THE SIGNATURE TEAM

FOR ENVIRONMENTAL SERVICES

SYSTRA

OUR EXPERTISE

SYSTRA has a global commitment to influence climate change. We deliver high quality, innovative and responsive solutions, in partnership with our clients and the wider project team, to meet specific challenges and requirements. We serve many different and demanding market sectors, including transport and infrastructure. We are responsible for managing environmental and ecological risks and developing and implementing sustainable solutions on infrastructure projects throughout the UK.

ECO DESIGN

'Eco-design' is both a principle and an approach, supporting the full lifecycle of a product or design. Our objective is to fulfil our clients' needs while avoiding adverse impacts to the environment, society and the economy on all of our projects. We promote eco-design by:

- Measuring the carbon footprint at every stage (bids, design, project implementation)
- Using BIM to integrate ecodesign experts into the design process, making "real time" evaluation accessible to our engineers and clients at key decision-making moments
- Promoting collaboration between all project team members and stakeholders via a systemic approach to design

CHARTERED COMMITMENT

SYSTRA has joined the movement for the planet **Charte de l'ingénierie pour le climat** and is committed to:

- Considering climate change throughout our projects
- Reducing the carbon footprint of our own activities
- Supporting our employees with their commitments to combating climate change

Our staff are members of the following professional organisations:

- **IEMA**
- **CIWM**
- **CIWEM**
- **RISF**
- **CIEEM**
- **ICE**
- **CMI**
- **APM**
- **RTPI**
- **LI**
- **IES**
- **CIHT**
- **AFFI**
- **BREEAM**
- **CEEQUAL**
- **The Science Council**
- **Society for the Environment**

Our environmental policies are developed within the framework of the SYSTRA Ltd IMS that is ISO 14001:2015 certified. All projects are managed according to the requirements of the IMS throughout the project life-cycle and are fully compliant with the requirements of the standard and the SYSTRA Code of Ethics.

OUR SERVICES

CLIMATE CHANGE ADAPTATION
- Business case and funding bids
- Carbon assessments
- Climate change mitigation
- Detailed scheme design and implementation
- Development and assessment of low carbon transport strategies
- Research and strategy, promotion and consultation

CONSENTS AND PLANNING
- Consent management
- Consultation and stakeholder engagement
- Environmental Impact Assessments (EIAs) and coordination
- Environmental permits
- Planning permission
- Section 278 consents

CONTAMINATED LAND AND REMEDIATION
- Contaminated land risk assessments
- Geo-environmental site investigations
- Generic and detailed quantitative contaminated land risk assessments
- Material Management Plans (MMPs)
- Preliminary Risk Assessments
- Planning permission, consents and permitting
- Remediation options and Method Statements
- Soil and groundwater remediation design and management
- Validation reporting

ECOLOGY
- Arboricultural surveys
- Biodiversity offsetting/net gain assessments
- Ecological clerk of works and site supervision
- Ecological Impact Assessments (EcIAs)
- Habitat creation enhancement and management
- Habitat regulations assessments
- Invasive non-native species surveys
- Phase 1 Habitat Surveys and Preliminary Ecological Appraisal
- Protected Species Surveys and Licensing

LANDSCAPE
- Environmental and habitat design
- Expert witness at public inquiry and development consent orders
- Graphic design and visualisation
- Initial site survey and assessment
- Landscape and visual impact assessment for environmental statements and appraisals
- Landscape design
- Landscape planning
- Masterplanning/urban design
- Public consultation and stakeholder engagement

RESOURCE EFFICIENCY
- Action plans
- Geographic Information Systems (GIS) and data management
- Material optimisation
- Project strategies and frameworks
- Resource efficiency workshops
- Site waste/material management plans
- Waste permits

SPECIALIST SERVICES
- Air quality
- Clean air zone/low emission zone
- Cultural heritage
- Material assets and waste
- Noise and vibration
- Population and human health
- Stakeholder engagement supporting planning and consents

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS
- Carbon footprint assessment and reporting
- Circular economy
- Environmental Management Systems
- IEMA and CIWM approved training course provision
- ISO:14001 2015 Implementation
- Site environmental audits
- Sustainability workshops and action plan delivery
- Sustainability audits and reporting

WATER RESOURCES – FLOOD RESILIENCE AND WATER QUALITY
- Business case development
- Climate and flood resilience
- Civil engineering design
- Hydrological and hydraulic modelling
- Improvement studies
- Infrastructure project delivery
- Research and development
- Regulation and assurance
- Strategic asset management
- Urban planning
- Water resources and water quality planning

CLIMATE CHANGE ADAPTATION

Carbon management is a key element in combating the Climate Emergency, through the design of environmentally friendly infrastructure. Carbon assessments at all stages of a transport project, from initial concept to detailed design and implementation, can ensure that our transport infrastructure and services minimise their impact on Climate Change while not affecting their commercial success. SYSTRA has over 50 years' experience in the transport planning industry in the UK and abroad; expertise that will help clients to achieve their Climate Emergency goals in the following areas:

BUSINESS CASE AND FUNDING BIDS

All Climate Emergency measures and strategies need funding for their implementation, so successful business cases and funding bids are essential to achieving Net Zero Carbon. Likewise, any scheme promoter seeking funding needs to be able to demonstrate the contribution their scheme makes towards carbon reduction.

CARBON ASSESSMENTS

Carbon management is increasingly seen as a key element of combating the Climate Emergency through environmentally friendly infrastructure. SYSTRA's carbon assessments at all stages of a transport project (from concept to detailed design and implementation) can ensure that our transport infrastructure and services minimise climate impact.

CLIMATE CHANGE MITIGATION

The frequency of extreme weather events is already increasing so more protection of properties and infrastructure from these impacts will be required in future.

DETAILED SCHEME DESIGN AND IMPLEMENTATION

Low carbon design and implementation of schemes are significant and essential to any Net Zero Carbon strategy.

DEVELOPMENT AND ASSESSMENT OF LOW CARBON TRANSPORT STRATEGIES

Low carbon transport strategies are essential to reduce the demand for movement, encourage the use of zero carbon/ low carbon transport modes and drive behavioural change, including the uptake of electric vehicles if Net Zero Carbon is to be achieved. The use of modelling to understand how transport generates greenhouse gas emissions and the predicted impacts of various measures and strategies will generate a robust route map to Net Zero Carbon.

RESEARCH, STRATEGY PROMOTION AND CONSULTATION

Changing people's attitudes towards travel and environment, and understanding what will make people undertake this change, will be critical to achieving Net Zero Carbon.

SOUTHEND ///

WESTERN ESPLANADE

CLIENT
Southend Borough Council

CLIMATE CHANGE ADAPTATION

ECOLOGY

LANDSCAPE

Project Scope and Delivery

The site of a former restaurant on Southend's beachside Western Esplanade was proposed for redevelopment for retail/restaurant use on the ground floor residential use on the upper floors. The Esplanade fronts directly onto the Thames estuary and sea level rise is predicted to rise by more than 1m over the next century. This will lift the design flood level from its current position of just above footway level to part-way up the ground floor frontage in the latter stages of the development's lifetime meaning that less severe flood tides will reach the frontage more often than at present.

SYSTRA's Approach

SYSTRA identified where the proposed building design was needed to protect low-level entrances, and how safe access could be managed for the residential floors during a tidal flood. SYSTRA also produced an outline Flood Plan for the development to set out the evolution of flood risk over time and how flood management should evolve.

MIDLANDS ///

CLIENT
UK Government

CLIMATE CHANGE ADAPTATION

CONSENTS AND PLANNING

LANDSCAPE

NOTTINGHAM AND DERBY TRANSFORMATION

Project Scope and Delivery

SYSTRA was heavily involved in the preparation of the economics case for the recent Derby and Nottingham Transforming Cities Fund Bid, which identified the case for £160 million of Department for Transport funding for a range of transport schemes in both cities. Derby and Nottingham have both declared a Climate Emergency, and these schemes will play a part in reducing transport emissions to achieve Net Zero Carbon by 2050. The schemes included park and ride sites, new environmentally friendly bus routes, bus priority schemes, junction upgrades, a network of cycle routes and a range of pedestrian and townscape enhancement schemes.

SYSTRA's Approach

SYSTRA identified and applied an approach to model the impact of three packages of schemes (low, medium, and high cost) to determine the predicted effect in terms of modal change and congestion relief using the East Midlands Gateway Model. This included innovative modelling techniques to establish the impacts of active mode schemes as well as different public transport and highway schemes.

The output of this modelling was used by SYSTRA to produce the transport economic case to be submitted as part of the overall justification for the packages of schemes. Nottingham and Derby were successful in achieving funding for the 'high cost' scheme, consisting of £160 million of sustainable transport infrastructure.

CONSENTS AND PLANNING

SYSTRA provides practical advice and works with design teams to avoid, remedy or mitigate potential effects on the environment and to prepare consent application documents where they are required. We liaise with Statutory Authorities to discuss consent requirements, and where required, we can undertake surveys to confirm the presence or absence of protected species, types of waste on site (via ground investigation surveys) and baseline noise surveys to inform Section 61 consents.

CONSENT MANAGEMENT

Through the completion of desk-based preliminary risk assessments, site appraisals and environmental due diligence assessments, we can help to identify potential unacceptable risks and constraints early within the project programme to record risks, minimise costs and reduce project delays.

CONSULTATION AND STAKEHOLDER ENGAGEMENT

Early engagement and pre-application consultation with planning authorities allows for the effective preparation of focused and proportionate application submissions. Members of our team are experienced in hosting public consultation sessions to enable local communities to comment on development proposals.

ENVIRONMENTAL IMPACT ASSESSMENTS (EIA) AND COORDINATION

The planning and consents team can direct technical specialists, and deliver proportionate EIAs with consistent content, covering the required environmental topics. They have experience of the whole EIA process from screening and scoping to producing the environmental statement and post submission.

ENVIRONMENTAL PERMITS

The team's knowledge and understanding of environmental legislation means that we can direct clients through the complexities of environmental permitting regulations. Through our experience, we understand the importance of getting the right permit at the right time. We work with design teams to avoid costly constraints and work with regulators to provide the right permit submissions to deliver the project.

TOWN PLANNING PERMISSION

SYSTRA's consents team includes town planning specialists, chartered with the Royal Town Planning Institute. They are experienced in the preparation and multi-discipline co-ordination of planning applications, environmental impact assessments, and supporting documentation on behalf of public and private clients for a wide range of development types and scales.

SECTION 278 CONSENTS

SYSTRA's team works with the design and legal teams through the process of obtaining Section 278 consents. We build relationships with the highway authorities, understanding the requirements of each highway authority and navigating clients through a complex process.

MIDLANDS ///

CLIENT
Balfour Beatty VINCI (BBVJV)/HS2 Limited

CONSENTS AND PLANNING

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

LANDSCAPE

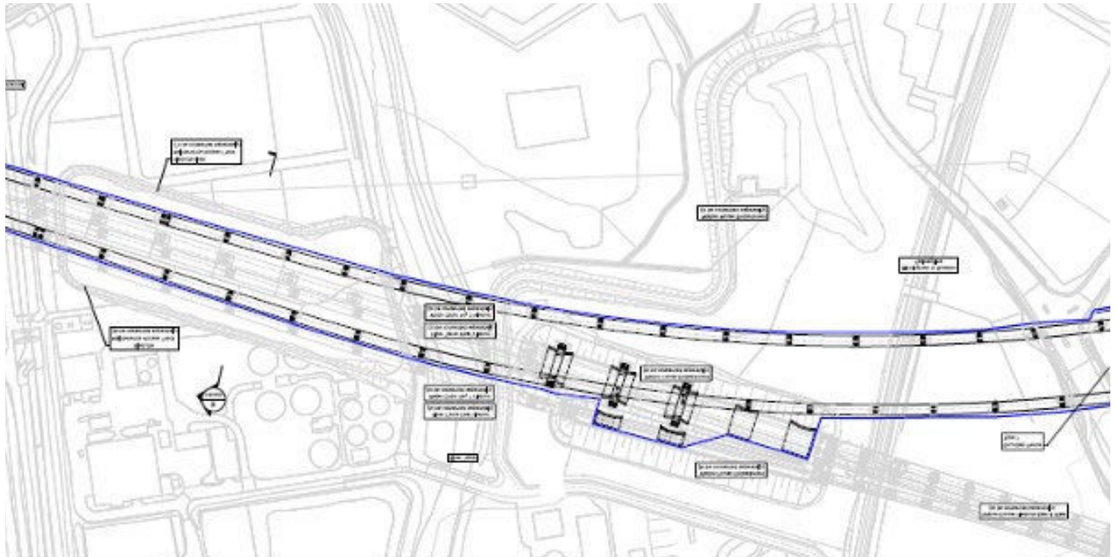
HS2 MAIN WORKS CIVILS CONTRACT – CONSENTS

Project Scope and Delivery

HS2 is the UK's state-of-the-art high-speed railway line, critical for tackling carbon reduction. It will provide much-needed rail capacity across the country, and is integral to rail projects in the North and Midlands. HS2 is Britain's biggest environment project, delivering miles of ecological and landscape investments alongside construction. SYSTRA is working in a Design Joint Venture with Mott MacDonald, supporting contractor Balfour Beatty VINCI (BBV) on Lots N1 and N2, which are between the Long Itchington Wood Green tunnel and the Delta Junction - Birmingham Spur and from the Delta Junction to the West Coast Main Line tie-in respectively.
The Consents Team continues to co-ordinate and prepare application material to secure approval from relevant planning authorities for plans and specifications pertaining to the detailed design of hundreds of railway assets, in accordance with Schedules 17 and 33 of the High Speed Rail (London - West Midlands) Act 2017. This requires collaboration with a wide range of stakeholders, including in-house engineering designers, environmental specialists, neighbourhood groups, construction contractors, and consenting bodies.

SYSTRA's Approach

SYSTRA is responsible for a number of 'sub lot' areas that include some of the project's most complex designs and interfaces, and associated mitigation. Assets in this region include many large and conspicuous pieces of infrastructure, e.g. extensive sections of railway viaduct that are required to carry the railway over existing infrastructure, including the M6 and M42 motorways, and natural features such as rivers and their floodplains. Schedule 17 requires permanent building and construction works to be carried out in accordance with plans and specifications first approved by the relevant local planning authority. The Consents Team is responsible for preparing application packs, each comprising a suite of design drawings, written statements, application proformas, and information concerning environmental mitigation. Our consents specialists are responsible for securing the approval of the Environment Agency, Lead Local Flood Authority, or relevant drainage board, as may be applicable, for all 'specified works', such as works that affect main rivers and watercourses. Given the extent of the project, hundreds of these approvals are required in Lot N2 alone.



Artist's impression of the Main Works Project

PROJECT KRAKEN ///

CLIENT
Offshore Energy

CONSENTS AND PLANNING

CLIMATE CHANGE ADAPTATION

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

FOOD AND ENVIRONMENT PROTECTION ACT (FEPA) AND ENVIRONMENT AGENCY (EA) CONSENTS

Project Scope and Delivery

Project Kraken was the establishment of a manufacturing facility for offshore wind energy components in the UK. The plan was to create a world class facility from redundant steel manufacturing assets in direct response to the UK Government's twin challenges of providing 20% of the nation's energy requirements from renewable sources and creating 'green jobs' to support the sector.

Through close, detailed liaison with the client and the statutory authorities, Appropriate Assessment (AA) and Environmental Impact Assessment (EIA) were avoided for the project, preventing costly project delays.

SYSTRA's Approach

Acting on behalf of the client, SYSTRA's Environmental Services team obtained the essential licences and consents by determining the likely impacts of the proposed works. They also undertook all necessary consultation with the relevant statutory authorities, including the Marine Management Organisation (MMO), Natural England, Environment Agency, the local authority, as well as PD Ports and others, while maintaining close contact with the client.

Co-ordination with key parties was maintained throughout this process. SYSTRA attended all site meetings and ensured that MMO, NE and all relevant parties were informed of any issues. This process ensured that all applications met formal requirements, so were quickly and easily approved.

CONTAMINATED LAND AND REMEDIATION

SYSTRA focuses on ensuring a smooth handover through the completion of contaminated land management, validating remediation works, and verifying construction works. We capture any residual risks to ensure that they are passed on and understood by future stakeholders. Working alongside clients and Principal Contractors, we offer closeout support through the following activities:

CONTAMINATED LAND RISK ASSESSMENTS

SYSTRA uses information collected from geo-environmental site investigations to refine areas of concern, and using a tier assessment approach, we refine and evidence decision-making on potential contamination risks. Our geo-environmental engineers are trained and skilled in the use of industry standard software for estimating and evaluating.

GEO-ENVIRONMENTAL SITE INVESTIGATIONS

We can support design, monitoring, sampling and implementation of targeted site investigations based on identified risks. Our experience as a Principal Contractor enables us to support the delivery of physical ground investigation works compliant with the CDM Regulations.

MATERIAL MANAGEMENT PLANS (MMPS)

Through application of the Contaminated Land: Applications in Real Environment (CL:AIRE) industry Code of Practice and the production of Material Management Plans, SYSTRA ensures material remains outside the waste hierarchy, avoiding environmental permitting and demonstrating certainty and suitability of re-use.

PLANNING PERMISSION, CONSENTS AND PERMITTING

SYSTRA's environmental consenting team can help lead you through the management of contaminated land aspects of planning consents, including the management of the contaminated land regulatory regime Part IIA of the Environmental Protection Act.

PRELIMINARY RISK ASSESSMENTS

Through desk-based preliminary risk assessments, site appraisals and environmental due diligence assessments, we can help to identify potential unacceptable risks and constraints early in a project programme to record risks, minimise costs and reduce project delays.

REMEDIATION OPTIONS AND METHOD STATEMENTS

We support our clients in identifying feasible remediation options, and provide detailed implementation strategies to support regulatory communication and remediation contractor engagement. We also consider sustainability as a key factor in appraising remediation options utilising the Sustainable Remediation Forum (SuRF UK) framework.

SOIL AND GROUNDWATER REMEDIATION DESIGN AND MANAGEMENT

Working alongside our clients and their preferred remediation contractors, SYSTRA supports the design and implementation plan to ensure the goals of the remediation are met while satisfying specific client requirements for the development. We also provide onsite technical supervision where necessary.

VALIDATION REPORTING

SYSTRA can support land development on brownfield sites as well as the management of any monitoring or maintenance requirements to demonstrate the successful implementation of the remedial strategy.

Potentially contaminated land

Site before development

OXFORD ///

CLIENT
Network Rail

CONTAMINATED LAND AND REMEDIATION

LANDSCAPE

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

OXFORD STATION REDEVELOPMENT

Project Scope and Delivery

The SYSTRA Geo-Environmental team is working on the Oxford Station Redevelopment Scheme for Network Rail. As part of the outline design for the scheme, a ground investigation identified a potential contamination risk within one of the development areas. This potential contamination risk was raised by the Network Rail design team and SYSTRA was commissioned to develop and manage a contaminated land strategy on behalf of Network Rail. Working closely with Network Rail and the design team, SYSTRA undertook contaminated land risk assessments to understand the level of risk and identified a remediation strategy to address the risks that aligned with the local constraints.

SYSTRA's Approach

SYSTRA designed a delineation survey to define the contamination area and assess the relevant pollutant linkages. Using this survey, SYSTRA demonstrated that, although significant organic contamination was evident, the ground conditions at the site were suitable for the risk to the recognised watercourse receptor to be limited by installing a low permeability barrier along the pollution pathway. Additionally, using a Controlled Water Detailed Quantitative Risk Assessment, proactive remediation targets were developed for removal of contaminated material within the made ground and treatment of hydrocarbon contamination within the groundwater.

A remediation strategy was developed to meet these targets through application of Sustainable Remediation Forum initiatives, while also considering the operational needs of the site. This led to a proposal for a combined remedial approach, with localised excavation and disposal of the main contaminated area; ex-situ pump and treat of the perched groundwater within the made ground; localised oil skimming to reduce free phase oil; and monitored natural attenuation of the aquifer to monitor improvements against the remedial targets.

ECOLOGY

Infrastructure and building projects have a huge part to play in protecting sensitive sites and, protected species, avoiding damage to ecological features and enhancing biodiversity. SYSTRA's team of qualified and experienced ecologists works proactively to avoid and mitigate potential impacts and project risks, identify enhancement opportunities and deliver bespoke and innovative design solutions around seasonal constraints.

ARBORICULTURAL SURVEYS

Our team includes qualified arborists who can undertake tree surveys to BS5837 and produce Tree Constraints Plans, Tree Protection plans and Arboricultural Impact Assessments.

BIODIVERSITY OFFSETTING/NET GAIN ASSESSMENTS

The ecology team is experienced at using the necessary biodiversity metrics to quantify impacts, as well as advising on potential enhancements within development footprints and calculating offsetting requirements.

ECOLOGICAL CLERK OF WORKS AND SITE SUPERVISION

SYSTRA can provide ecological clerk of works/site supervision services where necessary in order to manage ecological risks on site during site preparation and construction works.

ECOLOGICAL IMPACT ASSESSMENTS ECIA

Our team has experience of undertaking EcIAs at all levels, from standalone EcIAs to support planning applications, to ecology chapters of Environmental Statements for major infrastructure projects.

HABITAT CREATION, ENHANCEMENT AND MANAGEMENT

We have experience of advising on the most appropriate and cost-effective habitat creation and enhancement solutions, as well as producing management plans detailing long term maintenance regimes and monitoring.

HABITATS REGULATIONS ASSESSMENT

SYSTRA has experience of advising on options for mitigation to avoid/reduce impacts on habitats and working with colleagues in other environmental disciplines to prepare the necessary supporting information.

INVASIVE NON-NATIVE SPECIES SURVEYS

Our ecologists are trained to identify a wide range of invasive species during preliminary site surveys and can advise on requirements for avoidance, eradication and management.

PHASE 1 HABITAT SURVEYS AND PRELIMINARY ECOLOGICAL APPRAISAL

SYSTRA advocates appraisal of potential ecological constraints early on in the design process, which reduces project risks and leads to greater cost and programme certainty.

PROTECTED SPECIES SURVEYS AND LICENSING

Our team holds the relevant licences to survey for a range of protected species using the latest innovative techniques, including environmental DNA sampling, infra-red/thermal imaging surveys and aerial tree inspections.

MIDLANDS ///

HS2 MAIN WORKS CIVILS CONTRACT – ECOLOGY

CLIENT
Balfour Beatty VINCI (BBVJV)/HS2 Limited

ECOLOGY

LANDSCAPE

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

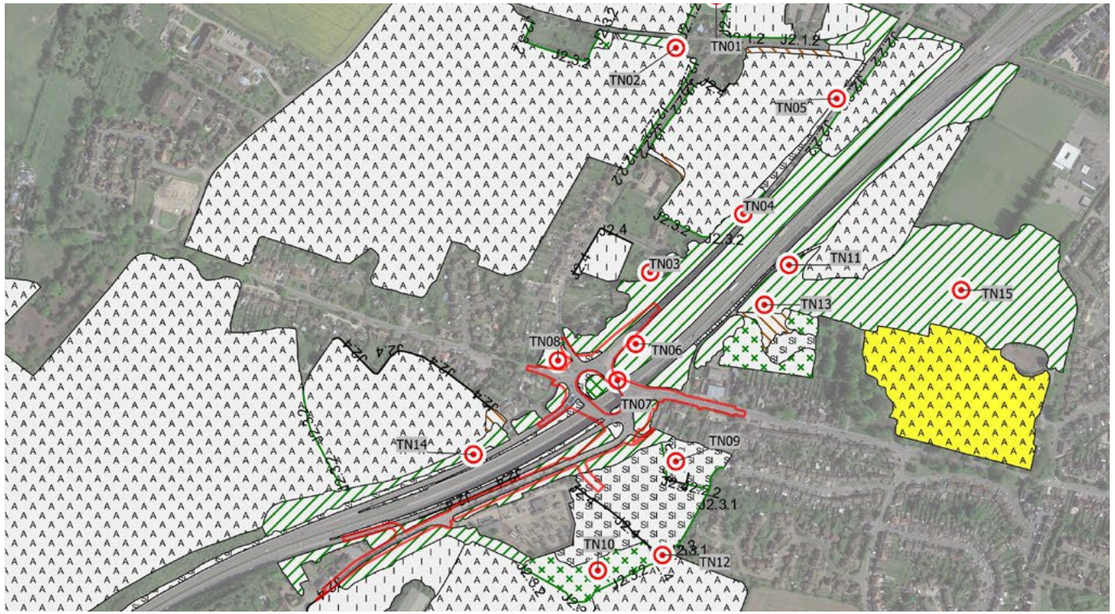
Delivering High Speed Rail Projects in the UK and Worldwide

HS2 is the UK's state-of-the-art high-speed railway line, critical for tackling carbon reduction. It will provide much-needed rail capacity across the country, and is integral to rail projects in the North and Midlands. HS2 is Britain's biggest environment project, delivering miles of ecological and landscape investments alongside construction. SYSTRA is working in a Design Joint Venture with Mott MacDonald, supporting contractor Balfour Beatty VINCI (BBV) on Lots N1 and N2, which are between the Long Itchington Wood Green tunnel and the Delta Junction - Birmingham Spur and from the Delta Junction to the West Coast Main Line tie-in respectively. The SYSTRA Ecology Team has embraced a pragmatic 'real world' approach working with external stakeholders, to drive a true 'biophilic' environmental engineering design philosophy to meet client and wider expectations. At the consolidation stage, key route-wide deliverables have included authoring ecological site management plans, managing ancient woodland optimisation at design stage, refining biodiversity offsetting measures to work towards 'no net loss' and technical ecological input to design for specific assets. As ecological designers we have tackled everything from ensuring that the design of water-course culverts will facilitate the passage of protected species such as bats and otters, to minimising and mitigating for impacts on existing habitats through novel habitat creation and enhancement.

SYSTRA's Approach

As we begin to prepare for the detailed design stage, the technical aspects of the work are proving both exciting and technically challenging. The team will be tackling everything from helping to design green bridges, green walls and green corridors, to testing the efficacy of ecological mitigation measures for protected species and working with stakeholders to ensure environmental compliance. Alongside our work on HS2, we continue to provide the technical field and consultancy expertise balancing complex infrastructure design and construction requirements with the conservation of biodiversity and the protection and enhancement of the wider natural environment.

'Green bridges' allow birds, mammals and insects to keep moving despite a road or railway blocking their path.



Wetland habitats

Protected species (hazel dormouse / slowworm)

Ancient orchard tree

KENT ///

CLIENT
Kent County Council

ECOLOGY

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

LANDSCAPE

SITTINGBOURNE JUNCTION IMPROVEMENTS

Project Scope and Delivery

SYSTRA was commissioned by Kent County Council to carry out detailed ecological assessments of two proposed highways junction improvements near the busy town of Sittingbourne in Kent.

SYSTRA's Approach

The SYSTRA Ecology team mobilised to undertake some ecological appraisals for the proposed junction improvement schemes at Key Street and Grovehurst on the busy A249 highway. Initial stages involved integrated Preliminary Ecological Assessments with Extended Phase 1 Habitat Surveys to highlight the key ecological features and to identify protected species and sites in and around the scheme footprints.

Drawing on their field expertise, the Ecology Team's site visits revealed the presence of a more diverse assemblage of protected species than was initially expected. The highways soft estate and surrounding habitats were home to the hazel dormouse, the slow worm and the scarce chafer beetle. With the nearby European Designated Swale Estuary classified as a Special Protection Area based on its wetland birds, the Ecology Team has been working closely with engineering colleagues to ensure the ecological implications of the development are mitigated in the design. They are also seeking ways to strengthen the ecological network and enhance habitats through targeted biodiversity offsetting opportunities. Further surveys are now planned to meet and exceed environmental compliance for project deliverables.

YORKSHIRE ///

BRIDGE RECONSTRUCTION

CLIENT
Murphy

ECOLOGY

LANDSCAPE

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

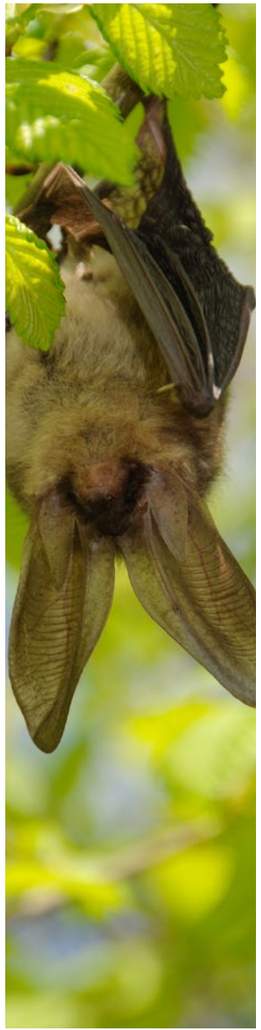
Project Scope and Delivery

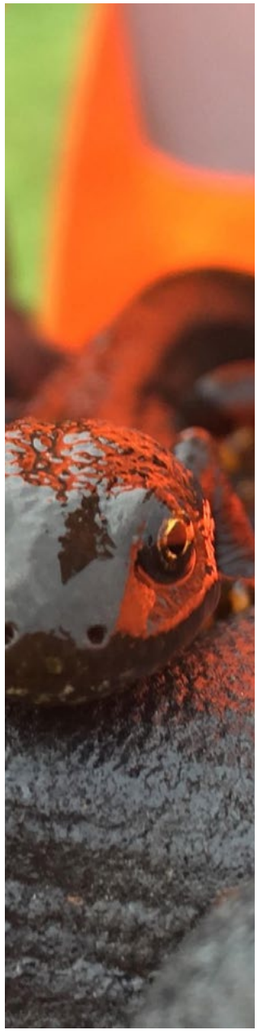
By adopting a proactive approach from the start, SYSTRA identified the potential for both great crested newts and bats during the early design stages of a bridge reconstruction project. European Protected Species licences were secured from the statutory authority, Natural England, with subsequent licensed mitigation implemented to maintain the existing, unyielding, construction programme.

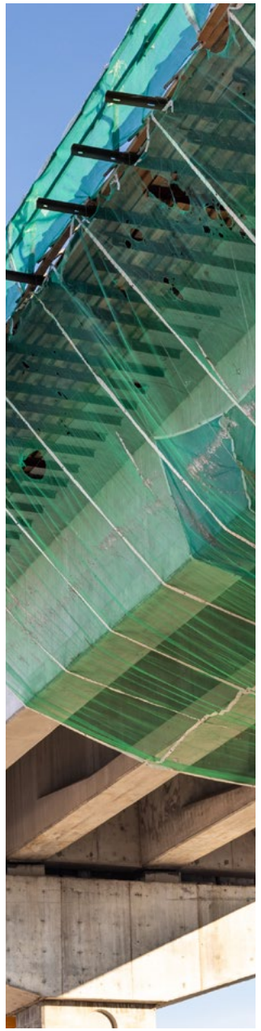
SYSTRA's Approach

A series of surveys identified bat roosts within the bridge and a population of great crested newts in land surrounding the site. Potential programme delays were avoided through detailed planning and liaison with Natural England around tight seasonal survey and construction schedules. Activities included the onsite management of two European Protected Species Licences concurrent with the construction activities, including implementing mitigation measures. Other actions included:

- A proactive and pragmatic approach to support the project's planning, enabling and construction stages ensured the client's interests were prioritised beyond our remit
- A fixed construction programme, and, challenging seasonal restrictions for mitigation requirements
- Effective completion of ecological survey work, outside standard methods, under challenging working constraints
- Direct engagement with Natural England for licensing solutions and Yorkshire Wildlife Trust for mitigation implementation
- Successful first-time application for licences and reapplications to maintain construction programme
- Liaison with multidisciplinary project teams to ensure ecological constraints are considered in design
- Continual support to client and Principal Contractor
- Construction commenced to programme without being impeded by ecological licensing concerns







SOUTH WALES ///

GREAT WESTERN ROUTE MODERNISATION PROGRAMME

CLIENT
Network Rail

ECOLOGY

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

LANDSCAPE

Project Scope and Delivery

The Great Western Route Modernisation Programme (GWRMP) involved electrifying the route from London to South Wales, via Cardiff, Bristol and the Severn Tunnel. SYSTRA was commissioned to produce the power and overhead line electrification (OLE) design for key sections of line from Approved in Principal (AiP) through to detailed design (including feasibility studies). The GWRMP project proposed various engineering interventions, including installation of OLE along the entire route as well as bridge, tunnel, station and embankment engineering interventions. SYSTRA was then commissioned to design 1,800no. foundations in differing ground conditions and constrained locations.

SYSTRA's Approach

Traditional pile analysis techniques indicated that large deep steel piles would have to be driven into the ground along a large portion of the route due to the poor ground conditions and deep bedrock. However, SYSTRA's Environment, Ecology and Sustainability and Geotechnical teams developed and presented an alternative; the 'floating pile' technique, which enabled the teams to identify alternative solutions and calculate the resulting carbon savings:

- Reducing the thickness of steel used in the OLE masts from 16mm to 12mm - this has saved the project 460 tonnes CO2e
- Optimisation of foundation depths to reduce the length of piles by up to 10% - saved 2,350 tonnes CO2e

Managing Environmental Impacts

Environmental issues on the project included:

- Field drains and ordinary watercourses associated with the Gwent Levels SSSI which crossed or ran adjacent to the railway many of which had water voles and otters within them

The EES team was proactive in identifying and assessing these environmental and ecological risks and mapping them onto GIS software. This allowed the OLE, Geotechnical and Civils design teams to reference the GIS layers into design drawings to quickly identify where the constraints were in relation to the proposed works and, where required, to move engineering elements to avoid or reduce impacts and consent requirements. Through this process, an OLE mast was located away from badger setts and watercourses, concrete pad and augured pile foundations were avoided in areas in or near Japanese knotweed and the impact of the project on bats was reduced by changing the design of OLE droppers at overbridges.

LANDSCAPE

SYSTRA has an integrated team of Landscape Architects who work with a range of clients to deliver a professional service and solutions, offering a wide range of complementary consultancy and design services to ensure your project achieves the best design in its environment with minimalised adverse impacts. We can provide landscape and visual assessment, and landscape design and co-ordination services for highways and transportation, infrastructure and technology projects.

ENVIRONMENTAL AND HABITAT DESIGN

SYSTRA can create bespoke designs and strategies for terrestrial and aquatic habitats, public open space, wetlands, rivers water courses and ponds, as well as landscape mitigation, enhancement and restoration.

EXPERT WITNESS AT PUBLIC INQUIRY AND DEVELOPMENT CONSENT ORDERS

Members of the Landscape team have experience of providing both written and in person evidence in support of applications within the Development Consent Order process for major infrastructure projects.

GRAPHIC DESIGN AND VISUALISATION

We work with a wide range of the latest 2D and 3D software, including BIM modelling using Revit and Bentley Software as well as hand drawn illustrations, sketches and photomontages.

INITIAL SITE SURVEY AND ASSESSMENT

Using a combination of desktop study and on-site analysis, we can provide and create detailed and comprehensive initial site surveys and assessments for a wide variety of project types.

LANDSCAPE AND VISUAL IMPACT ASSESSMENT FOR ENVIRONMENTAL STATEMENTS AND APPRAISALS

Our team includes Chartered Members of the Landscape Institute, and is experienced in preparing Landscape and Visual Appraisals in support of planning applications for a wide range of project types.

LANDSCAPE DESIGN FOR ALL DESIGN STAGES

SYSTRA believes that urban design is key to developing places that support economic growth and regeneration. We are an innovative market leader in the delivery of cycling-based projects, working with public and private sector clients.

LANDSCAPE PLANNING SERVICES

Our team has the capability and experience to produce a range of landscape planning services, including design and access statements, green infrastructure strategies, sensitivity and capacity studies, pre-planning landscape and visual feasibility studies and Landscape and Visual Impact Assessment (LVIA) audits.

MASTERPLANNING/URBAN DESIGN

We work from initial site identification and representation stages through to detailed planning application submission. Services include placemaking consultation and engagement, multi-modal urban transport planning, spatial analysis, street design, conceptual layouts, visualisation, design for cycling and walking, local and sustainable travel and transport.

PUBLIC CONSULTATION AND STAKEHOLDER ENGAGEMENT

SYSTRA works with a wide range of public and stakeholder groups including individuals, community groups, schools, local authorities, statutory organisations, charities and trusts.

MIDLANDS ///

CLIENT
Balfour Beatty VINCI (BBVJV)/HS2 Limited

LANDSCAPE

ECOLOGY

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

HS2 MAIN WORKS CIVILS CONTRACT – LANDSCAPE

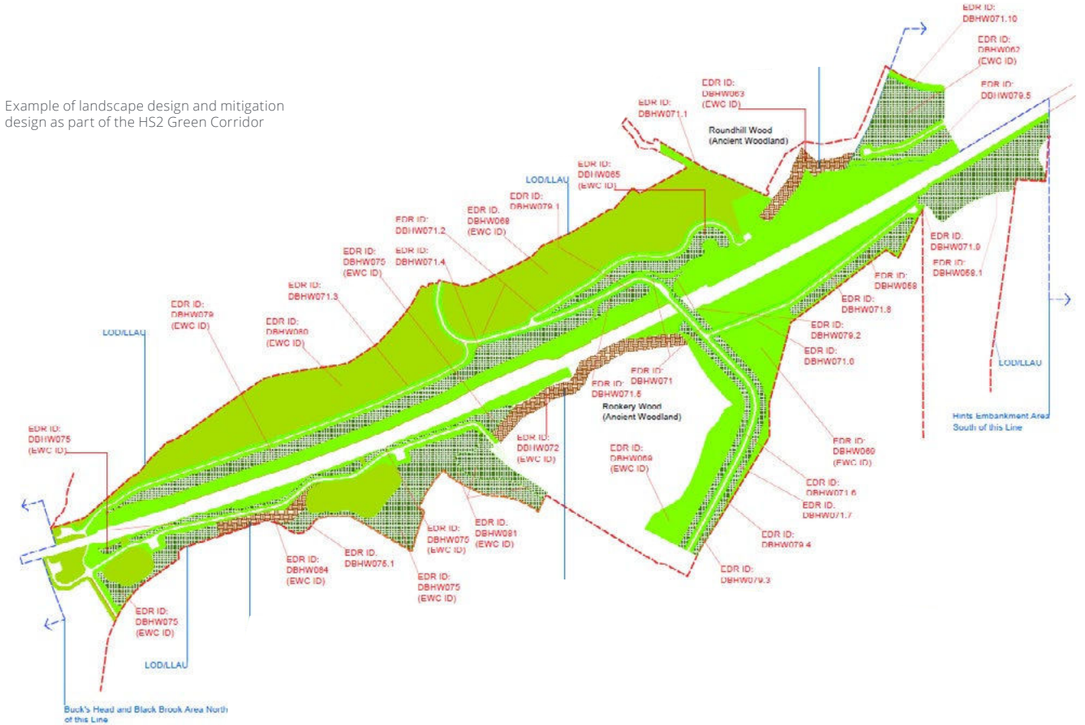
Delivering High Speed Rail Projects in the UK and Worldwide

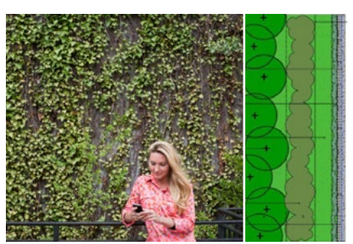
HS2 is the UK's state-of-the-art high-speed railway line, critical for tackling carbon reduction. It will provide much-needed rail capacity across the country, and is integral to rail projects in the North and Midlands. HS2 is Britain's biggest environment project, delivering miles of ecological and landscape investments alongside construction. SYSTRA is working in a Design Joint Venture with Mott MacDonald, supporting contractor Balfour Beatty VINCI (BBV) on Lots N1 and N2, which are between the Long Itchington Wood Green tunnel and the Delta Junction/Birmingham Spur and from the Delta Junction to the West Coast Main Line tie-in respectively. The SYSTRA Landscape Team's designs tie the proposed structures into the local landscape and enhance it where possible to ensure the landscape approach creates a sense of place.

SYSTRA's Approach

SYSTRA has embraced a pragmatic 'real world' approach working with external stakeholders, to drive a fully integrated and Landscape-Led design philosophy to meet client and wider expectations. At the Consolidation Stage, key route- wide deliverables have included designs for green walls, integration of existing infrastructure such as canal corridors, and the creation of the HS2-wide green corridor. The SYSTRA Landscape Team has proactively sought to resolve and influence design issues in collaboration with the multi-disciplinary design teams on the project.The landscape design proposals will continue to evolve and be refined through an iterative design process, with Landscape leading the way through the Detailed Design Stage and beyond. The technical aspects of the work are proving both exciting and technically challenging.

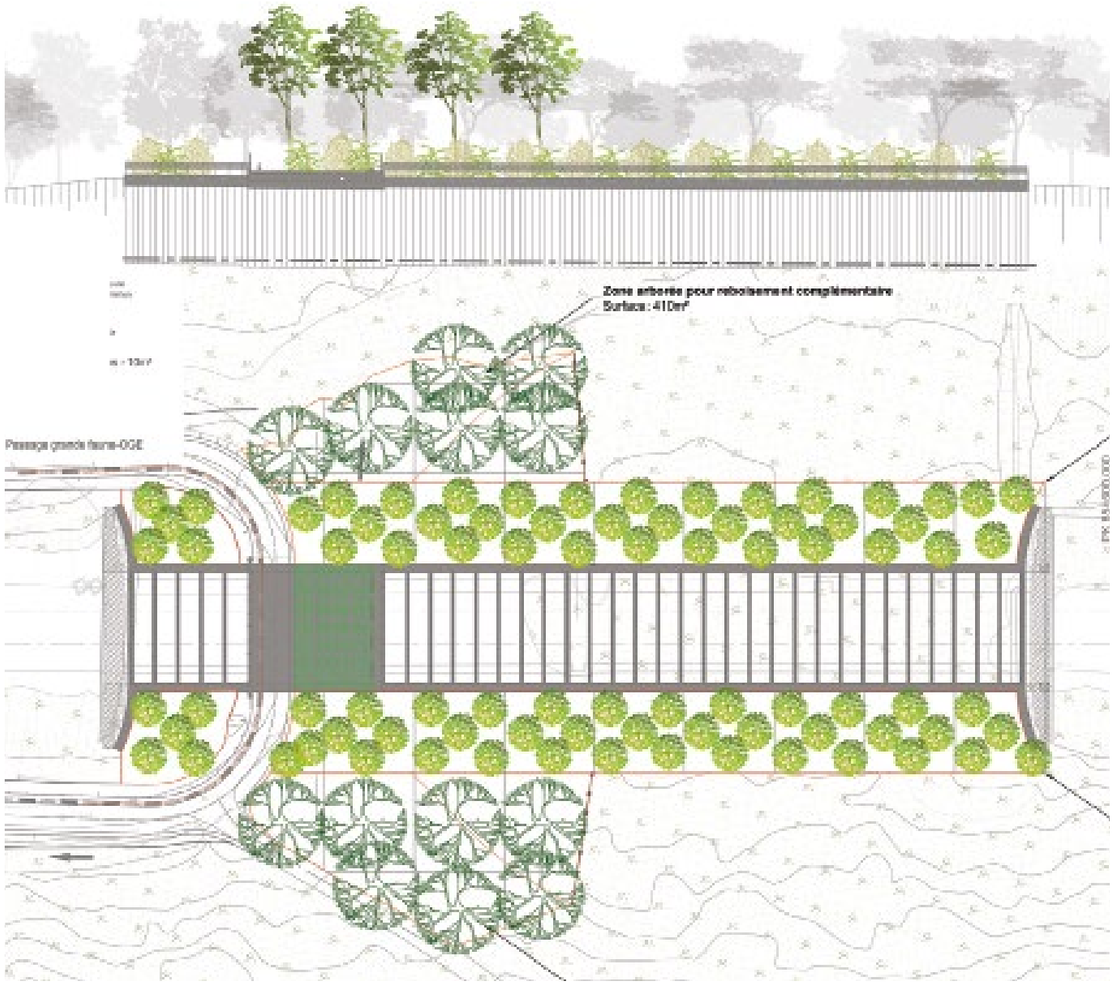
Example of landscape design and mitigation design as part of the HS2 Green Corridor





Green Wall detail

Landscape design around existing canal and H2 intersectional



Scheme design at Year 30 after implementation of planting

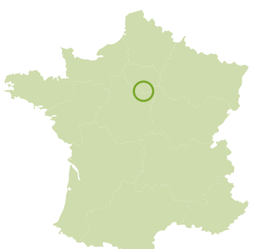
SAINT-LOUP-DE-NAUD ///

CLIENT
SNCF Reseau/TELT DDT

LANDSCAPE

ECOLOGY

CONSENTS AND PLANNING



GRETZ/TROYES LINE 2020

Project Scope and Delivery

The OA No 13 is located in the town of Saint-Loup-de-Naud, in the department of Seine-et-Marne in Northern France. The scheme relates to an existing 105m long tunnel which works have been undertaken for the electrification of the line. These include:

- Demolition of the existing tunnel and its replacement with retaining walls to form and open trench cutting.
- The creation of a new shorter, mixed crossing large fauna and agricultural track.

The tunnel works would have led to the existing right-of-way being cleared and the loss of existing vegetation so the client, DDT, requested that the right-of-way and the existing landscape be restored and reforested.

SYSTRA's Approach

SYSTRA was comissioned to design a landscape scheme for the restoration and reforestation of the area with a tree and shrub mix consisting of:

- Combining a layer of trees and shrubs in order to meet the two challenges posed by reforestation in this location; 1. Ensuring that there is ecological continuity in the new planting design, and 2. Ensuring that the existing landscape character is retained as much as possible
- Trees to be planted with a wide dispersed density of one tree per 10m2
- Robust and ecologically appropriate tree and shrub mix
- 'Future proofing' scheme that will integrate seamlessly into the existing landscape character over time
- Restore landscape character and ecological habitat

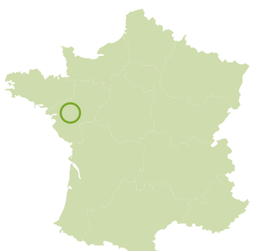
SAINT-NAZAIRE ///

CLIENT
SNCF Reseau

LANDSCAPE

CONSENTS AND PLANNING

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS



DONGES RAILWAY BYPASS

Project Scope and Delivery

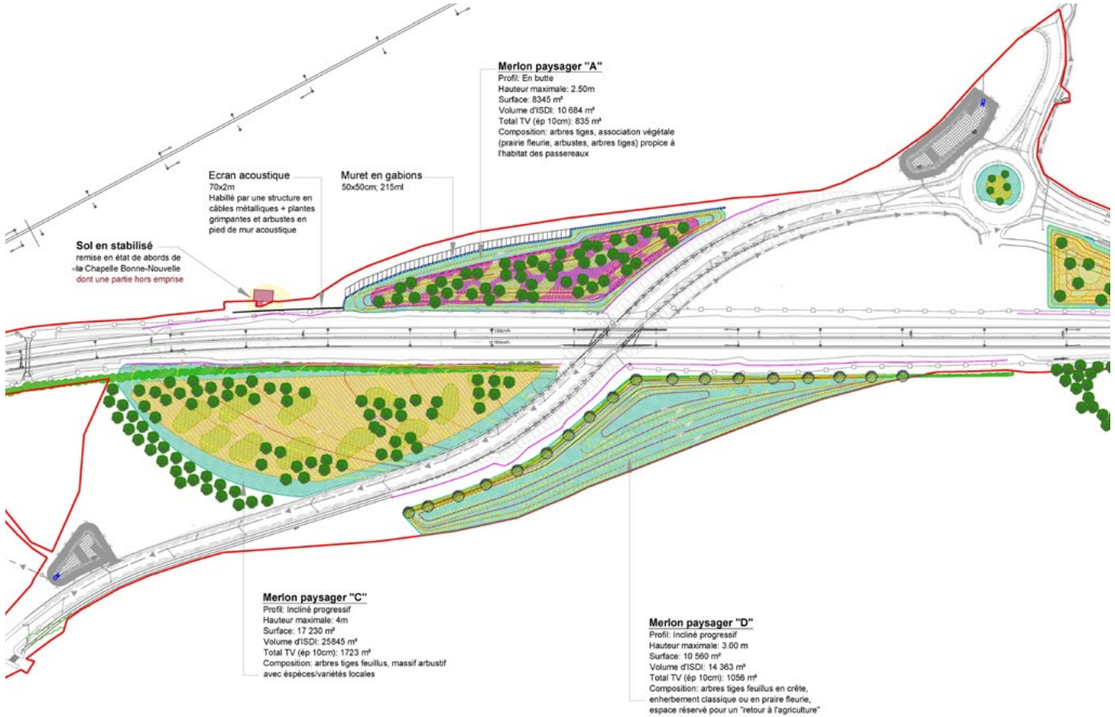
The project involved setting up a partial rail bypass at the Total refinery in Donges to divert a railway line away from potential industrial risks posed by the refinery.

SYSTRA's Approach

SYSTRA was commissioned to design the landscape earthworks and landscape mitigation associated with the railway bypass. The landscape design was organised into three major components:

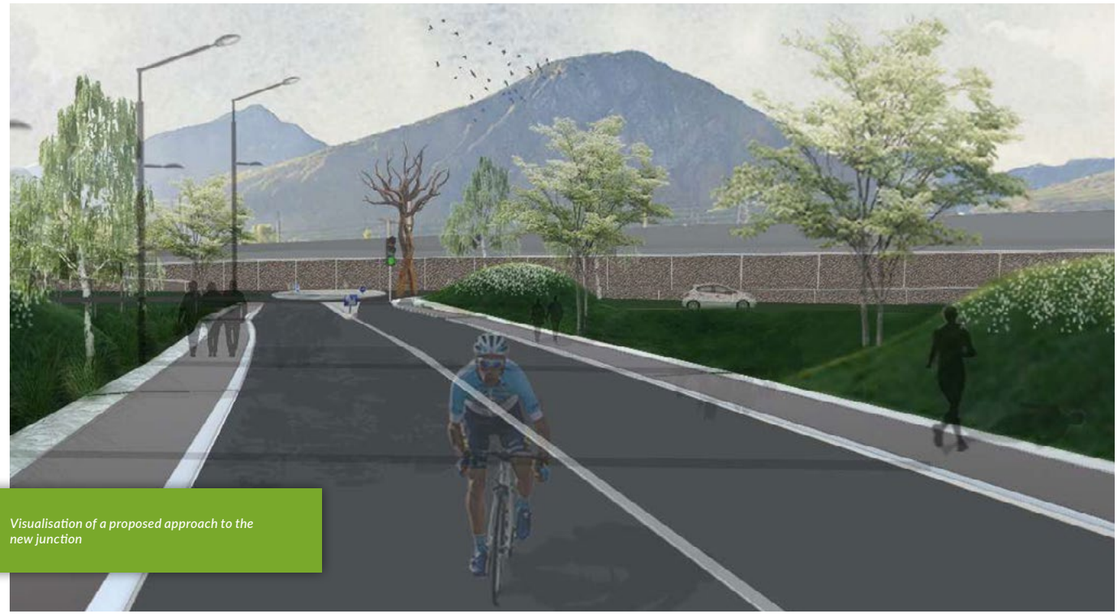
- Creation and modelling of landscape earthworks/landform using inert surplus material.
- Revegetation of the site in accordance with CNPN measures to integrate the scheme into the character of the surrounding existing planting.
- Fully integrating the whole scheme into the existing landscape character.

Being on the periphery of an urban, natural and industrial environment meant that the existing landscape was degraded to some extent. SYSTRA provided a landscape design that integrated new infrastructure into the existing city of Donges and its surroundings and implemented landscape design recommendations and measures defined in the Sustainable Development Action Plan (SDA) and the Office of National Parks in France (CNPN). Surplus material was reused to create landscape earthworks, and the local ecology was protected and enhanced.



Donges Bypass plans

Donges Bypass artist's impression



Visualisation of a proposed approach to the new junction

Arrangement plan for the new entrance junction to the town

Cross section through the proposed landscape design showing the arrangement of the landform modelling and planting

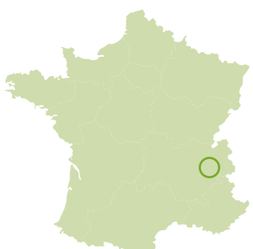
SAINT-JEAN-DE-MAURIENNE ///

CLIENT
SNCF Reseau/TELT DDT

LANDSCAPE

RESOURCE EFFICIENCY

CONSENTS AND PLANNING



TUNNEL EURALPIN LYON-TURN – TELT

Project Scope and Delivery

The challenge was to create a showcase entrance for the town of Saint-Jean-de-Maurienne as part of a new road junction, and to capture the unique surrounding landscape character of the town and the local industrial heritage.

SYSTRA's Approach

SYSTRA was commissioned to a create a landscape concept design for a new road junction as an entrance to the town. Landscape earthworks and ground modelling were introduced to represent and reference the surrounding mountains and the Arve and Maurienne Valleys that encircle the town. Like the mountains that make up the Massifs elsewhere in France, these proposed landscape earthworks will adopt varying heights without completely isolating drivers and pedestrians from the surrounding context. The proposed landforms will be enhanced further and accentuated with tree planting to bring vertical interest and rhythm to the design and white wildflower and bulb planting on the crests of the mounds to represent snow on top of the surrounding mountains.

The proposed landform will be enhanced further and accentuated with planting, and a metal sculpture of a tree will be placed in view of the RD1006 road at the crossroads. This feature will echo and reference the importance that metallurgy has played in the industrial history of Saint-Jean-de-Maurienne, as well as creating a strong landmark and point of reference for those entering the town on the RD1006. Overall, the location for the project has been reworked to showcase the magnificent landscape and industrial heritage specific to the identity of Saint-Jean-de-Maurienne.

RESOURCE EFFICIENCY

At SYSTRA we believe that resource efficiency is more than simply reducing waste and using less materials through design and construction. We recognise the risks and opportunities presented by a global decline in natural capital, the rising costs of non-renewable resources and the impacts of climate change. SYSTRA work with clients and project teams to help them minimise their embodied, operational and end-of-life impacts, create long term value in new and refurbished assets and gain better value from these assets over their lifespan.

ACTION PLANS
We provide bespoke sustainability action plans and design environmental management plans with project specific objectives and targets.

GEOGRAPHIC INFORMATION SYSTEMS GIS AND DATA MANAGEMENT
SYSTRA undertakes biodiversity, ecological and habitat assessments using the DEFRA biodiversity metric and ARCGIS collector apps, in conjunction with GIS data, to provide visual habitat mapping of net losses and gains.

MATERIAL OPTIMISATION
We can assist with your energy use over the lifecycle of built assets to minimise embodied and operational environmental impacts.

PROJECT STRATEGIES AND FRAMEWORKS
SYSTRA can create concepts and early designs to embed sustainable design principles and provide advice on innovative sustainable solutions and initiatives.

RESOURCE EFFICIENCY WORKSHOPS
SYSTRA holds regular collaborative Resource Efficiency Workshops to educate, advise and engage the project team.

SITE WASTE/MATERIAL MANAGEMENT PLANS
SYSTRA can produce Site Waste Management Plans (SWMP) and Material Management Plans (MMP) tailored to your project needs to help you understand your anticipated construction, demolition and excavation waste, and to manage the production of waste and re-use of material on site.

WASTE PERMITS
SYSTRA can provide support and advice on waste permits and consents.

NORTHERN ENGLAND ///

CLIENT
Network Rail

RESOURCE EFFICIENCY

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

ECOLOGY

TRANSPENNINE ROUTE UPGRADE

Project Scope and Delivery

SYSTRA's Environment team was responsible for delivering numerous environmental and sustainability elements in relation to the Trans Pennine railway line between Leeds, York and Selby (approximately 48km of track and associated structures).

SYSTRA's Approach

In order to record findings, a mobile GIS system was utilised to improve both efficiencies and accuracy in recording and presenting data, ground-truthing, target notes and photos, etc. Over 50 layers of data were incorporated into mapping using ESRI GIS software to create an interactive web-based GIS model. The model contained desk study information and environmental/ ecological data collected via site visits. The model highlighted designated sites, habitats and target notes of potential environmental and ecological issues/constraints. It enabled engineering drawings to be incorporated and used in multi-disciplinary and client meetings.

This Physical Works Environmental Management Plan (PWEMP) was produced to manage environment, sustainability and consents aspects/ impacts of intrusive works, and inform the design. The PWEMP describes how environmental requirements will be managed for the contract and specifies controls that will be implemented on site. It also provides a framework through which the project aims and objectives will be proactively managed to maximise environmental compliance and sustainable performance when carrying out physical works during design.

Noise barrier construction

LEEDS ///

CLIENT
Veolia, Leeds City Council,
Clugston Construction Limited

RESOURCE EFFICIENCY

CLIMATE CHANGE ADAPTATION

CONTAMINATED LAND
AND REMEDIATION

LEEDS RECYCLING AND ENERGY RECOVERY FACILITY

Project Scope and Delivery

The SYSTRA Geo-Environmental team was commissioned by Veolia and Leeds City Council to undertake a contaminated land study for the Leeds recycling and energy recovery (RERF) project; then later in the development scheme by Clugston Construction Limited to support the management of geo-environmental issues as part of the construction works. The outcomes of the study were used by the client as supporting evidence to satisfy the planning application in respect of impacts on human health and controlled water receptors.

SYSTRA's Approach

To identify the potential risk areas at the site, SYSTRA undertook generic and detailed Quantitative Risk Assessments covering risks to human health, controlled waters and building/infrastructure. The outputs of these risk assessments enabled SYSTRA to review residual contamination risk and write an appropriate remediation strategy and verification plan for the client to manage any significant risks posed by the site. Ground gas was identified as a key risk to the development and an extended period of monitoring ground gas conditions was undertaken to ensure the gas regime was fully understood.

As part of the construction works, during the implementation of the remediation strategy, SYSTRA supported the civils contractor to manage site won materials to avoid export and import. A Materials Management Plan was developed in accordance with Contaminated Land: Applications in Real Environment (CL:AIRE) guidelines to accommodate soils and concrete excavated as part of the design of the main facility infrastructure. Relocation of these materials was verified as part of the works to comply with the remediation strategy. A total of 21,000m3 of material was retained resulting in substantially lower material import/export requirements, with less than 5,000m3 exported and less than 7,000m3 imported. Transportation and waste impacts were reduced, resulting in a more sustainable solution and providing cost and carbon footprint savings.

SPECIALIST SERVICES

SYSTRA's Specialist Services team provides a wide range of solutions for issues including comprehensive environmental services relating to air quality, modelling, monitoring and assessment of pollutants that affect health, populations and ecosystems. SYSTRA is enthusiastic about engineering acoustic environments and maintaining archaeological heritage assets, as well as assessing waste management and assisting in creating a sustainable future.

AIR QUALITY AND CLEAN AIR PLANS

SYSTRA air quality consultants can provide comprehensive services relating to modelling, monitoring and assessing air quality, covering a range of air pollutants that affect health and ecosystems, as well as dusts and odours that affect amenity. We also develop clean air plans for our clients. including Clean Air Zones and Low Emission Zones

CULTURAL HERITAGE

Working across the UK, we provide advice and services to our clients across the historic environment, in both built and cultural heritage, the setting of heritage assets and archaeology.

MATERIAL ASSETS AND WASTE

Our Environmental Services team has all the experience required for the Design Manual for Road and Bridges (DMRB) Environmental assessment of material assets and waste.

NOISE AND VIBRATION

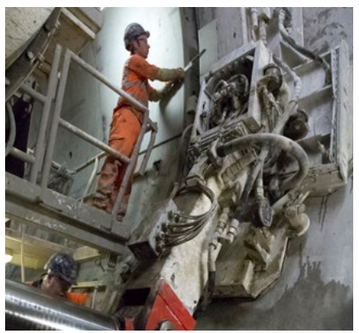
We help clients through their acoustical commitments by completing projects from conception and planning, through to design and construction. We can provide testing, commissioning and assessment services to all aspects of the project and the built environment.

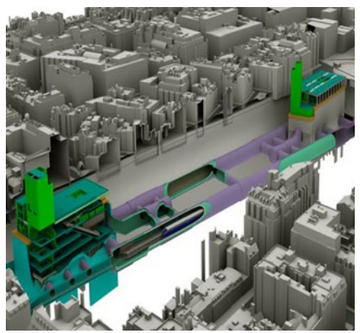
POPULATION AND HUMAN HEALTH

Our Environmental Services team has all the experience required for the Design Manual for Road and Bridges (DMRB) Environmental assessment of population and human health effects in land-use such as private property and housing, community assets and agriculture.

STAKEHOLDER ENGAGEMENT SUPPORTING – PLANNING AND CONSENTS

SYSTRA has experience of supporting the delivery and management of stakeholder and community engagement events for a wide variety of projects and developments. Our consultants support, plan and deliver tailor-made community and stakeholder engagement programmes before submission of project applications.





LONDON ///

CLIENT
Crossrail

SPECIALIST SERVICES

NOISE AND VIBRATION

CONSENTS AND PLANNING

CROSSRAIL

Project Scope and Delivery

Crossrail is the biggest infrastructure project in Europe, a new rail line running 118km from west to east London. SYSTRA is part of a team with Bechtel and Jacobs that is serving as Crossrail's project delivery partner to deliver this project.

Crossrail Limited (CRL) appointed Bechtel as Project Delivery Partner (PDP) to manage the delivery of the Crossrail project. SYSTRA (along with Jacobs) is supporting Bechtel as part of an integrated PDP team. We are responsible for managing the development of the detailed design, procurement, construction, testing and commissioning and for managing the consultants and contractors through all phases of the project through to handover to the infrastructure managers, Rail for London and London Underground.

SYSTRA's Approach

SYSTRA provided specialist noise and vibration advice throughout the Crossrail project. The relevant noise requirements were the result of parliamentary undertakings and assurances, which cover all phases of the project from construction through to operation. SYSTRA advised Crossrail on compliance, including the review of contractors' designs, reporting and stakeholder liaison. This included oversight of the consents process (Section 61 – Control of Pollution Act), noise mitigation on construction sites and specific off-site noise mitigation measures, such as the provision of secondary glazing and temporary rehousing.

Noise and vibration specialist services were provided by SYSTRA throughout the design, testing and commissioning phases, covering noise from fixed installations for all the new stations, depots, sidings, stationary trains, HV power and traction power. This included noise assessments for conventional MEP equipment, bespoke tunnel ventilation systems, transformers, public address and voice alarm systems, including ground-borne noise and vibration of rolling stock utilised during construction and rolling stock to be used on the operational railway.

SCOTTISH CITIES ///

CLIENT
Aberdeen City Council
Dundee City Council
Glasgow City Council

SPECIALIST SERVICES

RESOURCE EFFICIENCY

CONSENTS AND PLANNING

LOW EMISSIONS INITIATIVE

Project Scope and Delivery

SYSTRA is leading the modelling and appraisal work for low emissions initiatives in three Scottish cities, Aberdeen, Glasgow and Dundee. In each city, SYSTRA developed a Paramics base model, which has been used as the basis to develop and test proposed low emission zone (LEZ) options.

SYSTRA's Approach

In Dundee and Aberdeen, SYSTRA followed the National Low Emission Framework (NLEF) to develop and appraise a range of possible LEZ options. Options were simulated in the Paramics model, using assumptions for fleet compliance and future traffic forecasts. For Dundee, the results were relatively straightforward and allowed us to recommend a preferred LEZ option. In Aberdeen, the Paramics model was used to sift out and amend initial LEZ options through analysis of traffic flow changes at known emission exceedance locations. With additional qualitative appraisal, this allowed us to identify a preferred option for the city. In Glasgow, SYSTRA's role was to model a proposed LEZ scheme designed by Glasgow City Council, and to assess the impact to the traffic network resulting from its introduction.

SYSTRA has also assessed the medium and long-term impacts of the Covid-19 pandemic on these Scottish LEZ proposals and helped to design and deliver public and stakeholder consultation relating to the proposed LEZ schemes in Aberdeen and Dundee. The consultation was intended to inform and refine the detailed design of the LEZ schemes and to gauge public opinion towards the various options within the overall LEZ strategy.

MANCHESTER ///

CLEAN AIR PLAN

CLIENT
Transport for Greater Manchester

SPECIALIST SERVICES

NOISE AND VIBRATION

CONSENTS AND PLANNING

Project Scope and Delivery

SYSTRA was commissioned by Transport for Greater Manchester (TfGM) to undertake deliberative research with business representatives and transport operators across the Greater Manchester area, to understand the impacts of proposed initiatives in the draft Greater Manchester Clean Air Plan. During an initial data collection phase, we held a series of deliberative workshops and focus groups attended by over 170 participants from local businesses and transport operators. The research provided insight into perceptions and understanding of air pollution; views about and levels of support for the Clean Air Plan shortlisted measures; potential impacts of each measure; and views on mitigations to lessen the impacts of the main measures.

SYSTRA's Approach

Following the first stage of deliberative research, a revised draft Clean Air Plan was produced. TfGM then commissioned SYSTRA to undertake a further in-depth deliberative study to understand, in more detail, perceptions and impacts of the shortlisted measures in the revised Clean Air Plan on taxi and private hire vehicle drivers and operators owning and operating non-Clean Air Zone compliant vehicles. SYSTRA has also undertaken a series of in-depth deliberative interviews with sole, micro and small business owners who own and operate non-Clean Air Zone compliant heavy goods vehicles, and undertook a similar phase of research with coach operators.

SYSTRA was subsequently commissioned to undertake an evaluation of the Greater Manchester Clean Air Zone and financial support measures. This comprises the design, management, analysis and reporting of extensive baseline and evaluation online surveys to understand the effect of the Clean Air Zone and associated measures, such as vehicle finance, on behavioural responses, in addition to exploring the wider impacts of the scheme.

SUSTAINABLE DEVELOPMENT
ASSESSMENT SOLUTIONS

SYSTRA's team includes experts in sustainable design, construction and management. We provide solutions that consider lifecycle thinking and take a truly multidisciplinary approach to tackling the risks and opportunities presented by a global decline in natural capital, the rising costs of non-renewable resources and the impacts of climate change.

BREEAM AND CEEQUAL ASSESSMENTS
SYSTRA's qualified and licensed BREEAM and CEEQUAL Assessors have extensive experience in supporting project teams through every step of the assessment process.

CARBON FOOTPRINT ASSESSMENT AND REPORTING
SYSTRA understands the importance of undertaking carbon assessments to the highest quality in order to understand and reduce the carbon and resource impacts of projects and, ultimately, to reduce our impacts on climate change.

CIRCULAR ECONOMY
Maximising the use of renewed, re-used and recycled materials and reducing waste to landfill is a key area of focus on every project SYSTRA undertakes.

ENVIRONMENTAL MANAGEMENT SYSTEMS
SYSTRA uses tools such as the Network Rail Sustainability Charter, Environmental and Social Management Plans and the Business Policy Manual to achieve the aim of maximising protection of the environment, avoiding pollution and promoting opportunities for biodiversity enhancement.

IEMA AND CIWM APPROVED TRAINING COURSE PROVISION
SYSTRA is a certified provider of IEMA Environmental Management and CIWM courses. We provide a range of courses covering Environmental Auditing, implementing Environmental Management Systems, sustainability and waste management.

ISO:14001 2015 IMPLEMENTATION
We provide environmental guidance for all colleagues to promote the understanding of the company's environmental policy, objectives, initiatives and programmes and their role within them.

SITE ENVIRONMENTAL AUDITS
We use our diligence and knowledge to review processes on site to identify areas of best practice and any areas for improvement through liaison with the site team.

SUSTAINABILITY WORKSHOPS AND ACTION PLAN DELIVERY
Maximising sustainable performance on every project is a key objective for SYSTRA.

SUSTAINABILITY AUDITS AND REPORTING
We draw on applicable targets and objectives and exemplar practice examples from industry-leading projects, as well as sustainability assessment methods such as BREEAM and CEEQUAL.

LONDON ///

GATWICK AIRPORT STATION

CLIENT
Gatwick Airport Ltd.

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

RESOURCE EFFICIENCY

CONSENTS AND PLANNING

Project Scope and Delivery

Gatwick Airport Ltd. wanted to achieve seamless transition and enhancement of the passenger experience from train to plane, and plane to train. This was achieved through a range of measures that included LED lighting in all lifts and permanent installations, reduced speed technology for escalators, high efficiency gearless lifts and a hybrid heating and cooling system.

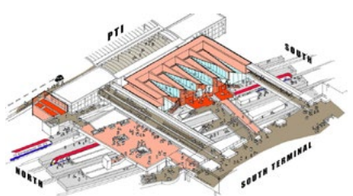
SYSTRA's Approach

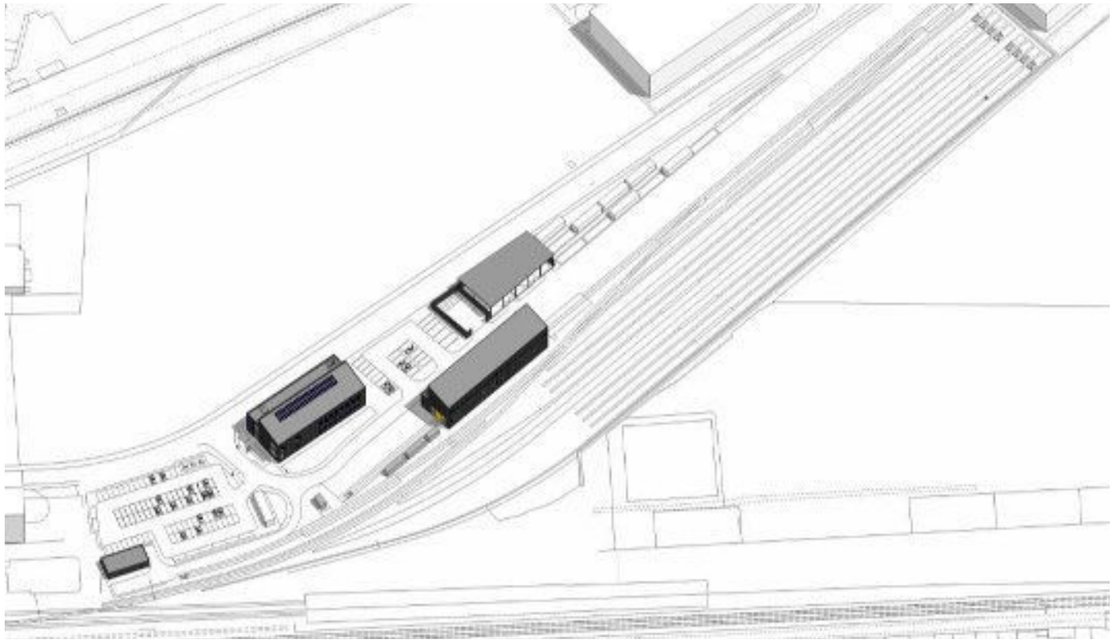
SYSTRA ensured that all building materials were leading low carbon items and were sourced from sustainable and responsible manufacturers. Assessments highlighted that lighting, vertical transportation, heating and cooling represented the largest proportion of the project's energy demands. Other assessments included:

- Biodiversity assessment and enhancement
- Social connectivity and inclusion
- Rainwater harvesting system
- Green walls/brown roofs
- Intuitive wayfinding
- SuDs
- Designing out waste
- Designing in sustainable materials
- Consideration of optimising materials

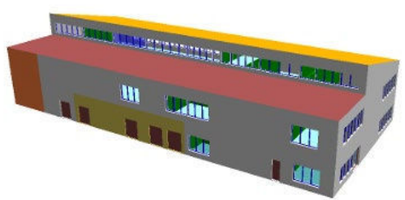
These innovative technologies provide an estimated annual operational cost saving of £58,700 and an annual carbon emission reduction of 143.57 tonnes CO2e. It was projected that over 50 years, this operational saving will equate to nearly £3 million.

Artist's impressions of the sustainability project at London Gatwick

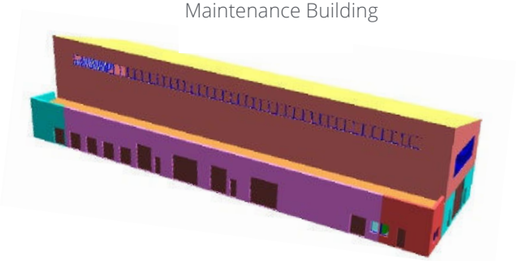




Accommodation Building



Maintenance Building



LONDON ///

CLIENT
ATC Joint Venture

SUSTAINABLE DEVELOPMENT ASSESSMENT AND SOLUTIONS

CLIMATE CHANGE ADAPTATION

CONSENTS AND PLANNING

Elliot Shiers
Principal Environmental Consultant

"Undertaking the carbon assessment for Plumstead in line with the PAS 2080:2016 Standard was one of the first assessments of its kind in the UK rail Industry. This innovative approach has changed the way we undertake carbon assessments and influence design and construction to promote sustainability.

On the Plumstead project the team worked collaboratively to baseline the embodied and operational carbon associated with the three main buildings of the project including the maintenance building including the bulk ground earthworks against total spend. This enabled the designers to identify carbon and cost saving opportunities throughout the whole life of the project."

PLUMSTEAD MAINTENANCE FACILITY CROSSRAIL C695

Project Scope and Delivery

A new maintenance facility is being constructed east of Plumstead railway station in southeast London, as part of the Crossrail project. The facility includes maintenance and accommodation buildings, undercover stores and associated external works such as car parking and lay down and loading bays.

SYSTRA's Approach

SYSTRA carried out a baseline embodied carbon assessment using Crossrail's RIBA stage F Bill of Quantities as the data source for materials types and quantities. The purpose of this assessment was to assess the capital carbon of the designs and to provide a framework to identify potential opportunities for carbon reduction during construction and operation. This data was put into the RSSB Rail Carbon Tool, with each material identified in the tool's material library, and the tool then applied a carbon factor to calculate a figure in kilograms of Carbon Dioxide Equivalent (CO_2e). When carrying out this process, assumptions on material specifications were made when necessary to ensure consistency and accuracy of the assessment.

The assessment, which was undertaken using the principles of the PAS 2080:2016 BSI Standard for Carbon Management in Infrastructure, calculated the embodied carbon and associated costs associated with the construction materials so that the design team could take account of embodied carbon when specifying and recommending materials.

Although the carbon assessment was undertaken as a baselining exercise after the proposed design had been finalised, value was still added to the project. High impact carbon materials were identified, and it was calculated that substituting standard concrete and steel with ground granulated blast furnace slag or pulverised fuel ash concrete and recycled steel could reduce the total embodied carbon of the Plumstead Maintenance Facility by 30%.

WATER RESOURCES – FLOOD RESILIENCE AND WATER QUALITY

Water is vital in our urban and rural environments. SYSTRA's primary aim is to optimise our clients' abilities to deliver solutions that enhance society while minimising or eliminating potential destructive impacts, such as property damage from flooding. Our hydrologists and hydraulic modellers understand catchments, and are fluent in river engineering and management, from assessing interactions between rainfall for water resources and drought management to understanding flood risk and providing forecasting and management options.

BUSINESS CASE DEVELOPMENT
SYSTRA has significant experience in business case Development, including understanding the requirements of the Government's Green Book and the Multi-Coloured Manual.

CLIMATE AND FLOOD RESILIENCE
We understand the challenges posed by our changing climate and the need for climate resilience in our activities, studies and designs.

CIVIL ENGINEERING DESIGN
SYSTRA can provide project managers and designer to support your civil engineering requirements.

HYDROLOGICAL AND HYDRAULIC MODELLING
Our Rivers and Drainage teams have extensive experience in sewer network modelling, MicroDrainage, and 1D and 2D river and tidal Modelling.

IMPROVEMENT STUDIES
We specialise in developing solutions to complex flooding problems.

INFRASTRUCTURE PROJECT DELIVERY
We manage and successfully deliver major infrastructure projects.

REGULATION AND ASSURANCE
SYSTRA has wide ranging, specialist knowledge of the regulatory requirements concerning planning for works within floodplains and the river/coastal environments.

RESEARCH AND DEVELOPMENT
Our staff have significant experience of research and Development, including areas such as Communities at Risk, natural flood risk management and pollution distribution in a water body.

STRATEGIC ASSET MANAGEMENT
Our team specialises in providing advice for planning and optimising investment at the greatest point of need over a long term planning cycle.

WATER RESOURCES AND WATER QUALITY PLANNING
Water is the environment's greatest resource – we understand how to assess and manage water to both improve the quality of life and the environment.

URBAN PLANNING
Water is the environment's greatest resource – we understand how to assess and manage water to improve both the quality of life and the environment.

MIDLANDS ///

HS2 MAIN WORKS CIVILS CONTRACT – WATER ORTON

CLIENT
Balfour Beatty VINCI (BBVJV)/HS2 Limited

WATER RESOURCES – FLOOD RESILIENCE AND WATER QUALITY

RESOURCE EFFICIENCY

CONSENTS AND PLANNING

Delivering High Speed Rail Projects in the UK and Worldwide

HS2 is the UK's state-of-the-art high-speed line, critical for tackling carbon reduction. It will provide much-needed rail capacity across the country, and is integral to rail projects in the North and Midlands. HS2 is Britain's biggest environment project, delivering miles of ecological and landscape investments alongside construction. SYSTRA is working in a Design Joint Venture with Mott MacDonald, supporting contractor Balfour Beatty VINCI (BBV) on Lots N1 and N2, which are between the Long Itchington Wood Green tunnel and the Delta Junction/Birmingham Spur and from the Delta Junction to the West Coast Main Line tie-in respectively.

The section of the HS2 route where the two Water Orton viaducts are located is known as the Delta Junction, a triangular section of line where the new railway curves west towards Birmingham and runs north towards Crewe and beyond. The Water Orton viaducts link the curve that heads west towards Birmingham with the main line heading north, and are needed to carry the railway across a network of existing motorways, roads and footpaths.

SYSTRA's Approach

The area between the two Water Orton viaducts, which was previously the site of the Old Saltleians Rugby Club, will be redesigned to provide bigger, better, more joined up habitats such as species-rich grasslands and native species tree planting. Improved connections through the Delta Junction area will be developed, with new paths and cycle routes set within a nature-rich corridor.

SYSTRA's Water Resources Team assessed the hydrology of the watercourse and built a 1D Hydraulic Model of the area, which allowed the team to assess the existing flood characteristics of the watercourse. Liaising with the wider design team, we produced a watercourse realignment design that significantly improved the environment in this area. Our hydraulic modelling also demonstrated that flood risk would be managed successfully.

Visualisation of the 'Delta Junction'

MIDLANDS ///

CLIENT
Balfour Beatty VINCI (BBVJV)/HS2 Limited

WATER RESOURCES - FLOOD RESILIENCE AND WATER QUALITY

RESOURCE EFFICIENCY

CONSENTS AND PLANNING

HS2 MAIN WORKS CIVILS CONTRACT – RIVER COLE

Project Scope and Delivery

HS2 is the UK's state-of-the-art high-speed line, critical for tackling carbon reduction. It will provide much-needed rail capacity across the country, and is integral to rail projects in the North and Midlands. HS2 is Britain's biggest environment project, delivering miles of ecological and landscape investments alongside construction. SYSTRA is working in a Design Joint Venture with Mott MacDonald, supporting contractor Balfour Beatty VINCI (BBV) on Lots N1 and N2, which are between the Long Itchington Wood Green tunnel and the Delta Junction/Birmingham Spur and from the Delta Junction to the West Coast Main Line tie-in respectively.SYSTRA is providing technical direction and advice regarding the hydraulic modelling, optioneering, replacement flood storage design and analysis, and reporting and presentating to HS2 and the regulator, the Environment Agency.

SYSTRA's Approach

As part of our work we were instructed to undertake a high-level optimisation of the design, which included:

- Moving viaduct embankments out of the floodplain
- Adding additional flood relief culverts
- Changing Manor Drive overbridge to a viaduct
- Remodelling river realignment
- Remodelling replacement floodplain storage

During the high-level optimisation, over 60 hydraulic model scenarios were configured and run to identify, at a high level, a cost-effective solution to mitigate the increased flood risk. Through consultation with HS2 and the Environment Agency, the preferred option of widening was selected.

GRANTHAM ///

POPLAR FARM

CLIENT
South Kesteven
District Council

WATER RESOURCES – FLOOD RESILIENCE AND WATER QUALITY

ECOLOGY

LANDSCAPE

Project Scope and Delivery

Poplar Farm is a large residential development on the edge of Grantham that will create up to 1,800 new homes on a greenfield site. During an earlier phase of the scheme, a large attenuation basin was created, linked to a small stream passing through the development, but to lower design standards than required. The ground conditions were generally clay-like with no feasible prospect of using infiltration. The site topography posed another constraint, with some areas of steep hillside limiting where attenuation features could be created without requiring more space to tie into the surrounding landscape.

SYSTRA's Approach

The solution comprised a series of five additional basins linking to the stream as the main flow-path for the attenuated flows. These basins intercept flows from different parts of the scheme and control the onward flow rates before the water reaches the main attenuation lagoon. The new basins are a mix of ponds and dry basins situated in corridors of open space and contribute to the landscape and habitat content of the development. The local wildlife was quick to take advantage of the new ponds, with waterfowl and insects moving in soon after completion.

THE SIGNATURE TEAM
FOR ENVIRONMENTAL SERVICES

SYSTRA

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