



CASE STUDY
15655

Millbrook Proving Ground High Voltage Infrastructure

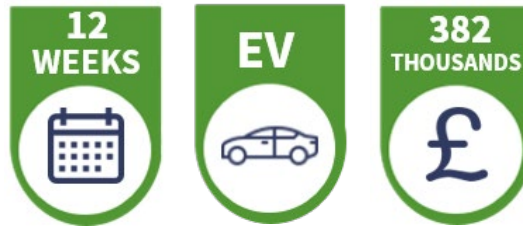


Millbrook Proving Ground:

As a high voltage (HV) engineering contractor Powersystems were chosen as the preferred partner to assume the responsibilities of designing, procuring, installing and commissioning the HV electrical infrastructure for the new Battery Testing and Powertrain facilities at Millbrook Proving Ground in Bedford. Officially opening in early September 2019, the battery testing facility will be the largest of its kind in the United Kingdom.

During the works, the existing 11kV network was extended to incorporate the two new test facilities and Powersystems engineers worked hard to ensure that their presence on site did not interrupt Millbrook's everyday business operations. Engineers re-routed the electrical supply to the various other test centres at Millbrook allowing works to be carried out safely and without the need for any outages. Further to this, engineers also carried out directional drilling works below the high speed test track – all whilst vehicles were still being tested.

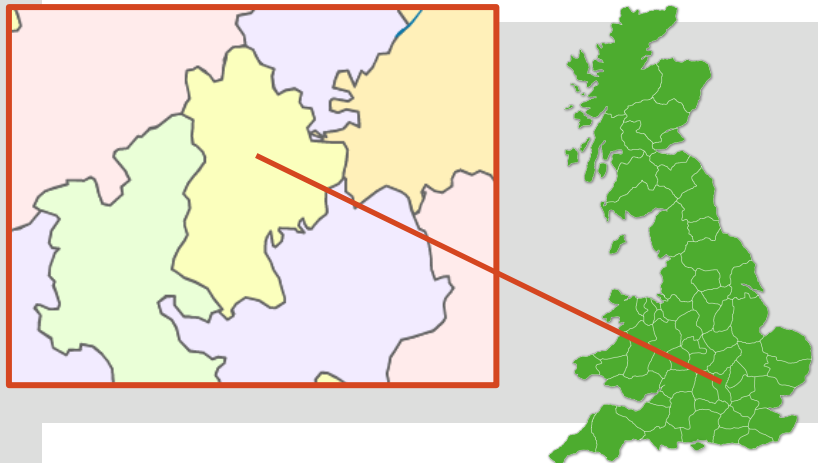
Thanks to Powersystems, Millbrook now have the HV infrastructure in place to support their new test facilities as well as a robust and reliable electrical network throughout their site. The facility also complements Millbrook's expansion into the USA, where they will support future electric vehicle development.



Millbrook Proving Ground Battery Facility:

The main scope of works undertaken by Powersystems at Millbrook was the following:

- ▶ Provide design engineers to design the network extension to suit the prospective load demands required by the new facilities.
- ▶ Carry out protection studies to ensure that the extension of the existing network would integrate well with the overall electrical protection of the existing site.
- ▶ Conduct earthing studies to aid the design of a safe earth grid.
- ▶ Installation of 1km of new 11kV cabling, a section of which was installed via directional drills under various car test tracks and roads.
- ▶ Install 3 no. new 11/0.4kV transformers
- ▶ Install 3 no. new Ring Main Units
- ▶ Procure bespoke new substation GRP housing on site
- ▶ Install additional earthing material to support the updated network.
- ▶ Supply Senior Authorised Person (SAP) to carry out HV switching operations during the works.
- ▶ Supply Commissioning Engineer to carry out the final testing and commissioning of the network.
- ▶ Provide cable jointing team to carry out HV cable joints and terminations.



**11
kV**

Millbrook Proving Ground – High Voltage Infrastructure

CASE STUDY 15655

The site:

Millbrook has a range of test facilities for full vehicles, and components and attracts clients who are leaders in automotive and defence industries.

Powersystems' delivery of the new battery test and powertrain facilities has upgraded the site ready for the future of automotive development. These new additions will complement what is already at Millbrook Proving Ground which comprises of the following:

- ▶ A wide range of outdoor and indoor test tracks totalling over 70km in distance
- ▶ Engine dynamometers to measure engine torque, speed, and used to calculate instantaneous power
- ▶ Environmental chambers where vehicles are exposed to the most extreme temperature conditions found across the globe
- ▶ e-motor and e-axle test cells to support electric car development
- ▶ Portable emissions measurement systems (PEMS).
- ▶ Structural test laboratories which provides validation testing of systems and components such as vehicle body and vehicle chassis systems.
- ▶ Crash laboratories (including a state-of-the-art ServoSled) where vehicles are tested to meet Euro NCAP, European, US and other worldwide safety standards.
- ▶ Interior systems laboratories

Located in central Bedfordshire, Millbrook Proving Ground is a geographically convenient test site for customers all over the United Kingdom, Europe and beyond. Millbrook is a one-stop shop for the development of electric vehicles and propulsion systems. Millbrook also operates sites in Leyland, UK and Michigan, USA, which specialise in e-motor and inverter testing

Millbrook has made a significant investment in facilities for testing advanced low emission vehicle technology. Its battery and propulsion systems test capabilities help bring new hybrid and battery electric vehicle powertrain technologies to market sooner. It has now installed 12 battery test cells, which will be expanded over time, each able to test automotive battery packs up to 1100V, 1400A, 750kW over a temperature range of -40°C to +90°C.

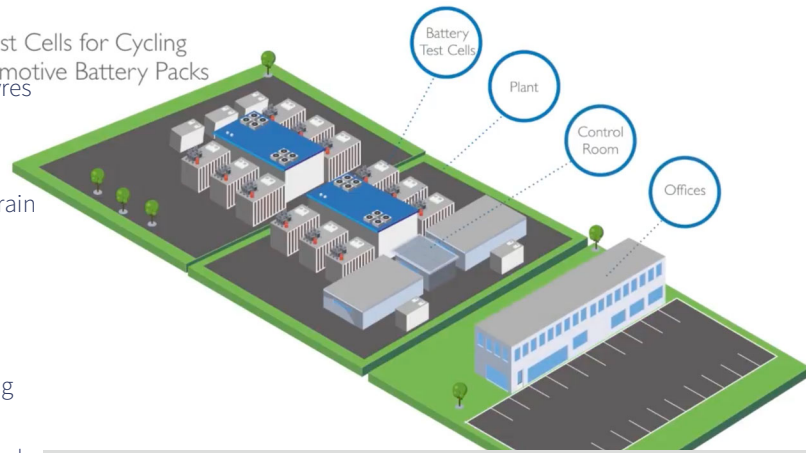
Scope of works:

One of the major project difficulties that Powersystems had to overcome was the installation of 11 kV cables underneath the high-speed circuit which was directional drilled by a specialist drilling contractor during this continuous 24/7 operation.

The major items of electrical plant that Powersystems supplied, installed, and commissioned were for the design, supply, installation, testing and commissioning of the Integration of new 11 kV cables, switchgear and 3 transformers into existing site HV ring main.

The works also included the co-ordination with incumbent civil contractor to provide Transformer bunds, cable trenches and directional drill under High speed test track.

12 Test Cells for Cycling Automotive Battery Packs



The results:

- ▶ The work was completed on time and to budget ready for official opening in September 2019

Project facts and figures:

- ▶ Length of onsite 11 kV cabling: 1.0 km
- ▶ Powersystems are a Lloyds registered (NERS) approved independent connection provider (ICP), who in addition carry out private wire infrastructure project works

Environmental Benefits:

- ▶ The project supports the acceleration in a sustainable shift to lower carbon, cleaner vehicles and fuels and will ultimately create opportunities for UK business.
- ▶ A move towards net zero targets
- ▶ Continued development of vehicle charging technology infrastructures



For more information

T 01454 318000

www.powersystemsuk.com

Powersystems UK Delivering Greener Power Solutions