ROCKHAMPTON REGIONAL COUNCIL
These plans are approved subject to the current conditions of approval associated with Development Permit No. D/89-2017
Dated 21-08-2017

45 m x 12.8 m Igloo

A4 Page scale at 1: 896.60
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Legend

Easements
Property Parcels (Main)
Roads1
Main Roads (TMR)
Major Council Roads
Council Roads
Access/Service Road
Private Roads
Unconstructed Road
Coastline
Ocean
Rivers
DCDB Parks
National Park
Reserves
State Forest

Rockhampton Regional Council

www.aprgreenhouses.com
apr@aprgreenhouses.com
Tel.: + 34 968 89 15 19

www.novedades-agricolas.com
info@novedades-agricolas.com
Tel.: + 34 968 89 15 19

TECHNICAL OFFER

greenhouses & technology

DELIVERY AND INSTALLATION QUOTATION FOR GREENHOUSES AND SYSTEMS

OFFER No. 25116 v2 **DATE:** 07-02-2017

CUSTOMER: FERNLAND **DESTINATION:** AUSTRALIA

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1.- GREENHOUSE INSTALLATION

1.1.- GENERAL DESCRIPTION

Quotation to supply a greenhouse facility with the following characteristics:

1.1.1.- Greenhouse distribution

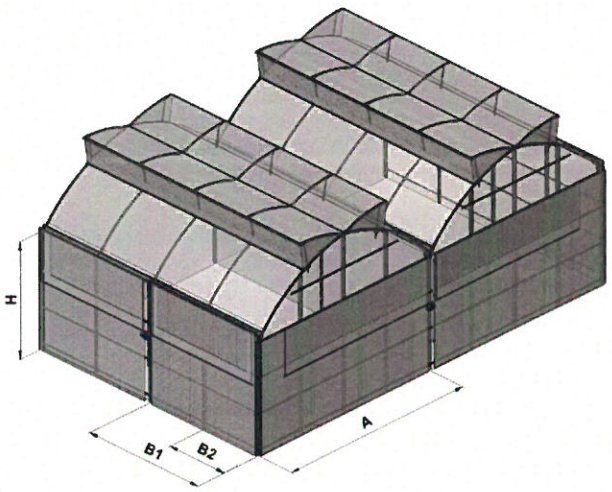
Module N°	Area (m^2)	Greenhouse width N° of bays	Length (m)	Gutter height
1	576 m^2	1 x 12,8 m bay = 12,8 m	45 m	3,5 m

1.1.2.- Model

The greenhouse is a **gothic** type, model **apg128**

Gothic greenhouse

This multi gothic greenhouse is designed to be adaptable to any kind of crop. It can be covered with film, net, polycarbonate or metallic sheet. The shape of the roof allows to have a bigger amount of air and to have a better micro climate and inner light. It is suitable for snow loads. It is suitable for all climate conditions.

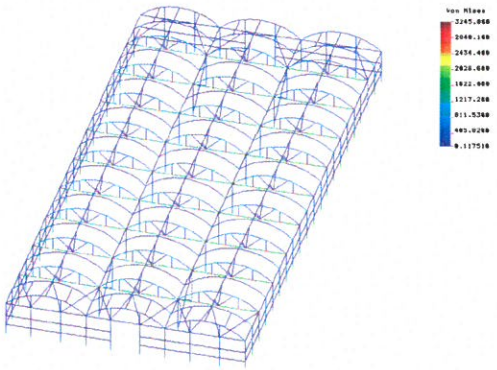


Standard dimensions: A = 12,8 m B_2 = 3 m H = 3,5 m

1.2.- STRUCTURE AND MATERIALS

1.2.1.- Structure calculation

The design of the greenhouse and its structure have been calculated by the **APR** technical department together with the University of Almeria (UAL), following the prescriptions of standard UNE-*EN 13031-1*, ***"Greenhouses, Project and Construction"***
Strength calculation has been made using computer tools based on the finite elements method, modelling previously the geometry with three-dimensional methods.



In general and taking into account different models, the load hypothesis adopted for calculations are the following ones:

- **Snow or hail:** 1B Region, in the order of 30 Kg/m^2
- **Crop weight:** crop is hanging from wires, it is estimated a resistance of 15 Kg/m^2
- **Wind speed:** under EN norms, the greenhouse has a sustained wind speed resistance of 97 km/h, 115 km/h for wind gusts (the windows must be closed for wind speed up 50 km/h)

Remark: In the winter season, against the snowfall, the greenhouse will be a correctly maintenance: the heating system will be working all the time to heat the greenhouse interior and the gutters, for the melting of the snow, (the snow **load it's referring to the gutters)**

1.2.2.- Materials

The materials used for the greenhouse have the following characteristics:

- **Pillars:** Welded tube has been hot-deep galvanized following a discontinuous process, according to EN 10305-3:2011, Steel type is S 235 JR.
- **Arches, bars and profiles:** Galvanized welded tube has been made from galvanized coils according to EN 10305-3:2011 standard. Steel type is Fe P02G.
- **Galvanized sheet (Gutters):** Galvanized sheet has been made from galvanized coils according to EN 10305-3:2011 standard. Steel type is S 275 J0H.
- **Screws** are made in bichromatic steel, with a high corrosion resistance surface treatment **"Delta Potekt KL-100"**

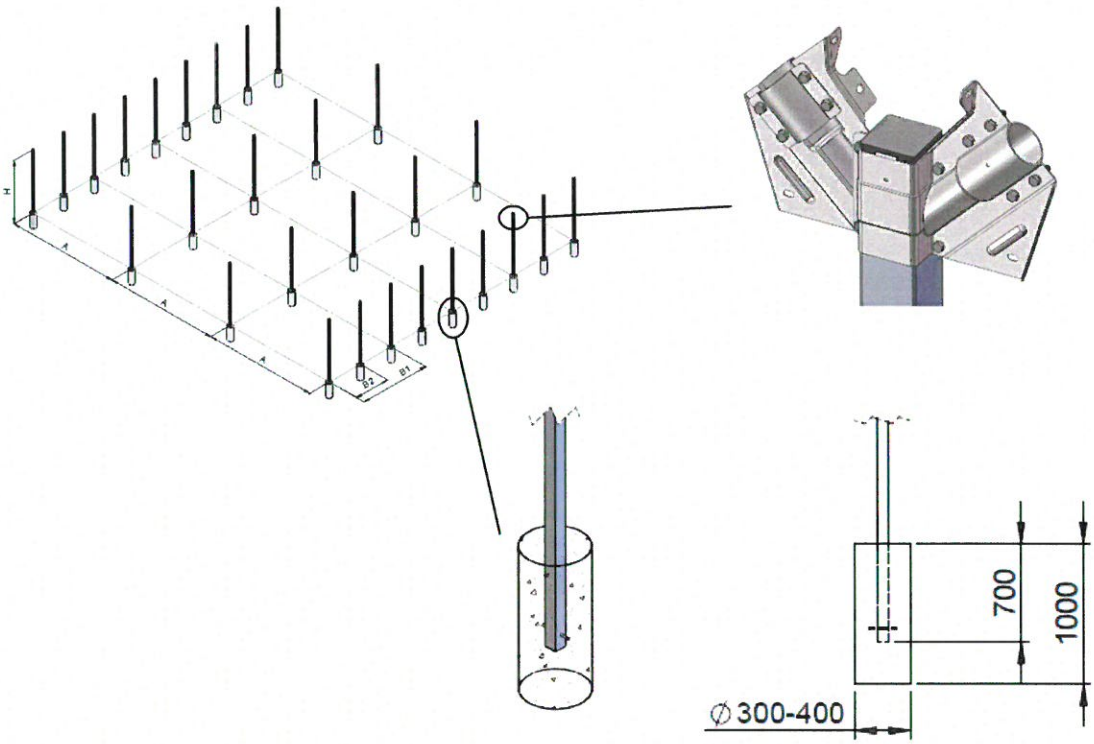
The supplier companies are certificated according ISO 9001:2008

1.3.- STRUCTURAL ELEMENTS

1.3.1.- Pillars

The greenhouse pillars have the following characteristics:

Side pillars:	square hot-deep galvanized tube
Front pillars:	Rectangular hot-deep galvanized tube



1.3.2.- Arches

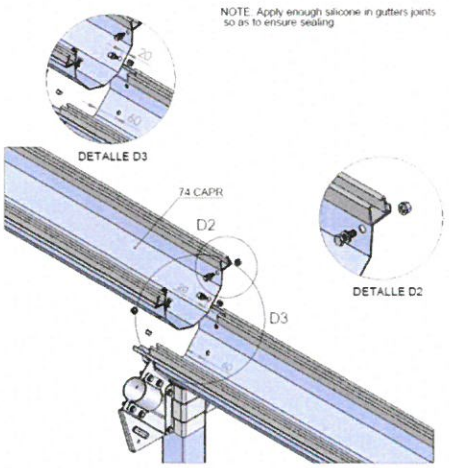
Type	gothic type, 12,8 m between capitals.
Material	Ø90x60x1.5 mm oval galvanized tube.
Distribution	Space between arches: 3 m, arches supported by pillars every 3 m

Arches supported by pillars configuration

Crop bars:	Ø48 mm round galvanized tube.
V-bracing:	2 V-bracing from crop bars to top belts.
Bracings:	Ø 32 mm galvanized bars
Frontal reinforcements:	Reinforcements in all the frontal arcs of the greenhouse, from the first arch to the second one.

1.3.3.- Gutters

Its function is to drain the rainwater. The water volume that can be drained by the gutter depends on the size of the sheet used in its manufacture. In this element it is basic to pay attention to the resistance to the environment and to the continuous contact with water. For this reason it is used SENDZIMIR Z-275 galvanized steel as well as joint systems between gutters in order to guarantee that they are watertight (silicone, rubber washers, etc).

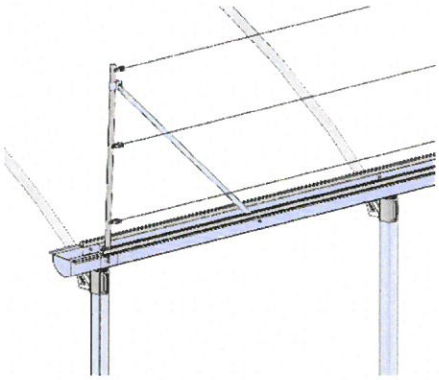


Central and lateral gutters have **416** mm of sheet width and 2 mm thickness, made in galvanized sheet of 9 folds. Gutters have simple slope.

Every gutter includes 1 holes for Ø160 rain pipes (rain pipes are not included).

1.3.3.1.- Fall prevention.

It's included an anti-fall system, fixed to the side gutters to guarantee fall protection in maintenances works and in the plastic changes time



1.3.4.- Profiles and belts

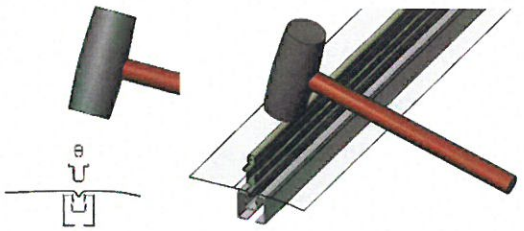
Profiles for plastic fixation work also as reinforcements for the structure. They will be placed as follows:

- Top and roof lines: ..... **"H" PROFILE**
- Furthest line of Zenithal window: ..... **"H" PROFILE**
- Base line of Zenithal window: ..... **"H" PROFILE**
- Gutter lines: ..... **"C" PROFILE**
- Side lines: ..... **"H" PROFILE**
- Front lines: ..... **"H" PROFILE**

Profiles characteristics:

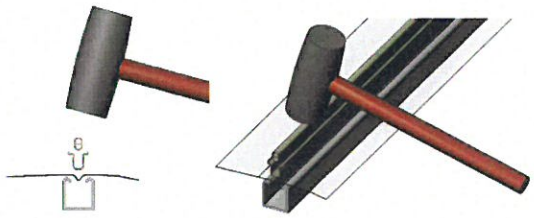
H PROFILE

- Dimensions: 34 x 32 x 1,5 mm
- Galvanized: continuous type, sendzimir Z-275
- Plastic / net fixation: PVC's clip



C PROFILE

- Dimensions: 26 x 18 x 1,2 mm
- Galvanized: continuous type, sendzimir Z-275
- Plastic / net fixation: PVC's clip



1.4.- VENTILATION

Air exchange between interior and exterior of the greenhouse has an effect over the crop climate, it's acting on the following parameters:

- Oxygen and carbon dioxide exchange.
- Air temperature
- Percentage of water vapour

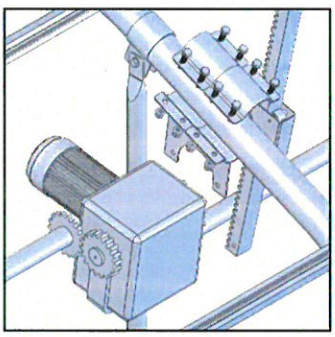
1.4.1.- Zenithal ventilation, type double ¼

Continuous ventilation systems allow for efficient ventilation in multi modular greenhouses, avoiding limitations on the maximum width to build.

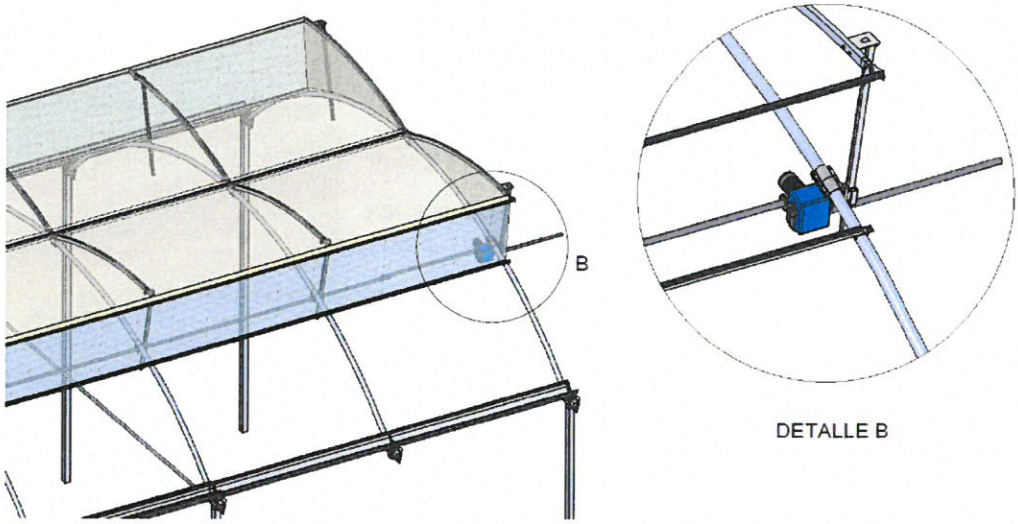
This offer includes (per tunnel) a window as long as the tunnel.

Mobile ventilation

Each window system is made up of a command bar which, using pinions and racks, converts its twist in the opening and closing of the zenithal window.



- geared motors for automatic opening
- Window arms made in 50x30x1,5 mm, rectangular tube.
- Pinions and racks with double tooth every 3 m.
- Motive axis Ø 33 x 2,5 mm thickness.



1.4.2.- Perimeter ventilation

Side or front ventilation comes from opening windows along the greenhouse walls. This quotation includes (per module)

Side ventilation: 4 roll-up side windows along the greenhouse sides, using 2 meters wide rolling system, with sliding geared motor with guide for automatic opening.

1.4.3.- Climatic compartment: Sensors

- 1 x temperature measure box, wiring and fittings are included

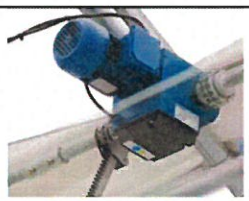
1.4.4.- Gear motor electric installation

General electric box, placed at the greenhouse corridor, consisting of:

- Electric box, with magnetothermic protection for supply lines.
- Command switches, one per each windows group, to open / close windows in manual or automatic mode.
- Reverse starters, one per geared motor, made of an adjustable current circuit breaker and contactors.
- Supply and command wiring to gear motors, in line sections adapted by R.B.T (Low Voltage Spanish norms – EC norms)., made in copper hose – cable RVK 0.6/1 kV, included cable ties and small fittings.
- Metal grid for wiring distribution.

ROOF WINDOWS GEARMOTOR

Description	T [Nm]	P [kW]	U [V]	I [A]	n [rpm]	L [mm]
Motor 400V, 3~ 50 Hz	300	0,26	230/400	1.6/0.9	2.6	460



PERIMETRAL WINDOWS GEARMOTOR

Description	T [Nm]	P [kW]	U [V]	I [A]	n [rpm]	L [mm]
	100	0,18	230/400	1,2/0,7	3.7	442

Note: This quotation does not include electric service connection and wiring from transformer / machine room to greenhouses, being necessary electricity supply of Triphase, three phases + neutral, 400V / 50 Hz voltage

1.5.- GREENHOUSE COATING

1.5.1.- Characteristics

Structure closing has the following characteristics:

Component	Cover material
▪ Roof:	3 layers film, 800 gauges, 3 seasons
▪ Side:	3 layers film, 800 gauges, 3 seasons
▪ Front:	3 layers film, 800 gauges, 3 seasons
▪ Half moon:	3 layers film, 800 gauges, 3 seasons
▪ Partition:	3 layers film, 800 gauges, 3 seasons
▪ Zenithal ventilation:	16x10 net
▪ Lateral ventilation:	20x10 net

Plastic properties

TYPE	Thermal plastic, 3 years .
Material	Triple co-extruded LDPE film, white translucent colour - **External layer**: resistant and anti-adherent, it's provided with U.V. additives - **Central layer**: Thermic: high EVA content, provided thermicity high EVA content, it is provided thermicity - **Internal layer**: provides good light diffusion and co-stabilizers against pesticides

Properties		Value	Unit	Norm
Thickness		200 / 800	µ / gauges	ISO 4591
Mechanical properties				
Traction at break - point	D.M.	21	Mpa	EN-ISO 527-3
	D.T.	21		
Final elongation	D.M.	780	%	EN-ISO 527-3
	D.T.	930		
Tear strength	D.M.	9	N	ASTM D-1922
	D.T.	13		
Dart test(F_{50})		1200	g	ISO 7765-1
Optical properties				
Global transmission of visible light		90	%	EN 2155-5
Thermal effect (thermicity)		13	%	EN 13206
Diffused light		38	%	EN 2155-9
Duration				
Recommended agricultural seasons		3	Season	UNE 53328

* climatology Almeria's type (Spain) (145 Kly/year)

Net properties

Thickness	20 x 10 threads/cm²	16 x 10 threads /cm²
Material	HD PE + stabilizers	HD PE + stabilizers
Threads		
Warp	20 monofilament threads	16 monofilament threads
Woof	10 monofilament threads	10 monofilament threads
Thread diameter	Ø 0.23 mm	Ø 0.25 mm
Weight	145 gr/m² (aprox)	135 gr/m² (aprox)
Mechanical strength	45	110
U.V. resistance	500	500
Elongation break	22%	22%
Porosity	64 %	71 %
Porometry	0.27 x 0.77 %	0.27 x 0.97 %
Light coverage	36%	29%

1.5.2.- Doors

We offer (per module):

Location	N° doors	Dimensions	Anteroom
Front door	2	3 x 3 m	it has not
Partition door	1	3 x 3 m	it has not

Doors are made with metal profiles and cover with cellular polycarbonate

1.6.- SUMMARY OF CHARACTERISTICS:

Pillars:

Side pillars:	----------	80x80x3 mm square galvanized tube, every 3 m
Frontal pillars:	----------	120x80x4 mm square galvanized tube, 3 pillars per bay
Gutter/ top height:	----------	3,5/6 m

Arches:

Arches:	----------	Ø 60x1.5mm round galvanized tube, gothic type every 3 m.
Crops bars:	----------	Ø48 mm type, in all arches
Interior reinforcement:	---	In all arches (5 vertical bars per bay)
Bracing:	----------	2 V - bracing

Profiles and belts:

Top and roof:	---------	1 x 34x32x1.5 "H" PROFILE belt
Gutter:	---------	2 x 26x18x1.2 "C" PROFILE belt
Sides:	---------	2 x 34x32x1.5 "H" PROFILE belt
Frontals:	---------	2 x 34x32x1.5 "H" PROFILE belt + under gutter belt
Line of Windows::	---------	2 x 34x32x1.5 "H" PROFILE belt

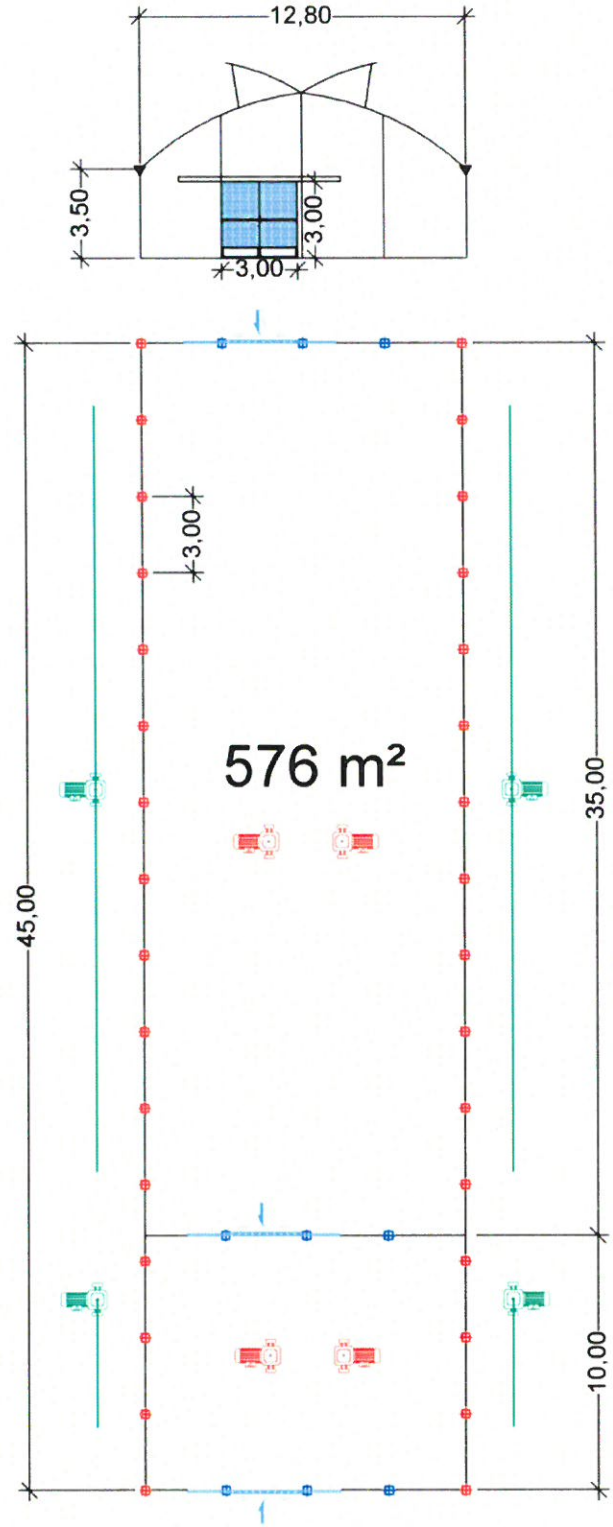
Ventilations:

Roof:	----------	double ¼ , 16x10 net with automatic operation
Lateral:	----------	roll - up , 20x10 net with automatic operation
Motors:	----------	4 units for roof, 4 units for perimeter
Electric system	----------	included

Cover:

Roof:	------	3 layers film, 800 gauges, 3 seasons
Sides:	------	3 layers film, 800 gauges, 3 seasons
Frontal:	------	3 layers film, 800 gauges, 3 seasons
Half moon:	------	3 layers film, 800 gauges, 3 seasons
Partition:	------	3 layers film, 800 gauges, 3 seasons
Doors:	------	3 frontal doors, size 3 x 3 m

1.7.- LAYOUT



EXCLUDED	✦ Power or water supply to the field ✦ Greenhouse's foundations ✦ Land levelling ✦ Civil work ✦ Permissions or legalizations in the destiny country ✦ Any subject non reflected in the present budget
SALE CONDITIONS	✦ Prices **C.I.F.** - AUSTRALIA ✦ Prices in EUROS ✦ Payment will be in EUROS ✦ Payment terms: Irrevocable letter of credit, confirmed by Spanish bank and payable in our bank offices in Mazarrón, Murcia (SPAIN) ✦ Customs expenses on charge of the buyer. ✦ Offer available during 30 days

NOTE: All the drawings and images that appear in the present budget, are only included for illustration purposes. They might not correspond to the specific characteristics of the requested project