Listen & Learn sessions

Ground Control

LOWERY

ganymede

Amey
Life's better connected

bam

Suttle Projects

McGINLEY
Part of the MSSI GROUP

BETTER TOGETHER
Southern Railway System

Amey

Life's better connected

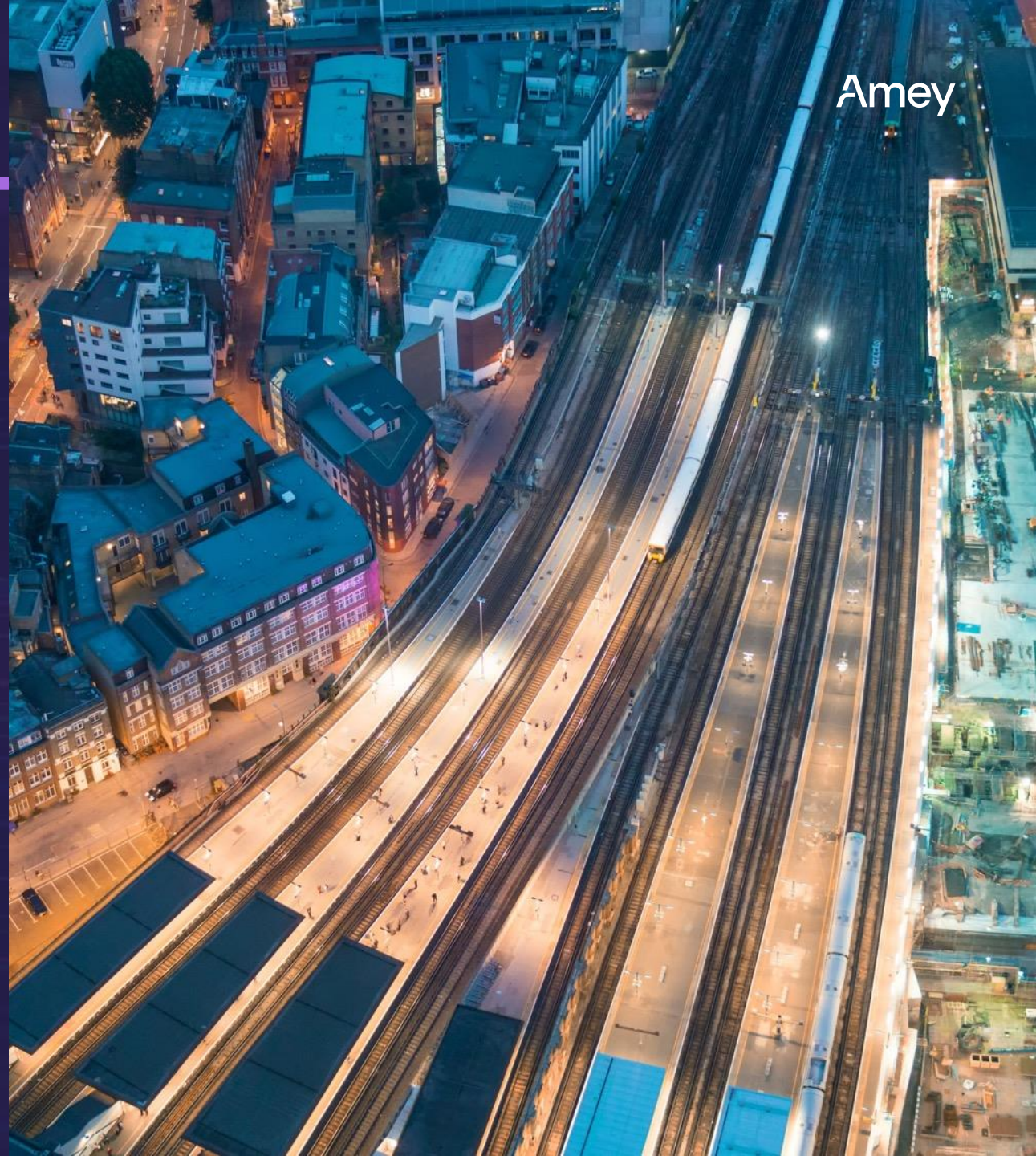
Tessera®

Digital signalling for modern rail networks

Agenda

- Why was Tessera developed?
- How does Tessera improve the railway?
- Tessera - HIMatrix Product
- Tessera - System design architecture
- Case Study: Walnut Tree Depot
- Case Study: Skerne Road Level Crossing
- AOB

Tessera®



Amey

Overview

Amey

Tessera is Amey's next-generation digital signalling solution for rail infrastructure, built on a commercially off-the-shelf SIL4-certified Programmable Logic Controller (PLC). It's designed, assured, and tested to UK rail network rigorous standards, offering a modular, future-proof approach to rail signalling.

Tessera launched to address the pressing need for affordable, modern, and reliable signalling solutions in the rail industry. It enables rail infrastructure managers to renew and upgrade infrastructure efficiently, meeting today's affordability challenges and supporting long-term sustainability for funders and stakeholders.

Why was Tessera developed?

Amey

UK Signalling market.

Conventional solutions too expensive	**Limited competition**	**Reduced innovation**	**No compatibility**

Affordability challenge to renew the signalling assets due to expire in next 10 years.

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How does Tessera improve the railway?

Amey

Key Differentiators

Cost-Efficiency

Tessera utilises commercially available (COTS) products, significantly reducing long-term operational and maintenance costs. By adopting open-source protocols, Tessera enables other suppliers to compete for future upgrades, fostering a more competitive and cost-effective environment. In contrast, most original equipment manufacturers (OEMs) rely on closed protocols, which limit competition and can lead to higher upgrade costs.

Enhanced Safety

The Programmable Logic Controller (PLC) meets the highest safety standards (Safety Integrity Level 4), ensuring robust process and machine safety.

Reliability

Robust hardware/software, enhanced asset condition monitoring, and consistent performance in demanding conditions.

Seamless Integration

Tessera connects with legacy, modern, and future rail control systems, supporting network modernisation.

Future-Proof Design

Modular, upgradable components; ETCS (European Train Control System) compatibility.

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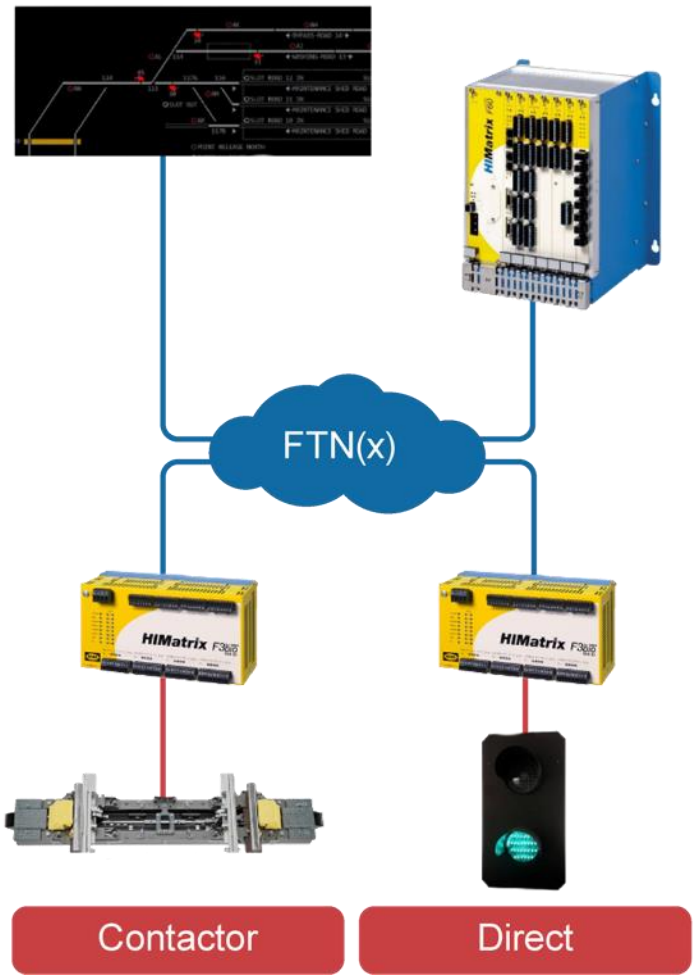
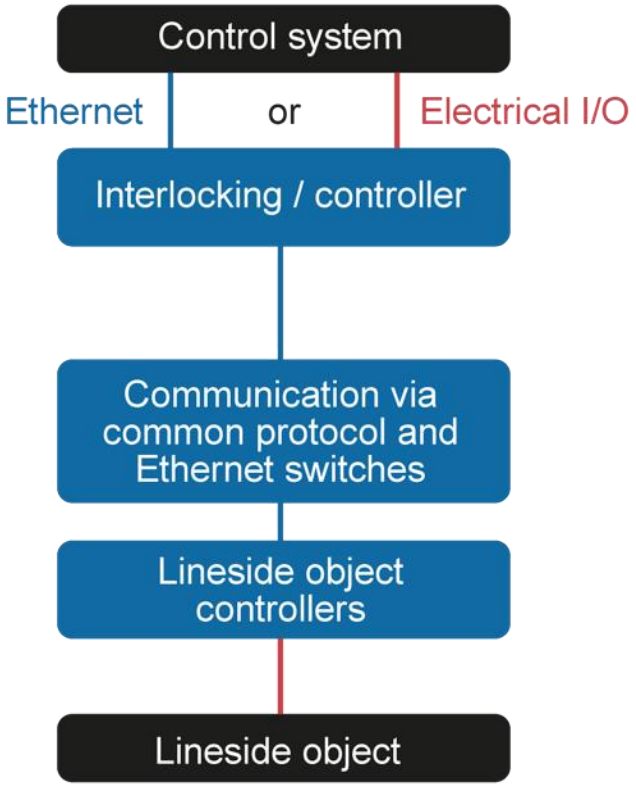
Tessera HI Matrix Product

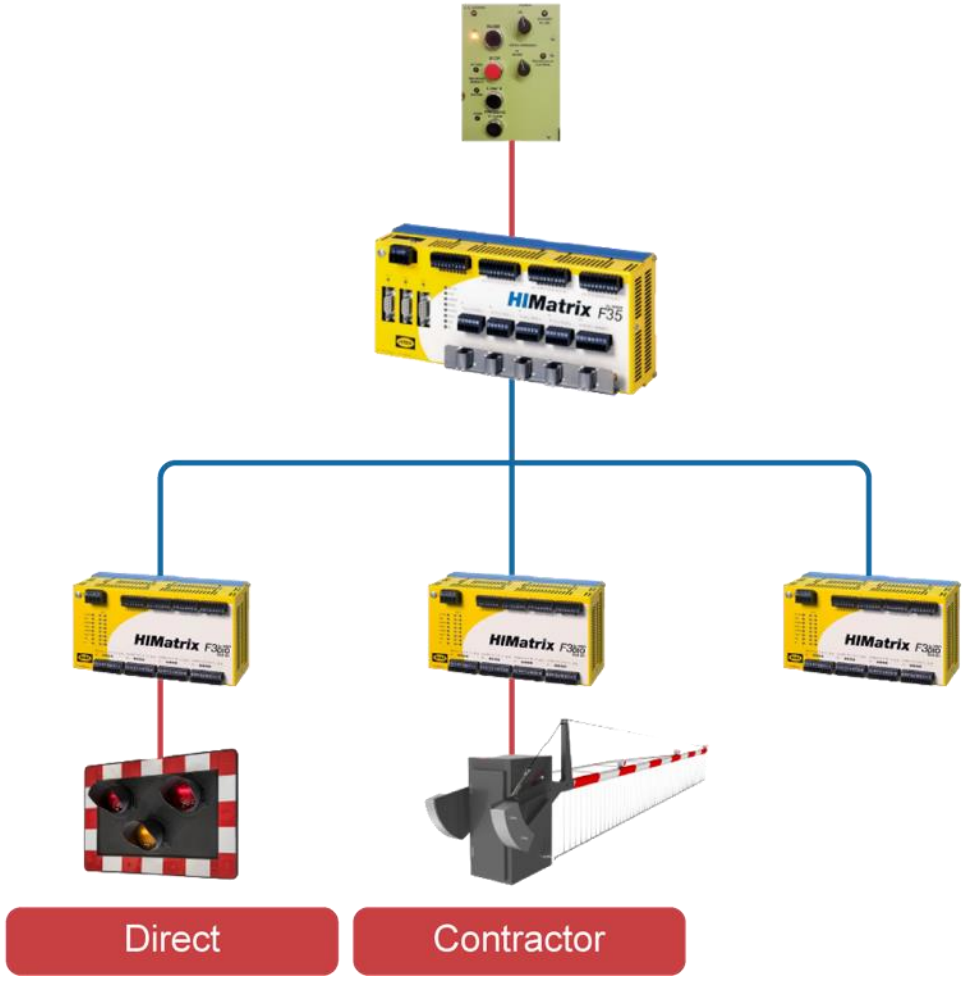
Amey

- Family of HIMA PLCs Product Approved for signalling applications in UK - **Amey IP**
- Safety integrity level (SIL) 4 – **The highest level**
- Ethernet based communication
- Environmentally robust suitable for lineside installation
- **Can be a signalling interlocking or an object controller or a transmission system**
- We can programme it to communicate with any other Ethernet technology
- We can programme it using familiar, easy to use relay-like logic principles
- It is a stepping stone to provide truly open protocol digital signalling

Tessera®


FTN(x)
Contactor
Direct


Control system
Ethernet
or
Electrical I/O
Interlocking / controller
Communication via common protocol and Ethernet switches
Lineside object controllers
Lineside object


Direct
Contractor

Case Study:
Magdalen Road Level Crossing

Amey

- Full Product Acceptance attained in July 2024
- We developed Tessera, an innovative open digital signalling control solution for the Manually Controlled Barrier (MCB) Level Crossing interlocking in collaboration with Network Rail Anglia.
- Our solution is a modular design with standardised data algorithms that can be easily configured for any given site, thus reducing Network Rail's costs with design, testing and maintenance.
- Faultless performance during operational trials; easy programming and powerful diagnostics for direct fault-finding and condition monitoring.
- Our Programmable Logic Controller (PLC) digital solution consists of 1 HIMatrix F35, operating as the Level Crossing interlocking and 6 HIMatrix F3s operating as object controllers.
- The successful deployment demonstrated Tessera's capability to enhance safety and efficiency at level crossings, paving the way for future implementations across the UK.

"The Amey solution is straightforward to install and maintain, offering enhanced reliability and safety. It interfaces seamlessly with our intelligent infrastructure system, providing us with improved maintenance information." **Andrew Kenning, Network Rail Signalling Project Engineer on the Magdalen Road Level Crossing Project**

Case Study: Walnut Tree Depot

Amey

- We showcased the versatility of Tessera on the interlocking system at Transport for Wales' Walnut Tree Depot, formally known as Taffs Well Depot.
- Commissioned in November 2024.
- The Walnut Tree depot is a fully signalled depot for a new tram-train fleet for the South Wales Metro in Cardiff. The depot has nine stabling platforms, 28 signals, 29 point ends, three staff crossings, one level crossing, a complex interface to the shed protection system and fringe to the main line.
- The Tessera digital platform is based on commercially off-the-shelf (COTS) products. This solution is based on four modular location cases, a central interlocking and a VDU control system built utilising the Panorama SCADA platform.
- Tessera offers a simple modular system architecture, each location case is capable of controlling up to 10 ends of points, 10 signals and 16 axle counter heads.
- The Walnut Tree Depot houses 36 metro vehicles and is a base for 400 train crew, and a Core Valley Lines integrated control centre.
- The modular Programmable Logic Controller (PLC) solution controls depot operations, reducing costs and supporting efficient train dispatch.
- Amey's role: Feasibility, outline design, integration, signalling, and systems design, testing and commissioning.
- This project highlighted Tessera's ability to deliver modern digital replacements for control systems, interlockings, and other critical rail infrastructure.

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Case Study:
Skerne Road Level Crossing

Amey

- Commissioned in January 2025
- After Tessera's successful deployment at Magdalen Road Level Crossing, Network Rail commissioned a second Amey solution for the Manually Controlled Barrier (MCB) Level Crossing at Skerne Road in September 2024. Tessera was installed just four months later, demonstrating significant cost and programme efficiencies through repeatable system implementation. By replicating the data construct used at Magdalen Road, the Skerne Road project clearly showcased the tangible savings achievable with Tessera's modular approach.
- Amey provided training to the local Network Rail works delivery unit, enabling them to install and integrate a fully factory-tested Tessera system at Skerne Road level crossing. This hands-on approach highlights Tessera's flexibility and ease of deployment, allowing seamless implementation by local teams.
- Tessera's system processes have been designed with a strong focus on the needs and expertise of existing signalling engineers. In-house conversion training courses enable these engineers to quickly learn how to design and test using Tessera. By adopting standard railway signalling nomenclature -rather than the complex data languages found on other digital platforms -Tessera ensures the system remains accessible, understandable, and helps prevent skills fade.

"The Amey solution was developed and installed at Skerne Road in a reduced timescale to a condensed programme, resulting in overall project savings and efficiencies." **Amelia Fordyce, Network Rail Scheme Project Manager (Signalling) on the Skerne Road Level Crossing Project**

Bridges for Schools

Sharing our social value 'Bridges for Schools' initiative bringing large social value to schemes for one day worth of volunteering by staff.

Bridges for Schools

- Aims to broaden pupils understanding of civil engineering and other roles in the construction industry
- Minimum 8 volunteers required to deliver the activities
- Ideally 60 pupils per event, but can work with 90 if required
- Social value generated £3,744 per event

Making Possible

Bridges for Schools – what the day involves

A hands-on engineering experience for year 5 and 6 pupils, delivered by engineers and other volunteers in the business.

Pupils

- Build and walk across the 13-metre cable stayed bridge
- Take part in a K'Nex bridge design challenge
- Learn about roles in engineering, quantity surveying, health and safety, communications and sustainability
- Develop teamwork and work collaboratively to solve real world problems

Curriculum links

- Maths: measuring, estimating, calculating
- Science: forces, materials, structures
- Design and Technology: planning, building, testing
- English: listening, new vocabulary, discussion
- PSHE: teamwork, confidence and responsibility

Typical Schedule for the day

Timetable	Activity
09:05 – 09:30	Civil Engineering Introduction (Class 1)
09:30 – 10:30	Session 1A (Bridge / K'NEX)
10:30 – 11:30	Session 1B (K'NEX / Bridge)
11:30 – 11:45	Summary Presentation and Q&A
12:30 – 12:55	Civil Engineering Introduction (Class 2)
12:55 – 13:55	Session 2A (Bridge / K'NEX)
13:55 – 14:55	Session 2B (K'Nex /Bridge)
14:55 – 15:10	Summary Presentation and Q&A

The activities are aimed at Year 5 and Year 6 pupils. Class sizes of up to 30 pupils are recommended, with one class participating in the morning and one in the afternoon.

Making Possible

Bridges for Schools – key results 2017 to date

bam

56

3,454

525

3,624

Making Possible

If you would like to get Involved

Scan Me

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Making Possible

Delivering Lasting Social Value:

Livvy Williams, Head of Compliance

Suttle Projects

Context

National youth employment crisis -
957,000 16 – 24 year olds
Not in Education, Employment or Training (NEET)

Industry crisis – CITB estimate we need 47,860 extra workers per year

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Response

2
Recently completed Apprenticeships

5
Current / pending Degree Apprentices

2
Current Apprentices

9%
Workforce are Apprentices

1
Apprentice per £3m turnover

1
Apprentice per £2.5m NR turnover

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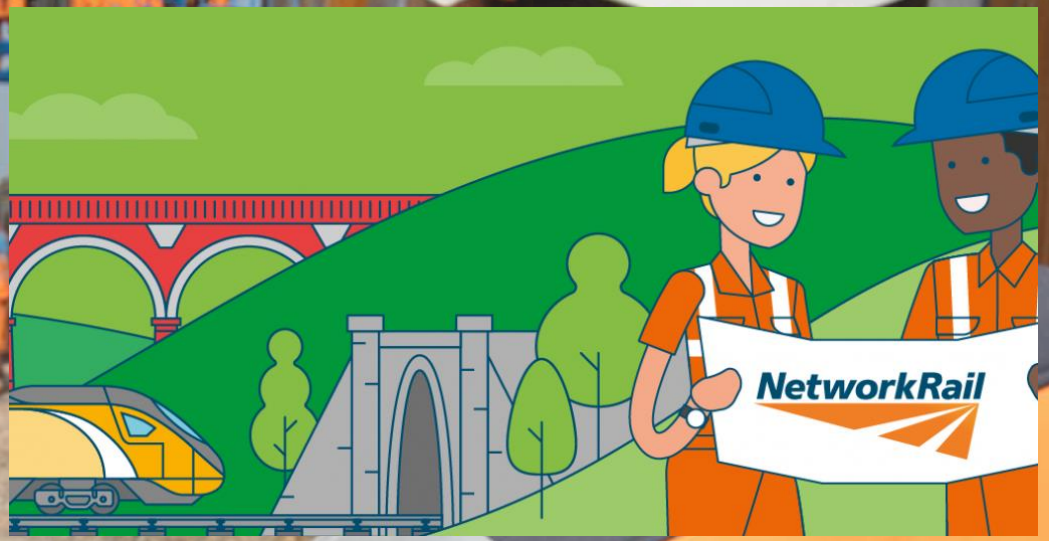
Challenges



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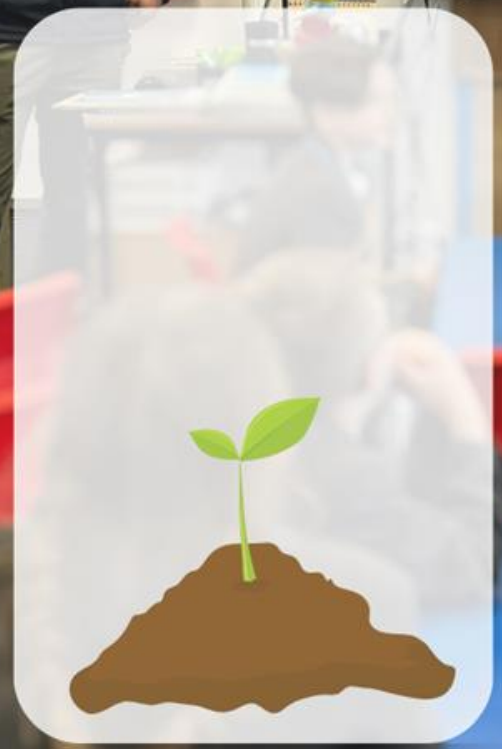
Development Cycle



Recruit early

Mentor

Reinforce Learning

Bake into local teams

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The Stars of The Show!

Olivia

Bournemouth & Poole College

GREEN SKILLS ADVISORY PANEL
Dorset

Rositsa

Ollie

Ryan

Suttle Projects

Social Value Delivery 2025-26

208
Apprenticeship weeks

356
Social Value Hours

£9,978.00
Social Value

Suttle Projects