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Directors: M.R.Keogh,
MSc IPM BSc C Eng
MIStructE MIEI
MAPM
T Keogh Dip QA
Company Reg no
364114
Vat Reg No
IE 6384114N

*GB Office The Old Manor House
Charity Street Carlton Scroop Lincolnshire NG32 3AT*

81 Main Street,
Applewood Village,
Swords, Co Dublin,
K67 WV30 Ireland
Tel: +353 1 8957818
Fax: +353-1-8957819
Email:
Postmaster@Maceo.ie





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1. INTRODUCTION

JE Piccaver and Co (JEPCO) have been growing fresh leaf produce from its Lincolnshire base since 1946, providing a wide range of conventional and organic leaves and salad onions to the Manufacturing, Retail, Foodservice and Wholesale sectors.

Committed to continuous innovation, the business strives to find new methods in conventional and organic varietal development, as well as cutting edge technologies to ensure that Jepco as a business and the industry in general moves forward in a sustainable and reliable fashion.

It is this desire to innovate which led Jepco to the practice of Hydroponics or Working water which is a type of horticulture which involves growing plants without soil, by using mineral nutrient solutions in an aqueous solvent. Although commercialised in the last 20 years this is not new technology with the first known instance of water-based hydroponics being in the Hanging Gardens of Babylon.

When compared with traditional Farming, Dry Hydroponics is not only sustainable in its use of space, it is also efficient in its consumption of water, fertiliser, and energy. Coupled with a maximisation of production volume this ensures that both the physical and ecological footprint per crop are significantly reduced.

2. BACKGROUND

In 1946 Major John E Piccaver began farming in the abundantly fertile silt lands of South Lincolnshire. Joined by his son David in 1965 they embarked upon a mission to deliver exciting, vibrant and innovative products to an eager nation.

By 1988, J E Piccaver & Co (JEPCO) had become established as a pioneer in the production of salad leaf. Now run by the Major's grandson Stuart, innovation, stewardship and the desire to deliver fantastic produce remain firmly at the heart of the business.

Similar to the rest of the industry and society in general, the business is now at an important juncture in its development with an opportunity Hydroponics presents to positively contribute to addressing challenges of sustainable mega trends that include:

- Climate change
- Domestic food security,
- food miles
- Rural employment
- low-carbon energy availability.

In embracing Dry Hydroponics, the business is seeking to further evolve its activities to become more efficient and to optimise the resources that can be harvested from the fertile region.



Figure 1 Jepco Products

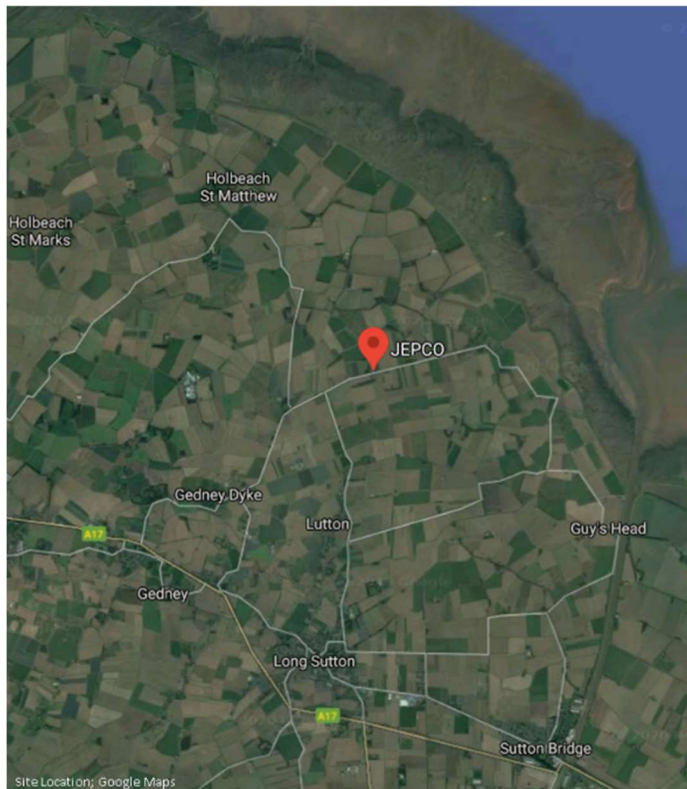
2.1 Existing Site

JEPKO occupies over 300 hectares of essentially flat and fertile land approximately 2.5km from the Lincolnshire coast and the Wash, an expansive protected area designated as a Special Area of Conservation, Special Protection Area and Site of Special Scientific Interest bordering the site to the North and East.

Due North on the coast is the military weapons range of RAF Holbeach, which also a designated low-flying area. Directly to the west of the site is an array of 6x 100m tall (to tip height) wind turbines and an associated weather monitoring mast. The Southern side of the site is bounded by similar Agricultural land.

The primary crops grown at the farm are green salad leaves the growing of which is currently undertaken predominately in open fields, to be harvested and packed within dedicated building infrastructure on Norfolk House Farm. Growing currently occurs throughout the year, with yield fluctuation dependent on weather patterns.

In addition to its dedication to excellence in the production of fresh quality salad. Jepco takes very seriously its stewardship responsibilities towards the environment. To this end Jepco has dedicated 127 acres to two schemes that include reed bed recreation, new woodlands, pollen and nectar mixes and buffer strips for watercourses, in efforts to maintain and improve the ecosystem



These managed areas provide a safe haven for a number of Red Listed birds, including the Cuckoo, Curlew, Mistle Thrush, Kingfisher, Yellow Hammer and Spotted Flycatcher; a number of breeding raptors and 35 owl boxes are found amongst the carefully managed woodlands.

Water is a scarce resource in the region, and JEPKO takes effort to maximise rain water capture and seeks to minimise consumption. By harvesting rainfall, employing seepage systems and developing cutting edge technologies, such as hydroponic growing, the impact on the environment is reduced.

Figure 2 Site Location.

The subject site of this particular planning permission is located to the east and adjoining the existing Norfolk Farm site and covers approximately 15 ha.

The site is currently in agricultural use and houses on its Western side one of a number of lagoons which are utilised as rainwater attenuation for storage in the growing processes. The site is bounded on the North, East and West by additional Jepco holdings and on its South by the Main Road. The site has always been in agricultural use, desk studies and previous project history indicate virgin farmland with no contamination and no archaeological significance.



Figure 3 Existing Site.

The harvested crop from the site is currently taken via the existing Jepco on site road network on the Norfolk House Farm site (annotated Jepco) on figure 3, where they are cut washed packed and dispatched onto the local road network.

3. SITE MASTERPLAN

JEPCO's ultimate development of the site shall consist of sustainable year round growing supported by renewable energy sources which will serve to contribute towards ongoing decarbonization of the UK grid and national target of achieving zero carbon emission by 2050.

Firstly in this endeavour, JEPCO is looking to expand growing yields at the Gedney Marsh farm using innovative and emerging agricultural technologies. It is planned that 10 hectares of land will be converted to enable undercover growing, within glasshouses and to support same with an integrated preparation, processing, storage and dispatch facility. This facility will minimise the time between harvesting and dispatch to enable the supply of high quality product to existing and prospective customers.

Secondly, in addition to the improved growing and processing JEPCO seek to harness the unique conditions for generating electricity from renewable sources which exist in Lincolnshire and the east of England.

Topographically, the local area is flat, at low elevation with very little variation. This results in consistent wind flow, regardless of the direction. The level topography also suits operation of ground-mounted solar photovoltaics (PV).

It is ultimately proposed that up to 3x 3.5MW wind turbines and about 5 to 8 MW of solar PV will be installed to provide electricity to the site, in addition onsite energy storage in the form of industrial-scale batteries will manage the anticipated surplus generation during daytime hours, and supplying this surplus back to the site when demand exceeds generation.

The storage capacity will, in conjunction with surplus generating capacity, supply the national electricity grid network with renewable energy through an upgraded electrical connection to the site.

4. PHASE 1 DEVELOPMENT

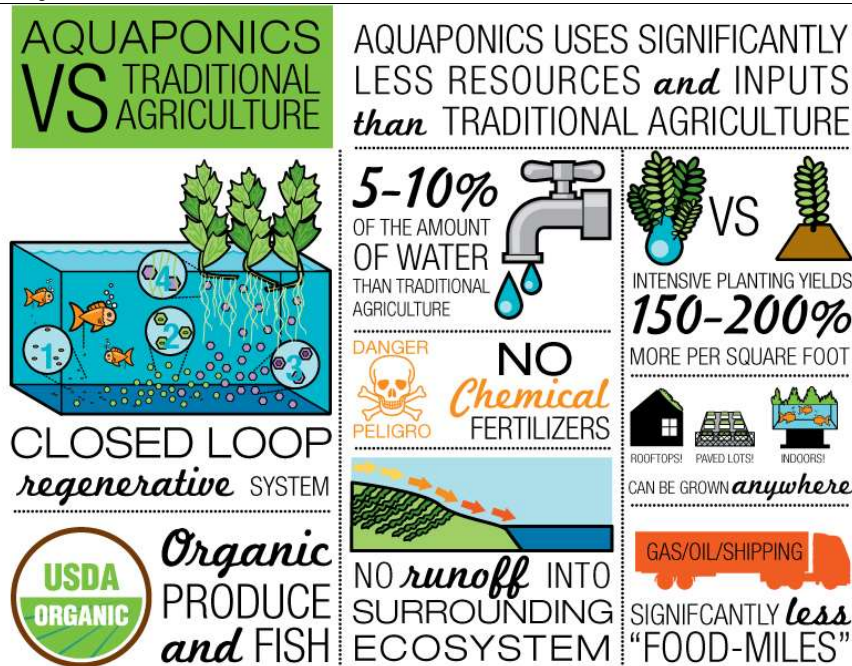
Given the scale and complexity of the overall undertaking it is proposed to execute same in Phases with this first phase consisting of the growing aspect of the overall development with the implementation of a dry hydroponic growing system on the existing site at Norfolk House Farm.

The worlds current agricultural system faces a huge challenge over the coming years with a requirement to increase global production by about 70% by 2050 in order to meet the caloric needs of a global population of 9.8 billion people. Projected linear growth in yield from our agricultural output based upon data from the past five decades will significantly fall short of these targets. Globally, 70% of water usage goes towards agricultural production, largely due to unsustainable irrigation practices. At present, 38% of earth's non-frozen land is used for growing food. This percentage will continue to rise: by 2050, 593 million hectares of land will need to be transformed into agricultural land to meet the projected calorie needs of the global population if we continue with business as usual.

The hydroponic approach to crop growth enables crops to grow in a primarily nutrient enriched water-based environment, rather than a traditional organic soil environment.

There are many advantages to this approach which deliver efficiencies that include reduced water intensity, targeted dosing of fertilisers and pesticides, increased planning density and all of which result in higher crop yields per unit area. These are all considered to be positives that address challenges.

The advantages of the Hydro or Aquaponics approach may be graphically outlined as per figure 4 below which highlights the significant reduction in inputs, resources and fertilisers while achieving significant increases in yields and product safety.



It is Jepco's intention to embrace these new methodologies and to introduce same into their extant farming process at Norfolk House Farm by covering 10 hectares of land on which they are currently growing. The use of the land shall be identical to its current use ie Agricultural however the process shall now be undertaken within a lightweight glasshouse building structure standing approximately 6m high.

Figure 4 Advantages of Hydroponic Growing

The conditions within the glasshouses shall be controlled using automated control systems integrating remote monitoring. Efficient, low-energy lighting at optimised intensity and wavelengths will be utilised in order to extend growing seasons and daily durations, in addition the roof rainwater shall be harvested and stored in a new surface water reservoir to facilitate its usage for year-round irrigation purposes.

Alongside and integral to the Glasshouse a new Insulated panel clad building shall be constructed facilitating the preparation, processing, storage and dispatch of the crop from the glasshouse. This facility shall be supported by the requisite Ancillary services including Welfare facilities, plant rooms etc and will minimise the time between harvesting and dispatch to enable high quality product to be available to customers in a significantly shorter timeframe.

The facilitation of the overall Scheme will also require a network of new roadways and hardstandings to allow access and house ancillary services such as tanks and plant rooms etc.

To validate these new technologies, JEPSCO have designed, implemented, and tested a hydroponics pilot plant on another of their sites for over a year which confirmed the significant:

- Increase in production per hectare,
- Reduction in water use per unit produced,
- Employment improvement, moving from seasonal unskilled to annual skill workers, and
- Onsite renewable energy generation potential.

The market for Economically, Socially and Environmentally sustainable agriculture is driving innovation and ultimately Jepco are focused on delivering all three elements on the Norfolk Farm Site focusing on local production, labour and energy.

The new system will facilitate the production of the existing salad crop volume on smaller land areas thus freeing up land for other production, nature conservation and other benefits. The elimination of the seasonal element will stabilise the employment market by providing year round opportunities and ultimately the incorporation of Renewable energy sources will make the carbon neutral.

5. SCOPE OF DEVELOPMENT

As previously outlined it is intended that 10 hectares of land will be converted to enable undercover growing within glasshouses and to support same with an integrated preparation, processing, storage and dispatch facility and the associated required infrastructure. The overall scope can therefore be sub divided into the following components:

- Main Glasshouse Area containing Hydroponic Growing System.
- Glasshouse Annex containing Seeding and Germination processes
- Main Pack Building.
- Administration and Welfare Building
- Main Plant Room
- External Roads & Hardstandings
- Landscaping

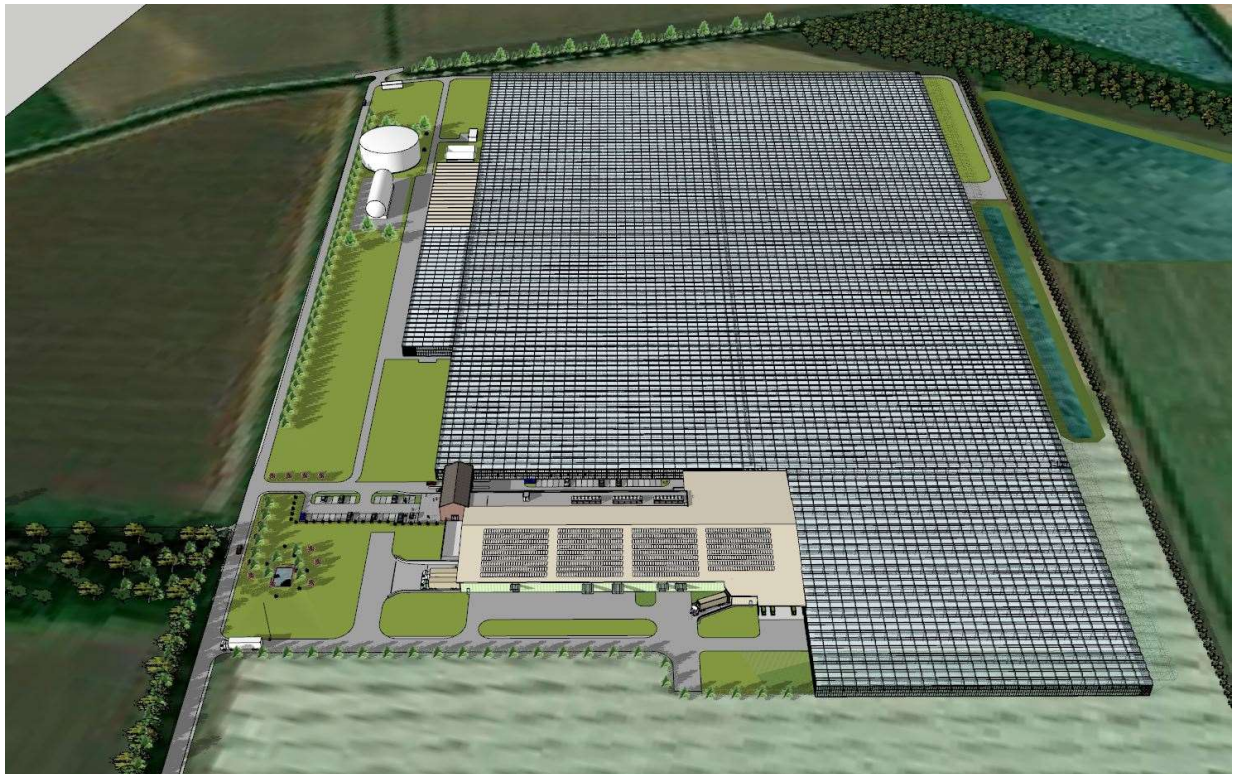


Figure 5 Agri-tech Development Viewed From South.

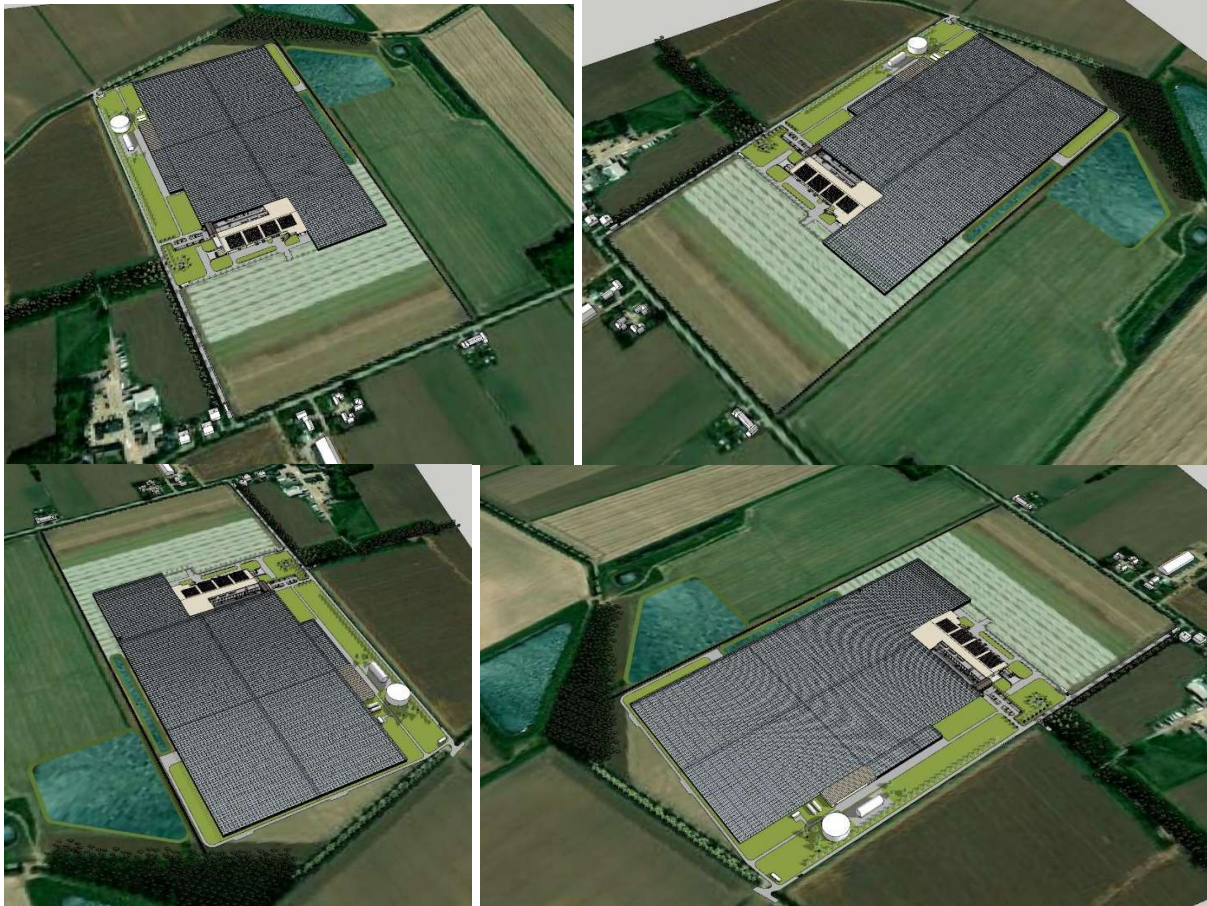


Figure 6 Agri-tech Development Site Views.

5.1 Main Glasshouse Area

The Main glasshouse area covers the vast majority of the overall development area covering 363m x 278m wide with an eaves height of 6.3m rising to an apex height of 7m on each of the 4m wide glasshouse bays.

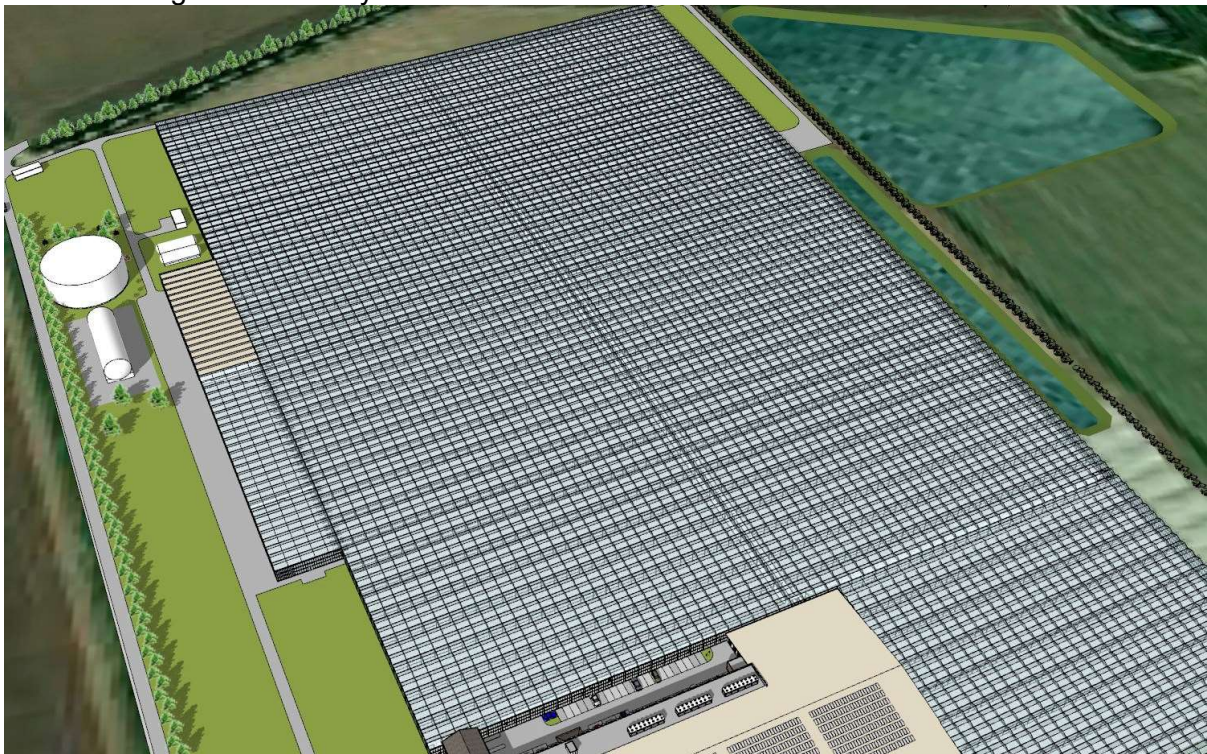


Figure 7 Main Glasshouse Area

The glasshouse consists of an aluminium tubular steel system on a grid of 12m x 4m and supporting three equal A roofed profiles across its 12m span as indicated in figure 8 below.

The structure is then clad with infill toughened glass sections some of which are openable to effect temperature control within the glasshouse structure.



Figure 8 Typical Glasshouse Structure

The glasshouses are founded on a driven precast concrete mini pile and connected via perimeter precast concrete stub walls. Within the perimeter and running at the central corridor concrete apron circulation spaces shall be constructed to facilitate the loading and unloading of the main growing ponds, from the elevated flumes as indicated in figure 9 below.



Figure 9 Typical Glasshouse Structure

The main growing ponds as indicated are approximately 300mm high and constructed of a Rubber liner supported from a Galvanised steel support frame and retain the nutrient laden water essential for the growing process. This nutrient laden water is constantly topped up from an underground pipework network connected back to a dosing and circulation system to supplement the water lost though transpiration of the crop.

The environment within the glasshouse is controlled by means of hot water circulation pipework radiating heat into the environment when required and a system of openable roof lights and screens to release and shade heat when the building is overheated.

The intention to grow product year round necessitates the employment of a regime of grow lamps within the glasshouse which requires significant power and has the potential to create appreciable light pollution.

To counter this effect the Glasshouse will be completed with automatic blackout/light pollution controlling blinds interconnected with a Horticultural Management System [HMS].



These Light pollution screens will be a combination of horizontal and vertical screening, and will ensure minimal light emission rates of less than 0.1%, thus meeting regulatory obligations on light emission levels

Figure 10 Typical Glasshouse Blackout Blind System

In addition the open structure of these screens, in combination with good ventilation, will assist to control moisture and heat within the glasshouse.

Jepco propose to use the SVENSSON OBSCURA 10070 FR WB BW to control the growing day length, the double layered blackout screed as outlined in the specification sheet below as well as retaining the light, is made from flame retardant materials alone, and is the optimum choice for all installations from a fire safety perspective. It meets the highest safety standard in the horticultural industry and test reports are available from various authorities.

 **svensson**



OBSCURA 10070 FR WB+BW

Product information

Application	Inside
System	Hanging, Sliding
Feature	Light deprivation / blackout, Energy saving
Flame retardant	Yes
Material	Polyolefin 66%, Polyester 34%
Pattern	Full plastic
Warranty	Warranty five (5) years under all types of greenhouse covering. See Svensson's limited warranty for all terms, conditions and exclusions in writing.

Properties	Value	Unit	Test Methods
Shading level in diffused light PAR**	99.9	%	Svensson method
Shading level in direct light PAR**	99.9	%	Svensson method
Energy saving	70	%	Svensson method
Width of strips	4	mm	
Weight	198	g/m ²	

Figure 11 Typical Glasshouse Blackout Blind System

5.2 Glasshouse Annex

The glasshouse structure continues from the main glasshouse area Southwards along the Eastern elevation of the infrastructural development and measures 128m x 125m wide with an eaves height of 6.3m rising to an apex height of 7m on each of the 4m wide glasshouse bays. and houses the main seeding, germination and propagation processes.

Both Medium and seeds are delivered to the intake bay and transferred to this area where the seeds are planted and placed on seed trays into the germination area. Once germinated the sprouted seed is placed through a propagation area on bed to grow further and then removed and placed on a main float on which it shall be moved into the main Glass house to fully develop.

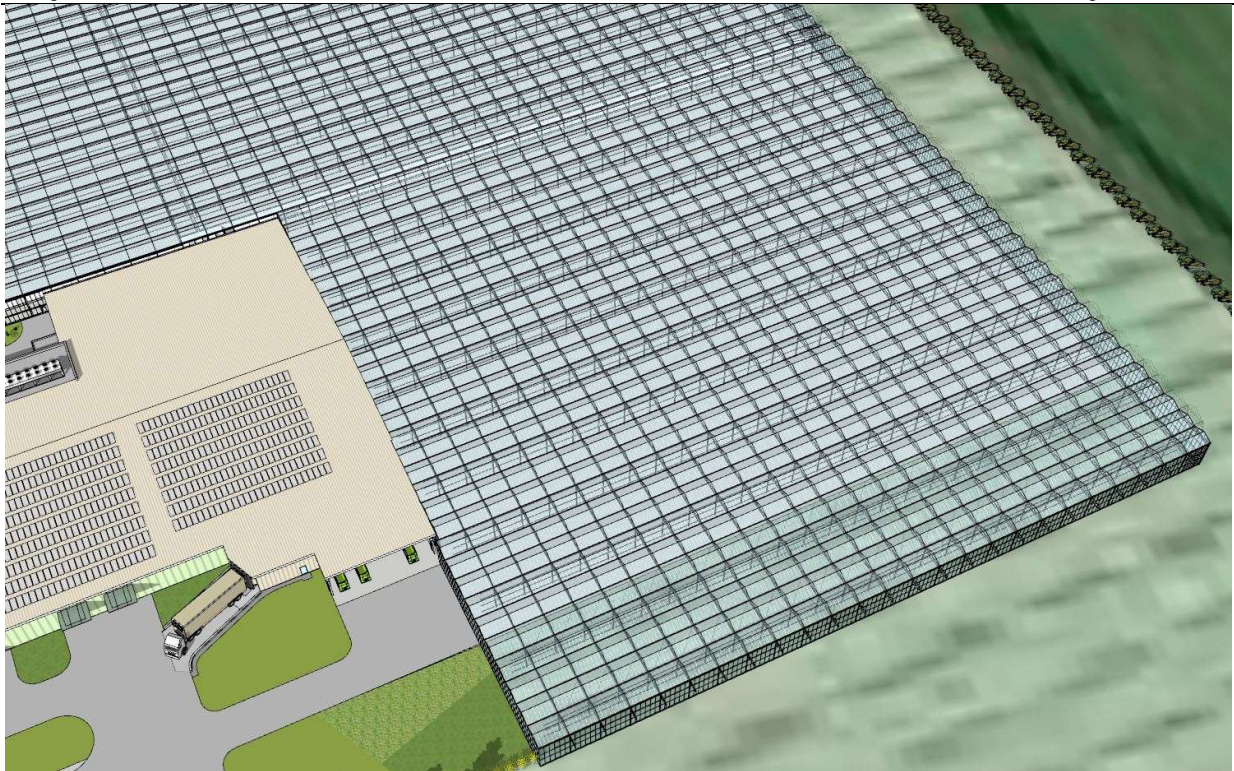


Figure 12 Glasshouse Annex View

5.3 Main Pack House

The proposed Main Pack House shall be located at the South Western corner of the infrastructural cluster and shall measure 137m long by 45m, increasing to 85m at the Eastern side over the Plant room and Harvesting area. The building roof shall be non symmetrical to maximise the potential for the installation of Solar panels on the Southern slope and shall therefore have varying Eaves levels from 6.1m at the Main dispatch area to 4.9m at the waste out location. The apex level shall be constant 9.7m.

The building shall be formed with a multi span structural steel portal frame spanning North South on 6m grids in an East West direction. These frames shall be supported from ground bearing pad foundations and shall support a standard trapezoidal insulated roof containing 100mm pir insulation spanning between cold rolled purlins. Lateral stability to these frames shall be provided in the non span direction by a system of roof and wall bracing and in the span direction by the portalisation of the frames. The roof shall on its Southern aspect also support a Solar array of 2050m² which shall supply power to the operations of the Pack house.



Figure 13 Main Pack Building

The external wall construction shall be integral to the internal walling system with the main steelwork columns being exposed on the outside of the building and flashed at their head by an additional horizontally spanning long span Micro rib insulated panel wall which shall further enclose a hidden gutter behind a small parapet wall.

Hot rolled Steel sections shall be installed around doors to support the panels as they are trimmed to form ops.

In general throughout the pack house building it is proposed to install a ceiling and wall system comprising a proprietary insulated core composite panel steel faced with a polyester finish such as the Kingspan Ultratech KS1100 CS panel with a microrib finish which has been designed specifically for Food production environments.

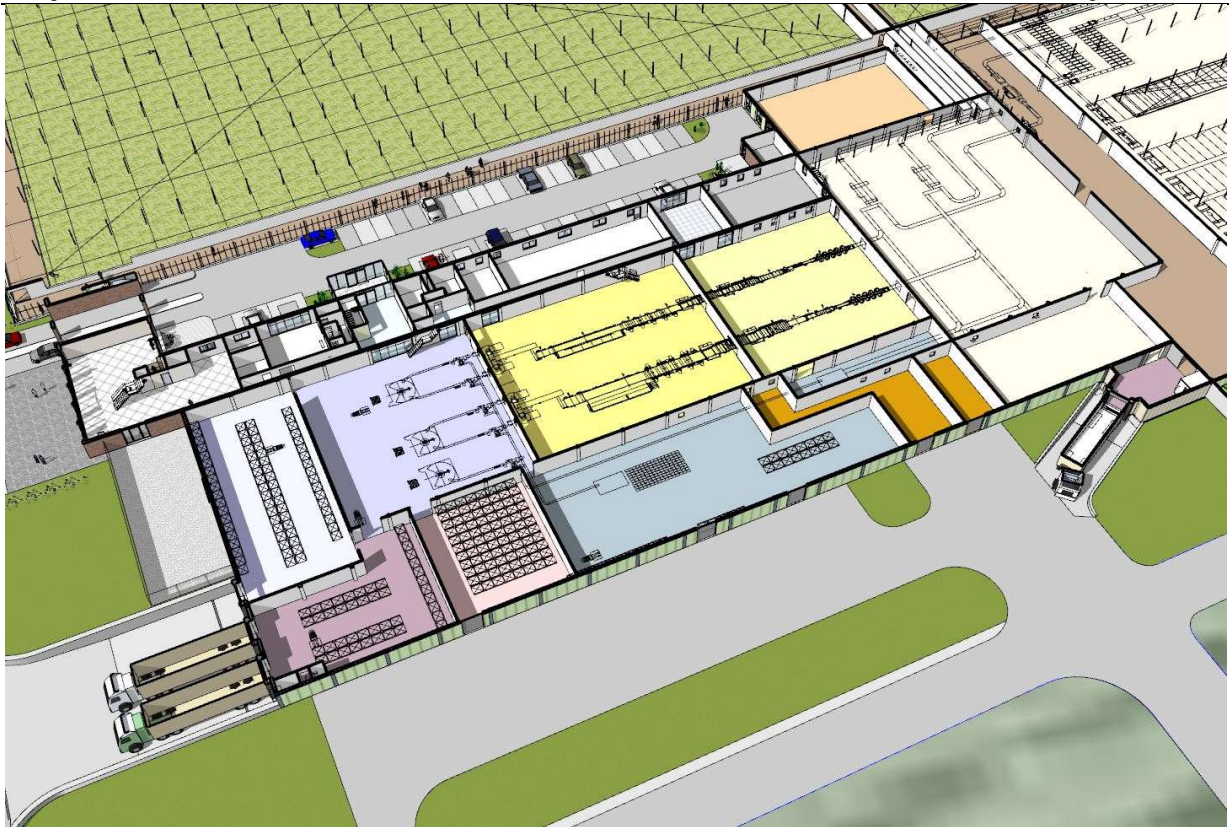


Figure 14 Main Pack Building Ground Floor

The insulated core is formed with 100mm PIR or quadcore which feature an environmentally sustainable closed-cell PIR insulation core which is non-deleterious with Zero Ozone Depletion Potential (Zero ODP) with mineral wool being utilised where fire resistance is required. The external skin of the panel shall be formed with continuously hot-dip coated strip and sheet of structural steel and finished coat of Kingspan cleansafe 55 on the production room side which is a polyester coating suitable for moderately aggressive internal environments, providing good chemical and humidity corrosion resistance. The Polyester coating measures 25µm with an overall Nominal thickness of 0.63mm including coating and Protection film.

The walls will be 100mm thick, with 50mm thick encasing internal columns. The ceilings will be 125mm thick and suspended a 6.0m centres from the main portal rafters above.

All internal corners shall be coved using proprietary cove material. Return air plenums shall be installed at 6000mm centres on the outside walls of the clean room and shall be formed with a single 50mm thk panel which shall be cut on one face and bent to provide a three sided shape thus effecting good air movement within the Production Space. These plenums shall in turn be flashed and sealed against the Production room Wall.

Integral to the system are flush-fitting food safe personnel doors and Nergeco Labo-5 rapid roll doors with a clear opening size of 1800mm wide x 2400mm high to provide access between the various rooms, in addition a number of flush-fitting double-glazed window units measuring 1.0m x 1.2m and conveyor openings shall be installed throughout the area. The floors shall be prepared through a system of sand blasting and coated with a variety of finishes. Within the food production areas a high build polyurethane finish such as Ucrete shall be employed on a sloping floor with integral stainless drainage channels, and in the dry areas such as packing, chill store and dispatch a dry shake hardener and sealer shall be installed.

Within this enclosure the overall Pack house shall be further sub divided into operational areas:

- Harvest area, WIP Chill, Intake.
- Plant Area
- Low care, waste out
- High care, Packaging
- Packing and Pallet Store
- Chill Store and Dispatch

5.3.1 Harvest Area, WIP Chill, Intake Dock

This area is located at the eastern most point of the pack building where it abuts the Glasshouse annex and represents both the start and the end of the growing process.



The intake dock located at the Southern end incorporates a ramp to facilitate the level entry unloading of vehicles delivering to the site. These deliveries shall consist of raw materials for the growing process such as seeds and growing medium which shall traverse the area and be retained within the Glasshouse annex and imported fully grown product from other Jepco sites which shall be retained within the adjacent Work in Progress(WIP) chill prior to processing. This loading dock shall be constructed complete with an insulated roller shutter and an inflatable dock seal to ensure the integrity of the building and shall be housed within the overall Pack house envelope.

Figure 15 Harvest Area, WIP Chill Intake Dock

The harvest area is located to between the intake dock and the main Glasshouse to the North and is fed with fully grown product from same as well as from the WIP chill. On entering the harvest area the fully grown product is removed from its growing float which returns to the Glasshouse annex, derooted and placed on an adjoining conveyor which will take it either directly to low care processing which can involve further cutting or simply packing or alternatively to WIP Chill for later processing. The waste generated shall be gathered in local bins or washed through a series of large channel floor drains to the waste area located at the Eastern side of the Intake dock where it shall be screened and removed from the flow. Elevated and dumped into trailers which shall be removed to be spread on land around the remainder of the farm. The wet environment coupled with the requirement to have significant falls on floors to drains in these areas will result in a requirement to install the higher grade Ucrete floors throughout.

5.3.2 Plant Area

The central plant area supporting the Main Pack building and ancillary buildings is located at the eastern end of the courtyard area and accessible from same. It is housed within the overall envelope of the Pack building and separated from same by 1hr fire protected solid blockwork walls. This area will house all required electrical, mechanical and water services required for the operation of the Pack house itself whilst the main site plant area on the Western side will cater for the glasshouse area.

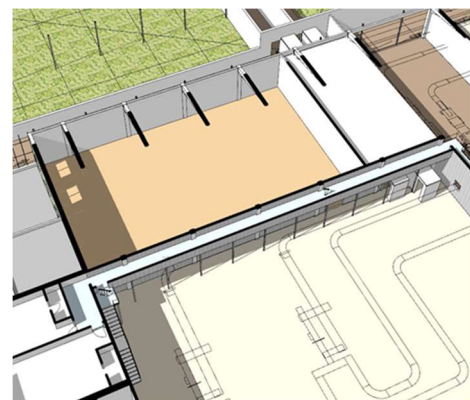


Figure 16 Plant Area

5.3.3 Low Care, Waste Out

Moving Westward through the building after harvest, we enter the low care process area which as previously noted involves either a simple flow wrapping of the full head of lettuce and its transportation to the packing and dispatch area as a ready to wash product or the further cutting and washing of same and transfer to the high care area for eventual dispatch as a ready to eat product.



As outlined in figure 17 below the cutting and washing will occur in the yellow floored area with the flow wrapping being undertaken in the adjoining blue floored area and the wrapped full head then being transferred to the packing area via a high level conveyor over the waste corridors from both the low and high care process areas. An independent packaging store is also located to the east of the waste out corridor to facilitate intake of flow wrap material to the low care packing area.

Figure 17 Low Care Processing, Waste Out

5.3.4 High Care, Packaging

Cut and washed product from the low care process area shall pass through a conveyor open into the high care area where it shall be sterilised, dried, mixed and packed into primary bags thereafter being checked, weighed and metal detected before passing through a further conveyor open into the main Low care packing area.

The primary packaging materials shall be stored and introduced into the High care area from the adjacent Packaging Store on its Southern Boundary which shall also serve the main Packing area with Bale arm cranes to transport the bagged material. This Packaging Store shall be serviced from the Southern Yard area via Insulated Roller Shutter Doors protected by high level canopies.



Figure 18 High Care Processing, Packaging Store

5.3.5 Packing, Pallet Store

Once the packed bags have left the High Care process area they shall be delivered to an automated packing system in which an automated packer shall place the individual bags into the bale arm crate which has been delivered via ground mounted conveyor to the pack station. Once filled the crate shall be moved on a conveyor to an automatic palletisation station which shall arrange the crates onto pallets ready to be moved into the Chill Store. As previous the crates shall be supplied from the adjacent Packaging Store with the Pallets being introduced from the pallet store which is also served from the external yard on the Southern side of the building. As the Wet processing aspect of the operation is complete and the product now within its primary and secondary packaging, the finishes with these low care areas are of a lower requirement with minimal falls on floors and a basic shake on grout and sealer finish. Wall materials etc will remain the same as previous however there is no requirement for a ceiling throughout the Pallet, packaging or waste areas.

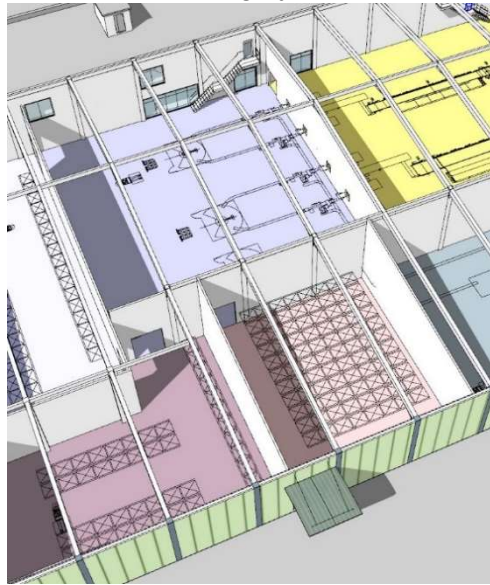


Figure 19 Packing Area, Pallet Store

The Pallet storage area shall also house the forklift charging area and shall be separated from the remainder of the building by a 150mm thk 1hr fire protected wall.

5.3.6 Chill Store. Dispatch

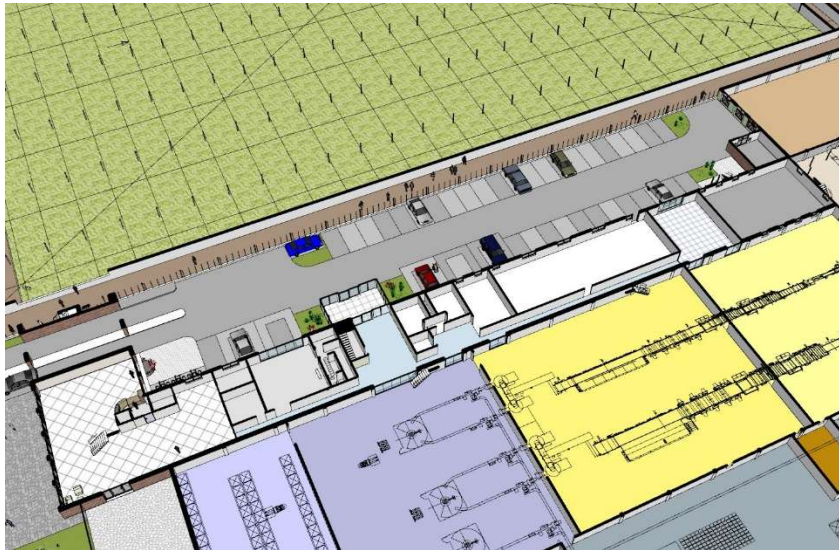
Once Palletised the Product is moved to a dispatch Chill store where it is stored until the specific order is ready to be dispatched, at which point it shall be moved into the Order picking and dispatch area where it shall be arranged into its specific load and hence loaded on the dispatch vehicle. This area shall be managed by the dispatch manager from an office on the South West corner of the dispatch area which shall also provide welfare facilities for drivers entering the site. Three Loading Docks as outlined in figure 15 shall be installed within the dispatch area to facilitate the loading of a variety of articulated vehicles. This loading dock shall be constructed complete with an insulated roller shutter and an inflatable dock seal, with the external ground level sloping at a maximum gradient of 1:12 to accommodate the installation.



Figure 20 Chill Store, Dispatch

Administration and Welfare Building

A two Storey Administration and Welfare Building shall be constructed to the North and



adjoining the main Pack Building set back 16m from the Southern boundary of the Glass house to minimise shadow effects on same, the area between the two buildings shall be utilised as staff car park and also provide access to the adjoining plant rooms and service entry points. The Building shall measure 96m x 10m x approx. 8m high with the Entrance area measuring 26m x 12m with an eaves of 7.7m and an apex of 10.6m

Figure 21 Administration Area Ground Floor Layout

The ground floor level of the building shall house the Jepco Administration and Management team within a suite of open plan and cellular offices with associated canteen and toilet areas and IT support functions. In addition at the Eastern end of the building the Engineering stores and workshop shall be located with access into the main Pack building and from outside through the main courtyard.

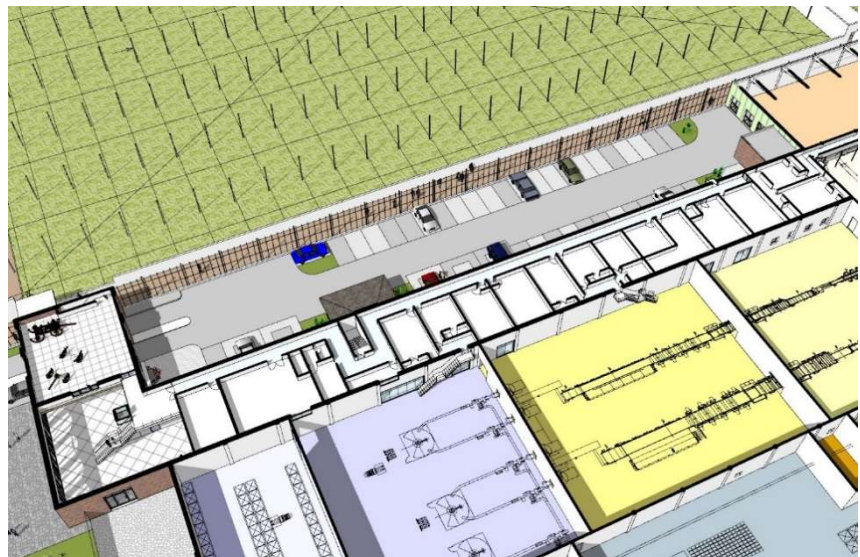


Figure 22 Administration Area First Floor Layout

The first floor level shall house the Production staff welfare facilities including Individual changing and lockers areas for low care Pre and Post Production staff and High Care Production staff along with associated toilets and shower areas. In addition Line side Production Management offices shall be provided to administer the individual production areas and a R&D Test kitchen shall be located at the Western end adjacent to the main canteen area.

The Administration area shall be constructed from load bearing 215mm blockwork walls supported from 1200mm wide strip foundations and in turn supporting 250mm thk precast concrete first floor slabs incorporating min 75mm screeds. First floor level walls shall, in common in ground floor be completed in solid blockwork and support a flat insulated and weathered concrete roof. External wall construction shall take the form of cavity blockwork with 215mm solid block load bearing walls internally surrounded by an cavity and a further external leaf of blockwork plastered and painted. This structure shall be tied in to the main Building structure to effect a lateral restraint between both.

Internal finishes shall be completed in hygienic floor and wall paints in the production access spaces and carpet tiles within the office and admin areas.

At the Western End of the Administration building and closing the space to the end of the glass house it is intended to construct a focal point entrance to the facility which shall embody the longevity of the Jepco organisation and demonstrate its eagerness to integrate innovatory technology to sustain the business and the industry into the future.



Figure 23 Main Entrance

To this end it is intended to construct a traditional Wagon Hovel type structure using common local brick and slate materials and to house the main entrance to the site within same along with the access to the staff carpark. The Structure shall be completed internally in a timber clad double height steel structure containing the main reception area and an exhibition centre charting the history of Jepco and farming in the general area.

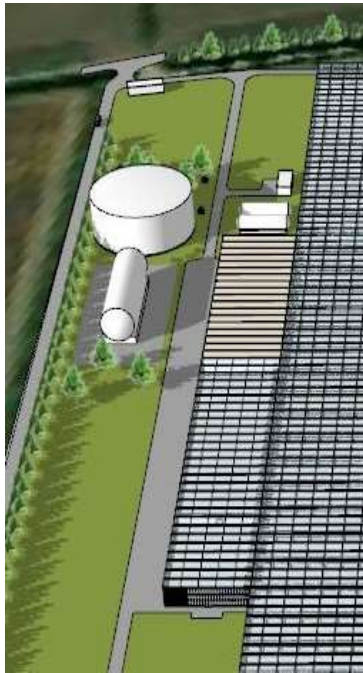
At the Eastern side a first floor gallery shall be accessed via lift and stairs and provide access to the first floor admin areas and the main site Conference room which shall be located above the vehicle access to the car park. This conference room shall also serve as the focal point for client tours of the glasshouse and process.



Figure 24 Entrance Area internal Views

5.4 Main Plant Room

The main glasshouse plant room is located along the Western Elevation of the Main Glass house building and is constructed in the same materials as the glasshouse with a 60mm thk insulated panel installed over the 40% which houses the main plant on the Northern end and the remainder in standard glass housing the irrigation room and the Research and development area where new crop trials are undertaken. The area measures 26m long x 16m wide with the R&D area extending to a further 36m long. The overall profile of the building match the general glasshouse construction. In addition this area shall also house some external plant and tankage which will extend to 13.2m in height.



As previously outlined this phase of the overall Programme of projects pertains solely to the Agri tech development with further developments focusing on the Renewable energy and overall power supply to the site. In the interim and as a full time reserve to the overall power installations once complete. It is intended to install two Gas Powered 8MW Combined Heat and Power (CHP) plants within the plant room. The Waste heat generated from the CHP will be used in concert with the adjacent heat store to provide the required heating to the Glass House to facilitate the year round growing critical to the viability of the project. Once the overall power project has been implemented the CHP are expected to operate only under abnormal conditions. Providing almost continuous operation, a CHP engine requires only a single fuel (typically gas) to function, thus minimising the infrastructure requirements. The engine, coupled to an alternator, generates power, which is then converted into usable electricity to meet on-site energy demands Simultaneously, heat is recovered from the engine exhaust, jacket and water/oil cooling circuit. The heat is then made available for redistribution on-site as per figure 26.

Figure 25 Plant Area

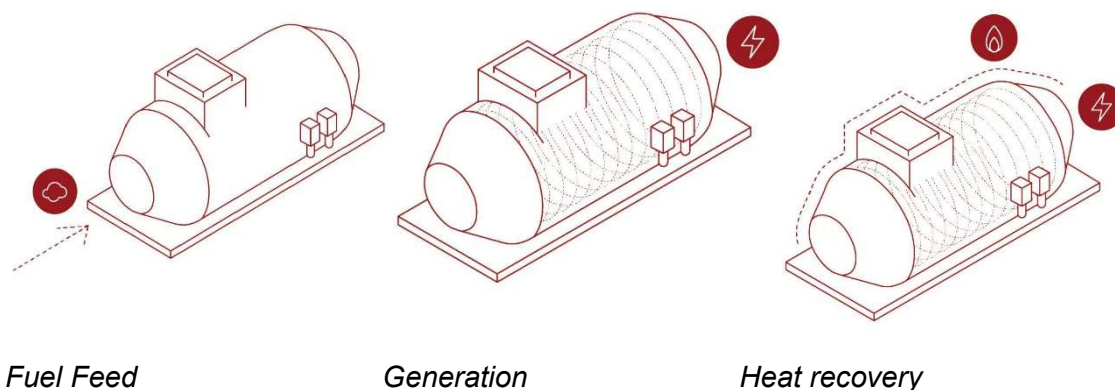


Figure 26 CHP Operation

CHP plants by their nature can generate high noise levels which are governed by two different sets of requirements from an environmental and regulatory perspective.

Firstly, there is Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise -.

Secondly, The Control of Noise at Work Regulations 2005 (the Noise Regulations) which came into force for all industry sectors in Great Britain on 6 April 2006. The aim of the Noise regulations is to safeguard workers' hearing, to ensure it is not subject to excessive noise in the workplace. The aim of these regulations is to prevent loss of hearing or the development of tinnitus.



When looking at the installation location of the proposed CHP both criteria have been considered along with boundary noise conditions which may be imposed by the local authority. and hence its siting within an acoustic plant room away from adjoining properties.

There are various component within and connected to CHP system that can cause noise:

- The ventilation system
- The engine itself
- The exhaust system
- Auxiliary equipment (such as fans or radiators)
- Vibration from equipment

During the procurement process all the different element within the system will be assessed to noise and noise attenuation across the system will be adapted to specific site needs. Health and safety compliancy is paramount as workers need to be in a safe environment that operates to the correct noise levels.

The CHP systems will be delivered within an individual acoustic enclosure which will then be be sited internally within the plant room. The individual enclosure will operate between 65dBA@1m and 75dBA@1m and thus meet all noise requirements.

The air intake for generator cooling will also be fitted with an attenuator. The attenuator reduces the generator breakout noise and will be designed specifically for the generator noise frequency spectrum. Where the ventilation air is extracted via fans, these will also have an attenuator fitted and the exhaust system will have a silencer located in the flue.

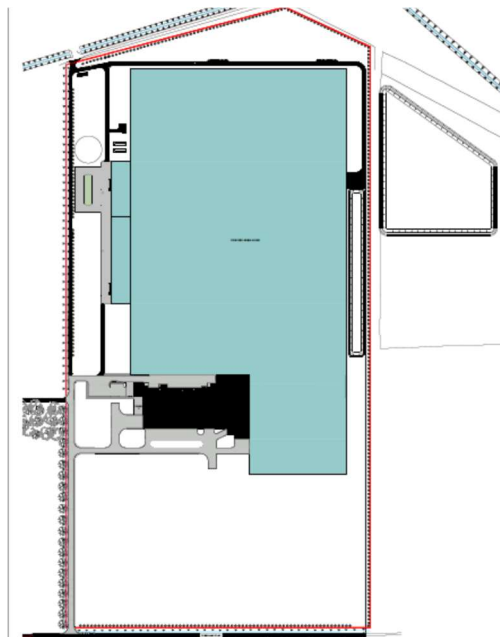
Any ancillary equipment such as fans or radiators will be selected appropriately for the target noise rating required.

The design will also ensure that the CHP unit operation does not create problems of noise and vibration and additional measures to prevent transmission of noise and vibration, such as anti-vibration mounts or additional insulation within the CHP bed frame will be included.

In addition to the CHP plant, the plant room will also house the dosing and irrigation system for the Growing ponds which will consist of internally located tank and pump infrastructure linking to a system of underground pipes feeding the ponds.

5.5 External Roads & Hardstanding

To accommodate the Vehicular Movement and personnel movements around the development, a new system of roadways and hardstandings shall be created and amalgamated into the existing systems, the overall extent of same is outlined in figure 27 below:



This shall include the widening of the existing entrance road and the realignment of the junction with same to meet with current roadway standards, and thus facilitate two way traffic along this particular stretch of the internal road network. All widening works shall be undertaken to the East of the existing road to ensure that the integrity of the existing tree line to Norfolk House farm is kept intact.

This roadway shall be maintained as a two way roadway as far North as the entrance into the new Carpark after which it shall revert to single carriageway providing service access to the main pant room area and maintaining the existing tree line and hedgerows. The two way roadway shall also provide access into the existing Norfolk House farm yard. Similar to the existing roadway construction shall be formed in a macadam finish with cast iron road gullies draining same to a surface water attenuation system.

Figure 27 Overall Road Infrastructure

As outlined above the widened main entrance road shall provide access into the new operational site as well as maintaining access to Norfolk House Farm. As below access to the site shall be separated into the Operational site for deliveries and dispatch and the Administration area which will cater for Staff parking , parcel deliveries, Visitors etc.

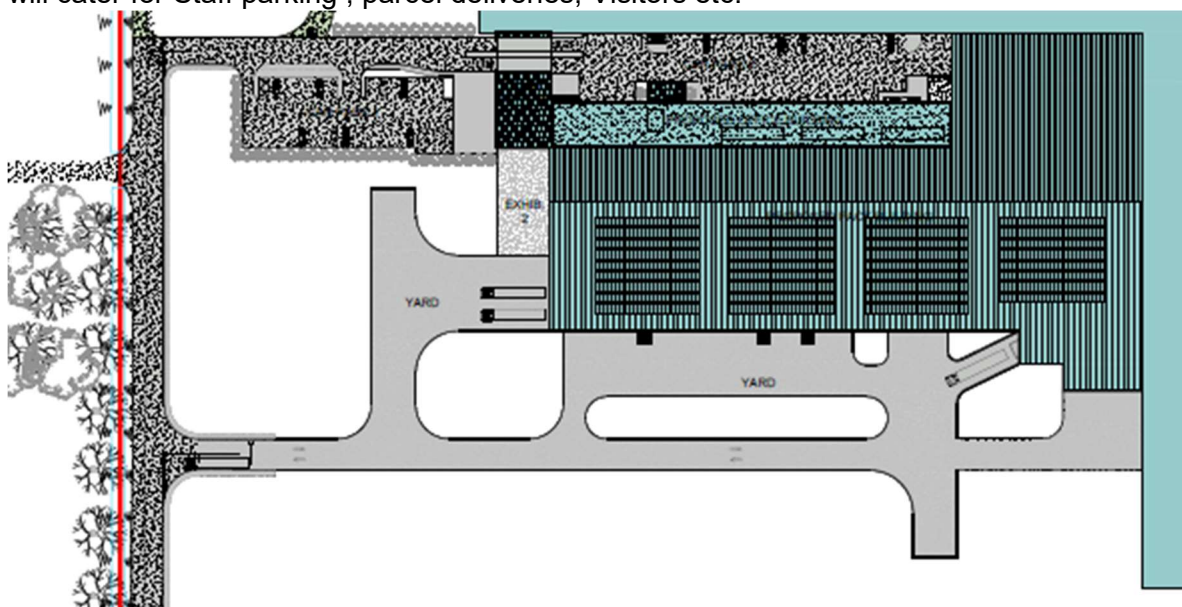
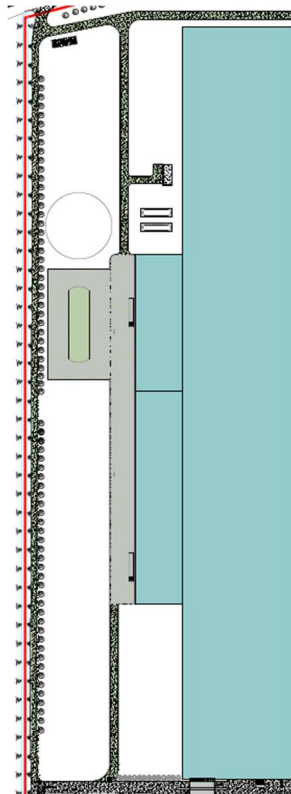


Figure 28 Overall Road Infrastructure

Due to the heavy vehicles loads in the operational area, these yards and hardstandings shall be completed in concrete slabs reinforced with square mesh reinforcement. The yards slabs shall be of a generally uniform level excepting those loading and unloading docks located at the dispatch and intake areas which will reduce in level to accommodate the direct bed loading of vehicles.

Car park areas both externally and within the Courtyard area shall be completed in a more light duty macadam surface sufficient to accommodate the regular transit of private vehicles and occasional transit of HGV's



North of the Main Pack Building and Administration area the road network will provide one way access to the main plant room service yard which shall be completed in concrete finish and be accessed via macadam roads as per Figure 29

Both the macadam and concrete areas shall be drained via a system of road gullies and aco drains to an underground drainage system completed in UPVC pipework and conveyed to a hydrocarbon interceptor to ensure the integrity of the local watercourses.

In addition the pipework for its final lengths shall be oversized to accommodate attenuation within the system and controlled by means of an end of line hydrobrake which shall serve to maintain the discharge to the local watercourse at its existing levels and thus eliminate the potential for any flooding due to the inundation of the system due to the faster entry of surface water to the system.

This attenuation system will comply with the requirements of SUDS guidelines. To comply with current best practice, the drainage system will:

- (i) manage runoff at or close to its source;
- (ii) manage runoff at the surface;
- (iii) be integrated with public open space areas and contribute towards meeting the objectives of the urban plan;
- (iv) be cost-effective to operate and maintain.

Figure 29 Service Yard

In accordance with the drainage design document the attenuation systems shall be split into four distinct areas to ensure gravity flow and shall contain flow controlled discharge points the the LDB drains. The overall drainage design and site Flood risk assessment are outlined in full in document no 20008-30-rp 001 and 20008-30-rp-002 .

In addition these individual operational areas shall be lit in accordance with document no 20008-50-rp-001 Site lighting design which is designed to minimise the light pollution to the adjoining areas.

6 LANDSCAPING

A plan for landscaping the proposed development has been developed in consultation with the client and the project Ecologist, Avian Ecology with a view to the maximum retention of extant features and their enhancement through the strategic selection and planting of a variety of additional native trees and shrubs.

As required under the National Planning Policy Framework The biodiversity metric has been employed to assess the site value to wildlife and to ensure that a Biodiversity net gain of a minimum of 10% is achieved. As demonstrated in the accompanying Avian Ecology report, the landscaping proposals as submitted achieve a Biodiversity net gain of 34%.

Figures 30 and 31 below indicate the views of the site from the B1359 main road and demonstrate the general nature of the topography and current levels of vegetation on the subject site. As indicated this essentially consists of linear arrangements of trees and hedges arranged along the boundaries of the individual holdings with a large copse at the North East corner of the subject site. The site itself being farmland is devoid of any appreciable topography or ground cover.



Figure 30 Main Entrance Existing

Figure 30 shows the view from the proposed main entrance location and clearly indicates the mature trees and hedgerows on the Western side of same delineating the site from the existing Norfolk House Farm infrastructure. As outlined previously it is intended to widen this road to accommodate two way traffic for the first section of same and these works will be undertaken on the Eastern side of the road to ensure the integrity of the existing vegetation,



Figure 31 South Eastern View

Figure 31 is taken from the South Eastern Corner of the subject site and shows a consistency in the volume and dispersion of the associated Vegetation.

As previously outlined, the approach to the landscaping proposals for the site is one of maximum retention of extant features and their enhancement through the strategic selection and planting of a variety of additional native trees and shrubs.

Given the dispersion of the extant features it is unlikely that the proposed development shall either through its implementation or operation have any effect on same.

Given the vast scale of the site is impractical to attempt to screen the development same in its entirety for all boundaries and unnecessary due to common agricultural nature of the vast majority of the development.

Hence it is proposed to concentrate the landscaping installation in those areas which will generate most activity namely the Service yards and loading areas and car park entrance.

This shall involve the development of a landscaped area between the loading area and car park centred around a surface water attenuation pond dedicated for these areas to enhance the habitat for extant wildlife and attract further numbers.

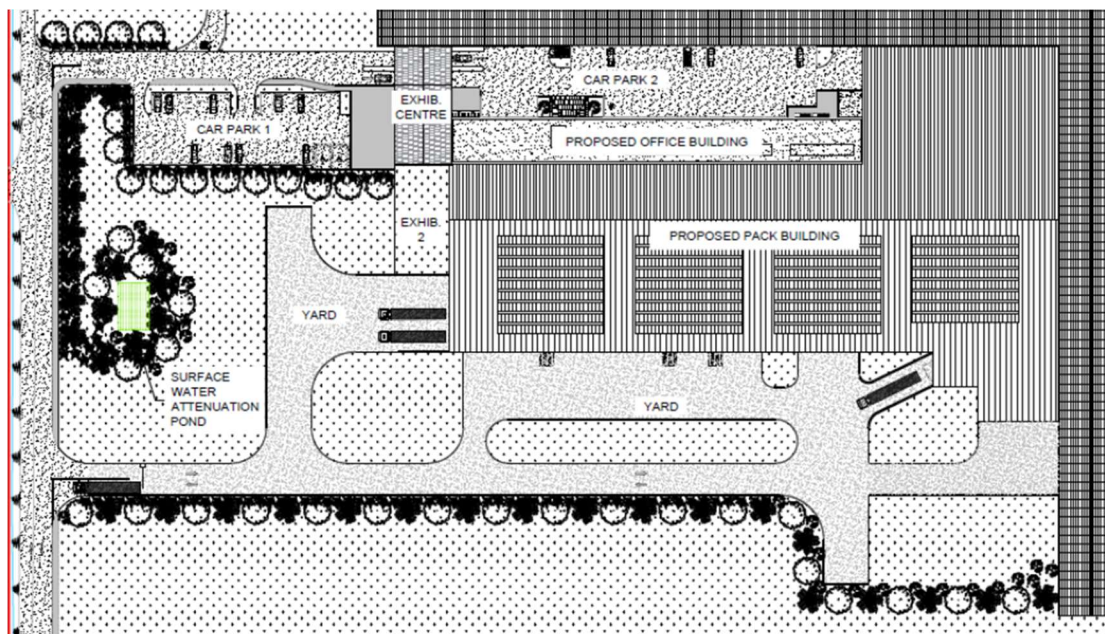


Figure 32 Southern Landscaping Scheme

This landscaping shall extend Eastwards in a combination of trees and low levels bushes in accordance with drg no 20008- 20- Dr 030 and figure 26 with a variety of trees and shrubs as outlined in figure 33 below.

PHOTOGRAPH	FOLIAGE TYPE	DRAWING SYMBOL
	ASH 12m HIGH SCIENTIFIC NAME: FRAXINUS EXCELSIORA	
	ALDER 12m HIGH SCIENTIFIC NAME: ALNUS GLUTINOSA	
	BROOM SCIENTIFIC NAME: CYTISUS SCOPARIUS	
	SPINDLE SCIENTIFIC NAME: EUGONYMUS EUROPAEUS	

In addition to the screening of the Southern Elevation of the overall development it is also proposed to augment the significant tree line on the North Western Boundary of the site adjoining the on site access road around the proposed service yard and its associated area of tanks and plant as outlined below.

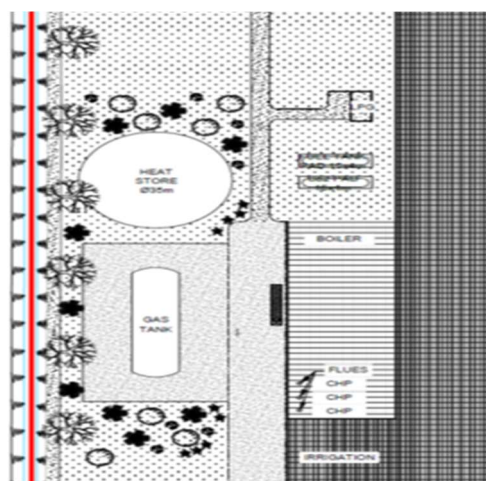


Figure 33 Landscaping Scheme

The scheme as proposed will, when implemented in its entirety serve to screen key operational areas while amalgamating the more rural aspects of the development into the existing topography. As previously noted the landscaping proposals as submitted achieve the biodiversity requirements with a net gain of 34%.

7 SITE ACCESS AND CIRCULATION

This current site access arrangement as outlined in Figure 24 will require an upgrade to make it suitable for the proposed usage. The present arrangement is utilised only for occasional entrance and generally for internal movements on the site with harvested crop being moved into the Norfolk House Farm infrastructure for processing, packing and dispatch.

At present all pedestrian, car and HGV traffic enters the Jepco holding at the Norfolk House site with little other than internal staff and product movements beyond this point. The creation of the additional pack house on the new site will necessitate the provision of an additional access point to eliminate cross traffic through the Norfolk House Farm yard.

To this end it is intended to upgrade the existing entrance as outlined in figure 24 by widening the roadway to accept two way traffic and to improve the turning radii onto the Main B1359 in accordance with Figure 34.

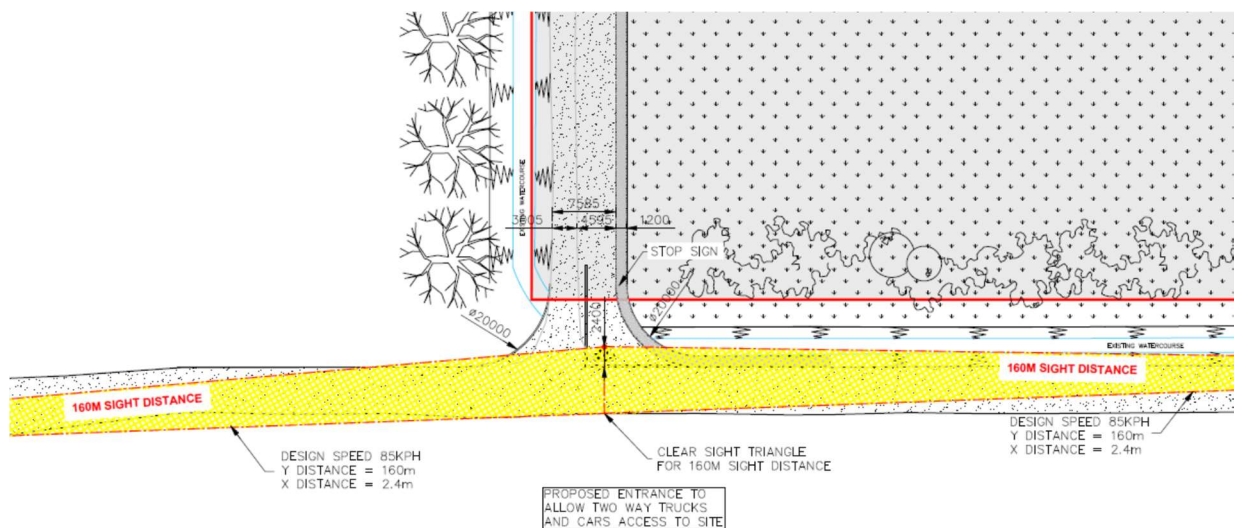


Figure 34 Site Entrance Modification

The routes to and from the site shall depend on the origination point of the individual travelling or the specific load being delivered or dispatched.

It is however anticipated that all HGVs travelling to and from the site approach and leave Westerly along the B1359 towards the A17 and thus access the National Road network. Some employees may approach the Site from the East from Gedney Drove End however the impact of same on the operations of the Entrance are deemed minimal.

In general departing HGVs shall turn right only towards Gedney Dyke and follow the B1359 as far as Chapelgate where they shall join the A17. Travelling Southwards, traffic can pick up the A10 at Kings Lynn and from there pick up the M11 at Cambridge. Travelling Northwards traffic can pick up the A1151 and hence A16 at Spalding to gain access to the A1(M),

The development does not represent a significant increase in type or daily volume or traffic onto the local Road networks as the proposed operations to be undertaken within the development are currently being undertaken on Norfolk House Farm, as outlined in the preamble the purpose of the development is increase yields through year round growing. Annual traffic figures will therefore increase due to the increase in operations over the calendar 12 months.

The expanded entrance shall be utilised by all vehicles entering the site including staff cars, delivery and dispatch vehicles in addition access will also remain to the yard at Norfolk House Farm. On entering the site all vehicles will proceed Northwards along the widened access road and to a variety of selected locations depending on employment.

Drg No 20008-20 -Dr-0029(extract in figures 35 and 36 below) outline the various routes, volumes and times of the individual vehicle types which dissipates in type and volume the further North one moves along the access road.

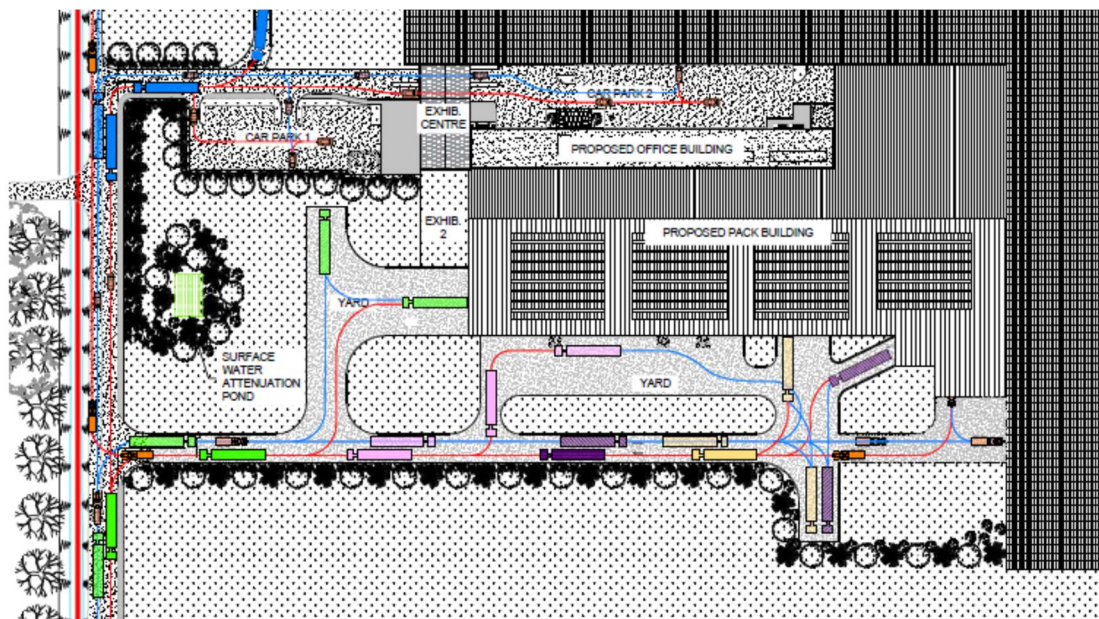


Figure 35 Site Traffic Movements

The main vehicle activity occurs in the Southern service yard which caters for the main operational functions of the plant. All deliveries required for the processes will occur through this area including the seeds and medium deliveries to the glass house annex, the delivery of imported product from alternative Jepco sites and the packaging, crates and pallets required in the process. In addition, the waste generated in the process shall also be collected centrally and dispatched from this yard area. Firstly, organic waste washed from the floors of the process building shall be drained to the waste area adjoining the Intake Dock where it shall be screened, scraped and elevated to be deposited into farm trailers which shall then be transported around the Jepco holdings and spread over the fields as fertiliser. Packaging waste including cardboard and plastics shall be compacted within the individual packaging waste areas and placed into a compactor skip which shall be removed from site by a registered contractor weekly. In addition the main Dispatch Vehicles shall operate from the loading docks on the Western end of the Pack house and shall collect and distribute the finished product to the National Road network via the internal road system.

VEHICLE MOVEMENTS			
FREQUENCY	TIMES	ROUTES	PURPOSE
A) DISPATCH VEHICLES			
APPROX 12-15 PER DAY	GENERALLY 0800-1000HRS 1100-1200HRS DAILY	ENTRY  EXIT 	OUTLOADING+ DISPATCH OF FINISHED GOODS PACKED SALADS ON PALLETS
B) RAW MATERIAL VEHICLES			
APPROX 2 PER DAY	GENERALLY 0800-1700HRS DAILY	ENTRY  EXIT 	DELIVERY OF SEEDS + GROWING MEDIUM+IMPORTED FINISHED GOODS
C) PACKAGING DELIVERY VEHICLES			
APPROX 2 PER DAY	GENERALLY 0800-1700HRS DAILY	ENTRY  EXIT 	DELIVERY OF PACKAGING MATERIALS AND PALLETS
D) ORGANIC WASTE MATERIAL VEHICLES			
APPROX 1 PER DAY	GENERALLY 0800-1700HRS DAILY	ENTRY  EXIT 	TRACTOR PROPELLED TRAILERS REMOVING ORGANIC WASTE FROM DRAINAGE FLUMES
E) PACKAGING WASTE VEHICLES			
APPROX 1 PER WEEK	GENERALLY 0800-1700HRS	ENTRY  EXIT 	VEHICLES REMOVE PACKAGING WASTE COMPACTORS
F) SERVICE VEHICLES			
APPROX 1 PER WEEK	GENERALLY 0800-1700HRS	ENTRY  EXIT 	VEHICLES SERVICING ENERGY CENTRE
G) PERSONAL VEHICLES			
APPROX 60 PER DAY	GENERALLY 0800-1800HRS DAILY	ENTRY  EXIT 	PRODUCTION STAFF

Figure 36 Site Traffic Movements

The second exit off the main internal site road shall give access to the Main Office and Administration building Entrance and Car Park. All staff cars. Motorbikes and bicycles along with any pedestrian traffic shall use this route which is accessible for pedestrians either through the Norfolk House Farm yard or from the Main B1359 road via a new footpath alongside the widened roadway.

Finally, service vehicles required to access the main plant rooms and associated areas along the Western Elevation of the building, shall continue Northwards along the existing repaved site road to the North Western Corner of the site where they shall turn through 180 degrees and proceed to the Service yard area. The existing site road will not be widened to preserve the tree line adjacent to same and this area of the network will be a one way system with the existing trucks re joining the network at the car park exit and heading southwards to the Main site exit.

7.1 On Site Car Parking

Although the development covers an extensive area, as can be seen from the foregoing information a large proportion is unmanned or lightly manned, as most of the growing and harvesting process is automated with human intervention at the critical points only. The table below outlines the proposed staffing of the facility.

Area	No	Transient	Shared With	Total No
Glasshouse	5	Y	Gemination/Seeding	5
Germination & Seeding	5	Y	Glasshouse	-
Harvesting	8	N	-	6
Low Care Production	8	N	-	8
High Care Production	8	N	-	6
Packing	6	N	-	6
Dispatch Chill	2	Y	Dispatch Loading dock	2
Dispatch Loading Dock	2	Y	Dispatch Chill	-
Packaging Store	2	Y	Pallet Store, Waste Areas	2
Pallet Store	2	Y	Pack Store Waste Areas	-
Waste Areas	2	Y	Pallet Store Pack Store	-
WIP Chill	2	Y	Intake Loading Bay	2
Intake Loading Area	2	Y	WIP Chill	-
Hygiene staff (all areas)	4	Y		4
			Total	41
Administration				
Office Staff	15	N		15
Canteen Staff	2	N		2
Management	5	N		5
Hygiene Staff (office)	2	N		2
Engineering Staff	5	N		5
			Total	29
Visitors (10%)	7	N	Total	7
			Required Facility Total	77
			Provided Facility Total	85

It should be noted that these parking numbers are worst case and in fact a number of employees share lifts to the site which would see a reduction of circa 25% of the Main Plant numbers. A shared lift scheme will be encouraged by Jepco in the operations of the site. The parking requirements are achieved in three distinct areas on the site on the Western boundary as per figure 37 below.

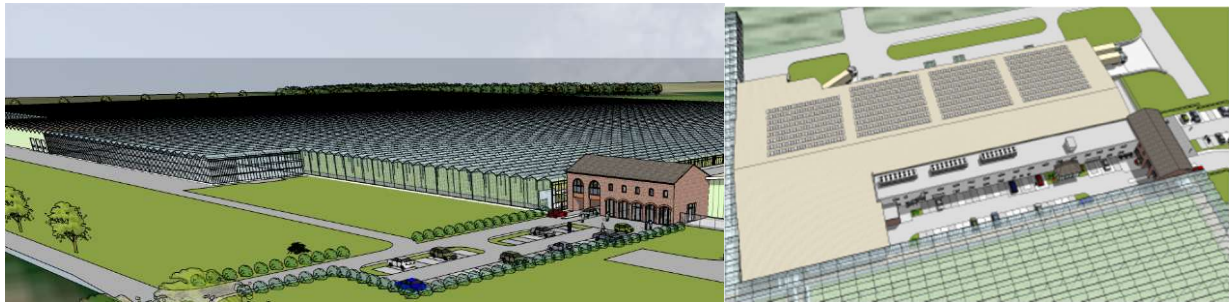


Figure 37 Car Parking Arrangements

Car park No 1 is located on the Western face of the main entrance building and is accessible from the main access road. This car park contains a total of 32 spaces including 2 disabled spaces and is intended to cater for office staff, Management, Canteen and hygiene staff and Visitors. In addition, bicycle parking will be located in this area adjacent to the Main entrance building. Engineering staff parking shall be located beside the main plant room along the Western Elevation remote from this area.

General Staff parking will be located within the courtyard parking area between the two storey Administration block and the Glasshouse and contains a total of 47 spaces along with a single disabled space. Secure parking for 16 staff bicycles shall also be located in this area.

Public Transport Access

Given its rural location, the site is not currently on a regular public service bus or train route.



It is however accessible through a combination of regular and on call services.

The Stagecoach operated Route 505 is a regular route which runs between Spalding and Kings Lynn approx. every 30mins from 0700hrs to 1930 hrs daily.

At Chapelgate Gedney, Holbeach and Long Sutton, the 505 service links to the Call Connect area, which is an on demand bus service run by Lincolnshire County Council. The Call Connect buses serve hamlets, villages and market towns throughout Lincolnshire and neighbouring counties, and offer passengers the flexibility to connect to their local communities and other transport options.

Figure 38 Local Bus Route 505

This means its routes can differ each day depending on the bookings made by passengers. Journey requests can be made by telephone or online. In addition to the network of on demand bookable bus services, CallConnect also provides a number of more traditional timetabled bus services. Designed to improve transport in rural communities and market towns and enhance connectivity. CallConnect offers passengers the freedom to request a bus online or by phone at times to meet their needs.



Anyone can use the Call Connect bus service for any reason and as frequently as required. The service is operated using fully accessible minibuses and most services operate between 7am-7pm Monday to Friday and 7:30am-6:30pm Saturday. The Call Connect minibus will pick up and set down at designated locations in each village or town. Registration to the service is free but patrons must be registered to book a journey. Once registered, transport bookings and cancellations can be made using this online portal or by phone.

Figure 39 Call Connect Area

Although not as convenient as a walk on walk off service, Call connect does offer a viable option for staff members using public transport from Spalding and Kings Lynn or anywhere between to access the site.

7.2 Emergency Access

The proposed widening of the entrance roadway provided clear and simple access for both Fire and general emergency services to the site, In addition the surrounding perimeter roadway gives clear access to 70% of the overall footprint and of the operational building.

8.SUMMARY

The long-established J E Piccaver & Co (JEPCO) is seeking to innovate and evolve its current site operations in response to climate change adaptation, and the shifting economic opportunities. The Redevelopment of a portion of the existing farm facilitates the integration of cutting-edge hydroponic growing strategies that increase crop yields which will then be integrated with a purpose built pack and distribution centre to further drive efficiency in processing and distribution.

The development will be undertaken with full cognisance of the existing Natural Environment and in keeping with the areas Heritage

The adoption of the proposed approach will result in substantial investment into the region, more jobs within the local rural economy, more produce sold to customers, fewer food-miles, and generation of renewable electricity that will decarbonize the activities described.

Key Benefits



Production 40-fold increase per ha freeing land for other uses including nature conservation



Annual Production



Employment for Annual and Skilled Operator Positions, not seasonal



Reduced Import from Continent



Ability to respond quickly to market requirements



An innovative and sector changing project