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SECTOR CASE STUDY

# AVIATION

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# CHARLES DE GAULLE AIRPORT EXPANSION

PARIS, FRANCE

CLIENT: AÉROPORTS DE PARIS (ADP)

Delivered by SYSTRA

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**SYSTRA is delivering the functional, operational, technical and environmental programming for the new AGEN Pier, part of the eastern expansion of Charles de Gaulle Airport. The 500 metre passenger pier will provide six aircraft contact stands, comprising four wide-body and two mixed wide-body/narrow-body positions with aerobridges and boarding facilities.**

SYSTRA is responsible for the project's operational functionality, technical performance, environmental integration and coordination across complex airport interfaces.

The southern section includes a transfer hub, security screening, retail and service areas and an Air France lounge, easing capacity pressure on Terminal 2E, while the northern section provides boarding and arrival facilities for international passengers.

The pier connects into the wider airport network via the LISA and Automated People Mover stations, Terminal 2G, and elevated walkways crossing future transport infrastructure, local roads and airport service routes.

# ORLY AIRPORT STATION

PARIS, FRANCE

CLIENT: GROUPE ADP, DELEGATED BY SOCIÉTÉ DES GRANDS PROJETS

Delivered by SYSTRA



**Opened in June 2024, Orly Airport Station connects the Paris-Orly Airport to the Grand Paris Express automated metro network. As the southern terminus of Line 14 and a future interchange with Line 18 from 2027, the station is a key hub within the expanding Paris transit network.**

SYSTRA delivered construction supervision through to commissioning, overseeing station fit-out, technical systems including electrical, ventilation, plumbing, lifts and escalators, BIM coordination, and stakeholder interface management within an operational airport environment.

The project supports the wider extension of Line 14, forming a major north-south transport corridor across Greater Paris and reducing reliance on road-based airport access.



# CHARLES DE GAULLE AIRPORT ELECTRIFICATION

PARIS, FRANCE

CLIENT: AÉROPORTS DE PARIS (ADP)

Delivered by SYSTRA

**Under a framework agreement with Groupe ADP (Aéroports de Paris), SYSTRA is delivering project management, technical advisory and works coordination services to support the electrification of airside operations at Paris Charles de Gaulle Airport between 2025 and 2028.**

The programme covers the deployment of new high-voltage electrical loops, the creation and upgrade of HV/LV substations, power supplies for ground support equipment and aircraft air-conditioning systems, and the renewal of ageing airside infrastructure.

It comprises two major projects: electrification of the Terminal 2D contact stands, and a new high-voltage loop serving Terminal 1.

SYSTRA's scope spans studies, design, procurement, construction supervision and commissioning, delivering increased electrical capacity, operational resilience and a transition toward more sustainable airport operations.

# BELO HORIZONTE INTERNATIONAL AIRPORT

CONFINS, MINAS GERAIS, BRAZIL  
CLIENT: BELO HORIZONTE AIRPORT

Delivered by SYSTRA

From December 2023, the SYSTRA-IBR consortium has supported Belo Horizonte Airport's long-term expansion and improvement programme through a three year multidisciplinary study and design assignment.

SYSTRA is delivering coordinated solutions across multiple disciplines to support the airport's continued growth and modernisation.

Serving one of Brazil's major aviation hubs, the programme supports the airport's development under its 30 year concession, aiming to improve capacity, operational efficiency and passenger experience.

The scope spans the full range of airport planning and design services, including terminal architecture, passenger facilities, civil and structural engineering, electrical and mechanical systems, baggage handling, airfield infrastructure, utility networks, fire safety, water and wastewater systems, navigation aids, airfield lighting and environmental design.



# ORLY AIRPORT: TERMINAL 4 REDEVELOPMENT

PARIS, FRANCE

CLIENT: GROUPE ADP, DELEGATED BY SOCIÉTÉ DES GRANDS PROJETS

Delivered by SYSTRA

**SYSTRA is supporting Aéroports de Paris in the redevelopment of the international departures border control and commercial zone at Orly Airport Terminal 4, as part of the relaunch of the airport's International Departure Process Redesign programme.**

Acting as technical advisor and programme manager, SYSTRA is delivering the functional, dimensional and detailed technical programming for 6,000 square metres of terminal space, including defining operational requirements, coordinating technical disciplines, and integrating low-carbon and circular economy principles into the future facilities.

The project aims to improve passenger experience and operational efficiency by expanding and reconfiguring border control facilities, improving passenger flow management, increasing capacity and accessibility, and creating a larger, consolidated retail area beyond security and border checks.





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# BORDEAUX MÉRIGNAC AIRPORT: MULTI-PROJECT FRAMEWORK AGREEMENT

BORDEAUX, FRANCE

CLIENT: BORDEAUX MÉRIGNAC AIRPORT

Delivered by SYSTRA

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**The Bordeaux Mérignac Airport building programme forms part of the airport's "RESOURCES 2027" strategic plan, aimed at creating a more sustainable, agile and efficient airport while enhancing passenger experience.**

SYSTRA has been appointed as project management assistant through a multi-project framework agreement, supporting the new central building from the architectural competition stage and the arrivals redevelopment from programme definition.

Its role covers project setup, procurement and contract management, coordination of studies, management of regulatory procedures, implementation of Building Information Modelling, aviation safety support and document management.

The project includes construction of a new central terminal building, redesign of controlled arrivals, expansion of the Iberian Pier, creation of a new immigration area, and a range of security and regulatory upgrades to improve operational flow and compliance.

The competition and programme phases began in November 2023, with Iberian Pier works targeted for completion in 2025 and the new central building expected to enter service in 2028. The overall investment is valued at approximately €80 million, with the first contract under the framework agreement valued at €350,000.00.

# HAMAD INTERNATIONAL AIRPORT

DOHA, QATAR

CLIENT: ALEC QIA JOINT VENTURE & BROOKFIELD MULTIPLEX MEDGULF

Delivered by BG&E – Part of SYSTRA

**BG&E delivered structural and construction engineering services across Hamad International Airport's expansive expansion programme, which has increased annual passenger capacity to beyond 65 million.**

BG&E's initial scope initially involved third-party review and verification of the large-span steel truss structure for the car rental area and design of the internal fit-out support structures, including foundations.

BG&E was subsequently engaged to advise on remedial work, strengthening existing airline lounge slabs to accommodate additional penetrations and partition walls, reviewing the existing slab's loading capacity and providing recommendations for structural implementation.

BG&E also designed the fit-out for coffee shops, restaurants and retail spaces within the airport, including internal steelwork structures, rationalisation of design intent, loading assessments and review of penetration layouts.



# AUCKLAND AIRPORT: TRANSPORT HUB 1 (TH01)

AUCKLAND, NEW ZEALAND

CLIENT: GRIMSHAW

Delivered by BG&E – Part of SYSTRA



**The Auckland Airport expansion and redevelopment project includes a new second runway and the merging of international and domestic terminals, supporting a more efficient travel experience.**

BG&E is providing structural peer review services for the NZ \$200 million transport hub, one of four anchor projects within the wider airport infrastructure upgrade progressing under the August 2021 COVID-19 Reset Plan.

The new transport hub, connected to the international terminal by an enclosed skybridge, will provide enhanced access to commercial and public transport options, along with a new covered pick-up/drop-off area, valet services and covered car parking.

# OMAN REGIONAL AIRPORTS EXPANSION

ADAM, SOHAR, RAS AL HADD & AL DUQM, OMAN  
CLIENT: OMAN GOVERNMENT

Delivered by BG&E — Part of SYSTRA



**BG&E provided structural engineering design services for four regional airports in Oman — Adam, Sohar, Ras Al Hadd and Al Duqm — supporting the country's growth as a tourism destination.**

The scope covered design of airport operations infrastructure, passenger terminals, runways, control towers, cargo hangars at Sohar and Al Duqm and supporting operation and maintenance facilities.

The four regional airports were designed to accommodate up to 250,000 passengers per year.



# PERTH AIRPORT SKYBRIDGE

PERTH, WA, AUSTRALIA  
CLIENT: PERTH AIRPORT

Delivered by BG&E — Part of SYSTRA

**BG&E was engaged by Georgiou Group to provide geotechnical, civil and structural engineering design services for the Perth Airport Skybridge, part of Perth Airport's Airport Master Plan and directly interfacing with the Ground Transport Centre Precinct.**

The elevated, enclosed walkway spans 280 metres, with travellers along its length to support an expected 8,000 pedestrians daily. A vertical node forms the foyer to the terminal frontage, serviced by stairs and lifts to meet universal access requirements.

BG&E's civil scope covered earthworks, drainage, roadworks and service utility diversions, along with oversight of the traffic and pedestrian analysis between the train station and terminal. This included engaging the geotechnical engineer and surveyor and coordinating across structural, architectural, mechanical and electrical disciplines.

The scope also extended to interface works across the site — including the Airport Central Station, Airservices Australia control tower, airport security car parking, car rentals, Terminal 1, passenger drop-off areas and short-term car parking.

# FORRESTFIELD-AIRPORT LINK

PERTH, WA, AUSTRALIA

CLIENT: PUBLIC TRANSPORT AUTHORITY (PTA)

Delivered by BG&E – Part of SYSTRA



**The \$1.86 billion Forrestfield-Airport Link, jointly funded by the Australian and Western Australian governments, delivers a new rail service to Perth's eastern suburbs via three new stations at Redcliffe, Airport Central and Forrestfield.**

The project involved construction of eight kilometres of underground twin-bored rail tunnels and an airport skybridge.

BG&E partnered with Jacobs and Golder Associates in a joint venture, ALERT (Airport Link Engineering Review Team), undertaking technical reviews for the PTA and providing specialist professional engineers across multiple disciplines.

# AIR NEW ZEALAND HANGAR 4

AUCKLAND, NEW ZEALAND

CLIENT: NZ STRONG

Delivered by BG&E – Part of SYSTRA



**BG&E provided construction engineering for Air New Zealand's Hangar 4 in Tamaki Makaurau, Auckland. This facility is the largest single-span timber arch aircraft hangar in the southern hemisphere. At 1.5 times the size of Air New Zealand's previous largest hangar, Hangar 4 has capacity to accommodate one wide-bodied and two narrow-bodied aircraft simultaneously.**

BG&E developed a precision lifting strategy for erection of the hangar's primary arches — 98 metre glue-laminated LVL timber trusses, each weighing 35 tonnes and requiring 20 tonnes of rigging to install safely.

Advanced parametric modelling, real-time field verification and reusable temporary works systems were integrated to reduce construction risk and increase installation precision, while BG&E's specialist timber team verified all timber screwed connections in the lifting case for out-of-plane bending.

# SYDNEY DOMESTIC AIRPORT: 7TH STREET CAR PARK

SYDNEY, NSW, AUSTRALIA

CLIENT: SYDNEY AIRPORT CORPORATION LIMITED (SACL)

Delivered by BG&E – Part of SYSTRA



## **BG&E provided structural engineering services for the Sydney Domestic Airport car park.**

The car park originally comprised 10 levels of above-ground parking with external ramps and a subsequent extension added four further levels, along with additional lifts and a link bridge.

The structure uses post-tensioned band beams spanning 17.5 metres and slabs spanning 8.7 metres, incorporating large spans to suit SACL's requirements. Foundations consist of CFA piles approximately 25 metres deep to sandstone, with crash barriers provided by reinforced concrete upstands and tensioned cables.

# SYDNEY AIRPORT: T1 & T2 SCREENING TRANSFORMATION

SYDNEY, NSW, AUSTRALIA

CLIENT: SYDNEY AIRPORT AUTHORITY

Delivered by BG&E — Part of SYSTRA

**BG&E was engaged on the extension of the T1 Immigration Hall and security lanes and the upgrade of T3's existing baggage handling system in Sydney Airport. The development comprised two buildings of eight and nine storeys on a shared podium with two basement levels.**

Key design work involved extensive review and analysis of undocumented existing structures, addressing height restrictions at mezzanine level and mitigating risks of connection damage to the departures slab above.

A major value add was the optimisation and reuse of an existing structure with limited capacity for additional loading.



# SYDNEY INTERNATIONAL AIRPORT: MULTI STOREY CAR PARK NO. 1

MASCOT, NSW, AUSTRALIA

CLIENT: ABIGROUP CONTRACTORS & LENDLEASE

Delivered by BG&E – Part of SYSTRA

**Car Park No. 1 is a 12 level above-ground parking structure with an external curved ramp, delivered in two stages – Stage 1 (to Level 8) completed by Abigroup, and Stage 2 (Levels 9–12) by Lendlease. A 20 metre cable-stayed link bridge connects the car park to Car Park No. 2, improving access between facilities.**

BG&E provided structural design and construction supervision for the car park and undertook concrete testing to verify capacity for the additional levels.

Design features included column-free spans via post-tensioned band beams and slabs, CFA piles founded on sandstone and lateral stability from concrete core walls. Level 8 was designed to carry Levels 9 and 10 without back-propping, preserving parking capacity throughout Stage 2.



# URBNSURF MAIN DRAIN OUTFALL

TULLAMARINE, VIC, AUSTRALIA  
CLIENT: ERTECH, AUSTRALIAN PACIFIC AIRPORTS  
MELBOURNE

Delivered by BG&E — Part of SYSTRA

**BG&E delivered detailed design and documentation for the outfall component of the main drain of the URBNSURF Wave Garden — a surf lagoon capable of generating a variety of artificial ocean-like waves for surfers of all levels.**

The design optimised the pipeline's alignment and vertical grading to lower flow velocities, maintain clearance from existing utilities and provide suitable site connections.

Scope included design and documentation of a 2100 millimetre diameter drainage outfall extension from the southwest corner of the Wavepark site to an existing detention basin, scour protection at the retarding basin outlet, connection of Lot 4 to the proposed main drain, and drawings and reporting compliant with Melbourne Water and APAM drainage standards, along with work volume computation and construction cost estimation.





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# SYDNEY GATEWAY STAGES 1 & 3

ST PETERS, NSW, AUSTRALIA

CLIENT: JOHN HOLLAND/SEYMOUR WHYTE JOINT VENTURE, FOR TRANSPORT  
FOR NSW

Delivered by BG&E — Part of SYSTRA

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**The Sydney Gateway is a major toll-free road connection linking Sydney's motorway network directly to Sydney Airport's domestic and international terminals. BG&E delivered the detailed design for 19 bridges and viaducts as part of the \$2.6 billion project on a heavily constrained brownfield site.**

Engaged directly by the John Holland and Seymour Whyte joint venture, BG&E designed nineteen bridges and a viaduct and led all durability analysis and planning, including complex long-span structures — some among the longest in the southern hemisphere — geotechnical design of bridge piles, extensive use of weathering steel, network arch and Super Tee bridges, and incrementally launched bridge solutions.

BG&E Materials provided project-wide durability services across more than 50 retaining walls, drainage and signage structures, road furniture, protection slabs and noise walls.

# PERTH AIRPORT: DIRECT FACTORY OUTLET

PERTH, WA, AUSTRALIA  
CLIENT: VICINITY CENTRES

Delivered by BG&E – Part of SYSTRA



**DFO Perth is a single storey retail centre with 118 specialty tenancies in the Perth Airport precinct.**

BG&E delivered civil and structural engineering services, balancing contemporary outlet design with an industrial aesthetic using precast concrete façades and steel trusses.

BG&E engineered honed concrete slabs with strategic jointing to accommodate a curved “race track” mall and food court layout, while civil works covered car park design, stormwater drainage, pavement design and street extension works.

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BG&E and SYSTRA joined forces in 2025, combining BG&E's civil and structural engineering expertise with SYSTRA's global capability in public transport, mobility and infrastructure.

With more than 1,000 people across Australia and New Zealand, the partnership strengthens our reach and position in one of the world's most dynamic infrastructure markets.

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