Follow on from Open & Issue Specific Hearings (July 2025)

David White, speaking on behalf of Jane Pumfrey and many concerned residents in and around our communities regarding the serious and severe pollution risks from building a massive BESS site and sub-station, close to a drinking water treatment plant (providing up to 2 million litres of water per day to the city of Lincoln), the 20 acre North Clifton Reservoir and across a drinking water protected area. In addition, are the surrounding land and waterways feeding into the River Trent, which supports sensitive aquatic ecosystems and plays a vital role in regional water supply and biodiversity and form part of a critical environmental buffer zone for both human health and wildlife.

Our concerns also extend to the installation of 196 shipping container sizes solar inverters, each with their own fire risks and consequent drinking water protected area pollution risks.

This submission is in addition to the first submission sent in previously and contains responses to some of the applicant's answers from the public hearings.

Transcript Source: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN010159-000375-OES_JUL10_ISH1_PT3.pdf

Introduction / Opening Statement

We are deeply concerned about the proposal to construct a massive Battery Energy Storage System (BESS) site and install 196 large solar inverters across a designated drinking water protected area, in close proximity to a water treatment plant and a 20-acre reservoir. The combination of high-voltage equipment, significant quantities of hazardous materials—including lithium-ion batteries containing fluorinated chemicals—and the risk of fire or chemical runoff presents an unacceptable threat to local water safety. Any incident could jeopardize both the nearby treatment facility and the reservoir, endangering public health and violating the fundamental principles of safeguarding vital drinking water resources.

Many in our community believe that allowing this solar farm development to be passed for building as is, would contravene Part IIA of the 1990 Environmental Act, plus Water Resources Act 1991 (s.85), multiple WFD frameworks and drinking water protections.

This document contains our response to some of the points put across by the applicant in response to some of our questions.

Drinking Water Protected Area

- 4000 Acre Development Site overlaps a Drinking Water Protected Area GB104028058480, 20 acre reservoir and water treatment plant (Map)

Department for Environment Food & Rural Affairs — Data Services Platform

Environment Agency — Catchment Data Explorer — Home Search Help API

Home / Humber / Trent Lower and Erewash / Trent and Trib / Trent from Carlton-on-Trent to Laughton Drain

Trent from Carlton-on-Trent to Laughton Drain Water Body

Moderate ecological status

Protected areas

PA Name	Id	Directive
Trent from Carlton-on-Trent to Laughton Drain	UKGB104028058480	Drinking Water Protected Area

GB104028058480 is a legally recognised protected catchment for drinking water sources.

The image shows the zone's boundaries and context.

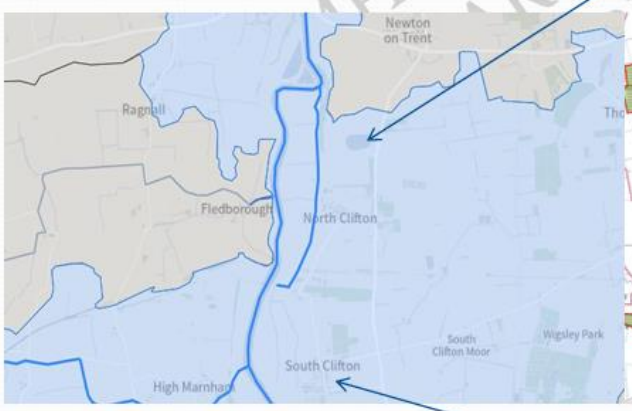
Included in the solar farm development zone are the 20 acre North Clifton Reservoir And the Anglian Water: Hall Water Treatment works Together providing up to 2million litres of drinking water per day to the city of Lincoln (image below)

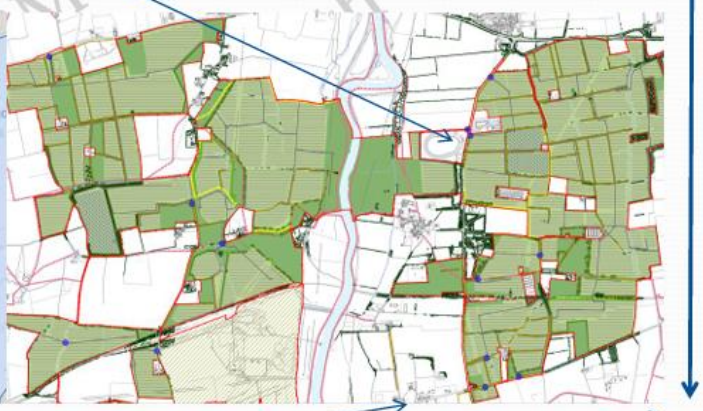
Drinking Water Protected Area
Side by Side Scale Maps, 36km^{sq}

- 'DWPA' Map

One Earth Solar Farm Map

Trent from Carlton-on-Trent to Laughton Drain Water Body





(transcript regarding fire-fighting run-off basins in the BESS)
00:54:20:04 - 00:54:50:08 For the applicant
Um, but fire suppression has been considered within the design. And should that occur. Um, we have incorporated a stock valve downstream of the basins, and that will automatically will be automatically triggered to essentially close and isolate any potentially contaminated discharge in that scenario. Um, should that occur, the contaminated water would be held, um, tankard away and treated accordingly off site. Um, and just to reiterate, the detention basins will have an impermeable lining.

00:54:50:10 - 00:55:28:06 So there wouldn't be any infiltration to groundwater. And that those measures also prevent, um, any potential discharges to ordinary watercourses, which is where the, uh, detention basins ultimately discharge to. Um, in addition to those measures, um, we have also assessed the potential for a fire to occur at the same time as a rainfall event. And that's been assessed and sort of quantified with in table four seven of the Fra, um, as 051. Um, and what the essentially the basins have been sized to provide sufficient storage to attenuate a 1 in 10 year rainfall event.

00:55:28:09 - 00:55:38:17 Plus um **plus fire water at a rate of 1900l per minute. Um, for a two hour time period**.

Our Response
The claim that two hours of firefighting water is sufficient for a large-scale BESS fire many people believe is fundamentally flawed and contradicted by both planning reports and real-world incidents.

Large-scale planning assessments (e.g., Sunnica / Sunnica East) highlight that while a 2-hour baseline is often cited, it is dramatically under-specified when scaled to the energy capacity of utility-scale batteries, with actual requirements running into hundreds of cubic metres.

Real-world cases reinforce this:

- a Tesla EV battery fire involving just 100 kWh of energy required around 4 hours and 115 m^3 (≈30,000 gallons) of water, demonstrating the extended suppression time even for relatively small batteries.
- At grid scale, incidents such as Moss Landing saw fires persist for 24–48 hours, with containment efforts consuming millions of gallons of water and, in some cases, necessitating controlled burn-outs due to the challenges of extinguishing thermal runaway.

These examples clearly show that a 2-hour supply is wholly inadequate for realistic BESS fire scenarios and overlooks both the scale of water required and the prolonged nature of such events.

Potential Consequences
In the event of a BESS fire exceeding the two-hour basin containment capacity, the consequences water treatment plant, a reservoir, and the River Trent. Once the containment basins overflow, contaminated firefighting water—laden with toxic by-products of battery thermal runaway, including heavy metals, fluorinated compounds, and other hazardous chemicals—could escape into the surrounding soil and waterways. This would pose a direct risk of pollution to ground water, the river Trent and important waterways, and water treatment infrastructure, threatening water supplies for a wide population.

Moreover, runoff into the waterways and River Trent could spread contamination downstream, breaching Water Framework Directive obligations and escalating the risk of ecological harm.

In such a scenario, the inadequacy of a 2-hour water containment design would not only undermine fire suppression efforts but could also trigger a major drinking water safety and environmental incident.

North Clifton Reservoir and the water treatment plant
The applicant's claim that the North Clifton Reservoir and the water treatment plant are "outside the development zone" many may consider this is misleading and fails to reflect the reality on the ground. While they may not fall within the red-line boundary of the development itself, their immediate adjacency to the proposed site places them at direct risk from any incident involving in particular airborne pollution escaping from a BESS fire.

This is where **serious airborne pollution** becomes possible.

If a **lithium-ion BESS** enters **thermal runaway**, it can release:

- **Hydrofluoric acid (HF)**
- **Hydrogen chloride (HCl)**
- **Phosphorus oxyfluoride**
- **Formaldehyde, acetaldehyde**
- **Carbon monoxide (CO)**
- **Particulate matter (PM2.5 and PM10)**
- **PFAS-related byproducts** from fluorinated electrolyte additives or plastic coatings

A **single container-scale Li-ion BESS** (typically ~1 MWh) in fire can emit:

- **PM2.5**: Several kilograms
- **HF**: 50–100+ kg (depending on chemistry)
- **CO**: Hundreds of kg
- **Toxic gas concentrations** within 100–300 m radius could reach **dangerous acute levels** (based on German UBA and US NFPA estimates)

Summary by Scenario

Condition	Airborne Emissions	Main Substances	Impact Area
Normal Operation	Negligible	Trace VOCs, heat	0–2m
Overheating (non-fire)	Low	VOCs, electrolytes	Local
Fire / Thermal Runaway	High	HF, HCl, CO, PM2.5, VOCs	100–500m
Explosion	Severe	Same as above + physical shrapnel	100–1000m (depending on venting)

Craig Thwaites, for the applicant (transcript)
01:02:02:19 - 01:02:38:11 Um, essentially, um, so those measures will be committed to within the, within the camp once it's produced. Um, I've had a note here. And forgive me, I'm not an expert, so if Pinsent Masons want to jump in. Um, however, er with regards to airborne particles, it's not my field of expertise, but I've been informed that that has been looked at within appendix C, unplanned emissions assessment of the OOB SMP map 183. And that confirms that there and then there is a figure in there which **shows the plumes, contours, um, from the fire outside of the reservoirs due to the prevailing wind direction.**

Our Response
We would be very concerned about any claim that a fire at the proposed site could be considered "safe" if it occurred outside the reservoir boundaries, given the prevailing wind patterns.

With the wind blowing directly towards the reservoir approximately 9% of the time, any smoke and airborne contaminants could easily reach and impact this critical drinking water source.

This risk is unacceptable in such a sensitive location and underscores the need for far greater caution and protective measures.

Emerging Reports of PFAS Pollution of Drinking Water Protected Areas Due to Fire-Fighting Foam Run-Off.
Note: There **are similarities** between the types of **PFAS (per- and polyfluoroalkyl substances)** chemicals historically used in **firefighting foams** and some of the PFAS compounds identified in **lithium-ion batteries and large Battery Energy Storage Systems (BESS).**

'Even if we stop drinking we will be exposed': a French region has banned tap water. Is it a warning for the rest of Europe?

Sandra Wiedemann at home in Buschwiller with her six-month-old son Côme. She finds it 'scary' that Pfas have contaminated her local drinking water, and that her son is among the vulnerable groups. Photograph: Stefan Pangritz

Forever chemicals have polluted the water supply of 60,000 people, threatening human health, wildlife and the wider ecosystem. But activists say this is just the tip of the Pfas iceberg

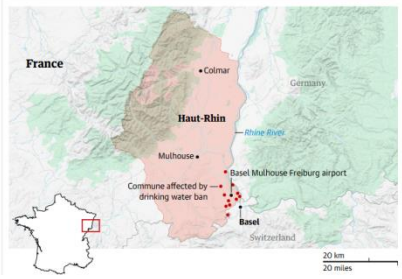
Read more: How a pristine lake came to have the highest levels of 'forever chemicals' on record

One quiet Saturday night, Sandra Wiedemann was curled up on the sofa when a story broke on TV news: the water coming from her tap could be poisoning her. The 36-year-old, who is breastfeeding her six-month-old son Côme, lives in the quiet French commune of Buschwiller in Saint-Louis, near the Swiss city of Basel. Perched on a hill not far from the Swiss and German borders, it feels like a safe place to raise a child - spacious houses are surrounded by manicured gardens, framed by the wild Jura mountains.

But as she watched the news, this safety felt threatened: Wiedemann and her family use tap water every day, for drinking, brushing her teeth, showering, cooking and washing vegetables. Now, she learned that chemicals she had never heard of were lurking in her body, on her skin, potentially harming her son. "I find it scary," she says. "Even if we stop drinking it we will be exposed to it and we can't really do anything."

Rural Saint-Louis is close to the borders of Switzerland and Germany, and is the site of France's biggest ever ban on drinking tap water. Photograph: Stefan Pangritz

The next morning she rushed to the supermarket expecting frantic Covid-style hoarding, but the aisles were calm - most people hadn't seen the news. Three days later, a letter dropped through her door from the local authority. Drinking water was prohibited, it said, for children under two years old, pregnant or breastfeeding women and people with weak immune systems. The same letter was pushed through the letterbox of about 60,000 other people across 11 communes. The supermarket rush began.



Saint-Louis is now the site of France's biggest ever ban on drinking tap water. Its at-risk residents will rely on bottled water until at least the end of the year, when authorities hope water filter systems will be installed. Tests of the local tap water showed levels of Pfas - "forever chemicals" linked to cancer, immune dysfunction and reproductive issues - had reached four times the recommended limit. Shelves were stripped bare as families scrambled to stockpile bottles of water to protect loved ones.

The source was a firefighting foam used at the airport since the 1960s, ending only in 2017, according to the joint statement from the local authority and regional health agency. Toxic residues from the foam lingered, filtering through the soil into drinking water and people's bodies - probably over decades.

Recent news reports like the one on the previous page are beginning to highlight growing concerns about PFAS contamination being detected in drinking water protected areas, rivers, and even in treated drinking water supplies.

Investigations and water quality testing across the UK and internationally are increasingly uncovering these so-called “forever chemicals” in locations previously assumed to be safe, raising alarm among regulators, environmental groups, and the public.

The persistence and mobility of PFAS compounds mean they can travel through soil and water systems, eventually entering rivers and groundwater that supply drinking water sources. These findings are intensifying calls for tighter controls on industrial discharges, more comprehensive monitoring of water sources, and urgent action to prevent further contamination of vital water supplies.

Whilst the pollution event in France is linked to historical use of fire-fighting foam, we as a community are seriously concerned regarding the **similarities** between the types of **PFAS (per- and polyfluoroalkyl substances)** chemicals historically used in **firefighting foams** and some of the PFAS compounds identified in **lithium-ion batteries and large Battery Energy Storage Systems (BESS)**, though their function and prevalence differ.

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1. PFAS in Firefighting Foam (AFFF):

- Firefighting foams (especially Aqueous Film-Forming Foams, AFFF) have historically contained **long-chain PFAS**, such as:
    - **PFOA (Perfluorooctanoic acid)**
    - **PFOS (Perfluorooctanesulfonic acid)**
    - Related sulfonates and fluorotelomer surfactants.
- These compounds were used because of their **water-repellent, surfactant, and heat-resistant properties**, allowing foams to smother hydrocarbon fires.
- Many of these "legacy PFAS" are now banned or restricted due to **persistence, bioaccumulation, and toxicity**.

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2. PFAS in Lithium Batteries and BESS:

- **Lithium-ion batteries** (including those used in large BESS) have been found to include PFAS-related materials:
    - **Binder materials (e.g., PVDF – polyvinylidene fluoride):** A fluoropolymer used to bind electrodes in cells.
    - **Electrolyte salts (e.g., $LiPF_6$ – lithium hexafluorophosphate):** While not itself PFAS, its breakdown products can generate fluorinated compounds.
    - **Thermal runaway by-products:** When batteries burn, **HF (hydrogen fluoride)** and other fluorinated degradation chemicals can be released.
- Some studies have detected **shorter-chain PFAS** or PFAS-like compounds in smoke plumes from BESS fires due to combustion of fluoropolymer components (PVDF and other fluorinated plastics).

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3. Key Similarities:

- **Fluorinated Chemistry:** Both use fluorinated compounds for their **chemical stability, heat resistance, and low surface energy**.
- **Persistence:** Both can lead to **persistent fluorinated by-products** that resist breakdown in the environment.
- **Fire/Incident Risk:** Fires at BESS sites can **release PFAS-like compounds**, similar to how firefighting foam has historically contaminated soil and water.

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4. Key Differences:

- PFAS in firefighting foam are **intentionally added surfactants** and are highly mobile in water, leading to widespread contamination.
- In lithium batteries/BESS, PFAS compounds are typically **contained in solid components** (e.g., binders, seals) and only pose a contamination risk during:
    - **Thermal runaway fires**
    - **Improper disposal/leaching**
    - **Catastrophic failure incidents**

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5. Implications for Large BESS Sites:

- **Firewater runoff** from a BESS fire can carry **fluorinated combustion by-products** similar in persistence and risk to those from firefighting foam contamination.
- Regulatory and environmental concerns are growing over **fluoropolymers (like PVDF)** in batteries, as they can **release PFAS-like degradation products**.

Inverter Fires in a drinking water protected area

Our concerns are not based solely on the dangers posed by BESS fires, but also on the significant fire risks associated with large solar inverters. These units, of which 196 are proposed for this site, are known to overheat and catch fire, with documented incidents worldwide. Fires from inverters can release toxic smoke and combustion by-products, including plastics, metals, and electronic components, which present their own pollution risks.

Conclusion

Given the numerous and well-documented pollution risks, we believe the proposed development poses an unacceptable threat to drinking water protected areas, the River Trent and its associated ecosystems, as well as the nearby large reservoir, which is a critical part of the region's water supply. In addition to the risks of chemical leaching and microplastic pollution from buried infrastructure, there is also a serious danger from fires involving the Battery Energy Storage Systems (BESS) and large solar inverters, both of which are known fire hazards. Such fires have been shown to release highly toxic PFAS "forever chemicals" and other pollutants, which could spread through firefighting water runoff or airborne fallout, contaminating surrounding land and watercourses. Many would consider allowing such a development in this sensitive location would be reckless and contrary to established environmental protections designed to safeguard drinking water and ecosystems.