pre>		
Approvals required	<ul style="list-style-type: none"> • Development consent 		
Documentation required	<p>DA and an acid sulfate soils management plan must be submitted to local council.</p> <p>[◇]Acid sulfate soils are mapped as Class 1 (highest probability of acid sulfate soils) through to Class 5 (lowest probability of acid sulfate soils). For farming related works on Class 2 acid sulfate soils, a DA is required to be submitted, depending upon the extent of the works ↴.</p>		
Approval costs (approximate)	Documentation	Cost	
	1. DA fee varies according to estimated cost of development	\$138	
	2. Preparation of DA: <ul style="list-style-type: none"> a. Costs to prepare DA documentation if professional assistance is required. b. However, it is likely that this type of application could be completed using application forms provided by the local council and standard acid sulfate soil management plans*. 	\$ variable or \$ nil	
	Total	\$138-variable	

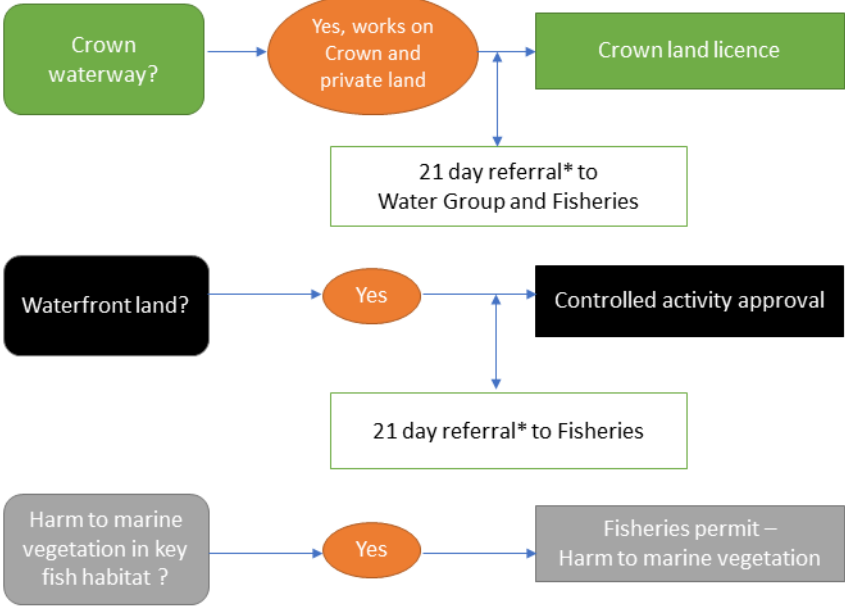
^If the works involve the disturbance of less than 1 tonne of soil and are not likely to lower the water table, then a DA is typically not required. Refer to the LEP for your Local Government Area.

▪ Refer to: Fees for development applications – Environmental Planning and Assessment Regulation 2021, Schedule 4, Part 2.

▪ Examples of management plans include:

- Tweed Shire Council's *Acid Sulfate Soil Management Plan for Minor Works*
- *Acid Sulfate Soils Management Guidelines* in the *Acid Sulfate Soil Manual* (NSW Acid Sulfate Soils Management Advisory Committee, 1998, p. 96+)

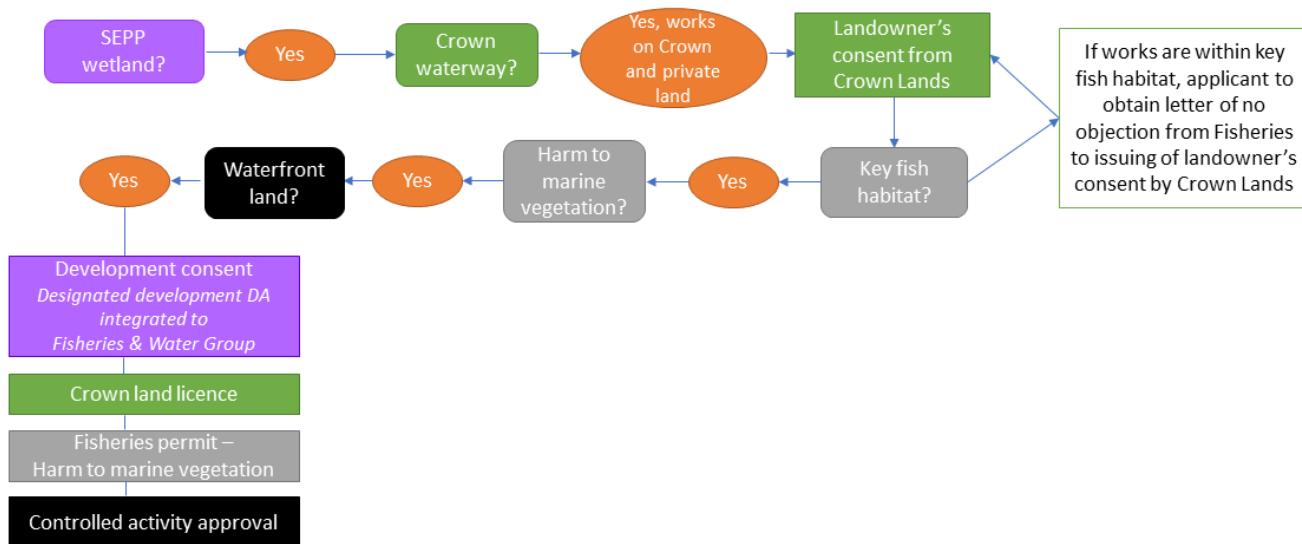
Table 3. Scenario 3 - A private landholder wants to do maintenance work on a drain and a floodgate

Scenario 3	A private landholder wants to do maintenance work on a drain and a floodgate	
Scenario type	<ul style="list-style-type: none"> • Medium regulatory complexity 	
Site characteristics	<ul style="list-style-type: none"> • The site is on or in: <ul style="list-style-type: none"> – both private and Crown land – waterfront land – key fish habitat. • The site is NOT on or in a Resilience and Hazards SEPP coastal wetland. • The development is permitted without consent under a LEP. 	
Approvals decision tree	 <pre> graph TD A[Crown waterway?] --> B{Yes, works on Crown and private land} B --> C[Crown land licence] B --> D[21 day referral* to Water Group and Fisheries] D --> C E[Waterfront land?] --> F{Yes} F --> G[Controlled activity approval] F --> H[21 day referral* to Fisheries] H --> G I[Harm to marine vegetation in key fish habitat?] --> J{Yes} J --> K[Fisheries permit – Harm to marine vegetation] </pre> <p>*Referrals: In this case, multiple approvals are applicable for dredging and reclamation activity. NSW Government agencies are legislated to refer to each other so that only one approval is required for this type of work and all agency requirements are considered for the one approval that is issued. Here, the Crown land licence becomes the singular approval for the work on Crown land and the controlled activity approval becomes the singular approval to work on private land. A Fisheries permit for harm to marine vegetation is always required when the applicant proposes to harm marine vegetation.</p>	
Approvals required	<i>Approval</i>	<i>Reason</i>
	1. Crown land licence	The site is partly on Crown land
	2. Controlled activity approval	The site is partly on private land and considered to be waterfront land under the WM Act

Approvals required	Approval	Reason
	3. Fisheries permit to harm marine vegetation	The proposed works would cause harm to marine vegetation
Approval costs (approximate)	Documentation/approval	Cost
	1. Preparation of application documentation a. Costs to prepare documentation if professional assistance is required b. However, in some cases, this type of application could be completed using application forms provided by the relevant agencies and other standard information publicly available online	\$ variable or \$ Nil
	2. Crown lands: a. Licence application fee b. Market-based rent proportional to area being occupied. Minimum per annum	\$618 \$587
	3. Controlled activity approval	\$484
	4. Fisheries permit: Harm to marine vegetation a. Authorisation fee b. Scaled assessment fee (\$179 applies for a minor assessment)	\$179 \$179
	5. Review of Environmental Factors (REF)	Variable, depending upon contracted or in-house production of REF
	Total	\$ nil to variable cost of documentation preparation + \$1,460 application fees + \$587 p.a. rent

Table 4. Scenario 4 - A private landholder wants to do maintenance work on a drain and floodgate in a coastal wetland

Scenario 4	A private landholder wants to do maintenance work on a drain and floodgate in a coastal wetland
Scenario type	<ul style="list-style-type: none"> High regulatory complexity and highest cost
Site characteristics	<ul style="list-style-type: none"> The works are on or in: <ul style="list-style-type: none"> both private and Crown land waterfront land a Resilience and Hazards SEPP coastal wetland key fish habitat.
Approvals decision tree	



Approvals/ documentation required	Approval	Reason
	1. Development consent –DA submitted to local council as integrated designated development, together with an Environmental Impact Statement	<p>The site is within coastal wetland under the Resilience and Hazards SEPP.</p> <p>The DA requires a high level of environmental assessment, with an Environmental Impact Statement (EIS).</p> <p>The DA would also be referred to the Water Group and Fisheries.</p>
	2. Landowner's consent and Crown land licence	The site is partly on Crown land licence

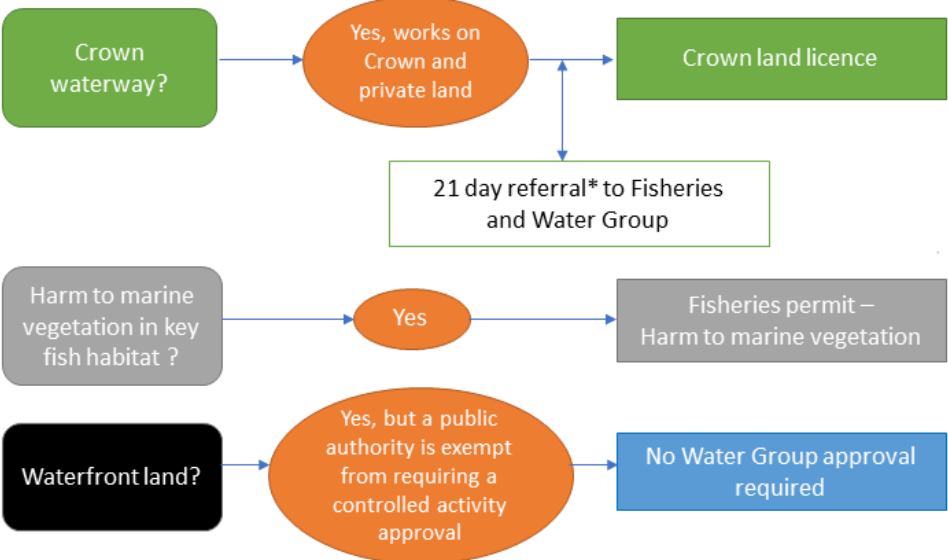
Approvals/ documentation required	Approval	Reason
	3. Fisheries permit to harm marine vegetation	The watercourse is within a coastal wetlands, which is considered key fish habitat and proposed works would cause harm to marine vegetation
	4. Controlled activity approval	The site is considered to be waterfront land under the WM Act
Approval costs (approximate)	Documentation/approval	Cost
	1. EIS prepared by professional consultant	Variable
	2. Landowner's consent from Crown Lands required prior to lodging DA: a. Letter from Fisheries of no objection to landowner's consent being issued b. Lanowner's consent from Crown Lands	\$347 \$106
	3. Integrated designated development a. DA fee varies according to estimated cost of development*. Minimum fee: b. Designated development advertising fee c. Integrated development agency referral fees to obtain general terms of approval (GTA)	\$138 [■] \$3,939 [^] \$401 per agency (Fisheries & Water Group) \$176 per agency (payable to local council) = \$1,154
	4. Controlled activity approval (after GTA received)	\$969
	5. Fisheries permit: Harm to marine vegetation a. Authorisation fee b. Scaled assessment fee (\$418 applies for a moderate assessment)	\$179 \$418

Approvals/ documentation required	Approval	Reason
	6. Crown Lands	
	a. Licence application fee	\$618
	b. Market-based rent proportional to area being occupied. Minimum per annum:	\$587
	Total	\$7,868 application fees + \$587 p.a. rent + \$ variable cost of EIS

▪ Refer to: Fees for development applications – Environmental Planning and Assessment Regulation 2021, Schedule 4, Part 2.

^ Example provided for Tweed Shire Council.

Table 5. Scenario 5 - A public authority wants to do maintenance work to clear out a drain and floodgate

Scenario 5	A public authority wants to do maintenance work to clear out a drain and floodgate	
Scenario type	<ul style="list-style-type: none"> • Medium regulatory complexity 	
Site characteristics	<ul style="list-style-type: none"> • The site is on or in: <ul style="list-style-type: none"> – both private and Crown land – waterfront land – key fish habitat. • The site is NOT on or in: <ul style="list-style-type: none"> – a Resilience and Hazards SEPP coastal wetland. • The development is permitted without consent under a SEPP 	
Approvals decision tree	 <pre> graph TD Q1{Crown waterway?} --> A1(Yes, works on Crown and private land) A1 --> B1[Crown land licence] A1 --> C1[21 day referral* to Fisheries and Water Group] C1 --> B1 Q2{Harm to marine vegetation in key fish habitat?} --> A2(Yes) A2 --> B2[Fisheries permit - Harm to marine vegetation] Q3{Waterfront land?} --> A3(Yes, but a public authority is exempt from requiring a controlled activity approval) A3 --> B3[No Water Group approval required] </pre> <p>*Referrals: In this case, multiple approvals are applicable for dredging and reclamation activity. NSW Government agencies are legislated to refer to each other so that only one approval is required for this type of work and all agency requirements are considered for the one approval that is issued. Here, the Crown land licence becomes the singular approval for the work on Crown land. While the site is on waterfront land, a controlled activity approval from the Water Group would not be required because public authorities are exempt from requiring a controlled activity approval. A Fisheries permit for harm to marine vegetation is always required when the applicant proposes to harm marine vegetation.</p>	
Approvals/ documentation required	<i>Approval</i>	<i>Reason</i>
	1. Crown land licence	The site is partly on Crown land.

Approvals/ documentation required	Approval	Reason
	2. Fisheries permit to harm marine vegetation	The floodgate is in key fish habitat and proposed works would cause harm to marine vegetation
Documentation required	Review of Environmental Factors	
Approval costs (approximate)	Documentation/approval	Cost
	1. Crown Lands:	
	a. Licence application fee	\$618
	b. Market-based rent proportional to area being occupied. Minimum per annum:	\$587
	2. Fisheries permit:	
	a. Authorisation fee	\$179
	b. Scaled assessment fee (\$179 applies for a minor assessment)	\$179
	3. Review of Environmental Factors (REF)	Variable, depending upon contracted or in-house production of REF
	Total	\$976 application fees + \$587 p.a. rent + \$ variable cost of REF

Attachment D – Issues outside the scope of this project

Some of the key issues in the *What we heard report* are not addressed by this project, as it was set up to reform the regulatory framework to improve water quality and approvals processes. Some of these out of scope issues are being addressed by other complementary NSW Government initiatives, including other projects under the Marine Estate Management Strategy (MEMS). The out of scope issues are:

- ownership, maintenance and responsibility for drainage infrastructure assets
- financial cost of managing drainage infrastructure
- non-regulatory ways to mitigate poor water quality and other environmental impacts
- viability of coastal floodplain agriculture due to sea level rise.

These issues are discussed below.

Ownership, maintenance and responsibility for drainage infrastructure assets

Ownership of the drainage infrastructure and the tenure of the land it is on are the main determining factors as to who is responsible for infrastructure maintenance. The NSW Government has information on drainage infrastructure ownership and land tenure of many floodgates on NSW's large coastal floodplains (the Tweed, Richmond, Clarence, Macleay, Hastings, Manning and Shoalhaven Rivers). It is intended that this information be made available in a spatial format. Access to this information when it is published should assist with addressing this issue.

Private drainage boards also have a role under the WM Act in managing drainage infrastructure assets.

Financial cost of managing drainage infrastructure

It is acknowledged that local councils are constrained by ageing infrastructure and a lack of funding to maintain publicly owned drainage infrastructure or take compliance action on private drainage works. Maintenance costs are expected to rise as infrastructure ages further and sea level rise will continue to reduce the functionality of low lying infrastructure. In February 2023, the NSW Government announced the Northern Rivers Drainage Reset Program, which is intended to fund one-off drainage maintenance works in local government areas within the Northern Rivers region. See Attachment F for more information.

Private drainage boards face similar constraints with ageing infrastructure and challenges collecting rates to fund infrastructure maintenance. The NSW Government is working to implement parts of the *Water Management Act 2010* which will give private drainage boards more flexibility to choose how they calculate rates and charges.

Non-regulatory ways to mitigate poor water quality and other environmental impacts

Considerable efforts have been made by many stakeholders to reduce the downstream impacts of acid sulfate soils and blackwater at varying scales, and some improvements have occurred. Past educational programs and ongoing land use best practice engagement have been implemented to better manage coastal floodplains and reduce water quality risks. However, coastal floodplain drainage systems are still one of the major contributors to poor water quality. Long-term change will only be possible if mitigation and changes occur at a meaningful scale.

The MEMS and other NSW Government programs are delivering a range of projects that are contributing to mitigating major environmental impacts, including:

- identifying high risk drainage locations and recommended methods to reduce risk
- creating opportunities to encourage and facilitate land use change in high-risk areas (for example grant funding for remediation activities and using Blue Carbon markets) that may reduce many environmental threats, restore biodiversity, and provide a range of co-benefits and ecosystem services.

Viability of coastal floodplain agriculture due to sea level rise

NSW coastal floodplains are vulnerable to climate change related impacts, including sea level rise. Sea level rise increases the risks of coastal inundation, storm surge, erosion, and saltwater intrusion into groundwater.⁶ It is already affecting coastal Australia and is projected to continue in coming decades.⁷ Many of the drainage networks and end-of-system infrastructure currently keeping agriculture viable and productive on low-lying land (< 1 m AHD) are already compromised and inefficient at draining. Ongoing sea level rise will reduce the amount of time for drainage during each low tide. It is expected that low-lying land will no longer effectively drain regular rainfall or larger flooding events. Larger, deeper drains will not improve this situation because of the higher low tide level. More drains and drainage infrastructure will become vulnerable as sea level rise continues. This poses a significant risk to the viability of current floodplain land uses in low lying areas, including agriculture.

Climate change adaptation and land remediation initiatives, such as blue carbon, are being developed by State and Commonwealth Government agencies (see Attachment E). Some of these initiatives will assist landholders to transition vulnerable land to other uses before sea level rise and drainage inefficiencies render the land non-viable for current agricultural production. Information

⁶ CSIRO & the Bureau of Meteorology's [State of the Climate 2022](#)

⁷ CSIRO & the Bureau of Meteorology's [State of the Climate 2022](#)

collected by the NSW Government can also help identify lower risk, highly productive agricultural land well suited to ongoing production.

For further information, refer to the [NSW Climate Change Adaptation Strategy](#) which sets out an approach for expanding and strengthening action to adapt to climate change now and over the long term.

Attachment E – Complementary NSW Government programs and other initiatives

The NSW Government has a range of programs and projects underway that complement the regulatory work undertaken by this project. These initiatives provide ways to influence changes in land use or management that may improve water quality outcomes and provide new opportunities for coastal floodplain landholders.

Coastal management programs

Coastal management programs (CMPs) are prepared by local councils in consultation with their communities and relevant public authorities. They set the long-term strategy for coordinated management of the coastal zone, including floodplains, in consideration of coastal hazards, including the potential impacts of coincident flooding from catchment and coastal events, with a focus on achieving the objectives of the *Coastal Management Act 2016 (CM Act)*.

CMPs identify coastal management issues and actions to address these issues in a strategic and integrated way. They detail how and when those actions are to be implemented, their costs, proposed cost-sharing arrangements and other viable funding mechanisms. Actions in a CMP are implemented through a local council's integrated planning and reporting (IP&R) framework and land-use planning systems.

CMPs identify a range of coastal management issues including poor water quality, management of acid sulfate soils and floodplain drainage. They propose environmental protection works and other actions to protect and enhance the coastal environmental values and natural processes, enhance biological diversity and ecosystem integrity and maintain and improve water quality and estuary health. Environmental protection works include re-vegetation, bush regeneration, wetland protection, erosion protection, ecological burning and weed control works. In addition, public authorities may carry out environmental protection works without consent under the EP&A Act if the development is identified in a certified CMP.

NSW Blue Carbon Strategy 2022-2027

'Blue carbon ecosystems' include coastal wetland and marine ecosystems such as mangroves, saltmarshes and seagrasses, which occur in most of our estuaries and coastal floodplains. 'Blue carbon' recognises the ability of these ecosystems to capture and store large amounts of carbon, in the living plants and the sediments and biological material below the ground, making them a significant 'carbon sink'.

The NSW Blue Carbon Strategy 2022-2027 (the Strategy) is a state-wide initiative to support evidence-based projects and research to protect and conserve important blue carbon ecosystems. Action 2.3 in the Strategy is to provide advice, guidance and support to landholders and primary producers to help their decision making.

Landholders who choose to restore coastal wetland habitat types, particularly mangrove and saltmarsh habitats through the reintroduction of tidal flows, may be eligible to generate Australian Carbon Credit Units (ACCUs) and an ongoing payment for retaining the wetland through the Australian Government's blue carbon initiative. At the time of writing this report, blue carbon credits only apply to the reintroduction of tidal waters to restore former brackish or saline coastal wetlands.

Action 3.1 of the Strategy is to review the NSW planning system to streamline approvals and enable blue carbon restoration projects; and Action 3.2 is to support councils to integrate blue carbon projects in coastal management programs and transition land uses on low lying floodplains vulnerable to extreme events and climate change.

Coastal floodplain prioritisation study

Some aspects of water quality, particularly acid sulfate soil discharge, can be improved with changes such as increased tidal flushing and reshaping drains to make them shallower and wider. Blackwater conditions are more challenging because improvement requires floodwater to be retained on land for a set period of time and previous wetland vegetation reinstated over large areas. This means that land use and management ultimately influence how much water quality can be improved. While some works have already been implemented at a local scale, works need to be implemented across the hydrological unit scale with multiple landholders to achieve meaningful outcomes.

To identify the most important coastal floodplain areas to target for water quality improvement, Fisheries contracted the Water Research Laboratory (WRL) at the University of NSW to undertake the coastal floodplain prioritisation study in seven large coastal floodplain catchments. WRL used existing research and conducted an extensive field work program to complete the study. The information can help land owners, councils and the government to make decisions about:

- the use of floodplain land
- ways to manage floodplain drainage
- how to reduce water pollution and adapt for climate change.

Attachment F – NSW Government response to 2022 flooding

The extreme flooding events throughout NSW in 2022 led to investigations and initiatives by the NSW Government that relate to this project.

NSW Parliamentary response to major flooding in 2022

The NSW Parliamentary Select Committee reported on the response to major flooding that occurred in February-March 2022⁸. Two of the Committee's recommendations (33 and 37 outlined below) align with the objectives of this project. Both recommendations received *in principle* support in the NSW Government response⁹ to this report.

Select Committee Recommendation 33:

That the NSW Government invest in the restoration of the Wilsons and Richmond Rivers to include riparian restoration, water quality and river health improvement.

Government response: Supported in principle – further work required on implementation

Financial assistance to support the repair and restoration of riparian sites and landscapes impacted from the February-March 2022 flood event is being provided through the jointly funded Commonwealth-State Disaster Recovery Funding Arrangements.

Further consideration and consultation is required to consider the implications of additional assistance to the specified sites as outlined in this recommendation.

This project's objective of addressing water quality impacts from agricultural drainage works is consistent with this broader recommendation of improving water quality and river health in the Northern Rivers region.

Select Committee Recommendation 37:

That the NSW Government work with relevant agencies and local landowners to find ways to improve the management of drainage channels including looking for recommendations to reduce red and green tape.

Government response: Supported in principle – further work required on implementation

⁸ NSW Parliament Legislative Council Select Committee on the Response to major flooding across New South Wales in 2022, tabled 9 August 2022.

⁹ NSW Government Response to the NSW Parliamentary Select Committee on the Response to Major Flooding across NSW in 2022, tabled 9 November 2022.

The NSW Government, through the Department of Planning and Environment, will work with all relevant agencies to explore options to simplify processes and streamline current management of drainage channels.

This report includes options to simplify and streamline regulatory requirements for coastal floodplain drainage systems.

Northern Rivers Drainage Reset Program

A \$5 million Northern Rivers Drainage Reset Program was announced in February 2023 and is proposed to be administered by the Department of Regional NSW in partnership with the Northern Rivers Reconstruction Corporation. Funding is for one-off drainage maintenance works in local government areas within the Northern Rivers region. The program is designed to support the recovery of Northern Rivers primary producers impacted by flood-damaged drainage systems.