

# Case Study



Sector: Transport  
Project: Mersey Tunnel  
Location: North West of England

## Project background:

When Queensway Tunnel opened in 1934 it was considered to be an eighth wonder of the engineering world. Even today the Tunnel continues to undergo upgrades in order to drive high standards of safety. Staff work in shifts to cover a 24 hour day, monitoring air quality and the safety of motorists via 240 cameras and an assortment of other highly specialised equipment.

Mersey Tunnels Police provide a dedicated service monitoring and ensuring safety within the Tunnels complex using a range of integrated communication networks. As a part of the continuous improvement programme it was decided to upgrade a number of these systems.

Various upgrades were introduced and provided the Police with a break in facility allowing them to send emergency signals/messages via passenger radio and a soon to be commissioned Public Address System, instructing the public to listen to further instructions and giving directions.

Additionally the Police team monitors the tunnels via a series of CCTV cameras. Rainford Solutions were contracted to provide cabinet and thermal solutions located in onerous conditions to ensure the reliable operation of the above system up-grades.

**"The safety improvements to the Queensway Tunnel have significantly improved the safety for our users", comments a Mersey Tunnel representative.**



Cabinet located in an onerous environment

## Customer recommendation:

*'Rainford Solutions has got the specialist knowledge in enclosure design, that's why we used their services to gain added value. The cabinets are still in situ\* and operating with all of the equipment working; this just proves that we made the right choice to use Rainford Solutions.'*  
Project Manager

- ✓ Read on to find out how our cabinets were adapted to provide top protection for the communication equipment.

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## Cabinets

Two types of cabinets were designed to meet the challenging project requirements. Both products were integrated to the 3<sup>rd</sup> stage of our integration stages. This comprises of mechanical assembly with thermal management and power management.

The IP65 cabinets were equipped with a number of features that allow them to operate in extremely onerous environments. When designing the product we took into consideration such factors as:

## Deployment Conditions

The cabinets had to conform to the strict sizes of the motorway hatches in the road surface via which they would be deployed along the length of the tunnels. In house design team and manufacturing techniques allowed us to develop suitable cost effective solutions. Additionally the deployment had to take place during the night to limit potential traffic disruptions, thus the cabinets had to be fully assembled to ensure the roadway could re-open on time.

## Water Flooding

The cabinets were located in the area below the roadway. This area experiences ongoing flooding coming from the underground water streams. Despite the tunnel pump system regulating the water levels we still needed to ensure the cabinet plinths and cable seals would provide secure protection against these conditions.

## Corrosive Water

The water accessing the tunnel grounds can be fresh water or salt laden water. This required extra protection in a form of a special paint coat. The stainless steel cabinet construction has been layered with specially designed high performance paint. Our proven external powder coating system consists of a number of different processes which when applied to strict guidelines provide adequate protection for the most challenging environment. The paint process developed by Rainford Solutions is a result of years of experience of designing cabinets for various corrosive environments worldwide.

## Tunnel Curvature

The naturally curved tunnel surface required the cabinet plinth to have features which allowed the cabinets to be installed at various locations. This adaptation allowed keeping the cabinet in correctly levelled, vertical position suitable for the equipment.

## Air Pollution

The tunnel environment is potentially corrosive due to the various emissions including diesel/petrol fumes, brake dust or even fuel spillages. The area in which the cabinets were installed are fed clean air from the main ventilation shafts via large fans towers. The system blows clean air into the tunnels and extracts the dirty air created by fumes and emissions from the circa 35 thousands vehicles which use the tunnel every day.

In order to protect the equipment from this harmful environment and to sustain its correct temperature, the product was equipped with an integral Heat Exchanger Solution designed and built by Rainford thus regulating the cabinet internal temperature, reducing maintenance down time and providing a clean internal cabinet environment to house the critical equipment.



Cabinet on a plinth adjusting to the tunnel's curvature