Leading provider of AC & DC Traction Power Distribution and Infrastructure Services
Founded in 1983 we have established an unrivalled reputation for quality and flexibility in all aspects of our projects.

We are providers of complete package services for the design, supply, construction, testing and commissioning of traction power systems and for the modification of operating systems.

| Installation, testing, commissioning and maintenance of complete traction substations |
| Modification of existing power distribution systems |
| Design, project and site management services |
| Comprehensive Electrical Track Equipment (ETE) works |
| Site surveys and reports |
| Depot overhead trolley and shore supply systems |
| Preparation of commissioning and maintenance documentation for new and existing installations |
| Design, installation and testing of complete earthing systems including deep hole boring |
| Type, short circuit and impulse testing including specialist equipment modification and the associated Network Rail product acceptance |
| Technical support |
| • Design Personnel |
| • Testing & Commissioning Engineer |
| • Nominated Personnel for Switching & Isolation (Cat A) |
| • Substation Access Supervisors (Cat B & C) |
| • HV Assessors |
| • HV Competent Persons |
| Low voltage building service installation and testing to BS7671 |
Continuing our ongoing works on the East London Line, Antagrade were engaged to support the additional berthing requirements at Silwood depot to allow train capacity increases in line with the Mayor of London’s manifesto.

Tasked with installing and testing the traction power system upgrades our workscope included the installation, testing and commissioning of a new modular DC switchboard building and its integration into the existing substation at Canal Junction. As well as delivering the ETE works, Section Proving and Short Circuit testing, we provided the system protection study and designed and installed the substation’s new frame leakage protection.

The new substation module feeds the sidings with DC traction power via a pair of controlled track switches and eleven trackside isolators, all of which were installed, tested and commissioned by Antagrade. All traction cabling – main feeder cables and conductor rail jumpers, negative bonding and return was laid and installed by us.

The Silwood project demonstrated Antagrade’s core strength as a flexible single-source supplier of design coordination, installation, testing and commissioning services for all elements of the traction power system.
THREE BRIDGES ETE DESIGN

This project included electrical designs for the reinforcement of DC Track Feeder cables directly connected to substations and Track Paralleling Huts (TPH) and also the along track / open route cabling. A combined electrical Form A/B design submission was prepared for each electrical section which included:

• Conductor rail layout drawings
• Comprehensive track diagram updates
• Negative bonding layouts
• Designer risk assessment
• Design Statements
WESSEX CONTROLLED MOTORISED SHORTING DEVICES

Outline and detailed design, installation, testing and commissioning.

Antagrade were engaged for the Grip 4 and Grip 5 design elements of the Network Rail ‘Smarter Isolations’ project.

This project will provide swifter and safer isolations of the third rail in DC electrified areas, increasing both operational safety and the working time available during possessions.

As part of this project over 200 Circuit Main shorting devices will be required to be installed at 43 sites throughout Wessex. Antagrade are applying their extensive experience and playing a key part in the design and integration of this new equipment with the wide variety of existing equipment in service in the Wessex area.

Project deliverables include both Form A and B electrical and civil designs based on preliminary and detailed site surveys.

As part of this project the full suite of design, installation and testing deliverables is provided in-house by our own design team, including:

- Design System Block Diagrams
- Operations Diagrams
- Amendments to Comprehensive Track Diagrams
- Modified Conductor Rail Drawings
- Protection Calculations
- LV Schematics
- Inspection and Test Plans

BACK TO ALL CASE STUDIES
Antagrade have worked with DLR since its inception in the 1980s, installing, upgrading and carrying out routine maintenance of all elements of the traction supplies for system operators including the current franchisee, Keolis Amey Docklands (KAD).

Building on our unparalleled experience and knowledge of the DLR Traction Power assets, Antagrade were awarded the works for the electrical installation, testing and commissioning of this sensitive technical project and played a key part in ensuring the lowest risk works realisation.

This was a critical project, especially so at the Bank TP Hut, where supplies to the dead-end interconnection with London Underground require to be maintained at all times. During the early consultation and strategy development period of the project, we proposed an interim commissioned phase to confirm the reliability of the scheme prior to full implementation.

As well as site installation and critical changeover, our contract included Attendance at Factory acceptance tests, off-site DC Protection relay programming and high current Direct Current (DAOL) testing. The existing tunnel trip and DC intertrip was proved for correction operation before being transferred to the temporary configuration and finally recommissioned, with all the works being carried out within very restricted possession periods.

The original systems installed and maintained by Antagrade since 1990 were then decommissioned and removed, the culmination of a project where our experience and cooperative working approach resulted in the acknowledgement from our client:

"Thank you for all your team’s efforts over the course of this project. You have been invaluable with your knowledge of DLR infrastructure and especially in liaison with KAD."
WAREHAM SIGNALLING POWER SUPPLY SECURITY WORKS

As part of a signalling power supply reinforcement project, a battery-backed 80kVA supply point had been partly installed but not connected or commissioned.

The system design was not able to be realised with the workscope defined in the original contract, and the project had been abandoned. Three years later, Antagrade were awarded a contract to reconcile the design to supply both the equipment and services necessary to commission and integrate the system with the Network Rail power supply and SCADA systems.

OUR WORKS COMPRISED:

- Design development and production of Form B designs for all High Voltage, Low Voltage, protection and control cabling
- Strategy development for UPS, Transformer, Signalling distribution panel and protection testing including critical supplies transfer
- Management of design changes to UPS and SCADA systems at site and in Control Room
- Project Management and Administration
- Isolation, reconfiguration, termination and testing of HV cables
- LV supplies cabling, testing and commissioning
DEPOT ISOLATION FACILITIES

Following a fatal accident to an operative in an electrified depot, Network Rail and one of its train operators jointly commissioned a proposal to provide a permanent solution to the requirements of an ORR improvement notice.

Antagrade were invited to assist in finding a solution to ensure that the conductor rails within depot sheds were able to be isolated and effectively bonded without affecting other depot operations.

The systems are now fully commissioned into service and enable train drivers to position stock within the sheds and to implement a fully secured isolation of stabled vehicles with the conductor rail status clearly enunciated to all other depot staff.

ANTAGRADE WERE COMMISSIONED TO:

Prepare and present:

• A detailed functional specification
• Options for implementation
• Develop the agreed solution to a design for construction

Procure, install and commission:

• Civil and cable route works
• Isolation and bonding equipment
• High-intensity overhead power status indicators
• Modifications to conductor rail and bonding cabling configurations
The only DC line heading north out of London, the Euston to Watford line could be regarded as having been somewhat neglected in comparison with other suburban areas.

This was a demanding project where our experience and flexibility allowed us to cope with an ever-changing programme and technical requirements.

The LOCIP works comprised a programme of DC power supply reinforcement and strategic reorganisation of HV distribution, with abandoned feeders being relocated and brought back into service and a complete new central HV substation installed and commissioned ready for the arrival of new grid supplies.

Antagrade were involved from the outset, working alongside and supporting the client through proposal development and the bid process into successful contract award, including the installation, testing and commissioning of the two new HV switchboards and a number of DC cabling and ETE reconfigurations, liaising closely with the Electrical Control Room and the maintenance organisation for local intelligence unavailable through project channels and assisting our client in a first foray into DC traction.
The East London Line is a former London Underground line, now been incorporated into the London Overground and running North to South through the East End, Docklands and South East London. The East London Line section covers seven substations and one Track Paralleling Hut including supplies to the Depot facility at New Cross Gate.

Antagrade have maintained all the traction power equipment on the revamped line since its opening in 2010. This includes planning, coordination and multi-party project interfacing to ensure undisrupted train running as well as carrying out routine maintenance activities.

All works are carried out using our in-house Network Rail substation-competent authorised personnel and technicians working to Network Rail standards.

We also provide technical support to the systems stakeholders and our expertise has been called upon for significant advisory, remedial and ad hoc works.

The scope of equipment maintenance responsibility includes, transformers, rectifiers, AC, DC & LV switchboards and auxiliary equipment.
DOCKLANDS LIGHT RAILWAY FIRST PHASE TO PRESENT DAY

Involved from the initial construction of Dockland’s Light Railway where Antagrade project managed and installed the fixed power supply system and cabling for GEC, including part of the Brecknell Willis third rail, we have since played a key role in the development of the tram system. Antagrade have also prepared tender specifications covering power system reinforcement which included additional 11KV switchgear, additional 750V DC switchgear and transformer rectifier sets.

For over 20 years we are proud to have provided expertise in the design, supply and installation of the upgrades including:

- DC negative reinforcement
- System mass trip
- Falling voltage protection
- Equipment/Substation earthing and bonding
- Equipment monitoring
- Motorised track isolation
- Local control panel modifications
- Track negative bonding
MANCHESTER METROLINK PHASE 1 TO PRESENT DAY

Manchester’s Metrolink light rail system was commissioned in 1992 running from Bury in the North to Altrincham in the South via the City Centre with a spur to Piccadilly main line station.

Antagrade provided site installation management and installed the complete fixed traction power supply equipment at twelve substations form the 6.6kV or 11kV incoming supply to the 750VDC traction output to the OLE.

Our scope of work included installation and jointing of the underground cables in the City Centre and trackside cables elsewhere together with the traction current return bonding.

Building on our involvement on the initial Manchester Metrolink construction we have provided technical services throughout the construction and integration of the tram system’s great expansion.

From the site management and pre commissioning of new modular substations and Track Paralleling Huts to the reconfiguration of the existing traction power system to allow reinforcement and reconfiguration Antagrade’s expertise has been utilised throughout the project.

COMPLETED WORKS INCLUDE

Relocation of equipment, including transformer rectifier units and circuit breakers, and integration design and installation at a key system section to allow traction power supplies to be connected to a new depot facility.

Taking delivery and pre-commissioning of modular substations and TPH to reinforce power supplies to the system and for the Phase 3 extension.

Protection system works including the design, installation and commissioning of a new Hard Wire Mass Trip system.
WRAYSBURY SUBSTATION HV SWITCHBOARD UPGRADE

The project was part of a strategic upgrade in which a new HV switchboard was installed to provide additional flexibility in the Network Rail 33kV distribution network.

Antagrade took responsibility for civil and electrical design and implementation works involving reconfiguration of the substation and phased changeover of essential connections to the HV network. All electrical design was carried out in-house, with a new switchboard and connections to power and peripheral systems installed, tested and commissioned to a challenging programme to meet new train service requirements.

The design and build package included all proposals for layout, interconnection, testing and integration and required structural modifications to the building as well as the provision of an innovative bunded shelter for outdoor transformers (the site was located between freshwater lakes in rural Surrey).

The works were further complicated by the inadequacy of the original 1950s cabling and supervisory system to accommodate the control and communications requirements of the latest switchboard and protection systems. By using local gathering and transfer, data was relayed between site and control room via adjacent substations, generating communications duplication capacity and thereby providing increased system availability.
Antagrade holds a Network Rail Principal Contractor Licence allowing us to undertake work directly with Network Rail on their controlled infrastructure throughout the UK.

We have implemented and maintain a documented Management System in compliance with the requirements of Railway Standards and maintain Certification to the following Standards:

BS EN ISO 9001:2015
BS EN ISO 14001:2015
BS OHSAS 18001: 2007

RIQC:
Our compliance with these standards has been independently audited by UKAS accredited RIQC.

RISQS:
Antagrade is RISQS registered under supplier ID 3045.

NSARE Licensed Distribution Assessment Provider
Antagrade is an NSARE Accredited Distribution Assessment provider allowing us to provide Level A and Level B competence assessments for access to Network Rail’s electrification assets under license RTAS0312.

COMPANY POLICIES AND PROCEDURES:
Our policies and procedures including Health and Safety, Quality and Environmental. These will be made available, by application, to relevant interested parties as appropriate, including subcontractors, clients, third parties and the general public.
Antagrade Electrical Limited was established in 1983 by engineers experienced in AC and DC Traction Power Construction going back to the West Coast Main Line Stage 1 Electrification.

We were formed by personnel from Switchgear and Cowans, part of CEM group which included Bertram Thomas (DC Traction Breakers), Hackbridge and Hewittic (Transformers and Rectifiers).

Switchgear and Cowans (S&C) manufactured AC Switchgear up to 33kV including 25kV Switchgear on the West Coast Main Line. The experience gained at S&C in AC and DC traction power systems included design, manufacture, site installation and commissioning, in particular on the West Coast Main Line Stage 1 Electrification.

The company’s original operations were substation and equipment construction. This expanded with the business to include track bonding, track cabling, track isolators, indicators and shore supply systems and maintenance.

Major contracts have included the site management and installation of traction and substations on Docklands Light Railway, Manchester Metrolink, London Underground, Channel Tunnel-related Power Supply Reinforcements and later the Channel Tunnel Rail Link together with Network Rail Power Supply Upgrade projects.
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