Conventional Facility & Siting (CF&S) Overview for the Positron Source

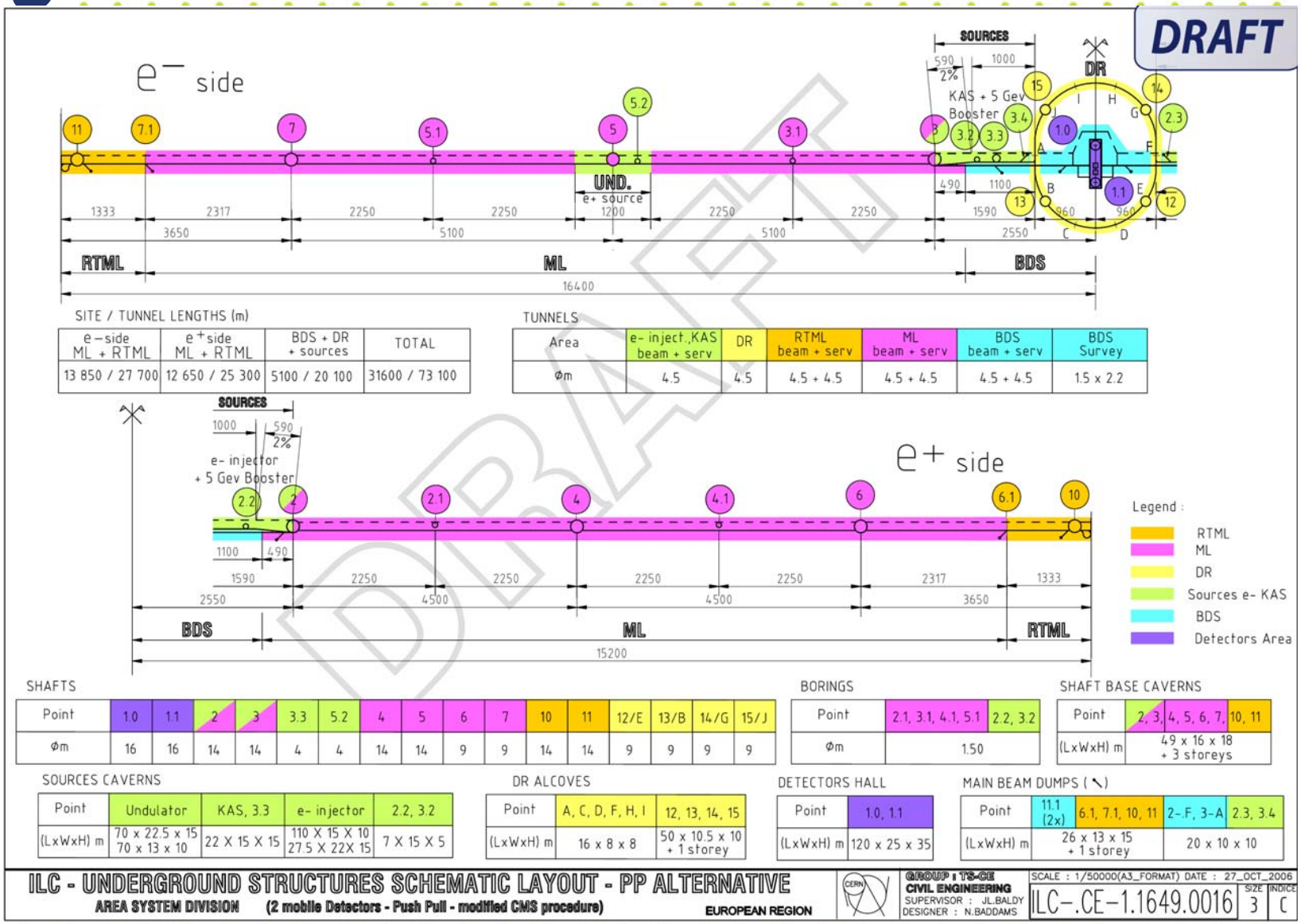
John Osborne / CERN

Acknowledgement : Jean-Luc Baldy CERN, Fred Asiri SLAC, Vic Kuchler FERMILAB

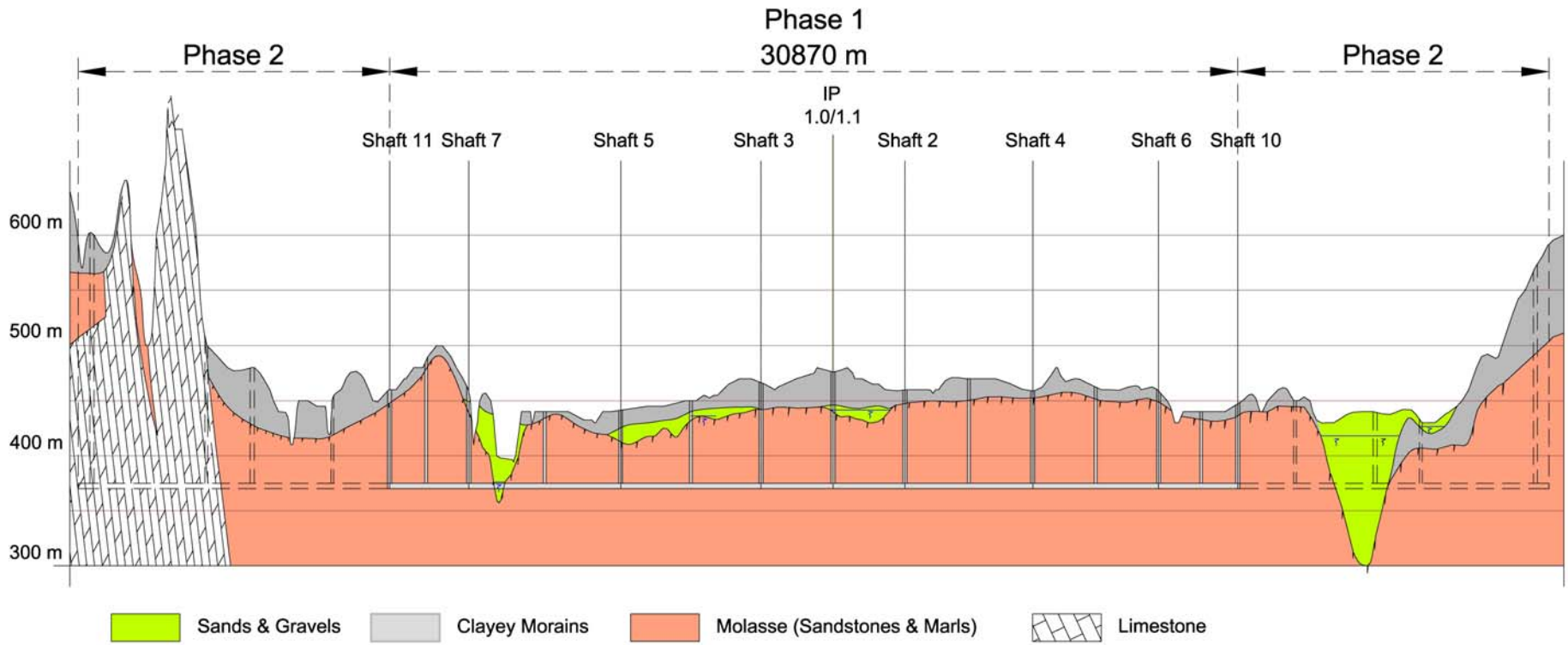
CF&S Overview for the Positron Source

- Current Status of :
  - Civil Engineering Layouts (with emphasis on Europe)
  - Breakdown of CF&S RDR Cost Estimates (What's included)
  - CF&S General Assumptions for RDR Estimates
  - Cooling Water Assumptions
  - Air Treatment Design Basis
  - CF&S EDR Planning
  - CF&S Draft Construction Schedule

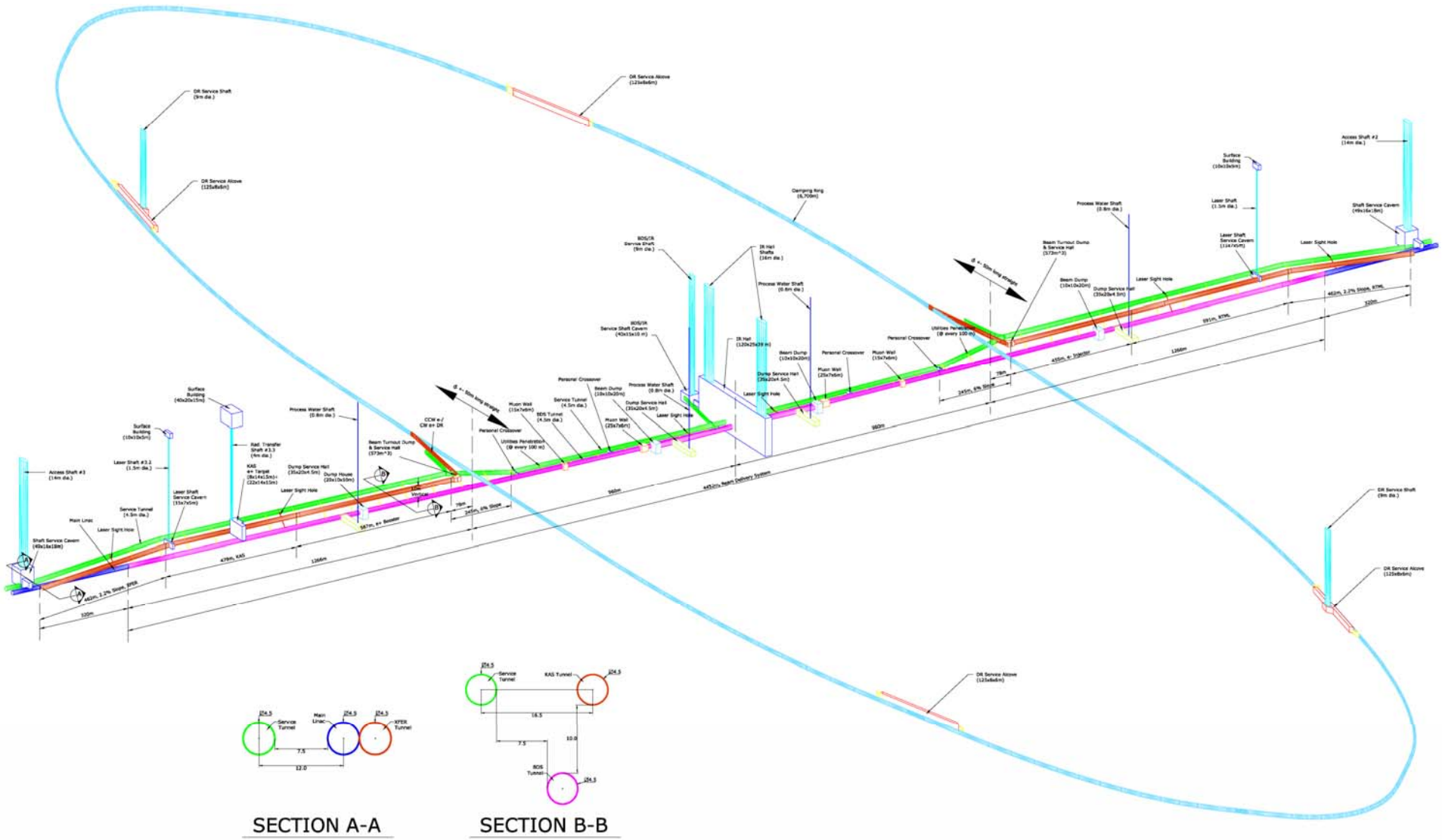
Current Status



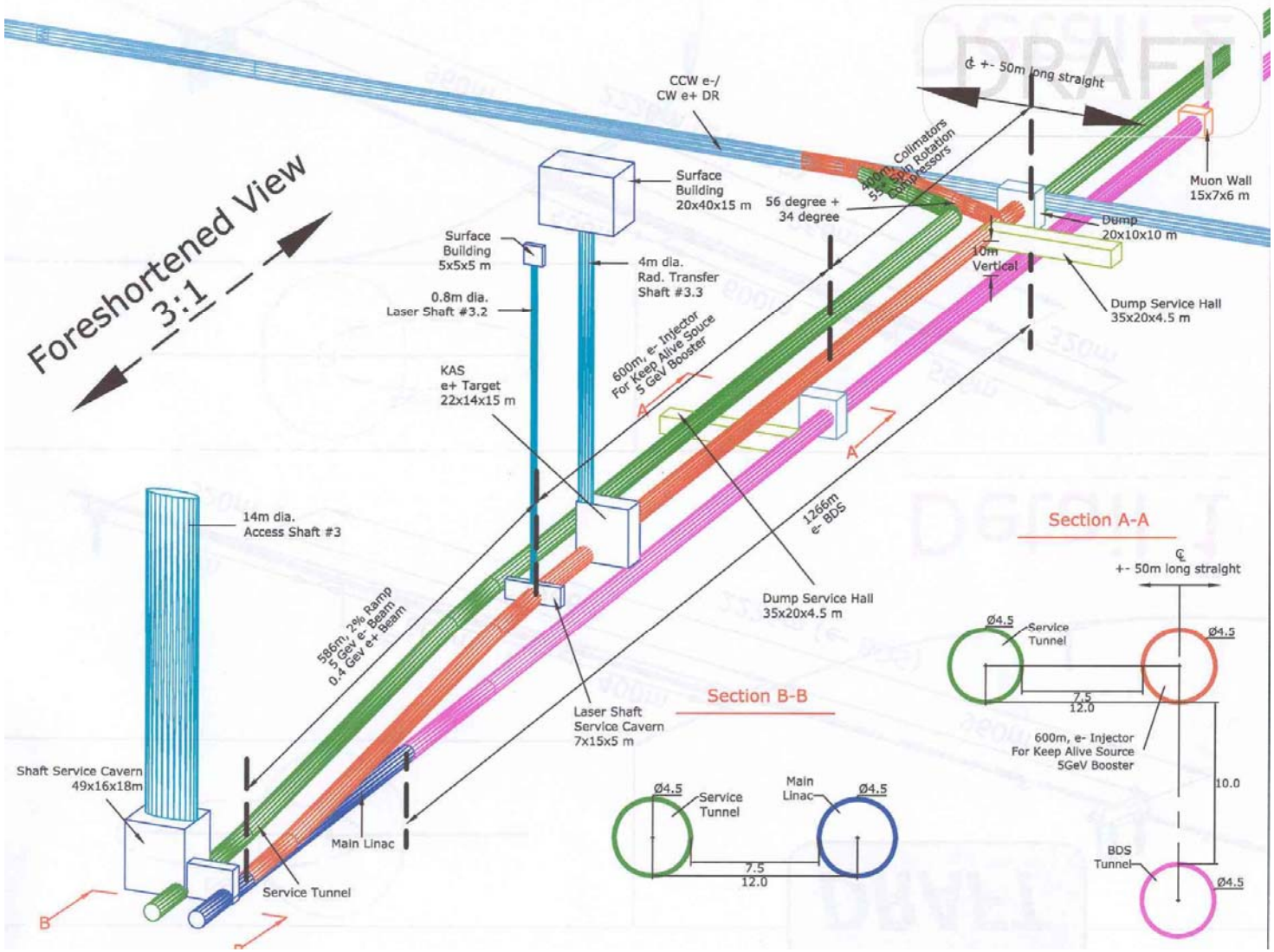
EUROPE – CERN Long Profile



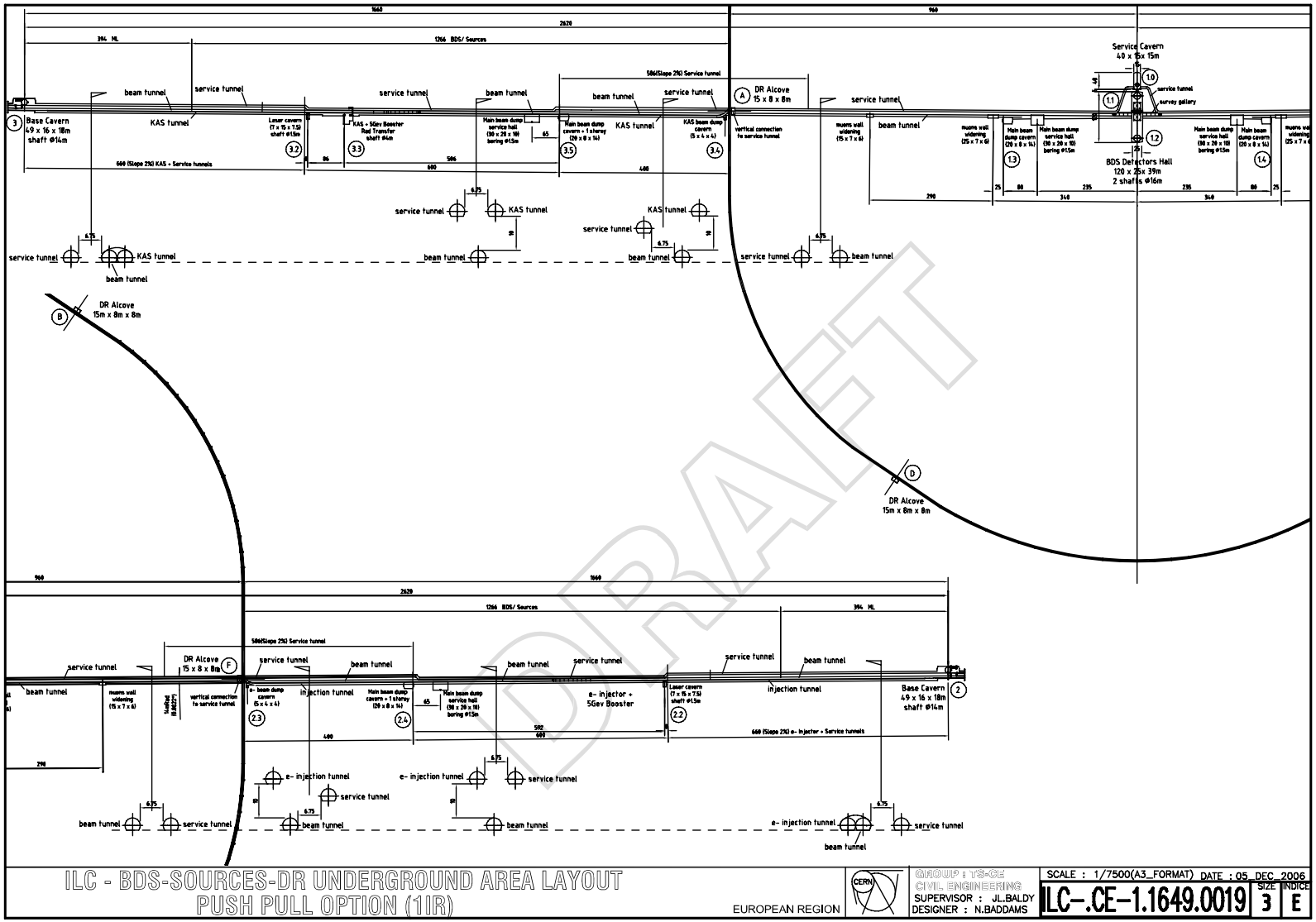
Current Status Central Area



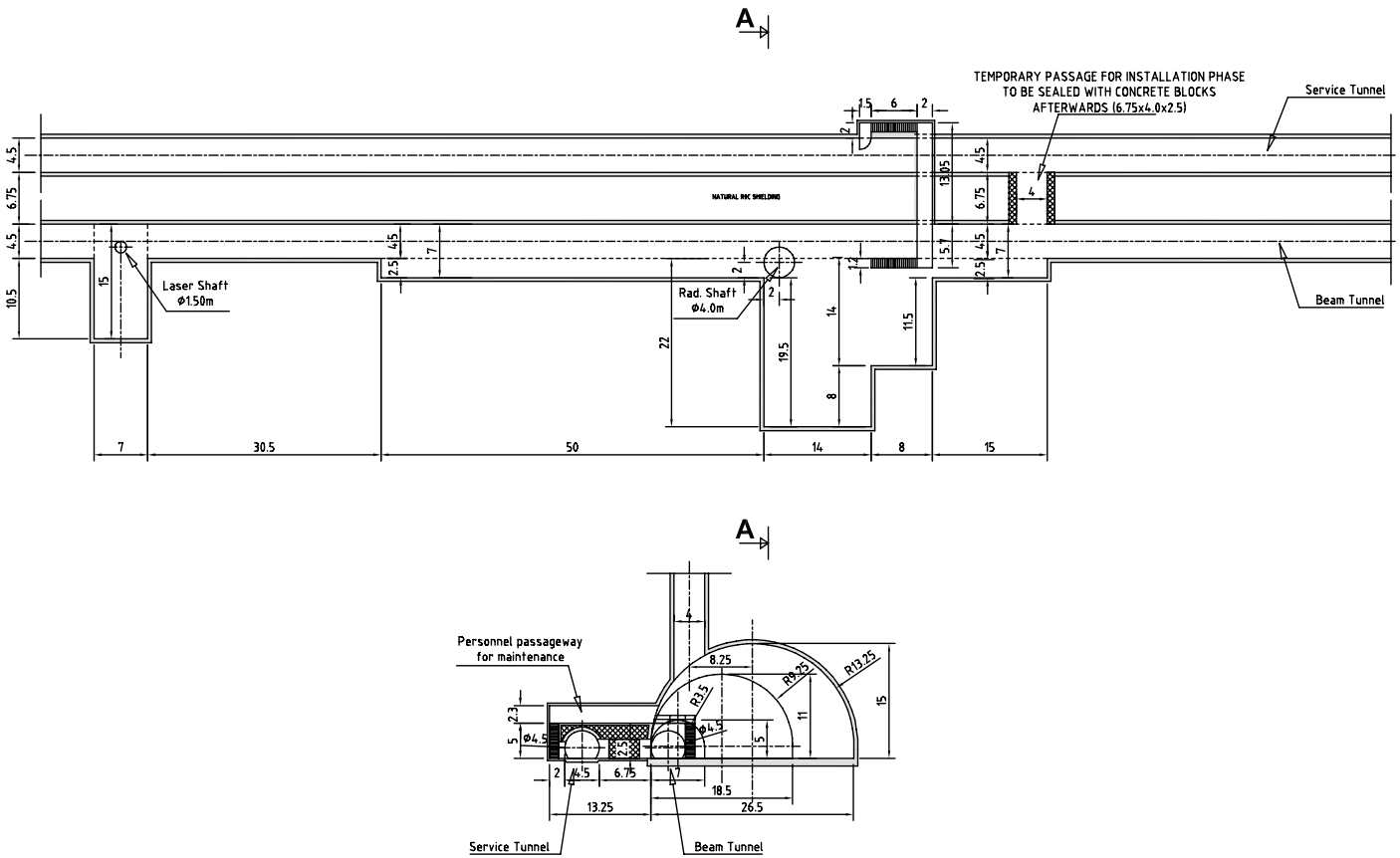
Positron Source 3d Layout



BDS Sources Layouts



Keep Alive Source Underground Layouts



Section A-A

ILC - SOURCES-KEEP ALIVE SOURCE TARGET AREA LAYOUT AND SECTION

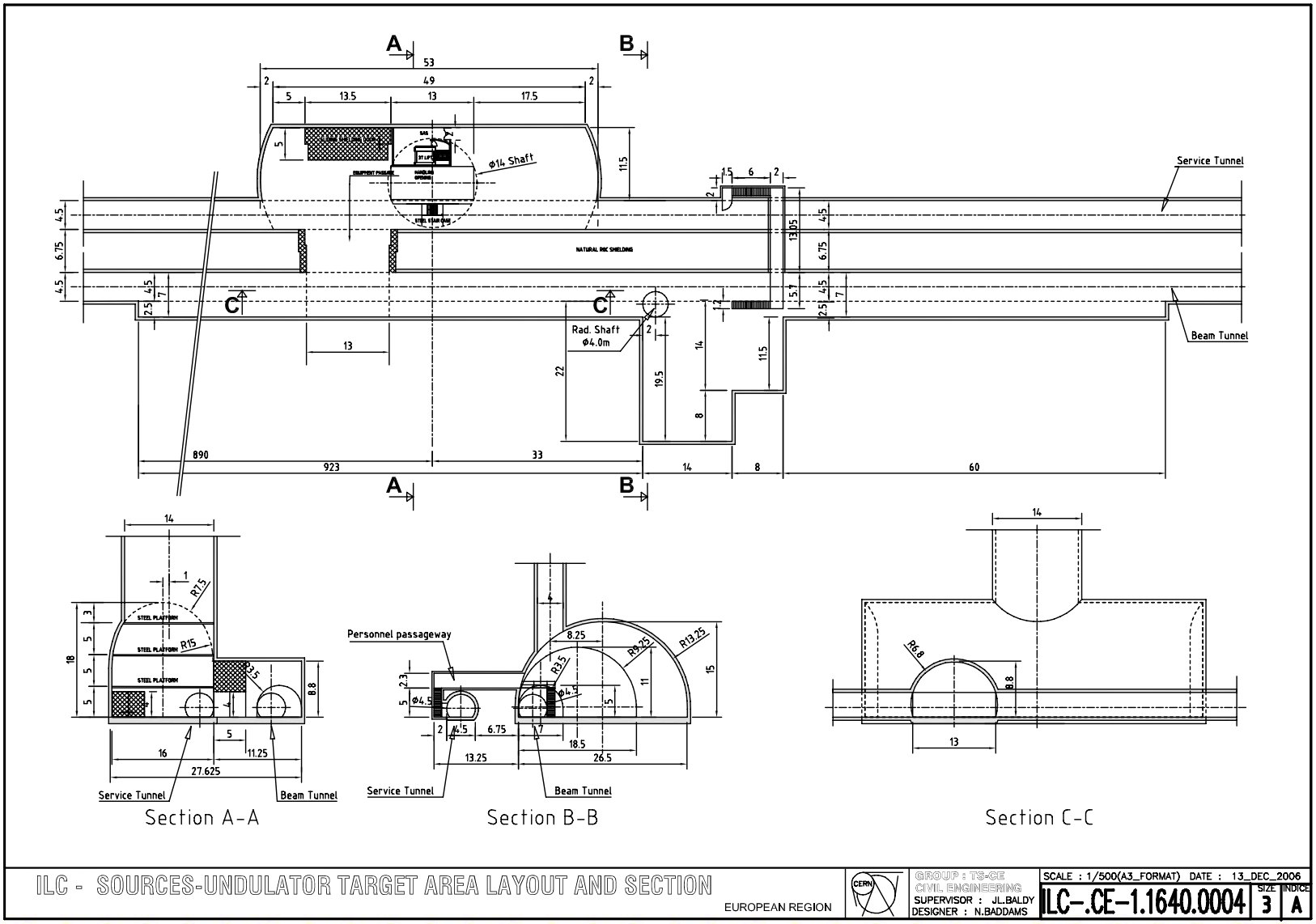
EUROPEAN REGION

GROUP : TS-CE
CIVIL ENGINEERING
SUPERVISOR : JL.BALDY
DESIGNER : N.BADDAMS

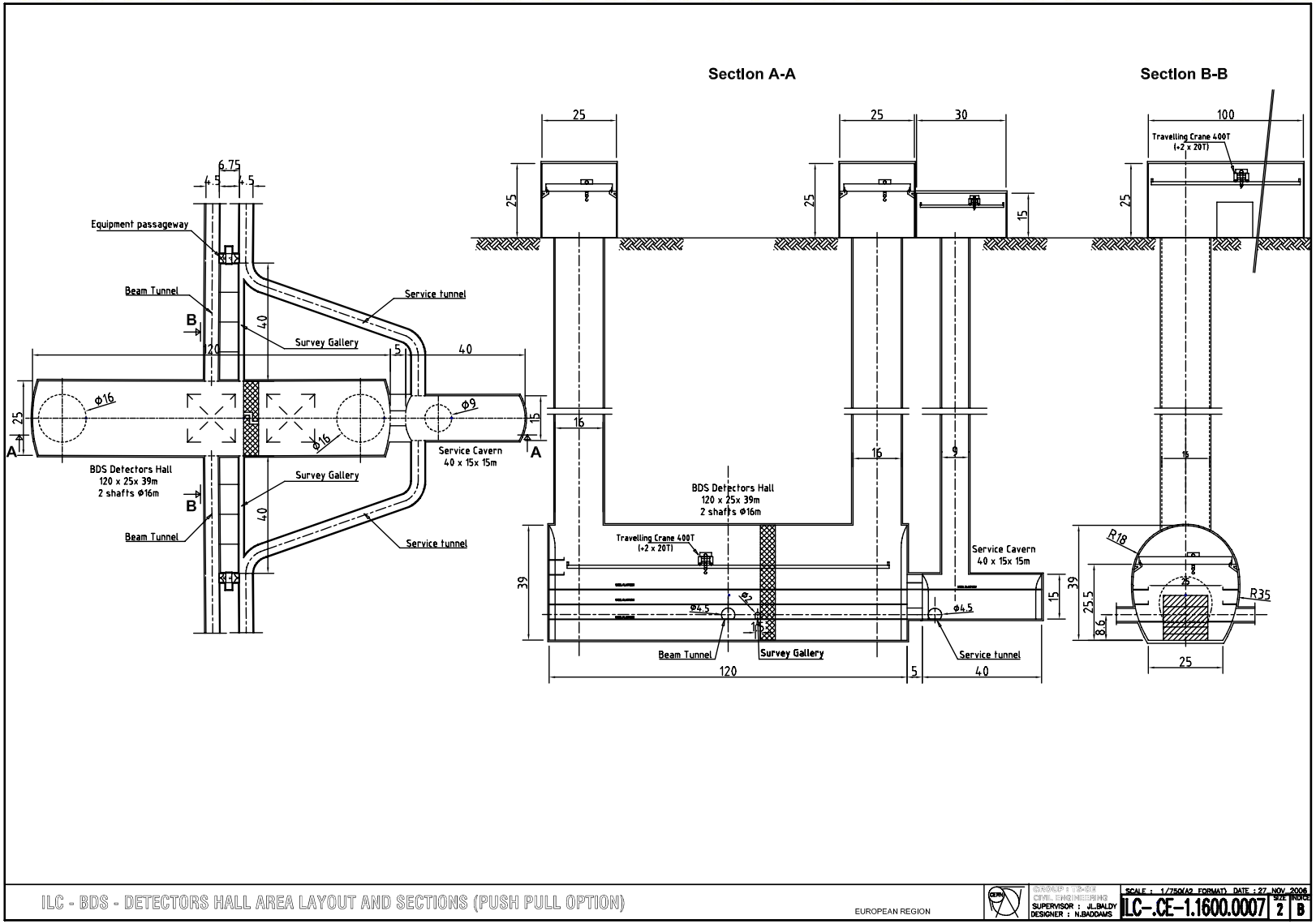
SCALE : 1/500(A3_FORMAT) DATE : 30_NOV_2006

ILC-.CE-1.1640.0003 | SIZE 3 | INDICE A

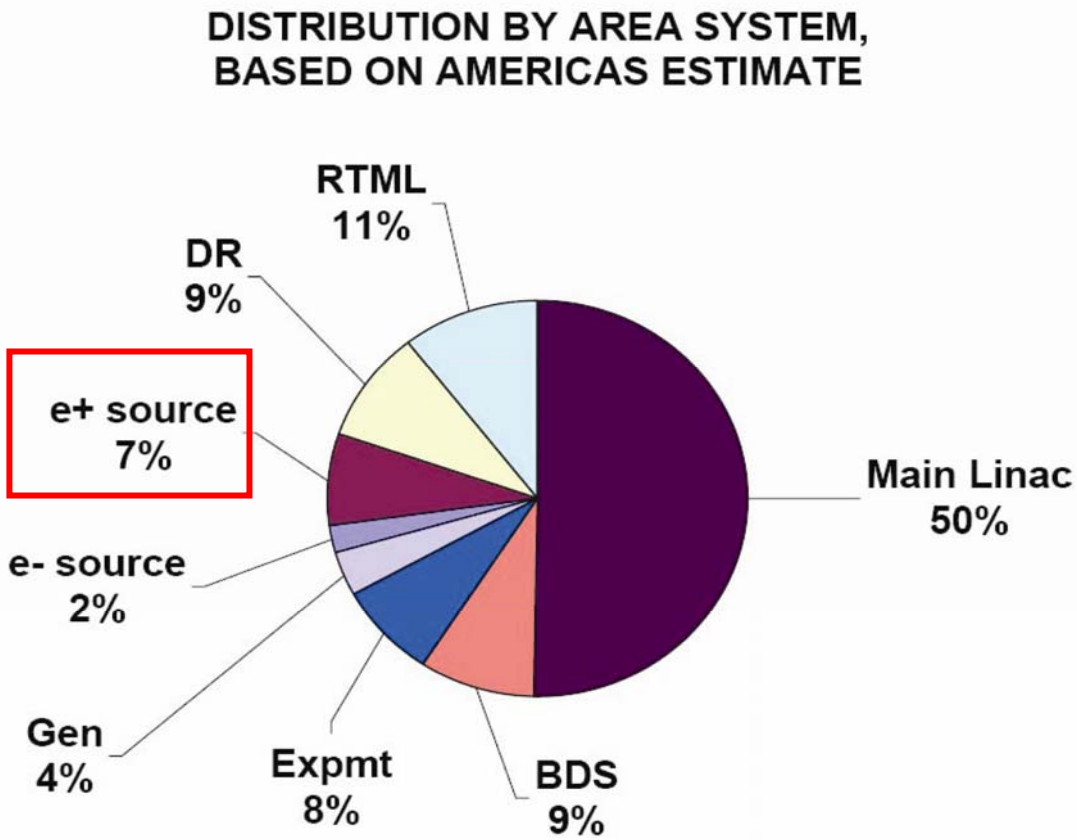
Undulator Underground Complex



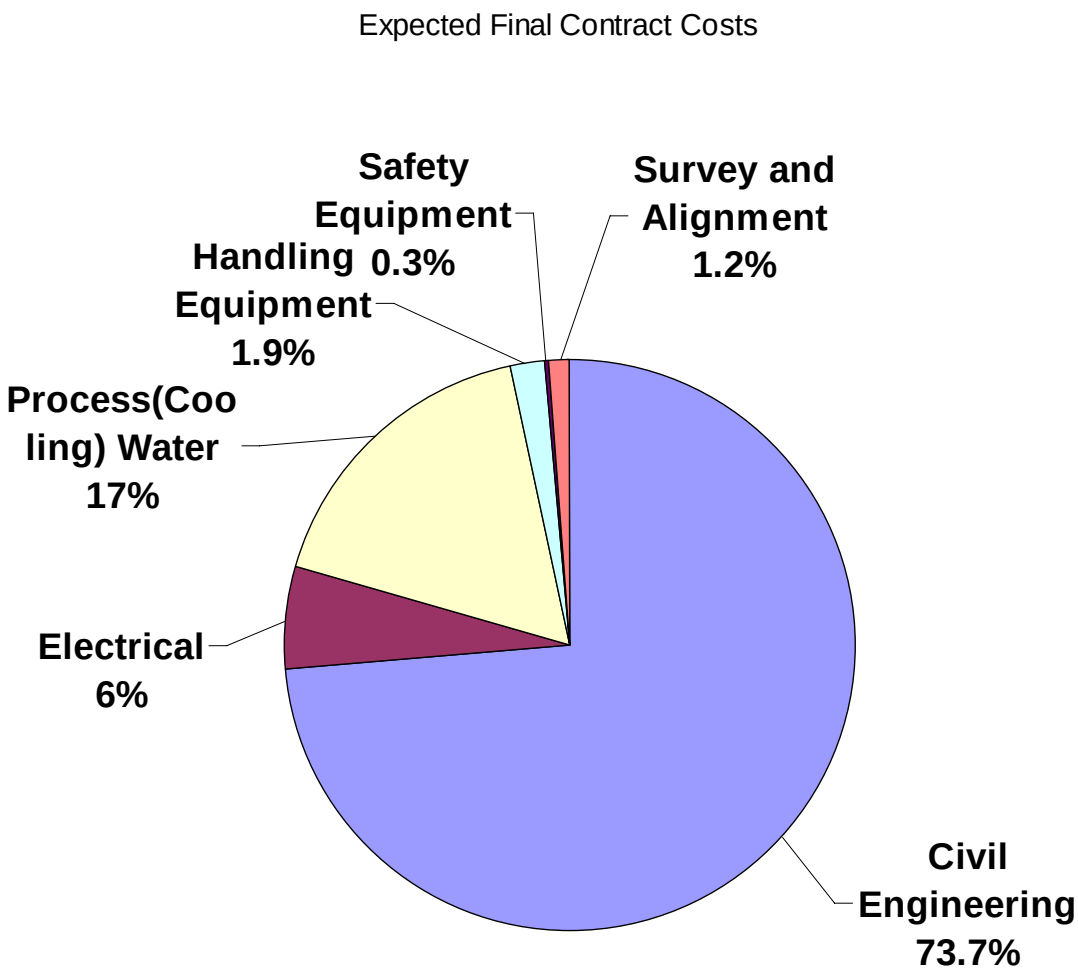
Interaction Region Layout for RDR



Total CFS Costs and Statistics



Total CFS Costs and Statistics for e+ Source

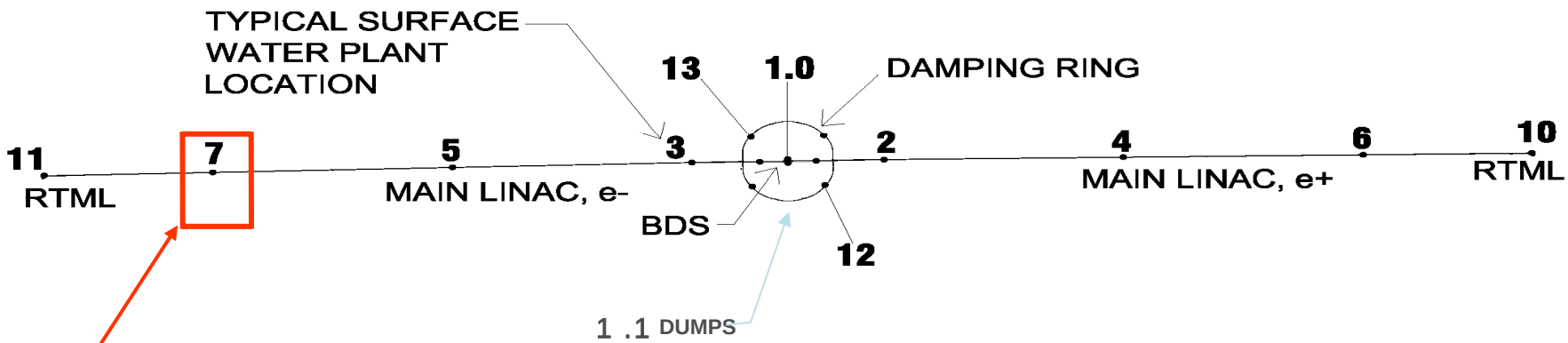


Underground work is about 74% of Civil Cost

CF&S General Assumptions for EDR Criteria

- General Considerations
  - Local Geology will Determine the Actual Shape of the Caverns
  - A "Dimensional Envelope" Needs to be Established for Each major component of e+ source system for during;
    - Installation & Maintenance
    - Commissioning & operation
  - "Dimensional Envelope" Should Include all Supporting Utility Requirements
  - Exiting Requirements Need to be Revisited from Installation, Maintenance and Operation Point of View
- Evolving Constraints and Criteria
  - Life Safety Egress Requirements
  - Construction Configuration Requirements
  - Operational Configuration Requirements
- Identification of Clear Boundaries Between CFS and Each Major Components

RDR Surface Water Plant locations

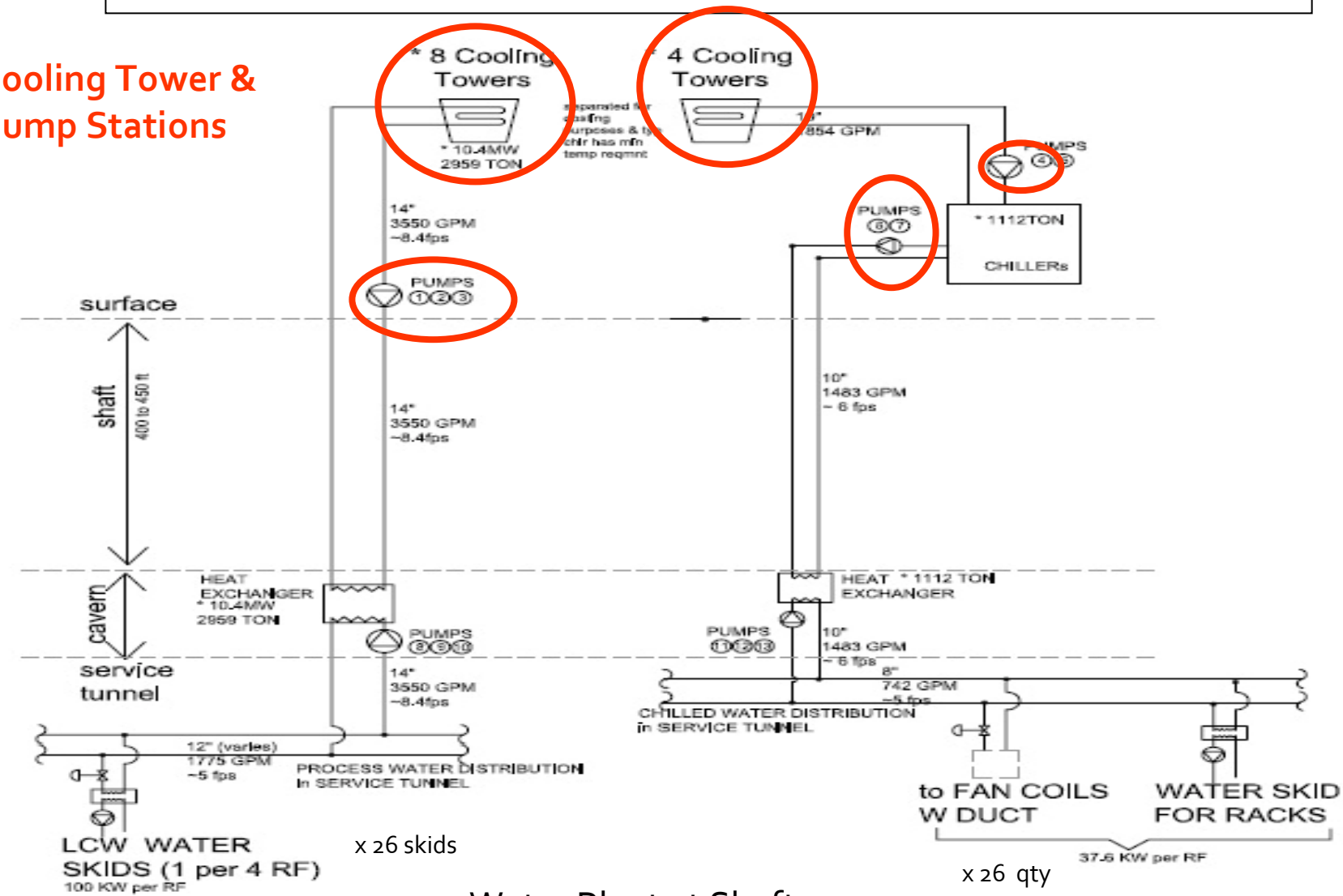


In RDR, this system at Shaft 7 serving ML, is what we used

In RDR, we used simplified distribution by Area System

RDR Process Water Schematic

Cooling Tower & Pump Stations



Water Plant at Shaft 7

RDR Process Water Concept

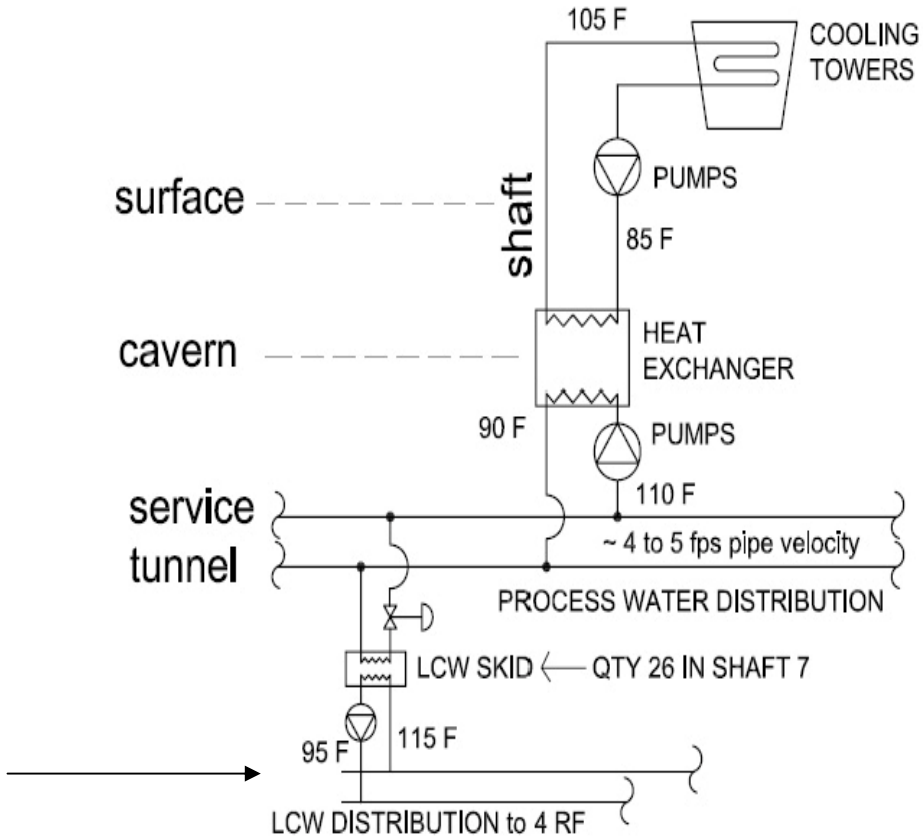
What's included

- Cooling Towers for Process Water/LCW (the chilled water is separate system)
- Pumps, surface and underground
- Heat Exchanger, LCW skid
- Piping, insulation, valves, controls and other process water accessories

What was NOT included

- Cooling tower system for Cryo

Simplified schematic based on Main Linac RF @ Shaft 7



RDR Process Water: Heat Load Basis- Total Loads

Thermal Loads used for e+ Source

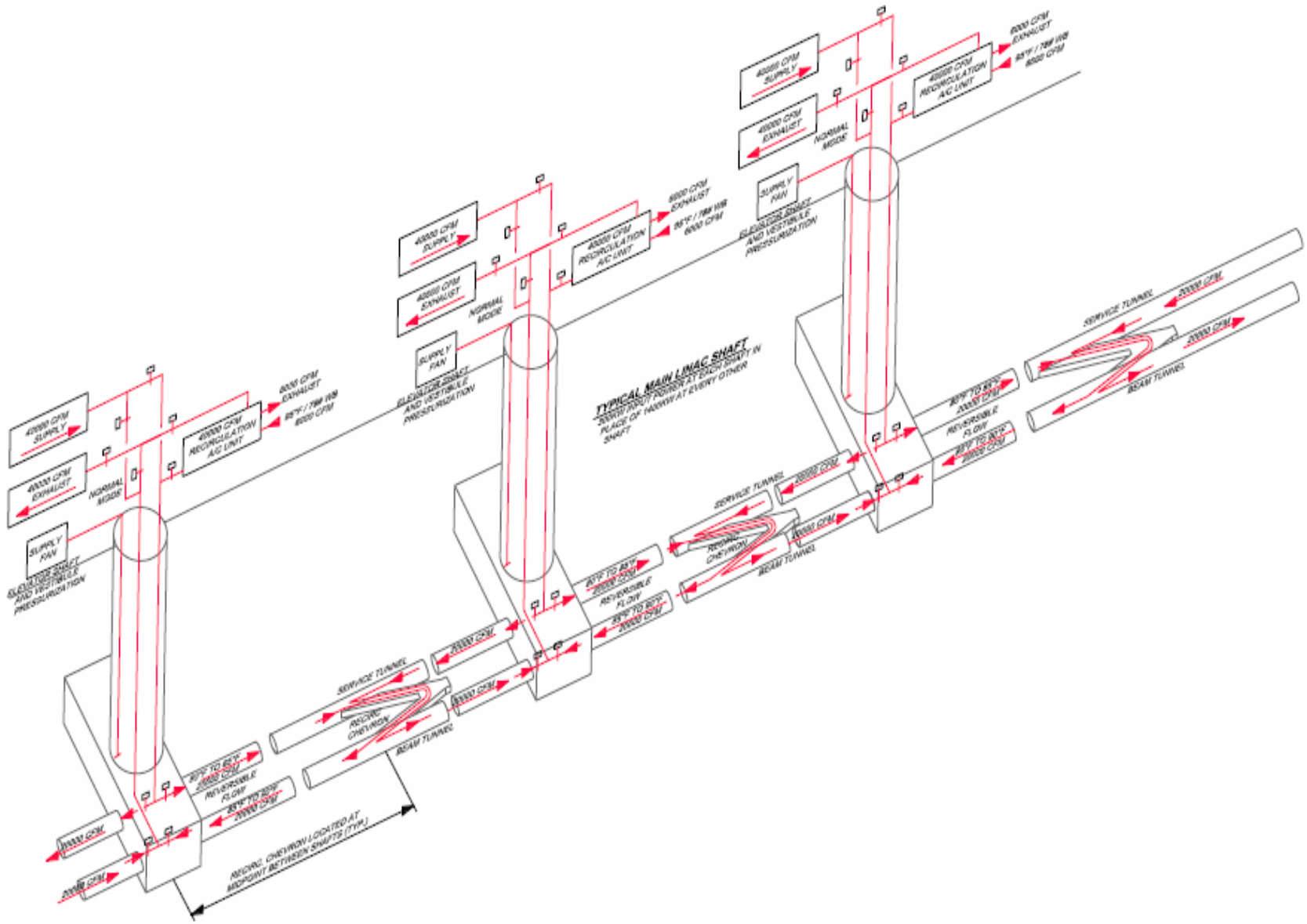
Area System	LCW	Chilled Water	**Total**
SOURCES e-	2.880	1.420	**4.300**
SOURCES e+	17.480	5.330	**22.810**
DR e-	8.838	0.924	**9.762**
DR e+	8.838	0.924	**9.762**
RTML	9.254	1.335	**10.589**
MAIN LINAC	56.000	21.056	**77.056**
BDS	10.290	0.982	**11.272**
DUMPS	36.000	0.000	**36.000**
	149.58	*31.971*	**182**

Air treatment Design Basis

- The design temperature for service and beam tunnels is 85-90F (29-32C). Air mixing fans will be used for temperature stability, possibly using process water for minor temperature adjustment.

- Used the basis that airflow could pass from the service tunnel to the beam tunnel through fire/smoke/ODH/radiation protected passages between the tunnels. This assumes that radiation/oxygen deficiency hazards (ODH) do not exist or can be mitigated between the tunnels from the standpoint of air mixing. This item needs concurrence as soon as possible.

CFS Air Treatment Layout



- **Air Treatment Components in RDR:**
  - Large air handling systems providing heating, cooling, dehumidification, humidification.
  - Fans for air purge, tunnel and shaft pressurization
  - Miscellaneous ducting and accessories, dampers, insulation, etc

- **Air treatment design is dependent on the ventilation requirements and the heat load criteria received from area system**

- **Air treatment and purge systems were not fully investigated for radiation issues**

CFS – EUROPE TECHNICAL TIME SCHEDULE

1. Presentation of Time Schedule

- *It covers all main tasks from now until second year after To.*
- *To is when the official green light is given to the project.*
- *It is tentative and based on European views (approved by the other Regions with some comments).*
- *It is a technical schedule : no delays or float is included for approval processes, political or financial negotiations…..*
- *However it is aimed at clarifying :*
  - *the logical sequence of main tasks*
  - *a clear splitting of what should be taken by ILC GDE and what will be in the hands of the bidders (if their offers include the provision of CFS works)*

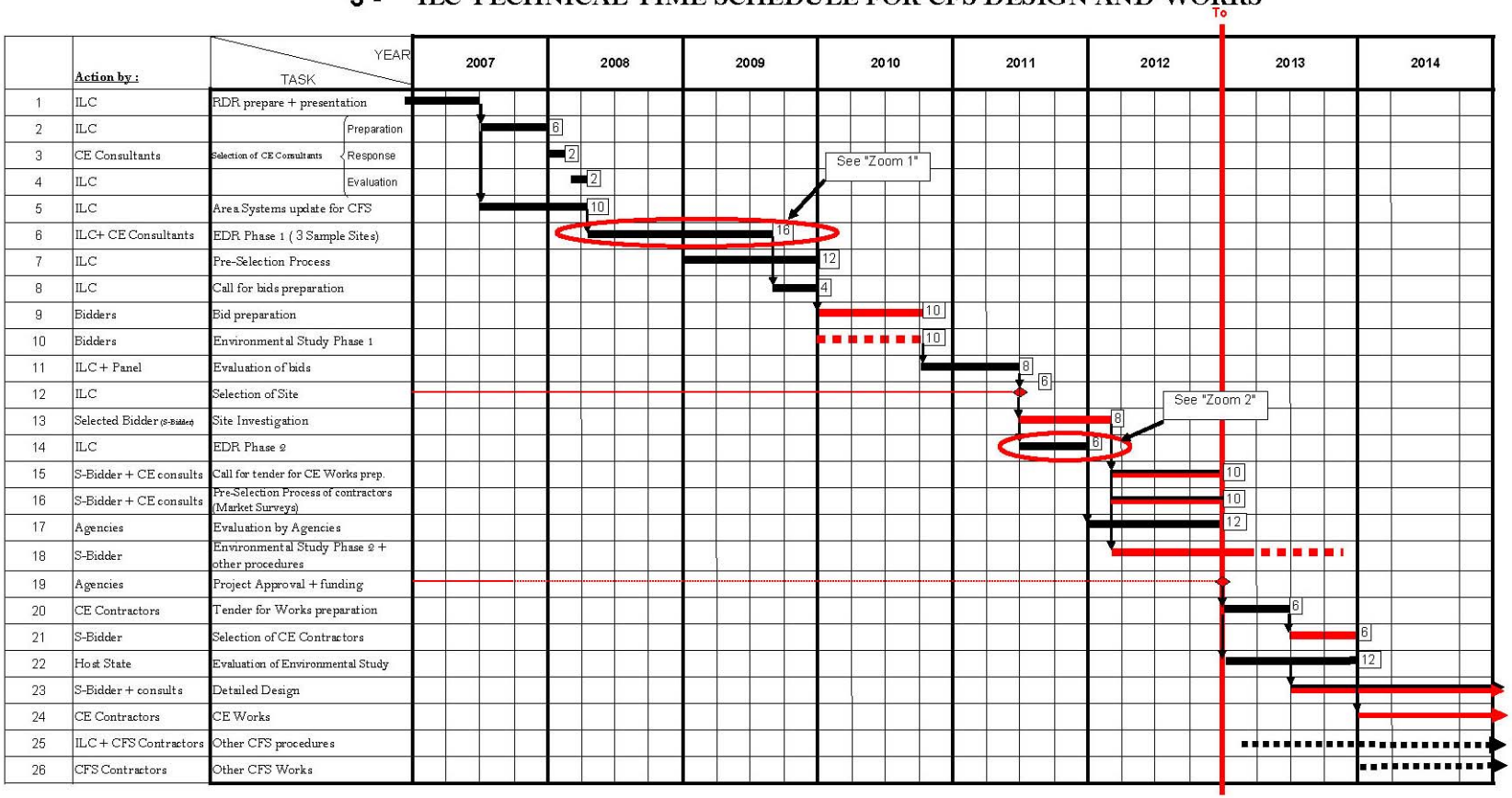
CFS – EUROPE TECHNICAL TIME SCHEDULE

2. Adopted «Philosophy»

- *Get the necessary information from the Area, technical and global systems as soon as possible (on critical path)*
- *Work as early as possible on an EDR phase 1 (3 sample sites)*
- *Use the EDR phase 1 to carry out the bidding selection process for the "final" selected site*
- *Use the selected site to carry out on EDR phase 2 (fully focused on this site)*
- *Use EDR phase 2 to seek and obtain the official green light for the project (To)*
- *Carry out the environmental studies as much as possible before To on the basis of EDR phase 1 (Bidder) and EDR phase 2 (Bidder + GDE)*

CFS – EUROPE TECHNICAL TIME SCHEDULE

3 - ILC TECHNICAL TIME SCHEDULE FOR CFS DESIGN AND WORKS



	Action by :	TASK / YEAR	2007	2008	2009	2010	2011	2012	2013	2014
1	ILC	RDR prepare + presentation								
2	ILC	Selection of CE Consultants – Preparation		6						
3	CE Consultants	Selection of CE Consultants – Response		2						
4	ILC	Selection of CE Consultants – Evaluation		2						
5	ILC	Area Systems update for CFS		10						
6	ILC+ CE Consultants	EDR Phase 1 (3 Sample Sites)		16						
7	ILC	Pre-Selection Process			12					
8	ILC	Call for bids preparation			4					
9	Bidders	Bid preparation				10				
10	Bidders	Environmental Study Phase 1				10				
11	ILC + Panel	Evaluation of bids					8			
12	ILC	Selection of Site					6			
13	Selected Bidder (S-Bidder)	Site Investigation						8		
14	ILC	EDR Phase 2						6		
15	S-Bidder + CE consults	Call for tender for CE Works prep.						10		
16	S-Bidder + CE consults	Pre-Selection Process of contractors (Market Surveys)						10		
17	Agencies	Evaluation by Agencies						12		
18	S-Bidder	Environmental Study Phase 2 + other procedures								
19	Agencies	Project Approval + funding								
20	CE Contractors	Tender for Works preparation							6	
21	S-Bidder	Selection of CE Contractors							6	
22	Host State	Evaluation of Environmental Study							12	
23	S-Bidder + consults	Detailed Design								
24	CE Contractors	CE Works								
25	ILC + CFS Contractors	Other CFS procedures								
26	CFS Contractors	Other CFS Works								

Notes : 1.The mentioned 'Actions by bidder(s)' assumes that the selected Host State manages and provides the financing for (at least) the CE Works in its bid to host. These Actions are highlighted in RED.

2.Line 11 : Panel of internationally recognised experts will have to be set up to evaluate the bids, rank them and propose a "winner".

3.Overall management by ILC-GDE-CFS teams which will be necessary at various levels is not systematically mentioned in the action column.

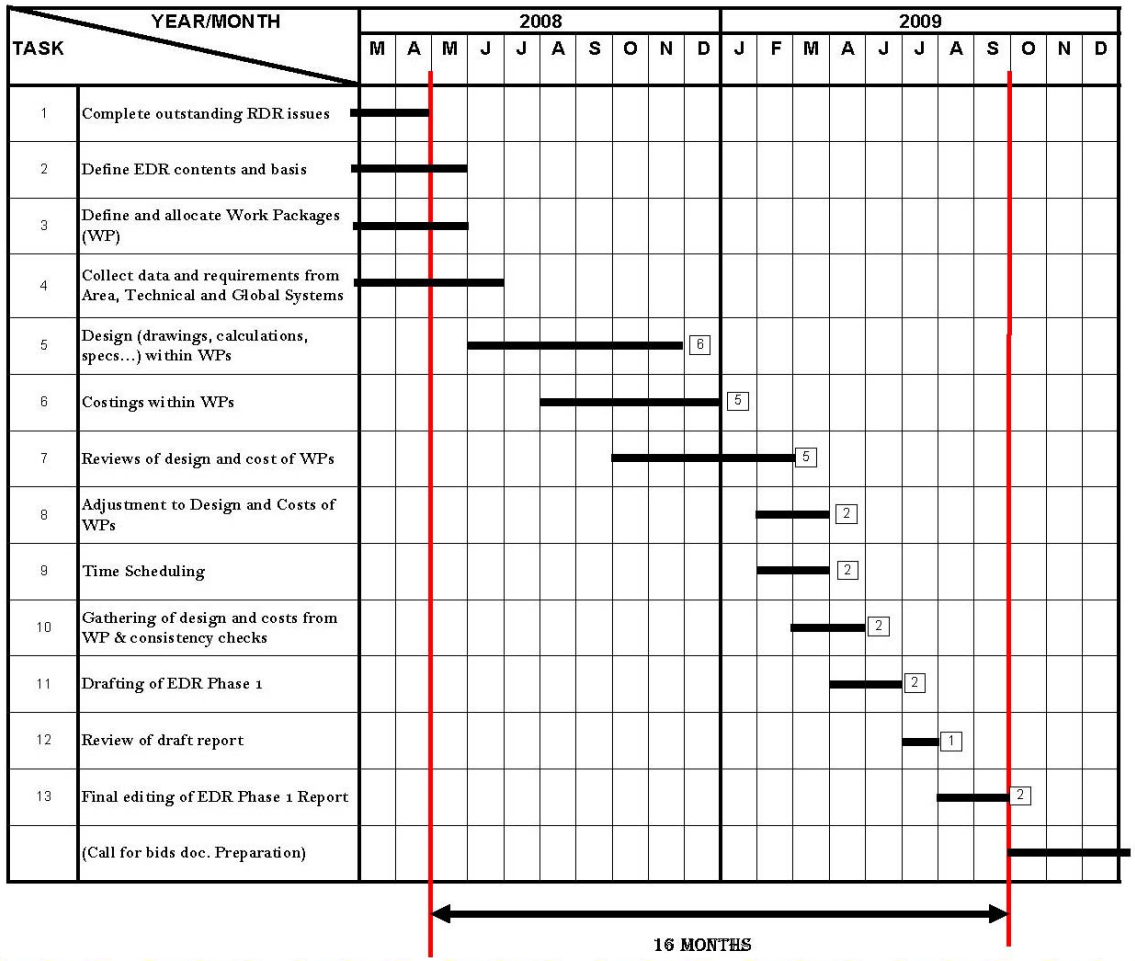
4. Provided that the overall time span of 7 years from To for construction works and installation is confirmed, this schedule implies start of commissioning at the end of 2019.

CFS Europe - 2 July 2007

CFS – EUROPE TECHNICAL TIME SCHEDULE

ILC TECHNICAL TIME SCHEDULE FOR CFS

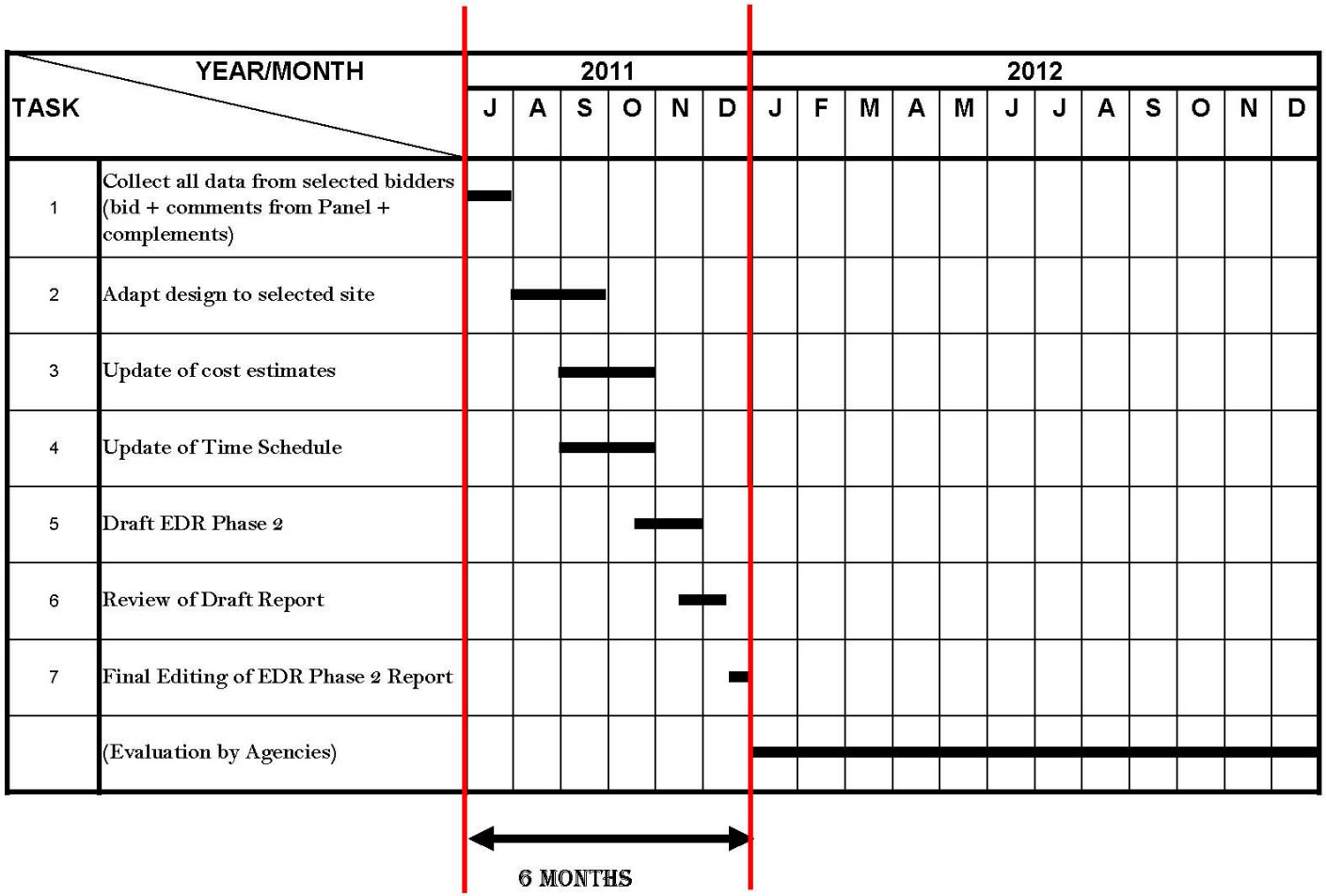
4 - ZOOM 1 - EDR PHASE 1 (3 SAMPLE SITES) - 16 MONTHS

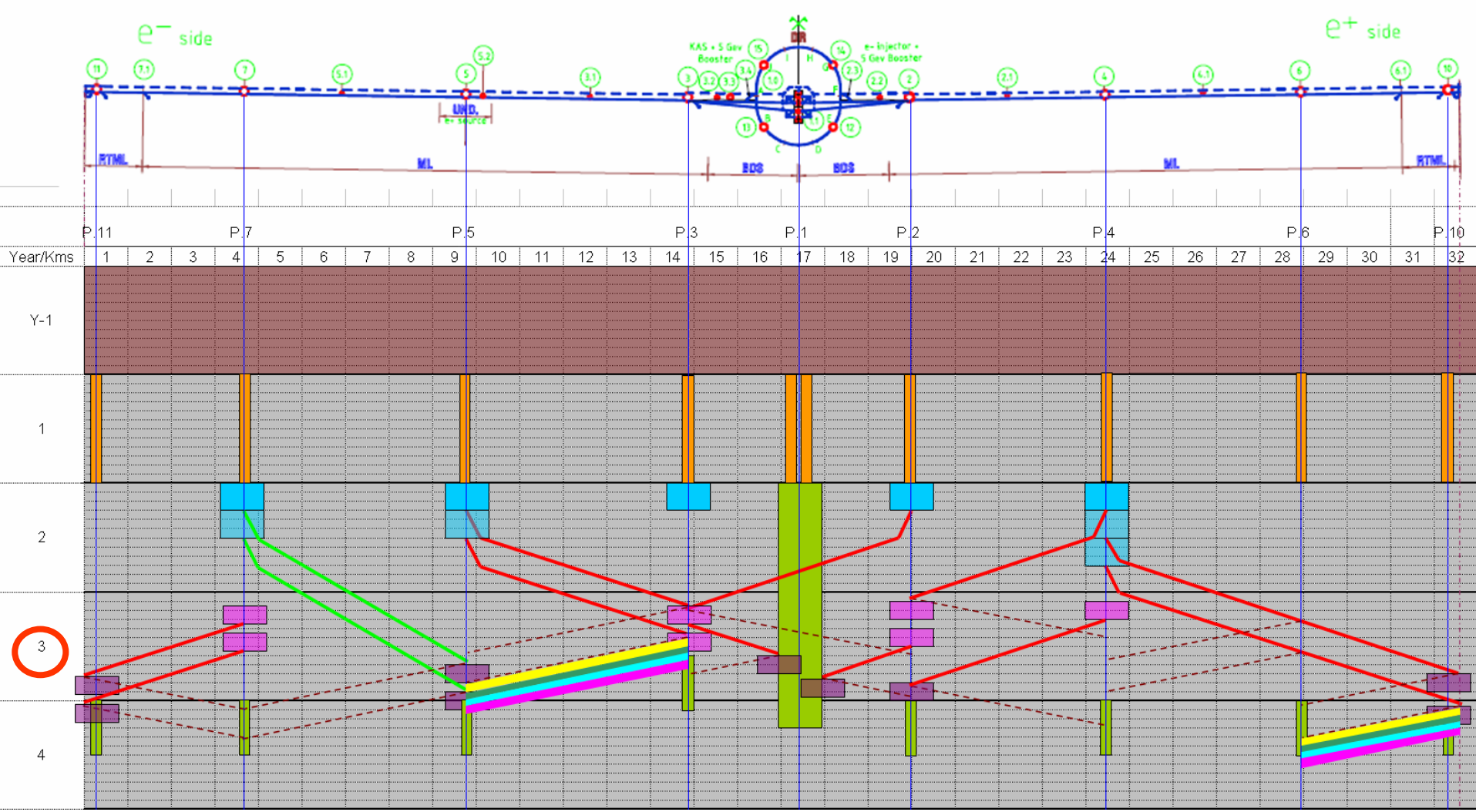


CFS – EUROPE TECHNICAL TIME SCHEDULE

ILC TECHNICAL TIME SCHEDULE FOR CFS

5 - ZOOM 2 - EDR PHASE 2 (1 SELECTED SITE) - 6 MONTHS





- Cable trays + pipes supports
- CV pipes
- EL cables + connection
- Lighting + sockets

Draft CFS Construction Planning

Extract from Valencia 06 by M.Gastal