

Rail Construction Solutions



Drainage, Cable Protection and Water Management Solutions

Trackside & station drainage solutions



Drainage, cable protection and water management for railways present unique challenges to network operators, contractors and engineers alike.

Polypipe is the UK's largest manufacturer of engineered plastic piping systems, offering bespoke design services and pre-fabricated solutions across the transport infrastructure, commercial and residential markets. Our tailored solutions provide efficient, reliable systems to bring tracks back into service sooner and keep inconvenience to rail travellers to a minimum.

Manufacturing expertise

We pioneered the development of plastic drainage solutions, challenging years of tradition to introduce the first true alternative to concrete and clay. Our state of the art manufacturing and pre-fabrication facilities, coupled with an extensive and responsive merchant network, ensure we are perfectly placed to meet the challenges posed by rail infrastructure drainage, cable protection and water management. Our knowledge and experience in designing and engineering systems for a number of rail projects means our technical teams can offer advice and support based on proven products and solutions.



Benefits of plastic

Polypipe products are manufactured from high strength polymer and are designed for complete system integration to link drains, culverts, catchpits and manholes in a single solution. They are far lighter in weight than equivalent concrete products and are easier to transport, using less fuel on their journey to site.

Product approvals

Where possible, our products carry Network Rail Parts and Drawing Systems (PADS) approval for their intended application, they are also Link-up Approved. Whether for drainage, cable protection, water management or rainwater harvesting, Polypipe solutions for rail can help you save time, money and materials whilst delivering performance and reliability in every project.

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Trackside drainage solutions

Any trackside work poses very specific problems for engineers and contractors.

The biggest issues, of course, are the need to close the track itself while the work is carried out and the cost of the subsequent downtime to rail operators and their customers. Anything that can speed up completion and allow the track to be opened sooner is a positive for the contractor and operator alike, and it's here that Polypipe's engineered solutions provide a significant advantage. Because our products are made from high strength polymers, they are up to 94% lighter in weight than equivalent concrete systems, allowing them to be easily manhandled to track level in areas that simply aren't accessible to heavy lifting gear. Once in place, innovations such as integral socket joints and our patented electro-fusion welding process allow longer lengths of drainage pipe to be joined and sealed quickly and efficiently. Many of our solutions are engineered to bespoke designs taking into account ground conditions, track use and the local climate. Not only does this reduce the cost of works by reducing downtime, it also means engineering teams spend less time at the trackside.

Trackside systems and products

Our design team will help you in the development of trackside systems using our range of integrated products and taking full advantage of our prefabrication capabilities.

Drainage systems

Our versatile, PADS approved Ridgidrain pipe provides efficient trackside drainage to stop surface water pooling on the trackbed itself and prevent saturation that can lead to ground movement. With its high strength and rigidity, Ridgidrain can accommodate extreme ground loads close to the trackbed, while remaining flexible enough to reduce the likelihood of leaks and the need for repair.

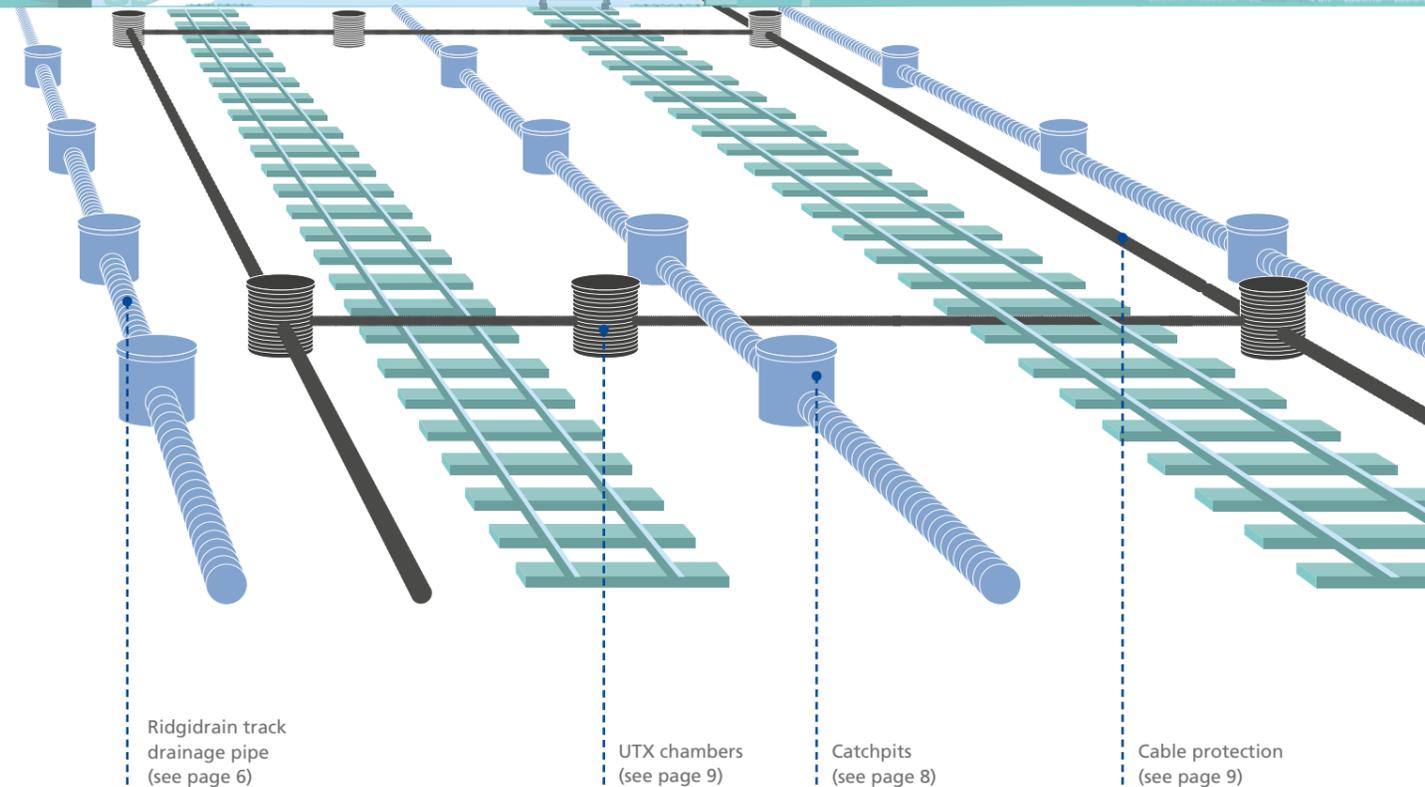
Manholes and catchpits

Our pre-fabricated manhole and catchpit products are manufactured off-site and brought to the trackside as and when they are needed to meet your project plan. Compared to concrete alternatives, which have to be built-up on-site, the pre-fabricated units arrive as 'one piece' and because of their light weight nature they are easier to handle and quicker to install.

Cable protection

Polypipe's robust cable protection solutions already safeguard thousands of miles of signalling and power cables in the UK rail network. As well as providing sealed systems that keep out the water which could damage expensive cabling and equipment, they also help prevent metal theft... saving rail operators money and improving passenger safety.

UTX Duct under track on project specific basis –
Call Polypipe for more information: +44 (0) 1509 615100



Products for trackside drainage and cable protection



Our innovative products for trackside applications offer significant benefits that clay or concrete systems simply can't deliver.

Much lighter in weight than traditional materials, they make delivery, site access and installation quicker and easier - even in restricted areas like tunnels and cuttings. Entire bespoke drainage systems can be pre-fabricated and stored at our state of the art facility and then delivered, ready for rapid installation, when required. Crucially, where possible, Polypipe products for use at the trackside are included in Network Rail's Parts and Drawings System (PADS) catalogue, guaranteeing their performance and safe use in the rail network.

Ridgidrain surface water drainage

A robust, structured wall drainage pipe with exceptional strength and load rating for leak tightness in trackside drainage.

PADS certified Ridgidrain is already being used successfully in a large number of rail drainage systems. It is engineered from high strength HDPE using a structured wall design to produce a pipe that has all the strength of a solid profile, while providing all the benefits of additional flexibility and a lighter weight.

As a result, it will shed the loads applied by passing trains to the surrounding backfill, minimising the risk of leaks. At a fraction of the weight of clay or concrete, Ridgidrain is manufactured in longer 6m lengths, leading in turn to fewer joints over a given distance. This reduces the number of points at which the overall drainage system is vulnerable to leakage, while speeding up installation and ultimately, the return of the track to the rail operator.

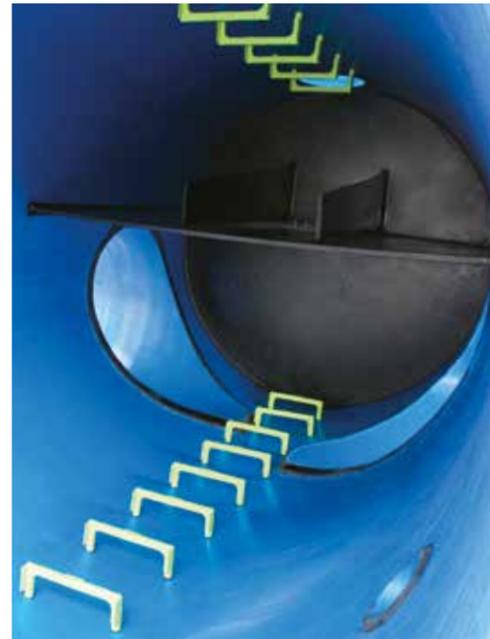
Typical Rail Applications

- Trackside and station area surface water drainage
- Infiltration systems (with perforated pipe wall)

Benefits to Rail Projects

- Lighter in weight: makes installation quicker, lowers costs and shortens track possession times
- Easy to handle and install
- 6m lengths to reduce number of joints
- Integral sockets speed up jointing process
- Can be transported and carried to track level without heavy lifting gear
- Easily cut to size on-site
- PADS approved for use in rail infrastructure:
 - 100mm - 600mm sizes approved for the Cess/non loaded area
 - 100mm - 450mm sizes approved for 6ft area

Products for trackside drainage and cable protection



Manholes and Catchpits

A wide choice of structured wall products for rail infrastructure projects.

Catchpits intercept silt, grit and other impurities that are washed by rain from the track into the drainage network. These impurities sink to the bottom of a catchment chamber, improving the quality of water at source preventing blockages and damage to drainage systems.

Our manhole units allow critical inspection points to be built into your trackside drainage system where the need for access by maintenance teams is most important.

Both products are manufactured off-site to precise specifications, taking into account water flow rates and ground conditions for each length of track. Arriving on-site as pre-fabricated modular units, they can be quickly installed and connected to your trackside drainage system and if they are being installed in non-trafficked areas, would not need supporting brickwork or concrete backfill.



Typical Rail Applications

- Trackside and station area access

Benefits to Rail Projects

- Off-site fabrication and delivery to project timescales
- No brickwork or wet trades in non-trafficked areas enables faster installation and reduced track possession times
- Lighter in weight than clay or concrete products for easier handling and improved health and safety
- Integral sockets for secure, leaktight connection
- PADS approved for use in rail infrastructure: Catchpits approved for the Cess/non loaded and 6ft area

Cable Protection

As the UK's largest supplier, Polypipe provides a full range of proven cable protection solutions for critical power, lighting and other railway cable networks.

With twin wall, single wall and coiled products to suit a variety of access and ground conditions, our products offer a flexible and practical way to install and protect cables in all railway applications. All our cable protection ranges are certified to British and European standards, are colour coded according to National Joint Utilities Group guidelines and include a full range of access boxes, pole boxes, covers and divider frames. Bespoke, pre-fabricated multi-connection UTX chambers



UTX Chamber

allow numerous Ridgiduct and Ridgicoil pipes to be laid in various configurations around the railway track. Manufactured from Ridgidrain 600mm and Ridgiform-XL large diameter pipe from 750mm, UTX chambers are PADS approved in sizes 600mm to 1200mm. We can meet short delivery lead times and the product enables fast installation, limiting disruption to railway activity at busy train stations.

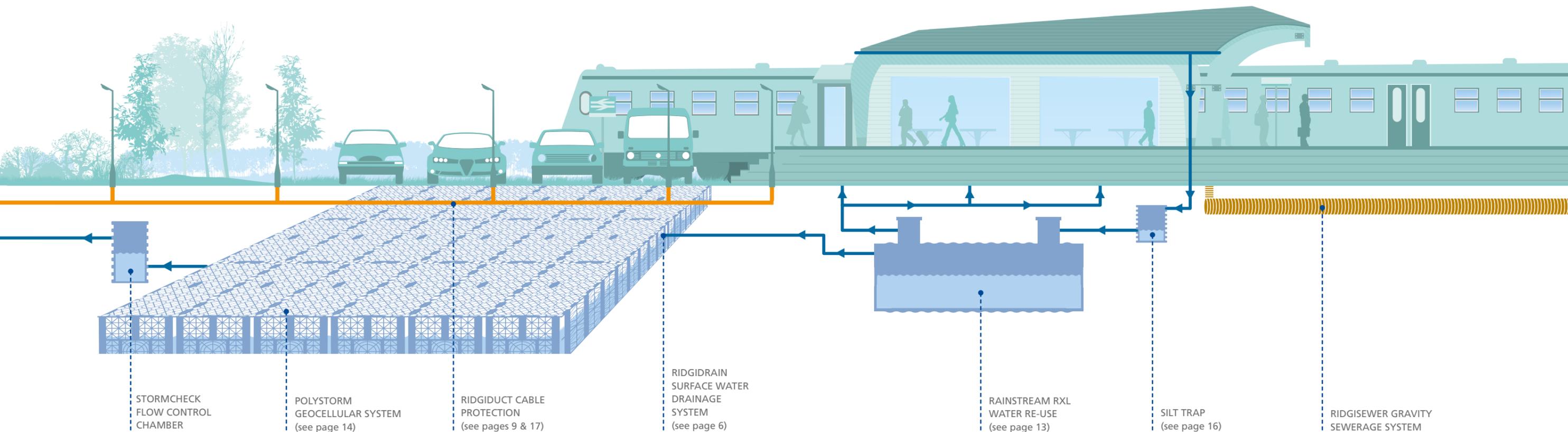
Typical Rail Applications

- Trackside area cable protection – used for signalling

Benefits to Rail Projects

- Lighter in weight: quick and easy to install, resulting in lower installation costs
- Good impact resistance, even at low temperatures
- Enables cables/signalling to be buried, reducing incidence of theft
- Colour coding according to NJUG guidelines for easy identification during maintenance work
- PADS approved for use in rail infrastructure: UTX Chambers, Ridgiduct and Ridgicoil cable protection approved for the 6ft area and Cess/non loaded area

Station applications



Station systems and products

Polypipe has extensive experience in helping rail operators plan effective drainage and water management strategies in station refurbishment projects.

Surface water can pose a significant problem in station complexes because of the large areas of impermeable paved surfaces that are necessary as part of their development. Concourses, car parking and platforms all contribute to rainwater run-off, which can quickly overwhelm drainage systems and lead to flooding. To combat this, the environment agency has developed detailed planning guidelines for controlling and managing water at source through the use of Sustainable Urban Drainage Systems (SUDS). We work closely with contractors, architects and engineers to deliver bespoke SUDS solutions that reflect the unique requirements and conditions of each individual station. These include large-scale geocellular attenuation structures, soakaway systems and rainwater harvesting solutions.

SUDS solutions

We offer bespoke systems to manage surface water and drainage from station concourses, approach roads and car parks. These include systems for water management, source control, treatment, re-use, soakaway, attenuation and drainage to sewers.

Podium deck solutions

Providing a robust, structural raft on the upper deck of underground or multi-storey station car parking, the Permavoid Podium Deck system allows water to be stored for attenuation or re-use. It can also be used in the temporary car-parking structures that are often necessary during station refurbishment works.

Rainwater harvesting

Capture, filtration and storage solutions utilising below or above ground tanks. The water captured in this way can be re-used for toilet and urinal flushing, for cleaning or in rolling stock washdown areas.

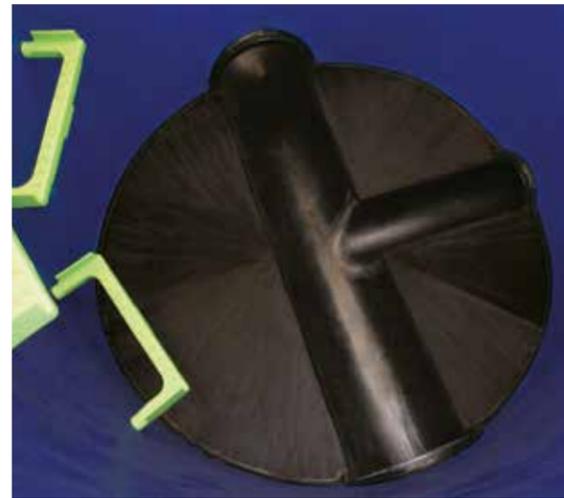
Cable protection

Our robust cable protection solutions safeguard essential systems like lighting, ticket machines and CCTV cameras in railway stations all across the UK.

Products for station drainage and water management

By talking to us at the earliest possible stage, we can work with your designers and engineers to develop a complete SUDS solution for your station new build or refurbishment project.

Our systems span the complete process of 'roof to river' water management, using a wide range of innovative, proven products for attenuation, drainage, soakaway and rainwater harvesting. With all the benefits of robust plastic construction and offering flexibility of design through bespoke fabrication, they can dramatically speed up installation times and reduce passenger inconvenience to a minimum.



SUDS products

Ridgistorm-XL large diameter pipe

Ridgistorm-XL is used for large volume drainage and in the construction of attenuation tanks to store water and delay its release into sewers or rivers after heavy rainfall.

Available in 750mm to 3000mm diameters, it can be engineered to exactly the right profile strength and stiffness for your project to deliver an effective and adaptable solution that is neither over nor under engineered. Ridgistorm-XL pipe offers profile options, stiffness classes SN2 to SN8 and diameters from 750mm to 2100mm are approved by the WRc.

Typical Rail Applications

- Large-scale attenuation structures
- Drainage and sewerage systems
- Fabrication of rainwater harvesting tanks

Benefits to Rail Projects

- Lighter in weight than concrete equivalent, for easier handling and lower installation costs
- 6m lengths, for fewer joints and increased pipe integrity
- Unique, leaktight electro-fusion jointing
- When used for rainwater harvesting, tanks do not require a concrete surround, making them quicker to install and commission

Rainstream RXL rainwater harvesting

Rainstream RXL is a rainwater harvesting and re-use system. It can significantly reduce station water consumption, particularly in water intensive areas such as toilets, urinals and rolling stock washdown.

The Rainstream RXL tank is a bespoke, fully engineered product based on the same proven technology as the Ridgistorm-XL large diameter pipe range. The result is a tank of exceptional stiffness and integrity that can be installed without the need for a concrete surround and without any mains water 'ballast' to weigh it down during installation. The tank incorporates an anti-microbial lining that resists the development of bacterial colonies, plus filters within chambers and leaf filters to improve water quality.

Typical Rail Applications

- Storage and re-use of water from car parks, concourses, roofs and platforms
- For use in any non-potable application: washrooms, WCs and urinals, station cleaning, irrigation and rolling stock washdown

Benefits to Rail Projects

- Significant savings in water and energy
- Contributes to sustainability targets for consumption and emissions

Products for station drainage and water management



Polystorm geocellular solutions

Polystorm cells can be combined to create a strong, load bearing geocellular tank to accept water channeled from platforms, car parks and surface drains.

The cells fit together to create underground tanks and retain large volumes of water. They can be wrapped in an impermeable membrane for attenuation applications, or in a permeable membrane for soakaway to surrounding sub soil. Because different Polystorm cells have different load bearing capabilities, it is possible to tailor finished structures according to the forces they are expected to bear, both from the burial depth and load bearing calculations.

Typical Rail Applications

- Used for both attenuation and soakaway on station areas/car parks

Benefits to Rail Projects

- Geocellular unit – allows flexibility of tank shape to suit the available space
- Light weight and easy to handle – providing excellent health and safety benefits and reduced installation costs
- Polystorm Access and Inspect can be designed into Polystorm, Polystorm-R and Polystorm Lite systems for visual inspection and maintenance



Permavoid System

A geocellular system for shallow applications or for use in restricted areas.

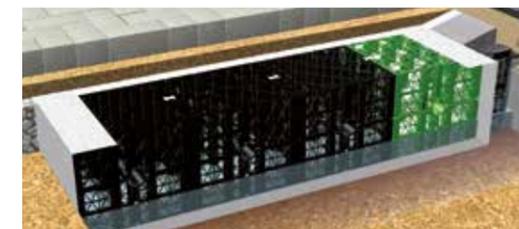
Permavoid is designed to be used in place of a traditional aggregate sub-base, either below permeable paved surfaces or integrated with channelled source control structures to accept water from roofs and surface drains.

Typical Rail Applications

- Shallow attenuation/soakaway for paved areas such as car parks and station approaches
- Using Permaties with the Permavoid system enables the creation of a high tensile strength raft suitable for temporary car parking

Benefits to Rail Projects

- Reduced excavation costs
- Quick and easy to install, reducing installation costs
- Can be used where deep excavation is impossible, such as high water table areas or in contaminated ground
- Reduces aggregate usage and the need to transport sub-base from merchants or quarries



Permavoid Podium Deck

A geocellular system used to create a load-supporting raft beneath deck areas while providing integral drainage or rainwater harvesting.

Used beneath permeable paving instead of an aggregate sub-base, Permavoid Podium Deck reduces the need for surface drains and channels and for falls in the deck surface. It is ideally suited to underground station car parks or temporary multi-storey car parking above ground level.

Typical Rail Applications

- Drainage and rainwater harvesting in multi-level station car parking
- Geocellular solution for use in temporary car parks

Benefits to Rail Projects

- Load bearing system that can support standing traffic loads
- Optimises valuable deck space for uses such as car parking at stations where space is limited



Products for station drainage, water management and cable protection

Water treatment products

Silt traps

Source control appliances preventing debris entering rail SUDS systems. Silt traps are used to isolate grit, silt and other impurities in surface water before they can enter a SUDS or rainwater harvesting system. This helps save time and money by preventing damage to system components and membranes, whilst reducing the need for expensive excavation and maintenance.

Typical Rail Applications

- Prevents leaves and debris entering SUDS systems

Benefits to Rail Projects

- Saves time and money preventing damage to system components

Surface water drainage and cable protection

Ridgidrain surface water drainage

Ridgidrain's strength and flexibility make it perfect for station car park drainage systems. Like all Polypipe products, it is easy to transport, handle and install even in smaller stations where space and vehicle access can be a problem.

Ridgidrain can also be specified as a perforated product, allowing it to act as a soakaway channel in surrounding land.

Typical Rail Applications

- Surface water drainage for car parks and surrounding areas
- Infiltration systems (with perforated pipe wall)

Benefits to Rail Projects

- Light weight and quick to install - resulting in lower installation costs
- 6m lengths and integrally socketed means less joints and quicker installation



Storm-X4 water treatment for surface water run-off

The use of the Storm-X4 advanced four stage filtration system can dramatically improve the quality of the surface water at source before entering the receiving water course. This improves bio-diversity and aids compliance with the EU Water Framework Directive.

Advanced Treatment of Surface Water Run-off

- Treatment of surface water run-off from car parks and surrounding areas
- Suitable for all stations

Benefits to Rail Projects

- Improves water quality at source
- Removes heavy particles, silt, oil, phosphorous and heavy metal pollutants such as copper from surface water
- Removes dissolved pollutants
- Low maintenance

Cable protection

Protection for critical power, lighting and other station cabling. All Polypipe cable protection products are certified to British and European standards, are colour coded according to National Joint Utilities Group guidelines and include a full range of access boxes, pole boxes, covers and divider frames.

Typical Rail Applications

- Station areas
- Platform and concourse lighting
- CCTV cabling
- Ticketing and other data applications

Benefits to Rail Projects

- Lighter in weight: quick and easy to install, resulting in lower installation costs
- Good impact resistance, even at low temperatures
- Enables cables to be buried, reducing incidence of theft
- Colour coding according to NJUG guidelines for easy identification during maintenance work

Case studies



- Polypipe products used**
- Polystorm geocellular solution (Polystorm Lite, Polystorm Xtra, Polystorm-R)
 - Cable protection
 - Ridgidrain pipes and fittings



Loughborough Station

A broad range of Polypipe solutions for water management and cable protection were integral to the refurbishment of Loughborough station.

Integrating Polystorm geocellular solutions, Ridgidrain surface water drainage pipes and Ridgiduct cable protection products, we provided a holistic SUDS system as part of a multi-million pound investment in the station and surrounding area by Charnwood Borough Council.

Polystorm solutions were used to create four separate attenuation and soakaway structures, making use of land beneath the station car park and its non-trafficked landscaped areas. Polystorm-R, Polystorm Xtra and Polystorm Lite geocellular systems were all included in the designs, meeting load capacity and required performance specifications in a bespoke solution.

One of the Polystorm structures had to be redesigned to accommodate an existing cable, demonstrating the flexibility of the Polystorm system and solving the problem without any delay to the project.

In addition, engineering drawings specified a bespoke distribution inlet. This was designed and fabricated using a four metre length of 600mm pipe with 6 x 300mm and 1 x 225mm outlets that matched the system design requirements for hydraulic performance.

Ridgiduct and Ridgicoil cable protection was used to provide a light weight, flexible and high strength alternative to conventional cable protection for street lighting, CCTV, ticket machines and power cables.



- Polypipe products used**
- Ridgidrain pipes and fittings
 - Catchpits

Bramhope Tunnel

Ridgidrain advanced plastic drainage provided a perfect upgrade from the Victorian original in Britain's wettest railway tunnel.

Carrying the main rail link between Leeds and Thirsk, Bramhope Tunnel had been affected by water ingress and ponding at track level for most of its 160 year life. In an effort to alleviate the problems that were enforcing a 48km/hr speed limit on all traffic passing through it, Network Rail embarked on a £10 million rebuild.

As part of the project, we worked closely with main contractor Corus to design and manufacture a trackside drainage system, using Ridgidrain to replace a Victorian stone box culvert that was beyond economical repair.

This new system needed to provide much higher flow rates to ensure further work would not be needed even if rainfall levels rise as predicted over the coming decades.

Ridgidrain's structured-wall design provided the ideal solution, enabling a bespoke solution to be produced with inspection and maintenance access points at thirty yard intervals along the tunnel's length.

Its lighter weight and manoeuvrability, even in the confines of a 3.6km railway tunnel, allowed work to progress at a faster pace than would have been possible with concrete sections, reducing delays and track closures to an absolute minimum.

Case studies

Chipping Sodbury Tunnel

Ridgidrain pipe was used to prevent flooding in the Chipping Sodbury tunnel, an important link on the mainline connection between London and South Wales.

The original drains simply could not deal with the levels of water entering the tunnel. So as part of a £3 million investment by Network Rail, we designed a conventional gravity drainage system involving around 6.5km of Ridgidrain structured wall piping from the east cutting, through the tunnel and into the outfall in the west cutting.

Ridgidrain's lighter weight, easier handling and longer pipe lengths kept time, costs and track closures to a minimum, while allowing installation teams to work quickly and safely at all times.

Polypipe products used

- Ridgidrain pipes and fittings
- Catchpits



Alloa to Sterling Rail Link

Polypipe's Ridgidrain drainage system was installed on a new commuter rail link in Eastern Scotland.

The line, connecting Stirling and Alloa in Central Scotland to Fife, was reopened after 30 years.

As part of the project, 150mm, 500mm and 900mm half-perforated Ridgidrain and Ridgistorm-XL pipes were used for trackside drainage and a series of catchpits - manufactured at Polypipe's 33,000 square metre fabrications facility - positioned at intervals along the pipe to prevent overflow during heavy rain.

Ridgidrain was chosen because it is only 6% of the weight of an equivalent size concrete pipe and withstands ground movement and differential settlement without leaking.

Polypipe products used

- Ridgidrain pipes and fittings
- Catchpits
- Ridgistorm-XL

Service and support

Our product knowledge and service teams provide an unrivalled level of technical support for rail infrastructure contractors and operators.

Technical support

Our technical services team includes fully qualified design engineers who provide detailed specification right through to installation and maintenance guidance. It's their aim to provide you with the support and resources required to meet the critical demands of the rail industry for safe and effective water management.

Design

Polypipe provides a full in-house design facility. Our designers, engineers and drainage specialists provide guidance on the most appropriate, value engineered solution for your rail project, which will be manufactured by our fabrications team and delivered to your site, ready for installation.

Installation guidance

We provide detailed advice for every stage of the installation process, ensuring you receive appropriate guidance on a project from start to finish.

At any stage, you can call us for a rapid response to all your enquiries on **+44 (0) 1509 615100**.

Commissioning and aftersales

All Polypipe water re-use systems are supported by both commissioning and post installation inspections. Please note this is an additional service that is available upon request.

Literature

Product Literature



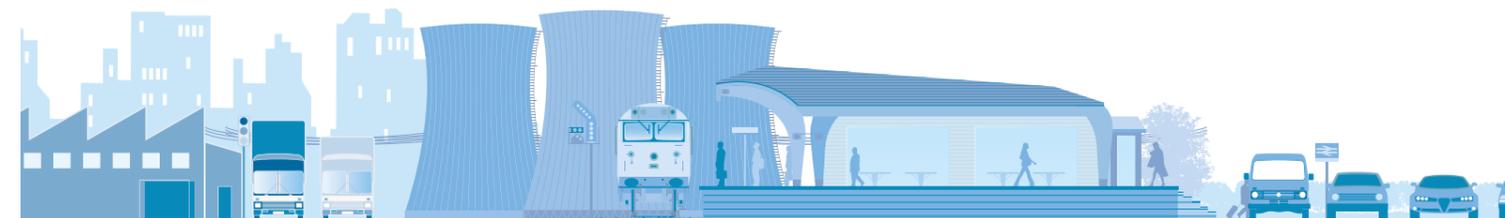
Solutions Literature



Market Sector Literature

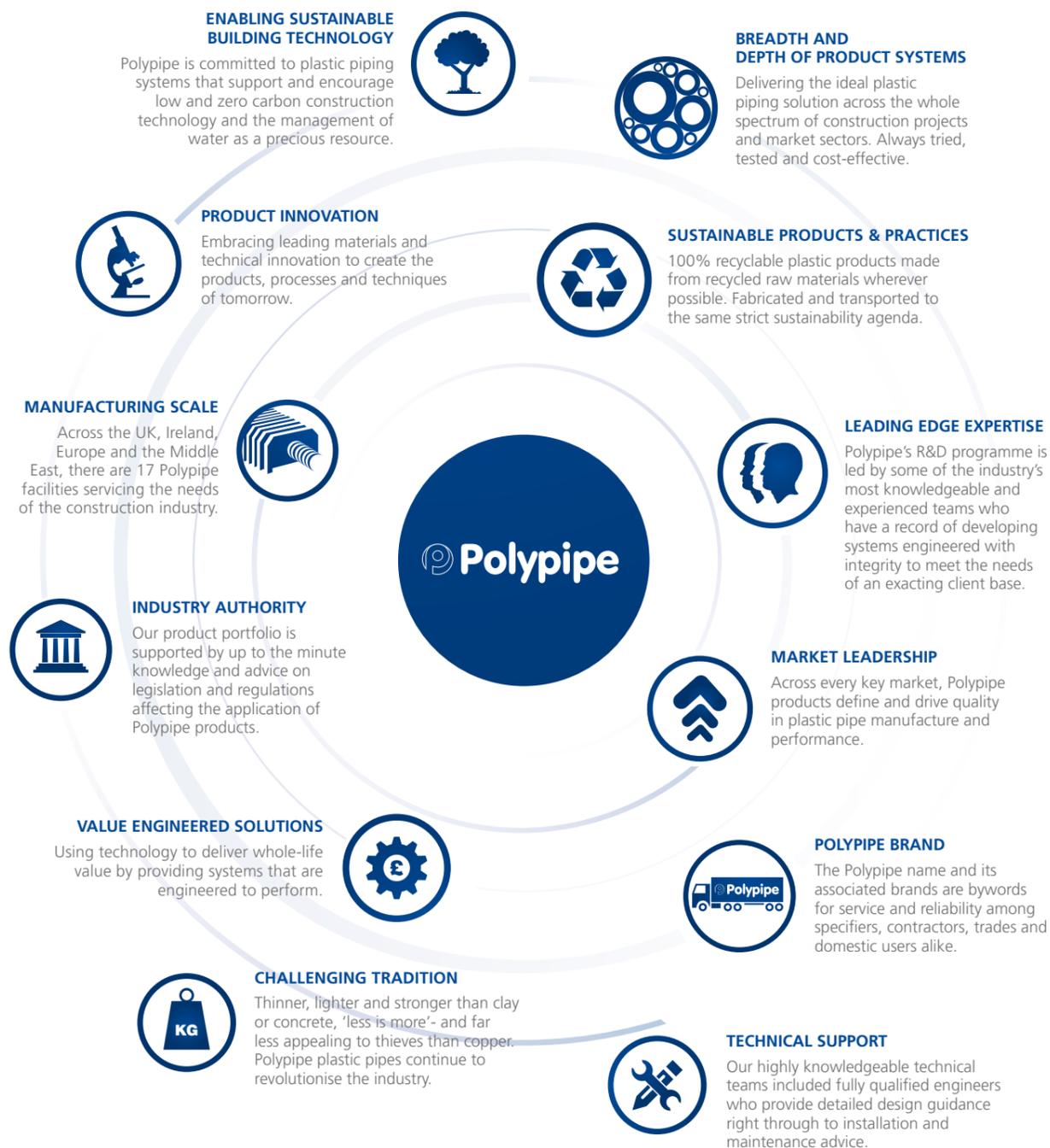
Additional market sector literature is available please visit www.polypipe.com or contact the telephone numbers appearing under each brochure.

All literature available at: www.toolbox.polypipe.com



Polypipe

We design, develop and manufacture the widest range of plastic piping products, with over 20,000 product lines available. Our primary focus is on developing and supporting pragmatic product systems through specific knowledge and understanding of the residential, commercial, civils and infrastructure market sectors. We ensure that customers can trust our unrivalled expertise to provide value engineered, fit for purpose piping solutions for the growing diversity and complexity of construction and building technology challenges they face.



Polypipe enabling sustainable building technology

Polypipe provides plastic piping systems that enable the effective installation and performance of sustainable building technology, meeting the twin global challenges of carbon reduction and water management.

CARBON EFFICIENT SOLUTIONS 'SUSTAINABLE INDOOR ENVIRONMENTS'

Ever stricter building regulations and ever more environmentally conscious customers are driving the demand for greener building products and technologies. Polypipe fulfils that demand with a full range of systems that enable collection, transmission, emission and control in heating, ventilation and cooling systems.

WATER MANAGEMENT SOLUTIONS 'ROOF TO RIVER'

Offering a comprehensive range of standalone and modular SUDS products, rainwater harvesting and surface water treatment solutions plus legislative and technical support services, Polypipe's water management solutions team address the surface water requirements of every construction and civil engineering project.



Sector Focus

Our product systems respond directly to sector-specific requirements thanks to focused technical and development teams with hands on expertise in the following areas.

CIVILS AND INFRASTRUCTURE

Delivering performance and sustainability, Polypipe's surface water drainage and cable management systems, supported by our in-house fabrications team, offer civils and infrastructure project planners a complete suite of solutions.

COMMERCIAL

Major commercial projects from car parks and high rise office blocks to hospitals, educational premises and shopping centres have all benefited from Polypipe's range of value engineered products and comprehensive service support.

RESIDENTIAL

Polypipe offers the broadest range of residential product and service solutions for both new build and RMI applications, as well as innovative solutions in response to legislative and industry targets for more sustainable housing.

All descriptions and illustrations in this publication are intended for guidance only and shall not constitute a 'sale by description'. All dimensions given are nominal and Polypipe may modify and change the information, products and specifications from time to time for a variety of reasons, without prior notice. The information in this Brochure is provided 'as is' on November 2014. Updates will not be issued automatically. This information is not intended to have any legal effect, whether by way of advice, representation or warranty (express or implied). We accept no liability whatsoever (to the extent permitted by law) if you place any reliance on this publication you must do so at your own risk. All rights reserved. Copyright in this publication belongs to Polypipe and all such copyright may not be used, sold, copied or reproduced in whole or part in any manner in any media to any person without prior consent. © Polypipe is a registered trademark of Polypipe. All Polypipe products are protected by Design Right under CDPA 1988. Copyright © 2013 Polypipe. All rights reserved.

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