Rail
Specification Guide

CUBIS SYSTEMS
A CRH COMPANY

www.cubis-systems.com

CUBIS SYSTEMS A CRH COMPANY
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Innovative *and* **Sustainable Infrastructure** *Solutions*

Cubis Systems is the sustainable partner of choice for both light and major rail infrastructure projects. We specialise in efficient, modern-day access systems for telecoms, drainage, trackside signalling, power and cabling.

Our intelligent technical design applies across composite access chambers, access covers and cable protection features. Importantly, these solutions are modular, scalable and lightweight. All of which means that they can be built on-site with speed and ease.

With significant – and measurable – benefits across sustainability, safety, and resource-savings, our solutions are designed to tackle your rail infrastructure challenges head-on.

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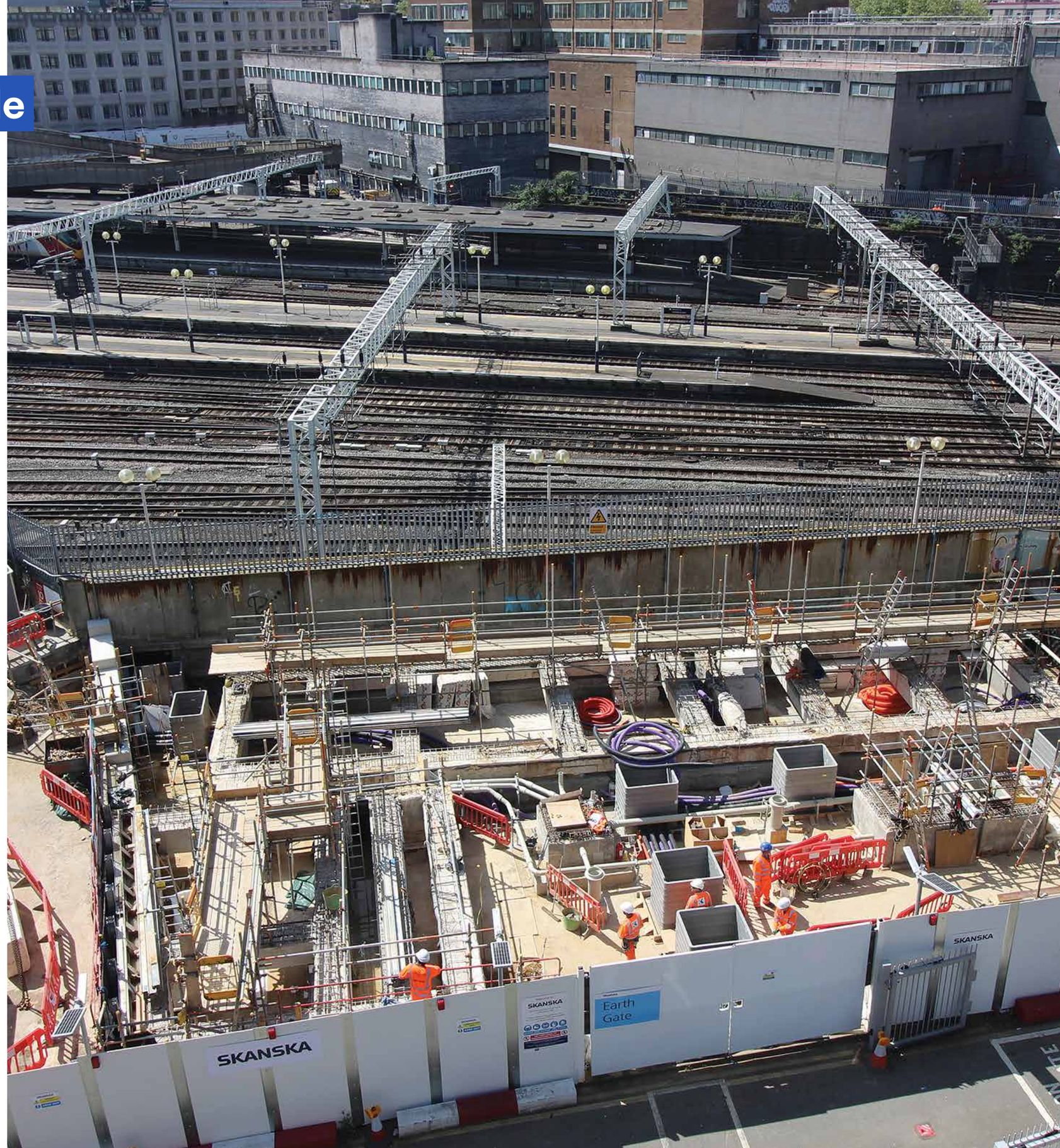


Since 2009, Cubis Systems has formed part of the wider CRH group. For our customers, this means that while your specialist rail team is small enough to care – we are more than big enough to deliver.

CRH is the leading provider of building materials solutions that build, connect and improve our world. Employing c.78,500 people at c.3,390 operating locations in 28 countries, CRH has market leadership positions in both North America and Europe. CRH's unique offering of materials, products and value-added services helps to deliver a more resilient and sustainable built environment.

Operating under the umbrella of a Fortune 500 allows us here at Cubis to benefit from global reach and resources. We're able to leverage CRH's extensive distribution network and customer base – expanding our potential market presence and reach across different regions.

Our CRH family consists of many other global businesses offering building solutions you know and use. From Tarmac, to Oldcastle, we all operate together as #OneCRH with the same purpose and vision:

> ***To develop sustainable solutions that build, connect and improve our world.***

Technical *Overview*

We're here to support you, whether that's on-site, in your office, or remotely. We tailor our support to suit your needs – with the tools and expertise to deliver your project successfully.

Structural Calculations
We'll provide engineering calculations to the latest EN and BS standards.

Site/Office Visits
We'll be with you from concept design stage through to project completion.

Installation Advice
We're on hand to help with the usage and installation of our products.

Mechanical Testing
We test our products with third parties to ensure maximum resilience.

Product Development
We can work with you to develop a bespoke solution for niche problems.

CAD Drawings
We'll create bespoke drawings and specifications – any format required.

Detailed Take-offs
We'll supply a bill of quantities to save you and your QS team time onsite.

Optimising Designs
We can offer cost-saving design alternatives to make optimum use of our products.

Material/Environmental Testing
We engineer solutions for any condition, backed by environmental and chemical tests.

Innovation, efficiency, and sustainability are central to every project we deliver. By choosing Cubis, you're accessing high-quality solutions with minimised environmental impact.

Recycled and recyclable products
We limit the use of virgin materials. Our UK site has achieved up to 100% recycled PP in its products, and our operations in the Republic of Ireland have been able to incorporate 80-100% recycled HDPE through investment in on-site material processors.

Optimised energy use through digitalisation
Cubis is the only manufacturer of network access chambers and cable protection solutions to provide a BIM configurator. With access to a digital technical library, clients can ensure greater accuracy at design stage – minimising cost, time, and waste.

Carbon impact visibility
We can calculate the tonnage of carbon saved by using our products over the traditional concrete alternative. (Typically, ~80.7%.) Plus, with Environmental Product Declarations for all our products, we can give you precise visibility on the carbon impact of projects.

Optimised product lifecycle
We invest in continuous internal and external tests to better understand the performance of our products and how they will fare in various real-world applications. From thermal ageing testing to fatigue testing, we validate our products' longevity.

Lightweight, efficient, and faster installation
Our solutions are designed for smaller teams. There's no need for heavy machinery, and no need to bring in specialist equipment. So, both the carbon footprint of the installation and the overall environmental impact of the project are comparatively low.

Green partnerships
We work closely with our partners to embed sustainability in every stage of the project lifecycle. We also collaborate externally – including research with universities and industry groups – to stay ahead of emerging trends in sustainability and innovation.

Reduced weight and vehicle emissions
Our products offer a flat pack option. This increases their shipping density and helps reduce the number of vehicles we are responsible for putting on the road. Across our sites, we aim for load optimisation to ensure all deliveries are used to full capacity.

No unnecessary waste
We're committed to working smarter to minimise the waste produced from our operations. This involves regular audits and maintenance checks to ensure that both our processes and equipment deliver operational excellence.

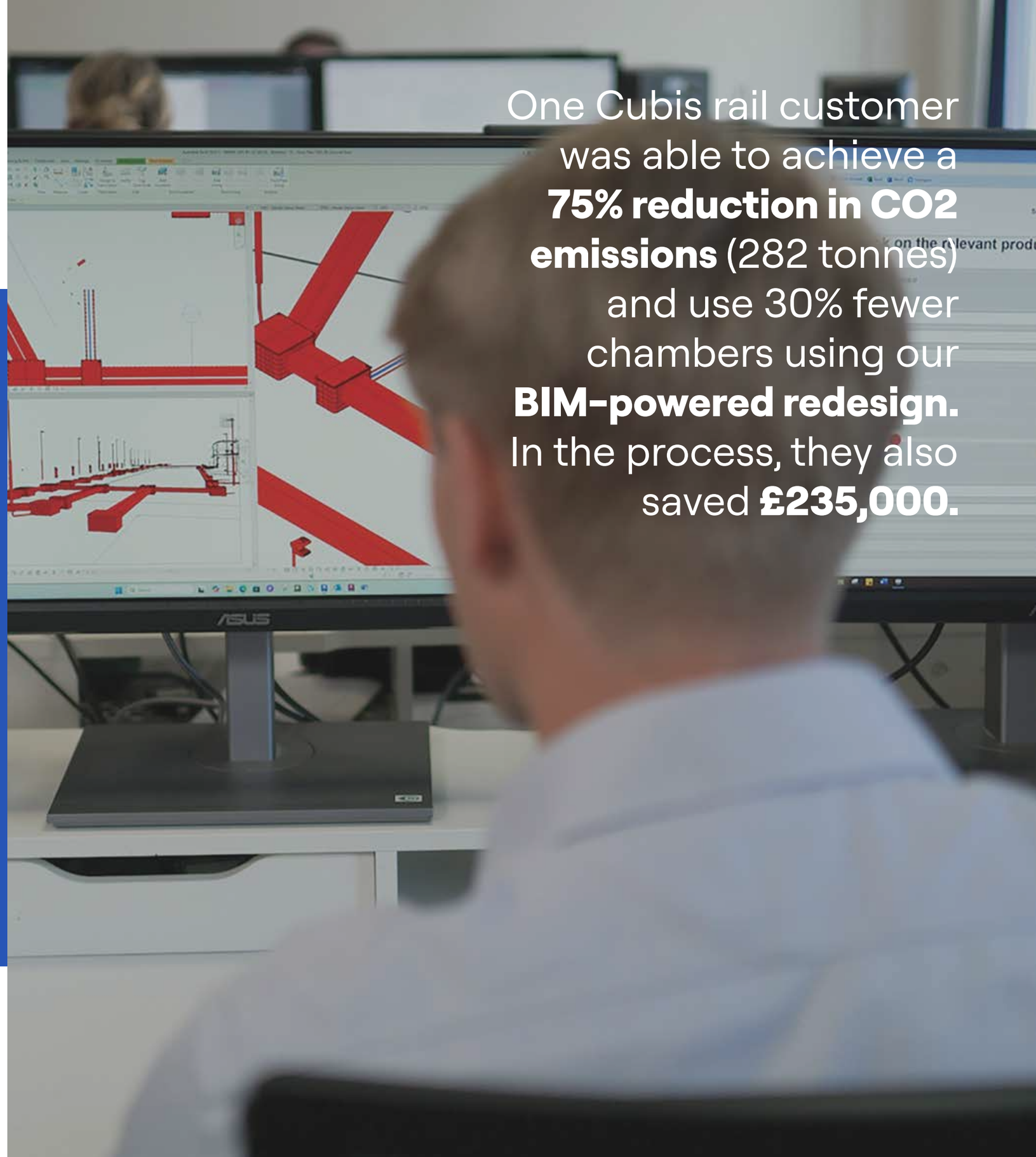
Made in Britain
We're proud to be a British manufacturer. So, as well as the inherent sustainability of using our lightweight products, you gain clear green supply chain implications from using a UK and Ireland manufacturer.

BIM

We're proud to be the only manufacturer in our space offering a free BIM tool. Using the BIM configurator doesn't just help you design smarter with our 3D models. It can also deliver you significant, and fully measurable, savings.

Features & *Benefits*:

- Easily drop our 3D product models into your designs
- Identify and resolve design conflicts early-on, saving time and resources
- Access precise data for better budget planning and analysis
- Download our CAD files in any number of formats
- Customise your project specs for fast calculations and data validations
- Work with our experts for custom sizes, quotes, and bespoke support
- Deliver projects that are smarter, safer, and more sustainable
- Ensure material optimisation and faster installation



Our **Applications**

Trackside **Drainage**

Troughing

Buried *Cable* **Routes**

Platform **Chambers**

Rail Cabinet *Bases*

Under *Road and Track* **Crossings**

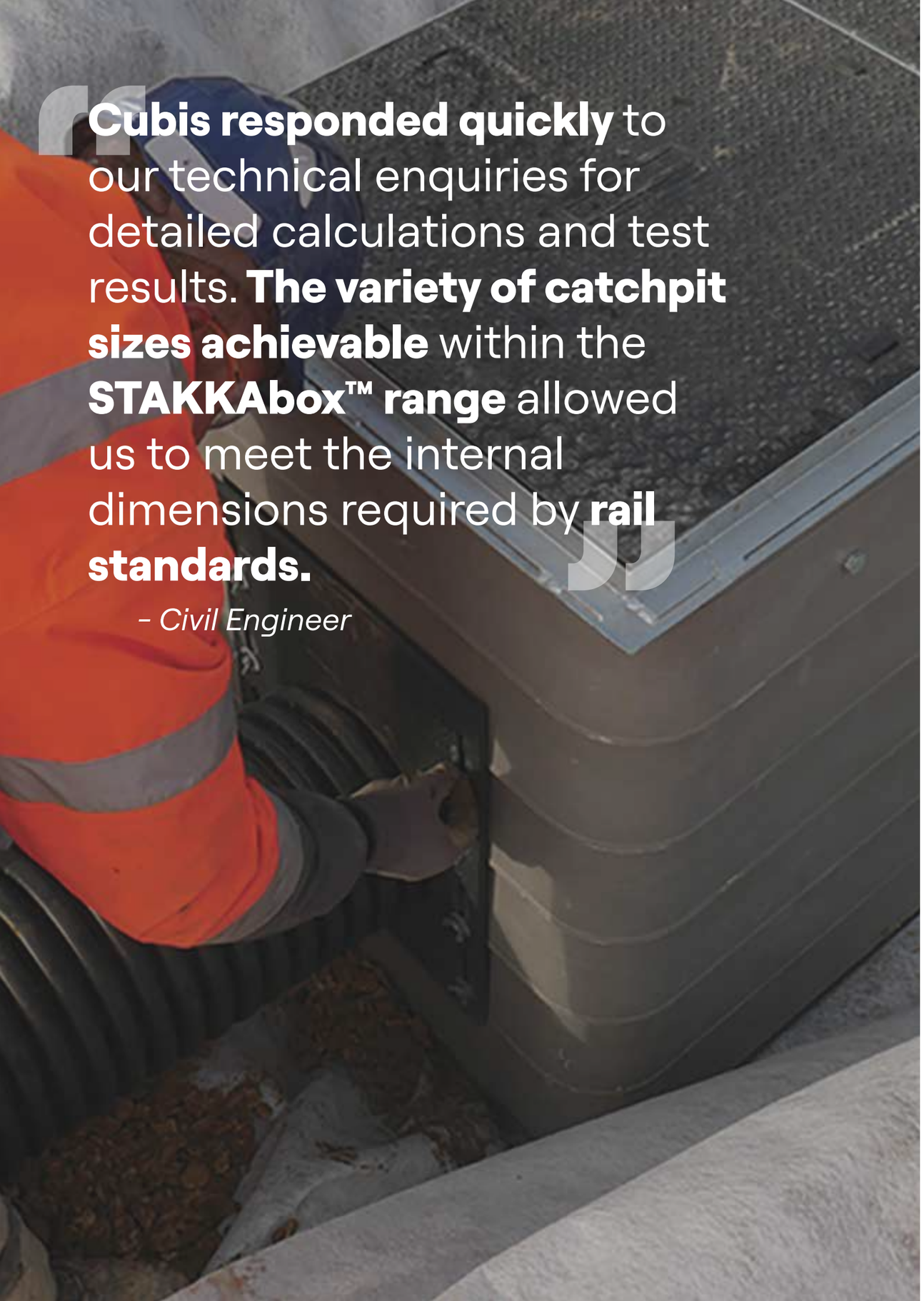
Trackside *Drainage*

Our trackside drainage inspection chamber – FLEXI-Pit™– is industry-approved by major rail operators across a number of networks. It collects silt and distributes water flow, with easily adjustable duct positions for varying pipe invert levels.

The drainage system is created from our STAKKAbox™ ULTIMA access chamber system. The ULTIMA provides a modular solution available in a variety of scalable sizes. This makes for a solution that is easily adaptable, lightweight, and fast and easy to install.

Our integrated systems approach means that all Cubis products are effortlessly compatible. So, seamless integration with chamber accessories and concrete and composite access covers provides you with a complete underground drainage system solution.

- **Complete on-site adjustability**
- **Rapid installation**
- **Unique sliding backfill barrier**
- **Compatible with existing drainage**
- **Achieve the correct pipe invert level with ≤150mm vertical adjustments**
- **Reduced installation costs**
- **Can accommodate almost any pipe size**
- **Access cover options**
- **Fully customisable, flexible and adjustable**
- **No additional tooling required**

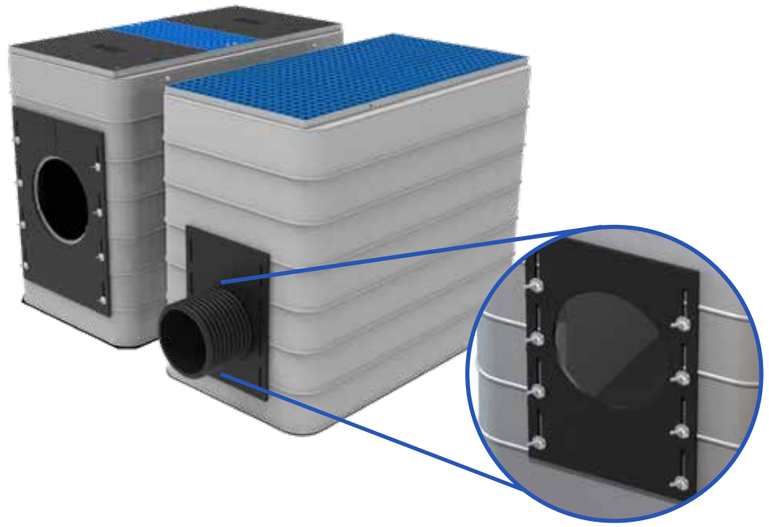


Cubis responded quickly to our technical enquiries for detailed calculations and test results. **The variety of catchpit sizes achievable** within the **STAKKAbox™ range** allowed us to meet the internal dimensions required by **rail standards.**

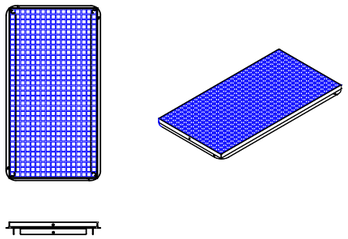
- Civil Engineer

Trackside *Drainage*

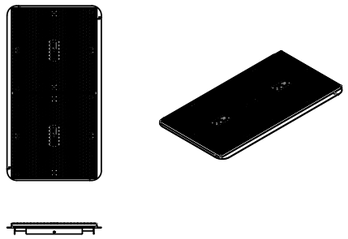
Internal Dimension (mm)	External Dimension (mm)	Maximum Pipe Diameter (external)
1200x1200	1326x1326	>700mm OD
1200x600	1326x726	470mm OD
915x445	1041x551	315mm OD
885x520	1011x646	390mm OD
1310x850	1436x976	690mm OD
1310x610	1436x736	470mm OD
1160x380	1287x506	280 mm OD
1200x675	1330x805	550mm OD
1200x750	1330x880	620mm OD
1200x1000	1330x1130	>700mm OD
1350x900	1480x1030	>700mm OD
1350x1350	1480x1480	>700mm OD



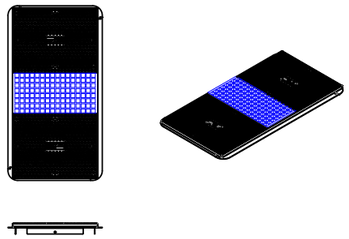
Chamber Size	Full Blue Cover	Full Composite	3 Part
1160 x 380mm	057/100694		
1200 x 600mm	057/100693		
1200 x 675mm	057/101493	057/101493	057/101493
1200 x 750mm	057/101498	057/101498	057/101498
1200 x 1000mm	057/101508	057/101508	057/101508
1310 x 850mm	057/100658		
1350 x 900mm	054/160756	054/160756	054/160756
1350 x 1350 mm	057/10065	057/10065	057/10065



TYPICAL CUBIS FRAME&COVER
Scale 1:40



ALTERNATIVE CUBIS FRAME&COVER
Scale 1:40



ALTERNATIVE CUBIS FRAME&COVER
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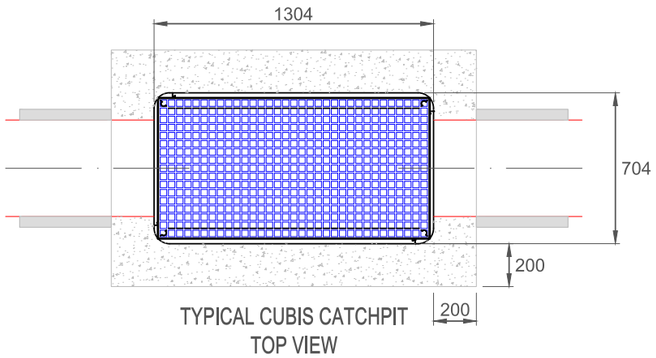
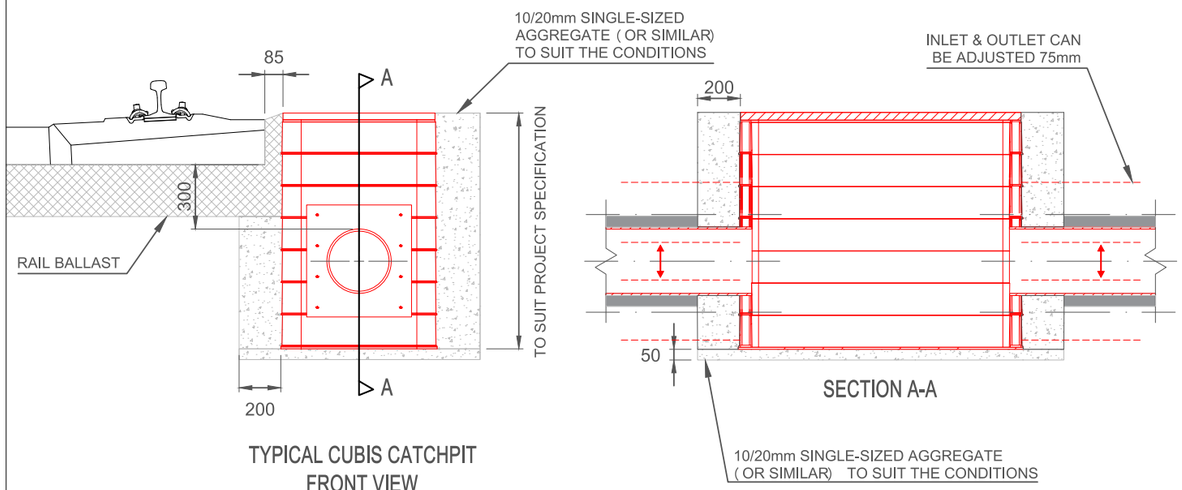
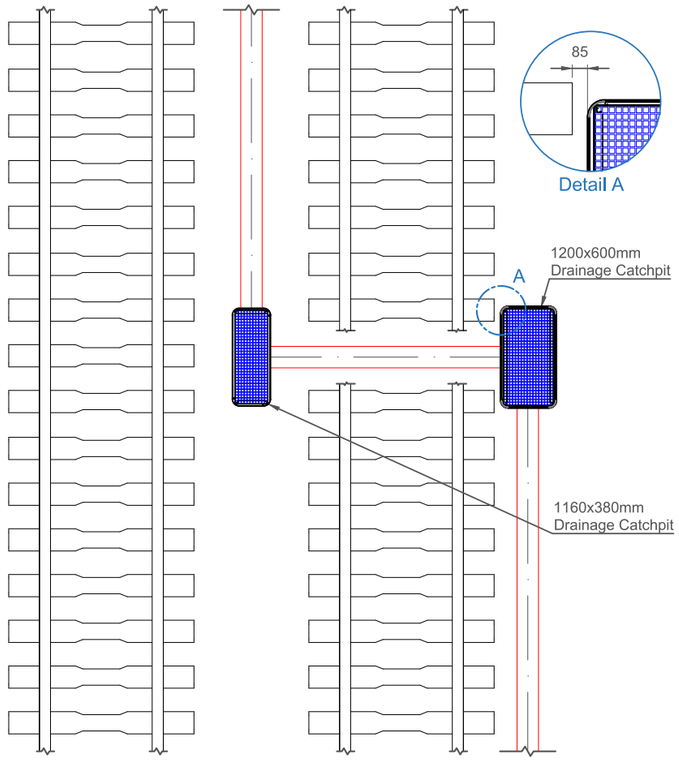


TYPICAL CUBIS CATCHPIT
TOP VIEW

CATCHPIT CHAMBER SIZES	MAXIMUM PIPE DIAMETER
1160x380mm	∅280mm OD
1200x600mm	∅450mm OD
1310x850mm	∅700mm OD



TYPICAL CUBIS CATCHPIT
FRONT VIEW



TYPICAL CUBIS CATCHPIT LAYOUT
Not to scale

Installation guidelines

Installation of Cubis chambers shall be in accordance with RT/CE/S/001, using a suitable uniform material compacted in 150mm layers.

Cubis Ultima chambers are certified (PA05/000635) for use directly adjacent to the running rail.

The drainage layout shall cross the rail line perpendicular to rail central line. Where local conditions dictate the crossing angle can be reduced to a minimum angle agreed by all stake holders to centre line of rail line.

The position of duct openings in chambers to be agreed with Network Rail Authority.

Pipes to be installed at a minimum depth of 300 below the rail sleepers to top of duct regardless of number of ducts unless noted otherwise in the site specific form.

A minimum of 85mm clearance from the sleeper edge to the edge of the chamber shall be provided.

Chamber & Cover Specification

Access chambers shall be a twin-wall design and assembled from stackable 150mm deep sections.

Access chambers must be tested to withstand a minimum vertical load of 90 tonnes without the use of concrete surround for support.

Due to high lateral loading from the 'Track Influence Zone' access chambers must manufactured for Glass Reinforced Polyester Resin (GRP) .

Pipe inlet and outlet must have the ability to be adjusted in height +/- 75mm in the vertical direction

Access chambers must not be jointed in the corner or require mechanical fixing to achieve strength.

Access chamber sections must be capable of being cut laterally to allow for transitional gradient installations.

External walls shall be free from moulding voids that would negatively impact the effectiveness of compaction.

Various cover options available, 25mm / 38mm Isophathelic grate, B125 composite cover or composite cover with central grating.

Composite covers must be manufactured from Sheet Moulding Compound (SMC)

Composite covers must be load tested to EN124 with a B125 (12,5 tonne) or C250 (25 tonne) loading.

Composite covers must have a minimum skid resistance value 55 wet & 75 dry (PTV) .

Composite covers must be supplied with lockable steel frames which are hot dipped galvanised to BS EN ISO 1461:2009.

DRAWING TITLE

DRAINAGE CATCHPIT

TYPICAL SECTION AND PLAN VIEW

DRAWING REFERENCE		UTX-001
A3	REVISION 0	Scale: 1:25
DRAWN	P. EGEA	18/06/20
CHECKED	J. GALLAGHER	18/06/20

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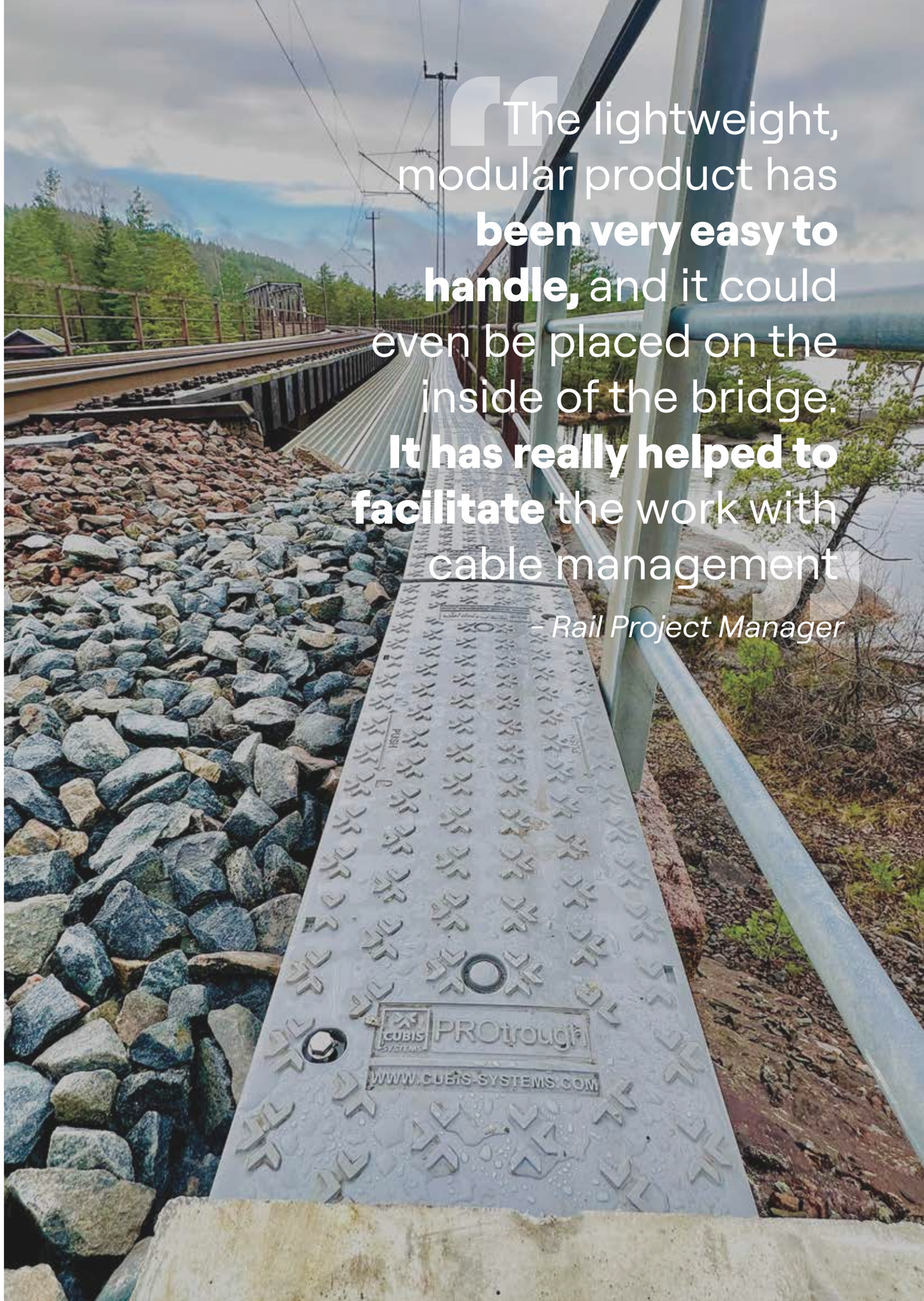
Troughing

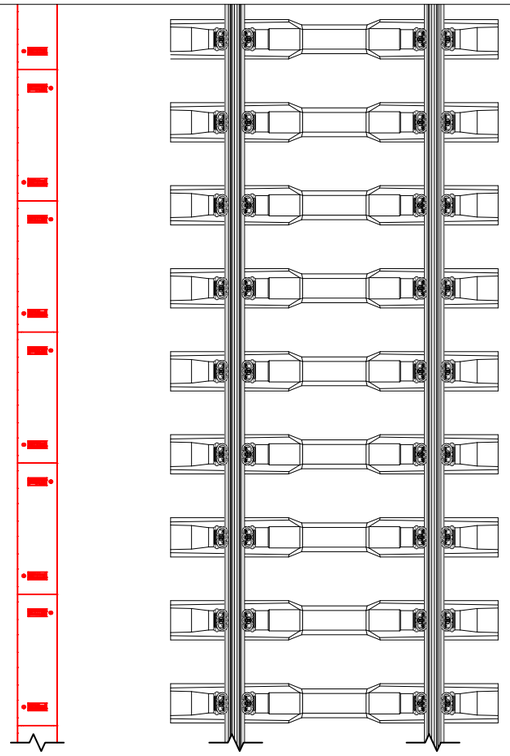
PROtrough offers a modern alternative to traditional concrete cable trough systems. It comprises of connectable meter-long units that allow for 3° rotation in the unit – following natural track curvature.

GRP composition (Glass Reinforced Polyester Resin) makes the solution 5x lighter than concrete, without compromising on strength. PROtrough also comes industry-approved by major rail operators – preferred for its significant health and safety, flexibility, and sustainability advantages.

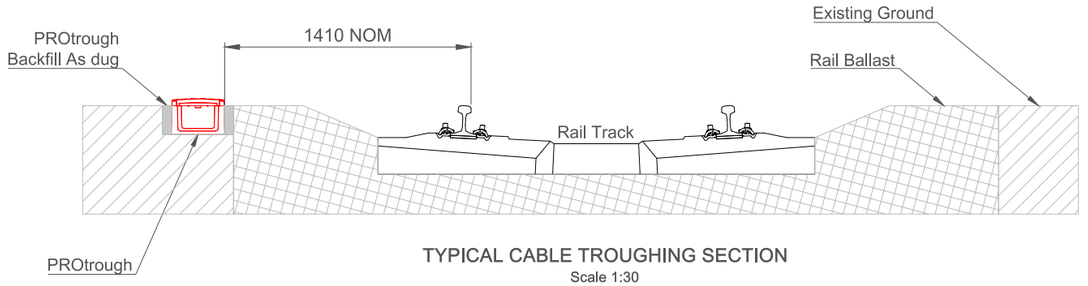
- **Lightweight, safe, and easy to install cable troughing system**
- **Handy grappling points and quick, modular assembly**
- **Long-term, durable use with weather-resistance and drainage**
- **Seamless integration with other Cubis products**
- **Complies with fire-retardant specs, including those for tunnels and stations**
- **A true time, cost, and carbon saver**
- **Secure, with linear ballast anchor points minimising displacement risk**
- **Heavy duty, with a cover vertical load of BS4592-6**
- **Simple slide and drop male to female connectivity**
- **Configurable customer branding options**



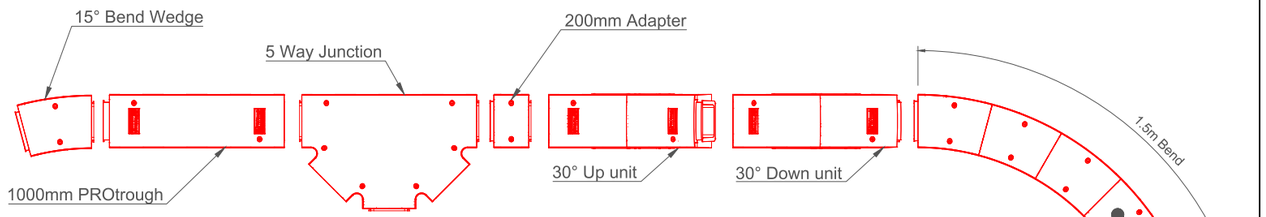
Troughing



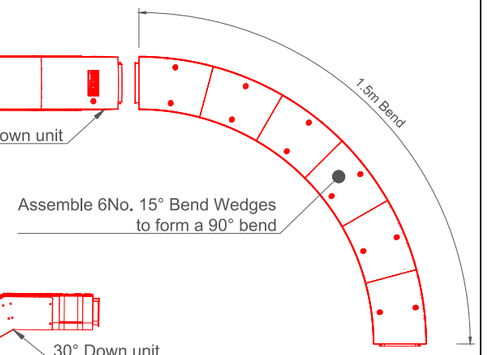
TYPICAL TROUGHING LAYOUT
Not to scale

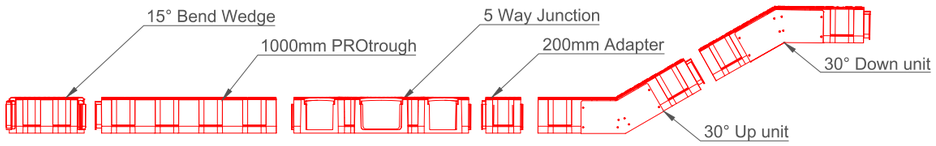


TYPICAL CABLE TROUGHING SECTION
Scale 1:30

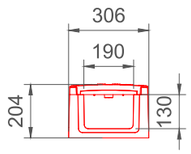


PROTROUGH UNIT AND ACCESSORIES
TOP VIEW
Scale 1:30

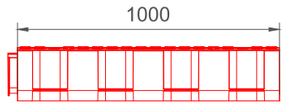




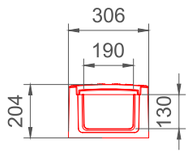
PROTROUGH UNIT AND ACCESSORIES
FRONT VIEW
Scale 1:30



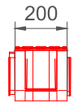
PROTROUGH
FRONT VIEW



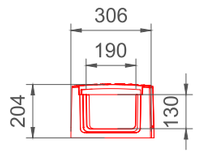
PROTROUGH
SIDE VIEW



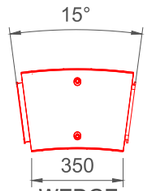
ADAPTER
FRONT VIEW



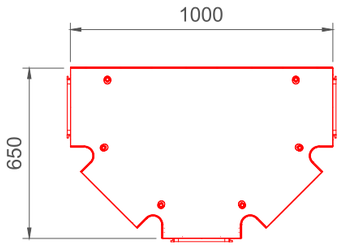
ADAPTER
SIDE VIEW



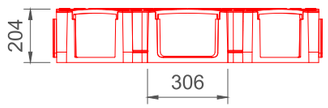
WEDGE
FRONT VIEW



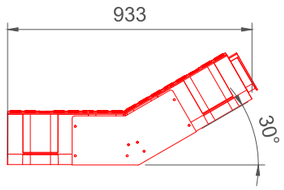
WEDGE
TOP VIEW



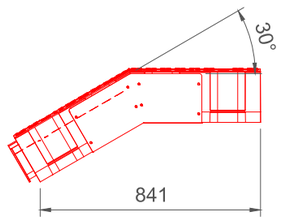
5WAY JUNCTION
TOP VIEW



5WAY JUNCTION
FRONT VIEW



UP BEND
SIDE VIEW



DOWN BEND
SIDE VIEW

INSTALLATION GUIDELINES

Troughs are to be joined by a drop down tongue and groove connection.

Lids are secured down by a screw in connection.

Troughing to be backfilled using compacted granular material.

Bends to be formed using multiple 15° wedge units. Bending radius can be extended by adding 200mm straights between wedge units.

Trough is keyed into ballast using anchor points in the sidewall.

If trough is to be elevated, anchor points are used to clamp trough to suspended cable tray.

TROUGH SPECIFICATION

Trough are to be manufactured from glass reinforced polyester resin (GRP).

Troughs to have 2° movement in all directions between each connection.

Trough covers must have a minimum skid resistance value
55 wet & 75 dry (PTV).

Troughing body must be a maximum weight of 12kg and cover 5kg to ensure ease of manual handling.

Trough can be manufactured from fire retardant S12 material for use in tunnel areas.

Locking head can be customised for high security/bespoke projects.

Troughing T piece allows exit points at 45°, 90°, 135° and 180°. T piece must have the ability to blank off unused exit points.

Troughing must have slots for drainage which also allow for the placing of divider panels.

Network rail approved cable tie can be provided with trough that allows for the clamping of cables to trough body.

DRAWING TITLE

TROUGHING

DRAWING REFERENCE		CR-001
A3	REVISION 0	Scale 1:20
DRAWN	P. EGEA	15/09/20
CHECKED	J.GALLAGHER	15/09/20

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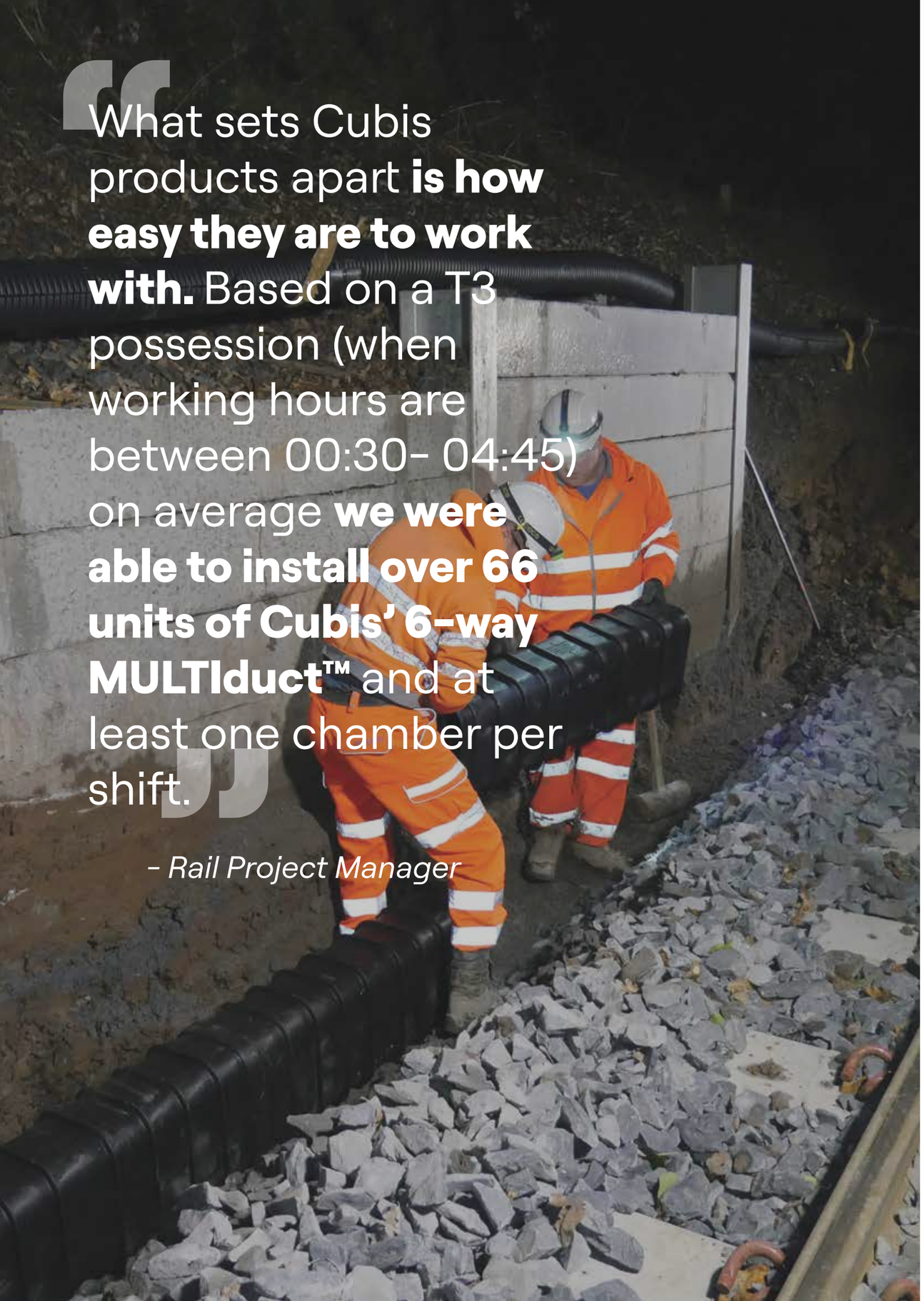


“What sets Cubis products apart **is how easy they are to work with.** Based on a T3 possession (when working hours are between 00:30- 04:45) on average **we were able to install over 66 units of Cubis’ 6-way MULTIduct™** and at least one chamber per shift.”

- Rail Project Manager

Buried Cable Routes

Our MULTIduct™ buried cable route system offers a secure and environmentally friendly way to bury trackside cabling. In one seamless solution, it integrates our:

- MULTIduct™ cable protection system
- STAKKAbox™ ULTIMA network access chambers and covers

This buried cable route system is approved by major rail operators, and installed across multiple networks in the UK and beyond. Installations are uniquely fast due to the solution’s lightweight properties – with all parts below 25kg. Plus, no specialist equipment is required to install, and excavation needs are significantly reduced.

With these advantages combined, installation on track upgrades can average 1km in a 20 hour possession.

Fully customisable, flexible and adjustable on-site

Improved build quality and enhanced security

Compatible with existing drainage, ducting and troughing networks

Available in a variety of different sizes to meet any cabling need

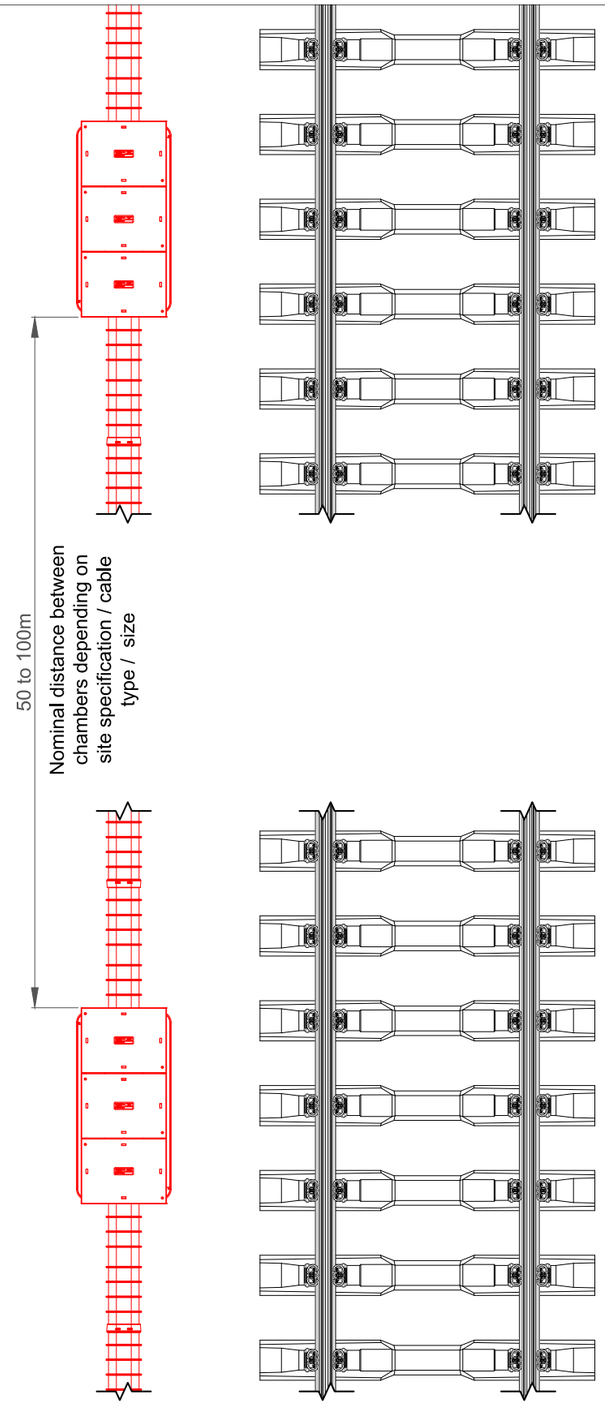
Rapid installation, for reduced track possession time and cost

No additional tooling required, and simple, modular assembly

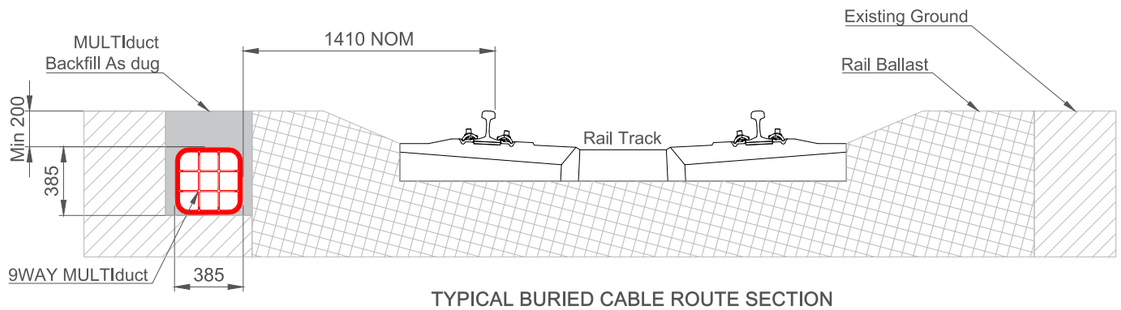
Easier and safer to install – able to fit the lightweight products under your arm

Shallow burial depth – approved to be buried at just 600mm below the sleeper bottom

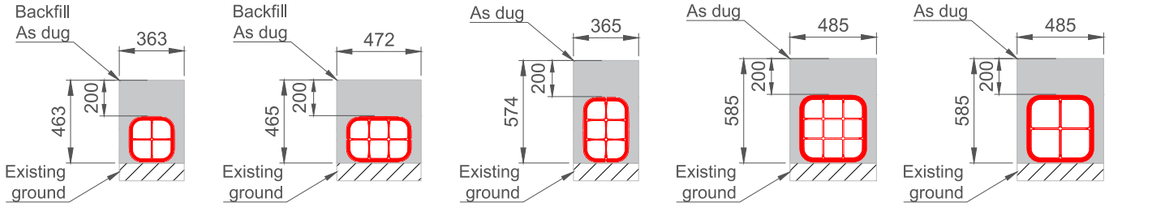
Buried **Cable Routes**



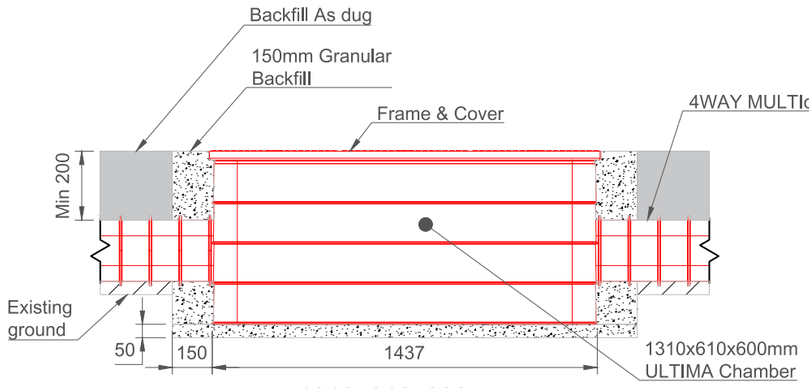
TYPICAL CABLE ROUTE LAYOUT
Not to scale



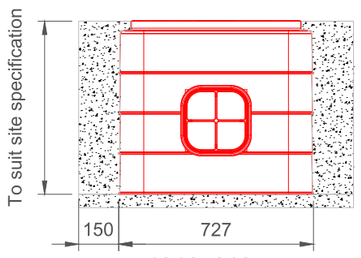
TYPICAL BURIED CABLE ROUTE SECTION



4WAY MULTIDUCT TRENCH SECTION | 6WAY MULTIDUCT FLAT TRENCH SECTION | 6WAY MULTIDUCT UPSTAND TRENCH SECTION | 9WAY MULTIDUCT TRENCH SECTION | 4WAY XL MULTIDUCT TRENCH SECTION



1310x610x600mm
STAKKAbox ULTIMA CHAMBER
SIDE VIEW
Scale 1:20



1310x610mm
STAKKAbox ULTIMA CHAMBER
FRONT VIEW
Scale 1:15

Installation Guidelines

MULTIduct units to be installed at a minimum depth of 200mm cover below surface level to the top of duct regardless of number of ducts unless requested otherwise in the site specific form.

This drawing must only be used in conjunction with suitable site specific drawings/diagrams.

Chamber's backfill surround and base shall consist of compacted granular fill. Backfill shall be placed in layers maximum 150mm thick and each layer shall be thoroughly mechanically compacted.

If multiple duct banks are used zero spacing is required between the MULTIduct sections.

Chamber & Cover Specification

Access chambers shall be a twin-wall design and assembled from stackable 150mm deep sections.

Access chambers must be tested to withstand a minimum vertical load of 90 tonnes without the use of concrete surround for support.

Due to high lateral loading from the 'Track Influence Zone' access chambers must manufactured for Glass Reinforced Polyester Resin (GRP).

For pulling cables chambers must be a minimum of 600mm wide for access and 1200mm in length for pulling.

Access chambers must not be jointed in the corner or require mechanical fixing to achieve strength.

Access chamber sections must be capable of being cut laterally to allow for transitional gradient installations.

External walls shall be free from moulding voids that would negatively impact the effectiveness of compaction.

Composite covers must be manufactured from Sheet Moulding Compound (SMC)

Composite covers must be load tested to EN124 with a B125 (12.5 tonne) or C250 (25 tonne) loading.

Composite covers must have a minimum skid resistance value of 55 wet & 75 dry (PTV).

Composite covers must be supplied with lockable steel frames which are hot dipped galvanised to BS EN ISO 1461:2009.

MULTIduct Specification

MULTIduct must be manufactured from 95% recycled Nitrogen foamed high density polyethylene.

MULTIduct cannot be supplied or used in conjunction with any chamber outside of the Cubis Systems range.

MULTIduct sections must be under 20kgs in weight enabling safe manual handling by one person.

MULTIduct must be completely recyclable at end of life.

DRAWING TITLE

Cable Route

DRAWING REFERENCE		CR-001
A3	REVISION 0	Scale 1:30
DRAWN	P. EGEA	15/09/20
CHECKED	J.GALLAGHER	15/09/20

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BT66 6LN
Tel: +44 (0) 28 33 313100
www.cubis-systems.com

Platform **Chambers**

Our access chamber systems can provide a modular, scalable solution for stations and platforms to access:

- Lighting columns
- Ticketing machines
- Information boards
- Communication and power cables

With the seamless integration characteristic of the Cubis product range, our platform chamber solution comprises:

• STAKKAbox™ access chamber systems – lightweight, stackable, and enabling easier manual handling and build in restricted spaces.

• Cubis access covers – manufactured to EN124 loadings, and incorporating unique 'slide-out' design for safe lift and removal. Featuring secure locking and badging options, and available in an extensive range of materials, sizes, and design options.

Rapid, safe, and easy installation as standard – saving you time and money

Access cover frame types manufactured to meet your exact specifications

Aesthetically suitable for landscaped areas

Integrates with MULTIduct™ buried cable route systems

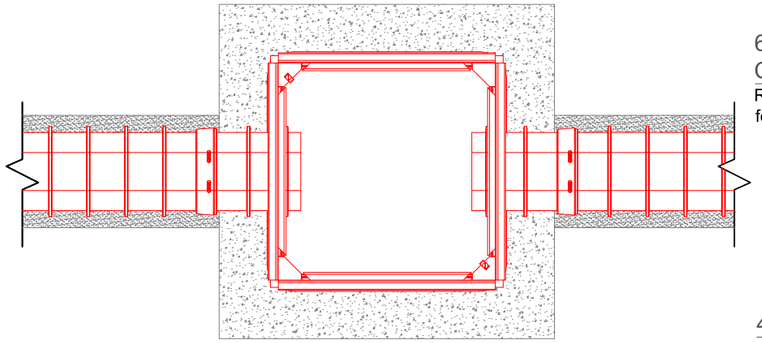
Fully customisable, flexible, and adjustable

Recessed covers allow network access systems to blend into the surrounding surface

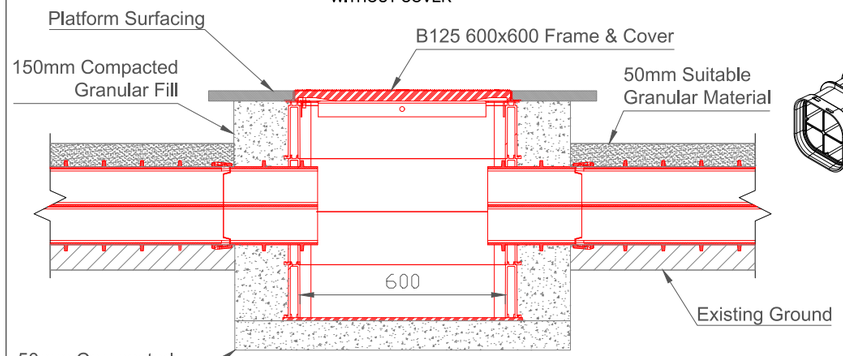
Designed for a streamlined lineside to platform transition

Integrates with platform furniture such as lighting and signage

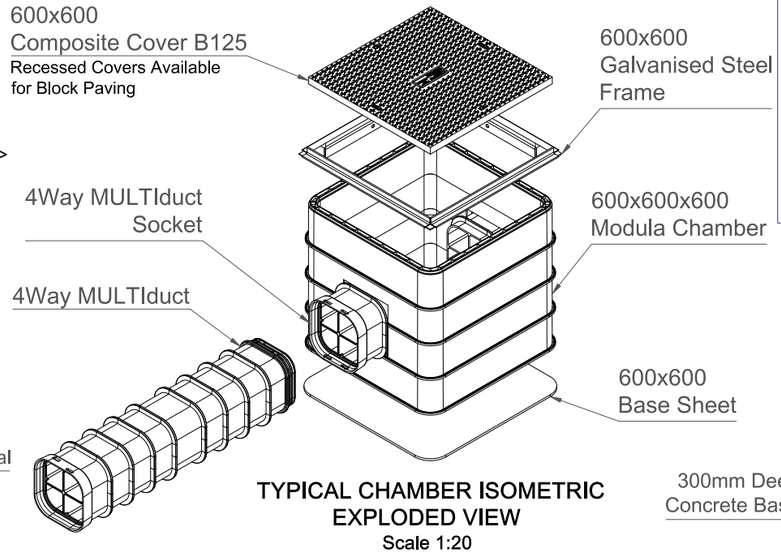
Platform **Chambers**



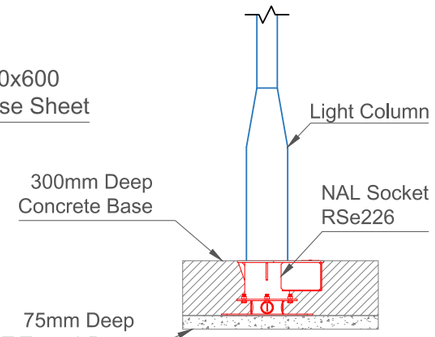
TYPICAL ACCESS CHAMBER PLAN
WITHOUT COVER



TYPICAL SECTION THROUGH ACCESS CHAMBER

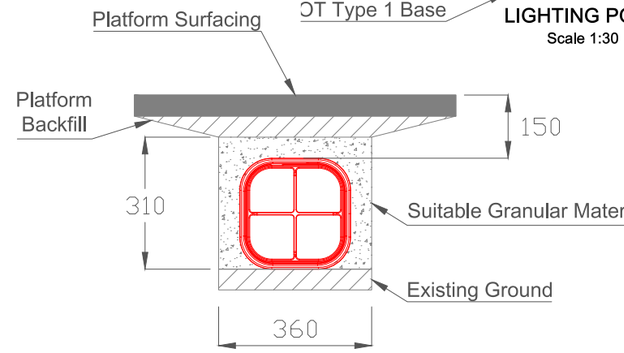


TYPICAL CHAMBER ISOMETRIC EXPLODED VIEW
Scale 1:20



LIGHTING POST
Scale 1:30

PROPOSED PLATFORM DUCTING
Scale 1:30

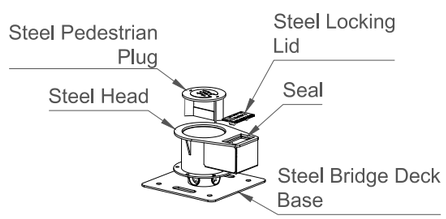


TYPICAL SECTION THROUGH 4WAY MULTIduct
Scale 1:13

CHAMBER CLEAR OPENING	COVER
450x450mm	COMPOSITE OR RECESSED COVER AVAILABLE
600x450mm	COMPOSITE OR RECESSED COVER AVAILABLE
600x600mm	COMPOSITE OR RECESSED COVER AVAILABLE
900x600mm	COMPOSITE OR RECESSED COVER AVAILABLE
900x900mm	COMPOSITE OR RECESSED COVER AVAILABLE

MULTIduct Sizes	Dimensions X	Y
4 Way	252mm	252mm
6 Way	252mm	376mm
9 Way	376mm	376mm
4 Way XL	376mm	376mm

4 WAY MULTIduct
6 WAY MULTIduct
9 WAY MULTIduct
4 WAY XL MULTIduct



NAL SOCKET RSe226 ISOMETRIC
Scale 1:30

NAL Socket Sizes	Pole Size
RS 168	168.3 mm
RS 194	193.7 mm
RS 219	219.1 mm
RS 245	244.5 mm
RS 265	265 mm
RS 273	273 mm
RS 280	280 mm
RS 300	300 mm

Installation Guidelines

MULTIduct units to be installed at a minimum depth of 150mm below the finished platform surface to the top of duct regardless of number of ducts unless noted otherwise in the site specific form.

This drawing must only be used in conjunction with suitable site specific drawings/diagrams.

Backfill around ducts shall consist of 50mm of suitable granular material.

The bed and surround to ducts shall comprise of 50mm surround of suitable granular material only when Cubis ducts are utilised.

Chamber's backfill surround and base shall consist of compacted granular fill. Backfill shall be placed in layers maximum 150mm thick and each layer shall be thoroughly mechanically compacted.

Chamber & Cover Specification

Access chambers shall be a twin-wall design and assembled from stackable 150mm deep sections.

Access chambers must be tested to withstand a minimum vertical load of 40 tonnes without the use of concrete surround for support.

Access chambers up to 900 span are to be manufactured from recycled polypropylene, any chamber spanning beyond 900mm must be manufactured from Glass reinforced Polyester Resin (GRP).

Access chambers must not be jointed in the corner or require mechanical fixing to achieve strength.

Access chamber sections must be capable of being cut laterally to allow for transitional gradient installations.

External walls shall be free from moulding voids that would negatively impact the effectiveness of compaction.

Composite covers must be manufactured from Sheet Moulding Compound (SMC)

Composite covers must be load tested to EN124 with a B125 (12.5 tonne) or C250 (25 tonne) loading.

Composite covers must have a minimum skid resistance value of 55 wet & 75 dry (PTV).

Composite covers must be supplied with lockable steel frames which are hot dipped galvanised to BS EN ISO 1461:2009.

MULTIduct Specification

MULTIduct must be manufactured from 95% recycled Nitrogen foamed high density polyethylene.

MULTIduct cannot be supplied or used in conjunction with any chamber outside of the Cubis Systems range.

MULTIduct sections must be under 20kgs in weight enabling safe manual handling by one person.

MULTIduct must be completely recyclable at end of life.

Retention Socket Specification

Retention Sockets tops must be constructed from cast steel to GS240 or ductile iron to BS2789 500-7.

Posts must be positively secured into the Retention Sockets and be able to withstand a turning moment of 3.4kNm through a load of
230kg @ 1.5metre from the centre of post without any rotation.

Retention sockets must be supplied in a maximum depth of 300mm.

All fixings which secure posts in place must be housed below ground ensuring no risk of damage, vandalism or theft.

DRAWING TITLE

PLATFORM PROPOSED DUCTING
TYPICAL DETAILS

DRAWING REFERENCE		PLATFORM-001
A3	REVISION 0	Scale 1:16
DRAWN	P. EGEA	30/06/20
CHECKED	J. GALLAGHER	30/06/20

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www.cubis-systems.com

Rail *Cabinet* **Bases**

The Cubis Rail Cabinet Base provides a secure foundation for electrical trackside assets. The system simplifies civils, cabling installation, and maintenance works – while providing a safe, inbuilt area to work from.

The solution is modular in construction and comprises six basic components. For your convenience, all these components can be delivered flat-packed, in parts, or fully assembled. This offers a format to build single or multiple cabinet sites and sizes.

The system's foundation is constructed from our STAKKAbox™ ULTIMA Connect chamber. Our composite chambers bring multiple key advantages, including easy access and a lightweight system that is adapted on site during installation.

Provides a safe standing zone, with a large working space underneath

Plug and play assembly that can be built within 4.5 hours

Made up of lightweight components that can all be safely manually handled

Flexible enough to accommodate multiple assets

Scalable – adaptable to different cabinets and able to be made in any size

Protects against rat ingress, with no spaces to get into

Easy to transport – can take all components to site in the back of a standard van

Can be installed in areas where the water base is high

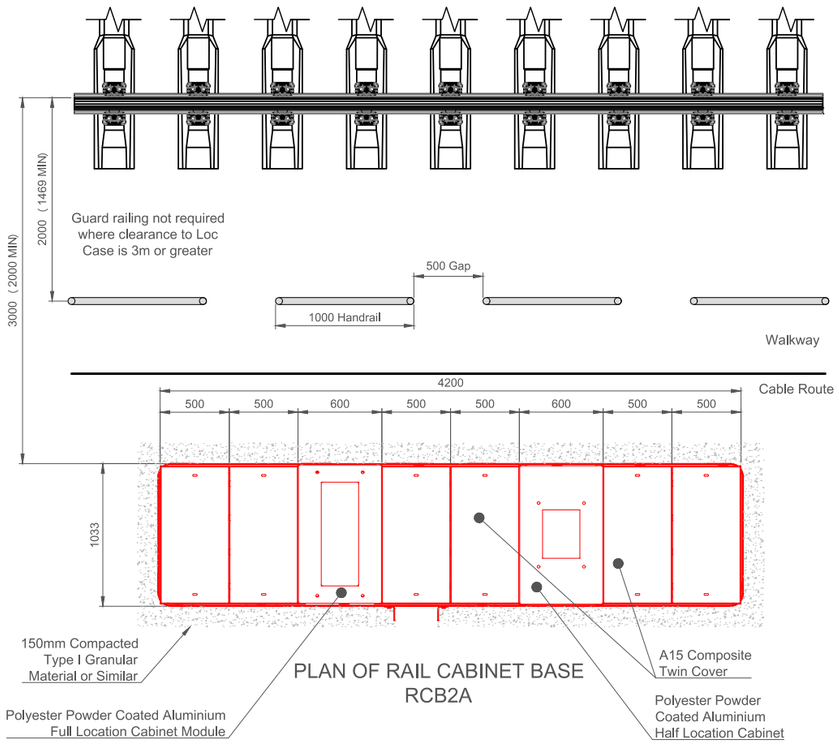
A future-proofed solution that provides a more flexible alternative to concrete

Removes the need for multiple troughs

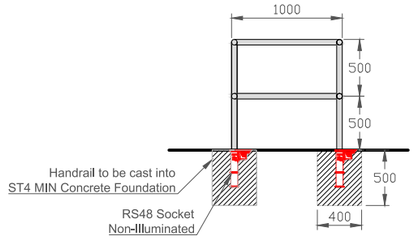
"It is one of the **best innovative products** which we have seen and I think **we will be using more of this...** Cubis STAKKAbox™ **is the ultimate solution"**

– Project Engineer

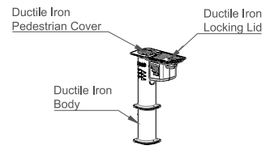
Rail *Cabinet* Bases



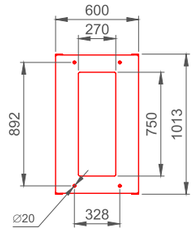
PLAN OF RAIL CABINET BASE RCB2A



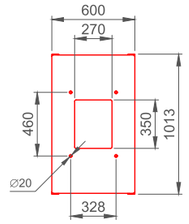
HANDRAIL DETAIL
Scale 1:50



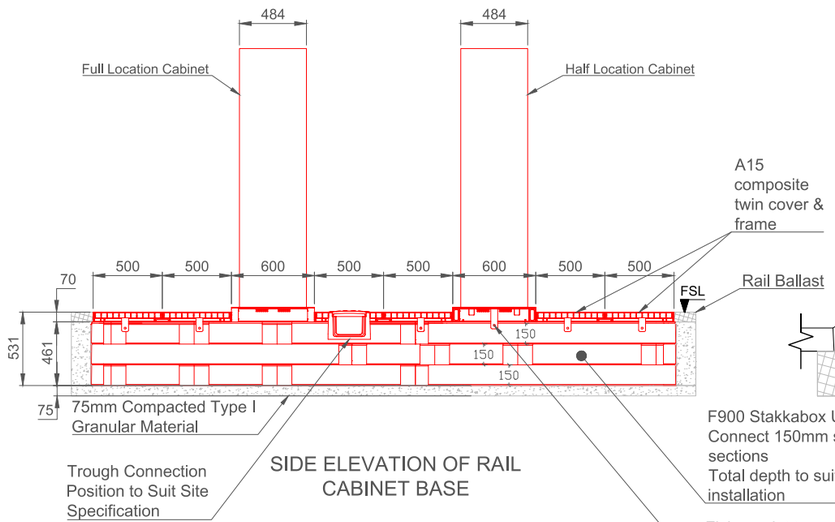
RS48 SOCKET
Scale 1:20



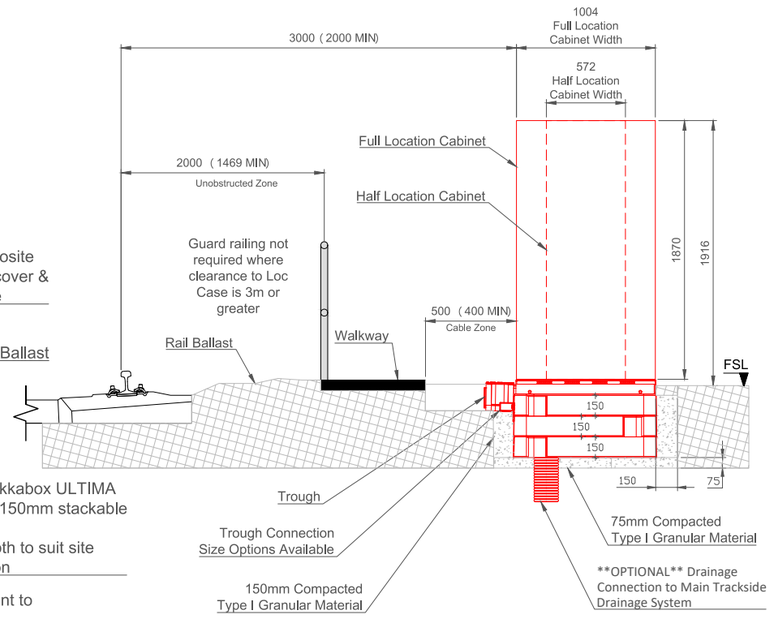
PLAN OF FULL LOCATION CABINET MODULE



PLAN OF HALF LOCATION CABINET MODULE



SIDE ELEVATION OF RAIL CABINET BASE



END ELEVATION OF RAIL CABINET BASE

STRUCTURES ARE TO BE POSITIONED SUCH THAT ALL PARTS ARE AT LEAST 3m DESIRABLE MINIMUM CLEARANCE FROM RUNNING EDGE. ABSOLUTE MINIMUM CLEARANCE FROM RUNNING EDGE TO BE 2m FOR LINESPEED < 125mph, 2.75m FOR LINESPEED >125mph. STRUCTURES ARE TO BE POSITIONED SUCH THAT ALL PARTS ARE AT LEAST 2.75m CLEARANCE FROM ALL LIVE OHLE.

WHERE GUARD RAILING IS REQUIRED THIS SHOULD BE AT LEAST 2m AWAY FROM THE RUNNING LINE AND OVERHEAD LINE STRUCTURES IF CLOSED AN INSULATED BARRIER SHOULD BE PROVIDED.

STRUCTURE TO BE POSITIONED SUCH THAT NO PART OF THE FOUNDATION IS WITHIN THE TRACK SUPPORT ZONE AS DEFINED IN (NR/SP/CIV/044) . STRUCTURAL ADEQUACY OF TRACK TO BE MAINTAINED AT ALL TIMES. TEMPORARY WORKS MAY BE REQUIRED ESPECIALLY FOR DEEP EXCAVATIONS.

WHERE STRUCTURE IS TO BE POSITIONED NEAR THE CREST OF AN EMBANKMENT OR CUTTING OR RETAINING WALL STABILITY CALCULATIONS SHALL BE PERFORMED ON A SITE SPECIFIC BASIS. WHERE STABILISATION WORKS ARE REQUIRED ROBUST RETAINING STRUCTURES MAY BE USED ALTHOUGH ELEVATED PLATFORMS ARE PREFERRED.

FENCING MAY BE REQUIRED IN HIGH RISK VANDALISM AREAS. WHEREVER FENCING IS REQUIRED CLEARANCE ARE TO BE INCREASED FROM FENCE TO NEAREST POINT OF LOC CABINET, IF NOT THE PROJECT SPECIFIC FORM B.

SPECIFICATION

ALL METAL HANDRAILS, LADDERS, PLATFORMS, ETC, WHERE ON A LINE ELECTRIFIED WITH AC CURRENT, SHALL BE ELECTRICALLY BONDED IN ACCORDANCE WITH THE NETWORK RAIL LINE STANDARD NR/SP/ELP/21085.

TYPE 1 FILL MATERIAL TO BE IN ACCORDANCE WITH SPECIFICATIONS FOR HIGHWAYS WORKS.

PERMISSIBLE BEND RADIUS OF CABLES TO BE ADVISED BY DISCIPLINE PROJECT ENGINEER PRIOR TO CONSTRUCTION OF CHAMBER, TO CHECK SUITABILITY OF CHAMBER SIZE. MINIMUM CABLE BENDING RADIUS IN CHAMBER. DUCTS TO BE PROVED WITH DRAW ROPE AND DUCT ENDS TO BE FORMED SMOOTH TO PREVENT CABLE/SHEATH DAMAGE DURING PULL DRAW ROPES TO BE TED OFF.

CONTRACTOR IS TO POSITION ANY TURNING CHAMBER TO ACCOMMODATE THE DUCT/TROUGH INTERFACE IN A SUITABLE LOCATION, TAKING BOTH THE ROUTE WORKS AND ENABLING POSITION INTO CONSIDERATION.

THE CABINET BASE SYSTEM IS TO BE CONSTRUCTED USING THERMOSET GLASS REINFORCED POLYESTER (GRP) STACKABLE TWIN WALL ACCESS CHAMBER CAPABLE OF WITHSTANDING A MINIMUM OF F900 (90T) VERTICAL LOAD.

ACCESS CHAMBERS WILL HAVE THE ABILITY TO BE CONSTRUCTED TO ANY DIMENSION WITHIN 100MM BUT MUST NOT HAVE JOINTS IN CORNER SECTIONS.

IT WILL HAVE A HEAT DEFLECTION TEMP >200°C AND A REACTION TO FIRE, D-S3, D0 (EN13501) , REACTION TO FIRE (SINGLE FLAME SOURCE) , PASS @ 30SEC (ISO 11925-2) .

IT MUST HAVE A CO-EFFICIENT OF LINEAR THERMAL EXPANSION < 33 X 10-6M/M°C (ISO 11359-2) .

ALL CABINET MODULES WILL BE CONSTRUCTED FROM ALUMINIUM AND MUST BE POLYESTER POWDER COATED WITH A MAXIMUM UNIT WEIGHT OF 20KG.

ALL MODULES WILL HAVE A SEPARATE RECESSED ALUMINIUM GLAND TRAY WITH IP RATED GLANDS TO SUIT THE CABINET (GREATER THAN IP66) .

COVER MODULES MUST BE ANTI-SLIP LIGHTWEIGHT COMPOSITE CAPABLE OF WITHSTANDING A MINIMUM A15 (1.5T) VERTICAL LOAD.

FRAMES MUST BE CONSTRUCTED FROM ALUMINIUM WITH A MAXIMUM UNIT WEIGHT OF 15KG.

DESIGN ASSUMPTIONS

DESIGN ASSUMES BASE IS LOCATED ON LEVEL GROUND, ANY SPECIAL ACCESS REQUIREMENTS FOR SLOPES, i.e WALKWAYS, STAIRS AND RETAINING WALLS ARE TO BE COVERED BY THE PROJECT SPECIFIC FORM 03 SUBMISSION.

THE TOP SURFACE OF THE BASE SHALL BE SET TO LEVEL WITH A TOLERANCE OF +/- 20mm.

LIVE LOADING IS ASSUMED TO BE 5kN/m^2 FOR LOC HARDSTAND.

WIND LOADING HAS BEEN DERIVED IN ACCORDANCE WITH BS EN 1991-1-4 AND MAX HEIGHT TO TOP OF CABINET OF 2050mm. LAND TIES TO DRAWING BRS-SC-33 TO BE USED WHERE WIND SPEED EXCEEEDS 24m/s.

GENERAL

ALL WORK TO BE IN ACCORDANCE WITH NETWORK RAIL COMPANY STANDARD (NR/L3/CIV/140) MODEL CLAUSES FOR SPECIFYING CIVIL ENGINEERING WORKS. REFER TO SITE LAYOUT PLAN FOR LOCATION SETTING OUT AND ORIENTATION.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH, AND THE NEW CONSTRUCTION IN ACCORDANCE WITH, NETWORK RAIL COMPANY AND GROUP STANDARDS.

THIS IS A GENERIC DRAWING AND IS IN ACCORDANCE WITH THE STANDARDS APPLICABLE AT THE DATE OF APPROVAL OF THE DRAWINGS. THE CONTRACTOR IS REQUIRED TO ENSURE THAT ANY SUBSEQUENT CHANGES TO STANDARDS ARE INCORPORATED INTO THE DESIGN AND PERMANENT WORKS.

ALL DETAILS ON THIS DRAWING ARE SUBJECTED TO CONFIRMATION BY DETAILED SITE SPECIFIC DESIGN FOLLOWING A TRAIL PIT GROUND INVESTIGATION AND TOPOGRAPHICAL SURVEY. THE CONTRACTOR IS EXPECTED TO CONFIRM GROUND CONDITIONS AND TO VERIFY THE DESIGN AT EACH AND EVERY SITE.

PRIOR TO THE CONSTRUCTION ALL VEGETATION IS TO BE REMOVED IN THE VICINITY OF THE WORKS AND GROUND TREATED WITH A NON-TOXIC HERBICIDE.

WHENEVER POSSIBLE THE FOUNDATION SHOULD BE SET WITH AT LEAST 3m CLEARANCE FROM THE RUNNING EDGE. THIS ENSURES THAT THE WHOLE OF THE INSTALLATION IS CLEAR OF THE TRACK SUPPORT ZONE AND IN A PERMANENT GREEN ZONE.

MODULES ARE MANUFACTURED TO SUIT STANDARD AND NON-STANDARD CABINETS.

ALL MODULES TO BE SUPPLIED WITH 6MM EARTH TO PROVIDE EARTH BONDING TO CABINET BASE SYSTEM.

INSTALLATION

1) PERMIT TO DIG
2) CAT SCAN
3) EXCAVATE
4) INSTALL EARTH MATS
5) FILL AND AND COMPACT TO FORMATION
6) CONSTRUCT NAL MODULAR BASE AS PER THIS DRAWING
7) INSTALL CABINETS

THIS LIST IS NOT EXHAUSTIVE AND RELEVANT STANDARDS AND PROCEDURES SHOULD BE ADHERED TO.

DRAWING TITLE

RAIL CABINET BASE
RCB2A

DRAWING REFERENCE		NAL-002
A3	REVISION 0	Scale 1:40
DRAWN	P. EGEA	02/07/20
CHECKED	G. WOOLLARD	02/07/20

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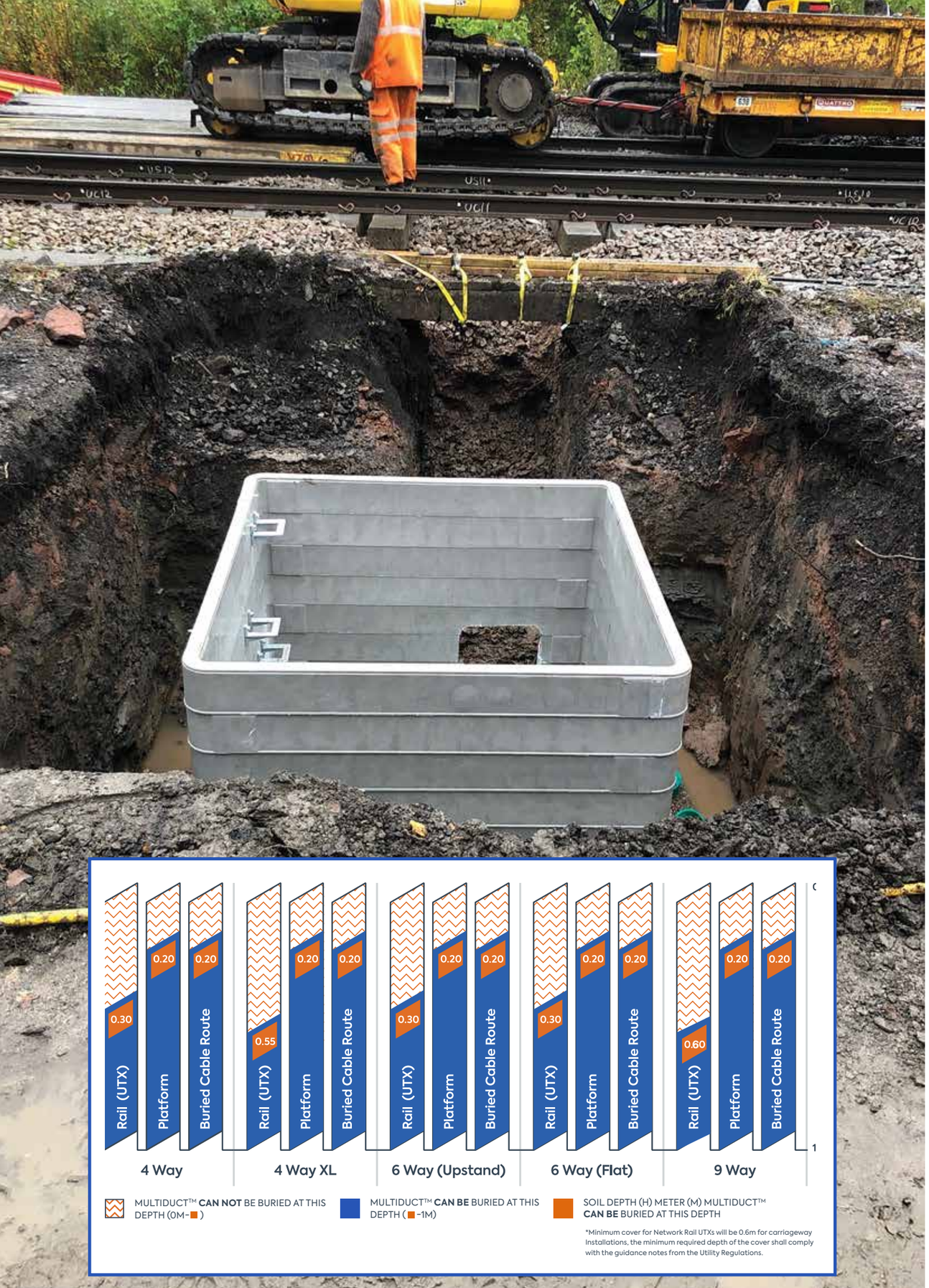


Under *Road and Track* Crossing

Our under road crossing (URX) and under track crossing (UTX) systems offer significant time, cost, and installation advantages. The modern solution seamlessly incorporates:

- Cubis STAKKAbox™ access chambers - lightweight, stackable, and modular
- MULTIduct™ cable protection - an innovative, lightweight, structural, multiple duct system

The 1m long 4, 6 or 9 way units are easy-to-handle, and extremely lightweight at under 20kg. They also offer a unique 'one click' push-fit connection that is fast and easy to install.

Excavated material can be reused during re-installation – further reducing time, cost, heavy plant, and disposal of excess material. These benefits mean that our URX and UTX solutions create a faster, safer construction system which reduces track possession times.

Industry-approved for use with major rail operators

High crush strength – requiring a shallower, narrower burial depth

Requires no concrete or specialist surround

Minimum cover for Network Rail UTXs of 0.6m is easily achievable

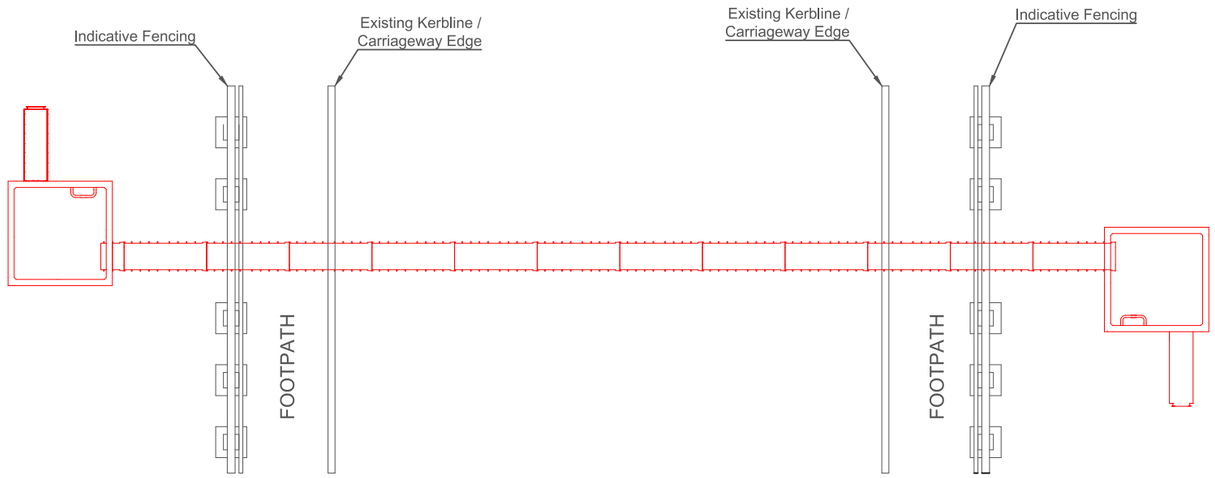
Future-proof, flexible, and sustainable compared to concrete alternatives

Improved project outcomes – including time, cost, and carbon savings

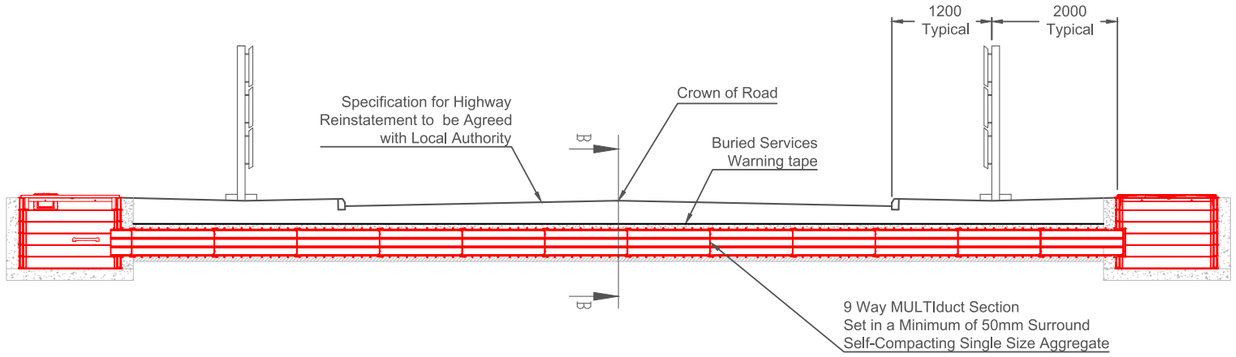
Intuitive plug-and-play installation with no additional tooling required

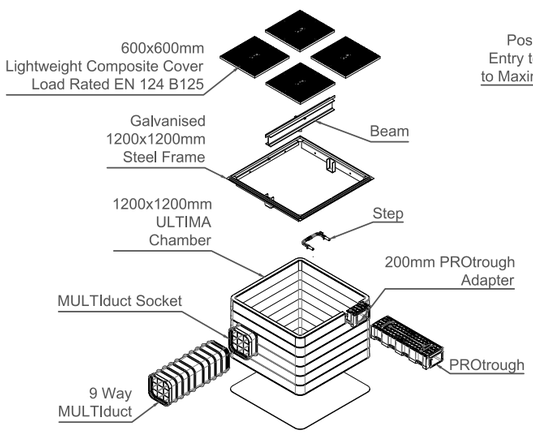
A solution-led approach where all products create a seamless integration

Under *Road and Track* **Crossing**

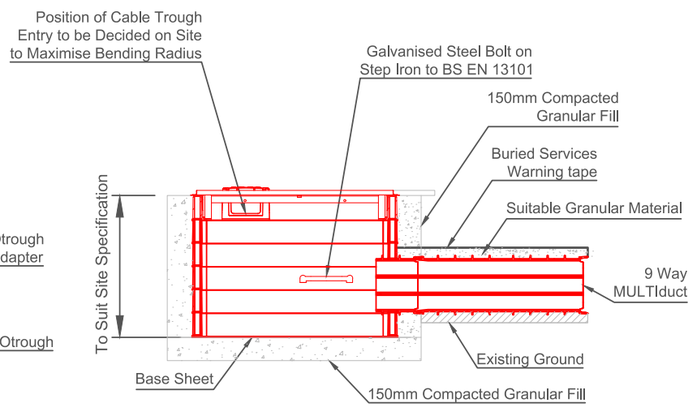


TYPICAL PLAN ON UNDER ROAD CROSSING

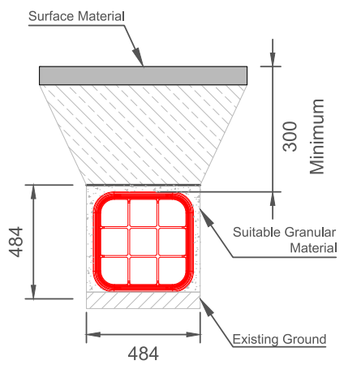




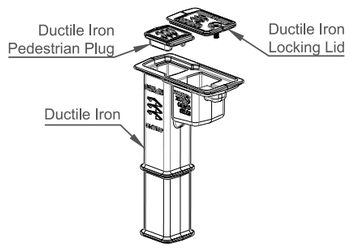
ISOMETRIC VIEW
Scale 1:70



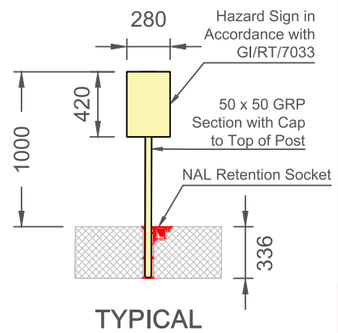
TYPICAL CHAMBER DETAIL
Scale 1:35



SECTION B-B
Scale 1:20



NAL RETENTION SOCKET ISOMETRIC
Scale 1:10



TYPICAL SIGNAGE DETAIL
Scale 1:35

Installation guidelines

The URX shall cross the road perpendicular to road central line. Where local conditions dictate the crossing angle can be reduced to a minimum angle agreed by all stake holders to centre line of road.

The position of duct openings in chambers to be agreed with Network Rail and the Highway Authority.

URX to be installed at a minimum depth of 300 below finish road level to top of duct regardless of number of ducts unless noted otherwise in the site specific form.

A minimum of 2.0m clearance from nearest footpath edge to edge of URX chamber shall be provided wherever practicable.

Position of under road crossing to be marked in accordance with NR/SP/CIV/044 section 9, with marker plates at each end. Warning tape shall be provided on top of ducts bed and surround.

Ducts to be installed at a minimum depth of 300mm below finished road level to top of duct. This may be increased if necessary to avoid road drainage or other obstructions.

Backfill around ducts shall consist of 50mm of suitable granular material.

If multiple duct banks are used zero spacing is required between the MULTIduct sections.

Chamber & Cover Specification

Access chambers shall be a twin-wall design and assembled from stackable 150mm deep sections.

Access chambers must be tested to withstand a minimum vertical load of 90 tonnes without the use of concrete surround for support.

Due to high lateral loading from the 'Carriageway ' access chambers must manufactured for Glass Reinforced Polyester Resin （GRP） .

Access chambers must not be jointed in the corner or require mechanical fixing to achieve strength.

Access chamber sections must be capable of being cut laterally to allow for transitional gradient installations.

External walls shall be free from moulding voids that would negatively impact the effectiveness of compaction.

Composite covers must be manufactured from Sheet Moulding Compound （SMC)

Composite covers must be load tested to EN124 with a B125 （12.5 tonne） or C250 （25 tonne） loading.

Composite covers must have a minimum skid resistance value
55 wet & 75 dry （PTV） .

Composite covers must be supplied with lockable steel frames which are hot dipped galvanised to BS EN ISO 1461:2009.

MULTIduct Specification

MULTIduct must be manufactured from 95% recycled Nitrogen foamed high density polyethylene.

MULTIduct cannot be supplied or used in conjunction with any chamber outside of the Cubis Systems range.

MULTIduct sections must be under 20kgs in weight enabling safe manual handling by one person.

MULTIduct must be completely recyclable at end of life.

Retention Socket Specification

Retention Sockets tops must be constructed from cast steel to GS240 or ductile iron to BS2789 500-7.

Posts must be positively secured into the Retention Sockets and be able to withstand a turning moment of 3.4kNm through a load of
230kg @ 1.5metre from the centre of post without any rotation.

Retention sockets must be supplied in a maximum depth of 300mm.

All fixings which secure posts in place must be housed below ground ensuring no risk of damage, vandalism or theft.

DRAWING TITLE

UNDERGROUND ROAD CROSSING （URX)

TYPICAL SECTION AND PLAN VIEW

DRAWING REFERENCE		UTX-001
A3	REVISION 0	Scale: 1:70
DRAWN	P. EGEA	18/06/20
CHECKED	J. GALLAGHER	18/06/20

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NAL: Supporting *Rail Infrastructure* Beyond the Tracks

Our sister company – NAL – provides innovative infrastructure solutions that enhance the efficiency, safety, and longevity of rail environments beyond the tracks. Their products focus on areas such as station car parks, pedestrian zones, access roads, and platform surroundings.

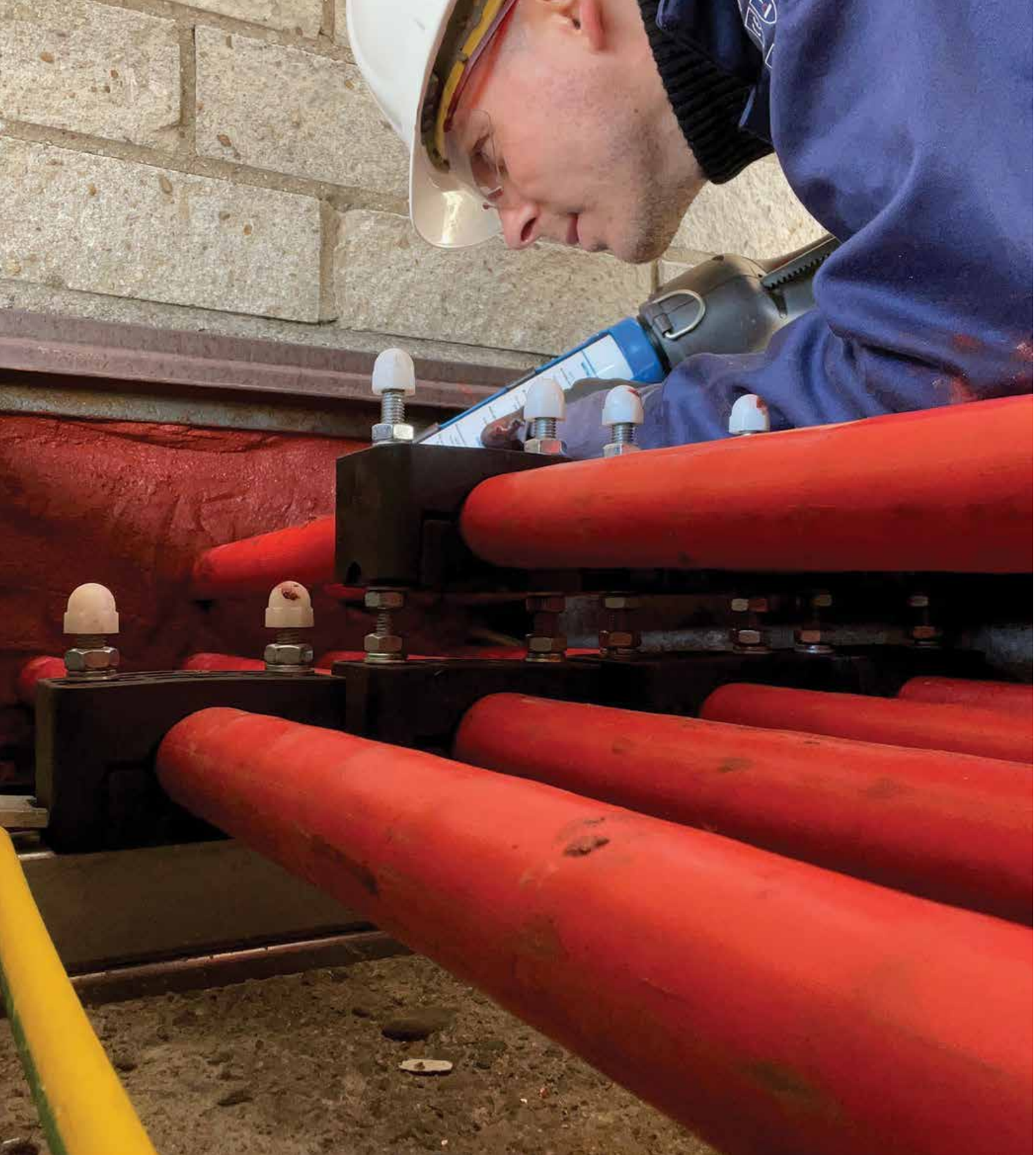
Retention Socket Systems

NAL's Retention Socket System is a patented solution for installing and maintaining off-track infrastructure such as lighting columns, signage, bollards, and CCTV. The system allows for quick installation, easy removal, and reinstallation – without requiring disruptive excavation. Available in various sizes, it secures street furniture with a robust locking mechanism while offering flexibility for future upgrades.

- Rapid installation in shallow foundations
- Enables easy replacement of damaged or outdated equipment
- Reduces traffic disruption and maintenance costs
- Allows furniture orientation adjustments after installation
- Withstands unlimited impacts, extending the life of assets

Plus:

- EV charging infrastructure for rail station car parks – including fast, rapid, and HCP foundations
- Guardian goalposts conforming to GS6 avoidance of danger from overhead electric power lines
- Rotating mast bollards to allow safe, simple, and cost-effective maintenance or replacement works of any platform furniture situated close to the track
- A portfolio of additional supporting products ensuring that lighting, signage, and other furniture is securely installed, easy to maintain, and future-proof



FILOform: Robust Cable Management and *Protection Systems*

FILOform – second sister company to Cubis – specialises in providing advanced solutions for connecting, sealing, and protecting underground cable networks. These solutions are essential for maintaining uninterrupted operations and ensuring the integrity of critical rail systems.

Cable Clamps

- FILOform offers a comprehensive range of industry-approved cable clamps suitable for securely fixing both individual and bundled cables
- Manufactured from hot-dip galvanized steel, these clamps provide excellent corrosion resistance, ensuring long-term durability in challenging rail environments
- They accommodate cable diameters ranging from 12mm to 36mm and are available in single or double cable configurations

Duct Sealing Systems

- To prevent water ingress, gas migration, and fire hazards, FILOform provides universal duct sealing solutions
- These systems are engineered to seal various cable and pipe diameters effectively
- For instance, the FiloSeal+HD FIRE is a highly certified fire, gas, and water sealing system suitable for both ducts and transit frames. It offers up to four hours of fire resistance and can withstand pressures up to 2 bar

Cable Joints

- FILOform also delivers innovative solutions for cable jointing
- This includes cast resin joints, gel joints, and heat-shrink joints – catering to both low and medium voltage cables
- Joints are designed to provide reliable electrical and mechanical connections, ensuring the seamless transmission of power and data across rail networks

The use of FILOForm's high-quality materials and precise engineering ensures durability and performance in demanding rail applications. By integrating Cubis-compatible cable clamps, duct sealing systems, and cable joints into rail infrastructure projects, operators can enhance the safety, reliability, and longevity of their networks.

MADE IN BRITAIN

Driven by *Innovation*

Cubis is Europe's leading manufacturer of network access chamber and ducting systems, used in the construction of infrastructure networks for rail, telecoms, water, construction and power markets.

Cubis has developed an innovative approach in an old-fashioned industry. This has been achieved by developing quality products which replace traditional construction materials, like bricks and concrete, with lightweight plastics incorporating intelligent design features. These can then be installed faster and ultimately save our customers both time and money.

Cubis manufactures preformed network access chamber systems STAKKAbox™, access covers, MULTIduct™ multiple duct system, and RAILduct™ cable trough at its manufacturing sites throughout the UK and Ireland. These products are exported to more than 25 countries throughout the world.

At Cubis we pride ourselves on delivering technical customer support, new innovation, product quality and the highest levels of customer satisfaction.

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