

East Hall under construction - 1962

East Area Renovation Project EAR.WP10 – Building 251 HVAC System

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EN/CV-PJ

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ENGINEERING
DEPARTMENT



EAST AREA RENOVATION



Outline

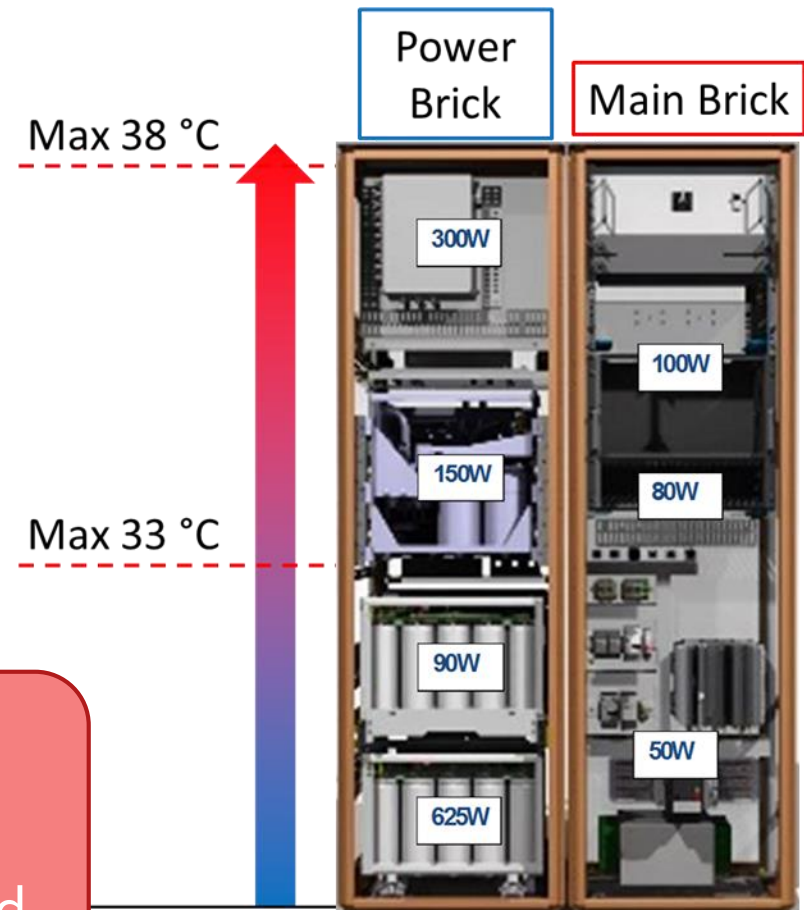
Building 251

- Power Converter requirements
- Current Heating and Ventilation
- Technical solution
- Budget
- Planning

Building 251 – Power Converter Requirements

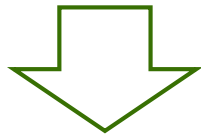
- 64 power converters
- 183 kW heat to air
- Max temperatures required:
 - 33 °C at capacitors
 - 38 °C at top

Exceeding this temperature will reduce the converter lifespan – especially of items not water cooled

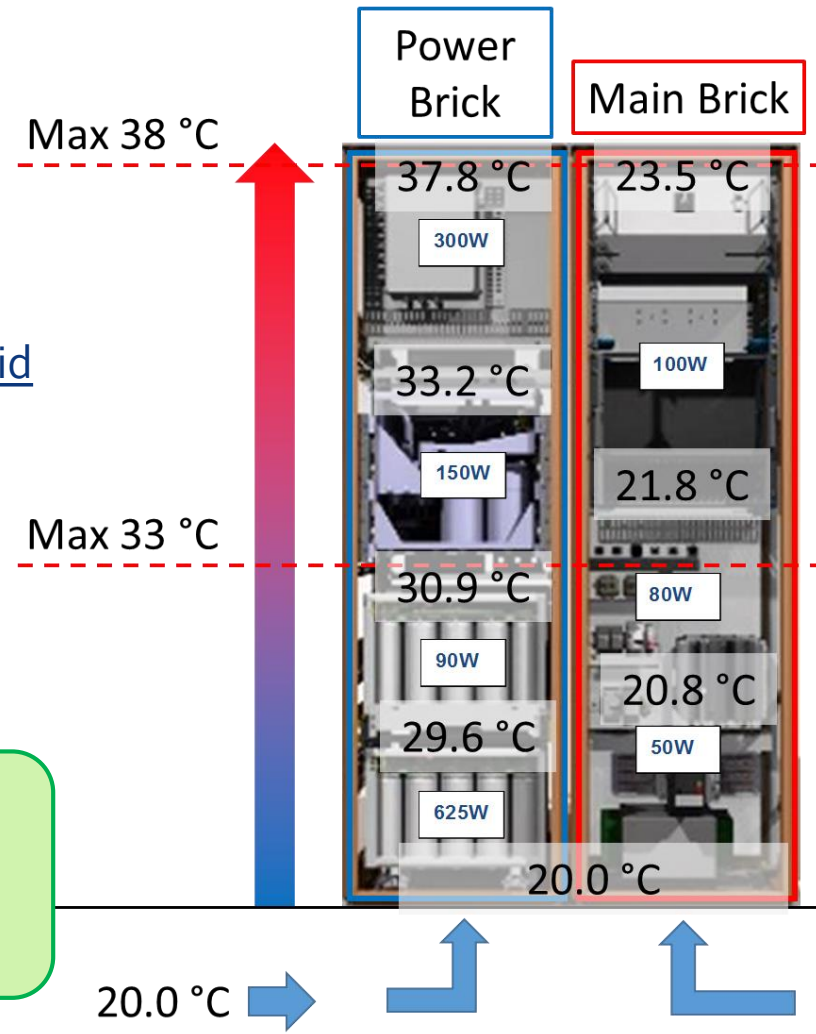


Building 251 – Power Converter Air cooling

- Air cooling working principle:
 - Blow air inside false floor to create a plenum that distributes air to each converter
- False floor geometry limits MAX flow rate
 - Supply temperature must be kept at 20 °C to avoid exceed required temperatures
- Current ventilation blows air at ambient temperature



Need ventilation system capable of temperature control



Building 251 – Current Heating Ventilation

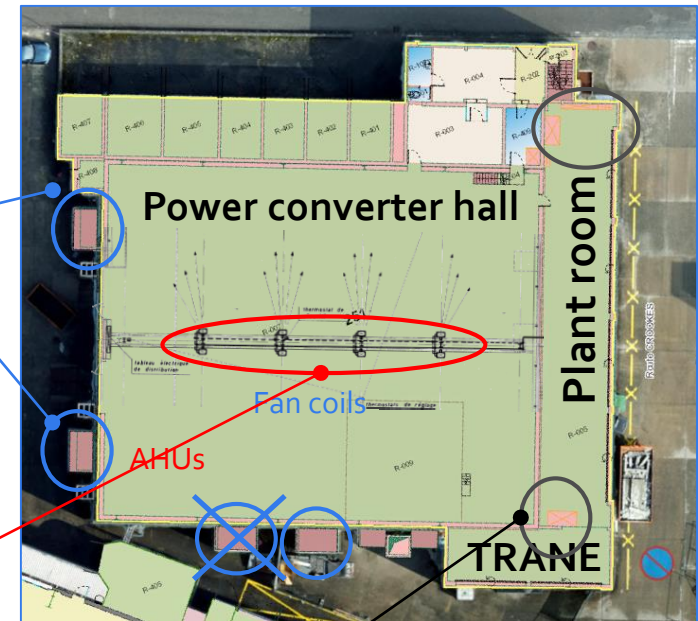
• Power Converter Hall

- 4 AHUs – fresh air only
 - Obsolete – Low performance
 - NO heating or cooling

- 8 Heating Fan Coil
 - Obsolete – Off design working
 - Leaks occurred recently
 - Freeze risk in false floor

• Plant Room

- 3 AHUs – fresh air and heating
 - Obsolete – Off design working



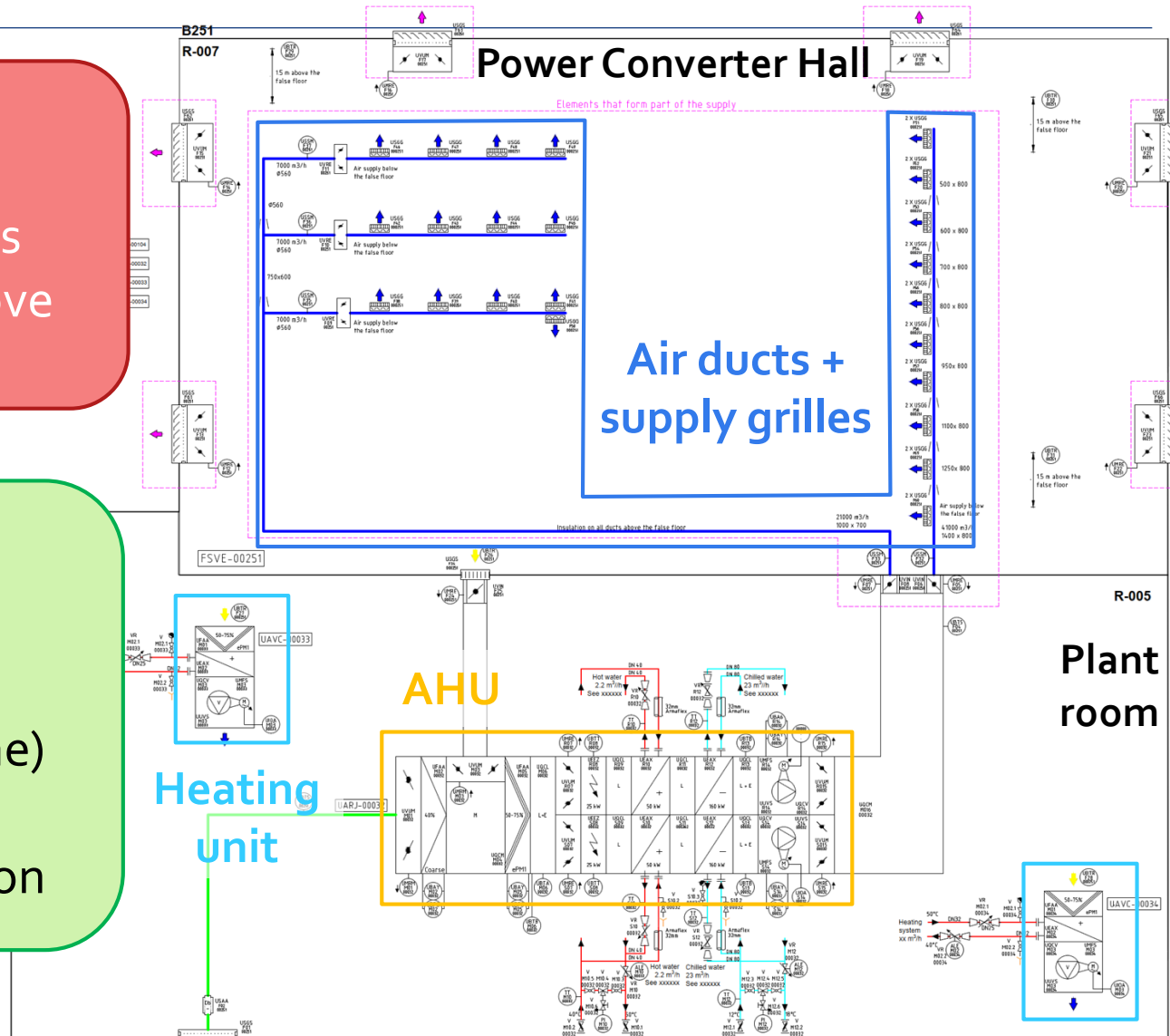
Building 251 HVAC System: Technical Solution

Dismantling

- 4 external units
- 8 heating fan coils
- Water piping above converters

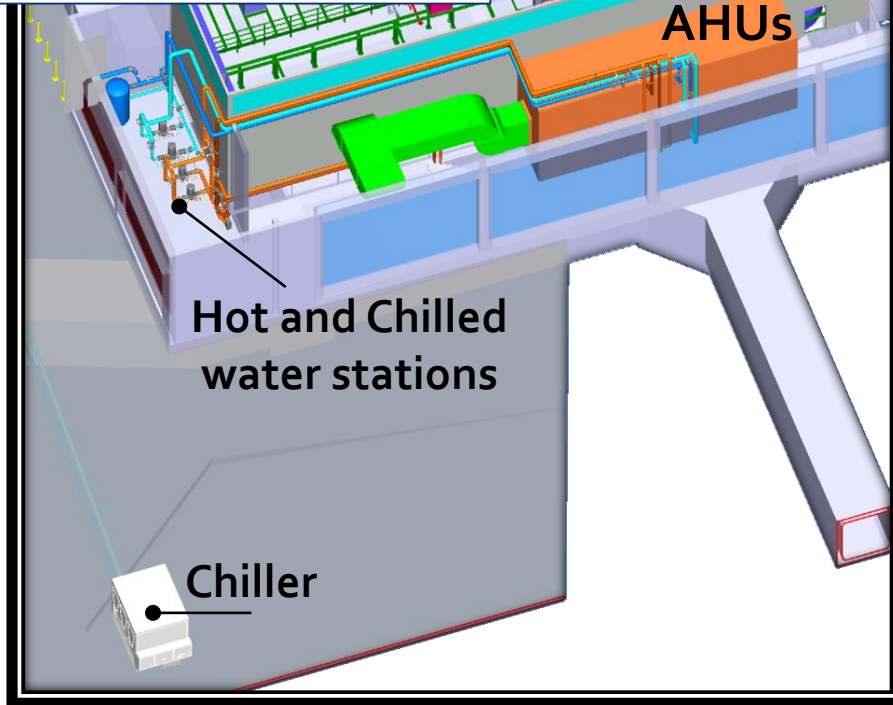
Installation

- Air Handling Unit
- 2-3 Heating units
- Ducts (already done)
- Hot water station
- Chilled water station

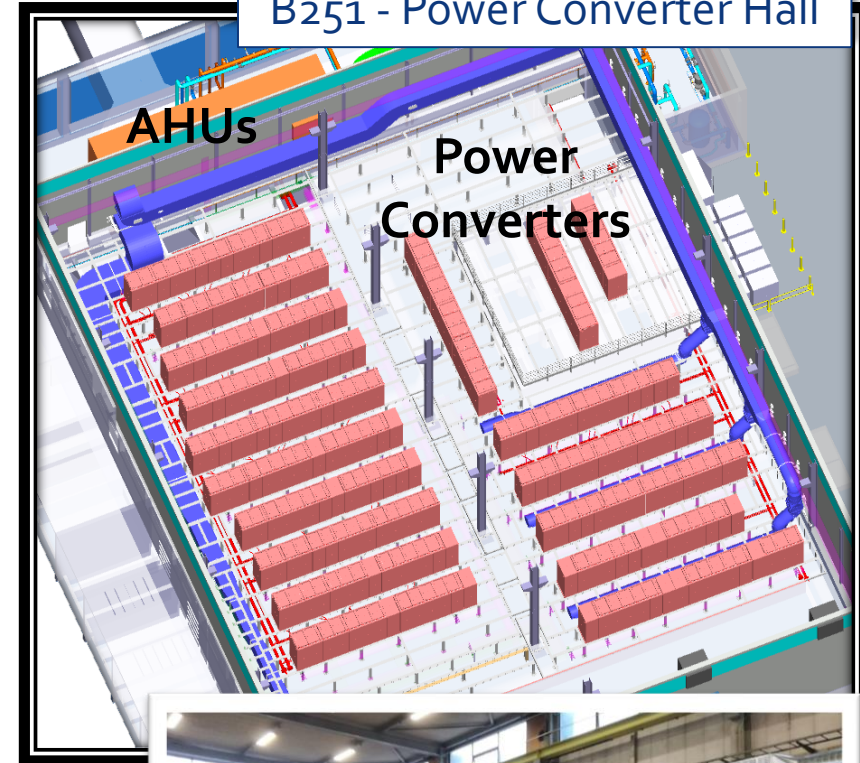


Building 251 HVAC System: Integration

B251 – Plant Room



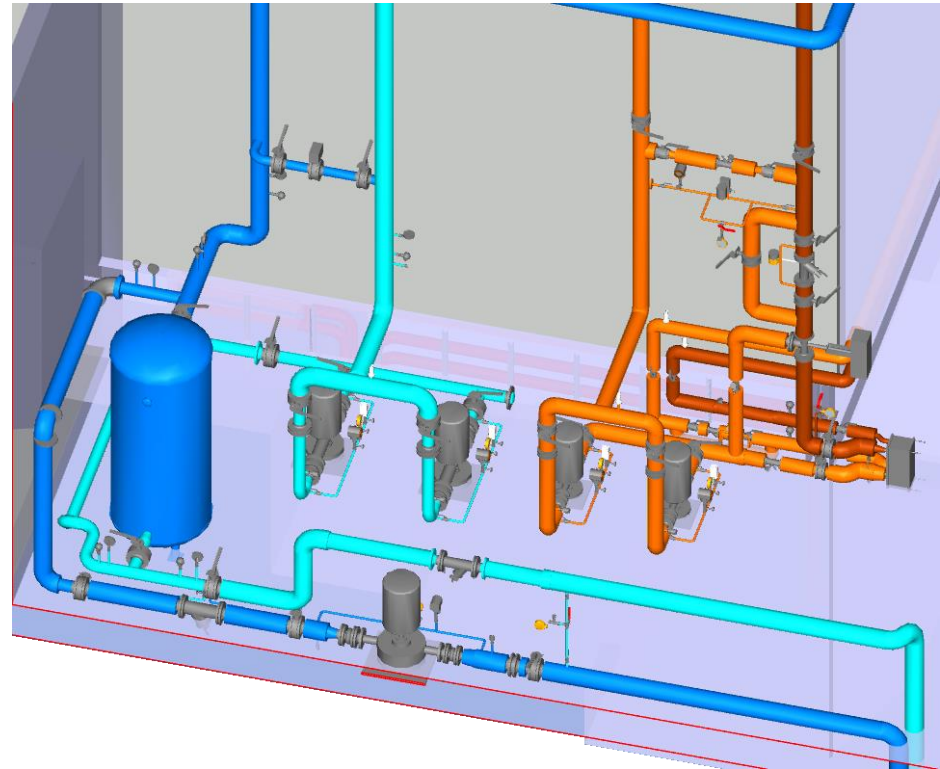
B251 - Power Converter Hall



Building 251 – Hot and Chilled Water Stations

- New hot water station – necessary for building heating
 - To cater for future reduction in Superheated Water supply temperature
 - To prevent drain of superheated network in case of leak on user side

- New chilled water station – essential for power converter cooling
 - Air cooled chiller 12/18 °C range
 - Pipework routed in existing trench and technical gallery to B251 plant room
 - Possibility of future redundancy via SMB chilled water production for B156



Building 251 Ventilation: CV Budget

During 2020 CV can deliver Stage #1 and #2 only

• Phased installation

1. Stage 1: Ventilation Units

- Dismantling (Ventilation Units)
- Air handling units
- Power and control cubicles

2. Stage 2: Hot Water

- Dismantling (Heating Units)
- Hot Water Station
- Insulated Piping
- Power and control cubicles

3. Stage 3: Chilled Water

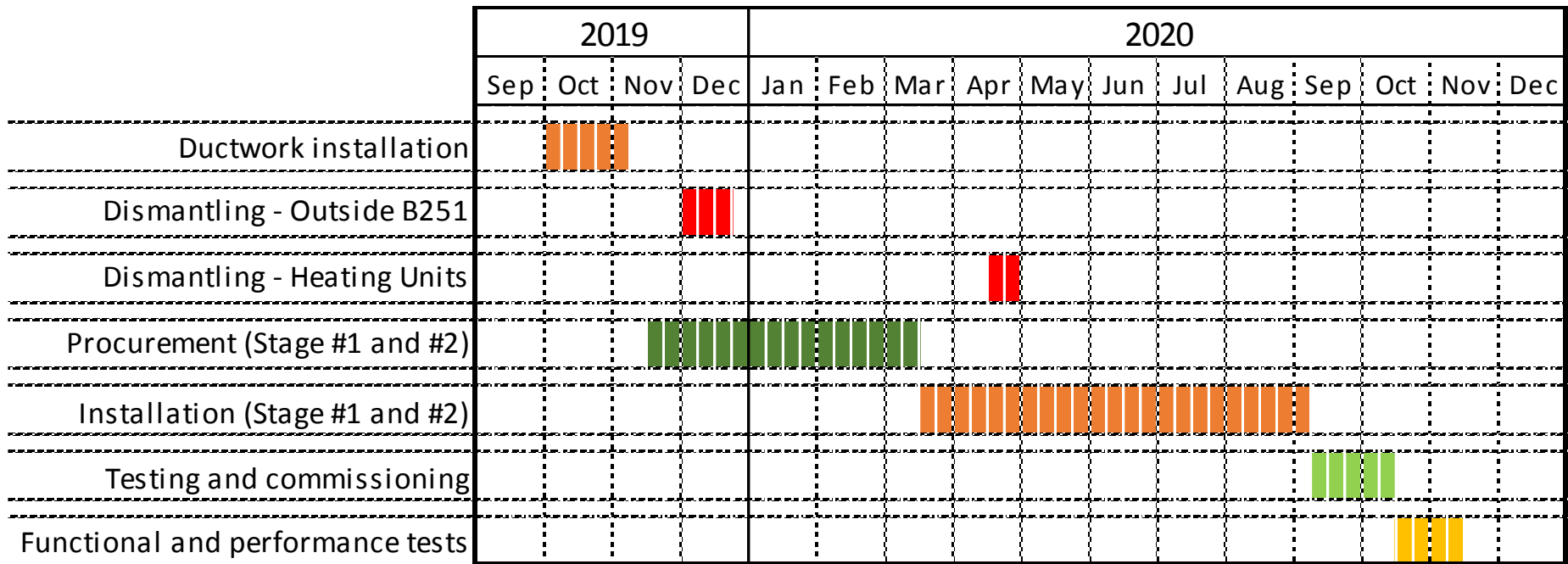
- Chiller and chilled water station
- Insulate Piping and trace heating

• Assumptions

- Central contingency
- EUR/CHF = 1.10
- False floor air tightness excluded

Item	Stage #1 Ventilation	Stage #2 Hot Water	Stage #3 Chilled Water	Total
Dismantling	40	+20	-	60
Air Handling Units	154	-	-	154
Instrumentation – Air side	24	-	-	24
Ductwork, fittings	33	-	-	33
Technical Room Heating	-	+14	-	14
Pumps, heat exchanger	-	+17	+18	34
Pipework, fittings, valves	-	+158	+162	320
Instrumentation - Water side	-	+30	+33	63
Chiller	-	-	+53	53
Electricity and controls	80	+87	+50	217
Design, Testing and Doc	23	+43	+39	105
External Transport	8	+14	+13	35
CERN (Scaffolding, Labelling)	5	+5	+5	15
CERN (Civil Eng, Weld X-Rays)	20	+10	+30	60
Internal transport	5	+2	+3	10
FSU (Supervisors, Controls, etc)	15	+11	+11	37
EN/EL	20	+41	+0	61
Travel	1	+1	+1	3
Total	428	+453	+416	1297

Building 251 Ventilation: CV Schedule



Thanks for your attention !



EAST AREA RENOVATION