



# Building structures and infrastructures

P.Favaron M.Calderolla



# Computer simulation





# Last meeting status

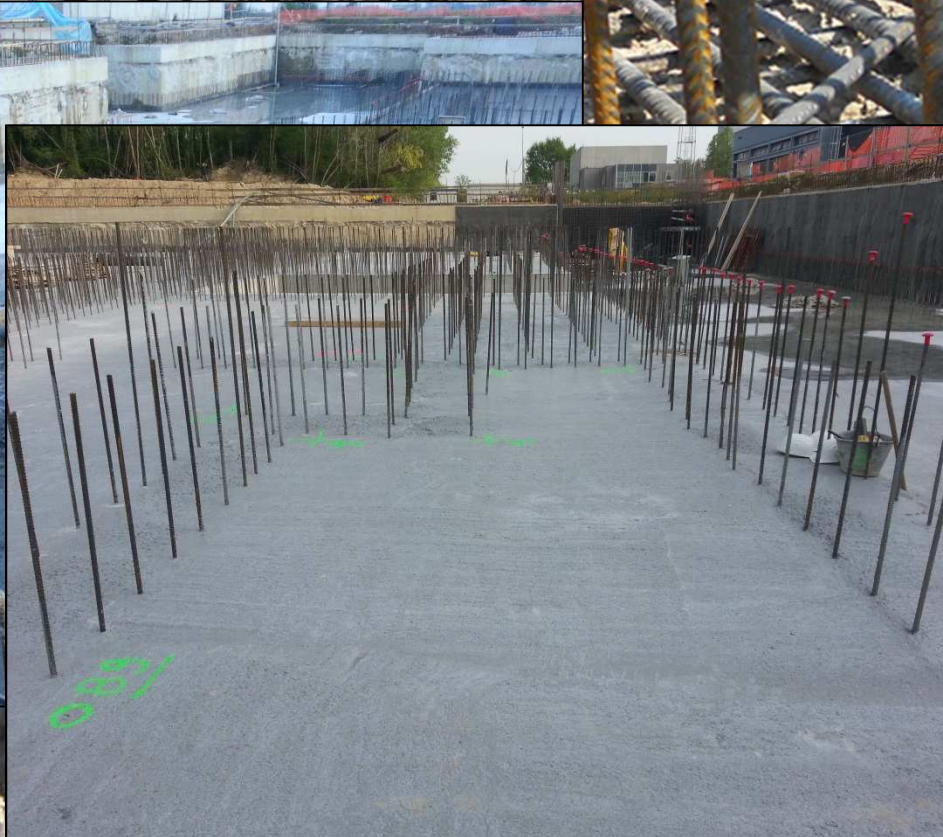
- Diaphragm walls and barrets were completed
- Excavation completed
- Basement for foundation on the way





# Foundation

Installation of the iron  
frame and then  
pouring of the concrete





# Waterproof system on external wall



A layer of Sodium Bentonite is placed and fixed on the concrete before putting the concrete of the external wall. When the membrane gets in contact with water it expands up to 16 times, thus stopping water penetration.



# Internal walls

Prebuilt panels are placed on the foundation to build the external perimeter of the thick walls.





# Internal walls

Reinforcement and concrete  
between the panels





# Wall penetration



Before starting the realization of the roof/floor the ducts for the technological plants were installed (air treatment, water system, cables, ...)



# Beams for floors



Prebuilt concrete beams are used to support the thick roof of the bunkers in the basements.

After placing the iron frame it is possible to pour the concrete.





# Stairwell and elevators





# Numbers...

Up to now:

⇒ In total 24 080 m<sup>3</sup> of concrete => 2400 cement mixer trucks (last time 8649 m<sup>3</sup>)

⇒ In total 1 150 000 Kg of iron (last time 545 673 Kg)





# Total Costs and cash flow

## • SAL 5

(31/01/2014-31/03/2014)

- Concrete for foundation
- Reinforcement **Euro 737 365**
- Waterstop system **+ IVA 10%**

## • SAL 6

(31/03/2014 – 31/05/2014)

- Beams for floor
- Walls
- Concrete for wall **Euro 363 898**
- Reinforcement **+ IVA 10%**
- Ducts

**3,6 Meuro + IVA 10% => 4 Meuro**  
**we expect 1 M€ for SAL 9**

## • SAL 7

(31/05/2014 -31/07/2014)

- Beams for floor
- walls
- Concrete **Euro 488 273**
- Reinforcement **+ IVA 10%**
- Ducts

## • SAL 8

(31/7/2014-31/9/2014)

- Beams for floor
- walls
- Concrete **Euro 354 727**
- Reinforcement **+ IVA 10%**
- Ducts



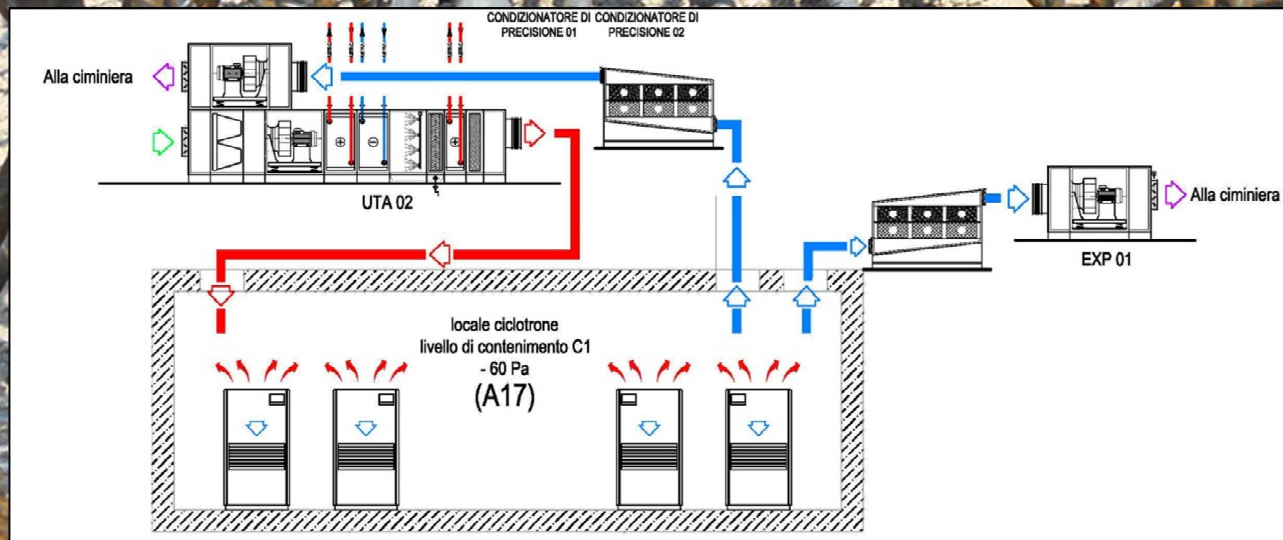
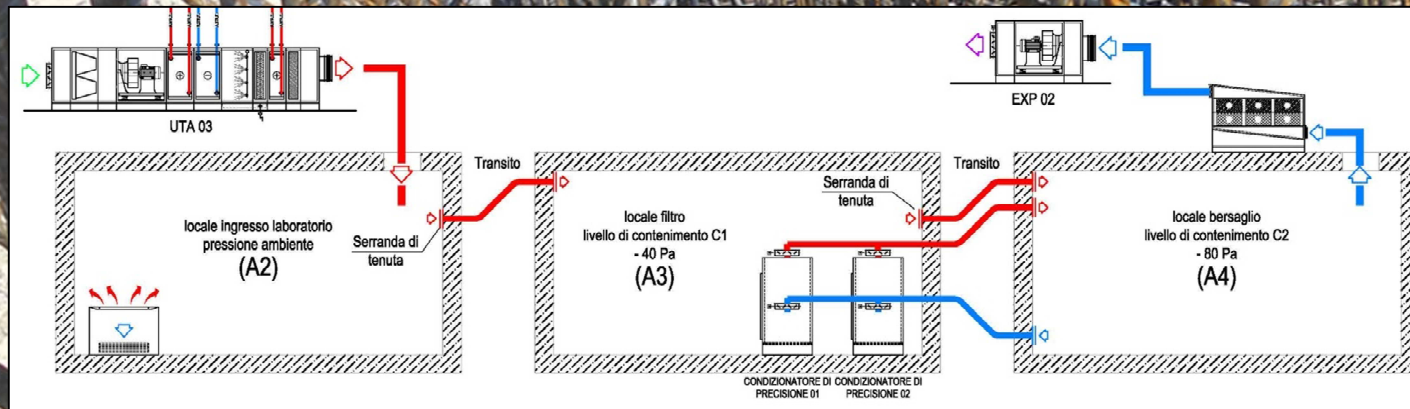
# The reality show





# Technical plants

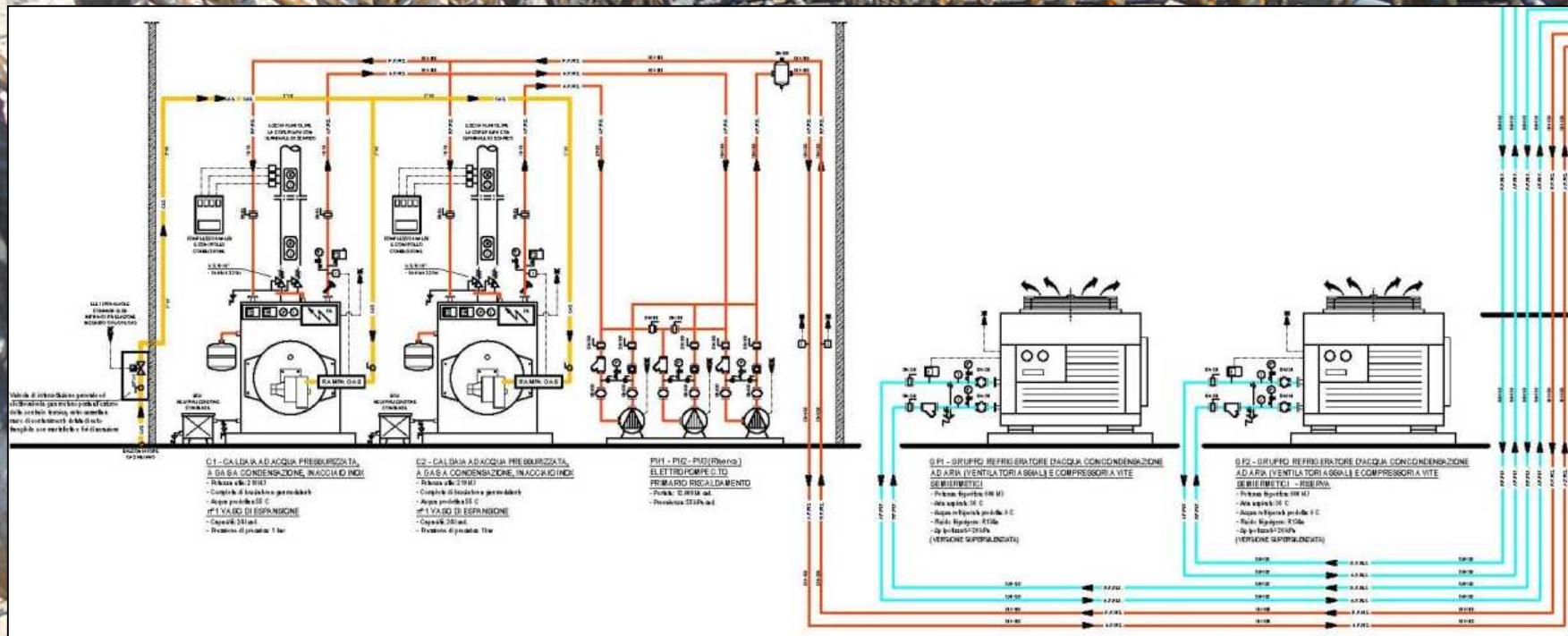
## Air distribution and treatment in the bunkers





# Technical plants

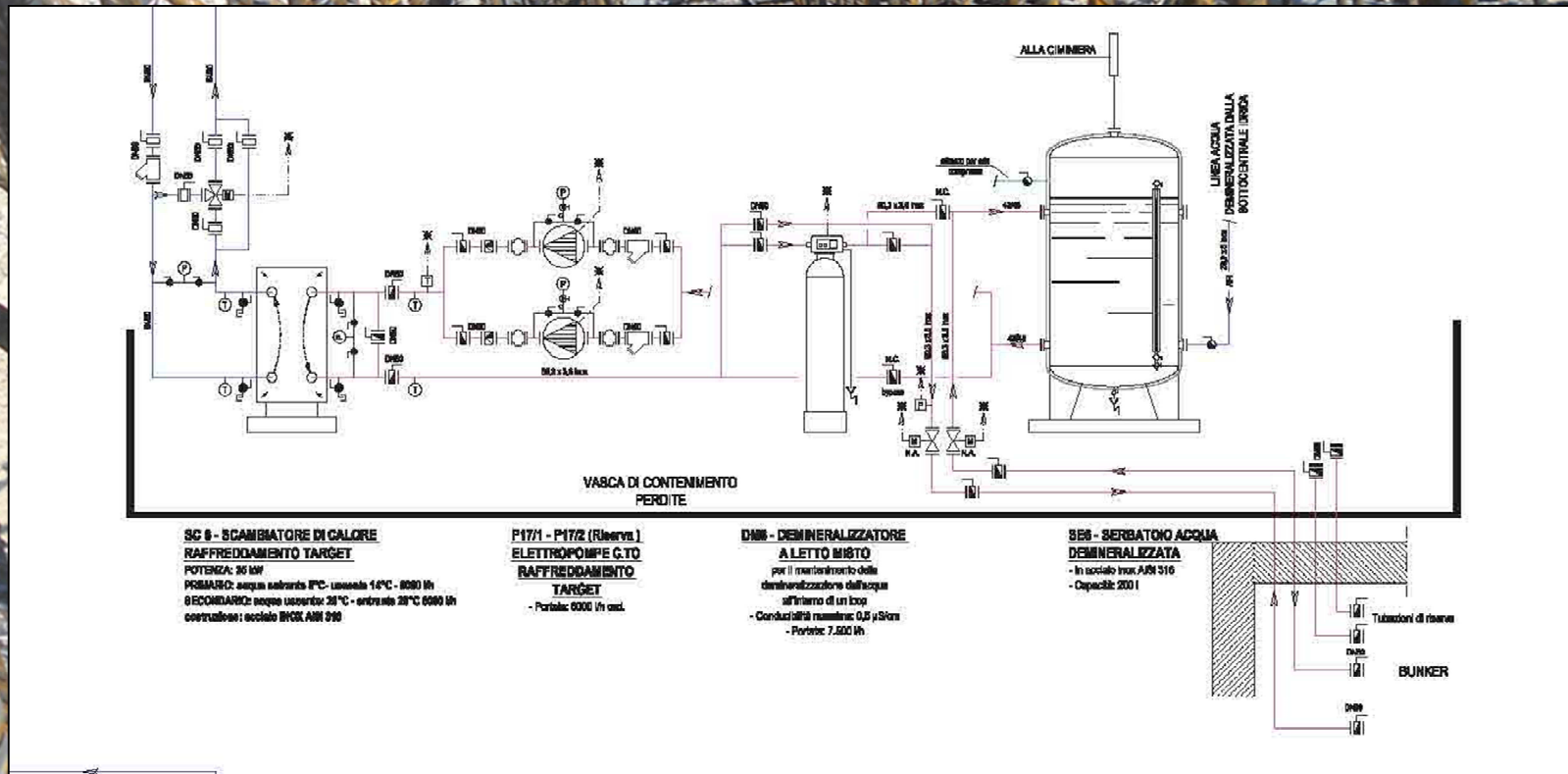
## Thermal power and cooling





# Technical plants

## Water distribution for the target

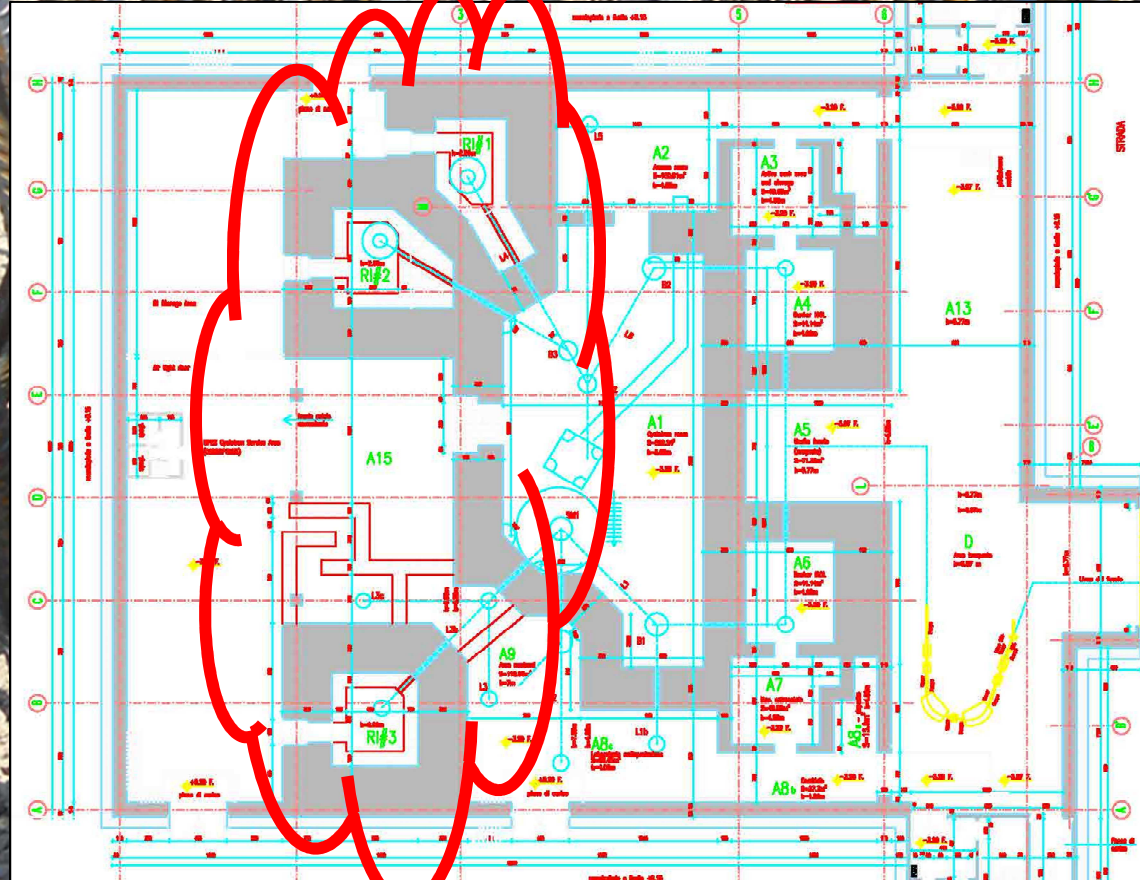




# New civil works

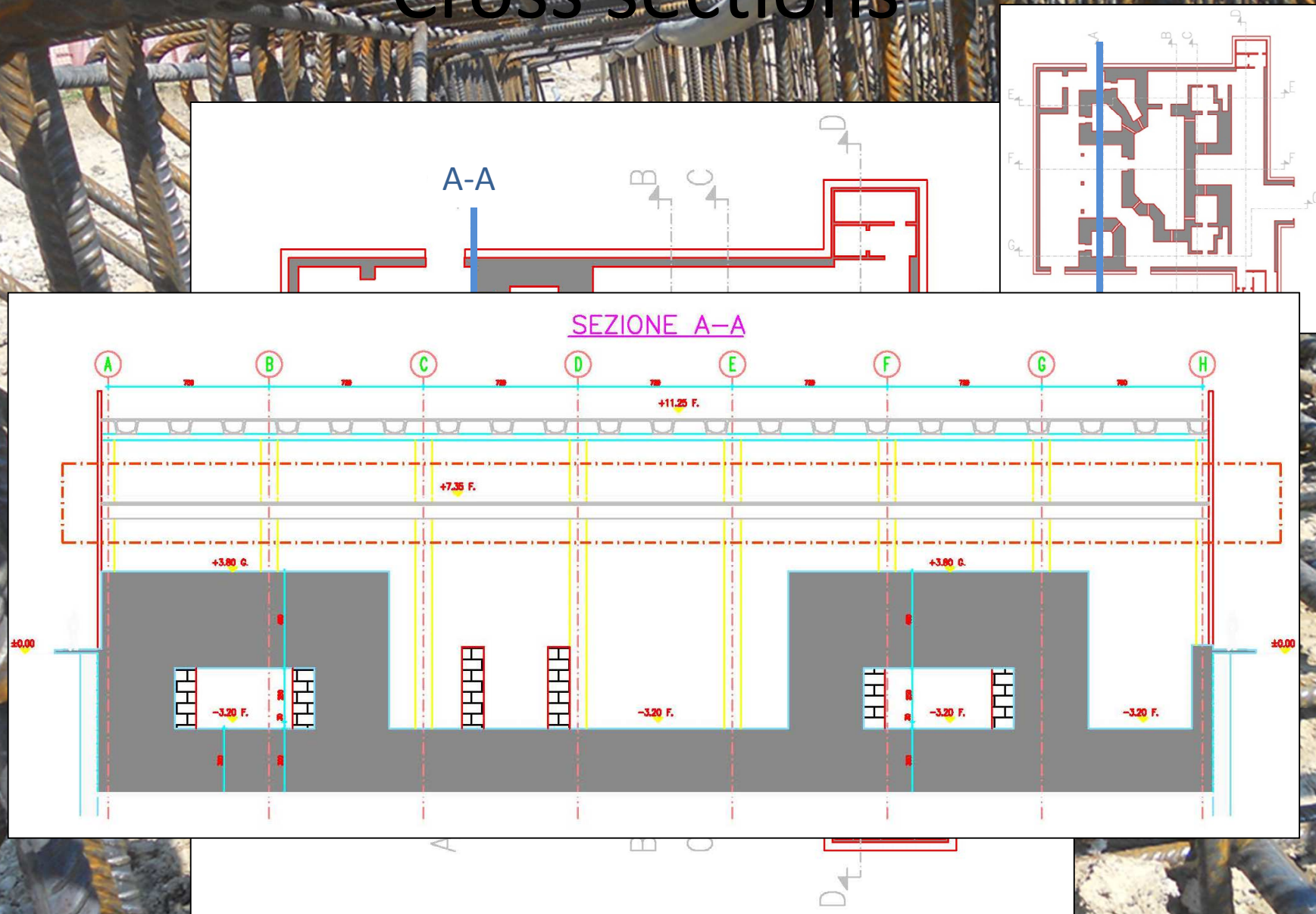
New civil works for Laramed bunkers and  
radiochemicals floor

Cost increase: 0,8 M€ +Iva 10%



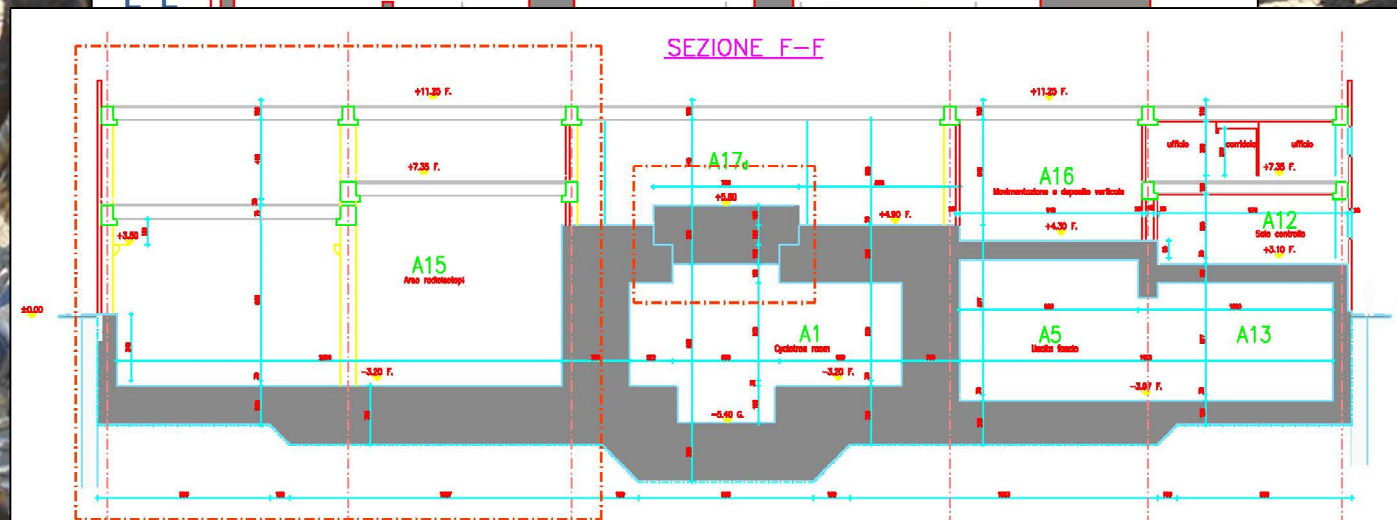
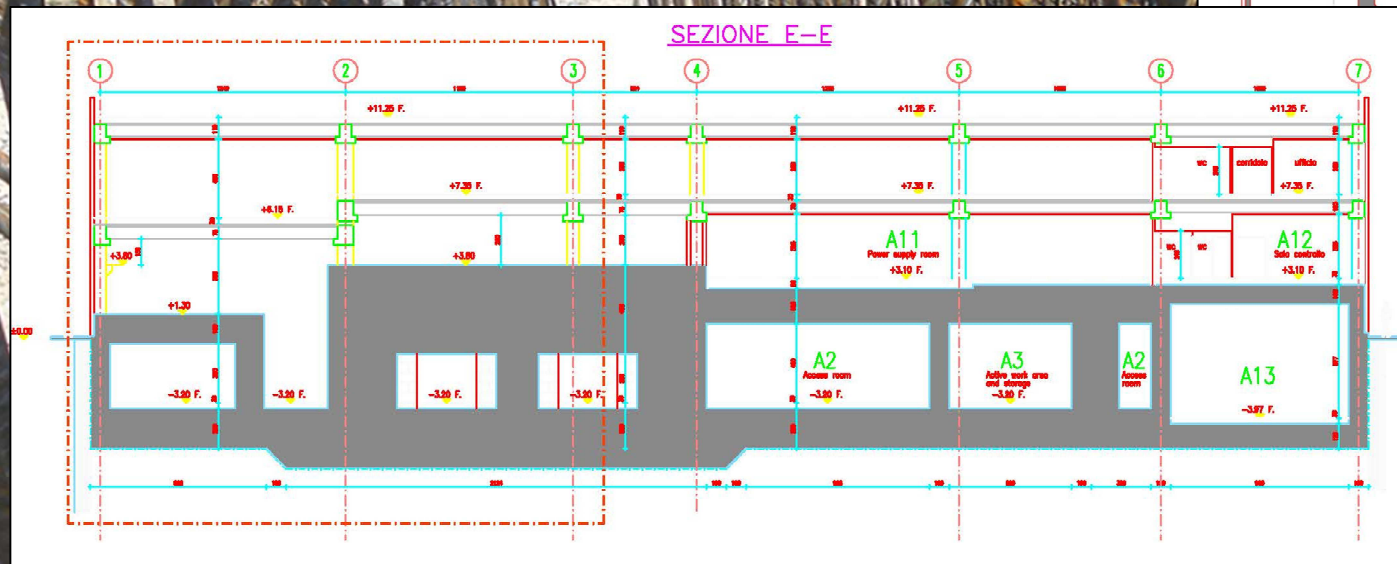


# Cross sections





# Longitudinal sections



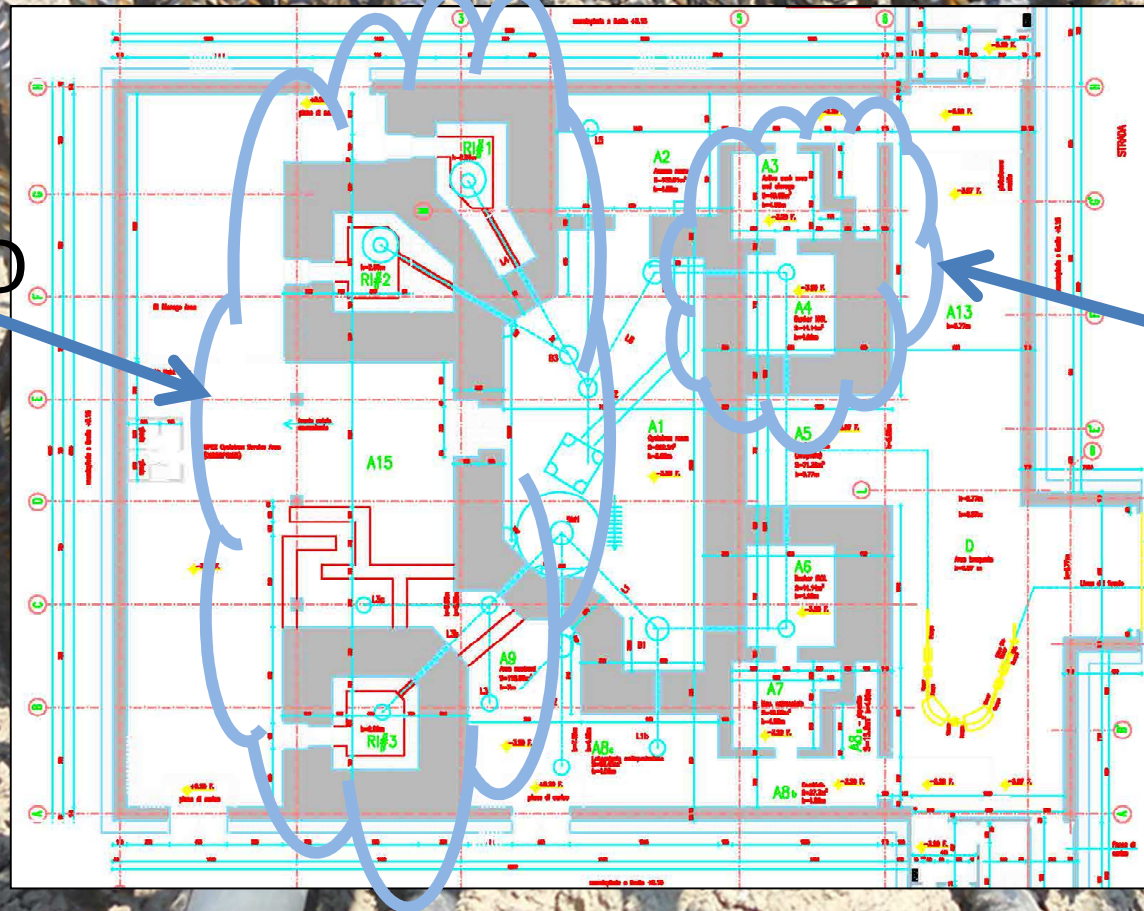


# New technological plants

New technological plants for Laramed

Cost increase: 2 M€ +Iva 10%

LARAMED



LARAMED  
TEMP



# Last year schedule

**Delivery construction work: 10 January 2013**

**Building completed (in order to accept the cyclotron): June 2014**

**Installation of the cyclotron: September 2014**

**End of the work: December 2014**

**After Laramed approval new end of work: June 2015**





# Today's schedule

## **By the end of February 2015:**

Cyclotron vault with electrical distribution, power supply room, control room, elevators.

## **By the end of April 2015:**

Building, mechanical and electrical plant as in the original contract.

## **By the end of June 2015:**

Mechanical and electrical plant for bunker «Laramed Temp».

## **By the end of September 2015:**

Mechanical and electrical plants for bunker Laramed, closing the yard.



An aerial photograph of a construction site. In the center, there are large rectangular structures made of concrete and steel reinforcement bars (rebar). A tall red crane is positioned in the background, and a blue crane arm is visible on the left. The site is surrounded by a red safety fence. In the foreground, there are some blue cylindrical objects on a concrete base. The background shows a landscape with trees and a cloudy sky.

THE END...  
WORK IN PROGRESS

22-23 January

Technical Advisory Committee