NOTE

Einstein Telescope

To:	*Writing Group ETO-Civil Engineering Roadmap for Phase 1- J. Bratanata, Nikhef / M. Marsella, INFN*
From:	*ET-EMR PO / POD*
Subject:	*Review draft version 1.0 proposal*

INTRODUCTION

We received the above mentioned draft version 1 by mail on November 7th, with de invitation to give comments before 19 November 2024.

ET-EMR PO is pleased to take advantage of this opportunity. General comments are included in this review document. The time to respond was short. ET-EMR PO does not rule out further comments coming into the picture later. The ET-EMR PO would like to keep space to still submit those comments.

Note: the WBS-document referred to in the draft version is not available for ET-EMR PO. ET-EMR PO cannot comment on the "Corresponding WBS Element" column.

REVIEW RESULTS IN GENERAL

ET-EMR PO is very pleased that the necessary initiative for this roadmap has been taken. There are some crucial issues that the EMR region is calling attention to.

Issue on ***'master planning'*** (planning across all institutions and responsibilities).

- In order to create parts 3.3 to 3.6 as a Local Team, prerequisites/input are needed from the deliverables of part 3.1.1 and 3.7. Deliverables from 3.1.1 and 3.7 must be ahead in time. The Target Delivery Date for 3.7 should be no later than Q3 2025 and actually as soon as possible from today.
- In this draft version, the Delivery Date is at the same time as sections 3.3 through 3.6. This inconsistency leads to an unfeasible 'master planning'. If – as an example - ET baseline civil infra layout from ETO is 2026, then bid book EMR should be somewhere in 2027 to allow modifications on ETO baseline in Q4 2026.
- This also requires that the ambition from §3.7.7 should be concept design instead of preliminary design.
- Another not unimportant point in that regard is that in the opinion of the EMR, the Target Delivery Date of 07/2026 for cost estimation and scheduling leaves no more room for adjustments in the TETI and EMR documents.
- Finally, the overall schedule does not allow for political decision-making within the EMR region on the final bid book.

Issue on ***layout***.

- EMR product and process planning is based on a triangle layout. For this, EMR needs time through Q4 2026, as also indicated in the various target delivery dates. The available budget is limited to the work in the defined product and process planning. Adding a 2L layout cannot be done without additional lead time and additional resources (budget, staff capacity). There is no certainty or perspective on these additional resources yet.
- EMR-LT still needs time to determine its boundary conditions and capabilities, and with that financial consequences. Additional drillings, noise measurements, studies on logistics, studies on civil engineering and studies on environmental impacts will soon amount to € 6 mln, according to rough estimates.
- In this draft version ETO asks a report about the position/location of underground design of both the triangle and 2L (§ 3.3.1). It is important to note, that currently the request to report on a 2L configuration does not fit within the scope, resources and lead time of ET-EMR PO.

The EMR-PO directorate cannot independently change this scope and will have to seek approval from its own client (i.e. the Taskforce ET-EMR, to whom this authority is delegated by the ET EMR Ministers). In order to set this possible scope change in motion ET-EMR needs to receive an official request from ETO to address the 2L configuration as defined in ETO's Roadmap document. If this ETO request is not received ultimately Q4 2024 it will be unrealistic to fit the scope change into the current product and process planning for the year 2025/2026, resulting in a longer lead time of approximately one year.

Issue on ***dependencies***.

- Delivery of deliverables for Local Teams, among others, depends on formulated prerequisites/input. The process planning of these prerequisites/inputs is not transparent and clear.
- Nor is it clear in the document what substantive input can be expected.
- For example: 3.2.1 This deliverable is very general. Input to be expected from WP4 is not clear.

This makes the reality value of a Target Delivery Date uncertain and makes process control quite unpredictable.

Issue on ***level of detail*** for a feasibility phase.

- Central question is: why delivering so many drawings and models for a feasibility study? It costs a lot of money and brings a very limited added value for the feasibility phase. Examples:
  - §3.1 a model-based analysis method.
  - §3.7.1 Cooling and ventilation: description is very detailed for a feasibility study. What is the point? CFD simulations! Some demands are typical for detailed design.
  - §3.7.2 Electrical engineering: description is very detailed for a feasibility study. What is the point? Some demands are typical for detailed design, not for a concept design.
- Report referred to in §3.3.1 is too detailed for the feasibility phase, referring to the contents of footnote no. 7. It is not feasible in the administrative/official process to visualize and meet all local government requirements. Nor can all risk management measures be depicted. The level of detail described is in the starting period of the construction phase.
- §3.5.5 EIA (Environmental Impact Assessment). An Environmental Risk Assessment as mentioned in §3.5.7. can be prepared. An exhaustive EIA as being a report is not feasible for the feasibility phase: (1) detailed project features (construction, exploitation) are not available on sufficient detail level and (2) EIA requires to follow a legal procedure, following the European, national and regional standards, to may be approved an that will take more time than Q4 2026. We suggest at least to scope and list in detail all the relevant environmental impacts, without deeply assessing the impacts, unless for certain environmental impacts a detailed impact assessment is mandatory or is determined as a possible showstopper. In that case detailed assessment can provide us detailed information to mitigate the plans or providing satisfying compensation measurements. An overall EIA will only be provided after the decision in Q4 of 2026.

Issue on ***safety and security***

- ETO seems to see safety and security as a site dependent aspect while it probably will be site independent. ETO should formulate demands in relationship with these topics that should be followed by both EMR as TETI.

- By formulating 'LTs to adjust for local solution/layout' it seems that issues as §3.7.3 Access and alarms / §3.7.4 Health & Safety are presented as an site dependent aspect. It should be posed as a requirement or starting point from ETO towards EMR and TETI.

SUGGESTIONS AND OTHER POINTS OF INTEREST

EPM-PO presents some suggestions.

- Suggesting a slightly different split up of topics (more chronological + different expertise), certainly if this becomes the basis for WBS:
  1. Standards and Formats for Site Studies
  2. Safety and security plan
  3. Technical studies for subsurface assessment (incl noise probability)
  4. Facility Infrastructure Design and Construction Feasibility Assessment (incl noise mitigation)
  5. Technical Installations (could also be part of Facility infrastructure design - previous point)
  6. Environmental impact assessment, permits (GRUP)
  7. Risk analysis
  8. Cost and Time Estimation
- §3.2 Delete "Risk analysis" in the title and make it a separate chapter as RI&E and even risk mitigation is more part of a general overview in the end and related to all aspects, not only subsoil. Risks should be better combined in a separate chapter as expected interference between disciplines. At this phase it is only top-level analysis.
- §3.3.2. Conceptual design of surface structures needs requirements needed from ETO on safety, water ingress allowance and landscape integration.
- §3.3.3 "Optimized Construction solutions "are typically taking place between detailed design and execution phase. What is the objective here? Is it not better to speak of a range of possible construction solutions that are to be defined after site selection.
- §3.7 If a separate chapter for this is needed (could join civil and technical installations could be joined under "Facility Infrastructure"), it would be better changing the wording to "Technical Installations" rather than Infrastructure.
- Appendix 5.1: Timing seems not correct for Facility Infrastructure. Facility infrastructure (civil engineering for ETO) has its assessment phase until end of 2025 and concept design phase in 2026. ET-EMR PO can deliver an update.

QUESTIONS

ET-EMR PO has some questions about the draft version:

1. What is ETO's timeline for adoption of the Roadmap?
2. §3.5.9 Long term assessment and sustainability plan has as responsible unit ETO, but the LT's in the column 'Target delivery date'. So is this a local or ETO deliverable?
3. Technical infrastructure (underground and surface) deliverables §3.7.1 - §3.7.7, column 'Intermediate actions' (LTs adjust for local solution/layout): what input is expected from the local teams here and how do these components affect the layout of the local site?

FINALLY: INVITATION

ET-EMR PO invites the authors and/or other representatives of ETO for a meeting to discuss the comments and more specifically the (formulation of) EMR Deliverables.