



Welcome

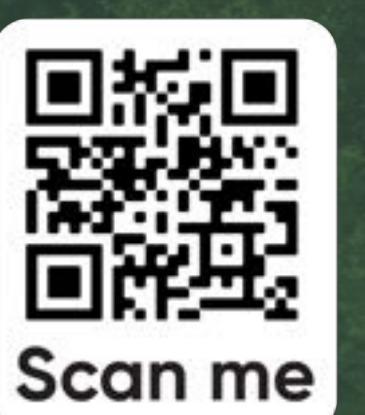
To the Sustain Initiative Public Consultation

Thank you for taking the time to come and review and share your views on the Sustain Proposals for Park Grounds, Wootton Bassett.

Please feel free to take a feedback form - please place your comments in the box provided, or alternatively you can provide feedback via the project website.

Privacy Notice - Photography

The Sustain Team intend to take some photographs of this consultation event. If you are not happy to have your image included in any of the photographs please let a member of the Sustain Team know and they will ensure that your image is not recorded as part of the record of this consultation event.



sustain

What is Sustain?

Sustain is a new initiative founded by Crapper and Sons Landfill Ltd, a family run business that has been providing landfill and sustainable solutions to its local communities for over 40 years.

Based on the outskirts of Wootton Bassett, Sustain aligns with the core values of Crapper and Sons Landfill Ltd, which is committed to recycling, reusing and repurposing.

Sustain's mission is to have positive impact on communities and places. Its goals are to deliver sustainable food, energy, employment and living to its local community.

What is the Sustain Initiative proposing?

The foundation stone of the Sustain is a radical new approach to the repurposing and reuse of landfill sites to create cheap energy and heat, as well as green food super production centres for local communities through its Super-Midden solution.



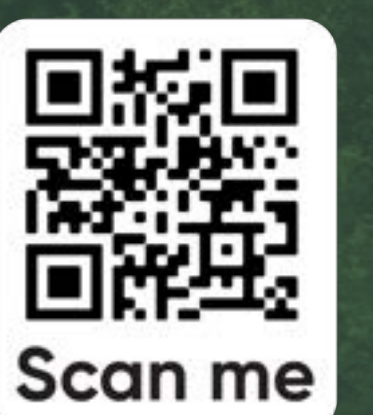
Masterplan Drawing. ©Designscape Architects



Section through the site illustrating landfill, and greenhouses with protective bunds around the site..

©Designscape Architects Ltd.

www.sustainwiltshire.co.uk



sustain

What is the Sustain Super-Midden?

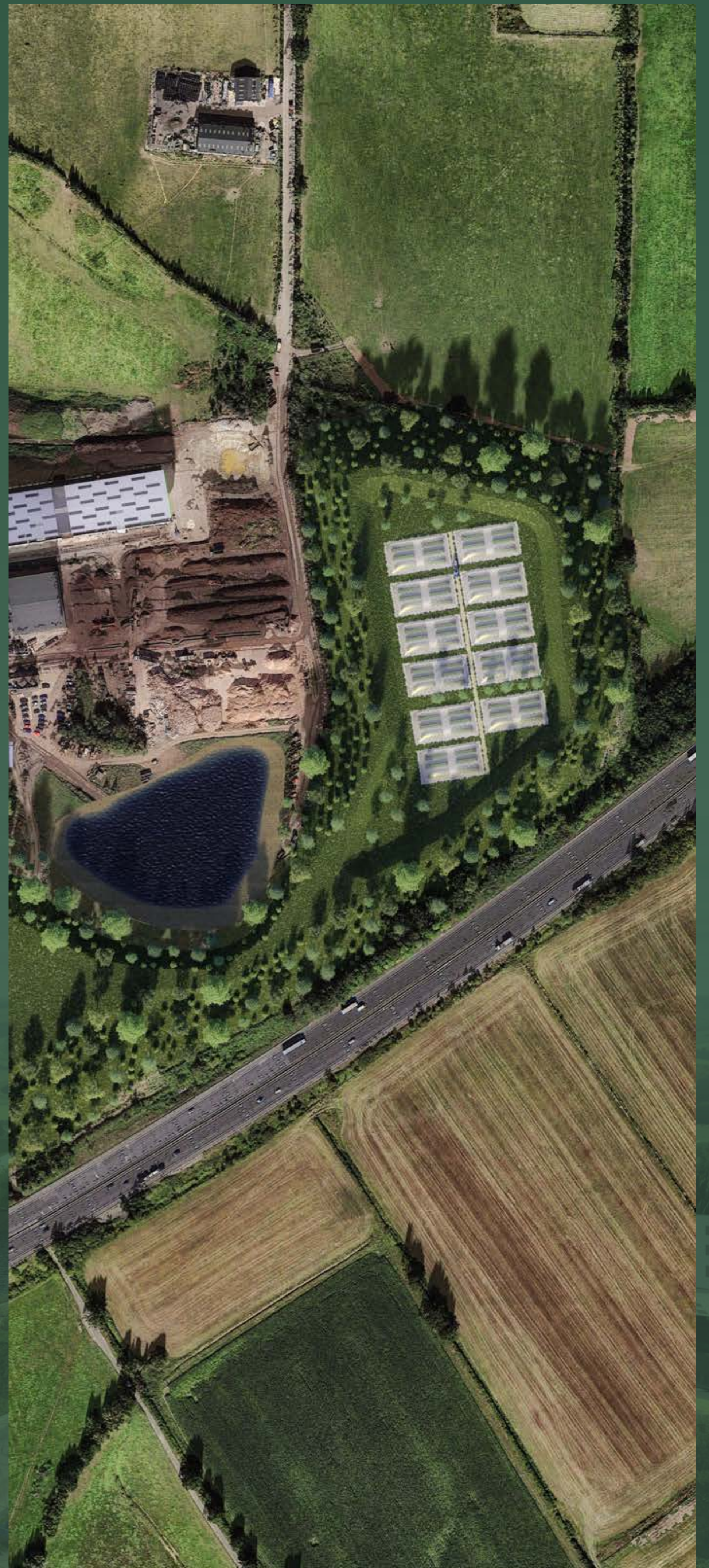
Based on the concept of the ancient midden where waste, including animal dung, would be piled outside homes to break down, providing heat, material to burn and composted biomass, the Sustain Super Midden is designed to turn landfill sites into energy, heat, food, and fertiliser generating centres for the benefit of the local community.

This is made possible through Sustain's plans to locate positively pressured greenhouses on the surface of sealed landfill cells, using heat and energy produced on site to enable just-in-time, demand-based, year-round fruit and vegetable production.

How is year-round fruit and vegetable production possible?

Methane gas produced from within the sealed landfill cells is currently collected and safely burnt off. Under the proposed plans, this gas will be used to power engines to generate electricity and heat. Combined with heat extracted from the landfill site, and power from the on-site energy from waste plant, the positively pressured, inflatable greenhouses will be kept at a perfect growing temperature for horticulture throughout the seasons.

CO₂ produced as a by-product of the energy from methane gas process, will be fed directly into the flexible greenhouses to enhance and control the rich growing environment. Aided by low-impact ultraviolet horticultural light to extend the growing season, multi-cropping and year-round harvesting of everything from lettuce to avocados will be possible.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

Will food grown on a landfill be safe to eat?

Yes. The flexible, positively pressured greenhouses have been specifically designed to be biosecure and are fully encapsulated.

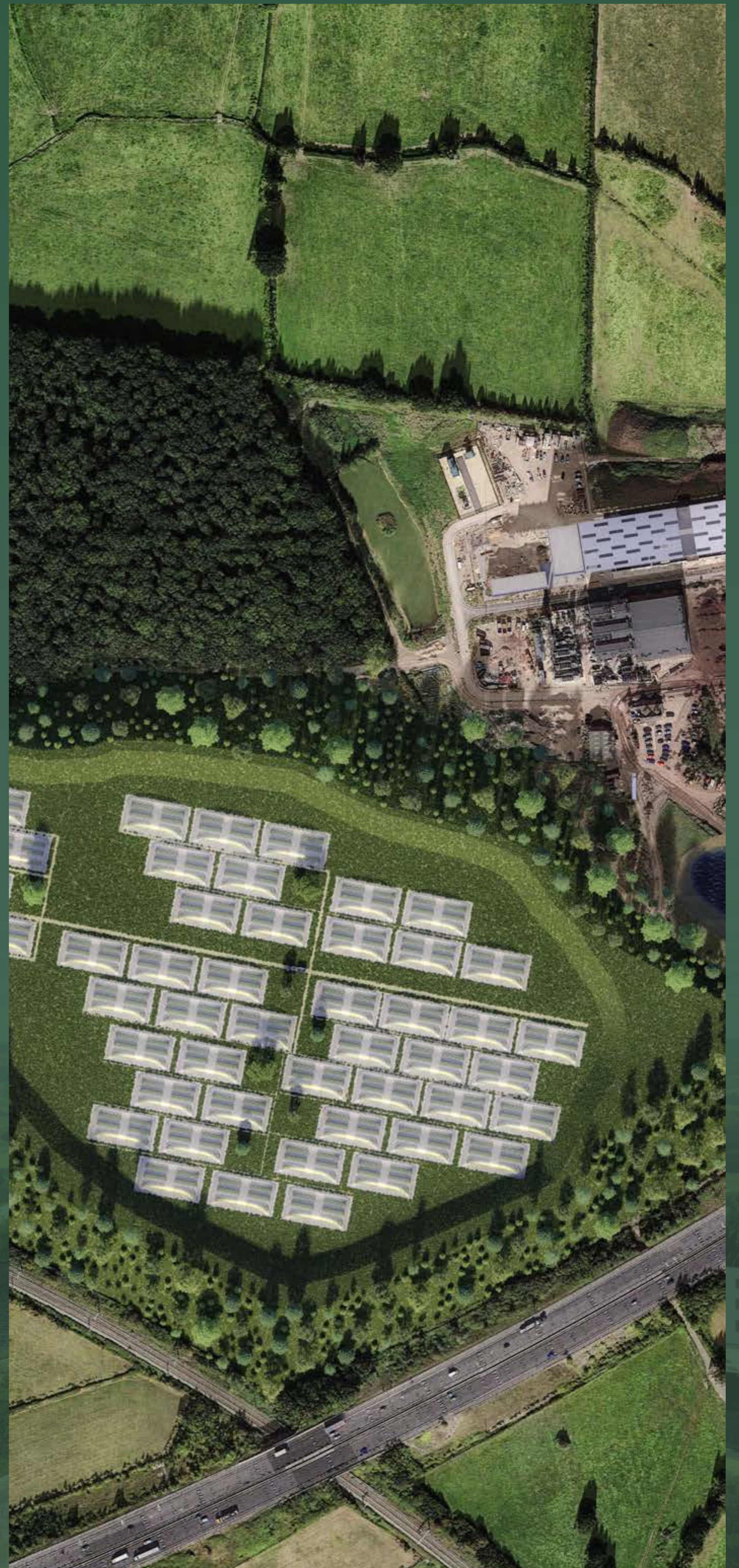
These will be located on securely sealed landfill cells. These cells are capped by 1/2m of inert material, then 2m of compressed clay, creating an impermeable lining. In addition to this, a topsoil compost mix is added to provide weather protection for the clay armour.

Within the greenhouses, all plants will be grown in raised beds on tables, using soils and compost introduced to the greenhouses, or hydroponics systems. Combined with the encapsulated structure of the greenhouse, which is totally impenetrable, plants cannot come into contact with the exterior surface of the landfill cells. This results in a safe, secure and rich growing environment within the greenhouses.

Additionally, thanks to integrated airlock doors and a constant flow of filtered CO₂ and air, any unwanted insects, disease, pollen, pollutants, and contaminants, including any traces of landfill gas, are kept out. This helps to ensure plant health and biosecurity without the need for pesticides, allowing for an organic approach to the production of fresh fruit and vegetables, aided by beehives that will be kept in the greenhouses to promote pollination.

How will you meet demand for fruit and vegetables locally?

Sustain's circular solution will see its greenhouses produce just-in-time, demand-based fruit and vegetables using advanced modelling technology to manage planting, levels of heat, light and CO₂.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.

www.sustainwiltshire.co.uk



Scan me

sustain

How will the fruit and vegetables be delivered?

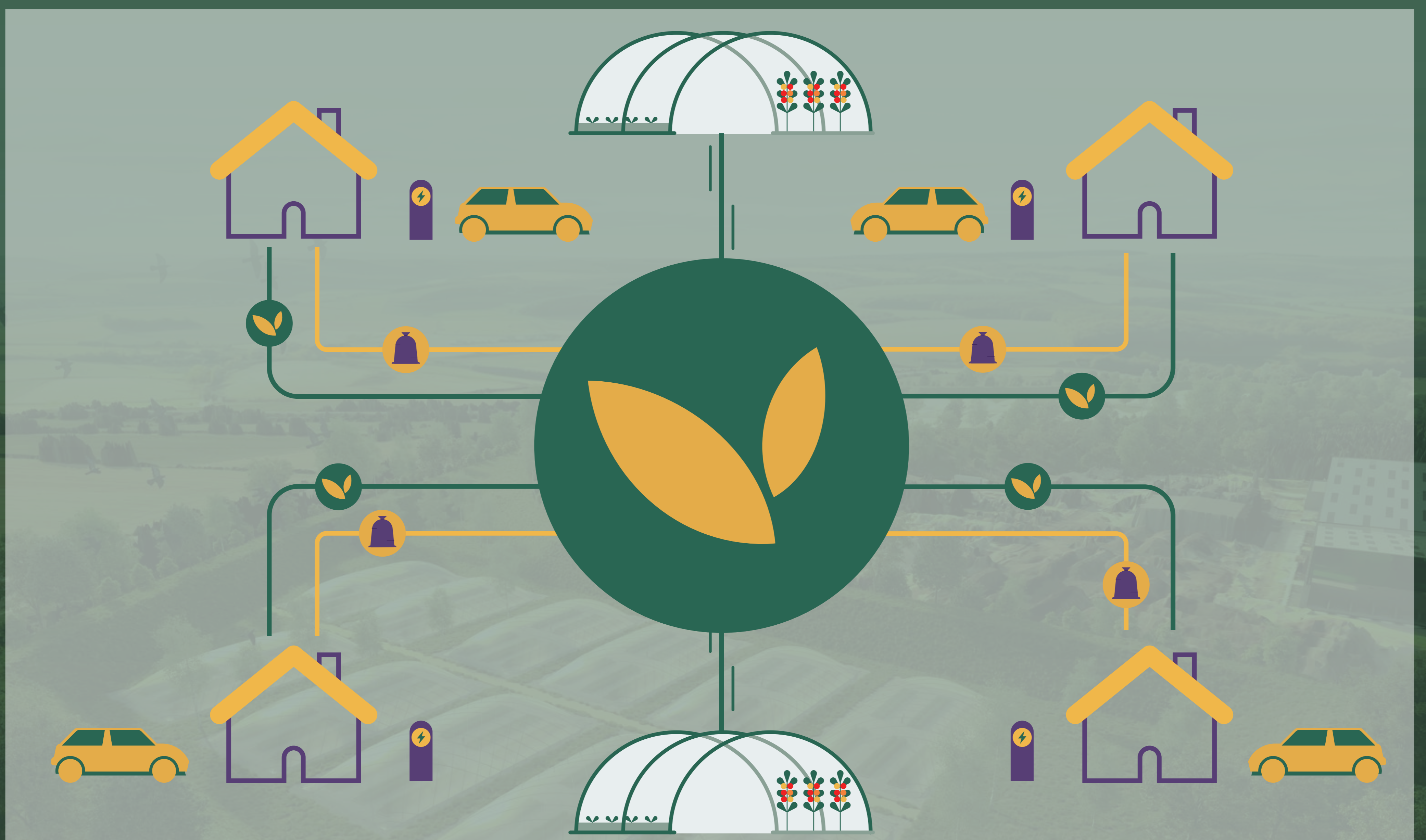
Using the Sustain Super-Midden landfill centre as a distribution hub, just-in-time food will be delivered daily to order, to the doorstep, reducing food miles at the same time as removing the need for large storage and warehousing operations. This approach will enable cheaper and more sustainable fruit and vegetables to be produced than can be provided by the supermarkets.

In time, these deliveries could also include dairy products and meat from local farmers, helping to provide healthy food from local sources, supporting local producers.

How much food will the greenhouses produce?

Projections show that each greenhouse will be capable of producing 10 tonnes of fruit and vegetables year-round. These will be planted and harvested on a just-in-time basis using advanced modelling technology to manage planting, levels of heat, light and CO₂ to accelerate or slow the growing process. Based on our modelling, the greenhouses have the potential to provide 80% of all fruit and vegetable requirements for the communities of Wootton Bassett, Brinkworth, Malmesbury and Purton.

Waste is transformed into energy, heat and CO₂ which is used to produce fruit and vegetables in the greenhouses for the community.....Spare energy can be used in the local community



sustain

How do you know that the positively pressured greenhouses will work?

Sustain has received planning permission for a 40m x 20m prototype inflated greenhouse, which will be constructed and tested as proof of concept. Each greenhouse is kept rigid through the use of positive pressure and an airlock door that keeps out unwanted insects and pollen. Air pumped in is filtered, regulated, and CO₂ increased or reduced to regulate the speed of growth and ripening within the greenhouse.

This ground-breaking solution is based on a combination of technologies that have been tried and tested previously, but not in this way. Pressurised structures, for example, are well proven, making it possible to create environmental conditions inside the greenhouses that repel insects and pests so that they cannot affect germination or plant growth inside the greenhouses.

CO₂ enrichment in greenhouses is also well practised. This allows crops to meet their photosynthesis potential. Conventionally, enriching air with CO₂ can be achieved by means of the combustion of natural gas or through the use of liquid CO₂. Sustain's Super-Midden solution produces CO₂ as a by-product of its methane to energy process.

The use of extra carbon dioxide to increase the yield of greenhouse crops is widely used in horticulture. The amount of carbon dioxide in the outside air is typically 350 parts per million. This amount is sufficient for plants to grow, however when placing many plants together in a greenhouse, the carbon dioxide levels drop. This is because plants are using carbon dioxide for photosynthesis. By adding CO₂ (CO₂ enrichment), it is possible to increase the photosynthesis potential of the crops, especially on sunny days. CO₂ made as a by-product of the power from methane gas will be used to enhance growing



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.

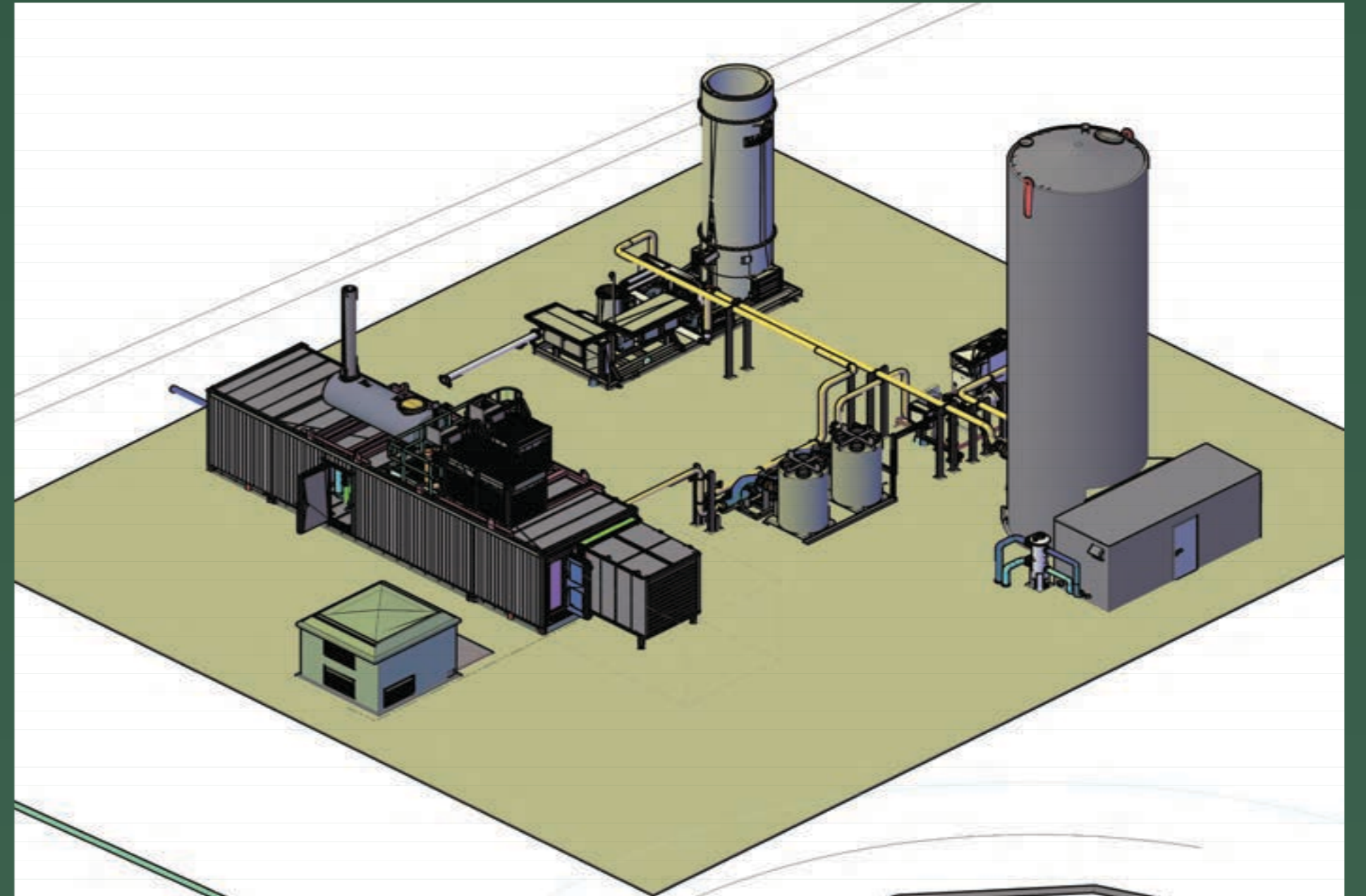
conditions within the positively pressured greenhouses at the Brinkworth Road site.

Energy from landfill gas is a well proven process which is used internationally. In 2021 energy from landfill gas produced to 3,313 gigawatt hours of electricity in the UK.



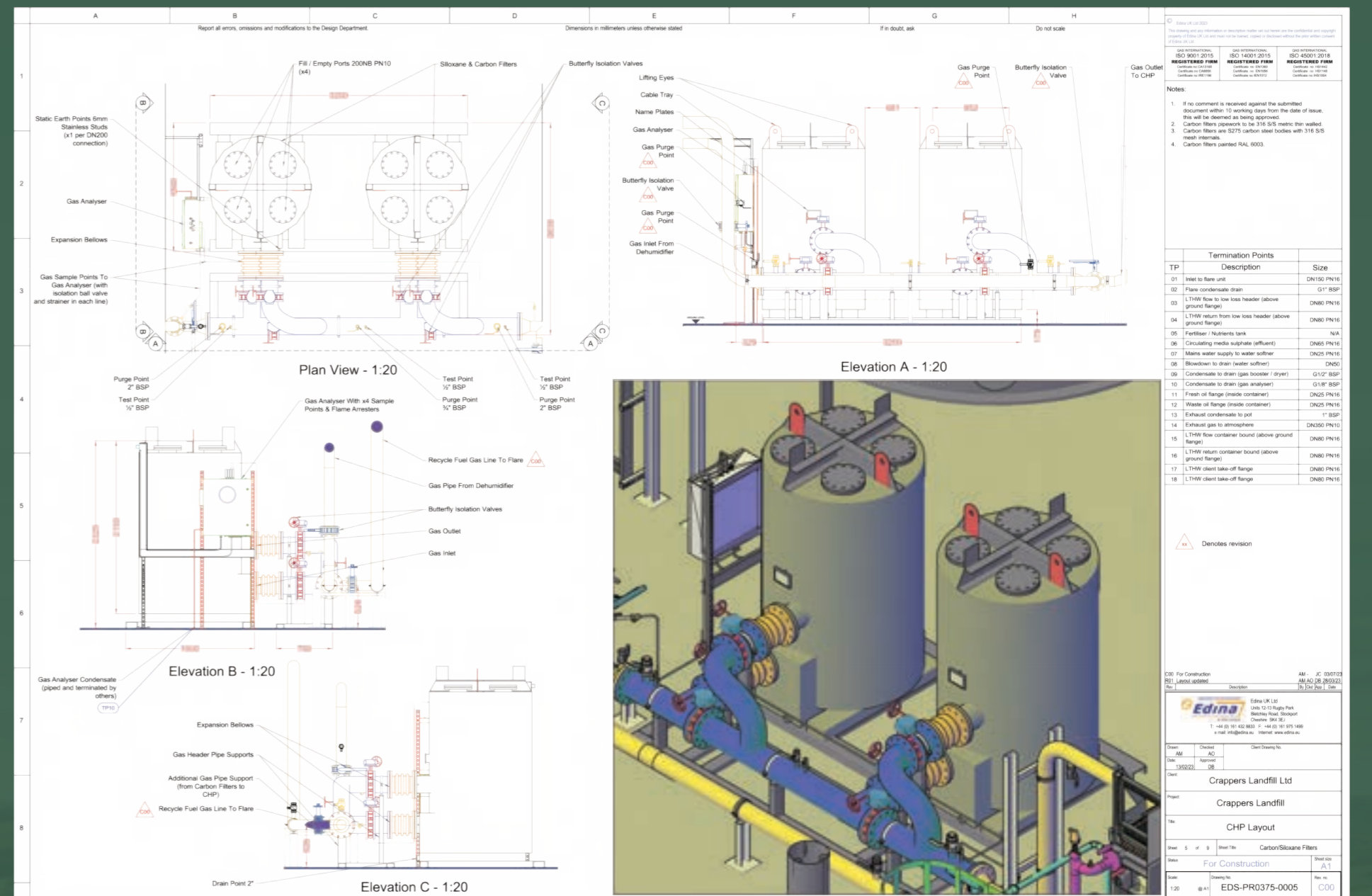
How does energy from landfill methane work?

Landfill gas is primarily composed of methane CH₄, CO₂ and H₂S. Through a series of wells placed within the landfill, gases from waste decomposition are collected and piped to a central location where it is cleaned by removing the H₂S and used to fuel a Combined Heat and Power Gas Engine. CO₂ will be collected from the engine exhausts, cleaned, and will be stored to be used in the greenhouses, where the process of photosynthesis will turn CO₂ into oxygen.



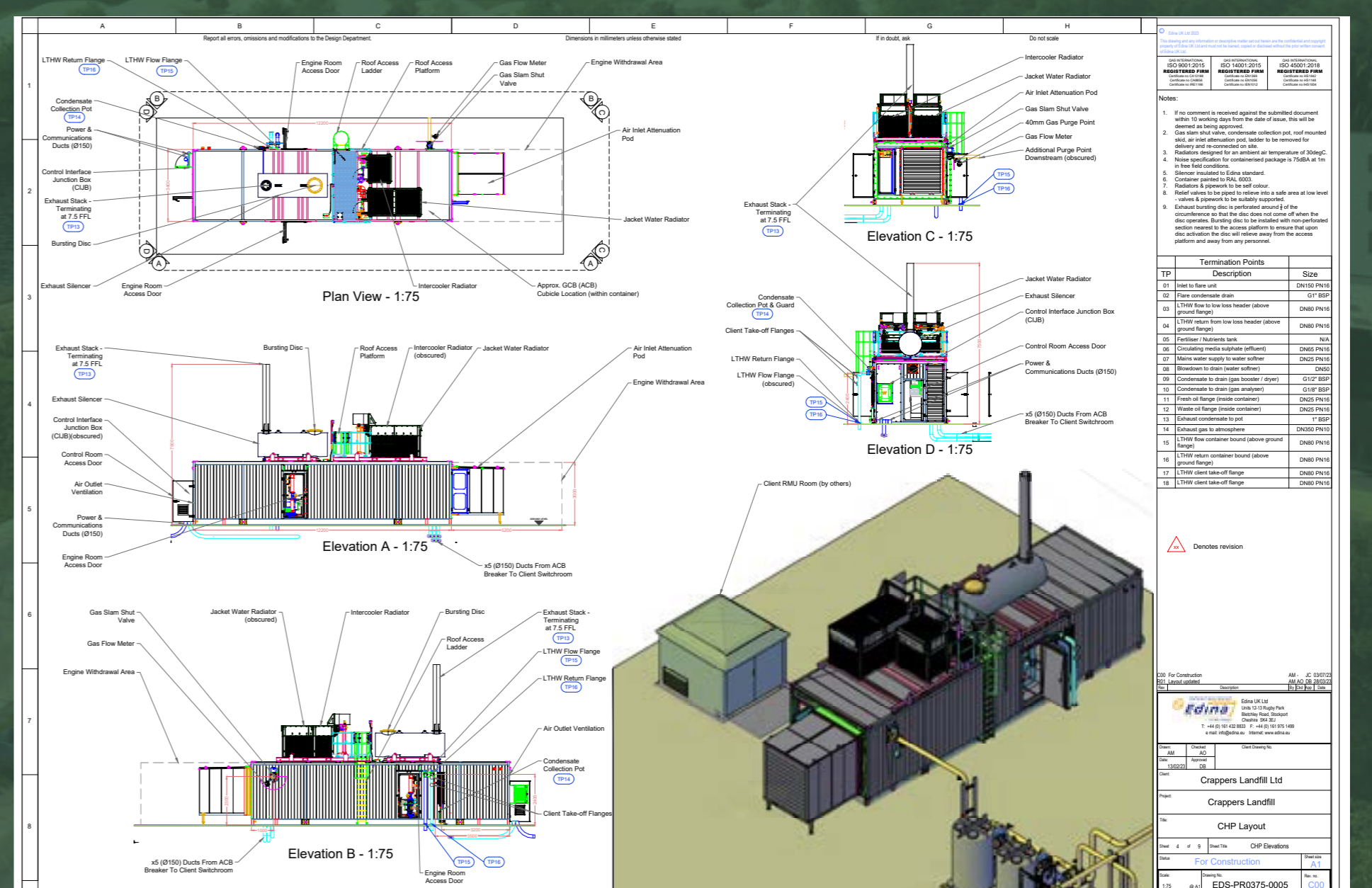
Is it safe to use methane from landfill to generate clean energy?

Yes. As part of the methane gas to clean energy process, pollutants will be removed from the landfill gas. Hydrogen sulphate will pass through a biological treatment tower where microbes will break it down. CO₂ will be captured and used in the greenhouses to regulate the speed of growth and ripening of produce.

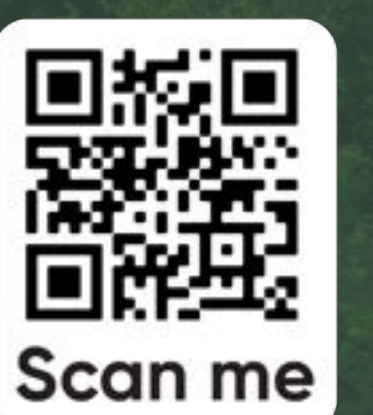


How much CO₂ will the greenhouses consume?

The inflatable, positively pressured greenhouses will each be 800 sqm. Each greenhouse is capable of consuming 58 tonnes of CO₂ a year through photosynthesis. Plant leaves pull in carbon dioxide alongside water, using the energy of the sun to convert this into chemical compounds such as sugars that feed plants. Oxygen is produced and released as a by-product of this process, helping to make the Super-Midden process climate friendly.



Methane Gas generator plant design drawings



sustain

How much light will the greenhouses produce?

Mitigation measures will be put into place to minimise the prospect of light pollution. This will be enhanced by the fact that the greenhouses will be recessed into the land using an extensive raised bund/embankment built around the site to shield it from Wootton Bassett, the motorway and the railway. This will be planted with native varieties of trees which will link with the existing woodland to form a green corridor of indigenous woodland, further enhancing the natural environment.

How many greenhouses can be built on the current site?

The Brinkworth Road site has the potential to house 56,000 m² of positively pressured inflatable greenhouses.

How long will it take before the greenhouses can be operational?

Before the first greenhouses can become fully operational, the energy from landfill gas plant will need to be built on site. This is a straightforward and well-practiced process. Once built, it is anticipated that the first trial greenhouse will be fully operational within 6 months. This will be operated for 12 months to perfect the design, before construction of the first phase of 20 units begins. The completion of these will see the first community supplies delivered in 2026.



CGI views of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



How long will it take for all the greenhouses to be in operation?

As live landfill cells come to the end of their fillable life, these will be capped and a plateau built above them on which the greenhouses will be situated. The cells will be tapped for methane gas, which will be processed, cleaned and used to power gas engines to generate electricity. CO₂ from the process will be captured and used to accelerate photosynthesis, plant growth and ripening within the positively pressured greenhouses.

We anticipate that it will take 10-15 years before all the greenhouses are in full operation at the Brinkworth Road site.

Why are the greenhouses designed to be flexible?

Due to the nature of capped landfill sites, which constantly move due to the production and release of gas, alongside the natural settling process of the content within landfill cells, flexible, positively pressured greenhouses are necessary. These adjust to the changing lie of the land and prevent the ingress of pests, disease and any external pollutants, including landfill gas.

Ultimate Limit State results

Axial Load and reaction

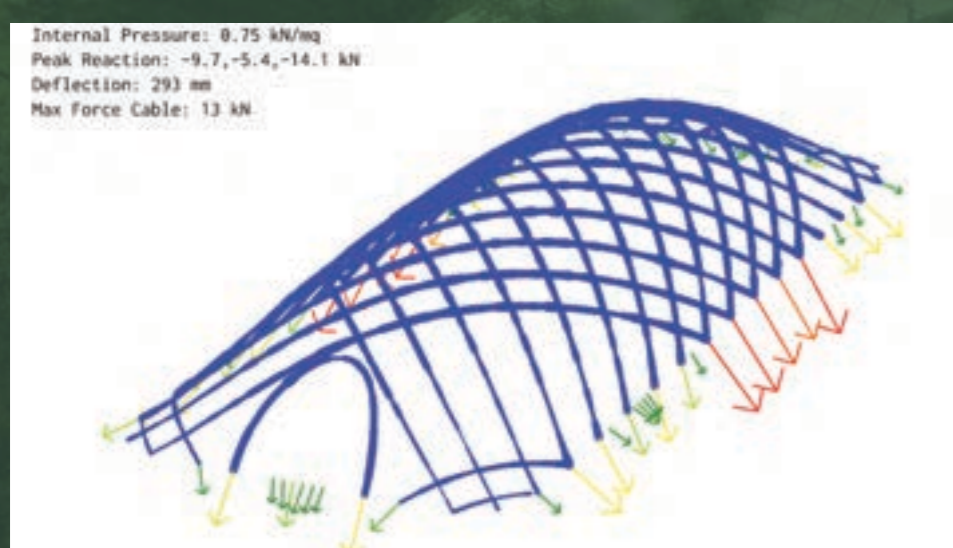


Figure 12. Self-weight and internal pressure 1.0Gk + 1.5Pk

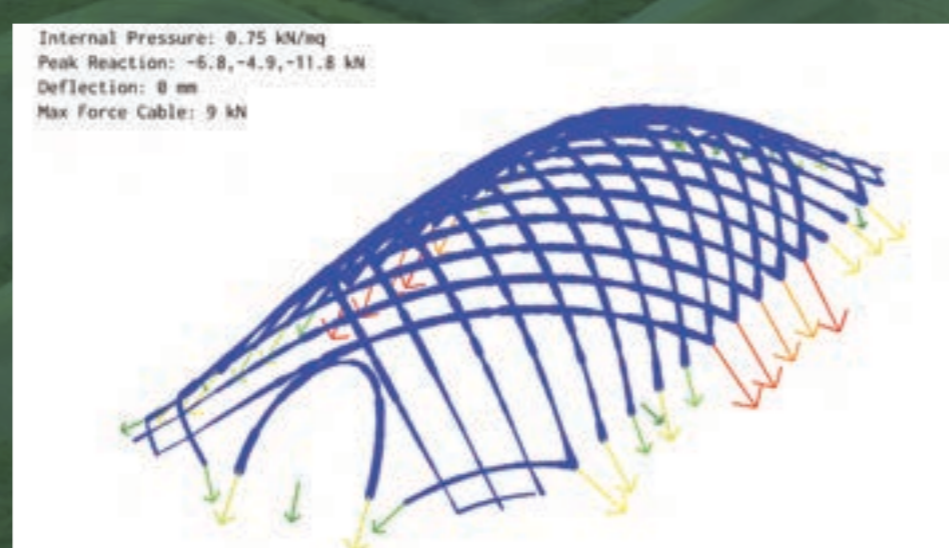


Figure 13. Self-weight, internal pressure and wind in Y direction 1.0Gk + 1.5Pk + 1.5W_y,k

Format

Greenhouse prototype
Structural Engineering Final Stage 3 Report
Serviceability Limit state results

A conventional measurement of deflection arising from a defined variable load is less applicable to the inflated greenhouse membrane.

In this instance we have chosen a maximum allowable value (250mm in any one resultant direction) and then increased the internal pressure until the structure achieves that value under a 1:50 return period wind load. This then equates to a design value of 0.45kN/m² of internal pressure.

Deflection due to temperature movement. This is moderated by a pressure sensitive valve in the membrane. See earlier description.

Deflection under wind loads + internal pressure

Surface Area: 933 mq
Cable Length: 800 m
n° Panels: 191
Internal Pressure: 0.5 kN/mq
Peak Reaction: -6.6, -4, -13.1 kN
Deflection: 218 mm
Max Force Cable: 10 kN

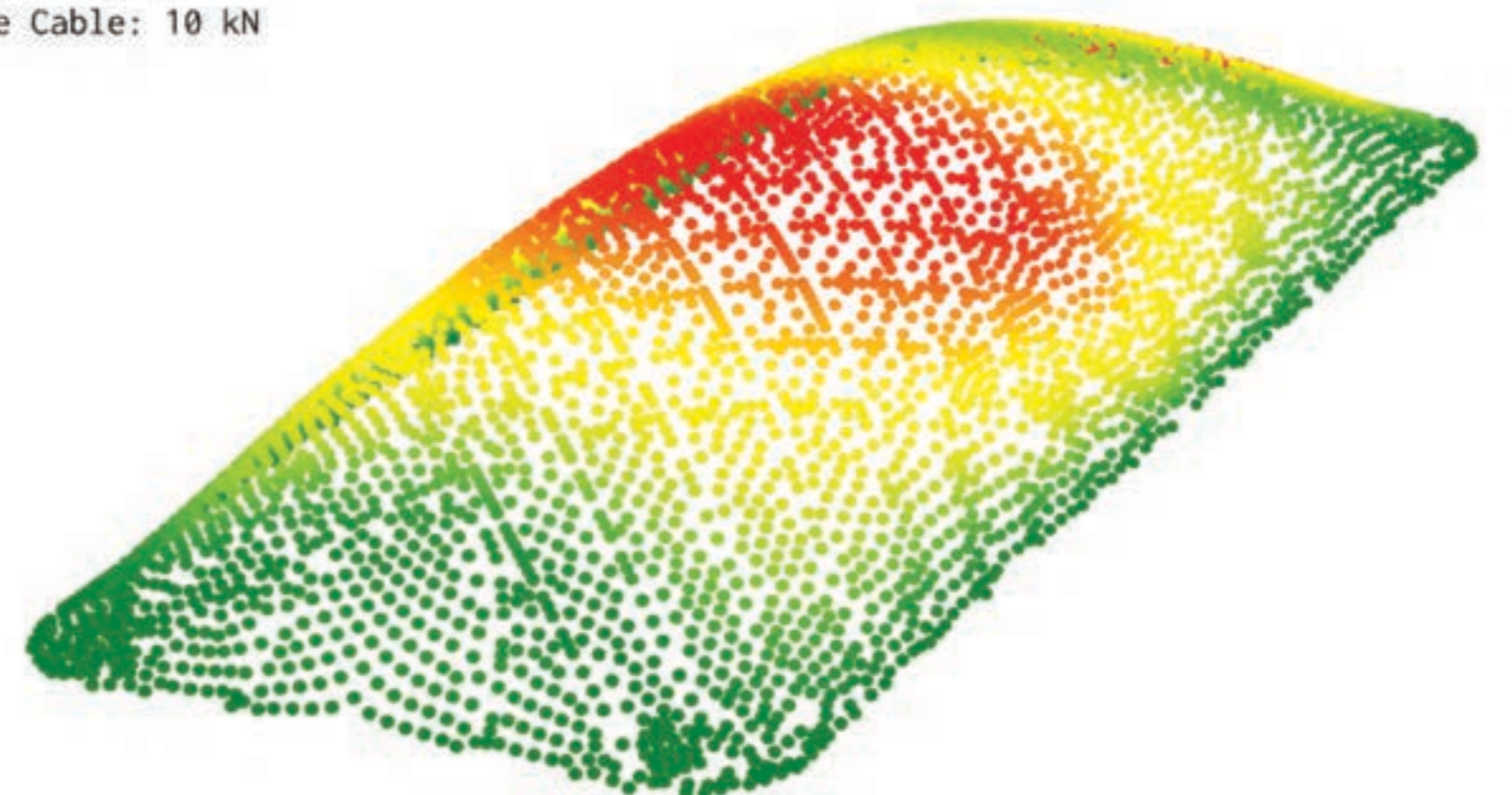


Figure 9. Self-weight, internal pressure and wind in +X direction 1.0Gk + 1.0Pk + 1.0W_x,k

Surface Area: 933 mq
Cable Length: 800 m
n° Panels: 191
Internal Pressure: 0.5 kN/mq
Peak Reaction: -7.2, -4.5, -13.3 kN
Deflection: 220 mm
Max Force Cable: 9 kN

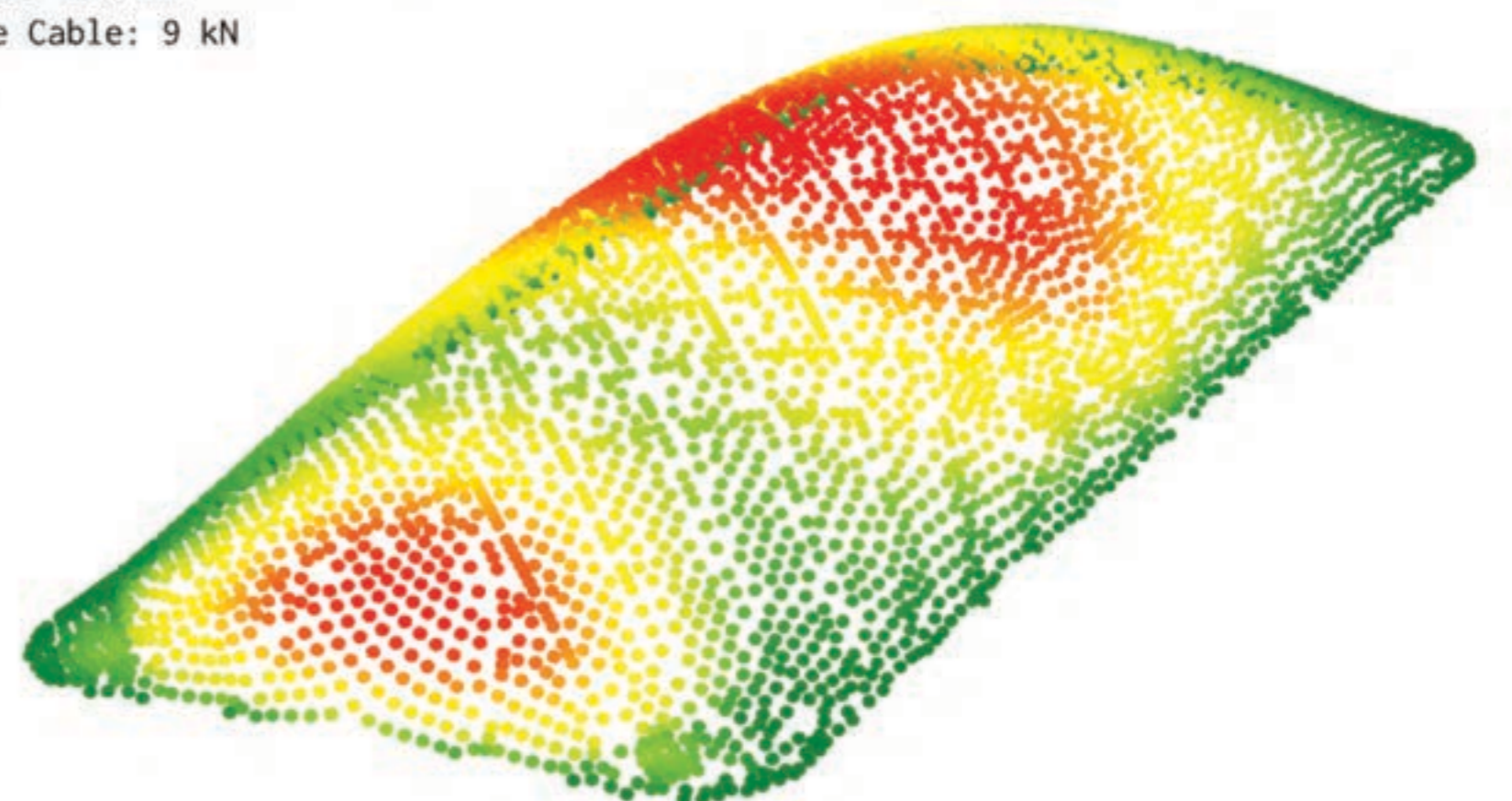


Figure 10. Self-weight, internal pressure and wind in -X direction 1.0Gk + 1.0Pk - 1.0W_x,k

Surface Area: 933 mq
Cable Length: 800 m
n° Panels: 191
Internal Pressure: 0.5 kN/mq
Peak Reaction: -6.4, -3.8, -9.4 kN
Deflection: 252 mm
Max Force Cable: 9 kN

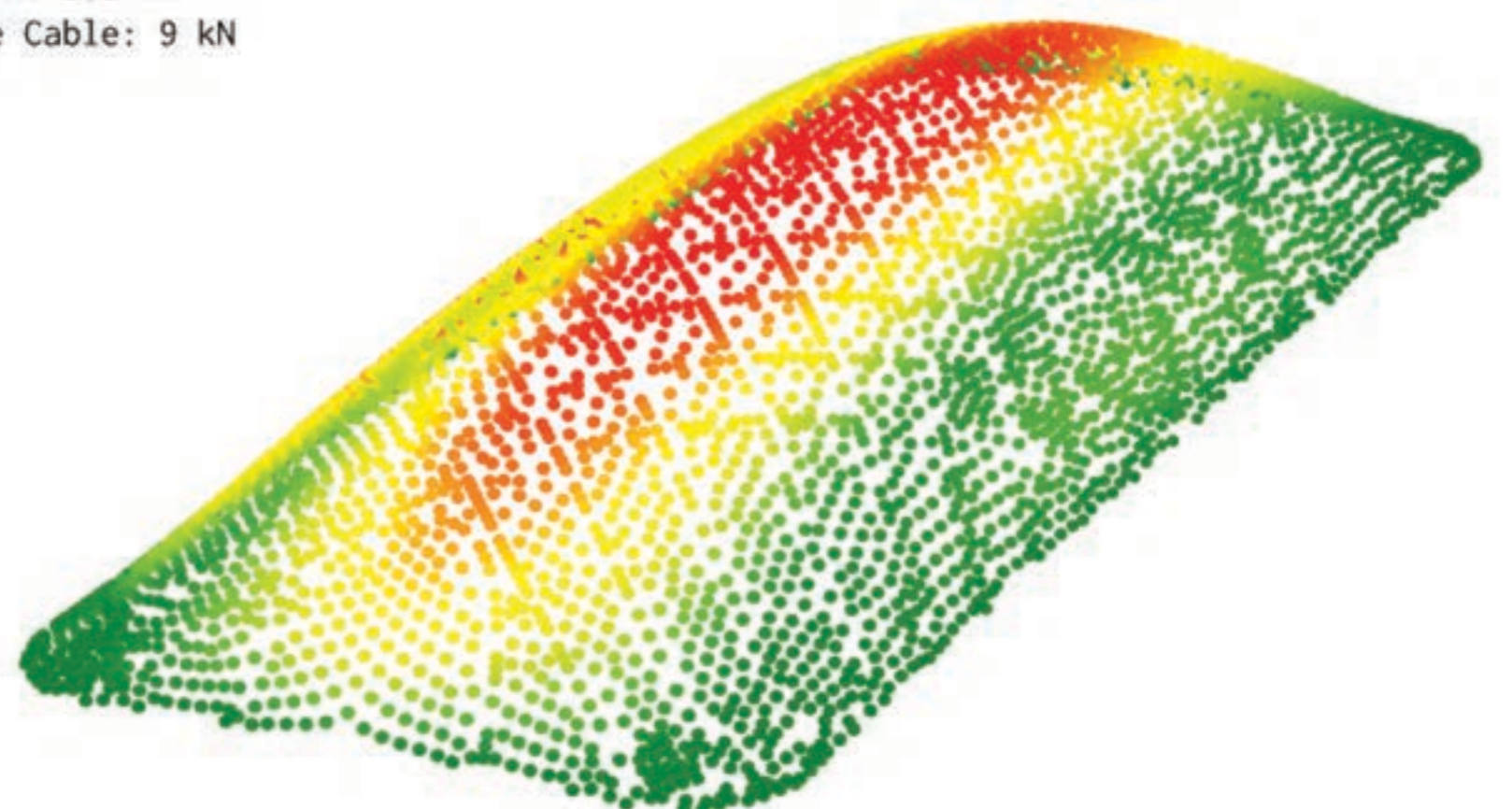


Figure 11. Self-weight, internal pressure and wind in Y direction 1.0Gk + 1.0Pk - 1.0W_y,k



Scan me

sustain

Will the greenhouses at the Brinkworth Road site be organic?

By adopting pressurised greenhouses there will be no need for pesticides, allowing for an organic approach to the production of fruit and vegetables.

This is achieved by constantly pumping a mix of filtered CO₂ and air into the greenhouses, keeping contaminants and disease out. Airlock doors ensure that no unwanted insects or pollen can enter, helping to ensure biosecurity. Beehives will be kept in the greenhouses to promote pollination.

The resulting honey will be available to the local community.

What else can be harvested from landfills?

Leachate from landfill can be harvested. This is high in phosphates and can be refined into fertiliser, providing a sustainable fertiliser alternative.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

How will the Sustain repurposing of landfill sites benefit the environment?

Each year, the current landfill site at Brinkworth Road, Royal Wootton Bassett, produces up to 2.6 million cubic meters of methane gas. This is burnt off using a flare system to prevent a build-up of gas within the commercial and industrial waste landfill cells. This is the equivalent to 3,800 tonnes of CO₂ being released into the atmosphere each year. By using this gas to power engines and generate electricity, CO₂ that is produced can be fed into the inflatable greenhouses.

What other measures are being implemented to enhance the environment?

A new lagoon and reed bed will be added to the site to enhance wildlife. This will be used to balance runoff. Water capture will also be used in the greenhouses, and artificial wetlands will be utilised to both store water and enhance biodiversity. An extensive bund will be added around the site to shield it from Wootton Bassett, the motorway and the railway. This will be planted with native varieties of trees which will link the existing woodland to form a green corridor of indigenous woodland, further enhancing biodiversity on site.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

How will spare energy produced on site be used?

Spare energy from the methane gas engines, alongside electricity generated by the energy from waste plant, will be provided to support green industrial development and recycling.

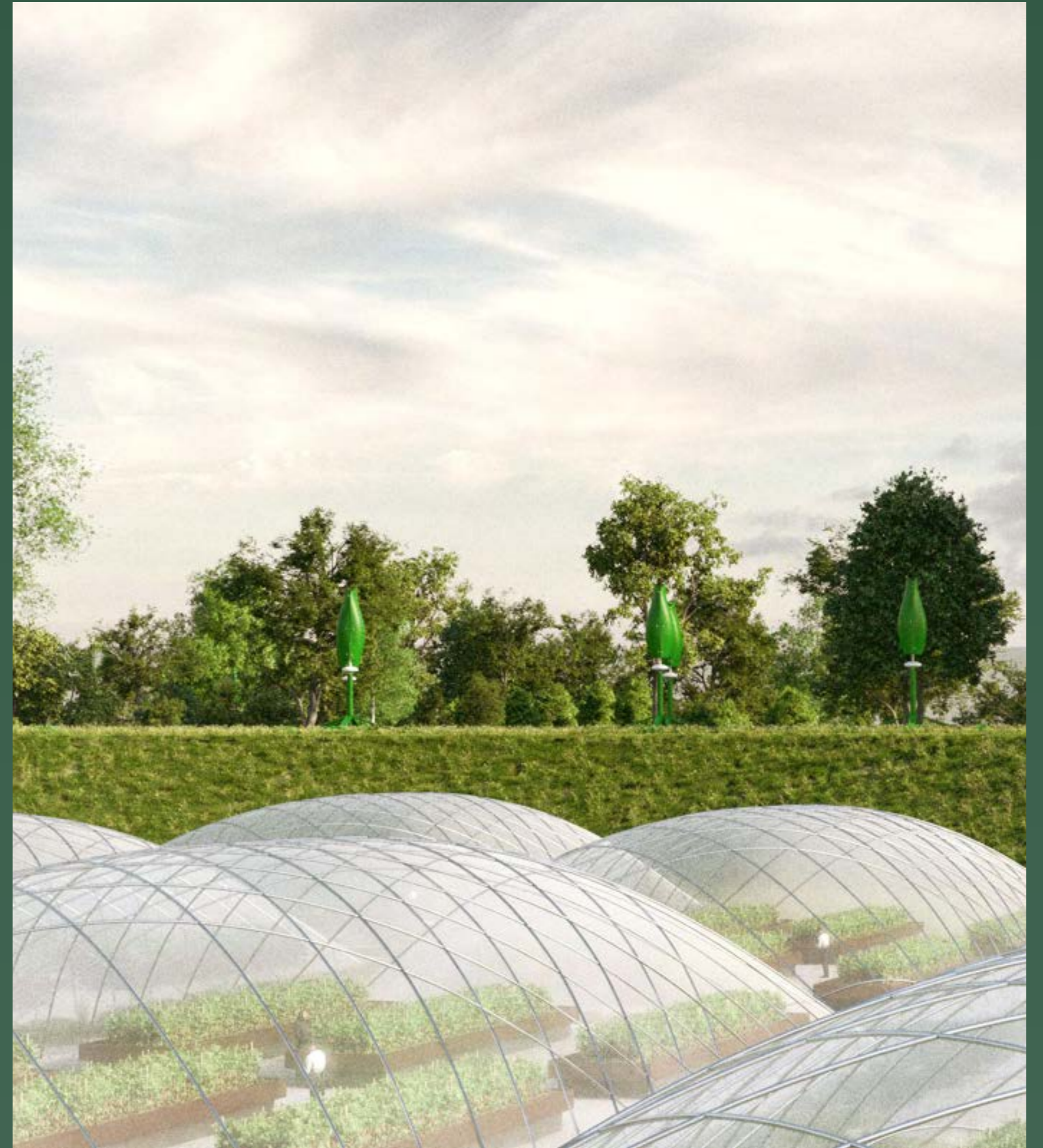
How significant is the Sustain Super-Midden solution?

If successful, Sustain's solution to rethinking, repurposing and reusing landfill sites could be used to change the way that landfill operations are run nationwide, transforming them to become one of the most climate-friendly methods of waste disposal, based on the concept of the Sustain Super-Midden.

Through the production of fruit and vegetables at a lower cost than the supermarkets, Sustain also has a part to play in both alleviating food shortages and addressing the cost-of-living crisis, while also providing affordable heat and power to make this possible.

Will the Sustain Super-Midden create new jobs?

Yes. It is estimated that the Sustain Super-Midden energy, heating and green super food production centre will create up to 130 new jobs.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

How will the existing landfill site be transformed in order to make the concept work?

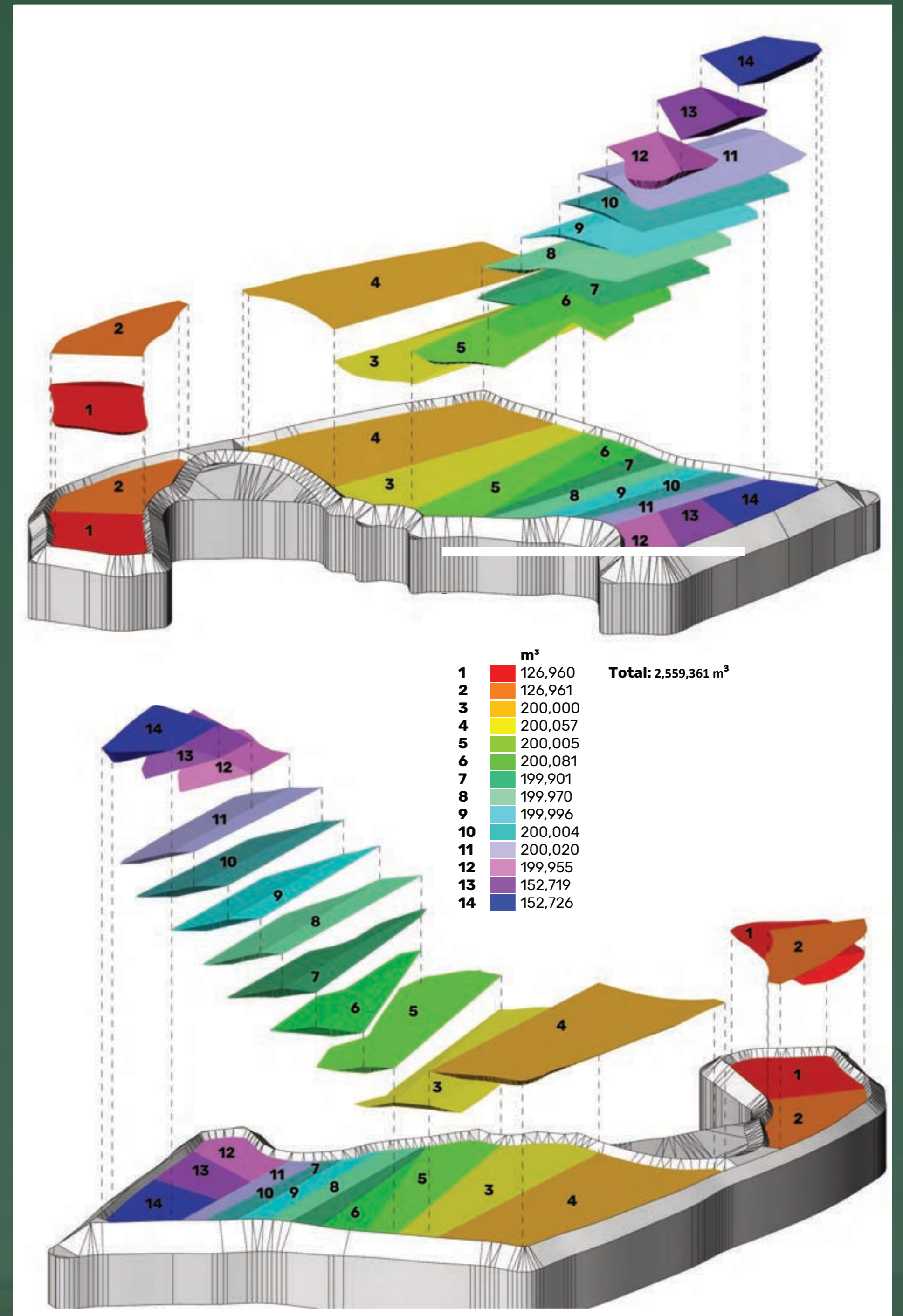
The existing landfill site will need to be modified in order to create the level "plateau" on which the greenhouses will be sited. The existing landfill cells will continue to be filled and capped off, and the land will be sculpted to create protective earth bunds around the perimeter.

New landfill cells will also be excavated and capped off to extend the capacity of the site to accommodate the volume of waste disposal that will be required over the next 10-15 Years.

Landscaping

As the bunds created around the edge they will be planted with hundreds of native species trees, which will be planted on the earth banks to provide visual screening and wind protection - as well as providing the other well understood benefits of extensive woodland planting - Capturing atmospheric CO2 and creating Oxygen, also providing valuable ecological habitat enhancement.

The bunds alongside the M4 Motorway will also offer an opportunity to trial innovative low impact "tulip" wind turbines, positioned within the tree planting.



Landfill cell capacity calculation



Innovative "Tulip" wind turbines can be installed with minimal foundations



sustain

Community Landfill Trust

Crapper & Sons Landfill Ltd and Community First have continued to work together to provide essential funding to community projects within Wiltshire. As a predominantly rural county, this funding has made a difference to people's lives; in particular, through the provision of amenities which encourage social and sporting activities closer to where people live.

The scope of the type of projects has widened, and rather than just funding sports complexes, we are now funding Community Halls, Play equipment and Arts and Heritage projects. In 2022, due to a decrease in Landfill Tax, Crapper & Sons decided to only fund projects within Royal Wootton Bassett. However, within a couple of months this decision was reversed and projects within 10 miles of the Crapper & Sons Landfill Site were again, invited to apply.



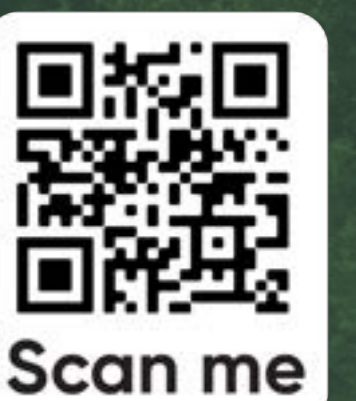
Previous Projects Funded



Wroughton Pump Track



Royal Wootton Bassett Rugby Club



sustain

Previous Projects Funded



Blunsdon Community Shop



Cricklade Rugby Club



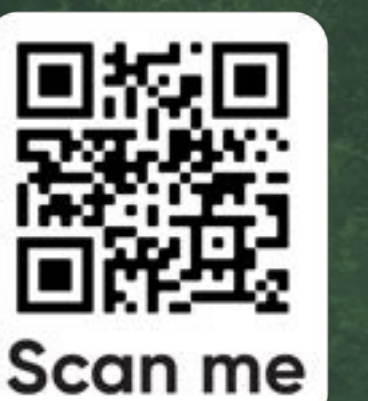
Royal Wootton Bassett Sports Association



Community Landfill Trust 2022 - 2023 Funding

	£
Avebury Sports and Social Club	£11,500.00
FC Calne - Borehole	£15,540.00
Little Somerford PC	£758.00
RWBSA - Landscaping	£24,175.75
Stratton St Margaret PC	£12,000.00
Ashbury Village Hall	£7,194.00
Hilmarton Jubilee Play Area	£16,000.00
Oaksey Village Hall Solar Panels	£10,000.00
RWBSA - LED Floodlighting	£26,578.00
Cricklade Develop. Foundation	£25,000.00
Dauntsey PC Play Area	£10,000.00
Swindon Cricket Club	£15,000.00
Avebury Cricket Club	£20,000.00
Total	£193,745.75

COMMUNITY
FIRST



sustain

What is Sustain?

Sustain is a new initiative founded by Crapper and Sons Landfill Ltd, a family run business that has been providing landfill and sustainable solutions to its local communities for over 40 years.

Based on the outskirts of Wootton Bassett, Sustain aligns with the core values of Crapper and Sons Landfill Ltd, which is committed to recycling, reusing and repurposing.

Sustain's mission is to have positive impact on communities and places. Its goals are to deliver sustainable food, energy, employment and living to its local community.

What is the Sustain Initiative proposing?

The foundation stone of the Sustain is a radical new approach to the repurposing and reuse of landfill sites to create cheap energy and heat, as well as green food super production centres for local communities through its Super-Midden solution.

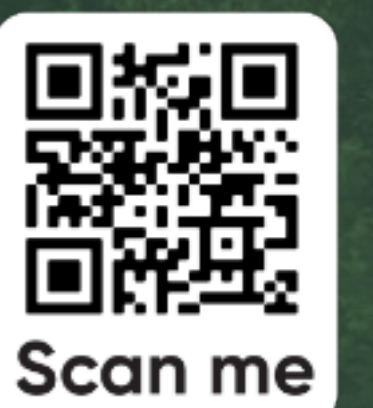


Masterplan Drawing. ©Designscape Architects

Section through the site illustrating landfill, and greenhouses with protective bunds around the site..

©Designscape Architects Ltd.

www.sustainwiltshire.co.uk



sustain

What is the Sustain Super-Midden?

Based on the concept of the ancient midden where waste, including animal dung, would be piled outside homes to break down, providing heat, material to burn and composted biomass, the Sustain Super Midden is designed to turn landfill sites into energy, heat, food, and fertiliser generating centres for the benefit of the local community.

This is made possible through Sustain's plans to locate positively pressured greenhouses on the surface of sealed landfill cells, using heat and energy produced on site to enable just-in-time, demand-based, year-round fruit and vegetable production.

How is year-round fruit and vegetable production possible?

Methane gas produced from within the sealed landfill cells is currently collected and safely burnt off. Under the proposed plans, this gas will be used to power engines to generate electricity and heat. Combined with heat extracted from the landfill site, and power from the on-site energy from waste plant, the positively pressured, inflatable greenhouses will be kept at a perfect growing temperature for horticulture throughout the seasons.

CO₂ produced as a by-product of the energy from methane gas process, will be fed directly into the flexible greenhouses to enhance and control the rich growing environment. Aided by low-impact ultraviolet horticultural light to extend the growing season, multi-cropping and year-round harvesting of everything from lettuce to avocados will be possible.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

Will food grown on a landfill be safe to eat?

Yes. The flexible, positively pressured greenhouses have been specifically designed to be biosecure and are fully encapsulated.

These will be located on securely sealed landfill cells. These cells are capped by 1/2m of inert material, then 2m of compressed clay, creating an impermeable lining. In addition to this, a topsoil compost mix is added to provide weather protection for the clay armour.

Within the greenhouses, all plants will be grown in raised beds on tables, using soils and compost introduced to the greenhouses, or hydroponics systems. Combined with the encapsulated structure of the greenhouse, which is totally impenetrable, plants cannot come into contact with the exterior surface of the landfill cells. This results in a safe, secure and rich growing environment within the greenhouses.

Additionally, thanks to integrated airlock doors and a constant flow of filtered CO₂ and air, any unwanted insects, disease, pollen, pollutants, and contaminants, including any traces of landfill gas, are kept out. This helps to ensure plant health and biosecurity without the need for pesticides, allowing for an organic approach to the production of fresh fruit and vegetables, aided by beehives that will be kept in the greenhouses to promote pollination.

How will you meet demand for fruit and vegetables locally?

Sustain's circular solution will see its greenhouses produce just-in-time, demand-based fruit and vegetables using advanced modelling technology to manage planting, levels of heat, light and CO₂.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.

www.sustainwiltshire.co.uk



sustain

How will the fruit and vegetables be delivered?

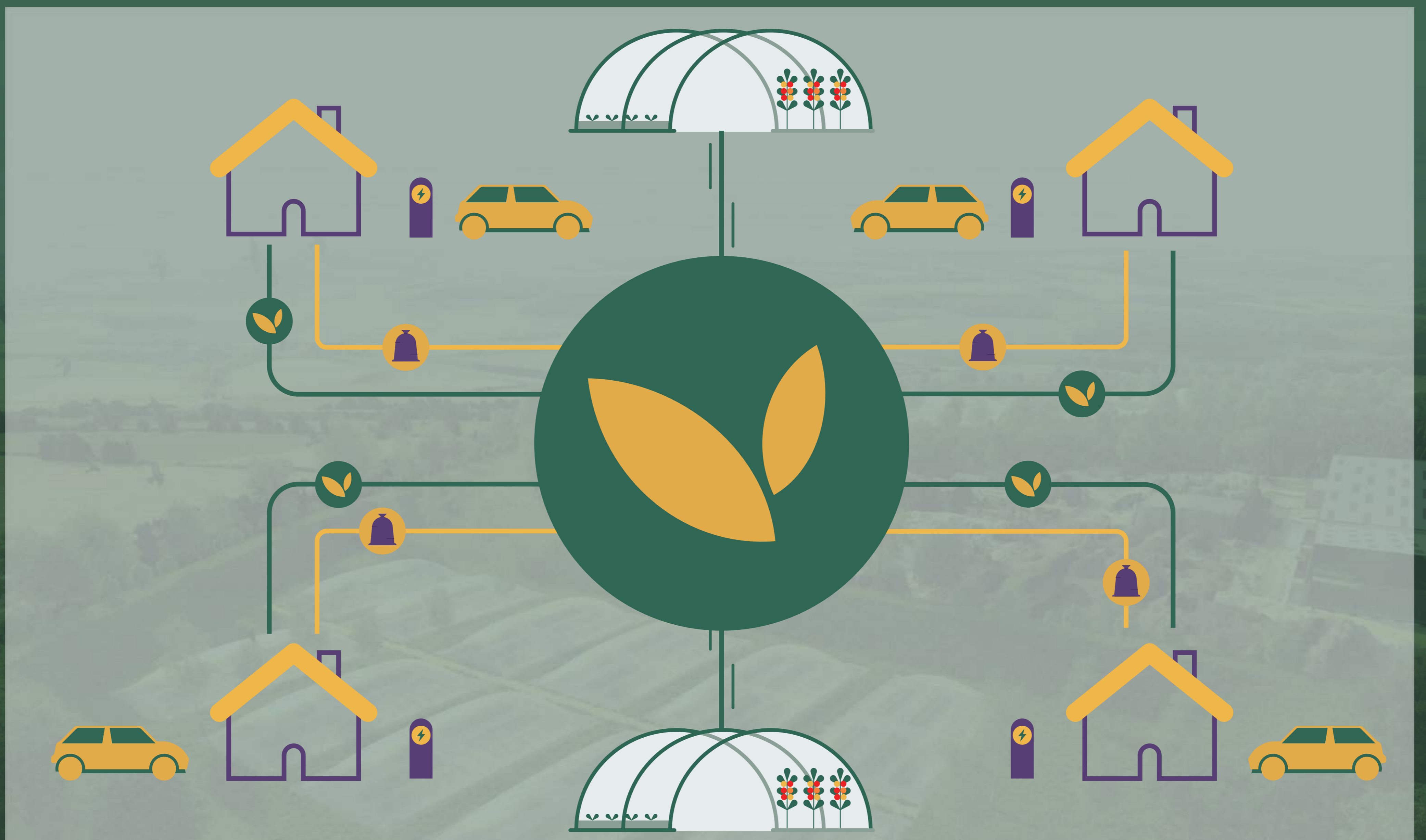
Using the Sustain Super-Midden landfill centre as a distribution hub, just-in-time food will be delivered daily to order, to the doorstep, reducing food miles at the same time as removing the need for large storage and warehousing operations. This approach will enable cheaper and more sustainable fruit and vegetables to be produced than can be provided by the supermarkets.

In time, these deliveries could also include dairy products and meat from local farmers, helping to provide healthy food from local sources, supporting local producers.

How much food will the greenhouses produce?

Projections show that each greenhouse will be capable of producing 10 tonnes of fruit and vegetables year-round. These will be planted and harvested on a just-in-time basis using advanced modelling technology to manage planting, levels of heat, light and CO₂ to accelerate or slow the growing process. Based on our modelling, the greenhouses have the potential to provide 80% of all fruit and vegetable requirements for the communities of Wootton Bassett, Brinkworth, Malmesbury and Purton.

Waste is transformed into energy, heat and CO₂ which is used to produce fruit and vegetables in the greenhouses for the community.....Spare energy can be used in the local community



sustain

How do you know that the positively pressured greenhouses will work?

Sustain has received planning permission for a 40m x 20m prototype inflated greenhouse, which will be constructed and tested as proof of concept. Each greenhouse is kept rigid through the use of positive pressure and an airlock door that keeps out unwanted insects and pollen. Air pumped in is filtered, regulated, and CO₂ increased or reduced to regulate the speed of growth and ripening within the greenhouse.

This ground-breaking solution is based on a combination of technologies that have been tried and tested previously, but not in this way. Pressurised structures, for example, are well proven, making it possible to create environmental conditions inside the greenhouses that repel insects and pests so that they cannot affect germination or plant growth inside the greenhouses.

CO₂ enrichment in greenhouses is also well practised. This allows crops to meet their photosynthesis potential. Conventionally, enriching air with CO₂ can be achieved by means of the combustion of natural gas or through the use of liquid CO₂. Sustain's Super-Midden solution produces CO₂ as a by-product of its methane to energy process.

The use of extra carbon dioxide to increase the yield of greenhouse crops is widely used in horticulture. The amount of carbon dioxide in the outside air is typically 350 parts per million. This amount is sufficient for plants to grow, however when placing many plants together in a greenhouse, the carbon dioxide levels drop. This is because plants are using carbon dioxide for photosynthesis. By adding CO₂ (CO₂ enrichment), it is possible to increase the photosynthesis potential of the crops, especially on sunny days. CO₂ made as a by-product of the power from methane gas will be used to enhance growing



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.

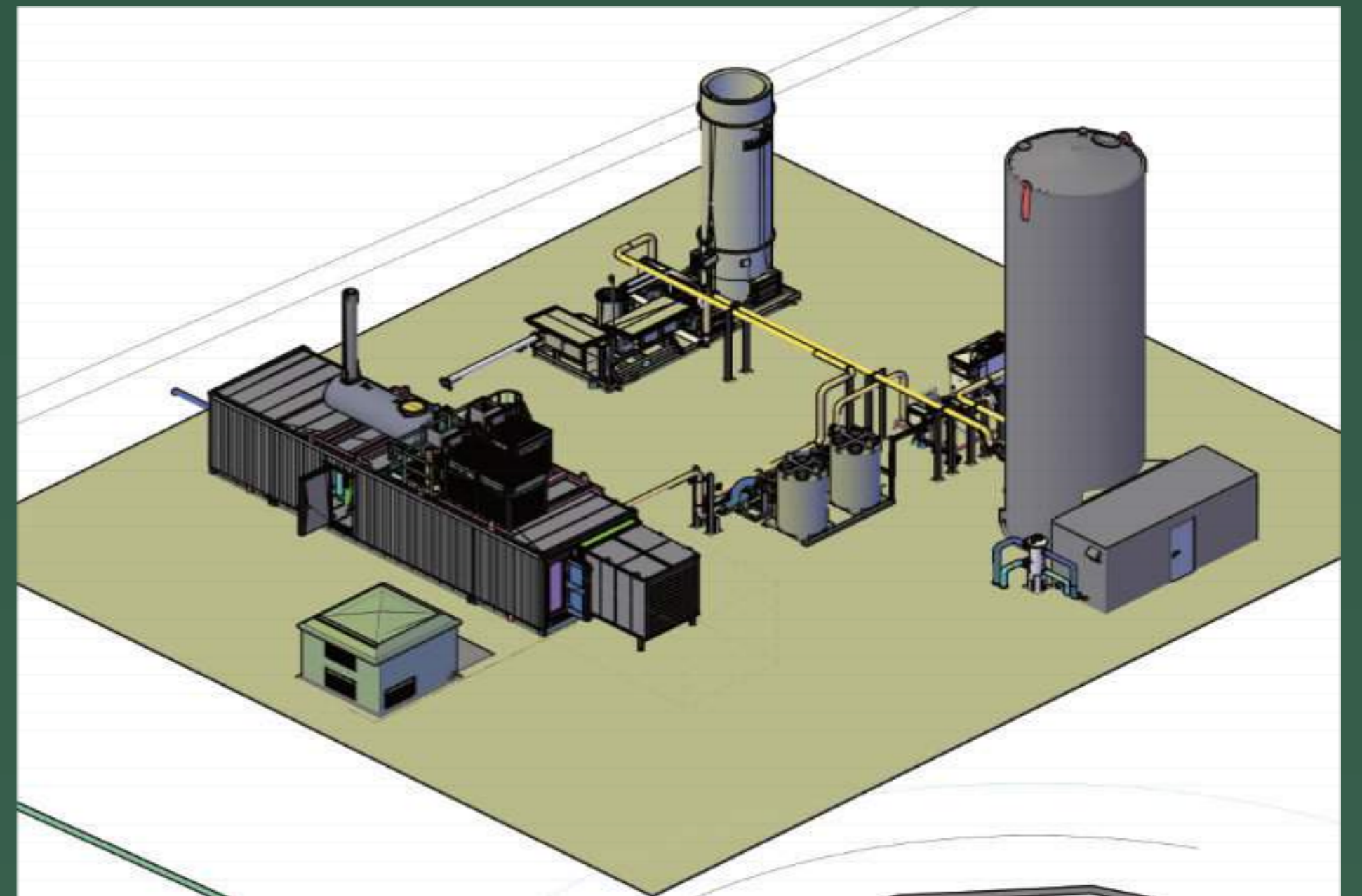
conditions within the positively pressured greenhouses at the Brinkworth Road site.

Energy from landfill gas is a well proven process which is used internationally. In 2021 energy from landfill gas produced to 3,313 gigawatt hours of electricity in the UK.



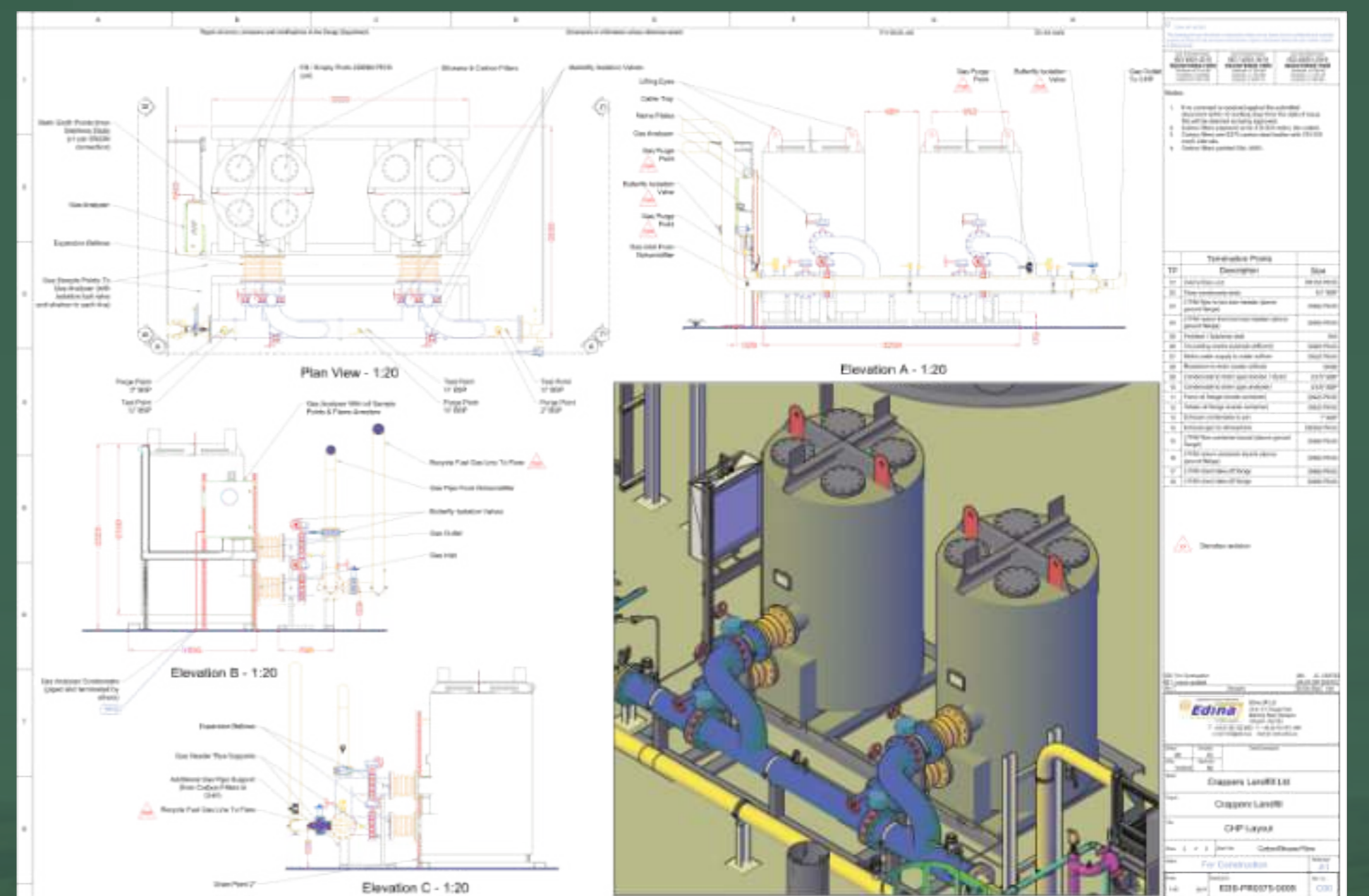
How does energy from landfill methane work?

Landfill gas is primarily composed of methane CH₄, CO₂ and H₂S. Through a series of wells placed within the landfill, gases from waste decomposition are collected and piped to a central location where it is cleaned by removing the H₂S and used to fuel a Combined Heat and Power Gas Engine. CO₂ will be collected from the engine exhausts, cleaned, and will be stored to be used in the greenhouses, where the process of photosynthesis will turn CO₂ into oxygen.



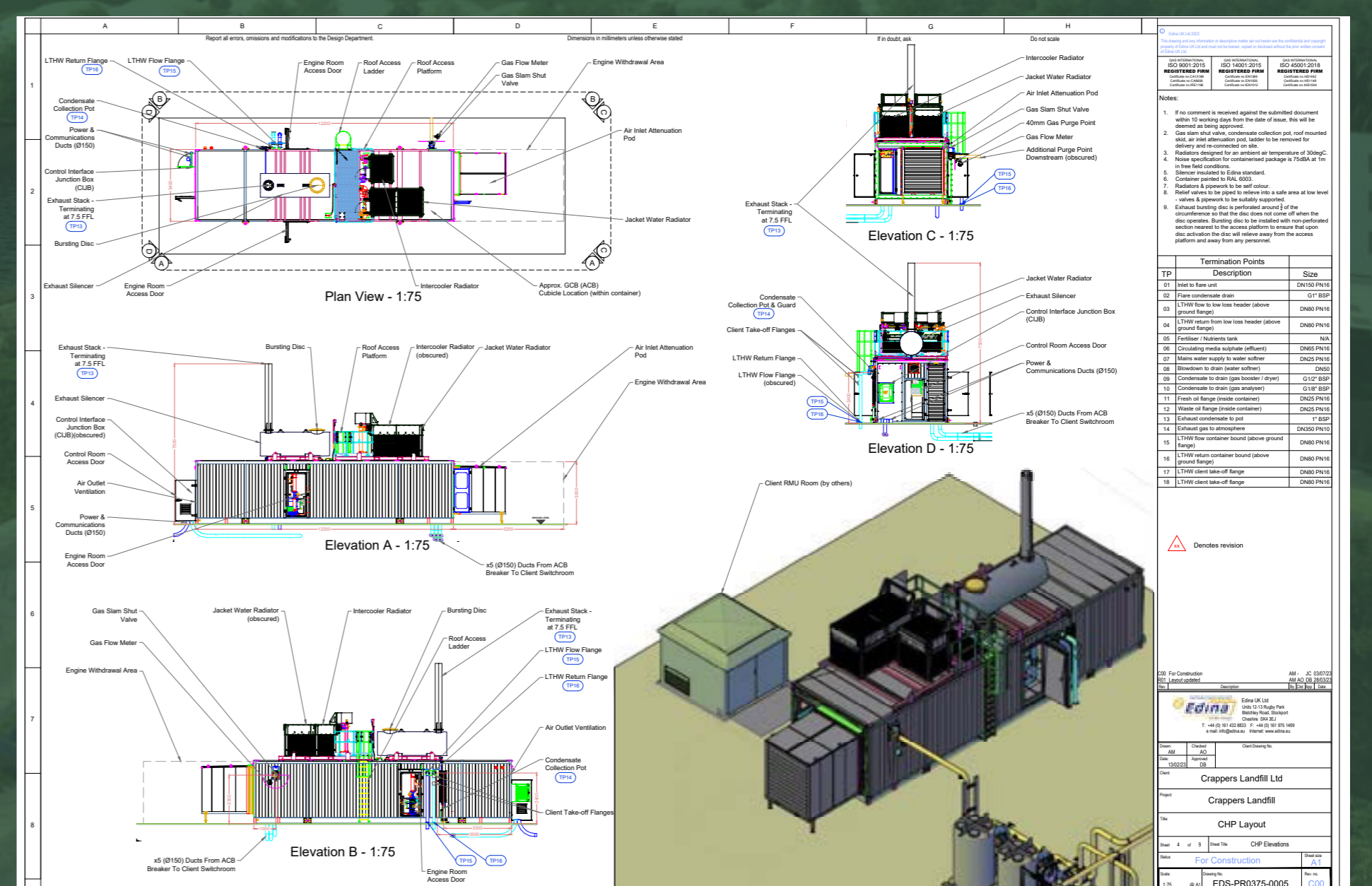
Is it safe to use methane from landfill to generate clean energy?

Yes. As part of the methane gas to clean energy process, pollutants will be removed from the landfill gas. Hydrogen sulphate will pass through a biological treatment tower where microbes will break it down. CO₂ will be captured and used in the greenhouses to regulate the speed of growth and ripening of produce.

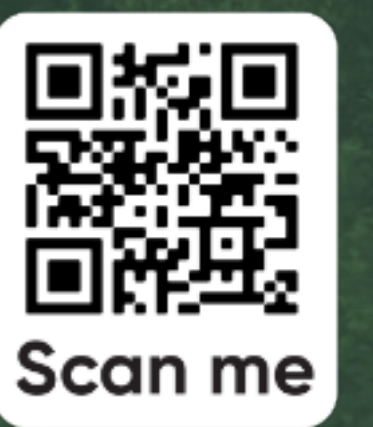


How much CO₂ will the greenhouses consume?

The inflatable, positively pressured greenhouses will each be 800 sqm. Each greenhouse is capable of consuming 58 tonnes of CO₂ a year through photosynthesis. Plant leaves pull in carbon dioxide alongside water, using the energy of the sun to convert this into chemical compounds such as sugars that feed plants. Oxygen is produced and released as a by-product of this process, helping to make the Super-Midden process climate friendly.



Methane Gas generator plant design drawings



How much light will the greenhouses produce?

Mitigation measures will be put into place to minimise the prospect of light pollution. This will be enhanced by the fact that the greenhouses will be recessed into the land using an extensive raised bund/embankment built around the site to shield it from Wootton Bassett, the motorway and the railway. This will be planted with native varieties of trees which will link with the existing woodland to form a green corridor of indigenous woodland, further enhancing the natural environment.

How many greenhouses can be built on the current site?

The Brinkworth Road site has the potential to house 56,000 m² of positively pressured inflatable greenhouses.

How long will it take before the greenhouses can be operational?

Before the first greenhouses can become fully operational, the energy from landfill gas plant will need to be built on site. This is a straightforward and well-practiced process. Once built, it is anticipated that the first trial greenhouse will be fully operational within 6 months. This will be operated for 12 months to perfect the design, before construction of the first phase of 20 units begins. The completion of these will see the first community supplies delivered in 2026.



CGI views of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



How long will it take for all the greenhouses to be in operation?

As live landfill cells come to the end of their fillable life, these will be capped and a plateau built above them on which the greenhouses will be situated. The cells will be tapped for methane gas, which will be processed, cleaned and used to power gas engines to generate electricity. CO₂ from the process will be captured and used to accelerate photosynthesis, plant growth and ripening within the positively pressured greenhouses.

We anticipate that it will take 10-15 years before all the greenhouses are in full operation at the Brinkworth Road site.

Why are the greenhouses designed to be flexible?

Due to the nature of capped landfill sites, which constantly move due to the production and release of gas, alongside the natural settling process of the content within landfill cells, flexible, positively pressured greenhouses are necessary. These adjust to the changing lie of the land and prevent the ingress of pests, disease and any external pollutants, including landfill gas.

Ultimate Limit State results

Axial Load and reaction

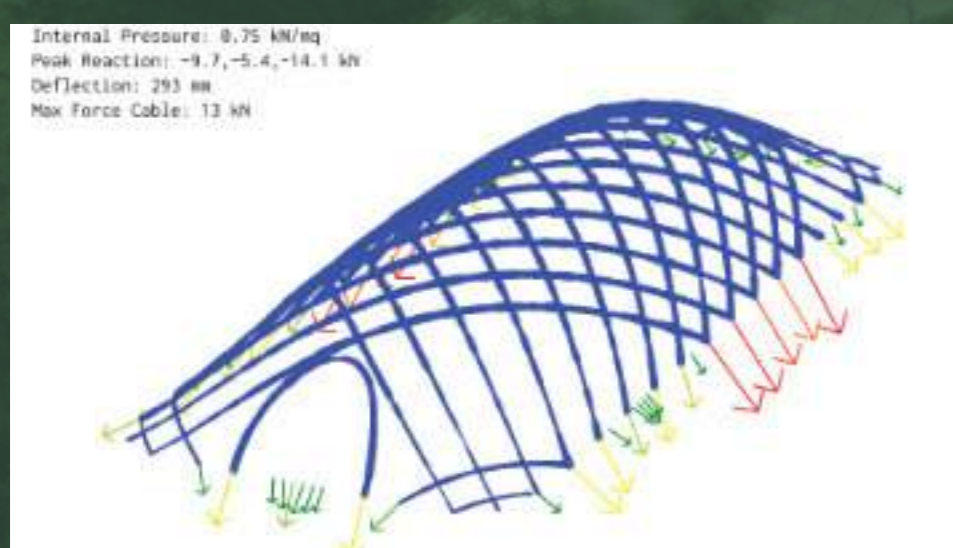


Figure 12. Self-weight and internal pressure 1.0Gk + 1.5Pk

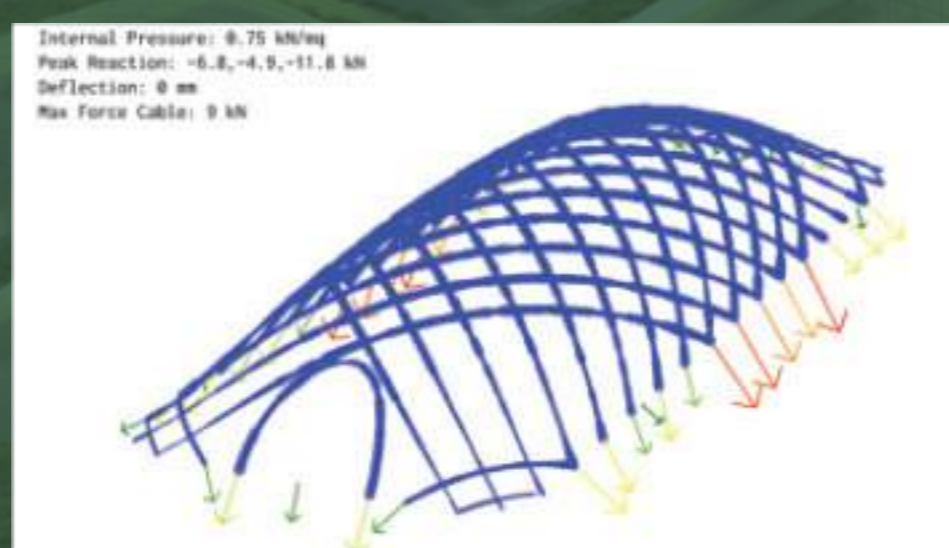


Figure 13. Self-weight, internal pressure and wind in Y direction 1.0Gk + 1.5Pk + 1.5W_y,k

Format

Greenhouse prototype
Structural Engineering Final Stage 3 Report
Serviceability Limit state results

A conventional measurement of deflection arising from a defined variable load is less applicable to the inflated greenhouse membrane.

In this instance we have chosen a maximum allowable value (250mm in any one resultant direction) and then increased the internal pressure until the structure achieves that value under a 1:50 return period wind load. This then equates to a design value of 0.45kN/m² of internal pressure.

Deflection due to temperature movement. This is moderated by a pressure sensitive valve in the membrane. See earlier description.

Deflection under wind loads + internal pressure

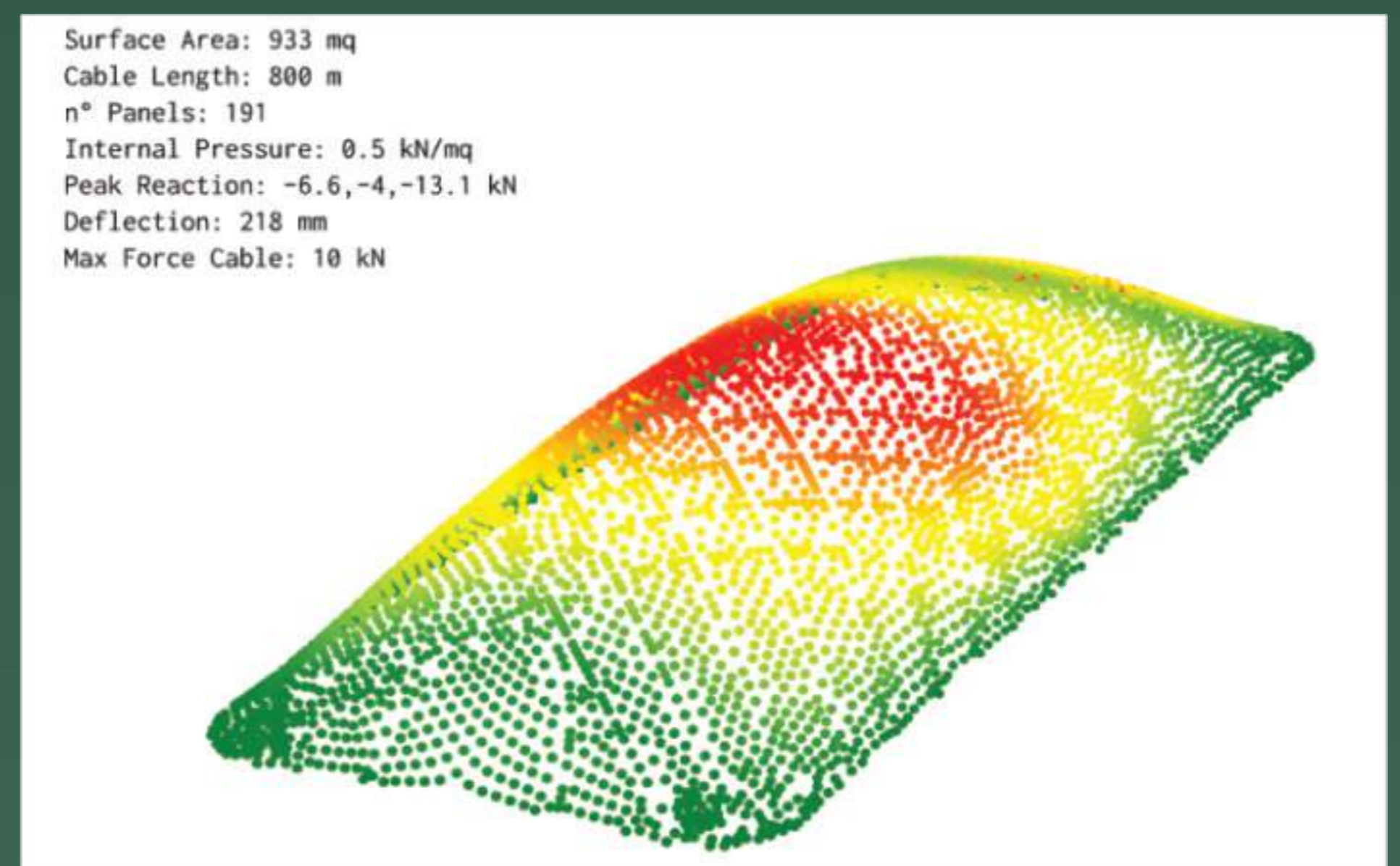


Figure 9. Self-weight, internal pressure and wind in +X direction 1.0Gk + 1.0Pk + 1.0W_x,k

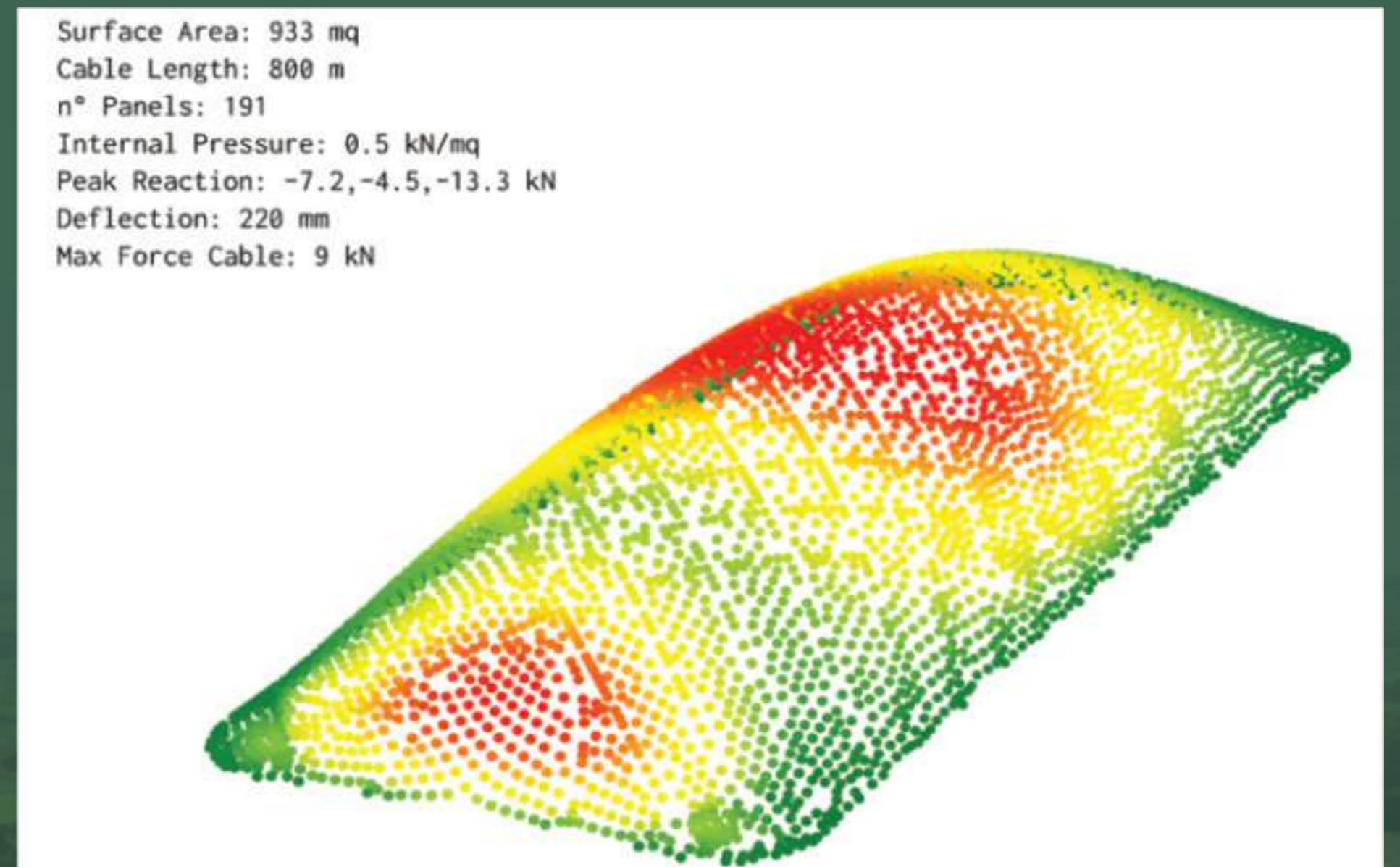


Figure 10. Self-weight, internal pressure and wind in -X direction 1.0Gk + 1.0Pk - 1.0W_x,k

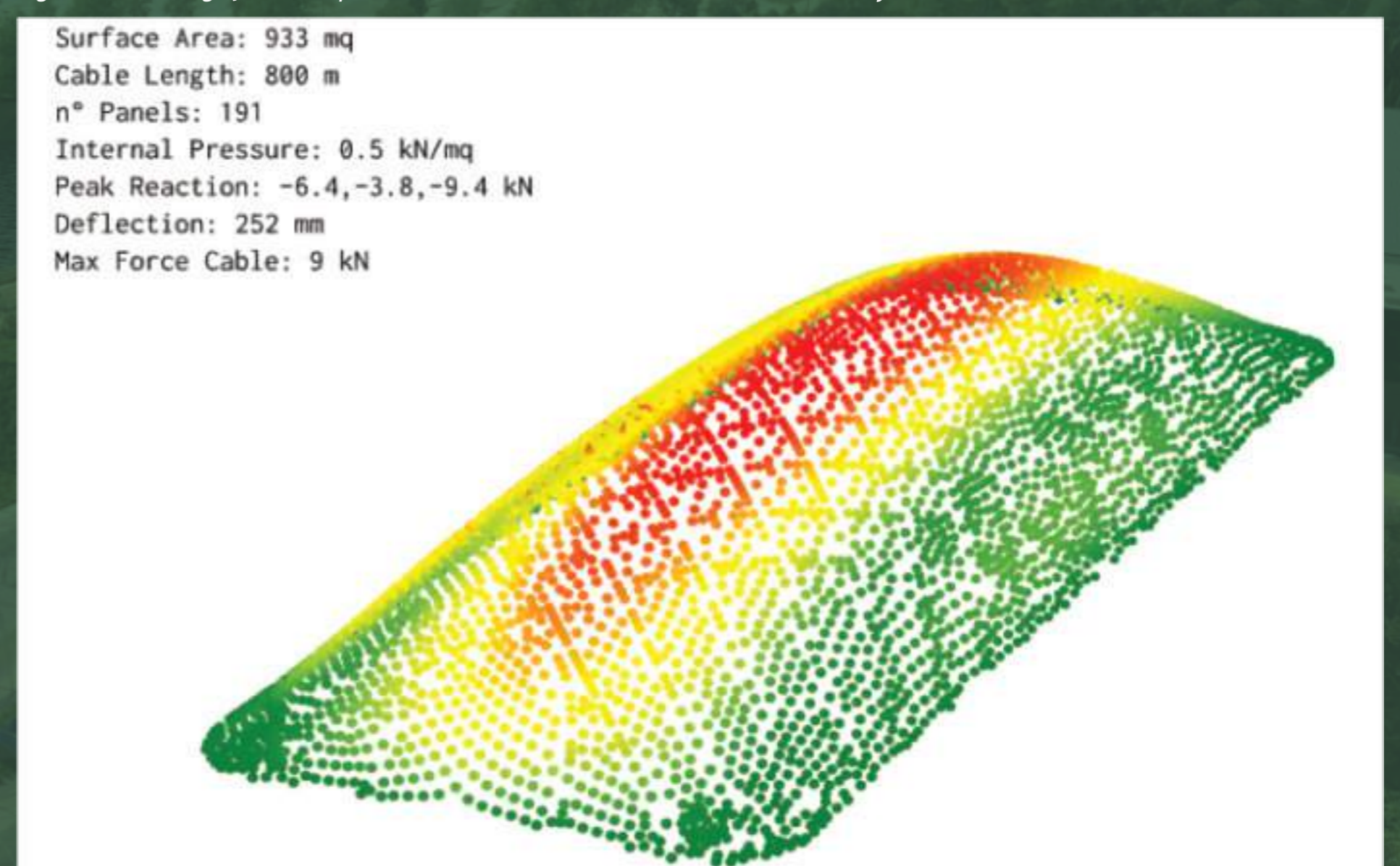


Figure 11. Self-weight, internal pressure and wind in Y direction 1.0Gk + 1.0Pk - 1.0W_y,k



Scan me

sustain

Will the greenhouses at the Brinkworth Road site be organic?

By adopting pressurised greenhouses there will be no need for pesticides, allowing for an organic approach to the production of fruit and vegetables.

This is achieved by constantly pumping a mix of filtered CO₂ and air into the greenhouses, keeping contaminants and disease out. Airlock doors ensure that no unwanted insects or pollen can enter, helping to ensure biosecurity. Beehives will be kept in the greenhouses to promote pollination.

The resulting honey will be available to the local community.

What else can be harvested from landfills?

Leachate from landfill can be harvested. This is high in phosphates and can be refined into fertiliser, providing a sustainable fertiliser alternative.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

How will the Sustain repurposing of landfill sites benefit the environment?

Each year, the current landfill site at Brinkworth Road, Royal Wootton Bassett, produces up to 2.6 million cubic meters of methane gas. This is burnt off using a flare system to prevent a build-up of gas within the commercial and industrial waste landfill cells. This is the equivalent to 3,800 tonnes of CO₂ being released into the atmosphere each year. By using this gas to power engines and generate electricity, CO₂ that is produced can be fed into the inflatable greenhouses.

What other measures are being implemented to enhance the environment?

A new lagoon and reed bed will be added to the site to enhance wildlife. This will be used to balance runoff. Water capture will also be used in the greenhouses, and artificial wetlands will be utilised to both store water and enhance biodiversity. An extensive bund will be added around the site to shield it from Wootton Bassett, the motorway and the railway. This will be planted with native varieties of trees which will link the existing woodland to form a green corridor of indigenous woodland, further enhancing biodiversity on site.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



sustain

How will spare energy produced on site be used?

Spare energy from the methane gas engines, alongside electricity generated by the energy from waste plant, will be provided to support green industrial development and recycling.

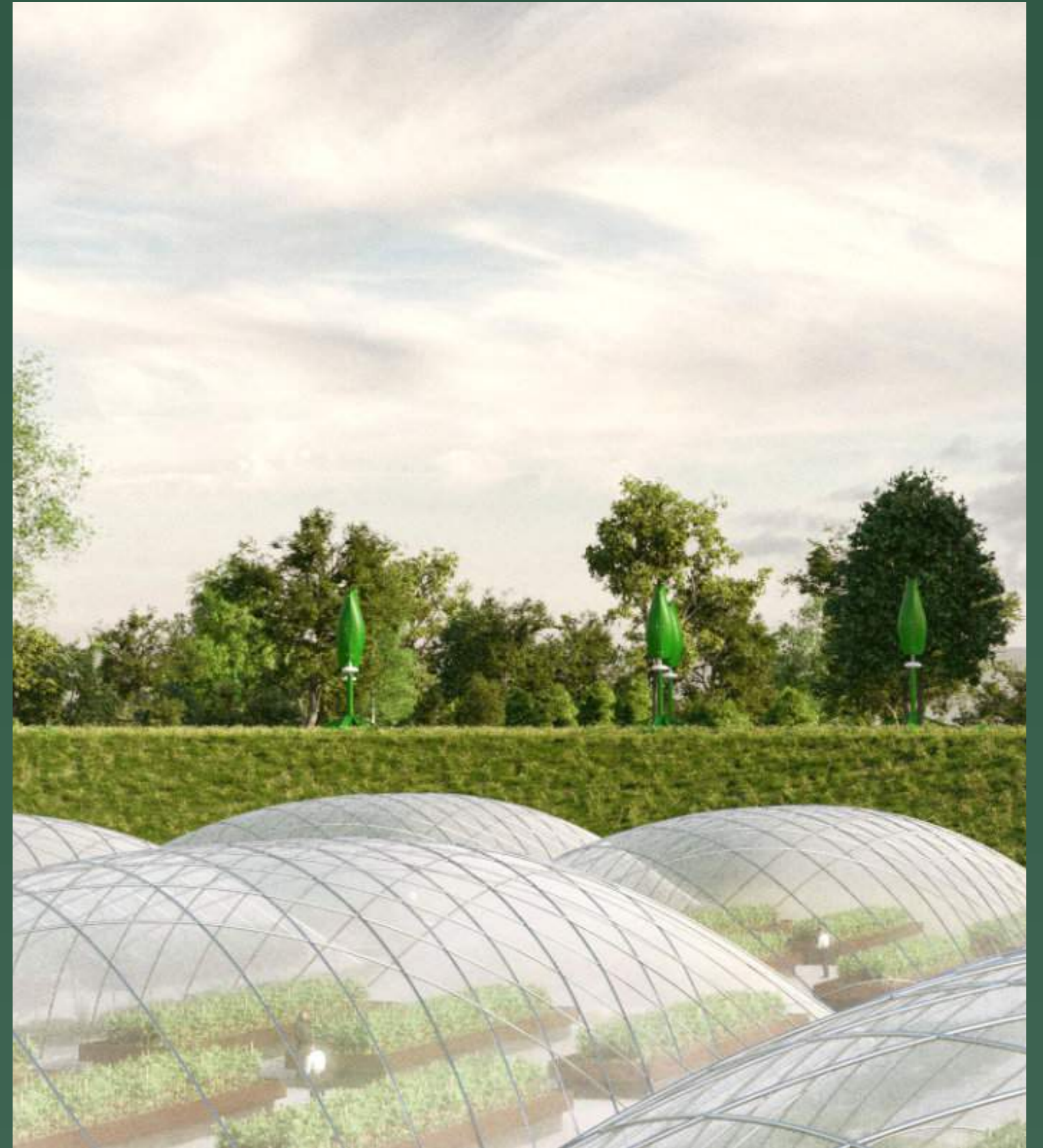
How significant is the Sustain Super-Midden solution?

If successful, Sustain's solution to rethinking, repurposing and reusing landfill sites could be used to change the way that landfill operations are run nationwide, transforming them to become one of the most climate-friendly methods of waste disposal, based on the concept of the Sustain Super-Midden.

Through the production of fruit and vegetables at a lower cost than the supermarkets, Sustain also has a part to play in both alleviating food shortages and addressing the cost-of-living crisis, while also providing affordable heat and power to make this possible.

Will the Sustain Super-Midden create new jobs?

Yes. It is estimated that the Sustain Super-Midden energy, heating and green super food production centre will create up to 130 new jobs.



CGI view of the proposed greenhouses and landscaping. ©Designscape Architects Ltd.



How will the existing landfill site be transformed in order to make the concept work?

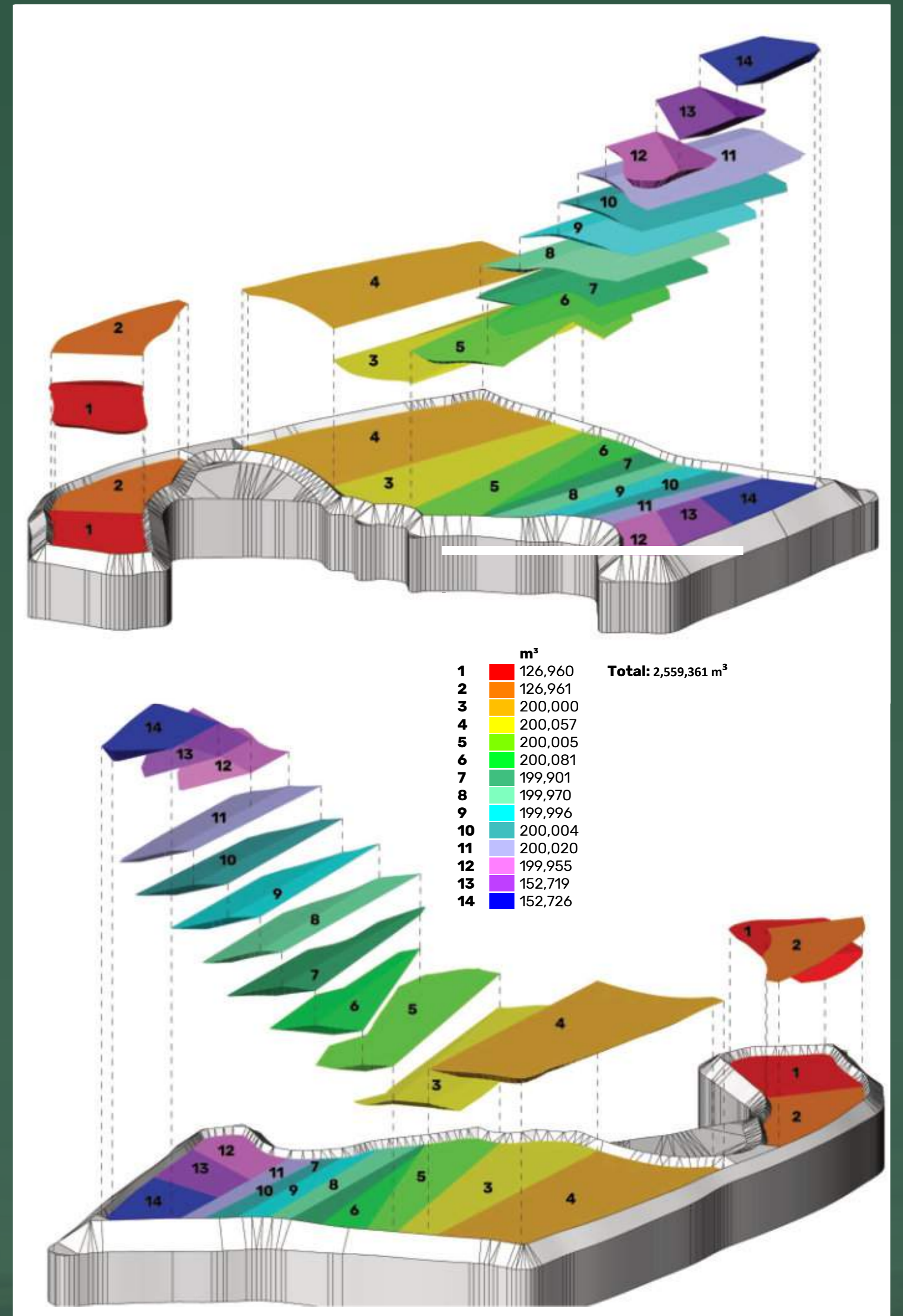
The existing landfill site will need to be modified in order to create the level "plateau" on which the greenhouses will be sited. The existing landfill cells will continue to be filled and capped off, and the land will be sculpted to create protective earth bunds around the perimeter.

New landfill cells will also be excavated and capped off to extend the capacity of the site to accommodate the volume of waste disposal that will be required over the next 10-15 Years.

Landscaping

As the bunds created around the edge they will be planted with hundreds of native species trees, which will be planted on the earth banks to provide visual screening and wind protection - as well as providing the other well understood benefits of extensive woodland planting - Capturing atmospheric CO2 and creating Oxygen, also providing valuable ecological habitat enhancement.

The bunds alongside the M4 Motorway will also offer an opportunity to trial innovative low impact "tulip" wind turbines, positioned within the tree planting.



Landfill cell capacity calculation



Innovative "Tulip" wind turbines can be installed with minimal foundations



sustain

Community Landfill Trust

Crapper & Sons Landfill Ltd and Community First have continued to work together to provide essential funding to community projects within Wiltshire. As a predominantly rural county, this funding has made a difference to people's lives; in particular, through the provision of amenities which encourage social and sporting activities closer to where people live.

The scope of the type of projects has widened, and rather than just funding sports complexes, we are now funding Community Halls, Play equipment and Arts and Heritage projects. In 2022, due to a decrease in Landfill Tax, Crapper & Sons decided to only fund projects within Royal Wootton Bassett. However, within a couple of months this decision was reversed and projects within 10 miles of the Crapper & Sons Landfill Site were again, invited to apply.



Previous Projects Funded



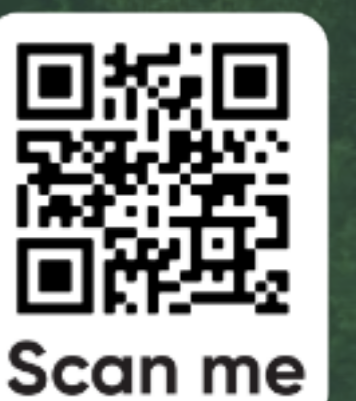
Wroughton Pump Track



Royal Wootton Bassett Rugby Club



www.sustainwiltshire.co.uk



sustain

Previous Projects Funded



Blunsdon Community Shop



Cricklade Rugby Club



Royal Wootton Bassett Sports Association



Community Landfill Trust 2022 - 2023 Funding

	£
Avebury Sports and Social Club	£11,500.00
FC Calne - Borehole	£15,540.00
Little Somerford PC	£758.00
RWBSA - Landscaping	£24,175.75
Stratton St Margaret PC	£12,000.00
Ashbury Village Hall	£7,194.00
Hilmarton Jubilee Play Area	£16,000.00
Oaksey Village Hall Solar Panels	£10,000.00
RWBSA - LED Floodlighting	£26,578.00
Cricklade Develop. Foundation	£25,000.00
Dauntsey PC Play Area	£10,000.00
Swindon Cricket Club	£15,000.00
Avebury Cricket Club	£20,000.00
Total	£193,745.75

COMMUNITY
FIRST



www.sustainwiltshire.co.uk

