JOHN HOLLAND

INLAND RAIL
ILLABO TO STOCKINBINGAL PROJECT

Flood Design Consultation Protocol

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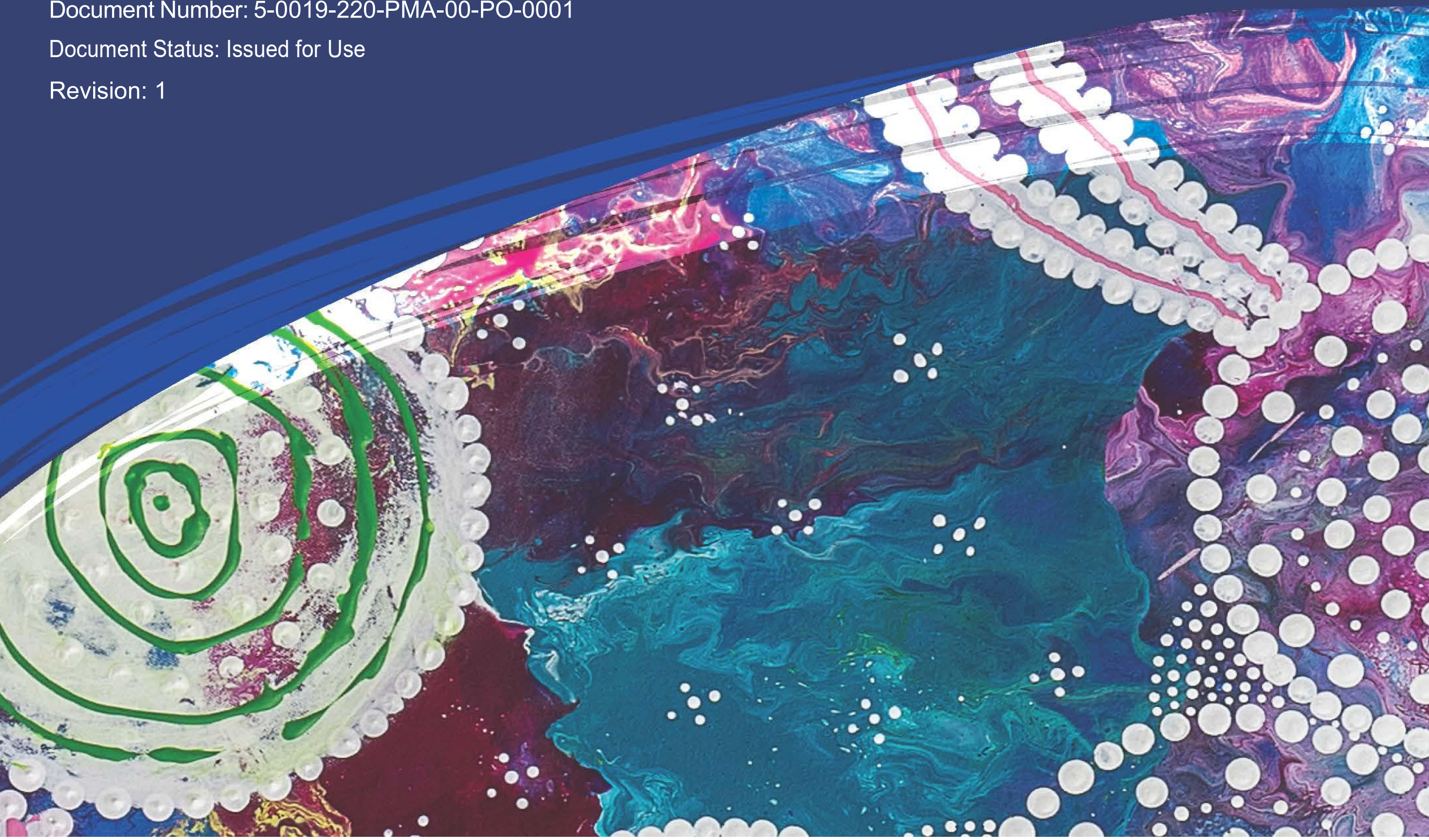

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Revision History

REVISION	DATE ISSUED	DESCRIPTION
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1 Definitions and Abbreviations

Table 1: Definitions and Abbreviations

Term/Abbreviation	Definition
AEP	Annual Exceedance Probability (defined in the NSW Flood Risk Management Manual as): The chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage for example, a 1% AEP flood has a 1% or 1 in 100 chance of being reached or exceeded in any given year.
Afflux	The increase in flood level resulting from implementation of CSSI
ARTC	Australian Rail Track Corporation
BCS	Biodiversity Conservation Services (now CPHR)
CEMP	Construction Environmental Management Plan
CoA	Conditions of Approval
CCS	Community Communication Strategy
CPHR	Conservation Programs, Heritage & Regulation Group
CSSI	Critical State Significant Infrastructure (The Project)
DCCEEW	Department of Climate Change, Energy, the Environment & Water
DPHI	Department of Planning, Housing and Infrastructure
EIS	Environmental Impact Statement
EPL	Environment Protection Licence
ER	Environmental Representative
ETV	Erosion Threshold Velocity
FDVR	Flood Design Verification Report
Flood Duration	The increase in duration of inundation resulting from implementation of CSSI.
Flood Hazard	The increase in the product of velocity and depth (vd) resulting from implementation of CSSI
IPMP	Individual Property Management Plan
IRPL	Inland Rail Pty Ltd
I2S	Illabo to Stockinbingal
JHPL	John Holland Pty Ltd (The Contractor)
QDL	Quantitative Design Limits
SEARs	Secretary's Environmental Assessment Requirements
SES	State Emergency Services
SFAIRP	So Far as is Reasonably Practicable, the concept of SFAIRP is to achieve the best possible outcomes, to the extent that is 'reasonably practicable' under the circumstances
TfNSW	Transport for New South Wales
Velocity	The increase in flood velocity resulting from the implementation of the CSSI (Both Flow Distribution and the Scour/Erosion velocity QDLs apply)

2 Introduction

2.1 Purpose of this Protocol

The intent of this Flood Design Consultation Protocol (protocol) is to provide a clear, transparent process on how the project will engage with landowners and road authorities to discuss the design and development of the flood model, how the project will manage non-compliances with approval limits identified during the design and development process and how mitigation measures will be presented for consideration to landowners. By outlining the steps for consultation, agreement, and dispute resolution, this protocol ensures that all affected parties are informed, involved, and protected through a fair and accountable process.

The protocol outlines:

- When landowners or road authorities will be notified about flood impacts that do not meet the approved limits
- How much time landowners and road authorities will have to review this information
- The steps the Project will take to reach agreement with landowners about these impacts and any proposed solutions, such as works, maintenance, acquisition or other commitments
- How disagreements will be resolved, including the use of mediation

This protocol is publicly available via www.inlandrail.com.au.

2.2 Overview

The Inland Rail, Illabo to Stockinbingal project (the Project) was approved as Critical State Significant Infrastructure (SSI-9406) by the NSW Minister for Planning in September 2024. The Conditions of Approval (CoA) outlined clear obligations that the Project must address. This includes how the Project should consult with landowners through the detailed design process that considers flooding risk.

This protocol has been developed in accordance with CoA E59 and the project commitments to support the project in meeting its obligations. For a full list of CoAs relevant to this protocol, refer to Appendix A.

This protocol forms part of a broader flood risk management framework. The framework includes several documents and processes that are described below:

- **Flood Design Verification Report (FDVR)**: which assesses compliance with the Quantitative Design Limits (QDLs);
- **Flood modelling and design reviews**: to ensure future rail infrastructure does not adversely impact flood behaviour.
- **Post-construction flood reviews**: to monitor performance and address any unforeseen impacts post construction of the Project.

A summary of the work associated with flooding undertaken, including how this protocol fits into the broader design process, has been provided below:

2019

- ARTC commence work to scope up the I2S project and develop a Reference Design.
- Consultants are engaged by ARTC to develop a Scoping Report and assist ARTC with developing a flood model.

2021

- The Secretary's Environmental Assessment Requirements (SEARs) are issued by the Department of Planning, Housing & Industry (DPHI) to ARTC.
- SEARs set the requirements for ARTC for completing environmental studies (the EIS). The SEARs include a requirement for the flood model to meet QDL's set by ARTC.

2021-2023

- IRPL become the delivery proponent acting on behalf of ARTC and the Australian Government to deliver the Project.
- WSP develop a flood model and report (Chapter 12 and Technical Paper 4 of the I2S EIS) on behalf of IRPL.

September 2024

- The Project is approved as CSSI 9406 by the Minister for Planning & Housing.
- Conditions of Approval include a requirement to complete detailed design so changes in flood behaviour do not exceed QDL's. Where QDL's are exceeded and cannot be changed practically through re-design, a process for consultation is required with affected landowners.

October 2024

- JHPL was awarded the contract to design and construct the I2S Project.
- BG&E are engaged by JHPL to undertake detailed design and flood modelling.

2025

- A detailed design and flood modelling has been developed with options explored through re-design activities to reduce QDL exceedances.
- Where QDL exceedances cannot be reduced, the process outlined in this protocol is followed.

2.3 Project Scope

The Inland Rail - Illabo to Stockinbingal (I2S) Project is a 39-kilometre greenfield section where a new track will be constructed in a newly established rail corridor, just east of Illabo, tracking north to Stockinbingal, NSW.

This new section of rail corridor will provide a direct route from Illabo to Stockinbingal through to the existing Forbes line. The line will bypass Cootamundra and the steep and windy Bethungra Range with the Bethungra Spiral.

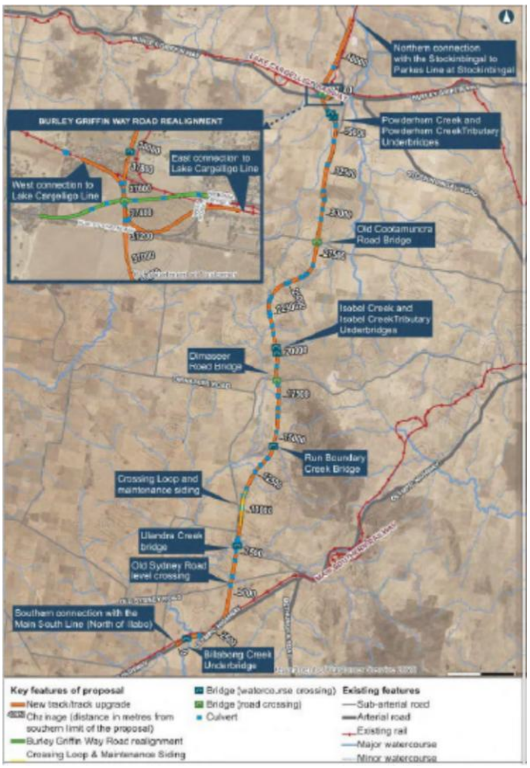
Bypassing the Bethungra Spiral will improve reliability and reduce travel distance by approximately 23 kilometres.

Burley Griffin Way will undergo a major realignment and a new road over rail bridge will be built. This will enable the closure of one of the existing rail level crossings in Stockinbingal, improving safety. In addition, Ironbong Road will undergo a minor realignment around the proposed level crossing to improve safety.

The project connects with the Albury to Illabo (A2I) and Stockinbingal to Parkes (S2P) enhancement projects.

This design and construct project works will include:

- New track construction
- Earthworks
- Bridge construction
- Culvert and drainage installation
- Road works
- Activated and passive level crossings
- Installation of rail systems
- Utility Adjustments



2.4 Key Organisations

The delivery of the project relies on the collaboration and contributions of key organisations and personnel, each with defined roles and responsibilities. These organisations work together to ensure the project is delivered on time, within budget, and to the required quality and safety standards. This section outlines the primary stakeholders involved in the project, their specific roles, and their responsibilities in achieving project objectives.

Table 2: Organisation Roles & Responsibilities

Role	Responsibility
Inland Rail Proprietary Limited (IRPL)	A subsidiary of ARTC, responsible for building Inland Rail on behalf of the Australian Government.
John Holland Proprietary Limited (JHPL)	Engaged by IRPL for the Design & Construction of I2S, The Contractor.
Australian Rail Track Corporation (ARTC)	Responsible for the operations and maintenance of the national rail network including the future operation of the Illabo to Stockinbingal section of the network.

2.5 Stakeholders

The consultation process will focus on highlighting measures taken to mitigate the project's effects on existing flood modelling for each property. Discussions will use plain language with minimal jargon to ensure clear understanding. Team members will remain available for future consultations and to address questions from impacted landowners as they arise.

Key stakeholders relevant to this Protocol from the CoA includes:

- **Landowners:** Property owners who may be impacted by changes in flood behaviour or water management because of the project.
- **Road Authorities:** Entities overseeing roads and other transportation infrastructure that could be impacted by flooding.
- **TfNSW:** Transport for New South Wales is the statutory authority responsible for the development, coordination, and integration of transport services and infrastructure in the state of New South Wales, Australia.
- **Local Councils**: Refer to the governing bodies responsible for managing and administering local government areas (LGAs) within a state or territory.
- **Australian Rail Track Corporation (ARTC)**: The owner and operator of the rail network. ARTC assesses feasibility, suitability and maintenance of any proposed at-property flood mitigation measures.

All outcomes from the flood design consultations with landowners will be incorporated into the Individual Property Management Plans (IPMP) for each property.

3 Design Development Process & Flood Modelling

3.1 Design Development Process

The design development process commences with an initial concept design which leads to a reference design which is used to pursue environmental and regulatory approvals. Following environmental approvals, further design work occurs to prepare for construction. The design gates are as follows:

- Reference Design which undergoes high level reviews as well as stakeholder consultation
- The design then progresses through several stages as part of the development process, these stages include Feasibility Design, Preliminary Design and Detailed Design
- Once the design is agreed, the design is Issued for Construction.

As the design advances through these key stages, it is refined and optimised to incorporate improvements, with reviews conducted by qualified professionals and subject matter experts. These reviews may result in design modifications to ensure it meets the project's requirements.

As the design develops, design consultation with landowners occurs, this process helps to shape the design and ensure landowners are taken on the journey. This process involves meeting with the landowners and presenting the current design, considering any feedback and updating the landowner on next steps.

The design stages are shown below.

- **Reference Design**
- High level design used to persue prelimiary project approvals

- **Feasibilty Design (30%)**
- Development of the design used to facilitate technical reviews and workshops

- **Preliminary Design (70%)**
- Commencement of detailed design and flood modelling
- Inital design consultations with landowners

- **Detailed Design (100%)**
- Finalised design
- Flood model non-conformances and mitigation measures identified
- Futher Design Consultations with landowners

- **Issued for Construction**
- Final design agreed
- Approved flood model

3.2 Development of the Flood Model

In parallel with the design development process, flood modelling and drainage design occur. These packages are prioritised due to the potential impact on the communities and the environment. Flood modelling uses computational analysis to predict how waterways and floodplains respond to precipitation events and to establish an understanding of existing flood extents, depths, velocity, flow distribution, flood inundation and flood hazard.

These models test the impact of the proposed infrastructure and enable quantification to change in flood behaviour (changes to flood depth, velocity, hazard, etc). The following process was adopted in the development of the flood models:

- Hydrological modelling: provides a means for identifying contributing catchment areas and estimation of runoff generated by the catchment areas upslope of the proposal area.
- Hydraulic modelling: using detailed topographic features and hydrographs to estimate water level, velocity and other hydraulic parameters around the project site.

This information provides a critical insight into potential flood risks and informs the design of resilient infrastructure. Drainage design complements this by ensuring systems are in place to manage surface runoff and soil erosion. This will also safeguard properties and rural landscapes from the adverse effects flooding.

The project has progressed through design phases, beginning with the reference design, which was used to develop the EIS. This initial design formed the baseline approach to flood mitigation, using early hydrological assessments and stakeholder feedback from initial consultations. The reference design identified potential flood impacts and informed subsequent design development.

3.3 Quantitative Design Limits (QDLs)

A key component of flood modelling is the application of QDLs, which are benchmarks for evaluating the hydrological performance of the project, a full description of the QDLs can be found in Appendix C. Achieving these limits demonstrates that the design complies with the rigorous standards set by the environmental impact assessments. Meeting QDLs reflects a commitment to mitigating flood risk and promoting the safety and sustainability of the built environment.

When the proposed design does not meet the QDLs, a thorough review process is initiated to identify the causes of non-compliance and determine appropriate design alternatives or mitigation measures. This may involve refining the design, incorporating additional engineering solutions, or implementing environmental safeguards to reduce the project’s hydrological footprint. Effective mitigation strategies are crucial to addressing any potential increase in flood risk and ensuring the project remains aligned with environmental and safety objectives. Every effort will be made to eliminate the non-compliance so far as is reasonably practicable (SFAIRP), ensuring that risks are reduced to an acceptable level while maintaining compliance with regulatory and project-specific requirements.

The Project is required to undertake a flood modelling impact assessment for critical rainfall events up to the 1% AEP, incorporating the effects of climate change. [A 1% Annual Exceedance Probability (AEP) event refers to a flood event that has a 1% (or 1 in 100) chance of occurring in any given year.] Should the flood modelling present results that are non-compliant to the nominated QDLs (in any of the events up to and including the 1% AEP event), and no practical solution can be found, a consultation process with the landowners and relevant authorities will be followed, as outlined in this protocol.

QDLs are specific, measurable criteria or thresholds established during the design phase of a project to quantify the acceptable limits of change or impact that a project can have on the environment. QDLs are used to guide the design process and ensure that the project does not exceed predefined environmental, engineering, or safety standards.

In the context of flood design and hydrology, QDL limits are inclusive of the following parameters:

- **Afflux:** The maximum allowable increase in water surface depth or flood level due to the project.
- **Velocity:** The maximum allowable change in flow velocity that could lead to erosion or impact aquatic habitats.
- **Flood Duration:** The maximum allowable increase in the duration of inundation or flooding at a specific location.
- **Flood Hazard:** The maximum allowable change in flood hazard, often expressed as a product of velocity and depth, which could affect the safety of people and property.

During the planning and environmental assessment processes, QDLs are used to evaluate the project's potential impacts and to develop mitigation strategies if the initial design exceeds these limits. They provide a clear benchmark for decision-making and help ensure that the project maintains environmental sustainability and public safety.

3.3.1 Consideration of Mitigation Measures

The Project will seek to eliminate non-compliances with the QDLs through revisions to the design of the railway infrastructure within the corridor. If it is not practical to modify the design, potential mitigation measures will be considered on the affected land, beyond the rail corridor, with the relevant landowners.

4 Consultation Approach

The consultation approach is intended to be a clear, transparent process which ensures landowners and all affected parties are informed and involved in the process. During each design consultation, records will be kept and issued to the stakeholder. The outcome of consultation with landowners will also be recorded in the Individual Property Management Plans. The consultation approach is outlined in the table below. Refer also to Appendix B for a visual representation.

Table 3: Consultation Process

Step No.	Context
1	**Initial Consultation** During this consultation, the design process will be explained including the flood design process and where applicable, the existing flood conditions per the flood model will be presented to the landowner to confirm it is representative of the current conditions.
2	**Ongoing Design Development** As the design develops, consultation with landowners will continue at different stages to help shape the design and test ways to reduce flood impacts. The goal is to consult with affected landowners as early as possible, so the design can be finalised, and flood impacts are identified and managed.
3	**Identify QDL Non-compliances** Non-compliances within the flood model are identified and the extent of the non-compliance is documented including the potential impacts on the environment, both biodiversity and soil stability.
4	**Investigate QDL Non-compliances** Investigate and document engineering options to remove or mitigate the non-compliance, this may involve re-checking input data or considering alternate design solutions. Each option will then be evaluated against a So Far as is Reasonably Practicable (SFAIRP) approach.
5	**Discuss QDL Non-compliances & Mitigation Measures** Further consultation will be arranged to discuss the non-compliances with the landowners. A qualified Hydrologist will present the following information: • The Flood Model • Provide details relating to the non-compliances including any associated implications • Discuss mitigation measures to achieve the best outcome for the landowner • Explain post-construction flood review requirements (detailed in section 5) • Encourage the landowner to provide any feedback
6	**Follow up Consultation & Agreement** Allowing a minimum of 2-weeks for the landowner to consider the non-compliance, a follow up consultation will be arranged with the landowner and the qualified hydrologist to discuss the following: • Any changes made to the flood model since the last consultation • Further discussion relating to the non-compliance & proposed mitigation measures Once the landowner is satisfied that the non-compliance and the mitigation measures proposed are acceptable, an agreement will be drafted.
7	**Binding Agreement** An agreement will be drafted and presented to the landowner to sign. Proceed to Step 11.

Step No.	Context
8	**Independent Hydrologist Review** If a satisfactory outcome is unable to be achieved, a DPHI-approved independent hydrologist (refer to Community Communications Strategy) will be available to review the information presented and assist the landowners in understanding and interpreting the design and its performance. This will assist the parties in agreeing a satisfactory outcome. Proceed to Step 7.
9	**Independent Mediation** If agreement has not been reached after 4-weeks (or alternate period agreed in writing between the parties), it will be referred to the Community Complaints Mediator appointed to the project. The DPHI-approved independent hydrologist will support the mediation process.
10	**Mediators Recommendations** Following mediation, the Mediator will issue recommendations which must be implemented unless otherwise agreed with the Planning Secretary.
11	**Submission of Design Documentation** On completion of the flood design consultations, all relevant documentation will be issued to the Planning Secretary of the Department of Planning, Housing and Infrastructure for review.

5 Flood Review Post Construction

Following construction completion of each section or stage of the Project and during the first 15 years of operation, a Flood Review Report will be prepared within three (3) months after the first defined flood event that occurs within or adjacent to the rail corridor.

To analyse the lengths of rail corridor impacted by rainfall and consequential flood events for the purposes of the Flood Review Report, spatially defined monitoring zones and associated monitoring methodologies for the flood catchments will be developed.

The monitoring methodologies will provide an approach to infer rainfall intensities utilising the available Bureau of Meteorology rainfall monitoring stations suitable for each catchment, as well as utilising the available streamflow data and water level records. The methodology will be developed in consultation with BCS and DCCEEW Water and submitted to the Planning Secretary for approval.

5.1 Flood Review Reports

The Flood Review Report(s) will be prepared by a suitably qualified and experienced hydrologist(s) and will include details of the following:

a) A comparison of the observed extent, level, and duration of the flooding event against those predicted in (or inferred from) the FDVR;
b) Identification of the properties and infrastructure affected by flooding during the reportable event; and
c) Where the observed extent and level of flooding or other flooding or erosion impacts exceed those predicted due to the CSSI with the consequent effect of adversely impacting on property(ies), structures, infrastructure or the environment, and/or exceed the QDLs:
    i. Determine if the exceedance is attributable to the CSSI, and
    ii. Where the cause is attributable to the CSSI, identify measures that would be implemented to reduce future adverse impacts of flooding from similar events related to the CSSI.

This post construction review process is a continuation of the consultation framework outlined in this protocol. This ensures the CSSI remains responsible for the review of flood impacts post construction of the project and provides a mechanism for continuous improvement, stakeholder engagement and environmental protection. Furthermore, mediation is available throughout construction and for 12 months post construction completion.

6 Road Authorities, Local Councils & TfNSW

6.1 Consultation Process

Ongoing consultation with key stakeholders including road authorities, local councils and TfNSW is mandatory under CoA E58. This engagement ensures that our flood modelling processes are comprehensive and aligned with regulatory requirements and community needs. This collaboration involves regular meetings, workshops, and information-sharing sessions to incorporate local knowledge, technical expertise, and stakeholder priorities into our designs and assessments. By collaborating with these stakeholders, we aim to deliver flood modelling solutions that not only meet engineering and environmental standards but also support the safety, resilience, and sustainability of the community.

During the design development process, as outlined in Section 3.1, all relevant designs, including the flood model, are developed in consultation with TfNSW and endorsed by the relevant road authorities prior to construction. At each design stage, the road authority, local councils, and TfNSW are provided opportunities to review design documentation, participate in workshops, and provide feedback, with all comments required to be addressed.

The Flood Risk Management Framework, detailed in Section 2.2, encompasses the FDVR, flood models, and post-construction flood reviews. When complete, each of these documents are submitted to BCS, DCCEEW Water, TfNSW, and local councils for review, the feedback is then addressed before the FDVR is submitted to the Planning Secretary for approval. This approval is required prior to commencing construction of any permanent works that may impact flooding.

Additionally, the flood model undergoes independent peer review at each design stage, with the Planning Secretary scrutinising how any findings or recommendations from the Independent Peer Reviewer have been addressed and resolved.

This rigorous process ensures that our flood modelling is thorough, meets regulatory requirements, and reflects the needs of the community.

7 Appendices

Appendix A | Compliance Roadmap

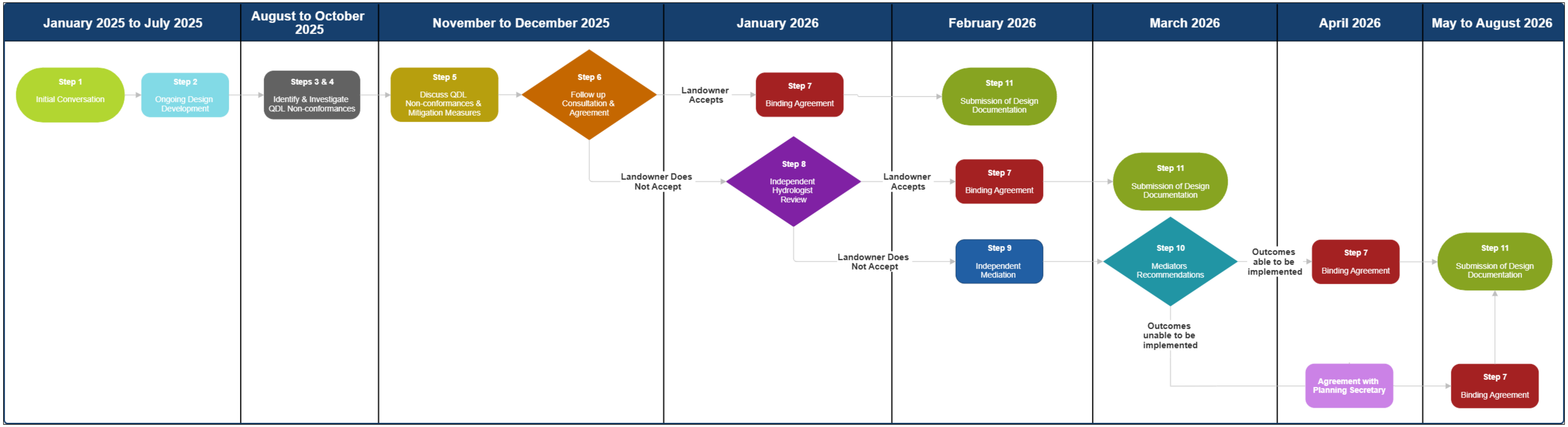
The table below highlights the CoAs relevant to this Flood Design Consultation Protocol.

Table 4: Compliance Roadmap

Reference	Condition of Approval	Applicable Section in this Plan
E57	If the CSSI does not meet the requirements of Condition E55 in relation to resultant velocity that exceeds the erosion threshold velocity (ETV), the Proponent must prepare and implement the Operational Erosion Mitigation and Management Program required by Condition E68.	Section 5
E58	If it is not practical to modify the design of the CSSI to meet the requirements of Condition E55, the Proponent must, in instances of non-compliance with Condition E55: (a) document the extent of the non-compliance and the impact to all landowners (public and private) and environment including biodiversity and soil stability; and (b) justify why it is not practical to achieve compliance through CSSI design changes including provision of details of design options investigated to achieve compliance; and (c) consult with and obtain the written agreement of the roads authority (where relevant); and (d) consult with and provide full disclosure of likely impacts resulting from non-compliance with the QDL and obtain the written agreement of the affected landowner to the non-compliance. Such an agreement may involve works, measures, maintenance activities, acquisitions, or other commitments by the Proponent to the landowner. All written agreements must be legally binding and meet any requirements of relevant legislation.	Section 4
E59	The Proponent must prepare a Flood Design Consultation Protocol, to outline the steps that the Proponent will take where there are non-compliances with the QDLs, in accordance with Condition E58, to consult with landowners, road authorities, and TfNSW. The Flood Design Consultation Protocol must include: (a) when non-compliances will be notified to the landowner or roads authority; (b) time provided to the landowner and roads authority to consider the non-compliance; (c) process for seeking agreement to the non-compliance and any associated works, measures, maintenance activities, acquisitions, or other commitments by the Proponent to the landowner; and (d) the process for mediation and resolution of disputes outlined in the Communications Strategy required by Condition B2. The Flood Design Consultation Protocol must be prepared prior to construction and made publicly available in accordance with Condition B18.	This Protocol

Appendix B | Consultation Protocol Visual Representation

Consultation Protocol Visual Representation



Appendix C | Quantitative Design Limits

APPENDIX B FLOODING

SCHEDULE 1 QUANTITATIVE DESIGN LIMITS

TABLE 1: QUANTITATIVE DESIGN LIMITS (QDLs)

(These QDLs are only applicable beyond the CSSI corridor, unless otherwise noted, and do not apply to model noise[3])

Parameter	Location or Land Use	Limit
Afflux i.e. increase in flood level resulting from implementation of CSSI.	Habitable floors and sensitive infrastructure[4]	10mm increase[5]
	Non-habitable floors[4]	20mm increase
	Surrounds of residential buildings, other urban, open space recreational land and infrastructure (excluding sensitive infrastructure)	100mm increase
	Agricultural	200mm increase
	Forest and unimproved grazing land	300mm increase
	Classified roads managed by TfNSW[7]	No increase[6]
	Highways and sealed roads >80km/hr[7]	No afflux where aquaplaning risk exists and remains unmitigated. Otherwise 50mm increase[6]
	Unsealed roads and sealed roads <80km/hr[7]	100mm increase[6]

[3] Model noise is an artefact of the modelling process and does not provide any useful information and is not the same as model tolerance. Modelling noise is to be ignored when assessing compliance with the QDLs. All modelling noise exclusions are to be reviewed by the independent reviewer required under **Condition E49**.

[4] Habitable floors/rooms are defined consistent with the use of this term in the Flood Risk Management Guideline AG01 which is part of the Toolkit accompanying the 2023 Flood Risk Management Manual. In a residential situation this comprises a living or working area such as a lounge room, dining room, rumpus room, kitchen, bedroom or workroom. In an industrial, commercial or other building, this comprises an area used for an office or to store valuable possessions, goods or equipment susceptible to flood damage in the event of a flood.

[5] 10 mm has been set to provide a margin for modelling uncertainties/tolerances. The intent of this requirement is that existing flood levels above floor level do not increase and there is no new flooding of floors.

[6] Any variation must be negotiated with the roads authority in accordance with **Condition E58**.

[7] Including where located within CSSI corridor.

Parameter	Location or Land Use	Limit
<u>Velocity</u> Ie. Increase in flood velocity resulting from the implementation of the CSSI (Both Flow Distribution and the Scour/Erosion velocity QDLs apply)		
Flow Distribution	All areas	20% increase in velocity[8]
Scour/Erosion Potential	Ground surfaces that have been sealed or otherwise protected against erosion. This includes roads and most urban, commercial, industrial, recreational and forested land	Velocities are not to exceed the limiting velocities which would erode the sealing or remove the protection that has been applied to the surface
	Other areas including watercourses, agricultural land, unimproved grazing land and other unsealed or unprotected areas	An erosion threshold velocity (ETV) is to be determined through a site specific assessment(s) conducted by an experienced geotechnical or scour/erosion specialist in accordance with **Conditions E60** to **E63**.[9] An ETV of 0.5m/s is to be adopted in the absence of a site specific assessment(s) Where existing velocity exceeds ETV, velocity is limited to a 0.025m/s increase[10] Where existing velocity is less than ETV, velocity is limited to the lesser of: • ETV • 20% increase or 0.5m/s whichever is greater
<u>Flood Hazard</u> i.e. increase in velocity~depth product (**vd**) resulting from implementation of CSSI. (Does not apply where vd<0.1m^2/s).	Urban, commercial, industrial, highways[7] and sealed roadways[7]	10% increase in vd
	Classified roads managed by TfNSW[7]	10% increase in vd where this does not result in an increase in hazard category. Otherwise, no increase [6]
	Elsewhere	20% increase in vd

[8] Local variations in velocity can exceed a 20% change provided that when assessed over a 30m wide flowpath, the velocity change within the flowpath does not exceed 20%.
[9] An equivalent shear stress may be substituted for an ETV determined through this process.
[10] Where velocity exceeds this QDL, the **Operational Erosion Mitigation and Monitoring Program** required by **Condition E68** must be prepared and implemented.

Parameter	Location or Land Use	Limit
Flood Duration i.e. increase in duration of inundation resulting from implementation of CSSI.	Habitable floors[4]	Where existing above floor flooding is: • less than 1 hour in flood duration, the post-development flood duration shall not exceed 1 hour • greater than 1 hour in duration, up to 5% increased inundation duration Where existing below floor flooding is: • less than 1 hour in flood duration, the post-development flood duration shall not exceed 1 hour • greater than 1 hour in duration, up to 10% increased inundation duration
	Classified roads managed by TfNSW	No increase in duration of flood inundation to sections of road not already inundated[6] Otherwise 10% increase in inundation duration
	Highways and sealed roads >80km/hr[7]	10% increase in inundation duration.
	Elsewhere	Where existing inundation is less than 1 hour in flood duration, the post-development flood duration shall not exceed 1 hour. Where existing inundation is greater than 1 hour in flood duration, up to 10% increase in duration of inundation No duration limits apply to newly flooded land no greater than 1000m^2 in area