



# Vertical Meadow Cladding Tall Building Fire Safety Conference

18/05/22



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# Vertical Meadow and my background

- Structural engineer & Façade Engineer Arup
- Lead projects such as the new Google HQ façade in London and the Jesus Cross at the top of Sagrada Familia
- Inventor of Vertical Meadow concept

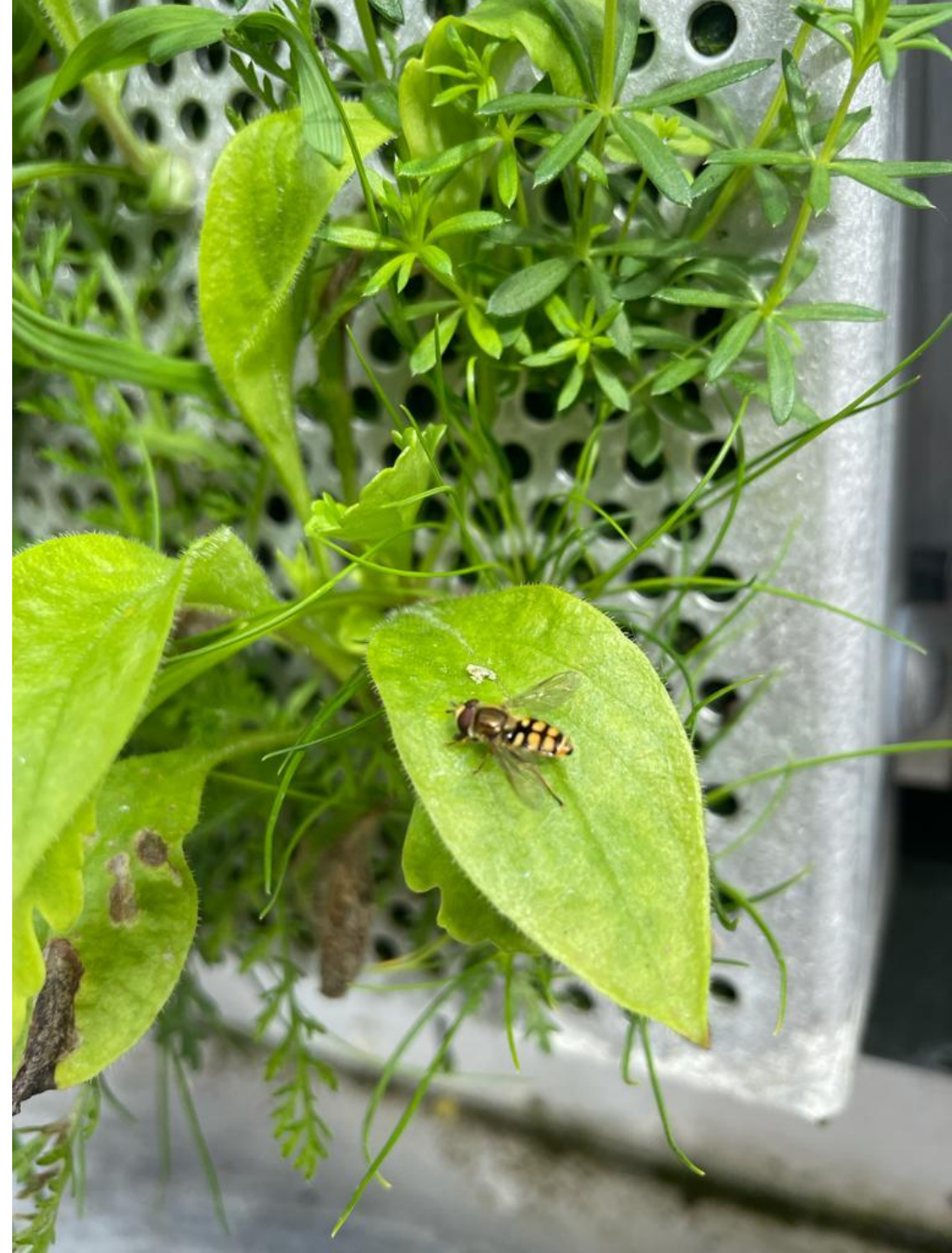
Google HQ Façade Kings Cross, London (Image Dezeen)



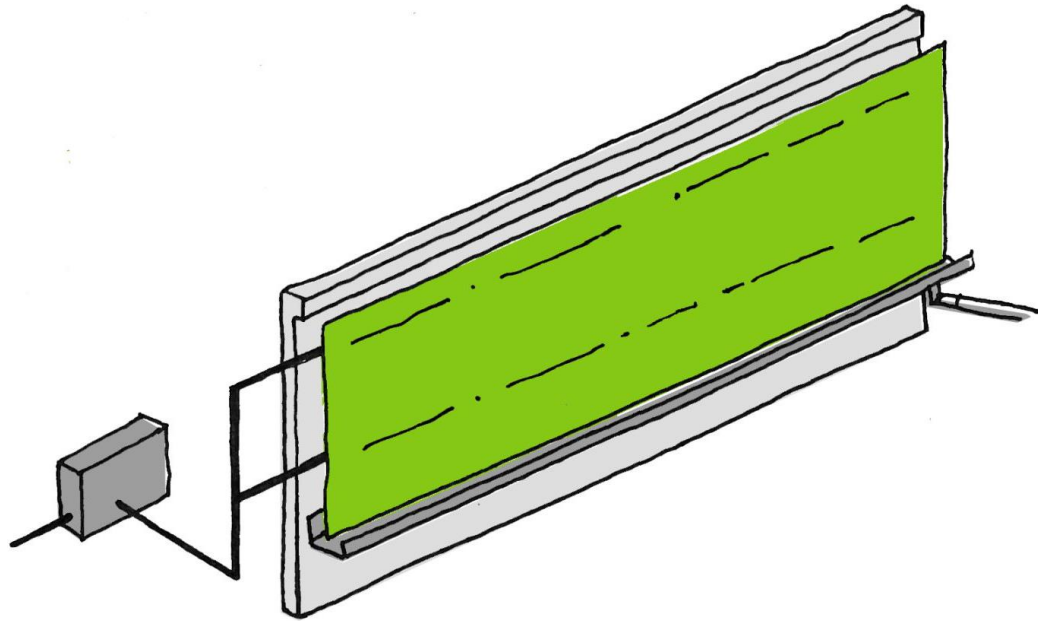
# Mission Statement

Vertical Meadow is revolutionising the living wall industry, to bring biodiversity back into our cities with simple, cost-effective and low maintenance solutions

Vertical Meadow Cladding System

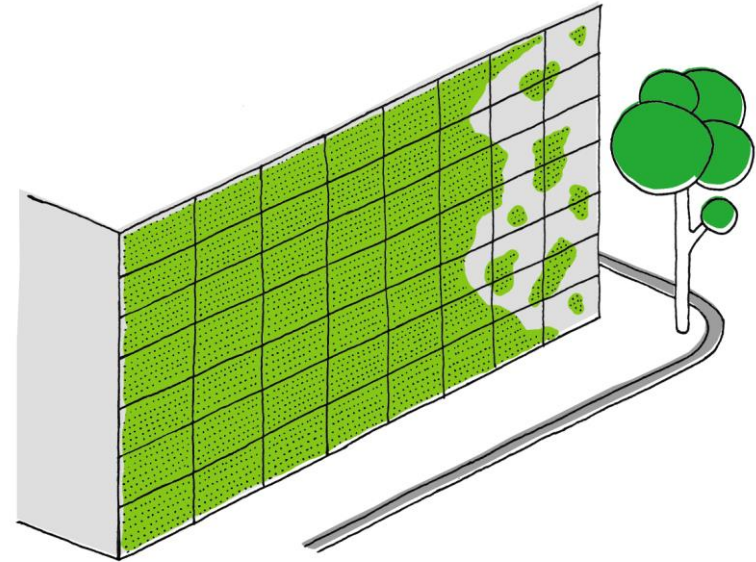


# Vertical Meadow Products



## Vertical Meadow Wrap

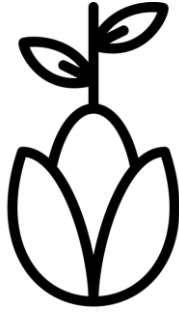
- Bespoke – e.g Billboards
- Construction Sites



## Vertical Meadow Cladding

- Façade cladding solution

# Our approach



**Grown from  
seed on site**



**Standard  
construction  
techniques**



**Use of  
data**

**Cost  
effective**

**Easy to  
install**

**Easy to  
maintain**

**Low  
environmental  
impact**

**Biodiverse &  
Visually  
interesting**

# Why are living walls important?

## Increasing demand for living walls



Community



Biodiversity



Regulation



Pairways  
GOLF LINKS ROAD, FERRDOWN  
A superbly crafted and highly specified development, of six 2 and 3 bedroom contemporary apartments & two luxury 2 bedroom penthouses with secure underground parking  
For further information please call  
The Sales Hotline on **0845 6038322**  
www.pairways.co.uk

Brand



# Why are living walls important?

## People and Regulatory Drivers

- No new parks in city centres
- Well being is driving peoples work-life decisions
- Relevance of cities following the impact of COVID
- Urban Greening Factor is a planning requirement
- Biodiversity Net Gain – 10% increase

Bosco Verticale, Milan (Image Boeri Architetti)



# What are the fire issues with living walls?

## The challenges

- Limited guidance on how living walls should be treated.
- Regulation- Why are living walls not treated like cladding?
- Living walls are not a steady state materials – dry / wet / in between
- Testing of living walls – unclear how to test them.



# What are the fire issues with living walls?

## Other challenges

- Living walls have come from the landscape industry and typically use combustible materials in their construction
- Plants are combustible especially when dry – research is being carried out how it varies with species

Generic living wall system - (Image: Alibaba.com)



# What are we trying to do differently?

## Vertical Meadow Design Approach

- Design brief: Biodiversity, Construction friendly, **Fire safe**
- Designed as a bolt on to a rainscreen cladding system
- VM Cladding - all materials should be non-combustible A1 unless alternatives not available

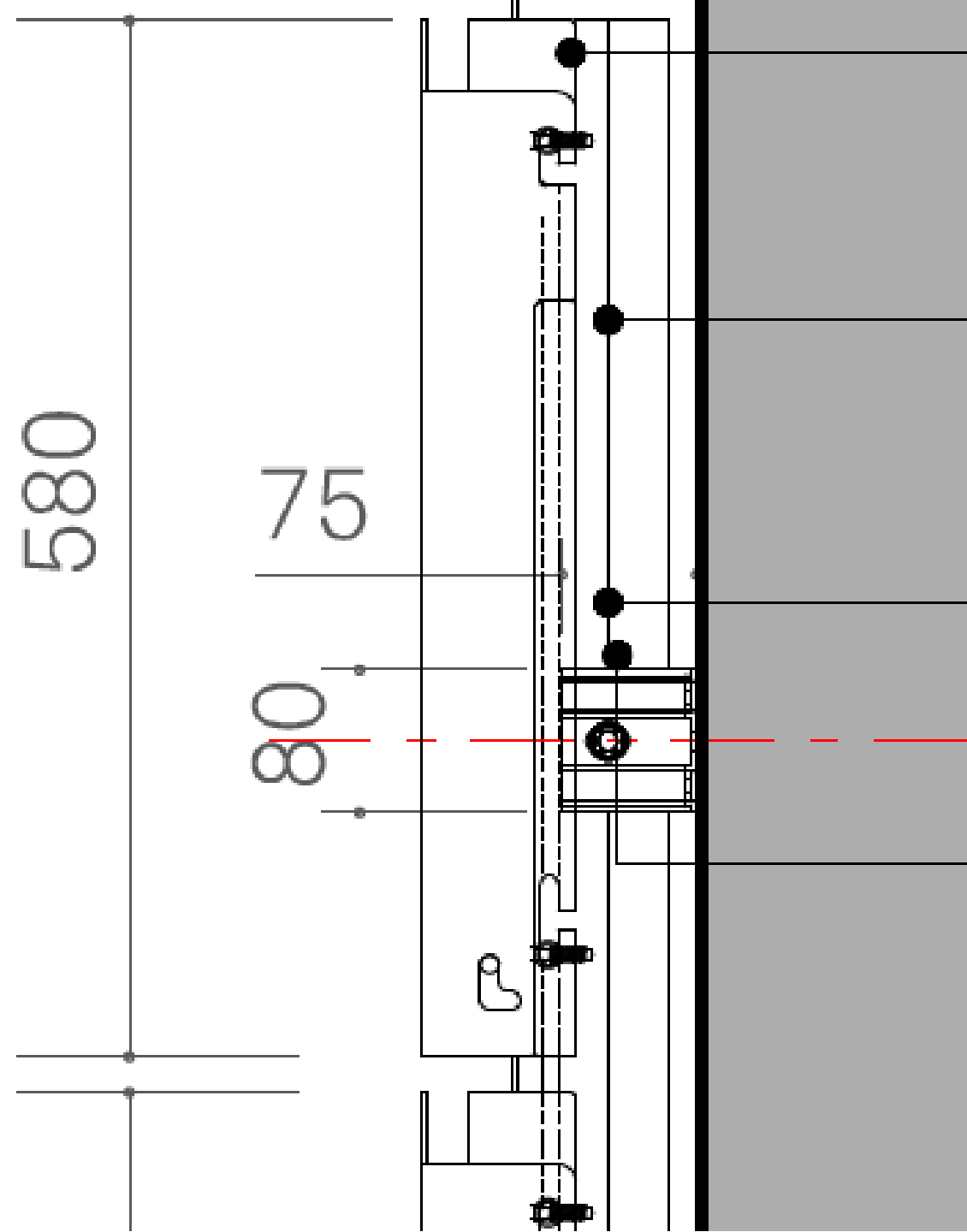
Vertical Meadow Cladding system



# What are we trying to do differently?

## Vertical Meadow Design Approach

- Our system is a rainscreen cladding system enabling robust fire compartmentation
- Robust irrigation approach to ensure always wet - alarms
- Testing of living walls – we tested wet and dry



Vertical Meadow drawing vertical section



# Results fire testing 1

- **Indicative wet test** – B - s3 - d0
- **Indicative dry test**– D - s3 - d0
- Both the wet and dry plants are combustible. Spread of flames is limited on the wet system to direct exposure flames / heat
- The dry plants (10 days without water) performed significantly worse than the wet plants in terms of rapid fire spread and smoke production.



## Results fire testing 2

- Apart from the plants, the only other combustible component of the system is the horizontal irrigation PVC pipes. This did not seem to contribute significantly to the fire or its spread during the test.
- The cavity behind the panels did not seem to contribute significantly to the spread of flames during the test.





# The next steps for the industry

## Non-expert view

- Avoid combustible materials in their construction. If the water system fails the plastic materials will burn
- Consensus on testing approach for living walls
- Regulation / Guidance to catch up with ongoing research

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# Robust Living wall system

## Key Aspects

- No combustible materials in living wall construction
- Avoid living walls that span between compartments.
- Robust irrigation systems with failsafe mechanisms
- Ensure that robust cavity barriers can be incorporated
- Maintenance of walls to minimise fire risk

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# Can living walls be incorporated in high rise buildings?

Why not?

- Robust design / systems
- Requires expert multidisciplinary teams working together from concept stage
- Right plants right place – high wind locations
- Get manufacturers on early and work with them

Etretat cliffs, France





Vertical  
Meadow

Any  
Questions?

