

PROPOSAL

Project: King's Point, Reading
Car Park Ventilation
Design, Manufacture, Install & Commission



PIONEERING ECO-FRIENDLY TECHNOLOGIES



Document Status

Information Provided	Date
4295a-M007-T1 Basement Mechanical Services Layout	April 16

Engineering Design Consultants

4th Floor
Ergon House
Horseferry Road
London
SW1P 2AL

Date: 06/01/17
Ref: 0028-17-ED

Att: Omprakash Subramanian
Email: osubramanian@edcengineers.com
Tel: 0203 004 0062

Re: King's Point, Reading – Car Park Ventilation

Dear Sirs,

We thank you for your enquiry and opportunity to submit our quotation for the supply and installation of eco-park ventilation equipment for the above project. We take pleasure in detailing our proposal as follows.

As our company name suggests we are actively involved in all aspects of car park ventilation and provide a conceptual engineering approach to the design and installation of air quality and fire safety systems for enclosed and underground facilities.

Eco-park has been specifically designed for residential and commercial buildings. It is an Induction based system that has the unique twin discharge fan at its core and uses the principal of thrust to move noxious gases or smoke laden air to a common extract point. Our concept benefits from using up to 60% less fans, less cable and smaller control panels. Which has ultimately led to this being the predominant method used worldwide, due in part to the systems flexibility, environmental and clearly derived sustainable benefits. With our focus being to create BREEAM rated parking schemes that compliment any development.

All of our equipment is fully compliant with all UK and European legislation and we fully guarantee, warrant and test each system to perform in accordance with British standards as well as all relevant approved documents.

Our engineers have carefully reviewed the information submitted and offer our equipment on the basis of our findings from the drawings provided. However there may be areas of the design that need a degree of further clarification especially in respect of the acoustic requirements.

From the drawings provided it appears that a provision for extract has been made and this will be utilised in order for the system to operate in accordance with Approved Documents B and F.

We therefore detail below a system that will meet all approvals and work under all pollution conditions including smoke clearance mode. The system has been designed to comply with the standard Mechanical, Electrical and Public health engineering systems, in particular specification U13 (Car Park Ventilation).

The system detailed below has been proved by calculation and will if required be further verified by independent CFD analysis, ensuring that both the design principal and actual performance are as required. Should a CFD be required we will provide this on the basis of the submitted fire strategy.

System Overview

Floor to Soffit Height:	2.85 m (Leaving 2.58 m Clear)
Net Floor Area Car Park:	734 m²
Net Volume Car Park:	2,092 m³
Number of Induction Fans:	2 off
Number of CO Detectors:	2 off
Number of Smoke Detectors:	8 off (Optional)
Number of Main Extract Fans:	2 off (500 Ø)

Airflow Rates

The airflow on the proposed system would be in excess to the minimum requirements of the current building regulations in force in the UK, i.e. building regulations approved documents B & F.

Day to Day Operation Set by Timer:	0.87 m³/s	1.5 ac/hr.
CO @ 20ppm: Design Flow for Low CO:	1.74 m³/s	3 ac/hr.
CO @ 30ppm: Design Flow for High CO:	3.48 m³/s	6 ac/hr.
Fire Condition: Design Flow for Smoke:	5.81 m³/s	10 ac/hr.

Main extract fans: We have had the opportunity to review a detailed drawing of the basic car park layout and note a fire-rated ductwork extract arrangement was originally designed. We would suggest swapping the fire-rated ductwork for builders-work as per the layout provided, which will be more cost effective. The plant room should be made sufficient to house 2 off 500 Ø extract fans mounted in parallel.

The system design will mean that 2 fans are required to extract fumes from the car park at the rate dictated by building regulations and indicated by the detection devices we would install.

Number of main extract fans: 2 (inverter driven, classified for standard and emergency operations for 120 minutes at 300°C).

Fan duty: Each fan 2.91 m³/s high speed.

Fan Ratings

In compliance with current building regulations Approved Document B, the main fans will each be rated to extract 50% of the maximum airflow. All fans supplied are rated to withstand a temperature of 300°C for a period of 120 minutes.

Basic System Operation

Fresh air will be drawn into the car park via the builders-work air inlet and contaminated air will be drawn out / extracted by the two main fans mounted in parallel. Throughout all sequences of operation the Induction fans will operate to dilute and guide fumes towards the main extract point at a performance level comparable to the system optimum requirement.

The 2 main extract fans proposed are each inverter driven and our control panel would be set so that under daily ventilation the fans would run at low speed just providing a slight dilution effect to the car park on the basis of day to day ventilation. Should the facility close at night or at any other time then the system can, via a time clock in our control panel, be effectively put to sleep for the period of inactivity.

Cause & Effect Table

The following table provides a summary of the system function under various environmental and fire conditions within the car park.

Condition	System Function	Air Change Rate
Daily Vent	Main Extract Fans run at 15%.	1.5
CO > 20ppm	Main Extract Fans run at 30% via inverters. Selected Induction fans at Low Speed.	3
CO > 30ppm	Main Extract Fans run at 60% via inverters. Selected Induction fans on Low Speed.	6
Fire Condition	Main Extract Fans activate at 100%. Induction fans initially switched off for a period of 3 minutes or as advised. Induction fans then switch to Full Speed.	10

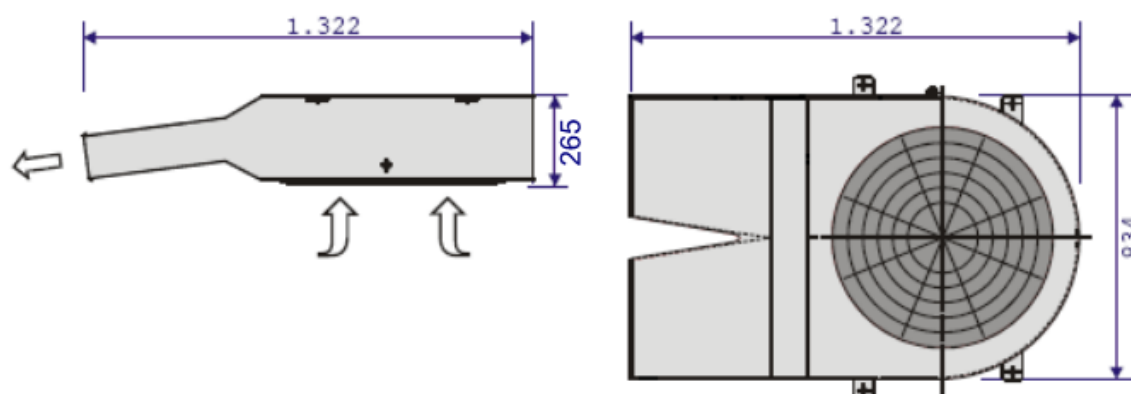
At Commissioning all testing will be to the satisfaction of the relevant Building Control Authority and Fire Officer if required.

Smoke Detection

If the smoke detection is supplied by others then we will simply require a volt free normally closed contact for each fire zone.

Our standard quotation details an optional price for a L5 detection system to cover the car park area only. This is a non-prescriptive system in which the protected area (car park) is designed to satisfy a specific fire risk objective. Our proposal allows for flat soffit arrangements with conventional down stand beams. It does not allow for egg crate type soffits that may require additional detectors to avoid the creation of smoke reservoirs furthermore it does not include adjoining rooms or additional areas. If a different category is required then we will need to know prior to the final design the 'L' detection classification in accordance with BS 5839 pt. 1.

Induction Fans



2 Off

Type	Multi speed, fire rated Induction fans
Thrust	PVE/ IDV-50 Twin Discharge
Motor	50 Newtons
Make	1.3 KW
Insulation	Western European
Protection	Class H
Voltage	IP 55
Noise Level	400/3/50
Finish	51-69 dBA@3m/45°
Temp Ratings	Powder Coated RAL 7032
	300°C – 2 Hours

Components (Included)

Patented Twin Discharge Guide Vanes
Inlet Guard
Heavy Gauge Fan Case
Motor 300°C for 2 hours rating
Centrifugal Impeller



Typical Specification

Eco-park Induction thrust fans will be of the low profile, twin discharge Centrifugal type manufactured and supplied by Parking Ventilation Equipment Ltd Casings will be constructed in galvanised heavy-duty steel plate with powder-coated finish.

Fans will drop a maximum of 265 mm from the soffit have a minimum thrust capacity of 50 Newton's in fire mode and be capable of operating on a 415v/ 3 ph /50hz supply. Fan Impellers will be narrow pattern centrifugal type balanced to grade 6.3 as minimum.

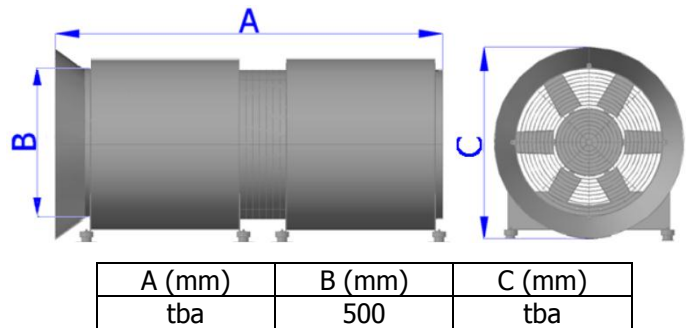
High Temperature Fans will be tested and certified to EN12101-3 CE marked and supplied and installed in accordance with BS 7346 part 2 1990. The Fans will be manufactured by Parking Ventilation Equipment and therefore can be finished in any standard RAL colour to suit architects design, developer's preference or corporate policy.

Main Extract Fans

2 Off	Main Extract fans high temperature (VFD)
Supply	Parking Ventilation Equipment Ltd
Type	PVE/500Ø inverter driven; smoke rated axial fan
Volume	2.91 m³/s high speed
Static Pressure	350 pa nominal
Speed	2 pole
Motor Type	Inverter driven, standard and emergency duty 300°C for 2 hours
Motor Power	2.64 KW
Motor Current	5.36 amp
Internal Noise Level	NR55
External Noise Level	55 dBA @ 3 m (High CO)
Insulation	Class H 1
Protection	IP 55
Temperature	300°C 2 Hours
Dimensions	500 mm Ø
Power Supply	415v/3ph/50Hz

Components per Fan (Included)

2 Off Matching Flanges	Inc.
2 Off Flex Connections	Inc.
4 Off Mounting Feet	Inc.
8 Off Spring Av Mounts	Inc.
2 Off 1Ø Silencers	Inc.
1 Off Backdraught Dampers	Inc.



Typical Specification

The eco-park Main Emergency Smoke Extract fan casings are manufactured from heavy gauge mild steel roll formed and automatically welded. Robust Flanges are formed and drilled to the standard European pitch and the whole case hot dip galvanised to BS729 after fabrication.

Impellers

Fans are to be fitted with adjustable pitch impellers of true aerofoil shape with blades made from high quality pressure die cast aluminium (LM6). Fans impellers will be supplied in natural finish. All impeller blades will be factory set, locked and pinned at the correct blade angle in order to provide optimum aerodynamic performance. Impeller Hubs will be manufactured from die cast aluminium alloy (LM24). Prior to despatch all fans will be dynamically balanced to grade 6.3 minimum.

Motors

Fans motors will be pad mounted totally enclosed metric frame motors to IP 55 as standard and suitable for continuous use at normal temperature for day-to-day ventilation and for a single use under emergency smoke clearance 300°C for the specified time requirement. Motor windings will be class H insulation.

Quality / Certification

Fans are designed and manufactured in accordance with BS EN ISO 9001-2000.

Fans are tested to:

BS EN ISO 5801 Performance

BS 848-2 Noise

BS ISO 13347-2 Reverberation

EN12101-3 Temperature

BSI EC Cert 0086-CPR- 493001

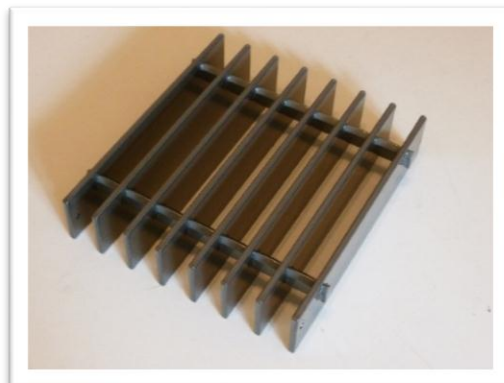
BSI Kite mark KM 613754

LPCB 937a



Eco-grille

- Specially developed for car park applications as part of the eco-park range. The product is precision engineered in lightweight aluminium with a robust modular connection system requiring no welding for assembly.
- Eco-grille has been developed to work in harmony with eco-park ventilation designs. It has the high tech, high quality finish demanded by all today's quality builders. It offers a low resistance to air flow ensuring system power and noise are minimised.
- Eco-grille is one third the weight of steel. The aluminium construction is light and easy to handle so saves on installation manpower. The unique construction method provides each panel with great rigidity and strength.
- Eco-grille is a 100% recyclable, Maintenance free, Non-toxic, Non-combustible product and very cost effective to use.



System Acoustics

Attenuation is focused on the main extract fans. The room side attenuation to achieve NR55 in the car park and external attenuation to achieve a level of 55dBA @3m. All in line with the guidance detailed in BS 8233 and derived from the World Health Organisation. Any enhancement of this criteria may impact the overall design and must be clarified with PVE first.

Cabling

To meet with current regulations we will use the following cables in this installation:

- Power cable to Main fans FP 600S or equivalent
- Power cable to Induction fans FP 400 or equivalent
- Power cable to smoke sensors FP 200 or equivalent
- Signal cable to CO detectors PVC YY cable

Cable Specifications and Standards

PVE uses only the finest quality cable manufactured by the Prysmian Group or equal and approved. Our cable will be manufactured to comply with BS 8519-2010 which supersedes BS 7346-6. This latest standard is a new Code of practice giving guidance and recommendations for the selection and installation of fire resistant power and control cable systems for life safety, smoke and heat and fire-fighting applications.

The standard introduces the concept of time based fire survival times (30 min, 60 min, and 120 min) defined as categories 1, 2, and 3 for both power and control cables.

Exclusions

The following items are specifically excluded from our scope of supply in this tender:

- Ductwork
- External Grilles & Louvres
- Site work related to the installation other than as mentioned
- Travel to site other than that included for installation
- Any builders work, including holes for cables and sealing and fire stopping
- Main Containment (optional price available on request)
- Specialist offloading of equipment (standard offloading by PVE)
- The hire of specialist lifting equipment and platforms (standard included)
- Hoisting of any equipment to roof level
- Any works carried out of normal working hours and weekends
- Value Added Tax (VAT)

Inclusions

The following items are specifically included within the Mechanical and Electrical Installation & Wiring section of our scope of supply. (See following Page)

- Drawings and electrical schematics
- Technical Submission
- Design CFD (optional)
- Supply of cause and effect diagram
- Standard health and safety procedures
- Standard method statements
- Standard risk assessments
- Supply and installation of support steelwork
- Supply of acoustics as per "System Acoustics" above
- Supply of all equipment to site
- Fixing of Induction Fans
- Fixing of Main Extract fans and Acoustics as described
- Fixing of Grilles (car park side)
- Mount Main Control panel
- Control software and HMI
- Supply, mount and cable auto-changeover panel
- Mount CO sensors
- CO Detection system, panel and software
- Mount Smoke panel and detectors (optional)
- Mount and cable manual call points (optional)
- Mount and cable fire-fighters override
- Supply and cable exhaust fan isolators
- Supply and install secondary containment to our equipment (within 5 metres of main cable tray)
- Run cable and connect Induction fans
- Run cable and connect all detection devices
- Run cable and connect main extract fans
- Removal of debris to central skip provided by others
- Site engineers (commissioning, training and testing)
- Supply of all handover documents
- Maintenance programme (see below)



All based on continuous work, with free uninterrupted access.

King's Road, Reading – Project Specific Scope of Supply & Price

eco-park® Equipment			eco-park® Design			eco-park® Commissioning		
Element	Inc	Opt	Element	Inc	Opt	Element	Inc	Opt
All Cable	✓		Technical Submission	✓		Handover Documentation	✓	
Twin Discharge Induction Fans	✓		Equipment Layout Drawings	✓		Test Certification	✓	
Induction Fan High Temp Isolators	✓		Detailed Exhaust Drawings	✓		O & M Manuals	✓	
Extract Fans and Ancillaries	✓		Electrical Schematic	✓		Demonstration and Training	✓	
Extract Fan Inverters	✓		System Cause and Effect	✓		9 Month Inspection	✓	
Attenuators	✓		Full CFD Modelling		✓	Cold Smoke Test		✓
Main Control Panel	✓		eco-park® Installation			Non-Standard Extras (Available on Request)		
CO Detection System	✓		Element	Inc	Opt	Element	Inc	Opt
System Specific Auto Changeover Panel	✓		Mechanical Installation	✓		80% Free Area Eco-Louvres		
Secondary Containment	✓		Electrical Installation	✓		Fire Curtain		
Exhaust Grilles	✓		Exhaust Fan Cabling (30 m)	✓		Floor Separation Dampers		
Fireman's Override Switch	✓		Induction Fan Cabling	✓		Secondary Backup Supply		
Smoke Detection System		✓	Cables From Control Panel	✓		Repeater Panel	✓	
Smoke Detection Control Panel		✓	CO Detection Cabling	✓		Car Stackers		
Manual Call Points		✓	Smoke Detection Cabling		✓	Main Containment		

Total Price:

Our total price for the design, supply, installation and commissioning of all equipment and services as detailed above would be in the sum of:

£32,942.00 net installed UK Site

Optional Price for Independent CFD report

£3,678.00 net

Optional Price for Supply, Installation and Commissioning of the Smoke Detection System

Incorporating 8 Smoke Detectors, Cable, Control Panel and Links

£3,153.00 net

Optional Price for Cold Smoke Test

£750.00 net

Parking Ventilation Equipment Ltd. Standard Insurance Cover

Type of Insurance	Insurance Cover
Employers Liability	£25,000,000
Public Liability	£15,000,000
Products Liability	£15,000,000
Permanent/Contract Works	£750,000
Professional Indemnity	£10,000,000

PVE System Guarantees & Maintenance

PVE Ltd offers a planned maintenance contract for all car park installations which are fully detailed in the handover documentation package.

PVE system are designed and manufactured to offer reliable operation in reasonable environmental conditions and will have a typical life in excess of 15 years subject to the guidance of our operating and maintenance manuals. Components that incorporate batteries and actuators or that are subject to temperatures or cycle patterns will be covered by our standard 12 month guarantee. Where paint finishes are subject to atmospheric corrosion such as coastal applications we would expect the products to be regularly cleaned in line with the operating manual.

PVE car park ventilation equipment is guaranteed for 12 months from commissioning and completion of our system. We will provide the first inspection nine months after installation free of charge. If non-standard access equipment is required this is to be provided by others. Any special equipment required to carry out the service or replacement components will be charged at cost + 25 %.

Life safety systems must be maintained and serviced every 12 months to meet the requirements of British and European standards BS 7346, EN 12101.

Our unique service agreement will be transferred to the end user, maintenance company or building owner upon practical completion. The first free inspection must be claimed within 9 months from issue of the system completion certificate. Any service not booked and completed within this time will be chargeable.

PVE service division can offer an emergency call out service operating 24/7 year round depending on the site location this can amount to attendance within one working day.

Terms & Conditions

General Conditions

Final terms and conditions are to be agreed. These proposals are based on our standards terms and conditions of sale, which are available on request from Parking Ventilation Equipment Ltd.

Contract Terms

We are committed to fair contracts and unless noted otherwise in writing within our offer, all tenders are priced based on using the un-amended JCT standard form of sub contract. This is the only basis on which this tender will be open to acceptance.

Control Panels

Where we have specifically included for PVE Panels these will be **open protocol** designed, manufactured and tested to HC Group technical specification.

The control panel will need to be located within 30 metres of the main extract fans as we have allowed for 30 metres of FP600 cable. It will also require 60 minutes fire rated separation from the car park & main extract fans.

Design Fee

The sum equivalent to 10% of the contract price will be charged on completion/supply of product arrangement drawings, positional layouts of sensors, technical submission and completion of the CFD if required. This fee is included in the contract sum quoted above.

Variations

Whilst every effort is made to incorporate everything within our proposal to protect the contractor and developer from extra costs. Variations to contract do on occasions occur should this happen the value of the variation is to be agreed in writing prior to the work execution.

Validity

This quotation is valid for acceptance up to 60 days from date of this tender.
This quotation is based on the project being completed in 2017/2018.

Day Work Rate

PVE offer an all in labour rate for any authorised alterations or additional works at a rate of £45.00 per man hour.

In addition costs of materials will be charged at +25% and cost of plant at +10%.

Technical Information

Full arrangement drawings of all fans and general size of panels can normally be supplied within 4 weeks of order placement. These details accompany the full design Technical submission and if required CFD. This will be dependent on the customer providing us with electronic drawings in DWG format of all relevant architectural and structural elevations and plans enabling us to proceed.

Delivery

Our equipment has different standard lead times, Panels and electrical components tend to be on shorter lead times therefore work can commence on site before the major components are ready. This will generally mean a staggered delivery and fit the program decided at the placement of order. Generally all equipment can be manufactured supplied and fitted within a 16-20 week lead-time unless affected by situations outside our control.

Property Rights

The information contained in this proposal or any design details supplied during discussion are unique to PVE and must not be divulged to any other party without the express permission of PVE Ltd.

Goods supplied whether installed or not shall remain our property until paid for, and so long as goods remain our property we reserve the right to remove items from site at any time (non-negotiable).

Electrical Power Wiring and Supply

PVE expects to provide wiring and final connection to all our components of supply. Our components will be supplied and installed in accordance with BS8519-2010, the requirements of approved document B or in the case of alarm systems BS 5839.

Although we use battery operated tools during installation it has been assumed that an 110v power supply will be provided free of charge during any testing and commissioning work. Also that an essential power supply of adequate capacity as advised in our technical submission will be provided and connected to the PVE Control Panel.

Tender Proposals

Please note that information contained in this proposal regarding quantities of products have been based on the information and design layouts submitted to PVE Ltd at this time and calculated on a standard matrix relating to the overall size of the facility.

Commissioning

Our costs include for commissioning to BS 7346-7:2013 and this would normally include an air movement test but can also include a smoke test on request. Commissioning will progress after consultation with the client and on the basis that all work is complete and permanent power is available on site. We would require 10 working days' notice of commissioning.

Client Demonstration and Training

System demonstration would normally be done at the commissioning stage as would any training. Should we need to return at a later date this would be chargeable at £580.00 per visit.

Payment

Our standard terms of payment are 30 days net on approved accounts from date of despatch from our Halifax works. In the event that you wish us to hold manufactured and finished goods to fall in line with your program and this has not previously been arranged a storage charge will be made.

Liquidated and Ascertained Damages

We note that the Liquidated and Ascertained Damages for this project are not known. In the unlikely event of delays, we would seek to limit these to a sum equivalent to 10% of our contract value, or in direct proportion to the overall contract value.

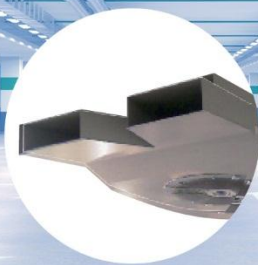
Confidentiality

We can advise that a confidential copy of your proposal is held by us electronically for up to 4 years and can be used to generate a revised and updated appraisal and valuation at any time. Should there be any changes or areas that need further clarification, it is important that you do not hesitate to contact us, as we will be delighted to assist further.

Yours faithfully,

Elliot Delahunty

Sales Engineer
Parking Ventilation Equipment
Unit 5, Prince of Wales Mill,
Birds Royd Lane,
Brighouse, HD6 1LQ
Tel: 0845 20 20 234
Email: ed@pveuk.com



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Unit 5, Prince of Wales Mill

Birds Royd Lane

Brighouse, West Yorkshire HD6 1LQ

T: 0845 20 20 234

E: sales@pveuk.com

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