Appendix 1 Low Impact Installations Checklist further Details

This document is in support of further explanations that how the installations meet the required criteria marked below

Appendix 1: Low impact installation checklist, continued

If you are applying for a standard rule that is a low impact installation, you must complete this checklist.

Low impact installation criterion (see guidance box below)	Section of supporting document that shows how your proposed activity meets the LII criterion	Do you meet LII criterion?
A – Management techniques		☑ Yes ☐ No
B – Waste water		☑ Yes ☐ No
C – Abatement systems/releases to air		☑ Yes ☐ No
D – Emissions to groundwater		☑ Yes ☐ No
E – Waste production		☑ Yes ☐ No
F – Energy consumption		☑ Yes ☐ No
G – Accident prevention		☑ Yes ☐ No
H – Noise		☑ Yes ☐ No
I – Emissions of polluting substances		☑ Yes ☐ No
J – Odour		☑ Yes ☐ No
K – Compliance history		☑ Yes ☐ No

If you answered 'No' to any of the above questions, your installation does not qualify as low impact. You will need to apply for a full bespoke permit for this activity.

A. Management Techniques

Management techniques: All the criteria described below must be met without having to rely on significant management effort. In other words, the installation intrinsically must have only a low environmental impact, including under start up, shut down, or abnormal operating conditions.

Management of the refuelling infrastructure is explained in line with following aspects

- Site Infrastructure Plan
- Details of Site Operations (normal operating, start up / shut down etc)
- Mitigation / Control measures
- Maintenance (including calibrations etc)
- Contingency plans
- Accident prevention & management
- Climate resilience & adaptation planning
- Complaints procedure
- Staff competence / training
- Records
- Reviews & Continuous Improvement

Hydrogen refuelling infrastructure would be managed under the wider Drayton Depot site Management plan. The hydrogen infrastructure must be maintained in accordance with the agreed schedule. Operatives will record maintenance activities using the maintenance tasks

log/diary, which will be closely monitored by the Environmental Advisor, Technically Competent Manager, and designated Supervisor to ensure compliance.

The envisioned HRS is expected to be safe, reliable, easy to operate, and adaptable for potential relocation to different sites in the future. Fuel Cell Systems will undertake the responsibility for the civil requirements, including the siting of the hydrogen electrolyser container and the HRS equipment. This ensures suitability and sufficiency for specific needs, along with any necessary electrical supply, water and lighting requirements.

The system's expected availability is a crucial consideration, designed for minimal downtime, preferably none or very limited during routine maintenance and servicing.

Only trained sub-contractors will be allowed to work on the system. Subcontractor will be part of early design meetings to ensure they know how the system will be fitted and any risks associated

Planned Preventative Maintenance (PPM)
A PPM Schedule shall be supplied, providing details of all activities required to ensure continued operation of all products supplied. This shall include:

- 3x Quarterly and 1 x Annual maintenance labour
- Standard specific service parts required for 3x Quarterly and Year 1 Annual maintenance, except filters.
- Remote support and diagnostics (subject to unit configuration) for the smooth operation of the installations

Quarterly site visits
All major components installed are fitted with Systems Telemetry, providing data logging of major system functions. Access to logged data will be made available via the cloud. Active alarms will alert FCSL staff to issues requiring attention.

Reactive Maintenance (RM)
A definition of SLA for response to reactive maintenance required shall be provided to include:

- Tier 1: Technician Fault Diagnosis & Triage
- Tier 2: Technician Repair – via remote systems support from FCSL Engineers
- Tier 3: Deployment of Engineer to site to Repair / Replace equipment.

Response / Repair commitments

- Customer support phoneline for reporting of faults and failures (Office Hours) Response to site, or by phone typically within 1 working day
- The equipment installed are FCSL manufactured products, so usual spare parts (including boosters, valves and sensors) will be kept in stock
- Recommissioning & signoff of repairs before site departure

User Training
Drayton Depot dispensing onsite advisory service

- Support and training with initial commissioning and operations
- Installations pre-start and basic maintenance checks site Operator and Technician training – to Competent Operator level
- Operator and Technician Competency training for safe system operations
- Pre and post start-up checks
- Routine set-up, power up and pack-up / shutdown
- Common operator errors, avoidance and solutions

Additional familiarisation sessions can also be set up for non-operators of the equipment as necessary, including highways operators, fire service, council engineers and management teams. Within a couple of hours, FCSL would be able to give an overview of the hydrogen industry and its role in decarbonisation, plus enough detail on the refuelling equipment to dispel any concerns and empower the wider group to speak knowledgeably and positively about the Hyer Project.

B. Waste Water

Waste water: The installation must not release more than 50 m^3 per day of waste water from process activities conducted at the installation. No account need be taken of the volume of water exported from the installation as product. Characterise and quantify any aqueous effluents released from the installation on a daily basis and provide justification that the installation releases no more than 50 m^3 per day.

Total estimated discharge of water is likely to be maximum of 360 litres per day from the system. The discharge is going to be from reverse osmosis which uses tap drinking quality water to purify to a level for the electrolyser.

The electrolyser uses up to a maximum of 40 litres per hour of standard tap water depending on the quality of water. Roughly about 36 litres per day of water would be discharged from the electrolyser. The quantity of water used could vary depending on water quality. The water discharge/rejection rate can be a minimum of 2:1 and a maximum of 10:1

It is planned that the discharged water being a good quality drinking water, will not be drained down to sewage, but would be collected in a container and would be recycled/reused for existing jet-wash system located on the Drayton depot.

C. Abatement Systems/Releases to Air:

Abatement systems/releases to air: The installation must comply with the criteria in this guidance without having to rely on active abatement for releases to the environment outside of any buildings. Releases must not be dependent on continuing or correct operation of equipment, where failure of active pollution prevention systems could result in an unacceptable external release. For example, if the installation depends on active abatement in the form of scrubbers, filters or electrostatic precipitators to achieve the releases to the environment set out in this guidance, it is unlikely that it can be treated as having only a low potential for impact. However, abatement systems installed solely for the protection of workers (where abatement is not to attenuate external environmental releases) need not be included in this assessment.

The operation of electrolyser is not expected to generate point source emission to air, water or land.

The only outputs from the electrolyser are Oxygen and tap water.

In case, when producing and using hydrogen, a leak will be possible through a poorly installed joint or faulty equipment. Pressure will be increased slowly. All electrical equipment will be switched off and all other sources of ignition will be removed. H2 sensors will be used to warn and leak spray to identify any leaks.

In the event of point source emissions occurring to air, water or land, this shall be treated as a pollution incident and reported using OPTIMUS reporting system (0800 028 0676) to all necessary site contacts and the Environment Agency as per Drayton Depot environment management plan. During treatment operations monitoring will be undertaken to ensure that point source emissions to air, water and land are not generated.

D. Emissions to Groundwater

> **Emissions to groundwater:** There must be no planned or fugitive emission from the permitted installation into the ground, or any soakaway. This does not preclude the discharge of clean rainwater run-off into soakaways.

No emissions to groundwater. Since the discharged water from the electrolyser is tap water, it is planned to be collected in the container and recycled for the existing jet-wash system at the Drayton depot site.

The electrolyser consumes up to 40 litres of standard tap water per hour. The actual water usage may vary based on water quality and operational hours. The water discharge/rejection rate ranges from a minimum of 2:1 to a maximum of 10:1. If the plant is not operating continuously due to a lack of hydrogen production requirements, the system will discharge less water.

The operation of electrolyser system is not expected to generate point source emission to air, water or land. In the event of point source emissions occurring to air, water or land, this shall be treated as a pollution incident and reported using OPTIMUS reporting system (0800 028 0676) to all necessary site contacts under the wider Drayton site emissions management plan and the Environment Agency. During treatment operations monitoring will be undertaken to ensure that point source emissions to air, water and land are not generated.

There is already a plan in place at Drayton Depot to Periodic Monitoring or soil and groundwater will be undertaken at 5- & 10-year intervals respectively, unless agreed otherwise with the Environment Agency. This will entail sampling through boreholes / coring and laboratory analysis.

E. Waste Production

> E. **Waste production:** The installation must not produce more than one tonne of waste or 10 kg of hazardous waste per day, averaged over a year, with no more than 20 tonnes of waste or 200 kg of hazardous waste being produced in any one day.

Not Applicable- As the electrolyser system is only using tap water and renewable energy as resources to produce green hydrogen, no waste is produced or generated

F. Energy Consumption

> F. **Energy consumption:** The installation must not consume energy at a rate greater than 3 MW or, if the installation uses a combined heat and power installation to supply any internal process heat, 10 MW. These limits apply to the sum of energy imported as electricity and produced on site through the combustion of fuels.

The energy consumption for the electrolyser is approximately 24kW at 100% production rate During compression HyQube power consumption around 25kW, during standby and dispensing that drops to 2kW.

Electrolyser system would be operating using renewable energy from the grid initially.

Energy efficiency will be reviewed and recorded in activities conducted at the facility every four years. If appropriate measures are identified as part of a review, they will be implemented. Any issues regarding inefficient use of energy will be identified and rectified as soon as possible.

Energy usage at the site is monitored and reported into the ERH data reporting system. This data is collated monthly by the Oxfordshire Highways Environmental Advisor.

G. Accident Prevention

> G. **Accident prevention:** You must have in place satisfactory containment measures to prevent fugitive emissions to surface water, sewer or land and ensure that these are adequately maintained at all times. This requirement applies to all substances present on site and in any quantity.

Enclosure

As seen from the attached site plan, the pumps are as far away from any other building on site as possible. You will also see from the photo below that the pump and containment cylinders will be protected by traffic bollards, 6ft security mesh fencing, locked gates and a 2m high concrete block fire wall.

Photos showing Site fencing, distance from surrounding Buildings

All production equipment will be housed in a lockable 10ft ISO-shipping container. This includes:

- 2 x 19” racks, each with 5 AEM Electrolyser units and 1 Hydrogen Dryer
- Water purification system
- Category-5 break-tank as per Water Supply (Water Fittings) Regulations 1999
- Collection of exhaust-water into an IBC for site use (vehicle washing/plants etc)
- Power distribution and protection devices
- Control and safety systems
- Forced ventilation fans

H2 Generation Safety Systems

The electrolyser modules supplied are not Ex-rated, therefore the entire enclosure has been designed to not be an ATEX zone. This is achieved by Ex-rated extractor fans which provide enough airflow to ensure sufficient dilution should there be a hydrogen leak.

Since these fans are safety-critical, they are monitored and connected into the emergency-stop circuit. In the event of a fan failure, the system stops producing hydrogen.

Also connected into the emergency-stop system are hydrogen sensors, fire-detection heads (smoke and heat), and internal and external emergency-stop buttons.

External to the container is a beacon showing the current status of the emergency-stop system, as well as an external display showing the hydrogen sensor readings of the so that users can ensure a safe environment before entering.

H2 Generation Monitoring Systems
A 4G modem with SIM card that allows the electrolysers access to the Enapter Cloud is inbuilt within the plant. This allows control and monitoring of the Enapter modules via web or phone app.

The HyQube 500 is FCSL's CE/UKCA-certified standalone refuelling solution. It comprises all equipment needed to accept a supply of hydrogen from a low-pressure source and boost to pressures required to dispense via standard refuelling protocols into a vehicle at 350bar pressure. Using an external high-pressure storage tank, the boosters take a 35bar input from the electrolyser buffer tank and compress up to 500bar. This storage is then used to cascade into the vehicle.

The FCSL refuelling nozzle and control system has been tried and tested across various vehicles to refuel safely to the SAE J2601-2010 protocol.

Refuelling is instigated via the touch-screen panel that feeds back real-time data on the status of the fill via the 4G comms module within the HyQube. Once complete, the fill process automatically stops.
The module is also equipped with a manual E-Stop button that allows the operator to shut down the refuelling process if necessary.

Safety, Monitoring and Resilience
Safety is the top-most priority when designing FCSL refuelling systems. A multi-level approach is taken to ensure that the systems are as safe as possible. This starts with keeping the hydrogen contained in the tubing. All fittings are suitable for hydrogen and rated above the working pressure.

Hydrogen pressure sensors are located throughout the system. If any unexpected pressure drop is detected, then the system will alarm and shutdown.

Hydrogen sensors are installed throughout all equipment to shut down the system should the need arise. If there is a hydrogen leak, all equipment is designed to allow any hydrogen to escape to atmosphere.

All FCSL equipment has been through independent HazOp workshops.

Monitoring System
A 4G modem and SIM card is included in enabling the HyQube to be remote monitored by FCSL. Refuelling data can be provided to OCC.

The 4G connection also allows FCSL to perform remote diagnostics in the event of a fault.

There is a CCTV camera installed on the site to monitor wider general safety of the plant and the site.

H. Noise

H. **Noise:** There must be only a low potential for causing offence due to noise. An installation will not be considered as a low impact installation if it may give rise to noise noticeable outside the installation boundary. This requires the exercise of judgement, taking account of any history of noise complaint arising from the installation and consideration of the likely offsite noise levels and proximity of sensitive receptors. Describe the main sources of noise from the installation; the nearest noise sensitive locations; any relevant noise measurement surveys which have been undertaken and the proposed techniques and measures for the control of noise. Provide justification that there is only a low potential for offence due to noise.

A maximum noise-reading of 78dB has been measured (intermittent, at line-purge, measured with doors open), below the level where the HSE recommend ear defenders. Further, Fuel Cell Systems (FCSL) have produced a noise level monitoring of the HyQube 500 refuelling unit which is being installed at the OCC site for accurate readings. Please refer attached document *SUR-NOISE-HYQUBE V2.0-Jun-25.pdf* for the survey report.

The same equipment has been installed in public areas without complaint.

The impact of noise and vibration upon residents is not considered to be significant.

In general, at Drayton Depot, Residential properties are located adjacent to the boundary fence at the north of the depot. Residential Properties located to south of the depot are approximately 150m away. Depot Staff are informed of the need to minimise noise on site as well as on the health risks associated with noise and vibration exposure.

A new residential building has recently been constructed adjacent to the site boundary, approximately 30 meters from the proposed installation site. The installations are protected by a 2-meter high fireproof concrete block wall, which will effectively block any noise and vibration. Additionally, there are trees at the edge of the installation and the adjoining property, providing an extra barrier

The depot is setup to be operational 24 hours per day. Where an issue occurs due to activities outside of the norm, a noise risk assessment will be completed by the Environment Team.

If noise complaints are received, the Site Agent shall keep records of the complaint and demonstrate to the complainant that all practicable efforts have been made to ensure noise levels are limited as much as possible. These will be reported to the OPTIMUS reporting line (0800 028 0676).

I. Emissions of Polluting Substances

> **I. Emissions of polluting substances:** Justify that there will be no likelihood of a release to the environment of any particular substance from the whole installation at a rate greater than that determined as insignificant as set out in our guidance note (see **https://www.gov.uk/guidance/control-and-monitor-emissions-for-your-environmental-permit**).

Installations doesn't produce any emissions of polluting substances as it is a clean technology using tap water and renewable energy as a resource to produce green hydrogen and Oxygen. Oxygen will be released to air. O2 quantity released to air – not measured since O2 is of no consequence to the atmosphere.

At wider Drayton Depot environment management plan, there are already measures and monitoring system in place for daily visual monitoring of aerial emissions at site boundaries shall be carried out by supervisors and operatives. There are other control measures in place on site to control other emissions. Please refer to attached document *DEMP02 Drayton Depot DEMP April 2025.*

J. Odour

J. **Odour:** There must be only a low potential for giving offence due to odour. An installation will not be considered as a low impact installation if it may give rise to an offensive smell noticeable outside the installation boundary. This requires the exercise of judgement, taking account of any history of odour complaint from the installation and whether this class of activity is known by experience to give rise to smells. A significant possibility or actual history of excursions or fugitive emissions, for example from stored materials, would suggest that the installation could not be treated as having a low impact. Provide details of potential sources of odour from the installation, for example from stored materials, and justify that there is only a low potential for offence due to odour.

The electrolyser system is a clean technology using just tap water and electricity to generate hydrogen. Both end products Hydrogen and Oxygen are odourless, and no other waste is generated in the process.

At wider Drayton depot there are management rules under which, no Wastes producing pungent / strong odours will be accepted onto site.

Any waste that starts to produce pungent / strong odour will be removed from site immediately and a report raised on the OPTIMUS reporting system (0800 028 0676).

If complaints are received regarding odours these will be documented on the OPTIMUS and thoroughly investigated.

K. Compliance History

K. **Compliance history:** If any of the following enforcement actions have taken place at the same installation under the same management (and where appropriate, have not been overturned on appeal), then it will not normally be considered further as a low impact installation:

- prosecution*
- formal caution*
- suspension notice*
- enforcement notice relating to an actual or potential environment incident*

Installations being implemented at the Drayton site are completely new and in full compliance with Low Impact Installations criteria. The Council has confirmed that there is no history of enforcement actions such as prosecution, formal caution, suspension notice, or enforcement notice related to an actual or potential environmental incident at this site under the same management.