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Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Deliverable 1.1

Dissemination and Exploitation Plan

Lead beneficiary: IFAE
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EXECUTIVE SUMMARY

This document, D1.1 Data Dissemination and Exploitation Plan (DEP), is a deliverable of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696. ET-PP Dissemination actions aim at communicating project results to scientific, industrial and socio-political stakeholders. The execution of this plan will be continually monitored during the lifecycle of the project. In this sense, this is a living document that will develop through the project and it will change in accordance with the needs of the dissemination and exploitation process.

List of acronyms and abbreviations

DEP Dissemination and Exploitation Plan

DMP Data Management Plan

WP Work Package

CA Consortium Agreement

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1. Introduction

The Einstein Telescope (ET) is a proposed gravitational wave (GW) observatory of new generation. GWs are opening a new window on the cosmos that can revolutionize humanity's understanding of the universe up to cosmological distances and unlock unexplored territories of extreme physical conditions that no experiment on Earth can ever provide. ET has the ambitious mission to push the limits of our ability to detect GWs and learn more about the evolution of our Universe back to its earliest form right after the Big Bang. Based on well proven and experimentally tested concepts, ET will exploit cutting-edge technologies and push them to their physical limits. It combines the well-proven technologies from the current advanced LIGO and Virgo detectors with beyond-state-of-the-art systems planned for the next evolution stage of the advanced detectors, in an infrastructure designed to accommodate several technology upgrades over many decades.

2. Goals and objectives

The main objective of this ET-PP project is to support crucial items in the preparatory phase of ET including: the enlargement of the ET consortium, the legal framework, governance schemes, and financial regulations under which the ET Research Infrastructure will be constructed and operated; the technical design and costing of the ET observatory; the preparation of the site selection, where ET will be deployed, detailing and cost-estimation of the required site infrastructure, and its socio-economic and environmental impacts; the schemes for technology transfer, procurement and industry involvement in the technical design and construction of ET; and the required linking with relevant science communities regarding the detailed definition of the science program, and the user services and data access model.

The ET-PP project via the dedicated work package WP10 - Education, Outreach and Citizen Engagement - has the mandate to strategize the promotion to the widest possible audience of the game-changing scientific potential of ET for astronomy, cosmology and fundamental physics. It will coordinate across all member countries of our Consortium to design a dissemination plan and a set of educational and promotional materials to bring the scientific

vision of the ET research infrastructure to all relevant stakeholders - including other scientists, journalists, politicians and policy makers, industry leaders, school and university students and the general public.

A proper communication strategy for ET will be central in keeping the community and the public informed and convinced and engaged with consistent messaging; seeking financial support from political leaders in Europe; securing broad long-term support in all areas; and in getting the best people involved. ET-PP communications experts will help to identify suitable content for communications, draw attention to pitfalls and consult in all areas of reaching out to the target audiences.

The purpose of this document is to present the dissemination, exploitation and communication plans of ET-PP in detail, listing the foreseen activities. The Project Coordination within WP1 is responsible for ensuring that the different activities described herein are performed within the consortium, and will contribute globally to increase the social awareness of the ET project.

3. Dissemination actions

Our dissemination actions aim to establish critical mass and commitment from strategic stakeholders through a lean and efficient plan. Results from project activities will be disseminated to the widest possible community through various channels and instruments. External participation and knowledge sharing will be encouraged through networking activities and events aimed at increasing the impact potential and at enriching the scientific and industry contribution to the project.

- Dissemination to Scientific Community
    - Scientific publications

Journal articles are one of the most efficient dissemination tools to attract the interest of the scientific community in academia. The consortium partners will identify peer-reviewed journals to which papers can be submitted following Open Access policy. We will always choose gold open access, if available; otherwise (or simultaneously) we will default to a green option, using each partner's own open repository, and the community's arXiv.org.

The Data Management Plan (D1.2) describes the lifecycle for all data sets collected, processed and generated by ET-PP in D1.2. The DMP will evolve along the project, outlining how data will be handled during and after the project, and what data will be collected and following what methodology and what standards, and whether it will be made open and how it will be preserved. The DMP is part of WP1.

The ET-PP website will list the publications and provide links to the repositories and their related open data if applicable.

    - Dissertations and conferences

Academic conferences or symposiums are ideal venues to present and discuss results. They provide an important channel for information exchange between researchers. Partners within ET-PP are committed to attend the most relevant conferences and promote the results of the project through oral talks and/or posters. Conferences will also be a vehicle to increase the networking with other partners and stakeholders interested in the ET technologies.

The ET-PP website will list the conferences organized by the consortium.

    - Workshops

Annual workshops will be organized to promote awareness of ET-PP objectives and to report on results from the ET Organisation and the ET Collaboration. Seminars, oral presentations, and poster sessions will be included to facilitate maximum sharing of knowledge. Researchers

outside the consortium and other important actors (industrial sector, policy makers and European Commission representatives) will be invited to attend.

The ET-PP website will list the workshops organized by the consortium.

- Communication to Policy Makers and Industrial sector

The ET-PP consortium members will identify and participate in relevant industrial fairs, for instance: Big Science Business Forum, etc. Participation in industrial fairs will allow the consortium to promote the project's technology and establish contacts with companies and stakeholders to gather their feedback.

Guidelines for intention of dissemination of results

As stated in the CA, any partner willing to disseminate results of the project by any of the means stated in this document or any other channel must give advance notice to the rest of beneficiaries at least 21 days in advance, together with sufficient information on the results it will disseminate.

Any objection to the planned publication shall be made in writing to the Coordinator and to the Participant or Participants proposing the dissemination within 14 calendar days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted. The information facilitated by the partner/partners willing to disseminate certain results will be carefully examined by the Project Coordinator. This information must contain sufficient details as to fully understand the extent of the results intended to be disseminated to be able to evaluate whether protection of the results is needed prior to dissemination.

4. Communication tools and activities

The specific objectives of the communication plan are to spread the project knowledge, promote the project outcomes, disclose the progress and the results, and increase the public awareness involving youngsters and students in science and physics events. The communication target audiences are divided in the following groups: Consortium members, scientific community, industrial stakeholders, other related projects and platforms, EC and policy makers, general public and students.

- Communication tools
    - Project logo and visual identity

The ET logo has been adopted to advertise the ET-PP project. The ET logo is the visual element that represents the project and promotes instant public recognition. The visual identity is included in business cards, letter envelopes, corporate folios, document folders, poster templates, and presentation templates including the cover, base document and back cover.

    - ET-PP and ET websites

The ET-PP website has been published under the following url: https://www.etpp.ifae.es.

The website is the main online communication tool of the project. It contains information on the project, the consortium and its members, the project achievements, and its activities. This information is addressed to all sorts of audiences, from scientists and industrial researchers to the general public.

One of the deliverables of ET-PP project under the responsibility of work package WP10 is the definition of the official ET website including information about the ET Organization and ET Collaboration. For the latter, there is already a working version of the ET Collaboration website with url: https://www.et-gw.eu/.

- Social networks

Social networks will be used to promote the content of the project's webpage, related projects and relevant news. We will use partners´ social media accounts to deliver project news and updates.

- Templates and branding elements

Templates for word documents, presentation slides, posters, etc., containing layout and styles used to create standardized documents have been designed to ensure a unified corporate image, this document being an example.

- Educational Communication: outreach activities

In addition to the communication tools described above, outreach activities within the framework of the ET Collaboration will also be developed to increase public engagement. The major goal of the outreach activities will be to attract the younger generations to the scientific careers and communicate the advances in the ET project.

The ET-PP partners will participate in activities of public outreach and education to disseminate the project outcomes, such as open-public events and science fairs.

In addition to these identified actions, all partners are encouraged to propose new ones. Finally, joint actions are also envisaged during the consortium official meetings and the project's workshops, such as: conferences open to the general public, special lectures for graduate students and postdoctoral researchers, demonstration experiments, etc.

5. Exploitation actions

Project partners will strive to identify the strongest project exploitation potential at the level of each partner and of the project partnership as a whole, in order to support the development of their current activities, and to possibly enable the launch of new ones. Details concerning access rights for exploitation to background and results, including possible patentability are included in the Consortium Agreement.

- Intellectual Property Management

The research carried out during ET-PP will generate significant intellectual property. In order to ensure further and extended industrial and commercial use of the results, the protection of intellectual property rights is a crucial task. This topic has been addressed in the Consortium Agreement, which is based on the standard DESCA model.

- Knowledge Management and Protection Strategy

The most appropriate process of capturing, developing, sharing, and effectively using organizational knowledge will be defined by the Project Coordinator according to the measures imposed by the pilot on Open Research Data. As stated in the ET-PP data Management Plan The project's repository, IFAE's corporative google drive, will be a paramount tool for information sharing and knowledge management amongst the members of this consortium. The repository will contain all the information and documents generated as a result of this action, including progress reports, deliverables, formal reports corresponding to each of the reporting periods, minutes of the project board meetings, work package leaders' meetings, etc. The consortium members will be notified by e-mail when an important document is uploaded to the repository.

The ET-PP website will publish those documents that will be made public.

6. Partners responsibilities

All partners must contribute to public engagement and communicate the results of the project to society. Partners must use the ET project's logo and EU emblem in all their communications and outreach activities.

IFAE is the WP Leader of the WP1, Project Management and Coordination. Therefore, regarding the communication plan, IFAE will be in charge of:

- Managing and updating the webpage, intranet and social networks related to ET-PP.
- Collecting, evaluating and archiving press releases, communication and outreach activities developed during ET-PP.
- WP deliverables preparation.
- Informing consortium members about important aspects related to this WP.

In addition, each partner will have their own responsibilities:

- To prepare 6-month progress reports where communication and outreach activities, dissemination and exploitation will be included when relevant.
- To inform and send the coordinator the press releases managed by their institution.
- To keep a fluent communication with the project coordinator and, whenever possible, provide information and graphical material (such as pictures, posters, leaflets, etc.) of any activities developed within the framework of the project.

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Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Deliverable 1.2

Data Management Plan

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EXECUTIVE SUMMARY

This document, D1.2 Data Management Plan (DMP), is a deliverable of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696. This first version provides an analysis of the data management policy that will be used by the partners of the ET-PP Consortium with regard to the data that will be produced, collected and processed during the lifecycle of the project. The DMP is intended to be a living document in which information can be made available through updates as the implementation of the project progresses and when significant changes occur.

List of acronyms and abbreviations

DMP- Data Management Plan

CSV - Comma-Separated Values

TXT - Text

HDF5 - Hierarchical Data Format 5

TB - Terabyte

FAIR - Findable, Accessible, Interoperable, Reusable

JPG - Joint Photographic Group

PNG - Portable Network Graphics

PDF - Portable Data Format

DOC - Microsoft Windows Document Format

SVG - Scalable Vector Graphics

DOI - Digital Object Identifier

XML - Extensible Markup Language

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1. Data Summary

The ET-PP project aims to address fundamental aspects for the successful construction and operation of the Einstein Telescope, in its preparatory phase. The output results of the project will be delivered mainly as documents, that will be the reference for the next phases of the setup of the Einstein Telescope instrument and related supporting structures for its operation.

The project will reuse publications, studies and related data produced by the ET Collaboration. The deliverables of the ET-PP project (www.etpp.ifae.es) include public and non-public documents, with the datasets produced or collected to support the documents content. Website contents will be published in the ET-PP web page, including relevant information about the Einstein Telescope preparatory phase. The dissemination material produced during the project activities will be described in the Dissemination Plan documents (D1.1, D10.1 and D10.4). Therefore, at this stage of the project, they will not be treated in detail in this initial DMP.

The expected size of the data is not currently known, but it is likely to be less than 1 TB in total. In future versions of the DMP, once the project starts to generate results, we will expand on the characteristics of the data.

2. FAIR data

2.1. Making data findable, including provisions for metadata

The public data repositories of the ET-PP project will be ET Technical Documentation System (TDS) at EGO, and the Engineering & Equipment Data Management Service (EDMS) at CERN. The two systems are well suited to guarantee the findability of the project data and documentation. We will create an "ET-INFRA-DEV" community and all the datasets and documents uploaded by the partners will be attached to this community. The repositories will provide DOIs for persistent identification with a unique URL for direct access.

The generic metadata will follow the DataCite standard, linking the data to researchers, publications, providing descriptions and licensing, and will provide specific keywords. For specific metadata the project will adopt the discipline standard, referencing the existing ontology and vocabulary.

Non-public data supporting confidential documentation will be stored in local repositories whenever needed. Details about the storage of this data will be documented in future versions of the DMP.

2.2. Making data openly accessible

All of the data associated with scientific publications will be made openly available at the time of publication by default, If there is a specific reason not to publish the data, data will be retained and properly motivated. Datasets which cannot be openly shared, may be made available on a case-by-case basis if it is relevant for third parties.

Once processing, quality control, organization, analysis and publication are complete, the data and associated metadata, documentation and code will be made accessible by deposition in the EGO TDS and CERN EDMS open access repositories under the ET-INFRA-DEV community. Links from the ET-PP website will be provided.

2.3. Making data interoperable

The data produced in the project will be interoperable. The datasets will adhere to standardized formats: .txt, .csv, .hdf5, .xml, .jpg, .png, .pdf, .doc.

A standard vocabulary, properly referred, will be used in all documents, with specific reference to the standard of the disciplines (scientific instrumentation, civil engineering, geology, computing, etc.) covered by each document and dataset.

2.4. Increase data re-use (through clarifying licenses)

Wherever possible, the data will be shared right after production following the Creative Commons 4.0 International License with Attribution (CC4BY). Experimental test data

will in some cases only become available after the end of the project or publication of the results, whatever comes first, and will be shared by the same CC4BY license.

Data collected under this project will be made available for reuse upon publication of the results. For reasons of competitive advantages, a data embargo may apply and be properly justified.

The data will remain reusable until EGO and CERN discontinue the dataset(s) (i.e. warrantied for a minimum of 20 years).

Software produced for the production of the project results will be made available following as much as possible the best practices established by the CERN and EGO communities. They will be specified in the next versions of this DMP.

3. Allocation of resources

There are no costs associated with the described mechanisms to make the database FAIR and long term preserved because EGO TDS and CERN EDMS have no cost for the expected volume of the ET-PP datasets. For in-house back-ups there are no costs expected but, if there are any, they will be covered by ET-PP during the duration of the project, and they may be covered by the respective research centers beyond the project. Within the ET-PP structure, the Coordinator of the project will be responsible to guarantee the documentation is complete and properly placed in the data repositories.

Each partner has to respect the policies set out in this DMP. Datasets have to be created, managed and stored appropriately and in line with applicable legislation. Each partner's PI will be responsible to ensure the DMP policies are being carried out. Backing up data for sharing through open access repositories is the responsibility of the partner possessing the data.

4. Data Security

The procedure in which the data will be generated and stored prior to publication will be detailed at a later stage by each ET-PP partner individually and will be documented in this section.

As described in section 2.1, published data will be stored in the EGO TDS and CERN EDMS platforms. Data not connected to publications will be stored locally by each partner following the procedures outlined in a future version of this section. Currently, the preliminary plan for ensuring data security involves using an institutional data center (EGO, CERN, PIC in the case of IFAE, a University library in case of academic partners, as examples).

Webinars related to data security and storage will be attended at least once a year by a member of one of the consortium partners in order to report to the rest of partners in order to keep raising awareness on data privacy and security. In all cases where personal data will be collected for organization or dissemination activities (like participants personal data, photos or videos), all data treatment will be GDPR compliant.

5. Ethical Aspects

All the activities carried out under the ET-PP project comply with ethical principles and relevant national, EU and international legislation, for example the Charter of Fundamental Rights of the European Union and the European Convention on Human Rights. The tasks for ET-PP only concern basic research activities and the project does not involve humans, animals or cells.

Activities that may have ethical implications (for example the environmental and societal impact of the ET installations) will be identified and properly tackled by the work packages individually, whenever necessary. In a later version of this DMP, they will be resumed in this section.

6. Other Issues

As well as European Commission policies on open data management, Project Partners will also adhere to their own institutional policies and procedures for data management.

7. Further support in developing this DMP

● Data Management in the context of H2020:

http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/data-management_en.htm

● Guidelines on Data Management & FAIR data principles under H2020 OA policy: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/

oa_pilot/h2020-hi -oa-data-mgt_en.pdf

● The Open Research Data (ORD) Pilot in H2020:

https://www.openaire.eu/what-is-the-open-research-data-pilot

● OpenAIRE Guidelines for Literature Repositories, Data Archives, and CRIS Managers based on CERIF-XML: https://guidelines.openaire.eu/en/latest

● ET-PP website : https://etpp.ifae.es

Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Work package 2 (WP2) Organization, Governance and Legal Aspects

Deliverable 2.1

Viable options for ET legal entity

Lead beneficiary: Nikhef
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v 1.0	6 November 2023	Miriam Roelofs	Revision including all partners' contributions. Final approval by coordinator Mario Martínez (IFAE)

Objective WP2

This work package focuses on issues related to potential options for the organization, governance and legal for the construction, operation, and decommissioning of the proposed Einstein Telescope Observatory. The main goal of this work package is to provide all necessary input for the political processes related to legal entity, governance and site selection process. The main deliverables include the preparation of the documents for the legal entity and governance model. Here the main principle will be that structure follows function and this requires close cooperation between scientific, technical, legal and financial experts as well as governments investing in ETO in order to allow a stable and fruitful long-term operation of the facility.

Aim of the paper

This document, D2.1, is a deliverable of WP2 of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696. This report will represent the current status of governance options for ETO. This report is a key deliverable and can provide information for the Board of Government Representatives (BGR) in their deliberations on the right path forward for the governance of ETO. This report represents our analysis and thinking until September 2023.

Inhoud

Introduction

1) Description ET

The Einstein Telescope (ET) will be the European Third-Generation Gravitational Wave (3G GW) Observatory, a multi-detector, multi-interferometer designed to observe the whole Universe. Thanks to the unprecedented sensitivity of ET, Europe will be able to take the lead in the new era of multi-messenger astronomy by combining information delivered by ET with optical, IR, UV, gamma, cosmic ray and neutrino telescopes observations. ET, being a unique tool to investigate the space-time fabric of the Universe, will impact on our fundamental physics knowledge, and our understanding of the fundamental interactions governing the evolution of blackholes and neutron stars. The technologies needed for ET will affect industrial sectors, like lasers, sensors, optics, seismic isolation, and materials, and will drive innovations in these areas as scientists and engineers push the boundaries of what is possible.

2) List of Acronyms and Abbreviations

ET — Einstein Telescope
ETC — Einstein Telescope Collaboration
ETO — Einstein Telescope Organisation
ET-PP — Einstein Telescope Preparatory Phase - EC Grant Agreement agreement 101079696
BGR — ET Board of Governmental Representatives
BSR— ET Board of Scientific Representatives
ET Coordinators — Coordinators of the ET ESFRI project
ET Directorate — Directors of the ETO
INFN — Instituto Nazionale di Fisica Nucleare
Nikhef — Nationaal instituut voor subatomaire fysica
STFC — Science and Technology Facilities Council
EGO — European Gravitational Observatory
VIRGO — Virgo Experiment
ERIC — European Research Infrastructure Consortium
IGO — Intergovernmental Organization
CTAO — CTA Observatory
ESS — European Spallation Source
SKA — Square Kilometre Array
CERN- European Organisation for Nuclear Research
VCLT - Vienna Convention on the Law of Treaties

3) Current organization ETO

The line of hierarchy in the ETO consists of a Board of Governmental Representatives (BGR), two ET ESFRI Coordinators and two ET Directors and the coordinator of the INFRADEV project. The line of hierarchy has been established with the BGR Terms of Reference (**annex I**) and the Mandate for the ET Project directors (**annex II**). The ET Collaboration has organized itself and is governed with Bylaws.

The ET BGR serves as an interim entity to bridge the present situation until in the future a more formalized governing structure is established. The ET BGR is representing the countries potentially interested in joining the activities for setting up the Einstein Telescope. The ET ESFRI Project Coordinators (ET Coordinators), the President of the INFN and the Director of Nikhef, are in charge and responsible for the creation of the organisation of the ET Research Infrastructure.

The ET Directors are mandated to set up and manage the organisational structure of the ETO (Phase I). The INFRA-DEV project is executed under the responsibility of the two ET Directors and the INFRADEV coordinator is a member of the ET Directorate. The ET Directors role is to align the activities of the ET Collaboration with the ETO activities.

4) Executive summary

ETO needs a legal framework that provides a legal personality and authority to act in all territories where ET is active (e.g. employing staff, executing legal contracts, etc.). A legal framework can be established under either national law or international law. In this paper, WP2 provides findings and recommendations to feed into the decision-making process of the BGR.

Legal models
Looking at legal models we differentiate the models according to national law and the models according to international law. We have adapted the mantra of 'Form follows function' as a sensible starting point for the development of an appropriate governance structure and legal framework. Starting from the current understanding of the ET characteristics, we investigated the pros and cons of the ERIC model, the International Governmental Organization and a national legal entity with international participation. WP2 also collected best practices and lessons learned from ESS, SKA, CTA, EGO and CERN and grouped some reflections in chapter 7 .

After these steps, WP2 focused on two models under international law allowing governmental participation when looking at the ET characteristics and the desired robustness: ERIC and IGO model. These two models will both provide a robust framework for the lifetime of ET. We will continue our study on these models and will make our findings available to the BGR. We also raise the notion of an intermediate entity which may need to be required in advance of the establishment of the final legal form.

In chapters 5 we will report on our analysis of the legal models and highlight the viable options for ET for the long term, in chapter 6 we set out the necessity and characteristics of an intermediate legal entity. In chapter 7 we reflect on the gathered practices and lessons learned and in chapter 8 we look ahead to the work program for the next period of our work package.

5) GOVERNANCE MODELS FOR ET

ET needs a legal framework that provides the ETO with a legal personality and authority to act in all territories where ET is active. A legal framework can be established under national law or international law.

ET working assumptions
Not all characteristics with an impact on governance are known yet (September 2023). The project, for example its operational design (instrument, offices, data centres), will be optimised during the process of developing options for a legal framework and governance. We will therefore need to make assumptions for ET about aspects such as the number of public funding partners, a procurement model, HR model, in-kind contributions, two or three candidate sites and a draft operational model. The short listing of the viable legal models is based on currently known assumptions.

Later on in the project some of the assumptions might need to be revised or adjusted and the operational model might therefore change as well. This might have an impact on the legal model preferred. We also note that the origin of funding has an impact on the selection of the available models. Public entities are only viable if the funding comes from public resources. The ERIC or an International organisation can only be established if there is a high level of political commitment at governmental level. We assume that all current BGR members will be members in the future ETO and that other members will join later.

Our current ET working assumptions with an impact on governance are listed below:

- According to the ESFRI application ET will be a single-site observatory with a Headquarter and datacenters.[1]
- ET design is an underground construction.
- Two options for hosting, both European sites with one being a cross-border site.
- The site selection procedure will be executed under the responsibility of the BGR or its successor body.
- European participants (83 institutions/10 countries).
- **ESFRI** Roadmap (5 EU countries application).
- Estimated timeline: construction readiness is 2028, start operations 2036.
- Timeline for site preparation.
- Flexible procurement policy
- Provision of exemptions of VAT and excise duties
- ET science case embedded in multi messenger network of observatories/detectors.

Governance models chosen

The governance model chosen for ET should be long standing and robust as ET is supposed to operate for 50 years. Looking at the legal models we differentiate distinct, the models according to national law and the models according to international law. International law is an independent system of law existing outside the legal orders of states (national legal system) whereas national law is connected with the territory of the individual states.

International law is governed by treaties, custom and general principles of law and has organised its own settlement of disputes. The domestic legal systems do of course provide the establishments of a range of national legal entities.

Why did we choose the examples to gather best practices?

Over the past decade much experience was gathered how to structure the governance in large scale international research infrastructures, single site and multi-site facilities. As the current working assumption for ETO is a single site facility, we looked first into these recent examples. We have chosen to look at recent examples such as ESS, SKAO, CTAO and EGO and looked into a long existing example such as CERN for the elements of robustness.[2]

Our overview is based on our analysis of the main characteristics of ET and other existing facilities and the Assessment on Implementation of the ERIC regulation, by the EC tasked expert group in 2021[3]. The ERIC legal framework is common practice now for the establishment of large scale research infrastructures within the European Research Area. The ERIC model is specifically developed to serve the institution of (new) research infrastructures of European Interest while allowing the participation of non-EU states and international organisations.

Below is a comparison of legal frameworks in national law (table 1) and international law (table 2.)[4]

Table 1. National Law

NATIONAL LAW	PARTNERSHIP	MANAGEMENT	Procurement	FINANCIAL ISSUE	STAFF
Variety of entities in EU member states: - Not for profit purpose. - Limited liability.	- Private/public	- Director or board	- EU Tender regulation	- National law - Taxes (VAT) - Accounting - Public funding	- National law

Table 3. International Law

[1] However, multiple site options are under discussion within the ET organisation.

[2] In addition we will also take ESRF in account after the suggestion by the BGR 27/9/23.

[3] European Commission, Directorate-General for Research and Innovation, Assessment on the implementation of the Eric Regulation, Publications Office of the European Union, 2021, https://data.europa.eu/doi/10.2777/747211

[4] Comprehensive overview (pag. 12, https://doi.org/10.5281/zenodo.5094508)

INTERNATIONAL LAW	PARTNERSHIP	MANAGEMENT	LIABILITY	FINANCIAL ISSUE	STAFF
- Intergovernmental organisation	- EU and non-EU States	- Custom-fit defined by partners - Director or board Assembly	- As agreed in convention	Custom fit: -Exemptions in partner states. -Tender regulation. - Fair return	- As agreed to international standards
- ERIC (EU regulation)	- EU and non-EU states. - Intergovernmental organisations. - Minimum of three EU-states	- Assembly of all members - Director or board EU-states jointly have majority in votes in assembly	Limited to contribution	- Exemption of VAT, excise duties - EU Tender exemption -	- Applicable law of statutory seat or host country

Focus on two models: ERIC and IGO

The governance model chosen for ET should be long standing and robust as ET is supposed to operate for 50 years and taken into account that the funding will be by national public resources. Therefore we analyzed the two legal frameworks States are familiar with in the field of large scale international research infrastructures: an ERIC model and IGO model.

The ERIC model is specifically developed to serve the institution of (new) research infrastructures of European interest while allowing the participation of non-EU states and international organisations. A recent assessment (2021) of the ERIC regulation by an EC expert group provided input based on the lessons learned and good practices in existing ERIC facilities. This EGERIC group provided recommendations for improvement of the implementation of the ERIC regulation and recommendations for an update of the ERIC practical guidelines.[5]

Independently from the model chosen, experience also highlights that the complexity of the negotiations towards the constitutional documents for the legal entity, should not be underestimated. There is considerable effort required to deliver policies that govern the scientific and technical content inside the perimeter of the legal entity , the need for service level agreements , the item of a solid contribution model including its set of rules and arrangements for dealing with cost overruns, cash- and in-kind contributions , consequences of national VAT-regulations , etc.

Below you find the results of a more detailed analysis of main items in either an ERIC-format or an IGO-format for ETO.

- European participants (83 institutions/10 countries BGR).
- **ESFRI** Roadmap (5 EU countries application).

The following items are discussed.

[5] European Commission, Directorate-General for Research and Innovation, *Assessment on the implementation of the Eric Regulation*, Publications Office of the European Union, 2021, **https://data.europa.eu/doi/10.2777/747211**

	Topics	ERIC	IGO, treaty organisation
1	Legal personality	Yes (EU treaty)	Yes (Vienna Convention)
2	Governmental participation	Yes	Yes
3	Jurisdiction	- EU law:6 ERIC regulation - National law of EU Member state (seat)	- International law: Vienna Convention on Law of Treaties (VCLT, 1969) [7]
4	Dispute resolution, competent court	European Court of Justice (Luxembourg)	International Court of Justice UN (The Hague) [8]
5	Establishment (steps)	Guidance in the approach and negotiations process [9] Baseline for the Statutes and annexes (ERIC guidelines). ERIC is designed for research infrastructures. Involvement of Research Ministries Ratification process: Step 1. application 3 months Step 2. application 6 months[10] - Applications of minimum of 3 EU states. - Assessment and approval of the Statutes by EC. - Publication of Statutes by EC. *Implementation process* in the Member states (experience; in most EU states a light procedure)	Guidance by reference practices and case studies All elements in the statutes need to be negotiated by the sovereign states: see items 10 to 18. Involvement of Research Ministries and Ministries of Foreign Affairs *Ratification process* (lengthy process: signing of Statutes by the member states and parliamentary approval in each state) Depositary of the Statutes and annexes: secretary-general of UN[11], *Implementation process* in the Member states (experience of SKA; involvement Ministry of Foreign Affairs)
6	Statutes (good practice: lean and mean)	Amendments needs approval of the Members and the EC	Amendments need approval and ratification of the

[6] https://european-union.europa.eu/principles-countries-history/principles-and-values/founding-agreements_nl https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32009R0723

[7] https://legal.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf

[8] https://www.un.org/en/about-us/un-charter/full-text

[9] https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/european-research-infrastructures/eric_en

[10] Recent example of CTA shows that the total timeline might be much longer than just the timeline for the applications steps. The total timeline of the process also include the digestion of the EC comments in step 1 and 2 on the statutes and annexes.

[11] https://treaties.un.org/

	Topics	ERIC	IGO, treaty organisation
			Members and have to be in accordance with amendment process in VCLT, Deposit secretary-general UN
7	Membership/Observership	EU states, non-EU states and International organisations	EU and non-EU States and International organisatons
8	Accession new Members	Defined in the statutes: requirements and procedure Non-EU members need to recognize the ERIC legal framework	Defined in the statutes: - Requirements and procedure. - New Members need to ratify the Treaty.
9	Bilateral collaboration agreements	Third parties	International organisations and third parties
10	Member contributions	Initial commitment of 5-10 years - Cash and in-kind	To be negotiated - Cash and in-kind
11	Staff, personnel	National law of the Host state (seat), including pension schemes, benefits, social security	To be negotiated: HR ecosystem, privileges and immunities
12	Liability	Limited liability (limited to cumulated annual contributions)	To be negotiated by the Members
13	Tax exemptions	Exemption of VAT and excise duties (Council Directives) [12]	Privileges (including exemptions) to be negotiated
14	Procurement policy	Exemption from EU Tender regulation	Privileges (including exemptions) to be negotiated
15	Protection of the site	Protection by national law of the Host state (seat)	To be negotiated: either - national law (seat) or - immunity of the site
16	Access model for the data	To be negotiated	To be negotiated
17	Decision making model	To be negotiated but requirement: EU majority (votes)	To be negotiated

[12] Directive 2020/262 Excise duties https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32020L0262
Directive 2006/112 VAT exemption https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0112

	Topics	ERIC	IGO, treaty organisation
18	Financial model, - allocation key for contributions - contingency (cost overruns)	To be negotiated by the Members	To be negotiated by the Members

6) Need for an intermediate legal entity

From the gathered practices from ESS, SKAO and CTAO WP2 learned that it is most likely that ETO will need an intermediate legal entity to govern the activities in the project organization and prepare for construction of ET.

An intermediate entity may provide breathing space and enables the project to further mature and build the comfort and trust among the members for a longer-term commitment. The provision of an intermediate legal entity will formalize and confirm the partnership and commitment of the ET members and institutes. It should have a transparent and balanced decision-making- and financial model, open for late joiners, and a clear hierarchical line cascading down from the BGR (or equivalent group of participating governments) or recognition of the BGR as a decisive body in the entity. (E.g. ESS intermediate entity with steering committee, SKA Company with guarantee (members-body)). This transition entity should be as flexible as possible, no need to duplicate existing bodies or adding layers to the current Structure.

The present 'Einstein Telescope Organization' [ETO] requires for a variety of reasons an intermediate legal entity as soon as possible.

It is understood that the Construction and Maintenance Phase, where the large funds will be committed, will only start when the Final Legal Entity will be in place. Therefore, the most important role for the intermediate body is to help to shorten the transition also using the findings and the recommendation coming from the INFRADEV Preparatory Phase Project. It is important to keep the requirements of the preferred governance model in mind when developing an intermediate governance structure in order to smoothen the transition from the intermediate entity towards the final legal entity. Such an entity should be 'designed' in interaction with and endorsed by the BGR.

The aim and scope for which the intermediate ET legal entity should be established are:
- To build the necessary comfort and trust among the members in the ETO.
- To manage the member's financial and in-kind contributions for the benefit of the project.
- To do all things necessary for a professional development and promotion of the project.
- To provide the ET-directorate with the tools for delivering the necessary documents/reports for BGR decision-making as specified in the Preamble of their mandate [Annex III].
- To assist working groups that in the future may be initiated by the BGR for 1] the development of the organizational framework [governance] for the construction and

Proposal for options to establish an intermediate legal entity under conditions as described above.
Legal form
a) The entity could be created ex-novo [embedded in national law] taking the form of a Private Company Limited by Guarantee or something similar.
b) One agency might take this role and host the ETO project directorate with a dedicated board of directors.

Governance
a) The decisional board might be formed by two representative per country anticipating the shape of the Council that will rule the final Organisation (a merge of BSR and BGR).

b) Alternatively it could be run only by the Agencies, the entities that have the power to commit the funds.

Personnel
One complexity seen in other experiences (ESS, SKAO, CTAO) has to do with the process of transferring people hired by this entity to the final one. In order to avoid such a problematic step one could think that this entity works with seconded people only.

Selection of an intermediate legal entity
An intermediate entity may provide breathing space and enables the project to further mature and build the comfort and trust among the members for a longer-term commitment. The legal form should follow the functions of the entity. The entity should enable the ETO *to act* autonomous on timeline and organization and provide the flexibility to build the organisation to its own specific requirements.

The criterion of conversion and migration of the intermediate entity should not be given high priority, as it is a stepping-stone to the final legal entity, which is currently most likely to be an ERIC or IGO. If needed, the intermediate entity should have a pre-construction purpose, governing the design phase and preparing the governance for the construction and the following phases. It should also be aware of the legal obligations toward any employed staff and be aware of the issues with accrued assets (IP, etc.) that may need to be transferred to the final form.

7) Some reflections based on the gathered best practices and lessons learned

In this chapter, we reflect freely and for the benefit of WP2's coming activities on the best practices and lessons learned to ET based on our interactions with per-sons who were closely involved in the process of setting-up the governance of the ESS, SKAO, and CTAO, EGO or familiar with the organization of CERN.

Why did we choose the examples to gather best practices?
Over the past decade, much experience was gathered how to structure the governance in large-scale international research infrastructures, as well in single site and multi-site (distributed) facilities. As the current working assumption for ETO, according to the ESFRI application, is a single site facility, we focus on these examples first. We have chosen to look at recent examples such as ESS as an example of a single site facility, SKAO as an example of international organization, CTAO as an example for the lessons learned in the transition process, EGO as an example for lessons learned and the number of staff for the operations and looked into a long existing example such as CERN for the elements of robustness.

General reflections
Below you find our reflections on topics as council, contribution models, site selection, and interactions with politics. This is just a selection, in our interactions with the BGR we could reflect on other topics as well.

Council
In the examples we studied the council functions as the decision-making body in the research infrastructures. It is good practice to have a dual representation by Ministerial representatives and representatives of funding agencies in order to make informative decisions with the aim to facilitate the scientific goals. But it is a clear responsibility of the participating Country to appoint the most convenient Delegate and manage the information flow.

Building relationship between scientists and politicians
Overall, we may say that the connection between the scientists and the Ministries is key for the building of comfort and trust and momentum in the project. However, this is very different for each project and depends

on a large variety of aspects. Compared to the investigated examples the ET BGR-body has been established early on in the project and is now in the position to steer governance developments early on in the process.

Realistic narratives
The narratives on the benefits of the project, the construction and operational costs should be realistic as it sets the stage for the expectations of the politicians and credibility of the project. The introduction of cost caps or fixed numbers need to be based on realistic cost estimates and not on politically desirable numbers.
The timeline should be realistic to current understandings in the project. Management of expectations is necessary to build the support and to keep the (political) funding bodies, ET BGR involved.
However, the informal expectations or promises are very difficult to manage. Especially if they are not written down or formally approved at the highest level.
The importance of an accurate view on project costs can not be underestimated. We have seen this on some of the examples studied an other projects where project costs are either not well understood, or everyone informally accepts there is some issue but the political will to face the issues isn't there and the project can meet difficulties which can cause lasting reputational damage.

Contribution models
In our gathering of the practices and lessons learned some principles of the contribution models were discussed as far as it may have an impact on the governance development. E.g. the ability of 'return on investment' or *juste retour* is an important element just as the inclusiveness for late joiners. Fair return on investment may be accomodated by flexible procurement policies. Inclusiveness for late joiners may be hindered by an in-kind contribution model as it is more difficult to scale because the capability of the late joiners might overlap with the contributions, which are signed up already.

Establishment of an intermediate legal entity
The development of a research infrastructure is a long, stepwise process of building comfort and trust. A robust framework for the term of 50 years requires a high-level commitment with initial financial commitments for the first 10 years. Experience learns that for the infrastructures with high (construction) costs benefits from a stepwise approach towards the long-term legal framework by establishing an intermediate legal entity. The motivation for this entity is to establish a joint responsibility to govern a common fund for preparatory activities, such a R&D, site preparation, preparation of the site selection procedure etc.

Site selection procedures
The site selection procedure contains two parts: the development of site requirements and the site selection. The potential sites will compete, based on validated site-requirements and specifications. The site requirements need to be developed by the scientists under the responsibility of the ET coordinators.
The site selection procedure needs to be defined by the BGR to create the necessary political support and high-level commitment for the site decision.

8) Next steps for the workprogram WP2

The BGR is the decisive body for governance development in the Einstein project. Therefor work package 2 will continue to seek interaction with the ET BGR.

9) Annex I, Terms of Reference ET BGR

Einstein Telescope Board of Governmental Representatives

Terms of Reference

The objective of the Einstein Telescope (ET) is to build a large-scale research infrastructure that will be the next generation gravitational wave detector for further scientific research of the cosmos. The scientific part of the project has two coordinators overlooking the project developments and two project directors leading the project that is divided in several work packages with their own work package leader. This structure evolved from a steering committee of scientists that, over the years, coordinated international activities that led to the successful application of the project for the ESFRI roadmap.

After the ET was placed on the ESFRI Roadmap the involvement of national governments is growing more and more to help implement the project. The present ET Board of Governmental Representatives (ET BGR) is formed as a platform to discuss and streamline the views and actions in the ministries and as a sounding board for the coordinators of the project.

The ET BGR seeks as an interim entity and in consultation with the coordinators to bridge the present situation until in future a more formalized governing structure is realized. The ET BGR is representing the countries potentially interested in joining the activities for setting up the Einstein Telescope. The ET BGR will advise on issues such as the preparation for a legal entity in the Preparatory Phase Project, the preparation of the site selection procedure and the involvement of more countries in this project. It is foreseen that in one or more steps a council might be set up including scientific representatives. In that case the ET BGR is no longer necessary and will cease to exist.

1. Section 1: Scope and purpose

1. The Einstein Telescope Board of Governmental Representatives, hereafter referred to as the 'ET BGR', is established as strategic forum to discuss and agree in consultation with the ET coordinators on the progress and process of realizing ET. The BGR can invite the coordinators to a meeting.
2. The ET BGR shall among others prepare, discuss, negotiate, and approve the documents needed for the setting up of the ET legal entity.
3. ET BGR will especially aim to reach consensus on:
   - the procedure to select the host country for the ET, including what kind of information will be needed for the selection procedure;
   - the legal model, governance structure and founding documents;
   - the financial plan and the draft internal financial rules;
   - policy papers;
   - the procedure for selection and appointment of the Interim Executive Director when needed;
   - any other issues deemed necessary by the ET BGR and its members.
4. These Terms of Reference shall come into effect on the date of their adoption by the ET BGR.
5. The ET BGR and its rules are valid until they are replaced by other rules, or until the ET BGR terminates and any other interim or final ET governance boards, under the approved ET legal model, are set up.

2. Section 2: Membership

1. All countries considering participation in the ET project can declare their Membership of ET BGR. They shall be represented by their delegates, as defined in Section 4.
2. The initial Members of the ET BGR are those countries that were represented at any ET Informal Ministerial Group, provided they confirm their intention to join the ET BGR in writing an appointment letter to all other initial Members.
3. Any other country wishing to join the ET BGR as a Member should send an announcement according to section 4 to the Chair and the Secretariat of the ET BGR, comprising the names of its delegates.
4. The ET BGR is open for new Members during its entire lifetime.

3. Section 3: Chairperson/co-Chairs

1. The Chairperson and Vice-Chairperson (who will replace the Chairperson in case of absence) of the ET BGR are elected for a term of two years. A Chairperson or Vice-Chairperson can serve no more than two terms.
2. The first Chairpersons are the two co-Chairs of the informal Ministerial Group. What is decided for the Chairperson also applies for the co-Chairs.

3. The present co-Chairs are considered elected according to this ToR from the date of its approval.
4. The role of the Chairperson is to manage ET BGR meetings and neutrally moderate the discussion.
5. The Chairperson shall convene ET BGR meetings, on his/her either own initiative or on a joint request from at least two countries, with a notice of at least three weeks.
6. The Chairperson has the same voting right as the other Members, meaning that if no other delegate of the country is present the chair may vote for his country.

4. Section 4: Delegates

1. Each Member shall nominate up to two delegates and one expert to the ET BGR. In case of unavailability of the delegates, a member can decide to appoint the expert as proxy.
2. Each Member, by the respective country's ministry, shall send the letter of appointment of its delegates to the Chairperson and to the Secretariat. The composition of delegations shall be maintained and made available by the Secretariat.
3. Changes in delegations must be sent by the respective country's ministry to the Chairperson and the Secretariat by e-mail or a letter.
4. The Chairperson may invite guests to attend the ET BGR as appropriate. At their request, the Coordinators will be allowed to participate in (part of) an ET BGR meeting.
5. Each participant of ET BGR meetings shall respect the confidentiality of the information provided during the meeting and the content of debates and decisions taken by the ET BGR.

5. Section 5: ET BGR Secretariat

1. The ET BGR Secretariat will be proposed by the Chairperson for confirmation by the ET BGR. Until the host country has been decided, this may be anyone the Chairperson deems appropriate.
2. The Secretariat shall assist the Chairperson of the ET BGR in convening the meetings, preparing the agenda and related materials for the meetings.
3. The Secretariat shall prepare draft minutes of the ET BGR meetings, in agreement with the Chairperson.

6. Section 6: Preparation and adoption of the agenda

1. A draft agenda for ET BGR meetings shall be prepared by the Chairperson in collaboration with the Secretariat and shall be sent to the delegates at least two weeks preceding the ET BGR meeting.
2. Materials to be considered by the ET BGR shall be prepared by the Chairperson in collaboration with the Secretariat and sent to the delegates at least one weeks preceding the ET BGR meeting.
3. The meetings are open to Member's delegations, and other parties invited for the meeting.
4. The draft agenda shall be considered for adoption at the opening of the meeting.
5. A Member may request a new item to be added to the draft agenda by written notification to both the Chairperson and Secretariat at least one weeks preceding the ET BGR meeting, including all the material required.
6. During a meeting of the ET BGR, the Members present or represented can request to add a new item on the agenda by simple majority.

7. Section 7: Proxy

1. A Member may be represented at the meeting by another Member's delegate with written proxy by the respective country's Ministry. The Chairperson shall be notified preferably before, or at the latest, at the start of the meeting.

8. Section 8: Quorum

1. The quorum is reached if at least 75% of the Members of the ET BGR is present.
2. The Chairperson shall ensure that the relevant quorum is met.
3. If the quorum is not reached, the Chairperson shall convene, if necessary, a new meeting within a reasonable time with the same agenda. This new meeting shall be quorate regardless of the number of Members represented, but only if this is expressly stated in the invitation to such a new meeting of the ET BGR.

9. Section 9: Voting

1. The ET BGR shall always aim for consensus decisions.
2. If this cannot be reached and voting is required, each Member represented shall have one vote.
3. For all decisions, if requested by at least two members, voting shall take place by secret ballot. When voting concerns elections or nominations, voting shall always be by secret ballot.
4. Decisions at the ET BGR shall be made by a qualified majority, requiring that at least 75% of the members present and voting at the meeting vote in favour of the proposed decision.
5. In case the required majority is not achieved, a written procedure may be used for a second vote, using the same 75% majority rule.
6. Only delegates may vote, taking into account section 7. The transfer of voting rights should be communicated to the Chairperson by a written statement (letter or email) prior to the meeting.
7. Members who abstain from voting are to be considered as not voting and such abstention shall not prevent a decision from being taken with the required majority. However, abstentions are in all cases to be reported in the minutes.

10. Section 10: Working Groups

1. If needed, the ET BGR may establish separate working groups and committees to prepare issues for decision.

11. Section 11: Conflict of interest

1. At the beginning of each meeting, all participants shall inform the Chairperson of any conflict of interest[13] with regard to a particular item on the agenda. The opportunity to announce a conflict of interest will always be a standing item on the ET BGR agenda.
2. In the event of such a conflict of interest, the person concerned shall, at the request of the Chairperson and following a decision of the ET BGR, withdraw from the meeting whilst the relevant items of the agenda are being discussed.

12. Section 12: Minutes

1. For each meeting, minutes shall be drafted by the Secretariat and the Chairperson. Decisions taken by the ET BGR shall be recorded in the minutes.
2. The Chairperson shall send draft minutes to all delegates within three weeks of the meeting.
3. No additional point shall be added to the minutes if it has not been raised at the ET BGR meeting. No member shall modify either its vote or its opinion in the minutes.
4. The Chairperson will then send the accepted draft minutes to all the members.
5. The accepted draft minutes will then be approved by written procedure or in the next ET BGR meeting.

13. Section 13: Remote meeting

1. A meeting may be held remotely if the electronic procedure offers the possibility for all delegates to attend the meeting.
2. Remote meetings are treated as equally valid as physical meetings. If necessary, a written procedure (e.g. by email) can be applied.
3. The electronic procedure shall be explained before the meeting and before a vote.
4. In any case, the ET BGR procedures shall apply.

14. Section 14: Written procedure

1. The ET BGR may, in exceptional cases, take decisions by a written procedure conducted via email.
2. The written procedure can be requested by the Chairperson on his/her own initiative or on request of a Member.

[13] A conflict of interest (COI) is a situation in which a person or organization is involved in multiple interests, financial or otherwise, and serving one interest could involve working against another.

3. The Chairperson sends to all members the relevant material and requests to vote, via email, on a specific issue.
4. No additional item shall be added to this material and no modifications or amendments can be proposed to the subject of the vote. A decision taken on an additional or modified item shall be considered as null and void.
5. Normally, the Members shall be given three weeks to cast their vote. In case of exceptional urgency, the Chairperson can shorten the voting period to no less than five working days.
6. A written procedure is considered valid if no more than 25% of the Members oppose it.
5. The Chairperson shall collect the votes and abstentions of members after the deadline. The Chairperson shall immediately notify the members and the Secretariat of the decision taken which thereby becomes effective. Decisions made by written procedure shall be declared at the next meeting of the ET BGR. In any case, the ET BGR procedures shall apply.

10) Annex II, mandate of the ET directorate

Mandate for the ET Directors for the "Design and Preparatory Phase I"

and

Description of the project organisation under their responsibility in Phase I

Date: February 9, 2023

Purpose of this document

This document describes the line of authority in the Einstein Telescope (ET) ESFRI Project, details the mandate of the ET Directors and describes the project organisation for the Einstein Telescope Organisation (ETO).

Preamble

The Einstein Telescope ESFRI Project is presently in a Design and Preparatory Phase (in the ESFRI life cycle). There is a need to organize and structure the preparation of the Einstein Telescope as a project.

The preparation of ET is separated into two parts, the current 'Design and Preparation Phase I' will end with a selection of the site(s) for the ET Research Infrastructure, followed by a second phase to adapt the design and plans to the selected site.

This mandate covers the 'Design and Preparation Phase I' (Phase I). The main deliverables during this phase are reports addressed to the ET Board of Governmental Representatives (BGR), a group of ministry delegates, suggesting them to give a first approval for:

- the construction of the ET Research Infrastructure and its location(s)
- a budget and a schedule which both cover the procurement process, the installation, the commissioning, the operation and finally the dismantling,
- for the establishment of a legal entity for the Implementation Phase.

The final report as delivered by the Directors should include a comparison of two scenarios, namely the baseline consisting of one triangle versus an alternative option based on two L-shaped infrastructures, in scientific potential, risk analysis and costs.

INFRA-DEV is a EU-funded project (project 101079696 — ET-PP) approved for four years in 2022, which deploys a substantial effort for the Preparatory Phase of the ET ESFRI Project.

Line of Authority

ET Coordinators

The ET ESFRI Project Coordinators (ET Coordinators), the President of the INFN and the Director of Nikhef, are in charge and responsible for the creation of the ET Research Infrastructure. Their authority is recognised by the BGR in their Terms of References[1]. The ET coordinators will be consulted by the BGR on the progress and process of realizing the Einstein Telescope.

ET Directors

The ET Coordinators nominate two ET Directors: For now, these are Fernando Ferroni (INFN) and Andreas Freise (NIKHEF). The ET Directors are mandated to set up and manage the organisational structure of the ETO (Phase I). Mario Martinez (IFAE) is responsible for the INFRA-DEV project. He operates under the responsibility of the two ET Directors and is a member of the ET Directorate.

Mandate ET Directors

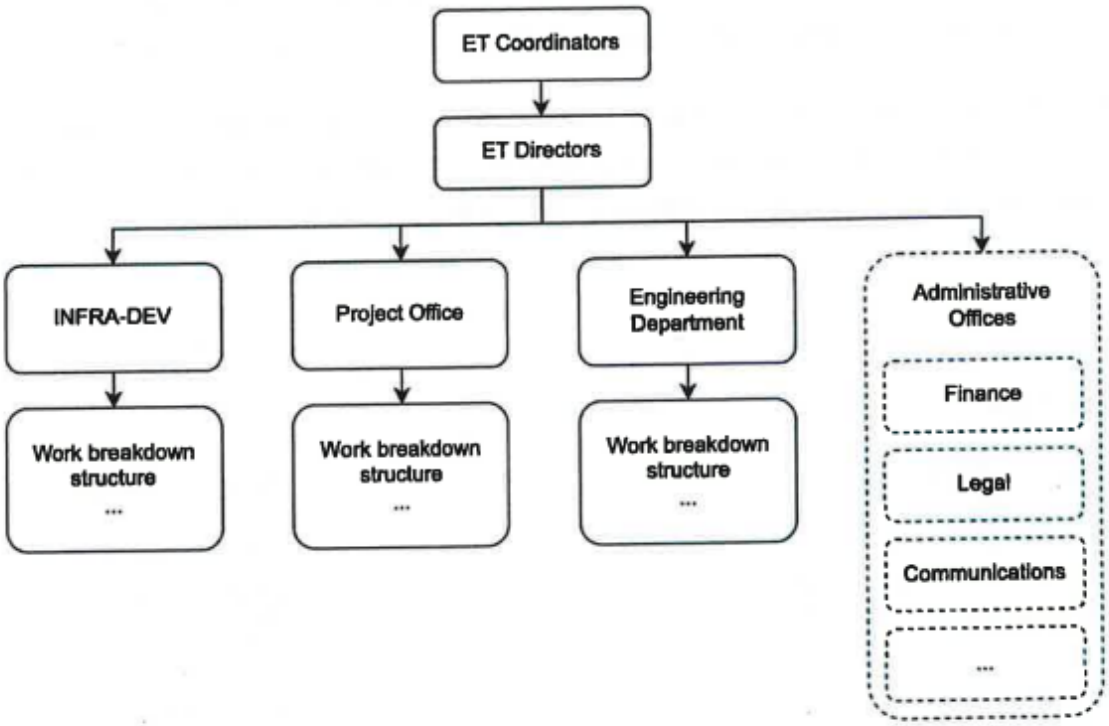
The ET Directors are mandated by the ET Coordinators to:

1. Set up the organization and the operations of the ETO (organisation chart below: ETO Project Organisation during Phase I). This implies defining the structure of the ETO (Phase I), giving mission statements and work programmes to the work units, naming staff members in the various work units, setting deadlines and quality control criteria.
2. Compare the triangle geometry with the geometry of two L-shaped infrastructures in scientific potential, risk analysis and costs.
3. Develop a budget plan and schedule for the Design and Preparation Phase I. Control the budget and account for the funds allocated to the ETO (Phase I) by the ET Coordinators.
4. Steer and oversee the studies and the production of the documentation necessary to the BGR and to the associated working groups in the ministries, for the BGR to be in a position to review, modify, update and approve the report and finally set-up the organization for the construction and operation of the gravitational wave detector.

[1] ET BGR Terms of Reference 03.12.2021

5. The ET Directors will give a progress report to the ET Coordinators each trimester.
6. This mandate has been given for the Design and Preparation Phase I and will remain valid until it is withdrawn by the ET Coordinators.

Project organisation D&PC Phase I



INFRA-DEV is a EU funded project to support key aspects of ET during the Preparatory Phase. Its activities are organised in well-defined work packages. The INFRA-DEV organisation and its internal structure will cease to exist at the end of the INFRA-DEV funding period. However, it will help to create parts of the organization of the ETO that will remain.

The Project Office will support the ET Directorate in setting up and management of the ETO (Phase I). During Phase I the PO will also deliver the project management plan for the future legal entity of ET. Eventually the aim of the Project Office (PO) will be to guarantee that the as-built research infrastructure fully complies with the requirements, the parameters and the technical layouts detailed in the project baseline configuration included in Technical Design Reports.

During Phase I the Engineering Department (ED) ED will deliver preliminary Technical Design Reports for the vacuum pipe system and the technical infrastructure. The ED will further support the creation of the documents mentioned in the Preamble with technical support. The ED will eventually be mandated for the design, procurement, installation, commissioning, operation, maintenance and eventually dismantling of the special systems (e.g. vacuum, cryogenics, survey) associated with the gravitational-wave detector; and the technical infrastructure systems needed to operate the interferometer (e.g. civil engineering, cooling, ventilation, electricity).

The Administrative Offices include any additional organisation body that is deemed necessary to prepare and deliver the documents listed in the Preamble and to support the management of the ETO (Phase I).

Signed by

President INFN

Antonio Zoccoli

ROMA, 9/2/2023

Director Nikhef

Stan Bentvelsen

Amsterdam, 9/2/2023

Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Workpackage 2, Organization, Governance and Legal Aspects

Deliverable 2.2

Minutes of meetings with EC and involved ministries

Lead beneficiary: Nikhef
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v 1.0	6 November 2023	Miriam Roelofs	Revision including all partners' contributions. Final approval by coordinator Mario Martínez (IFAE)

Objective WP2
This work package focuses on issues related to potential options for the organization, governance and legal for the construction, operation, and decommissioning of the proposed Einstein Telescope Observatory. The main goal of this work package is to provide all necessary input for the political processes related to legal entity, governance and site selection process. The main deliverables include the preparation of the documents for the legal entity and governance model. Here the main principle will be that structure follows function and this requires close cooperation between scientific, technical, legal and financial experts as well as governments investing in ETO in order to allow a stable and fruitful long-term operation of the facility.

Aim of the report

This document, D2.2, is a deliverable of WP2 of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696. This report will summarize the major points of discussion-meetings of Workpackage 2 with the group of Ministerial representatives, known as ET Board of Governmental Representatives (BGR).

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1. Description ET

The Einstein Telescope (ET) will be the European Third-Generation Gravitational Wave (3G GW) Observatory, a multi-detector, multi-interferometer designed to observe the whole Universe. Thanks to the unprecedented sensitivity of ET, Europe will be able to take the lead in the new era of multi-messenger astronomy by combining information delivered by ET with optical, IR, UV, gamma, cosmic ray and neutrino telescopes observations. ET, being a unique tool to investigate the space-time fabric of the Universe, will impact on our fundamental physics knowledge, and our understanding of the fundamental interactions governing the evolution of blackholes and neutron stars. The technologies needed for ET will affect industrial sectors, like lasers, sensors, optics, seismic isolation, and materials, and will drive innovations in these areas as scientists and engineers push the boundaries of what is possible.

2. List of Acronyms and Abbreviations

ET — Einstein Telescope
ETC — Einstein Telescope Collaboration
ETO — Einstein Telescope Observatory
ET-PP — Einstein Telescope Preparatory Phase - EC Grant Agreement agreement 101079696
BGR — ET Board of Governmental Representatives
BSR— ET Board of Scientific Representatives
ET Coordinators — Coordinators of the ET ESFRI project

ET Directorate — Directors of the ETO
INFN — Instituto Nazionale di Fisica Nucleare
Nikhef — Nationaal instituut voor subatomaire fysica
STFC — Science and Technology Facilities Council
EGO — European Gravitational Observatory
VIRGO — Virgo Experiment
ERIC — European Research Infrastructure Consortium
IGO — Intergovernmental Organization
CTAO — CTA Observatory
ESS — European Spallation Source
SKA — Square Kilometre Array
CERN — European Organization for Nuclear Research

3. Current organization ETO

The ETO consists of a Board of Governmental Representatives (BGR), two ET ESFRI Coordinators, two ET Directors. The line of hierarchy has been established with the BGR Terms of Reference (annex I) and the Mandate for the Project directors. The ET Collaboration has organized itself and is governed with Bylaws. The ET Directors role is to align the activities of the ET Collaboration with the ETO activities.

The ET BGR serves as an interim entity to bridge the present situation until in the future a more formalized governing structure is established. The ET BGR is representing the countries potentially interested in joining the activities to develop and realise the Einstein Telescope. The ET ESFRI Project Coordinators (ET Coordinators), the President of the INFN and the Director of Nikhef, are in charge and responsible for the creation of the ET Research Infrastructure.

The ET Directors are mandated to set up and manage the organisational structure of the ETO (Phase I). The INFRA-DEV project is executed under the responsibility of the two ET Directors and the INFRADEV coordinator is a member of the ET Directorate.

The ET Collaboration is the group of collaborating scientists governed by ET Bylaws. The ET Directors role is to align the activities of the ET Collaboration with the ETO activities.

4. BGR Meeting 16 February 2023

On invitation of BGR WP2 presented the first year work program and approach towards the deliverables.

It was a fruitful discussion with the BGR and the start of more future interactions. The secretary of the BGR receives a standing invitation to the WP2 meetings. The outcome of the discussion is summarized below:

1. The BGR appreciated the approach and work program of WP2 and requested the presentation of viable options for the governance and legal framework as input for the BGR decision making on the governance structure and legal framework.

2. The BGR agreed with the examples chosen for best practices and lessons learned from ESS, CTAO, SKA and CERN.

3. The BGR would like to invite WP2 for a workshop in person by the end Q2.

   In order to have an efficient interaction the timelines of WP2 deliverables and the workshop planning of the BGR should be aligned.

5. BGR meeting 27 September 2023

The task of the WP2 group is to proposals viable options on governance and organizational aspect for the development and realization of the Einstein Telescope Organisation (ETO) for the various phases of the ESFRI lifecycle of the ET-project. WP2 distributed and presented a discussion paper to the BGR with the first ideas on governance for preparatory phase and the construction and operational phase and the advice to strengthen the position of the ET directorate.

For the preparatory phase, WP2 proposes to work towards the establishment of an intermediate legal entity to provide breathing space and enable the project to further mature and build the comfort and trust for the longer term commitment of the potential Members. Considering the working assumptions of the ET characteristics, the WP2 focus is on two international legal frameworks as model for the final legal entity for ET.
WP2 took the points listed below as further input for the development of the governance and legal framework:

- the legal framework should be able to accommodate all the construction and operational, maintenance and decommissioning requirements of the ETO;
- the ERIC application process can be troublesome as is shown by some recent examples;
- especially for large and expensive infrastructures there is no evidence on how quickly an ERIC can be established, in comparison with an IGO;
- consideration should also be given to the hybrid model of ESRF, an intergovernmental agreement with an executive national legal entity;
- the legal entity should provide for the possibility to include future global partners, like IGOs and non-EU countries;
- take into account the operational aspect of the ability to attract and recruit qualified staff by offering a competitive salary and uniform labour regulations;
- the future ETO organization should take into account the experience of the existing EGO/VIRGO organization;
- the legal framework should be independent from the choice of the site independent from the infrastructure geometry.

6. Next steps for the work program WP2

The BGR is the decisive body for governance development in the Einstein project. Therefor work package 2 will continue to align and seek interaction with the ET BGR.

7. Annex I, Terms of Reference BGR

Einstein Telescope Board of Governmental Representatives

Terms of Reference

The objective of the Einstein Telescope (ET) is to build a large-scale research infrastructure that will be the next generation gravitational wave detector for further scientific research of the cosmos. The scientific part of the project has two coordinators overlooking the project developments and two project directors leading the project that is divided in several work packages with their own work package leader. This structure evolved from a steering committee of scientists that, over the years, coordinated international activities that led to the successful application of the project for the ESFRI roadmap.

After the ET was placed on the ESFRI Roadmap the involvement of national governments is growing more and more to help implement the project. The present ET Board of Governmental Representatives (ET BGR) is formed as a platform to discuss and streamline the views and actions in the ministries and as a sounding board for the coordinators of the project.

The ET BGR seeks as an interim entity and in consultation with the coordinators to bridge the present situation until in future a more formalized governing structure is realized. The ET BGR is representing the countries potentially interested in joining the activities for setting up the Einstein Telescope. The ET BGR will advise on issues such as the preparation for a legal entity in the Preparatory Phase Project, the preparation of the site selection procedure and the involvement of more countries in this project. It is foreseen that in one or more steps a council might be set up including scientific representatives. In that case the ET BGR is no longer necessary and will cease to exist.

Section 1: Scope and purpose

1. The Einstein Telescope Board of Governmental Representatives, hereafter referred to as the 'ET BGR', is established as strategic forum to discuss and agree in consultation with the ET coordinators on the progress and process of realizing ET. The BGR can invite the coordinators to a meeting.
2. The ET BGR shall among others prepare, discuss, negotiate, and approve the documents needed for the setting up of the ET legal entity.
3. ET BGR will especially aim to reach consensus on:
   - the procedure to select the host country for the ET, including what kind of information will be needed for the selection procedure;
   - the legal model, governance structure and founding documents;
   - the financial plan and the draft internal financial rules;
   - policy papers;
   - the procedure for selection and appointment of the Interim Executive Director when needed;
   - any other issues deemed necessary by the ET BGR and its members.
4. These Terms of Reference shall come into effect on the date of their adoption by the ET BGR.
5. The ET BGR and its rules are valid until they are replaced by other rules, or until the ET BGR terminates and any other interim or final ET governance boards, under the approved ET legal model, are set up.

Section 2: Membership

1. All countries considering participation in the ET project can declare their Membership of ET BGR. They shall be represented by their delegates, as defined in Section 4.
2. The initial Members of the ET BGR are those countries that were represented at any ET Informal Ministerial Group, provided they confirm their intention to join the ET BGR in writing an appointment letter to all other initial Members.
3. Any other country wishing to join the ET BGR as a Member should send an announcement according to section 4 to the Chair and the Secretariat of the ET BGR, comprising the names of its delegates.
4. The ET BGR is open for new Members during its entire lifetime.

Section 3: Chairperson/co-Chairs

1. The Chairperson and Vice-Chairperson (who will replace the Chairperson in case of absence) of the ET BGR are elected for a term of two years. A Chairperson or Vice-Chairperson can serve no more than two terms.
2. The first Chairpersons are the two co-Chairs of the informal Ministerial Group. What is decided for the Chairperson also applies for the co-Chairs.
3. The present co-Chairs are considered elected according to this ToR from the date of its approval.
4. The role of the Chairperson is to manage ET BGR meetings and neutrally moderate the discussion.
5. The Chairperson shall convene ET BGR meetings, on his/her either own initiative or on a joint request from at least two countries, with a notice of at least three weeks.
6. The Chairperson has the same voting right as the other Members, meaning that if no other delegate of the country is present the chair may vote for his country.

Section 4: Delegates

1. Each Member shall nominate up to two delegates and one expert to the ET BGR. In case of unavailability of the delegates, a member can decide to appoint the expert as proxy.
2. Each Member, by the respective country's ministry, shall send the letter of appointment of its delegates to the Chairperson and to the Secretariat. The composition of delegations shall be maintained and made available by the Secretariat.
3. Changes in delegations must be sent by the respective country's ministry to the Chairperson and the Secretariat by e-mail or a letter.
4. The Chairperson may invite guests to attend the ET BGR as appropriate. At their request, the Coordinators will be allowed to participate in (part of) an ET BGR meeting.
5. Each participant of ET BGR meetings shall respect the confidentiality of the information provided during the meeting and the content of debates and decisions taken by the ET BGR.

Section 5: ET BGR Secretariat

1. The ET BGR Secretariat will be proposed by the Chairperson for confirmation by the ET BGR. Until the host country has been decided, this may be anyone the Chairperson deems appropriate.
2. The Secretariat shall assist the Chairperson of the ET BGR in convening the meetings, preparing the agenda and related materials for the meetings.
3. The Secretariat shall prepare draft minutes of the ET BGR meetings, in agreement with the Chairperson.

Section 6: Preparation and adoption of the agenda

1. A draft agenda for ET BGR meetings shall be prepared by the Chairperson in collaboration with the Secretariat and shall be sent to the delegates at least two weeks preceding the ET BGR meeting.
2. Materials to be considered by the ET BGR shall be prepared by the Chairperson in collaboration with the Secretariat and sent to the delegates at least one weeks preceding the ET BGR meeting.
3. The meetings are open to Member's delegations, and other parties invited for the meeting.
4. The draft agenda shall be considered for adoption at the opening of the meeting.
5. A Member may request a new item to be added to the draft agenda by written notification to both the Chairperson and Secretariat at least one weeks preceding the ET BGR meeting, including all the material required.
6. During a meeting of the ET BGR, the Members present or represented can request to add a new item on the agenda by simple majority.

Section 7: Proxy

1. A Member may be represented at the meeting by another Member's delegate with written proxy by the respective country's Ministry. The Chairperson shall be notified preferably before, or at the latest, at the start of the meeting.

Section 8: Quorum

1. The quorum is reached if at least 75% of the Members of the ET BGR is present.
2. The Chairperson shall ensure that the relevant quorum is met.
3. If the quorum is not reached, the Chairperson shall convene, if necessary, a new meeting within a reasonable time with the same agenda. This new meeting shall be quorate regardless of the number of Members represented, but only if this is expressly stated in the invitation to such a new meeting of the ET BGR.

Section 9: Voting

1. The ET BGR shall always aim for consensus decisions.
2. If this cannot be reached and voting is required, each Member represented shall have one vote.
3. For all decisions, if requested by at least two members, voting shall take place by secret ballot. When voting concerns elections or nominations, voting shall always be by secret ballot.
4. Decisions at the ET BGR shall be made by a qualified majority, requiring that at least 75% of the members present and voting at the meeting vote in favour of the proposed decision.
5. In case the required majority is not achieved, a written procedure may be used for a second vote, using the same 75% majority rule.
6. Only delegates may vote, taking into account section 7. The transfer of voting rights should be communicated to the Chairperson by a written statement (letter or email) prior to the meeting.
7. Members who abstain from voting are to be considered as not voting and such abstention shall not prevent a decision from being taken with the required majority. However, abstentions are in all cases to be reported in the minutes.

Section 10: Working Groups

1. If needed, the ET BGR may establish separate working groups and committees to prepare issues for decision.

Section 11: Conflict of interest

1. At the beginning of each meeting, all participants shall inform the Chairperson of any conflict of interest[1] with regard to a particular item on the agenda. The opportunity to announce a conflict of interest will always be a standing item on the ET BGR agenda.
2. In the event of such a conflict of interest, the person concerned shall, at the request of the Chairperson and following a decision of the ET BGR, withdraw from the meeting whilst the relevant items of the agenda are being discussed.

Section 12: Minutes

1. For each meeting, minutes shall be drafted by the Secretariat and the Chairperson. Decisions taken by the ET BGR shall be recorded in the minutes.
2. The Chairperson shall send draft minutes to all delegates within three weeks of the meeting.
3. No additional point shall be added to the minutes if it has not been raised at the ET BGR meeting. No member shall modify either its vote or its opinion in the minutes.
4. The Chairperson will then send the accepted draft minutes to all the members.
5. The accepted draft minutes will then be approved by written procedure or in the next ET BGR meeting.

Section 13: Remote meeting

1. A meeting may be held remotely if the electronic procedure offers the possibility for all delegates to

[1] A conflict of interest (COI) is a situation in which a person or organization is involved in multiple interests, financial or otherwise, and serving one interest could involve working against another.

attend the meeting.
2. Remote meetings are treated as equally valid as physical meetings. If necessary, a written procedure (e.g. by email) can be applied.
3. The electronic procedure shall be explained before the meeting and before a vote.
4. In any case, the ET BGR procedures shall apply.

Section 14: Written procedure

1. The ET BGR may, in exceptional cases, take decisions by a written procedure conducted via email.
2. The written procedure can be requested by the Chairperson on his/her own initiative or on request of a Member.
3. The Chairperson sends to all members the relevant material and requests to vote, via email, on a specific issue.
4. No additional item shall be added to this material and no modifications or amendments can be proposed to the subject of the vote. A decision taken on an additional or modified item shall be considered as null and void.
5. Normally, the Members shall be given three weeks to cast their vote. In case of exceptional urgency, the Chairperson can shorten the voting period to no less than five working days.
6. A written procedure is considered valid if no more than 25% of the Members oppose it.
5. The Chairperson shall collect the votes and abstentions of members after the deadline. The Chairperson shall immediately notify the members and the Secretariat of the decision taken which thereby becomes effective. Decisions made by written procedure shall be declared at the next meeting of the ET BGR. In any case, the ET BGR procedures shall apply.

IFAE
Edifici Cn – Campus UAB
E-08193 Bellaterra (Barcelona) Spain
Prof. Mario Martínez Pérez

Tel: +34 93 691 1984
Fax: +34 93 581 1938
http://www.ifae.es
mmp@ifae.es

13th November 2023

HORIZON-INFRA-2021-DEV-02
Einstein Telescope Preparatory Phase (ET-PP)
GA-101079696

Notes on Deliverable 4.1 (D10)
Scan of legal procedures, permitting and land acquisitions

Dear EC Officer,

The document, D4.1, is a deliverable of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696.

There are two official candidate sites to host the Einstein Telescope, the EMR site (at the boarders of The Nederlands, Belgium and Germany) and Sardinia site. Site selection and the optimal geometrical configuration (1 triangle or 2L in two different sites) is still under discussion.

A strong activity to support site candidature is ongoing at both sites in order face different aspects related to ET constructions and operations, ranging from local noise to geophysical aspects, from environmental to socio-economic impact and so on.

Legal procedures, authorization, permits and land acquisitions are among the issues to be taken under consideration to build the ET infrastructure.

Host teams supporting the site candidature are implementing different organization strategies strongly affected by the national and regional fundings supporting the activities (42M€ for the EMR team and 50M€ for the Sardinia team).

In the case of EMR site, a first study of the engineering, legal, and permitting aspects ordered by the University of Liège using core funding of ULiège, RWTH, Provincie Limburg (NL) and Nikhef is available and it will act as a foundation for a second, more specific and detailed study, currently in development.

In the case of the Sardinia site, a call for tender for “Preliminary studies to the feasibility study of ET infrastructure in Sardinia” using national funding will produce, within a wider framework where an engineering study and a geotechnical investigation will be produced, a complete scan of all the procedures, authorization and permits needed. Consequently, the final outcomes of the tender are expected in summer 2025.

Given that such legal and permitting studies need to account for different regulations, and the possibility to obtain a new legislation tailored for the ET infrastructure, an introductive

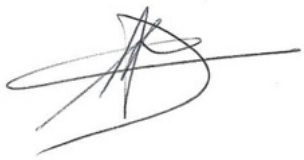
overview is given in the present document, while the final and most complete report will be delivered within the 31/12/2025. This delay does not interfere with other deliverables and comes naturally as complement information to that in D4.5 scheduled for month 42 (spring 2026) in the ET-PP plan.

The D4.1 is composed by two parallel documents, referring to EMR and Sardinia respectively and reflecting the different strategies mentioned above. In both an overview of the legal, permitting and acquisition procedures with regards to public and private aspects is given, listing public and private stakeholders, private and public authorizations and permits.

The complete report obtained by the EMR host team has been attached as annex to the EMR document. The study has been done under the following assumption: ET is located in The Netherlands and Belgium, it has a triangular shape, the access to ET are vertical shafts, and the tunnels will be dug at least at a depth of 200 m, more likely at 250 m depth.

The complete document containing Tender Specifications of the “Preliminary studies to the feasibility study of ET infrastructure in Sardinia” is the annex of the Sardinia document. Through a tender of about 14 million euros, the Sardinia host team is assuming that ET is located in the area of Sos Enattos (NU, Italy), and it is considering both triangular (six interferometers inserted in a system of tunnels and caverns with an equilateral triangle layout on a side about 11 km) and L shape (two interferometers inserted in a system of tunnels and caverns with an 'L' layout on a side about 16 km) configurations. As previously said, the tender includes the execution of surveys and the preliminary environmental impact assessment, for infrastructure works, underground and above-ground, building and plant engineering. The contract expressly includes, in addition to the preparation of the Study, also the execution of all surveys, measurements and surveys necessary for the required level of study.

Yours Sincerely,



Prof. Mario Martínez
ET-PP Coordinator

Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Deliverable 4.1 (D10)

Scan of legal procedures, permitting and land acquisitions (EMR site)

Lead beneficiary: NIKHEF
Delivery Date: 03/11/2023
Dissemination level: internal
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EXECUTIVE SUMMARY

This document, D4.1, is a deliverable of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696.
The report aims at providing high-level overview of the legal, permitting and acquisition procedures with regards to public and private aspects when considering the planning and constructions of the Einstein Telescope in the EMR site. This requires some fundamental assumptions which are for the EMR site: Germany and German law are not considered given the footprint of the Einstein Telescope exclusively located in The Netherlands and Belgium, it is furthermore assumed that the access to the ET are vertical shafts, and that the tunnels of the

ET will be dug at least at a depth of 200m, are more likely at 250 m depth. The report lists the stakeholders, the public authorizations and permits to be and the private authorizations and legal contracts to be acquired, including the acquisition procedures and the establishment of ownership and use rights before the start of the civil works. The scan of these procedures is meant to be updated as the design of the ET evolves and as the exact location of tunnels and corner points are known. Finally, the interactions between the technical aspects and the legal and administrative stages are outlined in the form of a timeline.

List of acronyms and abbreviations

Einstein Telescope : ET

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Sections

1.Stakeholders

The list below gives a non-exhaustive overview of the main stakeholders that will participate in the project:

Public stakeholders:

- Funding authorities
- The regional governments
- The communes and provinces
- Universities
- Permitting authorities
- Sewage authorities
- Road and rail authorities (AWV, SPW, Rijkswaterstaat, Infrabel, etc)
- Utility authorities (electricity, gas, water, signal cables, etc)
- Etc.

Private stakeholders:

- Owner
- Financial organisations
- Engineering offices
- Einstein Telescope
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- Contractors and suppliers
- Facility management
- Land owners
- Control organisms (SECO, AIB Vincotte, etc.)
- Safety coordinators
- Special consultants (lawyers, experts, etc)

- Etc.

2.Scan of public authorizations and permits to be acquired

The scan is provided in the Annex 1 (ANNEX D: Deliverable 2 - Inventory of public authorizations and permits to be acquired before the start of the civil works) regrouping information for the Walloon (including the German speaking community), Flemish and Dutch regions. This scan provides an overview of the Scope of application (including possible exemption); Competent authority; Procedure, including appeals; Criteria for theobtention; Timelines. Below is an example of the scan for the "Plan de secteur" in the Walloon area.

	Scope of application (including possible exemption)	Competent authority	Procedure, including appeals	Criteria for the obtention	Timelines
Walloon area plan (*plan de secteur*) review procedure[1]	Acts and works non-compliant with the area plan and carried out at least partially on the surface: review of the area plan can be put in place to confer greater legal certainty on permits than through a derogation to the area plan. In some cases, a derogation is impossible to grant, so that the review of the area plan is indispensable. Art. D.II.44 and following of the Territorial Development Code	Government (Wallonia or German-speaking community).	A project of revision can be initiated by the government, a municipality or an individual. The government first adopts a draft revision. This draft revision is submitted to an environmental impact report, a public inquiry, and the opinion of some public bodies. If it considers it necessary, the government can modify the draft before its final adoption. Under certain conditions, the revision can be conducted under an accelerated procedure, for example when the revision consists in replacing a zone intended for urbanization by another zone intended for urbanization.	Results of the environmental impact report, the public enquiry and the opinions of the consulted bodies. Since the Walloon area plan is the highest planning instrument in the hierarchy, it does not have to comply with the other instruments, subject however to the effects of territorial development plan (*schéma de développement territorial*).	In theory, the revision must be adopted before the introduction of the building permit application. In theory, the adoption of the final revision order takes place within 24 months from the adoption of the draft revision. In theory, in the accelerated procedure, the adoption of the final revision order takes place within 12 months from the adoption of the draft revision.

[1] This is not an "authorisation", but we place it in the table because it can be included in a multi-step authorisation procedure.

1

3. Scan of private authorizations and legal contracts to be acquired: description of acquisition procedures and establishment of ownership and use rights

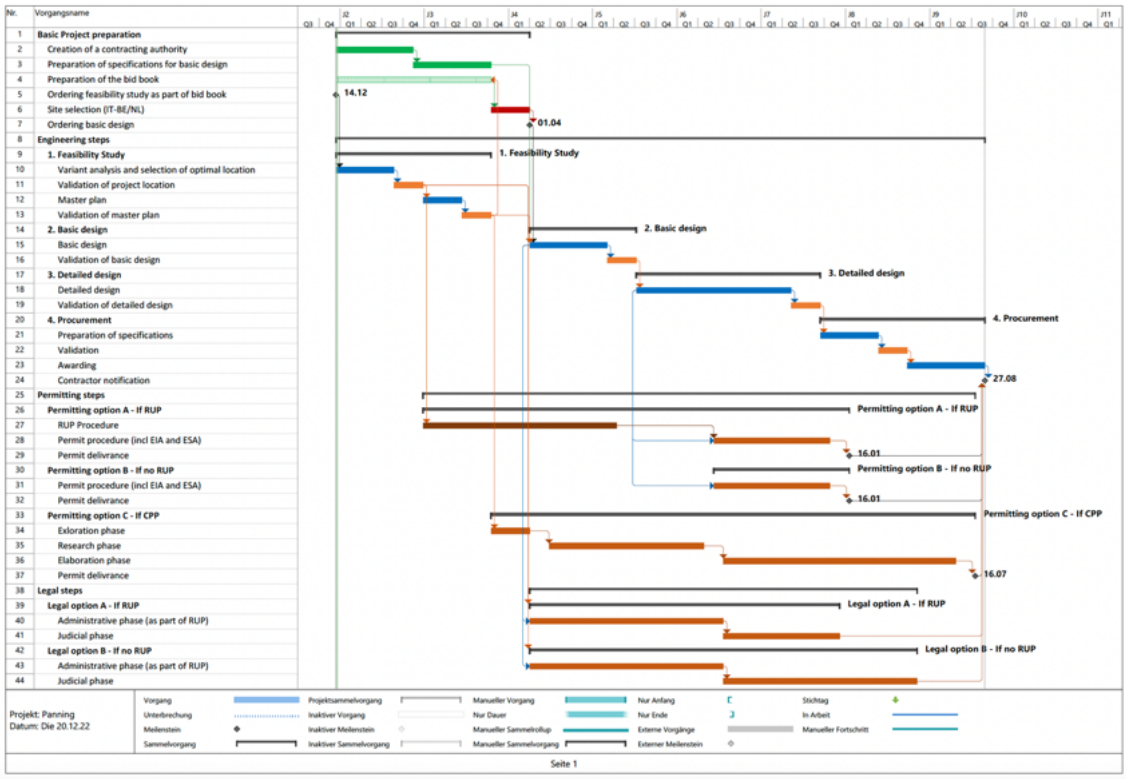
The scan is provided in the Annex 1 (ANNEX E: Deliverable 3 - Inventory of private authorizations and legal contracts to be acquired before the start of civil works) regrouping information for the Walloon, Flemish and Dutch regions. It provides an overview of the procedures for lands owned by private persons or public entities in their private domain which oversees the mode of acquisition, Duration, Extent of the right and Characteristics (advantages, disadvantages, cost, ...); lands owned by public entities in their public domain which oversees the scope of application (including possible exemption), Competent authority, Procedure, including appeals Criteria for the obtention ,Timelines; public procurement which oversees the scope of application (including possible exemption), procedure, timelines. Below is an example of the scan for the conventional and legal casement ("conventionele en Wettelijke erfdienstbaarheid") in the Netherlands.

Conventional and legal easement (*Conventionele en wettelijke erfdienstbaarheid*)	Conventional easement is obtained by contract. Legal easement is given by law. For example right to cross a neighbouring property if the rightholder's property doesn't have a connection to a public road.[4]	Can be infinite in time. Determined by contract.	Limited to what is allowed in the easement contract or allowed by law.	Advantages • Most likely cheaper than buying the property. • Well suited for the tunnels, as they will probably be deeper than the depth that is useful for the owner of the property. • This right 'follows' the property if it is sold. It will not seize to exist in case of a sale. Disadvantages • The things the holder of the right can do on the property are limited to what is allowed in the contract. • The owner of property has possibilities to ask judge to cancel the easement. However, also a limited possibility for the holder of right.[5]

4. Interaction between the technical aspects and the legal and administrative stages

The interaction between engineering steps (given in the Annex 1 : ANNEX A: Engineering steps in a project) and the legal and administrative stages is described in the for of a timeline (Annex 1: ANNEX C: Deliverable 1 - Timelines with all different

phases). An example of a timeline is given below:



Annexes

D4.1 Annex 1.pdf

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Confidential	
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EINSTEIN TELESCOPE

PLANNING OF A CONSTRUCTION PROJECT

Participants

Contributors	Equator, Explane
Writers	Laurence Delplace, Joseph Ickmans

Controls

Approbation	Laurence Delplace Joseph Ickmans	Date: 27.01.2023	Signature

Document references

Project	Document type	Document	Version
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B	Feedback EQTR	25.01.23	SVG/KDM	
C	Feedback Explane	25.01.23	MD/ZV	

TABLE OF CONTENT

1. Introduction

a. Context

The Einstein Telescope (hereafter also called 'ET') is a proposed underground infrastructure to host a gravitational-wave observatory. The infrastructure is foreseen to be dug at a depth of about 250 m and will form a triangular shape whose sides are tunnels about 10 km long and whose corners house scientific instruments in caverns.

One of the possible locations for the ET is in the border region between Maastricht (The Netherlands) and Liège (Belgium). Specifically, the ET will be built somewhere in a search area comprising parts of South Limburg (The Netherlands), the municipality Voeren (part of the Province of Limburg, Flemish region, Belgium) and the Province of Liège (Walloon region, Belgium).

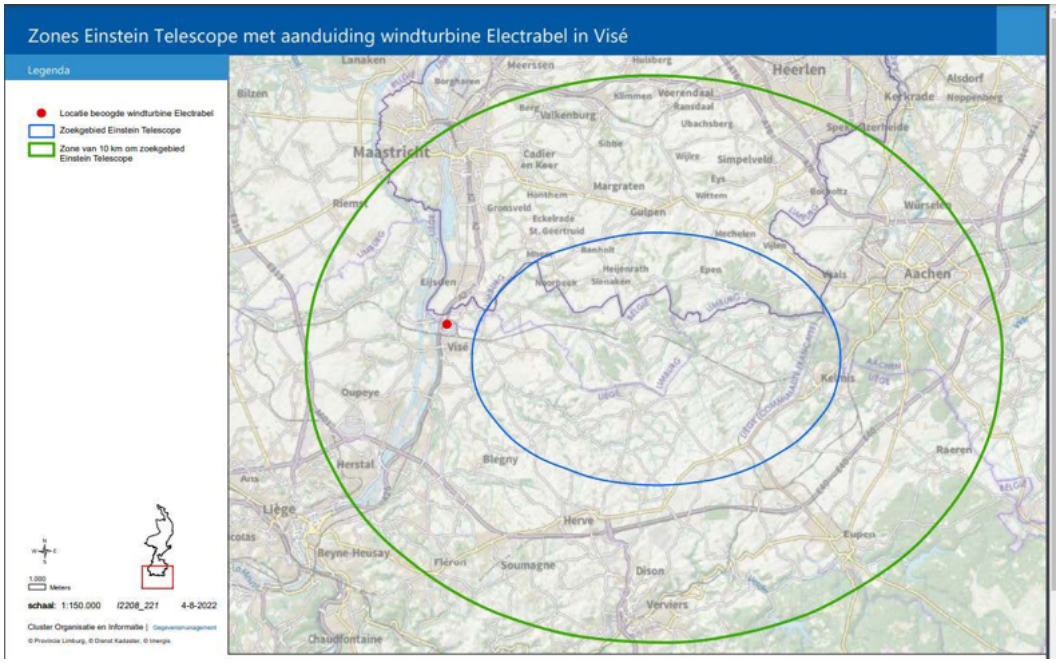


Figure 1: Perimeter of research for the ET project

In this context, we were asked to perform a high-level or global overview of the project timeline, considering the respective requirements in terms of technical and environmental management in three regions: The Netherlands, Flander (Belgium) and Wallonia (Belgium).

b. Objectives and deliverables

This report aims to provide specific important aspects related to the development of large (cross-borders) infrastructure projects and a high-level overview of the project steps, including engineering, legal, and permitting aspects, the latter two being approached under the current existing legal framework (with the exception for The Netherlands where we took into account the new Environmental Law (*Omgevingswet*) which is currently foreseen to enter into force by July of this year).

More specifically, and according to our offer from February the 28th 2022, following deliverables were produced and are attached in the annex of this report.

- Deliverable 1: A schedule of the phases to be planned until the beginning of the civil works, including the interactions between the technical, legal and administrative stages,

the decision moments and the risks associated with the implementation of a project of this scale.

- Deliverable 2: An inventory of public authorizations and permits to be acquired before the start of the civil works.
- Deliverable 3: An inventory of private authorizations and legal contracts to be acquired before the start of civil works: description of acquisition procedures and establishment of ownership and use rights.

This report helps to merge and summarize all different aspects.

2. Input data and assumptions

a. Input data

Following the kick-off meeting on August 31st 2022, we received the map hereabove setting the borders of the project perimeter. We also received a report from Implenia (report dated 25th November 2019), in which the construction of the ET is analysed from an engineering perspective. Finally, we also received a list of coordinates from contacts of some public stakeholders in the Netherlands.

b. Assumptions

The map displayed on the previous page suggests that the research area includes a small part of Germany as well. During the kick-off meeting, the representatives of the ULiège confirmed however that this study is limited to the aforementioned regions. Germany and German law will therefore not be part of this report.

During the kick-off meeting it was confirmed that this study can be conducted under the assumption that the access shafts of the ET will be constructed as “vertical shafts”, and not the inclined access tunnels.

We can also work under the assumption that the tunnels of the ET will at least be dug at a depth of 200 meters, and likely at a depth of 250 meters.

3. Important aspects of complex infrastructure projects

Bigger infrastructure projects are characterized by a multitude of aspects that define and have an impact on the design, the permitting, the execution, the maintenance and the operation of the asset. The first step after defining the project objectives, is often to choose the ideal location for the project, as it is the case for the Einstein telescope. The high level study that helps decide on this is referred to as the Feasibility study in which several defined criteria are compared to each other on a global scale. Criteria that are compared can be cost, timing, legal & permitting conditions, socio-economic impact, technical feasibility, resources and logistics (human and materials) needed for the creation and operation of the asset, etc. This kind of feasibility study is mostly done by an external consultant that can evaluate on an objective basis but that cannot judge the weight of each criteria in the decision for the site. Therefore it is equally important that the initiator of the project (the client or end-user) defines weight ratio's between the different criteria as some criteria will be deemed more important than others.

After an ideal site is chosen, based on the feasibility study, the design phase can be started. At this stage, some of the previously mentioned criteria, become starting points or conditions for the continuation of the project. When the design phase starts, it will be very important to coordinate and follow up on all aspects that define the project: the objectives, the conditions, stakeholders, etc. The main goal for a successful project is to **converge** towards a design that maximizes the compliance to the objectives but that also maximizes support with the related stakeholders.

Therefore an integrated project management is necessary.

There are several systems that describe methods on how to achieve this integrated management, like the PMI concept of Rijkswaterstaat in the Netherlands, but they all treat, more or less, the same aspects that need to be monitored and coordinated. Specifically in bigger projects, these aspects are often split up in different teams:

1) A project management that coordinates and monitors compliance to the objectives like cost & timing

2) Proper management and control of Quality and "Health, Safety and Environment" aspects. This team ensures control and uniform methods via workflows, Document Management Systems, Systems Engineering, Building Information Management, Cost control, planning control, etc.

3) Technical management ensures correct alignment between the different involved disciplines and ensures compliance with valid regulations. Also realistic

4) Contract management will advise on the best possible contractual set-up between client, designers, contractors, consultants, etc. so that risk are avoided and are put with the most suitable party to take these risks. Also change management is an important task in bigger projects.

5) Management of permits and legal aspects. Permit procedures and approach must be aligned with the design team. Also expropriation can be quite a challenge due to the magnitude of the area involved.

6) Management of stakeholders. Big projects have a multitude on stakeholders that are involved and have an impact on it. Proper management and communication proves vital in many similar projects.

It is also opportune to consider some early involvement of execution contractors and maintenance contractors in order to align a contractual set-up or technical design so that risks or additional costs are maximally avoided. Also collaboration with the most important stakeholders during the design, can be a positive input for the project.

In other words, starting up the design phase for big infrastructure projects like the Einstein Telescope will be a complex matter that, aside from technical experts, requires a highly skilled and experienced management team to deal with the above mentioned aspects. Mobilization and maintenance of such a large team, both coordinating and technical personnel, takes time and preparation and will have an impact on the planning.

Furthermore the contract type that will be chosen (Design Bid Build, Design & Build or PPP) and the procurement route will have a huge impact on the organisation of the project and on the process. In our study we started from a more general, traditional approach, but this will have to be revised dependant on the decisions mentioned. If for example a PPP route is chosen, timelines will be impacted an roles and risks will change (engineering in a preliminary phase will be focused on functional specifications, whereas detailed engineering will be undertaken by the PPP consortia, etc.).

4. Stakeholders

Like mentioned in the previous paragraphs, infrastructure projects of the size and complexity of the Einstein Telescope require the participation of many different technical and administrative stakeholders.

The list below gives a non-exhaustive overview of the main stakeholders that will participate in the project. Due to the complexity of the project, it is recommended to initiate a communication towards the different stakeholders already in a very early phase and seek political support.

Public stakeholders:

- Funding authorities
- The regional governments
- The communes and provinces
- Universities
- Permitting authorities
- Sewage authorities
- Road and rail authorities (AWV, SPW, Rijkswaterstaat, Infrabel, etc)
- Utility authorities (electricity, gas, water, signal cables, etc)
- Etc.

Private stakeholders:

- Owner
- Financial organisations
- Engineering offices

- Contractors and suppliers
- Facility management
- Land owners
- Control organisms (SECO, AIB Vincotte, etc.)
- Safety coordinators
- Special consultants (lawyers, experts, etc)
- Etc.

In this kind of project however the number of stakeholders is expected to be high. During the design phase, the owner will be mostly interacting with designers, experts, a project management assistance, peer reviewer, safety auditors and engineers in charge of the impact study. During construction, contractors and their subcontractors will enter the game. All different stakeholders will interact under the supervision of the owner.

5. Project steps

In this section, the global project timeline will be discussed. The project timeline consolidates the various inputs collected during the research. All inputs and analyses are given in the different annexes:

- Annex A. Engineering steps
- Annex B. Deliverable 1 – Schedule of the legal/permitting phases (worst case/best cases)
- Annex C. Deliverable 2 – Inventory of public authorizations and permits
- Annex D. Deliverable 3 – Inventory of private authorizations and legal contracts
- Annex E. Schedule

At this stage multiple scenarios can be considered, as shown in Annex B (without appeal, with appeal, etc.). We chose to represent a realistic case, using a standard design bid build contract form, but, as stated, this of course can vary a lot depending on many factors such as:

- Definitive contract type (design bid build, design & build, early contractor involvement, etc.)
- Success or not in the project communication for stakeholders (avoidance or not of appeals during the permitting and legal phases)

In the following paragraphs, we will detail each phase and the risk or opportunity associated with each of them. The figure below represents a realistic project timeline, be it based on the current data available, and includes three options concerning the permitting steps, and two options concerning the legal steps.

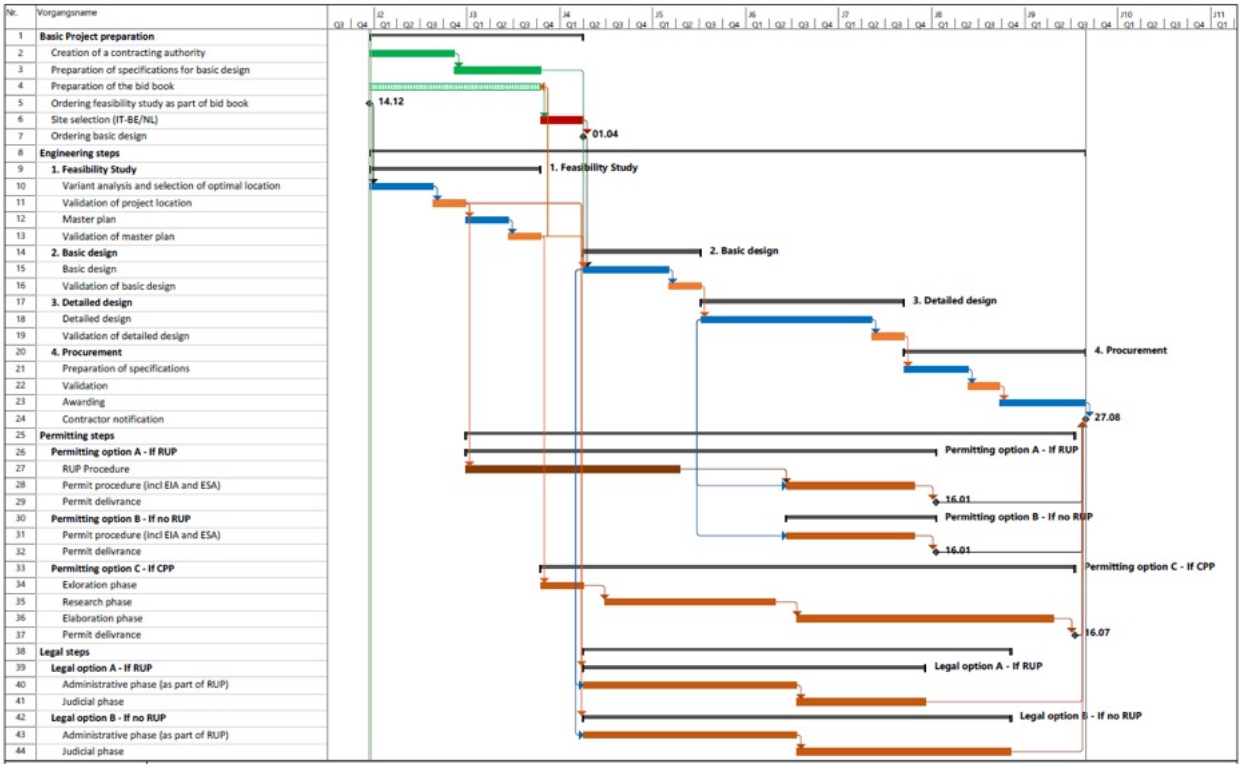


Figure 2: Realistic project timeline

a. Basic project preparation

The first step we want to discuss is the phase we call “Basic Project Preparation” which is currently ongoing. In this phase, we want to emphasize the importance of the different actors of the ET to create an authority that will be responsible for all contracting matters of the project. The existence of such an organization is of paramount importance for all the following steps of the project.

Once the contracting authority is created, the heavy design phases (basic design and detailed design) can start.

The preparation of the bid book is also part of Basic Preparation Phase phase. The selection of the definitive site (Italy or Belgium/The Netherlands/Germany) gives the start for the design work.

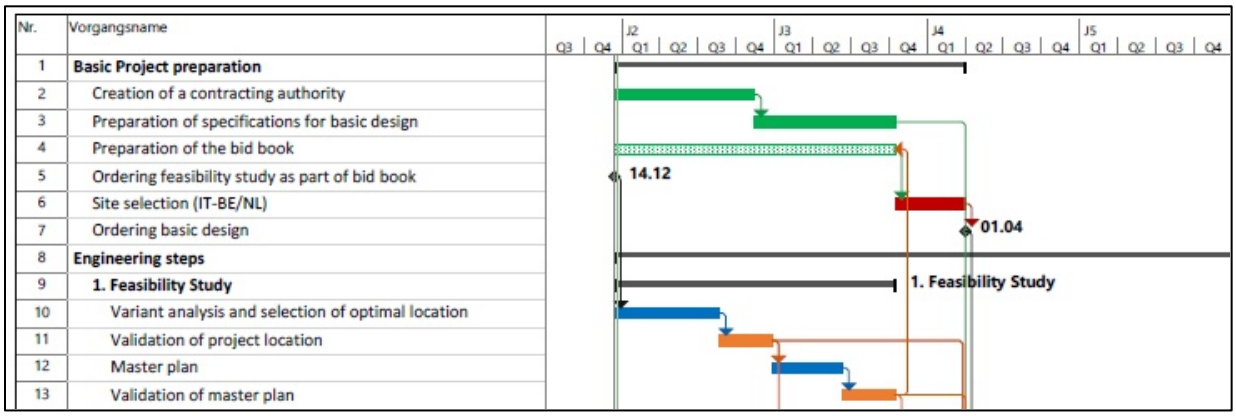


Figure 3: Basic Project Preparation

Feasibility study: The feasibility study comprises a variant analysis, and once the exact location is validated, the production of the Master Plan will serve as a guideline for the rest of the design phases.

We recommend that the feasibility study takes place during the same period that the bid book preparation. The results of this study should be integrated directly within the bid book and give a real added value to increase the chances for BE/NL/DE to be selected as the preferred site.

As mentioned earlier, this phase should start as soon as possible, based on all studies that have been performed until now (by the universities). The anticipation of this phase allows for the integration of the results in the bid book (real added value) and optimization of the overall project timeline.

Integrating the feasibility study in the bid book preparation period allows for an optimization of the project timeline. If ordered after the site selection, this would represent a global shift of the planning of approximately 18 months.

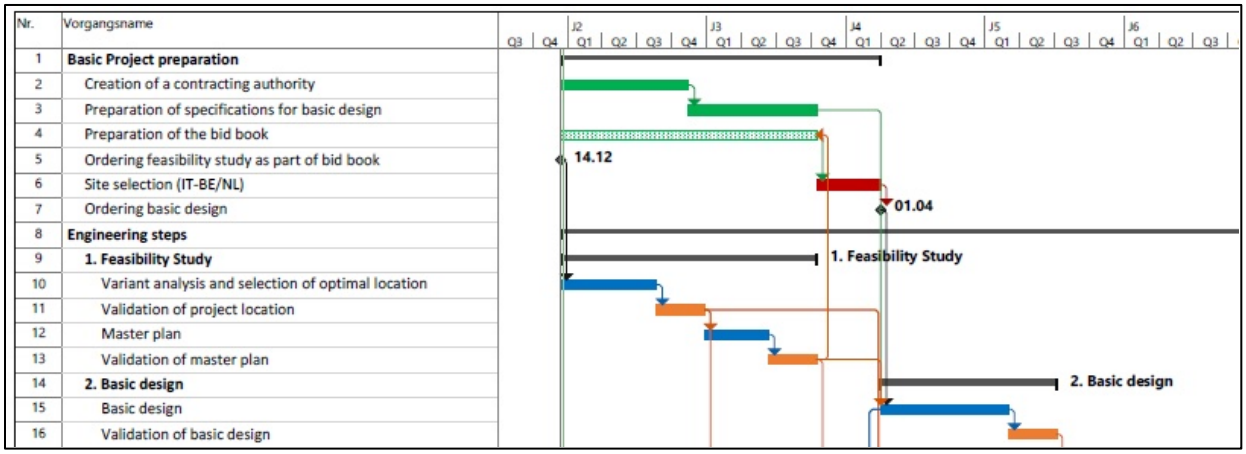


Figure 4: Feasibility Study

For this exercise, we took the assumption that each validation phase last 4,5 months.
The variant analysis is about 9 months long and the master plan is approximately 6 months long.

- As soon as the exact location is selected and validated, the phase of spatial (re)planning can be initiated (only valid if redesignation of lands is required).

- After validation of the Master Plan, the Conceptual & Basic Design can start. This can only be done after procuring the tasks publicly and choosing the most suited partner according to the public procurement law.

b. Conceptual & Basic design

Once the choice for the BE/NL/DE region is made, and after validation of the master plan by the competent authority, the conceptual and subsequent basic design can start. This phase will be followed by a period of validation (assumed to be 4.5 months, including reworking after comments). It will provide indications of the infrastructure costs, work schedule, risk analysis, etc.

Today 12 months have been foreseen for this phase. In this estimation we take into account a lot of repetition in the tunnel design so that the timing for this phase is reduced compared to other infrastructure projects. We assume that there is enough workforce available for this project.

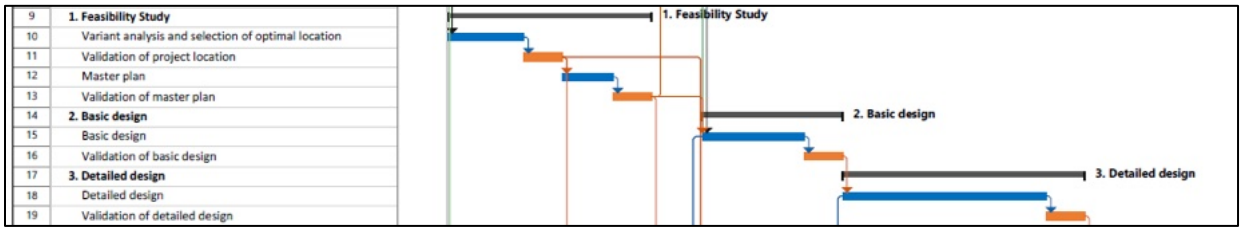


Figure 5: Basic design

c. Detailed design

After the validation of the basic design by the contracting authority, the detailed design can start. This phase is expected to last approximately two years and will lead to the tender design (ie design for procurement) if the majority of the execution design will be done by the executing contractor during construction.

Today 24 months have been foreseen for this phase. In this estimation we take into account a lot of repetition in the tunnel design so that the timing for this phase is reduced compared to other infrastructure projects. We assume that there is enough workforce available for this project.

Similarly, to the basic design, this phase ends with validation by the contracting authority of 4.5 months (including reworking after comments).

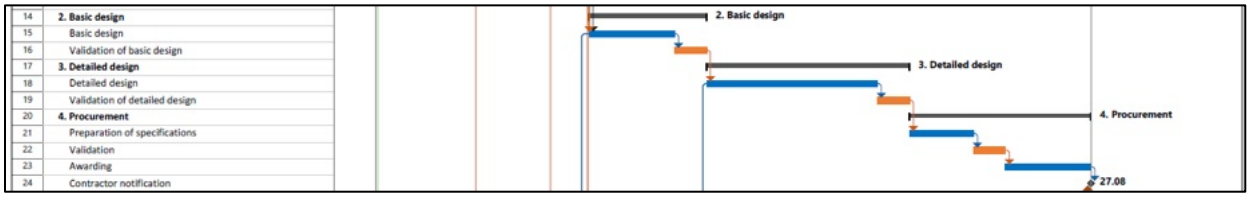


Figure 6: Detailed design

The duration of the detailed design phase depends on many different factors:

- The interface management within the project (also with other disciplines)
- The stakeholders management
- The availability of resources on the market
- The validation phases
- The contract type (execution design excluded or not)

Our experience on big infrastructure projects gives a range with significant deviation.

- Grand Paris Line 17 (design bid build): Detailed design phase (Pro1+Pro2) = 18 months
- Grand Paris Line 15 (design and build with competitive dialogue): Detailed design (Pro1+Pro2) = 12 months
- Brussels Metro Line 3 (design bid build): Detailed design = 5 years

- Oosterweel: Conceptual & Basic design: 18 years; Detailed design: 1.5 year and counting (at least 2 years still in the pipeline for detailed engineering and all important engineering companies are involved)

This shows the possible variations. Because the project is non-urban and impacts a smaller amount of stakeholders than the one listed we assume a duration of about 2 years to be realistic at this stage. The trick will be to generate as much repetition in design as possible. Also the majority of required engineering is geotechnical, so staffing will be a point of attention.

d. Procurement

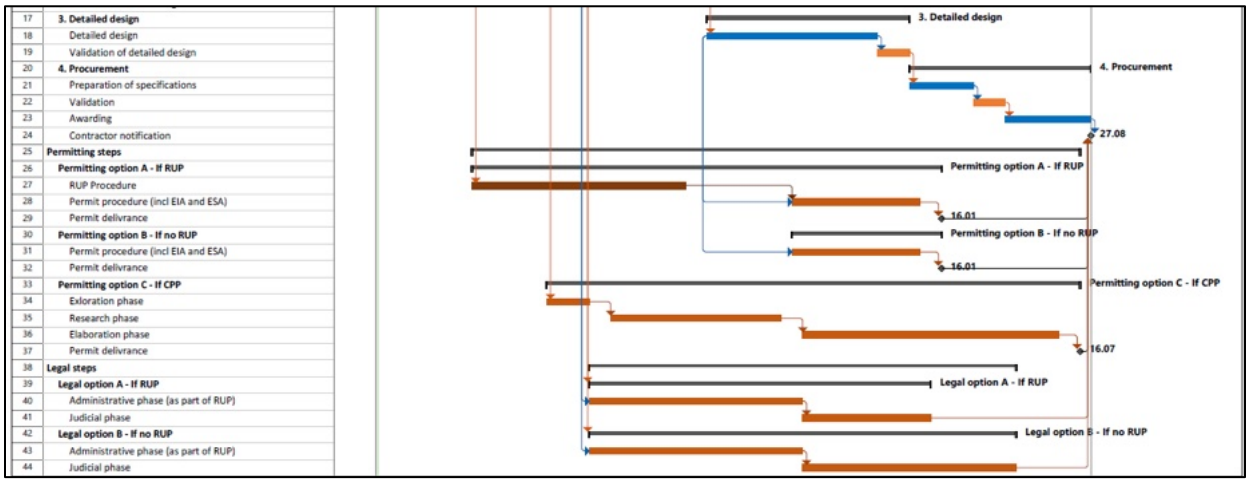


Figure 7: Procurement

Procurement for this magnitude of project will have to be done according to European procurement rules. It is very much depending on the type of contract that will be chosen. Today we took an assumption of 18 months for the timing of this phase.

e. Permitting

The permitting phase (standard procedure) is optimal to be started after finalisation of detailed design but often it is shifted more forward in the planning to gain time (with some risk). In the latter case, permitting is expected to start approximately one year after the start of the detailed design.

The documents given in the Annex B to E gives a summary of the most important permitting steps under the currently existing legal framework. In our project timeline we considered three different options that will be briefly discussed hereafter:

- Option A – standard procedure, with RUP or plan de secteur
- Option B – standard procedure, without RUP or plan de secteur
- Option C – Complex Project Procedure

When considering the standard procedure, we first need to decide if a redesignation of the land has to be done or not (with or without RUP/plan de secteur).

Option A: If yes, this is the first step to be taken. The RUP can start directly after the validation of the exact project location. For such a project, we expect the RUP to be about 30 months long. This duration would be even longer in case of an appeal (see Annex B – Deliverable 1). Once the RUP is finished (including terms of appeal) the permitting procedure can start. It comprises an Environmental Impact Assessment (EIA) and a Safety Impact Assessment (SIA). These procedures can start parallelly to the detailed design and will last at least 18 months, without appeal. This would be the best-case scenario. Obviously, in case of appeal, the permitting phase can extend significantly and even enter into a permit carousel that can last multiple years (cfr. Metro Brussels).

Option B: If no RUP is required, the contracting authority can directly start the permitting procedure in parallel with the detailed design. The risks in terms of duration are exactly the same as for Option A.

Option C: The Complex Project Procedure (CPP) is an alternative to the standard permit procedure and is specifically designed for large-scale, complex infrastructure projects of social, spatial, and strategic importance. It consists of three phases:

- Exploration phase, in which is decided if the project qualifies for the CPP (duration ~6months).
- Research phase, in which an alternative study and the draft-EIA are made. This culminates in a draft preferential decision. This decision will be subject to a public consultation, during which anyone can deliver remarks and objections. This phase coincides with the basic design and the start of the detailed design (duration ~24 months)
- Elaboration phase, which follows more or less the same structure as the research phase, but it will evidently be more concrete and precise. This culminates in a draft project decision. This decision will be subject to a public consultation, during which anyone can deliver remarks and objections. Afterwards, a definitive project decision is taken that can be challenged before the Council of State (duration ~36 months)

If globally the CPP is longer than the standard procedure, it also comes with several interesting advantages.

- There are very few legal deadlines, and thus a high degree of flexibility
- Nearly no appeal possibility, resulting at the end in a probably shorter procedure (compare best case standard procedure with realistic case PCC procedure)
- Many similarities between Belgian and Netherlands procedure allow for easier cross border planning.

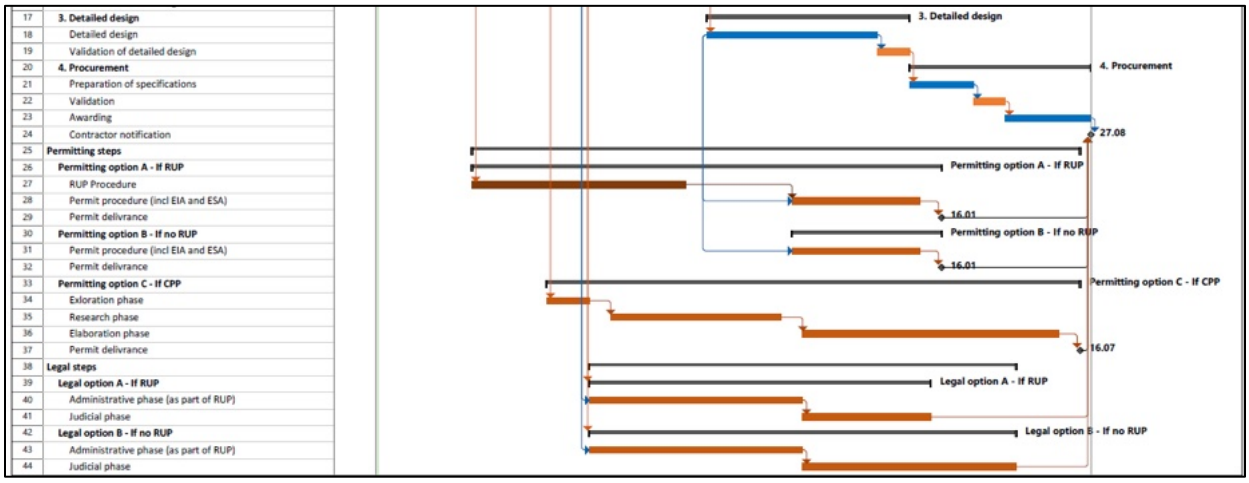
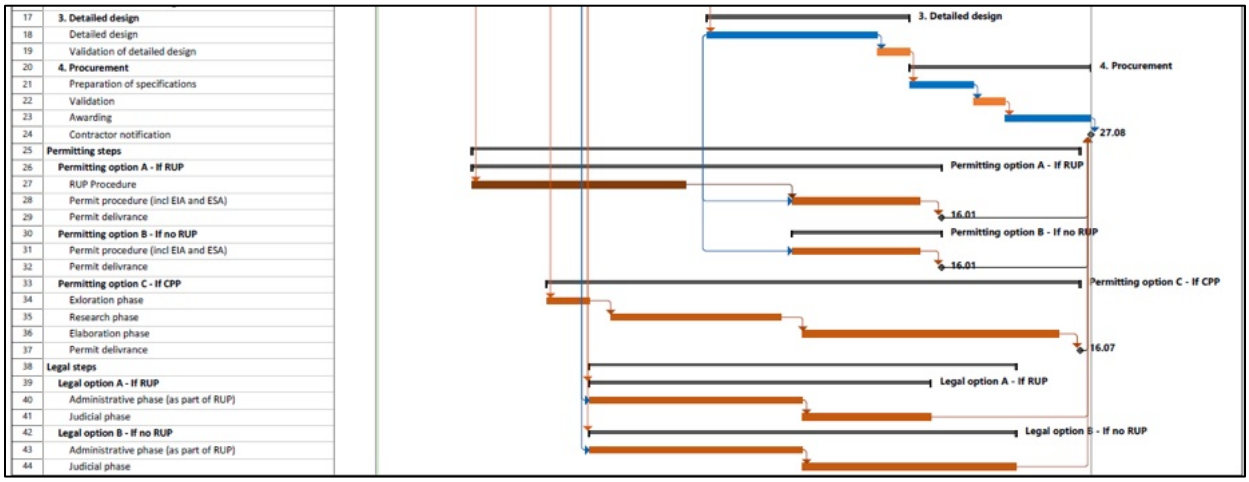


Figure 8: Permitting

f. Legal

The documents given in the Annex B to E give a preliminary overview of relevant legal steps. In our project timeline we considered two different options that will be briefly discussed hereafter:

- Option A – with RUP
- Option B – without RUP



For both options, the first step is an administrative phase of about 30 months (for Flemish and Dutch regions, shorter for Walloon region) and is followed by a judicial phase. The estimation of the duration of the administrative phase is on the “safer” side (and therefore appears to be quite long), since this will involve a large number of land owners that all have to be contacted in order to strive for an amicable acquisition.

The administrative phase can be integrated in the RUP procedure, which can have efficiency benefits. However, this can also be a risk if the RUP gets challenged, because the expropriation plan will in this case form a part of said RUP.

6. Alternative approach outside of the current legal framework

Except for the new Dutch Environmental Law, which is expected to enter into force in the not so distant future (currently expected to be July of this year), the legal and permitting aspects of this project were examined under the currently existing legal framework. Our research indicates that the (preparation of the) construction of the Einstein Telescope under the current legal framework does not seem to be impossible. However, we also noted that the current legal framework also poses possible challenges and uncertainties, especially due to the cross-border nature of the project. This is in part due to the fact that a project like the Einstein Telescope is not fully compatible with the existing legal framework.

Therefore, a completely different approach could be to consider creating a specific legal framework in all countries and or in the regions involved. It might be worth to further investigate for example an approach where the three regions (Flanders, Wallonia & The Netherlands) conclude a framework agreement/treaty in which they provide a legal framework for the Einstein Project. This framework would then be translated into legal texts in the three regions (decrees in Flanders and Wallonia, law in the Netherlands). This framework could involve planning and permitting aspects, potentially even considering obligations on e.g. environmental impacts and public participation.

This approach might be interesting with regards to the use of the underground. Generally speaking, for the access shafts, the research centre and the possible visitor centre and other adjacent functions that are above ground or just a few meters below ground, it will most likely be necessary to acquire the lands of the project area(s), via private contracts or through expropriation. For the tunnels, at a depth of 200-250 meters, it does not seem to be necessary to acquire the underground volumes, since in both The Netherlands and Belgium (federal law), property rights from the owner of a piece of land are limited to what is useful to him. It seems to be a reasonable assumption that in most cases, the property rights of the land owners above the trajectory of the tunnels will not extend so deep that acquiring them will be necessary. However, in order to achieve legal certainties it will still be necessary that legal titles (in the form of a permit/license/concession, similarly to e.g. mining permits/concessions or concessions at sea) are provided. This *ad hoc* legal framework could provide that.

Additionally, this legal framework could also at the same time describe more than just the (preparation of the) construction of the Telescope. It could for instance also create a new legal entity that will operate the Telescope once constructed or describe and organize the funding of the project.

While working with new laws might seem like a heavy burden on the timeline, this does not necessarily have to be the case. Working with new laws means that political motivations and political will also has to be taken into account. If there is enough willingness at the political level, this approach does not necessarily have to take a long time. Roughly speaking (if there is enough political will), the drafting and signing of the framework agreement might take about a year, and the legislative process another year. Besides the advantages mentioned this way of working could create legal certainty, which is needed when setting up mega projects.

7. Concluding remarks and recommendations

Bigger infrastructure projects are characterized by many aspects and stakeholders that define and impact the design, permitting, execution, maintenance, and operation of the asset. As a result, this kind of large infrastructure project is generally lengthy.

In this exercise, we showed how the different steps would succeed each other. In some cases, we chose to optimize the sequence by having various tasks in parallel. Of course, there needs to be a discussion on these as this involves risks.

Another aspect to consider is that the chain of tasks and their duration depends on a lot of repetition in design and the availability of resources on the market. This is not only true for private companies (engineering offices and contractors) but also for public authorities (staffing on managerial aspects aside from technical aspects (project control, contract management, environmental, permitting, etc.)).

Regardless of the option selected at the end, the project will generate reactions from landowners. Early communication with owners and public authorities is essential to avoid lengthy discussions during expropriation, and mediation with private owners will be necessary.

According to the current land planning, it is likely that a redefinition of the land function will be necessary (through a RUP or plan de secteur). This lengthy procedure should be started as soon as possible but is linked to the definition of the exact location of the telescope and an official organisation that can apply for these changes.

Furthermore, the contract type that will be chosen (Design Bid Build, Design & Build, or PPP) and the procurement route will significantly impact the project's organization and process. In our study, we started from a more general, traditional approach, but this will have to be revised depending on the decisions mentioned. If, for example, a PPP route is chosen, timelines will be impacted, and roles and risks will change (engineering in a preliminary phase will be focused on functional specifications, whereas the PPP consortia, etc. will undertake detailed engineering).

This study is a high-level analysis aiming to give a broad and general view of the situation for the permitting and expropriation aspects of the telescope Einstein project. Also to be mentioned is that all boundaries are not known today, and the degree of uncertainties is high. For some aspects, we see some opportunities but would need to investigate further. This is the case, for example, with the separate regulation, the contract type, etc.. In our opinion, it is imperative to create an organisation around the project very fast, further proceed with the investigations on all legal and permitting aspects and start the feasibility study/master plan before to submit the bid books to have a mature project.

8. Annexes

A. Engineering steps in a project

B. Accompanying report for Flemish and Dutch regions and the Netherlands[1]

C. Deliverable 1: Timelines with all different phases

   1. Walloon region
   2. Flemish and Dutch regions
   3. Overall project timeline

D. Deliverable 2: Inventory of public authorizations and permits to be acquired before the start of the civil works

   1. Walloon region
   2. Flemish region
   3. Dutch region

E. Deliverable 3: Inventory of private authorizations and legal contracts to be acquired before the start of civil works

   1. Walloon region
   2. Flemish region
   3. Dutch region

[1] *Explane, our partner in charge of the study in the Walloon region has chosen to group all the information in the tables (deliverables 2 and 3) while Equator, who was in charge of the Flemish and Dutch region has chosen to draft a written note to accompany the tables (deliverables 2 and 3)*

ANNEX A: Engineering steps in a project

1. Feasibility study, variants study and master plan

Description:

During this phase, the technical, geotechnical, urbanistic, environmental, legislative, and financial constraints are determined. The different methods possible for construction are analysed, assessed and the best option is chosen and more deeply analysed (production of the master plan). At the end of this phase, the designer will be able to present a pre-project, with a first estimation of costs and project schedule.

It is also in this phase that the thoughts on the contract type (design bid build, design & build, PPP) are initiated.

Deliverable:

Drawing with:

- Possible location(s) of the project
- Subsoil register (contractors, foundations, etc.)
- Private plots and urban planning constraints
- Geotechnical data

A technical report including:

- A presentation of the situation and the issues identified
- A description of the locations envisaged
- The identified technical constraints and an initial assessment
- The analysis note concerning the tunnel construction techniques,
- The main financial parameters

Feasibility study of the main variants, including the completed multi-criteria comparison for the chosen solutions:

- The technical studies for the construction of the structures and surface development,
- The financial study
    - Investment,
    - Operation,
    - Revenue forecasts,
    - Return on investment,
- Legal study
    - Soils and subsoils
- Planning (timing) study
- Permits study

Master plan including:

- plan views
- plan views of the major surface impacts
- longitudinal profiles
- more detailed plans for complex areas
- phasing of worksite plans
- cross-sections;

- a quantity survey of the main quantities involved;
- a more detailed estimate of capital costs,
- operating costs with projected costs and revenues
- an investment cost

A study including:

- the type of market of the project
- the type of contract to be made with contractors and designers

Planning:

- Feasibility Study
  - Variant analysis: 9 months
  - Master plan: 6 months
- Validation by owner: 3-6 months

2. Basic and Detailed Design

Description:

During this step, the design of the project goes deeper with the collaboration of all the different stakeholders. For example, the following subjects will be analysed more in detail; the requirements during the operation (functional cross-section, access for the personal,…), the impacts on the surrounding (traffic during the construction, settlement above tunnel or around shafts), the security during construction and the exploitation, the construction details, the costs, etc.

In this phase the owner has to take a decision on the contract type (design bid build, design & build, PPP).

Deliverable:

A pre-construction design with:

- A technical report of the Telescope installation,
- more detailed plan views,
- more detailed longitudinal profiles,
- more detailed cross-sections,
- detail drawings,
- descriptive notes by discipline, with starting points, standards in effect, calculations and simulations, argumentation and conclusions,
- a detailed estimate of the investment costs,
- a precise estimate of operating costs and revenues,
- timeframes for completion and phasing,
- expropriation plans.

Planning:

- Basic Design: About 12 months
- Detailed Design: About 24 months
- Validation by owner: ~3-6 months

3. Urbanistic and environmental permits

Description:

Based on the approved Basic and Detailed design, the permits files are completed and sent to the respective administration.

From that moment, the impact study is initiated and results at the end, after a phase of design update (if necessary) on the permits delivery.

Deliverable:

Files for permit request include:

- More detailed plan views,
- more detailed longitudinal profiles,
- more detailed cross-sections,
- a detailed estimate of the investment costs,
- the timeframe for completion and phasing,
- a description of the project.

Formular and eventual answer to be done for the urbanistic and environmental certificates.

Drawings adapted to the feedback from certification

Planning:

Permitting (urban & environmental): in total, including validation from owner, 18 months (if without appeal)

- Permits request: 4 months
- Impact study (external): ~12 months
- Design Update and Permit request update: ~4 months

4. Tendering

Description:

During this step, the project design needed for the call for tender documents will be prepared for the different disciplines, including:

- Tunnel construction works
- Shaft construction work
- Architectural works
- Power supply works
- Electromechanical installations
- Technical installations, smoke extraction, water pipes, sewers, and pumps.
- Access installations (lifts, escalators, etc.)

Then the call for tenders is published, and the question from the contractors must be answered. After receiving all the answers, the different tenders must be analysed to do the awarding.

Deliverable:

The project design for the call for tender documents with:

- more detailed and actualized plan views,
- more detailed and actualized execution plans,
- more detailed and actualized longitudinal profiles,
- more detailed and actualized cross-sections,
- actualized detail drawings
- all formwork plans and reinforcement plans
- Specifications (administrative clauses, technical prescriptions)
- Descriptive quantity take-offs
- Price estimates

Planning: (depending on the type of contract)

- Preparation of call for tenders: ~12 months
    - Tender design
    - Preparation of specifications (admin & technical): 9 months,
- Request for qualifications
- Request for proposal
  Awarding (included legal deadlines and negotiations): 9 months

Annex B: Accompanying report for Flemish and Dutch regions and the Netherlands [2]

[2] *Explane, our partner in charge of the study in the Walloon region has chosen to group all the information in the tables (deliverables 2 and 3) while Equator, who was in charge of the Flemish and Dutch region has chosen to draft a written note to accompany the tables (deliverables 2 and 3)*

Equator

Advocaten - Avocats - Attorneys

Einstein Telescope – Report on the legal circumstances in Flanders and The Netherlands

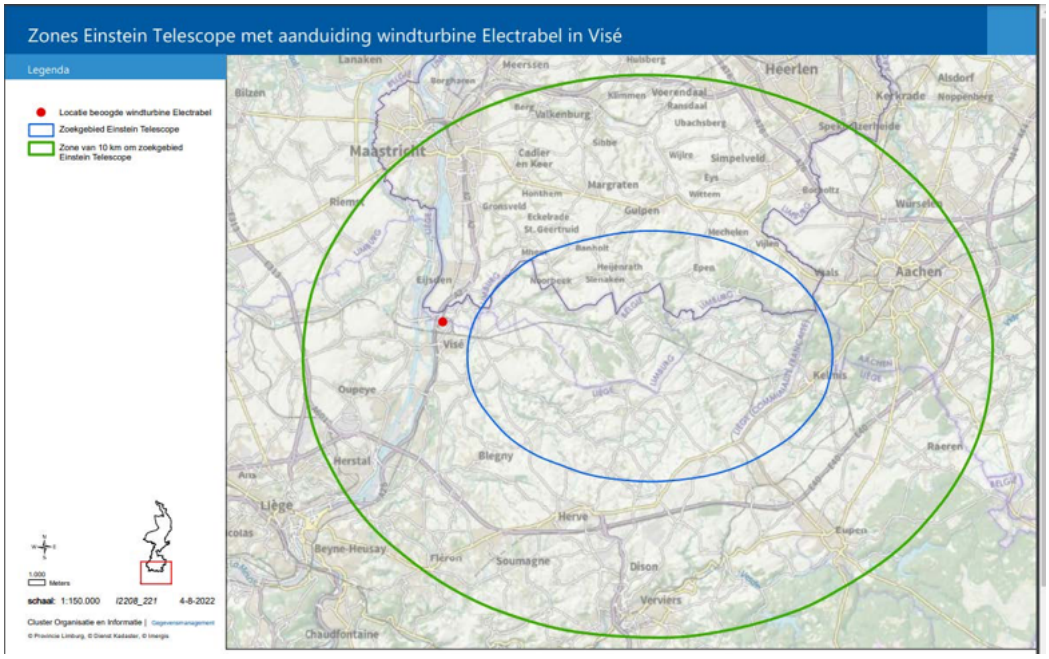
To:	Joseph Ickmans Tractebel Engineering	From:	Steven Van Garsse Koen De Metsenaere
O.Ref.	2931/22/SVG-KDM	Date:	27 January 2023

I. SCOPE OF THE PROJECT AND THIS REPORT

1. In this report we will provide a first, high-level overview of the legal circumstances in Flanders and The Netherlands under which the preparation and the construction of the Einstein Telescope will take place.

2. The Einstein Telescope (hereafter also called 'ET') is a proposed underground infrastructure to host a gravitational-wave observatory. The infrastructure is foreseen to be dug at a depth of about 250m and will form a triangular shape whose sides are tunnels about 10km long and whose corners house scientific instruments in caverns.

3. One of the possible locations for the ET is in the border region between Maastricht (The Netherlands) and Liège (Belgium). Specifically, the ET will be built somewhere in a search area comprising parts of South Limburg (The Netherlands), the municipality Voeren (part of the Province of Limburg, Flemish region, Belgium) and the Province of Liège (Walloon region, Belgium):



4. The University of Liège (ULiège) wants to conduct a feasibility study in order to determine the legal circumstances in the three Regions (The Netherlands and the Flemish and Walloon Regions) under which the ET will have to be prepared and constructed.

5. Apart from the map hereabove, we also received a report from Implenia (report dated 25th November 2019), in which the construction of the ET is analysed from an engineering perspective. Finally, we also received a list of coordinates from contacts of the different stakeholders.

6. After a kick-off meeting and further follow-up questions, the following research questions have been identified:

A. What is the best location for the entry shaft: Flanders, Wallonia or The Netherlands?

7. A few remarks need to be made regarding this main question:

- The map displayed on the previous page suggests that the research area includes a small part of Germany as well. During the aforementioned kick-off meeting the representatives of the ULiège confirmed however that this study is limited to the aforementioned regions. Germany and German law will therefore not be part of this report.
- During the kick-off meeting it was confirmed that this study can be conducted under the assumption that the access shafts of the ET will be constructed as "vertical shafts", and not the inclined access tunnels.[1]
- We can also work under the assumption that the tunnels of the ET will at least be dug at a depth of 200 meters, and likely at a depth of 250 meters.
- This constitutes the main and most important research question of this report. The following questions are important subjects in their own right, but are more or less to be considered as side questions that will hopefully help lead to a global and integrated answer to the main question.

B. Is it more advantageous to place the shafts on public or private property?

8. It was communicated as the difference between public and private property. This implies that the ULiège would like to know if there is a difference in legal approach towards locations that are owned by public actors (e.g. municipalities, public companies etc.) or private actors (private individuals or private companies).

C. Which region has the most lenient/flexible rules concerning ground excavation?

9. Seeing as the construction of the ET will be built almost exclusively underground, apart from the access shafts, it is of course relevant to know the rules regarding ground excavation in the aforementioned regions. A very large amount of ground and materials will be dug up and will need to be removed to other locations.

10. In this regard, the ULiège would also like to know whether there are legal thresholds in the three regions regarding the depth of digging and ground excavation. Are there different rules when

[1] As mentioned in the Implenia-report.

you dig deeper than a certain threshold? And if so, what are those rules?

D. Which procedures will have to be followed during this project, and what will they look like/ how long will they take/ … ?

11. The ULiège would like the know the legal procedures that need to be followed in order to construct the ET. This mainly involves the procedures to obtain the necessary permits in the three regions, but also possible expropriation procedures, planning procedures and environmental assessments.

12. Regarding the aforementioned procedures, it would also be opportune to know the according timelines.

E. What are the most important decision making moments during the project?

13. During the preparation of the construction of the ET, there will undoubtedly be certain key decision making moments. The following sub questions are relevant in that regard:

- What will have to be decided?
- Who has to decide?
- What are the possible consequences of the decision?

14. From a legal point of view, these questions largely relate to the aforementioned procedures and will usually correspond with and have an impact upon the timelines of said procedures.

Closing remark

15. Before we start with our analysis, we need to point out that this report will only examine Dutch and Flemish law. Our partners from the law office Explane will focus on the Walloon region.

II. ANALYSIS

II.1. What is the best location for the entry shaft: Flanders, The Netherlands or Wallonia

[*Answer will be determined by the findings under the following questions.*]

II.2. Which public procedures will have to be followed during this project, and what will they look like/ how long will they take/ … ? [2]

16. In this chapter, we will provide a high-level overview of the main public procedures that, at first glance, might have to be followed in Flanders and The Netherlands in order to build the ET. This overview is restricted to land-related matters (urban planning, permitting, environmental aspects…) and does not take into account other relevant procedures such as public procurement.

17. At first glance, taking into account the scale and specificity of the ET-project, the following procedures might be relevant:

[2] A summary of this chapter can be found in Annex 2 to this report.

- Planning procedure;
- Permit procedure;
- Environmental Impact and/or Safety Assessment;
- Procedures regarding ground excavation;
- Expropriation procedure.

These procedures will be discussed in the following sections (except for the procedures regarding ground excavation, which will be discussed in Chapter II.3[3]).

18. An alternative approach, the (Complex) Project Procedure, will also be highlighted in the final section of this chapter.

19. For **The Netherlands**, we based our analysis on the new "Environment Law"[4], which will replace the current laws regarding permits, plans, programmes, etc. The law was first adopted in 2016, but the entry into force has been delayed a number of times since then. The entry into force is now expected to take place in July 2023. New delays are of course possible, but since the ET project has a timeline of multiple years it is the most reasonable assumption that the new law will be applicable by the time this project starts.

A. Planning procedure

20. For the **Flemish Region**, only the municipality Voeren is included in the search area. Voeren is predominantly designated as agricultural area and areas for nature[5], with only a few "strips" of land designated as living/industrial area or areas for community and public utilities. There is a real possibility that a redesignation is therefore necessary in order to place the shafts. For the tunnels, an overprint on the existing designations might suffice so that the tunnels can be constructed via an easement.

21. The ideal instrument for redesignation is the *Ruimtelijk Uitvoeringsplan* (RUP). A RUP is a plan that is created by the Flemish Region, provinces or municipalities following an integrated planning procedure. It is possible to give specific designations to a certain area that allows the construction of certain facilities or the exploitation of certain activities.

22. The procedure itself is made up of five phases. During each phase, the RUP gets more detailed and concrete. Each phase ends in the finalisation of a (set of) document(s).[6] Between the 4th and 5th phase, the most important public consultation takes place, during which anyone can deliver remarks and objections. Furthermore, the "integrated" aspect of the integrated planning procedure relates to the fact that the Environmental Impact Assessment on the planning level (Plan-EIA) is integrated in the planning procedure.

23. As already mentioned, only the government can make a RUP. The Flemish Region can make a Regional RUP, the provinces make provincial RUPs and the municipalities can make municipal

[3] Since ground excavation is a specific research question, and since these procedures are not purely preparatory but are also intertwined with the execution of the construction works.
[4] *Omgevingswet 23 maart 2016* (in short: 'Ow.). We based our analysis on the consolidated text of 4/10/2022 that can be downloaded here.
[5] According to the Regional Plan (*Gewestplan*).
[6] E.g.: phase 1 → starting nota; phase 2 → scoping nota; phase 4 → draft RUP.

RUPs. Although a RUP can be beneficial towards one or more private actors and said private actors can theoretically also finance the planning process, the right of initiative remains with the aforementioned authorities and these authorities need to ensure that they are always handling in the general public interest, not (solely) in the interests of private actors. Therefore, a balance has to be struck between close contact with the planning authority and making sure that these contacts do not take the form of legally binding obligations for the planning authority.

24. The planning authority decides when the aforementioned phases end by communicating the finalised (set of) document(s). The phases are described and prescribed by Decree, but there are few legal deadlines attached to them. It is therefore difficult to give an estimation regarding the timeline of this procedure. As a general rule of thumb, we can assume that the creation of a RUP takes at least two years, but this can vary a lot depending on priorities, budget etc.

25. The final RUP can be challenged before the Council of State[7], in the form of an annulation appeal. Such a procedure can easily last ~1,5 years.

26. Under the new Environmental Law, the Dutch municipalities will have the obligation to create an Environmental Plan for their territories.[8] It therefore seems to be advised to include the municipalities that lie in the search area (Eijsden-Margraten, Gulpen-Wittem and Vaals, see page 1) in the planning of the ET project, so that the ET is taken into account in their new plans. Alternatively, a change of said plans might be necessary if they have already been created. A Plan-EIA will also have to be included in the plan if the (adjustment of the) plan forms the frame for a project with an EIA duty.

27. The drafting of these plans will of course take time, and since these plans are new and will cover the entire municipal territory it is difficult to give an accurate estimation. For the sake of this report, we will align the timeline with the Flemish creation of a RUP.

28. The administrative phase that culminates in a final plan takes around 6 months. Appeal against this decision is possible before the Dutch Council of State, where the procedure will normally last around 6 months.

B. Permit procedure

29. In Flanders, an environmental permit[9] is needed for the activities summed up in art. 5 OVD[10]. Actions which might be relevant for ET:

- Building the temporary "pre-shaft" and afterwards the permanent building at the shaft entrance (art. 4.2.1 VCRO[11] *jo.* art. 4.1.1, 3° VCRO);
- If built in a wooded area, and forest needs to be removed: permit for removal of forest;
- Building the underground constructions (tunnels, laboratories, ...);

[7] *Raad van State* (RvS).
[8] Art. 2.4 & 4.2 Ow.
[9] Dutch: Omgevingsvergunning ; French: Permis d'environnement
[10] OVD = Omgevingsvergunningsdecreet (Environmental permit-Decree); P. FLAMEY and E. MEES, *De omgevingsvergunning in het Vlaamse Gewest*, Brugge, die Keure, 2021, 32.
[11] VCRO = Vlaamse Codex voor Ruimtelijke Ordening (Flemish Codex for Environmental Planning)

- Exploitation of the underground laboratories might need a permit, but answer will differ if specific gasses, dangerous materials are stored/produced, the amount of energy/ waste-water produced, if generators/cooling installations/... etc. are present, and in what capacity. Due to the scope and scale of the project, we can for the purpose of this report assume that at least some activities will fall under the obligation to obtain an exploitation permit.[12]

30. Up until a few years ago, these different activities required separate permits with separate permit procedures. One of the main goals of the Flemish OVD was to simplify and streamline the different procedures, and therefore introduced the so called "integrated environmental permit" (codified in article 7, §2 OVD). It is now possible to group all the different activities into one singular permit request, resulting in a single permit procedure and a single permit.

31. In many cases, the integrated procedure will also be an obligation, and not simply a possibility. It is possible, under certain conditions, to still work with separate permit requests, but as a general rule of thumb we can assume for the purposes of this report that in Flanders one singular permit procedure and the single resulting permit will suffice for the ET.

32. Some activities don't need a permit, but require a simple notification to the competent government. These notifications are also subject to the rule in article 7, §2 OVD, meaning that if they are inseparably linked to other permitting elements of the project, they need to be included in a singular permit request together with these other permitting elements.

33. The administrative procedure to obtain a permit is organised on different levels. Usually, the municipality in which a project is situated will be the competent authority to assess the permit request and to grant or refuse the permit. The decision of the municipality can be challenged in an administrative appeal procedure, during which the relevant province will redo the assessment of the permit request and make a new, in this case final decision.

34. For some projects, due to their scale or subject, the province in which the project is located will be the competent authority to evaluate the permit at first administrative instance, instead of the municipality. In that case, the Flemish government will be the competent authority to evaluate a possible administrative appeal procedure and make a new, in this case decision. For some other projects, again due to their scale or subject, the Flemish government will be the competent authority to evaluate the permit at first and last administrative instance. In this case, there is no administrative appeal procedure and therefore this decision will be final.[13]

35. Every aforementioned final permit decision can be challenged in an annulation procedure before the Council of Permit Disputes (*Raad voor Vergunningsbetwistingen*, in short and hereafter 'RvVb'). This is a judicial appeal that can result in the annulment of the decision, in which case the authority that made the final (now annulled) decision will have to make a new decision, taking into

[12] The Flemish administration has developed an interactive tool for companies to help companies get an overview of which of their activities require an exploitation permit. See https://vlaremwegwijzer.navigator.emis.vito.be/. It has to be noted that this only provides an indication and is developed with SME's (small-medium enterprises) in mind.

[13] The list of so called "Flemish and Provincial projects" can be found in a Decision of the Flemish Government ("Besluit van de Vlaamse Regering 13 februari 2015 tot aanwijzing van de Vlaamse en provinciale projecten ter uitvoering van het decreet van 25 april 2014 betreffende de omgevingsvergunning", which can be found here).

account the judgement of the RvVb.

36. Every administrative instance follows more or less the same structure and timeline.[14] First, there is a period of 30 days during which the competent authority will determine whether the permit request is admissible and complete.

37. When it is determined that the request is admissible and complete, the actual assessment of the request begins. This assessment takes about 4 months in total (105 or 120 days after the initial period of 30 days, depending on whether an advice from the "environmental permit committee" (*omgevingsvergunningscommissie*) is necessary. This period can under certain conditions be extended with another 60 days. Therefore, as a general rule of thumb, a permit procedure will last about 6 months per administrative instance. At the end of the assessment, the assessing authority will have to make a decision to grant or refuse the permit.

38. The aforementioned timeline includes a public investigation of the permit request during which everyone (but in most cases, people in the neighbourhood) can send their remarks and objections to the assessing authority regarding the project.

39. If an administrative appeal is lodged against the decision, the higher authority will redo the assessment. Generally, the same timelines and principles can be taken into consideration. Therefore, in the case of two administrative instances, the total time it takes from filing the permit request until the final decision can take up to 1 year.

40. The aforementioned timeline of 6 months is purely administrative in nature. Should there be a judicial appeal against a permit decision before the RvVb, the uncertainty around these timelines and the eventual permit increases substantially.

41. Firstly, the duration of an annulment procedure before the RvVb is, on average, about 1 year. There are a few exceptions and incidents that can increase this timeline, but as a general rule of thumb and for the purposes of this report, we will assume a timeline of about 1 year until a judgement is delivered. Should the RvVb annul the permit decision, the authority that made that decision will have to make a new decision, in which case the aforementioned procedure of up to 6 months will have to be followed again.

42. If the RvVb denies the annulment request, the original decision will remain in place. A cassation appeal before the Council of State against the judgement of the RvVb is theoretically possible, and will, in the case that it is lodged, extend the period of legal uncertainty around the permit decision.

43. In **The Netherlands**, several activities related to the ET project will require an environmental permit (omgevingsvergunning). E.g.: 'building activities', 'earth removal activities',... Similarly to Flanders, one environmental permit can contain all the activities related to the ET project that require such a permit.

44. In general, the municipalities will be the competent authorities to evaluate permit requests.

[14] There is a so called "simplified" procedure with shorter timelines, but the ET will most likely be evaluated under the normal procedure. We therefore will not discuss the simplified procedure in this report.

The exception to the rule are the projects of provincial of national interest. For these projects, the provinces or the national government will have competence. The criteria to determine whether a project is of provincial or national interest are not clearly defined, but due to the scope of the ET project it would not come as a surprise if it is classified as a project of national or provincial interest.

45. When it is determined that the permit request is admissible and complete, the authority will decide within 8 weeks, or 12 weeks if another authority also has to decide (all extendable by 6 weeks). Within this period, stakeholders can submit objections. The person requesting the permit can submit an 'opinion' if the authority is planning on denying the request.

46. The permit decision can be challenged before the administrative judge within 6 weeks after the decision. Afterwards, higher appeal before the Council of State is possible. Both procedures last around 6 months.

C. Environmental Impact Assessment (EIA) and Environmental Safety Assessment (ESA)

47. In both Flanders and The Netherlands, an important part of both planning and permitting procedures is the Environmental Impact Assessment (EIA)[15], Plan-EIA and Project EIA respectively. There are a lot of similarities regarding this topic, which of course has to do with the fact that the rules and obligations regarding EIA mainly stem from EU-Directives.[16] In both Plan- and Project-EIA, the goal is to assess the impact of a plan or project on the environment, taking into account factors such as noise, pollution, biodiversity, water, soil, air, etc.

48. As already mentioned, the Plan-EIA procedure is integrated in the RUP-procedure in Flanders. For Projects listed in Appendix I to the MER-decision of 2004, it is required to follow the Project-EIA (Environmental Impact Assessment) procedure, possibly resulting in an Environmental Impact Statement (Report). There is also a possibility of integration regarding the Project-EIA: Project-EIA obligations can be fulfilled either before filing an environmental permit request, or during the permit procedure.

49. Both Plan-EIA and Project-EIA procedures involve close contact and cooperation with the so called "Team-MER", a specific division within the Flemish administration. Team-MER also has decision making competences within these procedures.

50. Generally speaking, the Project-EIA-procedure is divided in three phases. Phase 1 involves preparatory work, defining the scope of the Project-EIA and a notification to Team-MER. Team-MER needs to give its approval within 20 or 60 days, depending on whether or not cross border environmental impact is to be expected. During phase 2, drafting of the Project-EIA takes place. It is obligatory to ask a certified EIA-coordinator for assistance. During Phase 2, there can be cooperation with and support from Team-MER, but there are no formal decisions to be taken by Team-MER in this Phase. Therefore, the duration of this Phase depends heavily on the resources that the initiator of the project is willing to commit to the drafting of the Project-EIA. In the final phase, Team-MER will evaluate and accept or reject the Project-EIA. This decision needs to be taken within 60 days. In the case of a rejection of the Project-EIA, the permit procedure will automatically end (should the

[15] *Milieueffectrapportage*, MER.
[16] Directive 2001/42/EG for Plan-EIA and Directive 2011/92/EU for Project-EIA.

initiator of the project have opted for a simultaneous procedure).

51. Procedurally speaking, the Environmental Safety Assessment (ESA) is very similar to the Project-EIA in Flanders. Team-MER plays an important role in this procedure as well. The procedure is also divided into three phases, and integration in the permit procedure is also possible. During phase 2, there is also an obligation to ask a certified Environmental Safety-coordinator for assistance. The approval in Phase 1 takes up to 40 days, instead of 20 (or 60). In the case of a rejection of the Environmental Safety Assessment in phase 3, the Permit Procedure will automatically end.

52. The scope of the ESA is of course different than that of the Project-EIA. Generally speaking, an ESA is necessary for project related to hazardous substances. When a project will use certain hazardous substances in an amount that surpasses certain thresholds, an Environmental Safety Assessment will be necessary.

53. In The Netherlands, Annex V to the environment-decision (*Omgevingsbesluit*, Ob.) contains a list of projects that require a project-EIA. The project-EIA procedure will be integrated in the procedure of the environmental permit-request. It is important that the person requesting the plan notifies the competent authority (which will be the authority competent for the permit) that it will request a project that requires an EIA. The authority will decide, after (optionally) asking for advice from a specific EIA-Commission.

D. Expropriation in the public interest

54. In order to construct the ET, it may be necessary to acquire lands from public or private actors. If these landowners don't want to sell their lands, expropriation can be a means of last resort. In Flanders, certain levels of government (Flemish Region, provinces and municipalities) and certain named organizations (such as social housing entities) can start an expropriation procedure in order to acquire land in the public interest.

55. There are two main phases in the expropriation procedure: an administrative phase and a judicial phase. During the first phase, the land that will be expropriated is defined. It is mandatory to hold negotiations with the owners of these lands. A draft expropriation plan will be made, together with notes on the necessity and motivation of the expropriation. These documents will be subject to a public consultation, during which anyone (but most likely those who will be expropriated) can deliver remarks and objections. Afterwards, the final expropriation plan is made. The final expropriation plan can be challenged before the Council for Permit Disputes (RvVb) – BUT once the judicial phase begins, any procedures before the RvVb will become null and void.

In order to actually acquire the designated lands after concluding the administrative phase, the owners need to be subpoenaed before the Justice of Peace. This Justice will examine the legality of the administrative phase, and will determine the expropriation compensation. Both these decisions can be challenged before a higher judge.

56. With the different phases and multiple possibilities to appeal, it is difficult to give a coherent timeline is. As a rule of thumb, assume a timeline of about ~1-2 years (but longer is certainly possible). There is a possibility to integrate the administrative phase of the expropriation procedure

into the integrated planning procedure mentioned above. In the larger scheme of the ET project, this might be an interesting opportunity to save some time.

57. Similarly to Flanders, the Dutch constitution allows certain levels of government and certain named organizations to start an expropriation procedure in order to acquire land in the public interest. The government entity has to pay a compensation for the expropriated land which has to cover all the losses suffered by the expropriated person. The expropriation conditions are similar to those in Flanders, which is a result of the fact that the right to property is protected on a European level in article 1 of the first protocol to the European Convention for Human Rights. Since expropriation is an exception to said right, it has to be sufficiently motivated that an expropriation is in accordance with the expropriation conditions.

58. There are multiple public entities that can start an expropriation procedure, but similarly to Flanders the main candidates will most likely be the municipalities, provinces or the national government.

59. There is an administrative and a judicial phase. In the administrative phase the expropriating government has to obtain a decision to expropriate (*onteigeningsbeschikking*). This can be given by the municipalities, provinces or the competent Minister. It is also obliged to first try to obtain the property in an amicable way.

60. If an amicable solution fails, the expropriation can be achieved via court. In the judicial phase, the administrative judge will decide whether the expropriation conditions are met and, in case they are, endorse the decision to expropriate. Appeal against this judgement is possible. Both judicial procedures will last around 6 months. The duration of the administrative phase is difficult to estimate. For the sake of this report, we have aligned the duration with the Flemish administrative phase.

E. Alternative: (Complex) Project Procedure

61. The list procedures mentioned in this chapter is not exhaustive, but these are the main procedures that *prima facie* seem to be important during the preparation of the ET project from a public law point of view. Even though in Flanders there is a certain degree of integration possible during these procedures, we can still identify a number of elements that can have a negative impact on the preparatory work of the ET project:

- Firstly, the large number of different procedures with uncertain timelines makes it difficult to define a global timeline for the ET project;
- There is also a divergence in competences and initiating rights regarding these procedures. While the initiator of the ET project can initiate the permit procedure and Project-EIA- and ESA-aspects, the planning and expropriation procedure remains a sole initiative of public actors. There are also different authorities that have decision making competences;
- Due to the multitude of procedures and decisions to be taken, there are many possibilities for appeal against these decisions. In Flanders, the Council of State is the main instance for appeal, with procedures that can easily take up to 1,5 years. The Council for Permit Disputes is also relevant for the permit procedure, with standard procedures taking around

12 months. In The Netherlands, there are also a lot of possibilities for appeal. Generally speaking, the judicial procedures appear to be shorter, but the multitude of appealable decisions in both Flanders and The Netherlands remains a factor of uncertainty in the preparation of the ET project and risks slowing down the project with multiple years.

- There is also the cross border aspect of the ET project. The problems mentioned in the previous two bullet points are mainly described from a Flanders point of view, but it must not be forgotten that the rules and procedures of The Netherlands and Wallonia also need to be followed. This will create further complexity and asymmetry regarding the procedures, accompanying timelines and decision making moments. For example: it is perfectly possible that all procedures on the side of The Netherlands go very smoothly, but at the same time the permit in Flanders gets challenged before the Council for Permit Disputes. Even though all procedures in The Netherlands went fine, the ET project will in this case still be delayed because of the procedure in Flanders (or *vice versa*).

62. In an attempt to remedy these issues, it might be interesting to look into using the Complex Project Procedure and the Project Procedure for Flanders and The Netherlands respectively. The (Complex) Project Procedure is specifically designed for large scale, complex infrastructure projects of social, spatial and strategic importance. In such a procedure, which is optional, most of the aforementioned subjects (planning, permitting, EIA, possible expropriation) are considered in a global, integrated procedure. The Flemish and Dutch (Complex) Project Procedures are both inspired by a German role model called *Planfeststellungsverfahren* and are therefore very similar to each other.

63. The Flemish Decree[17] provides a procedural framework in which most of the aforementioned procedures are integrated. There are three phases during a Flemish Complex Project Procedure (CPP).

Exploration phase – During the exploration phase, it is determined whether or not a certain project qualifies for the CPP. If deemed possible, this phase culminates in a start decision.

Research phase – During the research phase, an alternative study and the draft-EIA are made. This culminates in a draft preferential decision. This decision will be subject to a public consultation, during which anyone can deliver remarks and objections. Afterwards, a definitive preferential decision will be taken. This decision can be challenged before the Council of State (RvS).

Elaboration phase – The elaboration phase follows more or less the same structure as the research phase, but it will evidently be more concrete and precise. This culminates in a draft project decision. This decision will be subject to a public consultation, during which anyone can deliver remarks and objections. Afterwards, a definitive project decision will be taken. This decision can be challenged before the Council of State (RvS).

Both the preferential decision and the project decision can include a redesignation of lands and can provide a legal ground for expropriation. The project decision is also an Environmental Permit, if necessary and appropriate. It is also possible for a private organization to take on a more active role

[17] Decree 25 April 2014 regarding complex projects.

during the procedure. Decisions are of course still taken by the competent authority.

The Complex Project Procedure contains very few legal deadlines, which allows for a high degree of flexibility in planning out the timeline and during the preparation of the ET project. The entire procedure can take many years, but the actual timeline will in large part be dependent on the available resources and budget.

64. In The Netherlands, the Project Procedure is fairly similar to the Flemish Complex Project Procedure. The procedure is integrated into the new Environmental Law.[18] It has an even higher degree of flexibility regarding timelines, and only has one appealable decision during the procedure instead of two like the Flemish version. Like the Flemish variant, the Project Procedure encompasses most of the aforementioned Dutch procedures.

65. There are a few asymmetries when you compare the two procedures, such as the absence of a prior appealable decision earlier in the procedure as already mentioned. There are also more obligations in the Flemish regulations regarding EIA compared to Dutch law. Researchers have pointed out however that these few asymmetries could potentially be tackled by aligning the Dutch procedure with the Flemish, which seems to be possible due to the high degree of flexibility in the Dutch procedure.[19]

66. There are many possible advantages in using the (Complex) Project Procedure. As already mentioned, these procedures have very few legal deadlines and allow for customisation and optimalisation of the global timeline for the preparation of the ET project. These procedures also allow for a more centralised decision making process, whereas using the different sectoral procedures would lead to a divergence in competences. It would allow for the initiator of the project to have a more global overview of the project and its timelines.

A very important advantage is the serious reduction of possible appeal procedures when using the (Complex) Project Procedure. Excluding the judicial phase of the expropriation procedure, using the Complex Project Procedure reduces the amount of appeal procedures to only two. In The Netherlands, this is even more favourable from the point of view of the project initiator, since there is only one possible appeal procedure.

Lastly, the high degree of flexibility in both procedures and the many similarities between them should allow for easier cross border planning between Flanders and The Netherlands, something that would be very difficult when one or both sides of the border would opt for following the sectoral procedures.

II.3. Which location has the most lenient/flexible rules concerning ground excavation?

67. Seeing as the construction of the ET will be built almost exclusively underground, apart from the access shafts, it is of course relevant to know the rules regarding ground excavation in the

[18] Sections 5.2 & 16.6 Ow.

[19] F. GROOTHUISE e.a., *Grensoverschrijdende samenwerking bij infrastructurele projecten 2.0. Aanbevelingen voor de revitalisering van de samenwerking tussen Vlaanderen en Nederland bij grensoverschrijdende infrastructurele projecten*, Research report from the Universities of Utrecht and Hasselt and LDR-advocaten by order of the Flemish and Dutch governments (can be downloaded here).

aforementioned regions. A very large amount of ground and materials will be dug up and will need to be removed to other locations. In this chapter, the rules regarding ground excavation in Flanders and The Netherlands will be discussed.

68. Ground excavation is regulated in the so called "Soil Decree"[20] and various implementing decisions from the Flemish government. The decree aims to protect the soil in Flanders from contamination and to reduce contamination where it arises. Therefore, when it comes to ground excavation, traceability of the extracted soils is an important factor.

69. The traceability procedure revolves around the so called Technical Reports. For projects where the volume of extracted ground is >250 m³, a Technical Report is necessary. The ET project will obviously exceed this threshold. The Technical Report has to be drafted by a certified soil remediation expert and examines the following:

- The quality of the soil;
- What can or has to be done with the excavated soil (re-use, remediation, processing, waste)

This Technical Report then needs to be subjected to a review by a certified soil management organization[21], which will then issue a declaration of conformity after a period of 30 days. This declaration is valid for two years. Should the digging works start after this period, an update will be required.

The declaration of conformity can be challenged before the Council of State. As already mentioned, the procedure before the Council of State can easily take around 1,5 years. However, in case of an appeal it will most likely also include a suspension procedure, which takes "only" a few months or even a few days in case of the so called UDN-procedure[22]. The goal of these procedures is to suspend the execution of the declaration of conformity and with it the execution of the excavation works as well.

Other certified soil organizations can challenge the declaration of conformity before OVAM in the form of an administrative appeal. This procedure takes 90 days.

70. Our preliminary high lever-research indicates that The Netherlands has somewhat more lenient rules regarding ground excavation. An authorisation to carry out digging activities (activities "on or in the soil") needs to be obtained on a project-basis. These authorisations are granted by the national government ("Our Ministers").

The applicant has to provide a number of documents and information in his request. One of the requirements is that the applicant must have an accreditation from the Counsel for Accreditation, or a certification from one of the certification-organisations (such as Kiwa Nederland). If these requirements are met, and the applicant is not in a state of insolvency, the authorisation will be granted.

The authorisation can be suspended or withdrawn by the administration. In that case, the general

[20] Decreet betreffende de bodemsanering en de bodembescherming (aangehaald als Bodemdecreet van 27 oktober 2006), *BS* 22 januari 2007, 2579.
[21] There are two certified organizations: Grondbank vzw and Grondwijzer vzw.
[22] This procedure is for extremely urgent matters.

rules regarding objection and appeal are applicable.

II.4. Is it more advantageous to place the access shafts on public or private property ?

71. The biggest difference between Flanders and The Netherlands when it comes to this question, is the distinction between public and private domain. In Belgium (Flanders), lands owned by public entities fall into one of these two categories. Both categories of lands are owned by public entities, but the difference is whether the lands are designated to be used by everyone or not. If they are, the lands are in principle "public domain". If they are not, they are classified as "private domain".

Lands under the category of private domain are in principle subject to private law. Therefore there is not a huge difference between these lands and lands that are owned by private entities. These lands can be sold and can be subjected to rights such as superficies etc.

For lands in the public domain category however, a more strict regime will be applicable, where the application of private law is heavily restricted. Public domain cannot be sold and the possibilities of establishing rights of superficies and emphyteusis are disputed. It is more generally accepted that easements are possible on public domain. An underground easement for the tunnels should be possible.

72. In The Netherlands, the distinction between public and private owned property does not exist anymore. Private law is applicable to lands owned by public entities. These entities are subject to the principles of public law, such as the general principles of good government or a 'public purpose' (*publieke bestemming*), which can lead to certain limitations regarding transactions of their lands owned, but in general public entities in the Netherlands have much more freedom in applying private law instruments to their lands in comparison to Flanders. Thus it is possible to put superficies, emphyteusis, easement, … on public owned property, whereas in Flanders this might be more difficult depending on the category of the property in question.

II.5. E. What are the most important decision-making moments during the project?

73. In Annex 1 to this report, we have drafted an example of a timetable for the preparation of the ET project.[23] In this table, we have indicated the different "terms of appeal" in red, indicating that a certain decision has been taken that can be challenged before a (administrative) judge or with an administrative appeal. These decision can be interpreted as the most important decision-making moments during the (preparation of the) project.

74. The table also clearly highlights the difference between applying sectoral law vs. the (Complex) Project Procedure. When applying the (Complex) Project Procedure in both Flanders & The Netherlands – and aligning them with each other – there is a clear path from start to finish with only three possibilities for appeal and subsequent delays. Compare this to applying sectoral law in Flanders and/or The Netherlands, and you can immediately see that the amount of possibilities for

[23] Disclaimer: this timetable is only an estimation of what the timelines might possibly look like. This timetable cannot be interpreted as advise or guideline and only serves as a visualisation of the different procedures in relation to each other.

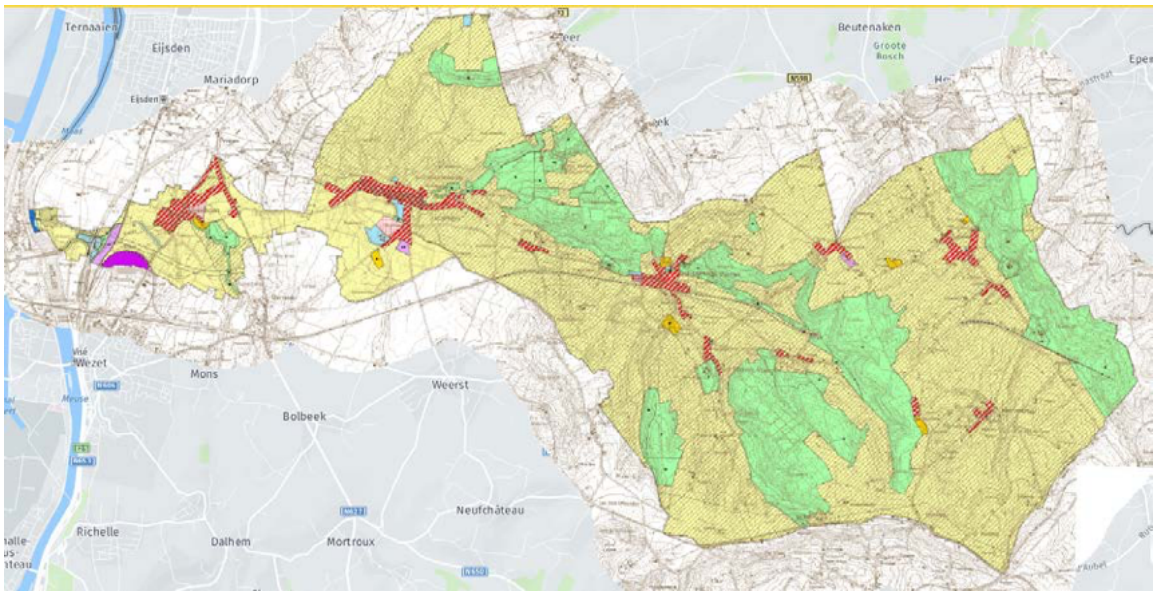
appeal – and subsequent delays – increases substantially.

III. ADDENDUM D.D. 28.12.2022

75. During a discussion with the engineers on the 14th of December, a few follow-up questions were asked. In this addendum we will shortly analyse these questions.

III.1. Is it possible to provide a map of the current "destinations" in Voeren and in the Dutch municipalities within the search area?

76. For Voeren, we have based our analysis on the regional *Gewestplan*, where it is clear that Voeren is predominantly designated as agricultural land (light yellow colour) and lands for nature (green colour). This can clearly be seen on the following map:



(We will also send this map as a separate document)

77. For the Dutch municipalities, we can refer to the following website to view the current destinations by selecting *Ruimtelijke plannen* → *Bestemminsgplannen* in the menu on the right and zooming in to the appropriate levels.

III.2. What would be the required destination in Flanders?

78. More specifically, the question is whether it would be possible to build the ET without a planning procedure (RUP) to change the destination of a certain area. In this case, the current destinations of the *Gewestplan* will need to be considered.µ

79. As we've previously mentioned, the yellow and green locations are not an option, since the planning regulations of these destinations won't allow the construction of the required buildings. That already takes away a lot of possibilities. The remaining destinations are mainly living areas (red colour) and a few spots of industrial area (purple).

80. Of these destinations, the living areas seem to be the main candidate. While it is possible

to have a dedicated "science park" as a subarea of industrial areas[24], there are no such dedicated zones in Voeren according to the *Gewestplan*. Living areas on the other hand are obviously mainly focused on housing, other activities are allowed if they are compatible with the immediate surroundings.

III.3. Is ESA only for the operation of the facility, or also required for the construction works?

81. Our first research indicates that ESA-obligations are indeed only necessary for the operation of the facility. The construction works and the impact of them will have to be described in the EIA.

III.4. Expropriation of underground volumes

82. It is generally accepted that an expropriation can be limited to an underground volume. In fact, it can be argued that this is an obligation rather than an option, since the expropriation conditions dictate that an expropriation has to limited to what is necessary for the fulfilment of the goal of public interest. If an underground volume is all that is needed, then the expropriation must in principle be limited to that underground volume.

83. Such expropriations seem like an alternative approach compared to working with an easement or acquiring all the lands within the trajectory of the ET by means of private law purchase agreements. The workload is not to be underestimated however, since an expropriation procedure dictates that the expropriating entity needs to strive for amicable acquisitions and, if these negotiations don't go well, the owners will need to be subpoenaed before the Peace Justice in order to finalise the expropriation.

84. Additionally it has to be noted that the new Civil Code in Belgium, similarly to The Netherlands, has a very functional approach towards property rights. Previously it was assumed that a landowner's property rights would also include everything above and below the land in question. Under the new Civil Code, property is limited to what is useful for the owner. Seeing as the tunnels will be constructed at a depth of at least 200 metres, an expropriation might in the end not be necessary in a lot of situations. In that case, it does however seem advisable that a legislative framework is provided for the construction works, so that the construction works have a more concrete legal basis.[25] These topics might be worth exploring in further research.

III.5. Regarding the timelines

85. We were asked the question whether it is correct that the (Complex) Project Procedure ((C)PP) will take more time than the combination of the sectoral procedures, since this appeared to be the case in the visualisation of the timelines (Annex 1).

86. In general, it is correct that the (C)PP will take more time compared to the combination of the sectoral procedures, assuming that the sectoral procedures go smoothly. The main positives for applying the (C)PP compared to the sectoral procedures are the increased control and the reduced

[24] If a planning procedure is followed and a certain area is reserved for the ET (in particular the shafts), this seems to be the obvious choice of destination at first glance.
[25] Similarly to the mining-regulations, where a system of permits and concessions is used.

risk of appeal procedures.

III.6. Final notes

87. This report and the considerations regarding the follow-up questions are based on high-level research as previously already communicated. Further detailed information falls outside the scope of this high-level research project and will require additional resources.

88. In that regard, it might also be an option to investigate the possibility to work with *ad hoc*-regulation in the three regions to accommodate the ET project, where each region adopts specific legislation in which the preparation of the ET project and the different procedures are described and, for example, a specific organisation is created for preparing, researching, funding and operating the ET. The regions could for example also work with an overarching treaty to streamline this legislation.

This seems to be a possible alternative approach compared to working with the already existing legal framework and might be worth further investigation.

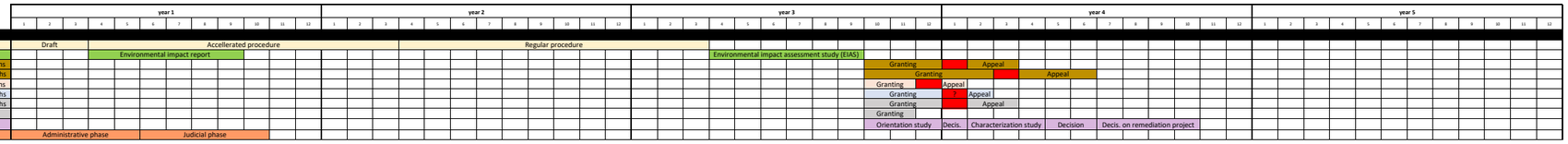
ANNEX C: Deliverable 1 - Timelines with all different phases

1. **Walloon region**
2. **Flemish and Dutch regions**
3. **Overall project timeline**

Preparation Einstein Telescope

DELIVERABLE 1 (estimation of timelines)

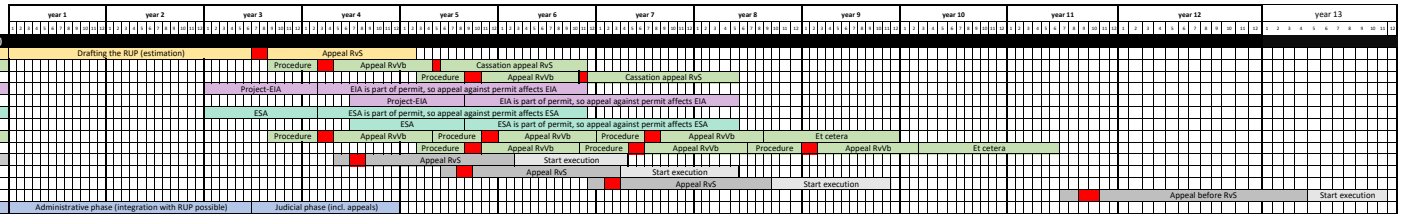
Waloon Region	start	end (without appeal)	end (appeal incl.)
Plan de secteur review procedure	n	n + 12 to 27 months	/
Projects environmental impact assessment	?	?	?
Permis unique (if only class 2 establishments)	End of EIAS	End of EIAS + 3 months	End of EIAS + 6 months
Permis unique (if at least one class 1 establishment)	End of EIAS	End of EIAS + 5 months	End of EIAS + 9 months
Heritage permit (German-speaking Community)	End of EIAS	End of EIAS + 2 months	End of EIAS + 4 months
Authorisation to derogate from the nature conservation law	End of EIAS	End of EIAS + 3 months	End of EIAS + 5 months
Authorisation to modify/create a municipal roadway	End of EIAS	End of EIAS + 3 months	End of EIAS + 6 months
Authorisation to modify/create a regional roadway and regional domain authorisation	End of EIAS	End of EIAS + 1 to 2 months	/
Obligations relating to ground management and remediation	End of EIAS	End of EIAS + 4 to 13 months	/
Expropriation in the public interest	n	n + 7 months	n + 10 months



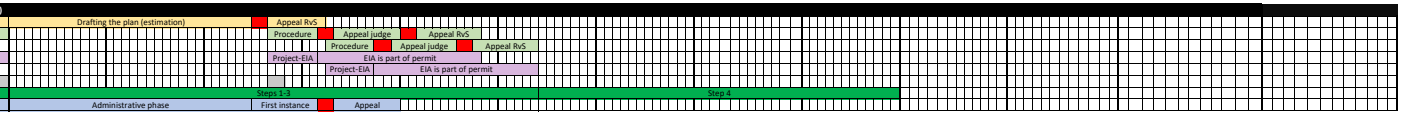
Preparation Einstein Telescope

DELIVERABLE 1 (estimation of timelines)

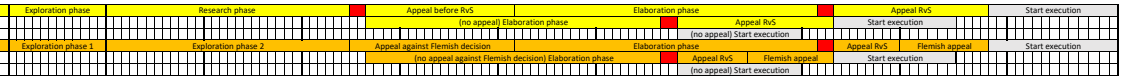
Flanders	start	end (without appeal)	end (appeal incl.)
Integrated planning procedure (RUP)	n	n + 30 months	n + 50 months
Environmental permit	n + 32 months	n + 38 months	n + 71 months
Environmental permit (if appeal against RUP)	n + 50 months	n + 56 months	n + 89 months
Project-EIA (preparation + integration with permit)	n + 24 months	n + 38 months	n + 71 months
Project-EIA (appeal against RUP)	n + 42 months	n + 56 months	n + 89 months
ESA (preparation + integration)	n + 24 months	n + 38 months	n + 71 months
ESA (appeal against RUP)	n + 42 months	n + 56 months	n + 89 months
Environmental permit worst case ("permit-carousel")	n + 32 months	not applicable	??
Permit-carousel (appeal against RUP)	n + 50 months	not applicable	??
Technical report ground excavation	n + 52 months	n + 54 months	n + 74 months
Technical report (appeal against permit)	n + 70 months	n + 72 months	n + 92 months
Technical report (RUP and permit)	??	??	??
Technical report (appeal RUP and permit-carousel)	??	??	??
Expropriation in the public interest	n	n + 36 months	n + 48 months



The Netherlands	start	end (without appeal)	end (appeal incl.)
Environmental plan	n	n + 30 months	n + 39 months
Environmental permit	n + 32 months	n + 38 months	n + 58 months
Environmental permit (if appeal against plan)	n + 39 months	n + 45 months	n + 65 months
Project-EIA (integration with permit)	n + 24 months	n + 38 months	n + 58 months
Project-EIA (appeal against RUP)	n + 42 months	n + 45 months	n + 65 months
Authorisation to carry out digging activities	n + 42 months	n + 44 months	not applicable
Optional- MIRT	n + months	n + 65 months	not applicable
Expropriation in the public interest	n	n + 38 months	n + 46 months

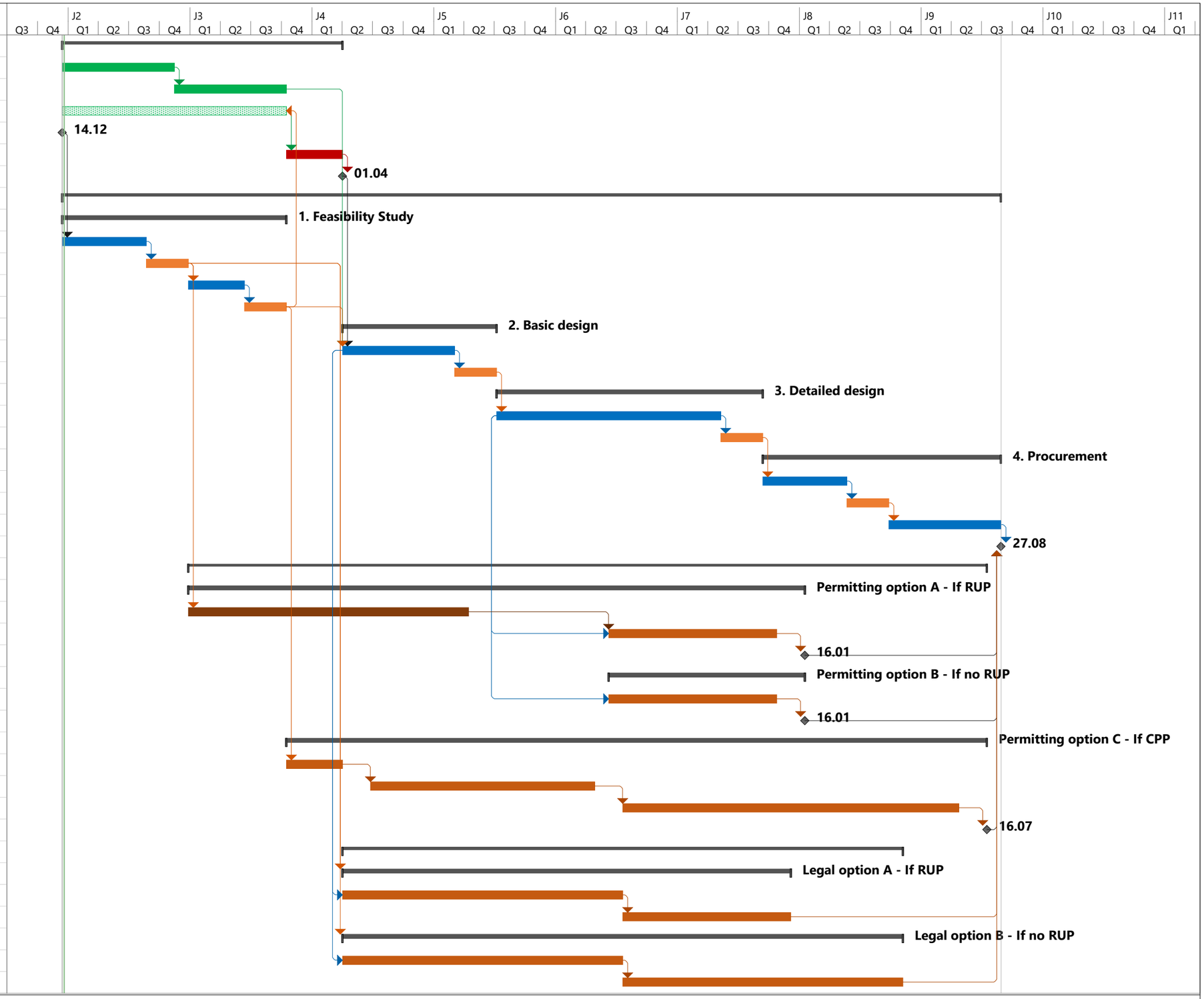


ALTERNATIVE			
Flanders: Complex Project Procedure (estimation)	n	n + 82 months	n + 118 months
The Netherlands: Project Procedure (estimation)	n	n + 82 months	n + 118 months



Terms of appeal

Nr.	Vorgangsname
1	**Basic Project preparation**
2	Creation of a contracting authority
3	Preparation of specifications for basic design
4	Preparation of the bid book
5	Ordering feasibility study as part of bid book
6	Site selection (IT-BE/NL)
7	Ordering basic design
8	**Engineering steps**
9	**1. Feasibility Study**
10	Variant analysis and selection of optimal location
11	Validation of project location
12	Master plan
13	Validation of master plan
14	**2. Basic design**
15	Basic design
16	Validation of basic design
17	**3. Detailed design**
18	Detailed design
19	Validation of detailed design
20	**4. Procurement**
21	Preparation of specifications
22	Validation
23	Awarding
24	Contractor notification
25	**Permitting steps**
26	**Permitting option A - If RUP**
27	RUP Procedure
28	Permit procedure (incl EIA and ESA)
29	Permit delivrance
30	**Permitting option B - If no RUP**
31	Permit procedure (incl EIA and ESA)
32	Permit delivrance
33	**Permitting option C - If CPP**
34	Exloration phase
35	Research phase
36	Elaboration phase
37	Permit delivrance
38	**Legal steps**
39	**Legal option A - If RUP**
40	Administrative phase (as part of RUP)
41	Judicial phase
42	**Legal option B - If no RUP**
43	Administrative phase (as part of RUP)
44	Judicial phase



Projekt: Panning
Datum: Die 20.12.22

Vorgang		Projektsammelvorgang		Manueller Vorgang		Nur Anfang		Stichtag	
Unterbrechung		Inaktiver Vorgang		Nur Dauer		Nur Ende		In Arbeit	
Meilenstein		Inaktiver Meilenstein		Manueller Sammelrollup		Externe Vorgänge		Manueller Fortschritt	
Sammelvorgang		Inaktiver Sammelvorgang		Manueller Sammelvorgang		Externer Meilenstein			

ANNEX D: Deliverable 2 - Inventory of public authorizations and permits to be acquired before the start of the civil works

1. **Walloon region**
2. **Flemish region**
3. **Dutch region**

Cabinet d'Avocats
EXPLANE

Deliverable 2
List of public authorisations that potentially need to be obtained and public procedures that potentially need to be followed before the start of civil engineering works
(Walloon Region)
DRAFT

8th December 2022

	Scope of application (including possible exemption)	Competent authority	Procedure, including appeals	Criteria for the obtention	Timelines
Walloon area plan (*plan de secteur*) review procedure[1]	Acts and works non-compliant with the area plan and carried out at least partially on the surface: review of the area plan can be put in place to confer greater legal certainty on permits than through a derogation to the area plan. In some cases, a derogation is impossible to grant, so that the	Government (Wallonia or German-speaking community).	A project of revision can be initiated by the government, a municipality or an individual. The government first adopts a draft revision. This draft revision is submitted to an environmental impact report, a	Results of the environmental impact report, the public enquiry and the opinions of the consulted bodies. Since the Walloon area plan is the highest planning instrument in	In theory, the revision must be adopted before the introduction of the building permit application. In theory, the adoption of the final revision order takes place within 24

[1] This is not an "authorisation", but we place it in the table because it can be included in a multi-step authorisation procedure.

	review of the area plan is indispensable. Art. D.II.44 and following of the Territorial Development Code		public inquiry, and the opinion of some public bodies. If it considers it necessary, the government can modify the draft before its final adoption. Under certain conditions, the revision can be conducted under an accelerated procedure, for example when the revision consists in replacing a zone intended for urbanization by another zone intended for urbanization.	the hierarchy, it does not have to comply with the other instruments, subject however to the effects of territorial development plan (*schéma de développement territorial*).	months from the adoption of the draft revision. In theory, in the accelerated procedure, the adoption of the final revision order takes place within 12 months from the adoption of the draft revision.
Joint plan-permit procedure	Some limited acts and works that need both building permit and revision of the area: both decisions can be obtained at the same time as result of an joint procedure. Art. D.II.54 of the Territorial Development Code[2]	Government (Wallonia or German-speaking community).	A single public enquiry for the revision of the Walloon area plan and for the permit is conducted. A single environmental impact assessment of the revision of the Walloon area plan and the permit is carried out. A joint preliminary information meeting is organised for the revision of the Walloon area plan and for the project. The competent authority concerning the permit is the government.	Indication in the acknowledgement of receipt of the application written by the Government, that the size and socio-economic impact of the project justify the use of the joint procedure.	The procedure must be executed before the undertaking of the act/work. The deadlines for ruling on the permit application and the deadlines for ruling on the draft Walloon area plan revision are cumulative.

[2] The future reform of the Code will increase the number of hypotheses for joint procedure.

			For the rest, the Walloon area plan revision procedure and the permit application procedure are being followed normally.		
Projects environmental impact assessment[3]	Each project subject to a building permit, an environmental permit, a *permis unique* and/or an authorisation to modify/create a roadway Art. D.62 and following of the Walloon environmental code. Two types of documents : - or environmental impact assessment notice (*notice d'évaluation des incidences sur l'environnement)*, i.e. the minimum document that must be attached to any application form; - or environmental impact assessment study (*étude d'incidences sur l'environnement*), which must be made for projects listed in Annex 1 of the order of the Walloon Government of 4 July 2002 adopting the list of projects subject to an impact study (…), or for projects that are likely to have a significant impact on the environment. Such a study will	Competent authority to grant the permit/authorisation also competent to check the completeness of the environmental impact assessment.	The environmental impact assessment study his is a complete scientific study carried out by an expert office.	Assessment of the impacts of the project on : - population and human health - biodiversity; - land, soil, subsoil, water, air, noise, vibration, mobility, energy and climate; - material assets, cultural heritage and landscape; the interaction between the factors referred above.	No general timelines, but: - environmental impact assessment study can take several months to complete; - the study must be attached to the application form relating to a building/environnemental permit or permis unique (s. below).

[3] This is not an "authorisation", but we place it in the table because it can be included in a multi-step authorisation procedure.

	necessarily be carried out for ET project.				
Building permit	Several acts and works including : - build, or use land for the placement of one or more fixed installations ; - demolish a building ; - transform an existing building ; - change the destination of all or part of a property ; - place a fixed installation; - significantly modify the ground relief ; - woodlanding or deforestation ; - cutting down some specific trees or clearing some specific vegetation. Art. D.IV.4 of the Territorial Development Code Possible exemptions (art. R.IV.1-1 of the Territorial Development Code). If the project also requires an environmental permit (see cell hereinafter), only one permit must be obtained : the *permis unique* (see cell hereunder).	In principle, municipal college. In some hypothesis, the official delegated by the Walloon government (*fonctionnaire délégué*) is the competent authority. It is for instance the case when the act/work take place on the territory of two or more municipalities or is undertook by some public entities (art. D.IV.22 and R.IV.22-1 of the Territorial Development Code).	An application form and a file must be completed and submitted to the competent authority. Some mandatory consultations are required depending on the nature of the act/work. For instance, the fire department must be consulted when the act/work involves the creation or modification of a road. In some cases, a consultation can be binding for the competent authority. In some cases, the permit application is subject to a public inquiry. The permit can be delivered under conditions and/or planning charges. An appeal is available to the Minister of land use planning. In this case, the Minister becomes the competent authority in the assessment of the permit application.	Compatibility with the contents of the Walloon sector plan and guides on the municipal and regional level (e.g.: *plan de secteur* – see below), and with the criteria of the local planning circumstances. However, in our view, these instruments apply only to acts and works carried out at least partially on the surface and not completely several tens of metres underground. For acts and works carried out at least partially on the surface, if they are considered to be carried out for research purposes, they can be considered at least in the following areas of the Walloon area plan: settlement area, rural settlement area, public service and community facilities	The permit must be obtained before the undertaking of the act/work. When the municipal college is the competent authority, it grants or refuses the permit within 30 days, 75 days or 115 days, from the acknowledgement of receipt of the complete file of the application, depending on the publicity and the consultations required. This period can be extended by 30 days. When the official delegated by the Walloon government is the competent authority, he grants or refuses the permit within 60 days, 90 days or 130 days, from the acknowledgement of receipt of the complete file of the application, depending on the publicity and the consultations

				area, mixed economic activity zone[4][5]. Besides, under certain conditions, it is possible to derogate from these spatial planning instruments. A derogation is provided in particular for constructions and equipment of general interest. The permit or refusal of a permit is also based on the constraints that apply on the ground. It may be a flood risk, a heritage protection measure, another measure from the water code, etc.	required. This period can be extended by 30 days. The appeal to Minister must be filled within 30 days following the reception of the decision. The Minister grants or refuses the permit within 95 days from the reception of the appeal. When a permit is granted by the municipal college, the applicant must wait 30 days before starting acts/works authorised.
Environmental permit	Installation or activity to operate in a class 1 or 2 establishment and identify in a list. Art. 11 of the decree of 11 March 1999 on the environmental permit	In principle, municipal college. In some hypothesis, the technical official	An application form and a file must be completed and submitted to the municipal college. If the establishment is located on the territory of several municipalities, the application is sent to one of the	Compliance with the respect of the legislation/regulations in force and assessment of the impacts of the operation on the	The permit must be obtained before the operation of the class 1 or 2 establishment.

[4] In the area that could potentially host the telescope, there is, for example, a vast public service and community facilities area that is not very urbanised and far from housing, in Dalhem at the former fort of Aubin Neufchâteau. There are also quite undeveloped settlement area and rural settlement area in Kelmis (e.g. between Chemin du Loup and Rue de Moresnet, or near Rue du Viaduc) and a large visibly free space in a mixed economic activity zone in Moresnet (rue de la Foulerie).

[5] The telescope will also have to comply with the requirements of the territorial development plan (*schema de développement territorial*), which is currently being drawn up. It could be very interesting to contact the Walloon administration and the Walloon government to try to integrate, in this plan, prescriptions which directly concern the ET project.

	Annex 1 of the order of the Walloon government of 4 July 2002 establishing the list of projects subject to an impact study, classified installations and activities or installations or activities presenting a risk for the soil. If the project also requires an building permit (see cell hereinabove), only one permit must be obtained : the *permis unique* (see cell hereunder).	(*fonctionnaire technique*) is the competent authority. It is for instance the case when the project takes place on the territory of serval municipalities.	municipal college of these municipalities, at the choice of the applicant, on whose territory the establishment is planned. Then, the municipal college sends it to the technical official. Some mandatory consultations are required depending on the nature of the establishment. For instance, the Groundwater Directorate of the Department of Environment and Water in case of drilling and equipping of wells. The permit application must be subject to a public inquiry, except, in some cases, for temporary and trial establishments. The technical official issues a summary report, unless he's the competent authority. The permit can be delivered under special operating conditions. An appeal is available to the Minister of environment. In this case, the Minister becomes the competent authority in the processing of the permit application.	environment in the broadest sense (protection of nature and man).	If the application concerns a class 2 establishment, the competent authority grants or refuses the permit within 90 days from the acknowledgement of receipt of the complete file of the application. If the application concerns a class 1 establishment, the competent authority grants or refuses the permit within 140 days from the acknowledgement of receipt of the complete file of the application. The appeal to the Minister must be filled within 20 days following the reception of the decision. The Minister grants or refuses the permit within 70 days from the reception of the appeal for class 2 establishments and within 100 days from the reception of the appeal for class 1 establishments.

Permis unique	Project requiring both a building permit and an environmental permit. Art. 81 of the decree of 11 March 1999 on the environmental permit. Such a permit will probably be needed for ET project.	In principle, municipal college. In some hypothesis, the technical official (*fonctionnaire technique*) and the official delegated by the Walloon government (*fonctionnaire délégué*), working together, are the competent authority. It is for instance the case when the establishment takes place on the territory of serval municipalities, or is undertook by some public entities (art. D.IV.22 and R.IV.22-1 of the Territorial Development Code).	An application form and a file must be completed and submitted to the municipal college. If the establishment is located on the territory of several municipalities, the application is sent to one of the municipal college of these municipalities, at the choice of the applicant, on whose territory the establishment is planned. Then, the municipal college sends it to the technical official and the official delegated by the Walloon government. Some mandatory consultations are required depending on the nature of the establishment. For instance, the Groundwater Directorate of the Department of Environment and Water in case of drilling and equipping of wells. The permit application must be subject to a public inquiry, except, in some cases, for temporary and trial establishments. The technical official and the official delegated by the Walloon government issue a summary report, unless they are the competent authority.	See criteria described in the two cells hereabove.	The permit must be obtained before the undertaking of the act/work and the operation of the class 1 or 2 establishment (see "environmental permit"). If the application concerns a class 2 establishment, the competent authority grants or refuses the permit within 90 days from the acknowledgement of receipt of the complete file of the application. If the application concerns a class 1 establishment, the competent authority grants or refuses the permit within 140 days from the acknowledgement of receipt of the complete file of the application. The appeal to the ministers must be filled within 20 days following the reception of the decision. The ministers grant or refuse the permit within 70 days from the reception of the appeal for class 2 establishments and within 100 days from the

			The permit can be delivered under special operating conditions. An appeal is available to the Minister of environment and the Minister of land use planning, working together. In that case, the ministers become the competent authority in the processing of the permit application.		reception of the appeal for class 1 establishments.
Heritage permit (German-speaking Community)	Physical alteration or transformation of the external appearance of a listed real properties, an archaeological site or a real property in a protection zone, located on the territory of the German-speaking community. If the act/work also requires a building permit (see above), the heritage permit do not have to be obtained. Heritage decree of the German-speaking community of 23 June 2008.	Government of the German-speaking community.	An application form and a file must be completed and submitted to the government of the German-speaking community. The government of the German-speaking community can exempt the work from a heritage permit if it judges that there is no impact on the protected real property. The royal commission of the German-speaking community for the protection of monuments and sites must be consulted and issues a notice. The competent authority is not obliged to follow this advice but, if it deviates, it must give reasons. The permit can be delivered under conditions.	Assessment of the impacts of the act/work on the protected heritage.	The permit must be obtained before the undertaking of the act/work. The minister – which is delegated by the government to decide in the first instance – grants or refuses the permit within 30 days, from the reception of the notice of the royal commission of the German-speaking community for the protection of monuments and sites. The appeal to the government of the German-speaking community must be filled within 30 days from the reception of the decision.

			An appeal is available to the government of the German-speaking community.		The government grants or refuses the permit within 30 days from the reception of the appeal.
Authorisation to derogate (*dispense*) from the nature conservation law (N.C.A. – *loi sur la conservation de la nature*)	Acts of works that involve destruction of specimens of protected animal and plant species and their natural habitats or the intentional disturbance of such species. Art. 2, § 2, 2 *bis*, § 2, and 3, § 2, of the N.C.A.	General Inspector of the department of nature and forests ("N.F.D.") of the Walloon region	The application is submitted to the Inspector General of the N.F.D. An appeal is available to the Minister responsible for nature conservation against the *refusing* of dispensation or in the absence of a decision by the Inspector General of the N.F.D. within the period. In this case, the Minister becomes the competent authority in the processing of the authorisation to derogate application	Compliance with three cumulative conditions : - derogation's justification on certain specific grounds, depending on whether it harms birds and/or other protected animals and plants species. These may be "imperative reasons of overriding public interest, including of a social or economic nature". However, this ground is not applicable for birds ; - demonstration that there is no satisfactory alternative to the derogation; - demonstration that the derogation "does not endanger the bird population concerned" or "does not adversely affect the maintenance of populations at a favorable conservation	The derogation must be obtained before the undertaking of the act/work. In theory, the Inspector General of the N.F.D. decides on the application within 3 months from the reception of the complete application. There is no deadline set for the introduction of the appeal. In case of an appeal, in theory, the Minister shall make a decision within 1 month from the reception of the appeal.

				status" (other protected species).	
Authorisation to modify/create a municipal roadway	Create, modify or abolish a municipal road. The modification of a municipal road for a period not exceeding twelve months and necessary for the implementation of an urban planning permit or an environmental permit is not subject to this authorisation. Decree of 6 February 2014 on municipal roads. Order of the Walloon Government of 24 January 2019 establishing the list of modifications to a municipal roadway not subject to prior authorisation by the municipal council.	Municipal council	The content of the application for authorisation is described in article 11 of the decree of 6 February 2014.. There is no legal application form. The application is submitted to the municipal college. The authorisation application must be subject to a public inquiry An appeal is available to the Minister of land use planning.	Assessment of the impacts of the modification/creation with regard to the objectives of improving the road network, making easier for weak users to get around and of encouraging the use of soft modes of communication.	Authorisation must be obtained before the creation, modification or deletion of a municipal road. The municipal council must decide within 75 days from the reception the application. The appeal to the Minister must be filled by the applicant within 15 days from the reception of the decision. For interested third parties, the appeal to the Minister must be filled within 15 days from the reception the decision. The Minister makes a decision within 60 days from the reception of the appeal.
Authorisation to modify/create a regional roadway	Works on the regional public road domain.	Walloon administration: S.P.W. Mobility & infrastructure	An application form must be completed and submitted to the S.P.W. Mobility & infrastructure. The S.P.W. Mobility & infrastructure may grant its	Assessment of the impacts of the modification/creation with regard to the objectives of establishing a road	Authorisation must be obtained before the undertaking of the work. The application must be submitted to the managing

	Decree of 19 March 2009 on the conservation of regional public roads and waterways. Order of the Walloon Government of 24 January 2019 establishing the list of modifications to a municipal roadway not subject to prior authorisation by the municipal council.		authorisation by means of a unilateral act or a contract (see deliverable 3). There is no organized appeal against the decision of S.P.W. Mobility & infrastructure	network in the interests of the public domain, its users or its environment, and in accordance with the principle of equality or other interests of a general nature.	authority 60 days before the start of the planned occupation or the work requested, or at least 30 days before when the work requested only superficially affects the public domain. The administration does not have a time limit for its decision.
Domain authorisation (municipal domain)	Occupy or use the municipal public domain, including municipal roads, in a manner exceeding the ordinary right of use belonging to any citizen.	Municipal college	The managing authority may grant its authorisation by means of a unilateral act or a contract (see deliverable 3). The procedure can be determined in a municipal regulation.	Assessment of the impacts of the domain authorisation with regard to the interests of the public domain, its users or its environment, and in accordance with the principle of equality or other interests of a general nature.	Authorisation must be obtained prior to the occupation or use of the municipal domain. Deadlines for decisions may be provided by communal regulations.
Domain authorisation (regional domain)	Occupy or use the regional public domain in a manner exceeding the ordinary right in a manner exceeding the ordinary right of use belonging to any citizen. The regional public domain includes the public road regional domain, the waterways and the major hydraulic works under the	Walloon administration: S.P.W. Mobility & infrastructure	An application form must be completed and submitted to the S.P.W. Mobility & infrastructure. The S.P.W. Mobility & infrastructure may grant its authorisation by means of a unilateral act or a contract (see deliverable 3).	Assessment of the impacts of the domain authorisation with regard to the interests of the public domain, its users or its environment, and in accordance with the principle of equality or other interests of a general nature.	Authorisation must be obtained prior to the occupation or use of the regional domain. The application must be submitted to the managing authority 60 days before the start of the planned occupation or the work requested, or at least 30

	management of the Walloon Region. Decree of 19 March 2009 on the conservation of regional public roads and waterways		There is no organized appeal against the decision of S.P.W. Mobility & infrastructure		days before when the work requested only superficially affects the public domain. The administration does not have a time limit for its decision.
(Future) Permit or declaration for exploration or exploitation of underground resources	Explore or exploit certain underground resources, including : - hydrocarbons and combustible gases deposits; - geological storage sites for heat or cold energy; - deep or shallow geothermal deposits for energy production (heat or electricity); - man-made or natural underground cavities; - sites for the geological storage of carbon dioxide. Preliminary draft decree on the management of underground resources, which should soon be tabled in the Walloon Parliament	To be seen when the decree is adopted	To be seen when the decree is adopted	To be seen when the decree is adopted	To be seen when the decree is adopted
Obligations relating to the use and traceability of excavated soil	Any movement and use of excavated soil. A control and monitoring regime is applicable, which includes various administrative documents, such as	NGO Walterre (appointed by the Walloon Region).	The control and traceability regime for excavated soil includes several obligations: - a soil quality control must be carried out by an expert before it leaves its original site ;	Compliance with the "threshold values" (*valeurs seuil*) that are established according to the concentration of pollutants present in the soil corresponding	The different steps must be carried out throughout the soil movement process. In theory, Walterre must send the soil quality control certificate to the

	a “soil quality report” (*rapport de qualité des terres*). However, this regime does not apply in particular to: - excavated soil reused on the site of origin, in an area of the same type of use, or a type of use less sensitive than the area from which the soil originated, and provided that the site of origin is not suspect of being polluted; - excavated soil from the site of origin, when the total volume does not exceed 20 m³ provided that this site is not suspect of being polluted or does not exceed 400 m³ and fulfill certain conditions; - excavated soil from natural or agricultural site, under certain conditions. **Order of the Walloon Government of 5 july 2018 relating to management and traceability of excavated soil**		- the expert prepares a soil quality report, which is sent to Walterre for approval; - if the report is approved, Walterre issues a "soil quality control certificate", which determines, in particular, the types of permissible uses of the soil concerned (see below); - the soil movement must be notified to Walterre, which must indicate in particular the soil origin and its destination. If the notification is complete, Walterre issues transport documents. Any vehicle transporting soil must have these documents ; - the end of the soil movement must also be notified to Walterre. The person in charge of the soil removal site must then confirm receipt.	to the level up to which the concentrations are acceptable are determined for each type of use. A “type of use” is determined for each site of origin and each site of reception, based on the allocation of the site of entitlement to the Walloon area plan or its de facto allocation.	applicant within 15 days from the reception of the soil quality report. In theory, Walterre must sent transport documents to the applicant 2 days – 24 hours if the soils are sent to a landfill – from the notification of the soil movement.
Obligations relating to ground management and remediation	According to the decree of 1 March 2018 on ground management and remediation, an “orientation study” – and then, if necessary, a characterization study and/or a remediation plan – must be carried out if an application for building permit relates to a	Walloon administration (Ground Remediation Direction – the “G.R.D.”).	The orientation study must be approved by the G.R.D. If pollutant concentration thresholds are exceeded, the G.R.D. requires a characterization study. The purpose of the latter is to know exactly the nature and level of the pollution and,	Granting of a ground control certificate (*certificat de contrôle du sol*) if : - after receiving the orientation study, G.R.D. notes that no values relating to the	Orientation study must be carried out before the application for building permit that relates to a polluted or potentially polluted land. The study must be attached to the application.

	polluted or potentially polluted land (see http://bdes.spw.wallonie.be/portal/fr/web/guest/app/-/consultation/carte). Derogations apply in several hypothesis and exemption may be applicationed to the Walloon administration (Ground Remediation Direction) (*direction de l'assainissement des sols*).		if so, to establish whether it constitutes a serious threat. This study also determines the need for remediation as well as the timeframe within which remediation should be carried out. The characterization study must also be approved by the G.R.D. According to the results of the characterization study, a remediation of the ground may be imposed by the G.R.D. The level of remediation will depend on the future use of the land.	soil concentration of pollutants are exceeded; - after receiving the characterization study, G.R.D. considers that a remediation of the site is not necessary; - after having taken note of the remediation works, G.R.D. finds that they have been carried out in accordance with the decree requirements.	The G.R.D. sends its decision on the orientation study within 30 days from the reception of the study. The characterization study must be sent to the G.R.D. within 90 days from the latter's decision concluding that such a study is necessary. The G.R.D. sends its decision on the characterization study within 60 days from the reception of the study. The G.R.D. sends its decision on the remediation project within 120 days from the day on which it sent its decision attesting to the admissibility of the project.
Obligations regarding the management of industrial waste	The producer and the holder of industrial waste is submitted to some obligations. There are three types of industrial waste : hazardous waste, inert	Soil and waste department of the Walloon administration.	The producer of hazardous waste must keep a register and retain it for 5 years. This register must contain some information such as the nature of the waste, the quantity, the date of transfer, etc.	NTR	The annual declaration concerning the storage of hazardous waste must be made before the 31 March of each year.

	waste and non-hazardous/non-inert waste. A waste is hazardous if it presents a specific risk to humans or the environment. The list of hazardous waste can be found in the annex I to the Order of the Wallon government of the 10 July 1997 establishing a catalogue of wastes. However, if a waste is in the list of hazardous waste, the soil and waste department can always recognise its non-hazardous nature. Order of the Walloon government of the 9 April 1992 on hazardous waste		Anyone who stores hazardous waste must make an annual declaration to the soil and waste department. Any holder of hazardous waste is required to make a declaration to the soil and waste department for each transport.		
Autorisation for exceptional transport	Circulation of vehicles which, by virtue of their construction or the indivisible load they carry, exceed at least one of the following dimensions: - length: * single vehicle: 12 m * tractor + semi-trailer: 16.50 m * truck + trailer: 18.75 m - width: 2.55 m - height: 4 m - weight: 44 T for 5 axle combinations - rear overhang: 3 m	Walloon administration "mobility & infrastructure"	The application must be done by registered letter by filling in the form available on the website, *or* online via the application WebTeuv (https://webteuv.wegenenverkeer.be/teuv/fr/login?returnUrl=%2F%3FreturnUrl%3D%252F)	Compliance with the technical requirements for the vehicle according to its characteristics (e.g.: front axle, rear axle, obligation to attach a technical note to the application, etc.).	Authorisation must be obtained before putting the vehicle on the road In theory, authorisation must be notified to the applicant within 5 days from the reception of the application or within 15 days from the application requiring consultation (application for technical information from the road manager).

	Royal order of 2 June 2010 on the road traffic of exceptional vehicles				
Expropriation in the public interest	Compulsory acquisition of real estate property by public authority in the public interest. Decree of 22 November 2018 on the procedure for expropriation in the public interest, applicable when expropriation is pursued in regional matters	Walloon government in regional matters[6]	The procedure is divided into three phases : - the administrative phase, at the end of which the government adopts an expropriation order - the negotiation phase between the beneficiary of the expropriation and the person who is threatened with deprivation of its private property right. If an amicable agreement is reached, there is no expropriation but a private sale (see deliverable 3) - the judicial phase, if an amicable agreement is not reached. A judge must order expropriation on the basis of the expropriation order.	Compliance with four cumulative conditions: - existence of an expropriation hypothesis enshrined in a legislative text (this condition may be difficult in practice because we are not aware of any legal basis that would allow, for example, expropriations for the purpose of scientific research[7]); - pursuit of a public interest purpose; - compliance with the procedure established by the decree; - payment of fair and prior expropriation compensation.	Expropriation must be ordered and found to be lawful before taking possession of real estate. The administrative phase last 135 days from the acknowledgement of receipt of the complete file of the expropriation application. The negotiation phase lasts minimum 15 days. The judicial phase lasts : - +- 50 days between referral to the court and taking possession of the property, if the legality of the expropriation is not contested and no appeal is filed against the provisional judgment; - +- 105 days between referral to the court and taking possession of the

[6] Scientific research is a parallel competence of each entity of the country, so that it can be implemented within a regional competence. However, this means that the realisation of the telescope should be linked to a regional competence, which we do not immediately identify.

[7] A priori, we do not perceive a legal basis for ET. It could be very interesting to contact a member of the government or parliament to try that a decree recognising the public utility of expropriating property for the realisation of the telescope or, more broadly, for reasons of scientific research, get adopted.

					property, if the legality of the expropriation is not contested, but an appeal is filed against the provisional judgment; - +- 95 days between referral to the court and taking possession of the property, if the legality of the expropriation is contested, but no appeal is filed against the provisional judgment; - +- 145 days between referral to the court and taking possession of the property, if the legality of the expropriation is contested, and an appeal is filed against the provisional judgment. In addition, there are time limits for appeals (appeal and cassation) against the judgment on expropriation compensation, but these do not affect the taking of possession of the property.

Some undescribed authorisations :
- Authorisation for the construction and operation of a gaseous products transport facility
- Obligations regarding the safety of elevators

- Obligations regarding the use of explosives
- Authorisation regarding electrical installations
- Authorisation regarding fire prevention and safety
- Obligations related to the use of hazardous substances within the meaning of the cooperation agreement of 16/02/2016 (Seveso)

Equator

Advocaten - Avocats - Attorneys

Deliverable 2
List of public authorizations that potentially need to be obtained and public procedures that potentially need to be followed before the start of civil engineering works
(Flemish Region)

Project of the 30th November 2022

Disclaimer: this list is only a summary of our research and does not provide full information. See our written report for more details.

	Scope of application	Competent authority or organization	Procedure, including appeals	Criteria / remarks	Timelines
Integrated planning procedure	Seeing as the municipality Voeren is predominantly designated as agricultural land and lands for nature[1], there is a real possibility that a redesignation is necessary, at least for the shafts. For the tunnels, an overprint on the existing designations might	Flemish Region, province of Limburg or municipality Voeren.	The creation of a RUP[2] follows an integrated process of five phases. In each phase, the RUP gets more detailed. Between the 4th and 5th phase, the most important public consultation takes place, during which anyone can deliver remarks and objections.	A RUP can only be made by the government (see Competent Authorities). Close contact with planning authority is therefore required.	Few legal deadlines. As a rule of thumb, assume a timeline of at least 2 years (can vary a lot depending on

[1] According to the Regional Plan (*Gewestplan*).
[2] *Ruimtelijk Uitvoeringsplan*.

	suffice so that the tunnels can be constructed via an easement. For every RUP, a Plan-EIA (Environmental Impact Assessment) procedure is also required, possibly resulting in an Environmental Impact Statement (Report)		The final RUP can be challenged before the Council of State[3]. The Plan-EIA procedure is integrated in the RUP-procedure.		priorities and budget). Appeal before the Council of State: ~1,5 years.
Integrated Environmental permit	In Dutch: *geïntegreerde Omgevingsvergunning*. This comprises the planning permit (*stedenbouwkundige vergunning*), environmental permit (*milieuvergunning*) which in itself comprises the exploitation of various classified facilities, and other acts and activities requiring a permit (such as deforestation). The creation/modification of a municipal roadway is also possible during the same procedure (*zaak der wegen*).	Most likely: Flemish Region, due to scale of the construction in floor space (>50.000 m²).	When it is determined that the request is admissible and complete, the actual assessment of the request takes place. This includes asking advice from different public actors, as well as a public consultation during which anyone can deliver remarks and objections. Depending on the competent authority, administrative appeal is possible. The final decision can be challenged before the Council of Permit Disputes.[4]	Since it is an integrated procedure, the list of criteria and conditions may vary. In general, a permit request needs to comply with the applicable planning and environmental regulations, and be in accordance with "good spatial planning"[5].	~6 months per administrative instance. Appeal before the Council of Permit Disputes: ~1 year.
Project-EIA procedure	For projects listed in Appendix I to the MER-decision of 2004, it is required to follow the Project-EIA (Environmental Impact Assessment) procedure, possibly resulting in an Environmental Impact Statement (Report).	Team-MER	Phase 1: notification to Team-MER and preparatory work Phase 2: drafting of the Project-EIA. Mandatory assistance of a certified EIA-coordinator. Phase 3: Evaluation of the Project-EIA. It is possible to do this before the request for an Environmental Permit, or simultaneously. In the case of a rejection of	During Phase 2, there can be cooperation with and support from Team-MER, but there are no formal decisions to be taken by Team-MER in this Phase. Therefore, the duration of this Phase	Phase 1 and Phase 3 both take up to 60 days.

[3] *Raad van State, RvS.*
[4] *Raad voor Vergunningsbetwistingen, RvVb.*
[5] *De goede ruimtelijke ordening.*

			the Project-EIA, the Permit Procedure will automatically end.	depends heavily on the resources that the initiator of the project is willing to commit to the drafting of the Project-EIA.	
Environmental Safety Assessment	Related to hazardous substances. When a project will use certain hazardous substances in an amount that surpasses certain thresholds, an Environmental Safety Assessment will be necessary.	Team-MER	Phase 1: notification to Team-MER and preparatory work Phase 2: drafting of the Environmental Safety Assessment. Mandatory assistance of a certified ES-coordinator. Phase 3: Evaluation of the Environmental Safety Assessment. It is possible to do this before the request for an Environmental Permit, or simultaneously. In the case of a rejection of the Environmental Safety Assessment, the Permit Procedure will automatically end.	Procedurally speaking, it is similar to the Project-EIA procedure.	Phase 1: up to 40 days. Phase 3: up to 60 days.
Soil certificate	Every transaction of land (buildings or no buildings). A soil certificate needs to be transmitted to the person that will acquire the land.	OVAM	Request (digital or by mail) to OVAM. Can also via notary. OVAM will deliver the certificate.	The certificate can be blank, meaning to OVAM there is no known soil contamination or pollution. If there is known soil contamination or pollution, the land will be classified as “high-risk land”.	In case of blank certificate: 14 days. Other cases: 60 days.
Procedures regarding ground excavation	When the volume of extracted ground is >250 m³, a Technical Report is necessary. This Technical Report then needs to be subjected to a review by a certified soil management	Certified soil management organization (Grondbank vzw or	The Technical Report has to be drafted by a certified soil remediation expert and examines the following: - The quality of the soil	The following documents are drafted and issued during these procedures:	Declaration of conformity: 30 days Administrative appeal against said

	organization, which will then issue a declaration of conformity.	Grondwijzer vzw)	- What can or has to be done with the excavated soil (re-use, remediation, processing, waste) The certified soil management organization then examines the Report and issues a declaration of conformity, which is valid for two years (update required if works start after this period). The declaration of conformity can be challenged before the Council of State (RvS). This will most likely be an urgent procedure in order the suspend the execution of the declaration of conformity, and thereby suspending the excavation works.[6] Other certified soil organizations can challenge the declaration of conformity before OVAM in the form of an administrative appeal. A study of the receiving ground also has to be made. In order to start moving the excavated ground, a permission from a certified soil management organization is required. For the transportation itself, transport documents are required.	- Technical Report → declaration of conformity - Study of the receiving ground - Permission to move excavated ground - Transport documents - Declaration of receival - Soil management report Notice that not all these steps are to be taken before the start of the works. The last few steps and documents are intertwined with the works.	declaration by another soil management organization: 90 days Appeal before the RvS: ~1,5 years. Urgent procedures to suspend the execution of decisions can be much shorter (a few months or even a few days in the case of UDN). Permission to move excavated ground: 5 workdays

[6] In extremely urgent cases, the Council of State has a special procedure known as the UDN-procedure (*uiterst dringende noodzakelijkheid*).

			The receiving party issues a declaration of receival upon receiving the excavated ground. The certified soil management organization then issues a soil management report.		
Expropriation in the public interest[7]	As a means of last resort, certain levels of government and certain named organizations can start an expropriation procedure in order to acquire land in the public interest.	Multiple, but the Flemish Region, province of Limburg or municipality Voeren are the main candidates. They also have a more general competence compared to other named organizations.	There are two main phases in the expropriation procedure: an administrative phase and a judicial phase. <u>Administrative phase</u> During the first phase, the land that will be expropriated is defined. It is mandatory to hold negotiations with the owners of these lands. A draft expropriation plan will be made, together with notes on the necessity and motivation of the expropriation. These documents will be subject to a public consultation, during which anyone (but most likely those who will be expropriated) can deliver remarks and objections. Afterwards, the final expropriation plan is made. The final expropriation plan can be challenged before the Council for Permit Disputes (RvVb) – BUT once the judicial phase begins, any procedures before the RvVb will become null and void. <u>Judicial phase</u>	There is a possibility to integrate the administrative phase of the expropriation procedure into the integrated planning procedure mentioned above.	With the different phases and multiple possibilities to appeal, it is difficult to give a coherent timeline is. As a rule of thumb, assume a timeline of about ~1-2 years (but longer is certainly possible).

[7] Expropriation is both relevant as a 'public procedure' (deliverable 2) and as an alternative way to acquire property rights (deliverable 3).

			In order to actually acquire the designated lands, the owners need to be subpoenaed before the Justice of Peace. This Justice will examine the legality of the administrative phase, and will determine the expropriation compensation. Both these decisions can be challenged before a higher judge.		
Alternative: Complex Project Procedure[8]	For large scale, complex infrastructure projects, the Flemish Region has adopted a specific Decree[9]. In such a procedure, most of the aforementioned subjects (planning, permitting, EIA, possible expropriation) are considered in a global approach, with less opportunities for appeal.	Most likely: Flemish Region, due to scale of the construction in floor space (>50.000 m²).	There are three phases during a Complex Project Procedure (CPP). <u>Exploration phase</u> During the exploration phase, it is determined whether or not a certain project qualifies for the CPP. If deemed possible, this phase culminates in a start decision. <u>Research phase</u> During the research phase, an alternative study and the draft-EIA are made. This culminates in a draft preferential decision. This decision will be subject to a public consultation, during which anyone can deliver remarks and objections. Afterwards, a definitive preferential decision will be taken. This decision can be challenged before the Council of State (RvS). <u>Elaboration phase</u> The elaboration phase follows more or less the same structure as the research phase,	The Decree provides a procedural framework in which most of the aforementioned procedures are integrated. It is also possible for a private organization to take on a more active role during the procedure. Decisions are of course still taken by the competent authority.	Multiple years, but as mentioned this comprises most of all the aforementioned timelines. In case of an appeal against the preferential decision or the project decision before the Council of State: ~1,5 years.

[8] See also our extensive report in which we point out the possibility to sync up the Complex Project Procedure in the Netherlands and Flanders.
[9] Decree regarding complex projects.

			but it will evidently be more concrete and precise. This culminates in a draft project decision. This decision will be subject to a public consultation, during which anyone can deliver remarks and objections. Afterwards, a definitive project decision will be taken. This decision can be challenged before the Council of State (RvS). Both the preferential decision and the project decision can include a redesignation of lands and can provide a legal ground for expropriation. The project decision is also an Environmental Permit, if necessary and appropriate.		

Equator

Advocaten - Avocats - Attorneys

Deliverable 2

List of public authorizations that potentially need to be obtained and public procedures that potentially need to be followed before the start of civil engineering works

(Netherlands)

Project of the 30th November 2022

Disclaimer: this list is only a summary of our research and does not provide full information. See our written report for more details.

Disclaimer: The law concerning environmental permits, environmental visions, programmes etc. will change somewhere in 2023, probably July, when a new "Environment Law" (*omgevingswet 23 maart 2016*) will enter into force. This table is based on the new law as the project will most likely start after this date.

	Scope of application	**Competent authority or organization**	**Procedure, including appeals**	**Criteria / remarks**	**Timelines**
Environmental policy : **Environmental vision and programmes** (*omgevingsvisies* en *programma's*)	The "Environmental Vision Limburg" is applicable to the province of Limburg. Important to note is that the Environmental Vision Limburg 2021 explicitly mentions the aspiration to develop big, cross-border projects like the	/	/	/	/

	Eintsein Telescope.[1] Thus, it can be assumed that the Province of Limburg will aid in the development of ET. A new vision or programme therefore will most likely not be necessary.				
Environmental plan (*omgevingsplan*)	Each municipality needs to have an Environmental plan (art. 2.4 & 4.2 Ow.). It is possible that this plan will have to be adjusted to be able to at least allow the shafts to be built. If the (adjustment of the) plan forms the frame for a project with an EIA duty, then a 'Plan-EIA' is also required. The authority creating this plan will arrange this.[2] It will have to consult several other (government) bodies.[3] Alternatively, a 'project decision' by the province of Limburg can include such adjustments. Considering that Limburg aspires to assist in the	Municipal council ,or the municipal executive if authority delegated by council (art. 2.8 Ow.).	First: Uniform Preparation procedure as in art. 3:10 a.f. Awb. Then: decision within 6 months after request, which can be extended (art. 3:18 Awb.).	The Environmental plan can only be made/adjusted by the government (see Competent Authority). Close contact with planning authority is therefore required.	~ 6-7 months Appeal before the Council of State: ~ 6-8 months

[1] Environmental Vision Limburg 2021, p. 57 ; 166 ; … (https://www-limburg-nl.translate.goog/onderwerpen/omgeving/omgevingsvisie/?_x_tr_sl=nl&_x_tr_tl=en&_x_tr_hl=nl&_x_tr_pto=wapp).
[2] Art. 16.36 Ow.
[3] For example art. 16.38-39 Ow.

	ET-project (*supra*), they are likely to assist with this.				
Environmental permit	Several activities related to the ET project will require an environmental permit (*omgevingsvergunning*). E.g.: 'building activities', 'earth removal activities', … (art. 5.1 a.f. Ow.) One environmental permit can contain all the activities related to the ET project that require such a permit. If a 'project decision' – procedure is used (see hereunder), the permit can be obtained within this procedure.	The municipal executive (*college van burgemeester en wethouders)* Or Deputy States if the ET project gets qualified as an 'environmental plan activity of provincial interest'.	When it is determined that the request is admissible and complete, the authority will decide within 8 weeks, or 12 weeks if another authority also has to decide (all extendable by 6 weeks).[4] Within this period, stakeholders can submit objections.[5] Stakeholders can appeal against the decision on their objection. The person requesting the permit can submit an 'opinion' (*zienswijze*) if the authority is planning on denying the request. The permit decision can be challenged before the administrative judge (*bestuursrechter*) within 6 weeks after the decision.[6] Afterwards, an appeal with	In general, the request needs to contain all data and documents necessary for the request (art. 4:2 Awb[7]).	Appeal before the administrative judge[8]: ~ 6 months Appeal against this decision before the council of state (*Raad van State*): ~ 6-8 months [9]

[4] Art. 16.62 – 16.64 Ow.
[5] Artt. 7:1; 7:2; 7;10 Awb.
[6] Art. 6:7 Awb.
[7] Awb = Algemene wet bestuursrecht van 4 juni 1992, *Stb.* 1992, 315.
[8] Art. 6:7-8; 8:1; 8:66 Awb.
[9] Art. 8:104-105 Awb.

			the Council of State is possible.		
Project-EIA procedure[10] **(***project-MilieuEffectenRapport***)**	Annex V to the environment-decision (*omgevingsbesluit, Ob.*) contains a list of projects that require a project-MER. If it is decided to work with a 'project-decision' (see hereunder), then a project-EIA has to be obtained. The procedure is streamlined with the procedure concerning the project-decision.	The authority that will decide on the permit.	The project-EIA procedure will be integrated in the procedure of the environmental permit-request. It is important that the person requesting the plan notifies the authority that it will request a project that requires an EIA (art. 16.45 Ow). The authority will decide, after (optionally[11]) asking for advice from the Commission for EIA (*commissie voor de milieueffectenrapportage*)	The notification that the project requires an EIA has to contain specific information mentioned in art. 11.10 Ob. The EIA needs to contain specific information, such as the contents of the project, possible environment-related problems, and other info mentioned in art. 11.16 Ob.	Integrated in procedure for environmental permit. If advice from Commission for the EIA is asked, this advice will be given within 6 weeks.[12]
MIRT **(***Meerjarenprogramma Infrastructuur, Ruimte en transport***)** (Optional)	When the national government financially works together with a region (i.c. Limburg) on a project, the project can be included in the MIRT.[13] For ET, it is possible that a MIRT is used to facilitate the collaboration between national	No legal basis so no specific competent authority. Will be created in collaboration between national and regional level.	<u>Optional step: MIRT-research</u> If certain difficulties/stakeholders aren't yet identified, research can be done to create more clarity around this.	As the MIRT is a vehicle for collaboration between government levels, but also stakeholders, it may be useful for the ET project. Communication with	Step 1-3: several years Step 4: duration of realising the project

[10] See art. 16.34 a.f. Ow; art. 11.1 a.f. Ob; Annex V Ob.
[11] Art. 16.47 Ow.
[12] Art. 11.13, 2 Ob.
[13] There is no legal basis for the MIRT. It is mainly a political instrument made to effectuate collaboration (between governments and stakeholders), creating compatible plans, …

	and regional level, in the event that ET gets funds from national level.		Step 1: Regional agenda[14] Created to identify mutual ambitions between national and regional level. Step 2: MIRT-exploration A 'project organization' is created, which will find solutions and alternatives for the projects, how it will be funded, etc. At the end, a 'preferential solution' will be chosen. This step can lead to the start of a Project Procedure (see hereunder). Step 3: MIRT-plan-effectuation Plans and budget-decisions are formed into a draft-Project decision. Step 3 is finished when a project decision is made (using the procedure explained hereunder). Step 4: MIRT-realization Creation of project decision marks the start of step 4. The project is carried out.	the governments is recommended.	

[14] For collaboration between Nl. And Fl., such regional agendas have been made before.

Soil examination (*bodemonderzoek*)	Considering ground excavations of more than 25 m³ will be done, soil examinations will have to be performed (art. 3.48 a.f. *jo.* Art. 4.1219 a.f. *jo.* 5.7a a.f. Bal[15])	The entity performing the project has to make sure the examination is done.	Examination has to comply to certain norms, for example NEN 5725 (art. 5.7a Bal). Norms such as NEN 5725 provide guidelines as to how to perform the examinations.	/	Depends on the type of examination.
Authorisation to carry out digging activities	Certain activities, including activities "on or in the soil" require an authorisation from the national government.[16] These authorisations are granted on a project-basis.	The national government (ministers) Certification: certification-organisations (example: Kiwa Nederland). Accreditation: Counsel for Accreditation	A request has to be filed with the national government, containing information mentioned in art. 10 BBk. The ministers will grant the authorisation when all the necessary information and documents are present AND the applicant has no issues regarding insolvency.	One of the requirements is that the applicant must be a certified or accredited organisation. Only certain organisations can grant certifications. Accreditations can only be given by the Counsel for Accreditation.	The ministers will answer the request within 8 weeks after receiving it.
Notification regarding exploitation of laboratory	* For the exploitation of a laboratory, a notification has to be given (art. 4.648 Bal)	Normally the municipal executive, but there is an exception where the authority that has to decide on the permit request has competence.[17]	/	The notification has to contain at least the information mentioned in art. 2.17-2.20 Bal.	/

[15] Bal = Besluit activiteiten leefomgeving (*decision activities living-environment*)
[16] Decision regarding Soil Quality (*Besluit Bodemkwaliteit*, BBk) *juncto* art. 11a.2, 2, e. Law concerning Environmental Management (*Wet Milieubeheer*).
[17] Art. 2.3 & 2.9 Bal.

Expropriation in the public interest[18]	As a means of last resort, certain levels of government and certain named organizations can start an expropriation procedure in order to acquire land in the public interest. The government entity has to pay a compensation for the expropriated land which has to cover all the losses suffered by the expropriated person.[19]	Multiple[20], but the province of Limburg or municipalities are the main candidates.	<u>Administrative phase</u> The expropriating government has to obtain a decision to expropriate (*onteigeningsbeschikking*). This can be given by the municipalities, provinces or the competent Minister.[21] It is obliged to first try to obtain the property in an amicable way.[22] <u>Judicial phase</u> If an amicable resolution fails, the expropriation can be achieved via court.[23] The administrative judge will decide whether the expropriation conditions are met and, in case they are, endorse the decision to expropriate. Appeal against this judgement is possible.[24]	The expropriation conditions have to be met, and this has to be sufficiently motivated due to the fact that expropriation is an exception to the right to property, as safeguarded by art.1 EAP EVRM.	The duration of the administrative phase is difficult to determine, since it is dependent on possible negotiations. The first instance of the judicial phase takes around ~ 6-8 months. The appeal procedure also takes ~ 6-8 months.

[18] Expropriation is both relevant as a 'public procedure' (deliverable 2) and as an alternative way to acquire property rights (deliverable 3).
[19] Art. 14 Dutch Constitution.
[20] Art. 11.2 Ow.
[21] Art. 11.4 Ow.
[22] Art. 11.7, 1. Ow.
[23] Section 16.9 Ow.
[24] Section 16.10 Ow..

Alternative: Project-decision [25] [26] **(*projectbesluit*)**	Deputy states, ministers or province boards (*provinciebestuur*) can decide to execute projects in the common interest (*algemeen belang*) via a 'project decision'. These projects don't have to be initiated by a government body. They can be started by a private entity, as long as they are beneficial to the common interest. In such a procedure, most of the procedures mentioned above (expropriation[27], planning, permitting, EIA, possible expropriation) are considered in a global approach.	Deputy states, ministers or province boards (likely to be province board of Limburg, as they explicitly mentioned ET-project in their Environmental Vision Limburg (see above).	There are two phases during a Project Procedure. <u>Exploration phase (part 1)</u> During the exploration phase, the possible problems and solutions are determined. It will also be determined how participation and communication (with the public) will be organized, who will be involved etc. Part 1 of this phase culminates in a start decision. <u>Exploration phase (part 2)</u> Part 2 consists of an alternative study and mandatory advise by the Commission for the EIA will be obtained (if applicable, in collaboration with Flemish team-MER). This culminates in a preparational decision, preferential decision, draft project decision. <u>Elaboration phase</u> The elaboration phase follows more or less the same structure as the research phase, but it will evidently be	/	Multiple years, but as mentioned this comprises most of all the aforementioned timelines. In case of an appeal against the project decision before the Council of State: ~ 6-8 months.

[25] See art. 5.44 a.f. and art. 16.70 a.f. Ow.
[26] See also our report in which we point out the possibility to synchronize the (Complex) Project Procedure in the Netherlands and Flanders.
[27] Art. 16.75 Ow.

			more concrete and precise. The draft project decision will be converted into a realistically feasible project decision. This decision can be challenged before the Council of State. The project decision can include a redesignation of lands and can provide a legal ground for expropriation.[28] The project decision is also an Environmental Permit, if necessary and appropriate.		

[28] Art. 16.75 Ow.

ANNEX E: Deliverable 3 - Inventory of private authorizations and legal contracts to be acquired before the start of civil works

1. **Walloon region**
2. **Flemish region**
3. **Dutch region**

Cabinet d'Avocats
EXPLANE

Deliverable 3 (DRAFT)
List of contractual agreements to be obtained before the start of civil engineering works
(Walloon Region)
DRAFT

8th December 2022

A) Regarding lands owned by private persons or public entities in their private domain:

	Mode of acquisition	**Duration**	**Extent of the right**	**Characteristics (advantages, disadvantages, cost, ...)**
Property rights	Can be obtained from others by buying rights. The transfer or constitution of a real right takes place by and at the time of the exchange of consents of the parties. If an amicable agreement is reached in the negotiation phase of the expropriation procedure	Potentially unlimited	The owner may carry out works and planting on, over and under his land. However, his property right extends only to such height above or depth below the land that may be relevant to his exercise. This legal clause is very useful for the construction	Advantage: the property owner has full prerogatives over his land. Disadvantages: it is the costliest right, given the extent of the parcels to be acquired to develop the telescope. Moreover, this will not solve the problem of other real rights which already existed on this land and which will remain

	(see deliverable 2), the transfer of ownership takes place by means of a purchase. **Civil code, art. 3.50 and following**		of tunnels. Nevertheless, the difficulty is that it is not clear who owns this part of the territory (the Belgian state, the Walloon region, … or nobody?).	
Conventional easement	Can be obtained by contract. **Civil code, art. 3.117 and following**	Limited or unlimited in time (depends on the will of the parties)	It depends on the will of the parties. It may be on, above or under the ground.	Advantages: it is possible to create a variety of easements, including rights of way. The servient land may not do anything that would diminish the exercise of the easement or make it less convenient. Furthermore, the division of the servient land cannot affect the easement. Finally, the dominant land may carry out any work useful to its exercise and may make changes to it in the event of technical developments and while respecting the purpose of the easement. This right in rem would make it possible to agree on useful rights of way for the execution of civil engineering works, for instance. A conventional easement of non aedificandi would also be advisable to prohibit the owner of the subsoil from carrying out any construction. Disadvantage: the easement must be directly and immediately related with the use and utility of the dominant land. This means that in order to hold an easement useful for the telescope project, one must hold another real right of use on the dominant land. Furthermore, the maintenance and conservation of the easement is carried out solely at the expense of the dominant land.
Legal easement	Can be obtained by fulfilling the conditions set out in the law (e.g. : for enclave, the owner of the landlocked must claim a	Potentially unlimited, but the right of way ceases by legal action when it is	The right of way extent on, above or below the neighbor's land.	Advantage: since a legal right of way is acquired by legal action, it does not matter whether the owner of the neighboring land agrees to it or not. Thus, if the land concerned by the telescope is landlocked and in the event that the owners of the neighboring

	right of way before a judge). **Civil code, art. 3.129 and following**	no longer necessary for the normal use of the landlocked.		lands do not want to agree contractually on a right of way, the judge could impose it on them for as long as it is useful. Disadvantages: conditions are defined by law, which leaves less room for maneuver to the parties. Moreover, the judge defines the limit of a right of way by granting the "least damaging passage". This requirement may not be appropriate to the extent of the civil engineering works for the placement of the telescope and, thus, the substantial passage it would require, leading to the payment of substantial compensation for the damage caused.
Usufruct	Can be obtained by will (contracts or wills) or by law. **Civil code, art. 3.138 and following**	May not exceed 99 years. In any event, extinction if the person in whose name it is established dies (i.e., if the legal entity declares bankruptcy or is dissolved).	The usufructuary has the right to the use and enjoyment of the property, on the ground, the subsoil and above ground. However, he must act in a prudent and diligent manner and respect the destination of the property.	Advantages: the usufructuary may carry out certain non-compulsory (i.e. not required by law) works and plantations that will be compensated by the bare-owner if he had agreed to them. Disadvantages: the temporary nature of the right may not correspond with the project, as well as the numerous obligations incumbent on the usufructuary (obligation to insure, to carry out maintenance repairs, etc). Moreover, the obligation to respect the destination of the land may be problematic. Therefore, usufruct is certainly not suitable for the ET project
Emphyteusis right	Can be obtained by buying rights. **Civil code, art. 3.167 and following**	May not be established for less than 15 years and more than 99 years. Exact duration determined in the contract.	The lessee has the right to the use and enjoyment lessee of the property, and may carry out any works and plantations on, under and above the ground, even by modifying the destination of the property, which are	Advantages: the lessee is not bound by the destination of the land. He is therefore entitled to do a wider range of works, compared to the holder of a right of usufruct or of a conventional or legal easement. In addition, he will be compensated for all works and plantations that he has carried out, whether or not the grantor of the right has given his consent to them. Disadvantages: the lessee cannot decrease the value of the land, which may be problematic *in casu* if the constructions carried out on or under the ground for the telescope change the destination of the land so as to prevent any new construction intended for

			then his property for the duration of his right. He may not, however, do anything that diminishes the value of the property.	something else (a private house, for example). Moreover, it is also a temporary right, which does not fit in well with the permanent (or at least long-term) nature of the project.
Superficies	Can be obtained by buying rights. Can also be established as a consequence of another right of use that allowed the holder to carry out work and plantation. This is known as "superficies-consequence". The applicable legal regime is then that governing the other right of use. **Civil code, art. 3.177 and following**	May not be established for more than 99 years. May however be perpetual if constituted by the owner of the land to allow the division into volumes of a complex and heterogeneous real estate complex comprising several volumes susceptible of autonomous and diverse use which have no common part between them.	The holder of the right is considered as the owner of the volumes, on, above and below the ground, as well as all works and plantations which pre-existed or which he carries out.	Advantages: the prerogatives of the holder of this right are equal to those of the real owner, which gives him a large margin of maneuver. Disadvantages: the temporary nature of the right does not fit in well with the permanent (or at least long-term) nature of the project. The application of the exception allowing a permanent superficies can however be argued.

B) Regarding lands owned by public entities in their public domain:

	Scope of application (including possible exemption)	Competent authority	Procedure, including appeals	Criteria for the obtention	Timelines
Domain concession (municipal domain)	Occupy or use the municipal public domain, including municipal roads, in a manner exceeding the ordinary right of use which belongs to all.	Municipal council	The managing authority may grant its authorisation by means of a contract or a unilateral act (see deliverable 2). Unlike the authorisation by individual decision, the concession confers on its holder a subjective right, even if it remains precarious. The award of a concession is not subject to public procurement law, but it must respect the principle of equality. The procedure can be determined in a municipal regulation.	Assessment of the impacts of the domain concession with regard to the interests of the public domain, its users or its environment, and in accordance with the principle of equality or other interests of a general nature.	Concession must be obtained prior to the occupation or use of the municipal domain. Deadlines for decision may be provided by communal regulations.
Domain concession (regional domain)	Occupy or use the regional public domain in a manner exceeding the ordinary right of use which belongs to all. The regional public domain includes the public road regional domain, the waterways and the major hydraulic	Walloon administration: S.P.W. Mobility & infrastructure	The managing authority may grant its authorisation by means of a contract or a unilateral act (see deliverable 2). Unlike the authorisation by individual decision, the concession confers on its	Assessment of the impacts of the domain concession with regard to the interests of the public domain, its users or its environment, and in accordance with the principle of equality or other interests of a general nature.	Concession must be obtained prior to the occupation or use of the municipal domain.

	works under the management of the Walloon Region. **Decree of 19 March 2009 on the conservation of regional public roads and waterways**		holder a subjective right, even if it remains precarious. The award of a concession is not subject to public procurement law, but it must respect the principle of equality. The order of the Walloon government of 6 December 2012 implementing article 3, §4, of the decree of 19 March 2009 on the conservation of the regional public road domain and waterways determines the general conditions applicable to any authorisation granted by the manager by virtue of article 3, §4 of the decree of 19 March 2009 relating to the conservation of the regional public road domain and waterways, as well as the scale of fees.		No general timelines.
Legal public easement	Use and enjoyment of immovable property for the benefit of the general interest. Established by law (i.e. established directly by the legislator) or under the law (i.e. the legislator delegates to	Depends on the competence of each legislator: many legal public easements	No general procedure.	Compliance with a public or general interest and compatible with the assignment of the public domain.	No general timelines.

	another authority the task of setting the terms and establishing the easement). **Civil code, art. 3.129 and following**	are regional given the jurisdiction of the Regions in terms of town planning.			
Emphyteusis right	Use and enjoyment of immovable property if it is compatible with the use of the public domain, namely the assignment for the use of all. **Civil code, art. 3.167 and following**	Depends on the sphere of jurisdiction *ratione materiae* and *rationae loci* in which the property is located	No general procedure.	Compatibility with the public destination of the public domain and precariousness.	No general timelines.
Superficies	Use and enjoyment of immovable property if it is compatible with the use of the public domain, namely the assignment for the use of all. **Civil code, art. 3.177 and following**	Depends on the sphere of jurisdiction *ratione materiae* and *rationae loci* in which the property is located	No general procedure.	Compatibility with the public destination of the public domain and precariousness.	No general timelines.

C) Public Procurement

	Scope of application (including possible exemption)	Procedure	Timelines
Belgian procedure	Contract concluded for valuable consideration between a contracting authority (see art. 2 of the law of 17 June 2016, which includes under others a body created to meet needs in the general interest and which is directly dependent, for example, on a Region or a Community for its activities, financing or management) and a public or private person, and which meets the needs of this contracting authority for supplies, services and works. Application of Belgian law depending on : - the place of operation of the authority and the place of the order; - the amount of the contract: see the thresholds set out in art. 11 of the royal order of 18 April 2017, which will most certainly be exceeded in the framework of the ET project. **Law of 17 June 2016 on public contracts** **Royal order of 18 April 2017 on the award of public contracts in the traditional sectors** **Royal order of 14 January 2013 establishing the general rules for the execution of public contracts** **Law of 17 June 2013 on the motivation, information and remedies for public contracts, certain works, supply and service contracts and concessions.**	ET project will certainly, at least, justify the setting up of: - one or more public procurement of services for studies to be carried out before the start of the construction phase (environmental impact assessment, soil pollution study, engineering-architect studies…). However, one way to avoid the procedure would be to conclude an "in house" contract, i.e. a contract between the contracting authority and a legal person under public or private law over which the contracting authority exercises, inter alia, a control similar to that which it exercises over its own departments ; - a public procurement of works for the construction phase. Ideally, it would be simplest to award a single public procurement design and build to a consortium. Another possibility would be to award a single public procurement that would include services and works. However, this would be very complicated given the proposed project and could lead to a competition deficit as such a global mission would risk reducing the number of candidates.. Depending on the status of the services and the work to be carried out, a choice should then be made between an a negotiated procedure (unless otherwise specified, if the needs are not yet completely defined) or open procedure (if the needs are already defined).	Public procurement must be concluded before the start of the services and works. Time for completing the specification : depends on the degree of specification of the services or work required. Time between the publication of the public procurement notice and the submission of tenders: at least 22 to 35 days depending on the type of procedure. Period of validity of the offer: maximum 90 days.

Equator

Advocaten - Avocats - Attorneys

Deliverable 3
List of contractual agreements to be obtained before the start of civil engineering works
(Flemish Region)

Project of the 30th November 2022

A) Regarding lands owned by private persons :

	Mode of acquisition	**Duration**	**Extent of the right (ground/subground)**	**Characteristics (advantages, disadvantages, cost, ...)**
Property rights	Property rights can be obtained from others by buying the rights. Expropriation is both relevant as a 'public procedure' (deliverable 2) and as an alternative way to acquire property rights	Infinite/ until passed on	Infinite right to use, limited by law, regulations and other people's rights.[1] Property of real-estate (*onroerend goed*) extends to everything above and underneath the ground, everything built on/in it, … (exceptions apply).[2] Others can use the space above or below the property at a height/depth	<u>Advantages</u> • Most control over what can and cannot be done on the property, ability to use it for other projects in the distant future, … • Is infinite in time, unlike some other rights <u>Disadvantages</u>

[1] Art. 3.50 Civil Code (*Burgerlijk Wetboek*, BW).
[2] Art. 3.63 BW.

	(deliverable 3). For information about expropriation; see deliverable 2.		which isn't useful to the owner → This might be relevant for the tunnels.	• Buying the property can be more expensive than other options • Might be harder to convince owner into selling his/her property than to obtain easement, …(but expropriation can be an option of "last resort")
Conventional and legal easement (*Conventionele en wettelijke erfdienstbaarheid*)	Conventional easement is obtained by contract. Legal easement is given by law. For example right to cross a neighbouring property if the rightholder's property doesn't have a connection to a public road.[3] Public easements can also be created via a planning instrument (RUP) → see deliverable 2.	Can be infinite in time. Determined by contract.	Easement in general is a "burden" on a piece of land in favour of another piece of land. The exact scope of the right is limited to what is allowed in the easement contract or as allowed by law.	<u>Advantages</u> • Most likely cheaper than buying the property. • Well suited for the tunnels, as they will probably be deeper than the depth that is useful for the owner of the property. • This right 'follows' the property if it is sold. It will not seize to exist in case of a sale. <u>Disadvantages</u> • The things the holder of the right can do on the property are limited to what is allowed in the contract. • The owner of property has possibilities to ask judge to cancel the easement. However, also a limited possibility for the holder of right.[4]
Emphyteusis right (*erfpacht*)	Emphyteusis is obtained by contract.	In principle no shorter than 15 years and no longer than 99	The right to hold and use the property with respect for other rights on the property and without lowering the value of the property.[7]	<u>Advantages</u> • Most likely cheaper than buying the property.

[3] Art. 3.135-3.137 BW.
[4] Art. 78 a.f. Book 5 Dutch Civil Code.
[7] Art. 3.172 BW.

		years.[5] Exact duration to be determined in the contract. An exception is possible when the right is established for "goals of the public domain".[6]		• Right can be passed on to someone else, along with the constructions built within the right.[8] • At end of superficies, owner has to compensate the added worth to the property.[9] <u>Disadvantages</u> • More limited than ownership. • If something is built on the property, ownership of the constructions will pass on to the owner of the property at the end of the emphyteusis.[10]
Superficies (*Opstal*)	Superficies is acquired by a contract. It can be connected with the emphyteusis right.	In principle no longer than 99 years.[11] Exact duration determined in the contract. An exception is possible when the right is established for "goals of the public domain"	Superficies gives the rightholder the right to build something on, above or under a property, and become the owner of that construction as long as the right exists.[13] Superficies can be useful to make sure the person building ET will be the owner of the structure/tunnel built under someone else's property.	<u>Advantages</u> • Most likely cheaper than buying the property. • If something is built on/under the property, rightholder is owner until end of the contract, so he can use, build, destroy as he pleases, unless stated otherwise. • Right can be passed on to someone else, along with the constructions built within the right.[14]

[5] Art. 3.196 BW.
[6] Art. 3.196 BW.
[8] Art. 3.171 BW..
[9] Art. 3.176 BW.
[10] Art. 3.176 BW.
[11] Art. 3.180 BW.
[13] Art. 3.177 BW.
[14] Art. 3.183 BW..

		or to divide a complex and heterogeneous property into volumes.[12]		• At end of superficies, owner has to compensate the added worth to the property.[15] <u>Disadvantages</u> • Only owner of constructions built on the property, not of the property itself. • Ownership of the constructions will pass on to the owner of the property at the end of superficies.[16]

B) Regarding lands owned by public entities :

When the lands in question are classified as "private domain" (= owned by public entities but not designated to be used by all), private law will in principle apply. The public entities will be subject to public rules and principles which might impose certain limitations, but generally speaking we can refer to the table mentioned above.

When the lands in question are classified as "public domain" (= owned by public entities and designated to be used by all), the application of private law is heavily restricted. Public domain cannot be sold and the possibilities of establishing rights of superficies and emphyteusis are disputed.
It is more generally accepted that easements are possible on public domain. An underground easement for the tunnels should be possible.

There is also a precarious "*sui generis*" legal construction, called the domain concession. This will be analysed in the following table.

	Mode of acquisition	**Duration**	**Extent of the right (ground/subground)**	**Characteristics (advantages, disadvantages, cost, ...)**
Domain concession	A domain concession is a contract with the government.	Depends on the contract. Important to note	A domain concession is an administrative contract, in which a government gives a person the right to	<u>Advantages</u>

[12] Art. 3.180 BW.
[15] Art. 3.188 BW.
[16] Art. 3.188 BW.

		that the government can always annul the contract for reasons of general interest.	temporarily use a part of the public domain in a way that does exclude the right of others to use said public domain, and which can be revoked by the government for reasons of general interest.[17] The contract stipulates the extent of the right and the obligations of the contracting parties.	• Allows the contracting party to use public domain with the exclusion of others. <u>Disadvantages</u> • The government can always annul the contract for reasons of general interest, resulting in a certain degree of uncertainty.

[17] V. PETITAT en S. VAN GARSSE, "De ene concessie is de andere niet. Het onderscheid tussen domeinconcessies en concessies van diensten" in C. DE KONINCK, P. FLAMEY, P. THIEL, B. WATHELET (eds.), *Jaarboek overheidsopdrachten 2019-2020*, Brussel, EBP, 2020.

Equator

Advocaten - Avocats - Attorneys

Deliverable 3
List of contractual agreements to be obtained before the start of civil engineering works (Netherlands)

Project of the 30th november 2022

Disclaimer: this list is only a summary of our research and does not provide full information. See our written report for more details.

A) Regarding lands owned by private persons :

	Mode of acquisition	**Duration**	**Extent of the right (ground/subground)**	**Characteristics (advantages, disadvantages, cost, ...)**
Property rights	Property rights can be obtained from others by buying the rights. Expropriation is both relevant as a 'public procedure' (deliverable 2) and as	Infinite/ until passed on	Infinite right to use, except if it violates other persons' rights.[1] Property of real-estate (*onroerend goed*) extends to everything above and underneath the ground, everything built on/in it, … (exceptions apply).[2]	<u>Advantages</u> • Most control over what can and cannot be done on the property, ability to use it for other projects in the distant future, … • Is infinite in time, unlike some other rights

[1] Art. 1, 2 Book 5 Dutch Civil Code
[2] Art. 20 Book 5 Dutch Civil Code.

	an alternative way to acquire property rights (deliverable 3). For information about expropriation; see deliverable 2.		Others can use the space above or below the property at a height/depth which isn't useful to the owner.[3] → For the tunnels, this can be relevant.	<u>Disadvantages</u> • Buying the property can be more expensive than other options • Might be harder to convince owner into selling his/her property than to obtain easement, …(but expropriation can be an option of "last resort")
Conventional and legal easement (*Conventionele en wettelijke erfdienstbaarheid*)	Conventional easement is obtained by contract. Legal easement is given by law. For example right to cross a neighbouring property if the rightholder's property doesn't have a connection to a public road.[4]	Can be infinite in time. Determined by contract.	Limited to what is allowed in the easement contract or allowed by law.	<u>Advantages</u> • Most likely cheaper than buying the property. • Well suited for the tunnels, as they will probably be deeper than the depth that is useful for the owner of the property. • This right 'follows' the property if it is sold. It will not seize to exist in case of a sale. <u>Disadvantages</u> • The things the holder of the right can do on the property are limited to what is allowed in the contract. • The owner of property has possibilities to ask judge to cancel the easement. However, also a limited possibility for the holder of right.[5]
Emphyteusis right (*erfpacht*)	Emphyteusis is obtained by contract.	Can be infinite in time.[6]	The right to hold and use the property in the same way as the owner, but with	<u>Advantages</u> • Most likely cheaper than buying the property.

[3] Art. 21 Book 5 Dutch Civil Code.
[4] Art. 57 Book 5 Dutch Civil Code
[5] Art. 78 a.f. Book 5 Dutch Civil Code.
[6] Art. 86 Book 5 Dutch Civil Code.

		Determined by contract. However, after 25 years, each party can ask a judge to end the emphyteusis in certain circumstances.[7]	some limits (no change of purpose (*bestemming*) of the property, …)[8] Holder of the right has duty to pay a fee, called 'canon'. Amount is determined in the contract.[9]	• The holder of the right can cancel it at all times, unless stated otherwise in contract.[10] • At end of emphyteusis, owner has to compensate the added worth to the property. Contract can state otherwise if certain conditions are met.[11] • Right can be passed on to someone else or given in 'sub-emphyteusis' (*ondererfpacht*) , except if stated otherwise in contract.[12] <u>Disadvantages</u> • More limited than ownership. For example no right to sell, … • If something is built on the property, the rightholder does not become the owner, unless superficies is also stipulated in the contract.
Superficies (*Opstal*)	Superficies is acquired by a contract. It can be connected with the emphyteusis right.	Can be infinite in time.[13] Determined by contract. However, after 25 years, each party	Superficies gives the rightholder the right to build something on the property, and become the owner of that building as long as the right exists. He can do whatever he wants with it, unless limited in the contract.[15]	<u>Advantages</u> • Most likely cheaper than buying the property. • If something is built on/under the property, rightholder is owner until end of the contract, so he can use,

[7] Art. 97, 1 Book 5 Dutch Civil Code.
[8] Art. 89 Book 5 Dutch Civil Code.
[9] Art. 85 Book 5 Dutch Civil Code.
[10] Art. 87,1 Book 5 Dutch Civil Code.
[11] Art. 87, 2 and 99 Book 5 Dutch Civil Code.
[12] Art. 91-93 Book 5 Dutch Civil Code.
[13] Art. 104 *jo.* 86 Book 5 Dutch Civil Code.
[15] Art. 102 Book 5 Dutch Civil Code.

		can ask a judge to end the superficies in certain circumstances.[14]	The rightholder is also allowed to use the property on which the right is located if this is needed to use the superficies right (unless stipulated differently in contract).[16] (for example driving construction vehicles onto the property to build the construction) Superficies can be useful to make sure the person building ET will be the owner of the structure/tunnel built on/beneath someone else's property. If stipulated, the rightholder has to pay a fee called 'retribution' (*retributie*).[17]	build, destroy as he pleases, unless stated otherwise. • The holder of the right can cancel it at all times, unless stated otherwise in contract.[18] • Right can be passed on to someone else or given in 'superficies' (*ondererfpacht*) , except if stated otherwise in contract.[19] • At end of emphyteusis, owner has to compensate the added worth to the property. Contract can state otherwise if certain conditions are met.[20] <u>Disadvantages</u> • Only owner of constructions built on the property, not of the property itself.

B) Regarding lands owned by public entities :

In the Netherlands, the distinction between public and private owned property does not exist anymore. Private law is applicable to lands owned by public entities. These entities are subject to the principles of public law, such as the general principles of good government or a 'public purpose' (*publieke bestemming*)[21], which can lead to certain limitations regarding transactions of their lands owned, but in general public entities in the Netherlands have much more freedom in applying private law instruments to their lands in comparison to Flanders. Thus it is possible to put superficies, emphyteusis, easement, … on public owned property.[22]

[14] Art. 104 *jo*. 97, 1 Book 5 Dutch Civil Code.
[16] Art. 103 Book 5 Dutch Civil Code.
[17] Art. 101, 3 Book 5 Dutch Civil Code.
[18] Art. 104 *jo*. 87,1 Book 5 Dutch Civil Code.
[19] Art. 104 *jo*. 91-93 Book 5 Dutch Civil Code.
[20] Art. 105 *jo*. 87, 2 and 99 Book 5 Dutch Civil Code.
[21] R. PALMANS , J. TOURY en T. LEYS, *Openbaar domein*, Antwerpen, Intersentia, 2019, 258.
[22] R. PALMANS , J. TOURY en T. LEYS, *Openbaar domein*, Antwerpen, Intersentia, 2019, 259.

Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Deliverable D4.1 (D10)

Scan of legal procedures, permitting and land acquisitions (Sardegna site)

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Delivery Date: 03/11/2023
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EXECUTIVE SUMMARY

This document, D4.1, is a deliverable of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696.
In the present document, a preliminary overview will be given about legal procedures, permitting and land acquisitions i.e. an overview of all the steps to be taken before starting excavations of the Einstein Telescope in Sardinia. This preliminary list of aspects to be taken under consideration is included in the call for tender for the preparatory study for the Technical Economic Feasibility Project (PFTE) in Sardinia*, founded by the ETIC project, which is currently in the tender phase.
In section 1 there is a lists of public and private stakeholders, section 2 is devote to describe public authorizations and permits to be acquired for urbanization, environmental, safety and excavation, in section 3 there a scan of private authorizations and legal contracts and in section 4 there is a short description of the interaction between technical aspects and the legal and

* https://ted.europa.eu/udl?uri=TED:NOTICE:253431-2023:TEXT:IT:HTML

administrative stages. As annex to the present document there is official version of the Tender Specification document (D4.1 Annex Sardinia 1.pdf) for the preparatory study for the Technical Economic Feasibility Project (PFTE) in Sardinia and an unofficial courtesy translation (D4.1 Annex Sardinia 2.pdf).

List of acronyms and abbreviations

Progetto_ET: progetto dell'Osservatorio Einstein Telescope
(Einstein Telescope Observatory Project)

PFTE: Progetto di Fattibilità Tecnico Economica delle infrastrutture dell'Osservatorio Einstein Telescope
(Technical-Economical Feasibility Project of the Einstein Telescope Observatory infrastructures)

PE: Progetto Esecutivo delle infrastrutture dell'Osservatorio Einstein Telescope
(Executive Project of the Einstein Telescope Observatory infrastructures)

SUAPE: Sportello Unico Attività Produttive ed Edilizia
(Single office for Production and Construction Activities)

VIA Valutazione di Impatto Ambientale
(Environmental Impact Assessment : EIA)

PAUR: Provvedimento Autorizzatorio Unico Regionale
(Single Regional Authorization Provision)

VVF: Vigili del Fuoco
(Fire Department)

NOF: Nulla Osta di Fattibilità dai VVF
(Feasibility Permit by VVF)

VIA: Valutazione di Impatto Ambientale
(EIA : Environmental Impact Assessments)

PAI: Piano per l'Assetto Idrogeologico
(Hydrogeological Asset Plan)

Table of Contents

1. Stakeholders

The ET_Project is, presumably, of National Interest for Italy .
The engineers who will develop the preparatory study for the Technical Economic Feasibility Project (PFTE) in Sardinia, which is currently in the tender phase, will describe in greater detail all the permits, their procedures and times.

The list below gives a non-exhaustive overview of the main stakeholders that will participate in the project.

Public stakeholders:
- Funding authorities
- Ministries
- The Sardinia Regional governments
- The communes and provinces
- Universities
- Permitting authorities
- Territorial authorities
- Road and rail authorities (there are not railwaies in this Sardinia area)
- Utility authorities: electricity, water, signal cables (there is not Gas in Sardinia)
- Etc.

Private stakeholders:
- Owner
- Financial organisations
- Engineering offices
- Einstein Telescope
- Contractors and suppliers
- Land owners
- Safety coordinators
- Special consultants (lawyers, experts, etc)
- Etc.

2. Scan of public authorizations and permits to be acquired

2.1. URBAN PLANNING PERMITS

2.1.1.HOW: procedures for obtaining permits

These permits can be requested with the PFTE.

The ET_Project must be submitted to **SUAPE (Sportello Unico Attività Produttive ed Edilizia).**
La **Conferenza dei Servizi** (Services Conference) is thus activated; it simultaneously involves all the authorities called upon to issue all the permits.
All authorisations, agreements, concessions, licences, opinions and consents however denominated, necessary for the creation and operation of the ET_Project are acquired within the scope of a specific and unique *Conferenza di Servizi*.
These procedures will presumably be included in those described in the paragraph 2.1 to which reference is made.

2.1.2.WHAT: main aspects covered by the permits

The main aspects covered by the permit are:

Infrastructure for ET_Observatory:
- Surface buildings serving ET

- Management buildings and surface laboratories serving ET
- Entrance windows to the underground laboratories
- Entrance and maneuvering areas
- Storage areas for underground laboratory equipment
- Access roads to laboratories and access control areas

Temporary infrastructures necessary for the works:
- Construction sites and worksites
- Access roads to worksites
- Cement factories necessary for construction
- Sites for storage of construction materials
- Sites for temporary storage, analysis and sorting of excavation materials
- Sites for supplying the water necessary for construction
- Roads and infrastructures.

Interference, if any, with public services:
- Roads
- Electric power lines
- Other underground services (there are not gas pipelines in Sardinia)
- Prisons or Penal Colonies(if any)
- Hospitals (there are not big hospital in this Sardinian area)
- Military zones (if any).

2.1.3.WHO: authority that issue the permits

The main authorities that will be consulted in the **Conferenza dei Servizi** are at least the following.
- The Autonomous Region of Sardinia
- Competent Provincial Administrations
- Competent Municipal administrations
- Competent Ministries
- Competent Territorial Authorities

2.2. ENVIRONMENTAL PERMITS, DNSH AND CULTURAL HERITAGE

2.2.1.HOW: procedures for obtaining permits

These permits must be requested with the PFTE.

The ET_Project is, presumably, subject to the **Valutazione di Impatto Ambientale (VIA)** (Environmental Impact Assessment = EIA); the VIA is a regional responsibility, and a *Istruttoria Tecnico Amministrativa* (Technical Administrative Investigation) must be initiated to obtain the **Provvedimento Autorizzatorio Unico Regionale (PAUR)** (Single Regional Authorization Provision), pursuant to article 27-bis of Legislative Decree 152/2006. An application must be submitted to the *Assessorato Regionale della difesa dell'ambiente – Direzione generale dell'ambientale – Servizio valutazioni impatti e incidenze ambientali* or to *SUAPE*
The *PAUR* provides that all authorisations, agreements, concessions, licences, opinions, concerts, clearances and consents however named, necessary for the implementation and operation of the ET_Project are acquired by all the Authorities in a synchronous manner, within the scope of a *Conferenza dei Servizi* (Services Conference), as follows.

The *Conferenza dei Servizi* (Services Conference) is called in synchronous mode and takes place pursuant to article 14-ter of law 7 August 1990, n. 241.

The deadline for concluding the *Conferenza dei Servizi* (Services Conference) is **120 days** starting from the date of convocation.
The conclusion of the *Conferenza dei Servizi* (Services Conference), with a reasoned determination, constitutes the *Provvedimento Autorizzatorio Unico Regionale (PAUR)* and includes the VIA and all the authorizations issued for the implementation and operation of the ET_Project, with explicit indication thereof by all the interested Authorities.

2.2.2.WHAT: main aspects covered by the permits

The ET_Project must comply with the principles of Do Not Significant Harm (DNSH) also according to the provisions of the PNRR.
The ET_Project must comply with the cultural, archaeological and landscape constraints in the area.
The ET_Project will be subject to the authorization of the Ministry of the Environment and Energy Security.
The ET_Project will be developed by adopting the guidelines of the document published by the European Commission in 2017 "Environmental Impact Assessments of Projects - Guidance on the preparation of the Environmental Impact Assessment Report" (Direttiva 2011/92/EU and 2014/52/EU), and the document "Valutazione d'Impatto Ambientale - Norme tecniche per la redazione degli studi di impatto ambientale di cui all'articolo 22 del D.Lgs. 152/2006 e s.m.i.".

At least the following general main aspects must be evaluated.

- Environmental impact on the territory.
- Environmental impact for the management of excavation materials.
- Hydrogeological constraint.
- Presence of archaeological sites.
- Presence of protected natural parks.
- Protection of the landscape.
- Protection of flora and fauna.
- Classification of areas at risk for the PAI.
- Analysis of the procurement and storage phases of raw materials, capital goods and people, functional to the ordinary maintenance of the work.
- Identification of solutions capable of improving the impact of the work on the environment during its operation.
- Evaluation of aspects related to the preparation of the works and accessibility to the construction sites with the construction vehicles and roads that possibly cross inhabited areas to evaluate the potential impact on residents (noise, air pollution, vibrations, etc.).
- Evaluation of the involvement of the hydrographic areas for the risk of impact due to the discharge of purified construction site water and first rainfall into seasonal watercourses and therefore the risk of alteration of the hydraulic regime.
- Evaluation of alternative forms of water and energy supply for construction sites.

At least the following particular aspects must be evaluated for the construction works.

- Raw material. Consumption of raw materials, energy consumption.
- Waters. Surface water, groundwater, consumption of water resources, water discharges.
- Emissions.
- Waste.
- Soil and subsoil.
- Noise.
- Vibrations.
- Dangerous substances.

- Vegetation, flora, fauna and ecosystems.
- Landscape morphology.
- Anthropic system.

The following aspects must also be evaluated for all the life cycle of the ET Observatory..

- Effects on the population and human health.
- Effects on the climate.
- The historical-cultural and archaeological heritage.
- The landscape.
- The forest system.
- The anthropic system.
- The built system.
- The road system.
- The agro-pastoral and pasture system.
- The settlement system.
- The agricultural system.

2.2.3.WHO: authority that issue the permits

The main authorities that will be consulted in the **Conferenza dei Servizi** are at least the following.

- The Autonomous Region of Sardinia
- Provincial Administrations
- Municipal Administrations
- Competent Ministries
- Competent Territorial Authorities

2.3. EXCAVATION PERMITS

2.3.1.HOW: procedures for obtaining permits

These permits must be requested with the PFTE.

The ET_Project must be presented to the competent authorities for issuing the permit.

2.3.2.WHAT: main aspects covered by the permits

The ET_Project must comply with the rules on excavation methods of the Sardinia Region and national governments.

- Excavation with Explosives: Commissione di Vigilanza Materiale Esplosivo (Explosive Material Supervision Commission).
- Excavation with Explosives: Prefettura.
- Polizia Mineraria (Mining Police) : DPR 128 del 1959 e 624 del 1996 for extractive activities, use of mines for different purposes.
- IGEA for interference with mines and for the creation of landfill areas and their reclamation and reuse..

2.3.3.WHO: authority that issue the permits

The main authorities that will be consulted in the **Conferenza dei Servizi** are at least the following.

- ARPAS
- Polizia Mineraria

- Prefettura
- IGEA SpA
- Commissione di Vigilanza Materiale Esplosivo
- Parco Geominerario

2.4. SAFETY PERMITS

2.4.1.HOW: procedures for obtaining permits

For these permits there are 3 steps in sequence.

Nulla Osta di Fattibilità VVF (NOF) (Feasibility Permit by VVF)**:** this permit can be issued by the il Comando Provinciale dei Vigili del Fuoco (VVF) (Provincial Fire Brigade Command) by presenting the documents described in art.7 of Decreto del Ministero dell'Interno 07 agosto 2012; these documents are a part of the PFTE.
The *NOF* authorizes the safety strategy, with the measures and solutions to be adopted to guarantee safety; for relevant projects this authorization is issued before the PFTE; i VVF (the Fire Brigade) can make their observations during the drafting of the PFTE in an interactive and iterative manner, until the issuing of the NOF.

Nulla Osta VVF: this permit can be issued, after the NOF, by the by the Comando Provinciale dei Vigili del Fuoco (VVF) (Provincial Fire Brigade Command) by presenting the PE. The PE must compliant to the NOF already obtained.

Segnalazione Certificata di Inizio Attività (SCIA) (Certified Report of Start of Activity): SCIA demonstrates compliance with fire prevention regulations according to DPR 151/2011. This permit must be issued by the Comando Provinciale dei Vigili del Fuoco (VVF) (Provincial Fire Brigade Command), before the start of the ET Observatory's activities. The SCIA must comply with the PE already approved and the Nulla Osta VVF.

2.4.2.WHAT: main aspects covered by the permits

The ET_Project must comply with the rules on prevention, safety and emergency management.
The ET_Project must comply with the D. Lgs. 9 aprile 2008 n.81 "Testo Unico sulla Sicurezza".

At least the following main aspects must be evaluated

- Risk Analysis
- Risk Mitigation
- General strategy for emergency management and first aid.
- Location, access to the area and approach of emergency vehicles.
- Construction features and layout:
    - distancing, separations, isolation
    - compartment, fire resistance, reaction to fire.
- Escape routes for the total safety of the personnel involved.
- Classification of specific risk areas and systems to which particular attention should be paid in terms of fire risk and emergency management:
    - Saturating gases for cryogenics: He, N.
    - Laser.
    - Other sources of specific risk.
- Electrical safety systems, safety lighting.
- Detection, signaling and alarm systems with total remote management.
- Fire extinguishing means and systems.
- Natural or mechanical smoke control system.

- Safety warning signs.

2.4.3.WHO: authority that issue the permits

- Ministero degli Interni - Comando Nazionale dei Vigili del Fuoco (National Fire Brigade Command).
- Comando Provinciale dei Vigili del Fuoco competente (Provincial Fire Brigade Command).

2.5. OTHER PERMITS BEFORE STARTING WORKS

2.5.1.HOW: procedures for obtaining permits

These permits must be requested with the PE, before starting construction works on the ET Observatory.

The ET_Project must be presented to the competent Authorities for issuing the permit on concrete structures.

The ET_Project must be presented to the competent Authorities for issuing the permit for the military safety for presence of explosive devices.

2.5.2.WHAT: main aspects covered by the permits

The ET_Project must comply with the technical standards for construction, for example the following:

- Legge 5 novembre 1971, n. 1086 “Norme per la disciplina delle opere di conglomerato cementizio armato, normale e precompresso ed a struttura metallica”;
- Legge 2 febbraio 1974, n. 64 “Provvedimenti per le costruzioni con particolari prescrizioni per le zone sismiche”;
- DM LL.PP. 14/01/2008 “Norme tecniche per il calcolo, l’esecuzione ed il collaudo delle strutture in cemento armato, normale e precompresso e per le strutture metalliche”;
- Circolare Consiglio Superiore Lavori Pubblici del 02/02/2009 contenente istruzioni per l’applicazione delle “Nuove norme tecniche per le costruzioni” di cui al DM 14 gennaio 2008;
- Decreto 17 gennaio 2018 “Aggiornamento delle Norme tecniche per le costruzioni”;
- Circolare 21 gennaio 2019 n. 7 “Istruzioni per l’applicazione dell’Aggiornamento delle “Norme tecniche per le costruzioni” di cui al DM 17 gennaio 2018”.

The ET_Project must comply to the rules for the military safety for presence of explosive devices (if any).

2.5.3.WHO: authority that issue the permits

Permit for structures, geotechnics and hydrogeology

- Servizio del Genio civile competente

Permit for military safety for presence of explosive devices (if any):

- Ministero della Difesa.
- Genio Militare competent in the área.

3. Scan of private authorizations and legal contracts to be acquired: description of acquisition procedures and establishment of ownership and use rights

3.1. EXPROPRIATION AND RIGHT OF LIMITATION

3.1.1.HOW: procedures for obtaining permits

Expropriation of **public property**: concession procedures from **demanio pubblico**; this permit can be requested with the PE and will be effective in the execution phase.

Expropriation of **private property**: expropriation procedures of private individuals can be requested with the PE; the expropriation procedures will be effective in the execution phase, following the declaration of public utility *(dichiarazione di pubblica utilità)*; it will also be necessary to calculate the expropriation prices.

Rights of **limitation** *(servitù)* of public property and of private property: the ET_Project will have to stipulate with the owners of the neighboring lands all rights the easements on the limitation of activities that generate noise, such as wind farms; the easement procedures will be effective in the execution phase, following the declaration of public utility*(dichiarazione di pubblica utilità)*; it will also be necessary to calculate the limitation prices.

3.1.2.WHAT: main aspects covered by the permits

The urban planning compliance and legal ownership of the land must be assessed, as well as the verification of the properties and any easements or agreements, in order to prevent noisy installations, such as wind farms, which are not compatible with ET interferometer scientific research; all the land adjacent to the ET_Observatory must be assessed.

- Private land.
- Public land or land for public use.
- Interference with existing public or private activities.

3.1.3.WHO: authority that issue the permits

- Ministries responsible for the *Dichiarazione di Pubblica Utilità* (Declaration of Public Utility).
- Territorial Institutions for expropriations, easements and use of state-owned areas, and *Uso Civico (*civic use).

4. Interaction between the technical aspects and the legal and administrative stages

4.1. PRELIMINARY STUDIES AND DRILLING:

The first studies are going to start in December 2023; the tender is running with the PNRR funds; the name of the tender is:

"Studio propedeutico allo sviluppo del progetto di fattibilità tecnica ed economica dell'osservatorio di onde gravitazionali Einstein Telescope nella Regione Sardegna, in diverse configurazioni, comprensivo della esecuzione delle indagini e dei sondaggi e della valutazione preliminare di impatto ambientale, per le opere infrastrutturali, in sotterranea e in superficie, edili e impiantistiche." CIG_9760848A93

("Preparatory study for the development of the technical and economic feasibility project of the Einstein Telescope gravitational wave observatory in the Sardinia Region, in different configurations, including the execution of investigations and surveys and the preliminary environmental impact assessment, for the infrastructure works, in underground and above ground, construction and plant engineering.")

This preliminary studies will presumably end in June 2025.

4.2. PFTE (Progetto di Fattibilità Tecnico Economica)

The PFTE (Technical-Economical Feasibility Project) will start after the decision for choosing the site for ET Observatory.
The PFTE will be carried out according to the DLgs 36/2023 (Public Contracts Code).

A tender will be made to choose the designer for the PFTE. The designer for the PFTE will use the preliminary studies.

The PFTE will presumably be completed in 12 months.

4.3. PERMITS

The ET_Project will be presented to the Authorities for approval and obtaining permits with PFTE.

All the permits are assessed by the *PAUR*, with the *Conferenza dei Servizi* (see above).

In Sardinia the PAUR must be completed in 120 days.

4.4. WORKS

A tender will be made to choose the Company for the works.
The tender for works will presumably be completed in 12 months.

The Company that wins this tender will design also the PE (Progetto Esecutivo = Executive Project), and will obtain the final construction permits.
The PE will be carried out according to the DLgs 36/2023 (Public Contracts Code).

After the PE validation the work can start.

Annexes

D4.1 Annex Sardinia 1.pdf (Capitolato Speciale di Appalto)

D4.1 Annex Sardinia 2.pdf (Unofficial courtesy translation of “Capitolato Speciale di Appalto”)

HISTORY OF CHANGES		
Version	**Publication date**	**Change**
1.0	13.11.2023	▪ Initial version

Finanziato dall'Unione europea
NextGenerationEU

MISSIONE 4
ISTRUZIONE
RICERCA

Avviso pubblico rep.3264 del 28-12-2021 per "Rafforzamento e creazione di Infrastrutture di Ricerca" da finanziare nell'ambito del PNRR, Missione 4, "Istruzione e Ricerca" - Componente 2, "Dalla ricerca all'impresa" – Linea di investimento 3.1, "Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione"

Finanziato dall'Unione europea – Next Generation EU.

Progetto IR0000004 - ETIC, decreto di ammissione al finanziamento n. 410 del 27/10/2022
CUP_I53C21000420006 - CUI_S84001850589202300015

ETIC - EINSTEIN TELESCOPE INFRASTRUCTURE CONSORTIUM

"Studio propedeutico allo sviluppo del progetto di fattibilità tecnica ed economica dell'osservatorio di onde gravitazionali Einstein Telescope nella Regione Sardegna, in diverse configurazioni, comprensivo della esecuzione delle indagini e dei sondaggi e della valutazione preliminare di impatto ambientale, per le opere infrastrutturali, in sotterranea e in superficie, edili e impiantistiche." CIG_9760848A93

CAPITOLATO SPECIALE DI APPALTO

LISTA DI DISTRIBUZIONE:	**Marco Pallavicini:** membro giunta esecutiva dell'INFN **Santo Gammino:** direttore dei LNS dell'INFN **Michela Giovagnoli:** Project Officer di ETIC **Domenico D'Urso:** Co-Chair Site Preparation Board SPB di ET **Michele Punturo:** Responsabile Scientifico di ETIC **Maria Marsella:** WP6 leader **Gaetano Schillaci:** Responsabile Unico del Procedimento (RUP) **Dino Franciotti:** Ufficio a supporto del RUP (UR) **Giuseppe D'Emma:** Ufficio a supporto del RUP (UR) **Daniele Cittadino:** Ufficio a supporto del RUP (UR) **Andrea Paoli:** Ufficio a supporto del RUP (UR) **Maria Rachele Pallucco:** Ufficio a supporto del RUP (UR)		
STATO	☐ Bozza	☒ Rilasciato	☐ Eliminato

Registro delle modifiche

N° Rev	Descrizione	Data	Redazione	Verifica	Approvazione
1	prima emissione per studio di fattibilità	11 01 2023	G.Schillaci	G.Schillaci M.Marsella	M.Punturo
1.1	stime dei costi dell'opera	19 01 2023			
1.2	calcolo tariffe e base d'asta	27 01 2023			
1.3	DNSH e CAM e SdA	30 01 2023			
1.4	risposte cons06	06 02 2023			
1.5	analisi cons06	22 02 2023			
2.0	seconda emissione	27 02 2023			
2.1	revisione Intellera	22 03 2023			

Sommario:

1. PREMESSA:

I rivelatori di onde gravitazionali (GW Gravitational Wave) di prima generazione (GEO600, LIGO, TAMA, Virgo) hanno raggiunto, o si sono avvicinati, alle loro sensibilità progettuali e hanno quindi dimostrato l'efficacia del principio di funzionamento. I principali rivelatori attualmente operativi sono versioni avanzate dei rivelatori iniziali, per questo anche chiamati di seconda generazione ("Advanced LIGO", "Advanced Virgo"). Al momento sono in corso ulteriori potenziamenti degli apparati per la preparazione della prossima campagna osservativa, chiamata O4, il cui inizio è previsto nel corso del 2023.

I Rivelatori di seconda generazione mostrano una sensibilità migliorata approssimativamente di un fattore dieci rispetto agli interferometri iniziali.

La comunità scientifica ha deciso di iniziare a indagare su una nuova (terza) generazione di rivelatori di onde gravitazionali GW.

Con una sensibilità notevolmente migliorata, le nuove macchine della terza generazione apriranno l'era della normale astronomia GW e con il progetto del Einstein Telescope (ET) l'Europa si candida a guidare questa rivoluzione scientifica.

A tal fine la comunità scientifica italiana ha individuato un sito che, per le sue specificità, può ospitare le infrastrutture di ET; attualmente è in corso la caratterizzazione del sito sia dal punto di vista del rumore microsismico di profondità sia, in generale, del rumore ambientale e delle qualità geologiche e geotecniche delle aree interessate.

Per l'implementazione del rivelatore Einstein Telescope, l'Istituto Nazionale di Fisica Nucleare (l'"**INFN**") ha partecipato con il Progetto Einstein Telescope Infrastructure Consortium ("**ETIC**") all'Avviso pubblico del Ministero dell'Università e della Ricerca rep.3264 del 28-12-2021 per la presentazione di proposte progettuali per "Rafforzamento e creazione di Infrastrutture di Ricerca" da finanziare nell'ambito del Piano Nazionale di Ripresa e Resilienza ("**PNRR**"), Missione 4, "Istruzione e Ricerca" - Componente 2, "Dalla ricerca all'impresa" – Linea di investimento 3.1,

"Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione", Finanziato dall'Unione europea – NextGenerationEU.

All'esito, la proposta progettuale IR0000004 [ETIC] si è collocata utilmente in graduatoria definitiva, come da Decreto Direttoriale n. 371 del 11.10.2022 e il progetto ETIC è stato ammesso al finanziamento con Decreto di Concessione n.410 del 27-10-2022.

2. SCOPO

Lo scopo della presente procedura di affidamento (la "**Procedura**") è di acquisire lo **Studio propedeutico ("Studio") allo sviluppo del progetto di fattibilità tecnica ed economica dell'osservatorio di onde gravitazionali Einstein Telescope nella Regione Sardegna, in diverse configurazioni, comprensivo della esecuzione delle indagini e dei sondaggi e della valutazione preliminare di impatto ambientale, per le opere infrastrutturali, in sotterranea e in superficie, edili e impiantistiche.**

Tale Studio costituirà l'elemento principale della proposta italiana (*"bid book"*) per ospitare Einstein Telescope in Italia e, di conseguenza, ciò determina il livello di dettaglio necessario.

L'appalto include espressamente, oltre alla predisposizione dello Studio, anche l'esecuzione di tutte le indagini, le misurazioni ed i sondaggi necessari per il livello di studio richiesto.

Il sito che è stato individuato per l'installazione del rivelatore di onde gravitazionali ET si trova nella Provincia di Nuoro.

La geometria del rivelatore ET è determinata dalle considerazioni scientifiche ed è oggi in fase di sviluppo;

Configurazioni del rivelatore ET: le ipotesi attuali prevedono che il rivelatore, costituito da sei interferometri per onde gravitazionali, sia inserito in un sistema di tunnel e caverne con layout a Triangolo equilatero 'T' di lato circa 11 km, oppure, costituito da due interferometri per onde gravitazionali, sia inserito in un sistema di tunnel e caverne con layout a 'L' di lato circa 16 km.

La profondità di installazione è determinata dalla caratterizzazione del sito e dipende dal rumore di fondo valutabile per le caverne di vertice ed è oggi in fase di sviluppo; l'ipotesi attuale prevede che le caverne di vertice del rivelatore siano situate alla profondità minima compresa tra 120 e 250 metri sotto il livello del suolo.

Lo Studio, oggetto del presente appalto, comprende lo scavo dei tunnel e delle caverne, la realizzazione delle opere civili e degli impianti di servizio in sotterraneo ed in superficie, le predisposizioni per il rivelatore ET e per i suoi impianti tecnologici.

Al termine dell'esecuzione dell'appalto dovrà essere possibile valutare, confrontando le diverse configurazioni e le diverse profondità del rivelatore ET anche con riferimento al sito, le diverse soluzioni dal punto di vista ingegneristico, per fornire adeguato supporto alla comunità scientifica.

Il presente documento, di seguito denominato "**Capitolato**" o "**CSA**", è parte integrante dei documenti posti a base della Procedura.

Esso costituisce, inoltre, parte integrante e sostanziale del Contratto per l'affidamento dell'appalto in epigrafe, unitamente all'Offerta, corredata dai relativi allegati ivi citati, che sarà stata accettata dalla Stazione Appaltante, nonché dei documenti che l'Operatore Economico (OE) aggiudicatario si sarà impegnato a produrre alla Stazione Appaltante per effetto dell'accettazione della sua Offerta. La procedura di affidamento e l'esecuzione del servizio sono regolate dal Decreto legislativo 18 aprile 2016, n. 50 (il "**Codice**"), dal D.P.R. 5 ottobre 2010, n. 207, per le parti ancora in vigore, dalle Linee Guida del MIMS di cui all' Art. 48, comma 7, del decreto-legge 31 maggio 2021, n. 77, convertito nella legge 29 luglio 2021, n. 108 ("**DL 77/2021**"), nonché dalla vigente normativa di settore.

Le prestazioni oggetto dell'appalto dovranno essere svolte secondo le modalità, nei termini ed alle condizioni stabilite nel presente Capitolato, nelle Prime Indicazioni sullo Sviluppo della Progettazione (ISP), nell'Offerta Tecnico-economica ed in tutti i documenti che faranno parte del contratto.

3. STAZIONE APPALTANTE

La Stazione Appaltante (nel seguito SA) è i Laboratori Nazionali del Sud (nel seguito LNS) dell'Istituto Nazionale di Fisica Nucleare (nel seguito INFN).

4. FINANZIAMENTO

La Procedura è finanziata a valere: (i) sulle risorse del PNRR e, in particolare sulla Missione 4 "*Istruzione e Ricerca*" - Componente 2 "*Dalla ricerca all'impresa*", Linea di investimento 3.1, "*Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione*", finanziato dall'Unione europea – Next Generation EU, azione di riferimento la 3.1.1 "*Creazione di nuove IR o potenziamento di quelle esistenti che concorrono agli obiettivi di Eccellenza Scientifica di Horizon Europe e costituzione di reti*" di cui al D.M. 7 ottobre 2021, n. 1141, giusto Decreto di ammissione al finanziamento n. 410, del 27/10/2022; (ii) in parte minoritaria sulle risorse dei Fondi di bilancio dell'INFN.

L'esecuzione delle prestazioni oggetto dell'appalto deve avvenire nel rispetto delle regole, dei principi e delle tempistiche stabilite nell'ambito del finanziamento.

Lo studio, in particolare, dovrà essere completato entro e non oltre il **30 giugno 2025**. Le tempistiche previste dal finanziamento PNRR per l'esecuzione del servizio costituiscono termine essenziale ai sensi dell'art 1457 del Codice civile e l'Operatore Economico, fermo restando quanto previsto dall'art. 108, comma 5, del Codice, si assume il rischio di non ricevere alcun indennizzo o corrispettivo qualora detti termini che non siano rispettati e le ulteriori condizioni per beneficiare del finanziamento non siano soddisfatte per fatti a lui imputabili.

Resta fermo il diritto della Stazione Appaltante al risarcimento dei danni che dovessero derivare: (i) dalla risoluzione del Contratto per mancato rispetto del termine essenziale; (ii) dalla revoca totale o parziale degli importi finanziati dovuta a ritardi dell'Operatore Economico nell'esecuzione del servizio o a causa a lui imputabile

5. OGGETTO DELL'APPALTO E LUOGO DI ESECUZIONE

Ai sensi dell'articolo 28, co. 1 e 9, del Codice, il presente appalto è qualificabile come appalto misto poiché comprensivo di servizi di ingegneria e architettura e di lavori, con prevalenza dei primi.

Il presente appalto ha, infatti, ad oggetto la predisposizione dello **"Studio propedeutico allo sviluppo del progetto di fattibilità tecnica ed economica dell'osservatorio di onde gravitazionali Einstein Telescope nella Regione Sardegna, in diverse configurazioni, comprensivo della esecuzione delle indagini e dei sondaggi e della valutazione preliminare di impatto ambientale, per le opere infrastrutturali, in sotterranea e in superficie, edili e impiantistiche".** Si precisa che il PFTE sarà predisposto successivamente e remunerato a valere su diverse fonti di finanziamento. Il PFTE sarà, infine, sottoposto alla verifica di cui all'articolo 26 del Codice.

Lo Studio, in particolare, è finalizzato a sviluppare le seguenti due configurazioni per la realizzazione del rivelatore Einstein Telescope:

- realizzazione di un rivelatore, costituito da sei interferometri per onde gravitazionali e inserito in un sistema di tunnel e caverne con *layout* a Triangolo equilatero 'T' di lato circa 11km;

- realizzazione di un rivelatore costituito da due interferometri per onde gravitazionali e inserito in un sistema di tunnel e caverne con *layout* a 'L' di lato circa 16km.

È da considerarsi inclusa nello Studio la redazione di ogni elaborato necessario per il rilascio dei pareri previsti dalla normativa rilevante da parte degli Enti Locali competenti, nonché per garantire l'ottenimento, a successivi lavori ultimati, di ogni certificazione, attestazione o atto altrimenti detto previsto dalla normativa applicabile al caso di specie, per il livello di progettazione richiesto e incluso nella offerta tecnica.

In relazione alle diverse configurazioni oggetto dello Studio, l' Operatore Economico , in ragione della tipologia di opere che saranno individuate, dovrà acquisire da ciascuna

Amministrazione/Ente interessati, compresi gli Enti gestori di servizi pubblici a rete per i quali possono riscontrarsi interferenze con il progetto, le condizioni a cui dovrà corrispondere l'elaborazione dei successivi livelli di progettazione per la favorevole espressione di intese, concerti, nulla-osta, autorizzazioni, concessioni o altri atti di assenso, comunque denominati. Gli oneri per tali attività sono compresi nell'importo offerto in sede di gara dall'OE.

Quanto ai rilievi, le indagini e le prove *in situ* e di laboratorio, da eseguire a cura dell'Operatore Economico aggiudicatario, le stesse dovranno essere mirate ad acquisire tutte le informazioni atte a sviluppare la progettazione in modo completo, relativamente a qualsiasi elemento utile e/o necessario per l'individuazione delle diverse configurazioni oggetto dello Studio.

Le attività di rilievi e/o indagini devono essere eseguite, complete di noli, trasporti, opere provvisionali e tutto quanto necessario a eseguire il lavoro compiuto a perfetta regola d'arte, anche se non direttamente evidenziato negli elaborati di progetto, nel presente Capitolato, nell' ISP, nel Computo metrico e nell'Elenco Prezzi. Sono incluse nell'oggetto dell'appalto tutte le attività per l'ottenimento dei permessi necessari all'esecuzione delle indagini e dei sondaggi.

Nelle attività di rilievi e/o indagini sono altresì comprese le attività di trasporto, sgombero e allontanamento di detriti, l'opera di muratori, scarico ed accatastamento sul posto di lavoro con qualsiasi mezzo, l'uso di opere provvisionali e ogni altro onere per realizzare le attività a perfetta regola d'arte. S'intende compresa ogni fornitura di materiali comunque occorrenti ed ogni onere, magistero e mezzo d'opera per garantire la corretta esecuzione delle prestazioni in ogni sua parte.

L'Operatore Economico dovrà curare il ricevimento nei siti di esecuzione dei rilievi e delle indagini di eventuali materiali occorrenti, lo scarico ed il trasporto nei luoghi di deposito o a piè d'opera e dovrà provvedere alla loro custodia e guardiania, oltre agli altri oneri che si rendessero necessari, quali la custodia dei campioni prelevati e il loro trasporto e consegna presso i laboratori autorizzati. Rimane stabilito che sarà a carico dell'Operatore Economico ogni responsabilità per smarrimenti, perdite, furti, incendi o qualsiasi eventuale danno alla strumentazione e alle apparecchiature di prova nonché ai campioni prelevati.

Sono altresì compresi nell'appalto, senza ulteriori oneri per la Stazione Appaltante, i miglioramenti e le previsioni aggiuntive contenute nell'Offerta Tecnica che sarà presentata dall'Operatore Economico e recepite dalla Stazione Appaltante.

Nell'espletamento delle prestazioni oggetto dell'appalto sarà cura ed onere dell'Operatore Economico individuare e garantire il rispetto di tutta la legislazione sovranazionale, nazionale, regionale, provinciale e locale vigente. La determinazione completa delle regole e delle norme applicabili nello svolgimento delle attività di appalto è pertanto demandata all'OE.

Si precisa altresì che sono incluse nell'appalto la Direzione dei Lavori (DL), il Coordinamento della Sicurezza in fase di Progettazione (CSP) ed il Coordinamento della Sicurezza in fase di Esecuzione (CSE) e tutte le altre prestazioni professionali necessarie per l'esecuzione delle indagini e dei sondaggi.

Si precisa infine che, come previsto all'art. 3.3 del Disciplinare di gara, qualora, nel corso della Procedura, l'INFN e le ulteriori Autorità coinvolte dovessero individuare la configurazione preferibile tra le due, si potrà procedere con una variante del contratto e l'aggiudicatario dovrà sviluppare unicamente la configurazione prescelta.

6. AMMONTARE DELL'APPALTO

L'importo complessivo dell'appalto è pari ad **€ 14.241.427,58 (diconsi Euro quattordici milioni duecentoquarantuno mila quattrocentoventisette,58**), incluso di spese e di oneri fiscali e previdenziali, oltre IVA e oneri di legge se dovuti, ripartito come segue:

N.	Descrizione	Importo (euro)
a	A CORPO: servizi di ingegneria	€ 11.142.313,98
b	A MISURA: lavori e servizi per indagini e sondaggi preliminari	€ 2.999.113,60
c	**Importo a base d'asta soggetto a ribasso**	**€ 14.141.427,58**
d	Oneri della sicurezza non soggetti a ribasso d'asta	€ 100.000,00
e	**Importo complessivo**	**€ 14.241.427,58**

N.	Categoria	Descrizione	Importo (euro)	Aliquota (%)
	Servizi di ingegneria (a corpo)			
1	S.05	Studio delle opere in sotterraneo	€ 8.862.950,87	62,2%
2	E.10	Studio delle opere in superficie	€ 1.094.191,47	7,7%
3	IA.04	Studio degli impianti	€ 984.772,32	6,9%
	Altri servizi (a corpo)			
4	S.04	DL, CSP, CSE per rilievi, indagini, sondaggi preliminari	€ 200.399,32	1,4%
	Lavori (a misura)			
5	OS21	Rilievi, indagini, sondaggi e prove di laboratorio	€ 2.999.113,60	21,1%
	Totale importo soggetto a ribasso		**€ 14.141.427,58**	
6	OS21	Oneri per la sicurezza non soggetti a ribasso	€ 100.000,00	0,7%
	Totale importo complessivo		**€ 14.241.427,58**	**100.0%**

L'importo contrattuale sarà costituito dalla somma dei seguenti importi:

- importo posto a base di gara per i Servizi di Ingegneria a corpo, determinato avendo riguardo alle previsioni del D.M. 17 giugno 2016 in applicazione del combinato disposto degli articoli 24, co. 8, e 216, co. 6, del Codice dei Contratti, incluse le spese e gli oneri fiscali e previdenziali, e al netto del ribasso percentuale offerto dall'operatore economico aggiudicatario in sede di offerta;

- importo per l'esecuzione di rilievi, indagini, analisi e prove, a misura, determinato, al netto del ribasso percentuale offerto dall'Operatore Economico in sede di offerta sulla base dei seguenti Prezzari in ordine di priorità:

    - ETIC_WP6_1-A03: elenco prezzi unitari preliminare delle indagini e dei sondaggi.

    - Prezzario Regione Autonoma della Sardegna – Prezzario 2022 (pubblicato con Delibera regionale n. 19/23 del 21/06/2022).

    - RFI – Tariffa dei Prezzi "IG" – Indagini geognostiche e prove geotecniche – Edizione 2022;

    - Anas – Listino Prezzi 2022 – Prove, Indagini e Monitoraggio (Rev.2 rilasciata a seguito del Decreto Legge n.50 del 17 maggio 2022).

- importo per oneri della sicurezza relativi alle indagini ed ai sondaggi non soggetto a ribasso;

Il costo totale stimato della manodopera per l'esecuzione dei soli rilievi, indagini e prove, ai sensi dell'articolo 23, co. 16, del Codice dei Contratti pubblici, è pari a circa € 900.000,00 corrispondente al 30% dell'importo per le predette prestazioni, ed è compreso nell'importo totale di cui alla tabella che precede.

I prezzi e gli importi prescritti includono gli oneri fiscali e previdenziali (CNPAIA).

I prezzi e gli importi prescritti non includono l'Imposta sul Valore Aggiunto (IVA).

7. MODALITÀ DI STIPULAZIONE DEL CONTRATTO

Il Contratto è stipulato "nella forma mista *a corpo e a misura*" e, pertanto, per *le prestazioni a corpo il prezzo offerto rimane fisso e non può variare in aumento o in diminuzione, secondo la qualità e la quantità effettiva delle prestazioni eseguite. Per le prestazioni a misura il prezzo convenuto può variare, in aumento o in diminuzione, secondo la quantità effettiva delle prestazioni eseguite. Per le prestazioni a misura l'articolo 6 del presente CSA fissa i prezzi invariabili per l'unità di misura*".

7.1 prestazioni "a corpo"

Ai sensi dell'articolo 24, co. 8, del Codice dei Contratti, l'importo a base d'asta per l'attività di progettazione è stato calcolato facendo riferimento al D.M. 17 giugno 2016 per la categoria **"STRUTTURE - Strutture speciali S.05" (prevalente)**, per la categoria **"EDILIZIA Sanità, istruzione, ricerca E.10"**, per la categoria **"IMPIANTI - Impianti elettrici e speciali a servizio delle costruzioni IA.04"** e tenendo conto delle caratteristiche dello Studio da eseguire, della parziale ripetitività delle prestazioni e del contenuto degli elaborati da predisporre.

Il compenso rimarrà fisso ed invariabile anche laddove l'importo delle opere e dei lavori da progettare dovesse subire una rimodulazione e un successivo affinamento durante l'esecuzione del servizio e dei successivi livelli di progettazione, fatto salvo quanto previsto dall'art. 3.4 del Disciplinare di gara.

Il corrispettivo, per la parte a **"a corpo"**, si intende comprensivo di tutto quanto necessario alla puntuale esecuzione dell'appalto a perfetta regola d'arte, in ogni sua componente prestazionale, in ottemperanza alle normative applicabili e alle disposizioni del presente Capitolato, dell'ISP, del Contratto e di tutti i Documenti Contrattuali e all'Offerta, corredata dai relativi allegati ivi menzionati, nonché dei documenti che l'OE si è impegnato a produrre alla Stazione Appaltante per effetto dell'accettazione della sua Offerta da parte della Stazione Appaltante.

Il prezzo offerto dall'OE si intende comprensivo di tutto quanto necessario all'espletamento del servizio di ingegneria, anche se non specificamente indicato nei documenti di gara, ed, in linea generale, di ogni onere necessario allo svolgimento delle attività accessorie, delle attività di

sopralluogo, trasferte, misurazioni, sicurezze, permessi, rilievi, riproduzioni, prove tecnologiche di qualsiasi natura e tipo, reperimento di documentazioni progettuali presso soggetti terzi, pubblici o privati; si intendono altresì compensati dal prezzo offerto gli oneri per i trasferimenti, per l'impiego di personale specializzato e professionisti ed ogni onere relativo alla sicurezza del personale operante in strada o in campagna. Sono, altresì, comprese le spese e/o gli indennizzi per occupazioni temporanee o danneggiamenti per l'esecuzione di prove geognostiche o sismiche, per misurazioni topografiche, relative spese per la bonifica da ordigni esplosivi, ecc.

Nel prezzo offerto dall'Operatore Economico sono tra l'altro compresi:

- tutti i documenti necessari per l'ottenimento di tutti i permessi necessari per l'esecuzione di tutte le indagini e di tutti i sondaggi, e l'assistenza sino all'ottenimento degli stessi permessi;
- la Direzione dei Lavori (DL), il Coordinamento delle Sicurezze in fase di Progettazione (CSP) ed il Coordinamento delle Sicurezze in fase di Esecuzione (CSE) e tutte le altre prestazioni professionali necessarie per l'esecuzione delle indagini e dei sondaggi;
- tutte le modifiche necessarie per risolvere le osservazioni e le prescrizioni richieste a vario titolo dalle Amministrazioni e dagli Enti/Soggetti autorizzativi, anche nell'ambito di Conferenze dei servizi, come specificato all'articolo 1 del presente Capitolato;
- i necessari contatti da tenersi con le Amministrazioni, Enti, Organi ed Uffici locali;
- le spese per i viaggi e le missioni necessarie per i contatti tra l'OE e la Stazione Appaltante e i sopralluoghi anche con mezzi propri;
- le spese ai fini dell'acquisizione di dati/informazioni/cartografie, ecc. che si renderanno necessarie ai fini della progettazione;
- l'uso di attrezzature varie e di mezzi e strumentazione di calcolo;
- l'uso di modelli di calcolo;

- la collaborazione con altri professionisti, consulenti esterni, Università o studi tecnici di cui l'OE intendesse avvalersi nell'espletamento dell'incarico;
- copie cartacee debitamente sottoscritte dei documenti progettuali, oltre le copie su supporto informatico (DVD), in formato editabile (CAD, WORD, EXCEL, etc.) e in pdf, oltre alla scansione degli elaborati timbrati e firmati (pdf).

7.1 prestazioni "a misura"

Relativamente alla parte **"a misura"** per l'esecuzione dei rilievi, indagini, prove ed analisi, l'OE, nell'ambito delle quantità presenti a titolo indicativo e non esaustivo nel documento <ETIC_WP6_1.A04 - Stima sommaria della spesa delle indagini e dei sondaggi>, avrà l'onere di redigere, all'avvio delle attività, un *Piano Preliminare delle Indagini* contenente i rilievi/indagini/prove/analisi necessari allo Studio oggetto del presente appalto; tali rilievi, indagini, prove ed analisi saranno svolte dall'OE in quanto necessari allo Studio per diverse configurazioni. All'interno dell'importo totale, da intendersi *"a misura"*, l'OE potrà proporre tipologie di rilievi/indagini/prove purché complessivamente la quantificazione economica totale rimanga invariata rispetto a quella posta a base di gara, calcolata al netto del ribasso offerto, fatto salvo quanto previsto dall'art. 3.4 del Disciplinare di gara. L'esecuzione del *Piano Preliminare delle Indagini* è subordinata alla approvazione dell'INFN da parte del RUP.

La Stazione Appaltante potrà motivatamente richiedere l'esecuzione di rilievi, indagini e prove supplementari, secondo le previsioni di legge, concordando i tempi e sostenendo i conseguenti costi, entro i limiti di legge e comunque entro i limiti del finanziamento.

Sempre con riferimento ai rilievi, indagini, sondaggi e prove, eventuali variazioni che si rendessero necessarie durante la redazione del suddetto *Piano Preliminare delle Indagini* saranno prezzate facendo riferimento al documento <ETIC_WP6_1-A03 - elenco prezzi unitari preliminare delle indagini e dei sondaggi> contenuto tra i documenti di gara, nonché – ove non contemplati in detto Elenco Prezzi - ai suddetti Prezzari di riferimento, applicando il ribasso offerto in sede di gara.

Ogni variazione con aumento di spesa sarà subordinata alla preliminare verifica della disponibilità delle risorse necessarie.

Il corrispettivo dell'appalto comprende e compensa integralmente tutte le attività necessarie per eseguire le prestazioni affidate all'OE, nel rispetto di leggi, norme e regolamenti in vigore, ivi incluse tutte le attività necessarie per l'adempimento delle prescrizioni della Stazione Appaltante e/o Amministrazioni ed Enti competenti, l'assistenza alla verifica, nonché ogni ulteriore attività tecnica o amministrativa necessaria.

Nessun corrispettivo sarà dovuto, oltre a quello previsto nel presente Capitolato per qualsiasi maggiorazione per incarichi parziali o per interruzione dell'incarico per qualsiasi motivo non imputabile alla Stazione Appaltante.

Gli oneri di sicurezza sono valutati a corpo in base all'importo previsto separatamente dall'importo delle prestazioni negli atti progettuali e nel Bando di gara, secondo la percentuale ricavabile dalle predette tabelle, intendendosi come eseguita e liquidabile la quota parte proporzionale a quanto eseguito.

L'OE rimane obbligato, a sua cura e spese, a partecipare a tutte le riunioni con le Pubbliche Amministrazioni o con gli Enti terzi e in quelle in cui la Stazione Appaltante riterrà opportuno al fine dello sviluppo e dell'approvazione del Progetto, nonché ad interfacciarsi con Enti e Società su richiesta della Stazione Appaltante.

I rapporti ed i vincoli negoziali si riferiscono agli importi come determinati nel presente Capitolato.

L'importo del Contratto, come offerto in sede di gara dall'OE in base ai calcoli di propria convenienza, a tutto suo rischio e alle condizioni tutte del Contratto, del presente Capitolato e dell'ISP, resta fisso e invariabile fatto salvo quanto previsto dall'art. 3.4 del Disciplinare di gara.

Il Contratto sarà stipulato, a pena di nullità, in modalità elettronica secondo le norme vigenti per la Stazione Appaltante, in forma pubblica amministrativa a cura dell'Ufficiale rogante della Stazione Appaltante o mediante scrittura privata.

8. CATEGORIE DEL SERVIZIO

8.1 Categorie per i Servizi di ingegneria

La correlazione con le classi e con le categorie previste dalla Legge 2 marzo 1949, n. 143 è stata effettuata mediante la tavola Z-1 "Categorie delle opere - parametro del grado di complessità – classificazione dei servizi e corrispondenze", del D.M. 17 giugno 2016:

Categoria D.M. 17/06/2016	Destinazione funzionale	ID opere	Corrispondenza L. 143/49	Identificazione delle opere	Grado di complessità	Importo [€]
Strutture	Strutture speciali	S.05	IX/bIX/c	Dighe, Conche, Elevatori, Opere di ritenuta e di difesa, rilevati, colmate. Gallerie, Opere sotterranee e subacquee, Fondazioni speciali.	1,05	€ 948.184.323,28
Edilizia	Sanita', istruzione, ricerca	E.10	I/d	Poliambulatori, Ospedali, Istituti di ricerca, Centri riabilitazione, Poli scolastici, Università, Accademie, Istituti di ricerca universitaria.	1,2	€ 117.626.256,00
Impianti	Impianti elettrici e speciali a servizio delle costruzioni - singole apparecchiature per laboratori e impianti pilota	IA.04	III/c	Impianti elettrici in genere, impianti di illuminazione, telefonici, di sicurezza, di rivelazione incendi, fotovoltaici, a corredo di edifici e costruzioni complessi - Cablaggi strutturati - Impianti in fibra ottica - Singole apparecchiature per laboratori e impianti pilota di tipo complesso.	1,3	€ 180.702.000,00
Altri costi						€ 36.000.000,00
Totale						**€ 1.282.512.579,28**

Come riportato nel documento "Calcolo delle tariffe professionali", a cui si rimanda, vengono riportate le Fasi prestazionali per ogni diversa Categoria d'Opera con la distinta analitica delle singole prestazioni e con i relativi Parametri <<Q>> di incidenza.

8.2 Categorie per i Lavori

Ai sensi del combinato disposto degli articoli 83, co. 2, e 216, co. 14, del Codice dei Contratti, l'Operatore Economico dovrà possedere l'attestazione di qualificazione rilasciata da una SOA, regolarmente autorizzata, in corso di validità, per l'esecuzione delle prestazioni di lavori nella categoria e nella classifica adeguata nelle seguenti lavorazioni, ai sensi dell'articolo 61 del D.P.R. n. 207/2010 e in conformità all'allegato «A» al citato D.P.R. n. 207/2010:

CATEGORIE DI LAVORAZIONI	CLASSIFICA	QUALIFICAZIONE
OS-21	**IVbis (sino a 4.200.000)**	OBBLIGATORIA

9. INTERPRETAZIONE DEL CONTRATTO E DEL CAPITOLATO D'ONERI

In caso di discordanza tra i vari elaborati posti a base di gara vale la soluzione più aderente alle finalità per le quali la prestazione è stata richiesta e comunque quella meglio rispondente ai criteri di ragionevolezza e di buona tecnica esecutiva.

In caso di norme del Capitolato tra loro non compatibili o apparentemente non compatibili, trovano applicazione in primo luogo le norme eccezionali o quelle che fanno eccezione a regole generali, in secondo luogo quelle maggiormente conformi alle disposizioni legislative o regolamentari oppure all'ordinamento giuridico, in terzo luogo quelle di maggior dettaglio e infine quelle di carattere ordinario.

L'interpretazione delle clausole contrattuali, così come delle disposizioni del presente Capitolato, è fatta tenendo conto delle finalità del Contratto e dei risultati ricercati conl'attuazione degli

obiettivi dell'incarico; per ogni altra evenienza trovano applicazione gli articoli da 1362 a 1369 del Codice civile.

Ovunque nel presente Capitolato si preveda la presenza di raggruppamenti temporanei e consorzi ordinari, la relativa disciplina si applica anche agli appaltatori organizzati in aggregazioni tra imprese aderenti ad un contratto di rete, nei limiti della compatibilità con tale forma organizzativa.

Qualunque disposizione omessa o comunque non correttamente riportata nel presente Capitolato, contenuta però nelle normative che regolano l'appalto e l'esecuzione dei servizi, si intende comunque da rispettare secondo quanto indicato nel suo testo originale.

10. DOCUMENTI CHE FANNO PARTE DEL CONTRATTO

Sono parte integrante e sostanziale del Contratto d'appalto:

a) il Capitolato Generale d'Appalto negli articoli ancora in vigore, per quanto non in contrasto con il presente Capitolato o non previsto da quest'ultimo;

b) il presente Capitolato Speciale d'Appalto (CSA);

c) il Disciplinare di Gara (DDG);

d) le Prime Indicazioni sullo Sviluppo della Progettazione (ISP);

e) l'Offerta tecnica ed economica presentata in sede di gara;

f) il Capitolato Tecnico delle indagini e dei sondaggi;

g) l'Elenco Prezzi Unitari preliminare delle indagini e dei sondaggi;

h) tutti i documenti riportati nell'Elenco Elaborati;

i) il Cronoprogramma;

j) le Polizze di garanzia di cui ai successivi articoli del presente Capitolato.

Sono contrattualmente vincolanti tutte le leggi e le norme vigenti e in particolare:

k) D.lgs. 18 aprile 2016, n. 50, Codice dei contratti pubblici", e ss.mm. e ii.;

l) D.P.R. 5 ottobre 2010, n. 207 "Regolamento di esecuzione ed attuazione del decreto legislativo 12 aprile 2006, n. 163, recante «Codice dei contratti pubblici relativi a lavori, servizi e forniture in attuazione delle direttive 2004/17/CE e 2004/18/CE", per gli articoli ancora in vigore;

m) Linee Guida del MIMS di cui all' Art. 48, comma 7, del decreto-legge 31 maggio 2021, n. 77, convertito nella legge 29 luglio 2021, n. 108

n) Decreto del Presidente della Repubblica 6 giugno 2001, n. 380 recante "Testo unico delle disposizioni legislative e regolamentari in materia edilizia";

o) Decreto 17 gennaio 2018 recante l'aggiornamento delle "Norme tecniche per le costruzioni";

p) Decreto Ministeriale 17/06/2016 recante "Approvazione delle tabelle dei corrispettivi commisurati al livello qualitativo delle prestazioni di progettazione adottato ai sensi dell'art. 24, comma 8, del decreto legislativo n. 50 del 2016";

q) Decreto Ministeriale 7 marzo 2018, n. 49, recante "Approvazione delle linee guida sulle modalità di svolgimento delle funzioni del direttore dei lavori e del direttore dell'esecuzione";

r) Decreto Ministeriale n. 145/2000, per gli articoli ancora in vigore;

s) D.lgs. n. 159 del 6 settembre 2011, aggiornato alla legge 7 ottobre 2017 n. 61;

t) Legge 13 agosto 2010, n. 136 "Piano straordinario contro le mafie, nonché delega al Governo in materia di normativa antimafia";

u) Codice civile e altre disposizioni normative in materia di contratti di diritto privato per quanto non regolato dalle disposizioni quivi richiamate;

v) Norme in materia di contabilità generale dello Stato;

w) Disposizioni normative applicabili concernenti i servizi e i lavori in oggetto, per quanto non regolato dalle clausole e dalle disposizioni sopra richiamate;

x) Legge n. 190 del 6 novembre 2012, cd. "Legge anticorruzione";

y) Normativa in materia di risparmio energetico;

z) Normativa sulla sicurezza antincendio;

aa) D.lgs. 3 aprile 2006, n. 152, Codice dell'ambiente;

bb) Decreto del Ministero Infrastrutture e Trasporti 1 dicembre 2017, n. 560 e ss.mm.;

cc) Decreti del Ministero dell'ambiente e della tutela del territorio e del mare in ordine all'adozione dei CAM;

dd) Linee guida e deliberazioni dell'ANAC per quanto pertinenti ed applicabili alle prestazioni oggetto del Contratto.

ee) Le Norme in materia igienico sanitaria, di sicurezza, di prevenzione incendi:

ff) DM 10/3/1998, DM 22/2/2006, DPR 151 del 1/8/2011, DM 8/6/2016 s.m.i.;

gg) D.M. 37 del 22/01/2008 e s.m.i.;

hh) D. Lgs. 09/04/2008 n. 81 "Attuazione dell'art. 1 della L. 3/8/2007, n. 123, in materia di tutela della salute e della sicurezza nei luoghi di lavoro";

ii) D.M.I. del 07/08/2012.

jj) Le Norme in materia di risparmio e contenimento energetico:

kk) L. 10 del 09/01/1991, D.Lgs. 192 del 19/08/2005 e DM 26 giugno 2015 e s.m.i.

ll) D.P.R. 59/2009;

mm) D.L. 63/2013 convertito in Legge n. 90/2013 e relativi Decreti Attuativi.

nn) D. Lgs. 81/2008 sulla tutela della salute e della sicurezza nei luoghi di lavoro

11. DISPOSIZIONI PARTICOLARI RIGUARDANTI L'APPALTO

La sottoscrizione del Contratto da parte dell'OE equivale a dichiarazione di perfetta conoscenza e incondizionata accettazione anche dei suoi allegati, della legge, dei regolamenti e di tutte le norme vigenti in materia di lavori pubblici, nonché alla completa accettazione di tutte le norme che regolano il presente appalto per quanto attiene alla sua perfetta esecuzione.

La sottoscrizione del Contratto e dei suoi allegati da parte dell'OE equivale altresì a dichiarazione della sussistenza delle condizioni che consentono l'immediata esecuzione delle prestazioni oggetto del presente Appalto.

L'OE dà atto, senza riserva alcuna, della piena conoscenza e disponibilità degli atti della Procedura e della documentazione ivi richiamata, della disponibilità dei siti, dello stato dei luoghi, delle condizioni pattuite in sede di offerta e ogni altra circostanza che interessi le prestazioni che, come da apposito verbale sottoscritto con il DEC, consente l'immediato avvio dell'esecuzione.

L'OE trasferisce in capo alla Stazione Appaltante i diritti patrimoniali di proprietà intellettuali, a decorrere dalla data di consegna dello Studio o di parte di esso. Per effetto del pagamento del corrispettivo d'appalto, resteranno nella titolarità esclusiva della Stazione Appaltante i diritti di proprietà e/o utilizzazione e sfruttamento economico della documentazione progettuale e contabile relativa all'intervento e dei singoli elaborati che lo compongono, nonché di tutto quanto realizzato dall'OE, dai suoi dipendenti e collaboratori nell'ambito o in occasione dello svolgimento delle attività oggetto del Contratto.

L'OE dovrà garantire alla Stazione Appaltante che, nel momento in cui i prodotti commissionati saranno stati ad essa consegnati, tutti i Soggetti che – a qualsiasi titolo – avranno collaborato per la realizzazione degli stessi, abbiano preventivamente fornito piena e incondizionata liberatoria e consenso, per quanto di rispettiva competenza, allo sfruttamento tecnico, economico e commerciale dei prodotti, nella loro interezza e/o in ogni singola componente.

La Stazione Appaltante avrà diritto all'utilizzazione piena ed esclusiva della documentazione prodotta per effetto delle attività affidate in virtù del Contratto, potendo apportarvi varianti, modifiche ed altri interventi di qualunque genere ove riconosciuti necessari, senza che in tali casi possano essere sollevate da alcune eccezioni di sorta.

L'OE rimane obbligato a non divulgare il materiale progettuale prodotto, che resta di proprietà della Stazione Appaltante.

L'OE dovrà mantenere strettamente riservati tutti i progetti, i disegni, le specifiche, le informazioni di carattere tecnico, contabile e tecnologico relative all'esecuzione del Contratto e non farne uso se non per l'esecuzione dell'Appalto. L'OE risponderà a tal fine anche per il proprio personale e per gli eventuali subfornitori ed assumerà le misure e cautele occorrenti per assicurare che anche da parte di costoro tali impegni siano pienamente rispettati.

L'Operatore Economico rimane obbligato ad apportare alla documentazione progettuale consegnata le modifiche che eventualmente potranno essere chieste dalla Stazione Appaltante al fine di rendere la documentazione progettuale coerente con le necessità della Stazione Appaltante, fatto salvo il diritto di tutela ai fini della responsabilità progettuale.

Le modifiche richieste e le copie da produrre al fine degli adeguamenti di cui sopra si intendono già compensate nel prezzo offerto in sede di gara.

L'OE rimane obbligato alla sottoscrizione per assunzione di responsabilità (da parte del Coordinatore del gruppo di progettazione di ogni elaborato, da parte degli specialisti di settore per gli elaborati di rispettiva competenza) di tutte le copie che saranno prodotte, anche in forma parziale, ai fini dell'ottenimento delle autorizzazioni previste dalla legge o, per qualsiasi procedura

amministrativa interna o esterna, sia nel perdurare del rapporto contrattuale che a rapporto concluso.

L'incarico è affidato ed accettato con l'osservanza delle norme, condizioni, patti, obblighi, oneri e modalità dedotti e risultanti dal Codice dei Contratti Pubblici e dal DPR 207/2010, dalla documentazione di gara e dai relativi allegati.

L'OE è obbligato, inoltre, all'osservanza di tutte le norme di legge e di regolamento vigenti e dovrà tenere conto delle indicazioni, disposizioni e/o direttive che potranno essere impartite dalla Stazione Appaltante tramite il RUP ed il DEC.

Il RUP sarà considerato dalla Stazione Appaltante quale referente cui rivolgersi relativamente all'espletamento dei predetti servizi. Le funzioni di coordinamento, direzione e controllo tecnico-contabile dell'esecuzione del Contratto potranno essere affidate ad un DEC diverso dal RUP.

L'OE dovrà garantire la massima disponibilità per lo svolgimento di incontri o riunioni inerenti all'appalto presso la sede della Stazione Appaltante o in qualsiasi altra sede.

L'OE è obbligato ad apportare al progetto tutte le modifiche, correzioni, integrazioni da fornire, chiarimenti che dovessero essere richiesti da Amministrazioni, Enti e Soggetti preposti al rilascio di eventuali nulla osta o pareri, senza avere diritto ad alcun maggior compenso.

L'OE, in ogni caso, si impegna a tenere indenne la Stazione Appaltante da qualsivoglia azione che dovesse essere intrapresa da terzi in relazione a presunti diritti di proprietà intellettuale vantati sugli elaborati, le opere d'ingegno, le creazioni intellettuali e l'altro materiale predisposto o realizzato dall'OE medesimo, nonché per qualsivoglia azione intrapresa da terzi per illegittimo utilizzo di tali opere dell'ingegno.

12. FALLIMENTO DELL'OE E ALTRE VICENDE SOGGETTIVE DELL'OE

In caso di fallimento dell'OE ovvero in caso di liquidazione coatta e concordato preventivo, ovvero procedura di insolvenza concorsuale o di liquidazione dell'OE, o di risoluzione del Contratto ai sensi dell'articolo 108 del Codice dei Contratti pubblici ovvero di recesso dal Contratto ai sensi del Codice antimafia, ovvero in caso di dichiarazione giudiziale di inefficacia del Contratto, la Stazione Appaltante si avvale, senza pregiudizio per ogni altro diritto e azione a tutela dei propri interessi, della procedura prevista dall'articolo 110 del Codice dei Contratti pubblici.

Se l'OE è un raggruppamento temporaneo, in caso di fallimento, liquidazione coatta amministrativa, amministrazione controllata, amministrazione straordinaria, concordato preventivo ovvero procedura di insolvenza concorsuale o di liquidazione dell'impresa mandataria o di una impresa mandante ovvero, qualora si tratti di professionista singolo, in caso di morte, interdizione, inabilitazione o fallimento del medesimo ovvero nei casi previsti dalla normativa antimafia, trovano applicazione rispettivamente i commi 17, 18 e 19 dell'articolo 48 del Codice dei Contratti pubblici.

13. RAPPRESENTANTE DELL'OE E DOMICILIO

In sede di stipulazione del Contratto, l'OE dovrà eleggere domicilio legale indicando una PEC alla quale si intendono ritualmente effettuate tutte le intimazioni, le assegnazioni di termini e ogni altra notificazione o comunicazione dipendente dal Contratto.

L'OE deve altresì comunicare in sede di stipulazione del Contratto, le generalità delle persone autorizzate a riscuotere, ricevere e quietanzare le somme ricevute in conto o saldo, anche per effetto di eventuali cessioni di credito preventivamente riconosciute dalla Stazione Appaltante.

Il **Rappresentante dell'OE** per l'esecuzione del servizio, con professionalità adeguata ai servizi oggetto d'appalto è, **con responsabilità personale**, il **Responsabile della integrazione delle prestazioni specialistiche** che è stato indicato in sede di offerta.

Tale persona, in possesso di requisiti di provata capacità tecnica e morale per tutta la durata dell'appalto, deve:

- sostituire l'OE medesimo nella condotta dei servizi ivi compresi quelli subappaltati in un ambito di legittimità degli stessi e all'interno dei limiti contrattuali, nonché prendere decisioni su qualsiasi problema;
- ricevere e fare eseguire gli ordini verbali e/o scritti dal DEC o dal RUP, in questo caso sotto firmandoli e, ove il medesimo Rappresentante ritenga che le disposizioni ricevute rientrino tra quelle da impartirsi per iscritto, sarà suo obbligo farne immediata richiesta scritta, altrimenti l'OE non potrà, in alcuna evenienza, invocare a propria discolpa o ragione la carenza di disposizioni da parte della Stazione Appaltante per il fatto che esse non siano state impartite per iscritto;
- firmare tutti i documenti, con il diritto di formulare le proprie osservazioni o riserve, considerandosi - sia per la liquidazione, sia per ogni altro effetto di legge - valida la sua firma tanto quanto quella dell'OE;
- intervenire e prestarsi alle verifiche tutte le volte che verrà richiesto dal DEC o dal RUP.

L'OE è tenuto a comunicare alla Stazione Appaltante anche il nominativo di chi, in caso di temporanea assenza, sostituisca il suo Rappresentante e comunicare inoltre tempestivamente, in caso di cessazione o riserva del mandato, il nome del nuovo Rappresentante.

Per ciascuno dei Rappresentanti che verranno designati, devono essere comunicati alla Stazione Appaltante e al DEC i seguenti dati: nominativo, residenza, mail, numeri telefonici fissi, numeri telefonici degli apparecchi mobili di cui ognuno dovrà essere dotato.

La Stazione Appaltante si riserva il diritto di giudicare, in maniera inappellabile, sulla regolarità dei documenti prodotti e sulla conseguente accettabilità dei Rappresentanti che verranno designati. Resta inteso che l'OE rimane tuttavia responsabile dell'operato del Rappresentante da lui delegato.

La Stazione Appaltante sarà rappresentata nei confronti dell'OE dal RUP o dal DEC che verrà designato dalla Stazione Appaltante medesima. In considerazione delle dimensioni, della complessità e del carattere multidisciplinare della progettazione, nonché della necessità che la sua realizzazione avvenga in tempi quanto più contenuti possibile, il RUP (Responsabile Unico del Procedimento) potrà avvalersi di una struttura in grado di fornire il supporto tecnico e organizzativo necessario per la conduzione dell'appalto.

14. CONVENZIONI IN MATERIA DI VALUTA

In tutti gli atti predisposti dalla Stazione Appaltante i valori in cifra assoluta si intendono in euro.

In tutti gli atti predisposti dalla Stazione Appaltante i valori in cifra assoluta, ove non diversamente specificato, si intendono I.V.A. esclusa.

Tutti i termini di cui al presente Capitolato, se non diversamente stabilito nella singola disposizione, sono computati in conformità al Regolamento CEE 3 giugno 1971, n. 1182.

15. ONERI E OBBLIGHI A CARICO DELL'OE

L'OE dovrà garantire l'esecuzione delle attività "a regola d'arte", verificare la qualità dei dati prodotti e garantire inoltre la loro affidabilità in relazione ai fini preposti.

L'acquisizione dei dati e la formazione dei prodotti richiesti dovranno essere sviluppati attraverso fasi operative distinte e successive, regolate ciascuna da specifiche prescrizioni tecniche, per cui i controlli di qualità degli elaborati intermedi dovranno avvenire in corso d'opera, prima di ammetterli ad ogni altro successivo trattamento.

Nell'espletamento dell'incarico l'OE dovrà:

- utilizzare esclusivamente strumenti di misura tarati per l'esecuzione delle attività di propria competenza custodendo le relative certificazioni da esibire alla Stazione Appaltante in caso di richiesta da parte della stessa;

- accettare integralmente l'attività di controllo che verrà messa in atto dalla Stazione Appaltante
- utilizzare software regolarmente licenziati esibendo a richiesta del personale della Stazione Appaltante copia delle rispettive certificazioni;
- utilizzare macchinari e attrezzature dotate di Marcatura CE secondo le vigenti Normative comunitarie (es. Direttive Macchine 2006/42/CE recepita dal D.lgs. n. 17/2010), esibendo a richiesta del personale della Stazione Appaltante copie delle rispettive certificazioni di conformità;
- garantire a proprie spese l'esecuzione di tutte le misure previste dal Testo Unico in materia di salute e sicurezza nei luoghi di lavoro.

Le prove e le analisi sui materiali e sui campioni prelevati dovranno essere eseguite presso laboratori ufficiali ovvero autorizzati ai sensi dell'art. 59 del T.U. Edilizia.

L'OE si obbliga a risarcire la Stazione Appaltante per i danni, le perdite di beni o distruzione di beni di proprietà dello stesso e che siano imputabili direttamente all'OE.

L'OE si obbliga a manlevare la Stazione Appaltante da tutti i danni diretti e indiretti che possano derivare dallo svolgimento delle attività.

L'OE si obbliga altresì a rispondere e a manlevare la Stazione Appaltante da ogni pretesa di risarcimento avanzata dagli Enti competenti o da Soggetti terzi, compresi i dipendenti dell'OE e/o subfornitore ovvero della Stazione Appaltante medesima, a mezzo di domanda giudiziale o stragiudiziale per qualunque titolo derivante o comunque connesso con l'esecuzione del Contratto, salvo che le pretese risarcitorie derivino da azioni e/o omissioni causate direttamente dalla Stazione Appaltante. L'OE risponderà direttamente e manleverà la Stazione Appaltante da ogni responsabilità od onere di qualsiasi natura derivanti da violazione da parte dell'OE, e/o subfornitori di leggi, decreti, regolamenti, disciplinari tecnici, ordini di autorità o enti locali, connessi ed in ogni caso derivanti dall'esecuzione del Contratto.

Il Rappresentante dell'OE si obbligherà, a titolo esemplificativo e non esaustivo a:

- comunicare alla Stazione Appaltante ogni informazione ritenuta idonea a dare conoscenza del corretto svolgimento dell'appalto;
- organizzare una struttura tale da garantire lo svolgimento del servizio in conformità ai tempi e alle modalità previste nella documentazione presentata in sede di gara e nel presente Capitolato;
- eseguire le prestazioni conformemente al presente Capitolato e secondo quanto indicato nella documentazione presentata in sede di gara;
- a manlevare e tenere indenne la Stazione Appaltante da tutte le conseguenze derivanti dall'eventuale inosservanza delle norme applicabili;
- a dare preventiva comunicazione alla Stazione Appaltante di eventuali situazioni di potenziale incompatibilità al fine di valutarne congiuntamente gli effetti, restando inteso che in caso di inosservanza di detto obbligo la Stazione Appaltante ha la facoltà risolvere di diritto il contratto ai sensi e per gli effetti dell'articolo 1456 c.c.;
- a consentire alla Stazione Appaltante di procedere, in qualsiasi momento, anche senza preavviso, alle verifiche sulla piena e corretta esecuzione del contratto e a prestare la propria collaborazione per consentire lo svolgimento di tali verifiche. Si intenderanno assunti dall'Operatore Economico tutti gli oneri e responsabilità connessi al completo espletamento della prestazione di cui trattasi con le modalità e nei tempi prescritti nel presente Capitolato, nella documentazione presentata in sede di offerta e delle vigenti disposizioni in materia.

Tutti gli elaborati prodotti saranno debitamente timbrati e sottoscritti dal Rappresentante dell'OE.

Deve intendersi rientrante fra gli oneri e responsabilità del Rappresentante dell'OE tutto quanto necessario al corretto espletamento dell'incarico, tra i quali a titolo esemplificativo:

- gli oneri di cancelleria;
- gli oneri della comunicazione, precisato che, attesa la natura dell'appalto, dovranno essere adottati tutti i mezzi più tempestivi (corriere, telefoni, mail);
- gli oneri di trasporto, attrezzature e strumenti, materiali di consumo e quant'altro necessario in funzione al tipo e numero delle indagini, prove, verifiche per l'espletamento dell'appalto;
- gli oneri assicurativi e fiscali attinenti ai previsti adempimenti.

L'Operatore Economico con la presentazione dell'offerta prende atto di aver valutato le difficoltà di esecuzione dei lavori, le attività presenti nell'area, l'impegno richiesto dalle attività richieste nel presente Capitolato, e che quindi la sua offerta è presentata considerando tutto quanto riguarda lo sviluppo dell'appalto.

L'accertamento della corrispondenza delle prestazioni eseguite rispetto a quanto richiesto sarà effettuato dal RUP o dal DEC, o da altra persona appositamente nominata da INFN, con il rilascio del certificato di verifica di conformità di cui all'articolo 102 del Codice dei Contratti Pubblici.

15.1 DNSH: PRINCIPIO "DO NOT SIGNIFICANT HARM" E TAGGING CLIMATICO

Il Dispositivo per la ripresa e la resilienza (Regolamento UE 241/2021) stabilisce che tutte le misure dei Piani Nazionali per la Ripresa e Resilienza (PNRR) debbano soddisfare il principio di "non arrecare danno significativo agli obiettivi ambientali". Tale vincolo si traduce in una valutazione di conformità degli interventi al principio del **"Do Not Significant Harm" (DNSH)**, con riferimento al sistema di tassonomia delle attività ecosostenibili indicato all'articolo 17 del Regolamento (UE) 2020/852.

Il principio DNSH, declinato sui sei obiettivi ambientali definiti nell'ambito del sistema di tassonomia delle attività ecosostenibili, ha lo scopo di valutare se una misura possa o meno

arrecare un danno ai sei obiettivi ambientali individuati nell'accordo di Parigi (Green Deal europeo).

Tutti gli investimenti e le riforme proposti nel PNRR sono stati valutati dalle amministrazioni titolari; in particolare, le valutazioni condotte sugli interventi della Missione 4 – Ricerca sono contenute nelle schede di valutazione allegate alla Circolare MEF-RGS del 30 dicembre 2021 n. 32, e la successiva del 13 ottobre 2022 n.33, che comprende altresì una mappatura di applicabilità delle schede e le check list di controllo.

Il progettista incaricato dovrà applicare – all'intervento in oggetto – le prescrizioni contenute nelle Schede Tecniche associate all'intervento, identificando altresì quelle ulteriori eventualmente applicabili alle specificità dell'intervento stesso, e avendo cura di garantire – secondo il regime 2 – l'applicazione delle prescrizioni associate.

In particolare, per gli interventi in oggetto si sono individuati i seguenti Regimi, ed associate le seguenti Schede Tecniche evidenziate in grassetto.

Tabella aggiornamento Circolare n. 33 del 13.10.2022. Per ulteriori informazioni consultare il link: https://italiadomani.gov.it/it/Interventi/dnsh.html

MISSIONE COMPONENTE	INV.	NOME INVESTIMENTO	REGIME DNSH	SCHEDA TECNICA
M4C2	1.1	Fondo per il Programma Nazionale della Ricerca (PNR) e Progetti di Ricerca di Rilevante Interesse Nazionale (PRIN)	Regime 2	• Scheda 26
	1.2	Finanziamento di progetti presentati da giovani ricercatori	Regime 2	• Scheda 26
	1.3	Partenariati estesi a Università, centri di ricerca, imprese e finanziamento progetti di ricerca	Regime 1	• Scheda 6 • Scheda 26

	1.4	Potenziamento strutture di ricerca e creazione di "campioni nazionali" di R&S su alcune Key enabling technologies	Regime 1	• Scheda 1 • Scheda 2 • Scheda 3 • Scheda 6 • Scheda 8 • Scheda 26
	1.5	Creazione e rafforzamento di "ecosistemi dell'innovazione per la sostenibilità", costruendo "leader territoriali di R&S"	Regime 2	• Scheda 1 • Scheda 3 • Scheda 6 • Scheda 26
	2.1	IPCEI	Regime 1	• Scheda 26
	2.2	Partenariati - Horizon Europe	Regime 1/ Regime 2	• Scheda 26
	2.3	Potenziamento ed estensione tematica e territoriale dei centri di trasferimento tecnologico per segmenti di industria	Regime 2	• Scheda 26
	3.1	**Fondo per la realizzazione di un sistema integrato di infrastrutture di ricerca e innovazione**	**Regime 2**	• **Scheda 2** • **Scheda 3** • **Scheda 5** • **Scheda 6** • **Scheda 26**
	3.2	Finanziamento di start-up	Regime 2	• Scheda 26
	3.3	Introduzione di dottorati innovativi che rispondono ai fabbisogni di innovazione delle imprese e promuovono l'assunzione dei ricercatori da parte delle imprese	Regime 2	• Scheda 26

Si rimanda pertanto alle prescrizioni contenute nelle Schede, richiamando che l'OE affidatario:

1. è responsabile del rispetto delle norme e dei regolamenti vigenti nell'ambito del raggiungimento degli obiettivi di mitigazione, adattamento e riduzione degli impatti e dei rischi ambientali, fornendo gli elementi di verifica ex ante indicati nelle Schede Tecniche associate all'investimento in oggetto, e di quelle ulteriori eventualmente applicabili.

2. è tenuto a fornire ogni elemento giustificativo, ogni quantificazione e rendicontazione al fine di consentire alla Stazione Appaltante la dimostrazione che l'effettiva realizzazione dell'appalto è rispettosa del principio DNSH.

15.2 CAM: adozione dei criteri ambientali minimi

In osservanza degli articoli 34 e 71 del D.Lgs. 18 Aprile 2016 n.50 e ss.mm.ii., costituiscono parte integrante del presente Capitolato i Criteri Ambientali Minimi (CAM), emanati dal Ministero competente ed applicabili allo Studio affidato.

L'OE aggiudicatario, pertanto, dovrà porre in essere tutte le azioni e le opere necessarie per il rispetto dei requisiti ambientali minimi, del loro eventuale miglioramento e degli ulteriori impegni presi in sede contrattuale (ai sensi dell'art. 34, comma 2 del Codice degli Appalti), relativamente alla tematica ambientale.

La fonte normativa primaria che disciplina la materia dei CAM per il servizio oggetto del presente appalto è il Piano d'Azione Nazionale sul Green Public Procurement (PANGPP) "Criteri ambientali minimi per l'affidamento del servizio di progettazione ed esecuzione dei lavori di interventi edilizi" D.M. n.256 del 23 giugno 2022 pubblicato nella GURI_6-8-2022. Si fa riferimento, inoltre, al DM Ambiente 11 Ottobre 2017: "*Criteri ambientali minimi per l'affidamento di servizi di progettazione e lavori per la nuova costruzione, ristrutturazione e manutenzione di edifici pubblici*", per le parti ancora in vigore.

Nell'applicazione dei criteri di cui sopra, si intendono fatte salve le normative ed i regolamenti più restrittivi, così come i pareri espressi dalle Soprintendenze competenti.

Si precisa che la scelta dei criteri ambientali minimi da adottare è demandata unicamente al progettista che redigerà un'apposita relazione tecnica, comprensiva degli allegati grafici in cui vengano esplicitate:

1. le tematiche di impatto ambientale e sulla riduzione dei consumi relative allo studio;

2. le modalità di selezione dei CAM da recepire nell'attività e nei successivi livelli di progettazione;

3. il confronto tra lo stato ante operam e post operam al fine di determinare l'impatto degli interventi previsti ed i risultati raggiungibili, ove possibile;

4. la verifica dei livelli prestazionali (qualitativi e quantitativi) in riferimento alle prestazioni ambientali di cui alle specifiche tecniche ed ai criteri premianti;

5. gli obiettivi del piano di manutenzione dell'opera, ove previsto per il livello di progettazione di riferimento.

Al fine di agevolare l'attività di verifica da parte della Stazione Appaltante della conformità alle caratteristiche ambientali minime richieste, e di quelle migliorative offerte, oltre alla relazione appena descritta, l'OE aggiudicatario dovrà sviluppare nei contenuti e dettagliare le modalità di attuazione e quelle di verifica, accompagnate da un cronoprogramma delle attività di misurazione, monitoraggio, verifica e rendicontazione dei livelli prestazionali raggiunti, compatibilmente con il livello di progettazione di riferimento.

16. GRUPPO DI PROGETTAZIONE

Il gruppo di progettazione è quello indicato in fase di offerta ed è conforme a quanto richiesto nel Disciplinare di Gara (DDG).

Il rappresentante dell'OE è la persona fisica indicata in sede di offerta come **Responsabile della integrazione delle prestazioni specialistiche.**

È facoltà della Stazione Appaltante accertare in ogni tempo, ed in relazione alla natura dell'attività svolta, l'idoneità professionale dei professionisti incaricati e di assumere, in caso di inidoneità, tutti i conseguenti provvedimenti.

A tal fine, l'OE sarà tenuto a consentire l'effettuazione di verifiche ed ispezioni da parte della Stazione Appaltante e a fornire alla medesima tutta la documentazione e le informazioni

eventualmente richieste ed occorrenti ai fini della valutazione dell'idoneità di tali Soggetti all'espletamento delle attività ai medesimi attribuite, nel rispetto delle vigenti norme in materia di controllo dell'attività lavorativa nonché di tutela e trattamento dei dati personali.

L'eventuale svolgimento delle prestazioni oggetto del Contratto da parte di soggetti non idonei costituirà grave inadempimento contrattuale dell'OE. Per tale evenienza, resta in ogni caso ferma la facoltà della Stazione Appaltante di procedere alla risoluzione del Contratto.

In nessun caso, se non previa espressa autorizzazione della Stazione Appaltante, l'OE ha facoltà di modificare la composizione del Gruppo di progettazione indicato in sede di Offerta. In caso di modifiche non autorizzate dalla Stazione Appaltante, alla stessa è riconosciuta la facoltà di risolvere il Contratto.

La Stazione Appaltante ha facoltà di chiedere in qualsiasi momento per giustificati motivi, ricondotti e/o riconducibili alla rilevata inidoneità professionale del personale incaricato dell'espletamento delle prestazioni oggetto del Contratto, la sostituzione dello stesso, senza che in conseguenza di tale circostanza l'OE possa avanzare pretese di sorta, a qualunque titolo, nei confronti della Stazione Appaltante medesima.

La mancata sostituzione del personale nel termine eventualmente indicato dalla Stazione Appaltante, così come l'inosservanza da parte dell'OE anche di uno solo degli obblighi previsti dal presente articolo, costituisce grave inadempimento contrattuale.

17. ATTIVITÀ DI RILIEVO, DI INDAGINI, DI SONDAGGI E DI PROVE DI LABORATORIO

L'appalto include la esecuzione di tutte le indagini geologiche, geotecniche, idrologiche e sismiche, sondaggi e analisi, rilievi, misurazioni e picchettazioni, topografia, la predisposizione di elaborati specialistici e di dettaglio, necessarie al livello di progettazione di riferimento per lo Studio oggetto dell'appalto. Le attività incluse nell'appalto sono almeno le seguenti.

- Redazione del piano preliminare di indagini e sondaggi.
- Redazione dei Piani di Sicurezza ove necessario per l'esecuzione delle indagini e dei sondaggi preliminari.
- Richiesta e ottenimento dei permessi necessari per le indagini e i sondaggi preliminari.
- Direzione dei Lavori (DL) per le indagini e i sondaggi preliminari.
- Coordinamento della Sicurezza in fase di Progettazione (CSP) ove necessario per le indagini e i sondaggi preliminari.
- Coordinamento della Sicurezza in fase di Esecuzione (CSE) ove necessario per le indagini e i sondaggi preliminari.
- Esecuzione di rilievi, misurazioni e topografia.
- Esecuzione delle indagini, dei sondaggi e delle prove in situ finalizzate a:
    - caratterizzazione dei terreni di scavo,
    - localizzazione delle acque sotterranee,
    - individuazione di gas sotterranei.
- Esecuzione delle analisi e delle prove di laboratorio.
- Analisi dei dati provenienti dalle indagini e dai sondaggi.
- Individuazione di eventuali terre rare e di materiali da destinare al riuso.

Al termine delle operazioni di cui sopra l'OE esegue, per una sola configurazione scelta dalla Stazione Appaltante, la redazione del Piano Esecutivo dei sondaggi e delle indagini che dovranno essere eseguiti successivamente e in futuro per la realizzazione dell'osservatorio; è prevista la redazione almeno di quanto segue.

- Redazione del piano di indagini e sondaggi esecutivo
- Capitolato tecnico delle indagini e dei sondaggi esecutivi
- Computo metrico estimativo delle indagini e dei sondaggi esecutivi

I rilievi e le indagini a supporto dello Studio dovranno essere eseguiti secondo quanto stabilito nel presente Capitolato, e nel rispetto di quanto indicato in sede di Offerta, e dovranno tendere ad acquisire tutte le informazioni necessarie a sviluppare lo Studio in modo completo, nonché ad acquisire qualsiasi elemento utile e/o necessario, per le diverse configurazioni.

La Stazione Appaltante si riserva la facoltà di introdurre, nei Piani Preliminari presentati, quelle variazioni che riterrà opportune nell'interesse della buona riuscita e dell'economia delle opere. L'OE per contro non potrà variare né modificare i Piani Preliminari presentati ed approvati senza averne ottenuto la preventiva autorizzazione scritta dalla Stazione Appaltante, la quale avrà il diritto di non contabilizzare le attività eseguite in contravvenzione a tale disposizione e diritto, altresì, di fare ripristinare, a spese dell'OE stesso, le condizioni morfologiche, di stabilità e di permeabilità del terreno preesistenti all'esecuzione di tali attività, secondo le modalità che saranno fissate dal DEC. Le disposizioni in merito all'esecuzione dei rilievi topografici, dei sondaggi e delle prove in situ, delle prove di laboratorio e della indagine sulla bonifica da ordigni esplosivi sono riportate nei documenti specialistici di riferimento.

Sono espressamente richiamati, come parte integrante del presente Capitolato, i seguenti documenti specialistici di riferimento:

ETIC_WP6_	1-A01	CARATTERISTICHE E PRIME INDICAZIONI DELLE INDAGINI E DEI SONDAGGI
ETIC_WP6_	1-A02	CAPITOLATO TECNICO DELLE INDAGINI E DEI SONDAGGI
ETIC_WP6_	1-A03	ELENCO PREZZI UNITARI PRELIMINARE DELLE INDAGINI E DEI SONDAGGI

E' espressamente richiamato, a scopo indicativo, il seguente documento specialistico di riferimento:

ETIC_WP6_	1-A04	STIMA SOMMARIA DELLA SPESA DELLE INDAGINI E DEI SONDAGGI

18. ATTIVITÀ DI INGEGNERIA E ARCHITETTURA

18.1 Prescrizioni generali

L'attività di ingegneria oggetto del presente appalto ha ad oggetto lo Studio propedeutico allo sviluppo del PFTE sviluppando le configurazioni progettuali nel rispetto degli obiettivi e dei fabbisogni specificati nel Quadro Esigenziale e nell'ISP.

In questa prima fase l'OE eseguirà gli studi propedeutici allo sviluppo del progetto di fattibilità tecnico economica sviluppando le alternative progettuali che perseguono gli obiettivi e i fabbisogni specificati nel Quadro Esigenziale e nell'ISP.

Le attività descritte nel seguito saranno eseguite per entrambe le due configurazioni L16 e T11 oggetto dello Studio, determinandone la profondità delle caverne minima ottimale, a priori compresa tra 120 e 250 metri. Inoltre, per ciascuna delle due configurazioni L16 e T11, è richiesta una relazione finale che descriva la variazione dei costi, delle principali soluzioni di disegno e ingegneristiche, e dell'impatto ambientale al variare della profondità nel suddetto intervallo.

Nello svolgimento di tali attività, previa ricognizione e raccolta degli studi, progetti, dati ed informazioni finalizzati alla progettazione, l'OE redigerà un Piano Preliminare dei rilievi, indagini, analisi e prove, che l'OE eseguirà in quanto ritenute necessarie dallo stesso per l'espletamento dello Studio. Detto Piano Preliminare dovrà essere coerente con quanto previsto nei documenti specialistici di riferimento e tener conto delle prescrizioni riportate nel presente Capitolato. Il valore economico del Piano Preliminare dovrà essere ricompreso entro la somma complessiva offerta dall'Operatore Economico aggiudicatario al netto del ribasso. Successivamente all'approvazione del predetto Piano Preliminare da parte della Stazione Appaltante, l'OE procederà all'esecuzione di quanto previsto nel Piano Preliminare.

L'OE redigerà, inoltre, per una sola configurazione scelta dalla Stazione Appaltante, un Piano Esecutivo dei rilievi, indagini, sondaggi, analisi, a completamento di quanto già eseguito, che consentirà gli approfondimenti necessari per redigere successivamente il PFTE e garantire

l'affidabilità della stima dei costi e dei tempi di realizzazione delle opere da progettare. Anche detto Piano Esecutivo dei Sondaggi dovrà essere coerente alle prescrizioni riportate nel presente Capitolato ed inoltre dovrà contenere anche la valutazione economica dei rilievi/indagini/prove da svolgere, ed un Elenco Prezzi di riferimento.

Nello svolgimento delle attività progettuali l'OE incaricato dovrà coordinarsi costantemente con la Stazione Appaltante secondo le specifiche modalità previste dal presente Capitolato e dal Contratto.

Tutti gli elaborati progettuali rimarranno in proprietà della Stazione Appaltante che potrà quindi utilizzarli in maniera piena ed esclusiva a sua discrezione. Tali elaborati dovranno essere forniti secondo la tempistica dettagliata all'interno del presente Capitolato.

L'OE è obbligato alla sottoscrizione **per assunzione di responsabilità personale** da parte del **Responsabile della integrazione delle prestazioni specialistiche** per tutti gli elaborati, e da parte degli Specialisti di settore per gli elaborati di rispettiva competenza, di tutte le copie che saranno prodotte, anche in forma parziale, ai fini dell'ottenimento delle autorizzazioni previste dalla Legge, o per qualsiasi procedura amministrativa interna o esterna, sia in costanza di rapporto contrattuale che successivamente.

Eventuali ulteriori copie di lavoro di ciascun elaborato e/o dello Studio che verranno realizzate dall'OE nel corso della progettazione, su richiesta della Stazione Appaltante ovvero su richiesta di soggetti terzi nella fase di ottenimento dei pareri, saranno interamente a carico dello stesso.

L'OE incaricato dovrà recepire nel progetto tutte le indicazioni e le prescrizioni provenienti dal RUP e/o dagli Enti di controllo preposti, senza che possano essere sollevate eccezioni di sorta e/o richiedere oneri aggiuntivi e/o speciali compensi.

L'OE incaricato dovrà predisporre tutte le pratiche e i fascicoli, in duplice copia, da trasmettere agli Organi deputati al rilascio dei pareri, e dovrà prestare la massima assistenza e collaborazione alla Stazione Appaltante.

Qualora l'OE incaricato abbia formulato proposte migliorative in sede di offerta, le attività andranno svolte senza alcun onere aggiuntivo per la Stazione Appaltante.

Su tutti gli elaborati dello Studio dovranno essere indicati i nominativi dei progettisti incaricati. Tutti gli elaborati dovranno essere sottoscritti dal **Responsabile della integrazione delle prestazioni specialistiche** per l'assunzione della piena e incondizionata **responsabilità personale**.

È onere dell'OE il reperimento di tutti i dati che si rendessero eventualmente necessari per l'attività oggetto dell'appalto.

L'OE s'impegna ad interfacciarsi con gli Organi locali e con gli Enti a qualunque titolo deputati al rilascio di pareri o nulla osta, per recepire le eventuali indicazioni o pareri necessari alla successiva approvazione.

Costituiscono inoltre parte integrante dell'appalto:

- la redazione o assistenza alla Stazione Appaltante per la redazione di tutti gli atti ed elaborati necessari per acquisire indicazioni e quant'altro previsto dalle leggi nazionali o locali vigenti per il livello di progettazione di riferimento;
- i costi connessi all'utilizzo di ogni attrezzatura speciale eventualmente necessaria per la definizione ed il corretto dimensionamento delle aree e delle dotazioni impiantistiche;
- l'attività di gestione informativa Building Information Modeling (B.I.M.).

Pur lasciando all'OE ampia libertà nella definizione progettuale, si richiede che venga posta massima attenzione ai seguenti aspetti:

- *adeguatezza delle infrastrutture a servizio di laboratori*: scelte progettuali che garantiscano l'uso in qualità di un laboratorio di ricerca scientifica; scelte progettuali per migliorare la gestione delle sicurezze e dell'emergenza;
- *contenimento dei costi di investimento e di esercizio nel ciclo di vita di 50 anni*: scelte progettuali per migliorare la gestione e le manutenzioni ordinarie e straordinarie;

- *ecosostenibilità e minimo impatto sul territorio:* scelte progettuali per migliorare i consumi di energia primaria e le emissioni di CO2, come richiedono le nuove applicazioni legislative in materia di risparmio energetico e Carbon Footprint e DNSH;
- *minimo rumore ambientale antropico nelle caverne (da 1 a 1000Hz):* inserimento di impianti ed elementi tecnologici innovativi e loro integrazione nell'architettura.

18.2 Prescrizioni sugli elaborati

Per ciascuno degli argomenti elencati nell'ISP, **e per ciascuna configurazione**, sarà necessario consegnare, a titolo indicativo ma non esaustivo, almeno i seguenti elaborati.

1 Piano Preliminare delle indagini e dei sondaggi funzionali allo Studio di cui trattasi, piani di sicurezza per l'esecuzione dei sondaggi;

2 relazione di analisi dei dati e relativi grafici delle indagini e misurazioni eseguite sulla base del Piano Preliminare delle indagini e dei sondaggi;

3 relazione generale;

4 relazione tecnica preliminare, corredata da rilievi, accertamenti, indagini e studi specialistici;

5 relazione di verifica preventiva dell'interesse archeologico (art. 28 comma 4 del D.Lgs. 42/2004, per la procedura di cui al D. Lgs. 50/2016 art. 25, c. 1) ed eventuali indagini dirette sul terreno secondo quanto indicato nell'art. 25, c. 8 del D.Lgs. 50/2016;

6 studio di prefattibilità ambientale (art.20 D.P.R.207/2010);

7 relazione di sostenibilità dell'opera;

8 rilievi plano-altimetrici e stato di consistenza delle opere esistenti e di quelle interferenti nell'immediato intorno dell'opera da progettare;

9 elaborati grafici delle opere, nelle scale adeguate;

10 studio della viabilità di accesso ai cantieri;

11 indicazione degli accorgimenti atti ad evitare inquinamenti del suolo, acustici, idrici ed atmosferici;

12 relazione di conformità al DNSH;

13 relazione sul rispetto dei CAM;

14 studio delle cave eventualmente necessarie e la valutazione sia del tipo e quantità di materiali da prelevare, sia delle esigenze di eventuale ripristino ambientale finale;

15 relazione geotecnica; relazione idrologica; relazione geologica;

16 prime indicazioni di progettazione antincendio;

17 prime indicazioni sulla sicurezza ed il coordinamento, finalizzato alla tutela della salute e sicurezza dei lavoratori nei cantieri;

18 stima dei costi reali di mercato, e computo estimativo dell'opera e quadro economico (art.22 DPR 207/2010);

19 stima dei tempi di esecuzione;

20 analisi costi benefici.

21 relazione finale che descriva la variazione dei costi, delle principali soluzioni di disegno e ingegneristiche, e dell'impatto ambientale al variare della profondità;

22 elaborati e modelli grafici, rendering, video e animazioni utilizzabili per la presentazione del progetto sui tavoli scientifici in sede di competizione internazionale;

Per una sola configurazione, indicata dalla SA, sarà necessario consegnare, i seguenti elaborati.

- Piano Esecutivo delle indagini e dei sondaggi;
- studio delle aree espropriande o da acquisire, ove pertinente.

Nel seguito sono descritti i contenuti minimi dei principali documenti che dovranno essere predisposti dall'operatore economico aggiudicatario nell'ambito dello Studio oggetto del presente affidamento.

18.2.1 relazione generale

La relazione generale, in rapporto alla tipologia, alla categoria e alla dimensione dell'intervento si articola nei seguenti punti:

1) descrizione delle motivazioni giustificative della necessità dell'intervento, in relazione agli obiettivi generali individuati dalla Stazione Appaltante nel Quadro Esigenziale e nell'ISP. Indicazione dei conseguenti livelli di prestazione da raggiungere e, ove pertinenti, dei relativi indicatori di prestazione che consentano di verificare ad opere ultimate, in fase di esercizio, il raggiungimento degli obiettivi previsti;

2) individuazione degli obiettivi posti a base della progettazione, in relazione ai contenuti del documento con le Prime Indicazioni sullo Sviluppo della Progettazione (ISP), nonché degli specifici requisiti tecnici da soddisfare;

3) descrizione dettagliata, tramite elaborati descrittivi e grafici, delle caratteristiche tipologiche, funzionali, tecniche, gestionali ed economico-finanziarie delle configurazioni;

4) riepilogo in forma descrittiva e grafica delle possibili configurazioni;

5) elenco delle normative di riferimento, con esplicito richiamo ai parametri prestazionali o prescrittivi adottati per lo Studio, in relazione ai vari ambiti normativi cogenti o comunque presi a riferimento, quali azioni e loro combinazioni, tempi di ritorno, classi di esposizione, scenari di evento;

6) riepilogo degli aspetti economici e finanziari (quadro economico di spesa presuntiva; eventuale articolazione dell'intervento in stralci funzionali e/o prestazionali, ovvero in tratte funzionali e fruibili per le opere a rete; sintesi delle forme e delle fonti di finanziamento per la copertura della spesa; piano economico e finanziario, ove previsto; indicazioni di sintesi sull'impatto occupazionale dell'intervento sia in fase di realizzazione che di esercizio, nei casi in cui sia richiesto; indicazioni generali di impatto in termini di coinvolgimento delle micro e piccole imprese, sia nella fase di realizzazione dell'opera sia nelle fasi di manutenzione programmata e straordinaria);

La descrizione di ogni **singola configurazione** si articola in:

1) esplicazione della soluzione progettuale e del percorso progettuale che ha condotto ad elaborare tale soluzione sulla base degli esiti degli studi specialistici e delle indagini di cui al successivo punto 3);

2) aspetti funzionali, tecnici e di interrelazione tra i diversi elementi del progetto, architettonici, strutturali, funzionali, impiantistici, anche in riferimento ai contenuti dell'ISP;

3) considerazioni relative alla fattibilità dell'intervento, documentata anche in base ai risultati della valutazione preliminare di impatto ambientale, nonché agli esiti delle indagini di seguito indicate e alle conseguenti valutazioni riguardo alla fattibilità dell'intervento:

    a. esiti degli studi e delle indagini geologiche, idrogeologiche, idrologiche, idrauliche, geotecniche, sismiche, ambientali, archeologiche effettuate;

    b. esiti degli accertamenti in ordine agli eventuali vincoli di natura ambientale, idraulica, storica, artistica, archeologica, paesaggistica, o di qualsiasi altra natura, interferenti sulle aree o sulle opere interessate;

c. esiti delle valutazioni sullo stato della qualità dell'ambiente interessato dall'intervento e sulla sua possibile evoluzione, in assenza e in presenza dell'intervento stesso, nonché in corso di realizzazione;

d. considerazioni e valutazioni sulla compatibilità dell'intervento rispetto al contesto territoriale ed ambientale;

4) accertamento in ordine alle interferenze dell'intervento da realizzare con opere preesistenti o con pubblici servizi presenti lungo il tracciato e proposta di risoluzione delle interferenze stesse e stima dei prevedibili oneri, secondo quanto stabilito all'articolo 27, commi 3, 4, 5 e 6 del Codice;

5) ricognizione in ordine alla disponibilità delle aree e di eventuali immobili sui quali deve essere eseguito l'intervento, alle relative modalità di acquisizione, ai prevedibili oneri;

6) indicazioni per l'efficientamento dei processi di trasporto e logistica alla luce delle tecnologie e modelli di sostenibilità logistica maggiormente utilizzati a livello internazionale;

7) indicazioni sulla fase di dismissione del cantiere e di ripristino anche ambientale dello stato dei luoghi;

8) indicazioni su accessibilità, utilizzo e livello di manutenzione delle opere, degli impianti e dei servizi esistenti.

Deve essere considerato che la modellazione informativa, corrispondente alla evoluzione dei livelli di progettazione, dovrà assicurare la continuità nella progressione dei contenuti e dei contenitori informativi, sino alle fasi di esecuzione, di direzione dei lavori, di coordinamento per la sicurezza in fase di esecuzione, di collaudo tecnico-amministrativo e dovrà essere sempre funzionale alle esigenze di rendicontazione del PNRR.

18.2.2 relazione tecnica preliminare

La Relazione tecnica dello Studio è corredata da indagini e studi specialistici (che ne costituiscono allegati e che sono firmati anche dai rispettivi tecnici abilitati).

La Relazione tecnica riporta:

1) le esigenze, i requisiti e i livelli di prestazione che devono essere soddisfatti con l'intervento, in relazione alle specifiche esigenze definite nel documento contenente le Prime Indicazioni sullo Sviluppo della Progettazione (ISP);

2) le risultanze degli studi, delle indagini e delle analisi effettuate, in funzione della tipologia, delle dimensioni e dell'importanza dell'opera, evidenziando le conseguenti valutazioni in ordine alla fattibilità dell'intervento raggiunte attraverso la caratterizzazione del contesto locale territoriale, storico-archeologico, ambientale e paesaggistico in cui è inserita l'opera;

3) gli esiti della verifica della sussistenza di interferenze dell'intervento con il sedime di edifici o infrastrutture preesistenti;

4) le risultanze dello studio di inserimento urbanistico con relativi elaborati grafici, ove pertinente;

5) la descrizione e motivazione del grado di approfondimento adottato per la pianificazione delle indagini effettuate, in funzione della tipologia, delle dimensioni e dell'importanza dell'opera;

6) la descrizione e la motivazione delle scelte tecniche poste a base dello Studio, anche con riferimento alla sicurezza funzionale, all'efficienza energetica ed al riuso e riciclo dei materiali;

7) elementi di dimensionamento preliminare (strutturali, geotecnici, impiantistici, idraulici, viabilistici…) di natura concettuale e, ove necessario, anche quantitativa. Ciò al fine di giustificare le scelte progettuali compiute, utili a garantire:

   a. il regolare sviluppo del processo autorizzativo;

   b. il coerente sviluppo dei successivi livelli di progettazione;

   c. la coerenza delle previsioni di stima economica dell'opera.

Salvo diversa motivata determinazione della Stazione Appaltante in relazione alla tipologia ed alle caratteristiche dell'opera o dell'intervento da realizzare, la Relazione tecnica, corredata da indagini e studi specialistici, è riferita almeno ai seguenti tematismi della progettazione:

1) aspetti geologici, idrogeologici, idrologici, idraulici, geotecnici e sismici;

2) mobilità e traffico, esclusivamente per le infrastrutture di trasporto e qualora risulti pertinente in relazione alle caratteristiche del progetto;

3) sintesi delle analisi e delle valutazioni contenute nello studio di impatto ambientale, DNSH, misure di monitoraggio ambientale;

4) vincoli che insistono sull'area d'intervento e sull'intorno territoriale ed ambientale, qualora risulti pertinente in relazione alle caratteristiche del progetto;

5) aspetti paesaggistici;

6) aspetti archeologici, con descrizione di sviluppi ed esiti della verifica preventiva dell'interesse archeologico, qualora risulti pertinente in relazione alle caratteristiche del progetto;

7) censimento delle interferenze esistenti, ai sensi dell'articolo 27, commi 3, 4, 5 e 6 del Codice, con le relative ipotesi di risoluzione, il programma degli spostamenti e

attraversamenti e di quant'altro necessario alla risoluzione delle interferenze, nonché il preventivo di costo, qualora risulti pertinente in relazione alle caratteristiche del progetto;

8) piano di gestione delle materie, tenuto conto della disponibilità e localizzazione di siti di recupero e discariche, con riferimento alla vigente normativa in materia;

9) bonifica bellica;

10) aspetti architettonici e funzionali dell'intervento;

11) aspetti strutturali;

12) aspetti impiantistici, con la definizione della loro costituzione in relazione alla necessità di sicurezza, continuità di servizio, sostenibilità ed efficienza energetica, nel loro funzionamento normale ed anomalo e nel loro esercizio;

13) sicurezza antincendio, in relazione ai potenziali rischi e scenari incidentali;

14) misure di sicurezza finalizzate alla tutela della salute e sicurezza dei lavoratori nei cantieri;

15) misure di manutenzione e di monitoraggio geotecnico e strutturale;

16) espropri e servitù.

18.2.3 Studio di prefattibilità ambientale (art. 20 del DPR 207/2010)

Lo studio dovrà essere conforme ai principi del Do Not Significant Harm (DNSH).

Lo studio di prefattibilità ambientale in relazione alla tipologia, categoria e all'entità dell'intervento e allo scopo di ricercare le condizioni che consentano la salvaguardia nonché un miglioramento della qualità ambientale e paesaggistica del contesto territoriale comprende:

a) la verifica, anche in relazione all'acquisizione dei necessari pareri amministrativi, di compatibilità dell'intervento con le prescrizioni di eventuali piani paesaggistici, territoriali ed urbanistici sia a carattere generale che settoriale;

b) lo studio sui prevedibili effetti della realizzazione dell'intervento e del suo esercizio sulle componenti ambientali e sulla salute dei cittadini;

c) l'illustrazione, in funzione della minimizzazione dell'impatto ambientale, delle ragioni della scelta del sito e della soluzione progettuale prescelta nonché delle possibili alternative localizzative e tipologiche;

d) la determinazione delle misure di compensazione ambientale e degli eventuali interventi di ripristino, riqualificazione e miglioramento ambientale e paesaggistico, con la stima dei relativi costi da inserire nei piani finanziari dei lavori;

e) l'indicazione delle norme di tutela ambientale che si applicano all'intervento e degli eventuali limiti posti dalla normativa di settore per l'esercizio di impianti, nonché l'indicazione dei criteri tecnici che si intendono adottare per assicurarne il rispetto.

Nel caso di interventi ricadenti sotto la procedura di valutazione di impatto ambientale, lo studio di prefattibilità ambientale, contiene le informazioni necessarie allo svolgimento della fase di selezione preliminare dei contenuti dello studio di impatto ambientale. Nel caso di interventi per i quali si rende necessaria la procedura di selezione prevista dalle direttive comunitarie lo studio di prefattibilità ambientale consente di verificare che questi non possono causare impatto ambientale significativo ovvero deve consentire di identificare misure prescrittive tali da mitigare tali impatti.

18.2.4 Relazione di sostenibilità dell'opera

La relazione di sostenibilità dell'opera, declinata nei contenuti in ragione della specifica tipologia di intervento infrastrutturale, deve contenere almeno quanto segue.

1) la descrizione degli obiettivi primari dell'opera in termini di "outcome" per le comunità e i territori interessati, attraverso la definizione quali e quanti benefici a lungo termine, come crescita, sviluppo e produttività, ne possono realmente scaturire, minimizzando, al contempo, gli impatti negativi. Individuazione dei principali portatori di interessi

("stakeholder") e indicazione dei modelli e strumenti di coinvolgimento dei portatori d'interesse da utilizzare nella fase di progettazione, autorizzazione e realizzazione dell'opera, in coerenza con le risultanze del dibattito pubblico;

2) l'asseverazione del rispetto del principio di "non arrecare un danno significativo" ("Do No Significant Harm" - DNSH), come definito dal Regolamento UE 852/2020, dal Regolamento (UE) 2021/241 e come esplicitato dalla Comunicazione della Commissione Europea COM (2021) 1054 (Orientamenti tecnici sull'applicazione del citato principio, a norma del regolamento sul dispositivo per la ripresa e la resilienza);

3) la verifica degli eventuali contributi significativi ad almeno uno o più dei seguenti obiettivi ambientali, come definiti nell'ambito dei medesimi regolamenti, tenendo in conto il ciclo di vita dell'opera:

   a. mitigazione dei cambiamenti climatici;

   b. adattamento ai cambiamenti climatici;

   c. uso sostenibile e protezione delle acque e delle risorse marine;

   d. transizione verso un'economia circolare;

   e. prevenzione e riduzione dell'inquinamento;

   f. protezione e ripristino della biodiversità e degli ecosistemi;

4) una stima della Carbon Footprint dell'opera in relazione al ciclo di vita e il contributo al raggiungimento degli obiettivi climatici;

5) una stima della valutazione del ciclo di vita dell'opera in ottica di economia circolare, seguendo le metodologie e standard internazionali (Life Cycle Assessment – LCA), con particolare riferimento alla definizione e all'utilizzo dei materiali da costruzione ovvero dell'identificazione dei processi che favoriscono il riutilizzo di materia prima e seconda riducendo gli impatti in termini di rifiuti generati;

6) in ogni caso, l'analisi del consumo complessivo di energia con l'indicazione delle fonti per il soddisfacimento del bisogno energetico, anche con riferimento a criteri di progettazione bioclimatica;

7) la definizione delle misure per ridurre le quantità degli approvvigionamenti esterni (riutilizzo interno all'opera) e delle opzioni di modalità di trasporto più sostenibili dei materiali verso/dal sito di produzione al cantiere;

8) una stima degli impatti socio - economici dell'opera, con specifico riferimento alla promozione dell'inclusione sociale, la riduzione delle disuguaglianze e dei divari territoriali nonché il miglioramento della qualità della vita dei cittadini;

9) l'individuazione delle misure di tutela del lavoro dignitoso, in relazione all'intera filiera societaria dell'appalto (subappalto); l'indicazione dei contratti collettivi nazionali e territoriali di settore stipulati dalle associazioni dei datori e dei prestatori di lavoro comparativamente più rappresentative sul piano nazionale di riferimento per le lavorazioni dell'opera;

10) l'utilizzo di soluzioni tecnologiche innovative, ivi incluse applicazioni di sensoristica per l'uso di sistemi predittivi (struttura, geotecnica, idraulica, parametri ambientali);

11) l'analisi di resilienza, ovvero la capacità dell'infrastruttura di resistere e adattarsi con relativa tempestività alle mutevoli condizioni che si possono verificare sia a breve che a lungo termine a causa dei cambiamenti climatici, economici e sociali. Dovranno essere considerati preventivamente tutti i possibili rischi con la probabilità con cui possono manifestarsi, includendo non solo quelli ambientali e climatici ma anche quelli sociali ed economici, permettendo così di adottare la soluzione meno vulnerabile per garantire un aumento della vita utile e un maggior soddisfacimento delle future esigenze delle comunità coinvolte.

18.2.5 Elaborati grafici delle opere

Gli elaborati grafici dello Studio, redatti in scala e debitamente quotati, tenendo conto della necessità di includere le eventuali misure e interventi di mitigazione e di compensazione ambientale con la stima dei relativi costi, salva diversa motivata determinazione della Stazione Appaltante, sono costituiti come di seguito indicato per la parte di opere a rete e opere puntuali previste nel progetto.

PER LE OPERE PUNTUALI

1) stralcio documentale degli strumenti di pianificazione territoriale e di tutela ambientale e paesaggistica, nonché degli strumenti urbanistici generali ed attuativi vigenti, sui quali sono indicate la localizzazione dell'intervento da realizzare e le eventuali altre localizzazioni esaminate; tali elementi sono altresì riportati in una corografia in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali, con la perimetrazione dell'intervento;

2) planimetrie con le indicazioni delle curve di livello in scala adeguata e non inferiore a 1:2000, sulle quali sono riportati separatamente le opere ed i lavori da realizzare e le altre eventuali ipotesi progettuali esaminate;

3) elaborati relativi alle indagini e studi preliminari, in scala adeguata alle dimensioni dell'opera in progettazione:

    a. planimetria con ubicazione delle indagini eseguite;

    b. carte geologica, geomorfologica e idrogeologica, con la localizzazione dell'intervento, estese ad un ambito territoriale significativo;

    c. sezioni e profili geologiche, geomorfologiche e idrogeologiche, con localizzazione dell'intervento, illustranti gli assetti litostrutturali, geomorfologici ed idrogeologici;

    d. carta del reticolo idrografico;

e. carta della potenzialità archeologica;

f. carta dei vincoli ordinati e sovraordinati, in scala adeguata e con la localizzazione dell'intervento;

g. carta di microzonazione sismica, ove disponibile, in scala adeguata, estesa ad un ambito significativo;

h. planimetria delle interferenze ai sensi dei commi 3 e 4 dell'articolo 27 del codice;

i. planimetrie catastali;

j. planimetria ubicativa dei siti di cave attive, degli impianti di recupero, dei siti di deposito temporaneo e delle discariche autorizzate ed in esercizio da utilizzare per il conferimento dei rifiuti derivanti dalla realizzazione dell'intervento; elenco dei lavori programmati nella Regione Sardegna e che prevedono uso di materiale di cava;

4) Rendering, schemi grafici e sezioni-tipo nel numero, nell'articolazione e nelle scale necessarie a permettere l'individuazione di massima di tutte le caratteristiche geometrico-spaziali, tipologiche, funzionali e tecnologiche delle opere da realizzare, integrati da tabelle relative ai parametri da rispettare; in scala non inferiore a 1:500 per le planimetrie di insieme, ed in scala non inferiore a 1:200 per i singoli edifici.

5) elaborati che consentano, mediante schemi, piante e sezioni in scala adeguata non inferiore a 1:200, la definizione delle componenti impiantistiche presenti nel progetto, ivi compresi gli impianti di protezione antincendio attivi e passivi, con l'indicazione delle caratteristiche tecnico-funzionali.

PER LE OPERE A RETE

1) corografia generale di inquadramento dell'opera in scala in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali, in scala non inferiore a 1:100.000;

2) corografia contenente l'indicazione dell'andamento planimetrico dei tracciati esaminati con riferimento all'orografia dell'area, al sistema integrato di mobilità e di trasporto e agli altri servizi esistenti, al reticolo idrografico, in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali, in scala non inferiore a 1:10.000;

3) stralcio degli strumenti di pianificazione territoriale e di tutela ambientale e paesaggistica, nonché degli strumenti urbanistici generali ed attuativi vigenti, sui quali sono indicati i tracciati alternativi esaminati;

4) planimetrie con le indicazioni delle curve di livello e/o dei punti quotati, sulle quali sono riportati i tracciati alternativi esaminati, in scala adeguata e comunque in scala non inferiore a 1:1.000;

5) planimetrie su foto mosaico, in scala adeguata, sulle quali sono riportati i tracciati alternativi esaminati, in scala non inferiore a 1:1.000;

6) profili longitudinali altimetrici dei tracciati alternativi esaminati in scala adeguata e comunque in scala non inferiore a 1:5.000/500;

7) elaborati relativi alle indagini e studi preliminari, ed in particolare:

   a. planimetria con ubicazione delle indagini eseguite, in scala non inferiore a 1:5.000;

   b. planimetria idraulica, in scala non inferiore a 1:5.000;

   c. sezioni geotecniche con indicazione delle unità stratigrafiche omogenee sotto il profilo fisico meccanico, delle principali grandezze fisiche e proprietà indice, nonché

del regime delle pressioni interstiziali nel volume significativamente interessato dall'opera in scala non inferiore a 1: 5.000/500;

d. carta archeologica in scala non inferiore a 1:10.000;

e. carte e sezioni geologiche, geomorfologiche e idrogeologiche, con localizzazione dell'intervento, estese ad un ambito significativo, in scala non inferiore a 1:5.000/500;

f. sezioni geologiche, geomorfologiche e idrogeologiche, con localizzazione dell'intervento, illustranti gli assetti litostrutturali, geomorfologici ed idrogeologici;

g. profili litostratigrafico, idrogeologico, geotecnico con caratterizzazione fisico-meccanica dei principali litotipi e con indicazione della posizione delle falde idriche;

h. carta del reticolo idrografico in scala adeguata, e comunque non inferiore a 1:5.000;

i. carta dei vincoli ordinati e sovraordinati, in scala adeguata e con la localizzazione dell'intervento;

j. carta della potenzialità archeologica in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali;

k. carta di microzonazione sismica, ove disponibile, in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali;

l. eventuali planimetrie con i risultati delle indagini e delle simulazioni del traffico in scala adeguata, ove pertinenti;

m. planimetria delle interferenze con il sedime di edifici e/o reti infrastrutturali esistenti, in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali, in scala non inferiore a 1:5.000;

n. corografia in scala in scala adeguata, estesa ad un ambito significativo, riferibile ai sistemi cartografici nazionali, con l'ubicazione dei siti di cave attive, degli impianti di recupero, dei siti di deposito temporaneo e delle discariche autorizzate ed in esercizio da utilizzare per il conferimento dei rifiuti derivanti dalla realizzazione dell'intervento, in scala non inferiore a 1:10.000;

o. sistemazione tipo di aree di deposito o di rinaturalizzazione ambientale, in scala non inferiore a 1:500;

p. rendering, schemi grafici e sezioni schematiche nel numero, nell'articolazione e nelle scale necessarie a permettere l'individuazione di massima della localizzazione e delle caratteristiche spaziali, funzionali e tecnologiche delle aree di cantiere necessarie per la realizzazione delle opere;

8) planimetrie con le indicazioni delle curve di livello, in scala non inferiore a 1:1.000, per il tracciato selezionato; la scala non dovrà essere inferiore a 1:500 per le tratte in area urbana. La planimetria contiene una rappresentazione delle opere secondo tutti gli assi di progetto, in base alle caratteristiche geometriche assunte. La geometria delle opere è rappresentata in ogni sua parte (scarpate, opere di sostegno, opere d'arte idrauliche, fasce di rispetto e fasce di interesse urbanistico), allo scopo di determinare l'ingombro complessivo dell'infrastruttura e i relativi rapporti con il territorio, nonché le eventuali interferenze con edifici e infrastrutture esistenti. Sono inoltre rappresentate le caratteristiche geometriche del tracciato e le opere d'arte principali;

9) planimetrie su foto mosaico, in scala non inferiore a 1:1.000, del tracciato selezionato;

10) profili longitudinali altimetrici delle opere da realizzare in scala non inferiore a 1:5.000/500, contenenti l'indicazione di tutte le opere d'arte previste, le intersezioni con reti di trasporto, di servizi e/o idrografiche, le caratteristiche geometriche del tracciato; per le tratte in area urbana la scala non è inferiore a 1:2000/200;

11) sezioni tipo delle opere in scala adeguata, e comunque non inferiore a 1:200;

12) sezioni trasversali correnti, in numero adeguato per una corretta valutazione preliminare delle quantità da utilizzare nei computi per la quantificazione dei costi dell'opera;

13) elaborati che consentano, mediante piante, prospetti e sezioni in scala adeguata, la definizione tipologica di tutti i manufatti speciali e di tutte le opere correnti e minori che l'intervento richiede, in scala non inferiore a 1:200;

14) elaborati che consentano, mediante schemi, piante e sezioni in scala adeguata, la definizione delle componenti impiantistiche presenti nel progetto, ivi compresi gli impianti di protezione antincendio attivi e passivi, con l'indicazione delle caratteristiche tecnico-funzionali, in scala non inferiore a 1:200;

15) elaborati che riassumono i criteri di sicurezza previsti per l'esercizio dell'infrastruttura, in scala non inferiore a 1:5.000/500;

16) elaborati grafici a corredo delle prime indicazioni sulla sicurezza e coordinamento nei cantieri.

Le planimetrie e gli elaborati grafici riportano altresì le indicazioni relative alla suddivisione dell'intervento in lotti funzionali e fruibili, ove prevedibile.

Sulla base di tutti gli elaborati grafici è predisposta una stima che consenta la quantificazione complessiva dei costi delle opere in progetto, ai fini del calcolo della spesa.

Sia per le opere puntuali che per le opere a rete, lo Studio specifica gli elaborati e le relative scale da adottare in sede dei successivi livelli di progettazione, ferme restando le scale minime, laddove previste, che possono essere variate soltanto su indicazione dell'amministrazione ai sensi dell'articolo 23, comma 4 del Codice.

19. MODALITÀ DI SVOLGIMENTO DELLE PRESTAZIONI

Lo studio dovrà essere svolto secondo un percorso integrato e condiviso con la Stazione Appaltante, solo per il tramite del RUP e del DEC ciascuno per le rispettive competenze. Tale percorso integrato seguirà lo svolgimento, dall'avvio sino alla fase conclusiva, senza che ciò comporti oneri aggiuntivi per la Stazione Appaltante rispetto all'importo di aggiudicazione anche a seguito di richieste di partecipazione a incontri aggiuntivi presso la sede della Stazione Appaltante o presso Amministrazioni/Enti/Gestori interessati alle opere oggetto dello Studio o di approfondimenti, modifiche, integrazioni delle scelte progettuali e, conseguentemente, degli elaborati prodotti.

I servizi oggetto di affidamento dovranno essere svolti presso la sede dell'OE e dovranno prevedere altresì tutti i sopralluoghi, gli incontri e gli approfondimenti necessari presso la sede di esecuzione delle opere.

L'OE può avvalersi di propri collaboratori; in ogni caso, l'attività dei suddetti collaboratori avviene sotto la stretta e personale responsabilità dell'OE, e costui ne risponde sotto ogni profilo e senza alcuna riserva. Resta inteso che l'utilizzo e la collaborazione di eventuale personale di assistenza per tutte le operazioni oggetto dell'incarico di cui al presente Capitolato, saranno regolate mediante intese dirette ed esclusive tra l'OE e gli interessati, le cui competenze saranno a totale carico e spese del medesimo.

Il RUP può, in ogni momento, chiedere all'OE l'allontanamento immediato o la sostituzione immediata dei predetti collaboratori, senza obbligo di motivazione. Il compenso economico degli eventuali collaboratori rimane ad esclusivo carico dell'OE.

I contenuti dello Studio dovranno essere conformi alle indicazioni contenute nel presente Capitolato, nell'ISP, nella documentazione di gara e, in generale, nelle istruzioni operative che la Stazione Appaltante formalizzerà all'OE prima dell'avvio dello Studio o in corso di svolgimento dello stesso.

L'avvio delle singole fasi dell'Appalto dovrà essere espressamente ordinato dalla Stazione Appaltante; pertanto, nessun compenso verrà riconosciuto per attività svolte dall'OE di propria iniziativa senza la preventiva richiesta della Stazione Appaltante in forma scritta.

Nello svolgimento delle attività da progettare e coordinare particolare cura ed attenzione dovrà essere posta nei confronti di tutte le attività circostanti e delle possibili interferenze con le stesse, dell'osservanza degli aspetti inerenti alla salvaguardia della salute, della sicurezza e dell'igiene, dei lavoratori (con particolare riferimento all'art. 26 del Testo Unico in materia di tutela della salute e della sicurezza nei luoghi di lavoro).

19.1 Comitato tecnico scientifico

Si rende noto che, in considerazione del carattere eccezionale e della rilevanza economica e scientifica dell'opera oggetto dello studio, prima dell'avvio dell'esecuzione dell'appalto, o comunque entro non oltre cinque giorni da tale data, la Stazione Appaltante potrà istituire un Comitato Tecnico Scientifico, con compiti di consulenza tecnica in favore della stessa.

In tal caso il Comitato potrà essere composto da esperti della Stazione Appaltante, presieduto da un Presidente, e vedrà la partecipazione di almeno un rappresentante dell'Appaltatore. Gli eventuali oneri economici per gli esperti della Stazione Appaltante non gravano sul presente appalto, mentre i costi per il rappresentante dell'appaltatore sono a carico dell'OE e inclusi nel corrispettivo dell'appalto stesso. In tal caso entro quindici giorni dalla stipula del contratto di appalto, l'Appaltatore dovrà comunicare alla Stazione Appaltante il nominativo del soggetto che parteciperà alle riunioni del Comitato.

Il Comitato potrà avere una funzione consultiva rispetto all'attività di predisposizione, da parte dell'Appaltatore, dello studio delle due diverse configurazioni.

Spetterà dunque al Comitato la funzione di cooperare al fine di definire le attività necessarie alla predisposizione dello studio, anche suggerendo di condurre approfondimenti diretti a raggiungere l'obiettivo di ottenere le migliori valutazioni progettuali per la realizzazione di Einstein Telescope in Sardegna.

Il Comitato si riunirà con cadenza mensile. Le riunioni potranno tenersi in presenza ovvero, da remoto, in videoconferenza.

In preparazione dell'ordine del giorno della riunione del Comitato, circolato in anticipo dal suo presidente, l'appaltatore, il RUP, il DEC e i membri del Comitato possono contribuire sottoponendo al presidente medesimo domande e quesiti in forma scritta. La riunione del Comitato è l'occasione di scambio di informazioni e di richieste fra il Comitato e l'appaltatore attraverso il suo o i suoi rappresentanti.

A valle della riunione del Comitato sarà cura del suo presidente produrre un report contenente le risposte o i commenti riguardanti gli argomenti della riunione.

Il report sarà trasmesso al RUP e da questo al DEC, che ne valutano la conformità rispetto a quanto previsto nel contratto e per i controlli e le verifiche di rispettiva competenza.

A valle delle valutazioni, al buon esito, il DEC provvederà a trasmettere all'Appaltatore il report predisposto dagli esperti.

20. METODI E STRUMENTI INFORMATICI - CARATTERISTICHE DEGLI ELABORATI DI PROGETTO – PIANO GESTIONE INFORMATIVA

Nel presente paragrafo si forniscono indicazioni circa l'uso di metodi e strumenti informatici finalizzati al supporto della razionalizzazione delle attività di progettazione oggetto del Contratto. Si fornisce, altresì, la specificazione dei tipi di files in formato aperto con cui l'OE dovrà rappresentare e presentare i dati, le informazioni e i contenuti oggetto dellaprestazione.

I metodi e gli strumenti informatici dichiarati dall'OE dovranno garantire alla Stazione Appaltante la disponibilità, la confidenzialità e l'integrità dei dati e, delle informazioni oggetto della prestazione. **L'OE prima di dare avvio al servizio dovrà predisporre e presentare alla Stazione Appaltante il Piano di Gestione Informativa (PGI).**

Per ogni postazione informatica coinvolta nel processo di sviluppo della progettazione nel PGII'OE dovrà compilare la seguente tabella; l'insieme di tutte le tabelle compilate, una per ogni postazione informatica coinvolta, definirà l'infrastruttura hardware utilizzata.

Postazione informatica numero	
Modello pc o workstation	
Destinazione utilizzo	
Processore	
RAM	
Numero hard disk	
Capacità totale hard disk	
Tipo configurazione RAID	
Scheda video	
Sistema Operativo	

Ai fini della dichiarazione del software utilizzato con regolare licenza sulle postazioni dell'infrastruttura hardware, nel PGI l'OE dovrà compilare la tabella seguente, indicando il software utilizzato, il formato proprietario dei files, il rispettivo formato aperto, con la condizione che il formato aperto dovrà essere ricompreso tra quelli indicati in tabella. Nel campo note potranno essere riportate eventuali indicazioni aggiuntive per descrivere più compiutamente le caratteristiche tecniche e le certificazioni del software utilizzato.

Infrastruttura software				
Contenuto	**Software utilizzato**	**Formato proprietario**	**Formato aperto**	**Note**
Metodi e strumenti elettronici specifici, di cui all'articolo 23, comma 13, del Codice dei contratti			.ifc	
Computo metrico			.xml .xls	
Analisi e modellazione(idrologica, idraulica, sismica, geotecnica, strutturale, ecc.)			.ifc	

Infrastruttura software				
Contenuto	**Software utilizzato**	**Formato proprietario**	**Formato aperto**	**Note**
Rappresentazioneimmagini raster			.jpg .png .raw .gif .tif	
Rappresentazione video			.mp4 .mpeg .avi .swf	
Video scrittura			.txt .odt	
Rappresentazionetabellare			.csv .ods	
Rappresentazionedocumentale			.pdf .ps	
Presentazione			.odp	
Disegno tecnico assistito all'elaboratore (CAD)			.dxf	
Sistema Informativo Geografico Vettoriale			(shp, .shx, .dbf, .prj) .gpkg	

Sarà cura della Stazione Appaltante predisporre un ambiente di data storage in cloud ai fini della realizzazione dell'Ambiente di Condivisione dei Dati (ACDat), protetto e accessibile in modalità sicura tramite il web. L'ACDat sarà predisposta per assicurare la condivisione e la cessione alla Stazione Appaltantedi tutti i dati, di tutte le informazioni e di tutti i contenuti in formato digitale che costituiranno lo studio, ivi compresi i dati strutturati acquisiti e prodotti dall'OE a tal fine (per esempio dati DEM, dati LIDAR, rilievi topografici, ecc.).

Sarà cura dell'OE fornire alla Stazione Appaltante le licenze di eventuali software non aperti, necessari per visualizzare i documenti prodotti.

Tutti i file, sia quelli riguardanti le relazioni, che le tavole progettuali e quant'altro componga lo studio, dovranno essere consegnate, in forma cartacea e in forma digitale.

L'OE, dovrà garantire i metodi, gli strumenti informatici e le infrastrutture hardware e software specificati nel PGI.

L'OE dovrà, altresì, assicurare per tutto il periodo della prestazione oggetto del Contratto i software utilizzati con regolare licenza sulle postazioni dell'infrastruttura hardware specificati nel PGI. In caso di integrazioni dovrà darne tempestiva comunicazione alla Stazione Appaltante.

21. AVVIO DELL'ESECUZIONE DEL CONTRATTO

L'avvio all'esecuzione dell'appalto è disciplinato dall'art. 19 del DM 7 marzo 2018 n. 49.

Il DEC, sulla base delle disposizioni del RUP, dopo che il Contratto è divenuto efficace, dà avvio all'esecuzione delle prestazioni, fornendo all'OE tutte le istruzioni e direttive necessarie e redigendo, apposito verbale ("**verbale di avvio dell'esecuzione**") firmato contestualmente anche dall'OE.

È facoltà della Stazione Appaltante procedere in via d'urgenza all'avvio del servizio, anche nelle more della stipulazione formale del Contratto, ai sensi dell'articolo 32, co. 8, del Codice dei Contratti. In tal caso il DEC indica espressamente nel verbale di avvio le prestazioni che l'OE deve immediatamente eseguire.

Se nel giorno fissato e comunicato, l'OE non procede all'avvio della prestazione il DEC fissa un nuovo termine perentorio, non inferiore a 5 (cinque) giorni e non superiore a 15 (quindici) giorni; i termini per l'esecuzione decorrono comunque dalla prima data di avvio. Decorso inutilmente il termine anzidetto è facoltà della Stazione Appaltante non stipulare o risolvere il Contratto e incamerare la cauzione provvisoria o definitiva, a seconda che la mancata consegna si verifichi prima o dopo la stipulazione del Contratto, fermo restando il risarcimento del danno (ivi compreso l'eventuale maggior prezzo di una nuova aggiudicazione) se eccedente il valore della cauzione, senza che ciò possa costituire motivo di pretese o eccezioni di sorta da parte dell'OE. Se è indetta una nuova procedura di affidamento, l'OE è escluso dalla partecipazione in quanto l'inadempimento è considerato grave negligenza accertata.

Qualora l'avvio dell'esecuzione avvenga in ritardo per causa imputabile alla Stazione Appaltante, l'OE può chiedere di recedere dal Contratto. Nel caso di accoglimento dell'istanza di recesso l'OE ha diritto al rimborso delle spese contrattuali effettivamente sostenute e documentate.

Di seguito sono elencati i casi in cui è facoltà della Stazione Appaltante non accogliere l'istanza di recesso dell'OE:

- quando il recesso comporti ritardi non compatibili con il PNRR;
- quando il recesso comporti ritardi non compatibili con gli impegni assunti dalla Stazione Appaltante in caso di contributo di altri Enti o per le modalità di finanziamento;
- quando il recesso comporti ritardi che possano arrecare danno economico alla Stazione Appaltante o creare pericolo per la pubblica incolumità.

Prima dell'avvio all'esecuzione delle prestazioni l'OE presenta il Piano di Lavoro delle attività, per approvazione da parte della Stazione Appaltante.

22. DURATA DEL CONTRATTO E STATI DI AVANZAMENTO

La esecuzione dello Studio deve seguire le regole del finanziamento e deve essere ultimato entro i tempi imposti dal Finanziamento PNRR che **si intendono come termini essenziali** ai sensi dell'art.1457 del Codice Civile.

Inizio progetto IR0000004 - ETIC: 01 gennaio 2023

Durata: 30 mesi

Fine progetto IR0000004 - ETIC: 30 giugno 2025

L'appalto, ad avvenuta stipulazione del Contratto, ha inizio dalla data del Verbale di avvio dell'esecuzione e ha durata coerente con i tempi imposti dal finanziamento PNRR e dalla sua

rendicontazione, pari a **540 giorni naturali e consecutivi**, decorrenti dalla data di avvio all'esecuzione delle prestazioni, con le tempistiche di seguito definite.

L'OE redige il cronoprogramma delle attività che deve essere coerente con i suddetti termini essenziali; il cronoprogramma, una volta approvato dalla Stazione Appaltante, diventa operativo per l'esecuzione dell'Appalto.

Nel seguito sono riportate le attività da eseguire e le relative scadenze temporali intermedie entro cui ciascuna attività deve essere completata. Nel seguito sono riportate anche le percentuali degli Stati di Avanzamento (SdA), da considerare come tabella *a forfait* per i pagamenti in acconto, anche per frazioni.

	Riepilogo delle attività per gli Stati di Avanzamento (SdA)	***Scadenze [giorni solari dall'inizio della attività]***	***Percentuale da fatturare per SdA %***	***Avanzamento della prestazione %***
A	Piano preliminare dei sondaggi per l'esecuzione delle indagini e dei sondaggi	120	5,1%	5,1%
B	Edilizia e strutture sotterranee: concept	210	7,6%	12,7%
C	Opere in superficie: studio di fattibilità	330	7,7%	20,4%
D	Impianti: studio di fattibilità	360	6,9%	27,3%
E	Edilizia e strutture sotterranee: Valutazione preliminare di Impatto Ambientale e DNSH	420	12,7%	40,0%
F	Esecuzione delle indagini e dei sondaggi preliminari e studio idrologico, geotecnico e geologico	450	21,8%	61,8%
G	Edilizia e strutture sotterranee: studio di fattibilità	480	28,6%	90,4%
H	Elaborazione di una lista di titoli autorizzatori	510	3,2%	93,6%
I	Verifica di conformità e fine contratto	540	6,4%	100,0%
	durata presunta mesi	**18**	**100,0%**	

Il mancato rispetto dei predetti termini comporta **l'applicazione delle penali da ritardo anche intermedie** stabilite nel seguito del presente Capitolato.

	Attività da eseguire per gli stati di avanzamento
A	**Piano preliminare dei sondaggi per l'esecuzione delle indagini e dei sondaggi.** Alla consegna degli elaborati previsti in <ETIC_WP6_1-A01 caratteristiche e prime indicazioni delle indagini e dei sondaggi> e <ETIC_WP6_1-A02 capitolato tecnico delle indagini e dei sondaggi> con riferimento al Piano Preliminare delle indagini e dei sondaggi.
B	**Edilizia e strutture sotterranee: concept.** Alla consegna degli elaborati inclusi nell'articolo 18 del presente capitolato nelle scale di minor dettaglio per gli elaborati grafici e nelle descrizioni concettuali per gli elaborati relazionali.
C	**Opere in superficie: studio di fattibilità.** Alla consegna degli elaborati inclusi nell'articolo 18 del presente capitolato per le opere puntuali con riferimento a tutte le opere infrastrutturali edili e impiantistiche in superficie.
D	**Impianti: studio di fattibilità.** Alla consegna degli elaborati inclusi nell'articolo 18 del presente capitolato per le opere puntuali e per le opere a rete con riferimento a tutte le opere infrastrutturali impiantistiche in sotterranea.
E	**Edilizia e strutture sotterranee. Valutazione preliminare di Impatto Ambientale e DNSH.** Alla consegna degli elaborati inclusi nell'articolo 18 del presente capitolato per lo Studio di impatto ambientale, per la Relazione di sostenibilità dell'opera, oltre alla relazione sul rispetto del DNSH.
F	**Esecuzione delle indagini e dei sondaggi preliminari e studio idrologico, geotecnico e geologico.** Alla esecuzione delle indagini e dei sondaggi inclusi nel piano preliminare dei sondaggi, ed alla consegna delle relazioni e degli studi inclusi nell'articolo 17 del presente capitolato, in <ETIC_WP6_1-A01 caratteristiche e prime indicazioni delle indagini e dei sondaggi> ed in <ETIC_WP6_1-A02 capitolato tecnico delle indagini e dei sondaggi>.

	Attività da eseguire per gli stati di avanzamento
G	**Edilizia e strutture sotterranee: studio di fattibilità.** Alla consegna degli elaborati inclusi nell'articolo 18 del presente capitolato, per le opere puntuali e per le opere a rete con riferimento a tutte le opere infrastrutturali edili in sotterranea.
H	**Elaborazione di una lista di titoli autorizzatori.** Elaborazione di una lista di titoli autorizzatori che dovranno essere ottenuti (ad esempio, autorizzazioni, pareri, nulla osta etc.) con contestuale consegna alla Stazione Appaltante della documentazione che dovrà necessariamente essere presentata alle pubbliche amministrazioni al fine di ottenere tali titoli autorizzatori.
I	**Verifica di conformità e fine contratto.** Alla consegna completa dello Studio e della relazione finale che descriva la variazione dei costi, delle principali soluzioni di disegno e ingegneristiche, e dell'impatto ambientale al variare della profondità nel suddetto intervallo e del documento di fattibilità delle alternative progettuali.

Al fine di assicurare ogni sforzo possibile per la celere realizzazione dello Studio, secondo le tempistiche date, si ritiene necessario, con riferimento alle modalità di esecuzione delle attività di progettazione, prevedere l'obbligo per il soggetto incaricato della progettazione di effettuare incontri o sopralluoghi, con cadenza periodica, laddove richiesto anche settimanale, presso qualsiasi luogo che verrà indicato dal RUP, alla presenza di quest'ultimo o del/dei referente/i tecnico/i all'uopo indicato/i. La cadenza degli incontri sarà stabilita nel verbale di avvio dell'esecuzione a discrezione del RUP e del DEC.

In occasione di tali incontri l'incaricato dovrà produrre la documentazione progettuale "*in progress*" in formato elettronico e cartaceo anche per consentire la valutazione da parte del RUP, o del referente tecnico da lui incaricato, del corretto avanzamento delle attività progettuali in relazione al termine di consegna intermedio e finale.

Il RUP potrà, a suo insindacabile giudizio e senza che questo possa giustificare la richiesta di ulteriori compensi da parte del soggetto incaricato della progettazione, disporre una frequenza più ravvicinata degli incontri o l'esecuzione di specifici incontri al fine di far fronte a particolari problematiche progettuali, tecniche o amministrative, oltre che pianificare incontri mirati con i soggetti incaricati della verifica "*in progress*" della progettazione di che trattasi.

In ogni caso lo svolgimento delle prestazioni deve essere improntato alla tempestività.

I suddetti termini saranno interrotti solo con atto scritto motivato da parte della Stazione Appaltante, come meglio specificato in successivo articolo e da ogni altra disposizione legislativa o regolamentare vigente, in relazione all'andamento delle prestazioni afferentiall'intervento o, per quanto non disciplinato da tale normativa, da ordini specifici della Stazione Appaltante. Il termine di cui trattasi resta pertanto sospeso dalla data del verbale di sospensione e riprende a decorrere all'emissione del verbale di ripresa o altro ordine scritto della Stazione Appaltante.

L'OE comunicherà al DEC, a mezzo PEC, la data nella quale ritiene di aver ultimato le prestazioni intermedie e finale. Il DEC procederà, in contraddittorio alle eventuali constatazioni redigendo apposito certificato di ultimazione delle prestazioni.

23. PENALI PER RITARDO

Nel caso di mancato rispetto del termine stabilito per l'esecuzione delle prestazioni contrattuali, **per ogni giorno solare naturale consecutivo di ritardo viene applicata una penale pari allo 0.8‰ (zero virgola otto per mille) sull'importo netto contrattuale.**

La penale, nella stessa misura percentuale di cui sopra, trova applicazione anche in caso di ritardo:

- nel rispetto delle singole **scadenze temporali intermedie** previste nel presente Capitolato per ciascun Stato di Avanzamento;
- nell'avvio dell'esecuzione del Contratto rispetto alla data fissata dal DEC;

- nell'avvio dell'esecuzione del Contratto per cause imputabili all'OE che non abbia effettuato gli adempimenti prescritti;
- nella ripresa dell'esecuzione del Contratto seguente un verbale di sospensione, rispetto alla data fissata dal DEC.

Le penali trovano altresì applicazione nel caso di:

- qualora l'Operatore Economico aggiudicatario, che occupi un numero pari o superiore a quindici dipendenti ma non sia tenuto alla redazione del rapporto sulla situazione del personale di cui all'art. 46, del D.lgs. n. 198/2006, ometta di consegnare alla Stazione Appaltante, entro sei mesi dalla conclusione del Contratto, una relazione di genere sulla situazione del personale maschile e femminile, in conformità a quanto previsto dall'articolo 47, comma 3, del DL 77/2021, e delle Linee guida approvate con DPCM del 7 dicembre 2021;
- qualora l'Operatore Economico aggiudicatario, che occupi un numero pari o superiore a quindici dipendenti, ometta di consegnare alla Stazione Appaltante entro sei mesi dalla conclusione del contratto una relazione che chiarisca l'avvenuto assolvimento degli obblighi previsti a carico delle imprese dalla L 12 marzo 1999, n. 68, e illustri eventuali sanzioni e provvedimenti imposti a carico delle imprese nel triennio precedente la data di scadenza della presentazione delle offerte, in conformità a quanto previsto dall'articolo 47, comma 3 bis, del DL n. 77/2021, e delle Linee guida approvate con DPCM del 7 dicembre 2021.

Le penali sono contabilizzate in detrazione in occasione del pagamento immediatamente successivo al verificarsi della relativa condizione di ritardo.

L'importo complessivo delle penali irrogate ai sensi dei commi che precedono e negli altri casi previsti dal Capitolato non può superare il 20% (venti percento) dell'importo netto contrattuale; qualora i ritardi o le violazioni siano tali da comportare una penale di importo superiore alla

predetta percentuale la Stazione Appaltante avrà la facoltà di risolvere il Contratto, fatto salvo il diritto all'eventuale risarcimento del danno patito a causa dell'inadempimento.

È ammessa, su motivata richiesta dell'OE, la totale o parziale disapplicazione delle penali, quando si riconosca che il ritardo non è imputabile all'OE, oppure quando si riconosca che le penali sono manifestamente sproporzionate, rispetto all'interesse della Stazione Appaltante. La disapplicazione non comporta il riconoscimento di compensi o indennizzi all'OE. Sull'istanza di disapplicazione delle penali decide la Stazione Appaltante su proposta del RUP e/o del DEC.

Tutte le fattispecie di ritardo sono segnalate tempestivamente e dettagliatamente al RUP da parte del DEC immediatamente al verificarsi della relativa condizione, con la relativa quantificazione temporale.

La Stazione Appaltante potrà compensare i crediti derivanti dall'applicazione delle penali di cui al presente articolo con quanto dovuto all'OE a qualsiasi titolo, anche per i corrispettivi dovuti all'OE medesimo.

La richiesta e/o il pagamento delle penali di cui al presente articolo non esonera in nessun caso l'OE dall'adempimento dell'obbligazione per la quale si è reso inadempiente e che ha fatto sorgere l'obbligo di pagamento della medesima penale, fatta salva la facoltà per la Stazione Appaltante di risolvere il Contratto nei casi in cui questo è consentito.

L'applicazione delle penali non pregiudica il risarcimento di eventuali danni o ulteriori oneri sostenuti dalla Stazione Appaltante a causa di ritardi per fatto dell'OE, per mancati introiti o per qualsiasi altro titolo.

24. VERIFICA PERIODICA DELL'AVANZAMENTO DELLA PROGETTAZIONE

La Stazione Appaltante ha facoltà di esercitare, sia direttamente sia mediante soggetti terzi dalla medesima incaricata, ogni più ampia attività di verifica e controllo sull'operato dell'OE e/o di tutti

i soggetti deputati all'espletamento delle prestazioni oggetto del Contratto, senza che in conseguenza di tale circostanza l'OE possa avanzare pretese disorta, a qualunque titolo, nei confronti della Stazione Appaltante.

L'esito favorevole delle verifiche e/o dei controlli eventualmente effettuati dalla Stazione Appaltante non esonera né limita in ogni caso l'OE dai propri obblighi e dalle proprie responsabilità; pertanto, anche successivamente all'effettuazione delle verifiche stesse, qualora venga accertata la non conformità alle prescrizioni contrattuali dell'attività esercitata dall'OE, il medesimo dovrà in ogni caso provvedere a sua cura e spese al tempestivo adempimento di tutto quanto eventualmente richiesto dalla Stazione Appaltante o, comunque, occorrente al fine di ricondurre l'attività alle suddette prescrizioni contrattuali.

Resta in ogni caso ferma ed impregiudicata l'integrale responsabilità dell'OE nei confronti della Stazione Appaltante per il perfetto e puntuale adempimento delle prestazioni oggetto del Contratto.

La Stazione Appaltante durante lo sviluppo dello Studio avrà facoltà di richiedere l'approfondimento di taluni aspetti tematici, nonché la strutturazione di determinate porzioni dello Studio in modo differente da quello proposto dall'OE, dovendo, in tal caso, quest'ultimo uniformarsi alle disposizioni impartitegli senza sollevare eccezione alcuna.

La Stazione Appaltante si riserva di effettuare tramite il Responsabile Unico del Procedimento o altra figura allo scopo incaricata dalla Stazione Appaltante, verifiche circa l'effettivo stato di avanzamento dello Studio, mediante convocazione di incontri, richiesta di relazione per iscritto, sopralluoghi o con altre forme ritenute idonee, di prendere visione degli elaborati sino a quel momento prodotti, che dovranno essere tempestivamente consegnati in bozza, senza che l'OE possa opporre rifiuto e eccezioni di sorta.

L'OE è tenuto ad effettuare incontri con il DEC e/o con RUP al fine di:

- consentire il continuo monitoraggio dello stato di avanzamento dello Studio;

- identificare tempestivamente le possibili cause che possano influire negativamente sulla progettazione proponendo le adeguate azioni correttive;
- identificare tempestivamente la necessità di acquisire ulteriori informazioni, indicazioni tecniche e/o amministrative, pareri e quant'altro eventualmente necessario rispetto a quanto già in possesso, comunicandole alla Stazione Appaltante con la tempistica dovuta affinché la stessa possa adottare le opportune determinazioni;
- agevolare la redazione dello Studio seguendone lo sviluppo "passo a passo" e fornendo un supporto continuo al RUP.

Il DEC o il RUP potranno disporre una frequenza più ravvicinata degli incontri, anche settimanale, o l'esecuzione di specifici incontri al fine di far fronte a particolari problematiche progettuali, tecniche o amministrative.

L'OE è tenuto a partecipare agli incontri indetti dalla Stazione Appaltante al fine di fornire le necessarie spiegazioni in merito allo Studio elaborato.

L'OE è inoltre tenuto a partecipare agli incontri indetti della Stazione Appaltante per l'acquisizione dei pareri da parte di tutti gli Enti/Soggetti di controllo.

L'OE è obbligato a far presente alla Stazione Appaltante evenienze, emergenze o condizioni che si verifichino nello svolgimento delle prestazioni definite dall'incarico, che rendano necessari o anche solo opportuni interventi di adeguamento o razionalizzazione.

L'OE sarà tenuto a modificare e/o integrare gli elaborati prodotti sulla base delle richieste avanzate dalla Stazione Appaltante per il recepimento delle prescrizioni che dovessero essere formulate da Enti, Autorità di controllo e Soggetti coinvolti, a vario titolo, ai fini dell'approvazione dello Studio. Resta inteso che i pareri, propedeutici ad approvazioni, nulla-osta o atti di assenso comunque denominati, rappresentano le condizioni necessarie alla successiva approvazione da parte della Stazione Appaltante.

25. APPROVAZIONE DEGLI STATI DI AVANZAMENTO

Ciascuno Stato di Avanzamento sarà predisposto dal DEC e firmato dall'OE.

L'avvenuta approvazione di ciascuno stato di avanzamento sarà comunicata in forma scritta all'OE da parte del RUP, mediante l'emissione di un certificato di pagamento.

L'emissione del certificato di pagamento autorizza l'OE all'emissione della relativa fattura.

È esclusa ogni forma di approvazione tacita o implicita.

L'approvazione non comporta accettazione e non esime l'OE dai propri obblighi e dalle proprie responsabilità.

26. PROROGHE E DIFFERIMENTI

Se l'OE, per causa a esso non imputabile, non è in grado di ultimare le prestazioni nei termini stabiliti, può chiedere la proroga ai sensi dell'articolo 107, comma 5, del Codice dei Contratti pubblici, con istanza formulata con congruo anticipo rispetto alla scadenza del termine a pena di decadenza, fermo restando il rispetto del termine finale di cui al precedente art. 22 previsto dal finanziamento PNRR per la conclusione delle prestazioni. Sull'istanza decide il RUP, sentito il DEC, entro il termine di 30 giorni previsto dal sopra citato comma 5 dell'articolo 107 del Codice dei Contratti pubblici.

A titolo indicativo e non esaustivo sono considerate cause non imputabili all'OE: ritardi causati o da impedimenti frapposti dalla Stazione Appaltante in relazione a proprie esigenze o conseguenti all'inadempimento, da parte della Stazione Appaltante, delle obbligazioni per la stessa derivanti dal presente Capitolato o ritardi nell'esecuzione di altre prestazioni o opere propedeutici o strumentali ai servizi oggetto del Contratto e formanti oggetto di altri contratti in essere tra la Stazione Appaltante e terzi.

Qualora nel corso dell'appalto si verificasse un evento che a giudizio dell'OE risultasse tale da impedire oggettivamente il rispetto del termine di esecuzione, l'OE può presentare alla Stazione Appaltante richiesta di proroga in forma scritta, entro 7 giorni dalla data del verificarsi dell'evento e fornire dalla Stazione Appaltante, entro i successivi 7 giorni, tutti gli elementi in suo possesso a comprova dell'evento stesso. Detti adempimenti si intendono prescritti per l'OE che non vi ottemperi, a pena di decadenza del diritto di avanzare successivamente, in qualsiasi sede, pretese relative alla proroga del termine di esecuzione.

La richiesta di proroga deve essere presentata al RUP o al DEC che può richiedere, in merito alla concessione della proroga, la formale espressione della Stazione Appaltante.

Se la proroga è concessa formalmente dopo la scadenza del terminedi esecuzione, essa ha effetto retroattivo a partire da tale ultimo termine.

La mancata determinazione del RUP entro i termini indicati precedentemente costituisce rigetto della richiesta.

27. SOSPENSIONI ORDINATE DAL DEC

Ai sensi di quanto previsto dall'art. 107, comma 1 del Codice dei Contratti, in tutti i casi in cui ricorrano circostanze speciali che impediscono in via temporanea la regolare esecuzione del servizio, e che non siano prevedibili al momento della stipulazione del Contratto, il DEC può disporre la sospensione dell'esecuzione del contratto, compilando, se possibile, con l'intervento dell'OE o del suo Rappresentante, il verbale di sospensione, con l'indicazione delle ragioni che hanno determinato l'interruzione dei servizi, l'eventuale imputazione delle cause ad una delle parti o a terzi, nonché dello stato di avanzamento.

Non appena siano venute a cessare le cause della sospensione il RUP, ovvero il DEC che lo comunica al RUP affinché vi provveda, dispone la ripresa dell'esecuzione e indica il nuovo termine contrattuale. Entro cinque giorni dalla disposizione di ripresa effettuata il RUP, o il DEC, procede

alla redazione del verbale di ripresa, che deve essere sottoscritto anche dall'OE e deve riportare il nuovo termine contrattuale.

L'OE non potrà di propria iniziativa, per nessun motivo, sospendere o interrompere l'esecuzione. L'eventuale sospensione delle suddette attività per decisione unilaterale dell'OE costituisce grave inadempimento contrattuale e può comportare la risoluzione di diritto del Contratto ai sensi dell'art. 1456 del Codice civile, fermo restando che saranno a carico dell'OE tutti gli oneri e le conseguenze derivanti da tale risoluzione. La richiesta di sospensione da parte dell'OE può essere legittimamente avanzata alla Stazione Appaltante qualora, durante l'esecuzione, sopraggiungano condizioni sfavorevoli rilevanti che oggettivamente ne impediscono la prosecuzione dell'appalto.

Ai sensi dell'articolo 107, comma 2, del Codice dei Contratti, se la sospensione, o le sospensioni se più di una, durano per un periodo di tempo superiore ad un quarto della durata complessiva prevista dell'appalto, l'OE può richiedere lo scioglimento del Contratto senza indennità; la Stazione Appaltante può opporsi allo scioglimento del Contratto ma, in tal caso, riconosce al medesimo la rifusione dei maggiori oneri derivanti dal prolungamento della sospensione oltre i termini suddetti, iscrivendoli nella documentazione contabile. Nessun indennizzo è dovuto all'OE negli altri casi.

28. SOSPENSIONI ORDINATE DAL RUP

Ai sensi dell'art. 107, comma 2, del Codice dei Contratti, il RUP può ordinare la sospensione dell'esecuzione per cause di necessità o di pubblico interesse, tra cui l'interruzione di finanziamenti per esigenze di finanza pubblica. L'ordine è trasmesso contemporaneamente all'OE e al DEC ed ha efficacia dalla data di emissione.

Lo stesso RUP determina il momento in cui sono venute meno le ragioni di pubblico interesse o di particolare necessità che lo hanno indotto ad ordinare la sospensione ed emette l'ordine di ripresa, trasmesso tempestivamente all'OE e al DEC.

29. PIANO DI LAVORO

Entro 10 (dieci) giorni dalla stipula del Contratto, e comunque prima dell'avvio della prestazione, l'OE predispone e consegna al DEC e al RUP un proprio Piano di lavoro delle attività, che deve essere coerente con le fasi previste nell'ISP, i tempi contrattuali, di ultimazione e con quanto proposto nell'Offerta; detto Piano deve essere approvato dal DEC, mediante apposizione di un visto, entro 10 (dieci) giorni dal ricevimento, dandone contestuale comunicazione al RUP. L'approvazione fa salve palesi illogicità o indicazioni erronee incompatibili con il rispetto dei termini di ultimazione.

Il Piano di Lavoro deve tener conto ed essere coerente con le soglie temporali intermedie previste nel presente Capitolato.

Il Piano di Lavoro deve essere coerente con le scadenze del PNRR.

30. INDEROGABILITÀ DEI TERMINI DI ESECUZIONE

Non costituiscono motivo di differimento dell'inizio delle prestazioni, della loro mancata regolare o continuativa conduzione secondo il relativo programma o della loro ritardata ultimazione:

a) il ritardo nell'installazione del cantiere per l'esecuzione delle indagini, prove e rilievi in situ e nell'allacciamento alle reti tecnologiche necessarie al suo funzionamento, per l'approvvigionamento dell'energia elettrica e dell'acqua;

b) l'adempimento di prescrizioni, o il rimedio a inconvenienti o infrazioni riscontrate dal DEC o dagli organi di vigilanza in materia sanitaria e di sicurezza, ivi compreso il coordinatore per la sicurezza in fase di esecuzione;

c) il tempo necessario per l'espletamento degli adempimenti a carico dell'OE comunque previsti dal presente Capitolato;

d) le eventuali controversie tra l'OE e i fornitori, subappaltatori, affidatari, altri incaricati dall'OE né i ritardi o gli inadempimenti degli stessi soggetti;

e) le eventuali vertenze a carattere aziendale tra l'OE e il proprio personale dipendente;

f) le sospensioni disposte dalla Stazione Appaltante, dal DEC, o dal RUP per inosservanza delle misure di sicurezza dei lavoratori nel cantiere o inosservanza degli obblighi retributivi, contributivi, previdenziali o assistenziali nei confronti dei lavoratori impiegati nel cantiere;

g) le sospensioni disposte dal personale ispettivo del Ministero del lavoro e della previdenza sociale in relazione alla presenza di personale non risultante dalle scritture o da altra documentazione obbligatoria o in caso di reiterate violazioni della disciplina in materia di superamento dei tempi di lavoro, di riposo giornaliero e settimanale, ai sensi dell'articolo 14 del Testo Unico in materia di tutela della salute e della sicurezza nei luoghi di lavoro, fino alla relativa revoca.

Non costituiscono altresì motivo di differimento dell'inizio delle prestazioni, della loro mancata regolare o continuativa conduzione secondo il relativo programma o della loro ritardata ultimazione, i ritardi o gli inadempimenti di ditte, imprese, fornitori, tecnici o altri, titolari di rapporti contrattuali con la Stazione Appaltante, se l'OE non abbia tempestivamente denunciato per iscritto alla Stazione Appaltante medesima le cause imputabili a dette ditte, imprese o fornitori o tecnici o altri.

Le suddette cause non possono costituire motivo per la richiesta di proroghe o di sospensione, per la disapplicazione delle penali, né per l'eventuale risoluzione del Contratto.

31. RISOLUZIONE DEL CONTRATTO PER MANCATO RISPETTO DEI TERMINI

Ai sensi dell'articolo 108, co. 4, del Codice dei Contratti, qualora l'esecuzione delle prestazioni ritardi per negligenza dell'OE rispetto alle previsioni del contratto, il direttore dell'esecuzione del contratto (DEC) gli assegna un termine, che, salvo i casi d'urgenza, non può essere inferiore a dieci giorni, entro i quali l'OE deve eseguire le prestazioni. Scaduto il termine assegnato, e redatto processo verbale in contraddittorio con l'OE, qualora l'inadempimento permanga, la Stazione Appaltante risolve il contratto, fermo restando il pagamento delle penali.

32. ANTICIPAZIONE DEL PREZZO

Ai sensi dell'articolo 35, co. 18, del Codice dei Contratti Pubblici è prevista, a titolo di anticipazione, una somma pari al **20% (venti per cento)** dell'importo contrattuale relativo al servizio. Detta anticipazione sarà corrisposta dopo la sottoscrizione del Contratto ovvero entro 15 (quindici) giorni dall'effettivo inizio della prestazione e che siano verificate le condizioni di cui ai successivi commi.

L'erogazione dell'anticipazione è subordinata alla prestazione, da parte dell'OE, di apposita garanzia fideiussoria o assicurativa, con importo garantito almeno pari all'anticipazione, maggiorato dell'IVA all'aliquota di legge, maggiorato altresì del tasso legale di interesse applicato al periodo necessario al recupero dell'anticipazione stessa secondo il cronoprogramma della prestazione. L'importo della garanzia viene gradualmente ed automaticamente ridotto nel corso dell'esecuzione, in proporzione alle quote di anticipazione recuperate in occasione di ogni pagamento, fino all'integrale compensazione.

La garanzia è prestata mediante presentazione di atto di cauzione o di fideiussione, o nelle forme dell'art. 93, comma 2, del Codice dei Contratti, da imprese bancarie o assicurative che rispondano ai requisiti di solvibilità previsti dalle leggi che ne disciplinano le rispettive attivitào rilasciata dagli intermediari finanziari iscritti nell'albo di cui all'articolo 106 del decreto legislativo 1 settembre

1993, n. 385, che svolgono in via esclusiva o prevalente attività di rilascio di garanzie e che sono sottoposti a revisione contabile da parte di una società di revisione iscritta nell'albo previsto dall'articolo 161 del decreto legislativo 24 febbraio 1998, n.58 e che abbiano i requisiti minimi di solvibilità richiesti dalla vigente normativa bancaria assicurativa.

La garanzia deve essere conforme alla relativa scheda di cui all'"Allegato B – Schede Tecniche" del Decreto del Ministero Dello Sviluppo Economico del 16 settembre 2022, n. 193 (in Gazz. Uff., 14 dicembre 2022, n. 291) recante "*Regolamento contenente gli schemi tipo per le garanzie fideiussorie e le polizze assicurative di cui agli articoli 24, 35, 93, 103 e 104 del decreto legislativo 18 aprile 2016, n. 50, e successive modificazioni*".

L'OE decade dall'anticipazione, con l'obbligo di restituzione, se l'esecuzione non procede secondo gli obblighi pattuiti e/o i tempi contrattuali, per ritardi a lui imputabili. In tale caso, sulle somme restituite, spettano alla Stazione Appaltante anche gli interessi corrispettivi al tasso legale con decorrenza dalla data di erogazione della anticipazione.

33. PAGAMENTI IN ACCONTO

Il pagamento dei corrispettivi avverrà secondo le modalità di legge, secondo le percentuali degli Stati di Avanzamento previsti nell'articolo 22 di questo Capitolato**, ogni qualvolta il credito dell'OE sia superiore a 1'500'000 euro** al netto delle ritenute e delle tasse.

Al fine di procedere con i pagamenti, l'accertamento ai sensi dell'art. 26 del D.M. 7 marzo 2018, n. 49 della prestazione effettuata, in termini di quantità e qualità, rispetto alle prescrizioni previste nei documenti contrattuali è effettuato dal DEC. Tale accertamento avviene entro 30 giorni dal termine di esecuzione della prestazione a cui si riferisce. Il DEC certifica lo Stato di Avanzamento con apposito documento firmato anche dall'OE.

Il RUP, previa verifica della regolarità contributiva dell'OE, dispone il pagamento, sul quale sono operate le ritenute di legge oltre quelle per la compensazione dell'anticipazione. Il RUP emette il certificato di pagamento che autorizza l'OE ad emettere la fattura.

La Stazione Appaltante provvede al pagamento, a favore dell'OE, entro i successivi 30 (trenta) giorni dopo la presentazione di regolari fatture fiscali elettroniche.

La corresponsione degli acconti è sospesa nei seguenti casi, previo riscontro documentale degli inadempimenti rilevati e contestazione scritta degli stessi:

- per mancata attivazione della polizza professionale o RC, all'insorgenza di danni arrecati a beni mobili e immobili e/o a terzi;
- per mancato adeguamento o insufficienza delle garanzie e coperture assicurative conseguenti a variante o dalla concessione di proroghe;
- per mancata eliminazione delle conseguenze dannose o mancata esecuzione di prestazioni eventualmente disposte dal DEC.

L'OE ha facoltà di presentare osservazioni o contestazioni scritte in occasione dei pagamenti.

34. FORMALITÀ E ADEMPIMENTI AI QUALI SONO SUBORDINATI I PAGAMENTI

Ai sensi dell'art. 1, co. 3 del d.lgs. 5 agosto 2015 n. 127, come modificato dall'art. 1, co. 909 della L. 27 dicembre 2017 n. 205, i pagamenti avverranno previa emissione delle fatture in formato elettronico attraverso il Sistema di Interscambio (SdI) dell'Agenzia delle Entrate, al Codice Univoco Ufficio IPA **KR07WA** e riportando nel Campo Esigibilità IVA la lettera "S"

Ogni pagamento è subordinato alla presentazione alla Stazione Appaltante della pertinente fattura fiscale in formato elettronico, contenente i riferimenti al corrispettivo oggetto del pagamento, e successiva all'emissione del certificato di pagamento da parte del RUP.

Si precisa che la Stazione Appaltante è tenuta all'applicazione del meccanismo della scissione dei pagamenti (cd. split payment) previsto dall'articolo 1, comma. 629, lettera b), della legge 23 dicembre 2014, n. 190.

Le fatture dovranno essere intestate a INFN-LNS (Codice Fiscale Ente 84001850589) e, corredate dagli estremi del Contratto (numero e data), dovranno riportare, oltre alla modalità di pagamento, CIG e CUP e le note previste dal PNRR per la rendicontazione.

Nella fattura l'OE, ai fini della contabilità economico patrimoniale, dovrà specificare la competenza temporale, nonché tutti gli elementi utili alla comprensione degli importi unitarie/o totali che hanno condotto all'importo fatturato.

Nel caso di raggruppamenti temporanei, la fatturazione del corrispettivo deve corrispondere alle quote risultanti dal mandato conferito o dall'atto costitutivo ovvero indicate in sede di stipulazione del Contratto. La mancata corrispondenza tra gli importi fatturati e le quote di partecipazione note alla Stazione Appaltante sospende il pagamento, senza diritto per l'OE al riconoscimento di interessi o altri indennizzi.

Non si potrà procedere a nessun pagamento, nemmeno parziale, sino alla ricezione della fattura elettronica secondo le specifiche di cui sopra. In caso di fattura irregolare il termine di pagamento verrà sospeso dalla data di contestazione da parte della Stazione Appaltante.

Ogni pagamento è subordinato:

a) alla verifica della regolarità del documento fiscale (fattura) emesso dall'OE;

b) all'acquisizione del DURC dell'OE e di eventuali subappaltatori;

c) agli adempimenti di cui al presente Capitolato in favore dei subappaltatori e subcontraenti;

d) all'ottemperanza alle prescrizioni in materia di tracciabilità dei pagamenti;

e) all'accertamento, da parte della Stazione Appaltante, ai sensi dell'articolo 48-bis del d.P.R. 29 settembre 1973 n. 602, di eventuale inadempienza all'obbligo di versamento derivante dalla notifica di una o più cartelle di pagamento, per un ammontare complessivo pari almeno all'importo da corrispondere, con le modalità di cui al D.M. 18 gennaio 2008, n. 40.

In caso di inadempimento accertato, il pagamento è sospeso e la circostanza è segnalata all'agente della riscossione competente per territorio.

Ai sensi dell'art. 30, comma 6 del Codice dei Contratti, in caso di ritardo nel pagamento delle retribuzioni dovute al personale dipendente dell'OE, dei subappaltatori o dei soggetti titolari di cottimi, di cui all'art. 105, comma 18, ultimo periodo del Codice dei Contratti, il RUP invita per iscritto il soggetto inadempiente, ed in ogni caso l'OE, a provvedere entro 15 (quindici) giorni. Decorso infruttuosamente il suddetto termine senza che sia stata contestata formalmente e motivatamente la fondatezza della richiesta, la Stazione Appaltante provvede al pagamento, trattenendo una somma corrispondente ai crediti vantati dal personale dipendente dell'OE, dei subappaltatori o dei soggetti titolari di cottimi.

35. RITARDI NEI PAGAMENTI

Non sono dovuti interessi per i primi 45 giorni intercorrenti tra il verificarsi delle condizioni e delle circostanze per l'emissione del certificato di pagamento e la sua effettiva emissione e messa a disposizione della Stazione Appaltante per la liquidazione; trascorso tale termine, senza che sia emesso il certificato di pagamento, sono dovuti all'OE gli interessi legali per i primi 60 giorni di ritardo; trascorso infruttuosamente anche questo termine spettano all'OE gli interessi di mora.

Per il calcolo degli interessi moratori si prende a riferimento il Tasso B.C.E. di cui all'articolo 5, comma 2, del decreto legislativo 9 ottobre 2002, n. 231, maggiorato di 8 (otto) punti percentuali.

Il pagamento degli interessi avviene d'ufficio in occasione del pagamento, in acconto o a saldo, immediatamente successivo, senza necessità di domande o riserve; il pagamento dei predetti interessi prevale sul pagamento delle somme a titolo di esecuzione.

In nessun caso sono dovuti interessi moratori allorché il pagamento sia stato sospeso per effetto di carenze e/o inadempienze secondo quanto specificati nel presente Capitolato.

É facoltà dell'OE, trascorsi i termini di cui ai commi precedenti, oppure nel caso in cui l'ammontare delle rate di acconto non liquidato raggiunga il 15% dell'importo nettocontrattuale,

di agire ai sensi dell'articolo 1460 del Codice Civile, rifiutando di adempiere alle proprie obbligazioni se la Stazione Appaltante non provveda tempestivamente al pagamento integrale di quanto maturato; in alternativa, è facoltà dell'OE, previa costituzione in mora della Stazione Appaltante, promuovere il giudizio per la dichiarazione di risoluzione del contratto, trascorsi 60 giorni dalla data della predetta costituzione in mora.

Per il pagamento della rata di saldo in ritardo rispetto al termine stabilito per causa imputabile alla Stazione Appaltante, sulle somme dovute decorrono gli interessi legali.

La disciplina del presente articolo si applica sia ai pagamenti in acconto sia a saldo.

36. REVISIONE PREZZI E ADEGUAMENTO DEL CORRISPETTIVO

Si rimanda all'articolo 3.4 del documento <ETIC_WP6_0-A02 DISCIPLINARE DI GARA (DDG)>.

37. CESSIONE DEL CONTRATTO E CESSIONE DEI CREDITI

Ai sensi dell'articolo 105 del Codice dei Contratti, è vietata la cessione del Contratto sotto qualsiasi forma, ogni atto contrario è nullo di diritto. In caso di inadempimento da parte dell'OE degli obblighi di cui al presente comma, la Stazione Appaltante, fermo restando il diritto al risarcimento del danno, ha facoltà di risolvere di diritto il Contratto.

È ammessa la cessione dei crediti, ai sensi del combinato disposto dell'articolo 106, co. 13, del Codice dei Contratti Pubblici e della Legge 21 febbraio 1991 n. 52 a condizione che il cessionario sia un Istituto bancario o un Intermediario finanziario iscritto nell'apposito Albo presso la Banca d'Italia e che il Contratto di cessione, stipulato mediante atto pubblico o scrittura privata autenticata sia notificato alla Stazione Appaltante. La cessione è efficace e opponibile alla Stazione Appaltante qualora questa non la rifiuti con comunicazione da notificarsi al cedente e al cessionario entro quarantacinque giorni dalla notifica della cessione stessa. La Stazione Appaltante non accetta cessioni di credito per gli importi di Contratto relativi a prestazioni che

l'OE intende subappaltare. Il contratto di cessione, ancorché effettuato cumulativamente per più rapporti contrattuali, indica chiaramente gli estremi del contratto al quale la cessione si riferisce ed i singoli importi ceduti con riferimento ai relativi contratti e reca in ogni caso la clausola secondo cui la Stazione Appaltante ceduta può opporre al cessionario tutte le eccezioni opponibili al cedente in base al Contratto di appalto, pena l'automatica inopponibilità della cessione alla Stazione Appaltante.

Dall'atto di cessione dovrà desumersi l'entità del credito ceduto, il cessionario dello stesso, le modalità di pagamento ed i riferimenti bancari (codice IBAN) del cessionario medesimo. Il cessionario è tenuto a rispettare la normativa sulla tracciabilità di cui alla Legge 13 agosto 2010, n. 136. La Stazione Appaltante potrà opporre al cessionario tutte le eccezioni opponibilial cedente in forza del Contratto di appalto. In ogni caso, la cessione dei crediti dovrà avvenire secondo le modalità e le disposizioni normative suindicate.

38. GARANZIA PROVVISORIA

Ai sensi dell'articolo 93 comma 1 del Codice dei Contratti, agli offerenti è richiesta una cauzione provvisoria, con le modalità, alle condizioni e nei limiti riportate nel Disciplinare di gara a cui si rimanda.

39. GARANZIA DEFINITIVA

Ai sensi dell'articolo 103 del Codice dei Contratti, in caso di aggiudicazione dell'appalto, l'OE dovrà costituire una garanzia definitiva per l'esecuzione del Contratto, pari **al 10% (dieci per cento) dell'importo contrattuale** sotto forma di cauzione o fideiussione con le modalità di cui all'articolo 93, co. 2 e 3, del Codice dei Contratti, in favore della Stazione Appaltante, valida fino al certificato di verifica di conformità.

Ai sensi dell'articolo 103, co. 1, del Codice dei Contratti, in caso di aggiudicazione con ribassi superiori al dieci per cento la garanzia da costituire sarà aumentata di tanti punti percentuali

quanti sono quelli eccedenti il 10 per cento. Ove il ribasso sia superiore al venti per cento, l'aumento è di due punti percentuali per ogni punto di ribasso superiore al venti percento.

L'OE, pertanto, contestualmente alla sottoscrizione del Contratto, dovrà produrre la garanzia definitiva.

La garanzia dovrà essere conforme allo schema tipo di cui al Decreto Del Ministero Dello Sviluppo Economico del 16 settembre 2022, n. 193 (in Gazz. Uff., 14 dicembre 2022, n. 291) recante "*Regolamento contenente gli schemi tipo per le garanzie fideiussorie e le polizze assicurative di cui agli articoli 24, 35, 93, 103 e 104 del decreto legislativo 18 aprile 2016, n. 50, e successive modificazioni*".

La garanzia definitiva potrà essere utilizzata per le finalità stabilite dall'articolo 103, comma 2 del Codice dei Contratti Pubblici. L'incameramento della garanzia avviene con atto unilaterale della Stazione Appaltante senza necessità di dichiarazione giudiziale, fermo restando il diritto dell'OE di proporre azione innanzi l'autorità giudiziaria ordinaria. Costituisce inadempimento contrattuale rilevante, anche ai fini dello svincolo progressivo e sul saldo, la mancanza della regolarità retributiva e contributiva dell'OE e dei suoi subappaltatori desumibili dal DURC e/o da analoghe attestazioni rilasciate dagli istituti previdenziali.

Qualora la garanzia sia prestata con fideiussione con contratto formato e sottoscritto con modalità telematica, essa è sottoscritta digitalmente sia dal fideiussore che dall'OE.

Qualora il fideiussore rilasci copia del contratto con le modalità stabilite dal comma 2-bis dell'articolo 23 del Decreto legislativo 7 marzo 2005, n. 82 (Codice dell'amministrazione digitale), sarà cura dell'OE fornire, via PEC, il contratto munito di entrambe le firme digitali.

Lo svincolo della fideiussione è regolato dall'articolo 103, comma 5 del Codice dei Contratti.

La Stazione Appaltante richiede all'OE la reintegrazione della garanzia ove questa sia venuta meno in tutto o in parte; in caso di inottemperanza, la reintegrazione si effettua a valere sugli acconti da corrispondere all'OE. In caso di variazioni al Contratto per effetto di successivi atti di sottomissione, la medesima garanzia può essere ridotta in caso di diminuzione degli importi

contrattuali, mentre è integrata in caso di aumento degli stessi importi fino alla concorrenza di un quinto dell'importo originario.

Ai sensi dell'articolo 103 comma 10 del Codice dei Contratti Pubblici in caso di raggruppamenti temporanei le garanzie fideiussorie e le garanzie assicurative sono presentate, su mandato irrevocabile, dalla mandataria in nome e per conto di tutti i concorrenti ferma restando la responsabilità solidale tra le imprese.

40. OBBLIGHI ASSICURATIVI A CARICO DELL'OE

Ai sensi dell'articolo 24, co. 4, del Codice dei Contratti, l'OE dell'incarico dovrà essere munito della polizza di responsabilità civile professionale, di cui all'art. 5 del D.P.R. 7 agosto 2012, n. 137. Qualora l'OE sia una società, trasmette la polizza di assicurazione di cui all'art. 1, comma 148 della legge 4 agosto 2017 n. 124. La polizza delle associazioni di professionisti prevede espressamente la copertura assicurativa anche degli associati e dei consulenti.

Il soggetto incaricato della progettazione, contestualmente alla sottoscrizione del contratto, dovrà produrre una dichiarazione di una compagnia di assicurazioni autorizzata all'esercizio del ramo "responsabilità civile generale" nel territorio dell'Unione Europea, contenente l'impegno a rilasciare la polizza di responsabilità civile professionale con specifico riferimento ai lavori progettati. La polizza sopra detta e la dichiarazione d'impegno dovranno avere una copertura per un massimale non inferiore a: **€ 1.000.000,00 (unmilione/00 di euro).**

La polizza, oltre ai rischi di cui all'articolo 106, commi 9 e 10 del Codice dei Contratti, dovrà coprire anche i rischi derivanti da errori od omissioni nella redazione del progetto che possano determinare a carico della Stazione Appaltante nuove spese di progettazione e/o maggiori costi.

In caso di raggruppamento, la copertura assicurativa contro i rischi professionali dovrà essere soddisfatta dal raggruppamento nel complesso e, più specificamente, dovrà essere presentata un'unica polizza da parte della mandataria per il massimale indicato, con copertura estesa a tutti gli operatori del raggruppamento.

La polizza deve altresì coprire i danni causati da collaboratori, dipendenti e tirocinanti.

L'OE dovrà altresì produrre, contestualmente alla sottoscrizione del Contratto, o in ogni caso prima della data prevista per l'avvio dell'esecuzione una polizza assicurativa a copertura della responsabilità civile per infortunio o danni eventualmente da lui/loro stesso/i causati a persone e/o beni dell'OE medesimo, della Stazione Appaltante o di terzi (compresi dipendenti dell'OE e/o subappaltatore e/o subfornitore ovvero della Stazione Appaltante), nell'esecuzione delle attività di rilievo e di indagine, prove di laboratorio e di ogni attività di campo.

La polizza deve inoltre assicurare la Stazione Appaltante contro la responsabilità civile per infortunio e/o danni causati a persone e/o beni dell'OE medesimo, della Stazione Appaltante o di terzi (compresi dipendenti dell'OE e/o subappaltatore e/o subfornitore ovvero della Stazione Appaltante) nel corso dell'esecuzione. Pertanto, la garanzia deve essere stipulata nella forma «Contractors All Risks» (C.A.R.).

La polizza assicurativa è prestata da imprese bancarie o assicurative che rispondano ai requisiti di solvibilità previsti dalle leggi che ne disciplinano le rispettive attività o rilasciata dagli intermediari finanziari iscritti nell'albo di cui all'articolo 106 del decreto legislativo 1 settembre 1993, n. 385, che svolgono in via esclusiva o prevalente attività di rilascio di garanzie e che sono sottoposti a revisione contabile da parte di una società di revisione iscritta nell'albo previsto dall'articolo 161 del decreto legislativo 24 febbraio 1998, n. 58 e che abbiano i requisiti minimi di solvibilità richiesti dalla vigente normativa bancaria assicurativa.

La garanzia assicurativa di responsabilità civile per danni causati a terzi (R.C.T.) e quella per danni causati agli operai (R.C.O.) deve essere stipulata per una somma assicurata (massimale/sinistro) pari **ad euro € 500.000,00.** La polizza R.C.T./R.C.O. dovrà espressamente prevedere che tra i terzi assicurati devono essere ricompresi tutti i soggetti che a qualsiasi titolo e/o veste partecipino o presenzino al servizio, indipendentemente dalla natura del loro rapporto con l'OE, tra i quali rientrano, in via meramente esemplificativa e non esaustiva:

-il DEC, il RUP, gli amministratori, tutti i dirigenti, il personale dipendente, i preposti, il personale e i consulenti della Stazione Appaltante e chiunque, a qualsiasi titolo, intrattenga rapporti con i suddetti organi;

-tutto il personale dipendente dall'OE, per le lesioni corporali da questo subite in occasione di servizio;

-i titolari ed i dipendenti di eventuali subappaltatori, di tutte le Ditte e/o Imprese che partecipino, anche occasionalmente, all'esecuzione, nonché delle Ditte fornitrici;

-il pubblico e chiunque intrattenga rapporti con la Stazione Appaltante.

Se il contratto di assicurazione prevede importi o percentuali di scoperto o di franchigia:

-in relazione all'assicurazione contro tutti i rischi di esecuzione, tali franchigie o scoperti non sono opponibili alla Stazione Appaltante;

-in relazione all'assicurazione di responsabilità civile, tali franchigie o scoperti non sono opponibili alla Stazione Appaltante.

Le polizze assicurative dall'OE coprono senza alcuna riserva anche i danni causati dalle imprese subappaltatrici e subfornitrici.

Se l'OE è un raggruppamento temporaneo o un consorzio, giusto il regime delle responsabilità solidale disciplinato dall'articolo 48, comma 5, del Codice dei Contratti, la garanzia assicurativa è prestata dall'impresa mandataria in nome e per conto di tutti i concorrenti raggruppati o consorziati.

Le polizze di cui ai precedenti commi devono essere estese oltre che all'ipotesi di colpa grave dell'OE anche al caso di colpa lieve dell'OE stesso, e devono portare la dichiarazione di vincolo a favore della Stazione Appaltante. L'OE è tenuto allo scrupoloso rispetto di tutte le condizioni espresse dalle polizze ed a provvedere tempestivamente a tutti gli adempimenti dalle medesime richiesti per conseguire l'operatività in ogni circostanza.

In caso di sinistro l'OE ha l'obbligo di provvedere al reintegro delle somme assicurate.

In caso di proroga o di aggiornamento della somma assicurata l'OE dovrà trasmettere alla Stazione Appaltante l'aggiornamento corrispondente della polizza.

Le polizze decorreranno dalla data di inizio dell'incarico ed avranno termine con il rilascio del certificato di verifica di conformità. La mancata presentazione della polizza determinerà la decadenza dall'incarico e autorizzerà la sostituzione dell'affidatario.

41. VARIAZIONE DELLE PRESTAZIONI

Nessuna variazione può essere introdotta dall'esecutore di propria iniziativa, per alcun motivo, in difetto di autorizzazione della Stazione Appaltante, espressa esplicitamente ed esclusivamente da RUP e DEC, ed in nessun caso potrà vantare compensi, rimborsi o indennizzi per quanto eseguito in violazione di tale divieto.

La Stazione Appaltante si riserva la facoltà di introdurre varianti che a suo insindacabile giudizio ritenga opportune. Ove necessario, in caso di variazioni in aumento, all'OE sarà accordato un termine suppletivo, commisurato al tempo necessario all'esecuzione delle prestazioni oggetto di variante.

Non sono riconosciute prestazioni extracontrattuali di qualsiasi genere, eseguite senza preventivo ordine scritto del DEC, previa approvazione da parte della Stazione Appaltante ove questa sia prescritta dalla legge o dal Regolamento.

Qualunque reclamo o riserva deve essere presentato dall'OE per iscritto al DEC prima dell'esecuzione della variante o modifica oggetto della contestazione. In assenza di accordo preventivo prima dell'avvio delle prestazioni oggetto di modifica o variante, non sono prese, per qualsiasi natura o ragione, in considerazione domande di maggiori compensi su quanto stabilito in Contratto.

Non sono considerati varianti ai sensi del precedente comma 2 gli interventi autorizzati ai sensi dell'art. 106, comma 1 lettera e) del Codice dei Contratti, disposti dal RUP per risolvere aspetti di dettaglio, che siano contenuti entro un importo non superiore al 10% dell'importo del Contratto stipulato e purché non essenziali o non sostanziali ai sensi dell'art. 106, comma 4 del Codice dei Contratti.

La variante è accompagnata da un atto di sottomissione che l'OE è tenuto a sottoscrivere in segno di accettazione.

Come previsto dall'art. 106, comma 12 del Codice dei Contratti Pubblici, la Stazione Appaltante potrà sempre ordinare l'esecuzione in misura inferiore o superiore rispetto a quanto previsto nel Contratto, nel limite di un quinto dell'importo di Contratto stesso, agli stessi prezzi patti e condizioni del Contratto originario e senza che nulla spetti all'OE a titolo di indennizzo ad eccezione del corrispettivo relativo alle nuove prestazioni.

Ai fini della determinazione del quinto, l'importo dell'appalto è formato dalla somma risultante dal Contratto originario, aumentato dell'importo degli atti di sottomissione, degli atti aggiuntivi per varianti già intervenute nonché dell'ammontare per importi, diversi da quelli a titolo risarcitorio, eventualmente riconosciuti all'OE per transazioni e/o accordi bonari.

Ai sensi dell'art. 22, co. 4 del D.M. 7 marzo 2018, n. 49, nel caso in cui la Stazione Appaltante disponga variazioni in diminuzione nel limite del quinto dell'importo del Contratto, deve comunicarlo all'OE tempestivamente e comunque prima del raggiungimento del quarto quinto dell'importo contrattuale; in tal caso nulla spetta all'OE a titolo di indennizzo.

Durante l'esecuzione l'OE può proporre al DEC eventuali variazioni migliorative, nell'ambito del limite di cui al comma 5, se non comportano rallentamento o sospensione dell'esecuzione e non riducono o compromettono le prestazioni previste. Tali variazioni devono essere approvate dal RUP, che ne può negare l'approvazione senza necessità di motivazione diversa dal rispetto rigoroso delle previsioni poste a base di gara. Il relativo risparmio di spesa costituisce economia per metà a favore della Stazione Appaltante e per metà a favore dell'OE.

Il RUP ovvero, previa autorizzazione di quest'ultimo, il DEC, può disporre modifiche di dettaglio non comportanti aumento o diminuzione dell'importo contrattuale.

L'OE è obbligato a comunicare al RUP ogni eventuale modificazione soggettiva del Contratto con altro operatore in corso di esecuzione ai sensi dell'art. 106, co. 1, lett. d) del Codicedei Contratti, quali successioni per causa di morte o a seguito di ristrutturazioni societarie, comprese rilevazioni, fusioni, scissioni, acquisizioni o insolvenze. Sono comprese nelle ristrutturazioni societarie anche le cessioni e gli affitti d'azienda o di ramo d'azienda ed altre eventuali ulteriori e diverse vicende societarie legittime alla luce dell'ordinamento giuridico.

Per la verifica della sussistenza dei suddetti presupposti è fatto obbligo all'OE di comunicare preventivamente al RUP le suddette modifiche, documentando il possesso dei requisiti di qualificazione dell'operatore economico succeduto. In mancanza di tale comunicazione le modifiche non producono effetto nei confronti della Stazione Appaltante. A seguito della comunicazione ricevuta dall'OE, la Stazione Appaltante procede entro i 30 giorni successivi alle verifiche in merito al possesso dei requisiti di qualificazione, mancando i quali può opporsi alle modifiche di cui al presente comma. Decorsi i predetti termini senza che sia intervenuta opposizione, le modifiche di cui sopra producono i propri effetti nei confronti della Stazione Appaltante, fatto salvo quanto previsto dall'art, 88, co. 4-bis e 92, co. 3del Codice Antimafia.

42. SICUREZZA NEI LUOGHI DI LAVORO

Ai sensi del Testo Unico sulla salute e sicurezza sul lavoro, l'OE deve trasmettere alla Stazione Appaltante, entro il termine prescritto da quest'ultima con apposita richiesta e comunque prima della stipulazione del Contratto o, prima della redazione del verbale di avvio dell'esecuzione se questi sono iniziati nelle more della stipula del Contratto il DUVRI ed una dichiarazione di non essere destinatario di provvedimenti di sospensione o di interdizione di cui all'articolo 14 del predetto Testo Unico.

Sarà obbligo dell'OE di adottare nell'esecuzione dei servizi, le misure e le cautele necessarie a garantire la vita e la incolumità degli operai, delle persone addette al servizio e dei terzi, nonché ad evitare danni di qualunque natura a beni pubblici e privati.

L'OE è sottoposto a tutti gli obblighi, verso i propri dipendenti, risultanti dalle disposizioni legislative e regolamentari vigenti in materia di lavoro e di assicurazioni sociali ed assume a suo carico tutti gli oneri relativi.

Nell'esecuzione dell'appalto l'OE garantisce la piena osservanza degli obblighi in materia ambientale, sociale e del lavoro stabiliti dalla normativa europea e nazionale, dai contratti collettivi o dalle disposizioni internazionali elencate nell'Allegato X del Codice dei Contratti Pubblici.

L'OE, entro 30 (trenta) giorni dall'aggiudicazione e comunque entro 5 (cinque) giorni prima dall'inizio delle attività, dovrà consegnare tutti i documenti inerenti la sicurezza di competenza dello stesso, nel rispetto delle vigenti disposizioni legislative e regolamentari in materia di sicurezza.

Le gravi o ripetute violazioni delle norme inerenti la sicurezza sui luoghi di lavoro da parte dell'OE, previa formale costituzione in mora dell'interessato, costituiscono causa di risoluzione del Contratto.

La Stazione Appaltante rimane esonerata sin d'ora da ogni responsabilità per le conseguenze di eventuali infrazioni commesse dall'OE che fossero accertate durante l'esecuzione delle prestazioni oggetto del contratto.

43. SUBAPPALTO

Il subappalto è ammesso nel rispetto delle condizioni stabilite nel presente Capitolato, ed in conformità a quanto previsto dall'articolo 105 del Codice dei Contratti, come modificato dall'articolo 49 del decreto-Legge 31 maggio 2021, n.77, convertito con modificazioni dalla legge

29 luglio 2021, n. 108, nonché dall'articolo 31, co. 8,secondo periodo, del medesimo Codice dei Contratti Pubblici.

Il subappalto è ammesso, previa autorizzazione della Stazione Appaltante, su istanza dell'OE debitamente documentata, in conformità a quanto previsto nel presente Capitolato e in ogni caso nel rispetto della normativa vigente.

Si precisa che in relazione all'incarico di progettazione ai sensi dell'articolo 31, co. 8, del Codice dei Contratti, l'OE **non** può avvalersi del subappalto, fatta eccezione per indagini geologiche, geotecniche e sismiche, sondaggi, rilievi, misurazioni e picchettazioni, predisposizione di elaborati specialistici e di dettaglio, con esclusione delle relazioni geologiche, nonché per la sola redazione grafica degli elaborati progettuali. Resta, comunque, ferma la responsabilità esclusiva del progettista.

L'affidamento in subappalto è consentito, previa autorizzazione della Stazione Appaltante, subordinata all'acquisizione del DURC dell'OE e del DURC del subappaltatore, alle seguenti condizioni:

a) che il subappaltatore sia qualificato per l'esecuzione delle prestazioni;

b) che l'OE abbia indicato all'atto dell'offerta i servizi e le forniture o parti di servizie forniture che intende subappaltare; in caso di variazioni in corso di esecuzione tale indicazione deve essere fatta all'atto dell'affidamento;

c) che, almeno venti giorni prima della data di effettivo inizio dell'esecuzione delle relative prestazioni, l'OE provveda al deposito, presso la Stazione Appaltante:

   - di copia autentica del contratto di subappalto, in originale o copia autentica; tale contratto di subappalto sarà eventualmente sottoposto a condizione risolutiva, nel caso in cui, all'atto della consegna alla Stazione Appaltante, il Contratto di appalto non fosse ancora stato sottoscritto; dal contratto di subappalto devono risultare, pena rigetto dell'istanza o revoca dell'autorizzazione eventualmente rilasciata:

- l'inserimento delle clausole ai sensi dell'articolo 3, commi 1 e 9, della Legge 13 agosto 2010, n. 136;
- l'individuazione delle prestazioni affidate con i relativi importi, al fine della verifica della qualificazione del subappaltatore e del rilascio del certificato di esecuzione delle prestazioni;
- l'importo del costo della manodopera (comprensivo degli oneri previdenziali) ai sensi dell'articolo 105, comma 14, del Codice dei Contratti.

▪ di una dichiarazione circa la sussistenza o meno di eventuali forme di controllo o di collegamento, a norma dell'articolo 2359 del Codice civile, con l'impresa alla quale è affidato il subappalto o il cottimo; in caso di raggruppamento temporaneo, società di imprese o consorzio, analoga dichiarazione dev'essere fatta da ciascuna delle imprese partecipanti al raggruppamento, società o consorzio;

d) che l'OE unitamente al deposito del contratto di subappalto presso la Stazione Appaltante, ai sensi della lettera c., trasmetta alla Stazione Appaltante:

▪ la documentazione attestante che il subappaltatore è in possesso dei requisiti prescritti dalla normativa vigente per la partecipazione alle gare di lavori pubblici, in relazione alla categoria e all'importo dei lavori da realizzare in subappalto o in cottimo;

▪ una o più dichiarazioni del subappaltatore, rilasciate ai sensi degli articoli 46 e 47 del d.P.R. n. 445 del 2000, attestante il possesso dei requisiti di ordine generale e assenza delle cause di esclusione di cui all'articolo 80 del Codice dei Contratti;

e) che non sussista, nei confronti del subappaltatore, alcuno dei divieti previsti dall'articolo 67 del Codice antimafia; a tale scopo:

▪ se l'importo del subappalto è superiore ad euro 150.000, la condizione è accertata mediante acquisizione dell'informazione antimafia di cui all'articolo 91, co. 1, lettera c),

del Codice predetto, acquisita con le modalità di cui al successivo articolo 67, co. 2 o co. 3;

- il subappalto è vietato, a prescindere dall'importo dei relativi lavori, se per l'impresa subappaltatrice è accertata una delle situazioni indicate dagli articoli 84, co. 4, o 91, co. 7, del citato Codice.

In assenza della documentazione antimafia ed in assenza della verifica circa l'insussistenza delle cause di esclusione di cui all'art. 80 del Codice dei Contratti, il subappalto si intende concesso in pendenza di condizione risolutiva; qualora la documentazione antimafia così come i controlli a campione eseguiti risultino negativi, l'autorizzazione al subappalto si intende revocata.

Il mancato rispetto delle condizioni previste dalla normativa vigente per l'autorizzazione al subappalto e per l'esecuzione dello stesso preclude l'autorizzazione o ne comporta la revoca se è stata già emessa, e può costituire motivo di risoluzione del Contratto di appalto, secondo l'apprezzamento del RUP.

In caso di sub-contratti o sub-affidamenti che non sono subappalti ai sensi dell'articolo 105, comma 3 del Codice dei Contratti, stipulati per l'esecuzione dell'Appalto, devono essere comunicati al RUP prima dell'inizio della prestazione, dettagliando specificamente:

- il nome del sub-contraente;
- l'importo del sub-contratto;
- l'oggetto del lavoro, servizio o fornitura affidati;
- eventuali modifiche a tali informazioni avvenute nel corso del sub-contratto.

L'OE è, altresì, obbligato a comunicare alla Stazione Appaltante eventuali modifiche a tali informazioni avvenute nel corso del sub-contratto.

L'OE è, inoltre, tenuto a presentare alla Stazione Appaltante la seguente documentazione:

- dichiarazione del sub-contraente attestante la conformità delle attrezzature utilizzate;
- elenco del personale autorizzato;
- dichiarazione attestante il rispetto della normativa in materia di sicurezza e salute dei lavoratori;
- dichiarazione del sub-contraente, in ottemperanza agli obblighi di tracciabilità previsti dall'art. 3 della Legge 13 agosto 2010, n. 136.

Il subappalto deve essere autorizzato preventivamente dalla Stazione Appaltante in seguito a richiesta scritta dell'OE, nei termini che seguono:

- l'autorizzazione è rilasciata entro 30 giorni dal ricevimento della richiesta; tale termine può essere prorogato una sola volta per non più di 30 giorni, ove ricorrano giustificati motivi; trascorso il medesimo termine, eventualmente prorogato, senza che la Stazione Appaltante abbia provveduto, l'autorizzazione si intende concessa a tutti gli effetti se sono verificate tutte le condizioni di legge per l'affidamento del subappalto;
- per i subappalti di importo inferiore al 2% dell'importo contrattuale o di importo inferiore a 100.000 euro, i termini di cui alla lettera a) sono ridotti a 15 giorni.

Si applica l'articolo 105 comma 14 del Codice dei Contratti.

I servizi affidati in subappalto non possono essere oggetto di ulteriore subappalto, pertanto il subappaltatore non può subappaltare a sua volta le prestazioni.

In caso di inadempimento dell'OE agli obblighi di cui ai commi precedenti, la Stazione Appaltante può risolvere il Contratto principale, salvo il diritto al risarcimento del danno.

La Stazione Appaltante verifica che nei contratti sottoscritti con i subappaltatori e i sub-contraenti della filiera delle imprese a qualsiasi titolo interessate ai servizi, sia inserita, a pena di nullità assoluta, un'apposita clausola con la quale ciascuno di essi assume gli obblighi di tracciabilità dei flussi finanziari ai sensi della Legge 13 agosto 2010, n. 136.

Con riferimento alle prestazioni affidate in subappalto, il DEC svolge le seguenti funzioni:

- verifica la presenza sul luogo dell'esecuzione del Contratto delle imprese subappaltatrici autorizzate, nonché dei subcontraenti, che non sono subappaltatori, i cui nominativi sono stati comunicati alla Stazione Appaltante ai sensi dell'articolo 105, comma 2, del codice;
- controlla che i subappaltatori e i subcontraenti svolgano effettivamente la parte di prestazioni ad essi affidate, nel rispetto della normativa vigente e del contratto stipulato;
- registra le contestazioni dell'Esecutore sulla regolarità delle prestazioni eseguite dal subappaltatore e, ai fini della sospensione dei pagamenti all'esecutore, determina la misura della quota corrispondente alla prestazione oggetto di contestazione;
- provvede, senza indugio e comunque entro le ventiquattro ore, alla segnalazione al RUP dell'inosservanza, da parte dell'esecutore, delle disposizioni di cui all'articolo 105 del Codice.

In caso di ricorso all'istituto dell'avvalimento da parte dell'Esecutore, il DEC coadiuva il RUP nello svolgimento delle attività di verifica dei requisiti di capacità tecnica ai sensi dell'articolo 89, comma 9, del Codice.

Ai sensi dell'articolo 105, co. 1, del Codice dei Contratti, a pena di nullità, fatto salvo quanto previsto dall'articolo 106, comma 1, lettera d), il contratto non può essere ceduto, non può essere affidata a terzi l'integrale esecuzione delle prestazioni o lavorazioni oggetto del contratto di appalto, nonché la prevalente esecuzione delle lavorazioni relative al complesso delle categorie prevalenti e dei contratti ad alta intensità di manodopera.

44. RESPONSABILITÀ IN MATERIA DI SUBAPPALTO

Ai sensi dell'articolo 105, co. 8, del Codice dei Contratti, il contraente principale e il subcontraente sono responsabili in solido nei confronti della stazione appaltante in relazione alle prestazioni oggetto del contratto di subappalto.

L'OE resta in ogni caso responsabile nei confronti della Stazione Appaltante per l'esecuzione delle prestazioni oggetto di subappalto, sollevando la medesima da ogni pretesa dei subappaltatori o da richieste di risarcimento danni avanzate da terzi in conseguenza all'esecuzione di servizi subappaltati. L'OE si obbliga a manlevare e tenere indenne la Stazione Appaltante da qualsivoglia pretesa di terzi per fatti e colpe imputabili al subappaltatore o a suoi ausiliari. L'OE è solidalmente responsabile con il subappaltatore degli adempimenti, da parte di quest'ultimo, degli obblighi di sicurezza previsti dalla normativa vigente.

L'OE si obbliga a risolvere tempestivamente i contratti di subappalto qualora durante l'esecuzione degli stessi vengano accertati da Stazione Appaltante inadempimenti delle imprese subappaltatrici di rilevanza tale da giustificare la risoluzione, avuto riguardo all'interesse di Stazione Appaltante; in tal caso l'OE non avrà diritto ad alcun indennizzo da parte di Stazione Appaltante né al differimento dei termini di esecuzione del Contratto.

Il DEC e il RUP provvedono a verificare, ognuno per la propria competenza, il rispetto di tuttele condizioni di ammissibilità e di esecuzione dei contratti di subappalto.

Il subappalto non autorizzato comporta inadempimento contrattualmente grave ed essenziale anche ai sensi dell'articolo 1456 del Codice civile con la conseguente possibilità, per la Stazione Appaltante, di risolvere il Contratto in danno dell'OE.

L'OE dovrà provvedere a sostituire i subappaltatori relativamente ai quali apposita verifica abbia dimostrato la sussistenza dei motivi di esclusione di cui all'articolo 80 del Codice dei Contratti.

L'OE dovrà curare e garantire il coordinamento di tutti i subappaltatori, al fine di rendere gli specifici piani redatti dai singoli subappaltatori compatibili tra loro e coerenti con il piano presentato dall'OE. Nell'ipotesi di raggruppamento temporaneo o di consorzio, detto obbligo incombe al mandatario.

45. PAGAMENTO DEI SUBAPPALTATORI

Ad eccezione dei casi di cui all'articolo 105, commi 10 e 13 del Codice dei Contratti, la Stazione Appaltante non provvede al pagamento diretto dei subappaltatori, in relazione alle somme ad essi dovute per le prestazioni effettuate.

In ogni caso, l'OE è obbligato a trasmettere alla stessa Stazione Appaltante, entro 20 (venti) giorni dalla data di ciascun pagamento effettuato a proprio favore, copia delle fatture quietanzate relative ai pagamenti da esso corrisposti ai medesimi subappaltatori, con l'indicazione della parte delle prestazioni effettivamente eseguite dai subappaltatori e i relativi importi, pena la sospensione dei successivi pagamenti.

La stessa disciplina si applica in relazione alle somme dovute agli esecutori in subcontratto le cui prestazioni sono pagate in base allo stato di avanzamento dell'esecuzione.

Gli eventuali pagamenti effettuati direttamente dalla Stazione Appaltante al subappaltatore sono subordinati all'acquisizione del DURC dell'OE e del subappaltatore e all'ottemperanza alle prescrizioni in materia di tracciabilità dei pagamenti stabiliti dal presente Capitolato.

Se l'OE non provvede agli adempimenti di cui al comma 2, la Stazione Appaltante sospende l'erogazione delle rate di acconto o di saldo fino a che perdura l'inadempimento.

L'OE è responsabile in solido con il subappaltatore in relazione agli obblighi retributivi e contributivi, ai sensi dell'articolo 29 del decreto legislativo 10 settembre 2003, n.276. Nelle ipotesi di cui al comma 13, lettere a) e c), dell'articolo 105 del Codice dei contratti l'OE è liberato dalla responsabilità solidale di cui al primo periodo.

L'OE è tenuto ad osservare integralmente il trattamento economico e normativo stabilito dai contratti collettivi nazionale e territoriale in vigore per il settore e per la zona nella quale si eseguono le prestazioni. E', altresì, responsabile in solido dell'osservanza delle norme anzidette da parte dei subappaltatori nei confronti dei loro dipendenti per le prestazioni rese nell'ambito del subappalto.

L'OE e, per suo tramite, i subappaltatori, trasmettono alla Stazione Appaltante prima dell'inizio dell'esecuzione la documentazione di avvenuta denunzia agli enti previdenziali, assicurativi e antinfortunistici.

In caso di ritardo nel pagamento delle retribuzioni dovute al personale dipendente dell'OE o del subappaltatore o dei soggetti titolari di subappalti e cottimi, nonché in caso di inadempienza contributiva risultante dal DURC, si applicheranno le disposizioni di cui all'articolo 30, commi 5 e 6 del Codice dei contratti.

Nel caso di formale contestazione delle richieste di cui al comma precedente, il RUP inoltrerà le richieste e delle contestazioni alla Direzione Provinciale del Lavoro per i necessari accertamenti.

La Stazione Appaltante può opporre al subappaltatore le eccezioni al pagamento costituite dall'assenza di una o più d'una delle condizioni di cui sopra, nonché l'esistenza di contenzioso formale dal quale risulti che il credito del subappaltatore non è assistito da certezza ed esigibilità, anche con riferimento all'articolo 1262, primo comma, del Codice civile.

46. ACCORDO BONARIO

Si può ricorrere all'accordo bonario ai sensi dell'art. 206 del Codice dei contratti quando insorgano controversie in fase di esecuzione del Contratto circa l'esatta esecuzione delleprestazioni dovute. Si applica per quanto compatibile la disciplina dell'art. 205 del Codice dei contratti.

Ai sensi dell'articolo 208 del Codice dei Contratti, anche al di fuori dei casi in cui è previsto il ricorso all'accordo bonario ai sensi del comma precedente, le controversie relative a diritti soggettivi derivanti dall'esecuzione del Contratto possono sempre essere risolte mediante atto di transazione, in forma scritta a pena di nullità, nel rispetto del Codice Civile, solo ed esclusivamente nell'ipotesi in cui non risulti possibile esperire altri rimedi alternativi all'azione giurisdizionale.

In conformità a quanto previsto dall'art. 6 del DL n. 76/2020, prima dell'avvio dell'esecuzione, o comunque non oltre dieci giorni da tale data, sarà costituito un collegio consultivo tecnico per la

rapida risoluzione delle controversie o delle dispute tecniche di ogni natura suscettibili di insorgere nel corso dell'esecuzione del Contratto stesso.

Per la disciplina del collegio consultivo tecnico si rinvia a quanto disposto dall'art. 6 del DL n. 76/2020 e dalle "*Linee guida per l'omogenea applicazione da parte delle stazioni appaltanti delle funzioni del collegio consultivo tecnico di cui agli articoli 5 e 6 del decreto-legge 16 luglio 2020 n. 76, convertito, con modificazioni, dalla legge 11 settembre 2020, n. 120 e all'art. 51 del decreto-legge 31 maggio 2021 n. 77, convertito, con modificazioni, dalla legge 29 luglio 2021, n. 108*".

47. DEFINIZIONE DELLE CONTROVERSIE E FORO COMPETENTE

Ove non si proceda all'accordo bonario e salvo e impregiudicato quanto previsto al precedente articolo con riferimento al Collegio consultivo tecnico e nella normativa in esso richiamata, per qualunque controversia relativa al contratto che sarà stipulato con l'operatore economico aggiudicatario sarà competente, in via esclusiva, il Foro di Roma.

È esclusa la competenza arbitrale.

La decisione dell'Autorità giudiziaria sulla controversia dispone anche in ordine all'entità delle spese di giudizio e alla loro imputazione alle parti, in relazione agli importi accertati, al numero e alla complessità delle questioni.

48. CONTRATTI COLLETTIVI E DISPOSIZIONI SULLA MANODOPERA

L'OE è tenuto all'esatta osservanza di tutte le leggi, regolamenti e norme vigenti in materia, nonché eventualmente entrate in vigore nel corso del Contratto, e in particolare:

a) nell'esecuzione delle prestazioni che formano oggetto d'appalto, l'OE si obbliga ad applicare integralmente il contratto collettivo nazionale di lavoro di settore e gli accordi

locali e aziendali integrativi dello stesso, in vigore per il tempo e nella località incui si svolgono i servizi;

b) i suddetti obblighi vincolano l'OE anche se non è aderente alle Associazioni stipulanti o receda da esse e indipendentemente dalla natura industriale o artigiana, dalla struttura o dalle dimensioni dell'impresa stessa e da ogni altra sua qualificazione giuridica;

c) è responsabile in rapporto alla Stazione Appaltante dell'osservanza delle norme anzidette da parte degli eventuali subappaltatori nei confronti dei rispettivi dipendenti, anche nei casi in cui il contratto collettivo non disciplini l'ipotesi del subappalto; il fatto che il subappalto non sia stato autorizzato non esime l'OE dalla responsabilità, e ciò senza pregiudizio degli altri diritti della Stazione Appaltante;

d) è obbligato al regolare assolvimento degli obblighi contributivi in materia previdenziale, assistenziale, antinfortunistica e in ogni altro ambito tutelato dalle leggi speciali.

Ai sensi dell'articolo 30, comma 6, e 105, commi 10 e 11 del Codice dei Contratti Pubblici, in caso di ritardo immotivato nel pagamento delle retribuzioni dovute al personale dipendente dell'OE o dei subappaltatori, il RUP invita per iscritto il soggetto inadempiente, ed in ogni caso l'OE, a provvedervi entro i successivi quindici giorni. Ove non sia stata contestata formalmente e motivatamente la fondatezza della richiesta entro il termine sopra assegnato, la Stazione Appaltante paga anche in corso d'opera direttamente ai lavoratori le retribuzioni arretrate, detraendo il relativo importo dalle somme dovute all'OE ovvero dalle somme dovute al subappaltatore inadempiente nel caso in cui sia previsto il pagamento diretto.

Ai sensi dell'articolo 30, comma 5, del Codice dei Contratti, in caso di inadempienza contributiva risultante dal DURC relativo a personale dipendente dell'OE o del subappaltatore o dei soggetti titolari di subcontratti, impiegato nell'esecuzione del Contratto, la Stazione Appaltante trattiene dai pagamenti l'importo corrispondente all'inadempienza per il successivo versamento diretto agli enti previdenziali e assicurativi.

Ai sensi dell'articolo 30, comma 5bis, del Codice dei Contratti, sull'importo netto progressivo delle prestazioni è operata una ritenuta dello 0,50 per cento; le ritenute possono essere svincolate soltanto in sede di liquidazione del saldo, dopo l'approvazione da parte della Stazione Appaltante del Certificato di verifica di conformità, previa acquisizione del DURC.

In ogni momento il DEC e, per suo tramite, il RUP, possono richiedere all'OE e ai subappaltatori copia del libro unico del lavoro di cui all'articolo 39 del decreto-legge 25 giugno 2008, n. 112 convertito con modificazioni dalla L. 6 agosto 2008, n. 133, possono altresì richiedere i documenti di riconoscimento al personale presente sul luogo di esecuzione e verificarne la effettiva iscrizione nel predetto libro unico dell'OE o del subOE autorizzato.

49. DOCUMENTO UNICO DI REGOLARITÀ CONTRIBUTIVA

La stipula del Contratto, l'erogazione di qualunque pagamento, la stipula di eventuali atti di sottomissione o di appendici contrattuali, il rilascio delle autorizzazioni al subappalto, il certificato di verifica di conformità, sono subordinati all'acquisizione del DURC dell'OE.

Ai sensi dell'articolo 31, commi 4 e 5, del decreto legge 21 giugno 2013, n. 69, convertito dalla legge 9 agosto 2013, n. 98, dopo la stipula del Contratto il DURC è acquisito ogni 120 (centoventi) giorni, oppure in occasione del primo pagamento se anteriore a tale termine; il DURC ha validità di 120 (centoventi) giorni e nel periodo di validità può essere utilizzato esclusivamente per il pagamento dell'anticipazione, delle rate di acconto e per il certificato diverifica di conformità o di regolare esecuzione. Per il pagamento del saldo finale è in ogni caso necessaria l'acquisizione di un nuovo DURC.

Ai sensi dell'articolo art. 30, comma 5, del Codice dei Contratti pubblici e dell'articolo 31, comma 3, del decreto-legge 21 giugno 2013, n.69, convertito dalla legge 9 agosto 2013, n.98, in caso di ottenimento del DURC che segnali un inadempimento contributivo relativo a uno o più soggetti impiegati nell'esecuzione del Contratto, in assenza di regolarizzazione tempestiva, la Stazione Appaltante:

- chiede tempestivamente ai competenti Enti previdenziali e assicurativi la quantificazione dell'ammontare delle somme che hanno determinato l'irregolarità, se tale ammontare non risulti già dal DURC;
- trattiene un importo corrispondente all'inadempimento sulle rate di acconto e sulla rata di saldo;
- corrisponde direttamente agli Enti previdenziali e assicurativi, quanto dovuto per gli inadempimenti accertati mediante il DURC, in luogo dell'OE e dei subappaltatori;
- provvede alla liquidazione delle rate di acconto e della rata di saldo, limitatamente alla eventuale disponibilità residua.

Nel caso il DURC relativo al subappaltatore sia negativo per due volte consecutive, la Stazione Appaltante contesta gli addebiti al subOE assegnando un termine non inferiore a 15 (quindici) giorni per la presentazione delle controdeduzioni; in caso di assenza o inidoneità di queste la Stazione Appaltante pronuncia la decadenza dell'autorizzazione al subappalto.

50. RISOLUZIONE DEL CONTRATTO – ESECUZIONE D'UFFICIO

Anche ai sensi dell'art. 108, comma 1, del Codice dei Contratti pubblici, la Stazione Appaltante ha facoltà di risolvere il Contratto, durante il periodo di efficacia dello stesso, senza ulteriori adempimenti nei seguenti casi:

a) al verificarsi della necessità di modifiche o varianti qualificate come sostanziali dall'articolo 106, comma 4, del Codice dei Contratti, che avrebbero richiesto una nuova procedura di appalto o eccedenti i limiti o in violazione delle condizioni stabilite dal presente Capitolato;

b) con riferimento alle modificazioni di cui all'articolo 106, comma 1, lettere b) e c) sono state superate le soglie di cui al comma 7 del predetto articolo; con riferimento alle modificazioni

di cui all'articolo 106, comma 1, lettera e) del predetto articolo, sono state superate le soglie stabilite dalla Stazione Appaltante; con riferimento alle modificazioni di cui all'articolo 106, comma 2, sono state superate le soglie di cui al medesimo comma 2, lettere a) e b);

c) all'accertamento della circostanza secondo la quale l'OE, al momento dell'aggiudicazione, ricadeva in una delle condizioni ostative all'aggiudicazione previste dall'articolo 80, comma 1, del Codice dei Contratti, per la presenza di una misura penale definitiva di cui alla predetta norma;

d) all'accertamento della circostanza secondo la quale l'appalto non avrebbe dovuto essere aggiudicato in considerazione di una grave violazione degli obblighi derivanti dai Trattati, come riconosciuto dalla Corte di giustizia dell'Unione europea in un procedimento ai sensi dell'articolo 258 TFUE.

e) inadempimenti che abbiano comportato l'applicazione di penali per un importo complessivo superiore al 20% dell'importo contrattuale;

f) inadempimento agli obblighi di tracciabilità previsti nel paragrafo di riferimento del presente Capitolato;

Anche ai sensi dell'articolo 108, comma 2, del Codice dei Contratti costituiscono sempre e in ogni caso causa di risoluzione del Contratto:

a) la perdita dei requisiti di qualificazione dell'OE per aver prodotto falsa documentazione o dichiarazioni mendaci;

b) il sopravvenire nei confronti dell'OE di un provvedimento definitivo che dispone l'applicazione di una o più misure di prevenzione di cui al Codice antimafia e delle relative misure di prevenzione, oppure sia intervenuta una sentenza di condanna passata in giudicato per i reati di cui all'articolo 80 del Codice dei Contratti;

c) inadempimento alle disposizioni contrattuali o del DEC riguardo ai tempi di esecuzione o quando risulti accertato il mancato rispetto delle ingiunzioni o diffide fattegli, nei termini imposti dagli stessi provvedimenti;

d) manifesta incapacità o inidoneità, anche solo legale, nell'esecuzione delle prestazioni;

e) quando l'OE si rendesse colpevole di grave errore professionale o quando interrompesse l'esecuzione del Contratto, anche se in presenza di contestazioni;

f) quando l'OE modificasse la composizione del Gruppo di Progettazione indicato in Offerta, salvo nei casi dovuti ad impedimenti non riconducibili a colpa dell'OE stesso o da questi non prevedibili;

g) quando l'OE non sostituisse i componenti del Gruppo di Progettazione qualora ciò sia richiesto dalla Stazione Appaltante;

h) inadempimento accertato alle norme di legge sulla prevenzione degli infortuni, la sicurezza sul lavoro e le assicurazioni obbligatorie del personale;

i) sospensione delle prestazioni o mancata ripresa delle stesse da parte dell'OE senza giustificato motivo in misura tale da pregiudicare la realizzazione delle prestazioni nei termini previsti dal Contratto;

j) rallentamento delle prestazioni, senza giustificato motivo, in misura tale da pregiudicare la realizzazione delle prestazioni nei termini previsti dal Contratto;

k) associazione in partecipazione, cessione anche parziale del Contratto o violazione di norme sostanziali regolanti il subappalto, subappalto abusivo fatta salva, in quest'ultimo caso l'applicazione delle sanzioni previste dall'articolo 2 quinques della L. n. 726/1982;

l) la scarsa diligenza nell'ottemperamento alle prescrizioni del RUP e/o degli organi competenti al rilascio delle dovute necessarie autorizzazioni;

m) non rispondenza dei servizi alle specifiche di Contratto e allo scopo dello stesso;

n) errori materiali nella progettazione e/o mancato rispetto della normativa applicabile;

o) mancato rispetto della normativa sulla sicurezza e la salute dei lavoratori di cui al Testo Unico in materia di tutela della salute e della sicurezza nei luoghi di lavoro, e delle ingiunzioni fattegli al riguardo dal Direttore dell'esecuzione o dal RUP;

p) azioni o omissioni finalizzate ad impedire l'accesso al cantiere al personale ispettivo del Ministero del lavoro e della previdenza sociale o dell'ASL, oppure del personale ispettivo degli organismi paritetici, di cui all'articolo 51 del Testo Unico in materia di tutela della salute e della sicurezza nei luoghi di lavoro;

q) violazione delle prescrizioni in materia di tracciabilità dei pagamenti, in applicazione delle disposizioni di cui al presente Capitolato, fermo restando quanto previsto al medesimo articolo 66, co. 2, ultimo capoverso, del Capitolato medesimo;

r) applicazione di una delle misure di sospensione dell'attività irrogate ai sensi dell'articolo 14, co. 1, del Testo Unico in materia di tutela della salute e della sicurezza nei luoghi di lavoro ovvero l'azzeramento del punteggio per la ripetizione di violazioni in materia di salute e sicurezza sul lavoro ai sensi dell'articolo 27, co. 1-bis, del citato Testo Unico;

s) ottenimento del DURC negativo per due volte consecutive; in tal caso il RUP, acquisita una relazione particolareggiata predisposta dal Direttore dell'esecuzione, contesta gli addebiti e assegna un termine non inferiore a 15 (quindici) giorni per la presentazione delle controdeduzioni; in caso di assenza o inidoneità di queste propone alla Stazione Appaltante la risoluzione del Contratto, ai sensi dell'articolo 108 del Codice dei Contratti;

t) azioni o omissioni finalizzate ad impedire il controllo al personale ispettivo del Ministero del lavoro e della previdenza sociale o dell'A.S.L. competente, oppure del personale ispettivo degli organismi paritetici di cui all'articolo 51 del Testo Unico sulla salute e sicurezza sul lavoro.

Quando il DEC accerta un grave inadempimento alle obbligazioni contrattuali da parte dell'OE, tale da comprometterne la buona riuscita delle prestazioni, invia al RUP una relazione particolareggiata, corredata dei documenti necessari, indicando lo stato di esecuzione, il cui importo può essere riconosciuto all'OE.

Lo stesso DEC formula, altresì, la contestazione degli addebiti all'OE, assegnando un termine non inferiore a quindici giorni per la presentazione delle proprie controdeduzioni al RUP. Acquisite e valutate negativamente le predette controdeduzioni, ovvero scaduto il termine senza che l'OE abbia risposto, la Stazione Appaltante su proposta del RUP dichiara risolto il Contratto.

Qualora, al di fuori di quanto previsto al comma precedente, l'esecuzione delle prestazioni ritardi per negligenza dell'OE rispetto alle previsioni del Contratto, il DEC gliassegna un termine, che, salvo i casi d'urgenza, non può essere inferiore a 10 giorni, entro i quali l'OE deve eseguire le prestazioni. Scaduto il termine assegnato, e redatto processo verbale in contraddittorio con l'OE, qualora l'inadempimento permanga, la Stazione Appaltante risolve il Contratto, fermo restando il pagamento delle penali.

Nel caso di risoluzione del Contratto l'OE ha diritto soltanto al pagamento delle prestazioni regolarmente eseguite, decurtato degli oneri aggiuntivi derivanti dallo scioglimento del Contratto.

Nel caso di risoluzione del Contratto per fallimento dell'OE, i rapporti economici con quest'ultimo o con il curatore sono definiti, con salvezza di ogni diritto e ulteriore azione della Stazione Appaltante, nel seguente modo:

a) affidando ad altro Soggetto, ai sensi dell'articolo 110 del Codice dei contratti o, in caso di indisponibilità di altro Soggetto, ponendo a base d'asta del nuovo affidamento ai sensi dell'ordinamento vigente l'importo lordo per il completamento dei servizi e di quelli da eseguire d'ufficio in danno, risultante dalla differenza tra l'ammontare complessivo lordo dei servizi posti a base d'asta dell'appalto originario, eventualmente incrementato in corso d'opera per effetto di eventuali atti di sottomissione, e l'ammontare lordo dei servizi eseguiti dall'OE inadempiente medesimo;

b) ponendo a carico dell'OE inadempiente:

1. l'eventuale maggiore costo come sopra calcolato;
2. l'eventuale maggiore costo derivato dalla ripetizione della gara di appalto eventualmente andata deserta, necessariamente effettuata con importo a base d'asta opportunamente maggiorato;
3. l'eventuale maggiore onere per la Stazione Appaltante per effetto della tardata ultimazione dei servizi, delle nuove spese di gara e di pubblicità, delle maggiori spese tecniche, assistenza, contabilità e verifica di conformità, dei maggiori interessi per il finanziamento dell'intervento, di ogni eventuale maggiore e diverso danno documentato, conseguente alla mancata tempestiva esecuzione del servizio alla data prevista dal Contratto originario.

Qualora nel corso dell'esecuzione del servizio per esigenze sopravvenute, al momento non prevedibili, l'INFN non ritenesse di proseguire nella esecuzione del servizio il contratto sarà risolto, fermo restando il corrispettivo dovuto per le prestazioni rese, detratte eventuali penalità.

51. ATTIVITÀ DI VERIFICA

La documentazione conclusiva dello Studio verrà sottoposta all'attività di verifica di conformità di cui all'articolo 102 del Codice dei Contratti Pubblici; detta verifica sarà eseguita da un soggetto o una Commissione individuata da INFN e potrà anche essere effettuata da un Soggetto accreditato ai sensi del comma 6 dell'art. 26 del Codice dei Contratti Pubblici, e potrà essere in corso d'opera.

Restano a carico dell'OE, senza nessun onere per la Stazione Appaltante, tutte le modifiche che si renderanno necessarie per la conclusione positiva di tale verifica.

Le attività di verifica avranno luogo ai sensi dell'art.102 del Codice dei contratti, in contraddittorio con l'OE e saranno finalizzate, per il livello di progettazione di riferimento, e per le diverse configurazioni, all'accertamento:

- della completezza dello Studio;
- della coerenza degli aspetti economici in tutti i suoi aspetti e con il valore reale di mercato;
- della conformità con i principi del DNSH;
- dei presupposti per i successivi livelli di progettazione e per la realizzabilità dell'opera;
- dei presupposti per i successivi ottenimenti di autorizzazioni;
- dei presupposti per la durabilità dell'opera nel tempo;
- che tutti i documenti siano stati consegnati sia nel formato editabile, sia nel formato pdf, sia in formato cartaceo;
- che tutti i documenti siano firmati dal sia Responsabile della integrazione delle prestazioni specialistiche e sia dai rispettivi specialisti.

All'esito positivo del processo di verifica di conformità di cui sopra, con la consegna degli elaborati progettuali opportunamente rivisti, modificati ed integrati, potrà essere emesso il certificato di pagamento a saldo da parte del RUP.

52. ULTIMAZIONE DELLE PRESTAZIONI

Alla consegna dello Studio, così come modificato ed integrato ai fini degli esiti positivi della verifica, alla ultimazione di tutte le prestazioni incluse nella offerta tecnica, a fronte della comunicazione scritta dell'OE di intervenuta ultimazione delle prestazioni, il DEC effettuati i necessari accertamenti in contraddittorio, elaborerà tempestivamente il Certificato di

ultimazione delle prestazioni e lo invierà al RUP che, al buon esito, ne rilascerà copia conforme all'OE.

Per il periodo intercorrente tra l'ultimazione dei servizi e l'approvazione del certificato di verifica di conformità, salve le maggiori responsabilità sancite all'art. 1669 del Codice civile, l'OE sarà garante delle prestazioni eseguite.

53. TRACCIABILITÀ DEI FLUSSI FINANZIARI

Ai sensi dell'articolo 3, commi 1 e 7, della Legge 13 agosto 2010, n. 136, l'OE, i subappaltatori e i subcontraenti della filiera delle imprese, devono comunicare alla Stazione Appaltante gli estremi identificativi dei conti correnti dedicati, anche se non in via esclusiva, alle commesse pubbliche, accesi presso banche o presso Poste italiane S.p.A., prima della stipula del Contratto oppure entro 7 (sette) giorni dalla loro accensione se successiva, comunicando altresì negli stessi termini le generalità e il codice fiscale delle persone delegate ad operare sui predetti conti. L'obbligo di comunicazione è esteso anche ad ogni successiva modificazione delle informazioni fornite in precedenza. In assenza delle predette comunicazioni la Stazione Appaltante sospende i pagamenti e non decorrono i termini legali per l'applicazione degli interessi e per la richiesta di risoluzione del Contratto.

Tutti i movimenti finanziari relativi all'appalto:

a) per pagamenti a favore dell'OE, o comunque di soggetti che eseguono prestazioni, forniscono beni o erogano servizi in relazione all'intervento, devono avvenire mediante bonifico bancario o postale, ovvero altro mezzo che sia ammesso dall'ordinamento giuridico in quanto idoneo ai fini della tracciabilità;

b) i pagamenti di cui alla precedente lettera a) devono avvenire in ogni caso utilizzando i conti correnti dedicati di cui al comma 1;

c) i pagamenti destinati a dipendenti, consulenti e fornitori rientranti tra le spese generali devono essere eseguiti tramite i conti correnti dedicati di cui al comma 1, per il totale dovuto, anche se non riferibile in via esclusiva all'esecuzione dell'appalto.

Ogni pagamento effettuato con bonifico bancario o postale deve riportare, in relazione a ciascuna transazione, il CIG e il CUP dell'appalto.

Fatte salve le sanzioni amministrative pecuniarie di cui all'articolo 6 della Legge 13 agosto 2010, n. 136:

a) la violazione delle prescrizioni di cui al comma 2, lettera a), costituisce causa di risoluzione del Contratto ai sensi dell'articolo 3, comma 9-bis, della citata Legge 13 agosto 2010, n. 136;

b) la violazione delle prescrizioni di cui al comma 2, lettere b) e c), o al comma 3, se reiterata per più di una volta, costituisce causa di risoluzione del Contratto.

I soggetti di cui al comma 1 che hanno notizia dell'inadempimento della propria controparte agli obblighi di tracciabilità finanziaria, di cui all'art. 3 della citata Legge 13 agosto 2010, n. 136, ne danno immediata comunicazione alla Stazione Appaltante e alla Prefettura-Ufficio Territoriale del Governo territorialmente competente.

Le clausole di cui al presente articolo devono essere obbligatoriamente riportate nei contratti sottoscritti con i subappaltatori e i subcontraenti della filiera delle imprese a qualsiasi titolo interessate all'intervento ai sensi del comma 2, lettera a); in assenza di tali clausole i predetti contratti sono nulli senza necessità di declaratoria.

54. DISCIPLINA ANTIMAFIA

Ai sensi del decreto legislativo 6 settembre 2011, n. 159, per l'OE non devono sussistere gli impedimenti all'assunzione del rapporto contrattuale previsti dagli articoli 6 e 67 del citato decreto legislativo, in materia antimafia; a tale fine devono essere assolti gli adempimenti di cui

al comma 2. In caso di raggruppamento temporaneo tali adempimenti devono essere assolti da tutti gli operatori economici raggruppati e consorziati; in caso di consorzio stabile devono essere assolti dal consorzio e dai consorziati indicati per l'esecuzione.

La stipula del contratto è subordinata al rilascio della informativa liberatoria provvisoria ai sensi dell'articolo 3, co. 2 del decreto-legge 16 luglio 2010, n. 76, convertito con modificazioni dalla legge 11 settembre 2020, n. 120, (come modificato dall'articolo 51, co. 1, lett. c), sub 2, del D.L. n. 77/2021), a condizione che non emergano nei confronti dei soggetti sottoposti alle verifiche antimafia le situazioni di cui agli articoli 67 e 84, co. 4, lett. a), b) e c), del decreto legislativo 6 settembre 2011, n. 159. La stipulazione avviene sotto condizione risolutiva, ferme restando le ulteriori verifiche ai fini del rilascio della documentazione antimafia da completarsi entro sessanta giorni.

55. PROPRIETÀ DEL PROGETTO

I diritti di proprietà e/o di utilizzazione e sfruttamento economico di tutti i prodotti previsti generati dall'OE, dai suoi Dipendenti e Collaboratori nell'ambito o in occasione di tutto quanto dell'esecuzione del presente Appalto rimarranno di titolarità esclusiva della Stazione Appaltante che potrà, quindi, disporne, senza alcuna restrizione, la pubblicazione, la diffusione, l'utilizzo, la duplicazione e la cessione anche parziale.

La Stazione Appaltante potrà liberamente disporre degli elaborati dello Studio anche modificandoli e/o facendoli eseguire ad altro Operatore Economico, senza che l'OE possa sollevare obiezioni, eccezioni o rivendicazioni di sorta.

Gli elaborati e quanto altro prodotto nel corso del servizio inerente al contratto e ad eventuali integrazioni, con la liquidazione del relativo corrispettivo all'OE, resteranno di proprietà piena e assoluta della Stazione Appaltante, il quale potrà, a suo insindacabile giudizio, darne o meno esecuzione, come anche introdurvi, nel modo e con i mezzi che riterrà più opportuni tutte quelle varianti e aggiunte che saranno riconosciute necessarie, senza che l'OE possa sollevare eccezione

di sorta, purché tali modifiche non vengano in alcun modo attribuite all'OE medesimo e non comportino altresì uno stravolgimento sostanziale dello Studio approvato.

L'OE si riserva di tutelare, in ogni caso, il proprio prestigio e la propria dignità professionale e, laddove ne ricorrano i presupposti, i propri diritti d'autore ai sensi della legge 633/41.

La Stazione Appaltante potrà pubblicare qualsiasi disegno, immagine o altro documento preparato da o per l'OE in relazione alle opere oggetto del presente incarico, con obbligo di chiara indicazione del nominativo e dei dati dell'OE stesso.

56. OBBLIGO DI RISERVATEZZA E TUTELA DEI DATI

Tutta la documentazione relativa o connessa allo Studio e tutte le informazioni inerenti sono da considerarsi strettamente riservate e l'OE non potrà darne comunicazione a terzi, per nessuna ragione, senza l'autorizzazione della Stazione Appaltante o farne alcun uso proprio, a esclusione di quanto relativo all'esecuzione delle attività previste dal Contratto, né in fase di Contratto, né successivamente alla conclusione delle obbligazioni contrattuali.

L'OE è tenuto ad adottare tutti i provvedimenti per garantire che tale riservatezza sia rispettata da tutti i propri responsabili, preposti, dipendenti, collaboratori e consulenti diqualsiasi tipo.

Detto obbligo non concerne i dati che siano o divengano di pubblico dominio nonché le idee, le metodologie. L'OE s'impegna a far si che nel trattare dati, informazioni e conoscenze dell'INFN, di cui venga eventualmente in possesso, vengano adottate le necessarie ed idonee misure di sicurezza e impiegate modalità di trattamento che non compromettano in alcun modo il carattere della riservatezza o arrechino altrimenti danno.

Le informazioni, i dati e le conoscenze riservate non potranno essere copiate o riprodotte in tutto o in parte, se non per esigenze operative, strettamente connesse allo svolgimento delle attività di cui all'oggetto dell'appalto.

L'OE aggiudicatario sarà responsabile dell'esatta osservanza da parte dei propri dipendenti e consulenti degli obblighi di riservatezza anzidetti.

In caso d'inosservanza degli obblighi di riservatezza, l'INFN si riserva la facoltà di dichiarare risolto di diritto il contratto, salvo il risarcimento dell'ulteriore danno.

57. SPESE CONTRATTUALI, IMPOSTE, TASSE

Sono a carico dell'OE senza diritto di rivalsa:

a) le spese contrattuali comprendenti, nello specifico, le imposte di registro e di bollo, le spese per diritti di segreteria e di rogito, le spese di copia conforme del Contratto e dei documenti tecnici, nonché le ulteriori che si rendessero eventualmente necessarie;

b) le spese di pubblicazione obbligatoria degli avvisi e dei bandi di gara sulla Gazzetta Ufficiale della Repubblica Italiana ed Europea, ove previste, ai sensi del DM 2 dicembre 2016;

c) le tasse e gli altri oneri per l'ottenimento licenze tecniche, nulla-osta e quant'altro occorrenti per l'esecuzione delle prestazioni;

d) le tasse e gli altri oneri dovuti ad Enti territoriali (occupazione temporanea di suolo pubblico, passi carrabili, permessi di scarico, canoni di conferimento a discarica ecc.) direttamente o indirettamente connessi alla esecuzione delle prestazioni.

Se, per atti aggiuntivi o risultanze contabili finali fossero necessari aggiornamenti o conguagli delle somme per spese contrattuali, imposte e tasse, le maggiori somme sono comunque a carico dell'OE.

A carico dell'OE restano inoltre le imposte e gli altri oneri che, direttamente o indirettamente, gravino sui servizi e sulle forniture oggetto dell'appalto.

58. RESPONSABILITÀ VERSO TERZI

L'OE solleverà la Stazione Appaltante da ogni eventuale responsabilità penale e civile verso terzi in ogni caso connessa alla realizzazione ed all'esercizio delle attività affidate. Nessun altro onere potrà dunque derivare a carico della Stazione Appaltante, oltre al pagamento del corrispettivo contrattuale.

59. RESPONSABILE DEL PROCEDIMENTO

Il Responsabile Unico del Procedimento (di seguito, "RUP"), ai sensi dell'articolo 31 del Codice dei Contratti Pubblici, è il Dott. Ing. Gaetano Schillaci giusta nomina prot. LNS-2022-0001278 del 18/10/2022.

I riferimenti del RUP, in servizio presso i LNS dell'INFN con sede a Catania in via S. Sofia n°61, sono: schillaci@lns.infn.it e +39.329.8312289 .

Il Responsabile Unico del Procedimento si avvarrà di un ufficio a supporto, nominato da INFN-LNS.

60. LUOGO DI ESECUZIONE

A partire dall'inizio delle attività, l'OE potrà operare anche presso la propria sede, quando non siano necessari attività di sopralluogo e di indagini, mentre tutte le riunioni sia esse richieste dall'aggiudicatario e/o indette dal R.U.P. per il servizio di cui all'oggetto si terranno presso la sede dell'INFN-LNS in Catania alla Via S.Sofia n. 62, o in altra sede espressamente comunicata dal RUP.

61. LINGUA UFFICIALE

La lingua ufficiale è l'italiano.

Tutti i documenti, i rapporti, le comunicazioni, la corrispondenza, le relazioni tecniche ed amministrative, gli elaborati grafici e quant'altro prodotto dall'OE del servizio nell'ambito del Contratto dovranno essere redatti in lingua italiana.

Qualsiasi tipo di documentazione trasmessa dall'OE in lingua diversa da quella ufficiale e non accompagnata da traduzione giurata in italiano, che comunque prevale, sarà considerata a tutti gli effetti come non ricevuta.

62. GLOSSARIO

- INFN: Istituto Nazionale di Fisica Nucleare
- LNS: Laboratori Nazionali del Sud
- OE: Operatore Economico (Ditta) o soggetto giuridico (singolo, raggruppato o consorziato), concorrente o che si è aggiudicato il servizio
- SA: Stazione Appaltante
- Stazione Appaltante: INFN-LNS
- ET: rivelatore di onde gravitazionali Einstein Telescope
- Codice: Codice dei Contratti Pubblici o D.Lgs 50/2016 e s.m.i.
- PFTE: Progetto di Fattibilità Tecnico Economica di cui all'articolo 23, commi 1, 5 e 6 del Codice dei Contratti pubblici
- BIM: Building Information Modeling
- ACDat: l'Ambiente di Condivisione dei Dati;
- CAM: Criteri Ambientali Minimi di cui all'art. 34 del Codice dei Contratti pubblici;
- Capitolato Generale d'Appalto: il Capitolato generale d'appalto approvato con D.M. 19 aprile 2000, n. 145 per quanto ancora in vigore;
- RUP: il Responsabile Unico del Procedimento di cui all'articolo 31 del Codice dei Contratti pubblici;
- DEC: il Direttore dell'Esecuzione del Contratto, incaricato dalla Stazione Appaltante ai sensi dell'articolo 101 del Codice dei Contratti e del DM 7 marzo 2018 n. 49;

- ISP: Prime Indicazioni sullo Sviluppo della Progettazione <ETIC_WP6_0-A01>
- DURC: il Documento unico di regolarità contributiva previsto dall'articolo 30 del Codice dei Contratti pubblici e dall'articolo 90 del d.lgs. 9 aprile 2008, n. 81;
- DUVRI: il documento unico per la valutazione rischi da interferenze di cui all'articolo 26 del d.lgs. 9 aprile 2008, n. 81;
- Regolamento: Regolamento il D.P.R. 5 ottobre 2010, n. 207, per quanto ancora in vigore; e Schema di Regolamento bozza pubblicata in Luglio 2021 per il regime di transizione;
- Metodi e strumenti elettronici: i metodi di cui all'articolo 23, comma 13, del Codice dei contratti pubblici
- Oneri di sicurezza (anche OS): gli oneri per l'attuazione del PSC, relativi ai rischi da interferenza e ai rischi particolari del cantiere oggetto di intervento, di cui all'articolo 16, comma 1, lettera a.2) del Regolamento, all'art. 23 comma 15 del Codice dei Contratti, nonché all'articolo 26, commi 3, primi quattro periodi, 3-ter e 5, del d.lgs. 9 aprile 2008, n. 81 e al Capo 4 dell'allegato XV allo stesso Decreto;
- PGI: Piano di Gestione Informativa a cura dell'OE
- Piano di Lavoro: il Piano di lavoro redatto ai sensi dell'art. 43 co. 10 del Regolamento e dell'art. 1 comma 1, lett. f) del DM 7 marzo 2018 n. 49;
- PEC: indica la Posta Elettronica Certificata, sistema di comunicazione in grado di attestare l'invio e l'avvenuta consegna di un messaggio di posta elettronica e di fornire ricevute, conformemente alle disposizioni di cui al d.lgs. del 7 marzo 2005 n. 82 ed ulteriori norme di attuazione;
- POS: il Piano Operativo di Sicurezza di cui agli articoli 89, comma 1, lettera h) del d.lgs. 9 aprile 2008, n. 81 in conformità all'allegato XV punto 3.2;
- Prestazioni: indicano complessivamente le prestazioni oggetto dell'Appalto;
- PSC: il Piano di Sicurezza e di Coordinamento di cui all'articolo 100 del d.lgs. 9 aprile 2008, n. 81 in conformità all'allegato XV punto 2;
- T.U. edilizia: il Decreto del Presidente della Repubblica 6 giugno 2001, n. 380 recante Testo Unico delle disposizioni legislative e regolamentari in materia edilizia;
- Testo Unico in materia di salute e sicurezza nei luoghi di lavoro: il d.lgs. 9 aprile 2008, n. 81;

- UR: Ufficio di supporto al Responsabile Unico del Procedimento.
- Ufficio BCM: Ufficio Bonifica Campi Minati.

63. ALLEGATI

Si intendono allegati e parte integrante tutti i documenti riportati nell'Elenco Elaborati.

Finanziato dall'Unione europea
NextGenerationEU

MISSIONE 4
ISTRUZIONE
RICERCA

Public notice rep.3264 of 28-12-2021 for "Strengthening and creation of Research Infrastructures" to be funded under the PNRR, Mission 4, "Education and Research" - Component 2, "From research to business" - Investment Line 3.1, "Fund for the implementation of an integrated system of research and innovation infrastructures"

Funded by the European Union – Next Generation EU.

Project IR0000004 - ETIC, decree of admission to funding no. 410 of 27/10/2022 CUP_I53C21000420006 - CUI_S84001850589202300015

ETIC - EINSTEIN TELESCOPE INFRASTRUCTURE CONSORTIUM

"Preparatory study for the development of the technical and economic feasibility project of the Einstein Telescope gravitational wave observatory in the Region of Sardinia, in different configurations, including the execution of surveys and drillings and the preliminary environmental impact assessment, for infrastructural works, underground and surface, civil and plant engineering." CIG_9760848A93

SPECIAL TERMS AND CONDITIONS OF THE CONTRACT

MAILING LIST:	**Marco Pallavicini:** member of the executive board of INFN **Santo Gammino:** Director of the INFN LNS **Michela Giovagnoli:** Project Officer at ETIC **Domenico D'Urso:** Co-Chair Site Preparation Board SPB of ET **Michele Punturo:** Scientific Director of ETIC **Maria Marsella:** WP6 leader **Gaetano Schillaci:** Person in charge of the procedure (RUP) **Dino Franciotti:** Office in support of the RUP (UR) **Giuseppe D'Emma:** Office in support of the RUP (UR) **Daniele Cittadino:** Office in support of the RUP (UR) **Andrea Paoli:** Office in support of the RUP (UR) **Maria Rachele Pallucco:** Office in support of the RUP (UR)		
STATE	☐ Draft	☒ Released	☐ Deleted

Changelog

N° Rev	Description	Date	Editing	Verification	Approval
1	First issue for feasibility study	11 01 2023	G.Schillaci	G.Schillaci M.Marsella	M.Punturo
1.1	Estimates of the cost of the work	19 01 2023			
1.2	Calculation of rates and starting price	27 01 2023			
1.3	DNSH & CAM & SdA	30 01 2023			
1.4	Cons06 Replies	06 02 2023			
1.5	Cons06 Analysis	22 02 2023			
2.0	Second issue	27 02 2023			
2.1	Intellera revision	22 03 2023			
2.2	Category soa	22 05 2023			

Summary:

1. PREMISE:

The first-generation gravitational wave (GW) detectors (GEO600, LIGO, TAMA, Virgo) have reached, or come close to, their design sensitivities and thus demonstrated the effectiveness of the operating principle. The main detectors currently in operation are advanced versions of the initial detectors, which is why they are also called second generation detectors ("Advanced LIGO", "Advanced Virgo"). Further upgrades of the equipment are currently underway for the preparation of the next observing campaign, called O4, which is scheduled to begin in 2023.

The second-generation detectors show improved sensitivity by approximately a factor of ten compared to the initial interferometers.

The scientific community has decided to start investigating a new (third) generation of GW gravitational wave detectors.

With vastly improved sensitivity, the new third-generation machines will usher in the era of normal GW astronomy, and with the Einstein Telescope (ET) project, Europe is a candidate to lead this scientific revolution.

To this end, the Italian scientific community has identified a site that, due to its specificities, can host ET infrastructures; Currently, the site is being characterized both from the point of view of microseismic depth noise and, in general, of environmental noise and the geological and geotechnical qualities of the areas concerned.

For the implementation of the Einstein Telescope detector, the National Institute of Nuclear Physics (**the "INFN**") participated with the Einstein Telescope Infrastructure Consortium ("**ETIC")** Project in the Public Notice of the Ministry of University and Research rep.3264 of 28-12-2021 for the submission of project proposals for "Strengthening and creation of Research Infrastructures" to be funded under the National Recovery and Resilience Plan ("**PNRR"),** Mission 4, "Education and Research" - Component 2, "From research to business" - Investment Line 3.1, "Fund for the implementation of an integrated system of research and innovation infrastructures", Funded by the European Union - NextGenerationEU.

As a result, the project proposal IR0000004 [ETIC] was usefully placed in the final ranking, as per Directorial Decree no. 371 of 11.10.2022 and the ETIC project was admitted to funding by Concession Decree no. 410 of 27-10-2022.

2. PURPOSE

The purpose of this award procedure (the "**Procedure**") is to acquire **the Preparatory Study ("Study") for the development of the technical and economic feasibility project of the Einstein Telescope gravitational wave observatory in the Region of Sardinia, in different configurations, including the execution of surveys and drillings and the preliminary environmental impact assessment, for infrastructure works, underground and surface, civil and plant engineering.**

This study will be the main element of the Italian *bid book* to host the Einstein Telescope in Italy and, consequently, this determines the level of detail needed.

The contract expressly includes, in addition to the preparation of the Study, also the execution of all surveys, measurements and surveys necessary for the required level of study.

The site that has been identified for the installation of the ET gravitational wave detector is located in the Province of Nuoro.

The geometry of the ET detector is determined by scientific considerations and is now under development.

ET detector configurations: current hypotheses foresee that the detector, consisting of six interferometers for gravitational waves, is inserted in a system of tunnels and caverns with an equilateral triangle layout 'T' on a side about 11 km, or, consisting of two interferometers for gravitational waves, it is inserted in a system of tunnels and caverns with an 'L' layout on a side about 16 km.

The installation depth is determined by the site characterization and depends on the evaluable background noise for the vertex caverns and is currently under development; the current hypothesis is that the detector's vertex caverns are located at the minimum depth between 120 and 250 meters below ground level.

The Study, which is the subject of this contract, includes the excavation of tunnels and caverns, the construction of civil works and underground and surface service systems, the preparations for the ET detector and its technological systems.

At the end of the execution of the contract, it must be possible to evaluate, by comparing the different configurations and depths of the ET detector also with reference to the site, the different solutions from an engineering point of view, to provide adequate support to the scientific community.

This document, hereinafter referred to as the "**Specifications**" or "**CSA",** is an integral part of the documents on which the Procedure is based.

It also constitutes an integral and substantial part of the Contract for the award of the contract in epigraph, together with the Offer, accompanied by the relevant annexes mentioned therein, which will have been accepted by the Contracting Authority, as well as the documents that the successful Economic Operator (EO) will have undertaken to produce to the Contracting Authority as a result of the acceptance of its Offer. The award procedure and the execution of the service are regulated by Legislative Decree No. 50 of 18 April 2016 (the "**Code**"), by Presidential Decree No. 207 of 5 October 2010, for the parties still in force, by the MIMS Guidelines referred to in Article 48, paragraph 7, of Decree-Law No. 77 of 31 May 2021, converted into Law of 29 July 2021, no. 108 ("**DL 77/2021**"), as well as current sector regulations.

The services covered by the contract must be carried out in accordance with the procedures, terms and conditions established in these Specifications, in the First Indications on the Development of the Design (ISP), in the Technical-Economic Offer and in all the documents that will be part of the contract.

3. CONTRACTING STATION

The Contracting Authority (hereinafter SA) is the National Laboratories of the South (hereinafter LNS) of the National Institute of Nuclear Physics (hereinafter INFN).

4. FINANCING

The Procedure is financed from: (i) the resources of the PNRR and, in particular, on Mission 4 "*Education and Research*" - Component 2 *'From research to business*", Investment Line 3.1, "Fund for the creation of an integrated system of research and innovation infrastructures*', funded by the European Union - Next Generation EU, reference action 3.1.1 'Creation of new RIs or enhancement of existing ones that contribute to the objectives of Scientific Excellence of Horizon Europe and establishment of networks*" referred to in Ministerial Decree no. 1141 of 7 October 2021, just Decree of admission to funding no. 410, of 27/10/2022; (ii) a minority share of the resources of the INFN Budget Funds.

The performance of the services covered by the contract must be carried out in compliance with the rules, principles and timescales established in the context of the financing.

In particular, the study must be completed no later than **June 30, 2025**. The timing provided for by the PNRR funding for the execution of the service constitutes an essential deadline pursuant to Article 1457 of the Civil Code and the Economic Operator, without prejudice to the provisions of Art. 108, paragraph 5, of the Code, assumes the risk of not receiving any compensation or consideration if these terms are not respected and the additional conditions for benefiting from the loan are not met due to facts attributable to him.

This is without prejudice to the right of the Contracting Authority to compensation for damages that may result: (i) from the termination of the Contract for failure to comply with the essential deadline; (ii) the total or partial revocation of the amounts financed due to delays by the Economic Operator in the execution of the service or due to causes attributable to it

5. SUBJECT-MATTER OF THE CONTRACT AND PLACE OF PERFORMANCE

Pursuant to Article 28(1) and (9) of the Code, this contract can be classified as a mixed contract as it includes engineering and architectural services and works, with a prevalence of the former.

The purpose of this contract is, in fact, the preparation of the **"Preparatory study for the development of the technical and economic feasibility project of the Einstein Telescope gravitational wave observatory in the Region of Sardinia, in different configurations, including the execution of surveys and drillings and the preliminary environmental impact assessment, for infrastructural works, underground and surface, civil and plant engineering".** It should be noted that the PFTE will be prepared at a later date and remunerated from various sources of funding. Finally, the PFTE will be subject to the verification referred to in Article 26 of the Code.

The study, in particular, is aimed at developing the following two configurations for the construction of the Einstein Telescope detector:

- construction of a detector, consisting of six interferometers for gravitational waves and inserted in a system of tunnels and caverns *with* an equilateral triangle 'T' layout with a side of about 11km;
- construction of a detector consisting of two interferometers for gravitational waves and inserted in a system of tunnels and caverns with an 'L' layout on a side of about 16km.

The drafting of any document necessary for the issuance of the opinions required by the relevant legislation by the competent Local Authorities is to be considered included in the Study, as well as to ensure the obtaining, upon subsequent completion of the work, of any certification, attestation or otherwise said act provided for by the legislation applicable to the case in question, for the level of design required and included in the technical offer.

In relation to the different configurations covered by the Study, the Economic Operator, due to the type of works that will be identified, will have to acquire from each Administration/Body

concerned, including the Bodies managing public network services for which there may be interference with the project, the conditions to which the elaboration of the subsequent design levels must correspond for the favorable expression of agreements, concerts, clearances, authorizations, concessions or other acts of consent, however named. The costs for these activities are included in the amount offered by the EO during the tender.

As for the surveys, investigations and *on-site* and laboratory tests, to be carried out by the winning Economic Operator, they must be aimed at acquiring all the information necessary to develop the design in a complete way, relating to any element useful and/or necessary for the identification of the different configurations covered by the Study.

The surveys and/or investigations must be carried out, complete with freight, transport, provisional works and everything necessary to carry out the work carried out in perfect workmanship, even if not directly highlighted in the project documents, in these Specifications, in the ISP, in the Metric Calculation and in the Price List. The subject matter of the contract includes all activities for obtaining the permits necessary for the execution of surveys and surveys.

The activities of surveys and/or investigations also include the activities of transport, clearing and removal of debris, the work of bricklayers, unloading and stacking at the workplace by any means, the use of provisional works and any other charge to carry out the activities in perfect workmanship. It includes any supply of materials that are necessary and any charge, mastery and means of work to ensure the correct execution of the services in all its parts.

The Economic Operator shall take care of the receipt of any necessary materials at the sites where the surveys and investigations are carried out, the unloading and transport to the places of storage or at the foot of the work and shall provide for their custody and guarding, in addition to the other charges that may be necessary, such as the custody of the samples taken and their transport and delivery to the authorized laboratories. It is established that the Economic Operator will be responsible for any loss, theft, fire or any damage to the instrumentation and test equipment as well as to the samples taken.

The contract also includes the improvements and additional provisions contained in the Technical Offer to be submitted by the Economic Operator and implemented by the Contracting Authority, at no additional cost to the Contracting Authority.

In carrying out the services covered by the contract, it will be the responsibility and responsibility of the Economic Operator to identify and guarantee compliance with all supranational, national, regional, provincial and local legislation in force. The full determination of the rules and standards applicable in the performance of procurement activities is therefore entrusted to the EO.

It should also be noted that the contract includes the Works Supervision (DL), the Safety Coordination in the Design Phase (CSP) and the Safety Coordination in the Execution Phase (CSE) and all the other professional services necessary for the execution of the investigations and surveys.

Finally, it should be noted that, as provided for in art. 3.3 of the Tender Regulations, if, during the Procedure, the INFN and the other Authorities involved should identify the preferable configuration between the two, a variant of the contract may be proceeded with and the successful bidder will have to develop only the chosen configuration.

6. AMOUNT OF THE CONTRACT

The total amount of the contract is **€ 14,241,427.58 (Euro fourteen million two hundred and forty-one thousand four hundred and twenty-seven.58**), including expenses and tax and social security charges, plus VAT and legal charges if due, broken down as follows:

N.	Description	Amount (euro)
at	A CORPO: engineering services	€ 11.142.313,98
b	A MISURA: works and services for preliminary surveys and surveys	€ 2.999.113,60
c	**Auction starting price subject to discount**	**€ 14.141.427,58**
d	Security charges not subject to auction discount	€ 100.000,00
and	**Total amount**	**€ 14.241.427,58**

N.	Category	Description	Amount (euro)	Rate (%)
	Engineering Services (Body)			
1	S.05	Study of underground works	€ 8.862.950,87	62,2%
2	E.10	Study of the works on the surface	€ 1.094.191,47	7,7%
3	IA.04	Study of the plant systems	€ 984.772,32	6,9%
	Other services (per body)			
4	S.04	DL, CSP, CSE for surveys and drillings	€ 200.399,32	1,4%
	Works (custom-made)			
5	OS20B	Surveys, drillings, Investigation and laboratory tests	€ 2.999.113,60	21,1%
	Total amount subject to reduction		**€ 14.141.427,58**	
6	OS20B	Security charges not subject to rebate	€ 100.000,00	0,7%
	Total total amount		**€ 14.241.427,58**	**100,0%**

The contract amount will be the sum of the following amounts:

- the amount set as the basis for the tender for the Corporate Engineering Services, determined taking into account the provisions of the Ministerial Decree of 17 June 2016 in application of the combined provisions of Articles 24, paragraph 8, and 216, paragraph 6, of the Code of Contracts, including tax and social security expenses and charges, and net of the percentage discount offered by the winning economic operator at the time of the bid;
- amount for the execution of surveys, investigations, analyses and tests, to measure, determined, net of the percentage discount offered by the Economic Operator at the time of the bid on the basis of the following Price Lists in order of priority:
    - ETIC_WP6_1-A03: Preliminary unit price list of surveys and surveys.
    - Price list of the Autonomous Region of Sardinia – Price list 2022 (published by Regional Resolution no. 19/23 of 21/06/2022).
    - RFI – "IG" Price Tariff – Geognostic Surveys and Geotechnical Tests – 2022 Edition;
    - Anas – Price List 2022 – Tests, Investigations and Monitoring (Rev.2 issued following Law Decree no. 50 of 17 May 2022).
- amount for security charges relating to surveys and surveys not subject to reduction;

The estimated total cost of labour for the execution of surveys, investigations and tests only, pursuant to Article 23, paragraph 16, of the Public Procurement Code, is approximately € 900,000.00, corresponding to 30% of the amount for the aforementioned services, and is included in the total amount referred to in the table above.

The prescribed prices and amounts include tax and social security charges (CNPAIA).

The prescribed prices and amounts do not include Value Added Tax (VAT).

7. HOW TO CONCLUDE THE CONTRACT

The Contract is stipulated "in the mixed form *of body and measure' and, therefore, for* body services the *price offered remains fixed and cannot vary up or down, depending on the quality and quantity of the services performed. In the case of tailor-made services, the agreed price may vary, up or down, depending on the actual quantity of services performed. For metered services, Article 6 of this CSA shall fix the prices invariable for the unit of measurement*."

7.1 "A CORPO" performance

Pursuant to Article 24, paragraph 8, of the Code of Contracts, the basic auction amount for the design activity was calculated with reference to the Ministerial Decree of 17 June 2016 for the category "**STRUCTURES - Special structures S.05" (prevailing), for the category "**CONSTRUCTION Health, education, research E.10", **for the category "PLANTS - Electrical and special systems serving constructions IA.04"** and taking into account the characteristics of the Study to be performed, the partial repetitiveness of the services and the content of the papers to be prepared.

The fee will remain fixed and invariable even if the amount of the works and works to be designed should undergo a remodulation and subsequent refinement during the execution of the service and subsequent design levels, without prejudice to the provisions of Article 3.4 of the Tender Regulations.

The fee, for the "**body" part,** is understood to include everything necessary for the punctual execution of the contract in perfect workmanship, in all its performance components, in compliance with the applicable regulations and the provisions of these Specifications, the ISP, the Contract and all the Contractual Documents and the Offer, accompanied by the relevant annexes mentioned therein, as well as the documents that the EO has undertaken to produce to the Contracting Authority as a result of the acceptance of its Offer by the Contracting Authority.

The price offered by the EO is inclusive of everything necessary for the performance of the engineering service, even if not specifically indicated in the tender documents, and, in general, of

any charge necessary to carry out ancillary activities, inspections, transfers, measurements, safety, permits, surveys, reproductions, technological tests of any nature and type, retrieval of design documentation from third parties, public or private; The price offered also compensates for transfers, for the employment of specialized personnel and professionals and any charge relating to the safety of personnel working on the road or in the countryside. It also includes expenses and/or compensation for temporary occupation or damage for the execution of geognostic or seismic tests, for topographic measurements, related expenses for the remediation of explosive devices, etc.

The price offered by the Economic Operator includes, among other things:

- all documents necessary to obtain all permits necessary for the execution of all surveys and surveys, and assistance until the same permits are obtained;
- the Supervision of Works (DL), the Coordination of Safety in the Design Phase (CSP) and the Coordination of Safety in the Execution Phase (CSE) and all other professional services necessary for the execution of investigations and surveys;
- all the changes necessary to resolve the observations and requirements requested for various reasons by the Administrations and by the Authorizing Bodies/Subjects, also in the context of Service Conferences, as specified in Article 1 of these Specifications;
- the necessary contacts to be maintained with local Administrations, Bodies, Bodies and Offices;
- the expenses for travel and missions necessary for contacts between the EO and the Contracting Authority and inspections, including by own means;
- the costs for the acquisition of data/information/maps, etc., which will be necessary for the purposes of the design;
- the use of various equipment and calculation means and instrumentation;

- the use of computational models;
- collaboration with other professionals, external consultants, universities or technical firms that the EO intends to use in carrying out the assignment;
- duly signed paper copies of the project documents, as well as copies on computer support (DVD), in editable format (CAD, WORD, EXCEL, etc.) and in pdf, as well as the scan of the stamped and signed documents (pdf).

7.1 "A MISURA" performance

With regard to the "**tailor-made" part** for the execution of surveys, investigations, tests and analyses, the EO, within the scope of the quantities indicated as indicative and not exhaustive in document <ETIC_WP6_1.A04 - Summary estimate of the cost of surveys and surveys>, will have the burden of drawing up, at the start of the activities, a *Preliminary Plan of Investigations* containing the findings/investigations/tests/analyses necessary for the Study that is the subject of this contract; these surveys, investigations, tests and analyses will be carried out by the EO as they are necessary for the Firm for different configurations. Within the total amount, to be understood as *'tailor-made', the* EO may propose types of surveys/investigations/tests provided that the overall total economic quantification remains unchanged with respect to that set as the basis for the tender, calculated net of the discount offered, without prejudice to the provisions of art. 3.4 of the Competition Regulations. The execution of *the Preliminary Plan of Investigations* is subject to the approval of the INFN by the RUP.

The Contracting Authority may justifiably request the execution of surveys, investigations and additional tests, in accordance with the provisions of the law, agreeing on the timing and incurring the consequent costs, within the limits of the law and in any case within the limits of the financing.

Again with reference to surveys, surveys, surveys and tests, any changes that may be necessary during the drafting of the aforementioned *Preliminary Plan of Investigations* will be priced by reference to document <ETIC_WP6_1-A03 - preliminary unit price list of surveys and surveys>

contained among the tender documents, as well as - if not contemplated in said Price List - to the aforementioned reference Price Lists, applying the discount offered during the tender. Any change with an increase in expenditure will be subject to the preliminary verification of the availability of the necessary resources.

The consideration for the contract includes and fully compensates all the activities necessary to perform the services entrusted to the EO, in compliance with the laws, rules and regulations in force, including all the activities necessary for the fulfilment of the requirements of the Contracting Authority and/or competent Administrations and Bodies, verification assistance, as well as any other necessary technical or administrative activity.

No fee will be payable, other than that provided for in these Specifications, for any increase for partial assignments or for interruption of the assignment for any reason not attributable to the Contracting Authority.

The security charges are assessed on the basis of the amount provided separately from the amount of the services in the project documents and in the Call for Tenders, according to the percentage that can be obtained from the aforementioned tables, the portion proportional to what has been carried out is understood as executed and payable.

The EO remains obliged, at its own expense and expense, to participate in all meetings with Public Administrations or third parties and in those in which the Contracting Authority deems appropriate for the purpose of developing and approving the Project, as well as to interface with Bodies and Companies at the request of the Contracting Authority.

The contractual relationships and constraints refer to the amounts as determined in these Specifications.

The amount of the Contract, as offered during the tender by the EO on the basis of calculations of its own convenience, at its own risk and under all the conditions of the Contract, of these Specifications and of the ISP, remains fixed and invariable without prejudice to the provisions of art. 3.4 of the Competition Regulations.

The Contract will be stipulated, under penalty of nullity, electronically in accordance with the regulations in force for the Contracting Authority, in public administrative form by the Contracting Authority's Rogant Officer or by private deed.

8. SERVICE CATEGORIES

8.1 Categories for Engineering Services

The correlation with the classes and categories provided for by Law no. 143 of 2 March 1949 was carried out through Table Z-1 "Categories of works - parameter of the degree of complexity - classification of services and correspondences", of the Ministerial Decree of 17 June 2016:

Category D.M. 17/06/2016	Destination and functional	ID Works	Correspondence L. 143/49	Identification of works	Degree of complexity	Amount [€]
Facilities	Special Structures	S.05	IX/b IX/c	Dams, Locks, Elevators, Retention and Defence Works, Embankments, Filled. Tunnels, Underground and underwater works, Special foundations.	1,05	€ 948.184.323,28
Building	Health, education, research	E.10	I/D	Outpatient clinics, Hospitals, Research Institutes, Rehabilitation Centres, Schools, Universities, Academies, University Research Institutes.	1,2	€ 117.626.256,00
Plants	Electrical and special systems for construction - individual equipment for laboratories and pilot plants	IA.04	III/c	Electrical systems in general, lighting, telephone, security, fire detection, photovoltaic systems, in support of complex buildings and constructions - Structured cabling - Fiber optic systems - Single equipment for laboratories and complex pilot plants.	1,3	€ 180.702.000,00
Other costs						€ 36.000.000,00
Total						**€ 1.282.512.579,28**

As reported in the document "Calculation of professional rates", to which reference should be made, the Performance Phases for each different Category of Work are reported with the analytical list of the individual services and with the related <<Q>> parameters of incidence.

8.2 Categories for works

Pursuant to the combined provisions of Articles 83, paragraph 2, and 216, paragraph 14, of the Code of Contracts, the Economic Operator must possess a valid qualification certificate issued by a duly authorized SOA for the execution of works in the appropriate category and classification in the following works, pursuant to Article 61 of Presidential Decree no. 207/2010 and in accordance with Annex "A" to the aforementioned Presidential Decree no. 207/2010:

PROCESSING CATEGORIES	RANKING	QUALIFICATION
OS-20B	**IVbis (up to 4,200,000)**	MANDATORY

9. INTERPRETATION OF THE CONTRACT AND SPECIFICATIONS

In the event of discrepancies between the various documents on the basis of the tender, the solution that best adheres to the purposes for which the service was requested and in any case the one that best meets the criteria of reasonableness and good executive technique is valid.

In the case of rules in the Specifications which are incompatible with each other or appear to be incompatible, the exceptional rules or those which are exceptions to general rules shall apply, secondly those which are more in conformity with the laws or regulations or the legal system, thirdly those which are more detailed and finally those of an ordinary nature.

The interpretation of the contractual clauses, as well as of the provisions of these Specifications, is made taking into account the purposes of the Contract and the results sought with the implementation of the objectives of the assignment; for any other eventuality, Articles 1362 to 1369 of the Civil Code apply.

Wherever these Specifications provide for the presence of temporary groupings and ordinary consortia, the relevant rules also apply to contractors organized in aggregations between companies adhering to a network contract, within the limits of compatibility with this organizational form.

Any provision omitted or in any case not correctly reported in these Specifications, but contained in the regulations governing the procurement and execution of services, is in any case to be understood to be complied with as indicated in its original text.

10. DOCUMENTS THAT ARE PART OF THE CONTRACT

The following are an integral and substantial part of the Contract:

a) the General Tender Specifications in the articles still in force, insofar as they do not conflict with these Specifications or are not provided for in the latter;

b) these Special Tender Specifications (CSA);

c) the Competition Regulations (DDG);

d) the First Design Development Guidelines (ISPs);

e) the technical and economic offer submitted during the tender;

f) the Technical Specifications of surveys and surveys;

g) the Preliminary Unit Price List of surveys and surveys;

h) all the documents listed in the Processed List;

i) the Time Schedule;

j) the Warranty Policies referred to in the following articles of these Specifications.

All applicable laws and regulations are contractually binding, and in particular:

k) Legislative Decree no. 50 of 18 April 2016, Public Procurement Code", and ss.mm. and ii.;

l) Presidential Decree no. 207 of 5 October 2010 "Regulation for the execution and implementation of Legislative Decree no. 163 of 12 April 2006 on the "Code of public contracts relating to works, services and supplies in implementation of Directives 2004/17/EC and 2004/18/EC", for the articles still in force;

m) MIMS Guidelines referred to in Article 48, paragraph 7, of Decree-Law No. 77 of 31 May 2021, converted into Law No. 108 of 29 July 2021

n) Decree of the President of the Republic no. 380 of 6 June 2001 on the "Consolidated text of the legislative and regulatory provisions on construction";

o) Decree of 17 January 2018 updating the "Technical Standards for Construction";

p) Ministerial Decree 17/06/2016 on "Approval of the tables of fees commensurate with the quality level of design performance adopted pursuant to art. 24, paragraph 8, of Legislative Decree No. 50 of 2016";

q) Ministerial Decree no. 49 of 7 March 2018 on "Approval of the guidelines on the procedures for carrying out the functions of the director of works and the director of execution";

r) Ministerial Decree no. 145/2000, for articles still in force;

s) Legislative Decree no. 159 of 6 September 2011, updated to Law no. 61 of 7 October 2017;

t) Law no. 136 of 13 August 2010 "Extraordinary plan against mafias, as well as delegation to the Government in the field of anti-mafia legislation";

u) Civil Code and other regulatory provisions on private law contracts for what is not regulated by the provisions referred to herein;

v) Rules on the general accounting of the State;

w) Applicable regulatory provisions concerning the services and works in question, insofar as they are not regulated by the clauses and provisions referred to above;

x) Law no. 190 of 6 November 2012, so-called "Law no. "Anti-Corruption Law";

y) Legislation on energy saving;

z) Fire Safety Regulations;

aa) Legislative Decree no. 152 of 3 April 2006, Environmental Code;

bb) Decree of the Ministry of Infrastructure and Transport of 1 December 2017, no. 560 and ss.mm.;

cc) Decrees of the Ministry of the Environment and Protection of Land and Sea regarding the adoption of CAM;

dd) Guidelines and resolutions of ANAC as pertinent and applicable to the services covered by the Contract.

ee) Standards on health and safety, fire prevention:

ff) DM 10/3/1998, DM 22/2/2006, DPR 151 of 1/8/2011, DM 8/6/2016 as amended;

gg) D.M. 37 of 22/01/2008 and subsequent amendments;

hh) Legislative Decree no. 81 of 09/04/2008 "Implementation of art. 1 of Law no. 123 of 3/8/2007 on the protection of health and safety in the workplace";

ii) D.M.I. of 07/08/2012.

jj) Regulations on energy saving and containment:

kk) Law 10 of 09/01/1991, Legislative Decree 192 of 19/08/2005 and Ministerial Decree of 26 June 2015 and subsequent amendments

ll) D.P.R. 59/2009;

mm) D.L. 63/2013 converted into Law no. 90/2013 and related Implementing Decrees.

nn) Legislative Decree 81/2008 on the protection of health and safety in the workplace

11. SPECIAL PROVISIONS CONCERNING THE CONTRACT

The signing of the Contract by the EO is equivalent to a declaration of perfect knowledge and unconditional acceptance of its annexes, of the law, of the regulations and of all the rules in force in the field of public works, as well as the complete acceptance of all the rules governing this contract with regard to its perfect execution.

The signing of the Contract and its annexes by the EO is also equivalent to a declaration of the existence of the conditions that allow the immediate performance of the services covered by this Contract.

The EO acknowledges, without any reservation, the full knowledge and availability of the acts of the Procedure and the documentation referred to therein, the availability of the sites, the state of the places, the conditions agreed upon at the time of the bid and any other circumstance affecting the services which, as per the specific minutes signed with the DEC, allow the immediate start of the execution.

The EO transfers the intellectual property rights to the Contracting Authority, starting from the date of delivery of the Firm or part of it. As a result of the payment of the contract fee, the Contracting Authority will remain the exclusive property of the rights of ownership and/or use and economic exploitation of the design and accounting documentation relating to the intervention and of the individual documents that compose it, as well as of everything carried out

by the EO, its employees and collaborators as part of or on the occasion of the performance of the activities covered by the Contract.

The EO shall guarantee to the Contracting Authority that, at the time when the commissioned products have been delivered to it, all the Parties who – in any capacity – have collaborated for the realization of the same, have previously provided full and unconditional release and consent, to the extent of their respective competence, to the technical, economic and commercial exploitation of the products, in their entirety and/or in each individual component.

The Contracting Authority shall have the right to the full and exclusive use of the documentation produced as a result of the activities entrusted by virtue of the Contract, being able to make variations, modifications and other interventions of any kind where deemed necessary, without in such cases being relieved of any exceptions of any kind.

The EO remains obliged not to disclose the design material produced, which remains the property of the Contracting Authority.

The EO shall keep strictly confidential all projects, drawings, specifications, technical, accounting and technological information relating to the execution of the Contract and shall not use them except for the performance of the Contract. To this end, the EO will also be liable for its own staff and any subcontractors and will take the necessary measures and precautions to ensure that these commitments are also fully complied with by them.

The Economic Operator remains obliged to make any changes to the project documentation that may be requested by the Contracting Authority in order to make the design documentation consistent with the needs of the Contracting Authority, without prejudice to the right of protection for the purposes of project liability.

The changes requested and the copies to be produced for the purpose of the above adjustments are already compensated in the price offered during the tender.

The EO remains obliged to sign for the assumption of responsibility (by the Coordinator of the design group of each drawing, by the sector specialists for the drawings of their respective competence) of all the copies that will be produced, even in partial form, for the purpose of obtaining the authorizations required by law or, for any internal or external administrative procedure, both during the duration of the contractual relationship and after the relationship has been concluded.

The assignment is entrusted and accepted in compliance with the rules, conditions, agreements, obligations, charges and procedures deducted and resulting from the Public Contracts Code and Presidential Decree 207/2010, the tender documentation and the related attachments.

The EO is also obliged to comply with all the laws and regulations in force and must take into account the indications, provisions and/or directives that may be issued by the Contracting Authority through the RUP and the DEC.

The RUP will be considered by the Contracting Authority as the contact person to contact in relation to the performance of the aforementioned services. The functions of coordination, management and technical-accounting control of the execution of the Contract may be entrusted to a DEC other than the RUP.

The EO shall ensure maximum availability for the holding of meetings or meetings related to the contract at the headquarters of the Contracting Authority or in any other location.

The EO is obliged to make all changes, corrections, additions to the project to be provided, clarifications that may be requested by Administrations, Bodies and Subjects responsible for issuing any clearances or opinions, without being entitled to any greater compensation.

The EO, in any case, undertakes to indemnify the Contracting Authority from any action that may be taken by third parties in relation to alleged intellectual property rights claimed on the works, intellectual works, intellectual creations and other material prepared or created by the EO itself, as well as for any action taken by third parties for the unlawful use of such intellectual works.

12. BANKRUPTCY OF THE OE AND OTHER SUBJECTIVE EVENTS OF THE OE

In the event of bankruptcy of the EO or in the event of compulsory liquidation and arrangement with creditors, or insolvency proceedings or liquidation of the EO, or termination of the Contract pursuant to Article 108 of the Public Procurement Code or withdrawal from the Contract pursuant to the Anti-Mafia Code, or in the event of a judicial declaration of ineffectiveness of the Contract, the Contracting Authority avails itself, without prejudice to any other rights and actions to protect its interests, of the procedure provided for in Article 110 of the Public Procurement Code.

If the EO is a temporary grouping, in the event of bankruptcy, compulsory administrative liquidation, receivership, extraordinary administration, composition with creditors or insolvency proceedings or liquidation proceedings of the principal company or of a principal company or, in the case of an individual professional, in the event of death, interdiction, incapacitation or bankruptcy of the same or in the cases provided for by anti-mafia legislation, paragraphs 17, 18 and 19 of Article 48 of the Public Procurement Code apply, respectively.

13. EO REPRESENTATIVE AND DOMICILE

At the time of stipulation of the Contract, the EO must elect legal domicile by indicating a certified e-mail to which all notices, assignments of terms and any other service or communication dependent on the Contract are intended to be ritually made.

At the time of stipulation of the Contract, the EO must also communicate the personal details of the persons authorised to collect, receive and receive the sums received on account or in balance, also as a result of any credit assignments previously recognised by the Contracting Authority.

The **EO Representative for the** execution of the service, with professionalism appropriate to the services contracted, is, **with personal responsibility**, the **person responsible for the integration of specialist services** who was indicated at the time of the offer.

Such a person, in possession of the requisites of proven technical and moral capacity for the entire duration of the contract, must:

- to replace the EO itself in the conduct of the services, including those subcontracted within a framework of legitimacy of the same and within the contractual limits, as well as to make decisions on any problem;
- receive and have the verbal and/or written orders carried out by the DEC or the RUP, in this case by signing them and, if the same Representative considers that the instructions received are among those to be given in writing, it will be his obligation to make an immediate written request, otherwise the EO will not be able, in any eventuality, to invoke in its own defense or reason the lack of instructions on the part of the Contracting Authority due to the fact that they have not been given in writing;
- sign all documents, with the right to make their own observations or reservations, considering - both for the liquidation and for any other legal effect - his signature as valid as that of the EO;
- intervene and lend itself to checks as often as requested by the DEC or RUP.

The EO is also required to communicate to the Contracting Authority the name of the person who, in the event of temporary absence, replaces its Representative and also promptly communicate, in the event of termination or reservation of the mandate, the name of the new Representative.

For each of the Representatives who will be appointed, the following data must be communicated to the Contracting Authority and to the DEC: name, residence, e-mail, landline telephone numbers, telephone numbers of the mobile devices with which each must be equipped.

The Contracting Authority reserves the right to judge, in a final manner, on the regularity of the documents produced and on the consequent acceptability of the Representatives who will be

appointed. It is understood that the EO remains responsible for the actions of the Representative delegated by him.

The Contracting Authority will be represented vis-à-vis the EO by the RUP or DEC which will be designated by the Contracting Authority. In consideration of the size, complexity and multidisciplinary nature of the design, as well as the need for its implementation to take place in the shortest possible time, the RUP (Single Procedure Manager) will be able to make use of a structure capable of providing the technical and organizational support necessary for the conduct of the contract.

14. CURRENCY CONVENTIONS

In all the documents prepared by the Contracting Authority, the values in absolute figures are understood to be in euros.

In all the documents prepared by the Contracting Authority, the values in absolute figures, unless otherwise specified, are understood to exclude VAT.

All the terms referred to in these Specifications, unless otherwise established in the individual provision, are calculated in accordance with EEC Regulation no. 1182 of 3 June 1971.

15. OBLIGATIONS AND OBLIGATIONS OF THE EO

The EO will have to ensure the execution of the activities "in a workmanlike manner", verify the quality of the data produced and also guarantee their reliability in relation to the purposes set in question.

The acquisition of data and the formation of the required products must be developed through distinct and successive operational phases, each regulated by specific technical requirements, so that the quality controls of the intermediate documents must take place during construction, before admitting them to any other subsequent processing.

In carrying out the assignment, the EO shall:

- use only calibrated measuring instruments for the execution of the activities within its competence, keeping the relevant certifications to be shown to the Contracting Authority in the event of a request from the same;
- fully accept the control activity that will be carried out by the Contracting Authority
- use regularly licensed software by showing a copy of the respective certifications at the request of the Contracting Authority's staff;
- use machinery and equipment equipped with CE marking in accordance with current EU regulations (e.g. Machinery Directives 2006/42/EC implemented by Legislative Decree no. 17/2010), showing copies of the respective certificates of conformity at the request of the Contracting Authority's staff;
- guarantee, at its own expense, the implementation of all the measures provided for by the Consolidated Law on health and safety in the workplace.

Tests and analyses on the materials and samples taken must be carried out in official laboratories or authorized pursuant to art. 59 of the Construction Act.

The EO undertakes to compensate the Contracting Authority for damages, loss of property or destruction of property owned by the EO and directly attributable to the EO.

The EO undertakes to indemnify the Contracting Authority from all direct and indirect damages that may arise from the performance of the activities.

The EO also undertakes to respond to and indemnify the Contracting Authority from any claim for compensation made by the competent Bodies or by third parties, including the employees of the EO and/or subcontractor or of the Contracting Authority itself, by means of a judicial or extrajudicial claim for any reason deriving from or in any way connected with the execution of the Contract, unless the claims for compensation derive from actions and/or omissions caused

directly by the Contracting Authority. The EO will be directly liable and will indemnify the Contracting Authority from any liability or charge of any nature deriving from the violation by the EO and/or subcontractors of laws, decrees, regulations, technical specifications, orders of authorities or local bodies, connected to and in any case deriving from the execution of the Contract.

The EO Representative undertakes, by way of example but not limited to:

- communicate to the Contracting Authority any information deemed suitable to give knowledge of the correct performance of the contract;
- organize a structure that guarantees the performance of the service in accordance with the times and methods provided for in the documentation presented during the tender and in these Specifications;
- perform the services in accordance with these Specifications and as indicated in the documentation submitted during the tender;
- to indemnify and hold harmless the Contracting Authority from all consequences deriving from any non-compliance with the applicable regulations;
- to give prior notice to the Contracting Authority of any situations of potential incompatibility in order to jointly assess their effects, it being understood that in the event of non-compliance with this obligation, the Contracting Authority has the right to terminate the contract by law pursuant to and for the purposes of Article 1456 of the Italian Civil Code;
- to allow the Contracting Authority to proceed, at any time, even without prior notice, to the checks on the full and correct execution of the contract and to lend its cooperation to allow such checks to be carried out. The Economic Operator shall be deemed to have assumed all the burdens and responsibilities related to the complete performance of the service in question in the manner and within the time prescribed in these Specifications,

in the documentation submitted at the time of the bid and in accordance with the provisions in force on the subject.

All the documents produced will be duly stamped and signed by the OE Representative.

The duties and responsibilities of the EO Representative include everything necessary for the proper performance of the assignment, including, but not limited to:

- court fees;
- the costs of communication, specifying that, given the nature of the contract, all the most timely means (courier, telephones, e-mails) must be adopted;
- transport costs, equipment and tools, consumables and anything else necessary depending on the type and number of investigations, tests, checks for the performance of the contract;
- insurance and tax charges relating to the required obligations.

By submitting the bid, the Economic Operator acknowledges that it has assessed the difficulties in carrying out the works, the activities present in the area, the commitment required by the activities required in these Specifications, and that therefore its offer is presented considering everything related to the development of the contract.

The verification of the correspondence of the services performed with respect to what is required will be carried out by the RUP or DEC, or by another person specifically appointed by INFN, with the issuance of the certificate of verification of conformity referred to in Article 102 of the Public Contracts Code.

15.1 DNSH: "DO NOT SIGNIFICANT HARM" PRINCIPLE AND CLIMATE TAGGING

The Recovery and Resilience Facility (EU Regulation 241/2021) establishes that all measures of the National Recovery and Resilience Plans (NRRPs) must meet the principle of "do no significant

harm to environmental objectives". This constraint translates into an assessment of the compliance of the interventions with the principle of "**Do Not Significant Harm" (DNSH),** with reference to the taxonomy system of environmentally sustainable activities indicated in Article 17 of Regulation (EU) 2020/852.

The DNSH principle, based on the six environmental objectives defined under the taxonomy system of environmentally sustainable activities, aims to assess whether or not a measure may cause harm to the six environmental objectives identified in the Paris Agreement (European Green Deal).

All investments and reforms proposed in the NRRP have been assessed by the titular administrations; in particular, the evaluations carried out on the interventions of Mission 4 – Research are contained in the evaluation forms attached to the MEF-RGS Circular of 30 December 2021 no. 32, and the subsequent one of 13 October 2022 no. 33, which also includes a mapping of the applicability of the forms and the control checklists.

The designer in charge must apply – to the intervention in question – the prescriptions contained in the Technical Data Sheets associated with the intervention, also identifying any additional ones that may be applicable to the specificities of the intervention itself, and taking care to ensure – according to regime 2 – the application of the associated prescriptions.

In particular, for the interventions in question, the following Regimes have been identified, and associated with the following Technical Data Sheets highlighted in bold.

Table updated by Circular no. 33 of 13.10.2022. For more information, please consult the link: https://italiadomani.gov.it/it/Interventi/dnsh.html

MISSION COMPONENT	INV.	INVESTMENT NAME	REGIME DNSH	SHEET

M4C2	1.1	Fund for the National Programme of the Research (PNR) and Research Projects Important National Interest (PRIN)	Scheme 2	• Card 26
	1.2	Funding of projects submitted by young researchers	Scheme 2	• Card 26
	1.3	Partnerships extended to universities, research centres, companies and funding of research projects	Scheme 1	• Card 6 • Card 26
	1.4	Strengthening of research facilities and creation of "national champions" of R&D on some Key enabling technologies	Scheme 1	• Card 1 • Factsheet 2 • Card 3 • Card 6 • Card 8 • Card 26
	1.5	Creation and strengthening of "innovation ecosystems for sustainability", building "territorial R&D leaders"	Scheme 2	• Card 1 • Card 3 • Card 6 • Card 26
	2.1	IPCEI	Scheme 1	• Card 26
	2.2	Partnerships - Horizon Europe	Scheme 1/ Scheme 2	• Card 26
	2.3	Thematic and territorial enhancement and extension of technology transfer centres by industry segments	Scheme 2	• Card 26
	3.1	**Fund for the creation of an integrated system of research and innovation infrastructures**	**Scheme 2**	• **Factsheet 2** • **Card 3** • **Card 5** • **Card 6** • **Card 26**
	3.2	Start-up financing	Scheme 2	• Card 26
	3.3	Introduction of innovative doctorates that respond to the innovation needs of companies and promote the recruitment of researchers by companies	Scheme 2	• Card 26

Therefore, reference should be made to the provisions contained in the Sheets, recalling that the EO entrusted with:

1. is responsible for compliance with the rules and regulations in force in order to achieve the objectives of mitigation, adaptation and reduction of environmental impacts and risks, providing the ex-ante verification elements indicated in the Technical Data Sheets associated with the investment in question, and any additional ones that may apply.

2. is required to provide all supporting elements, quantifications and reports in order to allow the Contracting Authority to demonstrate that the actual performance of the contract is in compliance with the DNSH principle.

15.2 CAM: adoption of minimum environmental criteria

In compliance with articles 34 and 71 of Legislative Decree no. 50 of 18 April 2016 and subsequent amendments, the Minimum Environmental Criteria (CAM), issued by the competent Ministry and applicable to the Firm entrusted, are an integral part of these Specifications.

The winning EO, therefore, will have to carry out all the actions and works necessary to comply with the minimum environmental requirements, their possible improvement and the further commitments made in the contract (pursuant to Article 34, paragraph 2 of the Procurement Code), in relation to environmental issues.

The primary regulatory source governing the matter of CAM for the service covered by this contract is the National Action Plan on Green Public Procurement (PANGPP) "Minimum environmental criteria for the assignment of the design and execution service of building works" Ministerial Decree no. 256 of 23 June 2022 published in GURI_6-8-2022. Reference is also made to the Environment Ministerial Decree of 11 October 2017: "*Minimum environmental criteria for the assignment of design services and works for the new construction, renovation and maintenance of public buildings', for the* parts still in force.

In the application of the above criteria, the most restrictive rules and regulations are understood, as well as the opinions expressed by the competent Superintendences.

It should be noted that the choice of the minimum environmental criteria to be adopted is left solely to the designer who will draw up a special technical report, including the graphic attachments in which the following are explained:

1. the issues of environmental impact and consumption reduction related to the study;

2. the methods of selection of the CAM to be included in the activity and subsequent levels of design;

3. the comparison between the pre- and post-construction status in order to determine the impact of the planned interventions and the achievable results, where possible;

4. verification of performance levels (qualitative and quantitative) with reference to the environmental performance as per the technical specifications and award criteria;

5. The objectives of the maintenance plan of the work, where applicable to the reference design level.

In order to facilitate the verification by the Contracting Authority of compliance with the minimum environmental characteristics required, and of the improvements offered, in addition to the report just described, the winning EO must develop in content and detail the implementation and verification methods, accompanied by a timetable of the measurement, monitoring, verification and reporting activities of the performance levels achieved, compatible with the reference design layer.

16. DESIGN GROUP

The design group is the one indicated in the bidding phase and complies with the requirements of the Tender Regulations (DDG).

The representative of the EO is the natural person indicated at the time of the offer as the person **responsible for the integration of specialist services.**

The Contracting Authority has the right to ascertain at any time, and in relation to the nature of the activity carried out, the professional suitability of the professionals in charge and to take, in the event of unsuitability, all the consequent measures.

To this end, the EO will be required to allow checks and inspections to be carried out by the Contracting Authority and to provide the Contracting Authority with all the documentation and information that may be requested and necessary for the purpose of assessing the suitability of such Subjects to carry out the activities assigned to them, in compliance with the current regulations on the control of work activities as well as the protection and processing of personal data.

Any performance of the services covered by the Contract by unsuitable parties will constitute a serious breach of contract by the EO. In any case, the Contracting Authority has the right to terminate the Contract.

In no case, without the express authorization of the Contracting Authority, the EO has the right to change the composition of the Design Group indicated in the Offer. In the event of changes not authorised by the Contracting Authority, the Contracting Authority has the right to terminate the Contract.

The Contracting Authority has the right to request the replacement of the same at any time for justified reasons, attributable to and/or attributable to the detected professional unsuitability of the personnel in charge of carrying out the services covered by the Contract, without the EO being able to make any claims of any kind, for any reason, against the Contracting Authority itself.

Failure to replace staff within the deadline indicated by the Contracting Authority, as well as failure by the EO to comply with even one of the obligations set out in this article, constitutes a serious breach of contract.

17. SURVEYS, SURVEYS, SURVEYS AND LABORATORY TESTS

The contract includes the execution of all geological, geotechnical, hydrological and seismic investigations, surveys and analyses, surveys, measurements and stakeouts, topography, the preparation of specialized and detailed drawings, necessary at the reference design level for the Studio subject to the contract. The activities included in the contract shall be at least the following.

- Preparation of the preliminary plan of investigations and surveys.
- Drafting of Safety Plans where necessary for the execution of preliminary investigations and surveys.
- Applying for and obtaining the necessary permits for preliminary surveys and surveys.
- Works Supervision (DL) for preliminary investigations and surveys.
- Coordination of Safety in the Design Phase (CSP) where necessary for preliminary investigations and surveys.
- Execution Phase Safety Coordination (CSE) where necessary for preliminary investigations and surveys.
- Carrying out surveys, measurements and topography.
- Carrying out investigations, surveys and in situ tests aimed at:
  - characterization of excavated soils,
  - groundwater location,
  - detection of underground gases.
- Execution of analyses and laboratory tests.

- Analysis of data from surveys and surveys.
- Identification of any rare earths and materials to be reused.

At the end of the above operations, the EO shall carry out, for a single configuration chosen by the Contracting Authority, the drafting of the Executive Plan of the surveys and surveys that will have to be carried out subsequently and in the future for the construction of the observatory; at least the following will be drafted.

- Drafting of the executive investigation and survey plan
- Technical specifications for surveys and executive surveys
- Estimative bill of quantities of surveys and executive surveys

The surveys and investigations in support of the Firm shall be carried out in accordance with the provisions of these Specifications, and in compliance with what is indicated in the Offer, and shall aim to acquire all the information necessary to develop the Firm in a complete manner, as well as to acquire any useful and/or necessary element for the various configurations.

The Contracting Authority reserves the right to introduce, in the Preliminary Plans submitted, those variations it deems appropriate in the interest of the success and economy of the works. On the other hand, the EO may not vary or modify the Preliminary Plans presented and approved without having obtained the prior written authorization of the Contracting Authority, which will have the right not to account for the activities carried out in contravention of this provision and also the right to have restored, at the expense of the EO itself, the morphological, stability and permeability conditions of the ground that existed prior to the execution of such activities, in accordance with the modalities to be established by the DEC. The provisions regarding the execution of topographic surveys, surveys and in situ tests, laboratory tests and the investigation of the reclamation of explosive ordnance are reported in the relevant specialist documents.

As an integral part of these Specifications, reference is expressly made to the following specialist reference documents:

ETIC_WP6_	1-A01	CHARACTERISTICS AND FIRST INDICATIONS OF SURVEYS AND SURVEYS
ETIC_WP6_	1-A02	TECHNICAL SPECIFICATIONS FOR SURVEYS AND SURVEYS
ETIC_WP6_	1-A03	PRELIMINARY UNIT PRICE LIST OF SURVEYS AND SURVEYS

For indicative purposes, reference is expressly made to the following specialist reference document:

ETIC_WP6_	1-A04	SUMMARY ESTIMATE OF SURVEY AND SURVEY EXPENDITURE

18. ENGINEERING AND ARCHITECTURE ACTIVITIES

18.1 General requirements

The engineering activity covered by this contract concerns the preparatory study for the development of the PFTE by developing the design configurations in compliance with the objectives and needs specified in the Requirements Framework and in the ISP.

In this first phase, the EO will carry out the preparatory studies for the development of the technical-economic feasibility project, developing the design alternatives that pursue the objectives and needs specified in the Requirements Framework and in the ISP.

The activities described below will be performed for both the two configurations L16 and T11 under study, determining the optimal minimum cave depth, a priori between 120 and 250 meters. In addition, for each of the two configurations L16 and T11, a final report is required describing the change in costs, the main design and engineering solutions, and the environmental impact as the depth varies in the aforementioned range.

In carrying out these activities, after reconnaissance and collection of studies, projects, data and information aimed at design, the EO will draw up a Preliminary Plan of surveys, investigations, analyses and tests, which the EO will carry out as deemed necessary by the same for the completion of the Study. This Preliminary Plan must be consistent with the provisions of the relevant specialist documents and take into account the requirements set out in these Specifications. The economic

value of the Preliminary Plan must be included within the total amount offered by the winning Economic Operator, net of the discount. Following the approval of the aforementioned Preliminary Plan by the Contracting Authority, the EO will proceed with the execution of the provisions of the Preliminary Plan.

The EO will also draw up, for a single configuration chosen by the Contracting Authority, an Executive Plan of surveys, surveys, surveys, analyses, to complete what has already been carried out, which will allow the necessary in-depth studies to subsequently draw up the PFTE and ensure the reliability of the estimate of costs and implementation times of the works to be designed. This Executive Plan of the Surveys must also be consistent with the requirements set out in these Specifications and must also contain the economic evaluation of the surveys/surveys/tests to be carried out, and a reference Price List.

In carrying out the project activities, the EO in charge must constantly coordinate with the Contracting Authority in accordance with the specific procedures provided for in these Specifications and in the Contract.

All design documents will remain the property of the Contracting Authority, which may then use them fully and exclusively at its discretion. These documents must be provided according to the timetable detailed in these Specifications.

The EO is obliged to sign, **due to the assumption of personal responsibility** by the person responsible for the integration of specialist services **for all the documents, and by the sector specialists for the documents of** their respective competence, of all the copies that will be produced, even in partial form, for the purpose of obtaining the authorizations provided for by law, or for any internal or external administrative procedure, both during the contractual relationship and subsequently.

Any additional working copies of each document and/or the Study that will be made by the EO during the design process, at the request of the Contracting Authority or at the request of third parties in the phase of obtaining opinions, will be entirely at the expense of the same.

The EO in charge will have to incorporate into the project all the indications and prescriptions coming from the RUP and/or the control bodies in charge, without any exceptions being raised and/or requesting additional charges and/or special compensation.

The EO in charge must prepare all the files and files, in duplicate, to be sent to the bodies responsible for issuing opinions, and must provide maximum assistance and collaboration to the Contracting Authority.

If the EO in charge has formulated improved proposals at the time of the bid, the activities must be carried out without any additional burden for the Contracting Authority.

The names of the designers in charge must be indicated on all the Studio's drawings. All documents must be signed by the **Head of the Integration of Specialist Services** for the assumption of full and unconditional **personal responsibility**.

It is the responsibility of the EO to obtain any data that may be necessary for the activity covered by the contract.

The EO undertakes to interface with the local bodies and with the bodies in any capacity responsible for issuing opinions or clearances, in order to implement any indications or opinions necessary for subsequent approval.

The following shall also form an integral part of the contract:

- the drafting or assistance to the Contracting Authority for the drafting of all the deeds and drawings necessary to acquire indications and anything else required by the national or local laws in force for the reference design level;
- the costs associated with the use of any special equipment that may be necessary for the definition and correct sizing of the areas and plant equipment;
- the Building Information Modeling (B.I.M.) information management activity.

While leaving the EO ample freedom in the design definition, it is required that maximum attention be paid to the following aspects:

- *adequacy of the infrastructures serving laboratories*: design choices that guarantee the use as a scientific research laboratory; design choices to improve safety and emergency management;
- *containment of investment and operating costs over the 50-year life cycle*: design choices to improve management and ordinary and extraordinary maintenance;
- *eco-sustainability and minimal impact on the territory:* design choices to improve primary energy consumption and CO2 emissions, as required by the new legislative applications on energy saving and Carbon Footprint and DNSH;
- *minimum anthropogenic environmental noise in caves (from 1 to 1000Hz):* insertion of innovative systems and technological elements and their integration into the architecture.

18.2 Requirements on documents

For each of the topics listed in the ISP, **and for each configuration,** it will be necessary to submit, by way of example but not exhaustively, at least the following papers.

1 Preliminary Plan of the investigations and surveys functional to the Firm in question, safety plans for the execution of the surveys;

2 data analysis report and related graphs of the surveys and measurements carried out on the basis of the Preliminary Plan of Surveys and Surveys;

3 General Report;

4 preliminary technical report, accompanied by surveys, assessments, investigations and specialist studies;

5 report of preventive verification of the archaeological interest (art. 28 paragraph 4 of Legislative Decree 42/2004, for the procedure referred to in Legislative Decree 50/2016 art. 25, c. 1) and any direct investigations on the ground as indicated in art. 25, c. 8 of Legislative Decree 50/2016;

6 environmental pre-feasibility study (art.20 D.P.R.207/2010);

7 sustainability report of the work;

8 plano-altimetric surveys and state of consistency of existing works and those interfering in the immediate surroundings of the work to be designed;

9 graphic drawings of the works, in the appropriate scales;

10 study of the access roads to the construction sites;

11 indication of measures to avoid soil, noise, water and atmospheric pollution;

12 DNSH compliance report;

13 report on compliance with the CAM;

14 study of the quarries that may be necessary and the evaluation of both the type and quantity of materials to be removed, and the needs of any final environmental restoration;

15 geotechnical report; hydrological report; geological report;

16 first indications of fire protection design;

17 initial indications on safety and coordination, aimed at protecting the health and safety of workers on construction sites;

18 estimation of the real market costs, and estimation of the work and economic framework (art.22 DPR 207/2010);

19 estimation of execution times;

20 Cost-benefit analysis.

21 final report describing the variation in costs, the main design and engineering solutions, and the environmental impact as the depth varies;

22 drawings and graphic models, renderings, videos and animations that can be used for the presentation of the project on scientific tables during international competitions;

For a single configuration, indicated by the SA, it will be necessary to deliver the following documents.

- Executive Plan of Surveys and Surveys;
- study of areas to be expropriated or to be acquired, where relevant.

The following describes the minimum contents of the main documents to be prepared by the contracted economic operator as part of the Firm subject to this award.

18.2.1 General Report

The general report, in relation to the type, category and size of the intervention, is divided into the following points:

1) description of the justifying reasons for the need for the intervention, in relation to the general objectives identified by the Contracting Authority in the Requirements Framework and in the ISP. Indication of the consequent performance levels to be achieved and, where relevant, of the related performance indicators that make it possible to verify the achievement of the objectives once the works are completed, during the operating phase;

2) identification of the objectives underlying the design, in relation to the contents of the document with the First Indications on Design Development (ISP), as well as the specific technical requirements to be met;

3) detailed description, through descriptive and graphic drawings, of the typological, functional, technical, managerial and economic-financial characteristics of the configurations;

4) summary in descriptive and graphic form of the possible configurations;

5) list of the reference regulations, with explicit reference to the performance or prescriptive parameters adopted for the Study, in relation to the various mandatory regulatory areas or in any case taken as a reference, such as actions and their combinations, return times, exposure classes, event scenarios;

6) summary of the economic and financial aspects (economic framework of presumptive expenditure; possible articulation of the intervention into functional and/or performance sections, or into functional and usable sections for network works; summary of the forms and sources of financing to cover the expenditure; economic and financial plan, where applicable; summary indications on the employment impact of the intervention both during construction and operation, in cases where it is required; general indications of impact in terms of the involvement of micro and small enterprises, both in the construction phase of the work and in the scheduled and extraordinary maintenance phases);

The description of each **individual configuration** is divided into:

1) explanation of the design solution and the design process that led to the development of this solution on the basis of the results of the specialist studies and investigations referred to in point 3 below);

2) functional, technical aspects and interrelation between the different elements of the project, architectural, structural, functional, plant engineering, also with reference to the contents of the ISP;

3) considerations relating to the feasibility of the intervention, also documented on the basis of the results of the preliminary environmental impact assessment, as well as the results of the investigations indicated below and the consequent assessments regarding the feasibility of the intervention:

   a. results of the geological, hydrogeological, hydrological, hydraulic, geotechnical, seismic, environmental and archaeological studies and investigations carried out;

   b. results of the investigations with regard to any environmental, hydraulic, historical, artistic, archaeological, landscape, or any other constraints, interfering with the areas or works concerned;

   c. results of the assessments on the state of the quality of the environment affected by the intervention and on its possible evolution, in the absence and in the presence of the intervention itself, as well as in progress;

   d. considerations and evaluations on the compatibility of the intervention with respect to the territorial and environmental context;

4) ascertainment of the interference of the intervention to be carried out with pre-existing works or with public services along the route and proposal for the resolution of the interferences themselves and estimate of the foreseeable charges, in accordance with the provisions of Article 27, paragraphs 3, 4, 5 and 6 of the Code;

5) reconnaissance of the availability of the areas and any buildings on which the intervention is to be carried out, the relative methods of acquisition, the foreseeable charges;

6) indications for the efficiency of transport and logistics processes in the light of the technologies and models of logistics sustainability most widely used internationally;

7) indications on the phase of decommissioning of the construction site and restoration of the state of the places, including environmental restoration;

8) information on accessibility, use and level of maintenance of existing works, systems and services.

It must be considered that the information modelling, corresponding to the evolution of the design levels, will have to ensure continuity in the progression of content and information containers, up to the execution phases, construction management, safety coordination during the execution phase, technical-administrative testing and must always be functional to the reporting needs of the PNRR.

18.2.2 Preliminary technical report

The Firm's Technical Report is accompanied by surveys and specialist studies (which are annexes and which are also signed by the respective qualified technicians).

The Technical Report states:

1) the needs, requirements and performance levels that must be met with the intervention, in relation to the specific needs defined in the document containing the First Design Development Guidelines (ISP);

2) the results of the studies, investigations and analyses carried out, depending on the type, size and importance of the work, highlighting the consequent assessments regarding the feasibility of the intervention achieved through the characterization of the local territorial, historical-archaeological, environmental and landscape context in which the work is inserted;

3) the results of the verification of the existence of interference of the intervention with the grounds of pre-existing buildings or infrastructures;

4) the results of the urban insertion study with related graphic drawings, where relevant;

5) the description and justification of the degree of detail adopted for the planning of the investigations carried out, depending on the type, size and importance of the work;

6) the description and motivation of the technical choices underlying the Study, also with reference to functional safety, energy efficiency and the reuse and recycling of materials;

7) preliminary sizing elements (structural, geotechnical, plant, hydraulic, viable...) of a conceptual and, where necessary, also quantitative nature. This is in order to justify the design choices made, useful to ensure:

   a. the smooth development of the authorisation process;

   b. the coherent development of subsequent levels of design;

   c. the coherence of the economic estimate forecasts of the work.

Unless otherwise determined by the Contracting Authority in relation to the type and characteristics of the work or intervention to be carried out, the Technical Report, accompanied by surveys and specialist studies, refers at least to the following design issues:

1) geological, hydrogeological, hydrological, hydraulic, geotechnical and seismic aspects;

2) mobility and traffic, exclusively for transport infrastructure and where relevant in relation to the characteristics of the project;

3) summary of the analyses and assessments contained in the environmental impact study, DNSH, environmental monitoring measures;

4) constraints that insist on the area of intervention and on the territorial and environmental surroundings, if it is relevant in relation to the characteristics of the project;

5) landscape aspects;

6) archaeological aspects, with a description of developments and results of the prior verification of archaeological interest, if relevant in relation to the characteristics of the project;

7) a census of existing interferences, pursuant to Article 27, paragraphs 3, 4, 5 and 6 of the Code, with the relative hypotheses of resolution, the programme of displacements and crossings and anything else necessary for the resolution of the interferences, as well as the cost estimate, if relevant in relation to the characteristics of the project;

8) material management plan, taking into account the availability and location of recovery sites and landfills, with reference to current legislation on the subject;

9) war reclamation;

10) architectural and functional aspects of the intervention;

11) structural aspects;

12) plant engineering aspects, with the definition of their constitution in relation to the need for safety, continuity of service, sustainability and energy efficiency, in their normal and abnormal operation and in their operation;

13) fire safety, in relation to potential risks and accident scenarios;

14) safety measures aimed at protecting the health and safety of workers on construction sites;

15) maintenance measures and geotechnical and structural monitoring;

16) expropriations and easements.

18.2.3 Environmental pre-feasibility study (art. 20 of Presidential Decree 207/2010)

The study must comply with the principles of Do Not Significant Harm (DNSH).

The environmental pre-feasibility study in relation to the type, category and extent of the intervention and in order to seek the conditions that allow the protection and improvement of the environmental and landscape quality of the territorial context includes:

a) verification, also in relation to the acquisition of the necessary administrative opinions, of compatibility of the intervention with the requirements of any landscape, territorial and urban plans both of a general and sectoral nature;

b) the study on the foreseeable effects of the implementation of the intervention and its operation on the environmental components and on the health of citizens;

c) the illustration, with a view to minimizing the environmental impact, of the reasons for the choice of the site and the chosen design solution as well as the possible location and typological alternatives;

d) the determination of environmental compensation measures and any restoration, redevelopment and environmental and landscape improvement interventions, with the estimate of the related costs to be included in the financial plans of the works;

e) an indication of the environmental protection standards that apply to the intervention and any limits set by sector regulations for the operation of plants, as well as an indication of the technical criteria that are intended to be adopted to ensure compliance.

In the case of interventions falling under the environmental impact assessment procedure, the environmental pre-feasibility study contains the information necessary to carry out the preliminary selection phase of the contents of the environmental impact study. In the case of interventions for which the selection procedure provided for by EU directives is necessary, the environmental pre-feasibility study makes it possible to verify that these are not likely to cause significant environmental impacts or must make it possible to identify prescriptive measures such as to mitigate such impacts.

18.2.4 Sustainability report of the work

The sustainability report of the work, broken down in content according to the specific type of infrastructural intervention, must contain at least the following.

1) the description of the primary objectives of the work in terms of "outcomes" for the communities and territories concerned, through the definition of which and how many long-term benefits, such as growth, development and productivity, can really arise from it, while minimizing negative impacts. Identification of the main stakeholders and indication of the models and tools for stakeholder involvement to be used in the design, authorisation and construction phase of the work, in line with the results of the public debate;

2) certification of compliance with the "Do No Significant Harm" (DNSH) principle, as defined by EU Regulation 852/2020, Regulation (EU) 2021/241 and as set out in the European Commission Communication COM (2021) 1054 (Technical guidance on the application of the aforementioned principle, under the Recovery and Resilience Facility Regulation);

3) the verification of any significant contributions to at least one or more of the following environmental objectives, as defined in the same regulations, taking into account the life cycle of the work:

   a. climate change mitigation;

   b. adaptation to climate change;

   c. sustainable use and protection of water and marine resources;

   d. transition to a circular economy;

   e. prevention and reduction of pollution;

   f. protection and restoration of biodiversity and ecosystems;

4) an estimate of the Carbon Footprint of the work in relation to the life cycle and the contribution to the achievement of climate objectives;

5) an estimation of the assessment of the life cycle of the work from a circular economy perspective, following international methodologies and standards (Life Cycle Assessment

– LCA), with particular reference to the definition and use of construction materials or the identification of processes that favor the reuse of raw and secondary materials by reducing the impacts in terms of waste generated;

6) in any case, the analysis of the overall energy consumption with the indication of the sources for the satisfaction of the energy need, also with reference to bioclimatic design criteria;

7) the definition of measures to reduce the quantities of external procurement (internal reuse) and the options of more sustainable modes of transport of materials to/from the production site to the construction site;

8) an estimate of the socio-economic impacts of the work, with specific reference to the promotion of social inclusion, the reduction of inequalities and territorial gaps as well as the improvement of the quality of life of citizens;

9) the identification of measures for the protection of decent work, in relation to the entire corporate supply chain of the contract (subcontracting); the indication of the national and territorial collective agreements in the sector stipulated by the associations of employers and workers that are comparatively more representative at national level of reference for the work of the work;

10) the use of innovative technological solutions, including sensor applications for the use of predictive systems (structure, geotechnics, hydraulics, environmental parameters);

11) resilience analysis, i.e. the ability of infrastructure to withstand and adapt relatively quickly to changing conditions that may occur in both the short and long term due to climate, economic and social change. All possible risks with the probability with which they may occur must be considered in advance, including not only environmental and climatic but also social and economic ones, thus allowing the least vulnerable solution to be adopted to ensure an increase in useful life and a greater satisfaction of the future needs of the communities involved.

18.2.5 Graphic drawings of the works

The Firm's graphic drawings, drawn up to scale and duly dimensioned, taking into account the need to include any environmental mitigation and compensation measures and interventions with the estimate of the related costs, unless otherwise determined by the Contracting Authority, are constituted as indicated below for the part of network works and punctual works provided for in the project.

FOR PUNCTUAL WORKS

1) documentary excerpt of the territorial planning and environmental and landscape protection tools, as well as the general urban planning and implementation tools in force, on which the location of the intervention to be carried out and any other locations examined are indicated; these elements are also reported in a chorography on an adequate scale, extended to a significant area, referable to the national cartographic systems, with the perimeter of the intervention;

2) plans with the indications of the contour lines on an adequate scale and not less than 1:2000, on which the works and works to be carried out and any other design hypotheses examined are reported separately;

3) Drawings relating to the preliminary investigations and studies, on a scale appropriate to the size of the work being designed:

   a. plan with location of the investigations carried out;

   b. geological, geomorphological and hydrogeological maps, with the location of the intervention, extended to a significant territorial area;

   c. geological, geomorphological and hydrogeological sections and profiles, with the location of the intervention, illustrating the lithostructural, geomorphological and hydrogeological structures;

   d. map of the hydrographic network;

e. map of archaeological potential;

f. map of ordered and superordinate constraints, on an adequate scale and with the location of the intervention;

g. seismic microzonation map, where available, on an adequate scale, extended to a significant area;

h. interference plan pursuant to paragraphs 3 and 4 of Article 27 of the Code;

i. cadastral plans;

j. location plan of active quarry sites, recovery plants, temporary storage sites and authorized and operating landfills to be used for the delivery of waste deriving from the implementation of the intervention; list of works planned in the Sardinia Region that involve the use of quarry material;

4) Renderings, graphic diagrams and standard sections in the number, articulation and scales necessary to allow the general identification of all the geometric-spatial, typological, functional and technological characteristics of the works to be carried out, integrated by tables relating to the parameters to be respected; on a scale of not less than 1:500 for the overall plans, and on a scale of not less than 1:200 for the individual buildings.

5) drawings that allow, by means of diagrams, plans and sections on an adequate scale of not less than 1:200, the definition of the plant components present in the project, including active and passive fire protection systems, with an indication of the technical-functional characteristics.

FOR NETWORK WORKS

1) general chorography of framing the work on an adequate scale, extended to a significant area, referable to national cartographic systems, on a scale of not less than 1:100,000;

2) chorography containing an indication of the planimetric trend of the routes examined with reference to the orography of the area, the integrated mobility and transport system and other existing services, the hydrographic network, on an adequate scale, extended to a significant area, referable to national cartographic systems, on a scale of not less than 1:10,000;

3) excerpt from the instruments of territorial planning and environmental and landscape protection, as well as from the general urban planning and implementation tools in force, on which the alternative routes examined are indicated;

4) plans with indications of contour lines and/or elevation points, on which the alternative routes examined are shown, on an adequate scale and in any case on a scale of not less than 1:1,000;

5) plans on mosaic photos, on an adequate scale, on which the alternative routes examined are shown, on a scale of not less than 1:1,000;

6) longitudinal elevation profiles of the alternative routes examined at an adequate scale and in any case at a scale of not less than 1:5,000/500;

7) Preliminary investigations and studies, and in particular:

   a. plan with the location of the investigations carried out, on a scale of not less than 1:5,000;

   b. hydraulic plan, on a scale of not less than 1:5,000;

   c. geotechnical sections with indication of the stratigraphic units that are homogeneous from a physical and mechanical point of view, of the main physical

quantities and index properties, as well as of the regime of interstitial pressures in the volume significantly affected by the work on a scale of not less than 1: 5,000/500;

d. archaeological map on a scale of not less than 1:10,000;

e. geological, geomorphological and hydrogeological maps and sections, with the location of the intervention, extended to a significant area, on a scale of not less than 1:5,000/500;

f. geological, geomorphological and hydrogeological sections, with the location of the intervention, illustrating the lithostructural, geomorphological and hydrogeological assets;

g. lithostratigraphic, hydrogeological, geotechnical profiles with physical-mechanical characterization of the main lithotypes and with indication of the position of the water tables;

h. map of the hydrographic network at an adequate scale, and in any case not less than 1:5,000;

i. map of ordered and superordinate constraints, on an adequate scale and with the location of the intervention;

j. map of the archaeological potential on an adequate scale, extended to a significant area, referable to national cartographic systems;

k. seismic microzonation map, where available, on an adequate scale, extended to a significant area, referable to national cartographic systems;

l. any plans with the results of traffic surveys and simulations at an appropriate scale, where relevant;

m. plan of interference with the grounds of existing buildings and/or infrastructure networks, on an adequate scale, extended to a significant area, referable to national cartographic systems, on a scale of not less than 1:5,000;

n. chorography on an adequate scale, extended to a significant area, referable to national cartographic systems, with the location of active quarry sites, recovery plants, temporary storage sites and authorized and operating landfills to be used for the delivery of waste deriving from the implementation of the intervention, on a scale of not less than 1:10,000;

o. arrangement of standard storage or environmental renaturation areas, on a scale of not less than 1:500;

p. renderings, graphic diagrams and schematic sections in the number, articulation and scales necessary to allow the identification of the location and the spatial, functional and technological characteristics of the site areas necessary for the construction of the works;

8) plans with contour line indications, on a scale of not less than 1:1,000, for the selected route; The scale must not be less than 1:500 for sections in urban areas. The floor plan contains a representation of the works according to all the axes of the project, based on the geometric characteristics assumed. The geometry of the works is represented in all its parts (embankments, retaining structures, hydraulic works of art, buffer strips and bands of urban interest), in order to determine the overall size of the infrastructure and its relationships with the territory, as well as any interference with existing buildings and infrastructures. The geometric characteristics of the layout and the main works of art are also represented;

9) plans on mosaic photos, on a scale of not less than 1:1,000, of the selected layout;

10) longitudinal elevation profiles of the works to be carried out on a scale of not less than 1:5,000/500, containing an indication of all the works of art planned, the intersections

with transport, service and/or hydrographic networks, the geometric characteristics of the route; for urban areas, the scale is not less than 1:2000/200;

11) standard sections of the works on an adequate scale, and in any case not less than 1:200;

12) current cross-sections, in an adequate number for a correct preliminary assessment of the quantities to be used in the calculations for the quantification of the costs of the work;

13) drawings that allow, by means of plans, elevations and sections on an adequate scale, the typological definition of all the special artefacts and all the current and minor works that the intervention requires, on a scale of not less than 1:200;

14) drawings that allow, by means of diagrams, plans and sections on an adequate scale, the definition of the plant components present in the project, including active and passive fire protection systems, with an indication of the technical-functional characteristics, on a scale of not less than 1:200;

15) documents summarising the safety criteria required for the operation of the infrastructure, on a scale of not less than 1:5,000/500;

16) Graphic drawings accompanying the first indications on safety and coordination on construction sites.

The plans and drawings also contain indications relating to the subdivision of the intervention into functional and usable lots, where foreseeable.

On the basis of all the drawings, an estimate is prepared that allows the overall quantification of the costs of the works in the project, for the purpose of calculating the expense.

For both punctual and network works, the Firm specifies the drawings and the relative scales to be adopted at the subsequent design levels, without prejudice to the minimum scales, where applicable, which can only be varied on the recommendation of the administration pursuant to Article 23, paragraph 4 of the Code.

19. HOW TO PROVIDE SERVICES

The study must be carried out according to an integrated process and shared with the Contracting Authority, only through the RUP and the DEC, each for their respective competences. This integrated process will follow the development, from the start to the final phase, without this entailing additional costs for the Contracting Authority with respect to the amount awarded, also following requests to participate in additional meetings at the headquarters of the Contracting Authority or at Administrations/Bodies/Managers interested in the works subject to the Study or in-depth analysis, modifications, integration of the design choices and, consequently, of the elaborations produced.

The services to be entrusted must be carried out at the headquarters of the EO and must also include all the necessary inspections, meetings and in-depth studies at the site of execution of the works.

The EO may make use of its own collaborators; in any case, the activities of the above-mentioned collaborators are carried out under the strict and personal responsibility of the EO, and the latter is responsible for it in all respects and without any reservation. It is understood that the use and collaboration of any assistance personnel for all the operations covered by the assignment referred to in these Specifications will be regulated by direct and exclusive agreements between the EO and the interested parties, whose competences will be fully borne and at the expense of the same.

The RUP may, at any time, ask the EO for the immediate dismissal or replacement of the aforementioned employees, without the obligation to give reasons. The financial remuneration of any collaborators remains the sole responsibility of the EO.

The contents of the Study must comply with the indications contained in these Specifications, in the ISP, in the tender documentation and, in general, in the operating instructions that the

Contracting Authority will formalize to the EO before the start of the Study or during its development.

The start of the individual phases of the Contract must be expressly ordered by the Contracting Authority; therefore, no compensation will be paid for activities carried out by the EO on its own initiative without the prior written request of the Contracting Authority.

In carrying out the activities to be planned and coordinated, particular care and attention must be paid to all surrounding activities and possible interference with them, to the observance of aspects relating to the protection of health, safety and hygiene of workers (with particular reference to Article 26 of the Consolidated Law on the protection of health and safety in the workplace).

19.1 Scientific and Technical Committee

It should be noted that, in consideration of the exceptional nature and the economic and scientific relevance of the work under study, before the start of the execution of the contract, or in any case no later than five days from that date, the Contracting Authority may set up a Technical Scientific Committee, with the task of providing technical advice in favour of the same.

In this case, the Committee may be composed of experts from the Contracting Authority, chaired by a Chairman, and will see the participation of at least one representative of the Contractor. Any financial costs for the experts of the Contracting Authority do not weigh on this contract, while the costs for the contractor's representative are borne by the EO and included in the consideration of the contract itself. In this case, within fifteen days of the signing of the contract, the Contractor must communicate to the Contracting Authority the name of the person who will participate in the meetings of the Committee.

The Committee may have an advisory function with respect to the Contractor's preparation of the study of the two different configurations.

It will therefore be up to the Committee to cooperate in order to define the activities necessary for the preparation of the study, also suggesting to conduct in-depth studies aimed at achieving the goal of obtaining the best design evaluations for the construction of the Einstein Telescope in Sardinia.

The Committee will meet monthly. Meetings can be held in person or, remotely, via videoconference.

In preparation for the agenda of the meeting of the Committee, circulated in advance by its chairman, the contractor, the RUP, the DEC and the members of the Committee may contribute by submitting written questions and queries to the chairman. The meeting of the Committee shall be an opportunity for the exchange of information and requests between the Committee and the contractor through its representatives.

After the meeting of the Committee, it will be the responsibility of its chairman to produce a report containing the answers or comments regarding the topics of the meeting.

The report will be sent to the RUP and from there to the DEC, which will assess its compliance with the provisions of the contract and for the controls and verifications of their respective competence.

Following the evaluations, upon successful outcome, the DEC will send the report prepared by the experts to the Contractor.

20. IT METHODS AND TOOLS - CHARACTERISTICS OF THE PROJECT DOCUMENTS - INFORMATION MANAGEMENT PLAN

This paragraph provides information on the use of IT methods and tools aimed at supporting the rationalization of the design activities covered by the Contract. It also specifies the types of files

in open format with which the EO must represent and present the data, information and contents covered by the service.

The IT methods and tools declared by the EO must guarantee the availability, confidentiality and integrity of the data and information provided to the Contracting Authority. **Before starting the service, the EO must prepare and submit the Information Management Plan (PGI) to the Contracting Authority.**

For each computer workstation involved in the design development process in the PGI, the EO will have to fill in the following table; The set of all the tables compiled, one for each computer workstation involved, will define the hardware infrastructure used.

Computer workstation number	
PC or workstation model	
Intended use	
Processor	
RAM	
Hard Disk Number	
Total Hard Disk Capacity	
RAID Configuration Type	
Video card	
Operating system	

For the purposes of declaring the software used with a regular license on the workstations of the hardware infrastructure, in the PGI the EO must fill in the following table, indicating the software used, the proprietary format of the files, the respective open format, with the condition that the open format must be included among those indicated in the table. In the notes field, any additional information may be provided to describe more fully the technical characteristics and certifications of the software used.

Software Infrastructure				
Contents	**Software Used**	**Proprietary format**	**Open format**	**Notes**
Specific electronic methods and tools, referred to in Article 23(13) of the Code of Contracts			.Ifc	
Bill of quantities			..xml ..xls	
Analysis and modelling (hydrological, hydraulic, seismic, geotechnical, structural, etc.)			.Ifc	
Raster Image Representation			..jpg ..png ..raw ..gif ..tif	
Video Representation			..mp4 ..mpeg ..avi ..swf	
Word Processing			..txt ..odt	
Tabular representation			..csv ..ods	
Document representation			..pdf .Ps	
Presentation			.odp file	
Computer Aided Technical Drawing (CAD)			..dxf	
Vector Geographic Information System			(shp, .shx, .dbf, .prj) .gpkg	

It will be the responsibility of the Contracting Authority to set up a cloud data storage environment for the purpose of creating the Data Sharing Environment (ACDat), protected and securely accessible via the web. The ACDat will be set up to ensure the sharing and transfer to the Contracting Authority of all data, information and content in digital format that will constitute

the study, including structured data acquired and produced by the EO for this purpose (e.g. DEM data, LIDAR data, topographic surveys, etc.).

It will be the responsibility of the EO to provide the Contracting Authority with the licenses of any non-open software, necessary to view the documents produced.

All files, both those concerning the reports, the project tables and anything else that makes up the study, must be delivered, in paper and digital form.

The EO will have to guarantee the methods, IT tools and hardware and software infrastructures specified in the PGI.

The EO shall also insure, for the entire period of the service covered by the Contract, the software used under a regular license on the workstations of the hardware infrastructure specified in the PGI. In the event of additions, it must promptly notify the Contracting Authority.

21. INITIATION OF CONTRACT EXECUTION

The start of the execution of the contract is governed by art. 19 of Ministerial Decree no. 49 of 7 March 2018.

The DEC, on the basis of the provisions of the RUP, after the Contract has become effective, initiates the performance of the services, providing the EO with all the necessary instructions and directives and drawing up a special report ("report of **commencement of performance**") signed at the same time also by the EO.

The Contracting Authority has the right to proceed with the start of the service as a matter of urgency, even pending the formal stipulation of the Contract, pursuant to Article 32, paragraph 8, of the Code of Contracts. In this case, the DEC shall expressly indicate in the commencement report the services to be performed by the EO immediately.

If, on the day fixed and communicated, the EO does not proceed with the start of the service, the DEC shall set a new peremptory deadline, not less than 5 (five) days and not more than 15

(fifteen) days; In any case, the deadlines for execution start from the first start date. If the aforementioned term has expired, the Contracting Authority has the right not to stipulate or terminate the Contract and to forfeit the provisional or definitive deposit, depending on whether the non-delivery occurs before or after the conclusion of the Contract, without prejudice to compensation for damages (including any higher price of a new award) if it exceeds the value of the deposit, without this being a ground for any claim or objection on the part of the EO. If a new award procedure is initiated, the EO is excluded from participation because the failure to fulfil its obligations is considered to be established gross negligence.

If the start of the execution takes place late for reasons attributable to the Contracting Authority, the EO may request to withdraw from the Contract. In the event that the request for withdrawal is granted, the EO is entitled to reimbursement of the contractual costs actually incurred and documented.

The following are the cases in which the Contracting Authority may not accept the EO's request for withdrawal:

- when the withdrawal involves delays that are not compatible with the NRRP;
- when the withdrawal entails delays that are not compatible with the commitments undertaken by the Contracting Authority in the event of a contribution from other entities or for the methods of financing;
- when the withdrawal involves delays that may cause economic damage to the Contracting Authority or create a danger to public safety.

Before starting the execution of the services, the EO submits the Work Plan of the activities, for approval by the Contracting Authority.

22. CONTRACT DURATION AND PROGRESS

The execution of the Study must follow the rules of the financing and must be completed within the time limits imposed by the PNRR Financing, which **are understood as essential terms** pursuant to Article 1457 of the Civil Code.

Start of the IR0000004 - ETIC project: 01 January 2023

Duration: 30 months

End of the IR0000004 - ETIC project: June 30, 2025

The contract, once the Contract has been signed, starts from the date of the Execution Start Report and has a duration consistent with the times imposed by the PNRR funding and its reporting, equal to **540 natural and consecutive days**, starting from the date of start to the execution of the services, with the timing defined below.

The EO draws up the timetable of the activities, which must be consistent with the above-mentioned essential deadlines; the time schedule, once approved by the Contracting Authority, becomes operational for the execution of the Contract.

The following are the tasks to be performed and the related intermediate time deadlines within which each task must be completed. The percentages of the State of Progress (SdA) are also shown below, to be considered as *a lump sum* table for payments on account, even by fractions.

	Riepilogo delle attività per gli Stati di Avanzamento (SdA)	*Scadenze [giorni solari dall'inizio della attività]*	*Percentuale da fatturare per SdA %*	*Avanzamento della prestazione %*
A	Piano preliminare dei sondaggi per l'esecuzione delle indagini e dei sondaggi	120	5,1%	5,1%
B	Edilizia e strutture sotterranee: concept	210	7,6%	12,7%
C	Opere in superficie: studio di fattibilità	330	7,7%	20,4%
D	Impianti: studio di fattibilità	360	6,9%	27,3%
E	Edilizia e strutture sotterranee: Valutazione preliminare di Impatto Ambientale e DNSH	420	12,7%	40,0%
F	Esecuzione delle indagini e dei sondaggi preliminari e studio idrologico, geotecnico e geologico	450	21,8%	61,8%
G	Edilizia e strutture sotterranee: studio di fattibilità	480	28,6%	90,4%
H	Elaborazione di una lista di titoli autorizzatori	510	3,2%	93,6%
I	Verifica di conformità e fine contratto	540	6,4%	100,0%
	durata presunta mesi	**18**	**100,0%**	

Failure to comply with the above deadlines will result in the **application of the penalty for delay, including intermediate** ones, established below in these Specifications.

	Tasks to be performed for progress
At	**Preliminary survey plan for carrying out surveys and surveys.** Upon delivery of the documents provided for in <ETIC_WP6_1-A01 characteristics and first indications of the surveys and surveys> and <ETIC_WP6_1-A02 technical specifications of the surveys and surveys> with reference to the Preliminary Plan of the surveys and surveys.
B	**Construction and underground structures: concept.** At the delivery of the drawings included in Article 18 of these specifications in the scales of less detail for the graphic drawings and in the conceptual descriptions for the relational drawings.
C	**Surface works: feasibility study.** Upon delivery of the documents included in Article 18 of these specifications for punctual works with reference to all infrastructural, building and plant engineering works on the surface.
D	**Plants: feasibility study.** Upon delivery of the documents included in Article 18 of these specifications for punctual works and for network works with reference to all underground plant infrastructure works.
And	**Construction and underground structures. Preliminary Environmental Impact Assessment and DNSH.** Upon delivery of the documents included in Article 18 of these specifications for the Environmental Impact Study, for the Sustainability Report of the work, as well as the report on compliance with the DNSH.
F	**Execution of preliminary surveys and surveys and hydrological, geotechnical and geological study.** The execution of the surveys and surveys included in the preliminary survey plan, and the delivery of the reports and studies included in Article 17 of these specifications, in <ETIC_WP6_1-A01 characteristics and first indications of the surveys and surveys> and in <ETIC_WP6_1-A02 technical specifications of the surveys and surveys>.

	Tasks to be performed for progress
G	**Construction and underground structures: feasibility study.** Upon delivery of the documents included in Article 18 of these specifications, for punctual works and for network works with reference to all underground building infrastructure works.
H	**Elaboration of a list of authorizing titles.** Elaboration of a list of authorizations that must be obtained (e.g., authorizations, opinions, clearances, etc.) with simultaneous delivery to the Contracting Authority of the documentation that must necessarily be presented to the public administrations in order to obtain such authorizations.
The	**Verification of compliance and end of contract.** The complete delivery of the Study and the final report describing the variation in costs, the main design and engineering solutions, and the environmental impact at the variation of the depth in the aforementioned range and the feasibility document of the design alternatives.

In order to ensure every possible effort for the rapid implementation of the Study, according to the given timeframes, it is considered necessary, with reference to the methods of execution of the design activities, to provide for the obligation for the person in charge of the design to carry out meetings or inspections, on a periodic basis, where required even weekly, at any place that will be indicated by the RUP, in the presence of the latter or of the technical contact(s) indicated for this purpose. The frequency of the meetings will be established in the minutes of the start of the execution at the discretion of the RUP and the DEC.

On the occasion of these meetings, the person in charge will have to produce the project documentation *'in progress' in electronic and paper format also to allow the evaluation by the RUP, or the technical contact person appointed by him, of the correct progress of the project activities in relation to the intermediate and final delivery deadline.*

The RUP may, at its sole discretion and without this being able to justify the request for further compensation by the person in charge of the design, arrange for a closer frequency of meetings or the execution of specific meetings in order to deal with particular design, technical or administrative problems, as well as plan targeted meetings with the subjects in charge of the verification "*in progress*"" of the design in question.

In any case, the performance of the services must be based on timeliness.

The aforementioned terms will be interrupted only by a reasoned written act by the Contracting Authority, as better specified in the following article and by any other legislative or regulatory provision in force, in relation to the performance of the services relating to the intervention or, for what is not governed by such legislation, by specific orders of the Contracting Authority. The period in question therefore remains suspended from the date of the suspension report and resumes from the issuance of the resumption report or other written order from the Contracting Authority.

The EO will notify the DEC, by certified email, of the date on which it considers that it has completed the intermediate and final services. The DEC will proceed, in contradictory manner, to any findings by drawing up a specific certificate of completion of the services.

23. LATE PENALTIES

In the event of non-compliance with the deadline established for the performance of the contractual services, **a penalty equal to 0.8‰ (zero point eight per thousand) on the net contractual amount is applied for each consecutive calendar day of delay.**

The penalty, in the same percentage as above, is also applied in the event of delay:

- in compliance with the individual **intermediate deadlines** provided for in these Specifications for each State of Progress;

- in the commencement of the performance of the Contract with respect to the date set by the DEC;
- in the commencement of the execution of the Contract for reasons attributable to the EO that has not fulfilled the prescribed obligations;
- in the resumption of the execution of the Contract following a notice of suspension, with respect to the date set by the DEC.

Penalties also apply in the case of:

- if the winning Economic Operator, which employs a number equal to or greater than fifteen employees but is not required to draw up the report on the personnel situation referred to in art. 46, of Legislative Decree no. 198/2006, fails to deliver to the Contracting Authority, within six months of the conclusion of the Contract, a gender report on the situation of male and female staff, in accordance with the provisions of Article 47, paragraph 3, of Legislative Decree 77/2021, and the Guidelines approved by Prime Ministerial Decree of 7 December 2021;
- if the contracted Economic Operator, which employs a number equal to or greater than fifteen employees, fails to deliver to the Contracting Authority within six months from the conclusion of the contract a report clarifying the fulfilment of the obligations provided for by Law no. 68 of 12 March 1999, and illustrating any sanctions and measures imposed on the companies in the three years preceding the deadline for the submission of tenders, in accordance with the provisions of Article 47, paragraph 3 bis, of Legislative Decree no. 77/2021, and the Guidelines approved by Prime Ministerial Decree of 7 December 2021.

Penalties are deducted from the payment immediately following the occurrence of the relevant condition of delay.

The total amount of the penalties imposed pursuant to the preceding paragraphs and in the other cases provided for in the Specifications may not exceed 20% (twenty percent) of the net contract

amount; if the delays or violations are such as to result in a penalty of an amount greater than the aforementioned percentage, the Contracting Authority shall have the right to terminate the Contract, without prejudice to the right to any compensation for the damage suffered due to the non-performance.

At the reasoned request of the EO, the total or partial non-application of penalties is allowed, when it is recognized that the delay is not attributable to the EO, or when it is recognized that the penalties are manifestly disproportionate to the interest of the Contracting Authority. The non-application does not imply the recognition of compensation or indemnity to the EO. The Contracting Authority decides on the request for non-application of penalties on the proposal of the RUP and/or the DEC.

All cases of delay are promptly and in detail reported to the RUP by the DEC immediately upon the occurrence of the relevant condition, with the relative temporal quantification.

The Contracting Authority may offset the receivables deriving from the application of the penalties referred to in this article with the amount due to the EO for any reason, including for the fees due to the EO itself.

The request and/or payment of the penalties referred to in this article does not in any case exempt the EO from the fulfilment of the obligation for which it has defaulted and which has given rise to the obligation to pay the same penalty, without prejudice to the right of the Contracting Authority to terminate the Contract in cases where this is permitted.

The application of penalties does not affect the compensation of any damages or additional charges incurred by the Contracting Authority due to delays due to the fact of the EO, for loss of revenue or for any other reason.

24. PERIODIC VERIFICATION OF DESIGN PROGRESS

The Contracting Authority has the right to exercise, either directly or through third parties appointed by the same, any broader activity of verification and control on the work of the EO

and/or of all the subjects appointed to carry out the services covered by the Contract, without the EO being able to make any claims of any kind, for any reason, against the Contracting Authority as a result of this circumstance.

The favourable outcome of any checks and/or controls carried out by the Contracting Authority does not in any case exempt or limit the EO from its obligations and responsibilities; therefore, even after the checks have been carried out, if it is ascertained that the activity carried out by the EO does not comply with the contractual requirements, the same must in any case provide at its own care and expense for the timely fulfilment of all that may be required by the Contracting Authority or, in any case, necessary in order to bring the activity back to the aforementioned contractual requirements.

In any case, the full liability of the EO towards the Contracting Authority for the perfect and punctual performance of the services covered by the Contract remains unaffected and unaffected.

During the development of the Study, the Contracting Authority will have the right to request the in-depth study of certain thematic aspects, as well as the structuring of certain portions of the Study in a different way from that proposed by the EO, in which case the latter must comply with the instructions given to it without raising any objection.

The Contracting Authority reserves the right to carry out, through the Sole Manager of the Procedure or another figure appointed for this purpose by the Contracting Authority, checks on the actual progress of the Firm, by convening meetings, requesting a written report, inspections or with other forms deemed appropriate, to view the documents produced up to that moment, which must be promptly delivered in draft, without the EO being able to oppose refusal or objections of any kind.

The EO is required to hold meetings with the DEC and/or RUP in order to:

- allow the continuous monitoring of the progress of the Study;

- promptly identify possible causes that may negatively affect the design by proposing appropriate corrective actions;
- promptly identify the need to acquire further information, technical and/or administrative indications, opinions and anything else that may be necessary with respect to what is already in possession, communicating them to the Contracting Authority with the necessary timing so that it can adopt the appropriate decisions;
- facilitate the drafting of the Firm by following its development "step by step" and providing continuous support to the RUP.

The DEC or the RUP may arrange for a closer frequency of meetings, even weekly, or the execution of specific meetings in order to deal with particular design, technical or administrative problems.

The EO is required to participate in the meetings called by the Contracting Authority in order to provide the necessary explanations regarding the Study drawn up.

The EO is also required to participate in the meetings called by the Contracting Authority for the acquisition of opinions from all the Control Bodies/Subjects.

The EO is obliged to inform the Contracting Authority of any eventualities, emergencies or conditions that occur in the performance of the services defined by the assignment, which make it necessary or even just appropriate to adapt or rationalise them.

The EO will be required to modify and/or supplement the documents produced on the basis of the requests made by the Contracting Authority for the implementation of the prescriptions that may be formulated by Bodies, Control Authorities and Parties involved, for various reasons, for the purpose of approving the Study. It is understood that opinions, preparatory to approvals, clearances or acts of assent, however called, represent the necessary conditions for subsequent approval by the Contracting Authority.

25. APPROVAL OF PROGRESS REPORTS

Each Progress Report will be prepared by the DEC and signed by the EO.

The approval of each progress report will be communicated in writing to the EO by the RUP, by issuing a payment certificate.

The issuance of the payment certificate authorises the EO to issue the relevant invoice.

Any form of tacit or implied approval is excluded.

Approval does not imply acceptance and does not relieve the EO of its obligations and responsibilities.

26. EXTENSIONS AND DEFERRALS

If the EO, for reasons not attributable to it, is unable to complete the services within the established terms, it may request an extension pursuant to Article 107, paragraph 5, of the Public Procurement Code, with a request formulated well in advance of the expiry of the term under penalty of forfeiture, without prejudice to compliance with the final deadline referred to in Article 22 above provided for by the PNRR funding for the conclusion of the services. The RUP shall decide on the application, after hearing the DEC, within the 30-day period provided for in the above-mentioned paragraph 5 of Article 107 of the Public Procurement Code.

By way of example and not exhaustively, the following are considered to be causes not attributable to the EO: delays caused either by impediments put in place by the Contracting Authority in relation to its own needs or resulting from the non-fulfilment, by the Contracting Authority, of the obligations for the same deriving from these Specifications or delays in the execution of other services or works preparatory or instrumental to the services covered by the Contract and forming the subject of other contracts in place between the Authority Contracting Authority and third parties.

If, during the course of the contract, an event occurs which, in the opinion of the EO, is such as to objectively prevent compliance with the deadline for performance, the EO may submit a request for extension to the Contracting Authority in writing, within 7 days from the date of the occurrence of the event and provide the Contracting Authority, within the following 7 days, with all the elements in its possession as proof of the event itself. These obligations shall be deemed to be required for the EO that does not comply with them, under penalty of forfeiture of the right to subsequently make claims relating to the extension of the deadline for execution.

The request for extension must be submitted to the RUP or DEC which may request, with regard to the granting of the extension, the formal expression of the Contracting Authority.

If the extension is formally granted after the expiry of the period for implementation, it shall have retroactive effect from that deadline.

Failure to determine the RUP within the deadlines indicated above shall constitute rejection of the request.

27. SUSPENSIONS ORDERED BY DEC

Pursuant to the provisions of art. 107, paragraph 1 of the Code of Contracts, in all cases in which there are special circumstances that temporarily prevent the regular performance of the service, and which are not foreseeable at the time of the conclusion of the Contract, the DEC may order the suspension of the execution of the contract, filling, if possible, with the intervention of the EO or its Representative, the suspension report, with an indication of the reasons that led to the interruption of the services, the possible attribution of the causes to one of the parties or to third parties, as well as the state of progress.

As soon as the reasons for the suspension have ceased, the RUP, i.e. the DEC which notifies the RUP so that it can do so, orders the resumption of enforcement and indicates the new contractual term. Within five days of the resumption order made, the RUP, or the DEC, proceeds to draw up

the resumption report, which must also be signed by the EO and must indicate the new contractual term.

The EO may not, on its own initiative, for any reason, suspend or interrupt the execution. Any suspension of the aforementioned activities due to a unilateral decision of the EO constitutes a serious breach of contract and may result in the termination of the Contract pursuant to art. 1456 of the Italian Civil Code, it being understood that the EO will be responsible for all the costs and consequences arising from such termination. The request for suspension by the EO may legitimately be made to the Contracting Authority if, during the execution, significant unfavourable conditions arise that objectively prevent the continuation of the contract.

Pursuant to Article 107, paragraph 2, of the Code of Contracts, if the suspension, or suspensions if more than one, last for a period of time exceeding one quarter of the total duration of the contract, the EO may request the termination of the Contract without compensation; the Contracting Authority may oppose the termination of the Contract but, in this case, it shall reimburse the Contract for the additional costs deriving from the extension of the suspension beyond the aforementioned terms, recording them in the accounting documentation. No compensation is due to the EO in other cases.

28. SUSPENSIONS ORDERED BY RUP

Pursuant to art. 107, paragraph 2, of the Code of Contracts, the RUP may order the suspension of execution for reasons of necessity or public interest, including the interruption of financing for public finance needs. The order shall be sent to the EO and the DEC at the same time and shall be effective from the date of issue.

The RUP itself determines the point at which the reasons of public interest or special necessity which led it to order the suspension have ceased to exist and issues the resumption order, which is promptly forwarded to the EO and the DEC.

29. WORKTOP

Within 10 (ten) days from the signing of the Contract, and in any case before the start of the service, the EO prepares and delivers to the DEC and the RUP its own Work Plan of activities, which must be consistent with the phases provided for in the ISP, the contractual and completion times and with what is proposed in the Offer; this Plan must be approved by the DEC, by affixing a stamp, within 10 (ten) days of receipt, at the same time notifying the RUP. Approval is subject to obvious illogicalities or erroneous indications that are incompatible with compliance with the deadlines.

The Work Plan must take into account and be consistent with the intermediate time thresholds provided for in these Specifications.

The Work Plan must be consistent with the deadlines of the PNRR.

30. MANDATORY NATURE OF THE TERMS OF EXECUTION

The following shall not constitute grounds for postponement of the commencement of services, for their failure to be conducted regularly or continuously in accordance with the relevant programme or for their delayed completion:

a) the delay in the installation of the construction site for the execution of on-site investigations, tests and surveys and in the connection to the technological networks necessary for its operation, for the supply of electricity and water;

b) the fulfilment of requirements, or the remedying of inconveniences or infractions found by the DEC or by the health and safety supervisory bodies, including the safety coordinator during the execution phase;

c) the time necessary for the fulfilment of the obligations to be fulfilled by the EO in any case provided for in these Specifications;

d) any disputes between the EO and suppliers, subcontractors, contractors, other persons appointed by the EO or the delays or defaults of the same parties;

e) any disputes of a corporate nature between the EO and its employees;

f) suspensions ordered by the Contracting Authority, the DEC, or the RUP for non-compliance with the safety measures of workers on the site or non-compliance with wage, contribution, social security or welfare obligations towards workers employed on the site;

g) suspensions ordered by the inspection staff of the Ministry of Labour and Social Security in relation to the presence of personnel not resulting from the records or other mandatory documentation or in the event of repeated violations of the regulations on exceeding working hours, daily and weekly rest, pursuant to Article 14 of the Consolidated Law on the protection of health and safety in the workplace, until revoked.

Delays or non-fulfilment by firms, companies, suppliers, technicians or others, who have contractual relations with the Contracting Authority, shall not constitute grounds for postponement of the commencement of services, their failure to be carried out regularly or continuously in accordance with the relevant programme or their delayed completion, if the EO has not promptly notified the Contracting Authority in writing of the causes attributable to such companies, companies or suppliers or technicians or others.

The aforementioned causes cannot constitute grounds for requesting extensions or suspensions, for the non-application of penalties, or for the possible termination of the Contract.

31. TERMINATION OF THE CONTRACT FOR FAILURE TO COMPLY WITH THE TERMS

Pursuant to Article 108(4) of the Code of Contracts, if the performance of the services is delayed due to negligence on the part of the EO with respect to the provisions of the contract, the Director

of Contract Execution (DEC) shall assign it a time limit, which, except in cases of urgency, may not be less than ten days, within which the EO must perform the services. Once the deadline has expired, and minutes are drawn up in contradictory with the EO, if the non-compliance persists, the Contracting Authority terminates the contract, without prejudice to the payment of penalties.

32. PRICE ADVANCE

Pursuant to Article 35, paragraph 18, of the Public Procurement Code, a sum equal to **20% (twenty percent)** of the contractual amount relating to the service is provided for as an advance. This advance payment will be paid after the signing of the Contract or within 15 (fifteen) days from the actual start of the service and that the conditions referred to in the following paragraphs are verified.

The disbursement of the advance is subject to the provision by the EO of a specific surety or insurance guarantee, with a guaranteed amount at least equal to the advance, increased by VAT at the legal rate, also increased by the legal rate of interest applied to the period necessary for the recovery of the advance itself according to the time schedule of the service. The amount of the guarantee shall be gradually and automatically reduced in the course of execution, in proportion to the advance amounts recovered at the time of each payment, until full compensation.

The guarantee is provided by means of a deed of security or surety, or in the forms of art. 93, paragraph 2, of the Code of Contracts, by banking or insurance companies that meet the solvency requirements provided for by the laws governing their respective activities or issued by financial intermediaries registered in the register referred to in Article 106 of Legislative Decree no. 385 of 1 September 1993, which exclusively or predominantly carry out the issuing of guarantees and which are audited by an auditing firm registered in the register provided for by Article 161 of Legislative Decree no. 58 of 24 February 1998 and which meet the minimum solvency requirements required by current banking and insurance regulations.

The guarantee must comply with the relevant form referred to in "Annex B – Technical Data Sheets" of the Decree of the Ministry of Economic Development of 16 September 2022, no. 193 (in Official Gazette, 14 December 2022, no. 291) containing "*Regulation containing the standard schemes for surety guarantees and insurance policies referred to in articles 24, 35, 93, 103 and 104 of Legislative Decree no. 50 of 18 April 2016, as amended*".

The EO forfeits the advance, with the obligation to repay, if the execution does not proceed according to the agreed obligations and/or the contractual times, due to delays attributable to him. In this case, on the sums returned, the Contracting Authority is also entitled to interest at the legal rate starting from the date of disbursement of the advance.

33. PAYMENTS ON ACCOUNT

The payment of the fees will be made in accordance with the law, according to the percentages of the Progress Reports provided for in Article 22 of these Specifications**, whenever the EO credit exceeds 1,500,000 euros** net of withholding taxes and taxes.

In order to proceed with the payments, the assessment pursuant to art. 26 of Ministerial Decree no. 49 of 7 March 2018 of the service provided, in terms of quantity and quality, with respect to the requirements set out in the contractual documents is carried out by the DEC. This assessment takes place within 30 days of the deadline for performance of the service to which it refers. The DEC certifies the Progress with a special document also signed by the EO.

The RUP, after verifying the regularity of the EO's contributions, orders the payment, on which the legal withholdings are applied in addition to those for the compensation of the advance. The RUP issues the payment certificate authorising the EO to issue the invoice.

The Contracting Authority shall provide for the payment, in favour of the EO, within the following 30 (thirty) days after the submission of regular electronic tax invoices.

The payment of advances is suspended in the following cases, subject to documentary verification of the non-compliance detected and written objection to the same:

- for failure to activate the professional or third-party liability policy, in the event of damage caused to movable and immovable property and/or third parties;
- for non-compliance or insufficiency of the guarantees and insurance coverage resulting from the variant or the granting of extensions;
- for failure to eliminate the harmful consequences or failure to perform any services ordered by the DEC.

The EO has the right to submit written observations or objections when making payments.

34. FORMALITIES AND FULFILMENTS TO WHICH PAYMENTS ARE SUBJECT

Pursuant to art. 1, par. 3 of Legislative Decree no. 127 of 5 August 2015, as amended by art. 1, par. 909 of Law no. 205 of 27 December 2017, payments will be made after issuing invoices in electronic format through the Interchange System (SdI) of the Revenue Agency, to the IPA Office Unique Code KR07WA and reporting the letter "S" in the VAT Chargeability Field

Each payment is subject to the submission to the Contracting Authority of the relevant tax invoice in electronic format, containing the references to the consideration subject to the payment, and subsequent to the issuance of the payment certificate by the RUP.

It should be noted that the Contracting Authority is required to apply the split payment mechanism provided for in Article 1, paragraph. 629(b) of Law no. 190 of 23 December 2014.

The invoices must be made out to INFN-LNS (Ente 84001850589 Tax Code) and, accompanied by the details of the Contract (number and date), must include, in addition to the method of payment, CIG and CUP and the notes required by the PNRR for reporting.

In the invoice, the EO, for the purposes of economic and financial accounting, must specify the time accrual, as well as all the elements useful for understanding the unit and/or total amounts that led to the invoiced amount.

In the case of temporary groupings, the invoicing of the consideration must correspond to the amounts resulting from the mandate conferred or the deed of incorporation or indicated at the time of stipulation of the Contract. The discrepancy between the invoiced amounts and the participation fees known to the Contracting Authority suspends the payment, without the right for the EO to the recognition of interest or other compensation.

No payment, even partial, will be made until the receipt of the electronic invoice according to the above specifications. In the event of an irregular invoice, the payment deadline will be suspended from the date of dispute by the Contracting Authority.

Each payment is subject to:

a) verification of the regularity of the tax document (invoice) issued by the EO;

b) the acquisition of the DURC, the EO and any subcontractors;

c) the fulfilment of the obligations referred to in these Specifications in favour of subcontractors and subcontractors;

d) compliance with payment traceability requirements;

e) the ascertainment, by the Contracting Authority, pursuant to Article 48-bis of Presidential Decree no. 602 of 29 September 1973, of any non-compliance with the payment obligation deriving from the notification of one or more payment notices, for a total amount at least equal to the amount to be paid, in the manner set out in Ministerial Decree no. 40 of 18 January 2008. In the event of ascertained non-compliance, payment is suspended and the circumstance is reported to the competent collection agent for the territory.

Pursuant to art. 30, paragraph 6 of the Code of Contracts, in the event of delay in the payment of wages due to OE employees, subcontractors or piecework holders, pursuant to art. 105, paragraph 18, last sentence of the Code of Contracts, the RUP invites in writing the defaulting party, and in any case the EO, to take action within 15 (fifteen) days. If the aforementioned deadline has expired without the merits of the request having been formally and justifiably contested, the Contracting Authority shall proceed with the payment, withholding a sum corresponding to the receivables claimed by the employees of the EO, the subcontractors or the holders of piecework.

35. LATE PAYMENTS

No interest shall be payable for the first 45 days between the occurrence of the conditions and circumstances for the issuance of the payment certificate and its actual issuance and making available to the Contracting Authority for settlement; after this period, without the payment certificate being issued, statutory interest is due to the EO for the first 60 days of delay; If this period has also expired, the EO shall be entitled to interest on arrears.

For the calculation of default interest, the B.C.E. rate referred to in Article 5, paragraph 2, of Legislative Decree no. 231 of 9 October 2002, increased by 8 (eight) percentage points, is taken as a reference.

Interest shall be paid ex officio at the time of payment, either on account or in balance, immediately thereafter, without the need for questions or reservations; The payment of such interest shall take precedence over the payment of the sums by way of enforcement.

Under no circumstances shall default interest be payable where payment has been suspended as a result of deficiencies and/or defaults as specified in these Specifications.

It is the right of the EO, after the terms referred to in the previous paragraphs, or in the event that the amount of the unpaid advance instalments reaches 15% of the net contractual amount, to act pursuant to Article 1460 of the Civil Code, refusing to fulfil its obligations if the Contracting

Authority does not promptly provide for the full payment of the amount accrued; alternatively, the EO has the right, subject to formal notice from the Contracting Authority, to initiate proceedings for the declaration of termination of the contract, after 60 days from the date of the aforementioned formal notice.

For the payment of the balance instalment late with respect to the deadline established for reasons attributable to the Contracting Authority, legal interest shall run on the sums due.

The provisions of this Article shall apply to both payments on account and final payments.

36. PRICE REVISION AND ADJUSTMENT OF THE FEE

Please refer to Article 3.4 of Document <ETIC_WP6_0-A02 TENDER REGULATIONS (DDG)>.

37. ASSIGNMENT OF CONTRACT AND ASSIGNMENT OF RECEIVABLES

Pursuant to Article 105 of the Code of Contracts, the assignment of the Contract in any form is prohibited, any act to the contrary is null and void. In the event of non-compliance by the EO with the obligations referred to in this paragraph, the Contracting Authority, without prejudice to the right to compensation for damages, has the right to terminate the Contract by law.

The assignment of receivables is permitted, pursuant to the combined provisions of Article 106, paragraph 13, of the Public Contracts Code and Law no. 52 of 21 February 1991, provided that the transferee is a banking institution or a financial intermediary registered in the appropriate Register with the Bank of Italy and that the assignment contract, stipulated by means of a public deed or notarized private deed, is notified to the Contracting Authority. The assignment is effective and enforceable against the Contracting Authority if the latter does not refuse it with a notice to be notified to the transferor and the transferee within forty-five days of the notification of the assignment itself. The Contracting Authority does not accept assignments of receivables for the amounts of the Contract relating to services that the EO intends to subcontract. The

assignment contract, even if carried out cumulatively for several contractual relationships, clearly indicates the details of the contract to which the assignment refers and the individual amounts transferred with reference to the relevant contracts and in any case contains the clause according to which the assigned Contracting Authority may oppose to the transferee all the exceptions that may be enforced against the transferor on the basis of the Contract, under penalty of automatic unenforceability of the assignment to the Contracting Authority.

The deed of assignment must indicate the amount of the assigned receivable, the assignee of the same, the payment methods and the bank references (IBAN code) of the assignee itself. The transferee is required to comply with the traceability regulations set out in Law no. 136 of 13 August 2010. The Contracting Authority may oppose to the transferee all the exceptions that may be invoked against the transferor by virtue of the Contract. In any case, the assignment of receivables must take place in accordance with the methods and regulatory provisions indicated above.

38. PROVISIONAL WARRANTY

Pursuant to Article 93, paragraph 1 of the Code of Contracts, bidders are required to provide a provisional deposit, in the manner, under the conditions and within the limits set out in the Tender Regulations to which reference should be made.

39. ULTIMATE WARRANTY

Pursuant to Article 103 of the Code of Contracts, in the event of the award of the contract, the EO shall provide a definitive guarantee for the performance of the Contract, equal **to 10% (ten percent) of the contract amount in the form of** a bond or surety in the manner set out in Article 93, paragraphs 2 and 3, of the Code of Contracts, in favour of the Contracting Authority, valid until the certificate of verification of conformity.

Pursuant to Article 103, paragraph 1, of the Code of Contracts, in the event of an award with discounts of more than ten per cent, the guarantee to be provided will be increased by as many percentage points as those exceeding 10 per cent. Where the reduction is more than twenty per cent, the increase shall be two percentage points for each point of reduction of more than twenty per cent.

The EO, therefore, at the same time as signing the Contract, must produce the definitive guarantee.

The guarantee must comply with the model scheme referred to in the Decree of the Ministry of Economic Development of 16 September 2022, no. 193 (in Official Gazette, 14 December 2022, no. 291) containing "*Regulation containing the standard schemes for surety guarantees and insurance policies referred to in articles 24, 35, 93, 103 and 104 of Legislative Decree 18 April 2016, No. 50, as amended*".

The definitive guarantee may be used for the purposes set out in Article 103, paragraph 2 of the Public Procurement Code. The forfeiture of the guarantee takes place by a unilateral act of the Contracting Authority without the need for a judicial declaration, without prejudice to the right of the EO to bring an action before the ordinary judicial authority. The lack of regular remuneration and contributions of the EO and its subcontractors that can be inferred from the DURC and/or similar certificates issued by the social security institutions constitutes a significant breach of contract, also for the purposes of progressive release and on the balance.

If the guarantee is provided with a surety with a contract drawn up and signed electronically, it is digitally signed by both the guarantor and the OE.

If the guarantor issues a copy of the contract in the manner established by paragraph 2-bis of Article 23 of Legislative Decree no. 82 of 7 March 2005 (Digital Administration Code), it will be the responsibility of the EO to provide, via certified email, the contract with both digital signatures.

The release of the surety is regulated by Article 103, paragraph 5 of the Code of Contracts.

The Contracting Authority shall request the E to reinstate the guarantee if it has failed in whole or in part; in the event of non-compliance, reinstatement shall be made on the basis of the advances to be paid to the EO. In the event of changes to the Contract as a result of subsequent acts of submission, the same guarantee may be reduced in the event of a decrease in the contractual amounts, while it is supplemented in the event of an increase in the same amounts up to one fifth of the original amount.

Pursuant to Article 103, paragraph 10 of the Public Procurement Code, in the case of temporary groupings, the sureties and insurance guarantees are presented, on an irrevocable mandate, by the agent in the name and on behalf of all competitors, without prejudice to joint and several liability between the companies.

40. INSURANCE OBLIGATIONS TO BE BORNE BY THE EO

Pursuant to Article 24, paragraph 4, of the Code of Contracts, the EO of the assignment must be equipped with the professional civil liability policy, referred to in Article 5 of Presidential Decree no. 137 of 7 August 2012. If the EO is a company, it transmits the insurance policy referred to in Art. 1, paragraph 148 of Law no. 124 of 4 August 2017. The policy of professional associations expressly provides for insurance coverage for members and consultants as well.

The person in charge of the design, at the same time as signing the contract, must produce a declaration from an insurance company authorized to exercise the "general civil liability" branch in the territory of the European Union, containing the commitment to issue the professional civil liability policy with specific reference to the planned works. The above-mentioned policy and the declaration of commitment must have coverage for a maximum of not less than: **€ 1,000,000.00 (one million/00 euros).**

In addition to the risks referred to in Article 106, paragraphs 9 and 10 of the Code of Contracts, the policy must also cover the risks arising from errors or omissions in the drafting of the project that may result in new design costs and/or higher costs for the Contracting Authority.

In the case of a grouping, the insurance coverage against professional risks must be met by the group as a whole and, more specifically, a single policy must be presented by the agent for the indicated ceiling, with coverage extended to all operators in the group.

The policy must also cover damage caused by contractors, employees and trainees.

The EO must also produce, at the same time as signing the Contract, or in any case before the date scheduled for the start of the performance, an insurance policy to cover civil liability for accidents or damages that may be caused by him/her to persons and/or property of the EO itself, of the Contracting Authority or of third parties (including employees of the EO and/or subcontractor and/or subcontractor or of the Contracting Authority), in the execution of survey and investigation activities, laboratory tests and any field activity.

The policy must also insure the Contracting Authority against civil liability for accidents and/or damage caused to persons and/or property of the EO itself, the Contracting Authority or third parties (including employees of the EO and/or subcontractor and/or subcontractor or the Contracting Authority) during the course of execution. Therefore, the guarantee must be taken out in the form of "Contractors All Risks" (C.A.R.).

The insurance policy is provided by banking or insurance companies that meet the solvency requirements provided for by the laws governing their respective activities or issued by financial intermediaries registered in the register referred to in Article 106 of Legislative Decree no. 385 of 1 September 1993, which exclusively or predominantly carry out the issuing of guarantees and which are audited by an auditing firm registered in the required register Article 161 of Legislative Decree no. 58 of 24 February 1998 and that meet the minimum solvency requirements required by current banking and insurance regulations.

The insurance guarantee for civil liability for damage caused to third parties (R.C.T.) and that for damage caused to workers (R.C.O.) must be stipulated for a sum insured (maximum/claim) equal to **€ 500,000.00.** The R.C.T./R.C.O. policy must expressly provide that the insured third parties

must include all persons who, in any capacity and/or capacity, participate or attend the service, regardless of the nature of their relationship with the EO, including, but not limited to:

- the DEC, the RUP, the directors, all the managers, the employees, the supervisors, the staff and the consultants of the Contracting Authority and anyone, in any capacity, who has relations with the aforementioned bodies;

- all personnel employed by the EO, for bodily injuries suffered by the latter in the course of service;

- the owners and employees of any subcontractors, of all the companies and/or companies that participate, even occasionally, in the execution, as well as of the supplier companies;

- the public and anyone who has relations with the Contracting Authority.

If your insurance contract provides for overdraft or deductible amounts or percentages:

- in relation to insurance against all execution risks, such deductibles or overdrafts are not enforceable against the Contracting Authority;

- in relation to civil liability insurance, such deductibles or overdrafts are not enforceable against the Contracting Authority.

Insurance policies from the EO also cover damage caused by subcontractors and subcontractors without reservation.

If the EO is a temporary grouping or a consortium, under the regime of joint and several liability governed by Article 48(5) of the Code of Contracts, the insurance guarantee is provided by the contractor in the name and on behalf of all the competitors in the group or consortium.

The policies referred to in the previous paragraphs must be extended not only to the case of gross negligence of the EO but also to the case of slight negligence of the EO itself, and must bear the declaration of constraint in favour of the Contracting Authority. The EO is required to scrupulously

comply with all the conditions expressed by the policies and to promptly provide for all the fulfilments required by them to achieve operations in all circumstances.

In the event of a claim, the EO is obliged to replenish the sums insured.

In the event of an extension or update of the sum insured, the EO must send the corresponding update of the policy to the Contracting Authority.

The policies will start from the date of commencement of the assignment and will end with the issuance of the certificate of verification of conformity. Failure to present the policy will result in the forfeiture of the assignment and will authorize the replacement of the assignee.

41. CHANGE IN PERFORMANCE

No variation may be introduced by the executor on its own initiative, for any reason, in the absence of authorization from the Contracting Authority, expressed explicitly and exclusively by RUP and DEC, and in no case may it claim compensation, reimbursement or indemnity for what has been carried out in violation of this prohibition.

The Contracting Authority reserves the right to introduce variations that it deems appropriate at its sole discretion. If necessary, in the event of increasing variations, the EO will be granted an additional period of time, commensurate with the time required for the performance of the services subject to variation.

Non-contractual services of any kind are not recognised, carried out without prior written order from the DEC, subject to approval by the Contracting Authority where this is prescribed by law or by the Regulations.

Any complaint or reservation must be submitted by the EO in writing to the DEC prior to the execution of the variation or modification that is the subject of the dispute. In the absence of prior agreement before the start of the services subject to modification or variation, requests for higher fees on what is established in the Contract shall not be considered, for any nature or reason.

Interventions authorised pursuant to art. 106, paragraph 1 letter e) of the Code of Contracts, ordered by the RUP to resolve detailed aspects, which are contained within an amount not exceeding 10% of the amount of the Contract stipulated and provided that they are not essential or non-substantial pursuant to art. 106, paragraph 4 of the Code of Contracts.

The variant is accompanied by a deed of submission that the EO is required to sign as a sign of acceptance.

As required by art. 106, paragraph 12 of the Public Procurement Code, the Contracting Authority may always order the performance to an extent lower or higher than that provided for in the Contract, within the limit of one fifth of the amount of the Contract itself, at the same prices, agreements and conditions as the original Contract and without anything being due to the EO by way of compensation except for the consideration relating to the new services.

For the purposes of determining the fifth, the amount of the contract is made up of the sum resulting from the original Contract, increased by the amount of the deeds of submission, of the additional acts for variants that have already occurred as well as of the amount for amounts, other than those by way of compensation, that may be paid to the EO for amicable settlements and/or agreements.

Pursuant to art. 22, paragraph 4 of Ministerial Decree no. 49 of 7 March 2018, in the event that the Contracting Authority orders downward variations within the limit of one fifth of the amount of the Contract, it must notify the EO promptly and in any case before the fourth fifth of the contract amount is reached; in such a case, the EO is not entitled to any compensation.

During the execution of the contract, the EO may propose to the DEC any improvements within the limit referred to in paragraph 5, if they do not slow down or suspend the execution and do not reduce or compromise the expected performance. Such changes must be approved by the RUP, which may refuse to approve them without the need for a reason other than strict compliance with the provisions on which the tender is based. The relative cost savings are half in favour of the Contracting Authority and half in favour of the EO.

The RUP or, subject to the latter's authorisation, the DEC, may order detailed changes that do not entail an increase or decrease in the contract amount.

The EO is obliged to notify the RUP of any subjective modification of the Contract with another operator in the course of execution pursuant to art. 106, paragraph 1, letter d) of the Code of Contracts, such as inheritances due to death or as a result of corporate restructuring, including takeovers, mergers, demergers, acquisitions or insolvencies. Corporate restructuring also includes the sale and lease of a business or business unit and any other further and different corporate events that are legitimate in the light of the legal system.

In order to verify the existence of the above conditions, the EO is obliged to notify the RUP in advance of the aforementioned changes, documenting the possession of the qualification requirements of the successor economic operator. In the absence of such communication, the amendments shall not have effect on the Contracting Authority. Following the communication received from the EO, the Contracting Authority shall proceed within 30 days following the verification of the possession of the qualification requirements, failing which it may oppose the amendments referred to in this paragraph. Once the aforementioned terms have elapsed without any opposition, the above amendments shall have their effects with regard to the Contracting Authority, without prejudice to the provisions of Article 88, paragraph 4-bis and Article 92, paragraph 3 of the Anti-Mafia Code.

42. SAFETY IN THE WORKPLACE

Pursuant to the Consolidated Law on Health and Safety at Work, the EO must send to the Contracting Authority, within the deadline prescribed by the latter with a specific request and in any case before the conclusion of the Contract or, before the drafting of the report of the start of the execution if these have begun pending the stipulation of the Contract, the DUVRI and a declaration that it is not the recipient of suspension or interdiction measures referred to in Article 14 of the aforementioned Text Unique.

It shall be the obligation of the EO to adopt the necessary measures and precautions in the execution of the services to guarantee the life and safety of workers, persons in charge of the service and third parties, as well as to avoid damage of any kind to public and private property.

The EO is subject to all obligations towards its employees resulting from the laws and regulations in force on labour and social insurance and assumes all related charges.

In the execution of the contract, the EO guarantees full compliance with the environmental, social and labour obligations established by European and national legislation, collective agreements or international provisions listed in Annex X of the Public Procurement Code.

The EO, within 30 (thirty) days from the award and in any case within 5 (five) days before the start of the activities, must deliver all the documents relating to the safety of the same, in compliance with the current laws and regulations on safety.

Serious or repeated violations of the rules concerning safety in the workplace by the EO, subject to formal formal notice of formal notice by the interested party, constitute grounds for termination of the Contract.

The Contracting Authority remains exempt from any liability for the consequences of any infringements committed by the EO that may be ascertained during the performance of the services covered by the contract.

43. SUBCONTRACTING

Subcontracting is permitted in compliance with the conditions set out in these Specifications, and in accordance with the provisions of Article 105 of the Code of Contracts, as amended by Article 49 of Decree-Law No. 77 of 31 May 2021, converted with amendments by Law No. 108 of 29 July 2021, as well as by Article 31, paragraph 8, second sentence, of the same Public Procurement Code.

Subcontracting is permitted, subject to the authorisation of the Contracting Authority, at the request of the EO duly documented, in accordance with the provisions of these Specifications and in any case in compliance with current legislation.

It should be noted that in relation to the design assignment pursuant to Article 31, paragraph 8, of the Code of Contracts, the EO **may not** make use of subcontracting, except for geological, geotechnical and seismic investigations, surveys, surveys, measurements and stakeouts, preparation of specialized and detailed drawings, with the exclusion of geological reports, as well as for the sole graphic drafting of the design documents. However, the sole responsibility of the designer remains.

Subcontracting is permitted, subject to the authorisation of the Contracting Authority, subject to the acquisition of the DURC of the EO and the DURC of the subcontractor, under the following conditions:

a) that the subcontractor is qualified to perform the services;

b) that the EO has indicated at the time of the tender the services and supplies or parts of services and supplies that it intends to subcontract, in the event of changes in the course of execution, this indication must be made at the time of entrustment;

c) that, at least twenty days before the date of actual commencement of the performance of the relevant services, the EO shall deposit, at the Contracting Authority:

- a certified copy of the subcontract, either in original or certified copy; this subcontracting contract will eventually be subject to a condition of termination, in the event that, at the time of delivery to the Contracting Authority, the Contract has not yet been signed; The subcontracting contract must show, failing which the application will be rejected or any authorisation granted will be revoked:

  - the inclusion of clauses pursuant to Article 3, paragraphs 1 and 9, of Law no. 136 of 13 August 2010;

- the identification of the services entrusted with the relative amounts, in order to verify the qualification of the subcontractor and the issuance of the certificate of performance of the services;

- the amount of labour costs (including social security charges) pursuant to Article 105, paragraph 14, of the Code of Contracts.

▪ a declaration as to whether or not there is any form of control or connection, pursuant to Article 2359 of the Civil Code, with the undertaking to which the subcontract or piecework is entrusted; in the case of a temporary grouping, company of undertakings or consortium, a similar declaration must be made by each of the undertakings participating in the group, company or consortium;

d) that the EO, together with the filing of the subcontract with the Contracting Authority, pursuant to letter c., sends to the Contracting Authority:

▪ documentation certifying that the subcontractor meets the requirements prescribed by current legislation for participation in public works tenders, in relation to the category and amount of the works to be carried out on a subcontracted or piece-rate basis;

▪ one or more declarations by the subcontractor, issued pursuant to Articles 46 and 47 of Presidential Decree no. 445 of 2000, certifying the possession of the general requirements and the absence of the grounds for exclusion referred to in Article 80 of the Code of Contracts;

e) that the subcontractor does not comply with any of the prohibitions provided for in Article 67 of the Anti-Mafia Code; To do this:

▪ if the amount of the subcontract exceeds € 150,000, the condition is ascertained by acquiring the anti-mafia information referred to in Article 91, paragraph 1, letter c) of

the aforementioned Code, acquired in the manner referred to in Article 67, paragraph 2 or paragraph 3 below;

- subcontracting is prohibited, regardless of the amount of the related works, if one of the situations indicated in Articles 84(4) or 91(7) of the aforementioned Code is established for the subcontractor.

In the absence of anti-mafia documentation and in the absence of verification of the non-existence of the causes of exclusion referred to in art. 80 of the Code of Contracts, subcontracting is deemed to have been granted pending a termination condition; If the anti-mafia documentation as well as the sample checks carried out are negative, the subcontracting authorization is considered revoked.

Failure to comply with the conditions laid down by current legislation for the authorisation of subcontracting and for the execution of the same precludes the authorisation or leads to its revocation if it has already been issued, and may constitute grounds for termination of the Contract, according to the appreciation of the RUP.

In the case of sub-contracts or sub-contracts that are not sub-contracts within the meaning of Article 105, paragraph 3 of the Code of Contracts, entered into for the performance of the Contract, they must be communicated to the RUP before the start of the service, specifically detailing:

- the name of the sub-contractor;
- the amount of the sub-contract;
- the object of the work, service or supply entrusted;
- any changes to this information that occur in the course of the sub-contract.

The EO is also obliged to notify the Contracting Authority of any changes to this information that occur during the sub-contract.

The EO is also required to submit the following documentation to the Contracting Authority:

- declaration by the sub-contractor certifying the conformity of the equipment used;
- list of authorized personnel;
- declaration certifying compliance with the regulations on the safety and health of workers;
- declaration by the sub-contractor, in compliance with the traceability obligations provided for by art. 3 of Law no. 136 of 13 August 2010.

Subcontracting must be authorised in advance by the Contracting Authority following a written request from the EO, in the following terms:

- the authorisation shall be issued within 30 days of receipt of the request; this period may be extended only once for no more than 30 days, where justified reasons are present; after the same deadline, which may be extended, without the Contracting Authority having acted, the authorisation shall be deemed to have been granted to all intents and purposes if all the legal conditions for the award of the subcontract are met;
- For subcontracts of less than 2% of the contract amount or of less than €100,000, the time limits referred to in point (a) shall be reduced to 15 days.

Article 105, paragraph 14 of the Code of Contracts applies.

Subcontracted services may not be further subcontracted, so the subcontractor may not subcontract the services itself.

In the event of non-compliance by the EO with the obligations referred to in the preceding paragraphs, the Contracting Authority may terminate the Main Contract, without prejudice to the right to compensation for damages.

The Contracting Authority verifies that in the contracts signed with subcontractors and subcontractors in the supply chain of companies in any capacity interested in the services, a specific clause is inserted, under penalty of absolute nullity, with which each of them assumes the obligations of traceability of financial flows pursuant to Law no. 136 of 13 August 2010.

With regard to subcontracted services, the DEC performs the following functions:

- verifies the presence at the place of execution of the Contract of the authorised subcontractors, as well as of the subcontractors, who are not subcontractors, whose names have been communicated to the Contracting Authority pursuant to Article 105, paragraph 2, of the Code;
- checks that subcontractors and subcontractors actually perform the part of the services entrusted to them, in compliance with current legislation and the contract stipulated;
- records the Performer's objections to the regularity of the services performed by the subcontractor and, for the purposes of suspending payments to the Performer, determines the amount of the portion corresponding to the disputed service;
- shall, without delay and in any case within twenty-four hours, notify the RUP of the non-compliance by the executor with the provisions of Article 105 of the Code.

In the event of recourse to the institution of recourse by the Executor, the DEC assists the RUP in carrying out the activities of verifying the technical capacity requirements pursuant to Article 89, paragraph 9, of the Code.

Pursuant to Article 105, paragraph 1, of the Code of Contracts, under penalty of nullity, without prejudice to the provisions of Article 106, paragraph 1, letter d), the contract may not be assigned, the full performance of the services or works covered by the contract, as well as the predominant execution of the works relating to all the prevailing categories and labour-intensive contracts, may not be entrusted to third parties.

44. LIABILITY FOR SUBCONTRACTING

Pursuant to Article 105(8) of the Code of Contracts, the main contractor and the subcontractor are jointly and severally liable to the contracting authority in relation to the services covered by the subcontract.

In any case, the EO remains liable to the Contracting Authority for the performance of the subcontracted services, relieving the latter of any claim by subcontractors or claims for damages made by third parties as a result of the performance of subcontracted services. The EO undertakes to indemnify and hold harmless the Contracting Authority from any claim by third parties for facts and faults attributable to the subcontractor or its auxiliaries. The EO is jointly and severally liable with the subcontractor for the latter's fulfilment of the safety obligations provided for by current legislation.

The EO undertakes to promptly terminate subcontracting contracts if, during the execution of the same, the Contracting Authority ascertains non-compliance by the subcontractors of such importance as to justify the termination, having regard to the interest of the Contracting Authority; in this case, the EO will not be entitled to any indemnity from the Contracting Authority or to the postponement of the terms of execution of the Contract.

The DEC and the RUP shall verify, each according to its own competence, compliance with all the conditions for the admissibility and performance of subcontracting contracts.

Unauthorized subcontracting entails a serious and essential breach of contract, also pursuant to Article 1456 of the Civil Code, with the consequent possibility for the Contracting Authority to terminate the Contract to the detriment of the EO.

The EO shall replace subcontractors in respect of whom a specific verification has demonstrated the existence of the grounds for exclusion referred to in Article 80 of the Code of Contracts.

The EO shall take care of and ensure the coordination of all subcontractors, in order to make the specific plans drawn up by the individual subcontractors compatible with each other and

consistent with the plan submitted by the EO. In the case of a temporary grouping or consortium, that obligation is incumbent on the trustee.

45. PAYMENT OF SUBCONTRACTORS

With the exception of the cases referred to in Article 105, paragraphs 10 and 13 of the Code of Contracts, the Contracting Authority shall not provide for the direct payment of subcontractors in relation to the sums due to them for the services performed.

In any case, the EO is obliged to send to the same Contracting Authority, within 20 (twenty) days from the date of each payment made to it, a copy of the receipted invoices relating to the payments it has paid to the same subcontractors, indicating the part of the services actually performed by the subcontractors and the relative amounts, under penalty of suspension of subsequent payments.

The same rules apply in relation to sums due to subcontracted performers whose services are paid on the basis of the progress of performance.

Any payments made directly by the Contracting Authority to the subcontractor are subject to the acquisition of the DURC, the EO and the subcontractor and compliance with the payment traceability requirements set out in these Specifications.

If the EO fails to comply with the requirements referred to in paragraph 2, the Contracting Authority shall suspend the payment of the instalments on account or the balance for as long as the non-compliance persists.

The EO is jointly and severally liable with the subcontractor in relation to salary and social security obligations, pursuant to Article 29 of Legislative Decree no. 276 of 10 September 2003. In the cases referred to in paragraph 13(a) and (c) of Article 105 of the Code of Contracts, the EO shall be released from the joint and several liability referred to in the first sentence.

The EO is required to fully comply with the economic and regulatory treatment established by the national and territorial collective agreements in force for the sector and for the area in which the services are performed. It is also jointly and severally liable for the compliance of subcontractors with the aforementioned rules towards their employees for the services rendered in the context of the subcontract.

The EO and, through it, the subcontractors, shall transmit to the Contracting Authority before the start of the execution the documentation of the complaint to the social security, insurance and accident prevention institutions.

In the event of delay in the payment of wages due to the employees of the EO or of the subcontractor or of the subcontractors and piecework, as well as in the event of non-compliance with contributions resulting from the DURC, the provisions of Article 30, paragraphs 5 and 6 of the Code of Contracts shall apply.

In the event of a formal objection to the requests referred to in the previous paragraph, the RUP will forward the requests and objections to the Provincial Directorate of Labour for the necessary investigations.

The Contracting Authority may invoke against the subcontractor the exceptions to payment constituted by the absence of one or more of the above conditions, as well as the existence of formal litigation from which it appears that the subcontractor's claim is not secured by certainty and enforceability, also with reference to Article 1262, first paragraph, of the Civil Code.

46. AMICABLE AGREEMENT

An amicable agreement may be reached pursuant to Art. 206 of the Code of Contracts when disputes arise during the execution of the Contract regarding the exact performance of the services due. To the extent compatible, the provisions of art. 205 of the Code of Contracts.

Pursuant to Article 208 of the Code of Contracts, even except in cases where recourse to an amicable agreement is provided for pursuant to the previous paragraph, disputes relating to

subjective rights deriving from the execution of the Contract may always be resolved by means of a deed of settlement, in writing under penalty of nullity, in compliance with the Civil Code, only and exclusively in the event that it is not possible to pursue other alternative remedies to judicial action.

In accordance with the provisions of art. 6 of Legislative Decree no. 76/2020, before the start of the execution, or in any case no later than ten days from that date, a technical advisory board will be established for the rapid resolution of disputes or technical disputes of any nature that may arise during the execution of the Contract itself.

For the regulation of the technical advisory board, please refer to the provisions of art. 6 of Legislative Decree no. 76/2020 and the "*Guidelines for the homogeneous application by contracting authorities of the functions of the technical advisory board referred to in articles 5 and 6 of Decree-Law no. 76 of 16 July 2020, converted, with amendments, by the law of 11 September 2020, n. 120 and art. 51 of Decree-Law No. 77 of 31 May 2021, converted, with amendments, by Law No. 108 of 29 July 2021*".

47. DISPUTE RESOLUTION AND JURISDICTION

If an amicable agreement is not reached and without prejudice to the provisions of the previous article with reference to the Technical Advisory Board and the regulations referred to therein, the Court of Rome shall have exclusive jurisdiction over any dispute relating to the contract to be entered into with the winning economic operator.

Arbitration is excluded.

The decision of the court on the dispute also decides on the amount of the court fees and their allocation to the parties, in relation to the amounts ascertained, the number and complexity of the issues.

48. COLLECTIVE AGREEMENTS AND LABOUR PROVISIONS

The EO is required to comply with all applicable laws, regulations and rules that may have come into force during the Contract, and in particular:

a) in the performance of the services that are the subject of the contract, the EO undertakes to fully apply the national collective labour agreement for the sector and the local and company agreements supplementary to it, in force for the time and in the place where the services are carried out;

b) the above-mentioned obligations bind the EO even if it is not a member of the contracting Associations or withdraws from them and regardless of the industrial or artisanal nature, the structure or size of the company itself and any other legal qualification;

c) is responsible, in relation to the Contracting Authority, for compliance with the aforementioned rules by any subcontractors with regard to their respective employees, even in cases where the collective agreement does not regulate the hypothesis of subcontracting; the fact that the subcontracting has not been authorised does not exempt the EO from liability, without prejudice to the other rights of the Contracting Authority;

d) is obliged to regularly comply with social security contributions, welfare, accident prevention and in any other area protected by special laws.

Pursuant to Article 30, paragraph 6, and 105, paragraphs 10 and 11 of the Public Procurement Code, in the event of unjustified delay in the payment of salaries due to the employees of the EO or its subcontractors, the RUP shall invite the defaulting party, and in any case the EO, to do so within the following fifteen days. If the merits of the request have not been formally and justifiably contested within the deadline set above, the Contracting Authority shall also pay the arrears of wages directly to the workers during construction, deducting the relevant amount from the sums due to the EO or from the sums due to the defaulting subcontractor in the event that direct payment is envisaged.

Pursuant to Article 30, paragraph 5, of the Code of Contracts, in the event of non-compliance with contributions resulting from the DURC relating to employees of the EO or of the subcontractor or of the holders of subcontracts, employed in the execution of the Contract, the Contracting Authority withholds from payments the amount corresponding to the default for subsequent direct payment to social security and insurance institutions.

Pursuant to Article 30, paragraph 5bis, of the Code of Contracts, a withholding tax of 0.50 per cent is applied to the progressive net amount of benefits; the withholdings can only be released at the time of settlement of the balance, after the approval by the Contracting Authority of the Certificate of Verification of Conformity, after acquisition of the DURC.

At any time, the DEC and, through it, the RUP, may request from the EO and subcontractors a copy of the single labour book referred to in Article 39 of Decree-Law No. 112 of 25 June 2008, converted with amendments by Law No. 133 of 6 August 2008, they may also request identification documents from the personnel present at the place of execution and verify their effective registration in the aforementioned single register of the EO or the authorised subOE.

49. SINGLE DOCUMENT OF CONTRIBUTION REGULARITY

The stipulation of the Contract, the disbursement of any payment, the stipulation of any deeds of submission or contractual appendices, the issuance of subcontracting authorizations, the certificate of verification of conformity, are subject to the acquisition of the DURC of the EO.

Pursuant to Article 31, paragraphs 4 and 5, of Decree-Law No. 69 of 21 June 2013, converted into Law No. 98 of 9 August 2013, after the signing of the Contract, the DURC is acquired every 120 (one hundred and twenty) days, or on the occasion of the first payment if prior to this deadline; the DURC is valid for 120 (one hundred and twenty) days and during the period of validity it can only be used for the payment of the advance, the advance installments and for the certificate of verification of conformity or regular execution. In order to pay the final balance, the acquisition of a new DURC is in any case necessary.

Pursuant to Article 30, paragraph 5, of the Public Procurement Code and Article 31, paragraph 3, of Decree-Law No. 69 of 21 June 2013, converted into Law No. 98 of 9 August 2013, in the event of obtaining the DURC that signals a non-compliance with contributions relating to one or more persons employed in the execution of the Contract, in the absence of timely regularization, the Contracting Authority:

- asks the competent social security and insurance institutions in a timely manner to quantify the amount of the sums that led to the irregularity, if this amount does not already appear in the DURC;
- withholds an amount corresponding to the default on the instalments on account and the balance instalment;
- it pays directly to the social security and insurance institutions, the amount due for non-compliance ascertained through the DURC, in place of the EO and subcontractors;
- It provides for the payment of the advance instalments and the balance instalment, limited to any remaining availability.

In the event that the DURC relating to the subcontractor is negative for two consecutive times, the Contracting Authority contests the objections to the subOE by assigning a deadline of not less than 15 (fifteen) days for the submission of counter-arguments; in the event of the absence or unsuitability of these, the Contracting Authority shall declare the subcontracting authorisation to be forfeited.

50. TERMINATION OF THE CONTRACT – EX OFFICIO ENFORCEMENT

Also pursuant to art. 108, paragraph 1, of the Public Procurement Code, the Contracting Authority has the right to terminate the Contract, during the period of its effectiveness, without further obligations in the following cases:

a) the occurrence of the need for amendments or variations qualified as substantial by Article 106, paragraph 4, of the Code of Contracts, which would have required a new procurement procedure or exceeded the limits or in violation of the conditions established by these Specifications;

b) with reference to the amendments referred to in Article 106, paragraph 1, letters b) and c), the thresholds referred to in paragraph 7 of the aforementioned article have been exceeded; with reference to the amendments referred to in Article 106, paragraph 1, letter e) of the aforementioned article, the thresholds established by the Contracting Authority have been exceeded; with reference to the amendments referred to in Article 106, paragraph 2, the thresholds referred to in the same paragraph 2, letters a) and b) have been exceeded;

c) the ascertainment of the circumstance according to which the EO, at the time of the award, fell within one of the conditions preventing the award provided for in Article 80, paragraph 1, of the Code of Contracts, due to the presence of a definitive criminal measure referred to in the aforementioned provision;

d) a finding that the contract should not have been awarded on the ground of a serious breach of the obligations arising from the Treaties, as recognised by the Court of Justice of the European Union in proceedings under Article 258 TFEU.

e) non-fulfilment that has led to the application of penalties for a total amount exceeding 20% of the contractual amount;

f) failure to comply with the traceability obligations set out in the reference paragraph of these Specifications;

Also pursuant to Article 108, paragraph 2, of the Code of Contracts, the following shall always and in any case constitute grounds for termination of the Contract:

a) the loss of the EO qualification requirements for producing false documentation or false statements;

b) the occurrence of a final measure against the EO ordering the application of one or more preventive measures referred to in the Anti-Mafia Code and the related preventive measures, or a final conviction has been issued for the offences referred to in Article 80 of the Code of Contracts;

c) non-compliance with the provisions of the contract or the DEC regarding the timing of execution or when it is ascertained that the injunctions or warnings made to him, within the terms imposed by the same measures, have been ascertained;

d) manifests incapacity or unsuitability, even if only legal, in the performance of the services;

e) when the EO is guilty of serious professional misconduct or when it interrupts the performance of the Contract, even if there are disputes;

f) when the EO modifies the composition of the Design Group indicated in the Offer, except in cases due to impediments not attributable to the fault of the EO itself or not foreseeable by it;

g) when the EO does not replace the members of the Design Group if this is requested by the Contracting Authority;

h) ascertained non-compliance with the legal regulations on accident prevention, occupational safety and compulsory personnel insurance;

i) suspension of the services or failure of the same by the EO without justified reason to such an extent as to jeopardize the performance of the services within the terms provided for in the Contract;

j) slowing down of performance, without justified reason, to such an extent as to jeopardize the performance of the services within the terms provided for in the Contract;

k) joint venture, assignment of the Contract, even partial, or violation of substantive rules governing subcontracting, abusive subcontracting, without prejudice, in the latter case, to the application of the sanctions provided for in Article 2 quinques of Law no. 726/1982;

l) lack of diligence in complying with the requirements of the RUP and/or the competent bodies for issuing the necessary authorizations;

m) non-compliance of the services with the specifications of the Contract and the purpose of the same;

n) clerical errors in the design and/or non-compliance with applicable regulations;

o) failure to comply with the regulations on the safety and health of workers referred to in the Consolidated Law on the protection of health and safety in the workplace, and with the injunctions made in this regard by the Director of Enforcement or by the RUP;

p) actions or omissions aimed at preventing access to the construction site to the inspection staff of the Ministry of Labour and Social Security or the ASL, or to the inspection staff of the joint bodies, referred to in Article 51 of the Consolidated Law on the protection of health and safety in the workplace;

q) violation of the requirements on the traceability of payments, in application of the provisions of these Specifications, without prejudice to the provisions of the last paragraph of Article 66, paragraph 2, of the same Specifications;

r) application of one of the measures of suspension of activity imposed pursuant to Article 14, paragraph 1, of the Consolidated Law on the protection of health and safety in the workplace or the zeroing of the score for the repetition of violations in the field of health and safety at work pursuant to Article 27, paragraph 1-bis, of the aforementioned Consolidated Law;

s) obtaining the negative DURC twice in a row; in this case, the RUP, having obtained a detailed report prepared by the Director of Enforcement, contests the objections and

assigns a period of not less than 15 (fifteen) days for the submission of counter-arguments; in the event of their absence or unsuitability, it proposes to the Contracting Authority the termination of the Contract, pursuant to Article 108 of the Code of Contracts;

t) actions or omissions aimed at preventing the inspection staff of the Ministry of Labour and Social Security or the competent A.S.L., or the inspection staff of the joint bodies referred to in Article 51 of the Consolidated Law on Health and Safety at Work.

When the DEC finds that the EO has breached its contractual obligations in such a way as to jeopardise the success of its services, it shall send a detailed report to the RUP, accompanied by the necessary documents, indicating the state of performance, the amount of which may be awarded to the EO.

The DEC also contests the objections to the EO and sets aside a period of not less than fifteen days for the submission of its counter-arguments to the RUP. Once the aforementioned counter-arguments have been acquired and negatively evaluated, or if the deadline has expired without the EO having responded, the Contracting Authority, on the proposal of the RUP, declares the Contract terminated.

If, apart from the provisions of the preceding paragraph, the performance of the services is delayed due to negligence on the part of the EO with respect to the provisions of the Contract, the DEC shall assign to the DEC a time limit, which, except in cases of urgency, may not be less than 10 days, within which the EO must perform the services. Once the deadline has expired, and minutes are drawn up in contradictory with the EO, if the non-compliance persists, the Contracting Authority terminates the Contract, without prejudice to the payment of penalties.

In the event of termination of the Contract, the EO is only entitled to payment for the services duly performed, less any additional costs resulting from the termination of the Contract.

In the event of termination of the Contract due to the bankruptcy of the EO, the economic relations with the latter or with the receiver are defined, without prejudice to any rights and further actions of the Contracting Authority, as follows:

a) entrusting to another Subject, pursuant to Article 110 of the Code of Contracts or, in the event of the unavailability of another Subject, setting as the auction basis of the new award pursuant to the law in force the gross amount for the completion of the services and those to be performed ex officio to the detriment, resulting from the difference between the total gross amount of the services placed at the base of the auction of the original contract, possibly increased in the course of the work as a result of any acts of submission, and the gross amount of the services performed by the defaulting EO itself;

b) by charging the defaulting EO:

1. any higher cost as calculated above;
2. any higher cost deriving from the repetition of the tender that may have been abandoned, necessarily carried out with an appropriately increased auction base amount;
3. any increased burden for the Contracting Authority as a result of the late completion of the services, the new tender and advertising costs, the higher technical expenses, assistance, accounting and verification of conformity, the increased interest for the financing of the intervention, any greater and different documented damage, resulting from the failure to timely perform the service on the date provided for in the original Contract.

If, during the execution of the service, due to supervening needs, which are currently unforeseeable, INFN does not consider continuing with the execution of the service, the contract will be terminated, without prejudice to the consideration due for the services rendered, minus any penalties.

51. VERIFICATION ACTIVITIES

The final documentation of the Firm will be subjected to the compliance verification activity referred to in Article 102 of the Public Procurement Code; this verification will be carried out by a person or a Commission identified by INFN and may also be carried out by an accredited Entity pursuant to paragraph 6 of art. 26 of the Public Procurement Code, and may be in progress.

The EO shall be responsible for all changes that may be necessary for the successful conclusion of this audit, at no cost to the Contracting Authority.

The verification activities will take place pursuant to Article 102 of the Code of Contracts, in consultation with the EO and will be aimed, for the reference design level, and for the different configurations, at ascertaining:

- the completeness of the Firm;
- the coherence of the economic aspects in all its aspects and with the real market value;
- compliance with DNSH principles;
- the prerequisites for the subsequent levels of design and for the feasibility of the work;
- the prerequisites for subsequent obtaining of authorisations;
- the prerequisites for the durability of the work over time;
- that all documents have been delivered both in editable format, in pdf format, and in paper format;
- that all documents are signed by both the person responsible for the integration of specialist services and the respective specialists.

Upon positive outcome of the above conformity verification process, with the delivery of the appropriately revised, modified and integrated project documents, the balance payment certificate may be issued by the RUP.

52. COMPLETION OF SERVICES

Upon delivery of the Study, as amended and supplemented for the purposes of the positive results of the verification, upon completion of all the services included in the technical offer, against the written communication of the EO of the completion of the services, the DEC, having carried out the necessary adversarial investigations, will promptly draw up the Certificate of completion of the services and will send it to the RUP which, upon successful outcome, it will issue a certified copy to the EO.

For the period between the completion of the services and the approval of the certificate of verification of conformity, without prejudice to the greater responsibilities set forth in art. 1669 of the Civil Code, the EO will be the guarantor of the services performed.

53. TRACEABILITY OF FINANCIAL FLOWS

Pursuant to Article 3, paragraphs 1 and 7, of Law no. 136 of 13 August 2010, the EO, the subcontractors and the subcontractors of the supply chain of companies, must communicate to the Contracting Authority the identification details of the current accounts dedicated, even if not exclusively, to public contracts, opened with banks or at Poste Italiane S.p.A., before the Contract is entered into or within 7 (seven) days from their opening whichever is later, also communicating in the same terms the personal details and tax code of the persons delegated to operate on the aforementioned accounts. The obligation to notify is also extended to any subsequent modification of the information previously provided. In the absence of the aforementioned communications, the Contracting Authority suspends payments and the legal deadlines for the application of interest and for the request for termination of the Contract do not run.

All financial movements related to the contract:

a) for payments in favour of the EO, or in any case of subjects who perform, provide goods or provide services in relation to the intervention, they must be made by bank or postal transfer, or other means that is allowed by the legal system as suitable for traceability purposes;

b) the payments referred to in letter a) above must in any case be made using the dedicated current accounts referred to in paragraph 1;

c) Payments to employees, consultants and suppliers included in the general expenses must be made through the dedicated current accounts referred to in paragraph 1, for the total amount due, even if not exclusively related to the performance of the contract.

Any payment made by bank or postal transfer must show, in relation to each transaction, the CIG and CUP of the contract.

Without prejudice to the administrative fines referred to in Article 6 of Law no. 136 of 13 August 2010:

a) the violation of the provisions referred to in paragraph 2, letter a), constitutes grounds for termination of the Contract pursuant to Article 3, paragraph 9-bis, of the aforementioned Law no. 136 of 13 August 2010;

b) the violation of the provisions referred to in paragraph 2, letters b) and c), or in paragraph 3, if repeated more than once, constitutes cause for termination of the Contract.

The subjects referred to in paragraph 1 who have knowledge of their counterparty's non-compliance with the financial traceability obligations, pursuant to art. 3 of the aforementioned Law no. 136 of 13 August 2010, shall immediately notify the Contracting Authority and the Prefecture-Territorial Office of the territorially competent Government.

The clauses referred to in this article must be compulsorily included in the contracts signed with subcontractors and subcontractors in the supply chain of companies interested in any way in the intervention pursuant to paragraph 2, letter a); In the absence of such clauses, the aforementioned contracts are null and void without the need for a declaration.

54. ANTI-MAFIA REGULATIONS

Pursuant to Legislative Decree no. 159 of 6 September 2011, the EO must not be prevented from entering into a contractual relationship as provided for in Articles 6 and 67 of the aforementioned legislative decree on anti-mafia matters; To this end, the obligations referred to in paragraph 2 must be fulfilled. In the case of temporary grouping, these obligations must be fulfilled by all the economic operators grouped and in the consortium; in the case of a stable consortium, they must be fulfilled by the consortium and the consortium members indicated for execution.

The stipulation of the contract is subject to the issuance of the provisional release notice pursuant to Article 3, paragraph 2 of Decree-Law No. 76 of 16 July 2010, converted with amendments by Law No. 120 of 11 September 2020, (as amended by Article 51, paragraph 1, letter c), sub 2, of Decree-Law No. 77/2021), provided that the situations referred to in Articles 67 and 84 do not emerge with regard to the subjects subject to anti-mafia checks, paragraph 4(a), (b) and (c) of Legislative Decree no. 159 of 6 September 2011. The stipulation takes place under a condition of termination, without prejudice to further checks for the purpose of issuing anti-mafia documentation to be completed within sixty days.

55. PROJECT PROPERTIES

The rights of ownership and/or use and economic exploitation of all the envisaged products generated by the EO, its Employees and Collaborators in the context of or on the occasion of all the execution of this Contract will remain the exclusive property of the Contracting Authority, which may, therefore, provide, without any restriction, for the publication, dissemination, use, duplication and transfer, even partial.

The Contracting Authority may freely dispose of the Firm's documents even by modifying them and/or having them carried out by another Economic Operator, without the EO being able to raise objections, exceptions or claims of any kind.

The documents and anything else produced in the course of the service inherent to the contract and any additions, with the payment of the relevant consideration to the EO, will remain the full and absolute property of the Contracting Authority, which may, at its sole discretion, execute or not execute them, as well as introduce, in the manner and by the means it deems most appropriate, all those variants and additions that will be recognized as necessary, without the EO being able to raise any objection, provided that such changes are not in any way attributed to the EO itself and do not also entail a substantial distortion of the approved Study.

The EO reserves the right to protect, in any case, its prestige and professional dignity and, where the conditions are met, its copyright pursuant to Law 633/41.

The Contracting Authority may publish any drawing, image or other document prepared by or for the EO in relation to the works covered by this assignment, with the obligation to clearly indicate the name and data of the EO itself.

56. DUTY OF CONFIDENTIALITY AND DATA PROTECTION

All documentation relating to or connected to the Firm and all related information are to be considered strictly confidential and the EO may not communicate them to third parties, for any reason, without the authorization of the Contracting Authority or make any use of it on its own, except for what relates to the execution of the activities provided for in the Contract, neither during the Contract phase, nor after the conclusion of the contractual obligations.

The EO is required to take all measures to ensure that this confidentiality is respected by all its managers, supervisors, employees, collaborators and consultants of any kind.

This obligation does not apply to data that are or will become in the public domain, as well as ideas and methodologies. The EO undertakes to ensure that in the processing of data,

information and knowledge of INFN, which may come into its possession, the necessary and appropriate security measures are adopted and processing methods are used that do not in any way compromise the nature of confidentiality or otherwise cause damage.

Confidential information, data and knowledge may not be copied or reproduced, in whole or in part, except for operational needs, strictly related to the performance of the activities referred to in the subject of the contract.

The successful EO shall be responsible for ensuring that its employees and consultants comply with the above confidentiality obligations.

In the event of non-compliance with confidentiality obligations, INFN reserves the right to declare the contract terminated by law, without prejudice to compensation for further damages.

57. CONTRACT FEES, TAXES, FEES

The following shall be borne by the EO without the right of recourse:

a) contractual expenses including, in particular, registration and stamp duties, expenses for secretarial and deed fees, costs for certified copies of the Contract and technical documents, as well as any additional costs that may be necessary;

b) the costs of mandatory publication of notices and calls for tenders in the Official Gazette of the Italian and European Republic, where applicable, pursuant to the Ministerial Decree of 2 December 2016;

c) fees and other charges for obtaining technical licenses, clearances and anything else necessary for the performance of the services;

d) taxes and other charges due to local authorities (temporary occupation of public land, driveways, discharge permits, landfill fees, etc.) directly or indirectly related to the performance of services.

If, due to additional acts or final accounting results, it is necessary to update or adjust the amounts for contractual expenses, taxes and duties, the higher sums are in any case borne by the EO.

In addition, the EO shall continue to be responsible for taxes and other charges which, directly or indirectly, are borne by the services and supplies covered by the contract.

58. LIABILITY TO THIRD PARTIES

The EO will relieve the Contracting Authority of any criminal and civil liability towards third parties in any case related to the implementation and exercise of the activities entrusted. No other charge may therefore arise for the Contracting Authority, other than the payment of the contractual fee.

59. PERSON IN CHARGE OF THE PROCEDURE

The Person in Charge of the Procedure (hereinafter, "RUP"), pursuant to Article 31 of the Public Procurement Code, is Dr. Gaetano Schillaci. LNS-2022-0001278 of 18/10/2022.

The references of the RUP, in service at the INFN LNS based in Catania in via S. Sofia n°61, are: schillaci@lns.infn.it and +39.329.8312289 .

The Single Person in Charge of the Procedure will make use of a support office, appointed by INFN-LNS.

60. PLACE OF PERFORMANCE

Starting from the beginning of the activities, the EO will also be able to operate at its headquarters, when inspection and investigation activities are not necessary, while all meetings, whether requested by the successful bidder and/or called by the R.U.P. for the service referred

to in the subject, will be held at the headquarters of INFN-LNS in Catania at Via S.Sofia n. 62, or in another place expressly communicated by the RUP.

61. OFFICIAL LANGUAGE

The official language is Italian.

All documents, reports, communications, correspondence, technical and administrative reports, graphics and anything else produced by the service EO within the scope of the Contract must be drawn up in Italian.

Any type of documentation transmitted by the EO in a language other than the official one and not accompanied by a sworn translation into Italian, which in any case prevails, will be considered to all intents and purposes as not received.

62. GLOSSARY

- INFN: National Institute of Nuclear Physics
- LNS: National Laboratories of the South
- OE: Economic Operator (Company) or legal entity (individual, grouped or consortium), competitor or which has been awarded the service
- SA: Contracting Authority
- Contracting Authority: INFN-LNS
- ET: Einstein Telescope gravitational wave detector
- Code: Public Contracts Code or Legislative Decree 50/2016 and subsequent amendments
- PFTE: Technical and Economic Feasibility Project referred to in Article 23, paragraphs 1, 5 and 6 of the Public Procurement Code
- BIM: Building Information Modeling
- ACDat: the Data Sharing Environment;

- CAM: Minimum Environmental Criteria pursuant to art. 34 of the Public Procurement Code;
- General Tender Specifications: the General Tender Specifications approved by Ministerial Decree no. 145 of 19 April 2000 as far as still in force;
- RUP: the Single Person in Charge of the Procedure referred to in Article 31 of the Public Procurement Code;
- DEC: the Director of Contract Execution, appointed by the Contracting Authority pursuant to Article 101 of the Code of Contracts and Ministerial Decree no. 49;
- ISP: First Indications on the Development of the <ETIC_WP6_0-A01 Design>
- DURC: the Single Document of Contribution Regularity provided for by Article 30 of the Public Procurement Code and Article 90 of Legislative Decree no. 81 of 9 April 2008;
- DUVRI: the single document for the assessment of risks from interference referred to in Article 26 of Legislative Decree no. 81 of 9 April 2008;
- Regulation: Regulation of Presidential Decree no. 207 of 5 October 2010, as far as it is still in force; and Draft Draft Regulation published in July 2021 for the transition regime;
- Electronic methods and tools: the methods referred to in Article 23(13) of the Public Procurement Code
- Safety charges (including OS): the charges for the implementation of the PSC, relating to the risks of interference and the particular risks of the site subject to intervention, referred to in Article 16, paragraph 1, letter a.2) of the Regulation, art. 23 paragraph 15 of the Code of Contracts, as well as Article 26, paragraphs 3, first four sentences, 3-ter and 5, of Legislative Decree no. 81 of 9 April 2008 and Chapter 4 of Annex XV to the same Decree;
- PGI: Information Management Plan by the EO
- Work Plan: the Work Plan drawn up pursuant to art. 43 par. 10 of the Regulation and art. 1 paragraph 1, letter f) of Ministerial Decree no. 49 of 7 March 2018;
- PEC: means Certified Electronic Mail, a communication system capable of certifying the sending and delivery of an e-mail message and providing receipts, in accordance with the provisions of Legislative Decree no. 82 of 7 March 2005 and further implementing rules;
- POS: the Operational Safety Plan referred to in Article 89, paragraph 1, letter h) of Legislative Decree no. 81 of 9 April 2008 in accordance with Annex XV, point 3.2;

- Services: indicate the total number of services covered by the Contract;
- PSC: the Safety and Coordination Plan referred to in Article 100 of Legislative Decree no. 81 of 9 April 2008 in accordance with Annex XV, point 2;
- Construction Act: Decree of the President of the Republic no. 380 of 6 June 2001 containing the Consolidated Law on Laws and Regulations on Construction;
- Consolidated Law on Health and Safety in the Workplace: Legislative Decree no. 81 of 9 April 2008;
- UR: Support Office to the Single Person in Charge of the Procedure.
- BCM Office: Minefield Clearance Office.

63. ATTACHMENTS

All the documents contained in the Processed List are considered attachments and an integral part.

Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Deliverable 7.1

Innovation plan

Lead beneficiary: IFAE
Delivery Date: 31 July 2023
Dissemination level: public
Version: 1.0

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v 0.2	11/09/2023	I. Giammarioli, L. Monreal & G. Brona	Revision
v 1.0			Revision including all partners contributions. Final approval by Mario Martínez (IFAE)

EXECUTIVE SUMMARY

This document, D7.1, is a deliverable of the ET-PP Project, which is funded by the European Commission Framework Programme Horizon Europe Coordination and Support action under grant agreement 101079696.

The Innovation Plan establishes the innovation goals for the ET in order to accomplish successful innovation promotion and technology transfer. It elaborates a characterization of the organizational structure and timeline of the ET in order to identify the capabilities, limitations, and innovation potential of the project. Defining Key Performance Indicators associated to the innovation goals, in order to evaluate the performance of the associated actions. The core of the plan is structured around a series of baseline actions to promote innovation from Procurement, Collaborative R&D, IP Protection and Entrepreneurship perspectives. These actions are enlisted referring to their cost and implementation details in order to unroll them during the successive phases of the project, defining a clear map to boost the innovation potential of the ET.

List of acronyms and abbreviations

ET – Einstein Telescope

ETO - Einstein Telescope Organization

GW – Gravitational Waves

KTT – Knowledge and Technology Transfer

KT - Knowledge Transfer

TT - Technology Transfer

KTTO - Knowledge and Technology Transfer Office

ID – Invention Disclosure

ILO - Industrial Liaison Officer

IP – Intellectual Property

PoP – Proof of Principle

PoC – Proof of Concept

TRL – Technology Readiness Level

KPI – Key Performance Indicator

R&D – Research and Development

SWOT – Strengthens, Weaknesses, Opportunities and Threats

BSRO - Big Science Research Organization

BSO - Big Science Organization

BSP - Big Science Project

BIC – Business Incubation Centre

ETO-PS: The Procurement Service of the ETO

PCP - Pre-Commercial Procurement

PPI - Public Procurement of Innovative solutions

CERN – European Organization for Nuclear Research

ESA – European Space Agency

LIGO – Laser Interferometer Gravitational-Wave Observatory

LISA – Laser Interferometer Space Antenna

ITER – International Thermonuclear Experimental Reactor

Table of Contents

1. Introduction

The tasks developed by WP 7.1 team encompass the definition of the framework to guide the innovation promotion strategy for the ET project. By establishing clear goals and sketching the innovation model that the ET organization can pursue we aim at fostering an innovative ecosystem which translates scientific research into a positive impact for society. The ultimate goal of the Deliverable 7.1 is to generate an innovation plan of actions, aiming at addressing all the dimensions of innovation, giving a strategic view and therefore presenting a technology agnostic approach. On the other hand, it will aim at characterizing and defining the innovation promotion actions that adapt to the context and limitations of the ETO (and its future legal entity), so it will be specific to the projected structure, timeline and organizational characteristics of the ET project.

Global trends in innovation policy and the benchmark analysis from successful innovation models employed by other BSROs, as well as the definition of innovation and its different perspectives, have been identified and discussed in ET-PP Milestone 9. They will serve as a glance of valuable insights into effective strategies, organizational structures, and incentive systems that fosters a culture of innovation. To ensure a comprehensive approach, we recognize that the pursuit of innovation cannot occur in isolation, it permeates all aspects of the organization and intertwines with the grand techno-scientific challenges ET entangles. Therefore, for the creation of this innovation plan we have engaged in extensive discussions with representatives from other ET-PP work packages (WPs), internally named the WP7 ET Liaison Group (LG) specifically setup for this goal, fostering collaboration and seeking diverse perspectives to establish innovation goals that reflect the collective aspirations and needs of the ET organization. The members and management of the ET, as well as its main goals and objectives, will shape the innovation strategy beyond the conclusions of this analysis, and it is within that framework that the innovation strategy should be revisited in accordance with periodic evaluations.

This introductory section aims at setting the basis for the creation of the action plan by establishing the framework within which our innovation promotion efforts will unfold. This framework is in a first place defined by the innovation goals that set the innovation model ET aims at pursuing. In second place the particularities of the ET project, its timeline and organizational structure are presented, and the framework of action of the ETO with regards to technology transfer and innovation promotion is discussed. This contextualization and guidelines complement the methodological framework that guides the design, assessment and strategic planning of the actions that englobe the innovation promotion activities to be implemented in the ET project.

1.1 Innovation model building – benchmark analysis and methodology to define innovation goals

The methodology used for the development of an innovation strategy in a BSRO requires a previous benchmark of existing successful cases in other research fields within and beyond the gravitational wave (GW) domain. In this sense the CERN's innovation model was chosen for its open access approach, its relevant innovation outputs and the substantial documentation and data related to innovation management and execution. Additionally, the ESA's innovation model was studied, since LISA pathfinder is part of it, and the institution presents a diverse approach towards KTT. Concerning innovation management strategies within the GW field, the ET collaboration is aimed at producing the third generation of GW detectors, technological development started by LIGO and VIRGO collaborations, developing the first and second

generation of detectors (Marx et al., 2011), therefore their innovation strategies gives us a closer model to be analysed.

The innovation goals are key in the creation of an innovation model as they guide the core objectives of any project in relation to the promotion and production of novel technologies and know-how. They accompany the scientific goals of the institution and define the aim of all the innovation promotion actions to be implemented in order to support and enhance the development of innovative technologies and the incorporation of new ventures in the implementation of a BRSO like ET. However, we must bear in mind that these goals are the convergence of the different aims and interest of all the actors involved in the innovation prosecution. As Hoolings et al. (2012) describe, it is the strategic choices and compromises that define the relevance of each dimension of a research institution. There is no single way to define the objectives of a BSROs as we will elaborate in this section, the way in which we define these goals already shapes them and therefore must be part of a comprehensive approach involving all the relevant stakeholders.

Innovation goals are meant to complement and accompany the main scientific goals of any big scientific project, we can observe this in the way CERN KT office defines its mission and goals.

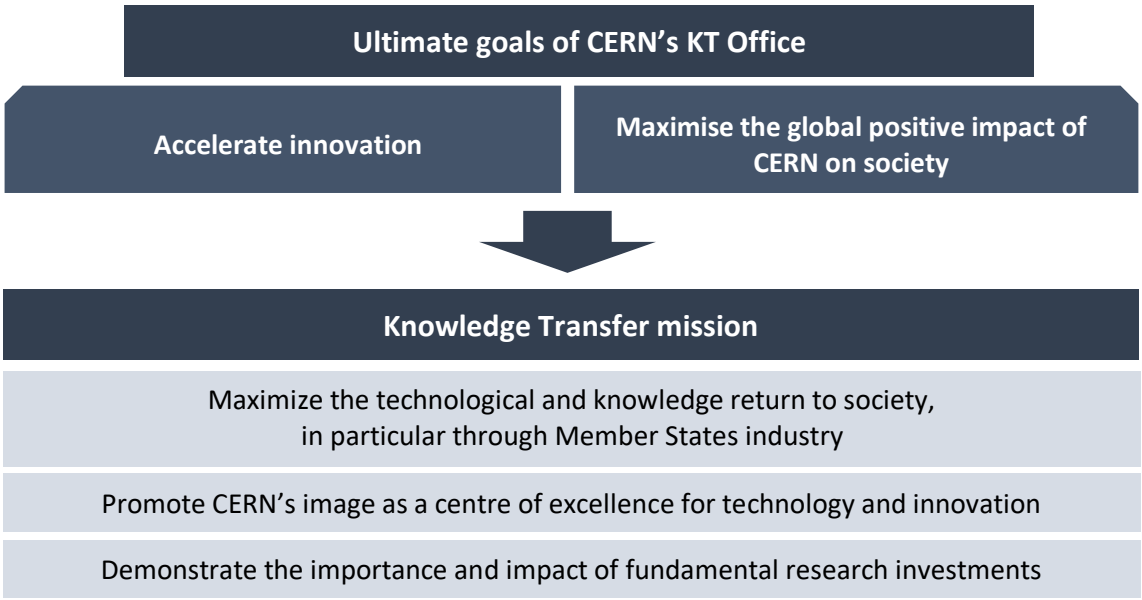

Figure 1 CERN's KT Office goals and mission. Source: Anelli, 2016

"This is done by promoting and transferring the technological and human capital developed at CERN. The CERN KT group promotes CERN as a centre of technological excellence, and promotes the positive impact of fundamental research organisations on society" (CERN Knowledge Transfer Group, 2023). Anelli (2016) acknowledges the key words when describing the innovation and technology transfer guidelines and mission are "dissemination and impact" meaning that the goals relating innovation are directed at accompanying research activities and boosting their innovation potential, and they are an extension of CERN's goals (Figure 1).

Looking at how ESA lays out its goals (Figure 2) we also see the reference to social impact before the goals are defined, they state that "every single European citizen should benefit from Europe's space capacities and capabilities" (Bieńkowska & Woerner, 2016). However, goals are way more concrete and focused as they are meant to be achieved by 2030. The ESA Technology Transfer policies make lot of emphasis on the application of space technologies in other fields (maximise the integration of space into European society and economy) and the development

of Europe industrial capabilities (foster a globally competitive European space sector and ensure European autonomy).

Vision and goals for the future of Europe in space (ESA)

Maximise the integration of space into European society and economy, by increasing the use of space technologies and applications to support public policies, **providing effective solutions to the big societal challenges faced by Europe and the world**, strengthening synergies between civilian and security activities in the fields of navigation, communication and observation, including through monitoring borders, land and maritime security conditions.

Foster a globally competitive European space sector, by supporting research, innovation, **entrepreneurship for growth and jobs** across all Member States, and seizing larger shares of global markets.

Ensure European autonomy in accessing and using space in a safe and secure environment, and in particular consolidate and protect its infrastructures, including against cyber threats.

Figure 2 ESA's Vision and goals for the future of Europe in space (ESA). Source: Bieńkowska & Woerner, 2016

In the field of GW we have not identified clear goals related to innovation in the case of the LIGO observatory. In its charter there is an objective of "Broader societal impacts", through technological development and advancement. In the actions it is mentioned the need to "address new industrial technologies and applications stimulated by the requirements of gravitational wave observation" (Lazzarini et al., 2018) and in the LIGO's Impact on Science and Technology website they highlight the impact of gravitational-wave science on other fields («LIGO's Impact on Science and Technology», s. f.). However as Shoemaker (2023) referred there was not great plan regarding technology transfer they just took opportunities as they showed-up, working with industrial suppliers and finding common ground, a process also facilitating the unplanned personnel mobility generated between LIGO laboratory and industry. However in similar terms to the work being done by this WP Shoemaker (2023) highlighted that they aim at developing a structured technology transfer strategy for the Cosmic Explorer.

Broader societal impacts (LIGO)

Education and Public Outreach | **Undergraduate Education** | **Technology development**

Associated mission and responsibilities

Address new industrial technologies and applications stimulated by the requirements of gravitational wave observation

Figure 3 LIGO's charter Broader societal impacts objectives. Source: Lazzarini et al., 2018

Summarizing in a few lines the key elements of each BRSOs goals with regards to innovation and technology transfer we could highlight the following.

- **CERN →** focus on knowledge diffusion, no explicit interest on economic profit (revenue reinvested in KT), focus on society, particularly trough member states industry (about 50% budget dedicated to procurement), reinforcing the importance of fundamental research, broad long-term knowledge and technology dissemination goals.
- **ESA →** use of space technologies to support public policy (focus on security), impulse for European economy to become key global actors, acknowledgement of current global challenges and threats, short term goals with focus on industry and technological development.
- **LIGO →** social impact of research through education and outreach, technological development expected to have spontaneous impact on society, no direct impulse defined in the goals, focus on knowledge diffusion.

From these global trends we can identify **the dissemination of research results, the societal impact and the return to the industry as key elements** that in some way are present in all the innovation guidelines of BSROs.

1.2 Innovation goals that ET could establish to support and enhance the development of innovative technologies in the implementation of the ET project

The findings in the reference documentation cited in the previous subsection and the feedback from the interaction with CERN and LIGO's KT representatives during Barcelona's Event: ET-PP INFRA-DEV Annual Meeting, respond to the global trends already identified in the SWOT analysis (ET-PP Milestone 9). In order to present these findings, and open a discussion about them, we propose the strategic axis (Figure 4) for the characterization of an innovation model. The choices agreed around these axes will lead to the definition of tailored innovation goals for the ET.

The innovation goals define the path the ET organization will take in order to promote innovation and boost its technological capabilities to create a socio-economic impact on society. In order to facilitate the decision-making process to define the ET innovation goals, we have arranged this set of axes to enable discussion and showcase the possible dimensions of these goals (Figure 4). These statements are not absolute or independent, there is always a grey area in between, they are interconnected and non-exclusive. It is not choosing one or the other, it is part of a methodology that brings forward all the possible scenarios and enables for agreements and compromises to been made in order to arrive to the final definition of the innovation goals.

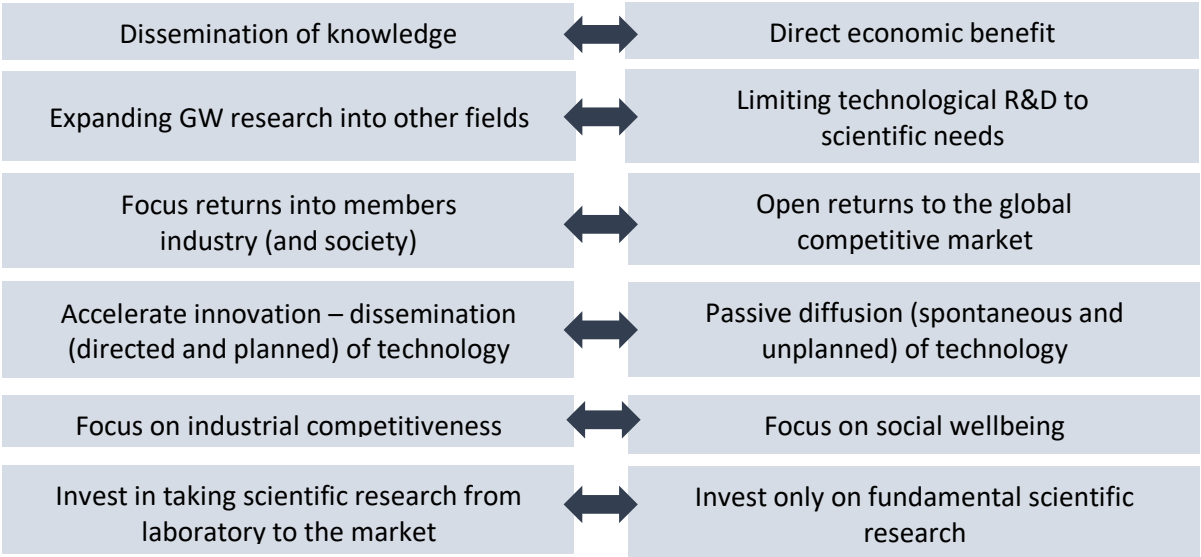

Figure 4 Axes to raise a discussion around the possible innovation goals for ET and the role of the ETO in the innovation ecosystem.

As such, following the discussion open by these strategic axes of the innovation ecosystem, we proposed that with regards to innovation ET follows an approach that prioritizes the impact of research and the dissemination of knowledge, returning to society the investment made in the development of GW technologies, applying the novel techno-scientific knowledge produced for the improvement of social wellbeing and the environment, with developments in personalized health services, sustainable materials or advancing in the digital transformation, among other implementation fields (Marx et al., 2011). The potential of specific ET technologies and their prospects will be specifically tackled in a future report by the end of 2023 developed within the WP 7.3 task and based on the technology scouting done within the WP 7.2 task, led by the WP team. In economic terms it has been considered relevant to contribute to the strengthening of European industry and the creation of high-quality jobs reverting in the national and regional economies of member states. Focusing as well in stimulating the valorisation of disruptive ET technologies exploring social wellbeing applications and mechanisms to reach the market.

Resulting from this framework that defines ET innovation model, we present a proposal of innovation goals for the ET project to be taken in consideration by the management of the ETO and the governing board. We have defined **baseline goals as a way to ensure social and industrial impact of the scientific research powered by the ET project**, in second place we define a set of **optional goals to also pursue economic return via ET technology transfer capabilities**.

Baseline goals

DISSEMINATION OF NEW ET TECHNOLOGIES

Deployment of open source hardware/software licensing offer, free of down payment patent licenses for EU companies, disclosure of novel and protected inventions using public repositories, etc. In order to maximize the impact of ET related technologies and know-how that can contribute to the grand societal challenges of the 21st century.

FOSTERING GW INDUSTRY AND RELATED SECTORS

Return for member states industry basically through procurement and collaborative R&D, contributing to the development of European industries capabilities and processes.

PROMOTION OF EMPLOYMENT AND HIGH QUALIFIED JOBS THE R&D&I FIELDS

By means of protecting inventions and creating new ventures, ET technologies can generate a positive socio-economic impact with the creation of deep-tech companies and the commercialization of new products and services incorporating novel ET technologies and know-how, rendering into the creation of qualified employment.

Optional Goals

ECONOMIC IMPACT FROM ET TECHNOLOGIES THAT COULD BE APPLIED TO SOLVE MARKET CHALLENGES

By licensing ET marketable technologies on a royalty basis and technical services offered to industry, returns can be reinvested directly into ET research groups to foster new research and promote the process of valorisation of novel technologies.

1.3 Methodology for the creation of the Innovation Plan

The proposed plan of innovation actions has the mission to facilitate that the technologies developed within the framework of the ET project will impact the market and the society. In order to design and assemble this plan (Section 2) we have to establish the context in which this will take place, this is to say, the organizational structure and the expected timeline and resources available within the ET, leading to some projections on the limits and competences of the ETO regarding innovation promotion and technology transfer. Once this framework is

established we will go over the structure of the plan itself, the elements it contains and how they are used to articulate and consolidate a cohesive action plan, including relevant definitions of the concepts we will work around.

1.3.1 Context

ET timeline and organizational structure
For the creation of the Innovation Plan we have to consider the specific characteristics of the ET project for what concerns in particular the timeline, the entities involved, the activities that are expected be relevant for exploiting its innovation potential.

The ET project will go through different phases that are displayed in the following timeline (Figure 5) taken by the ESFRI proposal.

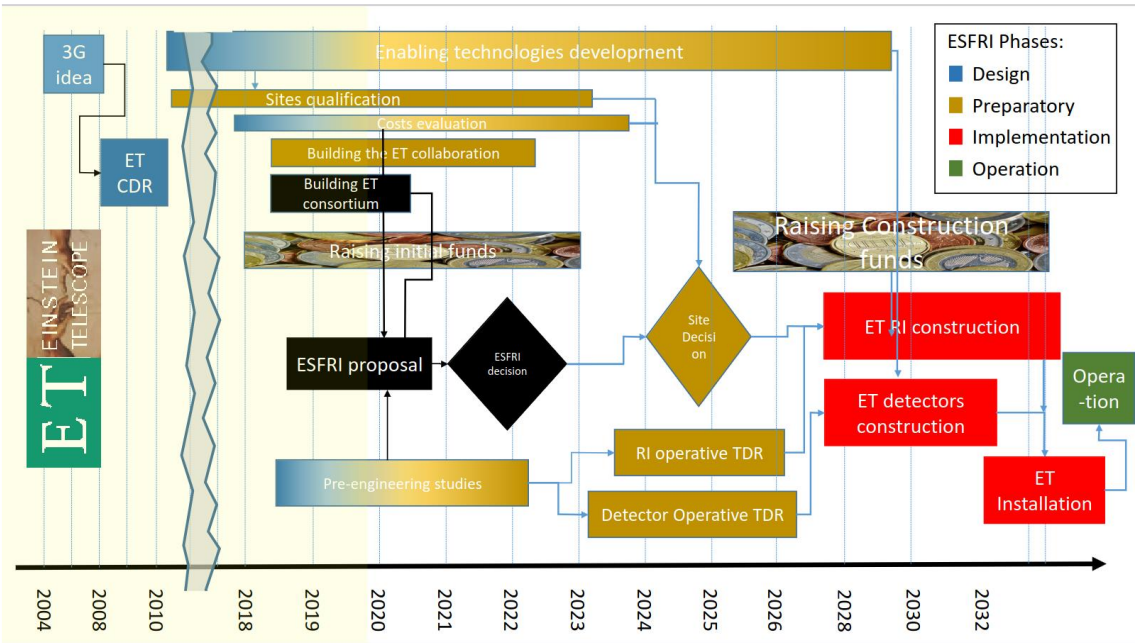

Figure 5 Timeline for the execution of the ET. Source: ESFRI

We can make a distinction between:

- a preparatory phase in which most of the technology is developed and which will reach a key milestone with the production of the Technical Design Reports;
- a construction/implementation phase for both the infrastructure and the detectors, which will partly overlap with the installation phase;
- an operational phase, which should start at the end of the construction of the RI and may then last for many years, most likely complemented by R&D activities allowing a gradual upgrading of the experimental apparatus.

The choice of site will determine the consolidation of the project towards construction and will be followed by the creation of a future legal entity responsible for managing the construction of the infrastructure and part of the detectors testing and validation, as well as for providing the technical support for the installation and operation phases. However, given the need to effectively coordinate the infrastructure design already during the preparatory phase, a centrally managed core of technical experts has been formed. For this purpose, the ETO is being

implemented on the basis of an intergovernmental agreement, as the intermediate legal entity responsible for the development of the ET.

ET requirements for each system and related R&D objectives are being defined and the progress towards completion carefully monitored,

- for R&D activities related to infrastructure aspects (e.g.: civil engineering, vacuum system, etc.) will be done by the ETO
- for the rest, it is not clear at the moment: the boundary between the ETO and the collaboration will have to be defined. In any scenario it would be advisable to have some degree of central coordination by the ETO, but this is something that needs to be discussed and agreed upon.

Prospects and limitations for innovation promotion activities

It can be assumed that the ET activities with the largest potential of fostering innovation will be mainly those related to R&D and procurement processes. It is important to note that most of these activities are now being carried out by regional teams, i.e. Euregio Meuse-Rhine (EMR), and ETICS in Italy, as they have the largest amount of funds available.

From the timeline of implantation and the experience in similar big science projects, R&D activities in the ET community will never cease, as there will always be a push to improve performance for extending the scientific reach. However, it is unlikely that the site/laboratory hosting ET will play a major role in carrying them out, as already highlighted, after the ET facilities, infrastructure and instrumentation are built, most of the R&D will most likely be done by the RIs working on the ET collaboration. In this framework the future ET organization will have mainly a coordination role, as the efforts for the exploitation of the generated innovation will be led by the RIs KT offices. In this scenario the ET organization can play a role by providing a platform for tech showcase events and innovation meet-ups, among other innovation promotion activities.

This has also implications for the creation of an Intellectual Property (IP) policy, whether the focus would be on ET technology economic exploitation or knowledge and technologies dissemination is something that governmental representatives will have to agree upon, following the definition of the innovation model. The benchmark analysis has shown that neither EGO nor LIGO nor CERN have prioritized patent production, furthermore EGO and LIGO do not have a plan of actions to promote technology transfer, this process has been a passive spontaneous process. This approach is meant to be slightly different for ET, more in line with CERN's perspective, as BSROs have been proven to be great ecosystems for innovation, and stakeholders support and demand that this type of public research facilities also serve to transfer the knowledge generated, creating a positive socio-economic impact as a by-product of scientific research (European Commission. Directorate General for Research and Innovation., 2021). Beyond this, we also have to consider that most of the IP will be generated by ET member institutions and collaborations among them or external entities, as funding and R&D will be managed by them.

Nevertheless, we must take in consideration that the ETO will be one order of magnitude larger than Virgo (in everything), and we may have to anticipate that ETO will have to organize/facilitate things which are currently done at national level. Therefore, the role of the ETO (or future legal entity) could encompass the coordination and definition of IPR rules, taking in consideration aspects related to ownership, protection management, protection costs distribution, valorisation and commercialization efforts, licensing agreement management or exploitation revenue distribution. This applies especially for those cases in which it is the result of a collaboration, if it its agreed between institutions and governments to assign this role to the

ETO. Furthermore, the ETO could play an important role in training R&D ET collaboration members in IPR matters and the possibilities of KT to generate impact and returns, as well as ensuring at all times that foreground knowledge developed by groups in the collaboration is freely shared among collaboration members for R&D purposes linked to the collaboration projects, in accordance with the requirements established by the IP policy.

By extrapolating the current vision for the future ETO and considering the minimum staff required for the operation and management of the infrastructure, we can infer what would be a reasonable number of personnel for an ETO KT office to manage and implement the innovation related actions that the ETO will undertake. If we take CERN as a reference organization succeeding in innovation promotion and new technologies dissemination, and we scale the level of resources with the operation budget, we obtain the extrapolations appearing in the following Table 1.

Table 1 Projection and comparison of KT budget and resources based on CERN's figures.

	CERN (2023 budget)[1]	ETO (projection)
Operation budget	1071.5 M€	40 M€
KT staff	31.4 FTE	~ 1.2 FTE
KT budget	10017 k€	~ 400 k€

[1]Conversion rate 1CHF = 1.04€ (market rate on 02/08/2023)

Therefore, for the purpose of this report will be assumed that a KT Office of around 1 FTE to ensure a minimum functioning or up to 2 FTE to offer a solid reliable service, and a budget between 200-300k€ (excluding personnel costs) would be a reasonable projection regarding the size and demands of the ET. This seams a realistic estimate assuming that most of the IP management will be done by the respective ET members KT offices and the main role of the ETO KT Office will be of coordination (e.g. common IP policy), training, management of collaboration agreements, promotion of innovation (e.g. raising of transversal valorisation funds) and stimulating the exploitation of technologies (e.g. showcase events).

Technological scenario

Even though this report is technology-agnostic for the sake of the reader to have an overview of the technologies relevant for the ET deployment. We briefly summarize the main technologies to be implemented and their requirements, as described in the Einstein Telescope Design Report (ET DR) – update 2020.

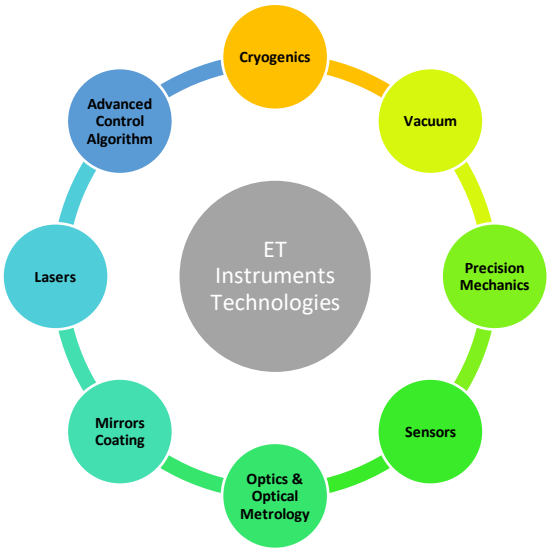

Figure 6 ET instruments related technologies to be developed and potentially transfer to industry and society.

The ET will feature three detectors with core optics operating at 10K. For this reason, large volume UHV cryostats will be realized, each of them surrounding a cryogenic payload consisting of a mirror and its suspension and steering mechanics. The low temperature mirrors will be suspended by means of monocrystalline silicon fibres 1-m long and a few mm thick. Manufacturing technology of such those fibres is at very early stage and requires a strong R&D program and support from industry to reach the readiness needed for the success of the project. Optical systems are a crucial aspect of ET: the heavy, super-polished mirrors with highly optimized coatings at the ends of the arms serve as test masses; an ultra-stable laser provides the monochromatic laser beams that probe the test masses; numerous additional optical systems and sensors serve to control and stabilize the instrument to be able to detect the signature of the passage of a gravitational wave through ET as a minute 'flicker' in the photodetector output registering the intensity of the recombined laser beams. The laser has highly demanding requirements as the detection of GW demand a beam source with an extremely narrow line width, high stability and high power at a wavelength of ca 2090 nm.

An essential system herein is the huge UHV (about 10–10 mbar pressure) vacuum system: in the order of 130 kilometres of about 1-meter diameter UHV vacuum pipes to allow laser light beams to travel undisturbed between mirrors. These will be complemented with vibration isolation systems have the function to isolate equipment from all source of disturbances and in particular from seismic motion. The sensors will register the disturbance caused by gravitational waves. Due to the very small wavelengths of these waves (10-18 m), the sensors need to be extremely sensitive to detect the gravitational waves. In this scenario, availability of ultralow noise cryocoolers and active vibration isolators compatible with the UHV low temperature environment is essential.

From the operations point of view the ET is a highly complex instrument with thousands of control signals needed to keep the interferometers at their optimal working point. Many of the controls are non-linear, coupled to other channels and affected by noise. At low frequencies, the current generation of interferometers is limited by the noise generated by the controls. New algorithms based at least in part on AI methods are needed to avoid such a limitation for the ET.

The fields in which ET related R&D could have an impact extend widely from the science of classical and quantum measurements and high-precision spacetime metrology at large, to optics, quantum optics and laser systems, space science and technology, geology and geodesy, material science and technology, cryogenics and cryogenic electronics, computing and methods in theoretical physics (Marx et al., 2011). All these developments will haven effect on research and industrial applications, as it will be detailed in future derivables by ET-PP WP7. In brief we can highlight some more concrete examples of these applications: as cryogenic and noise reduction mechanism play a fundamental role in quantum computer development or monocrystalline silicon fibres will impact photonics, communication and renewable energy (as their use in solar cells). Laser technologies will play a major role in optics and measurements industry and vacuum developments will bring new improvements in terms of efficiency and performance in the semiconductors and electrical machinery and apparatus industries.

1.3.2 Content and structure

The action plan is structured around the four innovation perspectives (IPR Protection, Collaborative R&D, Procurement and Entrepreneurship) that where identified in the benchmark study developed in Milestone 9, they refer to the most common perspectives that are used in BSROs in order to address and promote innovation. For each innovation perspective, we carried out an analysis focused on innovation KPIs and actions to promote the development and

exploitation of innovative technologies within the ET project, in order to serve as input information for the creation of the ET Innovation Plan.

To structure the action plan we have arranged these perspectives into two different groups that help us delineate the extent of each topic and the focus of the actions contained,

- Industry Innovation Perspectives (Procurement) – it is perhaps the most relevant innovation channel in a Research Infrastructure like ET, as the development and construction will imply big funding allocations to companies, and therefore we have to also address how we can promote innovation in an effective way through the procurement process.

- Academia Innovation Perspectives (Collaborative R&D, IPR production, Entrepreneurship) – these innovation channels are mainly contributed by ET members, referring to the IDs generated internally and manged by each Research Institution. The goal of bringing these perspectives together is to articulate joint actions and highlight the importance of these innovation channels, were the regional KT Offices have a valuable expertise and knowledge in the best ways and methods to achieve ET innovation goals.

For each innovation perspective the ET innovation goals are framed to address the specificity of the topics and specific KPIs are identified to assess how these goals are achieved. These KPIs will serve to evaluate the performance of the actions associated with each goal, tracking and adapting (if necessary) the implementation of the action plan. The actions described are meant to be clearly defined and targeted in order to facilitate their application, for this purpose the action plan main output is a table in which we present all the relevant information in a concise and structured way.

KPIs

Preceding the definition of the Key Performance Indicators, we would like to open a small discussion on what are they and what is their importance in the creation of ET Innovation Plan. The innovation KPIs respond to the standard trends in current R&D evaluation and management of innovation (European Commission. Directorate General for Energy. et al., 2021; Li-Ying et al., 2022), however the limitations and biases of such approach must be considered (Horlings et al., 2012; Puliga et al., 2019). In this line Georghiou (1999, p. 71) argues that there is a “risk that performance indicators inevitably reflect a particular view of the world and may miss developments which do not conform to that perspective”. Therefore, the KPIs we choose to evaluate the performance of the innovation plan already shape the aims of the plan, and should be derived from the innovation goals in order to best reflect the perspectives they aim at achieving. In other words, the KPIs are a tool to evaluate the performance of the actions that are being implemented, this performance is subjective, as such, KPIs serve to assess in a pragmatic and predominantly quantitative way if the actions serve to archive the established goals. This has to be taken in consideration when defining the KPIs for the ET as they should be defined in a way that abide and reflect the aims of the innovation goals we have set for the ET.

The tangible outputs such as disclosure of inventions, prototypes, patents, etc. can (if data is available) be easily quantified and transformed into KPIs, on the other hand, this leads to focus on signatures and paperwork to achieve targets, instead of concentrating on real results, usually identified as success stories. In this sense, impact indicators tend to be more qualitative and intangible. We can understand impact as a product of the interactions between the outputs and society or economy (Georghiou, 1999). Therefore, if we want to measure the full scope of the

actions to be implemented qualitative impact assessment is also important, in order to understand how society is impacted by improving life quality, or how companies have acquired new standards and more efficient (and sustainable) practises and methods.

In this Innovation Plan we will focus only on the innovation promotion and its various approaches, as such the KPIs that we will define will serve to evaluate the performance of the proposed actions and to adjust or rethink our approach towards innovation once the plan is implemented. To best reflect the reality of such a complex structure and the many dimensions of innovation we will propose a set of KPIs that are a mixture of pure quantitative indicators (e.g., number of IDs, number of licence agreements, etc.) and some more qualitative indicators, derived from impact assessment studies, that can be expressed in a quantitative form to facilitate its valuation and comparison (e.g., population potentially impacted by these new technological developments, etc.)

Action Plan Table

For each of the perspectives (Academic Innovation Perspectives and Industrial Innovation Perspectives) two sub groups of actions will be presented. In a first place those actions to be implemented by ETO based on ETO R&D results, even if few, some R&D developments will be carried out by ETO and presumably the management of any associated innovation would be handled by ETO, therefore some limited actions would be associated to this scenario. However, most of the R&D would be undertaken by ET members, entailing a higher innovation potential that is central for the construction of this Innovation Plan. For this reason, a second set actions will be proposed in order to support ET collaboration R&D results, these actions will also encompass coordination and centralised programs to foster innovation among the different participating universities and research institutes. We will also take in consideration the limitations already explained in Section 1.3.1, and a first scenario of actions will be presented as *baseline actions*, accommodating the conclusions of our interaction with the ET-PP WP7 Liaison Group, the foreseen level of resources and the technical conclusions obtained from the innovation SWOT analysis. Further relevant actions, *complementary actions*, will be described in a follow up table with an associated cost-benefit analysis of each of the actions, to provide sufficient evidence based decision-making resources in case it is deemed relevant to expand innovation promotion strategies as the ET project is consolidated.

The action tables will be organized around the following items

- *Actions* – they are mainly defined from the benchmark studies on other BSROs, previous experiences and trends in the KTT and innovation ecosystems, scaled and reshaped when necessary to best fit the ET goals and demands. The list of actions is exhaustive in the sense that presents possibilities for several scenarios, and detailed, in order to providing management with options when facing the decision process over which to implement.

- *Estimated costs* – the cost estimations are based on the current trends, fees and pricing of a standard implementation of the proposed actions. Detailed information is given on what direct funding is needed for the creation of a platform or the allocated funds per event or project, plus the personnel dedication in FTE (presumably by personnel at an ET KT office).

- *Implementation phase* – For the implementation phase we follow the timeline and definitions given by the European Strategy Forum on Research Infrastructures (ESFRI),

this gives us 3 different timelines in order to implement each action: *Preparation* (corresponding with the ET-PP), *Construction* and *Operation*.

- *References* - we have also included some additional comments as where these actions have been implemented or the model we suggest to apply for its implementation based on the benchmark studies carried out.

2. Plan of action to be executed in the ET

2.1 Industrial Innovation Perspectives: actions to promote the innovation through procurement

Interactions with economic actors that result from their involvement in pursuit of ET's scientific objectives and that take the form of contractual obligations for the provision of works, supplies or services, constitute the first and most immediate channel through which innovation can be promoted. They encompass a spectrum of possibilities, ranging from early adoption of new goods and services just appeared on the market to the involvement of companies in the development or co-development of new products that may require significant R&D efforts before reaching the final production.

In order to identify the possible actions that can foster the innovation impact of procurement, it's useful to make a distinction based on what the main sources of innovation are. We can identify two main cases to be considered for ET, although there isn't a real drastic clear cut between them:

A) Innovation developed mainly in industry: this is the case of public buyers that operate in organizations that do not carry out R&D activities themselves but which can favor or stimulate innovation through procurement generated by the initiative of economic operators. In the terminology of the European Commission it's defined as Innovation Procurement (EC Guidance on Innovation Procurement, 2021), and there are two main modalities of implementation:

    1. the first, known in the EC jargon as Public Procurement of Innovative (PPI) solutions, is based on the exploitation of novel technologies that are already available on the market, but not yet widely adopted;
    2. the second, which includes original developments, is usually referred to in EC documents as Pre-Commercial Procurement (PCP), but it includes also other possible specific approaches.

    Public buyers have been encouraged to pursue both PPI and PCP at regional, national and European level, given the potentially large impact associated with the high level of public investment[1]. In a BSO such as the ETO, PPI and PCP can become the main driver for innovation in those sectors where there is no specific need and commitment of the organization to participate directly in R&D activities. Civil engineering is probably one of the best examples of a sector where investment may be quite significant, but the potential for innovation may not exploited without a specific effort.

    In most cases existing BSOs do not have a policy in place that recognizes the value of promoting Procurement Innovation, particularly through PPI. On the other hand, their technical competencies puts them in a much better position than most public organizations to explore ways of tailoring tender requirements to stimulate innovative

[1] Public procurement accounted for nearly 19% of GDP in Europe in 2010 (European Commission, *Public Procurement as a Driver of Innovation in SMEs and Public Services*, 2014*)*

solutions from industry. So, it's a perspective that ET and the ETO should take in due consideration.

B) Internal R&D contributions: this case is specific to BSOs, where the main driver of business innovation is usually considered to be generated by the R&D activities carried out internally to develop technologies beyond the state of the art, needed to push the frontier of knowledge. The interaction with companies, which in this case may have opportunities to innovate their products, processes or services through Technology or Knowledge Transfer, can start at different TRLs and in the following we will refer to this process as KTT-induced business Innovation, KTTI for short. The feedback collected in the past indicates that the key factor to increase the impact on business innovation in this case is the early involvement of companies, if possible already in the design and prototyping phase. In this respect, a report prepared by the EU-funded AMICI project, based on interactions with several SMEs, introduced a principle that the industrial partners suggested as a possible guideline: the principle of subsidiarity, according to which the assignment of R&D tasks to industry should be preferred whenever companies have both the interest and the technical capacity to carry them out (AMICI Project, *Requirements and Conditions for Developing Prototyping in the Industry,* 2019)

C) Indirect contributions: these are aspects of business innovation not directly related to the development of new technologies, either by industry or BSOs, but nevertheless capable of generating improvements as a result of the interaction between technical sectors of BSOs and industrial suppliers. A transfer of new competencies, know-how, technical and organizational best practices, etc. can take place also in this case, and we will limit ourselves here just to mention it and to underline that again, the closer the interaction between BSO and companies, the greater the likelihood that such a transfer does take place.

The EC Directives on public procurement (Directive 2004/18/EC, superseded by Directive 2014/24/EU) have introduced a number of specific procurement procedures to provide the necessary flexibility to exploit the innovation potential through procurement, which could in principle also be adopted by a BSOs, as it can be the case for the ETO, not obliged to follow the European legislation. The use cases for these procedures are summarized in the following list, ordered in ascending degree of industrial involvement in R&D activities:

- Early adoption by the public buyer of solutions and technologies that are available, but not yet on a large-scale commercial basis or require conformal testing:
  - *Normal procedures* are usually sufficient;
- Necessity to develop solutions not available on the market but not requiring the development of new technologies:
  - *Competitive procedures with negotiation* can be used when modifications to existing solutions are required, but the main aspects of the functional specifications are already well defined;
  - *Competitive Dialogue* may be more appropriate when individual interactions to discuss and finalize the solutions presented by the firms are needed; the process ends with a final tender is awarded on the basis of criteria clearly defined from the beginning;
  - *Design Contest* to be used for designing works where more freedom has to be granted to economic operators. It can be organized in view of awarded prizes or service contracts to be adjudicated via a subsequent negotiated procedure.
- Need of technology development via specific R&D activities

- *R&D service procurement* and *Pre-Commercial Procurement (PCP)*, that comprise the development phase but do not include the final procurement of commercial volumes, to be obtained through a subsequent distinct procurement procedure;
- *Innovation Partnership* (IP) that includes all the steps, up and including the final production of the goods or services.

These approaches can be used in both the A) and B) scenarios described above. However, for scenario B), which is the one specific to BSOs, the two instruments that are mostly suited for early engagement of companies are the PCP, and especially the IP.

2.1.2 The ET procurement scenario

Procurement in ET will be carried out both by the Collaborating Institutions (CI) with in-kind contributions, and by the central ET organization (ETO). It can be assumed that the ETO will manage the procurement of the infrastructure aspects at the experimental site, including the vacuum and cryogenic systems, while the CIs will be mainly involved in the technological developments and the procurement of the detector components. In this scheme, almost 90% of the budget for the implementation phase would be managed by the ETO, as shown in the table below, taken from the proposal submitted to ESFRI. Therefore, in the case of the ETO it will be Innovation Procurement that is going to play a dominant role, while most of the opportunities for the CIs, will come through KTTI.

Once the ET is operational, procurement by the ETO will be significantly reduced and further R&D activities will mainly be carried out by the CI, so the direct impact of the ETO in Innovation through procurement is expected to become less important.

Table 2 Construction and development costs for the ET. Source: ESFRI proposal

Activity	Cost [M€]	Start	End	Note
Infrastructure costs	932			
Excavation	781	2027	2033	Excavation of the underground tunnels with TBMs and of the caverns. Cost based on the evaluation by two independent external companies.
Direction of the civil works	9	2026	2034	Evaluation based on the 1% of the underground and surface infrastructures realisation cost.
Civil works on the surface	98	2028	2033	Realisation of the technical and civil infrastructures on the surface. Cost evaluation based on the Conceptual Design study.
Services underground (ventilation …)	44	2030	2033	Technical infrastructures serving the underground facilities and apparatuses.
Detector costs	804			
Vacuum system	566	2026	2032	Vacuum plant, pumps and pipes.
Optics and Laser	125	2027	2032	Main mirrors, auxiliary optics and lasers.
Suspension system	48	2027	2032	Filtering and suspension systems.
Cryogenics	45	2026	2032	Cryogenic plants.
ET installation	20	2032	2035	Contracts and activities for the installation of the ET components.
Total	1736			

2.1.3 Challenges and opportunities:

As indicated in the SWOT analysis of the ET innovation potential, Procurement can play an important role and there are both obstacles and opportunities which have to be taken into

account in shaping the innovation plan. We briefly go through them, since they provide the basic motivations for the proposed actions

1. **Vision and strategy**
   Both Innovation Procurement and early industry involvement in ET R&D innovation entail the establishment of a common shared vision of the benefits that can justify the efforts to be made by all parties involved, the unavoidable risks to be taken, the necessary resources to be invested, etc. A precondition for success is that the strategic importance of fostering business innovation be spelled out as an overarching policy statement agreed upon with ETO funding agencies from the outset.
   In addition, the important synergies between Innovation Procurement and other possible ETO important policy objectives such as reducing the ET environmental impact, increasing energy efficiency, facilitating the access of start-ups and SMEs to the market, life-cycle cost reduction, etc. should also be examined and recognized.

2. **The Procurement Innovation Officer**
   The ETO should then invest in organizing the efforts to achieve the strategic goals, and this requires that the strategic policy framework specifies, besides the policy objectives and priorities, also the responsibilities; in this respect a specific role (Procurement Innovation Officer, PIO) within the organization should be defined with an appropriate charge. An important step is therefore to create as early as possible such a function in the organizational structure, which could probably find the most natural place within the Procurement Office.

3. **Enhancing the Procurement Offices' awareness of innovation procurement processes and building the required capacity**
   Personnel in Public organization is in general not familiar with the Innovation Procurement context, that requires a mind shift to overcome the risk aversion attitude usually associated with spending public money. Due to the specific procedures and tools, public buyers must also acquire specific knowledge and skills in areas which include market assessments, tendering procedures, contractual management and performance monitoring, risk assessment and IPR management. Therefore, an essential ingredient for success is developing a programme for enhancing the awareness and the familiarity on Innovation Procurement. It will also be important for the ETO as a whole that an evaluation of the expected, (in some cases long-term) economical and technical benefits of the innovative solutions that can originate from the Innovation Procurement is routinely performed to demonstrate that they outweigh the required investment costs. This may require to secure additional resources and skills.

4. **Attracting industry**
   There is also an experience gap on the industrial side, especially among SMEs. This, together with many other factors such as the administrative burden associated with public procurement, the difficulty for young companies to meet demanding selection criteria, despite their potentially strong innovative capabilities, the economic risks to be taken in the absence of a clear vision of the commercial opportunities, the fear of losing competitive know-how or of being excluded from the final production tenders, etc., may constitute strong disincentives to participate in tenders where innovation plays a key role. High priority should therefore be given to developing engagement strategies, adapting procurement rules and adjusting contract terms to overcome the above difficulties.

5. **Exploiting the ecosystem**

Besides internal resources, ETO can count also on the opportunities offered by the Innovation Ecosystems that have been created at regional, national and European level. As stated in the EC Guidance on Innovation Procurement: "In addition, there are a number of sources of funding that provide financial incentives for public buyers to engage in innovation procurement. Specific funding may cover many of the additional costs associated with innovation procurement, e.g. the cost of preparing and managing the procurement, preliminary market consultation, negotiations, research and development (e.g. prototyping, testing and certification), mobilising specific technical or legal expertise, adapting administrative procedures, etc. It may also compensate for the intangible costs of cultural shift and change of habits."

In Europe, four Member States (Austria, Belgium, Finland, and the Netherlands) have adopted a dedicated action plan for innovation procurement and five others (Denmark, Estonia, Greece, France, and Sweden) have included specific objectives and concrete measures on innovation procurement in wider national strategies or programmes, often with a dedicated budget and with a clear commitment of key actors. Twelve Member States have created national competence centres on innovation procurement that provide a one-stop-shop to raise awareness, coordinate capacity-building activities and assist public buyers in the implementation of innovation procurement. Finally, the European Commission funds networking activities among national competence centres through the European network of national competence[2].

Last but not least, the Industrial Lison Officers (ILOs) of the Big Science Organizations who act as links between International Scientific Organisations and industry in each member state, can be an important resource to assist procurement offices in promoting innovation procurement. ILOs play a role that gives them direct knowledge of the potential of industry in their country and thus can facilitate the search for industrial partners for both co-development activities and the supply of innovative products and services.

In addition, ILOs have established a European network (PERIIA), which can be an important interlocutor for the ETO, particularly when defining and implementing tools and procedures to facilitate innovation procurement.

[2] Opportunities for EU PCP and PPI funding: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/innovation-procurement_en.htm

Examples of prourement competence centres across Europe (for more info see https://procure2innovate.eu):

- https://www.pianoo.nl/pianoo-in-english
- http://www.procurementcompetence.fi/
- https://www.koinno-bmwi.de/en/
- https://www.vinnova.se/en/
- http://www.ioeb.at/

Financial support:
https://ec.europa.eu/digital-single-market/en/news/innovation-procurement-initiatives-around-europe

2.1.4 Industrial innovation KPIs derived from the innovation goals

ENHANCE THE POTENTIAL OF INNOVATION BY INVOLVING THE SUPPLIERS AS EARLY AS POSSIBLE IN CO-DEVELOPMENTS ACTIVITIES

KPIs

The proposed KPIs for this goal are:

1. the annual fraction of contracts originated by R&D activities carried out in ET where companies have been involved in low TRL activities (up and including the prototype phase) through R&D service procurement, Pre-Commercial Procurement (PCP) and Innovation Partnership (IP) procedures or similar approaches;
2. the fraction of the total annual investment that such contracts represent.

APPLY, WHENEVER FEASIBLE, THE INNOVATION PROCUREMENT APPROACH TO TENDERS IN ORDINARY SECTORS

KPIs

The proposed KPIs for this goal are:

1. the relative annual number of tendering procedures in ordinary sectors, where technical specifications have been defined with the objective of requesting or favoring innovative elements in the proposals and/or solutions submitted by the economic operators;
2. the annual number of cases where Competitive procedures with negotiation, Competitive Dialogue or Design Contest have been employed;

2.1.5 Definition of the actions, estimated costs and timeline of implementation

The enhancement of Innovation in the procurement cycle can be seen as a process that must be initiated with appropriate initial actions and then implemented through ongoing actions that can involve different actors including: the ETO management, the governing bodies of the ET collaboration, the Procurement service of the ETO and the contributing Institutions, the technical staff, the Industrial Liaison Officers, the KT services of the ETO and the Institutions.
In the following we will assume, based on the above, that there will be two main areas of intervention:

- the first concerning Innovation Procurement, mainly confined to the ETO, where it will be possible for ETO management to carry out the necessary planning, as well as setting and pursuing objectives and targets through appropriate resource allocations;
- the second concerning the engagement of companies in R&D and in the supply of detector components, which will involve mainly the collaborating Institutions; here the ETO will be able to play a role of stimulation, coordination and facilitation, but the objectives and targets to be achieved will have to be the subject of possible agreements to be established in the collaboration and may in the end turn out to be different among the various Institutions.

A plan of action is described below, which will have to be modulated according to the interest and willingness of the Institutions to collaborate with their own personnel in the initiatives.

I Area

A) Initial actions:
   1. definition of a policy framework for Innovation through Procurement;

2. creation of a specific organizational function (Procurement Innovation Officer) within the procurement department to play a major role in the activities described in the following points;
3. preparation of a three-year plan with definition of general objectives and specific targets to be achieved in terms of the related KPIs;
4. definition and implementation of an initial training and capacity building plan for ETO staff and information and awareness raising for companies;
5. adaptation of Procurement rules (to the extent that this will be made possible by the legislation to which ETO will be subject) and identification of practices, guidelines, templates and other tools that will enable:
    1. using the most appropriate procurement procedures and award criteria;
    2. increasing the interest of ETOs in participating in tenders;
    3. conducting preliminary market assessments and consultations;
    4. monitoring the performance of the contract execution with the possibility of terminating the contract if objectives are not met;
    5. clarifying all the important aspects that relate to IPR management
6. identification of incentive arrangements for the staff involved, both at the technical and administrative levels;
7. creation of a catalog of entities that can offer advice and support, including financial facilitations, for Innovation Procurement and opportunities that may be of interest to the ETO.

B) Recurring actions
1. annual evaluation of results and updating of objectives and targets of the three-year plan;
2. organization of periodic training opportunities and provision of update guidance, based on the accumulated experience, for the staff involved in the tendering process, both on the technical side and in the Procurement Service;
3. updating of the procedures and tools mentioned in items I.A.5 and I.A.7.

II Area

A) Initial actions
1. Presentation of the policy framework and the initial three-year plan adopted by the ETO to the ET collaboration and possible definition of shared objectives regarding the exploitation of industrial innovation that can be generated from R&D activities;
2. preparation of a proposed plan for actions to be developed collaboratively including those related to items I.A.4 and I.A.7 mentioned above, with participation of personnel from the Procurement and the KTT Offices of the collaborating institutions, as well as specific initiatives mentioned in the next paragraph

B) Recurring actions
1. collaboration in organizing the activities of item I.B.2 and I.B.3 above;
2. annual review of the actions taken and the results achieved with regard to the engagement of companies in R&D activities and the creation of innovation that has resulted from them;
3. organization of annual or biannual meetings where these results are illustrated and the various aspects of interaction with companies in R&D activities are examined and discussed, with the aim of exploiting possible synergies, enhancing the results achieved and planning initiatives of common interest.

In the following Table 3 and 4 the actions are reported with additional implementation details

Table 3 Action table with implementation details and manpower costs for the I Area of procurement actions.

Actions	Manpower [FTE-year]	Resources	Implementation phase - duration	Responsibility	Involvement	Users/Beneficiaries
A. Initial action						
Definition of a policy framework for Innovation Procurement	0.05		C&O - 1 month	ETO Management	Funding agencies, ET collaboration, ETO-PS	
Creation of a specific organizational function (Procurement Innovation Officer) within the Procurement Service and appoint the person in charge	-		C&O - 3 month	ETO Management		
preparation of a three-year plan with definition of general objectives and specific targets to be achieved w.r.t. the related KPIs	0.1		C&O - 1 month	PIO	ETO-PS, ETO management	ETO-PS officers, ETO procurement technical experts, suppliers
definition and implementation of an initial training and capacity building plan for ETO staff and information and awareness raising for companies;	0.15		C&O - 6 month	PIO	ETO-PS, ILOs	ETO-PS officers, ETO procurement technical experts, suppliers, ILOs
adaptation of Procurement rules (to the extent that this will be made possible by the legislation to which ETO will be subject) and identification of practices, guidelines, templates and other tools	0.2		C&O - 9 month	PIO	ETO-PS	ETO-PS officers, ETO procurement technical experts, suppliers, ILOs
identification of incentive arrangements for the staff involved, both at the technical and administrative levels;	0.05		C&O - 6 month	PIO	ETO-PS	ETO-PS officers, ETO procurement technical experts, suppliers, ILOs
creation of a catalogue of entities that can offer advice and support, including financial support, for Innovation Procurement and opportunities that may be of interest to the ETO.	0.1		C&O - 3 month	PIO	ILOs	ETO-PS, ETO management, ILOs. suppliers
B. Recurring actions						
Annual evaluation of results and updating of objectives and targets of the three-year plan	0.1		C&O - 1 month	PIO	ETO-Management, ETO-PS management	ETO-PS officers, ETO procurement technical experts, suppliers
organization of periodic training opportunities and provision of update guidance, based on the accumulated experience, for the staff involved in the tendering process, both on the technical side and in the Procurement Service;	0.15		C&O - 12 month	PIO	ETO-PS, ILOs	ETO-PS officers, ETO procurement technical experts, suppliers, ILOs
updating of the procedures and tools mentioned in items I.A.5 and I.A.7.	0.1		C&O - 3 month	PIO	ETO-PS, ILOs	ETO-PS officers, ETO procurement technical experts, suppliers, ILOs
TOTAL	**1 FTE**					

Table 4 Action table with implementation details and manpower costs for the II Area of procurement actions.

Actions	Manpower [FTE-year]	Resources	Implementation phase - duration	Responsibility	Involvement	Users/Beneficiaries
A) Initial actions						
Presentation of the policy framework and three-year plans adopted by the ETO and possible definition by the collaboration of shared objectives regarding the exploitation of industrial innovation that can be generated in from R&D activities;	0.05		C&O - 1 month	PIO	ETO-Management,	ETO-PS officers, ET collaborating Institutions
preparation of a proposed plan for actions to be developed collaboratively that include those related to items I.A.4 and I.A.7 mentioned above, with openness to the participation of personnel from other institutions, as well as specific initiatives mentioned in the next paragraph	0.05		C&O - 1 month	PIO	ETO-PS, ET Collab.	ETO-PS officers, ET collaborating Institutions
B) Recurring actions						
collaboration in organizing the activities of item I.B.2 and I.B.3 above;	0.05		C&O - 1 month	PIO	ETO-PS, ET Collab.	ETO-PS officers, ET collaborating Institutions
annual review of the actions taken and the results achieved with regard to the engagement of companies in R&D activities and the creation of innovation that has resulted from them;	0.05		C&O - 1 month	PIO	ETO-PS, ET Collab.	ETO-PS officers, ET collaborating Institutions
organization of annual or biannual meetings where these results are illustrated and the various aspects of interaction with companies in R&D activities are examined and discussed, with the aim of exploiting possible synergies, enhancing the results achieved and planning initiatives of common interest.	0.05		C&O - 1 month	PIO	ETO-PS, ET Collab.	ETO-PS officers, ET collaborating Institutions
TOTAL	**0.25 FTE**					

2.2 Academic Innovation Perspectives: actions for pushing IP production and exploitation, entrepreneurship culture and innovation by collaborative research (based on RIs and collaborative academia-industry R&D results)

Intellectual Property Rights (IPR)

IPR are essential in the innovation promotion process because they incentivize creators, encourage research and development, foster competition, attract investment, promote economic growth, and facilitate technology transfer in the market economy. By providing legal protection and exclusive rights, IPR plays a crucial role in balancing the interests of innovators and society, ultimately driving progress and benefiting the overall economy and society. Therefore, we look closely at this perspective and how it can be embedded in a BRSO like ET in order to achieve the innovation goals of the project.

From the benchmark study of BSROs innovation models, we observed that a diverse range of applied and innovative technologies are funded by KTT internal programmes to increase the TRL. There are many models in this regard, general flat funding calls allow a high level of patenting that however does not perform as well when looking at licensing rates. Indeed, if what we aim at archiving is high value technology portfolio, with high transfers potential, targeted and directed investment tailored to each project and with accompanying measures has been proven to be more effective, but also demanding of more resources. In general, the patenting approach has not been shown to be predominant, and while important in the general policies, it is just considered as another tool in the technology transfer process.

The results from the benchmark analysis can help us give some estimations on the expected innovation outputs. Based on LIGO annual IPR production (during the final construction and the operation phase of LIGO as works for advanced LIGO R&D started (1998-2012) a total of 14 patents where granted (Trainer, 2017), we could plan for ET to generate between 1 and 3 IDs yearly, during the R&D phase, if resources and actions for their identification and management are implemented. In this case, a technology innovation potential screening and IP protection process like the one carried out by CERN, focused on managing a valuable IPR portfolio (not based on a quantitative criteria) can be provided by the ET partner institutions owning the technology. Furthermore, independently of the final number of ET technologies being in valorisation phase, ET KT office could take advantage of any outside sources of funds for valorisation (e.g. regional public funds, national funds, banking funds, non-profit foundation funds, etc.) aiming at selecting a high market potential ET technologies, even if they are few.

The IPR perspective in order to promote innovation should focus around two main axes of action:

- *IDs identification* – this step serves as a bridge between inventors and the innovation ecosystem, ensuring that inventions are appropriately protected, recognized, and potentially commercialized for the benefit of society. This is particularly critical in BSROs which main purpose is purely scientific, therefore an extra effort is needed in order to identify potential innovative breakthroughs with applications beyond science industry.
- *Valorisation actions* – once inventions have been identified to bridge this gap between the laboratory and industry there is a further need to mature these technologies and increase their TRL in order for them to probe their viability and facilitate licensing or other types of technology transfer agreements.

Collaborative R&D

Collaborative R&D encompasses all projects in which ET partner institutions or the ETO work together with third party institutions or companies under the common goal to develop some kind of innovation or disruptive technological advancement. In these collaborations each of the parties involved contributes to the collaboration with workforce, know-how, manufacturing or test sites among other means that could be implemented, however the nature of these agreements is specific to each situation.[3]

Collaborative R&D can serve to promote innovation by leveraging the synergy of diverse expertise, sharing resources, cross-fertilizing ideas, bridging knowledge gaps, enhancing scalability, and accessing diverse perspectives while sharing the risk that developing state-of-the art research implies in terms of unpredictively and costs. It is a way of accelerating breakthroughs and solving complex challenges that individual efforts cannot accomplish. This approach towards R&D promotes efficiency, creativity, and comprehensive problem-solving, ultimately driving scientific progress and making a positive impact on society.

From the benchmark study we have observed that the fluctuation in R&D expenses does not seem to fluctuate at the same peace as that of KT projects, but with some years of delay, this is an indicator that the investment in R&D only generates an impact in a medium-long term. In this process knowledge transfer policies and actions become key actors to boost the TRL and further develop certain technologies for commercial uses, following up with the initial investments in R&D. The benchmark analysis has shown that it is also interesting to look at qualitative indicators, particularly when studying industry-academia collaborations. From the peer-reviewed study analysing Italian companies that collaborated with ITER the figures show a 20% increase in revenue after the collaboration, 93% of companies where able to establish new collaborations due to this experience and they also found out to have a better brand image. However probably one of the most remarkable figures and a key indicator in assessing the success of collaborative R&D is the acquisition or enhancing of new technical competences found in 93% of the cases. They also found out that most of the impact is on the supply chain, something that other output indicators fail to notice (Puliga et al., 2019).

Therefore, Collaborative R&D is itself a way of promoting innovation, not just in the output and technologies created but also in the process and competences developed and shared in the development. As a consequence, we consider two axes of action to boost this perspective:

- *Clear IP Policy to manage collaboration results* - is crucial in R&D collaborations in order to have common collaboration wide standards that facilitates the process. It establishes guidelines for ownership, confidentiality, publication, licensing, and commercialization, creating a framework that encourages collaboration while addressing legal, financial, and ethical aspects of intellectual property.
- *Synergies with industrial partners* - bring practical application expertise, access to resources and funding, technology transfer, and knowledge exchange. Furthermore, if enhances mobility between academia and industry as a by-product of Collaborative R&D, building a strong industrial ecosystem with close relation to leading scientific

[3] Clarification of the nature of academia-industry collaborations, and their distinction with procurement. It is important to note that what brings industry and academia together in an R&D collaboration is a common objective to achieve some particular technological development. As such both parties put resources and work together in the prosecution of the desire developments independently that later they could serve the academic institution for scientific purposes and the industrial partner for commercial goals. In many cases institutional actors also take part in these collaborations creating specific funding calls to promote and foster academia-industry partnerships.

institutions. While building trust and promoting also other types of knowledge transfer agreements and services.

Entrepreneurship

Entrepreneurship is traditionally understood as mass-production or service companies. However, modern front-edge companies are not only suppliers of products, services or consulting, but primarily R&D start-ups (spin-offs or spin-outs), which are a platform for the development of inventions created in research institutions. Raising the TRL of inventions in these institutions is, by the nature of these institutions, only possible to medium levels, which generally does not yet allow for their economic use. Hence the culture of entrepreneurship has been developed in recent decades, in which start-up companies carry out - on the one hand - the next stage of research (development), and on the other hand - they carry out application (implementation) work aimed at introducing new products to the market.

The range of supporting solutions extends from public grants including those of European Union and national government agencies, through financing from Business Angels, Venture Capital, to Private Equity, with the possibility of development and clustering to Technology Parks and Corporate Accelerators. Regardless of whether a niche service company will stabilize as a result, a technology company listed on the stock exchange, or a company or rights to technology will be acquired by mature companies or corporations, civilization progress is being made that gives social benefits in the form of new products, services, opportunities, highly qualified jobs, etc. Entrepreneurship in the scientific context is therefore not just a list of license agreements or companies using IPR. It is, above all, an attitude of great social commitment, based on the natural curiosity of a scientist, the mission of an innovator and business motivations of an entrepreneur in one person, which together give great dynamics of civilization development within knowledge-based society. Entrepreneurship understood in this way is not only creating companies, undertaking cooperation, managing knowledge - it is ultimately the ability to survive in the face of all challenges (climate, energy, migration) that would not be able to meet in traditional social and economic models.

The more ambitious the scientific project, the greater the motivation to implement it, and the greater the stimulation of the entrepreneurial attitude. This translates into the creation of new projects, cooperation - resulting in ideas for new applications, products or services. ET can be such a stimulator here, not only in the field of technologies related to the creation of new infrastructure that requires extensive vacuum, mechanical, optical (laser and detection) installations, measurement electronics, automation, etc., but also an inspiration for solutions that cannot be predicted or even identified before starting the project at its full scale.

Such motivation obviously extends not only to the scientific community and its immediate environment, but also to an established industry which, stimulated by “Innovation by Procurement”, expands its offer with new products that would probably not have been developed without such motivation.

The Entrepreneurship perspective in order to utilize outcome of research should focus around two main axes of action:

- *Mentoring for teams revealing potential to develop innovation projects* – regardless it leads to spin-offs, services of research institutions, or licensed corporate products. This would create a momentum for emergence of new joint undertakings and joint ventures with ET Consortium that may result in partnering and parenting organizations spin-offs with the share of ETC.

- *Increase of awareness* – covering widely understood community – by organization of workshops and other promotion actions. Exploring opportunities of the ET partnering organisations that do not just rely on their own internal knowledge, sources and resources (such as their own staff or R&D for example) for innovation (of products, services, business models, processes etc.) but also uses multiple external sources including knowledge, technology and infrastructure to drive innovation.

Both actions could benefit from common in-house workshops using multiple techniques of entrepreneurial discovery (design thinking, TRIZ, etc.). To secure the ETC interest in commercialization of innovation there may be a need to establish internal knowledge and technology transfer office (KTTO) within the organizational structure of ETC.

In context of better understanding of perplexed innovation and entrepreneurship landscape it could be also recommended to approach other ESFRI founded strategic infrastructure projects leaders and coordinators to share a good practice.

In order to financially boost an entrepreneurship some entrepreneurial programmes have been identified at European Union level:

I. CASSINI

CASSINI is the European Commission new initiative to support innovative entrepreneurs, start-ups and SME's in the space industry, including New Space, during 2021-2027. The initiative is open to all areas of the EU Space Programme, and covers both upstream (i.e. nanosats, launchers, etc. and downstream (i.e. products/services enabled by space data, etc.). CASSINI includes a €1 billion EU seeds and growth fund, as well as hackathons and mentoring, prizes, a business accelerator, partnering and matchmaking (more detailed information may be found in Annex B).

II. ESA BIC

ESA Business Incubation Centres (ESA BICs) are the largest network of space incubators in Europe. The main objective of ESA BICs is to support entrepreneurs with a space-based business idea, thereby creating and growing clusters of space related start-ups across Europe. All ESA BIC are managed by local champions who connect their ESA BICs to their local industry, universities, research organisations, government, and investor communities, while also maintaining strong regional/national links. This makes the ESA BICs very well embedded in the local communities as well as the place of choice for all space related innovation and business.

From the ET Consortium perspective ESA BICs as well as CERN BIC Network may become a crucial partner network with whom ET could organize multiple entrepreneurial oriented events including hackhatons, matchathons, workshops and roundtables.

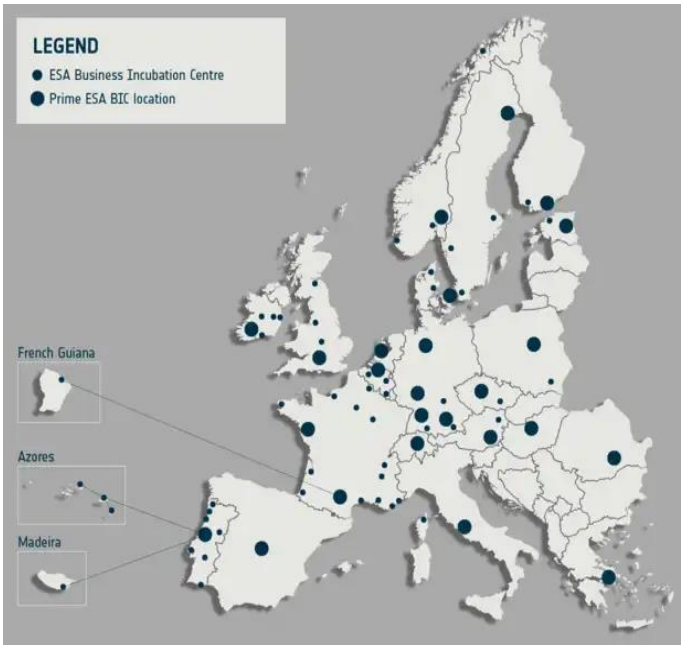

Figure 7 ESA BIC's distribution in Europe. Source: ESA

2.2.1 Academic Innovation KPIs derived from the innovation goals

Baseline goals

DISSEMINATION OF NEW ET TECHNOLOGIES

Facilitate and promote Invention Disclosures (IDs) to utilise the full innovation potential of ET associated research.

In order to expand innovations beyond research, we have to be able to identify those inventions involving novelty, inventive steps vs state-of-the art and industrial usability, to further increase their TRL and to reach the market more easily. Invention Disclosure (ID) has been proven to be the weakness factor in the technology transfer process as there are no incentives to create new inventions or explore uses of the R&D results beyond science. Additionally, researchers believe that it requires an extra effort to valorise their new technological developments, that patenting means delaying their research publications for a long time, and that it is required to them to look for additional funding resources beyond basic research public funds. The KT Office or specialized officers could identify IDs coming from ETO R&D results and would determine if it is viable to protect this invention and which is the best path for exploiting it. KT Officer should support researchers at any stage of the process even if none of this can happen without reliable ways of communicating.

KPIs

In order to assess the performance of the actions directly related at identifying IDs and increasing the maturity and dissemination of ET technologies we propose the following indicators:

- Number of IDs – keeping track of the final outcome of the IDs would also be an interesting indicator to be considered.
- Number of common open science/open innovation workshops per year

- ET technologies in valorisation phase – number of proof of principle/proof of concept projects funded or preclinical trials ongoing.
- Population potentially impacted by these new technological developments – this can be measured as the population benefited using products/services including ET software/hardware, number of active users, etc. based on market research reports.

FOSTER INNOVATION AS AN ENABLER OF EMPLOYMENT IN R&D&I AND DEEP-TECH

Generating added value in the EU innovation landscape by the creation of qualified jobs and new ventures from ET's techno-scientific developments.

To achieve this, the ET should aim at improving the diffusion of ET licences and technologies available for industry, making them widely available in order for companies to exploit them, opening new market opportunities that accompany the creation of new R&D related jobs in the sector and improving the competitiveness of those companies, generating both a social an economic impact in their regions. This can also be expanded to the creation of spin-offs and the alliance with start-ups that help research institutions overcome the difficulties of licensing to big corporations. These new ventures can be a great asset in boosting mobility and job creation, opening opportunities for research teams to continue their projects, maintaining and expanding the personnel involved and potentially generating a positive impact on society by taking new products and services to the market.

KPIs

The main way we can contribute with the promotion of employment via IPR is the protection of inventions and know-how, as such we propose the following indicators:

- Number of ET technologies and know-how available for licensing
- ET Patent Portfolio Quality – Impact of patents (forward patent citations), number of patents with positive International Search Report (ISR) or Extended European Search Report (EESR) and granted patents (short- & medium-term perspective: granting procedure can take a few years)
- Variation of workers employed at ET technologies or know-how licensee companies, before and after the agreement (medium- & long-term perspective) – including ET spin-offs

FOSTERING GW INDUSTRY AND RELATED SECTORS

Bring together academic researchers and private enterprises to promote innovation spill-over, based on attractive R&D schemes, mobility and a strong EU industrial ecosystem.

Industry and academia serve as complementary elements, working together they can boost the R&D potential and obtain the best performing solutions in a relatively short span of time. The joint efforts of such collaborations serve not only to promote European innovation ecosystem but also to generate a positive impact on society with new technological advancements reaching the market and in companies that enhance their competence allowing them to explore and expand to new markets. Collaborations serve to develop technologies that enable GW research while their application can be expanded to other fields, increasing efficiency, sustainability or creating new technologies that can improve the quality of life.

KPIs

To evaluate how collaborations between ET and industrial partners perform in terms of innovation and technology transfer capabilities, we propose the following KPIs:

- Number of collaboration agreements per year and typology of those agreements (academic or industrial)
- Number of spin-offs from partnering organizations with a share of ETC stakeholders
- Number of licence/know-how agreements signed by the collaboration and/or collaboration partners

Optional Goals

IMPACTING ECONOMY WITH NOVEL ET TECHNOLOGIES APPLIED TO SOLVE MARKET CHALLENGES

Promotion of ET technologies and know-how to address market issues can facilitate the licensing on royalty basis, increase exploitation and generate an economic return for ETO and ET members.

ET technologies and know-how can also generate a direct economic benefit to the ETO and ET members by the development of market-oriented licenses that can be licensed on a royalty basis or the creation of new ventures in which to take part as shareholders. This process can also contribute to increase the diffusion and value of such licenses as abiding by market dynamics will prompt companies to sign agreements with ETO and ET members. Furthermore, the economic benefit from the exploitation of these technologies and know-how can be directly reinvested in the development and valorisation of new technologies, following similar models revenues could be split between the research group that originated the invention to pursue further fundamental research and a valorisation fund manged by the KT Office.

KPIs

To evaluate the success of this approach, we propose the following indicators:

- Number of license agreements (know-how, patent, designed, etc.) signed by the collaboration and/or collaboration partners on royalty basis
- ET technologies reaching the market - Number of new products/services commercialised by companies including ET technologies and/or ET know-how.

2.1.2 Definition of the Actions, estimated costs and timeline of implementation

In a first-place the innovation actions for the IPR production, Collaborative R&D and Entrepreneurship perspectives are defined in a flowchart scheme. This flowchart scheme (Table 5) takes the conclusions of the SWOT analysis and builds on them to articulate a wide range of actions that are proposed to promote innovation through the different perspectives in the ET project, linking the associated benefits to the innovation goals of the project. Actions are defined in a first place to transform weaknesses into strengthens and in a second step to boost these strengthens to create a positive impact (Table 5A). In similar terms threats are mitigated to the extent of our possibilities with the described actions and opportunities are taken to our advantage by targeted actions that can generate a benefit from them (Table 5B).

These charts serve as a starting point to describe and organize the actions to be deployed, that are later detailed in Tables 6 and 7, according to the foresight scenarios and following the Action Plan Table methodology described in Section 1.3.2.

Baseline Goals	Optional Goals

Table 5a Weaknesses and Strengthens flowchart with necessary actions and associated benefits linked to ET top-level innovation goals.

Weaknesses	Primary Actions	Strengthens	Secondary Actions	Benefit	ET innovation goal
Low TRL and patenting activities of GW technologies	Creation of a specific competitive valorisation fund managed by the ET-KT Office directed at increasing the TRL of IDs	Ground-breaking R&D, novel, matured and high value technologies	Acquire a software license to get access to relevant open innovation platform/s	Find licensee companies to transfer ET technologies	Dissemination of new ET technologies
			Host companies on-site by offering them technical workshop spaces in a collaborative research environment	Promotion informal links and build trust for further commercial relations via R&D facilities access and technical services agreements	Promotion of employment and high qualified jobs in the R&D&I fields
Difficulty identifying IDs within ET collaboration	Creating the role of KT Coordinator in each Research Group / Technical Department	Close collaboration between researchers and KT staff	Create an internal ID registry for those ET protected inventions	Facilitate the management of IDs	Impacting economy with novel technologies applied to solve market challenges
	Innovation culture dissemination and training sessions for ET researchers, Postdocs and PhD students on IP topics for their research to have an impact on society	Increase awareness of the socio-economy implications of fundamental research	Funding for the pursuance of follow-up research beyond GW applications	Generate research results applications to expand GW impact beyond science industry (e.g. medical applications, sustainability, digital transformation, etc.)	Promotion of employment and high qualified jobs within the R&D&I fields
Need for novel incentives for researchers to get them engaged	Develop an IP policy regulating intangible assets ownership, protection and exploitation, as well as incentives	Clear guidelines for the exploitation of new technologies and know-how.	Program of incentives beyond assigning part of the revenues obtained from patent/know-how to inventors	Increase the innovative technologies portfolio by an incentive policy to address market issues	Impacting economy with novel technologies applied to solve market challenges
Long term and unpredictability of results may complicate academy-industry collaborations	The creation of an industrial liaison officer to facilitate R&D collaborations academia-industry and to manage the innovation ecosystem of the ET	Medium/long term benefits for companies and funding for novel research	ET can contribute with man-power and testing equipment	Shared risk on the development of novel technology	Fostering GW industry and related sectors
R&D collaboration limited to partner institutions	Organize networking and matchmaking events: such as industry-academia meetups, technology showcases, and innovation fairs	Open collaboration with industry to foster mobility and knowledge transfer	Informal briefings and regular R&D workshops academia-academia and academia-industry	Foster long-term partnerships and trust, enhancing academy-industry collaborations and mobility enabling knowledge spill-over	Fostering GW industry and related sectors

Baseline Goals	Optional Goals

Table 5b Threats and Opportunities flowchart with necessary actions and associated benefits linked to ET top-level innovation goals.

Threats	Actions	Opportunities	Actions	Benefit	ET innovation goal
Global competition	Organise showcase events hosted by ET partners with local third-party companies and R&D institutes to disseminate ET technologies	Benefits for companies by using IP from ET results	Creation of an open access repository of business cases based on ET patents and open-source technologies	Generates opportunities for creating new start-ups, and find potential collaborators, licensees and researchers	Promotion of employment and high qualified jobs within the R&D&I fields
	Presence of KT officers in GW research group meetings and deep-tech conferences/workshops	Awareness of the protected state of the art and the industrial demands into which ET technologies can be a valuable asset	Create an advisory board composed of public research entities and private companies	ET as a keystone actor in the innovation ecosystem, reference hub for industry and academia	Impacting economy with novel technologies applied to solve market challenges
Risk management and control over delivered tech	Prospective analysis during each of the design and operation phases with input from all groups involve in the ET to set the plan of action and resources needed to be implemented the coming period	EC funds for industry-academia collaborations in addressing challenges (like green and digital transition)	Forge partnerships with funding agencies, private foundations, and industry consortia to secure funding for collaborative R&D projects. Provide guidance and support in preparing joint funding proposals	Open new opportunities to fund novel and state-of-the art R&D	Impacting economy with novel technologies applied to solve market challenges

All these actions are explained in detail in the following Table 2 and 3, however, we would like to highlight the actions that we have considered to be baseline and their importance in other to create a cohesive and leading innovation promotion plan for the ET.

- The ETO should create an **internal ID registry** to facilitate the management of IDs and ET IP.
- The ETO should have a reliable and structured **IP Policy,** that establishes the legal framework for the management of ET IP. The creation of this policy will need to be dealt with during the preparatory phase with inputs from all the relevant stakeholders. Furthermore, a common IP Policy for ET can reduce bureaucracy and unintended conflicts when working in such a collaboration.
- To facilitate IDs and technology transfer processes one of the key consensus elements is the need for **innovation culture** among the members of BSROs. ETO can take on the role of organising **training sessions** for ET researchers, postdocs and PhD students on IP matters for their research to have an impact on society and the environment – raising awareness and instructing them in the paths for IDs creation, evaluation, protection, valorisation and exploitation.
- Due to the foresight scenario of RI taking the prominent role in R&D and independently managing the IP each of them generates is important for the ETO to take on a **coordination role**. ETO should hold regular meetings and have a common platform for ET member KT office and ETO KT office, in order to facilitate information exchange, coordination of actions and dialogue to maximize the impact and the dissemination of ET innovation results among the members and boost their potential through all the network.
- ETO should **organise industry-academia** meetups involving all ET member institutions. Opening opportunities for researchers, industry professionals, and other stakeholders to interact, collaborate, and exchange knowledge and prospective projects.
- ETO should consider the **creation of a specific competitive fund** managed by the ET KT Office directed at increasing the TRL of those IDs more marketable - awarded on the basis of the disruptivity and market potential of the invention. Paying also close attention to other competitive sources of funding in order to fund these valorisation projects (EC funds, transnational funds, private investment etc.).

To implement all these actions the ETO should have an ET KT Office that is responsible for the implementation of innovation promotion strategies, the management of IDs and IP, the coordination among ET members and the enablement of R&D collaborations and new ventures creation.

Beyond these baseline actions Table 2 and 3, also include a set of complementary actions that could be implemented in order to enhance the innovation capabilities of ET if additional resources are available. A cost benefit analysis for these complementary actions is also included in the Annex A.

2.1.2.1 Innovation Actions to be implemented by ETO based on ETO R&D results

Table 6 Detailed action table, with estimated cost, implementation phase, and further references for each of the proposed actions, to be implemented by ETO if R&D developments are undertaken also by ETO

Address perspective[1]	Actions	Estimated Cost		Implementation phase[2]	References
		Manpower	Resources		
Baseline Actions					
IP	Create an internal ID registry for those ET protected inventions	0.1 FTE - management by KTT personnel	Creation (one-off) 3,500€	P	CTA model
Complementary Actions					
IP/R&D	Presence of KT officers in GW research meetings/conferences, to have access to preliminary scientific results before publishing it + further advice on the most suitable funding options for future PoP/PoC development (and protection options if it makes sense).	0.1 FTE KTT personnel dedication in meetings	3,000€ (yearly) travel expenses	C&O	In case the IP policy considers the option of ETO IPR ownership, the KT officers should be in charge of the identification and management of the IDs
IP/R&D/Ent	Host companies on-site by offering them technical workshop spaces to promote informal links and build trust for further commercial relations via tech licensing or services agreements.	0.2 FTE - Technical services promotion events	Legal support for the service agreement and public rates templates 2,000€ (yearly)	O	Common in BSROs with their spin-offs
R&D	The creation of an industrial liaison officer to facilitate R&D collaborations academia-industry and to manage the innovation ecosystem of the ET. Including informal briefings and regular R&D workshops academia-academia and academia-industry, in order to foster long-term partnerships and trust, enhancing academy-industry collaborations and other transfer agreements.	0.4 FTE	5,000€ (yearly) travel expenses	C&O	Model following a pull approach, with a specific focus on R&D collaboration rather than procurement or commercialization.
IP/R&D	Acquire a software license to get access to relevant open innovation platform/s to identify industrial challenges matching ET technologies.	0.3 FTE - Industry – academia interaction management by KTT personnel	Licence 1,500€ (yearly)	C&O	Based on ESA's innovation model
IP	Create a program of incentives beyond assigning part of the revenues obtained from patent/know-how licences and/or contract research services to the research group and inventors originating the ID (e.g. preferential access to internal KT competitive funds, KT triannual bonus, annual award for inventors, etc.)	Design of the scheme included in the IP policy		P (ET-PP)	Just in case that ETO decides to retain ownership on project results. Common to BSROs and other research institutions
TOTAL costs	1.1 FTE (staff required) + 3.5k€ (one-off) + 11.5k€ (yearly)				
Baseline Actions	0.1 FTE (staff required) + 3.5k€ (one-off)				
Complementary Actions	1 FTE (staff required) + 11.5k€ (yearly)				

2.1.2.2. Innovation Actions to be implemented by ETO to supported ET collaboration based on its R&D results and for coordination among partners

Table 7 Detailed action table, with estimated cost, implementation phase, and further references for each of the proposed actions, to supported ET collaboration based on its R&D results

Address perspective[1]	Actions		Estimated Cost		Implementation phase[2]	References
			Manpower	Resources		
Baseline Actions						
IP	Develop an IP policy considering both the possibility of patenting and offering open licences, further definition should follow a mandate from the governmental board on the approach ET should follow in these regards, IP ownership needs to be clarified at this point by management. IP policy should also include common guidelines on IP ownership in collaborative R&D, within the ET collaboration and with third party institutions and private companies. Implementation of Copyleft licences could be considered with the aim of open science, the natural extension for associated technological developments is to be equally accessible.		0.3 FTE (one-off)	5,000€ (one-off)	P (ET-PP)	All BSROs have an IP policy, CERN or ESA retain ownership of IP while LIGO lets its partner institutions (MIT and Caltech) mange IPR.
IP	Regular meetings and a common platform for ET member KT office and ETO KT office in order to facilitate information exchange, coordination of actions and dialogue in order to maximize the impact and the dissemination of ET innovation results among the members and boost their potential through all the network.		0.1 FTE - one general meetings monthly, plus additional thematic and ad-hoc meetings to prepare specific actions	Licence for a common e-work platform 1,000€ (yearly - if such type of platform is not already provided by ETO as general working environment)	C&O	Demanded due to the organizational structure of ET
IP	Encourage/promote researchers' involvement in the technology transfer process by creating the role of KT Coordinator in each Research Group/ Technical Department in the different member institutions, in charge of identifying technologies which might be transferred, identifying research staff with certain competencies which can work with KT in handling external technical requests for support and help tracking contacts with industry which involve Knowledge Transfer.		0.1 FTE of research department representatives involved in KT (1-2 general meetings annually. Periodic ad hoc meetings KT Coordinator-KT Office)	Creation of a Knowledge Transfer Internal Network (KT-INET) (one-off) 1,000€	C&O	Based on INET CERN model. Expansion of the previous coordination actions, improves communication and coordination directly with the research groups
IP/Ent	Innovation culture dissemination and training sessions for ET researchers, postdocs and PhD students on IP topics for their research to have an impact on society and the environment – raising awareness and instructing them in the paths for IDs creation, evaluation, protection, valorisation and exploitation.[4]	Option A – full length course by a business school	0.05 FTE of KTT personnel per workshop. Dissemination through research groups and organization of the course.	30,000€ (yearly) business school + internal organization (estimated 20-30 participants) + diets of researchers attending covered by sending institution	C&O	Common to BSROs and other research institutions, like CERN Knowledge Transfer (KT) seminars, ESA Technology Transfer, Application & Innovation Workshop or BIST-ESADE from Science to Business Course
		Option B – series of seminars by KT office and/or KTT providers (2 per year)	0.2 FTE of KTT personnel. Organization of the seminars and preparation of the sessions, and dissemination of the seminars to interested researchers	3,000 – 5,000 € per series of seminars for organization and KTT providers expenses		

R&D	Organise as industry-academia meetups involving all ET member institutions. These events provide opportunities for researchers, industry professionals, and other stakeholders to interact, collaborate, and exchange knowledge and prospective projects.		0.05 FTE of KTT personnel	2,500€ per event (estimated 2 events per year – 5,000€)	P/C&O	CERN model adapted to project partner structure, member institutions can partner to host these events and ETO can act as promotor, coordinator and enabler
IP	Creation of a specific competitive fund managed by the ET-KT Office directed at increasing the TRL of those IDs more marketable -awarded on the basis of the disruptivity and market potential of the invention.[4]	Option A – ET funds invested in a valorisation plan for Proof of Principle (PoP) and Proof of Concept (PoC)	0.5 FTE dedication to innovation/market potential analyses of ID identified and protection strategy definition.	2 PoP * (25k€) + 2 PoC * (50k€) = 150,000€ (yearly) The levels of funding and number of projects can be modulated, depending on final TRL expected and minimum innovation level set to apply to the call for projects (innovative idea, invention disclosure ongoing, protected asset, etc.)	P^3/C&O	ESA's innovation model is based on a medium-low protection filtering (high ratio of protected IDs/total IDs), offering medium-low investment for PoP and PoC of a wide range of projects. CERN's protection process is more restrictive (low ratio of protected IDs/total IDs) and with medium-high investing PoC in developments for few technologies
		Option B – ET funds directed at PoP in order to aim at competitive PoC calls	0.4 FTE dedication to analyses of ID identified and management of the PoP strategy. Dissemination and preparation of competitive funding applications.	Flat rate of 25k€ for PoP – between 1-3 yearly projects = average of 50 k€ per year		
		Option C – raising of transnational competitive funds for PoP/PoC in coordination with ET members KT offices	0.3 FTE dedicated to identification of funds, dissemination and preparation of funding applications in coordination with ET members KT offices (additional 0.3 FTE)	-		
Complementary Actions						
IP	Organise showcase events hosted by ET partners with local third-party entities to disseminate ET technologies and show prototypes to maximise the transfer opportunities.		0.05 FTE coordination support by ETO KT Office (organization by ET member KT office 0.1 FTE)	500€ per event (estimated 6 events per year – 3,000€)	C&O	CERN model adapted to project partner structure, each partner institution can hold one event every two years

R&D	Prospective analysis during each of the design and operation phases with input from all groups involve in the ET to set the plan of action and resources needed to be implemented the coming period. Extended and focus coordination between ETO and ET member institutions.	0.2 FTE of ETO KT office for preparation and coordination + 0.1 FTE from ET members to provide information and feedback	-	C&O	Following the current work done at the ET collaboration
IP/R&D/Ent	Create an advisory board composed of public research entities and private companies (3:2), the latter as co-innovation partners and to explore new alternative experimental concepts and advanced prototyping of key technologies, and explore the possible areas for industry-academia collaborations.	0.1FTE - Coordination of quarterly meetings with CEOs and R&D Directors of relevant industries to exchange industry/science challenges and promoting the collaborative R&D and licensing of the portfolio of technologies	-	C&O	Inspired by the Innovation Fostering in Accelerator Science and Technology (I.FAST) at CERN
IP	Creation of an open innovation platform to show ET-technologies to potential licensee companies, based on the demand and success of the general open innovation platforms used. Bringing together all ET technologies having a centralised open innovation platform.	0.2 FTE - editing of the patented technologies (and know how available for licensing) repository	Creation of the platform (one-off) 5,000€ + maintenance and update (yearly) 1,000€	O	Based on CERN's innovation model
IP/Ent	Creation of an open access repository of business cases based on ET patents and open-source technologies – hiring business schools services to get feedback on the market potential (business models, suitable markets, competitors, etc.) and to generate opportunities for creating new start-ups. Also, to find potential collaborators, licensees, researchers and the general public.	0.05 FTE management of agreements with business schools	15,000€ (yearly) to contract Business School services	C&O	Extension of other BSROs actions
R&D	Forge partnerships with funding agencies, private foundations, and industry consortia to secure funding for collaborative R&D projects. Provide guidance and support in preparing joint funding proposals	0.5 FTE dedication to forge these alliances and funding capture	-	C&O	For collaborative R&D beyond GW field, following the guidelines of the EC and global trends in innovation
TOTAL costs[5]	2.35 – 1.9 FTE (staff required) + 12k€ (one-off) + 204 - 29k€ (yearly)				
Baseline Actions[5]	1.25 – 0.9 FTE (staff required) + 7k€ (one-off) + 185 – 10 k€ (yearly)				
Complementary Actions	1.1 FTE (staff required) + 5k€ (one-off) + 19k€ (yearly)				

[1] Intellectual property (IP), Collaborative R&D (R&D), Entrepreneurship (Ent)
[2] Preparatory Phase (P), Construction Phase (C), Operation Phase (O)
[3] Implementation of preliminary PoP/valorization actions during ET-PP to assess their efficacy and serve as test ground for the full deployment of actions in the following stages of the ET
[4] For these actions several implementation options are provided, adjusting costs in order to provide management with options in order to balance the relative weight of those baseline actions.
[5] Due to the different options provided for the implementation of some baseline actions, the maximum and minimum range of cost is provided in this added cost.

3. Conclusions and Prospects for the execution of the Innovation Plan

The ET infrastructure entangles lot of technical challenges that require a substantive R&D effort, as it has been outlined in this report. These R&D efforts are conceived as the innovation starters that can produce inventive breakthroughs. The aim of this Innovation Plan is to boost these innovation opportunities and transfer the techno-scientific innovations into tangible benefits for industry and society. For that purpose, this report has described an elaborated action plan that revolts around two main axes: innovation actions to promote the innovation induced by procurement, and actions for pushing IP production and exploitation, entrepreneurship culture, and innovation by collaborative research.

The procurement perspective plan of actions advocates for a structured approach that revolves around the creation of a clear policy framework, the appointment of a Procurement Innovation Officer, and the establishment of strategic objectives and performance metrics. Moreover, it highlights the necessity of staff training, adaptation of procurement rules, and intellectual property rights management, all aimed at promoting innovation. The plan's recurrent evaluations, and commitment to transparency through annual or biannual meetings underscore its dedication to continuous improvement and the fruitful exploitation of synergies, ultimately fostering a culture of innovation within the collaborating institutions.

Completing this, the actions regarding the academia innovation perspective outline a comprehensive strategy for the effective management of intellectual property (IP) and innovation within the context of the ET. Key elements of this strategy include the establishment of an internal ID registry to streamline IP management, the development of a structured IP Policy, and the promotion of an innovation culture among members through training sessions. Recognizing the landscape where ET member institutions manage their IP, the plan emphasizes the ETO's coordination role, facilitating information exchange, collaboration, and dissemination of innovation results among members. Additionally, there is a focus on the promotion of industry-academia meetups to foster collaboration and suggests the creation of a competitive fund to advance the valorisation of inventions beyond basic scientific research. Crucially, the plan highlights the necessity of an ET KT Office to execute these actions, underscoring its pivotal role in driving innovation, managing IP, and facilitating R&D collaborations and ventures within the organization.

This Innovation Plan is expected to be implemented by specialized personnel within the ETO organization, and with the support from the member institutions. With this scope the plan contemplates the possibility of appointing a Procurement Innovation Officer and KT personnel for a direct implementation of the enlisted actions, their evaluation, and the re-shaping of the Innovation Plan along the lifetime of the project. This last point is of crucial importance as both the timelines of the ET construction and operation and the global regulations concerning innovation may vary beyond the foresight scenarios, due to the long timespan and uncertainty of some crucial elements, like R&D efforts division between ETO and member institutions. Likewise, the implementation of the actions needs a close evaluation to measure the success or the need for adjustments.

Overall the actions envisioned in this Innovation Plan aim at acting as transversal elements in the implementation of the ET project, setting innovation promotion and its transfer to industry and society as key by-products in the scientific endeavour of gravitational wave research.

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Annex A – Complementary action prioritization

Action prioritization is based on a cost benefit analysis mixing qualitative and quantitative indicators. The impact indicator is given a 1 to 5 index when the action generates a benefit associated with one of the additional ET top level innovation goals and an index between 6 and 10 when it is associated with one of the baseline top level innovation goals, within those ranges we consider from a qualitative point of view how important is this impact in order to achieve the ET innovation goals. Additionally, those actions that address weaknesses and mitigate threats are assigned a +5 bonus in this indicator due to their greater impact they are considered primary actions. Also note that the impact index takes in consideration all the actions involved to achieve that goal, and therefore the impact factor is divided by the number of actions needed.

$$\text{Impact Indicator} = \text{Impact Factor}/2 + \text{IF}(\text{SWOT Input} = \text{"W" or "T"}|5|0)$$

The cost indicator is calculated based on a simplified model inspired by the work of Florio et al. (2016) on cost-benefit analysis of research, development and innovation infrastructures. We take as reference the 1 to 10 scale proposed for the qualitative analysis of the impact, then the ranges are established so 1 cost indicator corresponds to the smallest cost of one action and 10 to the highest (without considering baseline actions), as such 1.000€ of yearly expenses in resources corresponds to 1 unit of cost. For one-off investments we have considered an amortization factor of 3 (considering that there are likely to be hidden secondary costs in the long term for maintenance, updating, obsolescence, etc.). Finally, in the case of the KT personnel, we have considered an average salary of 60,000€, and assumed that the positive returns will be twice as high as in the case of the resource expenses (long-term impact, return to society, job creation, stimulation of the economy, etc.).

$$\text{Cost Indicator} = \text{FTE} \cdot 10 + \text{One} - \text{off Cost}/3000 + \text{Yearly Cost}/1000$$

$$\text{Cost/Benefit Ratio} = \text{Cost Indicator / Impact Indicator}$$

Table A1 Cost Benefit Analysis for the Complementary Actions included in the Academia Innovation Perspectives

SWOT Input	Innovation Action	Action Output	Impact (I)	Estimated Costs			Cost Indicator	Impact Indicator	Cost Benefit Ratio
				FTE	one-off	yearly			
S	Acquire and manage a software license	I	A	0,3	0	1500	4,50	3,5	1,29
S	Creation of an open innovation platform	I	A	0,2	5000	1000	4,67	3,5	1,33
T	Showcase events	O	C	0,05	0	3000	3,50	10	0,35
W	KT-Network among R&D Groups	S	E	0,1	1000	0	1,33	7	0,19
S	Host companies on-site	I	B	0,2	0	2000	4,00	4	1,00
O	Advisory board	I	D	0,1	0	0	1,00	2,5	0,40
S	ID registry	I	E	0,1	3500	0	2,17	B	
W	KTT workshops	S	F	0,05	0	30000	30,50	B	
T	KT officers in GW research conferences	O	D	0,1	0	3000	4,00	7,5	0,53
W	Competitive valorisation fund	S	A+B	0,5	0	150000	155,00	B	
W	IP Policy	S	G	0,3	5000	0	4,67	B	
T	Open access repository of business cases	O	C	0,05	0	15000	15,50	10	1,55
W	Industry-academia meetups	S	I	0,05	0	5000	5,50	B	
T	R&D action plan	O	J	0,3	0	0	3,00	7	0,43
O	Partnerships to secure funding	I	J	0,5	0	0	5,00	2,5	2,00
W	Industrial liaison officer to facilitate R&D collaborations	S	H	0,4	0	5000	9,00	8,5	1,06

Table A2 Quantitative conversion of the qualitative impact associated to each of the action paths in the flowchart diagram in order to quantify them for the Cost Benefit Analysis

Impact Code	Impact for ET (I)	Impact Factor
A	Find licensee companies to transfer ET technologies	7
B	Promotion informal links and build trust for further commercial relations via R&D facilities access and technical services agreements	8
C	Generate opportunities for creating new start-ups, and find potential collaborators, licensees and researchers	10
D	ET as a keystone actor in the innovation ecosystem, reference hub for industry and academia	5
E	Facilitate the identification and management of IDs	4
F	Generate research results applications to expand GW impact beyond science industry (e.g. medical applications, sustainability, digital transformation, etc.)	9
G	Increase the innovative technologies portfolio by an incentive policy (economic, access to KT funds, etc.)	3
H	Shared risk on the development of novel technology	7
I	Foster long-term partnerships and trust	8
J	Open new opportunities to fund novel and state-of-the art R&D	4

Annex B - CASSINI and EU Space Programme Initiatives

The EU Space Programme consists of several flagship programmes (6):

1) Copernicus is Europe´s Earth observation programme. Through its land, marine, atmosphere, climate change, emergency management, and security services, Copernicus supports a wide range of applications including environmental protection, management of urban areas, regional and local planning, agriculture, forestry, fisheries, health, transport, climate change, sustainable development, civil protection, and tourism.
2) Galileo is EU´s Global Navigation Satellite System (GNSS), providing improved positioning and timing information with significant positive implications for many European services and users. It allows users to know their exact position with greater precision than other available systems and supports emergency response and Search & Rescue. Galileo also enhances European innovation, contributing to the creation of new products, services and jobs.
3) EGNOS, the European Geostationary Navigation Overlay Service, is EU´s regional satellite-based augmentation system (SBAS). It is used to improve the performance of global navigation satellite systems, such as GPS and Galileo. It has been deployed to provide safety of life navigation services to aviation, maritime and land-based users over Europe.
4) GOVSATCOM (Governmental Satellite Communications) programme aims at providing secure and cost-efficient communications capabilities to security and safety critical missions and operations managed by the European Union and its Member States, including national security actors and EU Agencies and institutions. GOVSATCOM is one of the elements of the Global Strategy for the European Union's Foreign and Security Policy of June 2016. The Programme will contribute to the EU’s response to specific threats, provide support to the EU Maritime Strategy and the EU Arctic Policy.
5) SSA (Space Situational Awareness) is an essential component of the EU Space Programme. By providing comprehensive knowledge and understanding about space hazards, SSA plays a key role in ensuring the safety and security of the European economies, societies and citizens who rely on space-based capabilities and applications such as communication, navigation and observation applications. SSA mitigates the risk of a collision between European space assets – such as Galileo, EGNOS, Copernicus and GOVSATCOM satellites – and other spacecraft and debris.
6) IRIS2 (Infrastructure for Resilience, Interconnectivity and Security by Satellite) is the new EU Satellite Constellation in reply to the secure connectivity challenges of nowadays digital era. By offering enhanced communication capacities to governmental users and businesses while ensuring high-speed internet broadband to cope with connectivity dead zones, IRIS2 will constitute a new space-based pillar for a digital, resilient and safer Europe and foster European competitiveness and societal progress. The implementation of IRIS2 will follow an incremental approach with the ambition to deliver initial services in 2024 to reach full operational capability by 2027.

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Preparatory Phase for the Einstein Telescope Gravitational Wave Observatory

Deliverable 10.1

Initiate strategic media and communications plan

Lead beneficiary: UW

Delivery Date: 15th September 2023

Dissemination level: public

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List of acronyms and abbreviations

ET — Einstein Telescope

ETC — Einstein Telescope Collaboration

ETO — Einstein Telescope Observatory

ET-PP — Einstein Telescope Preparatory Phase

SMCP — Strategic Media and Communications Plan

SM — Social media

INTRODUCTION

*This document is the report on the activities undertaken to **initiate a Strategic Media and Communications Plan (SMCP)**, which serves as the first of five deliverables (D10.1) in Work Package 10 (WP10) – Education, Outreach and Citizen Engagement. It aligns with the project objectives (1-3) and tasks (tasks 10.1, 10.2, 10.3) related to establishing communication networks, developing online platforms, and creating a strategic engagement plan for stakeholders. The initial SMCP will be followed by a comprehensive and deeply developed document (D10.3).*

DESCRIPTION OF PREPARATORY ACTIONS

WP10 OVERVIEW IN PREPARATION TO D10.1

The primary objective of the WP10 team is to provide comprehensive support to the project in all aspects of communication and to serve as a vital link, connecting all stakeholders involved in the ET project. The WP10 team has organised itself into five sub-groups, according to the agreed deliverables.

Direct work on the implementation of WP10 began in September 2022, coordinated by co-convenors *Dorota Rosinska (University of Warsaw)* and *Martin Hendry* (Glasgow University). The chairs of the sub work packages D10.1–10.5 were appointed in October 2022. In May 2023 Vincenzo Napolano (EGO) succeeded Martin Hendry as co-convenor.

Currently the WP10 team consists of:

- more than 35 scientists and communications experts from 20 institutes in 15 countries (with major contributions from Germany, Italy, Netherlands, Poland, and Spain);
- 2 communication and outreach specialists employed at the University of Warsaw (UW) under contracts for work in the project — *Yuliya Hoika (EC)* and *Magda Jakubiak (UW);*
- a group of scientists experienced in communication and outreach: *Martine Oudenhoven* (Nikhef), *Sascha Rieger* and *Susanne Milde* (AEI/Milde Science Comms), *Vincenzo Napolano* (EGO);
- about 100 person-months of total engagement over 4 years of the ET-PP

The team meets regularly and focuses on the project tasks. These include:

- developing a communications strategy, an implementation plan, a budget, policies and procedures, a website, and basic information materials suitable for multiple purposes and audiences;

- establishing a repository for communications materials;

- engaging with other work packages to establish an information flow and to coordinate communication activities, aiming to develop sustainable communication structures;

- supporting both internal and external communications, providing valuable recommendations to the ET leadership across various communication-related areas.

It has been proposed to establish a communication proto-structure during the ET preparatory phase (ET-PP). This structure will be thoroughly evaluated and adjusted before being transformed into a dedicated communications office/structure. The envisioned ET communications office will be responsible for managing communications for both the Einstein Telescope Observatory (ETO) and Einstein Telescope Collaboration (ETC), consolidating interests and activities, presenting a unified position, and strengthening the project as a whole.

For gathering and storing documentation, including work documents, meeting minutes and audio recordings, the ET Wiki platform is used as a central repository (https://wiki.et-gw.eu/INFRA_DEV/WP10/).

WORK ON D10.1: INITIATE STRATEGIC MEDIA AND COMMUNICATIONS PLAN

In the case of D10.1, work was carried out by a sub-group of 6 members, including the WP10 co-convenors.

For initiating the SMCP and key activities/deliverables following from it we used various organisational tools:

- teleconferences and workshops held by the subgroup responsible for D10.1, which facilitated detailed content development;
- bi-weekly teleconferences involving the WP10 deliverable/tasks coordinators (comprising 9 members) for work on the project;
- bi-weekly and then (since March 2023) monthly teleconferences involving all WP10 participants for overall updates and general recommendations;
- meetings with the ET-PP and ETO and ETC management and with coordinators of other ET-PP WPs and ETC subgroups

At the initial stage of our work, in order to define the most suitable communication, outreach and education strategy for ET, we invited several experts to share their experience:

- *Joanna Holt* (University of Amsterdam): The Dutch Black Hole Consortium Education Programme (link) (30 Nov 2022);

- *Gideon Koekoek:* Overview of outreach activities in the NL (14 Dec 2022);

- *William Garnier* (director of Communications, Outreach and Education for the Square Kilometre Array project): SKA Observatory communication overview (link) (18 Jan 2023);

- *Michael Hoch:* A summary of the outcomes from the Oman Science Festival 2022: what lessons we can learn from that for doing other large-scale public exhibitions in future (1 Feb 2023);

- *Gideon Koekoek:* Project of the Einstein Telescope Education & Experience Centre in the Discovery Museum, Netherlands (1 Feb 2023).

In addition, the WP10 team participated in several further activities, including:

- 1st ET Annual meeting 15-17 November 2022
- The XIII symposium of the ET, Cagliari, 8th-12th May 2023
- ET-PP Annual Meeting, Barcelona, 12-13th June 2023
- WP10 coordinators workshops (15th November 2022, 8th-12th May 2023, and 27th-28th April 2023 on-line)

These events provided valuable insights, expertise, and collaborative opportunities for the WP10 group in shaping the initial SMCP (D10.1) and its subsequent development (D10.3).

STRATEGIC MEDIA AND COMMUNICATIONS PLAN: STEPS TAKEN

PRELIMINARY GOALS OF THE ET COMMUNICATION

An effective media and communications strategy plays a crucial role in promoting the scientific, technological, cultural and socio-economic potential of the ET to different target groups.

Initiating work on the SMCP, we previously outlined the goals of our actions, which will be refined and detailed in the future:

- to raise awareness of the project, its goals and progress, as well as build the image of a reliable enterprise with a high scientific mission;
- to facilitate collaboration;
- to secure broad long-term support in all areas;
- to enhance education and outreach;
- to enable the dissemination of knowledge;
- to foster financial support from political leaders in Europe;
- to contribute to the overall success and impact of the project.

To achieve these goals we have to:

- communicate effectively ensuring the community and the general public are well-informed, convinced, and engaged through consistent messaging;
- build support for the ET at the regional, national, and European levels, with a particular focus on obtaining financial backing,
- engage top talents attracting the most skilled and dedicated individuals to contribute to the ET's mission;
- optimize the flow of information within the ET, fostering efficient and transparent communication channels;
- inform and involve, get and stay in contact with relevant audiences.

TARGET GROUPS

- Politics and administration, funding agencies,
- Media,
- General public,
- Scientific community,
- Schools & students,
- Members of ETO and ETC (internal communication),
- Industry.

INITIAL PLAN OF WORK WITH TARGET AUDIENCES

Politics & administration / Advocacy

- To support contacts with relevant persons on a local, regional, national, EU-level.
- To participate in or initiate suitable events, prepare communication documents designed for these target groups; to collect information about related events; to produce appropriate materials.
- To be clear and concise, transparent, well prepared.

Media and the general public

- To identify topics and main milestones and develop a schedule for press; to maintain a schedule for media events.
- To support a team of people who speak for the ET.
- To prepare a press kit: to compile standard background texts, images, videos and animations.
- To be prepared for interviews, to offer training.
- To inform the supranational media and keep them updated (news briefings, background conversations); to maintain a list of press contacts that will be available for the whole WP10 group.
- To support contact with national and local media, by providing news items, press releases and coordinating a communication network.
- To consolidate and expand an ET communications network.

Education and science communities

- To compile opportunities for outreach activities (open days at institutes and ministries; local, regional, national science weeks).
- To collaborate with science centres and museums; to provide a portable or virtual exhibition, roll-ups and public talks.
- To inform about opportunities at the ET.
- To collaborate with schools, to participate in science-related public events.
- To accompany outreach activities with media and social media activities.
- To support the production of materials, to collect available materials.
- To develop the early career scientists programme and create links with secondary education.

Internal communications in all areas of the ET

- To define information flow, establish procedures of communication between groups, subgroups, with management.

Industry

- To support ET-PP WP7 (Innovation and industry engagement) groups in their activities, in particular at achieving WP7 task 1 (Promotion of innovative technologies).

GENERAL KEY MESSAGES

- The ET is next level cutting edge science.
- The project shows the high value of fundamental research for science and society.
- The ET Community as a role model: we are building an international, diverse and collaborative community.
- The ET Community acts responsibly, transparently and sustainably.
- Our community is in good shape and the status of our research matches the timeline of planning activities for third generation gravitational wave observatories.
- The ET holds significant educational potential.

PRIORITY COMMUNICATION TOOLS

The primary objective of the ET communication in the coming years will be to secure the support of national and international stakeholders for the realisation of the project: these include policy makers (national and international), scientific community, economic stakeholders, local communities, relevant international and national media. The visibility and positive public image of the ET among the general public and mainstream media will also play a role in this process from the outset. To achieve multiple communication goals, the project will actively use the priority communication channels described below.

Website

Work on the official page of the project is in progress. At this point the ET web page navigation tree and home page layout have been created, the ET website plan has been

formulated. Work has begun on collecting content and preparing texts for filling the site. The launch of the official website as well as social media accounts is the next deliverable in WP10 (D10.2).

We outlined a preliminary implementation plan and strategy, summarised below.

The ET website will serve the function of providing an institutional presentation and an initial outline of the scientific content mainly to those who have become aware of the ET through other routes (social media, mainstream media, social and professional contexts).

The homepage and the content of the site (in this first phase) should then address three main audiences: relevant stakeholders interested in learning more about specific aspects of the ET project, the general public and media. Although the public part of the site will not address the scientific community with specific content, it will play a crucial role as a shared self-representation of the community. The site will however provide access to an intranet platform for scientists.

We keep in mind also that the objective of this website should be to represent the joint and supranational effort of the gravitational wave community for the realisation of the Einstein Telescope, both as ETO and ET Collaboration. This naturally includes institutions and scientists from countries that are not directly candidates to host ET. In this sense, it is desirable that the website will give space for updates and news related to both ETO and the ET Collaboration, give neutral meaning to developments at the potential host locations, and provide content that serves the ET community at large.

Social media

The primary objective of using social media (SM) for ET is to enhance communication and engagement with various stakeholders, including national and international policymakers, the scientific community, economic stakeholders, media and the general public.

SM will aim to build support for the realization of the project and foster a positive public image of the ET. They will serve as platforms for quick updates, announcements, and engaging with the audience, while the official website will be the primary source of comprehensive information. SM will complement the website by directing traffic to it and promoting its updates and content.

SM content will be managed in accordance with the strategy that will be developed. The strategy will be flexible and adaptable depending on the changing needs of the project and the preferences of the target audience.

Contacts with traditional media

We have begun developing a press kit, and discussed the structure and key aspects of media relations as well as possible milestones for media communication.

Interaction with traditional media should be preceded by thorough preparation. Official project materials will be created by the communication office, then approved by management, and after that sent to the media.

Project spokespersons must speak in one voice, providing the public with only accurate and consistent information.

PLANNED PRODUCTION OF OUTREACH MATERIALS

We have defined basic information materials that can serve several purposes and chose the following types:

- leaflets,
- roll-ups,
- portable exhibition,
- stickers,
- t-shirts, cups, pens, other swag,
- bookmarks,
- advocacy brochure,
- digital materials (visualisations, infographics, etc.).

ADDITIONAL DOCUMENTS AND DETAILED IMPLEMENTATION PLANS

While working on the Strategic Media and Communication Plan, we have created a series of working papers shared with the ET leadership, detailing the actions planned in various areas:

- ET Communication Timeline (approximate timeline for implementing WP10 tasks until the end of ET-PP),
- Initial Communication Plan (the first schematic version of the future communication plan/strategy, which contains the main provisions and outlines the general direction of work),
- ET web page navigation tree and home page layout,

- ET website plan (a document describing the suggested approach for a general ET website developing).

NEXT STEPS

All the events and activities implemented during the preparation of D10.1 logically and consistently have led the team to work on a more holistic and in-depth SMCP. At the moment, we can highlight the following steps that will be taken in subsequent stages. This list is not exhaustive and will be updated in the course of further work:

1. Develop a detailed, well-defined Media and Communication Strategy with a more detailed overview of target groups and key messages, more sharply defined strategic lines, an organisational model for communication, a methodology for evaluation of the effectiveness of the strategy.
2. Develop and implement a coherent strategy for SM.
3. Develop an implementation plan that includes timing, activities description, budget, roles and responsibilities, milestones, key topics.
4. Ensure the continuity and efficiency of the communications team with well-defined roles and responsibilities.
5. Establish and consistently use clear procedures and communication channels (both external and internal, on national and regional levels).
6. Create basic materials, production or support of the production of materials and development of a well-organised repository.
7. Launch the official website of the project and regularly update the materials on it in accordance with the strategy and plan.
8. Develop a basic press kit and media list.
9. Start working on the concept and implementation of the official logo of the project.
10. Support contacts with all target audiences and stakeholders.
11. Identify ways to control and measure the effectiveness of the implementation of the Strategy.

HISTORY OF CHANGES		
Version	Publication date	Change
1.0	14/09/2023	▪ Initial version