

**Société  
du Grand  
Paris**



Project Management – Procurement Division

# SGP Technical Requirements

November 2019

## SYSTEMS Requirements

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# Contract Review

HV/LV and line cabling contract (GO1)



# Contract Review: HV/LV and line cabling contract (GO1)

The HV/LV services comprise of:

- Transport and distribution of overhead HV electrical energy;
- Transformation, transport distribution of LV electrical energy required for operating equipment

HV/LV services include the supply and installation of the following equipment rooms:

- 20kV energy Delivery Points (DP);
- Lighting Power Posts (LPP) in stations up to and including LV switchboards, and associated battery units;
- Power Posts (PP) in ancillary structures (or in-station utilities in the case of Saint Denis Pleyel) up to and including LV switchboards, and associated battery stations;

Main equipment:

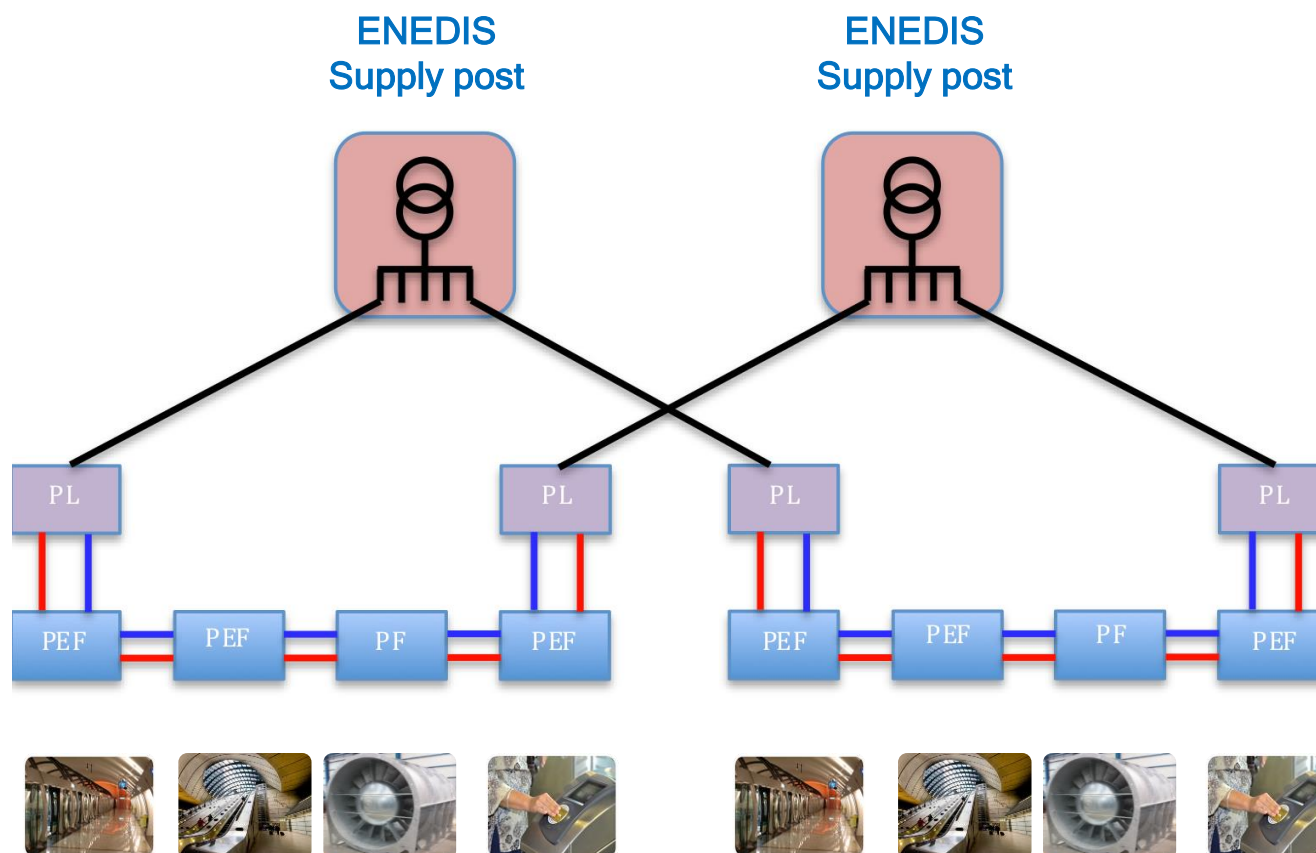
- 20kV / 400V transformers with a power rating between 400 and 2000kVA;
- LV switchboards;
- Uninterrupted Power Supply (UPS) units between 10 and 160kVA;
- Battery stations,
- Overhead HV switchboards (Delivery Post),
- Overhead HV cells,
- Capacitor banks,
- Complete control systems for controlling the HV/LV equipment in the post



# Contract Review: HV/LV and line cabling contract (GO1)

## HV/LV power supply principles in stations and Ancillary Structures (AS)

Each OVH HV loop powers approximately three stations (average number) via Lighting Power Posts (LPP) and seven ancillary structures (average number) via a Power Post (PP). Each OVH HV loop is powered by two Delivery Points (DP). The two DPs on the same loop are situated at the either end of the loop.



Examples of equipment to be powered:

- Standard and emergency lighting
- Ventilation for comfort and smoke extraction
- Air treatment systems
- Heat pumps
- Lifts
- Escalators
- Platform doors system
- Water pumping
- Transmission/radio networks
- CCTV
- Access control/ Interphones / Telephones
- Ticketing systems
- Customer information
- Fire detection systems
- ...

# Contract Review: HV/LV and line cabling contract (GO1)

Line cabling services comprise of :

## **Fibre-optic:**

- Inter-structures Fibre-Optic (FO) connection equipment in the Low Current (LC) equipment rooms, LC Centralised Control Posts (CCP), and local operators;
- Line fibre-optic cabling, up to main LC equipment rooms, LC CCP, LC shafts and local operators;

## **Temperature increase detection in tunnel garage areas**

- The temperature increase detection equipment in tunnel train garage areas to be installed in the main LC and LC shafts equipment rooms;
- The temperature increase detection cabling in tunnel train garage areas up to the main LC and LC shafts equipment rooms;

## **Lighting and emergency power in tunnels:**

- Lighting and emergency power equipment in tunnels, including cabling and connections to lighting Distribution Boards (DB) and emergency power DBs;

## **Sound powered telephone system:**

- Sound powered telephone equipment in tunnels, including cabling, up to **LGI equipment** rooms and shafts.

## **Handcar alcove equipment:**

- Lighting equipment, charging points and maintenance points, including cabling up to the lighting Distribution Boards (DB) and emergency power DBs,
- Cabling between the alcove and the lighting Distribution Boards (DB) and emergency power DBs for power and feedback on the status of the security grille.

# Contract Review

Traction contract (GO1)



# Contract Review: Traction contract (GO1)

## Technical scope: electrical power supply to trains

Two types of equipment rooms:

### ❑ Rectification Sub-stations (RS)

Located in stations and in maintenance areas, RSs ensure:

- Connection to to the 20kV ENEDIS public electricity supply (20kV cells)
- Transformation of 20kV supply into 1500Vdc for traction (transformer and rectifier)
- Electrical power supply and protection of the railway line (ultra-rapid circuit breaker)
- Traction automatic control systems and data exchange with centralised control (control cabinet)

20kV cells



Transformer



Rectifier



Ultra-rapid circuit breaker



Control cabinet





# Contract Review: Traction contract (GO1)

Technical scope: electrical power supply to trains

## □ Isolating Sub-stations (IS)

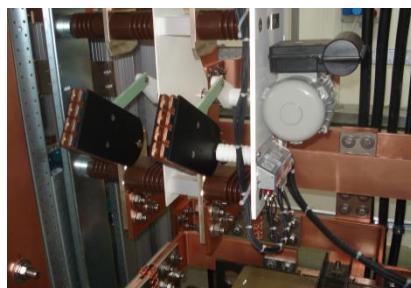
Located on the lines and in maintenance areas, ISs ensure the isolation of the traction network for the needs of:

- Managing electrical faults
- Putting into place temporary operating services
- Putting maintenance operations into place

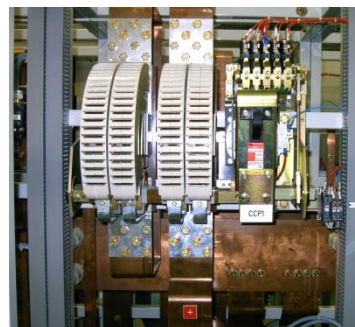
Switch gear



Isolator



Contactor



Control cabinet



Isolator/contactor/switch gear



# Contract Review

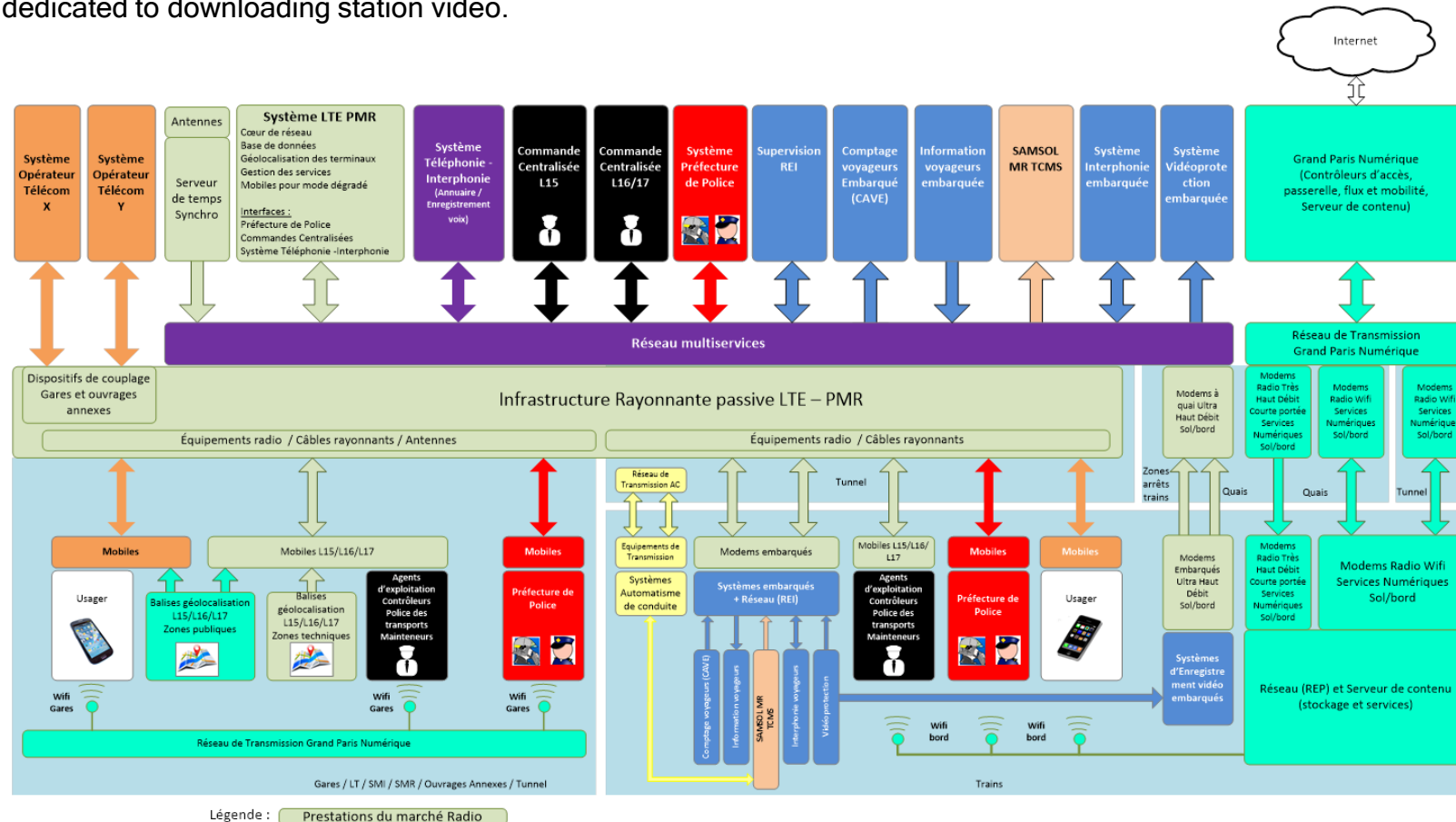
Radio contract (GO2)



# Contract Review: Radio contract (GO2)

The contract is comprised of two independent systems:

- The LTE PMR (LTE) radio system that will enable, on the one hand, communication and data communication for mobile terminals and, on the other hand, ground/train radio communications;
- The station located Ultra High Speed telecommunication system based on wireless communication protocols, which is dedicated to downloading station video.



# Contract Review: Radio contract (GO2)

“LTE - PMR systems in tunnels, in structures and external lines” notably comprising of the following equipment:

- Core of the LTE PMR network (SIP Core, EPC)
- Associated application and gateway servers (supervision, group calls, management of service quality and voice and data priorities,...),
- Radio systems and data backup tools,
- Wide-band leaky cables or equivalent in tunnels and external lines - from 700MHz to 2.6MHz (including associated cable fixings servicing cables),
- Wide-band leaky cables or equivalent in stations - from 700MHz to 2.6MHz (including associated cable fixings servicing cables),
- Station antennae - - from 700MHz to 2.6MHz (including associated cable fixings servicing cables),
- Equipment required for the correct operation of the radio emitting infrastructure (attenuators, couplers,...),
- Radio equipment for the access network (eNode B/RRH/BBU in structures, attenuators in tunnels and on external lines, between two leaky cables, transmission equipment and cables linked to the correct operation of the LTE PMR system, ...),
- On board equipment in the trains: LTE PMR modems and antennae,
- Mobiles terminals...

“Ultra High Speed video download system for station videos” notably comprising of the following equipment:

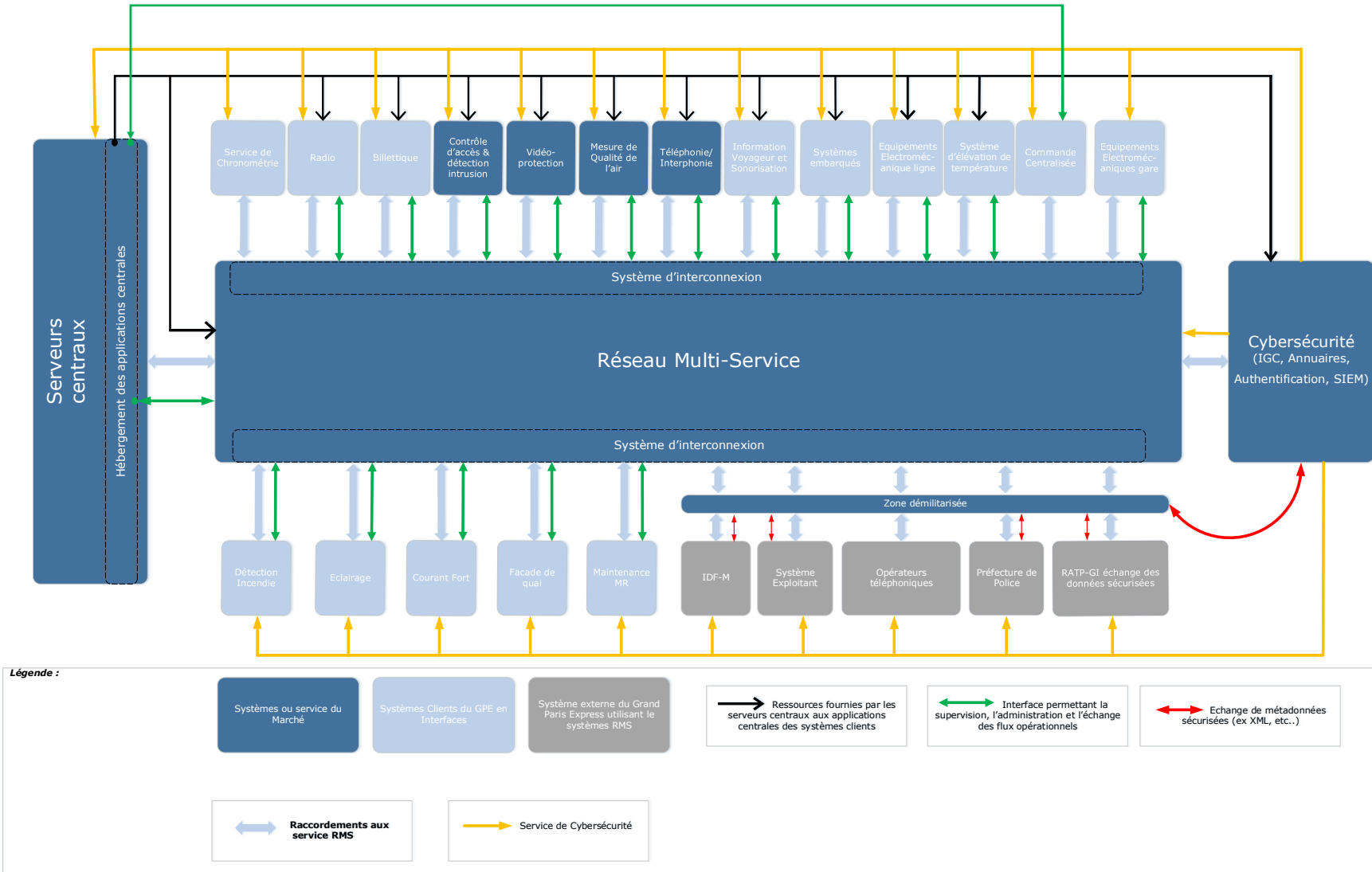
- Associated application and gateway servers (Ultra High Speed supervision, ...),
- Ultra High Speed telecommunication equipment (modems + antennae + associated connectors) for trains
- Ultra High Speed telecommunication equipment (modems + antennae + associated connectors) on the ground.

# Contract Review

Multi-functional network and surveillance systems contract (GO2)



# Contract Review: MFN - SS contract (GO2)



# Contract Review: MFN - SS contract (GO2)

The contract provides for the installation of the following main equipment or software packages:

## **“Central system servers and installation”**

- Equipment room development work (iced water input connection, piping system, cable runs, etc...)
- Supply and installation of the physical infrastructure for data centres:
  - Modular technical islands;
  - IT bays with containment systems;
  - Cooling system (pipework and cut-off valves, ventilation management modules, heat exchangers, insulated blower ducts, etc...);
  - Power supply system (Cables, PDU, etc...);
  - The monitoring system for the bays, cooling and power systems;
- The supply and installation of the IT infrastructure for data centres:
  - Processing and storage servers;
  - Virtualisation platform (including the associated operating licences);
  - Datacenter network equipment (switches and connections);
  - The monitoring system for the physical and IT infrastructure.

# Contract Review: MFN - SS contract (GO2)

The contract provides for the installation of the following main equipment or software packages:

## **“MFN system, inter-connection and chronometry”**

- Supply and installation of routers for the core network (“Core Router”);
- Supply and installation of routers for the edge network (« Edge Router »);
- Supply and installation of edge switches in the GPE structures;
- Supply of a network monitoring system (NMS);
- IT bay assembly, installation and mounting works in the station equipment rooms and ancillary structures;
- Distribution works in service rooms and connecting of terminal equipment to the MFN network;
- In relation to the MFN system, specific studies and service provision linked to staged implementation are planned (management and location of fibre-optics with external operators, migration plans, non-regression testing, etc...).

## **“GPE systems integration platform”**

- Supply and installation of a **GPE systems integration platform**;
- Provision of a building in the Ile de France (including security, the coordination of the activities of other contractors, etc...);
- Managing and maintaining the platform integrating systems supplied by third parties in operating condition;
- Moving the platform into a GPE equipment room.



# Contract Review: MFN - SS contract (GO2)

The contract provides for the installation of the following main equipment or software packages:

## **“Cyber security systems”**

- Supply and installation of dedicated servers including
- Cryptographic services;
- Directory services;
- Authentication servers;
- Revocation services for keys and or certificates;
- Firewalls;
- GPE system security event collection tools (network sensors, collection agents);
- Event storage servers;
- Real time processing and correlation tools and post-processing tools;
- Monitoring systems for cyber security systems infrastructure (SIEM/SOC) including administration stations.

# Contract Review: MFN - SS contract (GO2)

The contract provides for the installation of the following main equipment or software packages:

## “Video surveillance system”

- Supply and installation of a central video surveillance application “full IP” (video stream management, analysis and centralised storage system);
- Supply and installation of incident detection algorithms (IDA);
- Supplying cameras and managing camera supply (static cameras, 360° cameras,...);
- Supply and installation of a **video surveillance monitoring system**;
- Provision of installation kits and assistance for camera installation by third parties.

## “Telephone/interphone system

- Supply and installation of an IP automatic exchange;
- Supply and installation of edge servers (including media gateways);
- Monitoring of the design and construction of emergency phones;
- Supply of audible signalling devices to guide visually-impaired people;
- Supplying IP telephones and IP emergency phones and managing phone supply;
- Supply and installation of a monitoring system for the telephone/interphone system;
- Provision of installation kits and assistance for telephone and emergency phone installation by third parties.

# Contract Review: MFN - SS contract (GO2)

The contract provides for the installation of the following main equipment or software packages:

## **“Access control and intrusion detection system”**

- Supply of a centralised management application for badge access;
- Supply of a centralised management application for electronic key access;
- Supplying and managing supply of local processing units (LPU) and electronic key programming terminals;
- Supplying and managing supply of terminals (badges, badge readers, electronic keys, electronic locking cylinders, opening sensors,...);
- Supply and installation of a monitoring system for the telephone/interphone system;
- Provision of installation kits and installation assistance for the installation of local processing units, emergency phones and terminals by third parties.

## **“Air quality measurement system”**

- Supply and installation of air measurement and analysis stations;
- Supply and installation of a monitoring system for the air quality measurement system;
- Air measurement station installation works in the related stations

# Contract Review

Fire safety system contract (GO2)

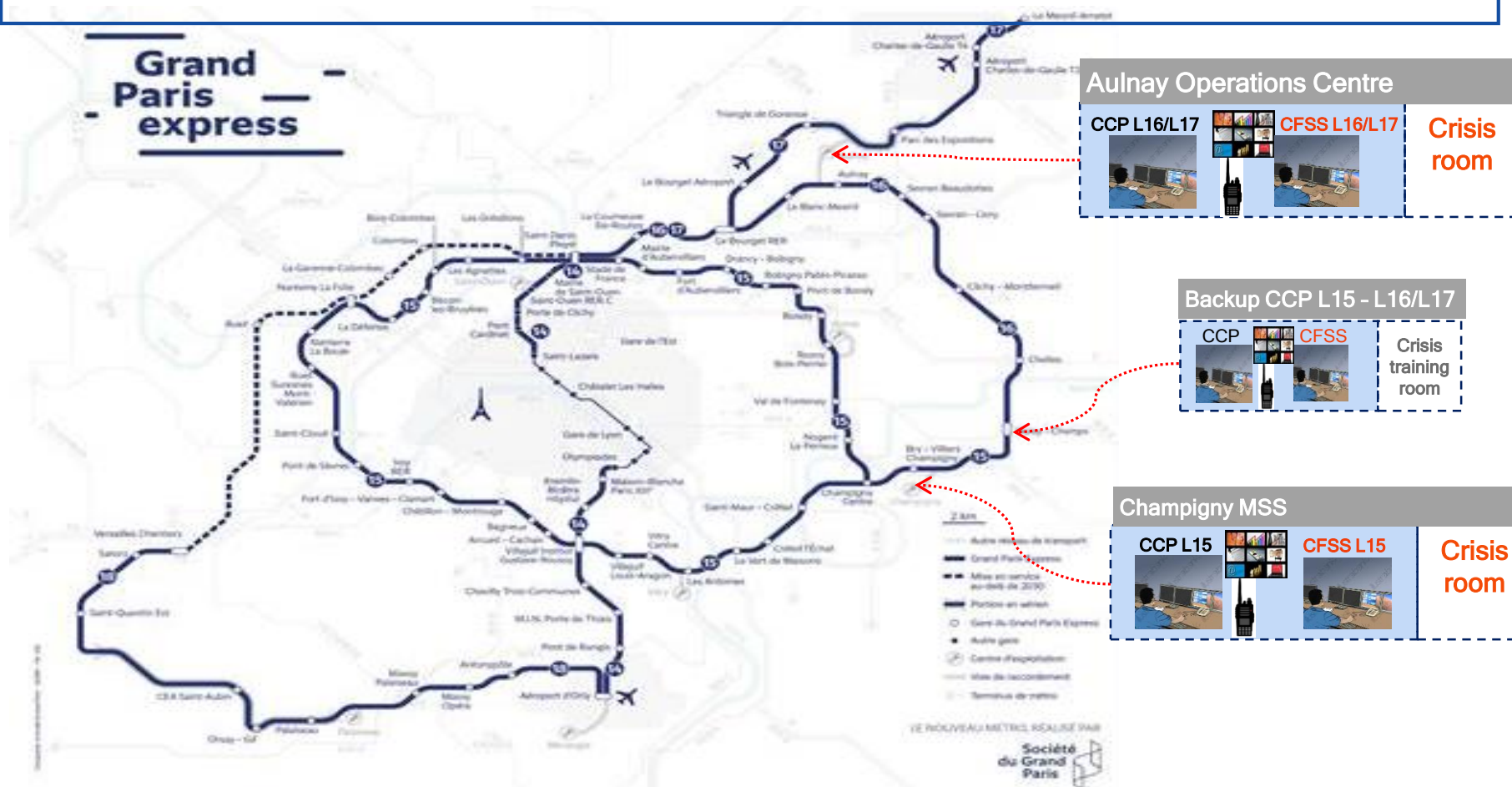


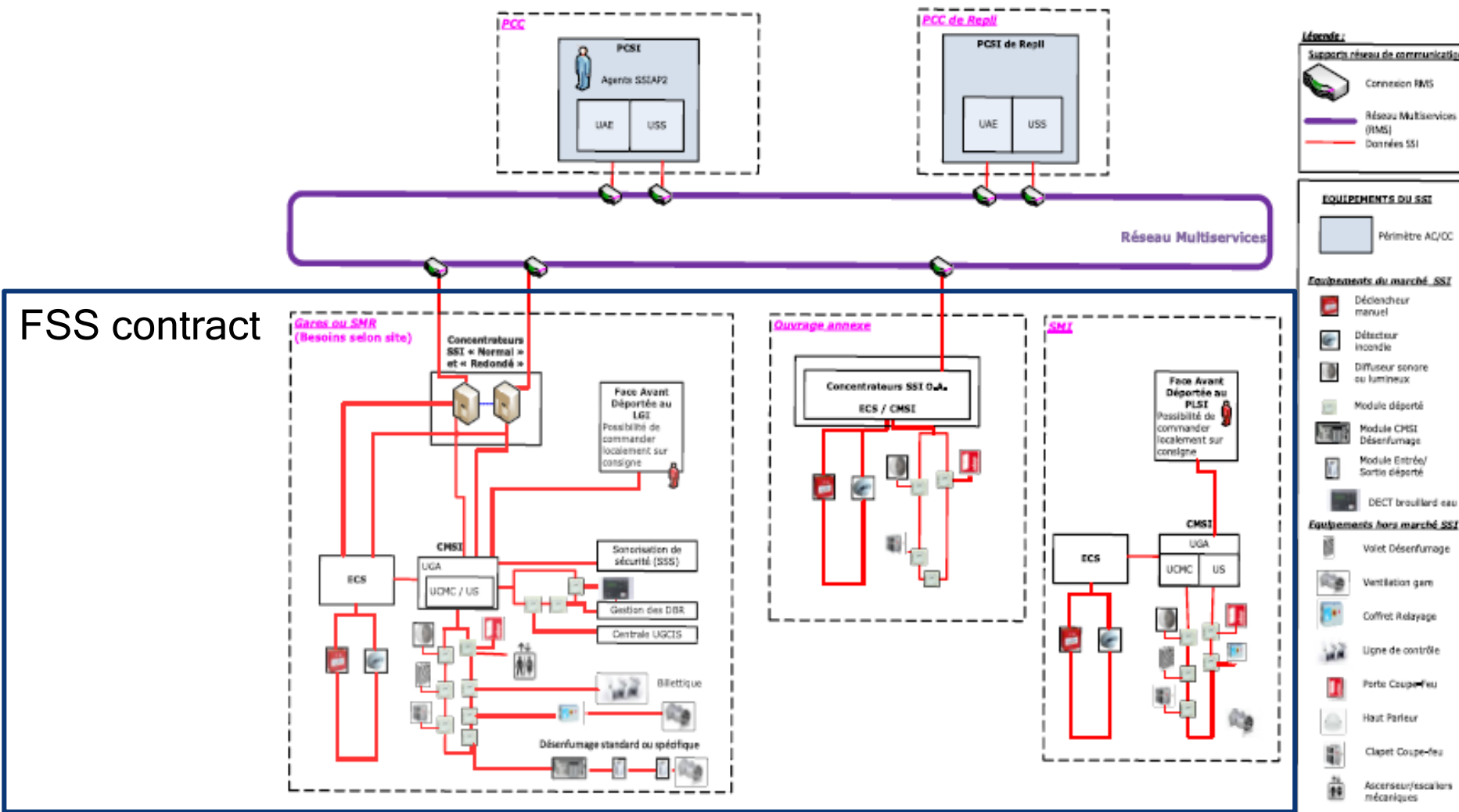
# Contract Review: FSS contract (GO2)

The contract notably includes the following equipment:

- Concentrator for stations and structures,
- Automatic detection,
- Manual activation,
- Action indicator,
- Fire alarm control panel (FACP) for stations and structures,
- Control and signalling equipment (CSE) for stations,
- Offset front panel,
- Emergency power supply (EPS) for stations and structures,
- Audible alarm for general alarm,
- Audible alarm for selective alarm,
- Light signal for general alarm,
- Offset modules for building safety devices (BSD) for partitioning,
- Automatic smoke extraction controller,
- Offset modules for building safety devices (BSD) for smoke extraction.

- ❖ From each central fire safety station (CFSS) (main or backup) **global processing of FSSs**
  - **In stations** (Supervision and activation of station installations)
  - **In ancillary structures** (Supervision)
  - **In maintenance and storage sites (MSS)** (Supervision and activation of MSS installations)
- ❖ Local FSS management in infrastructure maintenance sites (IMS)





# Contract Review

Platform doors system contract (GO3)





# Contract Review: Platform doors system (GO3)

The contract notably includes the following equipment:

For each platform:

- Platform screen modules comprising of motorised platform doors (MPD) Emergency platform doors (EPD) and fixed panels (FP),
- Platform end door (PED) ,
- Banner display screens,
- Station manual control panel (SMCP),
- Comprehensive air seal,
- Platform end lights (PEL),
- Fusible strip,

For each station:

- Platform doors power supply (energy conversion generating the full power supplies systems required for operating the platform doors system),
- Platform doors emergency power supply (batteries),
- Platform doors,
- Entry/exit module,
- Controller of the difference in potential between platform doors and rolling stock (CDDP).
- Full cabling required for platform doors, between the equipment room and the platform



# Contract review

Tunnel ventilation - decompression - smoke extraction contract (GO8)



# Contract Review: Tunnel ventilation - decompression - smoke extraction contract (GO8)

The contract comprises of four lots of technical services:

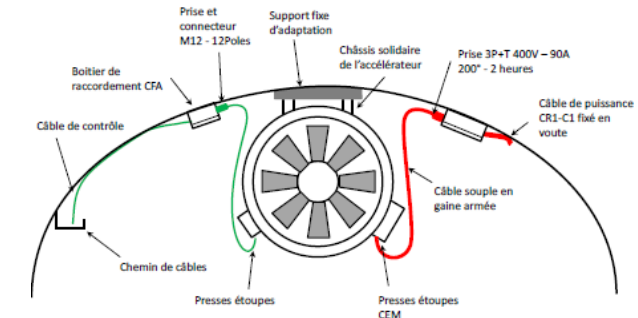
- Electro-mechanical ventilation services,
- Low voltage electricity services,
- Control and low current services,
- Metalworking and equipment handling services.

The electro-mechanical ventilation services comprise of the following equipment:

- Axial fans,
- Transformation parts,
- Accelerators,
- Motorised flap valves,
- Sound traps,
- Windbreak curtains.

The low voltage electricity services comprise of the following equipment:

- Variators,
- Starters,
- Low voltage cabinets,
- Power cables and cable runs



Fixation de l'accélérateur en voute

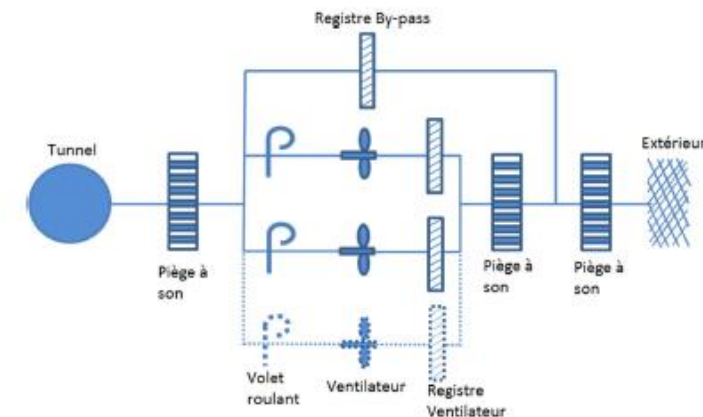


Schéma d'une installation de ventilation mécanique ainsi qu'une trémie de décompression

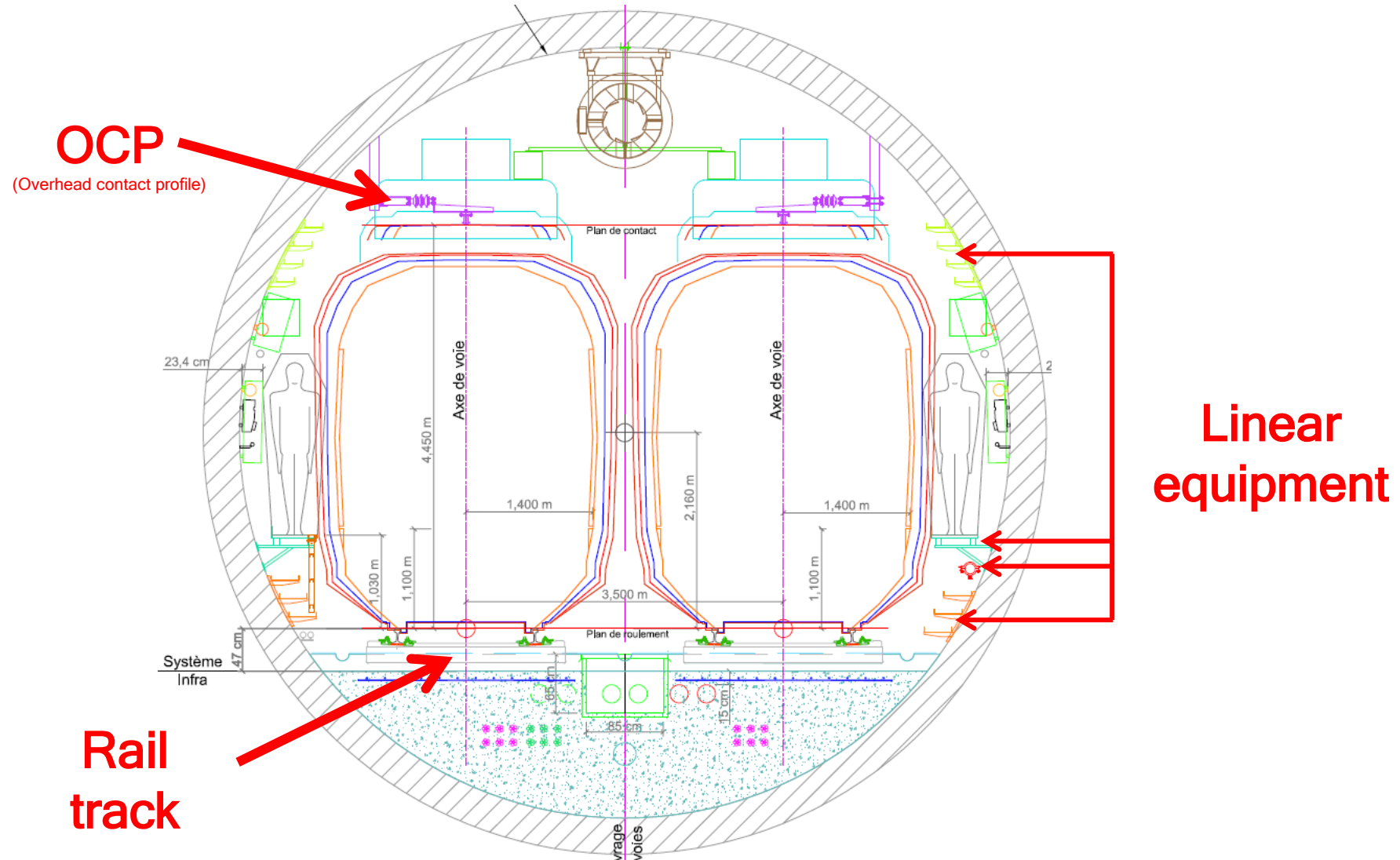
# Contract Review

Rail track, catenary and linear equipment contract (GO9)



# Contract Review: Rail track and catenary contract (GO9)

## Equipment systems to be installed



## Focus by contract: Rail track and catenary contract (GO9)

### Rail track



UIC 60  
Rails

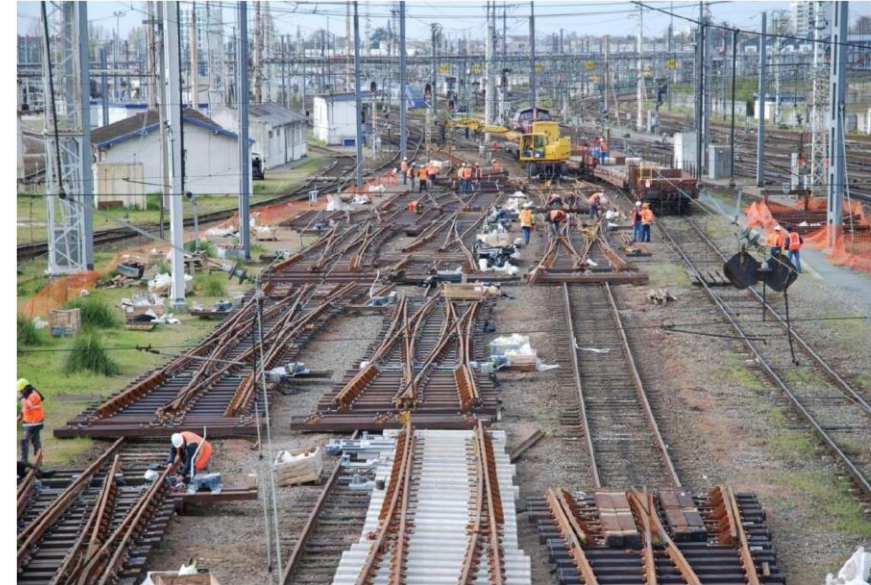
Concrete roadbed

Anti-vibration  
concrete sleepers  
+ rail fixings



# Contract Review: Rail track and catenary contract (GO9)

## Rail track

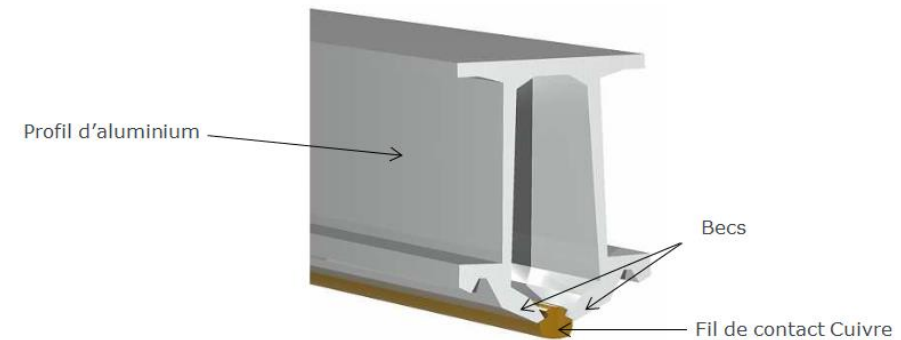
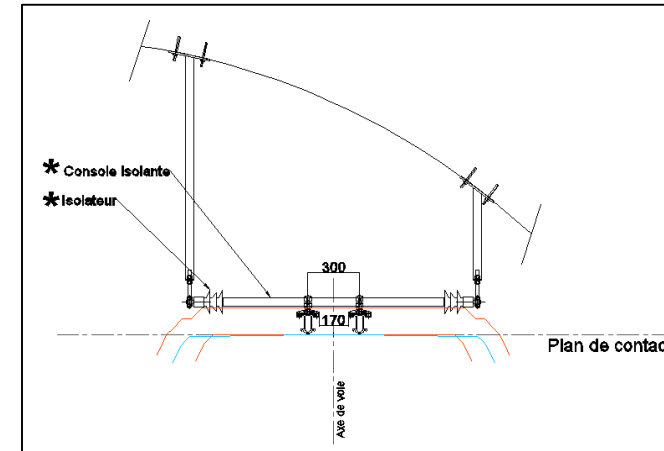
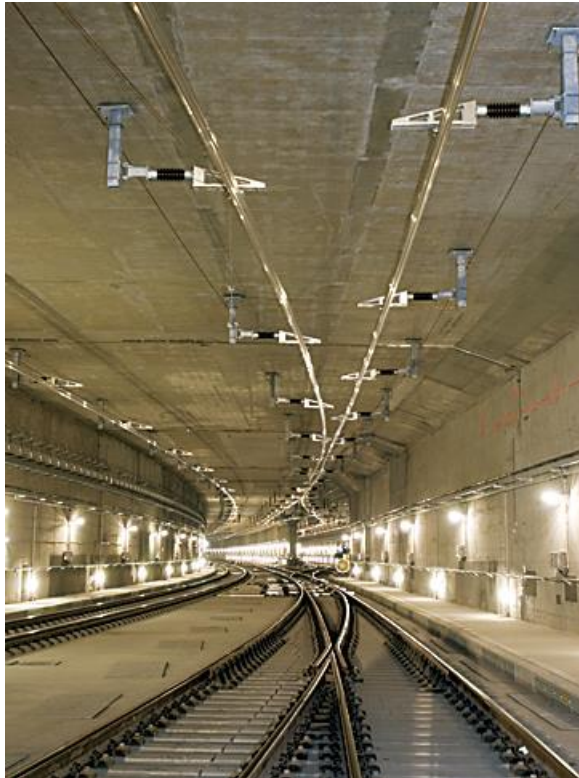


## Points and crossings

Simple crossover, crossing crossover, switch, acute crossing...

# Contract Review: Rail track and catenary contract (GO9)

## Overhead contact profile



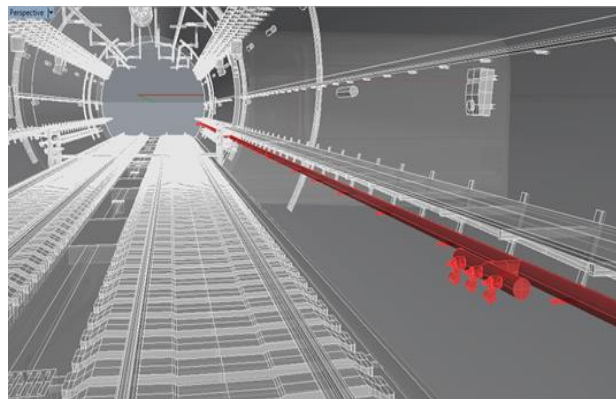
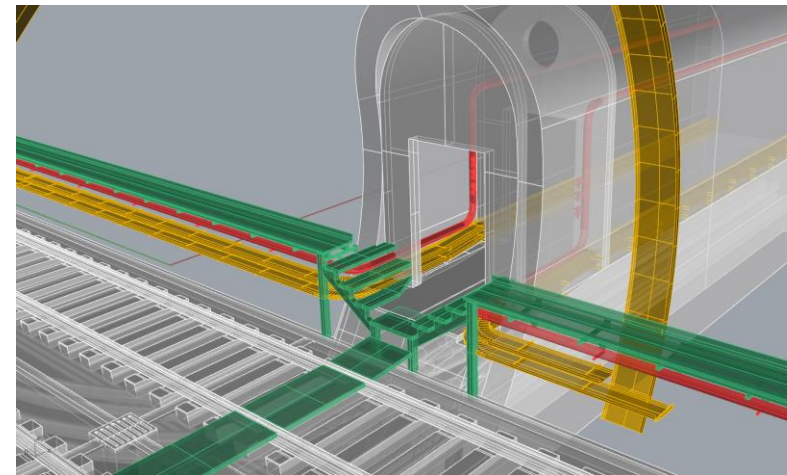
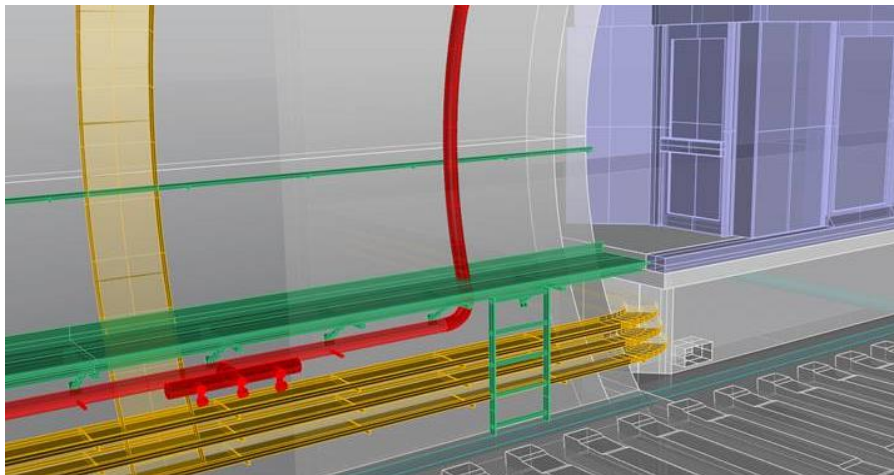
**OCP = “Rigid catenary”**

Adapted to restricted volume, restricted environments



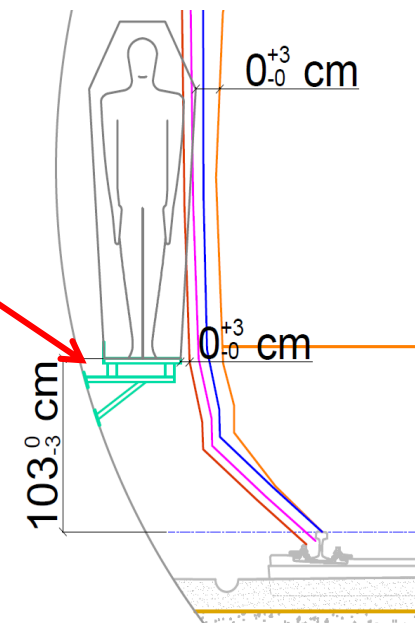
# Contract Review: Rail track and catenary contract (GO9)

## Linear equipment



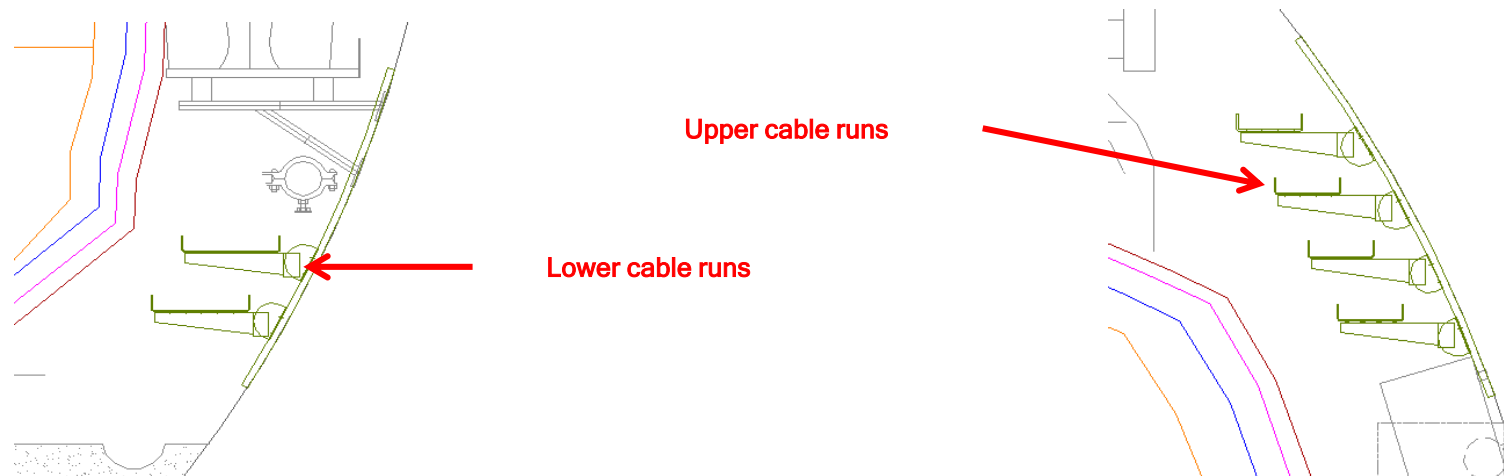
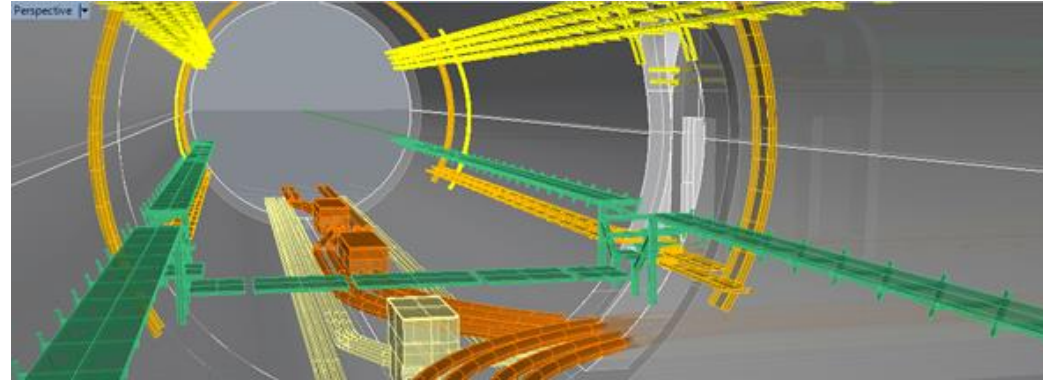
Evacuation path

Dry standpipe



# Contract Review: Rail track and catenary contract (GO9)

## Linear equipment



# Building trades involved in structures construction

- **Shell construction** - concrete surface structures, interior masonry
- **Water proofing / Covering / Cladding/ Framework**
- **Windows, doors and locks** - balustrades, glass panels, elevator shafts
- **Metalwork** - stairs, ladders, balustrades, doors, grills
- **Floor and wall coverings, suspended ceilings**
- **Internal doors, furniture and signage**
- **Floor and wall painting**
- **High current** - distribution from low voltage distribution board, normal and emergency lighting
- **Low current** - ticketing, access control and anti-intrusion, video surveillance, customer address sound system, telephone and interphone
- **Plumbing - fire protection**
- **Heating, ventilation, air conditioning, station smoke extraction**
- **Roads, various works and and landscaping**
- **Maintenance in operating condition (MOC)**

# Civil engineering

- **Metal framework** - Industrial techniques for minimum 300 tonne framework

