

Illabo to Stockinbingal Floodplain modelling

PROJECT UPDATE

NSW

About the project

The Illabo to Stockinbingal project is a new rail corridor approximately 39km in length and located within the local government areas of Junee and Cootamundra–Gundagai. This new section of rail corridor will provide a direct route from east of Illabo, tracking north to Stockinbingal and connecting into the existing Forbes rail line. The route bypasses the steep and windy section of track called the Bethungra Spiral.

Our approach to flooding

We are committed to minimising the impact of construction and operational activities on the communities in which we operate. Landowner and stakeholder input and consultation on existing flood conditions and potential impacts has been and will continue to be incorporated into the design of Inland Rail.

Our guiding principles are to minimise the impacts of Inland Rail on flood behaviour for stakeholders, landowners and the wider community. These principles take natural water flows into account and aim to achieve a level of flood immunity which will minimise the risk to operation and maintenance of the rail infrastructure.

To ensure we meet our guidelines and criteria, we have engaged industry professionals who have undertaken similar flood modelling within this region.

Guiding design and flood principles

- + **flood level control** – understanding any peak flood level changes and minimising this at houses and properties and roads
- + **velocity control** – maintaining existing velocities where practical and understanding any changes in the speed of water exiting culverts, and providing appropriate mitigation measures, considering existing soil conditions
- + **flow control** – minimising changes to the natural flood flow patterns and minimising changes to existing flow control structures (contour banks)
- + **inundation duration control** – understanding the impact of any changes in time of inundation for land and infrastructure
- + **culvert consideration** – consideration of potential culvert blockage in design (Inland Rail must design for 15% blockage design factor)
- + **climate consideration** – consideration of potential changes in flooding due to projected effects of climate change.

These criteria and principles are used to ensure the project will not create additional flooding impacts at houses, towns or communities.



Step 1

Step 2a

Step 2b

October 2016	June 2018	July 2019
<p>Development of the preliminary waterway crossing models*</p> <p>Guided by the Australian Rainfall and Runoff – A guide to flood estimation 1987***</p>	<p>Development of two preliminary floodplain models**</p> <p>In 2017, Inland Rail received detailed topographic data (Light Detection and Ranging LiDAR) for a 10km wide corridor</p> <p>A new industry standard was also in progress and later introduced. The project updated its preliminary floodplain models in line with the new standard: Australian Rainfall and Runoff – A guide to flood estimation 2019***</p>	<p>Collating information to validate the base floodplain models.</p>
<p>Who was involved?</p>	<p>Who was involved?</p>	<p>Who was involved?</p>
<p>ARTC, hydrology consultants, Office of Environment and Heritage (OEH)****</p>	<p>ARTC, hydrology consultants, OEH, Junee Shire and Cootamundra–Gundagai Regional Councils.</p>	<p>ARTC, IRDJV, landowners and other key stakeholders.</p>
<p>What consultation took place?</p>	<p>What consultation took place?</p>	<p>What consultation took place?</p>
<p>Inland Rail team working across Illabo to Stockinbingal, meeting with individual landowners alongside the engineering team to discuss and identify property issues including surface water and flooding.</p>	<p>ARTC and the Inland Rail Design Joint Venture (IRDJV) team met with Junee Shire and Cootamundra–Gundagai Regional Councils to gather information required to develop the sub-catchment model. Information collected included all available previous flood studies for the creeks and catchments near the project.</p> <p>ARTC and IRDJV met with OEH to confirm study methodology to ensure flood model had been developed in accordance with the OEH Floodplain Development Manual (NSW 2005).</p>	<p>We spoke to landowners about historic flood photographs, culverts, bridges, and creek/hydrology behaviour on their properties, which was used to validate the model.</p>
<p>What communication tools were used?</p>	<p>What communication tools were used?</p>	<p>What communication tools were used?</p>
<p>Stakeholder meetings.</p>	<p>Stakeholder meetings.</p>	<p>Landowner meetings.</p>
<p>What were the outcomes?</p>	<p>What were the outcomes?</p>	<p>What were the outcomes?</p>
<p>The project had a rough estimate of the number of culverts required as part of the alignment options assessment.</p>	<p>Confirmation that the project's flood model had been developed in line with the latest standard and that the outputs from the model could be used by local stakeholders such as councils and the OEH.</p>	<p>Refinements and enhancements were made to the base models for the two catchments. It was validated and calibrated against all available historic flood information including community inputs.</p> <p>As no substantial information was available to be able to survey flood marks to refine the Lachlan River catchment (Bland, Dudauman and Powder Horn Creeks) floodplain model, a previous floodplain model was checked against for consistency.</p>

Step 2c

Step 3a

Step 3b

Step 4

Oct 2019	Jan–Sep 2020	Oct–Nov 2020	Jan–Apr 2021
Testing designs in the floodplain models and peer review.	The project underwent a design refinement exercise, which required further enhancements to the two floodplain models.	Further ground truthing of the floodplain model following the design refinement exercise.	Floodplain model refined and peer review conducted.
Who was involved?	Who was involved?	Who was involved?	Who was involved?
ARTC, IRDJV and a peer review by a chartered engineer (certified and registered).	ARTC, IRDJV and hydrology consultants.	ARTC, hydrology consultants, Junee Shire and Cootamundra –Gundagai Regional Councils and other key stakeholders.	ARTC, hydrology consultants, Junee Shire and Cootamundra–Gundagai Regional Councils and other key stakeholders.
What consultation took place?	What consultation took place?	What consultation took place?	What consultation took place?
N/A	We spoke to landowners about the preferred refined design and upcoming flood model engagement.	We spoke to landowners and gathered more historic flood photographs. We presented the floodplain models to landowners and other key stakeholders (maps with a one in 10-year flood event) and confirmed existing environmental constraints.	We spoke to the Community Consultative Committee, and more landowners to address culvert locations.
What communication tools were used?	What communication tools were used?	What communication tools were used?	What communication tools were used?
N/A	Stakeholder meetings, community drop-in sessions.	Landowner meetings, technical flood workshops, council presentations, emergency services meetings, data sharing, survey and field investigations, and e-newsletters.	Landowner meetings, key stakeholder meetings.
What were the outcomes?	What were the outcomes?	What were the outcomes?	What were the outcomes?
The 2019 design was applied to the floodplain models and impacts to flooding identified. The model was adjusted in response to the peer review.	Further enhancements to floodplain models following a design refinement exercise.	Ground-truthing of the flood model, i.e. confirming the project's flood model reflected local flood behaviour as experienced by local stakeholders.	Project flood model reflects sensitivity to impacts.

*Waterway cross model – This involved 27 basic waterway crossing models which were isolated to waterways and did not extend beyond the project area.

**Preliminary floodplain models – This involved two detailed two-dimensional floodplain models. One for each of the two catchments within the project: Lachlan River Catchment (northern part of the project i.e. Bland, Dudauman and Powder Horn Creeks) and Murrumbidgee River catchment (southern part of the project i.e. Billabong, Ulandra Creek, Ironbong and Isobel Creek).

***Australian Rainfall and Runoff 1987 – A guide to flood estimation is an industry standard used to develop floodplain models. It outlines what needs to be in the model. Australian Rainfall and Runoff – A guide to flood estimation 2019. The project proactively updated its floodplain models in conjunction with the draft version of the new industry standard released in 2016.

****Office of Environment and Heritage (OEH) do flood models for regional councils. Its role is to help interpret information in a flood model and understand the risks. The Inland Rail project worked closely with OEH to ensure flood models can be used in the future.

How we have used the floodplain model

Extensive work has occurred to incorporate the refined floodplain model into the finalised reference design. This has informed the Environmental Impact Statement (EIS).

The EIS has been submitted to the NSW Department of Planning, Industry and Environment (DPIE), outlining the potential project impacts and approaches to mitigation.

What's next?


The EIS will be on public exhibition in early 2022 for a minimum of 28 days. At this time people can make a submission to DPIE.

More information

We will continue to work closely with the local community throughout the design and construction phases of the project. For more information, please visit [Inlandrail.com.au/i2s](https://inlandrail.com.au/i2s)

Want to know more?

ARTC is committed to working with landowners, communities, state and local governments as a vital part of our planning and consultation work, and we value your input. If you have any questions or comments, please let us know.

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