



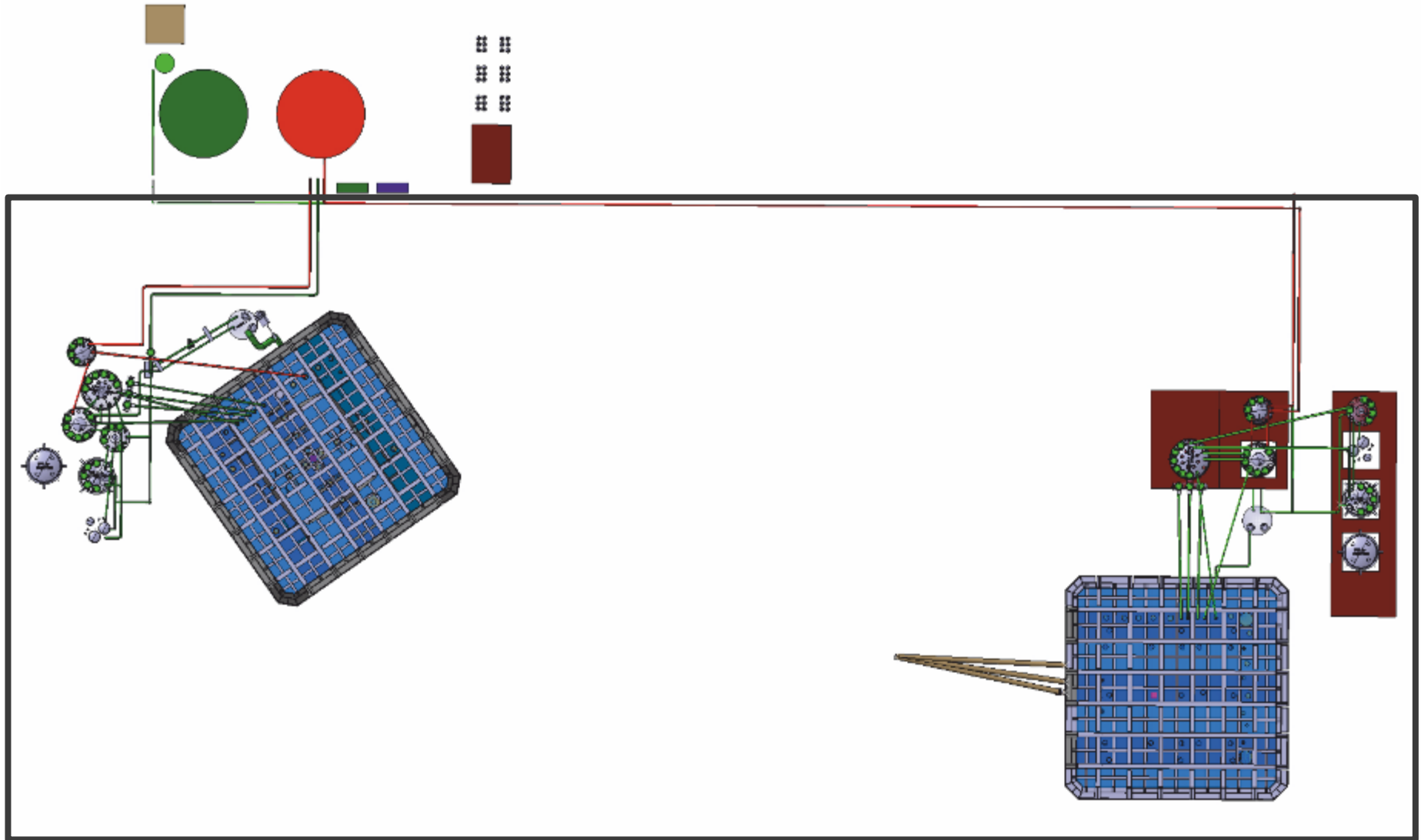
# EHN1 Cryogenics Integration

# Content

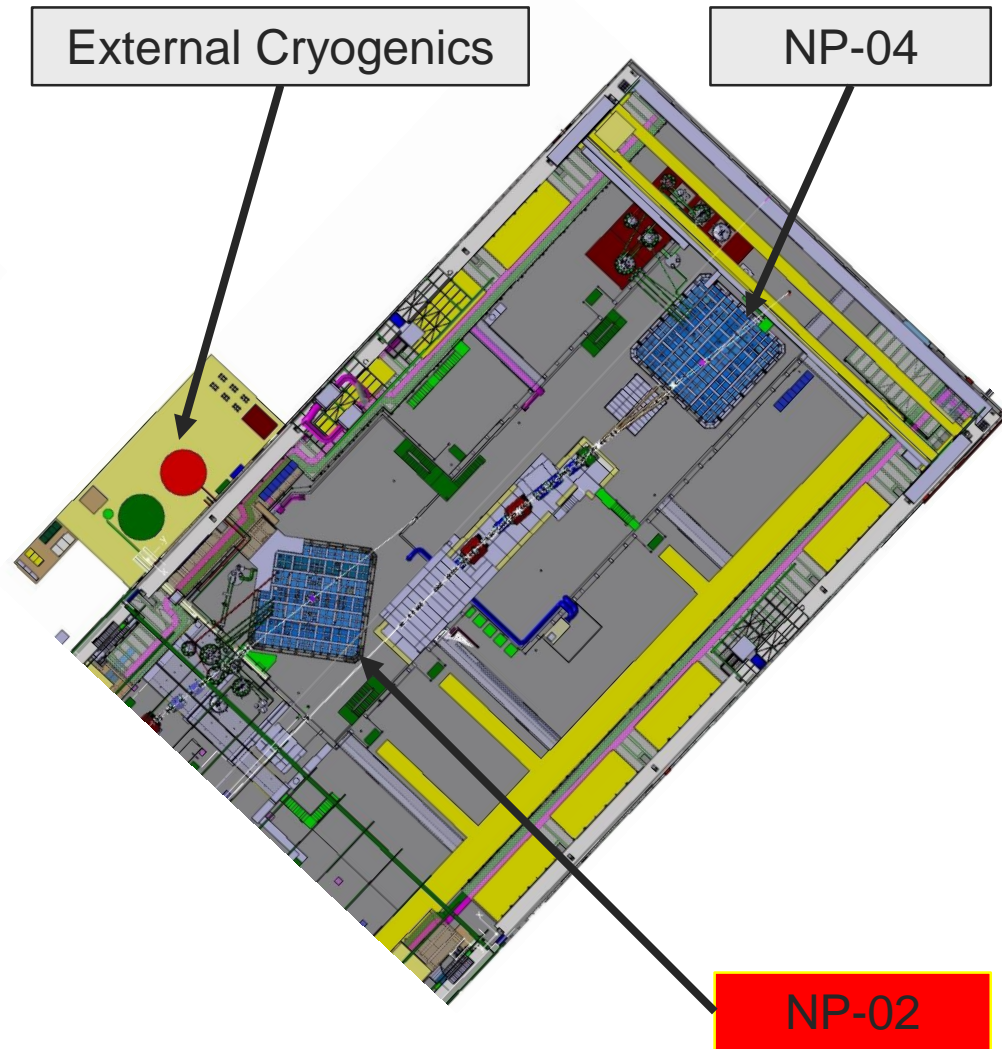
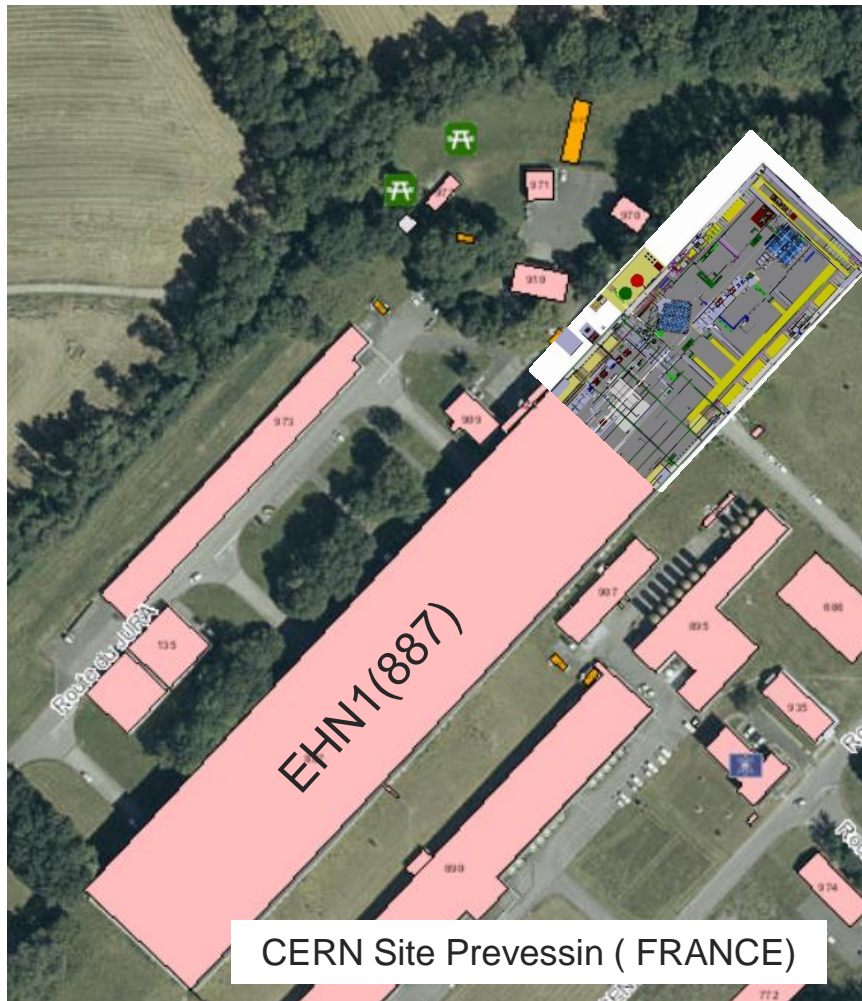
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- ❑ Layout Overview
- ❑ NP-02 Proximity Cryogenics
- ❑ NP-04 Proximity Cryogenics
- ❑ External Cryogenics
- ❑ Industrial Utilities
- ❑ Crane Clearance
- ❑ Conclusions

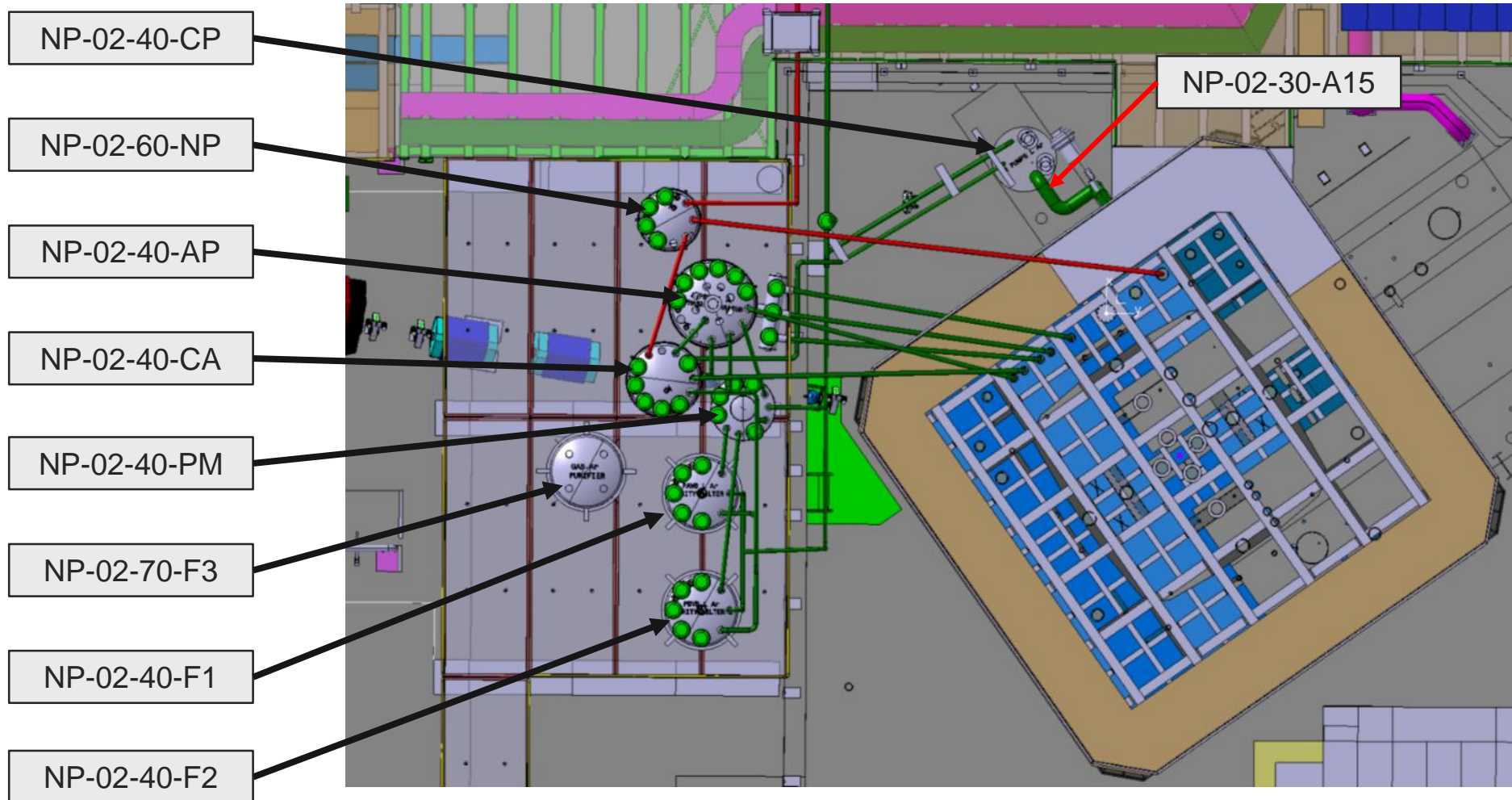
# Layout Overview



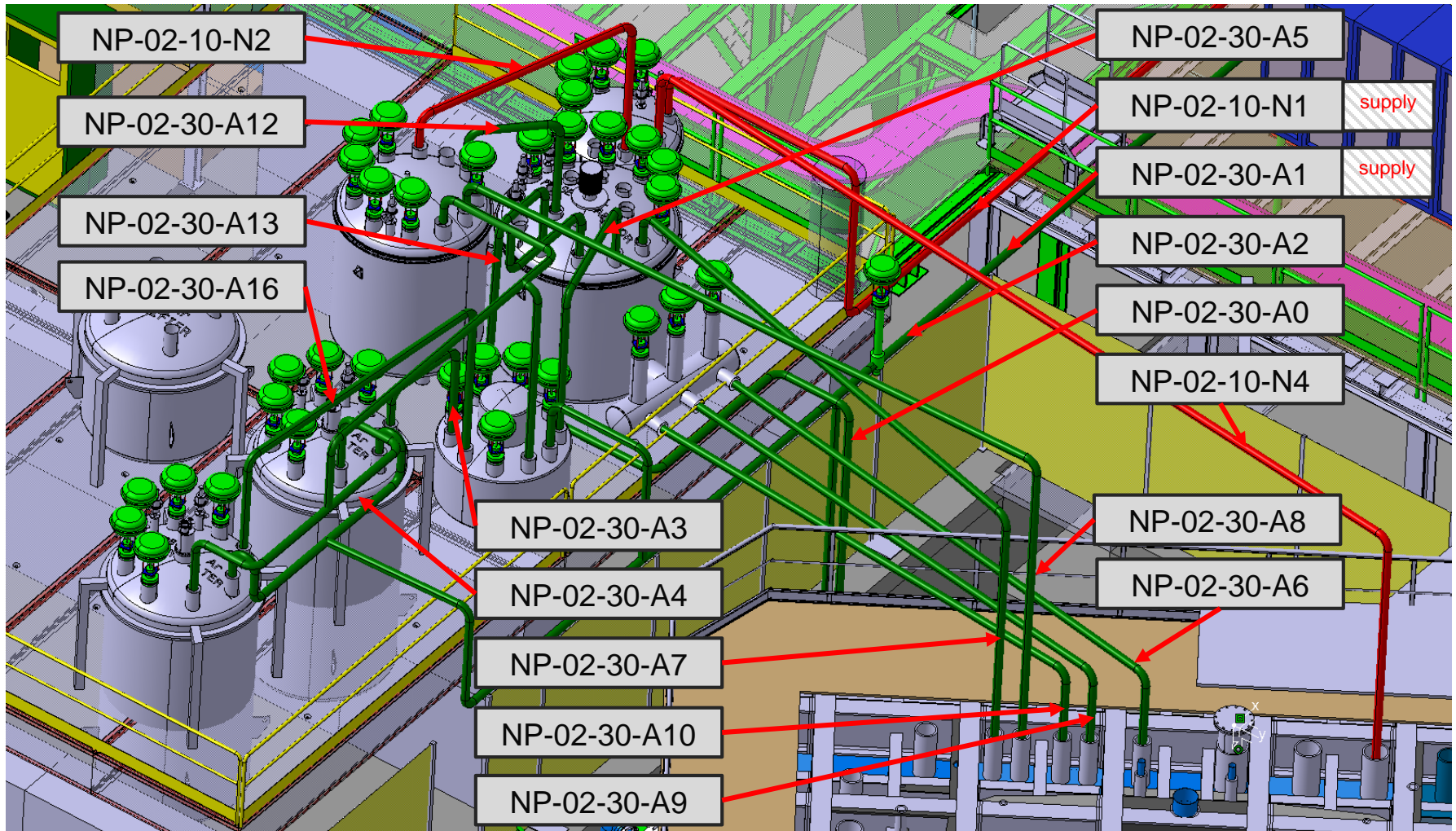
# NP-02 Proximity Cryogenics



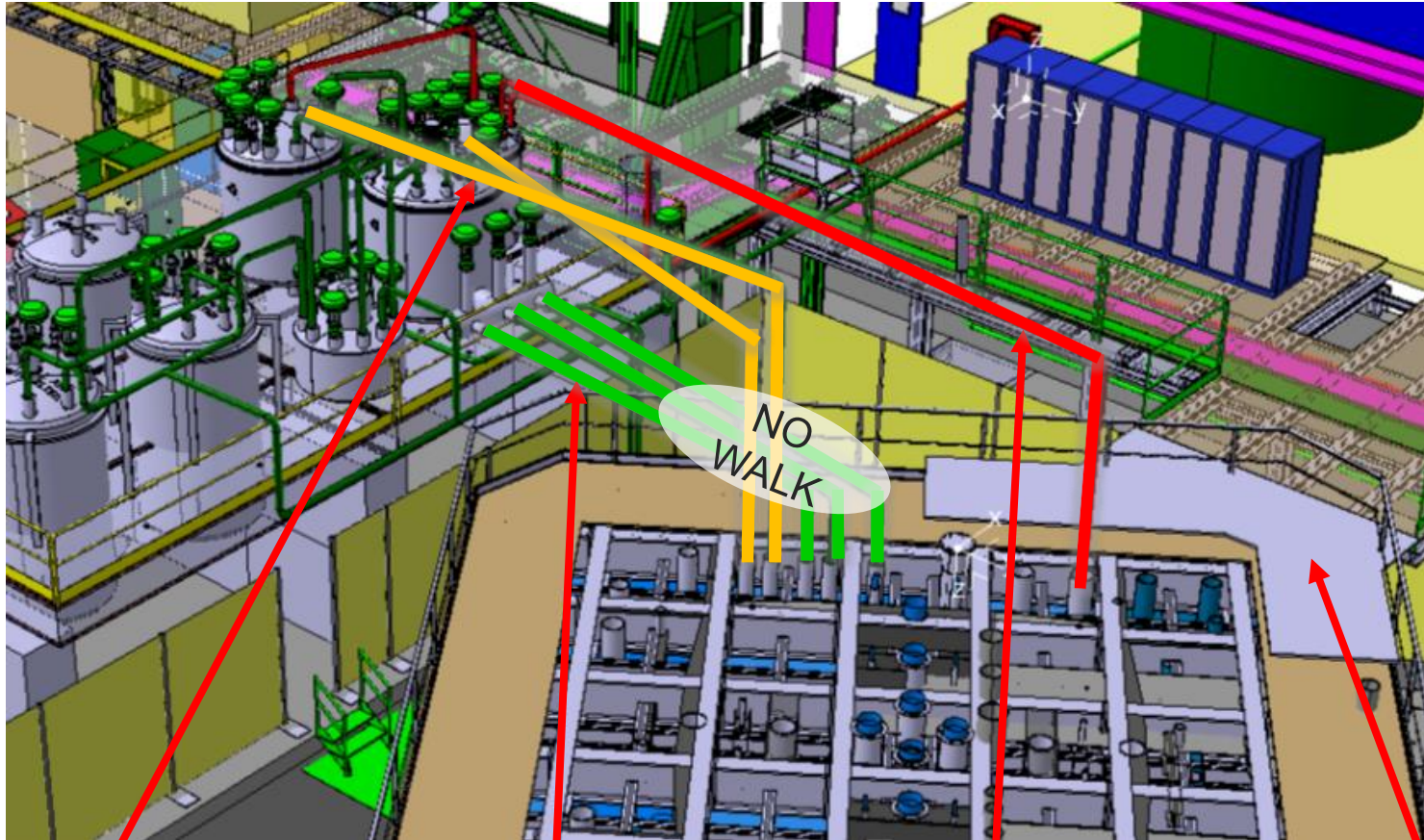
# NP-02 Proximity Cryogenics



# NP-02 Proximity Cryogenics



# NP-02 Proximity Cryogenics



GAr HIGH RETURN

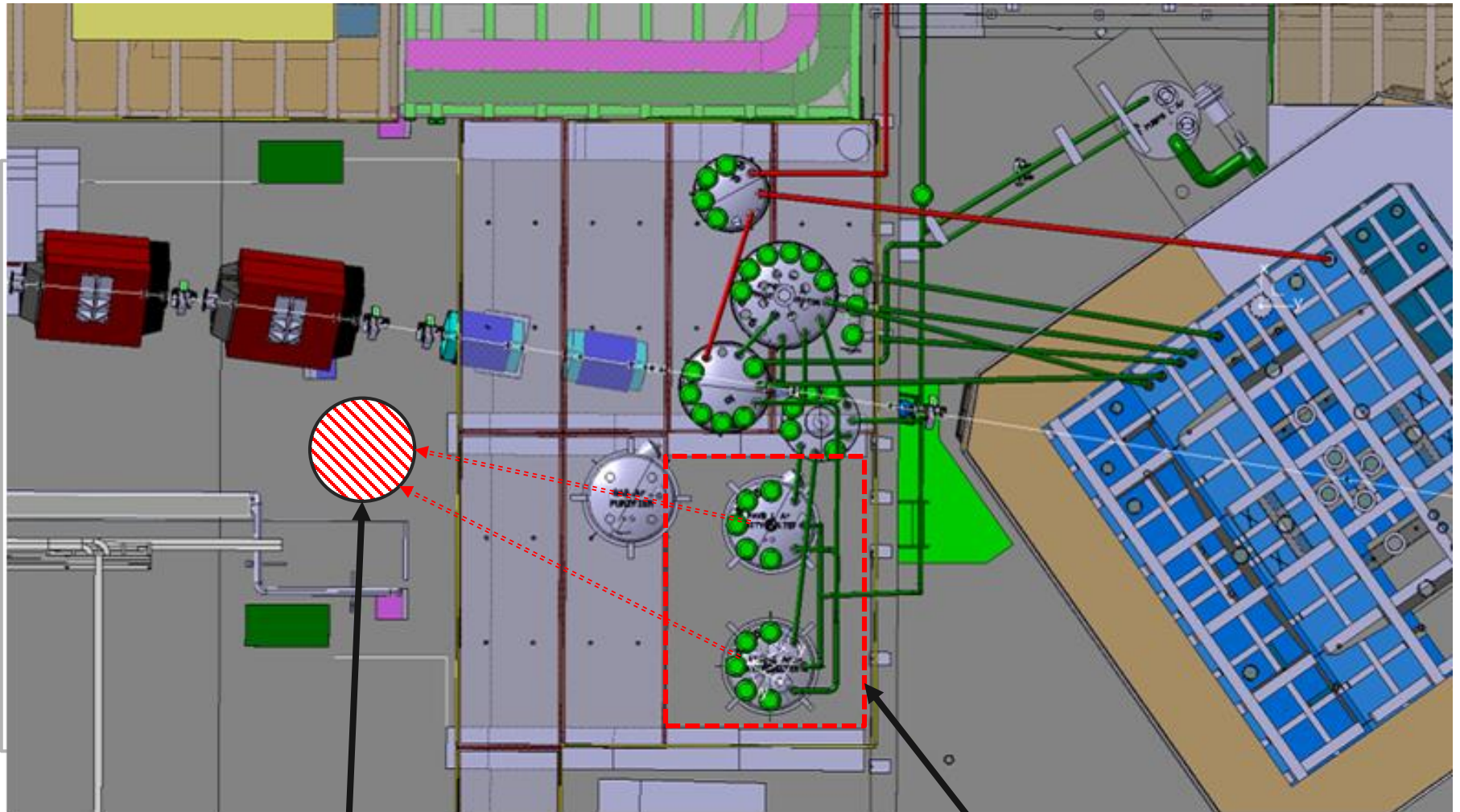
LAr LOW DISCHARGE

LN2 HIGH COOLING

CRYOSTAT WALKWAY



# NP-02 Proximity Cryogenics



FILTER EXTRACTION ZONE

PLATFORM AREA

# NP-02 Proximity Cryogenics

## Integration Report

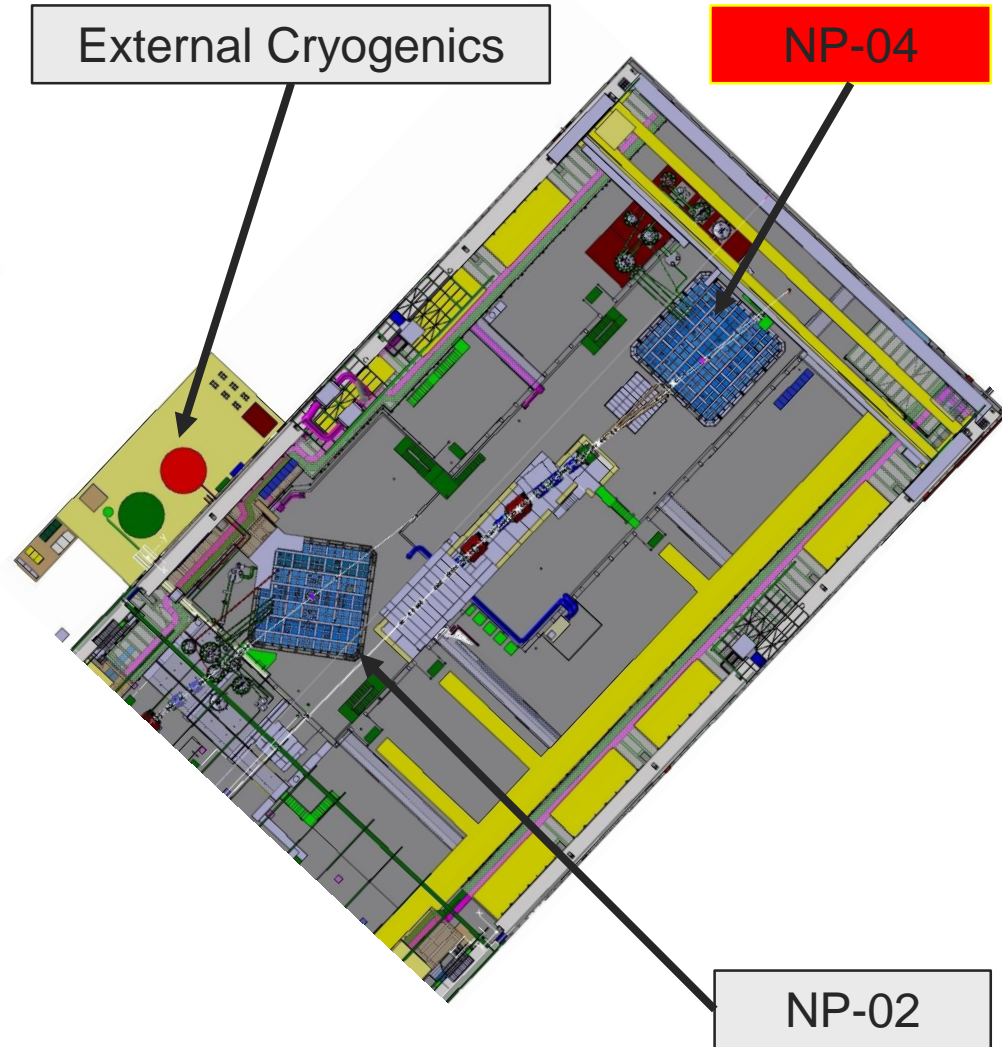
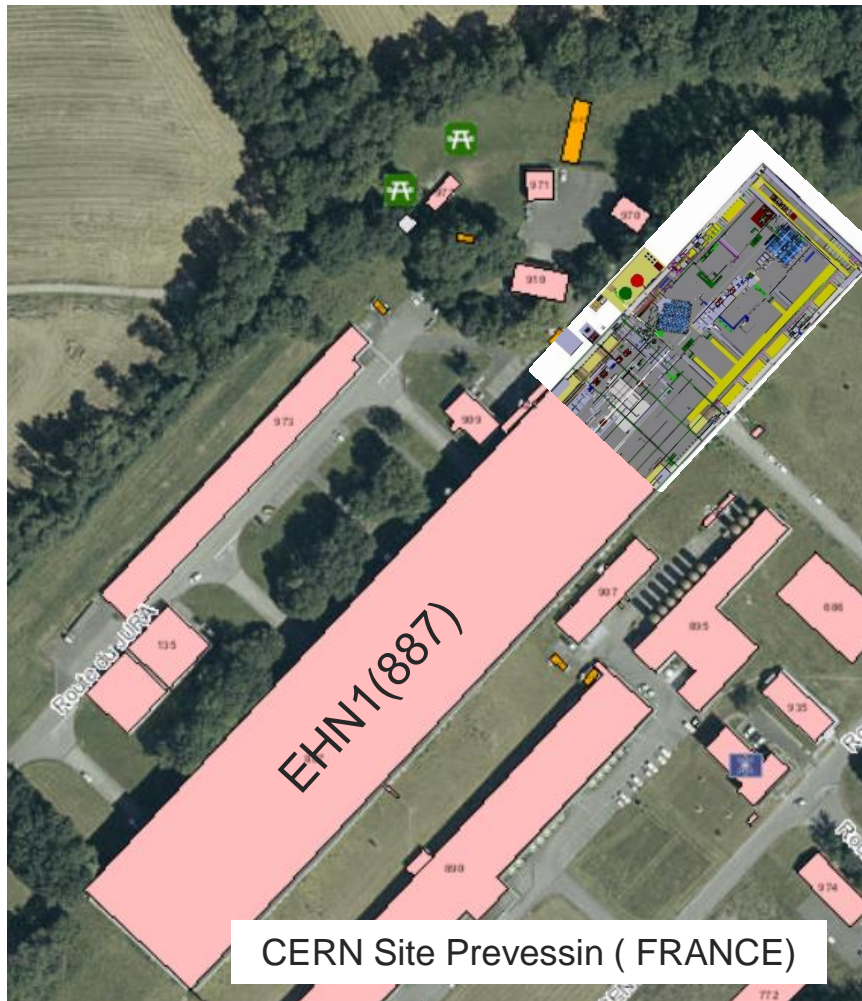
### Interactions

1. EHN1 Extension
2. External Cryogenics
3. Internal Cryogenics
4. Experiment Beam
5. Experiment Assembly
6. Radiation Protection

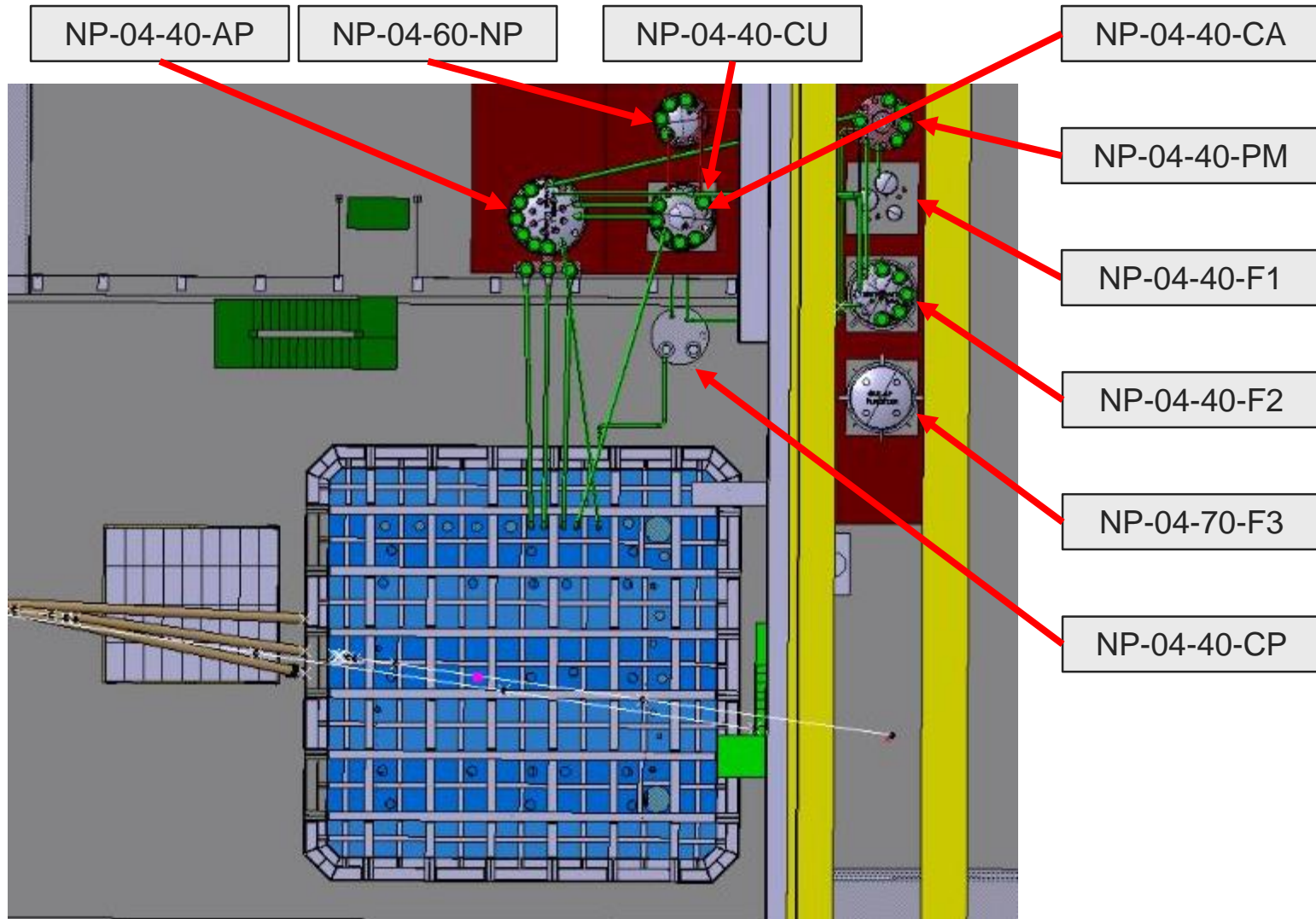
### Resolved Issues

- 1
  - Filter Removal: extraction of concrete boards and integration of platform to support the chemical filters
  - Modifications in utilities routing to allow safe handling of filters in the beam floor
  - Crane cabin exclusion zone required
- 2
  - Best effort to adapt supply lines to the external cryogenics layout
- 3
  - Adaptation of supply lines to allow access platform to the cryostat top
  - Definition of no pass zone after cryogenic liquid discharge pipes
- 4
  - Proximity cryogenics allows the removal of all close beam magnets
- 5
  - Proximity cryogenics does not interfere with the experiment assembly
- 6
  - Extraction of concrete blocks near beam reported to RP

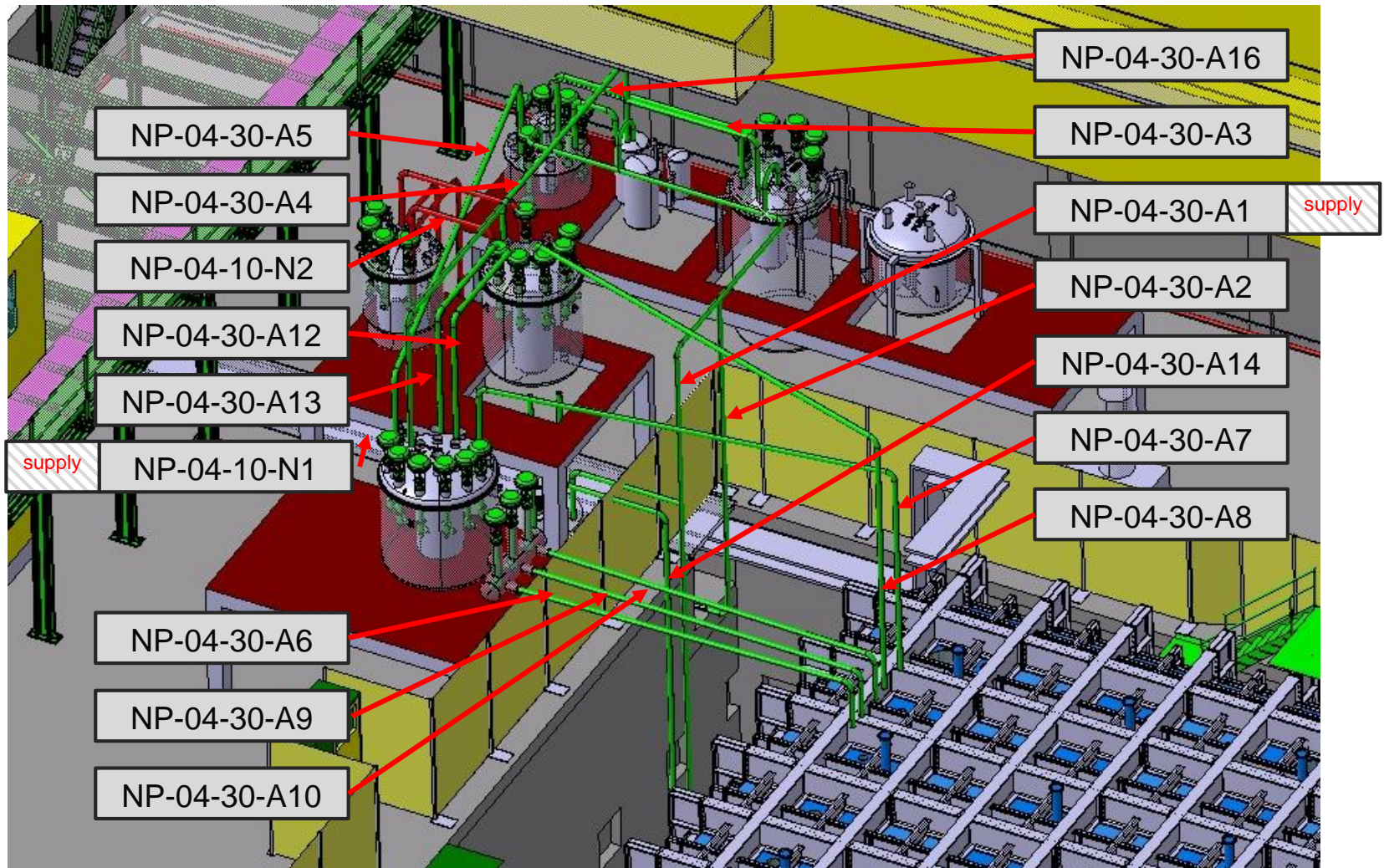
# NP-04 Proximity Cryogenics



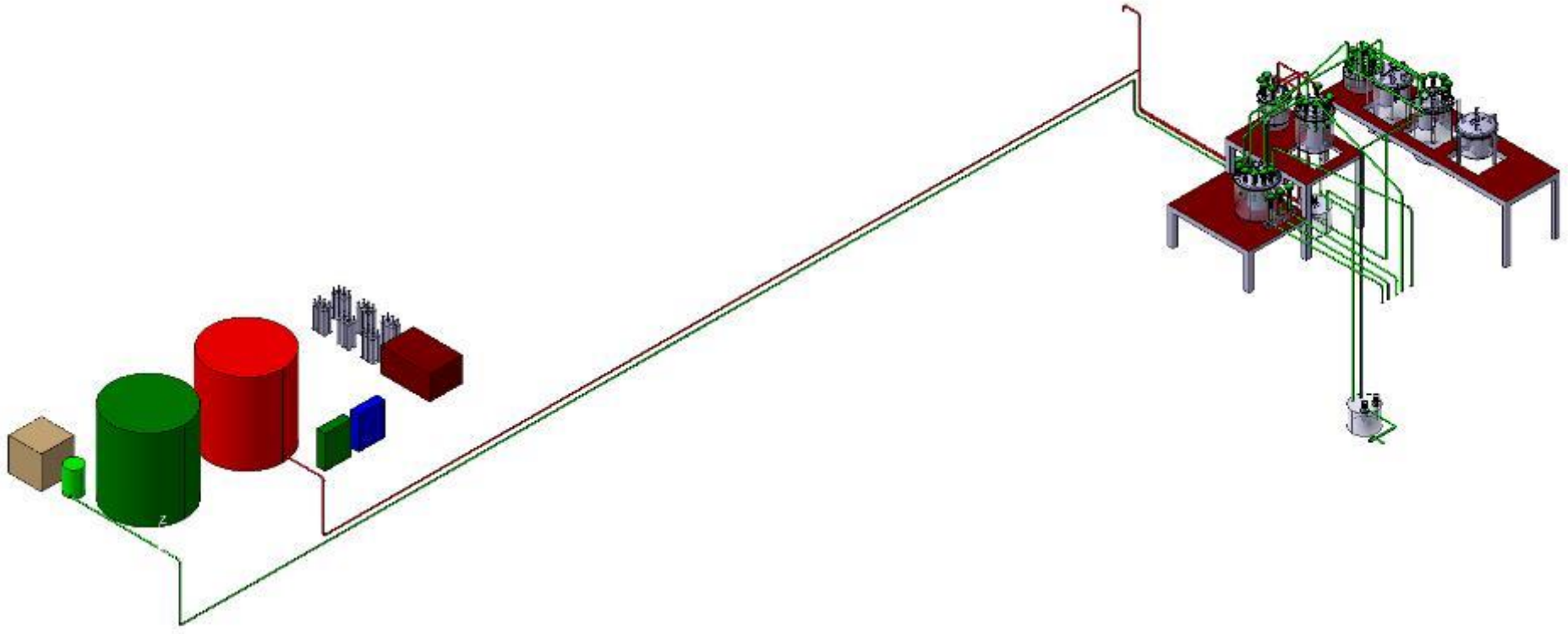
# NP-04 Proximity Cryogenics



# NP-04 Proximity Cryogenics



# NP-04 Proximity Cryogenics



# NP-04 Proximity Cryogenics

## Integration Report

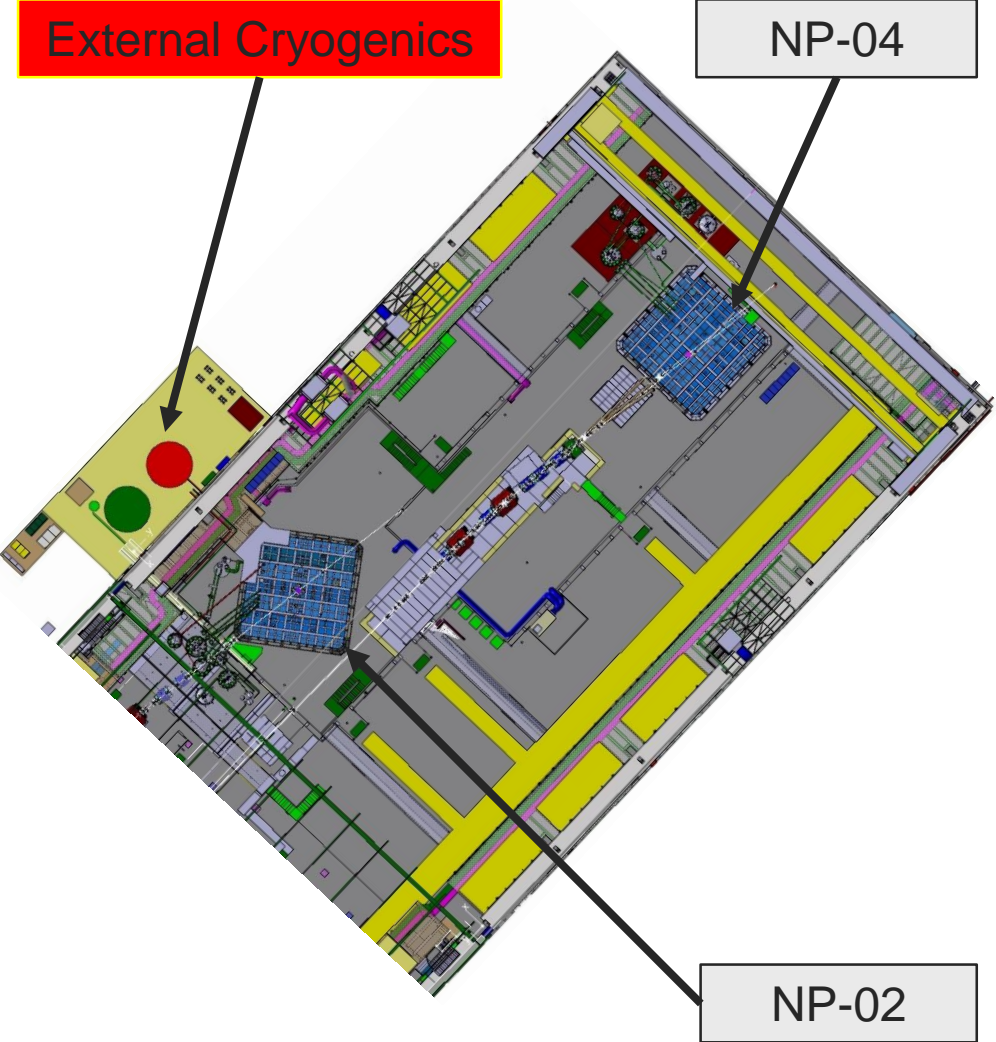
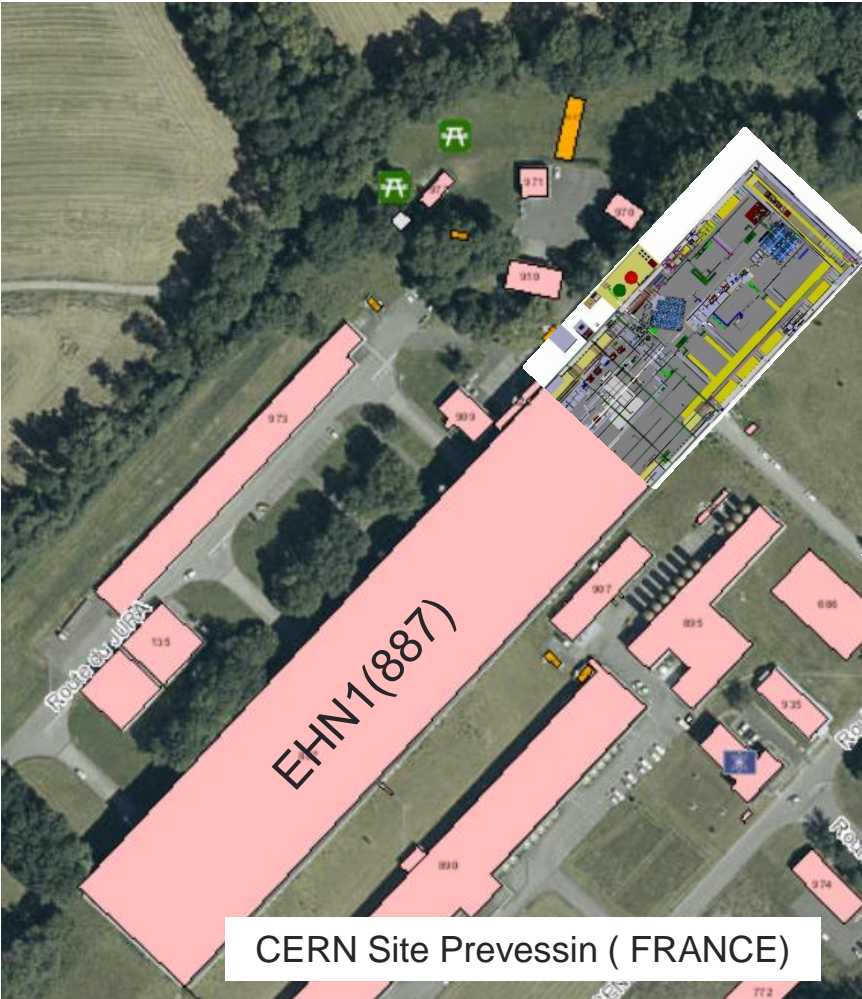
### Interactions

1. EHN1 Extension
2. External Cryogenics
3. Internal Cryogenics
4. Experiment Beam
5. Experiment Assembly
6. Radiation Protection

### Resolved Issues

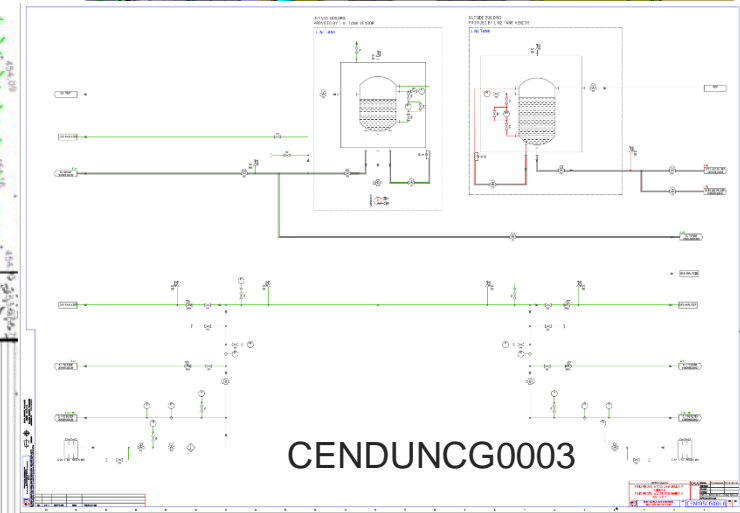
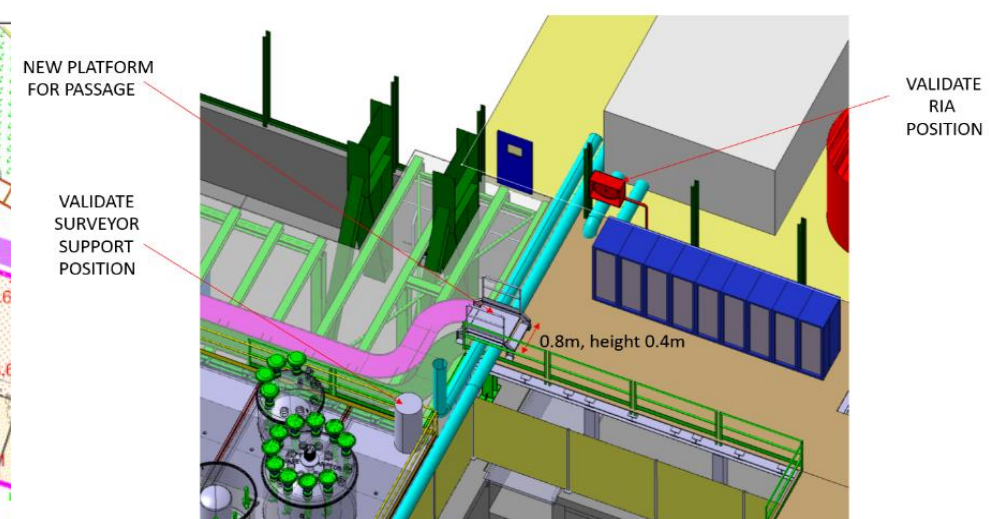
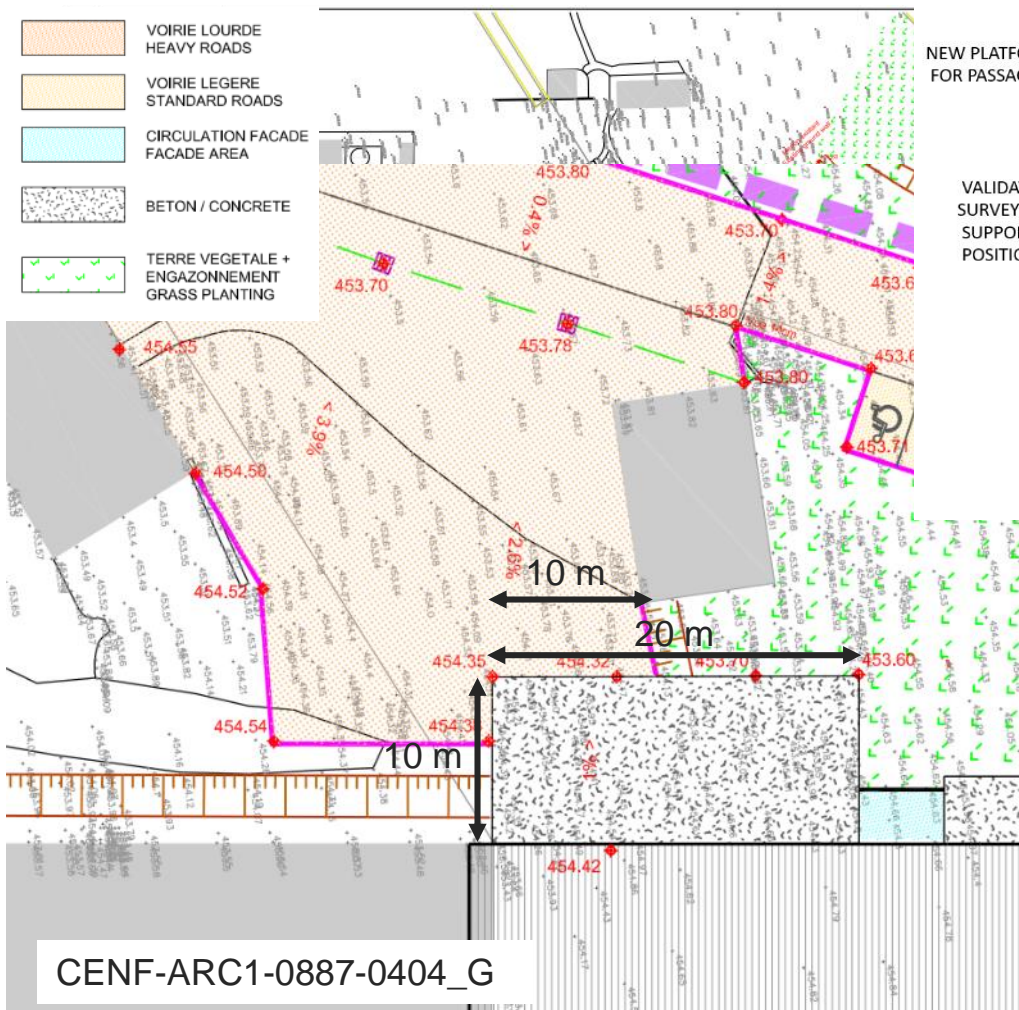
- 1
  - Filter Removal: integration of dedicated platform for filter removal
  - Best effort to route supply lines through EHN1 extension
  - Crane cabin exclusion zone required
- 2
  - Best effort to adapt supply lines to the external cryogenics layout
- 3
  - Definition of no virtual pass zone after cryogenic liquid discharge pipes ( to date, pass zones in the cryostat are not defined )
- 4
  - Proximity cryogenics have no interaction with beam magnets
- 5
  - Proximity cryogenics does not interfere with the experiment assembly
- 6
  - No relevant RP interaction reported

# External Cryogenics

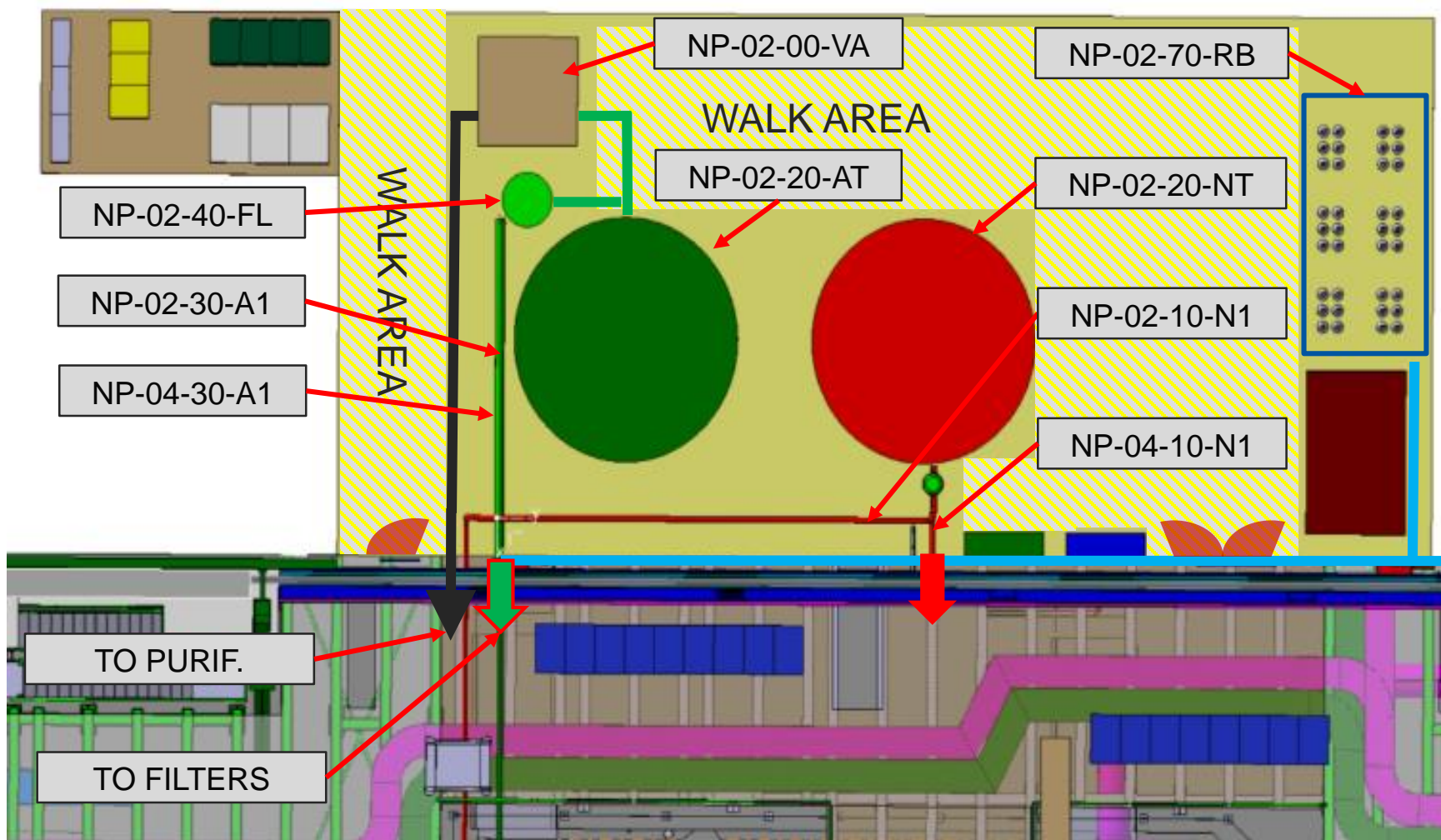




# External Cryogenics



# External Cryogenics



# External Cryogenics

## Integration Report

### Interactions

1. EHN1 Extension
2. Proximity Cryogenics
3. Industrial Utilities

### Resolved Issues

- 1
  - Passage of access and emergency doors guaranteed
  - Integration of cryogenic piping in two opening on the EHN1 extension wall
- 2
  - Centralized filtering of LAr cryogenic supply
  - Large area allocated for the storage of GAR+H2 mixture bottles in external area as well as GAR+H2 mixing and handling station
  - Centralized LAr vaporizer to supply both experiments with gaseous argon.
- 3
  - Request to move electrical container far from cryo area to facilitate cryogenic supply truck access

# Industrial Utilities

## Compressed Air

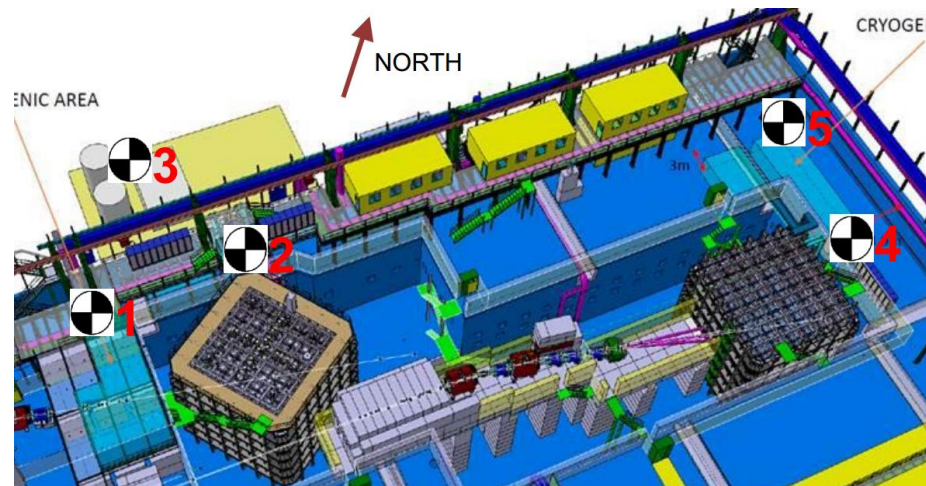
- Flow 20 m<sup>3</sup>/h
- Pressure 9 bar

## Electrical Power

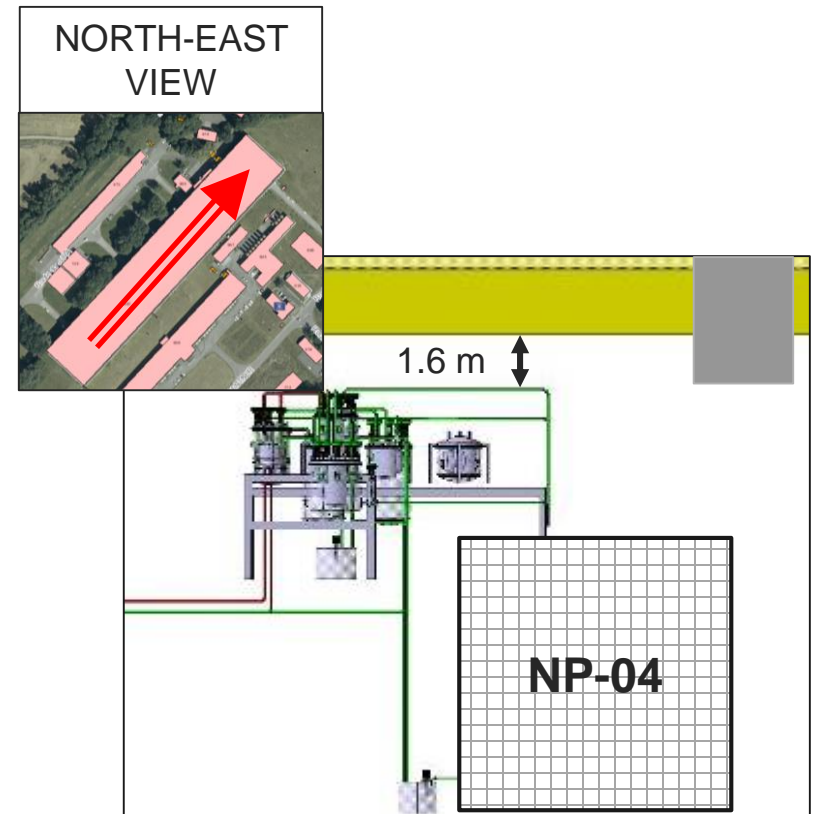
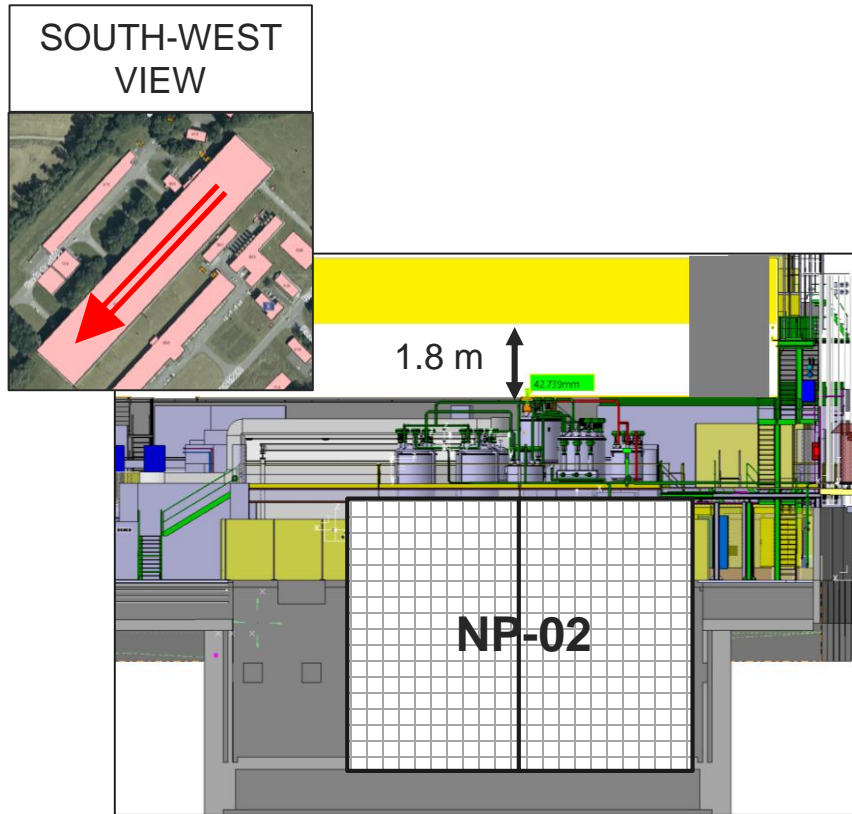
- Voltage 3ph -  $\Delta$ 220/Y380 V
- Frequency 50 Hz
- Power TBD kW
- UPS 20 kW/h

## Cooling Water

- Not required



# Crane Clearance



**CRANE CABIN EXCLUSION ZONE REQUIRED FOR NP-02 AND NP-04**



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