

EV Charging Infrastructure Risk Assessment



07766 107088

info@ev-exbox.com

Property inspected by Graeme Warnell

Address

BP Sonning Cutting
709 London Road
Woodley, Reading
Berkshire
RG6 1BG



Carried Out

**August
14th 2025**

Contents

Notes	3
Disclaimers	4
Areas	5
Document Control	5
Documents provided by client	5
Disclaimer	6
Risk Summary	7
Definition	7
Proposed EV charging scheme specific to this report.	7
Location overview of proposed EV charging scheme specific to this report.	8
Substation equipment	10
Risk of vapour cloud explosion (VCE)	10
Risk mitigation of vapour cloud explosion	10
Risk of vapour cloud explosion (VCE)	11
Risk of fire spreading on site	11
Risk of fire spreading on site	11
Early detection of gas, smoke, or fire	12
Early detection of gas, smoke, or fire	12
Risk Mitigation - Early Detection of gas, smoke and fire	12
Storage of flammable and combustible materials overview	12
"Guidance for Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations" (Blue Book 5th Edition) hazardous zones	13
Risk Mitigation - Storage of flammable and combustible materials	13
Separation/Segregation	14
Risk Mitigation - Separation/Segregation	14
Fixed suppression systems	14
Risk Mitigation - Fixed suppression systems	14
Hand held suppression systems (fire extinguishers)	14
Risk Mitigation - Hand held suppression systems (fire extinguishers)	15
Risk of fire crossing the site boundary	15
Risk mitigation of fire crossing the site boundary	15
Risk of fire crossing the site boundary	16
Risk of contaminated firewater leaving the site - below ground.	16
Risk of contaminated firewater leaving the site - below ground.	17
Risk mitigation of contaminated fire water leaving site below ground	17

Risk of contaminated firewater leaving the site – above ground	18
Risk mitigation of contaminated fire water leaving site above ground	18
Emergency services access	18
Employee / Public safety	18
Staff training	18
Conclusion(s)	19
Recommended action plan for consideration	19
Significant Safety System Upgrades for Consideration	20

Notes

Disclaimers

The following report is issued on the back of our recent survey of the above site.

Please note that under our terms and conditions our staff, employees, associates, and consultants will under no circumstances accept any responsibility as part of full for the role of "Responsible Person" as defined within the articles of the Regulatory Reform Fire Safety Order 2005.

Please note this survey and document is prepared on the basis of identifying potential risks and issues relating to the installation and management of Electric Vehicle (EV) charging systems in or around the building referred to in this report and how these impacts on life, public and environmental safety but does not constitute a Fire Risk Assessment. All notes herein are submitted on the basis of items seen on the day of the survey from a visual stance only. No destructive surveys were undertaken or any prior project delivery information including installation practices, records, and signoff.

This document reviews the risks associated with EV charging infrastructure and focusses on the risks and mitigation strategies associated with:

- A vapour cloud explosion within EV charging area.
- Fire spreading within the EV charging area.
- The risk of fire spreading beyond the site boundary.
- The risk of contaminated firewater leaving site below ground.
- The risk of contaminated firewater leaving site above ground.
- The risks to public safety within EV charging area.
- Emergency services access to the EV charging area.
- Staff training and awareness in relation to thermal runaway and emergency procedures.

The recommendations within this report are based on current safety thinking and practices regarding EV / HEV / ICE fires and thermal runaway events within batteries at the time the report was undertaken.

All items noted with this report are on the basis of our surveyor's experience, knowledge and standard industry articles and the documentation provided. Items noted here do not allow for any works associated with external wall cladding including (but not limited to) EWS1 surveys, FRAEW, and or destructive investigation surveys to determine compartmentation lines and materials including any insulation.

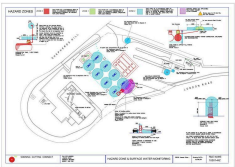
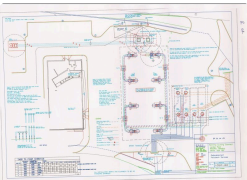
Please note that under our terms and conditions our staff, employees, associates, and consultants will under no circumstances accept any responsibility over control of the on-going management of the premises, once the report has been submitted. Nor will we be responsible for the failure to implement any breaches, problems, or significant findings.

Liability for management procedures for (including but not limited to) evacuation management, maintenance of firefighting equipment, maintenance of alarms will not in any way be adopted by GW Environmental Consulting Ltd (trading as EV-EXBOX) and our risk assessors or staff because the ongoing management of the premises is not within our control.

1. DOCUMENT CONTROL

Ref	Name	Description
Document author, client, and document details.		
1.1	Author	Graeme Warnell
1.2	Client	Williams Southern Limited
1.3	Project	EV Charging Infrastructure Risk Assessment
1.4	Document title	BP Sonning Cutting EV Charging Infrastructure Risk Assessment
1.5	Revision status	1.0
1.6	Date of initial report	14th August 2025
1.7	Date this version of the report issued for client review	
1.8	Date of final issue	
1.9	For the purposes of this report those referred to as AHJ (Authorities having Jurisdiction) are those persons defined as:	Client Name - Williams Southern Ltd Client Name - BP Oil UK Ltd Local Fire & Rescue Services – Berkshire Fire & Rescue Service (FRS) Local Authority – Reading Borough Council
1.10	Note:	An AHJ can be an organisation or an individual responsible for health, safety, environment, welfare of those who may occupy the named building. This report requires the agreement of all AHJ / parties concerned of the building in question. The agreement is a means to demonstrate that all reasonable care, attention has been carried out and being satisfied as such having reviewed information provided.

2. DOCUMENTS PROVIDED BY CLIENT

Ref	Document	Type
2.1	PDF	Sonning 10501 Haz Zones
 Ref #2.1 - Sonning 10501 Haz Zones		
2.2	PDF	Sonning Cutting Fuel System
 Ref #2.2 - Sonning Cutting Fuel System		
2.3	Word	Site Appraise Report – Sonning Cutting SF Connect - Document Number: EV002-PE-REP-000-GB00010501-0001 - Revision Code: B02

2. DOCUMENTS PROVIDED BY CLIENT (CONT.)



Ref #2.3 - Site Appraise Report –
Sonning Cutting SF Connect -
Document Number: EV0

3. DISCLAIMER

Ref	Name	Description
3.1	Disclaimer	The following report is issued on the back of our recent survey of the above site. Please note that under our terms and conditions our staff, employees, associates, and consultants will under no circumstances accept any responsibility as part of full for the role of “Responsible Person” as defined within the articles of the Regulatory Reform Fire Safety Order 2005. Please note this survey and document is prepared on the basis of identifying potential risks and issues relating to the installation and management of Electric Vehicle (EV) charging systems in or around the building referred to in this report and how these impacts on life, public and environmental safety but does not constitute a Fire Risk Assessment. All notes herein are submitted on the basis of items seen on the day of the survey from a visual stance only. No destructive surveys were undertaken or any prior project delivery information including installation practices, records, and signoff. This document reviews the risks associated with EV charging infrastructure and focusses on the risks and mitigation strategies associated with: ❖ A vapour cloud explosion within EV charging area. ❖ Fire spreading within the EV charging area. ❖ The risk of fire spreading beyond the site boundary. ❖ The risk of contaminated firewater leaving site below ground. ❖ The risk of contaminated firewater leaving site above ground. ❖ The risks to public safety within EV charging area. ❖ Emergency services access to the EV charging area. ❖ Staff training and awareness in relation to thermal runaway and emergency procedures. The recommendations within this report are based on current safety thinking and practices regarding EV / HEV / ICE fires and thermal runaway events within batteries at the time the report was undertaken. All items noted with this report are on the basis of our surveyor's experience, knowledge and standard industry articles and the documentation provided. Items noted here do not allow for any works associated with external wall cladding including (but not limited) to EWS1 surveys, FRAEW, and or destructive investigation surveys to determine compartmentation lines and materials including any insulation. Please note that under our terms and conditions our staff, employees, associates, and consultants will under no circumstances accept any responsibility over control of the on- going management of the premises, once the report has been submitted. Nor will we be responsible for the failure to implement any breaches, problems, or significant findings. Liability for management procedures for (including but not limited to) evacuation management, maintenance of firefighting equipment, maintenance of alarms will not in any way be adopted by GW Environmental Consulting Ltd (trading as EV-EXBOX) and our risk assessors or staff because the ongoing management of the premises is not within our control.

4. RISK SUMMARY

Ref	Name	Description
4.1	Risk Review Introduction	The risk of a lithium-ion battery and electric vehicle fire remain statistically low; however, the impact of a lithium-ion battery or electric vehicle fire is high. Over time as internal combustion engine vehicles are phased out and their electric counterparts increase with age the likelihood of electric vehicle fires will increase. Due to the increased intensity of a lithium-ion battery fire compared to a hydrocarbon fire the risks associated with the installation of electric vehicle charging needs to be carefully considered to ensure fire safety, public safety and firewater pollution prevention are all included in the electric vehicle charging risk assessment. These risks include, but are not limited to: Emission of explosive gasses Release of highly toxic vapour cloud Ejection of toxic particulates Extremely high fire temperatures Jetting of flames from battery packs Risk of re-ignition for several days Risk of serious firewater pollution event into storm drains and the environment. Some of these risks have the potential to cross the boundary of an EV charging facility and can have a high-risk impact on neighbouring housing, schools, and businesses. This report will highlight the main risks on site and make recommendations to improve employee, public, fire and environmental safety. Special consideration must always be given to the storing, delivery and dispensing of all flammable products within the petrol filling station as mandated within the Dangerous Substances and Explosive Atmospheres Regulations. 2002 (DSEAR) and as advised within the recognised industry code of best practise "Guidance for Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations" (Blue Book 5th Edition) and the supplementary code of practise "Electric Vehicle Charging Installations at Filling Stations".

5. DEFINITION

Ref	Name	Description
Consequences for Life, Public and or Environmental Impact & Safety		
The definition of this is defined as follows:		
5.1	Low	A thermal runaway event within the EV charging area is unlikely to result in serious injury or death, property damage or environmental pollution.
5.2	Medium	A thermal runaway event within the EV charging area could foreseeably result in injury (including serious injury) of one or more persons, property damage within the site boundary and the risk of environmental pollution exists.
5.3	High	A thermal runaway event within the EV charging area has the significant potential for serious injury or death of one or more persons, extensive property damage within or beyond the site boundary and may result in a significant environmental pollution event.
The risk assessment will look at the existing internal and external charging layouts and review and explain where, if at all, the proposed additional charges change the risk profile of the facility.		

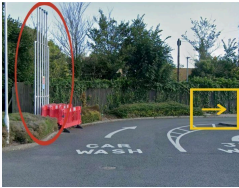
6. PROPOSED EV CHARGING SCHEME SPECIFIC TO THIS REPORT.

Ref	Name	Risk Level
The following risks and factors have been identified specific to the proposed EV charging scheme for this site. The risk level relates to the consequences of a thermal runaway event when multiple vehicles are charging adjacent to each other.		
Risk Summary		
6.1	Risk of vapour cloud explosion	Low
6.2	Risk of fire spreading on site	Medium
6.3	Risk of fire crossing the site boundary	Medium

6. PROPOSED EV CHARGING SCHEME SPECIFIC TO THIS REPORT. (CONT.)		
6.4	Risk of contaminated firewater leaving the site - below ground	Medium
6.5	Risk of contaminated firewater leaving the site - above ground	Low
6.6	Emergency services ingress and egress	Low
6.7	Public safety	Medium
Important note, the survey is not invasive and does not include a physical survey of below ground infrastructure.		
For the purposes of this survey is has been assumed that all electric wiring and power connections on site will be in accordance with UK legislation and existing best practise guidance.		

7. LOCATION OVERVIEW OF PROPOSED EV CHARGING SCHEME SPECIFIC TO THIS REPORT.		
Ref	Name	Description
7.1	Overview	The BP site sits on an island surrounded by roads on all sides with residential dwellings to the North and East and a retail food outlet to the West. The project involves installing a new EV charging infrastructure by installing 6 EV bays (including 1 accessible bay). The proposed EV charging scheme will consist of 3 Alpitronic HYC400-4 (400 kW) Key changes include the existing carwash and associated plant room to be removed and creating the new EV hub and safe foot passage to the convenience. Two new jet wash units and associated bays will be created The current ABB charger and associated equipment will be removed and a new air water tower and carvac installed on the old location of the ABB units. Installation of 2x new Jet wash. The new layout ensures minimal encroachment into hazardous areas, with the substation and feeder pillar to be located in line with the chargers. Additional upgrades include a canopy, signage, CCTV, lighting, waste bins and Totem. Air & Water, Vac and Jet wash to be relocated.
 Ref #7.1 - Site Appraise Report – Sonning Cutting SF Connect - Document Number: EV0  Ref #7.1 - BP Sonning Cutting		
Proposed EV charging location overview		
7.2	North of the proposed EV charging area	North of the proposed EV charging area will be bounded by a wooden fence that forms the boundary line between the BP site and Shepherds Hill. The Northern boundary is formed of a wooden fence that is partially clad with creeping ivy. On the opposite of the boundary is an an area approximately 3.0m wide that is laid to grass small trees and shrubs. Private vehicles park on Shepherds Hill opposite the BP site boundary.
 Ref #7.2 - Site Appraise Report – Sonning Cutting SF Connect - Document Number: EV0  Ref #7.2 - Wooden fence behind proposed EV charging area  Ref #7.2 - Northern boundary of site with Shepherds Hill  Ref #7.2 - Northern boundary of site with Shepherds Hill		

7. LOCATION OVERVIEW OF PROPOSED EV CHARGING SCHEME SPECIFIC TO THIS REPORT. (CONT.)		
 11 Aug 2025 14:01 Ref #7.2 - Northern boundary of site with Shepherds Hill  Ref #7.2 - Northern boundary of site with Shepherds Hill  Ref #7.2 - Proposed Ev charging area  Ref #7.2 - Proposed EV charging area  Ref #7.2 - Proposed EV charging area		
7.3	East of the proposed EV charging area	East of the proposed EV charging area will be bounded by the rea of hardstanding given over to the new sub station and feeder pillars for the proposed EV charging scheme which in turn give way to two new jet wash bays. The Eastern boundary is formed of a small landscaped area and then an open single rail wooden barrier fence approximately 0.5 metres in height. Running along the Eastern boundary is the A4 London Road and the entrance and exit routes to the BP site from the A4 London Road.
 Ref #7.3 - East of proposed EV charging scheme car wash building and plant room to be  Ref #7.3 - East of proposed EV charging scheme sub station and feeder pillar to be ins  11 Aug 2025 14:10 Ref #7.3 - Car wash plant room to be demolished to make room for new jet wash bays  11 Aug 2025 14:10 Ref #7.3		
 Ref #7.3 - Eastern boundary of site  Ref #7.3 - Eastern boundary of site		
7.4	South of the proposed EV charging area	South of the proposed EV charging area will be bounded by the vehicle refuelling forecourt. At present there is a raised island in between the proposed EV charging area and the vehicle refuelling forecourt, it is not clear under the new scheme if this will be retained or removed . The Southern boundary is formed by the A4 London Road, the BP store sits along the Southern boundary with approximately 20.0 metres of landscaped area between the store and the A4 London Road
 Ref #7.4 - Looking from the vehicle refuelling area towards the proposed EV charging a  Ref #7.4 - Looking from the vehicle refuelling forecourt towards the proposed EV charg  Ref #7.4 - Southern boundary of site  Ref #7.4 - Southern boundary of site		

7. LOCATION OVERVIEW OF PROPOSED EV CHARGING SCHEME SPECIFIC TO THIS REPORT. (CONT.)		
7.5	West of the proposed EV charging area	West of the proposed EV charging area will be bounded by the entrance to the EV charging area and the fuel system vent pipes. The Western boundary is formed of the A4 London road and the site entrance from the A4 London Road.
 Ref #7.5 - Western boundary of site  Ref #7.5 - Western boundary of site  Ref #7.5 - Western boundary of proposed Ev charging area  Ref #7.5 - Western boundary of proposed EV charging area		

8. SUBSTATION EQUIPMENT		
Ref	Name	Description
8.1	Equipment	The existing 2 existing ABB Power cabinets will be removed. DNO sub and power cabinet will be installed in between the proposed EV charging bays and new jet wash bays.
 Ref #8.1 - Existing power cabinets to be removed  Ref #8.1 - Existing power cabinets to be removed  Ref #8.1 - ABB cabinets to be removed  Ref #8.1 - Site Appraise Report – Sonning Cutting SF Connect - Document Number: EV0		

9. RISK OF VAPOUR CLOUD EXPLOSION (VCE)		
Ref	Name	Description
9.1	Risk of vapour cloud explosion (VCE) - overview	Vapour cloud explosions whilst very violent have only been recorded in approximately 5% of all thermal runaway events and are more prevalent in confined spaces such as basements multi storey car parks or fully covered depots. The off-gassing phase prior to explosion or fire can produce a considerable amount if flammable and toxic electrolyte gas. Electrolyte gasses can be both heavier and lighter than air with potentially either being dominant. In the event of a thermal runaway event the evacuation of other vehicles in the immediate area would be unfeasible unless undertaken by the emergency services with self-contained breathing apparatus (SCBA). The introduction of a canopy structure within the scheme would increase the likelihood of a vapour cloud explosion in the event of a vehicle entering thermal runaway. The proposed EV charging scheme states that a canopy is feasible, pending planning permission.

10. RISK MITIGATION OF VAPOUR CLOUD EXPLOSION		
Ref	Name	Description
10.1	Mitigation	Early detection prior to the initial thermal runaway off gassing event should be detected through the EV's battery management system (BMS). However, if the warning is provided by an illuminated signal within the EV it is unlikely to be noticed as the EV will often charge with no personnel in it. It is not known if there is any monitored telemetry through the EV charging systems that could indicate a potential issue whilst charging to provide an early warning. It should be noted that open air charging EV charging locations significantly reduce the risk of vapour cloud explosions (VCE) during thermal runaway, however vapour cloud explosions have been seen to occur where electrolyte gasses have accumulated within a vehicle and then exploded.

11. RISK OF VAPOUR CLOUD EXPLOSION (VCE)

File



12. RISK OF FIRE SPREADING ON SITE

Ref	Name	Description
12.1	Risk of fire spreading on site - overview	The main risk of fire spread on site will be vehicle to vehicle within the proposed EV charging area. The jetting from the battery packs of an EV vehicle has been recorded at distances of up to 2.64m up to temperatures in excess of 1500 degrees centigrade. Whereas the jetting from the battery packs may increase the speed at which fire spreads the overall heat release rate from ICE vehicles and EV's is generally similar. The extent of the spread of fire on site would be proportional to the number of vehicles charging at any one time within the proposed EV charging locations and any other vehicles parked close by which may or may not be EV's. The spread of fire vehicle to vehicle from an EV where the battery pack is involved to an adjacent vehicle has been recorded to have taken less than one minute and nineteen seconds. If fire spread extends to an internal combustion engine vehicle (ICE) the battery fire may also be accompanied by a running liquid fuel fire. The magnitude of any fire resulting from a thermal runaway event will depend on the speed at which it spreads, and the number of vehicles involved. In order to reduce or slow the spread of fire the following areas are considered: ◇ Early detection of gas, smoke, or fire ◇ Storage of flammable or combustible materials ◇ Separation / segregation within facility ◇ Vehicle quarantine area ◇ Fixed suppression systems ◇ Hand held suppression systems

13. RISK OF FIRE SPREADING ON SITE

File



14. EARLY DETECTION OF GAS, SMOKE, OR FIRE		
Ref	Name	Description
14.1	Early detection of gas, smoke, or fire overview	The early detection of gas, smoke or fire is critical in ensuring the safety of the public, reducing damage to assets and to ensure the fire and rescue services (FRS) are notified as soon as possible. It was noted that the site has CCTV cameras mounted on the front and side of the main shop building, underneath the vehicle refuelling area canopy and mounted to a floodlight pole which could be directed to additionally cover the proposed EV charging area.
 11 Aug 2025 14:02 Ref #14.1 - Pole mounted CCTV  11 Aug 2025 14:11 Ref #14.1 - Shop front CCTV  11 Aug 2025 14:13 Ref #14.1 - Under canopy CCTV  11 Aug 2025 14:13 Ref #14.1 - Under canopy CCTV		

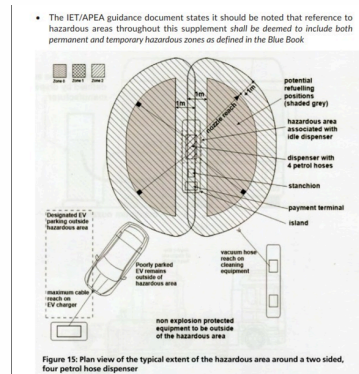
15. EARLY DETECTION OF GAS, SMOKE, OR FIRE	
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16. RISK MITIGATION - EARLY DETECTION OF GAS, SMOKE AND FIRE		
Ref	Name	Description
16.1	Mitigation Early Detection of gas, smoke and fire	Additional CCTV cameras could provide a visual image and monitoring of off gassing, smoke or fire The proposed EV charging scheme does make a provision for additional CCTV cameras to be fitted. An AI flame and smoke detection monitoring feed can be taken from the standard bullet or dome cameras. The current AI systems available in the UK can typically detect flame and smoke in less than 15 – 20 seconds.

17. STORAGE OF FLAMMABLE AND COMBUSTIBLE MATERIALS OVERVIEW		
Ref	Name	Description
17.1	Storage of flammable and combustible materials overview -overview	It is considered best practise to ensure that flammable and combustible materials that may aid the rapid spread of fire are not stored within the EV charging area. Combustible materials may also include landscaped areas which can create a fire pathway from the EV charging area. It is important to note that liquids and pressurized gasses though not flammable may react adversely to extreme heat radiation. Despite the fact that the pumps are marked as having extra-long hoses they all the same standard length (4.3m) and the sign is aimed at encouraging drivers to utilize the full length of the hose and prevent queues, as the hoses are already designed to be flexible enough for this purpose. The BP Global Appraise Document states that no works are required to the vents however protecting the vents from the jetting flame's from a battery pack or severe heat radiation should be considered.

18. "GUIDANCE FOR DESIGN, CONSTRUCTION, MODIFICATION, MAINTENANCE AND DECOMMISSIONING OF FILLING STATIONS" (BLUE BOOK 5TH EDITION) HAZARDOUS ZONES

File



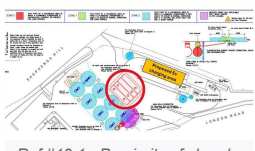
19. RISK MITIGATION - STORAGE OF FLAMMABLE AND COMBUSTIBLE MATERIALS

Ref	Name	Description
19.1	Mitigation Storage of flammable and combustible materials	No combustible or flammable materials will be stored within the immediate vicinity of the proposed EV charging area. The proposed EV charging area sit over 40.0 metres from the main shop building In relation to what would be the closest EV charging bay. The vehicle refuelling area pumps run parallel to the proposed EV charging area. There is a distance of approximately 22.0 metres between the pumps and the closest EV charger. The distance between a charging EV and refuelling vehicle when both are parked correctly will be approximately 20.0 metres. If any maintenance works are required on the pumps a 10.0m separation distance should be maintained between the end of the closest proposed EV charging bay and the boundary of the safe working area established by any contractor working on the pumps. The proposed EV charging bays should be fitted with instructions for customers stating that they must park correctly within EV charging bays. The end of the closest proposed EV charging bay will sit approximately 10.0m from the closest below fuel tank chamber lid, a 10.0m separation distance should be maintained between the end of the closest proposed EV charging bay and the boundary of the safe working area established by any contractor working on the tanks when the chamber covers are removed. The tanker delivery area is located over 30.0 metres from the closest EV charging bay. The below ground fuel system vent pipes sit approximately 10.0 metres from the edge of the closest EV charging. the current scheme states that a fence may need to be created around the vent pipes so that there is no encroachment into the hazardous zone due to erroneous parking. It would be advisable to ensure that the fence is solid and treated with intumescent paint or made of block work to also protect the vents from heat radiation in the event of a vehicle fire in the proposed EV charging area. The car wash and jet wash separator vent pipe will remain active if the current drainage infrastructure for these facilities is retained. The location of the car wash and jet wash separator vents which are located along the Northern boundary line at the exit of the carwash should be checked with regards to their proximity to the new DNO substation to ensure there is no hazardous zone encroachment. The main forecourt oil and water separator and carwash / jet wash separators may sit within 10.0m of the closest proposed EV charging bays consideration should be given as to whether EV charging is permitted when the oil water separators are being emptied. It was noted that the boundary line behind the proposed EV charging area is comprised of a wooden panel fence that is covered in creeping Ivy. The vegetation should be removed from the wooden fence and it should be treated with intumescent wood stain or paint. In the event of a vehicle fire within the proposed EV charging area all fuel dispensing must cease Including fuel deliveries to site.

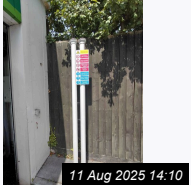
19. RISK MITIGATION - STORAGE OF FLAMMABLE AND COMBUSTIBLE MATERIALS (CONT.)



Ref #19.1 - Proximity of fuel system vent pipes to proposed EV charging area.



Ref #19.1 - Proximity of chamber lids to below ground fuel tanks to proposed EV charge



11 Aug 2025 14:10

Ref #19.1 - Car wash and jet wash oil water separator vent pip location to be checked w



11 Aug 2025 14:05

Ref #19.1 - Vegetation on boundary line behind proposed EV charging area



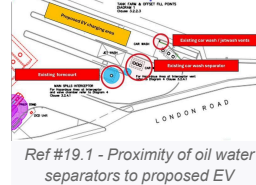
Ref #19.1 - Proximity of fuel system vent pipes to proposed EV charging area.



Ref #19.1 - Proximity of proposed EV charging area to vehicle refueling forecourt



Ref #19.1 - Wooden fence on boundary line behind proposed EV charging area



Ref #19.1 - Proximity of oil water separators to proposed EV charging area.

20. SEPARATION/SEGREGATION

Ref	Name	Description
20.1	Separation/Segregation - overview	It is impractical to use separation distances within the EV charging area to prevent the spread of fire between vehicles due to the limited space available and the fact that the effects of heat radiation extend beyond the 2.6m recorded jetting of flames during thermal runaway. Fire spread between modern vehicles EV and ICE has been seen to pass across empty parking spaces.

21. RISK MITIGATION - SEPARATION/SEGREGATION

Ref	Name	Description
21.1	Mitigation - Separation/ Segregation	Within the proposed EV charging scheme there are no buildings immediately nearby that pose a risk of aiding fire spread on site. It is likely that fire would spread to the wooden fence behind the proposed EV charging area.

22. FIXED SUPPRESSION SYSTEMS

Ref	Name	Description
22.1	Fixed suppression systems - overview	Fixed suppression systems in enclosed structures will not extinguish an EV fire but they will slow down the spread of fire from vehicle to vehicle. A fixed suppression system may be able to extinguish some components of the vehicle fire such as rubber, plastic and upholstery but it will not be able to penetrate the battery pack which is typically beneath the car and designed to be relatively water tight,

23. RISK MITIGATION - FIXED SUPPRESSION SYSTEMS

Ref	Name	Description
23.1	Mitigation fixed suppression systems	It is not typical to see fixed suppressions systems installed in open air charging areas as they are more suited to confined areas such as basements or fully enclosed depots.

24. HAND HELD SUPPRESSION SYSTEMS (FIRE EXTINGUISHERS)

Ref	Name	Description
24.1	Hand held suppression systems (fire extinguishers) - overview	Handheld fire extinguishers and firebuckets were present on site which are designed for risks associated with the dispensing of petroluem and diesel.

25. RISK MITIGATION - HAND HELD SUPPRESSION SYSTEMS (FIRE EXTINGUISHERS)

Ref	Name	Description
25.1	Mitigation Hand held suppression systems (fire extinguishers)	There are no handheld fire extinguishers on the market that are suitable for electric vehicle fires of any size and the potential use of them by staff for EV fires would be extremely hazardous, they should therefore not be installed in the EV charging area. Fire blankets may be used by the FRS if installed but they should never be used by staff as full firefighting PPE and SCBA are required. Before installing fire blankets always check with your local FRS if they would use them if provided. Fire extinguishers should be clearly labelled not for the use on electric or hybrid vehicle fires.

26. RISK OF FIRE CROSSING THE SITE BOUNDARY

Ref	Name	Description
26.1	Risk of fire crossing the site boundary - overview	Consideration should always be given to both the nature of the boundary line in terms of its fire stopping properties and what lies beyond the boundary line. Special consideration should be given to the presence of flammable and combustible materials or the presence of substances that may react adversely if subjected to heat radiation stored on the boundary line. It is important to note substances that may react adversely if subjected to heat radiation may be inside an adjoining or neighbouring building. Where EVs and hybrid electric vehicles charge side by side there is always the risk of a running liquid fuel fire as well as the jetting from the battery pack of the vehicle. The boundary to the proposed EV charging area is formed by a wooden fence with trees and shrubs on both sides of the boundary.



Ref #26.1 - Wooden fence on boundary line behind proposed EV charging area



Ref #26.1 - Wooden fence , trees, shrubs and parked cars on boundary line behind propos

27. RISK MITIGATION OF FIRE CROSSING THE SITE BOUNDARY

Ref	Name	Description
27.1	Mitigation of fire crossing the site boundary	It is likely that a fire starting within the proposed EV charging area would result in any fire crossing the site boundary through the wooden fence behind the proposed EV charging area. The vegetation should be removed from the wooden fence and it should be treated with intumescent wood stain or paint. It is not known if the addition of a canopy over the EV chargers would increase or decrease the risk of fire spread towards the wooden fence as the fire rating of the canopy structure was not available. Whereas the landscaped area along the Northern boundary and possibly any cars parked in Shepherds Hill may be damaged it is highly unlikely that any fire would spread to the private residential dwellings in Shepherds Hill.

28. RISK OF FIRE CROSSING THE SITE BOUNDARY

File



29. RISK OF CONTAMINATED FIREWATER LEAVING THE SITE - BELOW GROUND.		
Ref	Name	Description
29.1	Risk of contaminated firewater leaving the site below ground - overview .	It was noted that the forecourt refuelling area is served by a number of surface water gullies with the tanker delivery area being served by aco channel drains. The non refuelling areas are served by a number of surface water gullies. The site has a car wash and jet wash oil water separator and and oil water separator dedicated to the vehicle refuelling area and tanker delivery area. It was not possible to fully track the subterranean drainage system from the EV charging area, but it is likely that it runs to the combined public sewer. Drainage associated with the fuel dispensing area will pass through the oil water separator and drainage associated with any carwash and jet wash infrastructure will pass through a silt trap and separator and leave site after the oil water separator. Firewater run-off from any vehicle ICE, HEV or EV is heavily contaminated and should not be allowed to run into the environment or sewer system as this is an offence under the UK Water Resources Act 1999. Fire water run-off from an EV carries additional toxic pollutants when the battery pack is flushed as part of the firefighting process. Whereas all the volatile organics and plastics of EV, HEV and ICE vehicles are readily extinguishable the battery pack in an EV is not. An ICE fire might be extinguished with 2500 litres of water however, EV fires have commonly been treated with over 10,000 litres of water. It may not be possible to contain all the firewater run-off from site during a vehicle fire, but reasonably practical steps should be taken to reduce the amount of contaminated firewater that may enter the public sewer or environment. As it is not the legal responsibility of the emergency services to protect the environment from contaminated water that originates from a fire on private land .
 11 Aug 2025 14:08 Ref #29.1 - Surface gully drains to forecourt refuelling area  11 Aug 2025 14:09 Ref #29.1 - Surface gully drains to forecourt refuelling area  11 Aug 2025 14:08 Ref #29.1 - Surface gully drains to forecourt refuelling area  11 Aug 2025 14:11 Ref #29.1 - Surface gully drains to non forecourt refuelling area  11 Aug 2025 14:08 Ref #29.1 - Aco dish channel drain at entrance point to vehicle refuelling area  11 Aug 2025 14:09 Ref #29.1 - Jet wash silt trap  11 Aug 2025 14:09 Ref #29.1 - Forecourt oil water separator chamber covers.  11 Aug 2025 14:11 Ref #29.1 - Forecourt oil water separator chamber covers.		

29. RISK OF CONTAMINATED FIREWATER LEAVING THE SITE - BELOW GROUND. (CONT.)



11 Aug 2025 14:10

Ref #29.1 - Car Wash oil water separator chamber covers



Ref #29.1 - Aco channel drain to off set fill tanker delivery area



Ref #29.1 - Aco channel drain to off set fill tanker delivery area

30. RISK OF CONTAMINATED FIREWATER LEAVING THE SITE - BELOW GROUND.

File



31. RISK MITIGATION OF CONTAMINATED FIRE WATER LEAVING SITE BELOW GROUND		
Ref	Name	Description
31.1	Mitigation of contaminated fire water leaving site below ground	The point at which the drainage from the EV charging area leaves site should be identified and clearly marked on the site (ERP) and be made available to the FRS in the event of a fire. Where contaminated water may enter the public sewer or environment it is important to identify the last point at which the drain can be blocked or isolated. If the point at which the car park drains enter the public sewer can be identified this chamber cover should be sprayed RED, (or a colour mutually agreed with the local emergency response services), so that it can be clearly identified as the place to prevent firewater from escaping off site into the public sewer. The access chamber lid should be checked to see if can be easily lifted. If it can the frame should be cleaned and greased. If the access chamber lid needs replacing a composite lid can be used as these can be manufactured in an appropriate colour and would not need annual repainting. It may be possible to fit a manual or automated fire water pollution valve into one of the drain chambers. If contaminated fire water can be contained on site it can then be removed as contaminated waste and disposed of appropriately without it having to enter the public sewer. Automated firewater pollution prevention valves can be linked directly to the fire alarm panel. It is not recommended to install Penstock valves as these typically only slow the flow rate and do not seal the drain. Where the carwash facilities are being completely removed or amended to include two new jet washes it may be prudent to ensure run off from the proposed EV charging area feeds back into the existing carwash drainage infrastructure if it can be retained. This will reduce the potential for contaminated firewater run off from proposed EV charging area entering the oil water separator. Firefighting products, hot water or the contaminants in the fire water run off may allow hydrocarbons to pass through the oil water separator more readily . The retained jet wash separator may still contain some hydrocarbons but typically not in as high concentrations are the main forecourt fuel spill separator.

32. RISK OF CONTAMINATED FIREWATER LEAVING THE SITE – ABOVE GROUND

Ref	Name	Description
32.1	Risk of contaminated firewater leaving the site above ground - overview	In the event of a single or multiple vehicle fire the FRS may deploy firefighting water at a rate faster than the surface drainage system can cope with. A degree of the site drains overflowing may also occur if the below ground drainage from the site is sealed to prevent contamination of the public sewer. Pathways for water leaving site above ground will generally be dictated by the presence of walls, kerb lines and vehicle and pedestrian entrance and exits routes.

33. RISK MITIGATION OF CONTAMINATED FIRE WATER LEAVING SITE ABOVE GROUND

Ref	Name	Description
33.1	Mitigation of contaminated fire water leaving site above ground	With the exception of the entrance and exit to the A4 London Road the site is bound by a shallow kerb that would prevent contaminated fire water leaving site above ground. It was noted that the area to the West of the proposed EV charging area is bound by an aco channel drain that will serve the vehicle refuelling area. The site entrances also consist of raised tarmac speed ramps which make it easier for FRS to install a boom across entrance and exit routes to prevent firewater leaving site above ground. It is not known if the raised island that sits between the vehicle refueling forecourt and the current jet wash bay will be removed or remain in place, If the raised island is retained in part this would help prevent the flow of contaminated firewater towards the vehicle refueling forecourt area.



Ref #33.1 - Speed ramp to site entrance from A4 London Road



Ref #33.1 - Speed ramp to site entrance from A4 London Road



Ref #33.1 - Confirmation required if island will be retained in part as this will impact



Ref #33.1 - Aco channel drain to site entrance from A4 London Road

34. EMERGENCY SERVICES ACCESS

Ref	Name	Description
34.1	Emergency services access - overview	The speed at which the FRS can access a vehicle fire is critical in helping to slow down the spread of fire on site.
34.2	Mitigation emergency services access - overview	There are no restrictions on site that would inhibit fire fighting access to the proposed EV charging area.

35. EMPLOYEE / PUBLIC SAFETY

Ref	Name	Description
35.1	Employee / Public safety - overview	Due to the potential release of large volumes of electrolyte gasses, especially hydrogen fluoride (HF) during thermal runaway consideration should be given to ensure people evacuate the EV charging area immediately.
35.2	Mitigation employee / Public safety	Clear directional signage is required in the proposed EV charging area directing staff and customers to the designated muster point - preferably off site.

36. STAFF TRAINING

Ref	Name	Description
36.1	Staff Training overview	All site staff should receive training on how to respond to an EV fire. This includes being able to recognise the signs of a vehicle going into thermal runaway, activating the alarm, contacting the emergency services and most importantly to NEVER attempt to tackle and EV fire themselves.

37. CONCLUSION(S)

Ref	Name	Description
37.1	Conclusion	The proposed EV charging location is deemed to be appropriately located once the findings of this report have been taken into account. Items marked as HIGH RISK should be actioned as soon as reasonably practically possible. Items marked as MEDIUM RISK are recognised best practise and should be included in any annual planned preventative maintenance programs (PPM) or be considered within budget planning for the forthcoming financial year. Items marked LOW RISK provide an additional level of safety that can be considered. External EV charging always present less risk than EV charging within an enclosed structure. Early detection of a thermal runaway event will help with timely evacuation of the area and notification to the emergency services.

38. RECOMMENDED ACTION PLAN FOR CONSIDERATION

Ref	Recommended Actions for Consideration	Risk Category	Risk Rating	Pre-existing risk	Control Measure(s)
HIGH - Legal requirement or recommendation that may have a high impact in preserving life					
MEDIUM - Recommended best practises					
LOW - Additional safety measure for consideration					
38.1	Fire Separation Distances from fuel system vent pipes	Risk of fire spread off site	Medium	No	Ensure signage is fitted to proposed EV charging area instructing customers to park within dedicated EV bays correctly.
38.2	Fire Separation Distances from fuel system vent pipes	Risk of fire spread off site	High	No	Ensure fuel system vents are protected from fire and heat radiation in the form of a fence or blockwork wall treated with intumescent paint.
38.3	Fire Separation Distances from jetwash vent pipes	Risk of fire spread on site	High	No	Ensure existing car wash / jet wash oil water separator vent pipes do not conflict with DNO sub station of they are retained in situ.
38.4	Fire spread across boundary via wooden fence	Risk of fire spread off site	Medium	No	Ensure wooden fence to the rear of the proposed Ev charging area is cleared of creeping ivy and treated with intumescent wood stain or paint.
38.5	Monitoring and early detection of thermal runaway	Public / staff safety	Medium	Yes	Ensure planned EV charging area is sufficiently covered by CCTV cameras for continuous monitoring.
38.6	Drainage – confirm and mark on emergency response plan (ERP) the outflow from the proposed EV charging area area where they can be isolated before joining the public sewer.	Firewater crossing site boundary	Medium	Yes	Provide plan of where site drains leave site and join the soakaway and include in site ERP. This plan should be made accessible to local fire and rescue services in the event of an emergency.
38.7	Drainage - Any drain cover, before or where the drainage enters the public sewer should be physically marked or labelled so that it can be easily identified in an emergency	Firewater crossing site boundary	Medium	Yes	Any cover, before or where the site drainage joins the public sewer should be sprayed RED, (or a colour agreed with the local fire and rescue services), so that it can be clearly identified as the place to prevent firewater from escaping off site into the public sewer.
38.8	Drainage – ensure any accessible man chamber lids can be easily lifted and are kept clean and regularly greased	Firewater crossing site boundary	Medium	Yes	Include in annual planned preventative maintenance

38. RECOMMENDED ACTION PLAN FOR CONSIDERATION (CONT.)

38.9	Drainage - separate run off from EV charging area from forecourt vehicle refuelling area	Firewater crossing site boundary	Medium	Yes	Where possible utilise existing car wash and jet wash drainage to prevent contaminated firewater passing through the oil water separator.
38.10	Drainage directional flow of firewater from proposed EV charging area is	Firewater crossing site boundary	Medium	No	Confirm if raised island between proposed EV charging area and refueling forecourt will be retained.
38.11	Training – ensure all staff have been trained to identify the early signs of thermal runaway and how to respond	Public / staff safety	High	Yes	Implement risk awareness training
38.12	Fire extinguishers not to be used for EV or hybrid vehicle	Public / staff safety	Medium	Yes	Ensure fire extinguishers are clearly labelled not for the use on EV or hybrid vehicle fires
38.13	Emergency signage	Public / staff safety	Medium	Yes	Ensure clear there is clear emergency exit directional signage in the proposed EV charging area directing customers to the muster point
38.14	fires				

39. SIGNIFICANT SAFETY SYSTEM UPGRADES FOR CONSIDERATION

Ref	Recommended Actions for Consideration	Risk Category	Risk Rating	Pre-existing risk	Control Measure(s)
39.1	Drainage - It may be possible to fit a manual pollution prevention valve to the chamber that can be activated by a telescopic handle, so no confined space entry is required. Alternatively, automated drain closure systems can be fitted that connect directly to the fire alarm panel	Firewater crossing site boundary			Automated pollution control valves - David Cole Sandfield Engineering Ltd Tel +44(0)1299 823158 sales@sandfieldengineering.com Manual pollution control valves - Gavin Lottering Forecourt Solutions Ltd. Tel +44(0) 1278 42 88 33 info@forecourtsolutionsltd.com
39.2	CCTV – linking the cameras to an AI detection system for smoke and fire (additional cameras may be required)	Public / staff safety			CCTV and AI Fire & Smoke Detection - Robert Harrison, Highlight parking Ltd Tel +44(0) 208769 7730 info@highlightparking.co.uk