

Airports Capability Statement

Nolan.
Associates
Consulting Civil & Structural Engineers

About

Nolan Associates are located in Birmingham close to the city centre. We're ideally placed for national coverage. Employing over 40 technical staff, we are large enough to handle most projects and have secured projects up to £200 million.

We pride ourselves on our relationship with our clients and provide a friendly and effective service, ensuring that projects are managed by well-qualified senior staff who have broad experience and who adopt a 'hands on' approach to design promoting innovation and excellence.

We have a proven track record in providing structural and civil designs that have been constructed using a radical approach to solve engineering problems associated with marginal ground and Fastrak programs.

We're a company that strives to attain cost effective yet innovative civil and structural solutions. We are used to working with design and build contractor clients who retain us for our 'win factor' approach to solving problems with ground conditions, foundations and providing economic frame solutions. We have extensive experience in flagship building solutions and PFI schools programmes, and we believe our contribution to any team will add value to the design stage process through to completion.

Often following award, the challenges laid down by the client can put pressure on design and construction timescales. We are used to working within tight programmes and have the available resources and can source reinforcements to our core teams to cope with all challenges.

Our target is to maintain the vision throughout to create high quality, sustainable, functional, adaptable and aesthetically pleasing structures.

Nolan Associates have undertaken a number of Airport related projects which are included in the following pages.

Services

With highly qualified staff, using the latest specialist software for designing and detailing, we're able to provide detailed information and drawings for all structural requirements.

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Structural Engineering

Here at Nolans, we work with our developer and contractor clients to supply cost-effective, innovative and well-engineered designs. Our experienced structural staff have a wide range of skills, including steel framed structures, reinforced concrete structures and foundations.

Structural Engineering

- Structural design and detailing
- Structural condition surveys and reports
- Value engineering
- Compliance and validation assessment
- Expert witness

Civil Engineering

Our experienced structural staff have a wide-range of civil engineering skills that range from hydraulics and drainage, earthworks and foundations to highway and traffic engineering.

We offer an extensive array of services including:

- Civil engineering consultancy services
- Civil engineering condition surveys and reports
- External works design and detailing
- Planning support statements
- Ground modelling
- Drainage design, S104
- Pump station design
- Highway design S278, S38
- Site acquisition advice
- Water supply and sewerage treatment infrastructure design
- Flood risk assessment and modelling to PPS 25
- Value engineering
- Compliance and validation assessment
- Expert witness
- Procurement of drainage surveys and reports
- Procurement of site investigations and environmental reports

Sustainability

Working with our developers and contractors, we have achieved numerous BREEAM 'Excellent' and 'Very Good' projects.

Western Power Distribution's new 650m² depot in Spilsby, Lincolnshire, recently achieved a BREEAM 'Outstanding' rating of 100.5% at design stage under the BREEAM New Construction 2011: Simple Building's scheme. With this in mind, this project is currently the highest scoring BREEAM project in the world to date, with an anticipated 101.9% post-completion score.

Our services include:

- Planning support statements including flood risk assessment & modelling to PPS 25
- Ground modeling of attenuation ponds and swales
- Sustainable urban drainage systems (SuDS) design
- Procurement of site investigations and environmental reports
- Flood risk assessments using FSR and FEH techniques
- River and culvert modelling using "channel" or HEC-RAS
- Drainage design and simulation modelling using MicroDrainage WINDES
- The assessment of existing runoff rates including greenfield runoff

BIM

The majority of our structural staff are experienced in BIM, regularly using Revit or Tekla at their desks to calculate economic designs for walls, slabs and columns. We also have years of experience producing reinforcement drawings and quantities directly from design models.

Our wide range of services include:

- Structural engineering consultancy services
- Structural design and detailing
- Building modelling using Tekla Structures 2017, Tekla BIM site and Revit 2019–2022
- 3D modelling to establish cut/fill earthworks
- 3D modelling of drainage structures to co-ordinate with existing and new services
- 3D modelling of new roads and junctions

Norwich Airport

Nolan Associates were the civil and structural engineers for the KLM Engineering's new Hangar 9 and Workshop Buildings at Norwich airport.

The airport's new 54000 ft sq hangar features a 48m span central truss and 45m spanning roof trusses off each side.

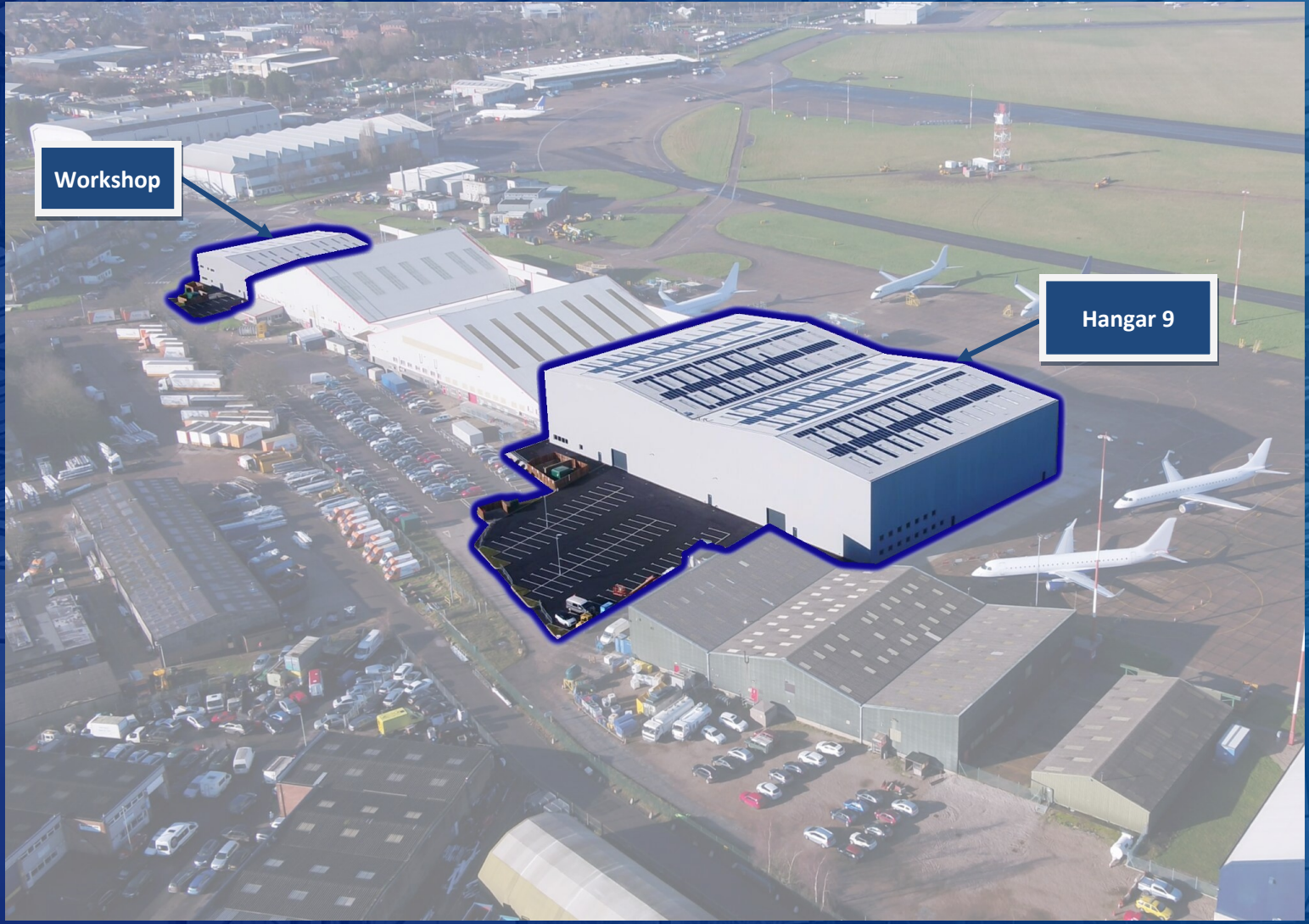
The ground floor slab was designed for heavy jacking loads.

The drainage was a major issue as the airport has increased in area dramatically over the years whereas the drainage sizes have not been improved. All the new storm water from the site passes through a 410m³ storage tank under the new car parking.

The new apron also designed in house also incorporates a new 900mm deep Qmax drainage channel to catch apron storm water.

The new 15000 ft sq repair and maintenance workshop for KLM's operations is located at the other end of the existing hangar buildings. The workshop also features a mezzanine office space at first floor.









Norwich Airport

This development was undertaken by local contractor MJS Construction with Stephen George and Partners of Leicester providing the architectural design. The buildings were completed in October 2020 despite the Covid 19 pandemic. Steelwork contractor Reid Steel provided the final design based upon the original tender drawings.

The £7 million development is part of Rigby Group and KLM's continuing investment in the airport. The Rigby group owns the Norfolk based airport as well as Bournemouth Airport, Coventry Airport, and Exeter Airport

The building will allow KLM UK Engineering to offer significant additional new capacity providing high quality aircraft maintenance and repair services to customers worldwide. KLM UK Engineering employs 390 staff at Norwich and also delivers aircraft engineering apprenticeships and training through its technical training college located in the neighbouring International Aviation Academy on site



Birmingham Airport

This was the second hanger Nolan Associates have designed at Birmingham Airport and is by far the largest with a clear internal span of 136m, a depth of 80m and a minimum clear height of 20m.

The brief was to accommodate two large wide body code E aircraft such as the Boeing 777 300ER side by side with two storey office, storage and maintenance facilities at the rear.

A double span lattice portal was utilized on a 6.7m grid with a 3.8m deep valley girder eliminating internal columns for full flexibility.

The frame design with braced bays utilized fixed pad bases to control deflections into Mercia Mudstone at depth.



Birmingham Airport

Particular attention was given to the hanger slab design as the Boeing 777 had caused premature runway failure at other airports due to its very high wheel loads compared to similar sized aircraft.

The main undercarriage of these aircraft support 90% of the aircraft weight which can double when fully loaded.

The 777 has a single 6 wheeled bogie per wing unlike the 747 for example which has twin four wheeled bogies. This resulted in six 200kN wheel loads when the aircraft is 75% fuelled.

To minimize costs the design of the hanger slab was split into two loading zones.

The first zone catered for the most onerous wheel load case and the remainder for smaller aircraft where it was impossible for the 777 undercarriage to track. The design was carried out to TR34 as a reinforced slab with six point loads with dynamic effects. This resulted in a 390mm thick slab for Boeing 777 undercarriage and 325mm for the remaining areas.

The external hard standing was an even more onerous slab design but this was carried out to MOD guidelines "A Guide to Airfield Pavement Design an Evaluation" utilizing un-reinforced 320mm deep Pavement Quality Concrete on 175mm Dry Lean Concrete on 200mm DOT Type 1 sub base. It was not possible to use this construction internally because the high cement content ruled out the use of a power float finish.

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