

# NSS planning status in the installation of neutron bunker, test beam line and 15 instruments

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[www.europeanspallationsource.se](http://www.europeanspallationsource.se)

14<sup>th</sup> June 2017

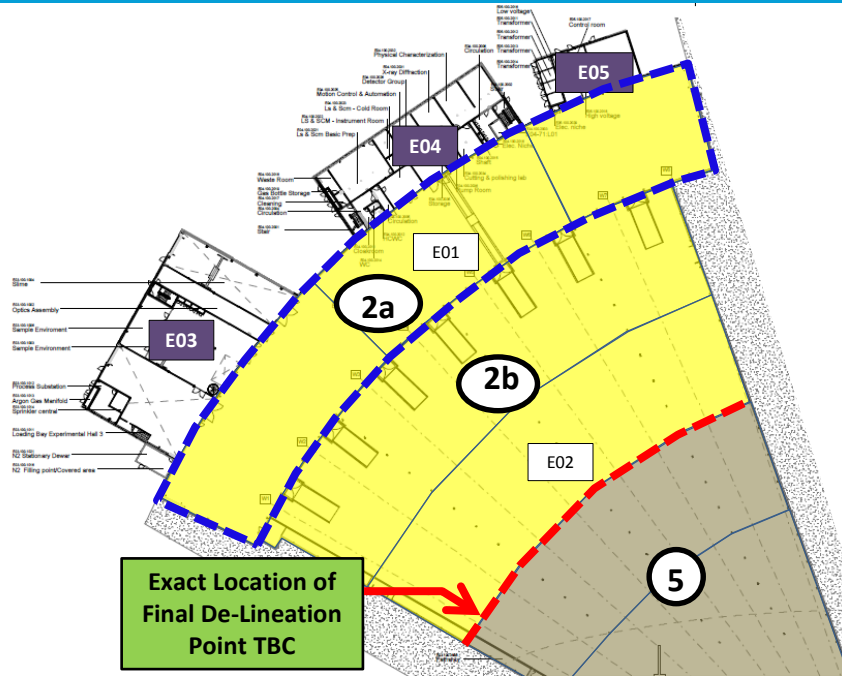
The installation works referred to the NSS Division will include a significant part of the installation at the ESS facility, and they are more specifically referred to:

- The construction of the neutron bunker;
- The installation of the test beam line;
- The installation of n. 15 instruments;

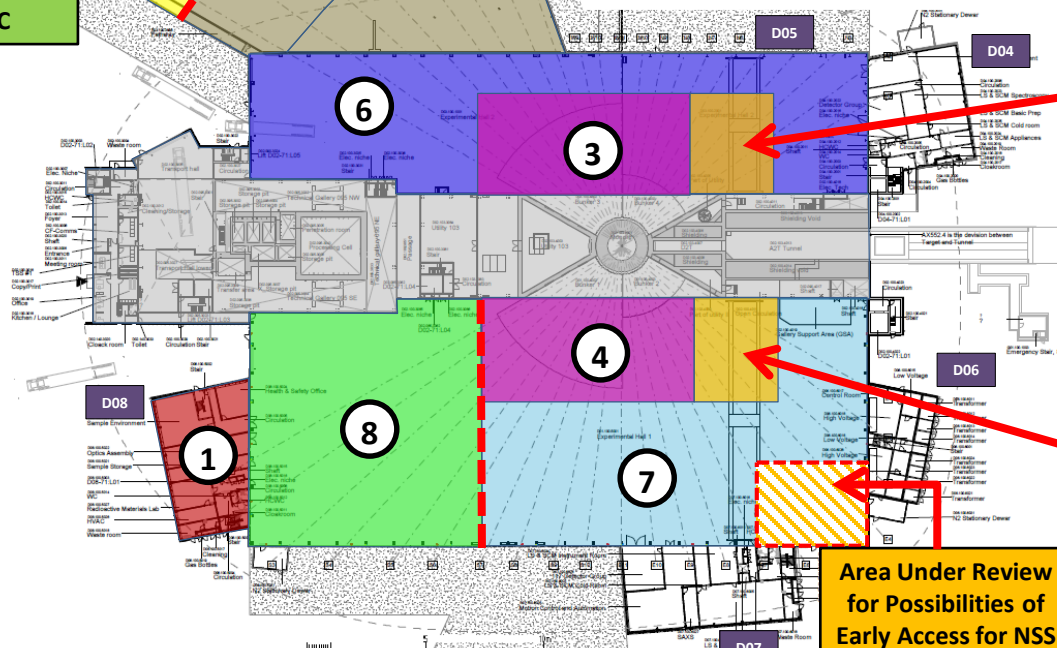
The current planning status of the instruments installation is considering the following main milestones:

<b>Optic monolith inserts delivery</b>	Nov/Dec 2018
<b>Installation of all the monolith inserts in the Target monolith (Target Division)</b>	March – September 2019
<b>Neutron Bunker construction</b>	January 2019 – October 2019 ; June-October 2020
<b>Installation of Instruments in Bunker components (related to 3-4 instruments)</b>	November 2019 – May 2020;
<b>installation of instrument components in the Facility Halls</b>	according to the halls access.

# 2019/2020: NSS Proposed Access Dates (Excludes Full Access Dates)



- 1  D08 RML Lab – Early Access 10-Jan-19 (Level 1b MS)
- 2a  E01 – Full Access 27-Apr-19 (Level 1 MS)
- 2b  E02 Area 1 – Partial Access 27-Apr-19 (Level 1 MS)
- 3  D03 Bunker – \* Early Access 03-Jun-19 (Level 1 MS)
- 4  D01 Bunker – \* Early Access 14-Aug-19 (Level 1 MS)
- 5  E02 Area 2 – Partial Access 15-Oct-19 (Level 1b MS)
- 6  D03 Main Hall – Partial Access 01-Nov-19 (Level 1b MS)
- 7  D01 Main Hall Ph 1 – Partial Access 06-Jan-20 (Level 1b MS)
- 8  D01 Main Hall Ph 2 – Partial Access 02-Mar-20 (Level 1b MS)



**Additional Area  
Made Available  
for Storage of  
D03 Cranes  
Operational: 13-  
Aug-19**

**Additional Area  
Made Available for  
Storage of Blocks  
D01 Cranes  
Operational: 28-  
Oct-19**

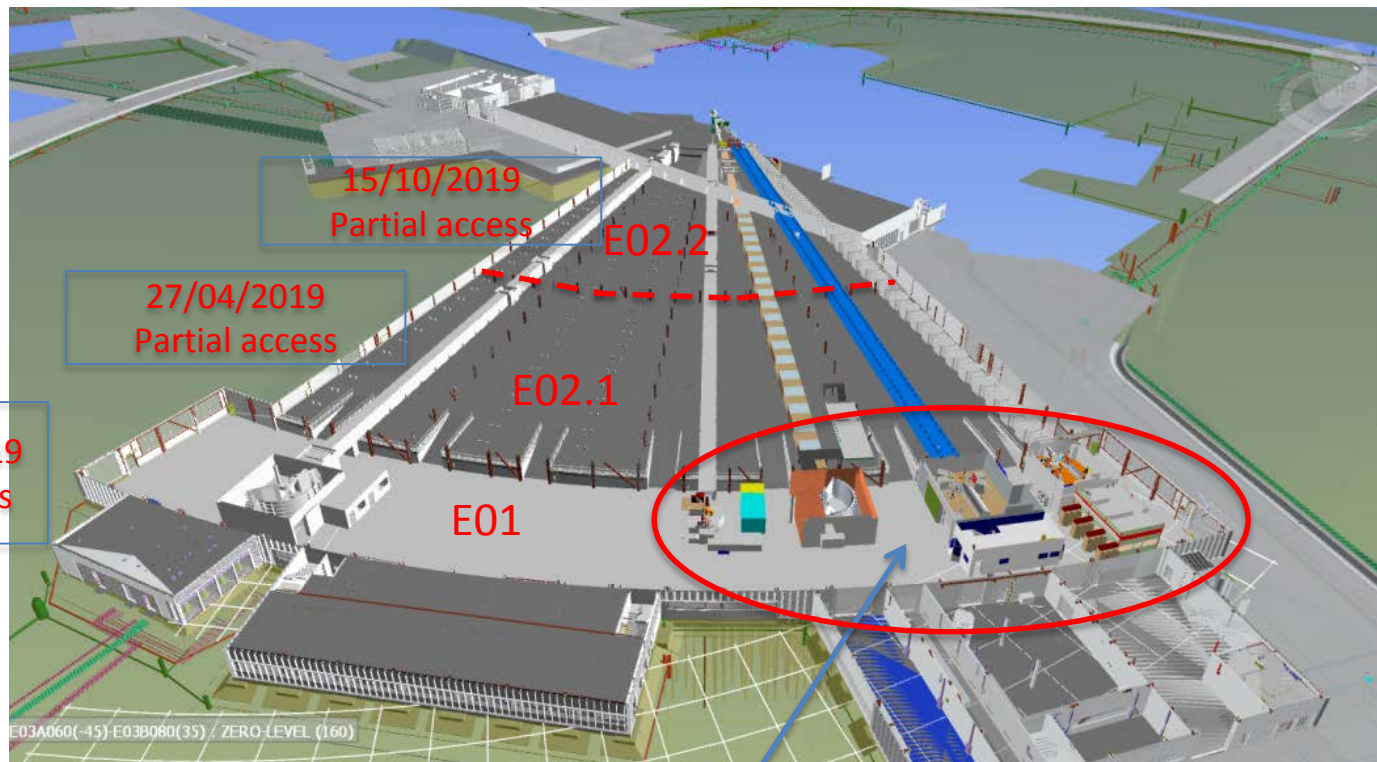
**Area Under Review  
for Possibilities of  
Early Access for NSS**

# First 8 instruments to be installed

B.P.	First eight Instruments to install	Installation Start	Cold Commissioning start	Hot Commissioning start
W2	BEER (HZG/NPI)	01/2020	09/2021	01/2022
W3	C-SPEC (TUM)	06/2019	04/2020	06/2021
W4	BIFROST (DTU)	07/2019	04/2021	04/2022
W6	MAGIC (LLB)	04/2019	07/2020	01/2022
S2	DREAM (FZJ)	2019	2020	2021
S3	ODIN (TUM/PSI)	07/2019	07/2020	09/2021
N7	LOKI (ISIS)	01/2021	01/2022	07/2022
E2	ESTIA (PSI)	07/2019	10/2019	01/2021

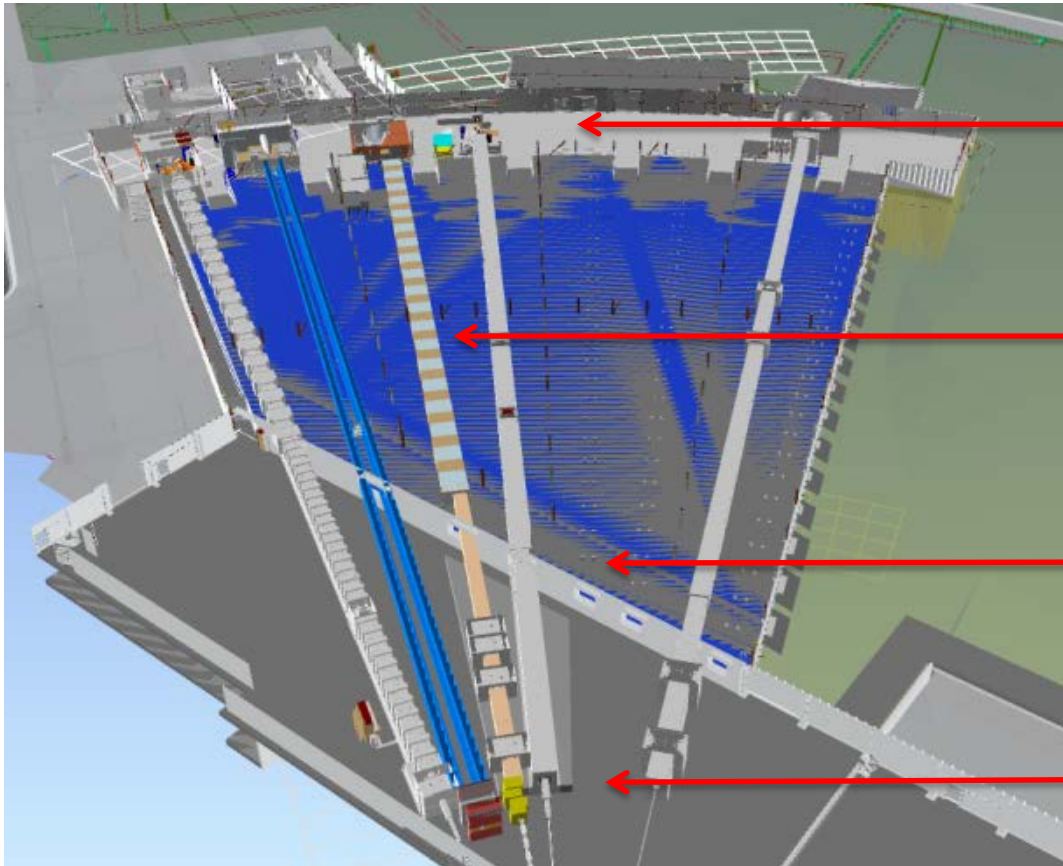
**DRAFT**

# E01/E02 view



E01 - Overhead crane 10 t

# West Sector view



E01 Overhead Crane 10 t

E02 Temporary Gantry  
Crane 10 t

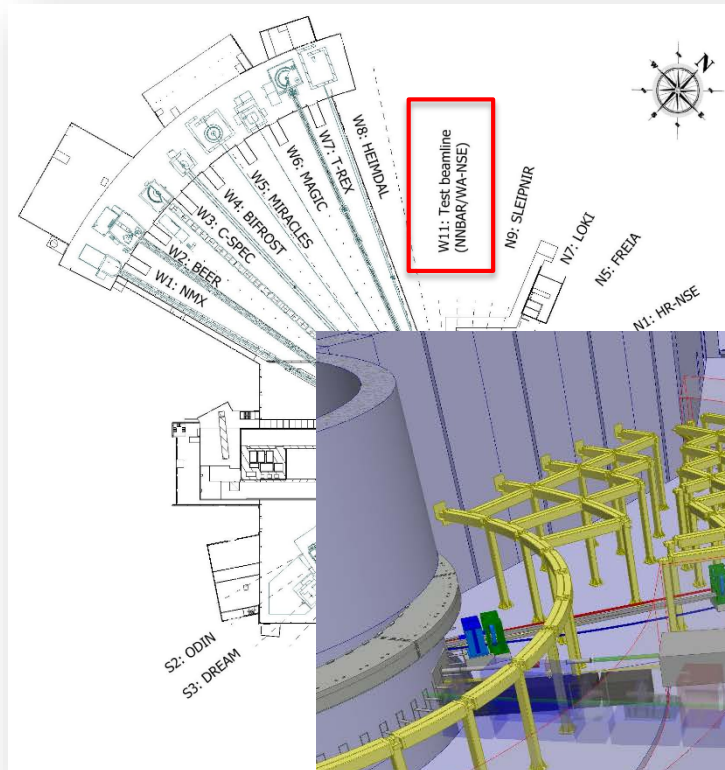
E02 Overhead Crane 5 t

D03 Overhead Crane 20 t

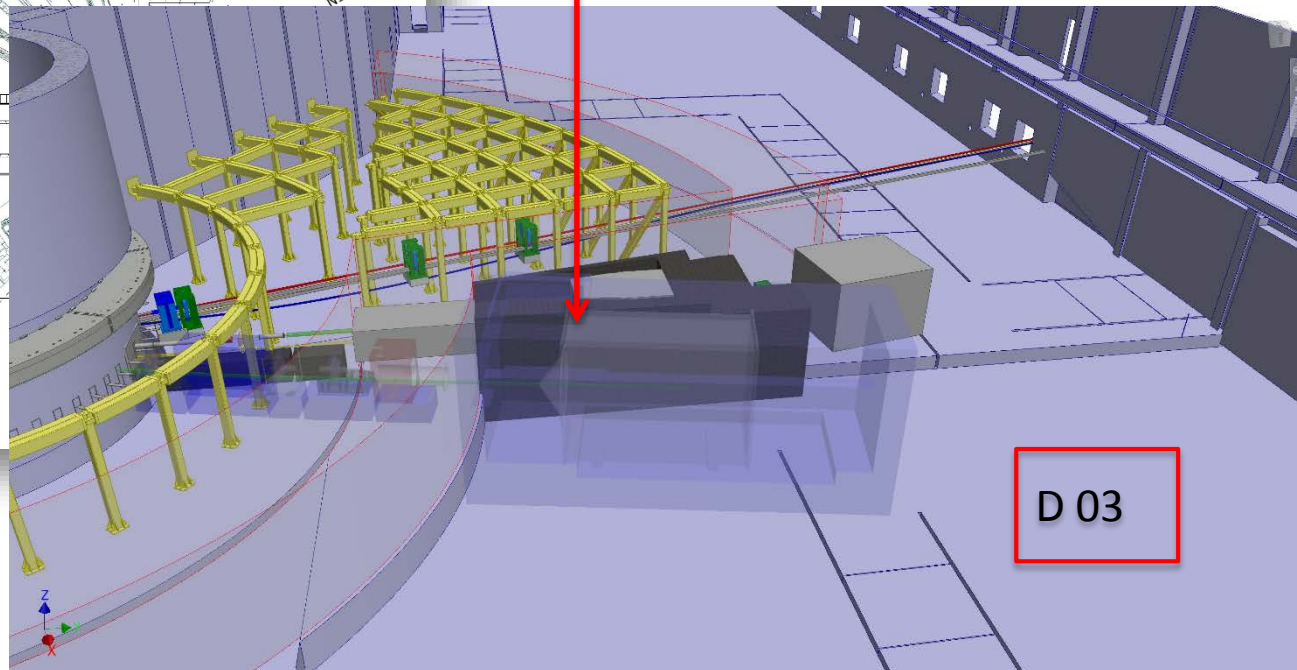
# D01-D03 view



# Test beam Line: W11 beam port



Installation and commissioning  
October 2019 – October 2020



# Live load capacities

- Under the bunker (D02 & inner parts of D01 & D03);

**30 t/m<sup>2</sup>**

- In the rest of D01 & D03

In general (under guides & instrument caves);

**14 t/m<sup>2</sup>**

- Around perimeter (3 metres from wall)

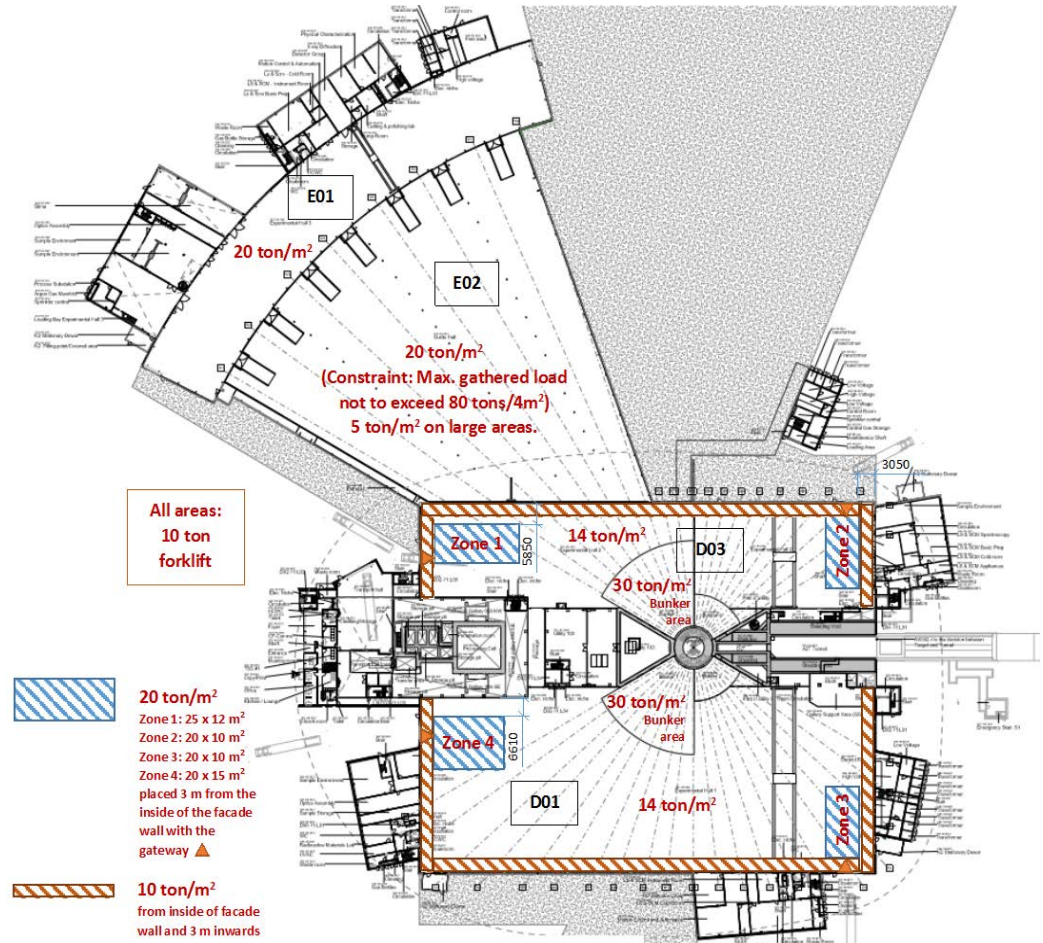
**10 t/m<sup>2</sup>**

- Staging areas (near truck access doors);

**20 t/m<sup>2</sup>**

- In E01 & E02 (long instruments in west sector);

**20 t/m<sup>2</sup>**



# Slab deformation influence on instrument installation



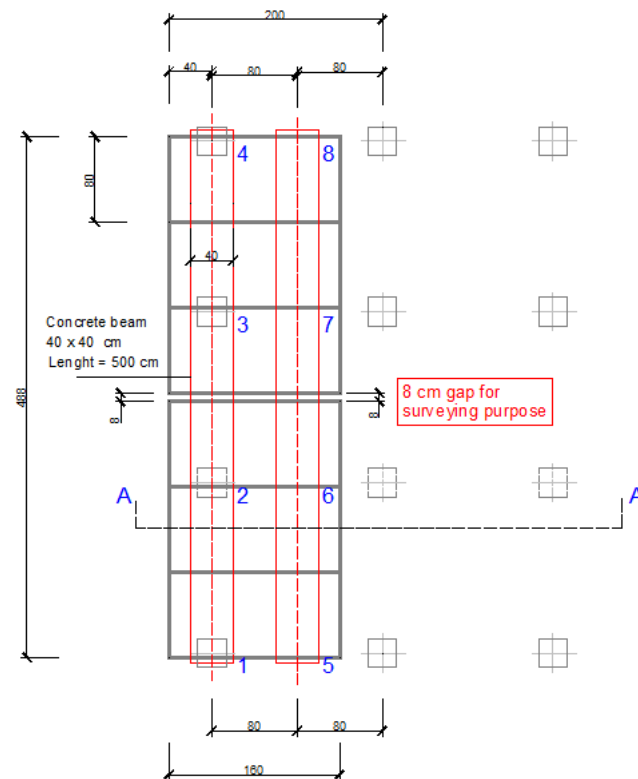
Slab deformation represent a key factor in the instrument installation. A proper sequence of the instrument installation can be influenced to the needs of a pre load, to avoid beam guides realignment.

A recent structural report has been specifically conducted from CF Consultant to identify the slab deflection into the E01 hall, taking into account a wall with 50 cm width and 20 t /m<sup>2</sup> load footprint. According to the report the total slab deflection should be around **1 mm** (generic NSS requirement is 3+3 mm deflection).

A load test has been planned in August 2017 in the E01 hall, to have a feedback of the slab deflection under a real load case. It will be performed in three step:

- 1 8,6 t/m<sup>2</sup>
- 2 16,3 t/m<sup>2</sup>
- 3 24 t/m<sup>2</sup>**

The test will consider both the situation of a load over a piles row and another case



# Instrument project Schedule (ESS – 0115143)



The “**Work Package Specification**” included in the Tollgate documentation from each instrument team has identified the installation phase (**phase 4**) into the general instrument Project Schedule (from design to hot commissioning).

The **ESS-0115143** provide general rules in order to define the different instruments project schedule. It is essential compare the different plans along the different phases of the project (from design to hot commissioning), with particular reference to the installation phase.

The project schedule will include a “*reference area code*” shall be adopted, **only with reference to installation (phase 4)**, according to the working areas as below represented.

The purpose is to identify “*where*” an activity will take place in addition to the defined timeframe.

# Installation plan - reference area code (ESS – 0115143)

<b>MON01</b>	monolith insert components D01 side
<b>MON03</b>	monolith insert components D03 side
<b>BUN01</b>	In-bunker component D01 side
<b>BUN03</b>	In-bunker component D03 side
<b>E01</b>	instrument hall 3
<b>E02.1</b>	guide hall (according to Skanska layout)
<b>E02.2</b>	guide hall (according to Skanska layout)
<b>D01.1</b>	instrument hall n. 1 phase 1 (according to Skanska layout)
<b>D01.2</b>	instrument hall n. 1 phase 2 (according to Skanska layout)
<b>D03</b>	instrument hall n. 2
<b>ONSITE</b>	On-site material delivery storage area
<b>OFFSITE</b>	Off-site material delivery storage/pre-installation area outside the ESS site (but in Lund – EMBL, RATS, UTGARD....)
<b>PREINST</b>	Integration works to be performed on site (activities performed outside the final destination of the components).

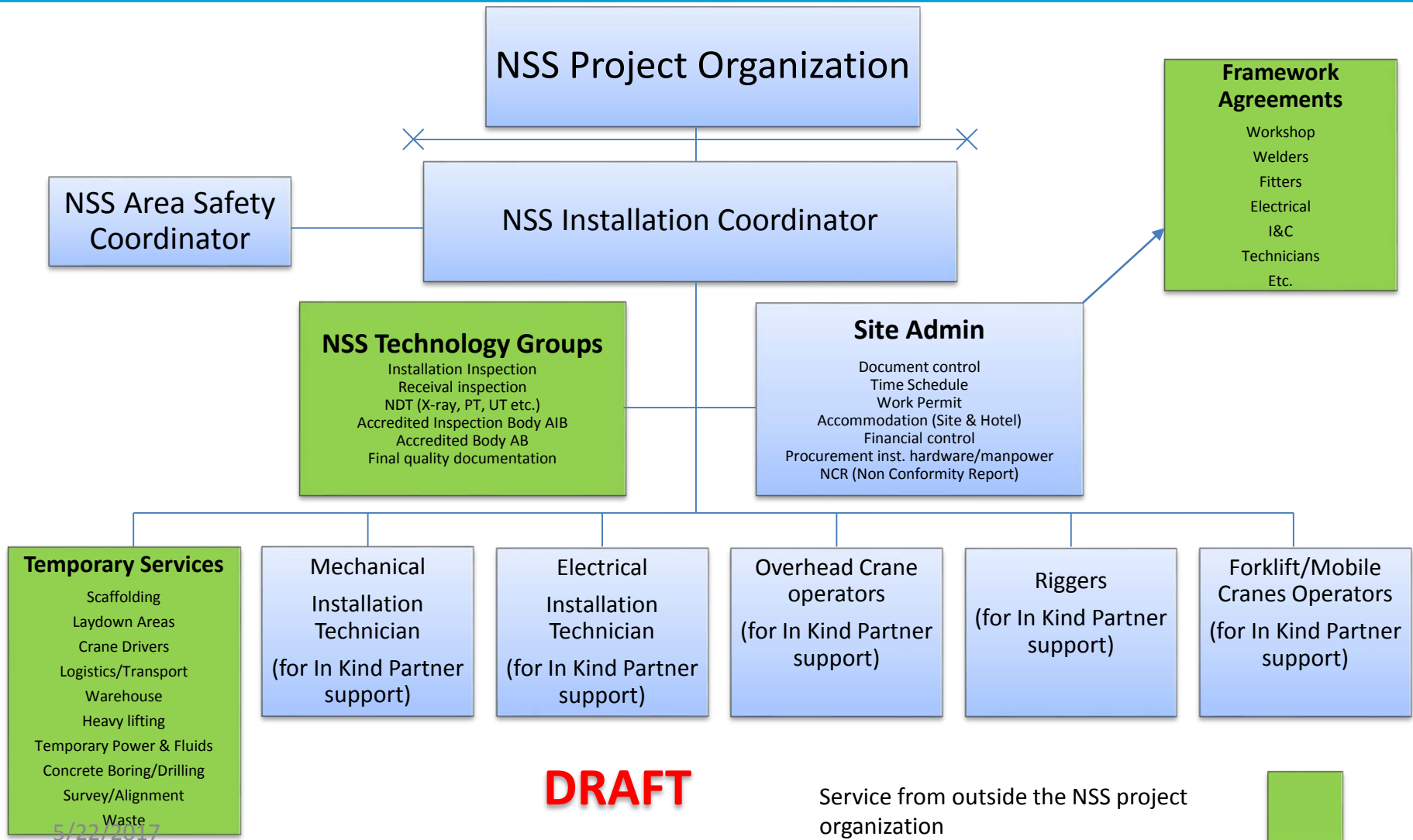
# Instrument installation plan

ID	Task Mod	Task Name	Duration	Start	Finish	Phase	PBS	Area	Resp	Predecessors
1										
2		ESS Milestones	134 days	Mon 19-04-29	Fri 19-11-01					
3		Access to Neutron Bunker	0 days	Fri 19-11-01	Fri 19-11-01				ESS	
4		Access to E01 area	0 days	Mon 19-04-29	Mon 19-04-29				ESS	
5		Access to E02.1 area	0 days	Mon 19-04-29	Mon 19-04-29				ESS	4
6		Access to E02.2 area	0 days	Tue 19-10-15	Tue 19-10-15				ESS	
7		W2 - BEER	664 days	Mon 17-03-27	Wed 19-10-09					
8		W.U. 1 Shielding	664 days	Mon 17-03-27	Wed 19-10-09					
9		Phase 2 Beamline Shielding Design	100 days	Mon 17-03-27	Fri 17-08-11		13.6.6.1.10.2			
10		Beamline Shielding Design	100 days	Mon 17-03-27	Fri 17-08-11		13.6.6.1.10.2		NPI	
11		Phase 3 Beamline Shielding Manufacturing and Procurement	109 days	Mon 17-08-14	Thu 18-01-11		13.6.6.1.10.2			
12		Beamline Shielding Manufacturing	100 days	Mon 17-08-14	Fri 17-12-29		13.6.6.1.10.2		NPI	10
13		Beamline Shielding Procurement	10 days	Fri 17-12-29	Thu 18-01-11		13.6.6.1.10.2			
14		Phase 4 Installation of Beamline Shielding	664 days	Mon 17-03-27	Wed 19-10-09		13.6.6.1.10.2		NPI	
15		delivery of material	3 days	Mon 17-03-27	Wed 17-03-29		13.6.6.1.10.2	ONSITE	NPI	
16		Integration activities	10 days	Thu 17-03-30	Wed 17-04-12		13.6.6.1.10.2	PREINST	NPI	15
17		Installation of Beamline Shielding into E03	30 days	Fri 19-04-26	Wed 19-06-05		13.6.6.1.10.2	E02.1	NPI	
18		Installation of Beamline Shielding into E03	30 days	Thu 19-06-06	Wed 19-07-17		13.6.6.1.10.2	E02.2	NPI	17
19		Installation of Beamline Shielding into D03	30 days	Thu 19-07-18	Wed 19-08-28		13.6.6.1.10.2	D03	NPI	18
20		Cold commissioning of beamline Shielding into E02.1	30 days	Thu 19-08-29	Wed 19-10-09		13.6.6.1.10.2		NPI	19
21		W.U. 2 Neutron Optics	664 days	Mon 17-03-27	Wed 19-10-09				NPI	
22		Phase 2 Transport guide design	60 days	Mon 17-03-27	Fri 17-06-16				NPI	
23		Transport guide design	60 days	Mon 17-03-27	Fri 17-06-16					
24		Phase 3 Transport Guide manufacturing and procurement	50 days	Mon 17-03-27	Fri 17-06-02		13.6.6.1.2.1.4		NPI	
25		Transport guide manufacturing	50 days	Mon 17-03-27	Fri 17-06-02		13.6.6.1.2.1.4			
26		Transport guide procurement	10 days	Mon 17-03-27	Fri 17-04-07		13.6.6.1.2.1.4			
27		Phase 4 Transport guide installation	100 days	Tue 17-03-28	Mon 17-08-14				NPI	26
28		Transport guide on site delivery	5 days	Tue 17-03-28	Mon 17-04-03		13.6.6.1.2.1.4	ONSITE	NPI	
29		Transport guide integration	25 days	Tue 17-03-28	Mon 17-05-01		13.6.6.1.2.1.4	PREINST	NPI	
30		Transport guide installation	35 days	Tue 17-03-28	Mon 17-05-15		13.6.6.1.2.1.4	D03	NPI	
31		Transport guide cold commissioning	35 days	Tue 17-03-28	Mon 17-05-15		13.6.6.1.2.1.4	D03	NPI	
32		W.U. 3 Choppers	602 days	Mon 17-03-27	Mon 19-07-15				NPI	
33		Phase 2 Assembly 1 Chopper Design	120 days	Mon 17-03-27	Fri 17-09-08					
34		Assembly 1 Chopper Design	120 days	Mon 17-03-27	Fri 17-09-08		13.6.6.1.3.1			
35		Phase 3 Assembly 1 Chopper Manufacturing and Procurement	100 days	Fri 17-09-08	Thu 18-01-25		13.6.6.1.3.1			
36		Chopper Assembly 1 Manufacturing	50 days	Fri 17-09-08	Thu 17-11-16		13.6.6.1.3.1		HZG	
37		Chopper Assembly 1 Procurement	50 days	Fri 17-11-17	Thu 18-01-25		13.6.6.1.3.1		HZG	36
38		Phase 4 Installation of Chopper Assembly	143 days	Thu 19-05-16	Mon 19-07-15		13.6.6.1.3.1		NPI	
39		Chopper Assembly 1 delivery of material	5 days	Thu 19-05-16	Wed 19-05-22		13.6.6.1.3.1	ONSITE	NPI	

ESS Milestones

Phase  
PBS  
Area code  
Responsible Institute

# NSS project site organization (for In Kind Partner support/coordination)



1. The first 8 instruments have been identified and they are moving fast to the Tollgate 3 (CDR);
2. Detailed design is taking into account since now the existing constraints of the facility as briefly described (slab load capacity, crane capacity, hook cranes height...);
3. 2019-2020 appear the most challenging years due to the high level of coordination required to:
  - Buildings halls to be completed (Skanska CF);
  - Monolith inserts installation (Target);
  - Bunker construction (Contractor to be identified);
  - In bunker components installation (3-4 instruments);
  - Other installation works outside bunker (including the test beamline);
4. Investigation on slabs deflection will be useful to define a proper installation sequence, with particular reference to the importance to operate slab preload to avoid realignment;
5. A common view in the project schedule development with particular reference to the installation works is crucial to pursue an easy and quick way to integrate the information from the different instruments team, identifies interferences in advance and define the solutions if necessary;
6. A centralised NSS/ESS staff in term of labour and equipment to support the instrument team is under definition. The specific support required will be defined case by case, according to the needs for each instrument team.