Conventional Facilities Update

Steve Dixon

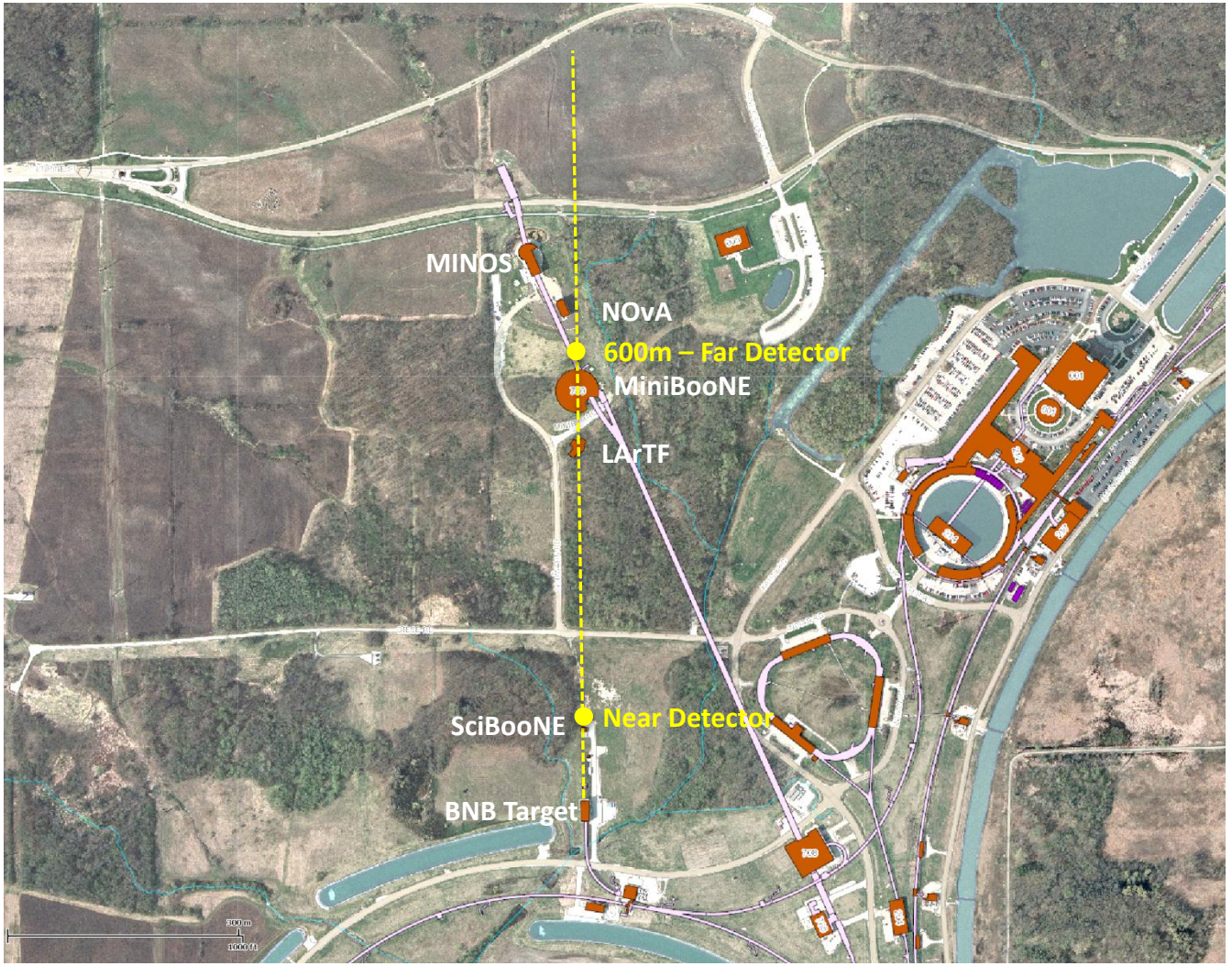
Joint WG3 and WG4 Workshop

02 July 2014

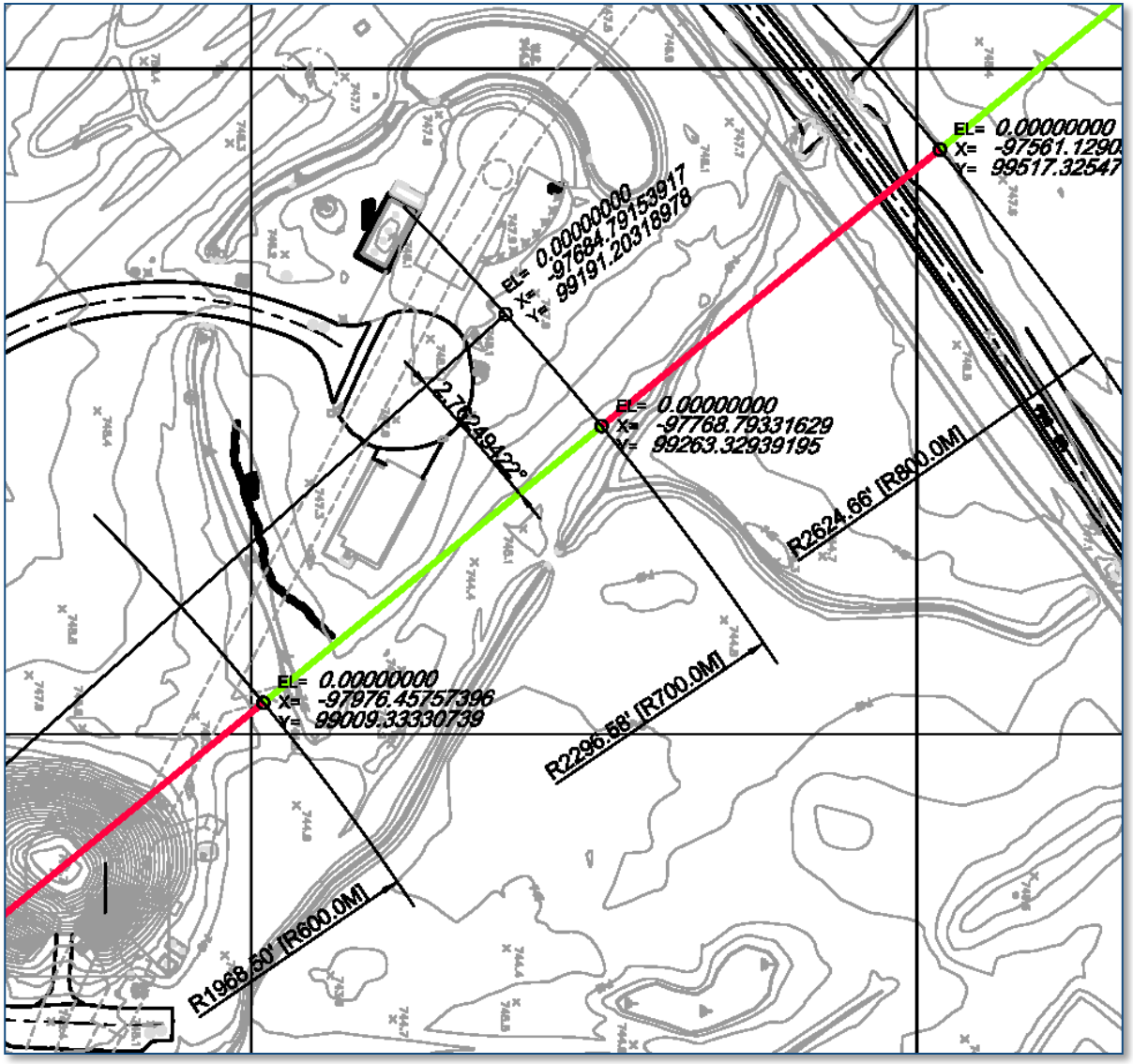
Agenda

- Location
- Far Detector Wetlands
- Far Detector Building Options
- Near Detector Building Options
- What’s Next

Site Plan

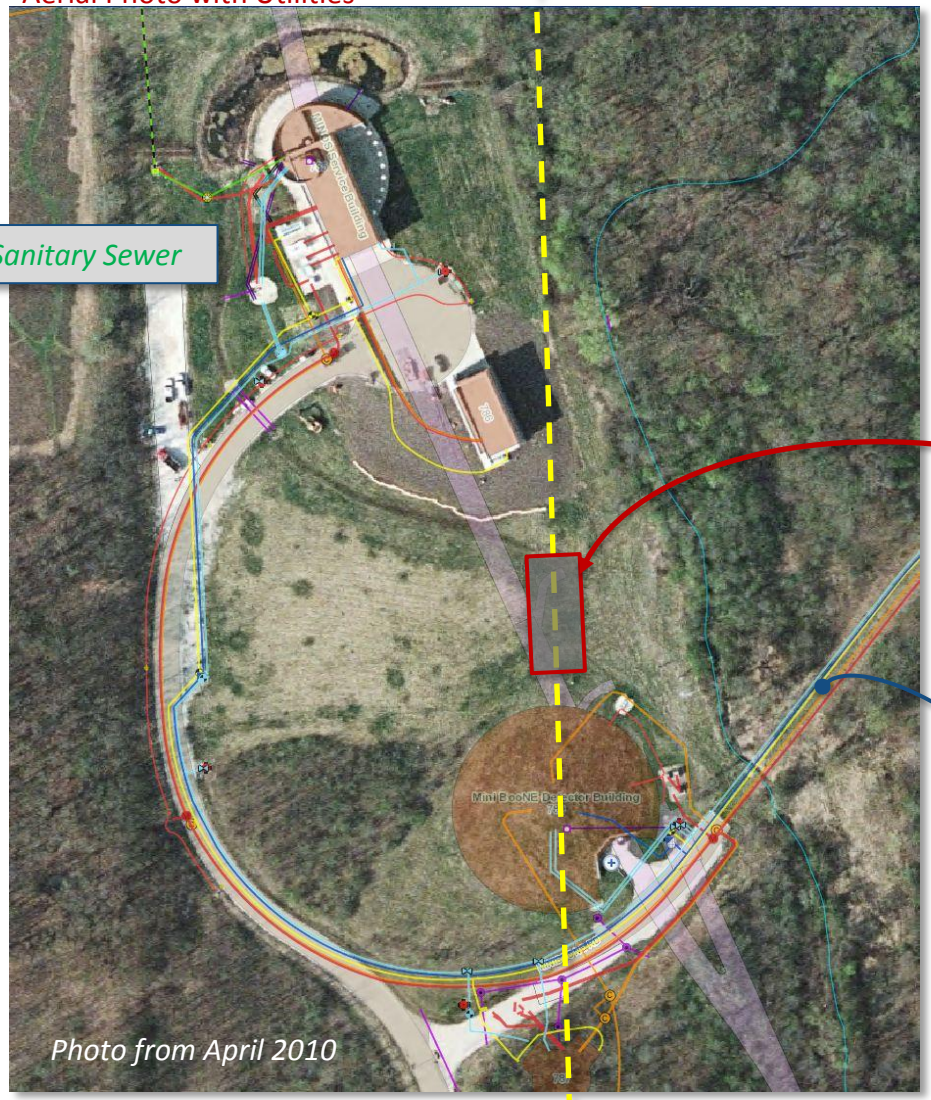

MINOS
NOvA
600m – Far Detector
MiniBooNE
LArTF
SciBooNE
Near Detector
BNB Target

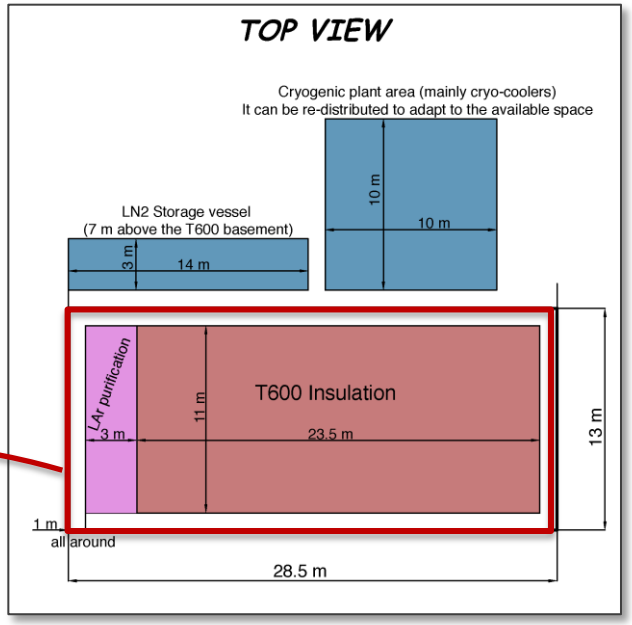
Far Detector Building – 600m location



Far Detector Building – 600m location

Aerial Photo with Utilities



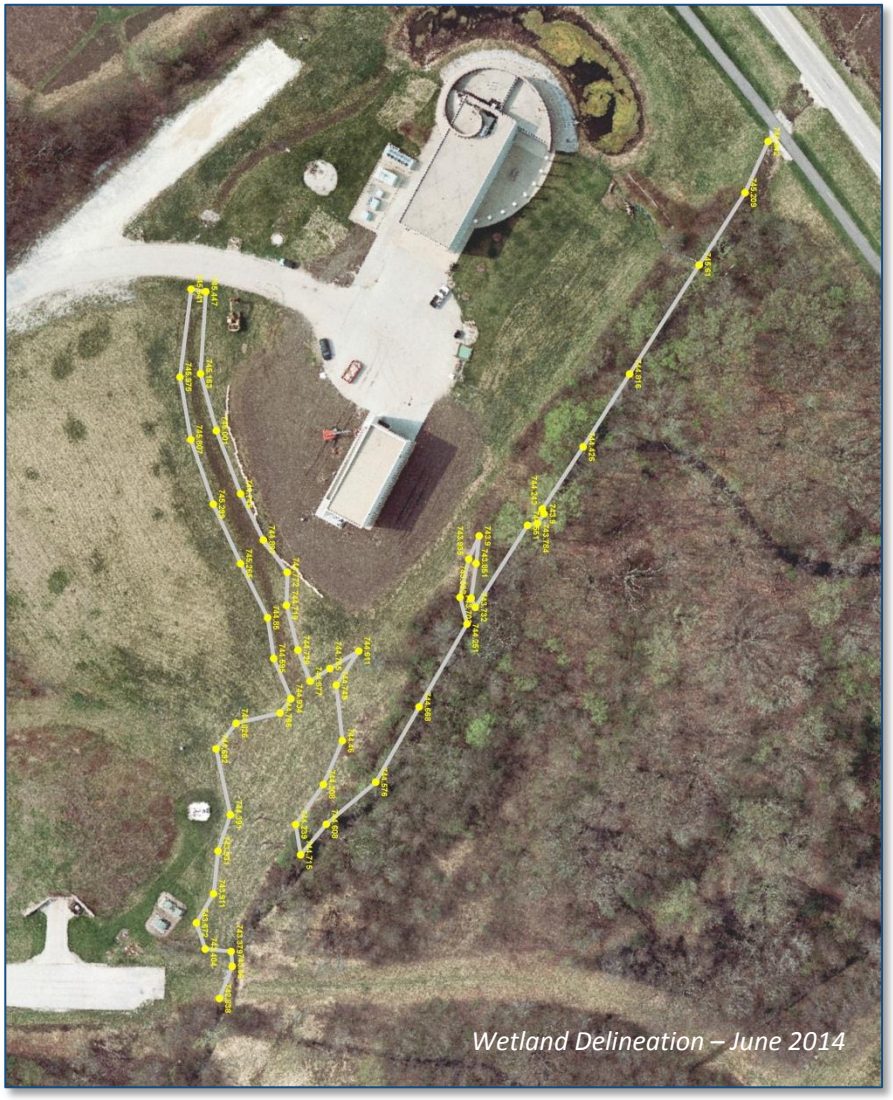


From C. Montanari Presentation, May 2014

Existing Utility Corridor:

- *Industrial Cooling Water (sprinklers)*
- *Domestic Water Supply (drinking water)*
- *Natural Gas (heating)*
- *Communication (phone/data)*
- *Electrical (power)*

Far Detector Site - Wetlands

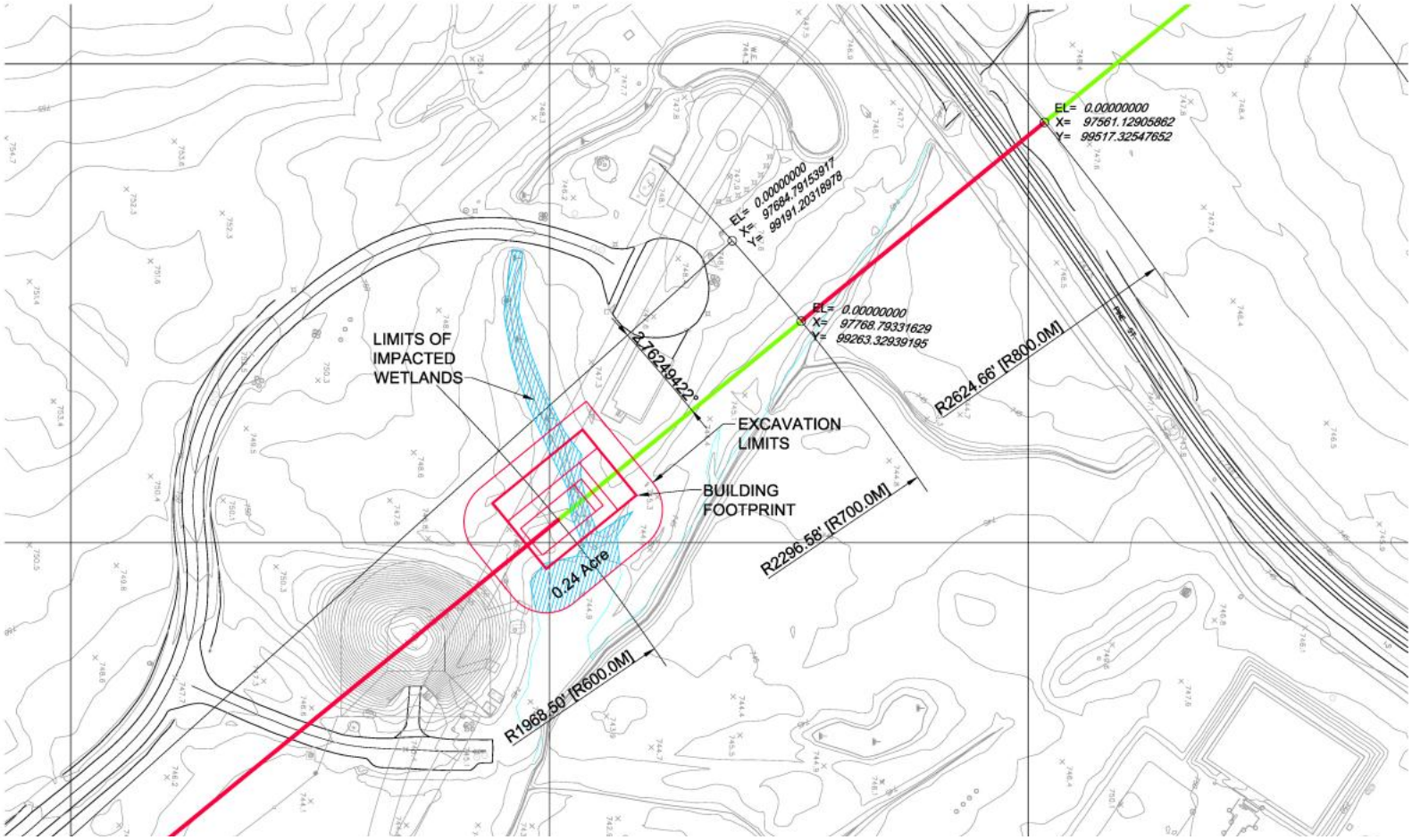


Wetland Delineation – June 2014

MINOS Construction - 2003

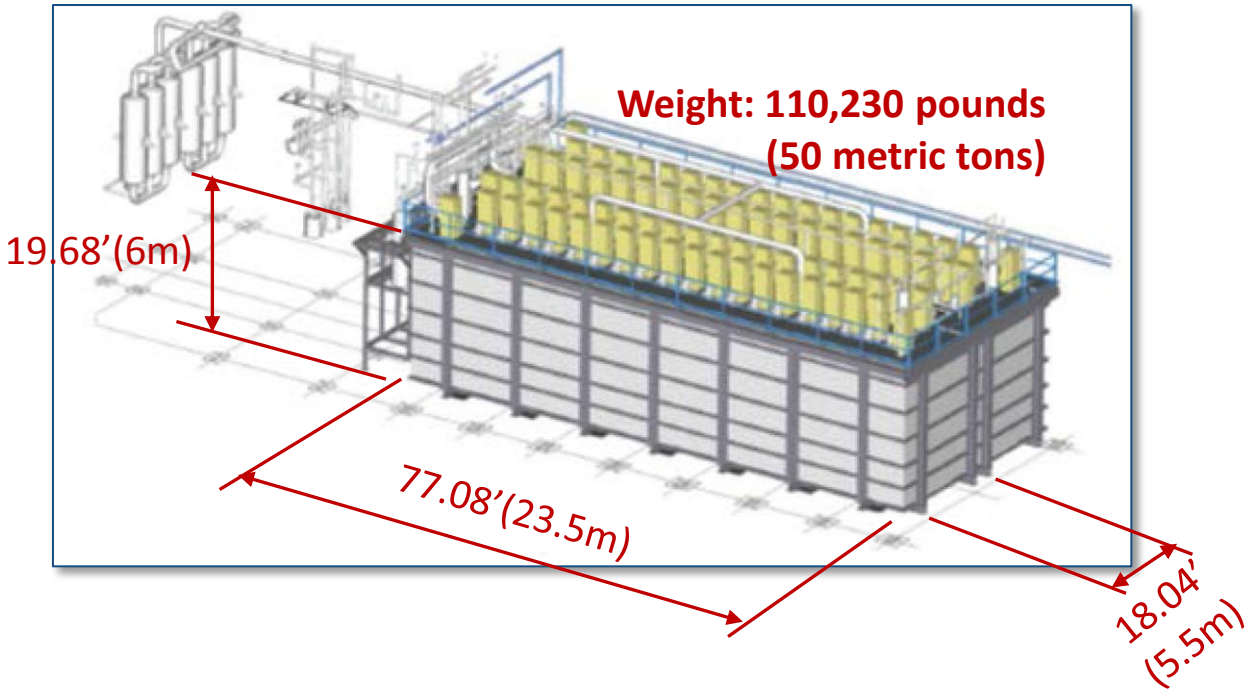
NOvA Cavern Construction - 2012

Far Detector Site - Wetlands

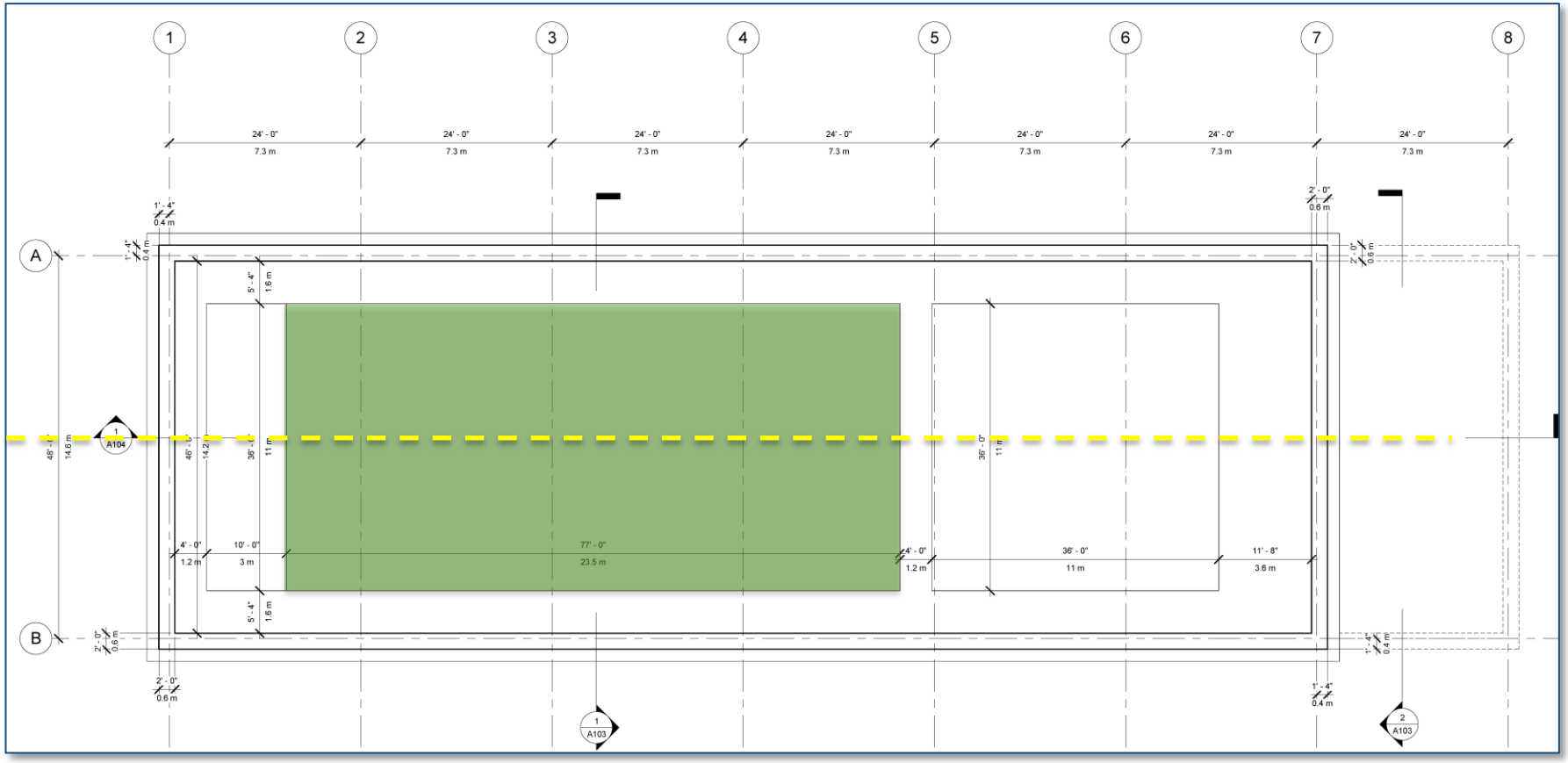


Far Detector Building Options

- Option 1- Surface Building
- Option 2 – Shielded Enclosure
- Option 3 – Removable Shielding

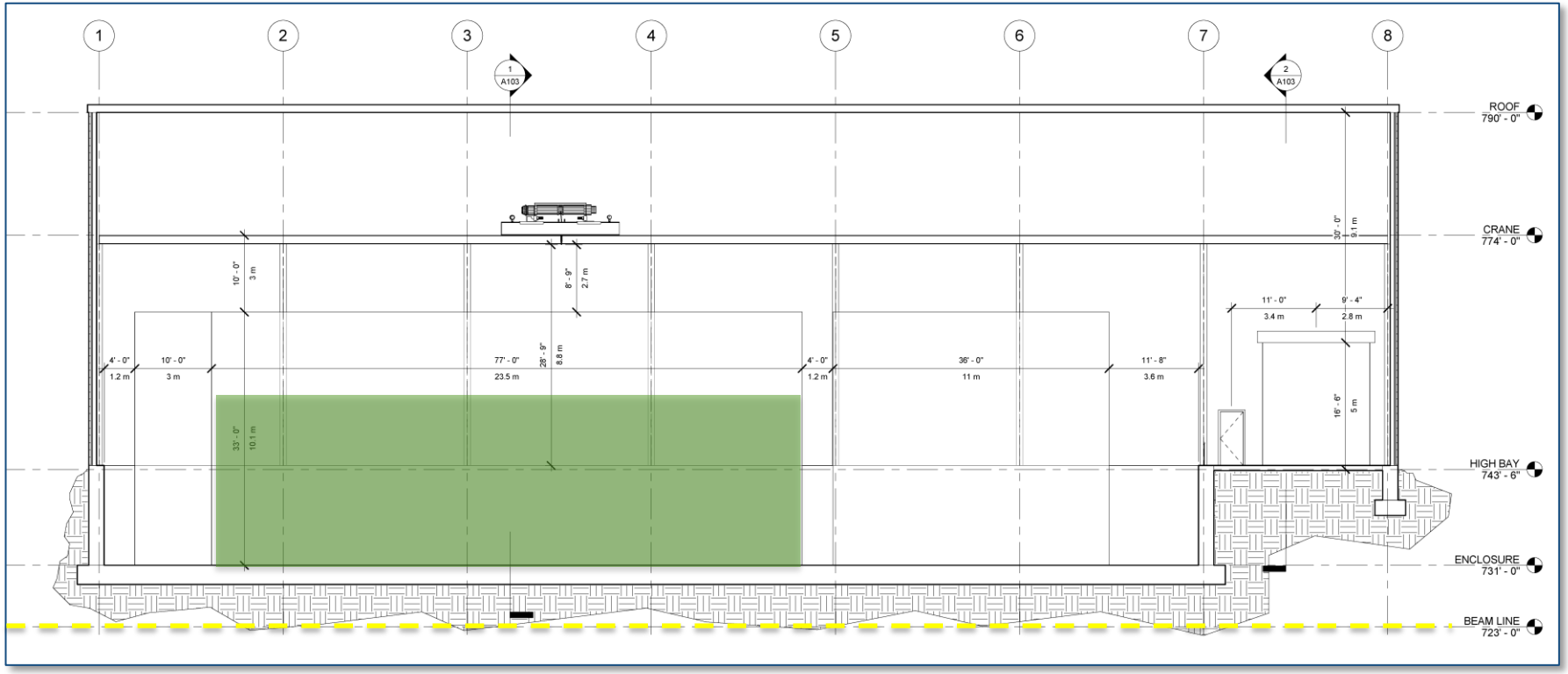


FDB – Option 1



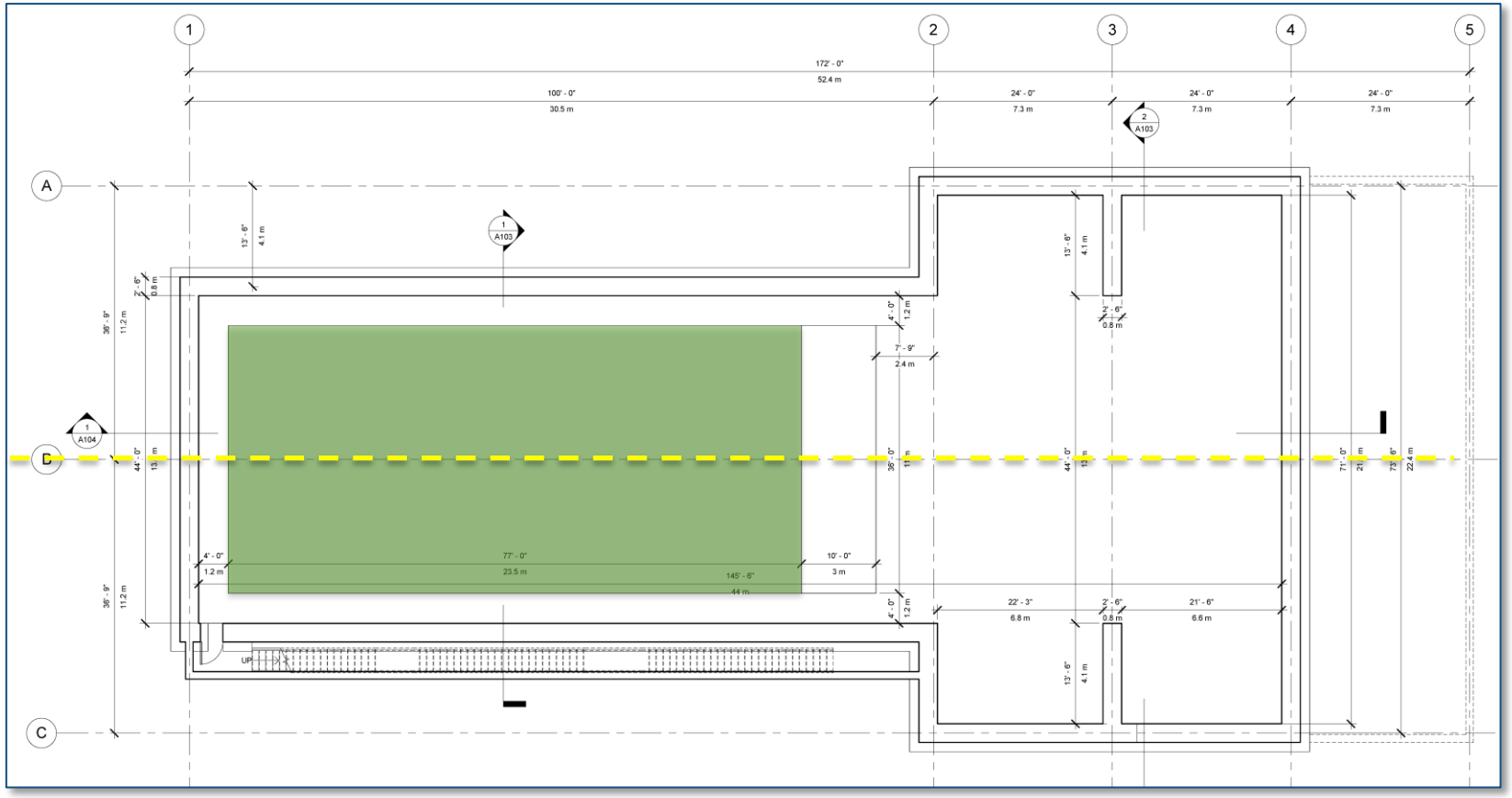
Plan

FDB – Option 1



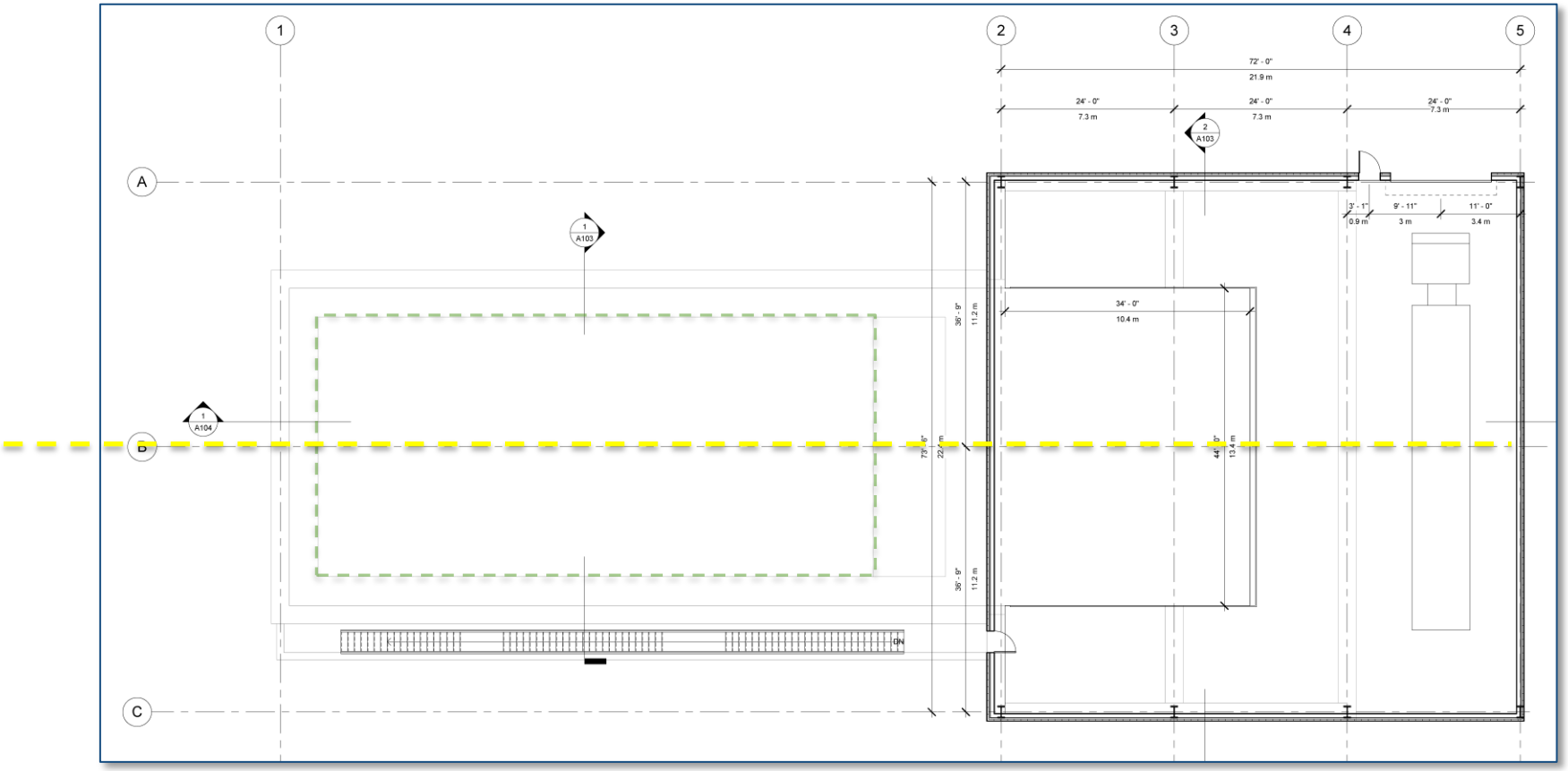
Section

FDB – Option 2



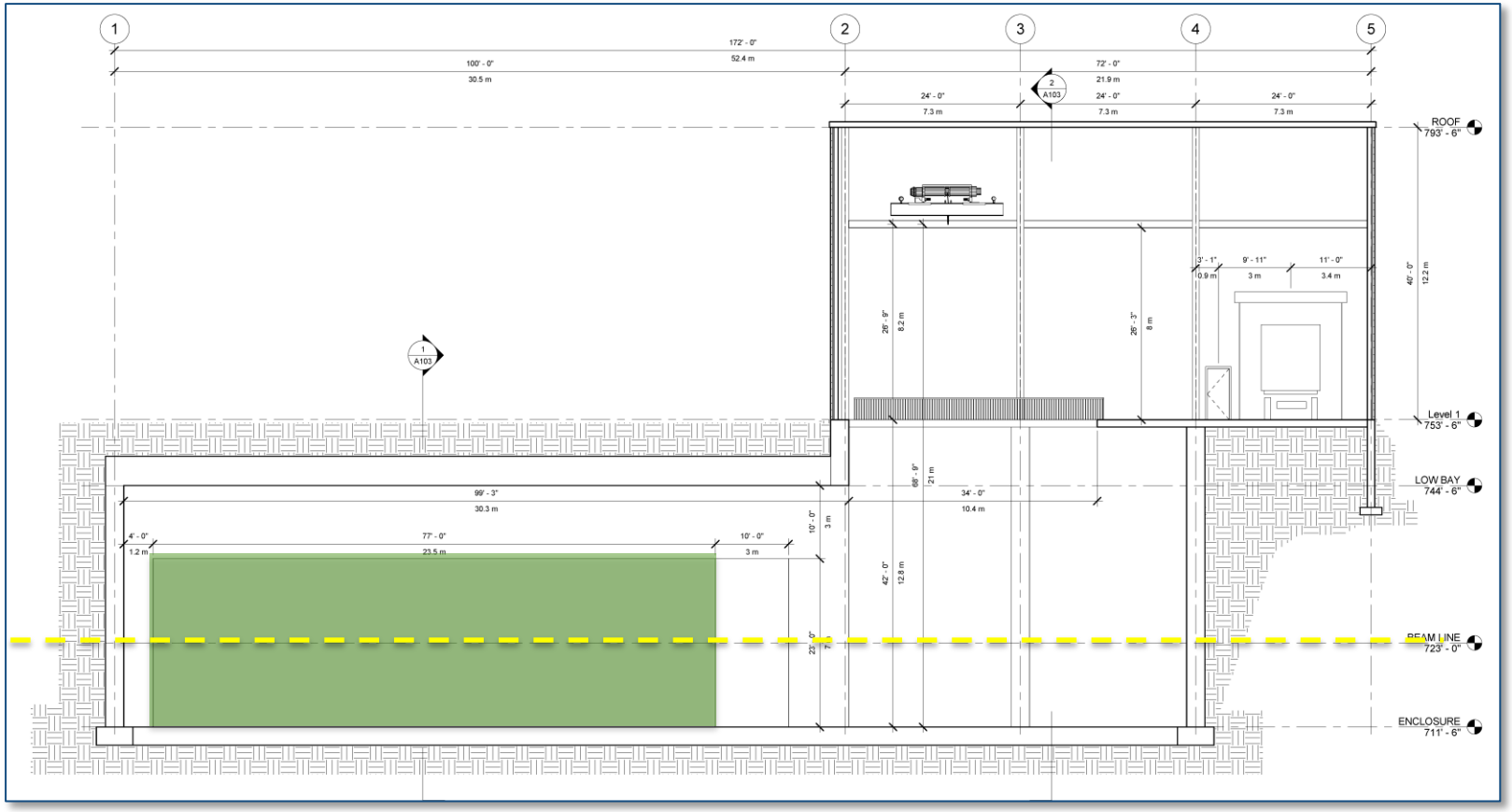
Plan at Detector Level

FDB – Option 2



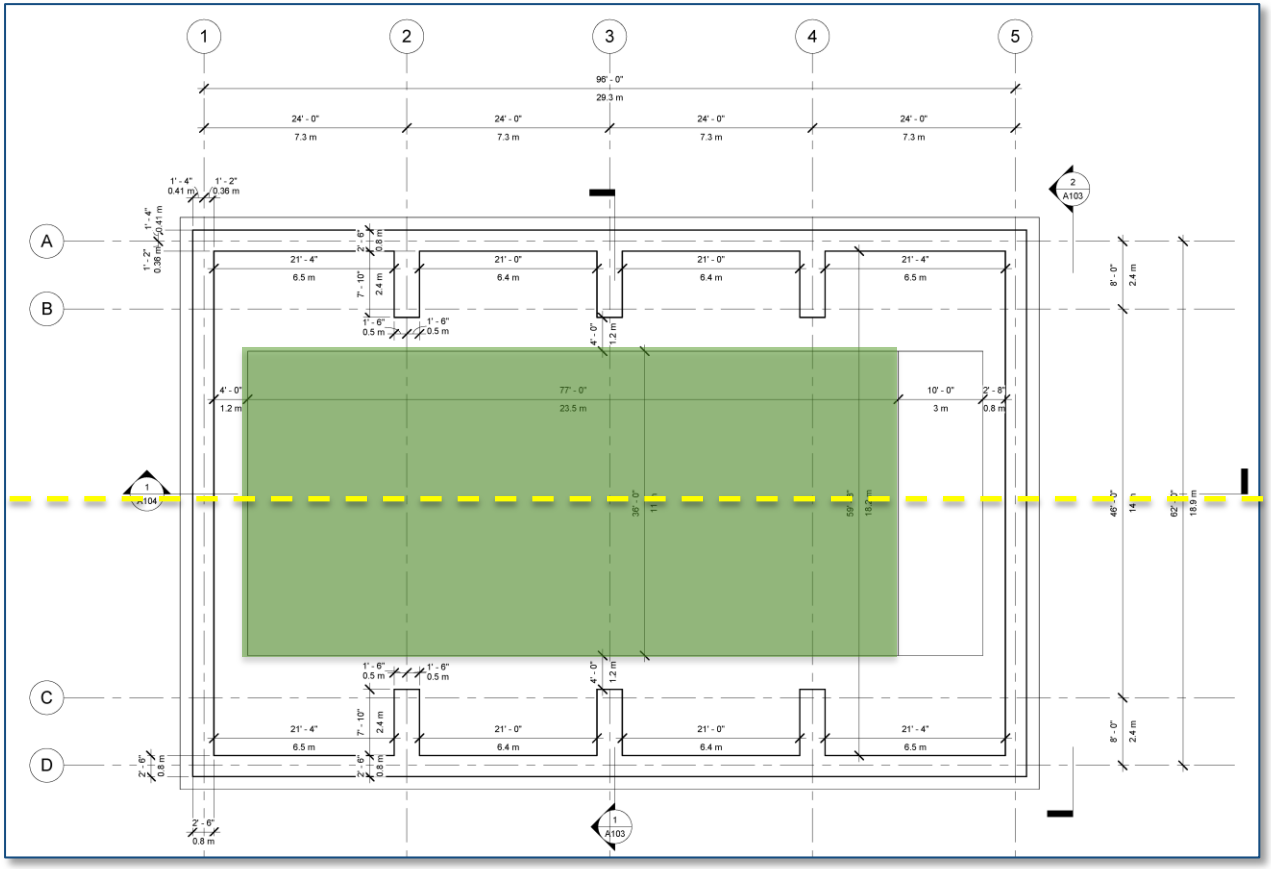
Plan at Detector Level

FDB – Option 2



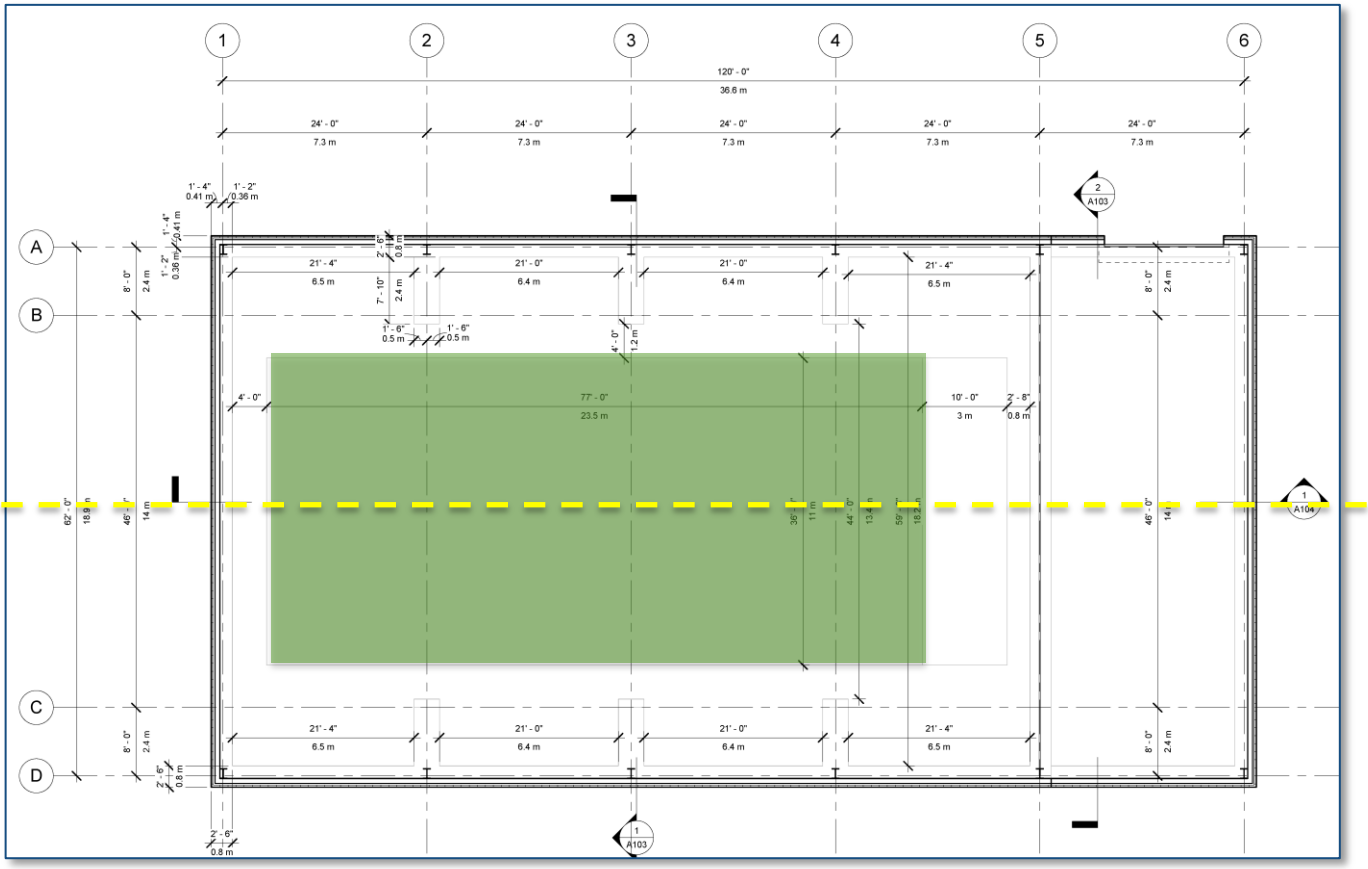
Section

FDB – Option 3



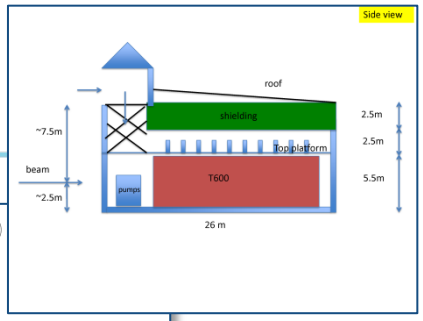
Plan at Detector Level

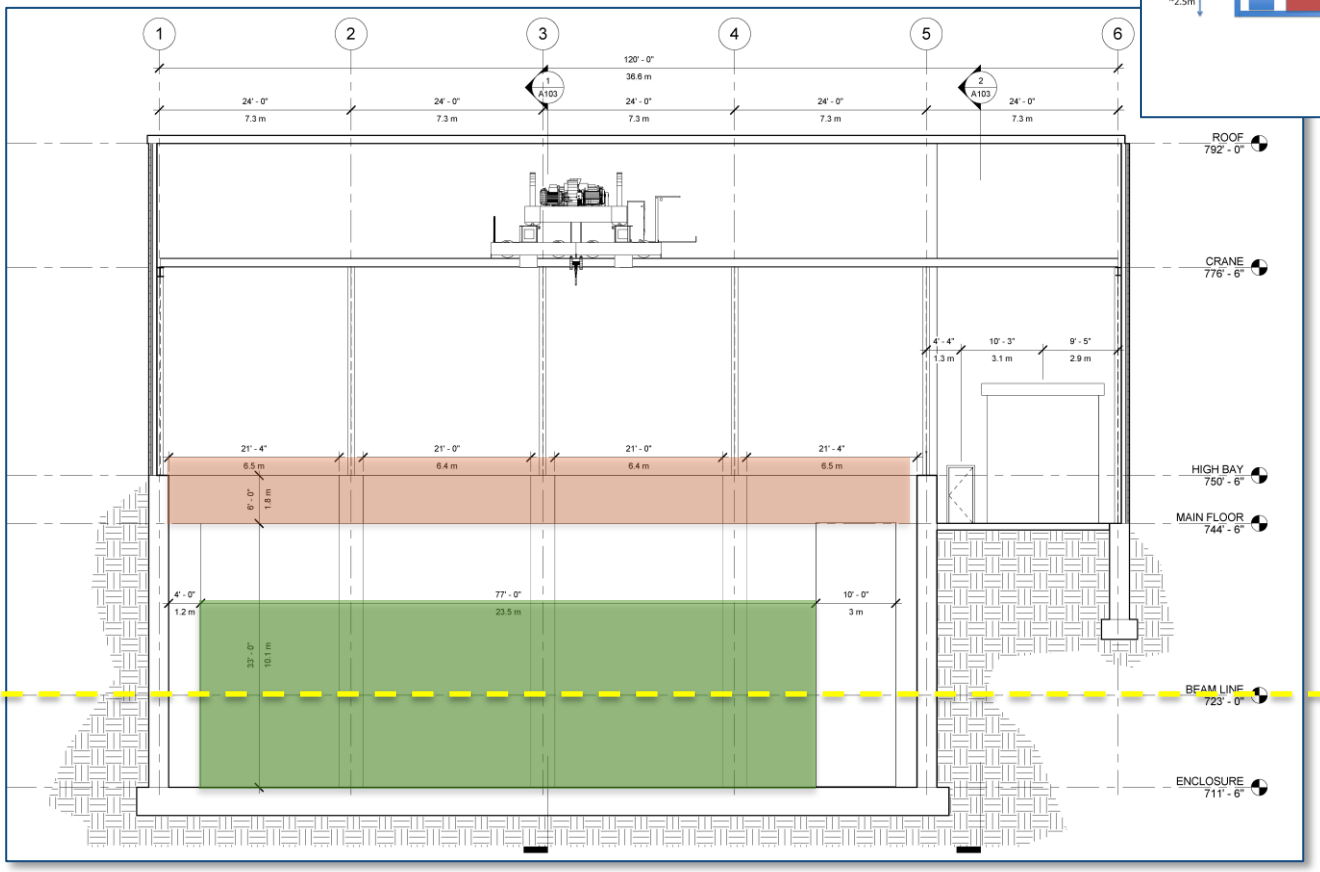
FDB – Option 3



Plan at Grade Level

FDB – Option 3

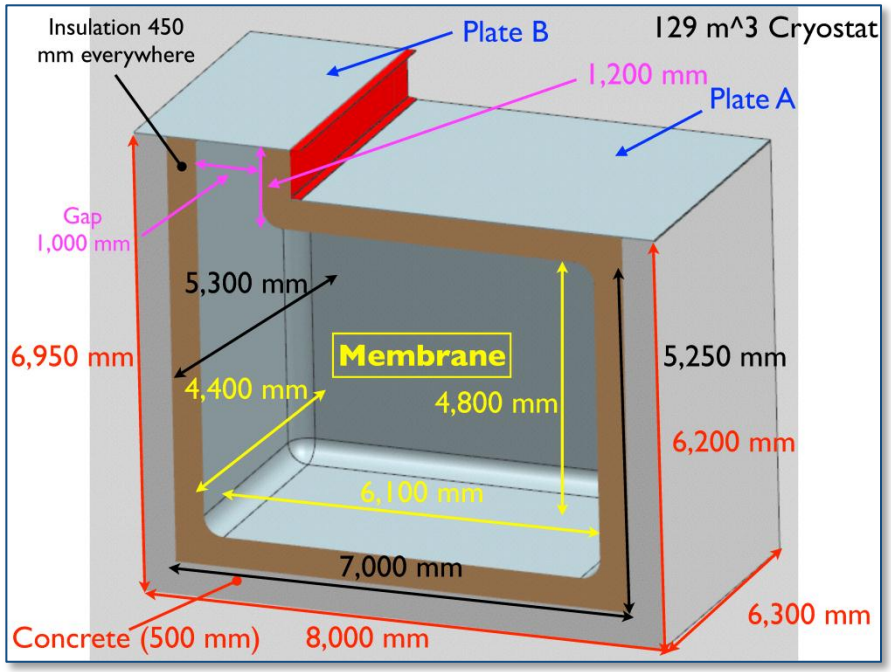


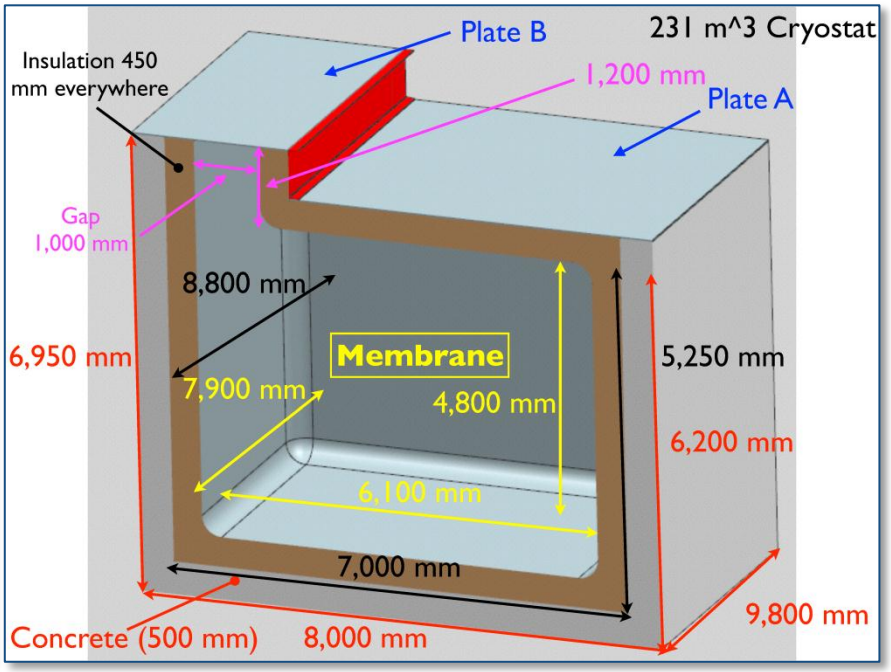


Section

Near Detector Building Options

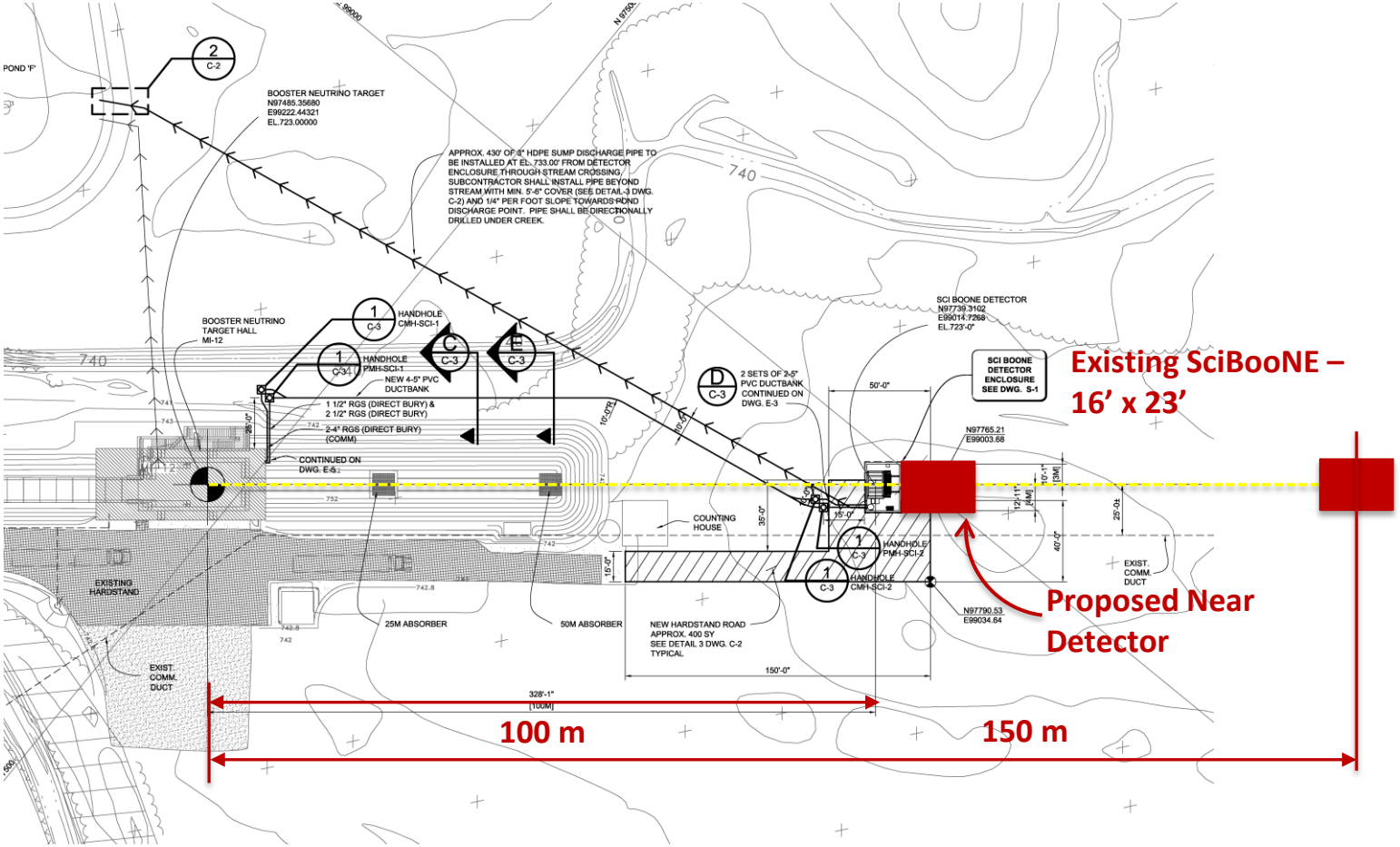
- Option 1 – 100m, 129m3
- Option 2 – 100m, 231m3
- Option 3 – 150m, 129m3 *(in progress)*
- Option 4 – 150m, 129m3 *(in progress)*





From D. Montanari

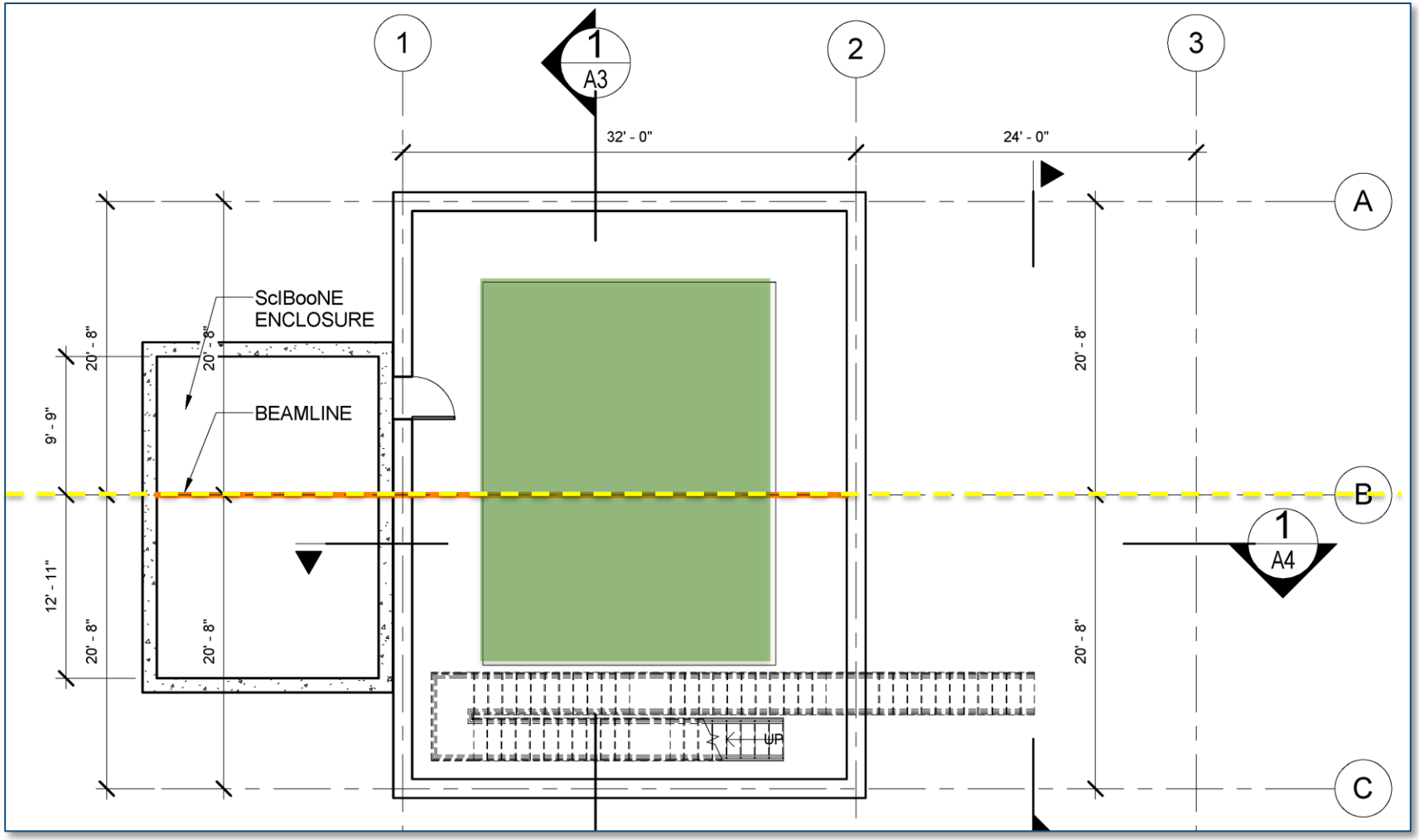
Near Detector Site Location



Near Detector Site Location

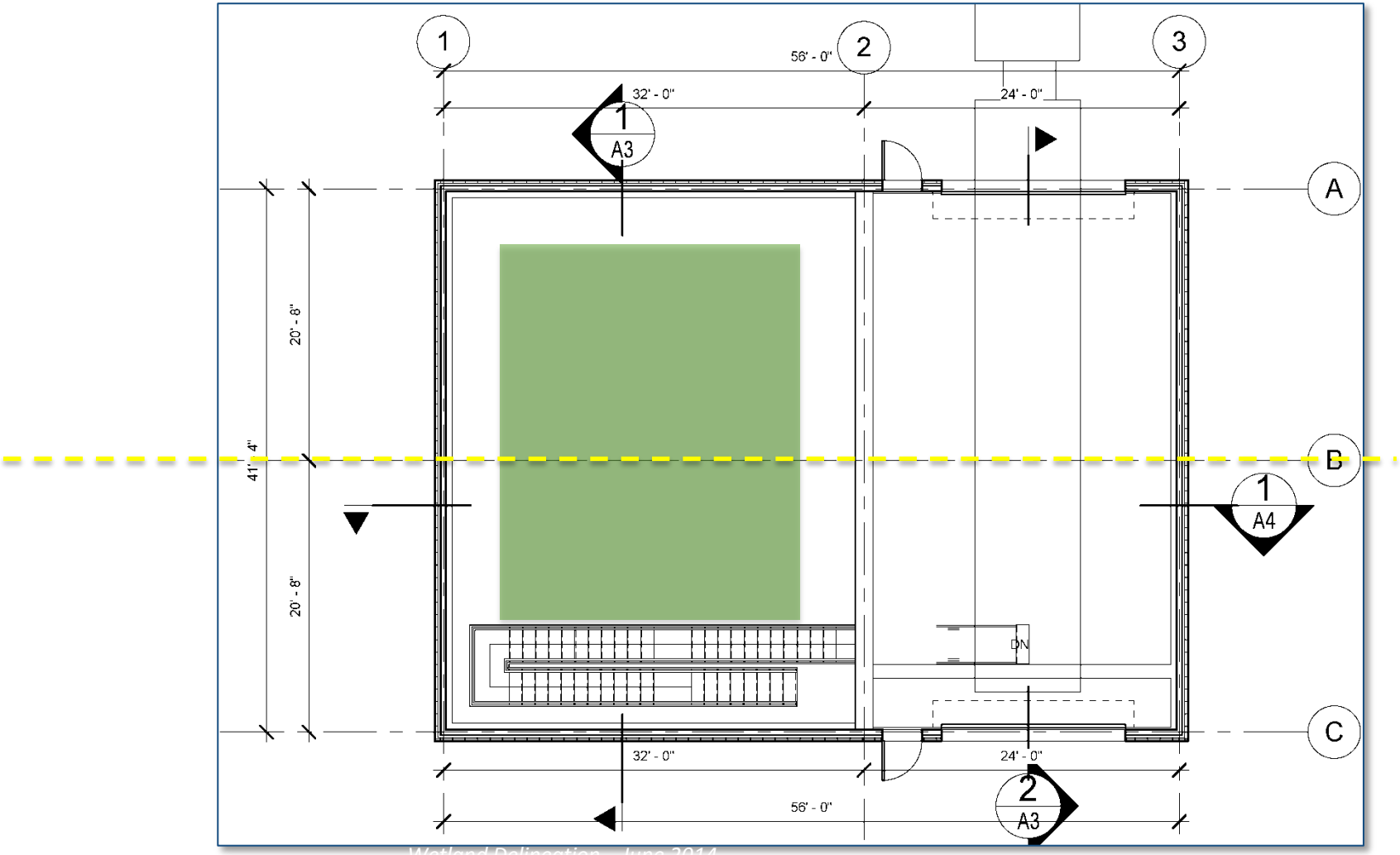
Near Detector Site Location

NDB – Option 1 – 100m, 129m3 Detector



Plan at Detector Level

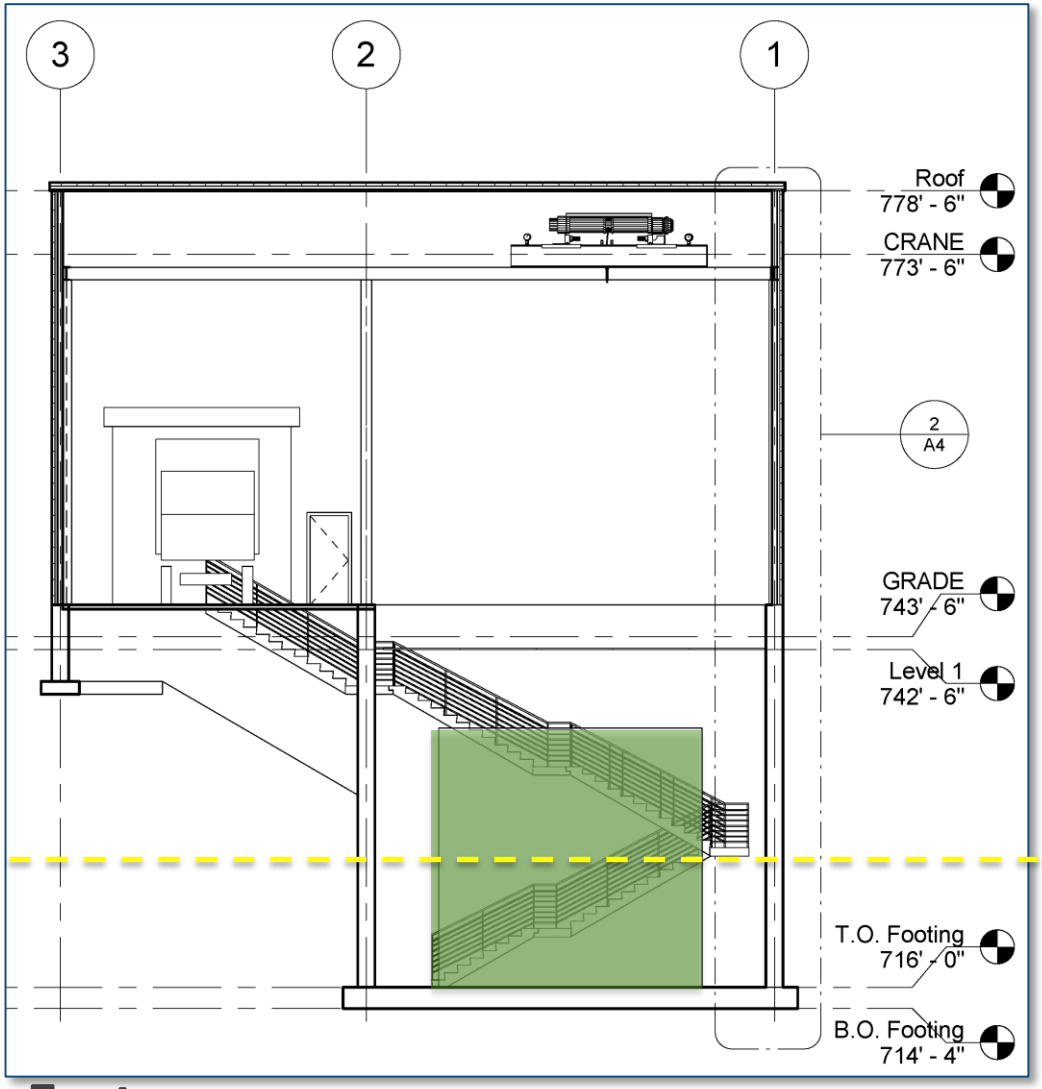
NDB – Option 1 – 100m, 129m3 Detector



Wetland Delineation – June 2014

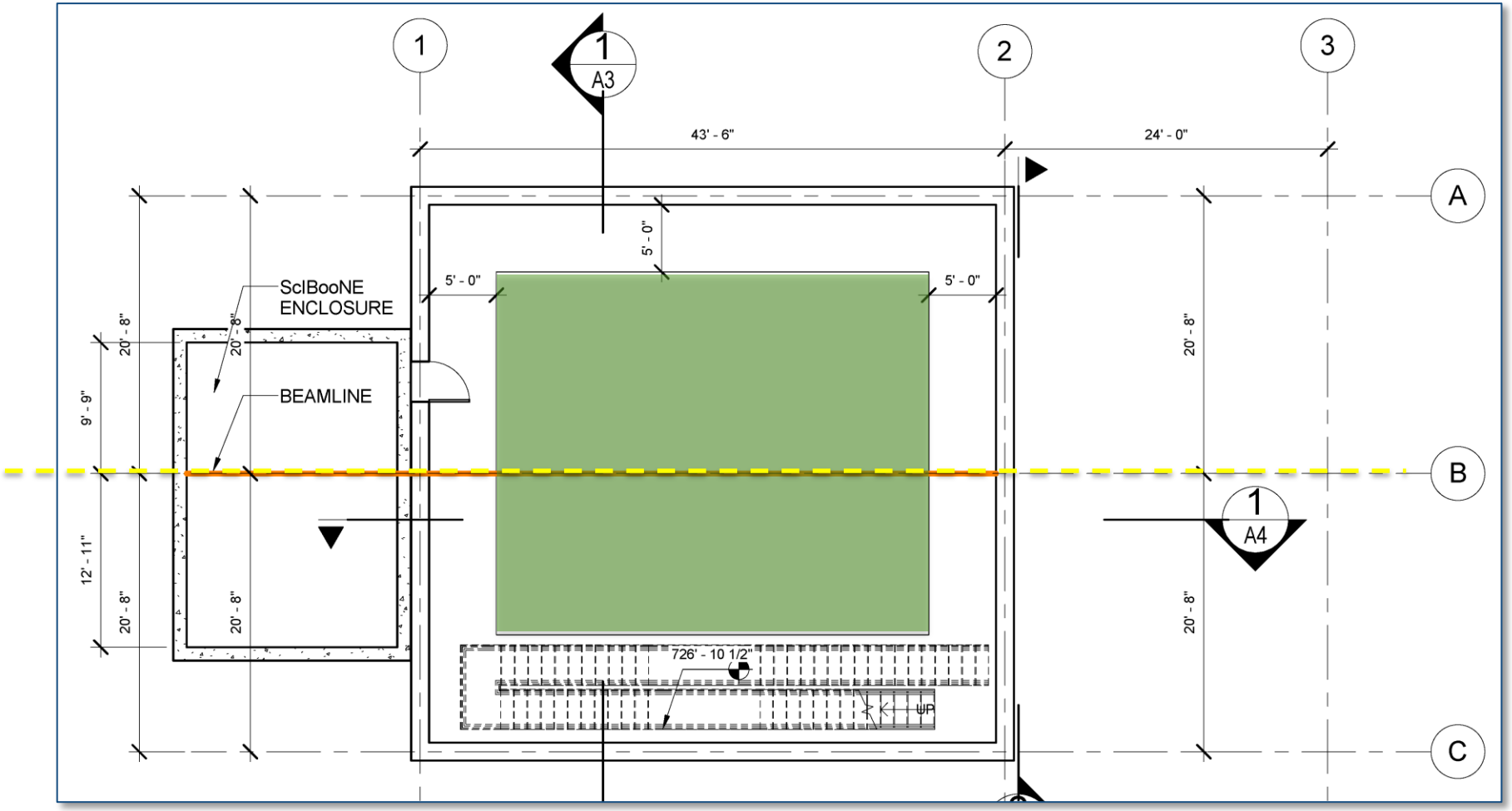
Plan at Grade Level

NDB – Option 1 – 100m, 129m3 Detector



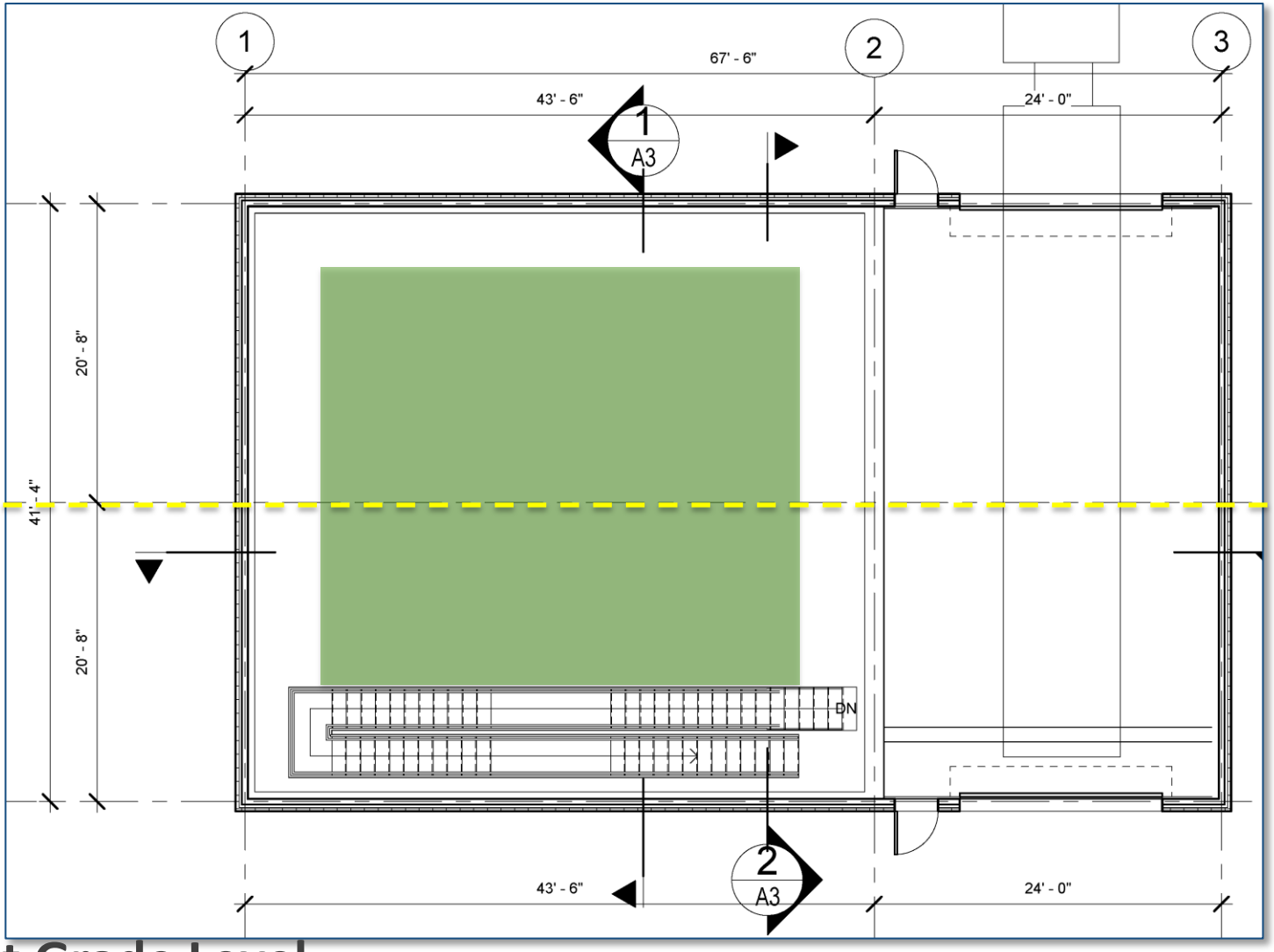
Section Looking East

NDB – Option 1 – 100m, 231m3 Detector



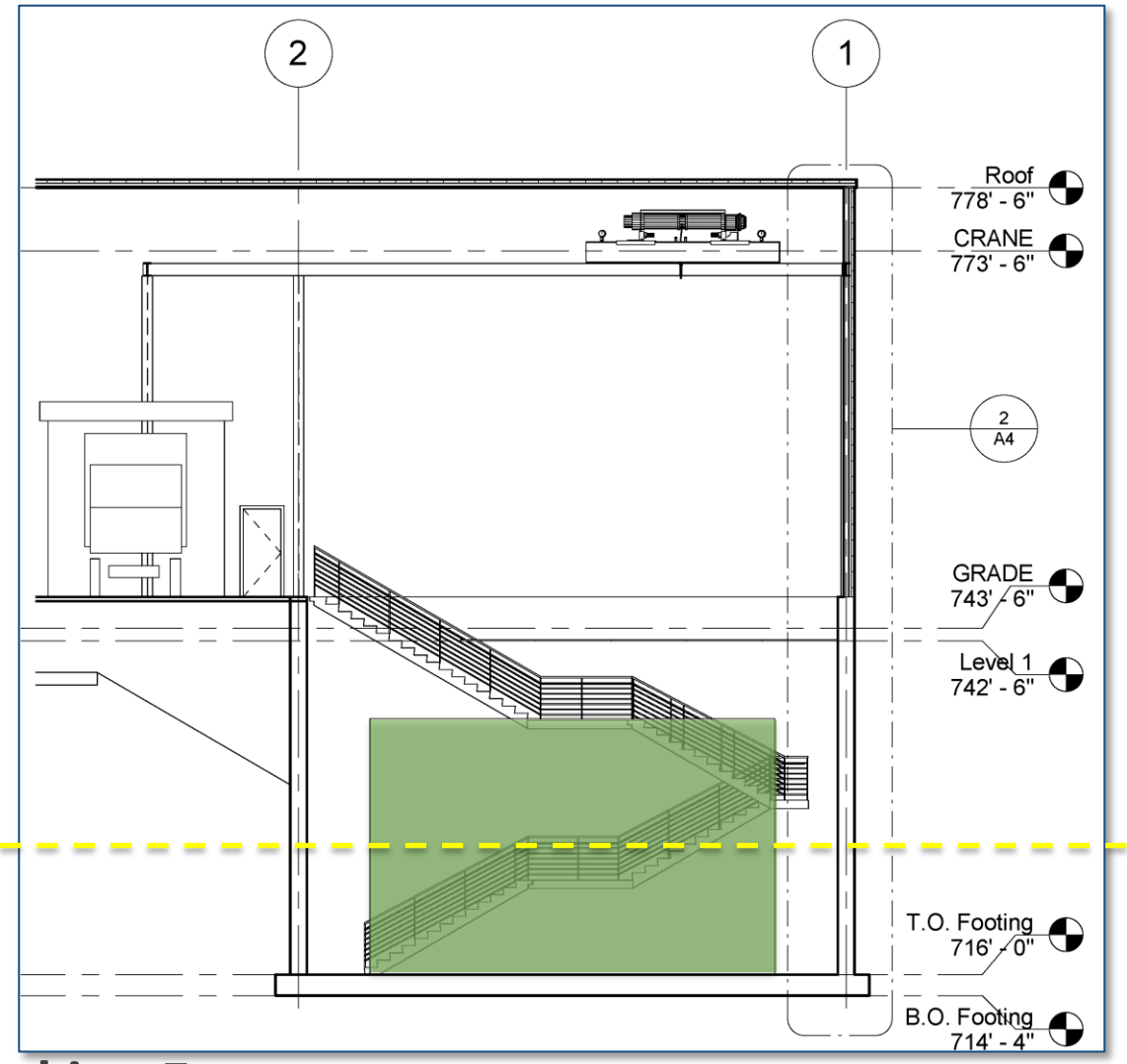
Plan at Detector Level

NDB – Option 1 – 100m, 129m3 Detector



Plan at Grade Level

NDB – Option 1 – 100m, 129m3 Detector



Section Looking East

What's Next – Two Paths

Wetland Mitigation

- Delineation - complete
- Report – in progress
- Discussion with USACOE – in progress
  - Letter of No Objection
  - Submit Permit
- Mitigation Options
  - Create Wetland
  - Purchase Credit

GPP Project Plans

- Refine Design
  - Add Support Functions
  - Develop Siting (access, parking, dewars, etc..)
- Develop Preliminary Cost Estimates
- Refine Design Based on Cost Estimate Results
- Finalize Drawings
- Develop GPP Project Plans
  - Project Charter
  - Conceptual Design
  - Project Execution Plan

What's Next – Two Paths – Complete by 30SEP14

Wetland Mitigation

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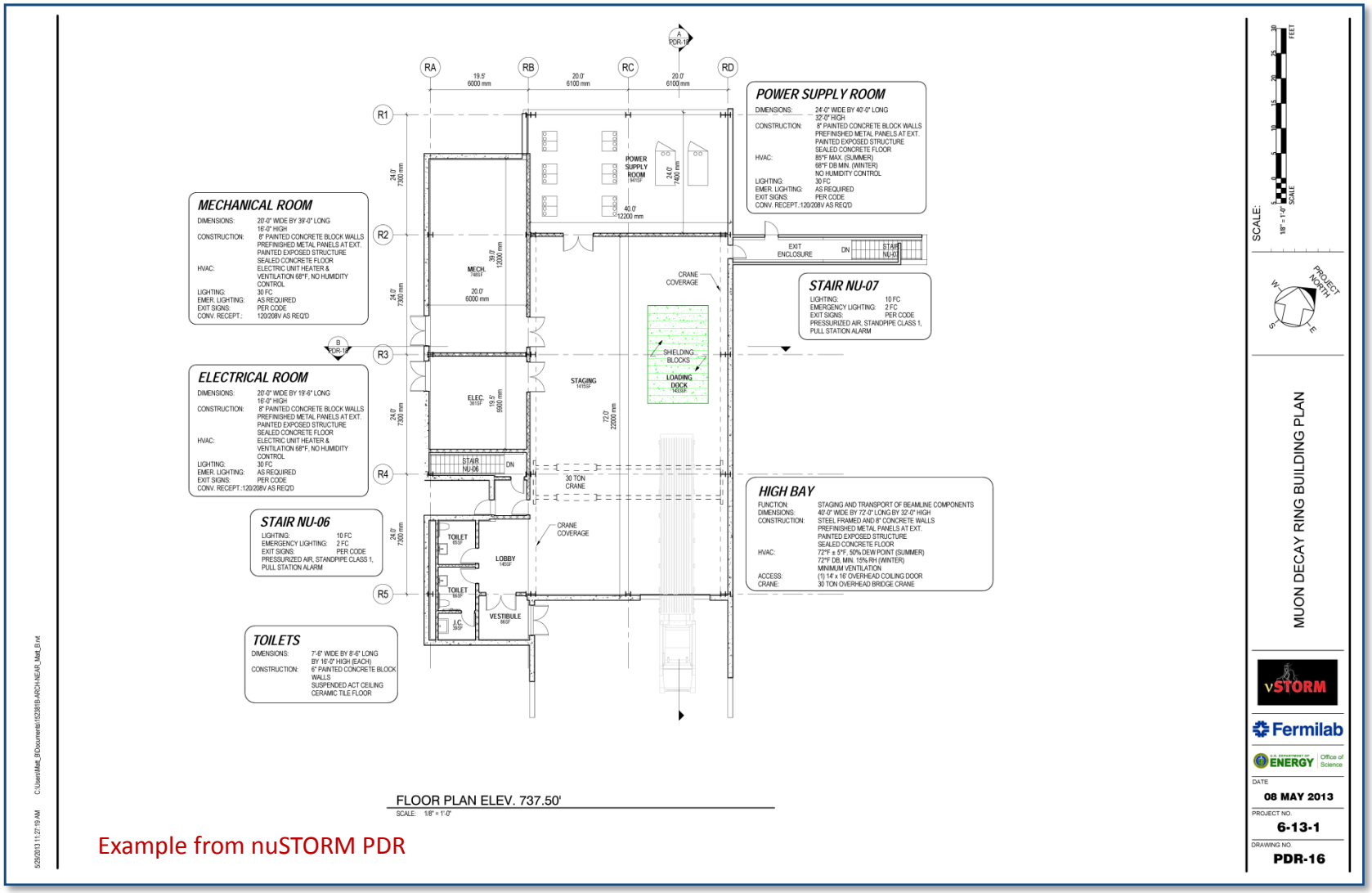
Questions

Backup Slides

Example Drawing

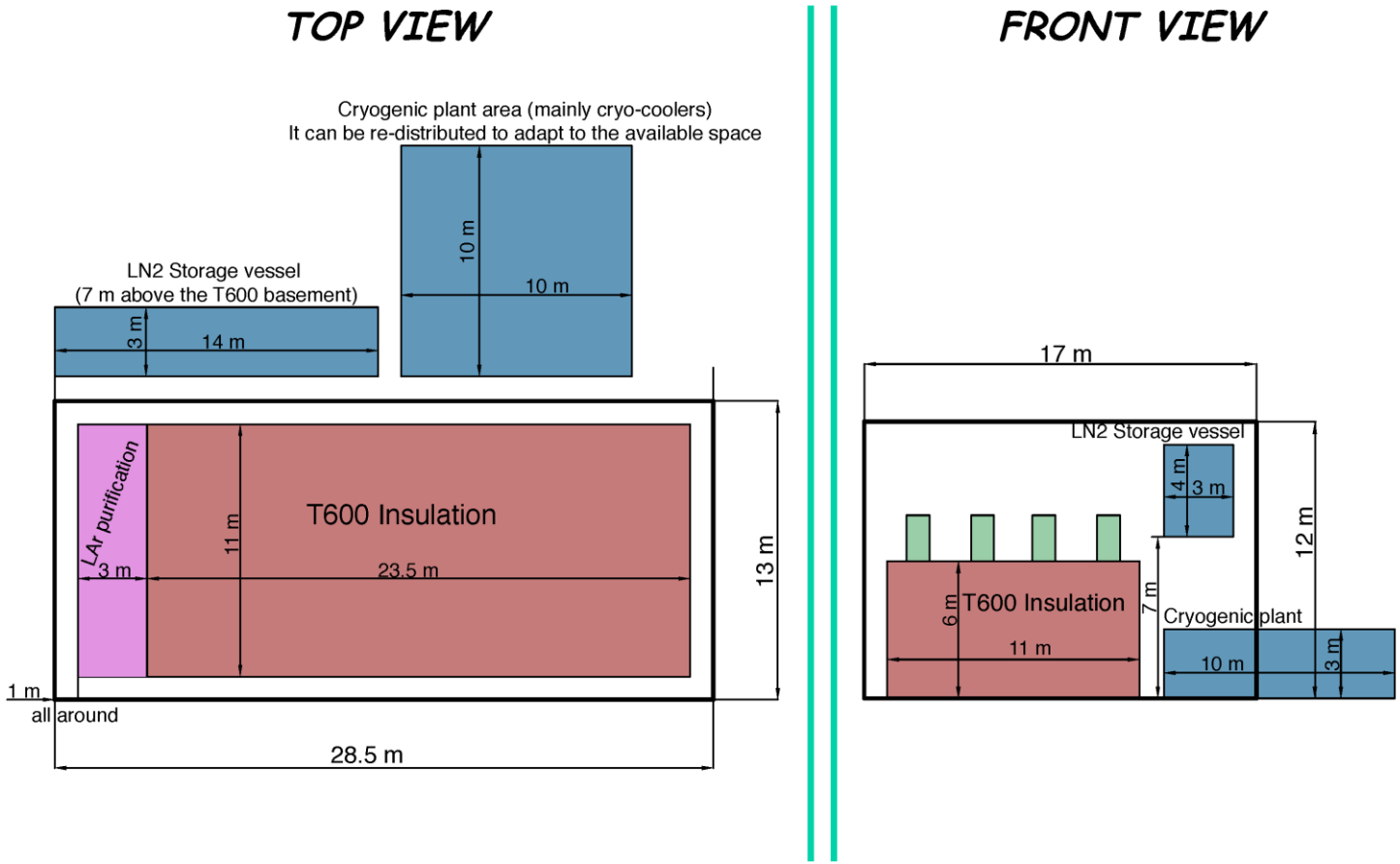


Example from nuSTORM PDR

Detector Information

From C. Montanari Presentation, June 2014

T600 Plant Space Requirements



ICARUS presentation at FNAL April 30, 2014

Slide: 5

Detector Information

From C. Rubbia Presentation, January 2014

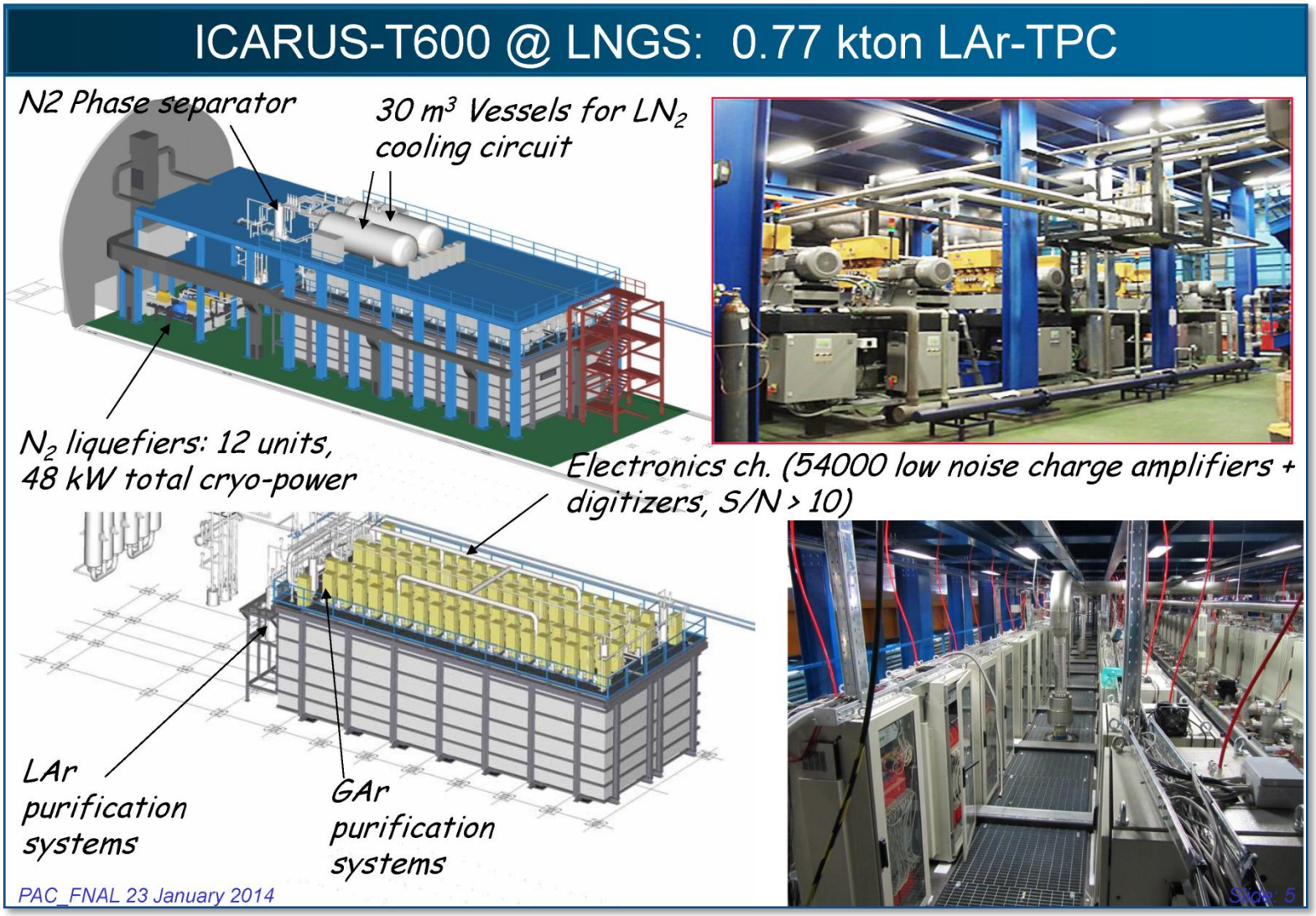
T600 at LNGS Hall B

PAC_FNAL 23 January 2014

Slide: 4

Detector Information

From C. Rubbia Presentation, January 2014

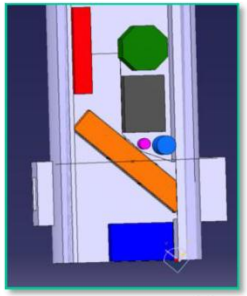


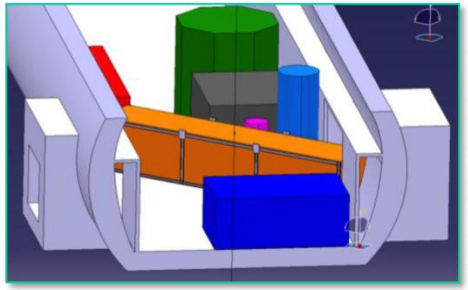
Detector Information

From C. Rubbia Presentation, January 2014

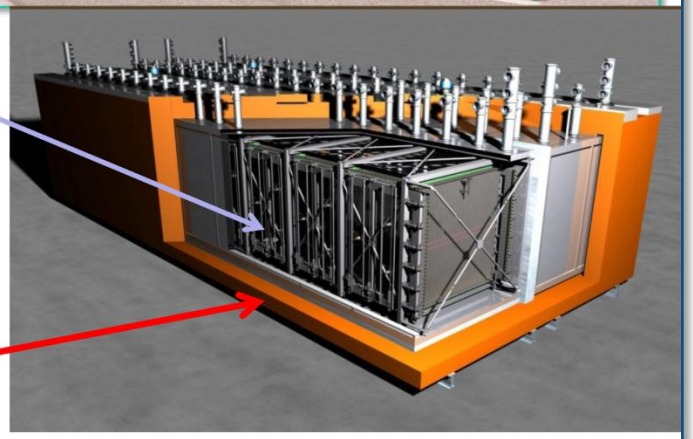
The ICARUS T600 as "Far" detector

- Components will be disassembled and transported to CERN: inner detectors, electronics, ancillary systems, LN_2 liquefaction system
- TPCs will be moved inside clean/lightweight containers like as for Pavia to LNGS transport.





- TPC's will be inserted in two new vessels of extruded Al, vacuum-tight $< 10^{-5}$ mbar l s^{-1} standing up to 1 bar internal overpressure.
- New external insulation with better performance based on industrial membrane tank concept.

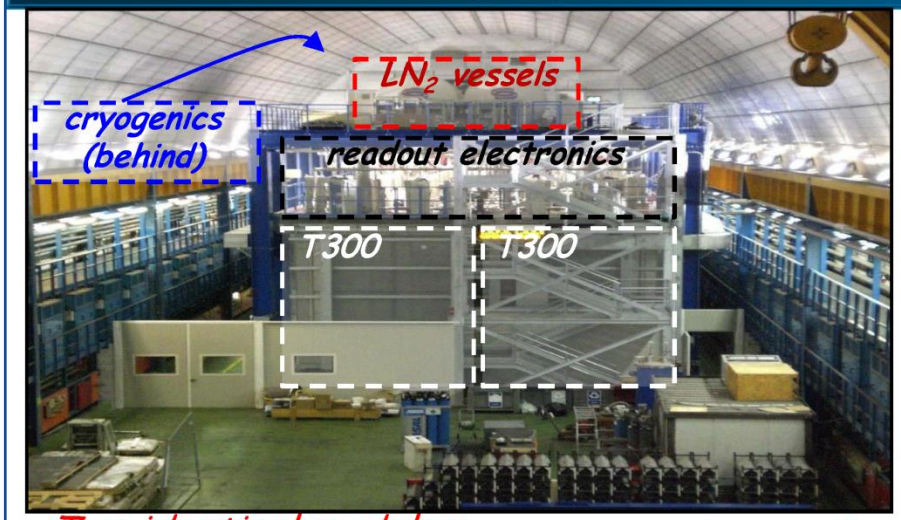


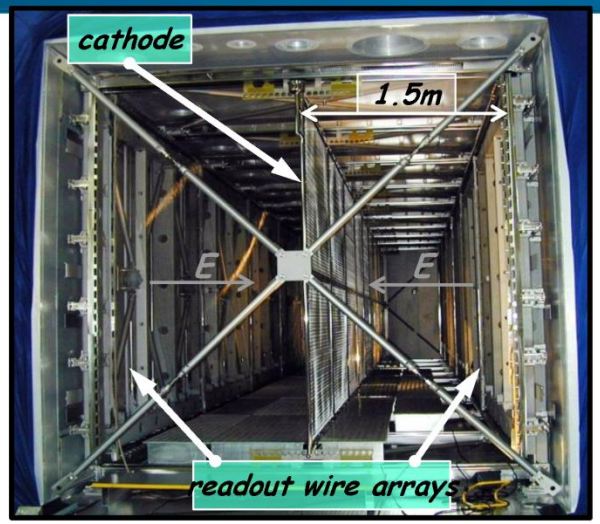
PAC_FNAL 23 January 2014 Slide: 20

Detector Information

From D. Gibin Presentation, January 2013

The ICARUS single-phase T600 LAr-TPC at LNGS laboratory





- Two identical modules
  - 3.6x3.9x19.6 ≈ 275 m^3 each
  - Liquid Ar active mass: ≈476 t
  - Drift length = 1.5 m (1 ms)
  - HV = -75 kV; E = 0.5 kV/cm
  - v-drift = 1.55 mm/μs
  - Sampling time 0.4μs (sub-mm resolution in drift direction)
- 4 wire chambers:
  - 2 chambers per module
  - 3 "non-distructive" readout wire planes per chamber wires at 0,±60° (up to 9 m long)
  - Charge measurement on collection plane
  - ≈ 54000 wires, 3 mm pitch and plane spacing
- 20+54 8" PMTs for scintillation light detection
  - VUV sensitive (128nm) with TPB wave shifter

ICFA 2014

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Fermilab