Campus Transit System

جامعة الملك سعود –

K.S.A.U.PROJECT

King Saud bin Abdulaziz University for Health Sciences

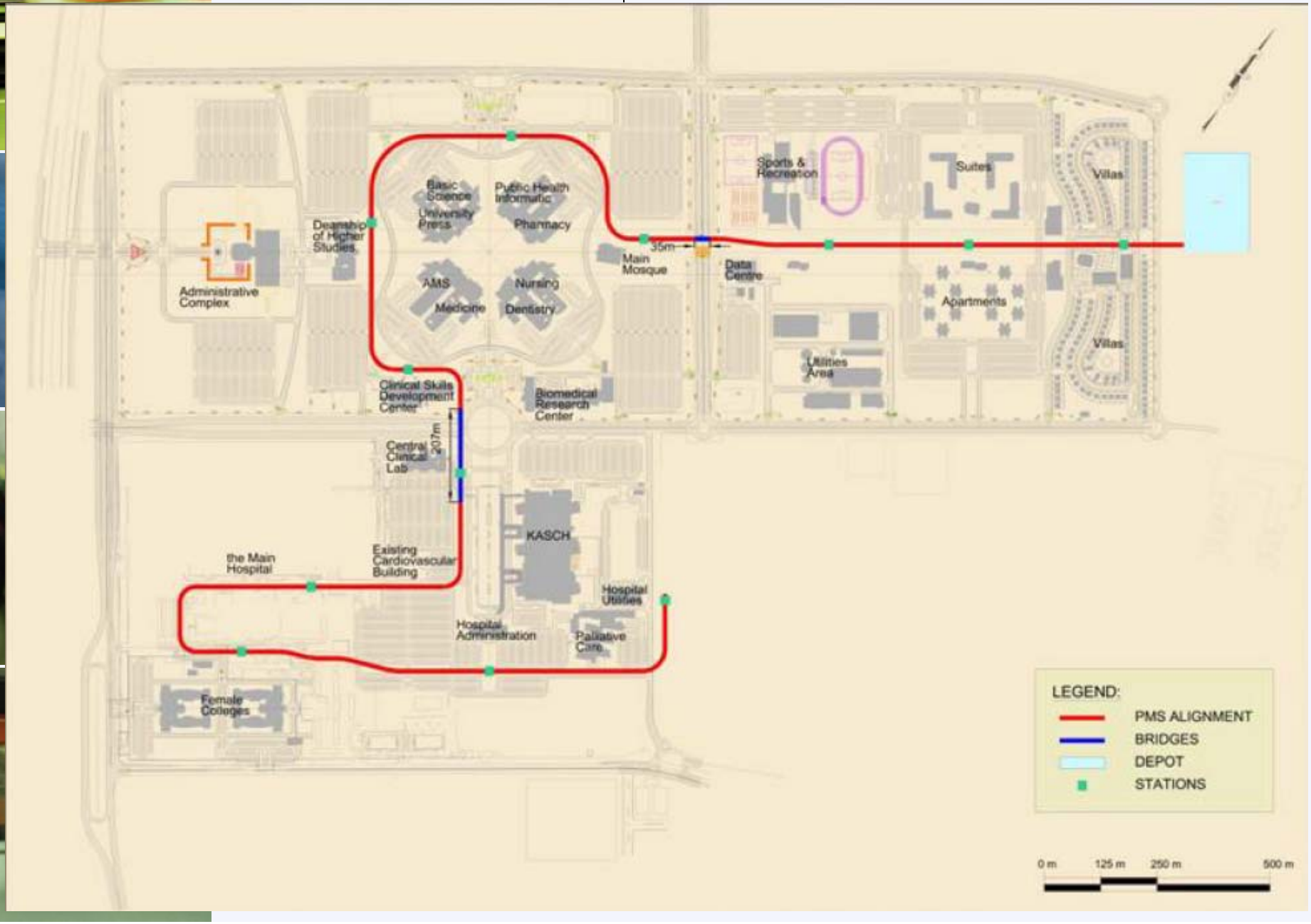
جامعة الملك سعود بن عبدالعزيز للعلوم الصحية

King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) is the first public university in the Kingdom of Saudi Arabia and the middle east region specialized in health sciences.

It is located in Riyadh, the capital of Saudi Arabia and occupy an area of 5 million square meter (5,000,000 m^2) in the eastern part of the city beside King Abdulaziz Medical City.

King Abdulaziz Medical City has been the nucleus of KSAU-HS that gradually moved from being a health institution offering state-of-the-art medical services to a distinguished and pioneering academic institution entitled King Abdulaziz Medical City Academy for Health Sciences - National Guard.

جامعة الملك سعود– - K.S.A.U.PROJECT



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Campus Transit System

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K.S.A.U.PROJECT

The approach




Trolmérida
Andes donde Andes

SICE

Typical Station of Merida RTS System.




Trolmérida
Andes donde Andes

Station of Merida RTS.

SICE




- Reference Barquisimeto, Venezuela

Reference Barquisimeto, Venezuela

TRANSBARCA
Sistema de Transporte Masivo de Barquisimeto




Trolmérida
Andes donde Andes

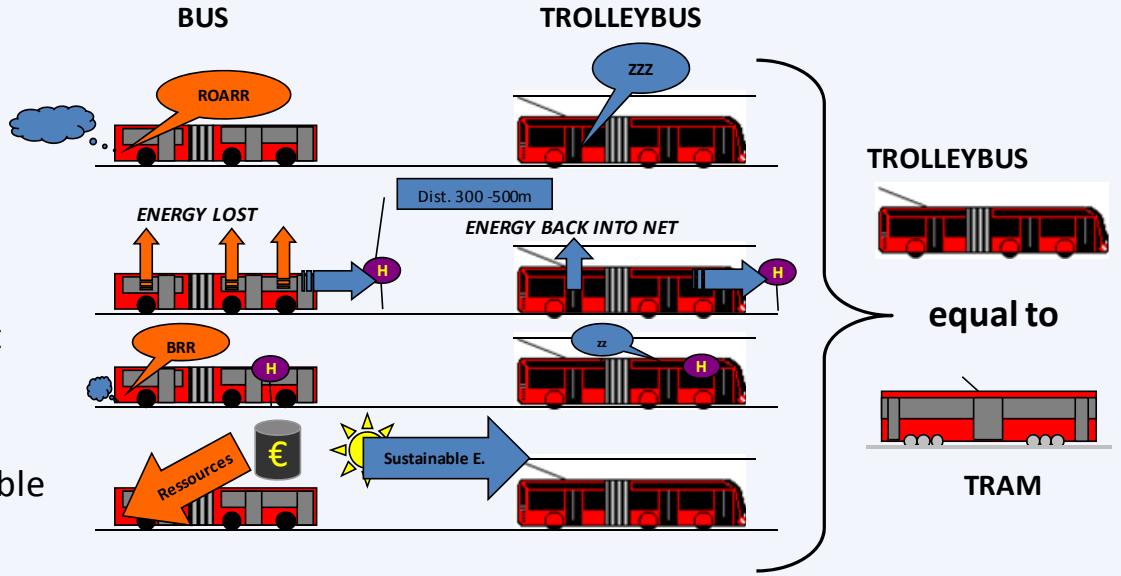
SICE

Depot of Merida RTS System.

Solution Comparison

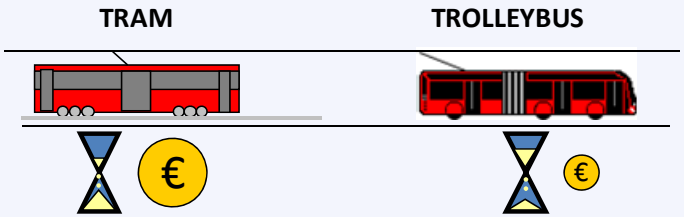
BUSES OR TROLLEYBUSES/TRAMS

- Locally Zero Emission
- Brake energy recuperation
- No engine run at stops
- Sustainable energies are usable



TROLLEYBUSES OR TRAMS

- Shorter construction time and substantially cheaper than a rail system



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Campus Transit System

جامعة الملك سعود –

K.S.A.U.PROJECT

The Signed Contract

The consortium

Leadership and project Management

SICE

System Integrator

Viseon

A MAN Company

Rolling Stock

TMB

Transports Metropolitans de Barcelona

Value engineering and Operation



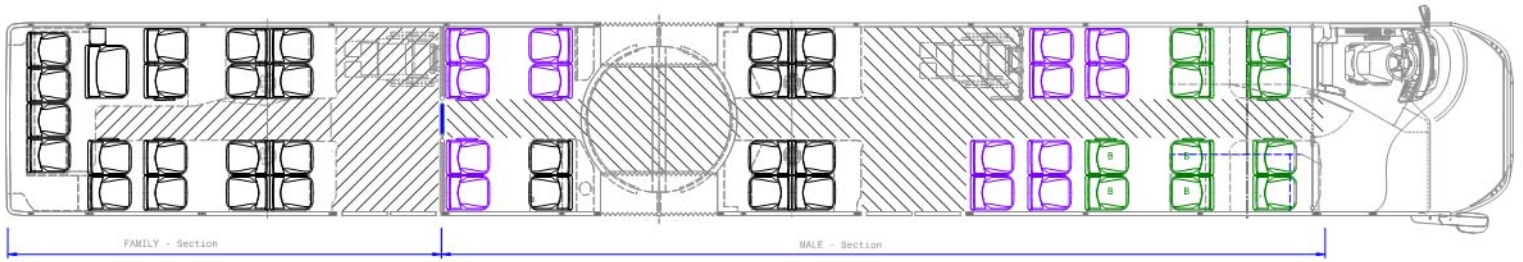

RAPID TRANSIT SYSTEM Vehicle, with capacity for 120 Passengers (12 Units).

Supplier VISEON (former MAN – Neoplan)
Length:19,5 m
3 Doors
The vehicles are powered by 750V DC electrical power.
Current collection is performed by a pantograph trolley-poles
Low emissions Auxiliary autonomous power unit 120kW EURO5
Closed wheel housing on drive axle with fiberglass covers.
Closed wheel housing on steering axle. The covering will be a permanent installation that covers the wheels, one that moves with the steering movement of the front axle.




SEATING LAYOUT

	SEATED Capacity	STANDEE Capacity
MALE	34	42
FAMILY	19	24
DRIVER	1	0
TOTAL	54	66

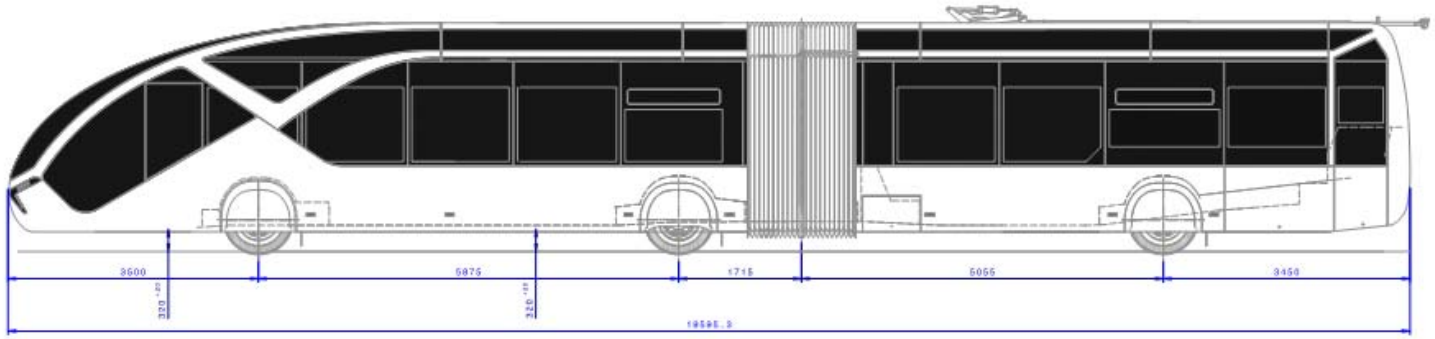


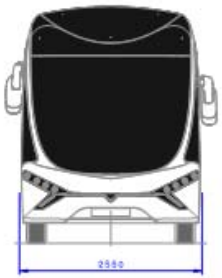
= fixed seating position – not to be changed, due to technical requirements

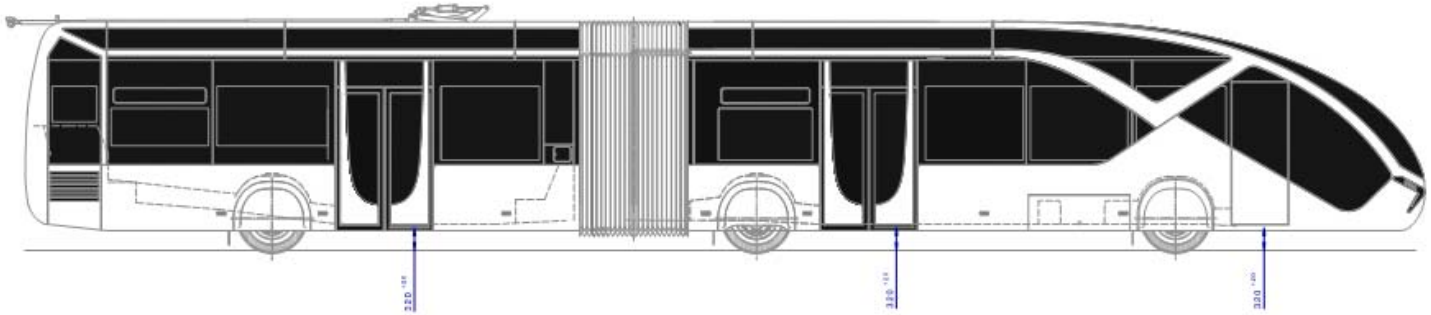
= variable between single seating or double seating – to optimize passenger flow for quick passenger exchange rates

= optional seating – subject to be changed to single seats or to be generally removed from layout, to optimize transport capacity for up to 140 passengers

VEHICLE DESIGN



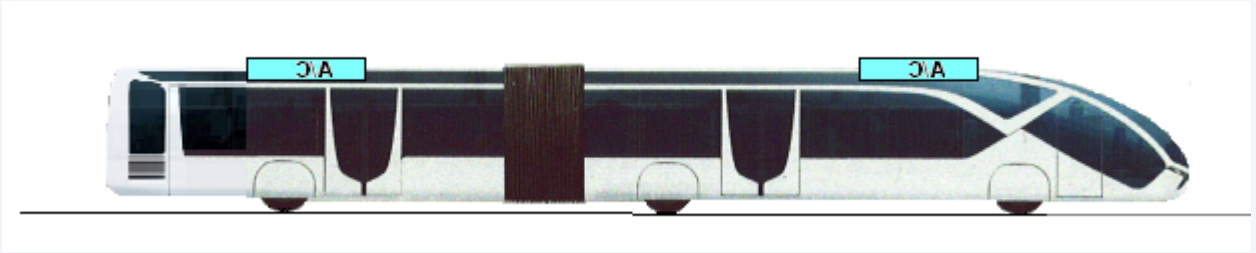





Viseon




AIR CONDITIONING SYSTEM



The RTS is fitted with **three independent working AC units**:

- Driver Unit: AC Front box for the comfort of the driver
- Passenger Unit at the front end of the RTS
- Passenger Unit at the rear end of the RTS

Total Cooling capacity 28.400 x2 = **56.800 kcal/h**

Air curtains on each door help to prevent hot and dusty air from the outside and help keeping good climate conditions in the passenger compartment of the RTS.

The temperature inside the vehicle can be controlled via a thermostat.
It can be adjusted to as low as 20ºC. when outside temperature is about 45ºC, and 23 ºC went outside temperature is about 55ºC.

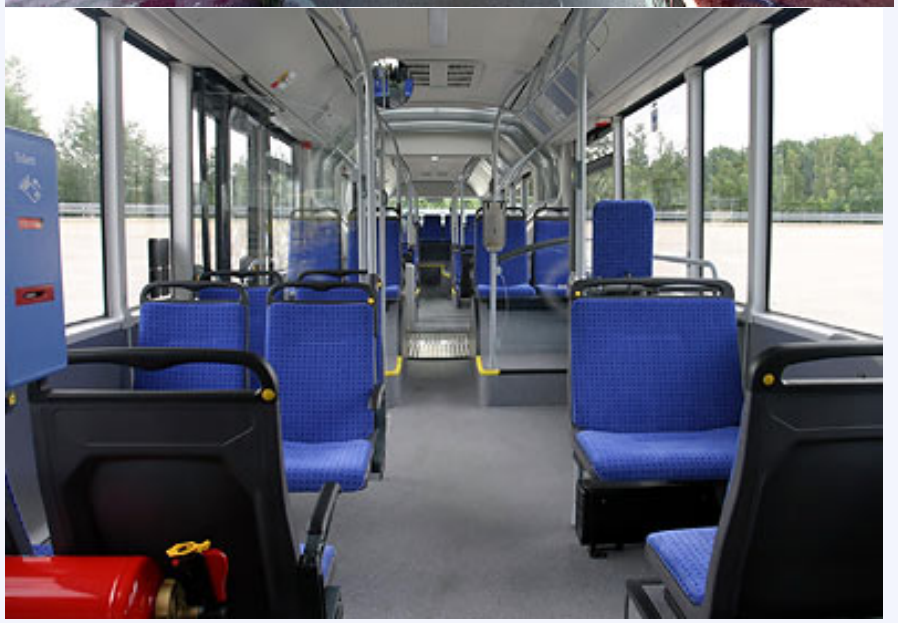
INTERIOR DESIGN

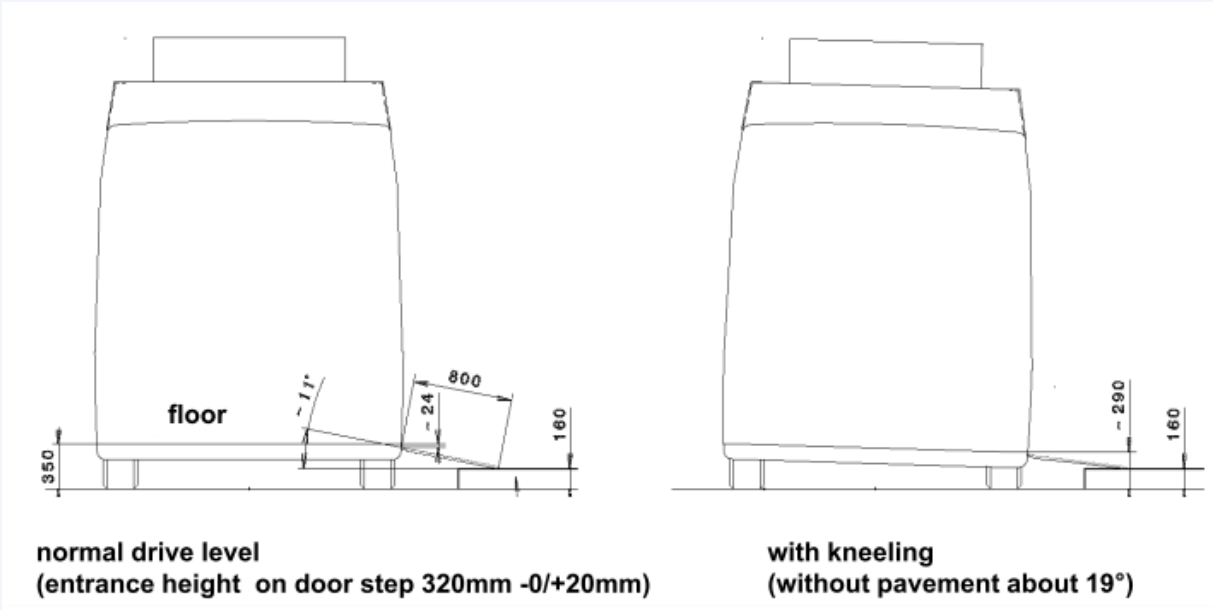
Various interior proposals will be made in draft version.

Seating-hardware, cushion **options**, flooring, as well as seat-fabric samples will be given for principal approval.

Interior **rendering** design will be presented

Color matched outer shell, **luxury** cushions and backrests, coated in a **high value** and durable fabric.





normal drive level
(entrance height on door step 320mm -0/+20mm)

with kneeling
(without pavement about 19°)




HIGH VOLTAGE EQUIPMENT AND TRACTION SUBSTATIONS

Designed to ensure the electrical energy supply to stations, rolling stock, depot and OCC equipments.

The voltage value of the high voltage supply from Saudi Electricity Company (SEC) is 13,8 kV AC.

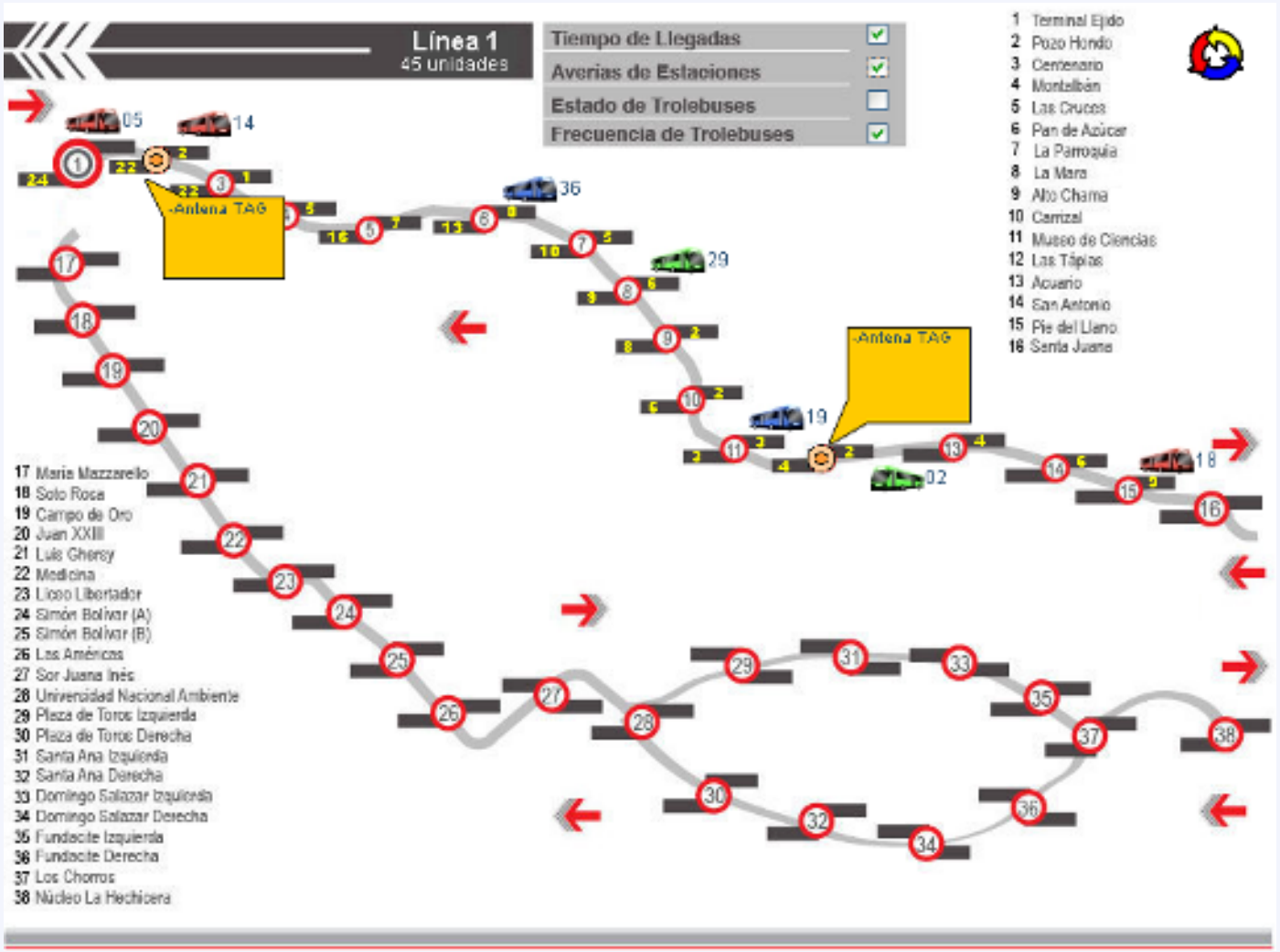
The voltage value of the traction network is set at 750Vdc.




CONTROL CENTER

Centralized control for the following systems:

- **Energy control. A robust SCADA application provides complete centralized management.**
- **Control of transport circulation (transport ops management) :This system controls the RTS vehicles, shifts, frequencies, regularity of the service.**
- **Centralized control of the Traffic Management system and RTS vehicle priority system at intersections.**
- **Communications control with the vehicles.**
- **Supervision of the CCTV system.**


Línea 1
45 unidades
Tiempo de Llegadas
Averías de Estaciones
Estado de Trolebuses
Frecuencia de Trolebuses
Antena TAG
Antena TAG
1 Terminal Ejido
2 Pozo Hondo
3 Centenario
4 Montalbán
5 Las Cruces
6 Pan de Azúcar
7 La Parroquia
8 La Mara
9 Alto Chama
10 Camizal
11 Museo de Ciencias
12 Las Tápias
13 Acuario
14 San Antonio
15 Pie del Llano
16 Santa Juana
17 María Mazzarello
18 Soto Rosa
19 Campo de Oro
20 Juan XXIII
21 Luis Ghersy
22 Medicina
23 Liceo Libertador
24 Simón Bolívar (A)
25 Simón Bolívar (B)
26 Las Américas
27 Sor Juana Inés
28 Universidad Nacional Ambiente
29 Plaza de Toros Izquierda
30 Plaza de Toros Derecha
31 Santa Ana Izquierda
32 Santa Ana Derecha
33 Domingo Salazar Izquierda
34 Domingo Salazar Derecha
35 Fundacite Izquierda
36 Fundacite Derecha
37 Los Chorros
38 Núcleo La Hechicera

PROJECT PLAN

TOTAL DELIVERY TIME
ALL IN
20 MONTHS

RTS VEHICLE

ENERGY DISTRIBUTION

DEPOT

CONTROL CENTER

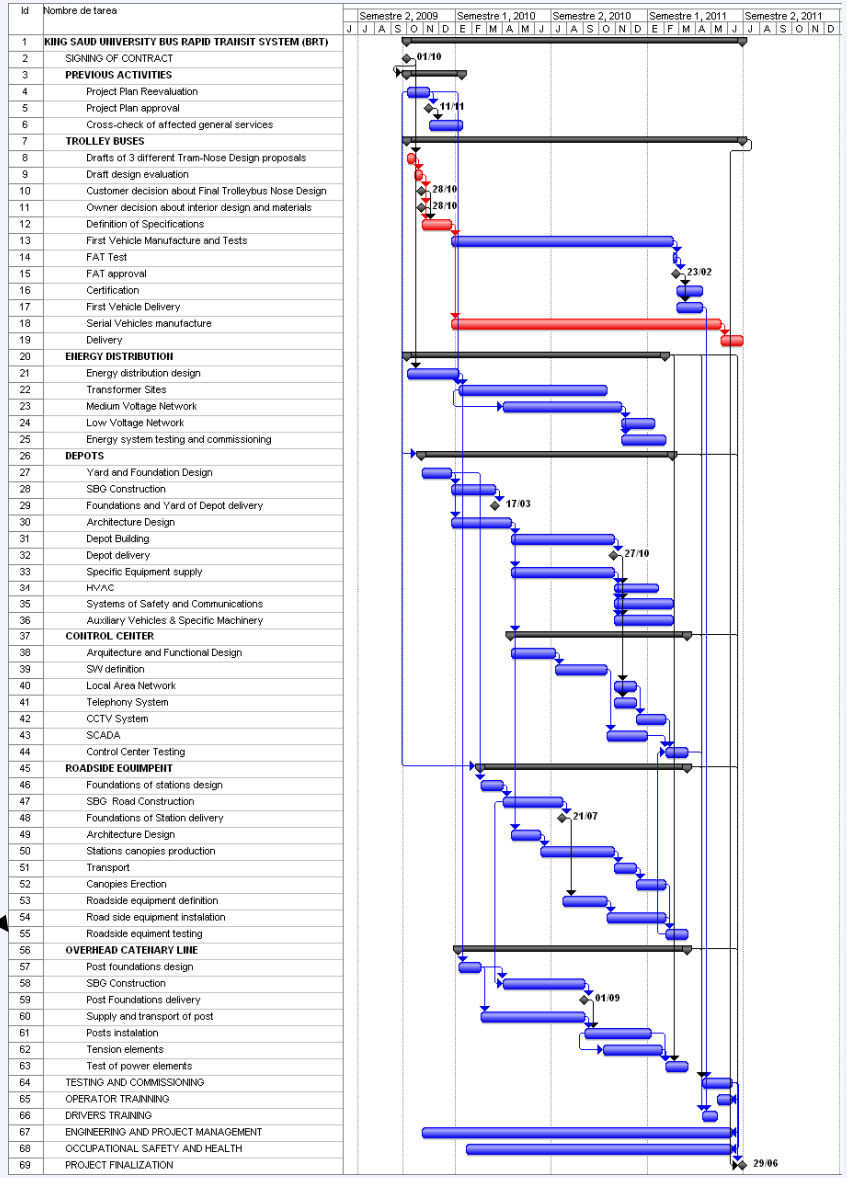
ROADSIDE EQUIPMENT

OVERHEAD CATENARY

TESTING AND COMMISSIONING

OPERATOR AND DRIVERS TRAINING

Id	Nombre de tarea
1	**KING SAUD UNIVERSITY BUS RAPID TRANSIT SYSTEM (BRT)**
2	SIGNING OF CONTRACT
3	**PREVIOUS ACTIVITIES**
4	Project Plan Reevaluation
5	Project Plan approval
6	Cross-check of affected general services
7	**TROLLEY BUSES**
8	Drafts of 3 different Tram-Nose Design proposals
9	Draft design evaluation
10	Customer decision about Final Trolleybus Nose Design
11	Owner decision about interior design and materials
12	Definition of Specifications
13	First Vehicle Manufacture and Tests
14	FAT Test
15	FAT approval
16	Certification
17	First Vehicle Delivery
18	Serial Vehicles manufacture
19	Delivery
20	**ENERGY DISTRIBUTION**
21	Energy distribution design
22	Transformer Sites
23	Medium Voltage Network
24	Low Voltage Network
25	Energy system testing and commissioning
26	**DEPOTS**
27	Yard and Foundation Design
28	SBG Construction
29	Foundations and Yard of Depot delivery
30	Architecture Design
31	Depot Building
32	Depot delivery
33	Specific Equipment supply
34	HVAC
35	Systems of Safety and Communications
36	Auxiliary Vehicles & Specific Machinery
37	**CONTROL CENTER**
38	Arquitecture and Functional Design
39	SW definition
40	Local Area Network
41	Telephony System
42	CCTV System
43	SCADA
44	Control Center Testing
45	**ROADSIDE EQUIMPENT**
46	Foundations of stations design
47	SBG Road Construction
48	Foundations of Station delivery
49	Architecture Design
50	Stations canopies production
51	Transport
52	Canopies Erection
53	Roadside equipment definition
54	Road side equipment instalation
55	Roadside equiment testing
56	**OVERHEAD CATENARY LINE**
57	Post foundations design
58	SBG Construction
59	Post Foundations delivery
60	Supply and transport of post
61	Posts instalation
62	Tension elements
63	Test of power elements
64	TESTING AND COMMISSIONING
65	OPERATOR TRAINNING
66	DRIVERS TRAINING
67	ENGINEERING AND PROJECT MANAGEMENT
68	OCCUPATIONAL SAFETY AND HEALTH
69	PROJECT FINALIZATION



PROJECT PLAN

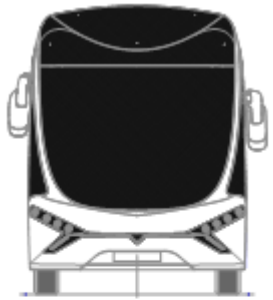
Delivery time vehicles : 16-20 months

We would like to highlight the Rolling stock - lead times:

At total number of twelve (12) RTS-vehicles:

Delivery of first RTS-vehicle no. 01

16 months after final purchase order.



Final delivery of RTS-vehicle no. 12

ends after 20 months




IMPLEMENTATION AND COMMISSIONING PHASE

TRAINING

During testing and commissioning tasks, the training of operators, supervisors, drivers and mechanics is considered in the scope of works, and the owner should provide the manpower .

RTS number	Workshop personnel	Drivers	Supervisors	CCO Personnel	Total
12	4	37	2	5	48

TMB OVERSIGHT

Transport Metropolitan of Barcelona (TMB) oversight is included like:

- ❑ Assistance to design the whole system,
- ❑ Designing the operation procedures,
- ❑ Defining de Commissioning procedure,
- ❑ Training courses schedule.

We are pretty sure that the TMB experience will give the owner complete confidence about a successful start of operation.

OPERATIONAL PHASE

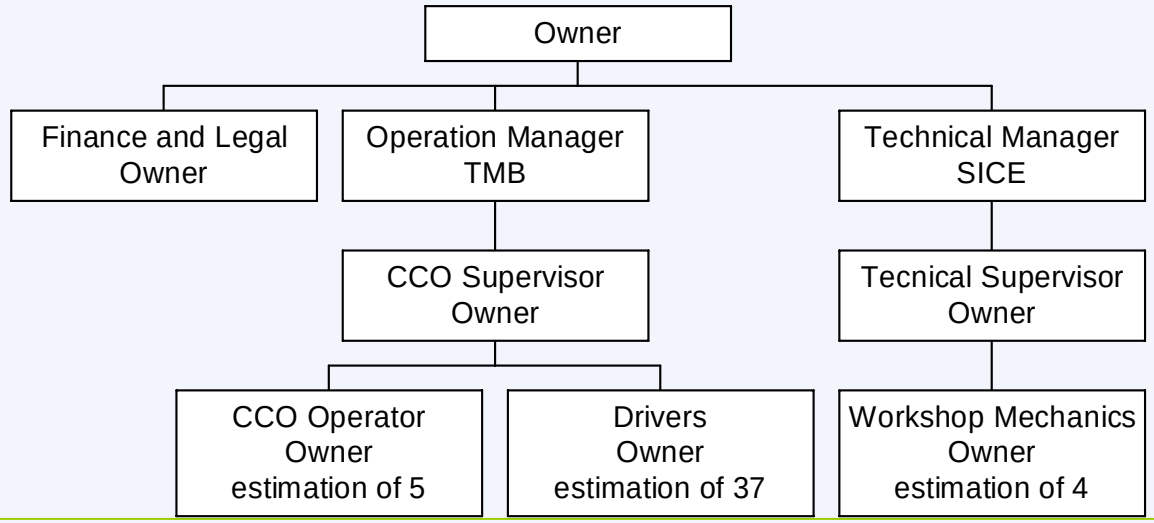
After project implementation is off.

A proposal optional to the owner (subject to contract).

This option includes **SICE and TMB high experience personnel on site**

Drivers, mechanics, CCO Personnel and Supervisors are provided by the owner.

RTS Organization Chart






VIP VEHICLE




SICE

GRACIAS POR SU ATENCIÓN

TMB Transports Metropolitans de Barcelona

VISEON