



Chek Lap Kok Airport

Hong Kong



Client:

Parsons Brinckerhoff (Asia)

Consultant:

Trident Engineering Constants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Alan Dundee
- Fraser Mackie

Project details:

Trident was appointed by Parsons Brinckerhoff as the aviation fuel specialist to manage all aspects of the fuel storage and distribution at the new Chek Lap Kok airport in Hong Kong. The project provides Hong Kong International Airport with the world's most advanced on-airport fuel hydrant systems.

Working in partnership with Parsons Brinckerhoff (Asia) Trident were commissioned to carry out the detailed design of the On-Airport Fuel Hydrant System and Storage facilities for the new airport at Chek Lap Kok, Hong Kong.

Trident scope included:

- Engineering Feasibility Study Aviation
- Tank Storage Design and Tanker Refuelling
- Hydrant Distribution and Pumping System Design
- Aircraft De-fuelling JET A-1
- Leak Detection
- Fire Fighting Facilities at Storage Compound,
- AVgas Loading system



In 2003 Trident continued their association with Parsons Brinckerhoff (Asia) to work on the expansion of the original jet fuel storage and distribution systems

Charles de Gaulle Airport, France



Client:

Air France / Kuwait Petroleum

Consultant:

Trident Engineering
Consultants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Craig Hollinger
- Fraser MacKie

Project details:

Trident was responsible for the Design and Commissioning of Fuel dispenser Road Vehicle Test Rig facility. They also completed the design for a fuel dispenser road vehicle test rig facility, company's own consumption (COC) refuelling facilities and vehicle service building for Air France and Kuwait Petroleum at Charles de Gaulle Airport, Paris.



Aviation Fuel Storage Depot

Bristol, England



Client:

Kuwait Petroleum International
Aviation Co.

Consultant:

Trident Engineering
Consultants

Services provided:

- Project management
- Commissioning
- Construction Supervision

Key Personnel:

- Callum MacLachlan
- Fraser MacKie
- Neil MacKay

Project details:

Trident was responsible for detailed design, engineering and project management for the redevelopment and refurbishment of an existing underground bulk fuel storage depot for dedicated aviation products, comprising 8 No. storage tanks of total capacity 62,000m³

Tridents scope included:

- storage tank upgrade
- pumping system upgrade
- pipework and pipeline upgrade
- SCADA system installation
- Hydraulic analysis
- Stress analysis
- Surge analysis
- Construction supervision
- Dry and Wet commissioning

Deep Water Aviation Tanker Berth

Bristol England



Client:

Bristol Ports Company
(Sponsored by Kuwait
Petroleum)

Consultant:

Trident Engineering
Consultants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Alan Dundee
- Fraser MacKie

Project details:

Development of a new deep water berth for maximum 80,000 dwt vessels, 2 x 12" unloading arms and 2 x 16" import pipelines (piggable) x 13km via booster pump(s) station to tie-in cross country pipeline system including hydraulic and flexibility analysis studies.

Trident's scope included;

- Pumping systems
- Hydraulic analysis
- Stress analysis
- Infrastructure design
- Pipeline (cross county) design
- SCADA systems
- Mechanical, electrical and civil detailed designs

Design and Build New on Airport Aviation Fuel Tankfarm Farnborough Airport,

England



Client:

Tag Aviation/ Shell Aviation

Consultant:

Trident Engineering Constants

Services provided:

- Detailed Design
- Build/ Construct

Key Personnel:

- Callum MacLachlan
- Alan Dundee
- Jim Semple

Project details:

As part of TAG Aviation development of Farnborough Airport new increased capacity aviation fuel storage and refueller loading facilities were required to meet the forecast increase in flights.

In a joint venture between TAG Aviation and Shell Aviation, Trident Engineering Consultants were employed to design and build of the new on-Airport Aviation Storage Facility, driver controlled off-loading, double containment storage compound and refueler loading facilities.

The development is designed around strict environmental impact assessments and conforms within the latest environmental agency guidelines.

The storage tanks are contained with primary, secondary and tertiary bunds and are supplied from a dedicated unloading bay with failsafe driver operated earth and overspill prevention.

Planning and Detailed Design Services for a Greenfield Birmingham & Bournemouth Airports,

England



Project details:

Trident had been commissioned by Exxon Mobil to provide engineering services at their Birmingham and Bournemouth on Airport sites.

Bournemouth:

Trident was responsible for the complete Civil, Mechanical & Electrical Installation of New Fuel Farm Facility, along with comprising Primary, Secondary and Tertiary bunding required for the SSSI (Site

of Special Scientific Interest) site. This also included all accompanying technical drawings.

Client:

Exxon-Mobil Aviation

Consultant:

Trident Engineering
Consultants

Duration / completion:

Jan 2006- Dec 2006

Services provided:

- Commissioning
- Civil, Mechanical & Electrical Installation
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Craig Hollenger
- Jim Semple

Birmingham:

Esso Petroleum Company Limited engaged Trident Engineering Consultants to design and commission Jet A1 Storage including automatic tank gauging, high level alarms, off loading and loading pumping facilities. The work was required to satisfy the local Health and Safety Executive concerns regarding the net capacity of the existing bunds with regards the storage tanks contained therein.



EssoMobil Aviation, Bournemouth International Airport, England –
Multi-discipline Design, supervision and Commissioning by Trident
Engineering

Project Permanent Aviation Fuel Facility
Siu Leng Shui, Tuen Mun
Hong Kong



Client:

Leighton Asia

Consultant:

Trident Engineering
Consultants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Mark Craig

Project details:

Following on from the successful completion of the new Hong Kong International Airport in 1998, fuel farm and hydrant system at Chek Lap Kok.

Trident were awarded the *Specialist Consultancy Services* contract by Leighton Asia to carry out sub-sea and transfer pipelines, stress and surge analysis and electrical instrumentation design specifications for the new PAFF project at Siu Leng Shui, Tuen Mun

Trident specialised input include:

- Design PEER review
- Hydraulic for pumping analysis
- Stress analysis
- Surge analysis

Pipeline Booster Pump Stations



New Aviation Import/Export Facilities at Bristol Port, England

Kuwait Petroleum International



60km Jet Fuel Cross Country Pipeline Upgrade From Class 300 to 600 South of England, UK

LPG Plant Design and Construction UK



Client:

BP Oil UK

Consultant:

Trident Engineering
Consultants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Neil MacKay
- Fraser Mackie

Project details:

Trident is responsible for installation of LPG facilities for BP Oil's UK petrol stations. Trident carries out installation and commissioning of LPG facilities in accordance with BP specifications. It provides design and development of fully buried and aboveground systems for storage of LPG at the retail forecourts. Trident also provides on site supervision and commissioning of LPG installations throughout the UK via its team of highly qualified and experienced engineers.

Trident has successfully completed the Design and Build of LPG Installations for major supermarket retail sites.



Stanley Services Limited (SSL)- Avgas Storage and Loading System Falkland Island



Project details:

Trident carried out the design and engineering associated with the depot re-development comprising of:

- Conceptual and detailed design for installation of Avgas storage and distribution facility including estimate, design options and recommendations

for installation and fuel supply.

Client:

Stanley Services Limited

Consultant:

Trident Engineering
Consultants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Fraser Mackie
- Neil MacKay

- Preparation of tender documentation and project management services on behalf of the client on the following projects;
 - Fuel storage terminal
 - redevelopment including new vertical storage tanks

Sahara Energy Nigeria Nigeria



Client:

Sahara Energy Nigeria

Consultant:

Trident Engineering
Consultants

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Okey Amuta
- Fraser Mackie

Project details:

Trident was primarily responsible for the design studies of the JET A-1 fuel hydrant system from Clients Depot to Lagos International and Domestic Airport.

The site was a brown field site which meant Trident was also involved in reviewing the existing airport and tankage facilities, hydrant rout surveys and fuel demand studies. Preliminary design of hydrant system complete with automate fuel management system for airport.

Planning and Detailed Design Services for a Greenfield International Airport at Hambantota, Sri Lanka



Client:

AECOM

Consultant:

Trident Engineering
Consultants

Duration / completion:

2012-Present
(Under Construction)

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Fraser Mackie

Project details:

Trident carried out the detailed design of the new Hambantota International Airport.

Trident scope included:

- Layout
- Storage tank details
- Hydraulic system design and detail
- Pumping studies and calculations
- Road loading/ unloading design
- SCADA system
- Electrical detailed design- power, lighting, ESD systems etc.
- Civil detailed design- bunker roadways, hydrant pits, building etc.
- Fire Fighting systems design
- Equipment specification

Larnaca Airport Fuel Farm

Cyprus

Client:

AECOM

Consultant:

Trident Engineering
Consultants

Project details:

Trident carried out a complete PEER review of an existing design including hydrant assessments, calculations, redistribution etc.

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Fraser Mackie

Glasgow Airport

Scotland

Client:

SKANSKA

Consultant:

Trident Engineering
Consultants

Project details:

Trident were appointed to carry out an assessment and PEER review of the proposed new aviation fuel tank farm at Glasgow airport.

Services provided:

- Conceptual Design
- Preliminary Design
- Detailed Design

Key Personnel:

- Callum MacLachlan
- Fraser Mackie
- Neil MacKay

Caticlan Airport Fuel Farm and Hydrant System

Philippines

Client:

AECOM

Consultant:

Trident Engineering
Consultants

Duration / completion:

Post Design Stage
(Pre Construction)

Key Personnel:

- Callum MacLachlan
- Fraser Mackie
- Grzegorz Swisch
- Alan Dundee
- Mark Craig

Project details:

Design layouts & details for Airport Fuel Farm and hydrant system incorporating:

- Demand analysis
- Road loading/ offloading system
- SCADA System
- Fuel Hydrant System
- Hydraulic & Surge Analysis
- Pumping and filtration
- Storage Tank Design
- Electrical & Instrumentation Design
- Civil Works Design – hydrant pits, buildings, roadways etc
- Fire Fighting Detection and protection – foam and water systems
- Specifications – Installation, equipment and functional design.