EUROPEAN SPALLATION SOURCE

IKON 18

Installation Panel discussion

Mikael Jakobsson
Installation Manager

Antonio Bianchi
Installation coordinator

Dirk Offermans
Area Coordinator
“E01 and E02” buildings

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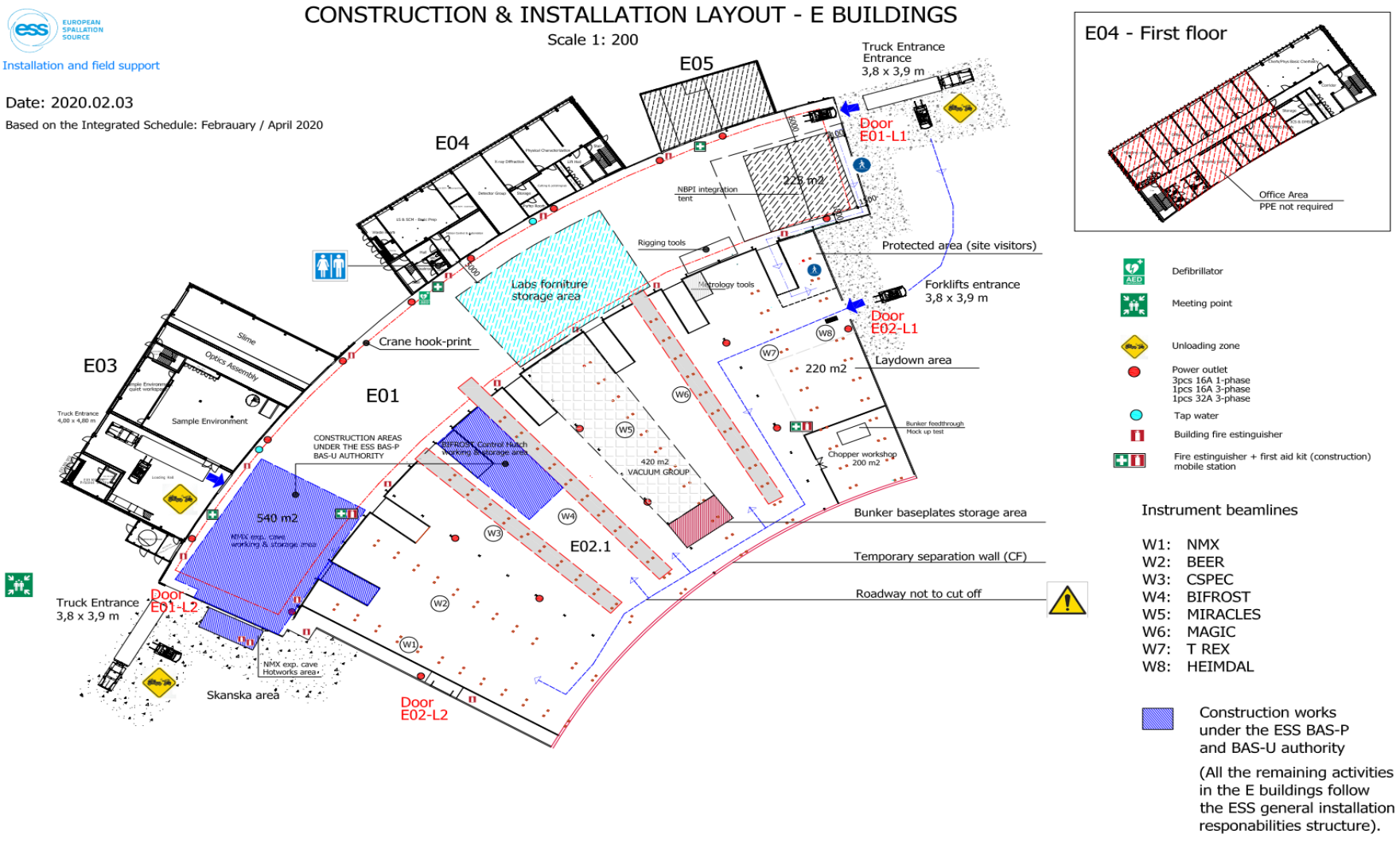
25th February 2020

Construction layout



High level integrated schedule Q1/Q2 2020

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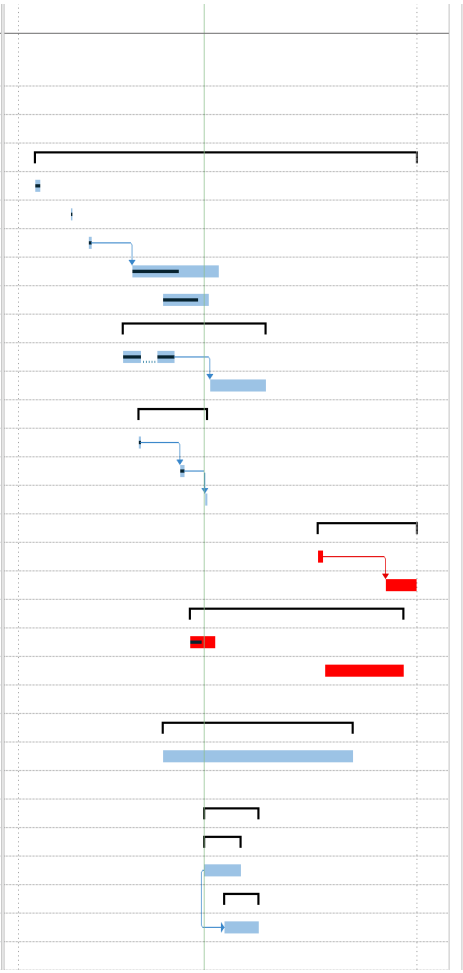
Schedule date: 24.02.2020

High level integrated schedule with Installation packages, IRRs review dates, Partners and Inst. Package Leaders

I.P.L.

					IRR date	Building	Respons	Install.	Inst. Binder
E02 and E01 buildings	**275 days?**	**Mon 02/09/19**	**Fri 02/10/20**						
Instuments Interface plates on top of the beamline piles W3, C SPEC beamline	5 days	Mon 02/09/19	Fri 06/09/19		08.08.2019	E02.1	NSS	Dirk Offermans (ESS)	ib147
Chopper workshop E02.1 (metal fence)	2 days	Wed 09/10/19	Thu 10/10/19		n.a.	E02.1	NSS	Dariusz Zielinski (ESS)	ib179
Installation of NBOA integration tent	3 days	Mon 28/10/19	Wed 30/10/19		n.a.	E01	NSS	Hansdieter Schweiger (ESS)	ib253
Fit out of NBOA integration tent	60 days	Thu 12/12/19	Tue 10/03/20	8	n.a.	E01	NSS	Hansdieter Schweiger (ESS)	ib253
Instruments baseplates and bunker feedthrought mock up test	35 days?	Mon 13/01/20	Fri 28/02/20		n.a.			Nicolas Breton (ESS)	work order
NMX (W1)	**101 days**	**Mon 02/12/19**	**Tue 28/04/20**						
NMX ex. Cave (foundation structure) - (W1)	29 days	Mon 02/12/19	Fri 24/01/20		13.11.2019	E01	NMX	Giuseppe Aprigliano (ESS)	ib 201
NMX ex. Cave (elevation structure) - (W1)	40 days	Mon 02/03/20	Tue 28/04/20	12	21.02.2020	E01	NMX	Giuseppe Aprigliano (ESS)	ib202
NSS GUIDE SHIELDING	**47 days**	**Thu 19/12/19**	**Thu 27/02/20**						
MAGIC (W6) guide shielding - lower walls	2 days	Thu 19/12/19	Fri 20/12/19		25.11.2019 (executed)	E02.1	NSS	Senad Kudumovic (ESS)	ib 217
BIFROST (W4) guide shielding - lower walls	2 days	Fri 31/01/20	Mon 03/02/20	15	25.11.2019 (executed)	E02.1	NSS	Senad Kudumovic (ESS)	ib 217
C SPEC (W3) guide shielding - lower walls	2 days	Wed 26/02/20	Thu 27/02/20	16	25.11.2019 (executed)	E02.1	NSS	Senad Kudumovic (ESS)	ib 217
BEER (W2)	**75 days**	**Mon 22/06/20**	**Fri 02/10/20**						
Delivery of guide system	5 days	Mon 22/06/20	Fri 26/06/20		tbd	E01	BEER	tbd	tbd
Installation and alignment of guide system	25 days	Mon 31/08/20	Fri 02/10/20	19	tbd	E02.1	BEER	tbd	tbd
BIFROST (W4)	**154 days?**	**Mon 10/02/20**	**Fri 18/09/20**						
Control Hatch (W4)	20 days	Mon 10/02/20	Fri 06/03/20		30.01.2020	E01	BIFROST	Liam Whitelegg (ESS)	tbd
Experimental cave (W4)	60 days	Mon 29/06/20	Fri 18/09/20		30.01.2020	E01	BIFROST	Liam Whitelegg (ESS)	tbd
E03 and E04 buildings	**135 days**	**Mon 13/01/20**	**Mon 27/07/20**						
Chemicals and technicals labs installation	135 days	Mon 13/01/20	Mon 27/07/20		18.11.2019	E03/E04	NSS	Monika Hartl (ESS)	ib122
D02 buildings (Parallel access with SKANSKA before the buildings handover)	**38 days?**	**Tue 25/02/20**	**Mon 20/04/20**						
D03 side	**28 days**	**Tue 25/02/20**	**Thu 02/04/20**						
R6 brackets D02 (D03 side)	28 days	Tue 25/02/20	Thu 02/04/20		11.02.2020	D02	NSS	Dawid Patrzalek (ESS)	ib232
D01 side	**23 days?**	**Tue 17/03/20**	**Mon 20/04/20**						
R6 brackets D02 (D01 side)	23 days	Tue 17/03/20	Mon 20/04/20	30SS+	11.02.2020	D02	NSS	Dawid Patrzalek (ESS)	ib232



The IPL deals with the TG4 coordinator to fix the IRR date

The IPL includes in the specific binder the detailed inst. plan

Installation Binder

Presentation's topics

Section 1

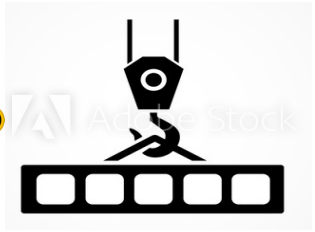
Installation plans, installation packages and binders, IRR, work orders

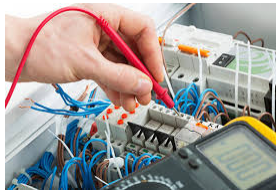
Section 2

Support functions at ESS

Section 3

Installation safety



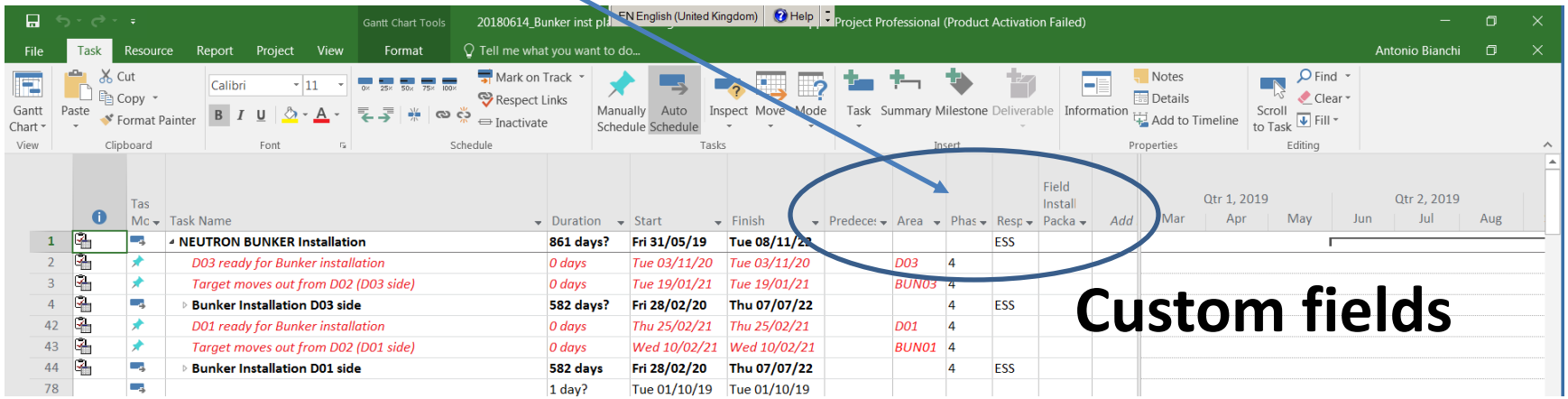


Installation plan and installation packages

The instrument installation plan will include the overall installation packages

Area:	text 27
Project Phase:	text 28
Responsible Institute (Partner):	text 29
Installation packages:	text 30

Design
RAMS
Safety certificates
Procedures
List of materials
....
.....



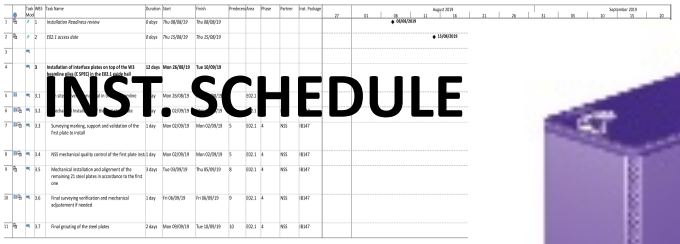
Installation Packages

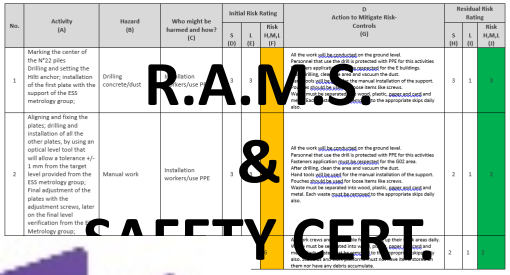
To facilitate management of installation an instrument will be divided into a set of *installation packages.* These will be chosen to be of manageable size and defined by the sequence of engineering work and the assembly process. The IPs will be prepared in an organized way to deliver the scope of work needed for the process of installation required at ESS by the partner and ESS installation teams.

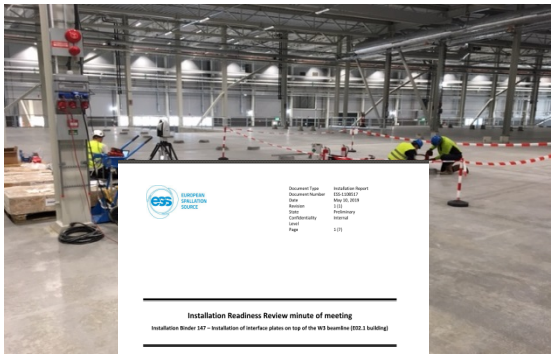
This process is aligned with the detailed design phase, manufacturing process, installation, QA & safety requirements, and specific constraints and requirements specific to the relevant installation areas.

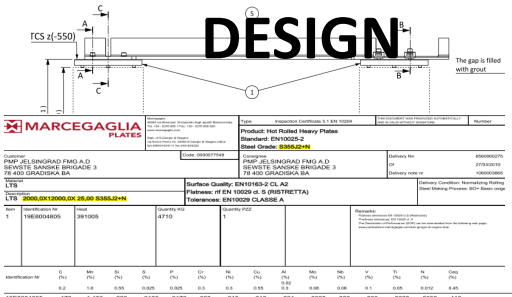
NSS Installation binder IB 147 – completed
Capping plates in the W3 beamline

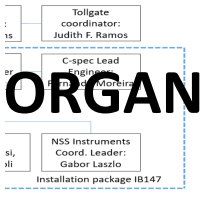
Binder name	Steel interface plates in the E02 hall
Binder ID	ib147
Created	15 Apr 2019
Description	Interface plates on top of the concrete piles

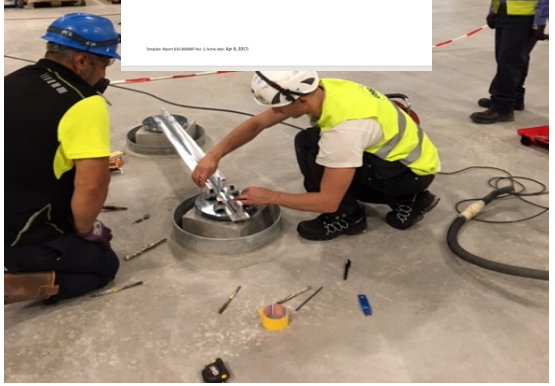


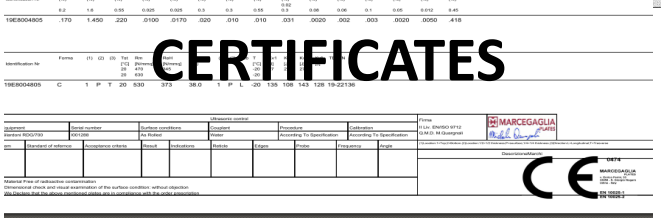


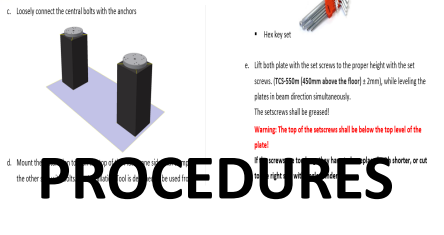












Final grouting planned in Q1/2020 (improvement of metrology network is needed)

IRR check list (ESS-0398509)

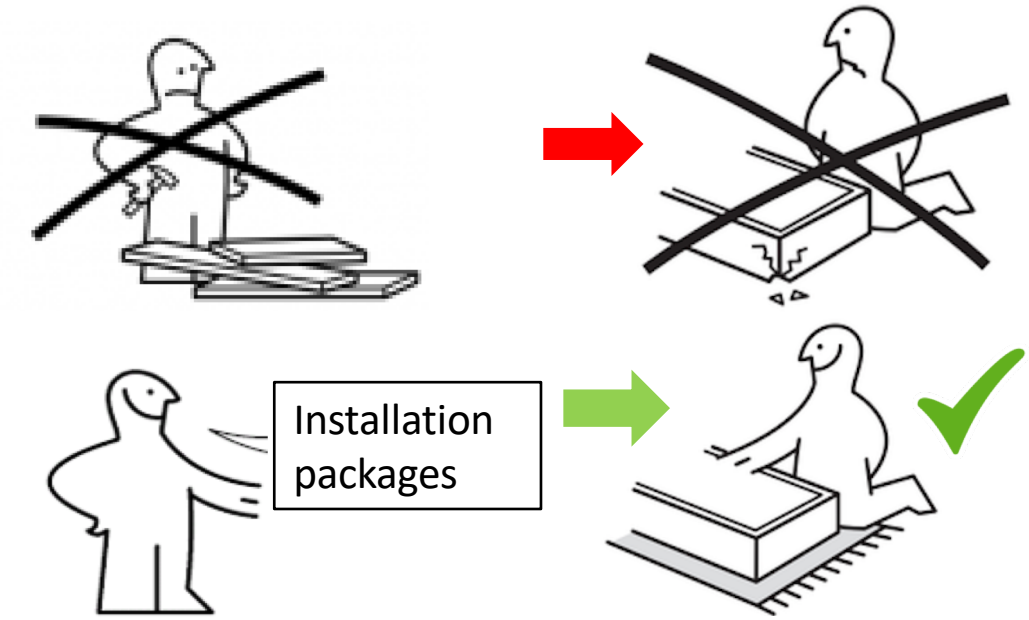
- Prepare your IRR by closing out topics according to the checklist.
- Plan your review date with the support of the TG Coordinator (Inga)
  - Leave enough time to close out open topics (min 1 month)
- A pre-IRR can be beneficial to get a first assessment and to minimize “surprises” in the final stage;
- Discuss the required IRR review team with the Installation Coordinator
  - Number of stakeholders participating should be ‘lagom’ (just the
    right amount, suitable for the package)

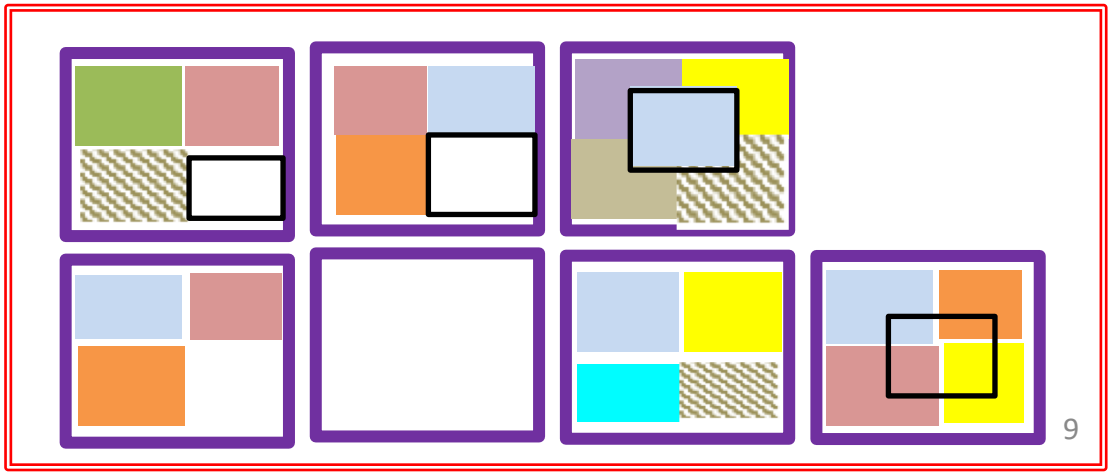
installation packages up to the completion of the Phase 4

(from Ikon 14, with Clara Lopez)

Instrument Work packages

- Instrument Team
- NOSG
- PSS (Personal Safety System)
- DMSC
- MCA
- Detectors
- Choppers
- Sample environment
- Vacuum Group
- ICS





Installation packages

from Ikon 14, with Clara Lopez)

"Definition of installation packages and the installation sequence are specific to each instrument."

Envelope space in instrument halls

Instrument

installation packages

IP5

IP2 IP4 IP1

IP7 IP3 IPn

Each Installation package (IPn) corresponds to a binder and an IRR

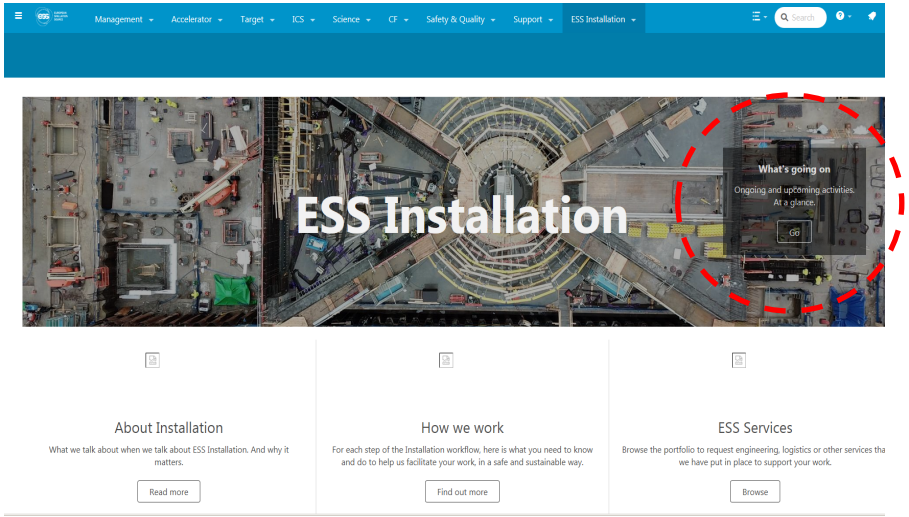
IRR

Binder

Installation packages (binders)

ESS Installation/What's going on/ESS Installation binder library/Create an Installation binder

1



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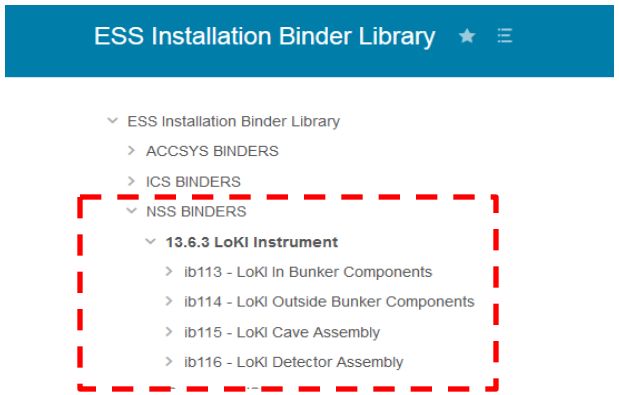
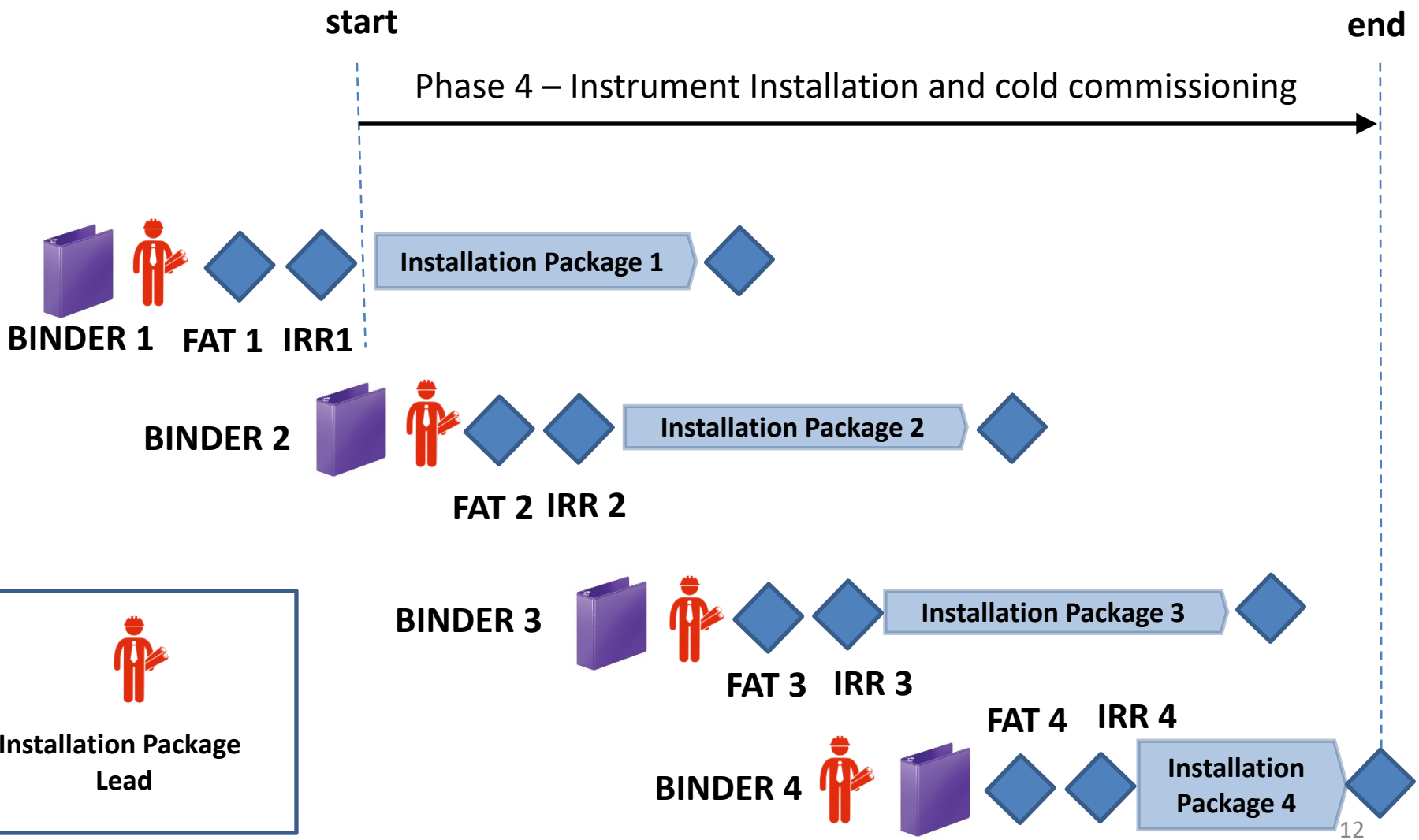


3

Instrument installation and cold commissioning (Phase 4)



Roles and responsibilities (1/2)

ESS Installation Manager

- Overall Site Coordinator

NSS Installation Coordinator and Area Coordinators

- Coordinates NSS installation works

Installation Package Leader (Binder owner)

- This person is appointed by the Instrument Team to lead/manage the on-site instrument installation works
- Responsible/owner of Installation binder.

In-Kind / Contractor

- Responsible for the installation work.
- Responsible for the contents of the installation preparation documents to include into the installation binder.

Roles and responsibilities (2/2)

NSS Installation and Area Coordinator

Responsible for

- An IRR is conducted and passed before installation starts for a package;
- Schedule and coordinate Installation packages within project;
- Installation Packages follow rules and regulations, including heath and safety regulations
- Coordinate support needs for installation packages;
- Resolve conflicts, including prioritize, between different installation packages within project
- Make sure there's a sign-off for the installation package (before it's regarded complete).

Installation package leader

Responsible for

- Interface with the Toll Gate Coordinator
- The installation binder is ready for IRR
- The on site installation for that package
- The installation follow rules and regulations
- Safety and Health during installation

The work order

Later on a successful IRR ….

- A work order is an electronic application extensively used by projects-based, manufacturing, building and fabrication businesses. A work order may be for products and/or services. A Work order will be used to signal the start of an installation process and will be linked to a Risk Assessment and Method Statement (RAMS) and an installation binder. The work order will mainly state:

- Installation activity start and end time.

- Summary of the activity.

- Documents related to this activity (in case there is not the binder)

Why does a work order need to be approved?

- An approver of a work order need to verify the following before approving a work order:

- 1 Installation/safety supporting documents are in place and up to date.
- 2 Permits are in place and up to date and standards.
- 3 Time frame is available and parallel work does not pose any risks.
- 4 Spatial integration requirements are met.
- 5 Other departments and areas coordinators are in Sync with the work order.
- 6 On site resources are available

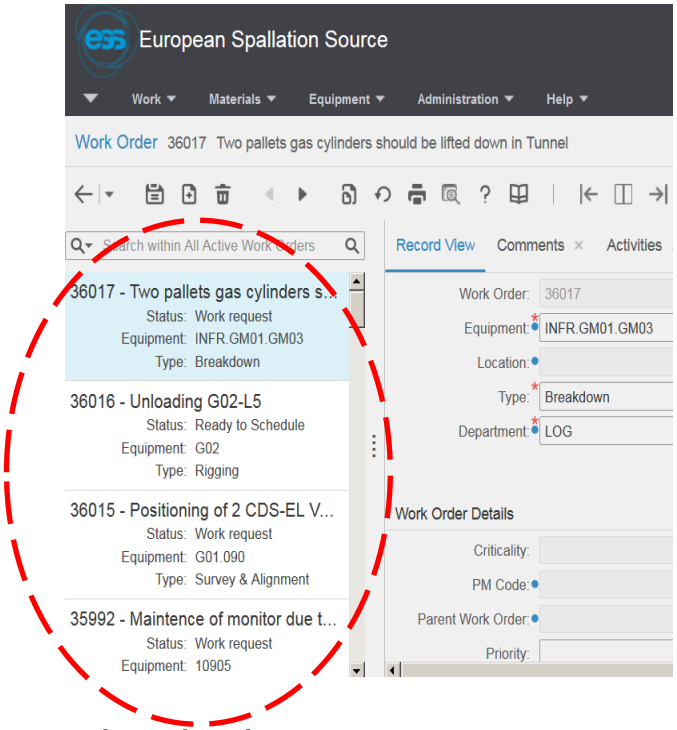
How to handle Work Orders

All the work orders will be managed by the ESS Enterprise Asset Management (EAM)

The EAM system at ESS encompasses several functions and processes.

When fully deployed, EAM will support:

- Work orders & work requests
- Work permits
- Maintenance planning
- Asset management
- Possibility to generate requisitions for spare part needs.
- Warehouse management
- ESS Logbook
- Mobile applications
- Printing of labels for equipment
- Material Master Management



Each work order will need the approval from both the Area Coordinator and the Installation coordinator before the installation can start.

Work Orders approval flow

The work order approval flow involves all the Installation Package Leaders, Area and Installation Coordinator

Step 1

The IPL generates the W.O. request in the system;

Step 2

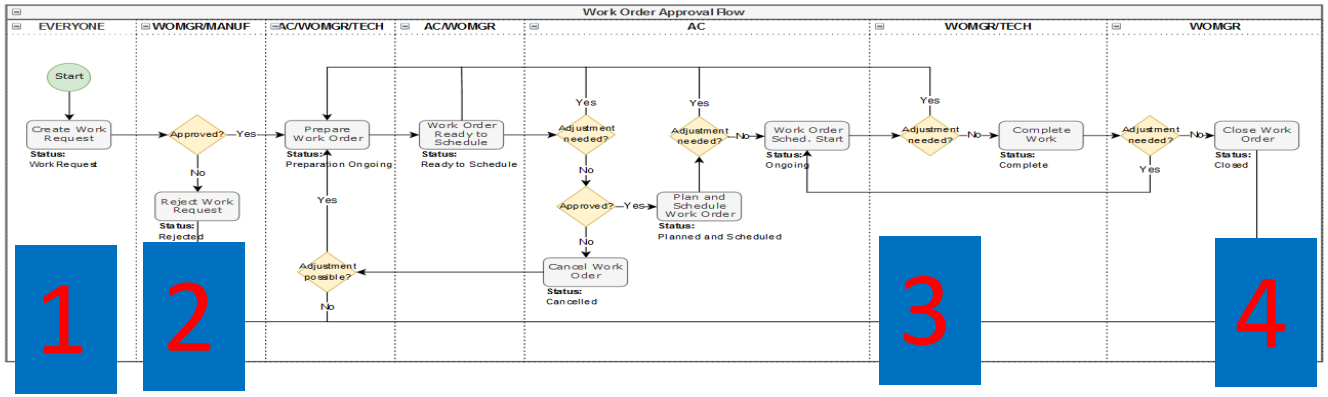
The Installation Coordinator approves the request from schedule point of view;

Step 3

The Area Coordinator and the Installation coordinator review the work order contents (in case of a W.O. related to an Installation package (binder) already approved by an IRR, it should be mainly a confirmation of what already defined;

Step 4

The Installation Coordinator provides the final approval



Section 2
Support functions

Antonio Bianchi

NSS Installation coordinator

Dirk Offermans

Area Coorinator E01 and E02

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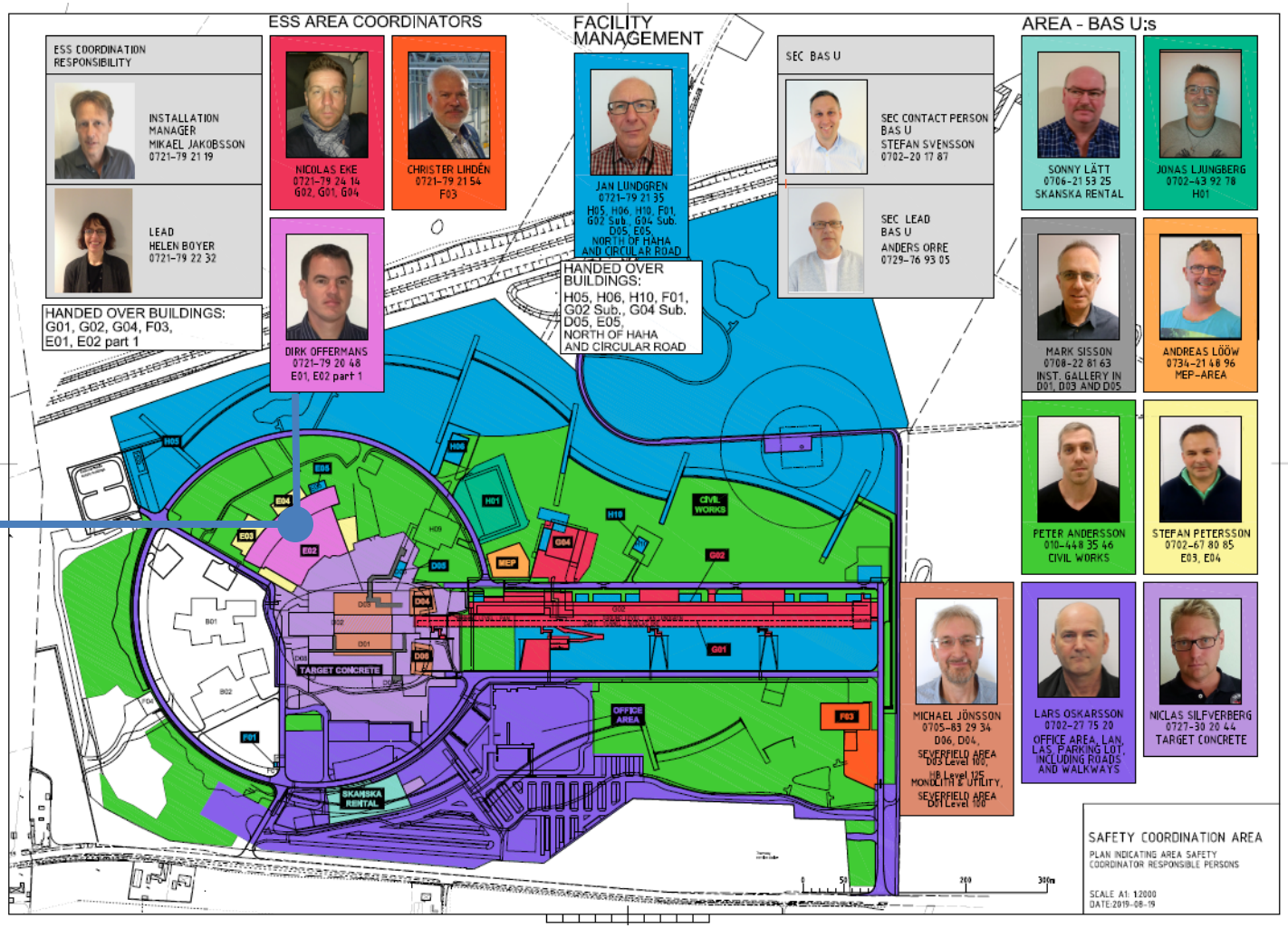
9th September 2019

Area Coordinator Map

Dirk Offermans

E01 and E02 Area Coordinator



Support functions at ESS

- In house services
  - Rigging/lifting
  - Metrology
  - Manufacturing
  - Logistics
  - Gases
- How to apply:
  - Jira
  - ESSnow
  - Confluence
  - Email, phone…

EAM

(+ ESSnow Logistics)

Support functions at ESS

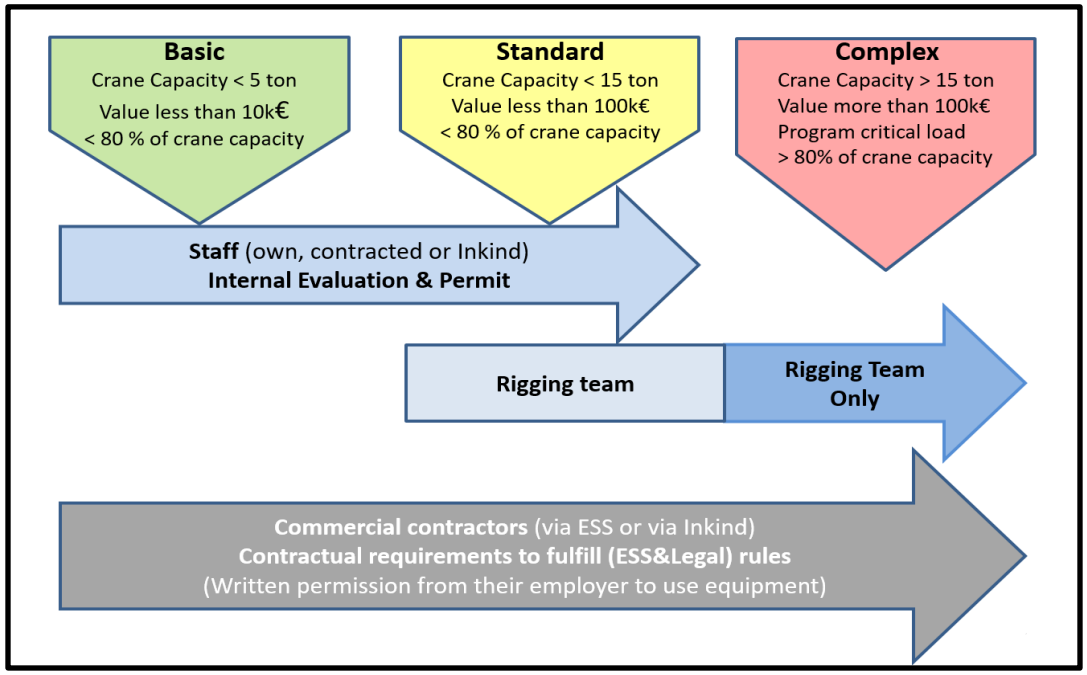
- Framework Agreements
  - Mechanical Installation
  - Electrical Installation
  - Cranes & Rental Equipment
  - Scaffolding
  - Components, PPE, tools
- How to apply
  - Request ESS conditions
  - Contacts list – Scenario 2
  - Time + Materials vs Fixed Price
- Own arrangement…

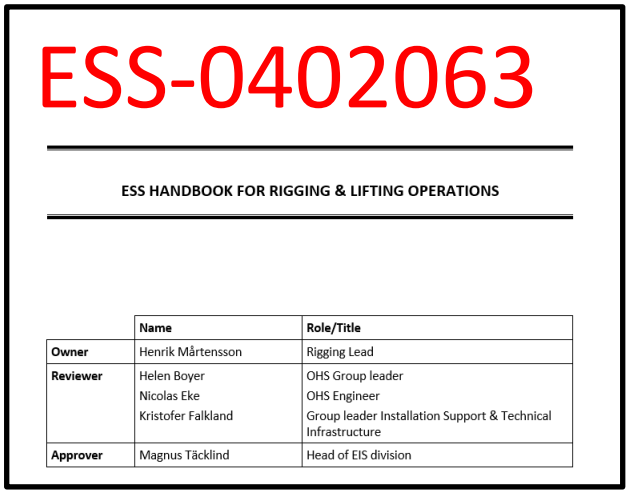
Considerations selecting support

- Site access:
  - Induction courses + ID06/ESS access
  - 1st aid course
  - Car / storage access
  - Work order + RAMS
- Certificates and training
  - Swedish laws
  - Foreign Certificates
  - Company Registration
  - Lifting & Rigging handbook

The rigging and lifting handbook

Lifting works are *collected* in three main categories, according to the following flowchart:





ESS-0402063

ESS HANDBOOK FOR RIGGING & LIFTING OPERATIONS

	Name	Role/Title
Owner	Henrik Mårtensson	Rigging Lead
Reviewer	Helen Boyer Nicolas Eke Kristofer Falkland	OHS Group leader OHS Engineer Group leader Installation Support & Technical Infrastructure
Approver	Magnus Täcklind	Head of EIS division

- As a general rule, a crane operator from "*ESS rigging team*" will operate the buildings overhead cranes;
- Employees and outsourced personnel shall have *written permission* from the employer and hirer respectively to use a mechanically powered lifting device

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Section 3
Installation safety

Antonio Bianchi
NSS Installation coordinator

Dirk Offermans
NSS Area Coordinator “E01 and E02” buildings

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10th September 2019

The Risk Assessment and Method Statement

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What is a RAMS?

- The Risk Assessment and Method Statement is a document collating information regarding:
- the work to be performed
- the hazards identified
- the control measures that are going to be applied.

Why do we need RAMS?

- We strive to build and operate ESS in a safe and sustainable way. In order to do so, we need to make sure that at each stage of an activity the hazards are identified and that the necessary controls are applied to ensure that the risk is acceptable. For the Area Coordinator, this information is needed to ensure that works in a given space and time are adequately managed. For the people performing the work, the preparation of the RAMS identifies the resources and permissions needed to carry out the work and to plan the activity in the most efficient and safe way.

Why are we using a new format?

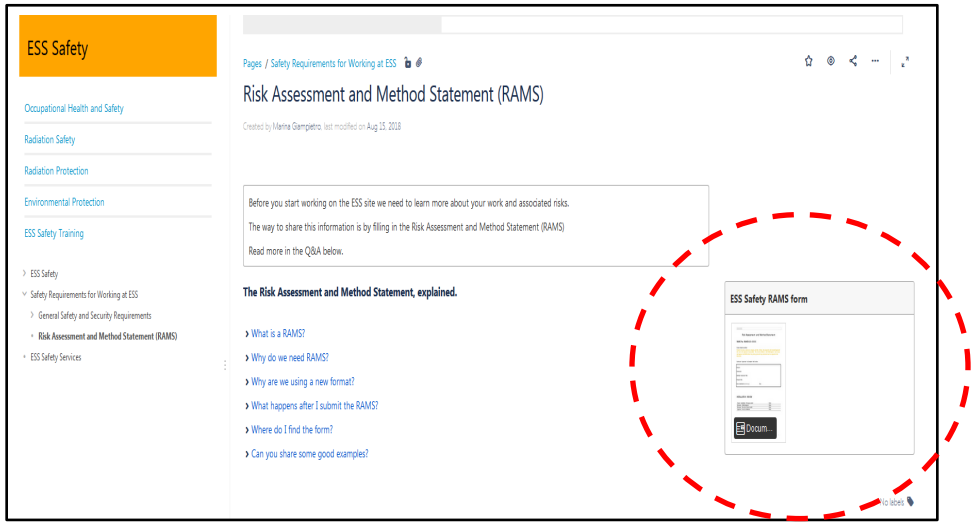
- We want to integrate Safety in everything we do.
- When it comes to preparation for installation, we want to see Safety as an integral part of the tasks to be performed. This starts with having the method statement merged with the risk assessment.

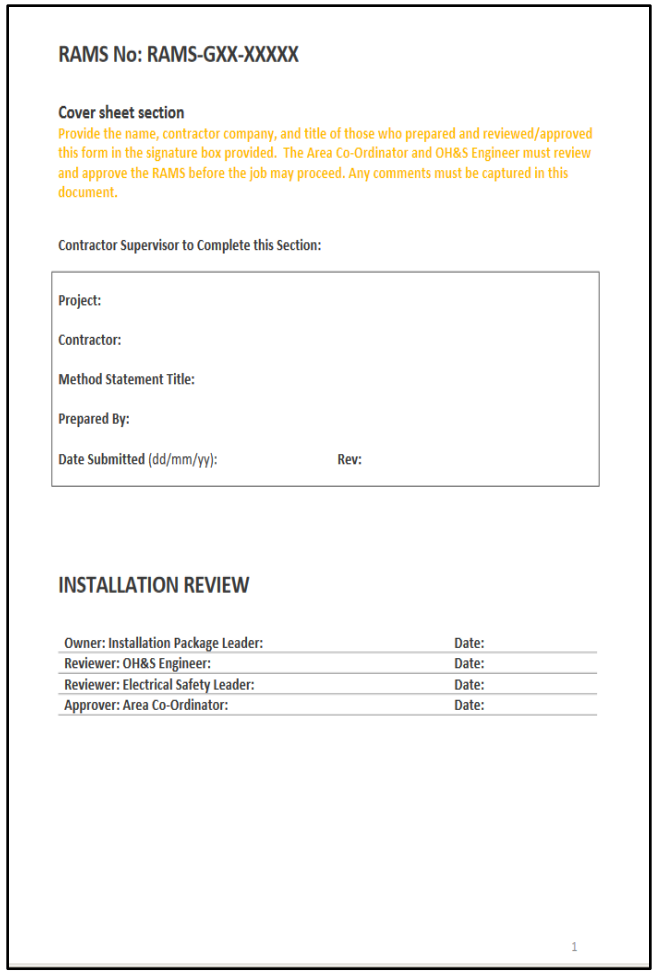
What happens after I submit the RAMS?

- ESS Safety, Area Coordinator and Installation Coordinator review your RAMS. Then we get back to you to ask for additional information and clarifications. Once the information is complete, the RAMS is approved. This is one of the prerequisites for starting your work.

ESS - Occupational Health & Safety

RAMS template available on Confluence





RAMS No: RAMS-GXX-XXXXX

Cover sheet section

Provide the name, contractor company, and title of those who prepared and reviewed/approved this form in the signature box provided. The Area Co-Ordinator and OH&S Engineer must review and approve the RAMS before the job may proceed. Any comments must be captured in this document.

Contractor Supervisor to Complete this Section:

Project:

Contractor:

Method Statement Title:

Prepared By:

Date Submitted (dd/mm/yy): Rev:

INSTALLATION REVIEW

Owner: Installation Package Leader:	Date:
Reviewer: OH&S Engineer:	Date:
Reviewer: Electrical Safety Leader:	Date:
Approver: Area Co-Ordinator:	Date:

1

CONFLUENCE PAGE
(ESS OCCUPATIONAL HEALTH & SAFETY)

https://confluence.esss.lu.se/pages/viewpage.action?pageId=265308713

RAMS section 1: method statement

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Method Statement

1. Description of Task/Process;
2. Sequence of work (step by step) and the duration of each (align with Installation Binder);
3. If temporary services are required i.e. scaffold, site logistics, temporary power and fluids etc.;
4. Who will carry out the works and detail training i.e Lifting & Slinging /Forklift / Harness / Abrasive Wheels / Working at Height etc;
5. Personnel protective equipment;
6. Indicate below what additional specific permits will be required for this RAMS:
7. Protection system for third party incl. public, adjacent workers etc.: (Fencing off areas, noise, flash from welding etc.);
8. If temporary amendments to escape routes, fire alarm, client rules etc. are required:
9. Description of Equipment and Tools;
10. Emergency procedures and incl. first aid arrangements:
11. Chemical & Substances – Safety Data Sheet (SDS):

RAMS section 2: risk assessment

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No.	Activity (A)	Hazard (B)	Who might be harmed and how? (C)	Initial Risk Rating			D Action to Mitigate Risk- Controls (G)	Residual Risk Rating		
				S (D)	L (E)	Risk H,M,L (F)		S (H)	L (I)	Risk H,M,L (J)
1.										
2.										
3.										
4.										
5.										

Matrix to assess risks

The main tool used for assessing risk in this system is a 5 x 5 matrix. The sides are labelled Severity x Likelihood as shown below.

Likelihood (L)	Severity (S)
1 = Very Unlikely	1 = Minor injury, No lost time or No Delays/Disruption
2 = Unlikely	2 = First aid injury, less than 3 days absence Minor Disruption
3 = Likely	3 = Minor injury, more than 3 days absence or Minor Delays
4 = Very Likely	4 = Major injury, long term absence or Major Delays
5 = Certain	5 = Fatality or Total Loss

Risk	Range
Low (L) Risk (Green)	1-4
Medium (M) Risk (Orange)	5-10
High (H) Risk (Red)	15-25

Likelihood (L) \ Severity (S)	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Safety matrix (installation)

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Safety Training Matrix

Trainings provided by ESS-Skanska on site
Training provided by external companies

Training / Purpose	HS site Induction	Site orientation training at gate	Safe lifting (slinging/ rigging)	Hot work training	Fall protection and rescue training (with harness)	Electrical Safety Instructions, (ESA 14 -, (EN 50110 certificate)	Electrical Safety Training, (How to apply ESA-14 on site)	MEWP (Scissor lift, Skylift, Boom lift)	First Aid course including Electrical Injuries	Forklift truck training	Crane operator training for specific crane	Training and medical examination
Estimated cost (SEK)/person	-	-	2000	3200	2200	6000	-	2500	7000/gr.	3600	3200	4000
Access to site	X											
Work on site (general)	X								X *			
Access to site with vehicle/transport		X										
Performing hot work	X			X								
Performing lifting and coupling work	X		X									
Work on site (Accessing energised areas, performing electrical work)	X								X**			
Accessing energised areas, performing electrical works	X					X***	X****		X			
Working on MEWP	X				X			X				
Operating forklift	X									X		
Operating cranes	X		X								X	
Working with epoxy or other allergenic chemical												X
VALIDITY of courses (duration)	-	-	(Swedish certificate)	5 years (Nordic certificate)	(Swedish certificate)	3 years	3years	5 years (ISO 18878 certificate)	3 years	Swedish BYN or TYA validation	Swedish BYN or TYA validation	Swedish certificate 5 years
	60-90 min	30 min	0.5 day	1 day	0.5 day	2 day	0.5 day	1 day	0.5 day	1 day per course or few hours if validation in-house		

Questions