

The Feasibility of an Explosives Range Outside the University of Wales Trinity St Davids (UWTSD)

A plot of land outside the UWTSD Swansea campus has been proposed as a new explosives trials site for the Ministry of Defence. Using a mixture of map and drone data, this poster will explore the practicalities of using this site, along with any safety and environmental concerns.

The Site Location

Map 1 shows the area of the proposed trials site. The location spans 0.03km² providing a large area for a firing pad and storage buildings.

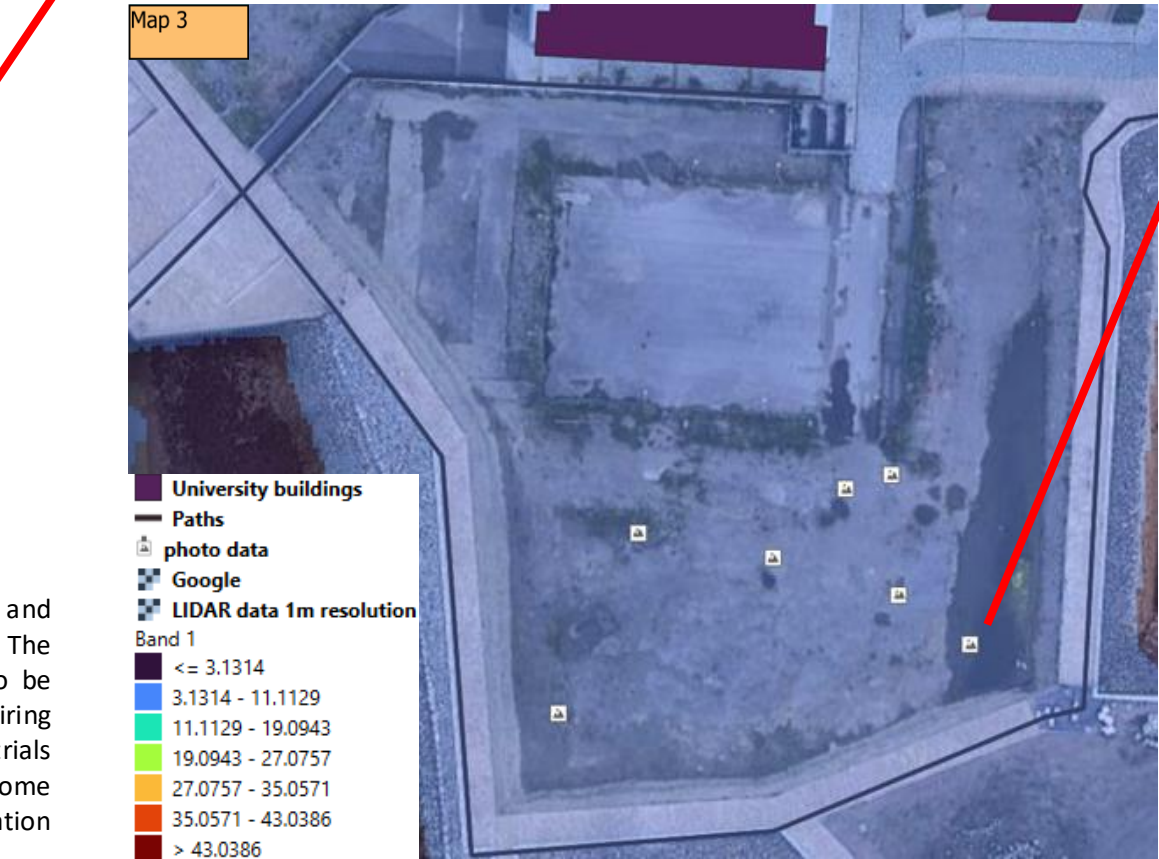
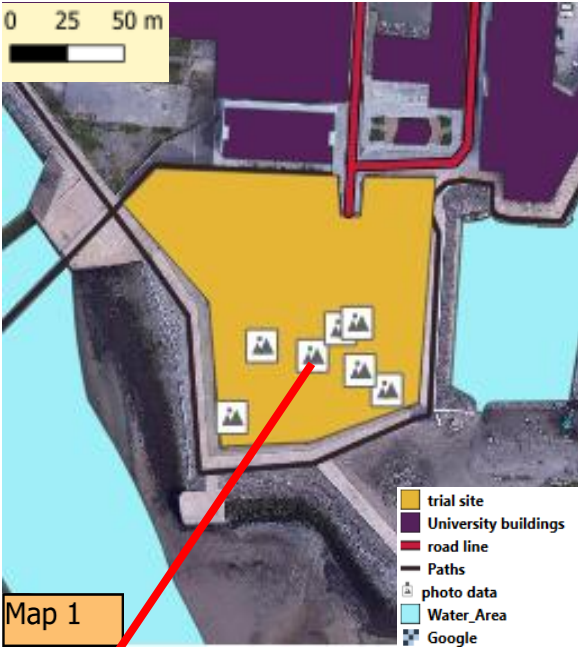
The area is close to two large bodies of water, potentially enhancing the propagation of explosive materials by carrying their by-products over large distances. Interactions between the water and explosive substances may also lead to adverse chemical reactions with potentially harmful consequences to local humans and aquatic life.

The proximity of residential and university buildings to the site is a major concern. Noise, and pressure waves from firings would be extremely disruptive to inhabitants as well as potentially damaging to buildings.

Lastly, the site is bordered on all sides by a public footpath. To prevent unauthorised access, additional fencing will need to be erected. This will incur an additional cost along with the likelihood of requiring local council approval.



This image was taken using a Mavic 2 drone and illustrates the natural terrain of the trials site. The mixture of mud and grass shown would need to be converted to a concrete firing pad to protect the firing area long term. When manually attended, the trials site also featured sharp rocks which could become airborne during firing, thus increasing fragmentation risks.



Safety

For an explosives trial to occur, relevant safety procedures and processes must be followed. Each explosive has a designated safety area in which no one can be within during a firing, due to a risk of injury. For high explosives up to 2.5kg, this is a 50m radius which appears achievable within the trials site as shown in map 2 [1].

Explosives are also required to be stored on site whilst adhering to the Explosive Quantity Distance (EQD). This is a legally mandated separation distance between a quantity of explosive and locations where persons could be at risk.

Map 2 highlights where the use of explosives is restricted. Each radius has been calculated using the Hopkinson-Cranz scaling law and assumes that 1kg of explosive is being stored [1]. The cream circle represents the distance between an explosive storehouse and a public traffic route with civilian access (roads and paths) and the green circle represents the distance between an explosive storehouse and vulnerable buildings inhabited by civilians such as those in UWTSD.

The unshaded area of Map 2 shows a slim majority of the site is still safe to store explosives. However, when the designated safety area, welfare area, parking etc. is considered, the notion of a full trials site is unfeasible.



Topography

Map 3 indicates the terrain is mostly flat, providing an ideal surface to set up instrumentation. It also aids in monitoring personnel for safety and security purposes. The map highlights how the site sits at less than 11.1 meters above sea level, demonstrating its vulnerability to flooding.



When investigated further using a drone, a waterlogged segment was discovered with a water depth of ~20cm at the time of capture, supporting the flooding concerns. In addition, the flooded area reduces the space available to conduct trials, as well as adding to the environmental concerns associated with bodies of water.

To conclude, the suggested trial site is deemed unsuitable for conducting explosive trials due to substantial safety and environmental concerns. Its proximity to water increases the risk of leeching explosive byproducts into the sea. The noise generated during firings would also be a significant concern to residents and students. Additionally, insufficient usable space of the area would prevent proper placement of the firing pad and explosive storage facility in adherence to safety regulations. Consequently, it is strongly recommended that this proposal is not pursued any further considering the logistical and safety concerns of the site.

References:
[1] Defence Safety Authority, "DSA 03.OME Part3 Volume 4 – Defence Code of Practice (DCOP) and Guidance Notes for Ranges", Oct. 01, 2019.
[2] Defence Safety Authority, "DSA 03.OME Part2 (JSP 482) – Defence Code of Practice (DCOP) and Guidance Notes for In-Service and Operational Safety Management of OME", Oct. 01, 2019.