EAST WEST RAIL 2 (EWR2)
BICESTER TO BLETCHLEY

EAST WEST RAIL ALLIANCE

BIG Biodiversity Challenge Award Category: *Innovation Award*

Project overview

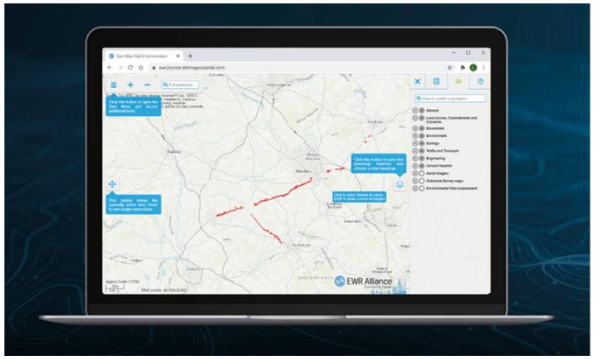
East West Rail (EWR) is creating a new direct rail link between Oxford and Cambridge to join key regional centres. The first phase of EWR, Oxford to Bicester, was completed in 2016. The second phase of EWR (EWR2) is between Bicester and Bletchley.

What were the biodiversity conditions on site, prior to the enhancement?

EWR2 will reinstate and upgrade old railway lines, allowing new train services to run. The project requires alteration of over and under bridges, improving intersections with roads, two new stations at Winslow and Bletchley, and new platforms and platform extensions. Track lifting, ballast removal and vegetation clearance are required to allow for drainage works and earthworks.
Baseline information was collected in 2016 to support the Environmental Statement, pre-construction surveys were conducted in 2018/2019, enabling works began in 2018, and a Transport and Works Act Order was granted in February 2020. Construction activities are underway and will continue until 2024.

What were the reasons behind this project ?

EWR2 pioneered several innovative technological approaches. The reason behind these approaches was ultimately to achieve better outcomes for biodiversity. Two of these approaches are associated with the development of mitigation licence applications, resulting in a more cohesive mitigation, compensation and enhancement package across the project. Two approaches include the development of a web map and Incidental Records Process to support the ecologists and construction teams during the construction phase of the project. This has resulted in effective spatial sharing of environmental and construction data, as well as rapid sharing of new data ensuring effective protection of newly identified ecological constraints.



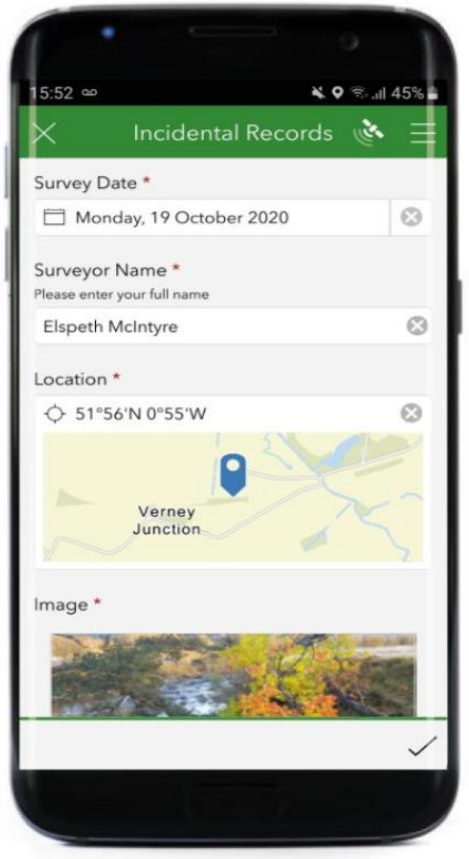
What the EWR2 web map looks like - the layer controls are on the right with several tools available within the top left menu

EWR2 staff recording and engaging with data on site using mobile devices

What were the biodiversity measures taken?

The innovative technological approaches are outlined below, all of which are replicable on other projects with both GIS and ecology expertise:

- Creation of a web-based interactive mapping portal (or web map) to store and display environmental and construction data. Having this information stored and displayed in a central location allows environmentalists, engineers and project managers to engage, interact and query spatial data relevant within the footprint of a proposed construction activity.
- Development of an Incidental Records Process, enabling new ecological constraints to be recorded, shared and considered in the construction planning process on the project web map within a matter of minutes. Custom configuration of legally compliant schemas or attributes within ESRI's ArcGIS 'Survey123' has given our ecologists an intuitive and portable method of capturing 'incidental' records at the point of discovery for multiple species.
- Development of customised web maps specifically to support European Protected Species mitigation licence applications. These assisted Natural England in their review of these complex licence applications. For the ecologists preparing the licence applications, they allowed a better understanding of the baseline survey results and the impacts as a result of being able to comprehensively visually interpret the data, ultimately resulting in better designed mitigation, compensation and enhancement.
- Automated calculations for the mitigation licences. The mitigation licences were underpinned by Method Statements which required spatial information about the habitats impacted, created, restored, reinstated and enhanced. Such calculations can be complex for projects of the scale of EWR2, with inputs from many sources. The GIS team and the ecology team collaborated to display all data sources on the web map and agree parameters for various habitats. A repeatable, automated calculation workflow was then created with Safe Software's FME package allowing habitat calculations to be re-run with different mitigation strategies or when data was updated.



The Incidental Records Survey123 form as it appears on a mobile phone

Further information

The approaches put forward for this award demonstrate the biodiversity benefits that can be achieved when there is close collaboration between ecologists and GIS professionals. The web map has facilitated multi-discipline engagement and has meant that ecological constraints were identified early in the project lifetime. It is now at the heart of the project's environmental risk assessment and works planning process. The Incidental Records Process has resulted in new ecological constraints being shared rapidly, with appropriate mitigation or working practices put into place in a timely manner. Already the process has ensured prevention of the spread of invasive non-native plant species and protection of bat roosts, badger setts, bird nests and polecat dens – all of which had colonised the footprint of the project since baseline surveys for planning permission.

The great crested newt and bat licence, supported by the web map, were some of the first digitally enabled licence applications in the country and allowed a much deeper understanding of all elements of the project, greatly benefiting decision making regarding these species. The outcome was a more cohesive mitigation, compensation and enhancement package.

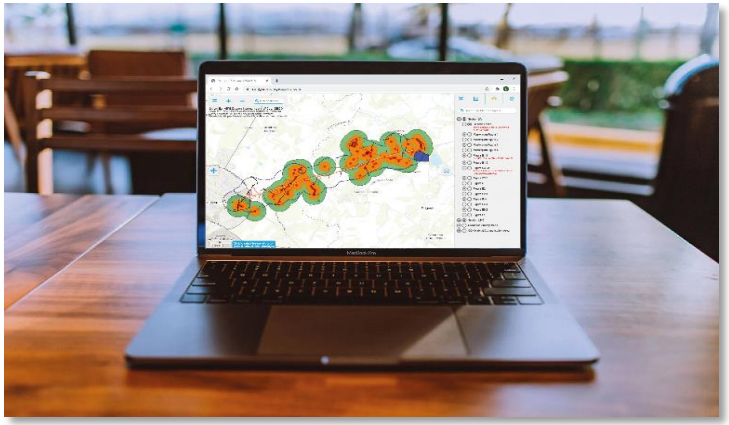
The automated calculations saved a significant amount of time and avoided the need to re-do complex calculations as areas changed during the lifetime of the project, as the spreadsheet could be re-run at the click of a button, using the commands already embedded. This automated process has been developed further and is being used to create automatic calculations for Biodiversity Net Gain (BNG) using the Defra metric.

Project Team

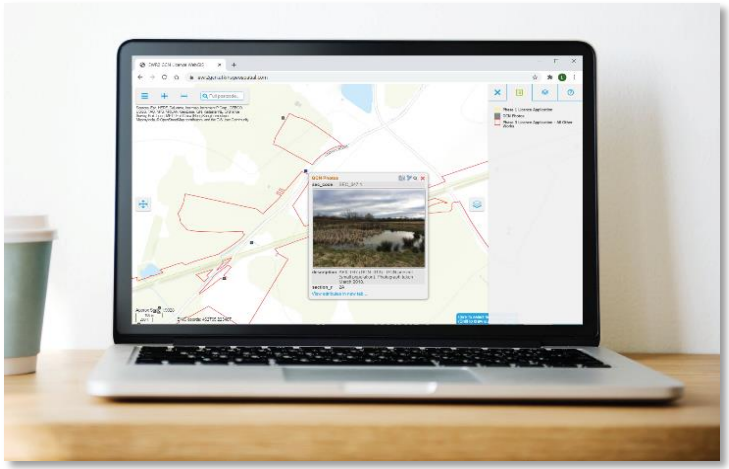
- Client / funders - East West Rail Alliance
- Other design team members – Tom Oliver (Ecology Manager)
- Volunteer organisations – N/A

What was the motivation for carrying out the enhancement?

The motivation for implementing the innovative approaches described here was primarily to achieve better outcomes for biodiversity. The ways of linking incidental records, as well as more historic data, to the construction planning process through a web map that is available to the entire EWR2 project team has resulted in environmental constraints being avoided and protected, or impacts mitigated appropriately. The technologies to support the mitigation licences allowed a detailed understanding of the baseline data and the impacts of the project, resulting in better designed mitigation, compensation and enhancement. The automated calculations have demonstrated that EWR2 will achieve 10% BNG.



What the EWR2 great crested newt web map looks like - the layer controls on the right align with the figures that are a requirement of the licence



What the EWR2 great crested newt web map looks like – photos are embedded into the web map