



Sustainable Historic Environments hoListic
reconstruction through Technological
Enhancement & community-based Resilience



D.2.3. Anatomy of HA: Part A-Full report

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Glossary

Acronym	Full name
BBB	Building Back Better
CA	Consortium Agreement
CBD	Convention on Biological Diversity
CCA	Climate Change Adaptation
CH	Cultural Heritage
CNH	Cultural and Natural Heritage
CHM	Cultural Heritage Management
CoE	Council of Europe
D	Deliverable
DRR	Disaster Risk Reduction
DRM	Disaster Risk Management
DoA	Description of Action
EC	European Commission
GIS	<i>Geographic Information System</i>
GIZ	Gesellschaft für Internationale Zusammenarbeit
HA	Historic Area
HUL	Historic Urban Landscape
IBC	Istituto per i Beni artistici Culturali e naturali
ICCD	Cultural Heritage Central Institute [Istituto Centrale per il Catalogo e la Documentazione]
ICCROM	International Centre for the Study of the Preservation and Restoration of Cultural Property
ICOMOS	International Council on Monuments and Sites
ICR	<i>Istituto Centrale del Restauro</i>
INSPIRE	Infrastructure for Spatial Information in the European Community
ISRBC	<i>International Sava River Basin Commission</i>
IuCN	International Union for Conservation of Nature
OL	Open Lab
MARIS	<i>MAppa del RISchio</i>
MiBACT	Ministry of Cultural Heritage, Culture and Tourism [Ministero per i Beni e le Attività Culturali e per il Turismo]
PDNA	Post Disaster Needs Assessment
SABAP	Local Institution for archaeology, Fine arts and landscape [Soprintendenza Archeologica Belle Arti e Paesaggio]
SDG	Sustainable Development G
SIGEC	<i>Sistema Informativo Generale del Catalogo</i>
UNITAR	United Nations Institute for Training and Research
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WHC	World Heritage Convention (1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage)

WP

Work Package

1 Executive summary

This report presents the multilayered methodology for categorizing Cultural and Natural Heritage (CNH) assets developed under Task 2.3, entitled "Anatomy of Historic Areas: collective characterization of Cultural Heritage assets."

The report includes two parts: Part A Full Report; Part B Practical Guide. The overall report provides a theoretical and practical framework that contributes to the SHELTER Project knowledge by framing a methodology building upon the state of the art and existing ontologies for integrating the factors relevant for the assessment of resilience and vulnerabilities of the Historic Area (HA). Specific attention is paid to their intrinsic resilience characteristics and their capacity to contribute to a heritage-led resilience. More precisely, the report contributes in specifying the methodology and the tools for the HA 'Anatomy' in a Disaster Risk Management (DRM) perspective, the CNH categorisation, the identification of the characterisation factors relevant to be taken into account for resilience assessment and, in addition, linking these outputs to other SHELTER activities.

The specific work developed includes (i) a theoretical contribution based on intense literature review and (ii) a practical approach to Anatomy of a wide range/scale of HA for a multi-risk resilience characterisation. It enriches and specifies the concept of Risk Informed Thinking addressed to CNH assets and it introduces a holistic approach to deal with cultural and natural environments at different scales. For this purpose, it also delivers tools including an interactive digital template for a CNH assets characterization in DRM perspective. The template can be customized by SHELTER Open Labs (OLs) for collaborative characterization according to diverse historic environments, scales, hazards exposure and specific objectives.

According to SHELTER Project, the theoretical and practical framework addresses HA at spatial scales including territorial, urban and building scale by taking into account cultural natural/urban features. It has been designed by considering that HA are complex systems with tangible and intangible features which encompass both cultural and natural values to be referred to the principles of the overall management of CNH. The methodology takes into account the DRM as part of a broader vision for HA overall management and it addresses specific requirements of CNH assets to support decision-making and action. More specifically it contributes to the Data Driven Platform (Work Package (WP) 5) and the SHELTER Community-based approach (WP6) by developing a methodology to be implemented in Open Labs (OLs) (WP7).

2 Introduction

2.1 Aims and objectives

This report presents the multilayered methodological framework for categorising CNH assets developed through the work done under Task 2.3, entitled “Anatomy of Historic Areas: collective characterization of CH assets.”

Its main aim is to define a theoretical and practical framework for contributing to the overall SHELTER knowledge-building by delivering a multi-layered methodology built upon the state of the art and existing ontologies for anatomizing different kind/scales of HA. The proposal is to integrate features of CNH assets with a particular consideration of those factors relevant for the assessment of resilience and vulnerabilities with attention to their intrinsic resilience characteristics and their capacity to contribute to a heritage-led resilience. With this methodology, the report delivers a structured and systemic approach to:

- (i) Categorize CNH assets in a risk informed thinking and,
- (ii) Address more specifically the Disaster Risk Management (DRM) concept according to CNH assets. To do so, it will provide both theoretical methodologies for categorization and an interactive digital template intended as a practical tool for resilience assessment.

On one hand, according to the SHELTER project framework, the report considers that HAs are composed of a wide range of tangible assets – from the territorial spatial scale to the urban, until the building scale – considering/encompassing their tangible and intangible dimensions. HA can be affected by one or more different natural hazards such as earthquakes, storms, floods, heatwaves, wildfire and subsidence. It should be noted that the definition of hazards also refers to those that are nature or man-made disasters and further exacerbated by natural factors - as defined by the EC in the 2018 *Safeguarding Cultural Heritage from Natural and Man-Made Disasters: A Comparative Analysis of Risk Management in the EU*[1]and as defined in *D.6.1 Glocal User Requirements* [2]. The report considers, thus, how to create an ‘Anatomy’ of a wide range of sites, from natural areas to differently inhabited human settlements including both natural and cultural sites, historic cities, built-up and open spaces and archaeological sites. It aims at identifying those different drivers that, at different scales, need to be considered as relevant for a systemic multiscale multi-risk resilience assessment of CNH assets. Accordingly, the report aims to specify the categorization with CNH risk characterization. For this purpose, it envisages a methodology that is able to consider and manage with both the complexity of natural/cultural HAs with its exposures and vulnerability and heritage-led resilience at the different kind/nature of spatial scales as well as the corresponding overall CNH categorizations according to international standards.

On the other hand, through the identification of this methodology for categorising CNH assets in a Risk Informed Thinking, the report finally contributes to the HAS management in a DRM perspective for addressing the specific requirements of CNH assets. It also delivers tools including an interactive digital template (available on the link: <https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>) as a practical framework for finalizing this objective. The template identifies the CNH categorization in the frame of the DRM approach with four phases (prevention, preparedness, response, recovery) within a systemic and dynamic understanding of the concept. It is intended to be adapted to the different spatial scales/nature of HAs where the knowledge about CNH categories at risk of natural hazard will increase each time a disaster event occurs.

For achieving its main objective, the report presents complementary steps which contribute to the Data Driven Platform (WP5) and the SHELTER Community-based approach (WP6) and develops a methodology to be implemented in five Open Labs (OLs) (WP7).

The report will thus contribute to the advancement of SHELTER knowledge building by providing a categorization according to **a systemic understanding of a Risk Informed Thinking for CNH asset requirements**. It does so by delivering a multilayered methodology beyond the state of the art that includes a practical application to equip OLs for these aims in its wide range of HA, risks and CNH assets.

2.2 Relations to other activities in the project

'Anatomy of Historic Areas: Collective characterisation of CNH assets' has been conceived and has been discussed and agreed with SHELTER coordinator and all relevant partners as an integrated process with other project activities.

SHELTER project has been structured in 9 Work Packages (WP) to ensure cross-fertilization among the different steps and partners. The main objective of WP2 (Knowledge generation: Systemic HA resilience assessment and monitoring) is to produce a knowledge generation methodology to build multidimensional, cross-scale and systemic resilience assessment and monitoring workflows that will provide information in all the phases of Disaster Risk Management (DRM) (See Figure 1).

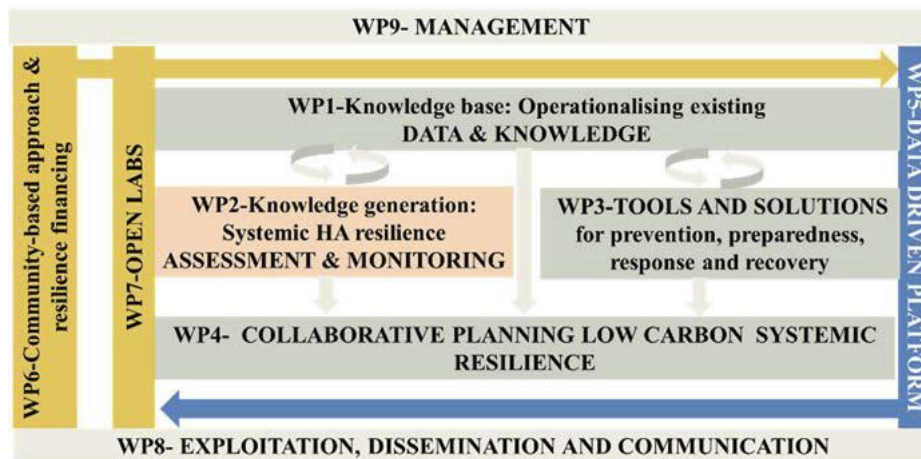


Figure 1: PERT chart of SHELTER

Within WP2, the work developed in Task 2.3 (Anatomy of Historic Areas: collective characterisation of CH assets) develops a multi-layered methodology to categorise CNH assets build upon existing domain ontologies according to factors relevant for the assessment of their resilience and vulnerability with attention to their intrinsic resilience characteristics and their capacity to contribute to a heritage-led resilience. The methodology is strictly linked with other WPs and Tasks and in particular:

The T2.3 has received relevant inputs from the **WP1 (SISTEMA)** and has provided outputs for the parallel knowledge developments and integrations. In particular:

- **T.1.2** Codification of existing knowledge (**UNIBO**) has provided the review of relevant regulatory frameworks for resilient CH protection against natural hazards (in international, national, and local levels). The process of the CH assets characterization started in the framework of Task 1.2 as an integrated cooperative process involving SISTEMA, UNIBO, UNESCO and POLITO and provided a mock up. Task 1.2 also identified the past events knowledge baseline which is used for characterisation of CH assets. This characterization was integrated and developed into a Risk Informative Thinking in the activity of the Task 2.3.
- The methodology presented for the CNH categorisation in the report supports the Multiscale Multisource data model developed in **T1.4 (EGIS)** by providing a prioritization of categories and attributes to be included in a CityGML-produced model.
- The T2.3 has used the indicators identified by the **T 2.2 (TEC)** as one of the primary parameter for the prioritization of these attributes, in addition to INSPIRE standards that are utilized in **T1.4 (EGIS)**.

The WP2 (TEC) has provided a theoretical and practical continuous confrontation about resilience characterisation and systemic approach. In particular:

- The **T2.1 (TEC)** has provided the shared context about the shared research questions and strategies.
- The **T2.2** Systemic resilience assessment and monitoring framework for HA (TEC) has provided the structure of indicators for the comparative framework with the CNH assets categorisation and the prioritisation of its characterisation.
- Advancements and knowledge exchanges have been developed between Task 2.3 and the **T2.4** on Characterisation of hazards, climate change events, impacts and projections/scenarios (TEC) for considering the impacts of hazards on CNH and multiscale approach. The output of the methodology developed in T2.3 will be used by both the Task 2.4 and the **Task 2.5** Specific hazard risk assessment (EKO) to be combined with other inputs in order to define a spatial explicit assessment methodology.
- The methodology will inform and support the development of a systemic multiscale resilience assessment (**T2.4 - TEC** and **T2.5 - EKO**), the identification of conservation friendly adaptation solutions (**T3.4 - NBK**) tailored to the characteristics of specific CNH assets and the periodisation of Resilience ID (**T4.1 - TEC**).

Synergies with the **WP3** concern:

- Measures for rapid response and recovery that will be developed by **T3.3** Consolidation and structural stabilization in emergency phases (UPV) by using the CNH categorisation developed in the T2.3
- With the **T3.4**. Existing (local) solutions for adaptation and building back better (NBK) will be organised a workshop in the OLs on local and traditional knowledge. for a collective CNH characterisation.

The report provides relevant inputs for **WP4 (UNIBO)**. In particular:

- It provides a literature review and inputs in term of theoretical and practical approach to **T4.2 (UNIBO)** for the definition of protocols, plans and guidelines.
- Specific inputs are provided for the **T4.3 (UNIBO)** for developing a strategy for the identification of relevant information for the Building Back Better approach in the SENDAI framework according to CNH requirements.
- More inputs in term of DRM model addressed to CNH concerns the developments of the **T4.5 (UNIBO)** for the policies recommendations in order to integrate CNH requirements within existing policies.

WP5 will generate a Historic Areas Resilience Dashboard in **T5.3 (EGIS)** dashboard interface to help visualisation of the information collected in generated in different work packages including the information that will be produced through the methodology presented in this deliverable.

Interactions with **WP6** especially concerns:

- The T2.3 has used knowledge built on **T6.1** especially on the matter of the understanding of recent disasters in HA and a wider understanding of natural hazards.
- The adaptive governance schemes mapping (ULIEGE) is an ongoing development of the **T 6.3**. The T2.3 has addressed CNH governance characterisation as relevant matter in shaping the CNH characterisation in DRM methodology.
- The methodology for Local Knowledge Generation developed in **T6.5 (POLITO)** has been used in the methodology to define the CNH asset in its context.

The suitability of the categorisation will be supported by and tested in the OLs in **WP7 (IHED)**. In particular, the Sava River Basin OL (**T7.6 – UNESCO**) provided a particular input for the development of the task. This input of the OL perspective as an intermediate validation of the methodology is presented in the paragraph 4.6. Steps toward a collective characterisation for CNH assets in Sava River OL: the OL perspective.

2.3 Report structure

The overall report includes two parts: part A Full report and part B Practical guide. It includes a main text, tools with detailed structured information the link to the digital template and annexes.

Part A Full report is structured as follows:

- Chapter 1 provides the Executive Summary.
- Chapter 2 provides the introduction.
- Chapter 3 provides the overall approach.
- In Chapter 4, starting from a literature review, the foundations of the theoretical approach are laid to outline the theoretical tools of the methodology. The literature review had the main purpose of defining the concept of HA in the light of the different scales (territorial/natural, urban and at the building level) and in DRM perspective. The specifications of the HA have been outlined in relation to the CNH assets. This chapter also includes an intermediate validation of CNH collective categorisation through the perspective of the OL.
- Chapter 5 reaches a redefinition and specification of those theoretical concepts that allowed to go beyond the existing state of the art, enriching and addressing the concept of CNH assets of HA in relation to the Risk Informed Thinking. It presents and explains the theoretical and conceptual basis of the shaped methodology, identifying and specifying macrocategories that are Building, Urban, and Natural. Moreover, based on the theoretical basis set up, it also defines the application framework of the methodologies and provides the practical tools to

apply the methodology. The tools include an interactive digital template intends to provide a collective characterisation of CNH in a DRM perspective in a practical and concrete way. The template allows dealing with the main challenge of managing the large scale through a flexible system that is also able to adapt to different CNH categories, HA scales and local applications.

- Based on the definition of the theoretical and practical framework of the Fifth chapter, Chapter 6 provides an assessment system as well as prioritization and finalization of attributes
- The Chapter 7 provides the Conclusion that summarizes the overall conceptual development of the report and the delivered contributions.
- Based on the Fourth Chapter, the Annex 1 delivers the Glossary.
- Following the theoretical development in the Chapter 5 on the matter of definition of the Natural Macrocategory, the Annex 2 provides the detailed complete Table of Natural Macrocategory.
- Following the parallel development in the Chapter 5 on the matter of definition of Urban Macrocategory, the Annex 3 provides the detailed complete Table of Urban Macrocategory
- Following the parallel development in the Chapter 5 on the matter of definition of Building Macrocategory, the Annex 4 provides the detailed complete Table of Building Macrocategory
- Based on the criteria of prioritization identified in the Chapter 6, the Annex 5 provides the Table of Prioritization of Attributes according to the Shortlist of Resilience Indicators
- Based on the developments of the conceptual and practical framework developed in the Chapter 5 and Chapter 6, the Annex 6 delivers the Template for CNH characterisation in a DRM perspective.

2.4 Contribution of partners

POLITO: coordination of the Task, development of the Deliverable. Presented and discussed the methodology in workshops.

ULIEGE: responsible of WP6, and T6.3. Contributed with the section 3.4 Cultural Heritage assets governance characterisation

UNIBO: responsible of T1.2. Contributed with the section 3.5 Good practices in national listing system: Italian Cultural Heritage catalogue and Carta del Rischio.

UNESCO: Technical Partner and co-coordinator of the Sava River Basin OL, contributor of T1.2, responsible for T6.1 Glocal User Requirements. Organised workshops for the methodology presentation and discussion. Reviewer.

TEC: Responsible of T2.2, participant in T1.4. Coordinator of the project.
Reviewer.

SAVA: contribution to the methodology.

3 Overall approach and objectives

3.1 Approach to the theoretical and practical framework for the Anatomy of Historic Areas

The full report is shaped to create a theoretical and practical framework for the management of HA in a DRM perspective. It provides a methodology for the characterisation of the CNH assets according to a Risk Informed Thinking. Specific attention is paid to their intrinsic resilience characteristics and their capacity to contribute to a heritage-led resilience. The overall report provides both a theoretical contribution based on intense literature review and a practical approach to a wide range/scale of HA Anatomy. It includes two parts: Part A Full Report and Part B Practical Guide.

The two parts contribute to the SHELTER Project knowledge by framing a methodology building upon the state of the art and existing ontologies for integrating the factors relevant for the assessment of resilience and vulnerabilities of the HA. More precisely, the overall report specifies the methodology for:

- the HA 'Anatomy' in a DRM perspective
- the CNH categorisation
- the identification of the characterisation factors to be taken into account for resilience assessment
- and, in addition, linking these outputs to other SHELTER activities of SHELTER.

The Part A Full Report includes an intense literature review and the theoretical analysis for shaping the methodology. The practical approach is also provided as an output of the analytical approach with the tools including an interactive digital template for the CNH characterisation in a DRM perspective.

HAs are complex systems with tangible and intangible features which encompass both cultural and natural tangible and intangible values. They also include different spatial scales including territorial, urban and building scale and cultural natural/urban features. The approach to HA needs to refer to the principles of the overall management of CNH. The report acknowledges these principles and more precisely, it links HA to the Historical Urban Landscape (HUL) approach included in the document titled *Recommendation on the Historic Urban Landscape* [3] as well as *The UNESCO on the Historic Urban Landscape. Report of the Second Consultation on its Implementation* [4]. Although the HUL documents address the changes especially in urban settings, in fact, they also include important specifications for an overall understanding of HAs including rural and natural HAs. According to the HUL approach, HAs include (i) Monumental heritage of exceptional cultural value; (ii) Non-exceptional heritage elements but present in a coherent way with a relative abundance; (iii) New urban elements to be considered.

In the SHELTER Project, HA refers to a range of kinds of CNH assets at different spatial scales. The range encompasses; 1) historical monumental building with its surroundings such as the Santa Croce in Ravenna; 2) an historical neighbourhood represented by Seferihisar district with the citadel, 3) the urban and industrial heritage of an historical city such as Dordrecht, 4) a natural area, the Baixa Limia-Serra Do Xurés Natural Park in Galicia which includes the rural territories with its communities; 5) a transboundary composite area including both natural areas and towns such as the Sava River Basin.

HA can be affected by one or more different natural hazards such as earthquakes, storms, floods, heatwaves, wildfires and subsidence. Hazards also include human-created disasters exacerbated by natural factors as defined by the European Commission in the document *Safeguarding Cultural Heritage from Natural and Man-Made Disasters: A Comparative Analysis of Risk Management in the Eu* (2018) [1] and as defined in *D. 6.1 Glocal User Requirements*. All these hazards can create severe damages to CNH assets with different kind of threats and issues.

The methodology is motivated by a lack of specific knowledge and management tools on the matter of HA Anatomy in the framework of disasters and risks reduction. We consider that a detailed CNH assets characterisation would help in Disaster Risk Reduction (DRR) both in understanding the risk and in assessing the damages. A tool for the CNH categorization in a Risk Informed Thinking would foster information and management that is needed. At the same time, it can help to develop a new awareness in CNH vulnerability and increase its resilience. For this purpose, the report provides a methodology as a theoretical development and a practical tool to support decision-making and action in a DRM perspective. The new multi-layered methodology is to allow characterising CNH for DRM.

The aim has been going beyond the state of the art by examining HA for an integrated characterization and management targeting DRM the range of HA spatial scales and types including cultural and natural holistic approach. It is important to note that the scope of the report is to **develop a multi layered methodology**. To achieve this, the mock-up presented in D1.2 has been a departure point that has been further developed by integrating a systemic DRM perspective. For this purpose, the report provides intense literature review and analysis addressing different specific aspects of the state of the art covering not only CNH literature, but also developments in DRM, natural area management, urban area management with a consideration of the specifications related to different spatial scales and governance. It assumes the risk management as part of a broader vision of HA management and it considers good practices to learn from them. The organization of this literature review and analysis is presented in the structure of the report at Chapter 2.2.

The report also provides the practical framework for finalizing its objective by delivering tools which are:

- (i) An interactive digital template in an excel google digital format for HA resilience assessment in DRM and CNH characterisation to be used at the different phases of hazards scenarios
- (ii) The identification of three macrocategories (Building, Urban, Natural) for the CNH categorisation
- (iii) HA assessments tools and categories
- (iv) Three tables for the identification of CNH characterisation of three Building, Urban, Natural macrocategories
- (v) A comparative table for Building/Urban/Natural characterisation
- (vi) Instructions for the HA resilience assessment in DRM
- (vii) A CNH Glossary

The methodology presented in this report also constitutes an essential part of the Multiscale Multisource Data Model developed within the SHELTER Project (D1.4). The Anatomy of HA and macrocategories with their specifications (that are defined within a Risk Informed Thinking) are defined through attributes as well as a prioritization of these attributes with a close inspection of both international standards (i.e. INSPIRE knowledge base that is the INfrastructure for SPatial Information in Europe) and the short list of indicators identified within in *D2.2 HA Systemic resilience assessment and monitoring framework* [6]. In order to exploit the multi-layered methodology for CNH categorization, the open data model CityGML modules to describe 3D features for building, vegetation and more urban components are also defined for a refinement of Macrocategories.

The overall approach has been shaped to be adapted by stakeholders at local level according to different scales and characters of their HA. The methodology can be customized by SHELTER Open Labs (OLs) for collaborative characterization according to diverse historic environments, scales, hazards exposure and specific objectives.

3.2 Scope and limitations

The framework of the presented methodology poses some critical issues and limitations. Firstly, it should be mentioned that even though the deliverable highlights the tangible and intangible features of HAs, mainly due to the objectives and priorities of the SHELTER project, the categorization of CNH assets is especially detailed for tangible CNH assets. The methodology provides the link between tangible assets and intangible values and includes them in the CNH characterization (e.g. cultural significance, community values and perspectives, uses by communities, local and traditional knowledge, cultural, historical, anthropological and social values). Secondly, the methodology in this deliverable frames CNH assets categorization into a Risk Informed Thinking. However, DRM is only one part of the overall management of HAs and CNH assets. Thirdly, as the methodology considers collective characterization by OLs, interactions with other tasks will make this aspect stronger in the implementation process. Especially the

implementation of the *D6.5 Local Knowledge Extraction* through workshops (scheduled for the next cycle of the project) and the finalisation of the *D6.3. Mapping of Adaptive Governance Schemes* (due to November, 2021) will reinforce the methodology in the matter of integrating local community values attributed to the CNH assets.

4 The Anatomy of Historic Areas and Cultural and Natural Heritage assets

Chapter 4 reviews literature, projects and policies in order to define the state of the art and the starting point for the Anatomy of HA and categorisation of CNH assets. The literature review is motivated by a lack of specific knowledge on the matter of HA anatomy in the framework of disasters and risks. The loss of cities' heritage values, for instance, has been variously underlined by recent assessments on the matter of heritage at risk. These assessments especially point out the potential added value of heritage for resilience enhancing.

The review of the state of the art assumes the European Commission recommendation in the document *Safeguarding Cultural Heritage From Natural and Man-Made Disasters* that highlights that "research on adaptation strategies, methodologies and other remedial tools is crucial, in order to safeguard Europe's cultural heritage from the continuous pressures it faces and the related decay-inducing consequences" [1]. In the same document, the Commission expressly recommends "improving the integration of cultural heritage in national platforms for Disaster Risk Reduction" [7]. For this reason, the literature review of existing definitions and categorisation of CNH assets also considers the need to integrate CNH and DRR by expanding the scope through the existing studies on resilience, ecosystem, natural protection, biodiversity.

On the matter of updated experiences of CNH assets specifications in the framework of disasters and risks, the chapter includes the Italian pilot *Carta del Rischio* as a good practice and a relevant reference.

The chapter also takes into account critical heritage studies that have underlined important new trends in improving CNH assets understandings and new approaches highlighting the role of CNH in resilience. More specifically it refers to the review *Changing Concepts and Values in Natural Heritage Conservation: A View through IUCN and UNESCO Policies* by Josep-Maria Mallarach and Bas Verschuuren, that have highlighted the trend on the matter of holistic approach including both cultural and natural values and the integration of Local Knowledge and governance for the identifications of their characterisations [8]. According to these interpretative readings, the chapter includes a recognition on the CNH Governance characterization and a paragraph to explain how the Local Knowledge (D6.5) will be integrated into the methodology for characterizing CNH assets in the SHELTER Project.

The objective is to build a knowledge baseline with the state of the art on the matter of the HA and CNH assets categorisation to achieve the best identification for its characterisation. According to the OLs, the categorisation requirements of SHELTER HAs referred to a range of kinds of CNH assets at different spatial scales. The outcomes include a **CNH glossary to be made available to OLs** that is presented in the Appendices (Annex 1).

It should be noted that SHELTER HAs not only represent risks and threats of historic territories to face natural hazards (with the extended meaning of hazards directly natural or created by humans and exacerbated by natural factors, as expressed D. 6.1[9]) at different spatial scales. In some cases, they represent complex sites including many CNH categories. In other cases, they are included in larger protected areas. Their huge variety together with their own specificities through small/huge scale territories require a specific review especially addressing the matter of contemporary, urban and natural heritage with update identifications and definitions.

The following section provides an overview of the intensive review carried out to identify the state of the art on the matter and includes the definitions of CNH assets.

4.1 Verifying CNH categories and definitions according to international standards and integrating new clarifications for a holistic categorisation

HA is a complex system of cultural and natural elements that include a wide range of CNH categories of varying scales and layers of changes over time. The protection definitions of HA is shifting from strict protected sites to a wider hybrid notion that combines natural and cultural features as well as natural and inhabited areas. [10] Accordingly, a protected HA can include/be included in urban, rural and natural areas. For this purpose, it has been important extending the recognition for a more inclusive categorization.

The following research questions have been considered for this review of the state of art:

- (i) How to specify the 'Anatomy' of the HA by referring to both natural areas and urbanised areas?
- (ii) What are the updates on the matter of the CNH assets especially referring to the SHELTER project HAs?
- (iii) What are the criteria to finally define a categorisation of the CNH assets that allows articulating them through different settings?

The main sources of this literature review have been existing ontologies and definitions, Glossary of World Heritage Terms [11], International Council on Monuments and Sites (ICOMOS) open archive [12], UNESCO Thesaurus [13]. They provide an essential reference for the identification of the existing terminology that is in-use and related definitions. The review also covers a wider recognition through European policies and classifications. The CNH glossary, thus, includes CNH categories identified by Council of Europe (CoE) through Conventions and Recommendations [14]. Moreover, it takes into account some national developments that represent how countries and local communities have identified

important values related to regional developments, collective memories and identities and, finally, some critical reflections.

The ICOMOS Open Archive is an Eprints on CH which takes the form of an institutional repository where all the scientific documentation produced by ICOMOS [15] is stored. The Open Archive's Classification Schema defines "heritage typologies" that are identified as: *Agricultural heritage, Archaeological sites, Architectural ensembles, Collections (movable), Cultural landscapes, Cultural routes, Heritage canals, Historic buildings, Historic gardens, Historic landscapes, Historic towns and villages, Historic town centres, Historic urban landscapes, Human settlements, Industrial and technical heritage, Intangible cultural heritage, Mixed sites, Natural sites, Polar heritage, Prehistoric sites, Rock art, Scientific heritage, Significant personalities (heritage related to-), Underwater cultural heritage, Habitations urbaines, Vernacular architecture, World Heritage.*

UNESCO Thesaurus is mainly used for indexing and searching resources in UNESCO's document repository. It is a controlled and structured list of concepts used in subject analysis and retrieval of documents and publications in the fields of education, culture, natural sciences, social and human sciences, communication and information [13]. The definitions in the Article 1 of *the Convention Concerning the Protection of the World Cultural and Natural Heritage* [16] (WHC) (monument, group of buildings, sites) are also included. Furthermore, the HUL concept and definitions in the 2011 *Recommendation on Historic Urban Landscape* (as well as clarifications in the 2019 *Second Consultation on the Implementation of the Recommendation*) is also included.

As mentioned, the output of this review has been summarized in the CNH glossary included in the Annex 1. Some relevant identifications and integrated definitions are elaborated below addressing SHELTER HA specifications.

4.1.1 Architectural heritage and contemporary architecture

The Convention for the Protection of the Architectural Heritage of Europe, also known as the Granada Convention [137] by defining architectural heritage refer to the following permanent properties: **monuments** (all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings), **groups of buildings** (homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest which are sufficiently coherent to form topographically definable units), **sites** (the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogeneous to be topographically definable and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest).

The European Charter of Architectural Heritage drawn up by the CoE Committee on Monuments and Site addresses **architectural heritage** as "a capital of irreplaceable spiritual, cultural, social and economic value" [17]. It defines

“architectural heritage consists not only of our most important monuments: it also includes the groups of lesser buildings in our old towns and characteristic villages in their natural or manmade settings. By its conceptualization architectural heritage is “an expression of history” that helps us to understand the relevance of the past to contemporary life.

Vienna Memorandum on World Heritage and Contemporary architecture has provided more identifications referring to the extended CH notion and better taking into account architecture in cities. It has especially introduced the **contemporary architecture notion**. “Contemporary architecture in the given context is understood to refer to all significant planned and designed interventions in the built historic environment, including open spaces, new constructions, additions to or extensions of historic buildings and sites, and conversions” [18].

Some national and local policies and regulations in place have also referred to contemporary interventions for its integration into historic urban fabric [19].

4.1.2 Historic areas, human settlements and cities’ heritage

The *Culture Urban Future Global Report* has defined the **urban heritage** as “a European concept at the heart of urban identities” and urban system as the output of “a layering process, whereby pre-existing structures were continuously transformed or reused.” [20] Accordingly, as a result of Europe urban background and experiences on the matter, **the 2016 UNESCO report** represent the European countries as one of “the largest ensembles of preserved urban heritage in the world” where “the practice of urban conservation has unlocked new approaches and instruments to achieve urban and environmental sustainability, emphasizing local knowledge, creativity and well-being.” [19] The ICOMOS Heritage at risk World Report 2014-2015 on monuments and sites in danger has identified among others intangible values such as the **urban “visual identity”** as an important aspect to be related to local communities and social resilience. [21]

By heritage studies, there is an increasing awareness on the need to better articulate the discourse on cities’ heritage, also due to the current condition of the planet where most population lives in cities. [22] [23]. However, although the attention on protecting CNH in cities has been attained and integrated in policies especially after the WWII, the international conventions and other recommendations also referring to urban conservation, disaster risks and management do not provide an exhaustive identification of urban heritage. From the recognition throughout international standards, the identification of an urban category is quite challenging. The “architecture ensemble” emerges as a related category to the urban dimension and a definition “habitation urbaines” is available from the French national categorisation. However, it is defined as an approach rather than a CNH category. The following reflection, thus, moves from the belief that the city cannot be reduced to a single idea or image or a collection of CNH assets.

The development of urban heritage as a category of heritage understanding started to be shaped especially in Italy since the 1950s and to be codified in the 1960s. The Gubbio Charter (1960) is the first document identifying **the historic town** (or historic centre) as a specific type of heritage with its characterisation. [24] The recommendations for safeguarding historic towns that were drawn up at that occasion, finally, identified the urban category as a whole. The notion of “centro storico” also identified the HA within cities (this notion and recommendations for its safeguard were also underlined for its opposite approach in relation to the demolition of HA in the pre-war Fascist period) [25]. In parallel, architectural studies - such as urban morphological studies undertaken by Saverio Muratori [26] on Venice and Carlo Aymonino and Aldo Rossi on Padua [27] as well as the Aldo Rossi theoretical reflection on historic cities among others[28] - shaped a morphological approach to urban analysis with long lasting meaningful experiences and theoretical contributions. These studies constitute a reference also in current approaches. In some cases, they have been “rediscovered” in recent times precisely for *The Implementation of the UNESCO Historic Urban Landscape Recommendation*. [29]

By the literature HA also can be understood as CNH category by itself. The UNESCO Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas (1976) defines **HA** as “any groups of buildings, structures and open spaces including archaeological and palaeontological sites, constituting human settlements in an urban or rural environment, the cohesion and value of which, from the archaeological, architectural, prehistoric, historic, aesthetic or sociocultural point of view are recognized”. [30] It also provides more specification: “Among these “areas”, which are very varied in nature, it is possible to distinguish the following in particular: prehistoric sites, historic towns, old urban quarters, village and hamlets as well as homogeneous monumental groups, it being understood that the latter should as a rule be carefully preserved unchanged”. [30]

The most relevant contribution on the matter of urban heritage comes from the definition of **HUL**. As outlined in the Recommendation document (2011), HUL is “the urban area understood as the result of a historic layering of cultural and natural values and attributes, extending **beyond the notion of “historic centre” or “ensemble”** to include the broader urban context and its geographical setting” [3].

The HUL approach is especially helpful in terms of identifying the complexities of CNH characterisation for DRR. It defines, in fact, **an important methodological approach** to include:

notably the site’s topography, geomorphology, hydrology and natural features, its built environment, both historic and contemporary, its infrastructures above and below ground, its open spaces and gardens, its land use patterns and spatial organization, perceptions and visual relationships, as well as all other elements of

the urban structure. It also includes social and cultural practices and values, economic processes and the intangible dimensions of heritage as related to diversity and identity.

Furthermore, the HUL also identifies three main categories: "Monumental heritage of exceptional cultural value; Non-exceptional heritage elements but present in a coherent way with a relative abundance; New urban elements to be considered (for instance): The urban built form; The open space: streets, public open spaces; Urban infrastructures: material networks and equipment".

The HUL approach has been included in policy papers for Urban Agenda by United Nations with more developments in term of urban heritage identification. In this framework, the paper of the group HABITAT III "Culture et Patrimoine urbains" identifies the urban heritage as a composite category: "Le patrimoine urbain est composé d'éléments urbains (morphologie urbaine et environnement bâti, espaces verts et ouverts, infrastructure urbaine), d'éléments architecturaux (monuments, bâtiments) et d'éléments immatériels". [31] The identification is also confirmed by the same organization. In relation to threats to urban heritage and destruction it refers to "**lived heritage of cities**" and urban resilience[32].

More understandings of historic areas and heritage of cities come from World Heritage inscriptions. Inscriptions and recent tentative list include in some cases cities' setting and urban layout among heritage characterisation that are especially perceived through open public space such as streets, squares, parks (see "Ferrara town and the Renaissance and its Po Delta" in World Heritage list and "The timeless humanistic architecture" of Jože Plečnik in Ljubiana in Tentative list).

4.1.3 Landscape and built and natural environment

The definition of **natural heritage** as defined by UNESCO delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty [16]. Recent developments and recommendations also foster a heritage understanding toward a **liveable built and natural environment approach**.

The "cultural landscape" notion embraces a diversity of manifestations of the interaction between humankind and its natural environment [33] Cultural landscapes often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature. They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal [34].

In the last decades the Europe has pointed out on the varieties of the HA, its values and the need of an integrated vision. The CoE, Culture and CNH underlines the need to include "European cultural landscapes, cities and towns, as well as a

variety of natural and historic monuments are part of the European heritage. Its fostering should be an important task for modern architecture, urban and landscape planning in all regions of the EU" [35]. European Landscape Convention identifies the landscape as "part of the land, as perceived by local people or visitors, which evolves through time as a result of being acted upon by natural forces and human beings" and highlights its important role in societies [36]. Recently this approach has been stressed by **the Lausanne Declaration** on "Landscape integration in sectoral policies" that has been assumed by the Plenary Session (Strasbourg, 10-13 November 2020). [37] The Steering Committee for Culture, Heritage and Landscape of the CoE, in particular, took note of the Declaration that considers: "the powerful symbolic significance of the landscape, which feeds on the sources of the **social imagination**; its structural role as a lever for sustainable development based on a harmonious **balance between the environmental, social, cultural, and economic dimensions**; and the importance of the landscape with regard to the challenges of health, food and energy, as well as addressing the challenges resulting from climate change, the disappearance of living species, pollution of the water and air, degradation of agricultural and forest soils, and artificialisation of land". [37]

Addressing the notion of CNH as an integrated element of natural and urban/rural settlements, the "**cultural route**" is also another important category which is identified by the International Committee on Cultural Routes of ICOMOS (CIIC-ICOMOS) as "a land, water, mixed or other type of route, which is physically determined and characterized by having its own specific and historic dynamics and functionality; showing interactive movements of people as well as multi-dimensional, continuous and reciprocal exchanges of goods, ideas, knowledge and values within or between countries and regions over significant periods of time; and thereby generating **a cross-fertilization of the cultures in space and time**, which is reflected both in its tangible and intangible heritage". In addition, the CoE has launched the Cultural Routes in 1987. According to CoE, the cultural routes demonstrate, by means of a journey through space and time, how the heritage of the different countries and cultures of Europe contributes to a shared and living cultural heritage.

The approach of the International Union for Conservation of Nature (IUCN) to "**protected area**" is also a relevant point for integrating CNH in DRR. The IUCN defines protected area as "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values" [38]. According to IUCN, protected areas include: Strict nature reserve, Wilderness area, National park, Natural monument or feature, Habitat/Species management area, Protected landscape/Seascape, Protected area with sustainable use of natural resources.

4.1.4 Cultural significance and multiculturalism

Literature and policies strongly underline also the need for a consideration of other aspects such as local traditions and crafts as relevant aspects for identifying both built and natural environments. Beyond 'cultural identities and collective memories' new understandings have been also shaped to include **multi-ethnic dynamics** and a more inclusive conceptualisation of CNH categorisation. The recommendations underline the need to include the definition plural identities by fostering the notion of "belonging" rather than identity and intercultural dialogue. In this respect, the integration of the concept of **"cultural significance"** in the Burra Charter [142] is significant (see the Glossary).

The methodology proposed in this deliverable underlines the need for strengthening analysis in relation to "Cultural significance" with a view to integrate the community values and perspectives more systematically. The tools allow such analysis through the community values and perspectives that are attributed to the CNH assets. In addition, it also asks how the community uses the CNH asset itself which is also key information.

4.2 Toward an ecosystem approach to the Anatomy of Historic Areas

New context for conceiving, evaluating, and prioritizing heritage conservation have been shaped by current literature and has been acknowledged by recent policies. [8] Protection strategies are shifting from strict protected areas notion to "people-centred protected areas" understandings which are inspired by the notion of bio-cultural diversity and socio-ecological resilience. [39] The relationships between societies and their environments are more and more acknowledged. The notion of landscape and its related conservation principles have marked an important turn. [40] Assessing approaches are definitively moved to reading the natural HA as landscapes and fostering its understanding as historical and cultural heritage. [41]

An important instrument for these approaches is the CBD that establishes that "Biodiversity is essential for human health and well-being, economic prosperity, food safety and security, and other critical areas necessary for the individual and collective thriving of all humans and all human societies." [42]. With the aim of safeguarding nature and securing the future it involves a wide range of organizations including local authorities, civil society and indigenous groups.

An analysis was performed by UNESCO in the Deliverable 1.2, Chapter 5, on "Building the relevant regulatory frameworks for resilient cultural heritage protection against natural hazards". Departing from this analysis, the present report extends the scope to define the ecosystem approach based on international policy documents, charters, recommendations, etc. As an outcome of this intensive research, the main considerations are summarized below:

- The new developments bridge over an opposition between nature and artificial environment as human-made. They go beyond an understanding of *cultural* as originated by human imprint and *natural* as untouched by culture. By “relating nature, culture and heritage”, a CNH holistic approach is fostered instead. [42]
- The holistic approach is required in order to analyse, survey and manage HA as combined elements of complex ecosystems. [42] This approach is needed to foster the social–ecological sustainability of a rapidly changing planet, and “capacity of a social–ecological system to absorb a spectrum of shocks or perturbations and to sustain and develop its fundamental function, structure, identity and feedbacks as a result of recovery or reorganization in a new context.” [44].
- The cultural and natural holistic approach [16] should takes into account that ‘humanized’ (settled by humans) areas have been extended more and more, urbanization is increasing, cities are increasing, population is increasing. For conservation and management, urbanized areas should be considered in an integrated manner as an ecosystem [8].
- Under this perspective, the term ecosystem is not to be understood as only totally referring to natural system. Ecosystems can also include human modifications and alterations such as the human imprint on the environment [45]. Ecosystems are complex, evolutionary systems that contain human as well as geo-physical units and are associated with socio-cultural factors and institutions.
- Urbanized human settlements should be considered as resources of biodiversity because – according to the Convention on Biological Diversity (CBD) approach – “biological diversity is about more than plants, animals and micro-organisms and their ecosystems – it is about people and our need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live”. [42]
- The aim for integration of human interaction with natural elements (as outlined in the Florence Charter [46]) has been specified in order “to achieve sustainable development based on a balanced and harmonious relationship between social needs, economic activity and the environment” but also as a need that comes from the awareness the landscape contributes of the formation of local cultures [47].
- The new vision has created the need to re-assess categories and reflect on the most relevant categories especially in the European culture. By the document UNESCO / ICCROM / ICOMOS / IUCN, *Managing Disaster Risks for World Heritage* (2010), for the process of categorization it is important to follow a systematic process of damage assessment that takes into account the local context and the resources available [48].

By combining the cultural and natural holistic approach with the SHELTER multiscale HA, this report proposes to anatomize HA by defining the elements of human settlements and the natural areas to be integrated through a combined understanding of their qualities and values. It should be noted that also the "cultural landscape" category doesn't exclude other categories included on the World Heritage List the possibility of properties of exceptional importance in relation to both cultural and natural criteria continuing to be inscribed. [45]

4.2.1 Natural historic areas

The natural areas constitute a living archive of material and immaterial traces of biodiversity, but also of the history of humankind and nature. The World Heritage List comprises about 1121 properties of Outstanding Universal Value. Natural sites represent about 23% of this list, including 39 mixed (both cultural and natural) sites and 213 natural sites. [49]

As mentioned above, this report especially refers to the IUCN identification of Protected areas that has proposed integrated approaches to bridge the divide among cultural and natural heritage. IUCN types of protected areas that could be useful for the HA Anatomy. For these areas the identification has defined the **degrees of naturalness [50]**, from the most natural to the least: 10. Natural virgin system (only natural elements and processes are present); 9. Natural system (few exotic species are present); 8. Sub-natural system (there is possibly an extended presence of wild exotic species, but with low impact); 7. Quasi-natural system (extensive human activities, but with low physical impact); 6. Semi-natural system (human infrastructure is scarce or concentrated; wild exotic species are possibly dominant, with native species considerably reduced); 5. Cultural self-maintained system (processes are conditioned by extensive human activities, with native species altered and occasionally managed); 4. Cultural assisted system (there are important infrastructures and/or conditioning of the physical environment, with forced biological production and moderate addition of matter, usually with pollution added); 3. Highly intervened system (still includes areas with natural, cultivated, or breeding biological production, mixed in a mosaic with buildings and other infrastructure); 2. Semi-transformed system (biological production is not dominant; human elements predominate); 1. Transformed system (human processes govern, with clear dominance of artificial elements) 0 Artificial system (there is no self-maintained macroscopic life; microscopic life is absent or in containers).

4.2.2 Human settlements

KINDS OF HUMAN SETTLEMENTS RANKED BY SIZE

Terms used to describe the size or character of human settlements are rarely precise. The following are some widely used English-language terms with generally accepted definitions. They relate to space and people, rather than to governmental jurisdictions.

- Hamlet: a settlement smaller than a village
- Village or commune: a rural community smaller than a town
- Town: a compactly settled area, larger than a village but smaller than a city
- City: a large or important populated place larger than a town
- Micropolis: a growing smaller city
- Metropolis: an important city and the densely populated surrounding areas that are socially and economically integrated with it
- Urban agglomeration or conurbation: includes a central city and neighbouring cities linked to it, e.g. by continuous built-up areas, or by patterns of commuting
- Megacity: an urban agglomeration of 10 million or more
- Megapolis or mega-region: an integrated network of metropolitan and micropolitan areas.
- Megalopolis: a large and highly connected urban region.

The term human settlement refers to the totality of human communities and their habitat, both in rural and in urban environments. According to the UNESCO dictionary, human settlements “consist of shelter, infrastructure, services required by a community for the fulfilment of its functions as a social body”. [13] With their diverse size, characters and historical developments, they are the places for social, political, and economic relations.

The human settlements are normally ranked by size based on the number of population and spatial relations (Figure 2). The IUCN has recognized that the terminology for human settlement identification is highly imprecise and varying as well as the definition of its characterization [51]. Other categorizations are also available with different definition. [52] Therefore, the table above, “Kinds of human settlements ranked by size” by the

Figure 2: Kinds of Human Settlements Ranked by Size. Source: Živković J., 2019.

Urban Protected Areas. Profiles and best practices guidelines (p. 2) is useful for a size-based classification. [51] The European Commission on the matter of Global Human Settlements indicates the needs of harmonized indicators and identifies the method of **degree of urbanisation** and defines the classes (they have been integrated in the Table in the Annex 3). [53]

As an outcome of the literature review on the matter of human settlement characterisation, the main considerations are summarized below.

- It has been argued that “despite this lack of uniformities in definition, the urban-rural dichotomy continues to dominate the UN’s reporting on urbanization” although it is based on definitions that have been introduced some decades ago. [54] This approach invites to break down the cultural barriers between the ‘natural’ and the ‘urban’ for a holistic and inclusive approach that can be applied to identify and tackle socioeconomic and cultural issues.
- Another important discussion regards biodiversity. Although urbanization affects biodiversity and ecosystem services, by considering that “biodiversity does not have to be rare to be valuable”, the CBD secretariat outlined that cities continue to retain a significant proportion of native biodiversity[55]. It is also highlighted that **the urban biodiversity** is a combination of natural and human interaction characterizations that include

rural to urban areas at the landscapes and habitat levels. They refer to remnants of natural landscapes, traditional agricultural landscapes and urban-industrial landscapes.

- From this literature review, we find the need to introduce more articulated criteria and parameters for categorizing human settlements. These criteria are especially important for considering the complex relationship among heritage assets in urbanised areas, urban development and urban heritage resilience. On one hand, cities are no longer considered autonomous entities due to complex processes on local, regional and global levels affecting their development. [56] On the other hand, the notion of urban sustainability and “living cities” are also characterized by their possession of a unique historic heritage. [57]
- This literature review also confirms **urban morphology** a key characterisation in the Anatomy of human settlements. Urban morphology refers to the urban form and the study of it focusing on the processes that shape and change the urban landscape as a result of the historical, political, and cultural (notably architectural) conditions in which the city was created and developed. Since its beginnings at the turn of the 19th to the 20th century, the morphological approach to cities has been linked to the study of heritage and a concern for preserving older forms of urbanism. In the second half of the 20th century (after urban development’s mostly focused on modernization), many countries developed bold and innovative experiments in the redevelopment of old city centres. Based on urban studies, these experiments sought to identify the qualities and particularities of historic centres while at the same time reconciling them with land use and development policy. In France “Loi Malraux”, in Belgium “Structuurplan Brugge” or else in Italy “Assises, Bologna”, historic cities are the main object of urban studies and of innovation in the domain of tools that link conservation and planning. The cornerstone is the study of urban morphology.
- For identifying elements of urban characterization, **the concept of “centre”** or “centrality” have been identified as a crucial point. [58] Centrality refers to the site of buildings important for the community social, political or economic life, or the site of a marketplace, or function for the institutions for decisions making and management. The process of urbanization is quite important thus for identifying the type and the characters of physic and human spaces of urbanized areas. It defines many characters of urban space and urban fabric.
- The process of the urban development in European countries met the patterns of the rapid urbanization by industrialization and capitalist production at different period. Industrialisation introduced **suburban areas** with specialized buildings for the production, but also for the housing, with working class neighbourhoods. Industrial characterisation of HA is, thus, an important category for assessing HA. Since the industrialization related

changes also include the building process, materials and techniques, with important diversification of urban areas and manufactures.

- According to Posey, *"Human evolution is about adaptation and change, and as cultures and environments adapt to different conditions there will inevitably be practices and customs that become unadaptive and must be modified to fit the new circumstances"* [59] **Disaster past events** also constitute an important characterisation for HA resilience assessment. They can produce permanent and irreversible endangerments both to physical features as well as intangible layers such as the environmental depletion, the urban landscape decay and the historical cultural local identity.
- Research on social resilience (e.g. **the Stockholm resilience centre [60]**) have shown as **the sense of place** is important for social cohesion and participation. However, in the sense of place and the sense of community, also cultural roots and links to heritage values in the attachments to places need to be considered and the characterizations of heritage in HA will address also to tangible and intangible categories for this identification.

As a result, the state of the art provides a knowledge baseline and strategies for the CNH assets characterisation and the Anatomy of HA in OLs in order to properly integrate some important achievements.

4.3 Integrating local and traditional knowledge for CNH assets characterisation

Local and traditional knowledge is an essential characterisation for the Anatomy of HA and for the categorization of CNH assets, because as highlighted by the World Bank, *"to understand the connection between cultural heritage and resilience, it is essential to first recognize the unique role and contribution of culture in reducing disaster risk and fostering resilience: culture reflects natural diversity, mitigates risks through goods and services, connects people, serves as a symbol of identity, is a factor in social stability, communicates risks (creativity is an important component in many situations), and is resource for sustainable socioeconomic development."* [61]

The 'Methodology for Local Knowledge Extraction' has already been identified in **the D6.5[62]**. According to this deliverable, Local Knowledge refers to the set of knowledge, skills, know-how and practices that societies have developed over time, through a long-lasting interaction with their environment. The report grounds in the awareness about the relevant contribution of traditional and Local Knowledge to science and technology systems of formal knowledge, and the purpose of preserving researching, cultivating and promoting this informal knowledge as an expression of the intangible cultural heritage.

The integration of the local Knowledge extraction (D6.5) with the 'Anatomy of Historic Areas: Collective characterisation of CH assets' is planned in the next

steps of the Shelter project. The local knowledge methodology requires organization of workshops with OLs and due to the COVID19 pandemic, it is needed to adopt the methodology for online workshops. The organization of these online workshops are already planned within the scope of the WP7 Open Labs and outcomes of these workshop will be integrated to the characterisation of CNH assets.

4.4 CNH assets governance characterisation

Research into the role of different stakeholder groups within DRM literature is in a state of persistent 'dearth' [63]. In which there is a limited amount of academic research that attempts to explicitly categorise the roles, responsibilities, and authority of different stakeholders within the stages of DRM. Furthermore, conceptually, the integration of CNH into the concept of climate change, sustainability and DRM strategies is also considered to be in its infancy by academics, with an emphasis in this subject, gathering significant traction in the last ten years. In response, there has been a surge in contemporary research, policy developments and practical approaches to understand better and integrate heritage into sustainability, DRM, and other relate disciplinary lens [64] [65] [66].

As part of this increase in research, scholars have noted the limited amount of contemporary research that specifically addresses the importance of different stakeholders in the realisation of sustainability goals in heritage [67]. Furthermore, contemporary research has highlighted the difficulties clashing governance structures can have on the protection of heritage [68]. Stressing the pressing need for contemporary research to conceptualise better and understand the role of different stakeholders within the management and protection of heritage sites creating a challenging but essential research opportunity for the ongoing work of the SHELTER project. The purpose of this section of the report is to develop a greater understanding of the roles of different stakeholder groups and the interactions that may influence the 'Anatomy' of any given site or asset. And, if possible, to elicit a basic schema pinpointing the different types of governance within heritage sites and how they manifest in practice. To achieve this, the section on governance characterisation of the report is structured into three sections. The first is a concise literature review which identifies key literature and categorises different forms of governance observed within the context of heritage. Secondly, the key literature is consolidated into Table 4, which is used to identify similarities and areas of consensus between the different categorisations of governance. The similarities identified within Table 4 are used to develop a simple conceptual model (Figure 3) which consists of four main forms of governance which are likely to be found within the management of CNH. Finally, the findings of both the literature review and the initial development of the organigraphs are then used to define a preliminary schema which briefly outlines the manifestation of these different governance forms in practice, highlighting the key stakeholders and their interactions. Before proceeding, it is crucial to note

that the schema has been developed as part of the ongoing research within WP6. It forms part of a continuous and ongoing iterative process of coproduction between the SHELTER consortium, the OLs and the stakeholder groups specific to each OL. As a result, this is not the final version of the work but provided to support D2.3, to see the final version of this schema and the detailed work regarding the understanding and development of governance see Deliverable 6.3 entitled 'Adaptive Governance Mapping' produced by ULIEGE for submission in November 2021.

The document outlines a variety for different sources and methods which can be used to define different types of governance. This includes both descriptive and normative definitions that have been popularized across CNH related disciplines. In reality, any of the designations identified in the document can and have been used to broadly define the governance within HAs. But, for the purpose of consistency and in order to begin the develop of a more holistic theoretical understanding of governance which can be used in practice, the report attempts to bring these different works together to provide an overarching conceptual model which can be used to broadly identify different types of governance within CNH.

It is important to note that the understanding and exploration of governance within CNH is begin explored in much greater detail with T6.3.

4.4.1 Exploring different forms of governance within the context of heritage and related disciplines: A literature review

A review of the relevant literature across academia, policy and practice yields a growing interest in the exploration of governance with the context of heritage areas [69]. What is clear from the literature is the evident shift in thinking as scholars cite a reassessment of the heritage paradigm [70] away from traditional hierarchical governance models, towards more inclusive, participatory approaches [71]. Historically, much of the governance within heritage areas were considered to be 'top-down' [8] in which decisions were made by overarching government organisations or institutions. However, contemporary research has seen a dramatic emphasis placed on decentralised and more democratic forms of governance [72]. In which greater degrees of participation from stakeholder groups and more inclusive governance strategies have become synonymous with 'good' governance [73].

While some experts have attributed this trend to an increase in more democratic governance models, rather than an explicitly decrease in hierarchical governance models. [74]. The increase in emphasis on more participatory governance mechanisms is evident, and the value it provides within the context of heritage management is widely debated. To date, however, it appears as though a lot of the research surrounding governance within the context of heritage has been focused towards natural heritage. [75] [6]. As well as on the identification of governance models on a case – by case basis, with limited meta-analytical

approaches attempting to conceptualise governance and the role of different stakeholders within the context of built heritage.

Furthermore, not only is there a variety of different governance structures, making it challenging to identify different forms of governance. [76]. Epistemologically, it appears that there are different terms used to categorise the structural elements of governance across academic research, policy development and practical applications. For instance, on the one hand, scholars use the more descriptive term to identify governance using terms like '*types*' and several distinct sub '*forms*' of governance within heritage areas. [77] [78]. Similarly, terms such as '*styles*' and '*approaches*' of governance are also used. [79].

In contrast to these more descriptive terms outlined above, there are examples from the literature of much more normative definitions of governance for example reference to '*models*' of governance, and other examples of literature also use term governance '*structures*' [80] [81] or '*systems*'. While varying disparity between these different terms and its implications on practice may be an important avenue for further research within other aspects of the SHELTER project, the purpose of this report is to help categorise different governance forms and therefore will not be explored explicitly within this deliverable.

Understandably, the differences in terminology and the diverse applications of governance can make it a challenging concept to engage with. [82] As a result, the following literature review draws from historical examples and the growing body of work conducted on governance within natural and built heritage. The section focuses explicitly on the research work, which attempts to conceptualise the different descriptive and normative elements of governance that have already been described within academic literature. This begins with an exploration into the different '*types*' of governance that have been identified within the context of heritage sites.

With this in mind, a good place to start is the widely cited work conducted by Hall [12]. Within the context of tourism Hall defines four governance typologies. Hall [12] provides four distinct governance typologies and a matrix to show how they relate to one another; these four typologies are as follows: hierarchical, markets, networks and communities. The key defining features of these four types have been summarised in Table 1 below.

Governance Typologies	Explanation
Hierarchical	<i>Governance by national state and supranational institutions, which is hierarchical in steering mode by public actors. "hierarchical governance remains significant because of the continued role of the state in international relations, the development of</i>

	<i>institutions that enforce international and supranational law and the ongoing importance of legislation and regulation as part of the exercise of state control " [hierarchical governance] rather it tends to be subsumed under a more general discussion about the roles of government in tourism and the nature of state intervention"</i>
Markets	<i>Marketisation and privatisation of state instruments, which is hierarchical with private actors. "The decision by the state to allow the market to act as a form of governance does not mean that government ceases to influence the market. Rather, instead of using imposed regulatory mechanisms, government may seek to use other forms of intervention, such as financial incentives, education and even the potential for future intervention, to encourage the tourism industry to move in particular directions, often via self-regulation"</i>
Networks	<i>Public-private partnerships, which is nonhierarchical with public actors. "Policy networks vary widely with respect to their degree of cohesion, ranging from "sub-governments", "iron triangles" and coherent policy communities through to issue specific coalitions. Nevertheless, despite such variability in their organisation, network governance is often considered as a "middle way" or "third way" between hierarchical and market approaches to tourism governance presented networks in a similar fashion in relation to top-down and bottom-up approaches to implementation"</i>
Communities	<i>Private-private partnerships communities. "This approach is very much influenced by communitarianism and demands for more direct citizen involvement in governance. Communitarianism proposes that large-scale government should be replaced by smaller spatial units of governing that are closer to the "community". Arguably, the most influential dimensions of communitarianism have been with respect to the focus on the significance of social capital in community and economic development and the development of alternative forms of consumption focused on the local region and voluntary simplicity. However, in addition to the communitarian focus on</i>

	<i>the development of more appropriate scales of governance, the 448 C.M. Hall communities' framework also builds on traditions of deliberative and direct democracy. The former focused on improving mechanisms for greater direct public involvement in policymaking through enhancing debate and dialogue, while the latter via measures such as citizen-initiated referenda. All three dimensions of governance as communities highlight the importance of public participation in public policy making"</i>
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Table 1: Four typologies of governance defined by Hall (2010) within the context of tourism and the development/analysis of policy.

The governance typologies defined by Hall [12] have been applied within a wide variety of disciplinary lenses but more specifically, within the context of sustainable tourism [12]. For this reason, they provide a valuable precedent for application within the context of built heritage. Secondly, another descriptive example of governance types can be found within the work conducted by the IUCN, which attempted to define the different types of governance within the context of natural, HAs. More specifically, the report entitled '*Governance of Protected Areas, from understanding to practice*' [14]. Within this report, the IUCN and the CBD define four broad governance types typically observed within natural, historic areas. These are defined as; Type A: Governance by Government, Type B, Shared Governance; Type C: Private Governance and finally, Type D: Governance by indigenous peoples and/or local communities. For the purpose of brevity these key elements of these four types have been briefly encapsulated in Table 2 below (however, for a more in-depth analysis, please refer to [14].

'Types' of Governance	Explanation
Type A: Governance by Government	<i>"In this type, one or more government bodies (such as a ministry or protected area agency reporting directly to the government, or a sub-national or municipal body) hold the authority, responsibility and accountability for managing the protected area, determine its conservation objectives (such as the ones that distinguish the IUCN categories) and develop and enforce its management plan. The state or federal government may or may not own the land, water and related resources. In some cases, the government retains the overall control of a protected area and takes all major decisions but delegates the planning and/or daily management tasks to other actors such as an NGO, private operator or community. Under a national legal framework and governance system, there may or may not be a legal obligation to inform</i>

	<i>or consult stakeholders prior to setting up protected areas and/ or making or enforcing management decisions, and accountability measures also vary from country to country."</i>
Type B: Shared Governance	<i>"Protected areas under shared governance are based on institutional mechanisms and processes which - formally and/ or informally - share authority and responsibility among several actors. This model is widely used, and many countries have been experimenting with it, sometimes adopting specific laws, policies and administrative arrangements to make sharing work. Shared governance is not, of course, unique to protected areas, and is indeed becoming more common in many other fields."</i>
Type C: Private Governance	<i>"Private governance comprises protected areas under individual, NGO or corporate control and/or ownership, which are often referred to as "private protected areas". Since much of the world's biodiversity is found on privately owned land, private sector bodies can be important owners and managers of areas set aside to protect nature."</i>
Type D: Governance by indigenous peoples and/or local communities	<i>"IUCN defines this governance type as: "protected areas where the management authority and responsibility rest with indigenous peoples and/or local communities through various forms of customary or legal, formal or informal, institutions and rules." "An effective governance regime under this type implies that the indigenous peoples or local communities possess an institutional arrangement that takes decisions and develops rules for the land, water and natural resources."</i>

Table 2: : Four different types of governance observed within protected heritage areas adapted from Borrini-Feyerabend et al., (2008., pp.29-42)

These four broad types of governance can be further divided into more specific sub-categories which can be found within [14] along with a series of supporting case studies to provide examples of these governance types in practice. Furthermore, according to Borrini-Feyerabend et al., (2008) [14] these governance types should not be perceived as static, but rather as flexible types in which governance within HAs can be conceptualised, to allow for the development of policy and strategies which are in line with the underlying system and appreciate the interactions between different stakeholder groups.

Similarly, continuing from the different types and typologies of governance defined in the previous paragraphs, a Natura 2000 report entitled *Current practices in solving multiple-use issues of Natura 2000 sites: Conflict management strategies and participatory approaches*, [13] outlines three main 'styles' of governance. These are developed within the context of participatory governance approaches within heritage areas. These three 'styles' of governance are defined as; Hierarchical policy styles and top-down approaches, Networking policy styles and Communicative styles of governance. In practice, these styles of governance were conceptualised to help provide practitioners with a guiding framework to achieve policy goals within the context of Natura 2000 sites. However, they also provide valuable conceptual insight into the different styles of governance which are observed within heritage sites and the different forms of governance, which assists policy implementation and development. Table 3 encapsulates the key elements from Bouwma *et al.* [13] below.

'Styles' of Governance	Explanation
Hierarchical policy styles and top down approaches	<i>"a small set of government actors prepares a policy [...]and assume the possibility of a smooth implementation of well-considered plans. The government, as the dominant actor, imposes instruments for policy implementation directly on other actors."</i>
Networking policy styles	<i>"Stakeholders and regional actors, that are mutually dependent on each other, participate in networks on specific policy issues. Decisions are the result of decision-making processes that are characterised by negotiating and striving for consensus. In these networks, power is shared, although the government can still be a dominant actor."</i>
Communicative styles of governance	<i>"Focuses on bottom up based processes for policy making and policy implementation in which citizens and communities are involved. Planning, according to the approaches, should be a process of facilitating community collaboration and consensus-building [...]. A characteristic of these arrangements is that citizens and interest groups are actively involved in the definition of problems and their solutions."</i>

Table 3: Three different styles of governance distinguished within participatory approaches within as defined by Bouwma *et al.* [13] ^[17].

4.4.2 Exploration of governance concepts without specifically attempting to categorizations different forms.

As well as the wide array of different terms used to conceptualise governance there is a great deal of theoretical and conceptual material which either explicit identifies a form of governance or postulates an alternative form in the cultural reassessment of the heritage paradigm. The following section explores these specific references and uses them to help reinform the descriptive and normative designations above with more specific details within the context of heritage.

A) Participatory and collaborative governance

A review of academic literature yields a variety of well establish academic sources which refer to different forms of governance within the context of heritage and other disciplinary lenses. For example, one such model is the 'participatory governance model' in which a variety of contemporary academic sources and policy documents refer to participatory governance and attempt to conceptualise it [83] [84].

Participatory governance can be defined as;

"a variant or subset of governance theory that puts emphasis on democratic engagement, in particular through deliberative practices."

More specifically, within the context of heritage experts define participatory governance as a distinct form of governance that is distinguished from other forms of governance because it prioritises the involvement of civil society in decision-making processes.

The active involvement of civil society in decision-making as para-mount to achieving an effective and equitable designation and management of heritage.

Participatory governance has become something of a buzzword within contemporary literature which has increased in popularity. This is stimulated by the need to enhance our understanding of intangible and tangible aspects of heritage and the recognition that local community groups which are typically absent in other forms of governance are vital in the understanding and delivery of policy, strategies and practices. This has created many examples of participatory governance. However, what is clear is that despite the variety of different terms used to define participatory governance there is a consensus amongst academia, policy and practice of the inclusion of different stakeholders and the participation of those stakeholders in the wider decision making processes.

It is important to note that participatory governance requires the establishment of a set of pre-conditions [8] [85]. For example, participatory governance relies on a supportive democratic context in which emphasis is placed on democratic engagement, particularly through deliberative processes[10] [21]. A participatory

governance approach cannot be defined as either a 'top-down' or 'bottom-up' approach and is most likely quantified as both [22]. Participatory governance models are gaining significant traction as an integral part of enhancing the resilience of heritage sites [3]. Participatory governance approaches are often cited as an excellent way to prevent or deal with conflicts between stakeholders groups and better quantify intangible values [86].

Alternatively, in seeming close relation to participatory governance is the explicit reference to collaborative governance outlined by [87] in which collaborative governance is defined as a collaborative governance model:

This mode of governance brings multiple stakeholders together in common forums with public agencies to engage in consensus-oriented decision making.

Finally, one scholar proposed a system governance referred to as 'The Territorial system' as part of the broader paradigm shift noted earlier in the chapter [88]. The territorial system of governance attempts to bring together the multi-dimensional nature of the heritage system in the form of the quantifiable tangible and intangible elements of an area. These elements are then provided as a representation of the territorial system that is useful for supporting government decisions. In this system, the protection and development of the heritage areas are established through a comprehensive review of the end-users requirements and requires various institutional levels of action and the use of tools to facilitate negotiations and collaboration between multiple stakeholder groups. While this governance model referred to as the territory system shares similarities with other participatory models of governance. It is also important to note the specific reference to '*various institutional levels of action*' and the explicit reference made to '*supporting government decisions*'. Suggesting that participation can still feature within a governance system in which authority is still held by one authority or across multiple centres of power.

B) Multilevel, networking and territorial governance

Multi-level governance refers to a governance system in which power and authority are spread either between multiple quasi-government and non-governmental organisations or across various levels of governance. Based on a series of recommendations and opinions proposed within the Committee of the Regions at the 80th plenary session in June 2009 [89] an opinion paper on multi-level governance is an arrangement for making decisions that engages a multiplicity of politically independent but otherwise interdependent actors. The actors can be private and/or public based across at different levels of territorial aggregation. Important there is no stable hierarchy of political authority to any of these levels.

Also, within the white paper, the European Commission also goes onto describe the implementation of multi-level governance.

Implementation of multi governance depends on respect for the principle of subsidiarity, which prevents restrictions from being restricted to a single tier of government and which guarantees that policies are applied at the most appropriate level.

C) Hierarchical governance

Finally, many scholars cite the presence of a form of hierarchical governance within cultural heritage and related disciplines. While according to many sources, hierarchical governance has seemingly fallen out of fashion as more participatory approaches are favoured in practice. Hierarchical governance still features as a core means of governance and management within heritage areas; specific practical examples include [90] [91]. And in some cases, is still referenced to persist within heritage sites despite the increased popularity of more participatory approaches. Hierarchical governance is typically used to refer to a model of governance in which the authority and process of decision making are made by one organisation, institution or government.

In summary, despite the wide area of different terms used to identify and conceptualise different forms of governance, similarities can be identified between the different sources and some degrees of consensus developed. The following section draws together the different conceptualised governances outlined within the literature review and attempts to identify those similarities.

4.4.3 Consolidating outcomes of literature review into a conceptual model defining the broad governances within heritage.

The following section of the report consolidates the variety of different term used to conceptualise the different forms of governance within heritage areas into a table. This table is used to draw out the key similarities and differences across the literature, allowing the identification of broad governance forms and the role of stakeholders within the management of heritage sites. Table 4 on the following page encapsulates the key findings from the literature review to establish a unified conceptual model of the governance perceived within heritage sites. Consistent themes and areas of consensus between the different definitions of governance have been highlighted using four different colours (see KEY on the following page).

KEY:**Hierarchical Governance****Participatory or Collaborative governance****Networking and/or multi-level governance****Community led governance**

Source	Defined Governance
Multi Level governance. Schmitter, (2004)	"Multi-level governance can be defined as an arrangement for making binding decisions that engages a multiplicity of politically independent but otherwise interdependent actors – private and public – at different levels of territorial aggregation in more-or-less continuous negotiation/deliberation/implementation , and that does not assign exclusive policy competence or assert a stable hierarchy of political authority to any of these levels "
'Types' of Governance Borrini-Feyerabend et al. (2008)	<p>Type A: Governance by Government - "In this type, one or more government bodies (such as a ministry or protected area agency reporting directly to the government, or a sub-national or municipal body) hold the authority, responsibility and accountability for managing the protected area, determine its conservation objectives (such as the ones that distinguish the IUCN categories) and develop and enforce its management plan. The state or federal government may or may not own the land, water and related resources. In some cases, the government retains the overall control of a protected area and takes all major decisions but delegates the planning and/or daily management tasks to other actors such as an NGO, private operator or community. Under a national legal framework and governance system, there may or may not be a legal obligation to inform or consult stakeholders prior to setting up protected areas and/ or making or enforcing management decisions, and accountability measures also vary from country to country</p> <p>Type B: Shared Governance - "Protected areas under shared governance are based on institutional mechanisms and processes which - formally and/ or informally - share authority and responsibility among several actors. This model is widely used, and many countries have been experimenting with it, sometimes adopting specific laws,</p>

	<p>policies and administrative arrangements to make sharing work.</p> <p>Type C: Private Governance - "Private governance comprises protected areas under individual, NGO or corporate control and/or ownership, which are often referred to as "private protected areas". Since much of the world's biodiversity is found on privately owned land, private sector bodies can be important owners and managers of areas set aside to protect nature."</p> <p>Type D: Governance by indigenous peoples and/or local communities - "IUCN defines this governance type as: "protected areas where the management authority and responsibility rest with indigenous peoples and/or local communities through various forms of customary or legal, formal or informal, institutions and rules." "An effective governance regime under this type implies that the indigenous peoples or local communities possess an institutional arrangement that takes decisions and develops rules for the land, water and natural resources"</p>
<p>Multi-level governance. The Committee of the Regions' White Paper on multi-level governance (Publications Office of EU, 2009)</p>	<p>"a connection of decision-making processes by a variety of independent actors, often part of a state's different hierarchy levels and equipped with different competences. This system, however, does not itself require a strict hierarchy or exclusive competences between its actors." AND "Implementation of multigovernance depends on respect for principle of subsidiarity, which prevents restrictions from being restricted to a single tier of government and which guarantees that policies are applied at the most appropriate level."</p>
<p>Governance Typologies (Hall, 2010)</p>	<p>Hierarchical governance by national state and supranational institutions, which is hierarchical in steering mode by public actors.</p> <p>"hierarchical governance remains significant because of the continued role of the state in international relations, the development of institutions that enforce international and supranational law and the ongoing importance of legislation and regulation as part of the exercise of state control " [hierarchical governance] rather it tends to be subsumed under a more general discussion about the roles of government in tourism and the nature of state intervention"</p>

	<p>Markets <i>Marketisation and privatisation of state instruments, which is hierarchical with private actors</i></p> <p><i>"The decision by the state to allow the market to act as a form of governance does not mean that government ceases to influence the market. Rather, instead of using imposed regulatory mechanisms, government may seek to use other forms of intervention, such as financial incentives, education and even the potential for future intervention, to encourage the tourism industry to move in particular directions, often via self-regulation"</i></p> <p>Networks <i>Public-private partnerships, which is nonhierarchical with public actors.</i></p> <p><i>"Policy networks vary widely with respect to their degree of cohesion, ranging from "sub-governments", "iron triangles" and coherent policy communities through to issue specific coalitions. Nevertheless, despite such variability in their organisation, network governance is often considered as a "middle way" or "third way" between hierarchical and market approaches to tourism governance presented networks in a similar fashion in relation to top-down and bottom-up approaches to implementation"</i></p> <p>Communities <i>Private-private partnerships communities</i></p> <p><i>"This approach is very much influenced by communitarianism and demands for more direct citizen involvement in governance. Communitarianism proposes that large-scale government should be replaced by smaller spatial units of governing that are closer to the "community". Arguably, the most influential dimensions of communitarianism have been with respect to the focus on the significance of social capital in community and economic development and the development of alternative forms of consumption focused on the local region and voluntary simplicity. However, in addition to the communitarian focus on the development of more appropriate scales of governance, the 448 C.M. Hall communities' framework also builds on traditions of deliberative and direct democracy. The former focused on improving mechanisms for greater direct public involvement in policymaking through enhancing debate</i></p>
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	<p>and dialogue, while the latter via measures such as citizen-initiated referenda. All three dimensions of governance as communities highlight the importance of public participation in public policymaking"</p>
<p>'Styles' of Governance (Bouwma et al., (2010)</p>	<p>Hierarchical policy styles and top down approaches - "a small set of government actors prepares a policy [...]and assume the possibility of a smooth implementation of well-considered plans. The government, as the dominant actor, imposes instruments for policy implementation directly on other actors."</p> <p>Networking policy styles – "Stakeholders and regional actors, that are mutually dependent on each other, participate in networks on specific policy issues. Decisions are the result of decision-making processes that are characterised by negotiating and striving for consensus. In these networks, power is shared, although the government can still be a dominant actor."</p> <p>Communicative styles of governance Focuses on bottom up based processes for policy making and policy implementation in which citizens and communities are involved. Planning, according to the approaches, should be a process of facilitating community collaboration and consensus building [...]. A characteristic of these arrangements is that citizens and interest groups are actively involved in the definition of problems and their solutions"</p>
<p>Participatory Governance Fischer (2012)</p>	<p>"a variant or subset of governance theory that puts emphasis on democratic engagement, in particular through deliberative practices"</p>
<p>Collaborative Governance Ansell and Cash (2012)</p>	<p>"This mode of governance brings multiple stakeholders together in common forums with public agencies to engage in consensus-oriented decision making"</p>
<p>The Territorial system (Barile and Savino, 2015)</p>	<p>A cultural heritage governance model: The Territorial system - The features that characterise the territorial systems as viable systems are due, on the one hand, to the multi-subjective nature and the articulation and fragmentation of the decision-making process and, on the other hand, to the wide variety that characterises the multi-dimensional nature of the operative structure. The identification of the relevant suprasystems is complicated by the large number of perspectives of observation that characterise the territory as a typically multi-stakeholder entity.</p>

Participatory governance 'model' Cortéz and Vázquez, (2017)	Participatory Governance 'model' - "The active involvement of civil society in decision-making as paramount to achieving an effective and equitable designation and management of heritage
Circular governance models for cultural heritage adaptive reuse (Garzillo et al., 2017)	"Multi-level governance - The multi-level governance of cultural heritage refers to cooperation, dialogue and interaction in which public as well as private actors participate, ranging from supra-national to national and sub-national levels."

Table 4: Consolidation of literature defining different governance 'types', 'models', 'styles' and 'structures' etc. in which key similarities have been highlighted into four distinct themes.

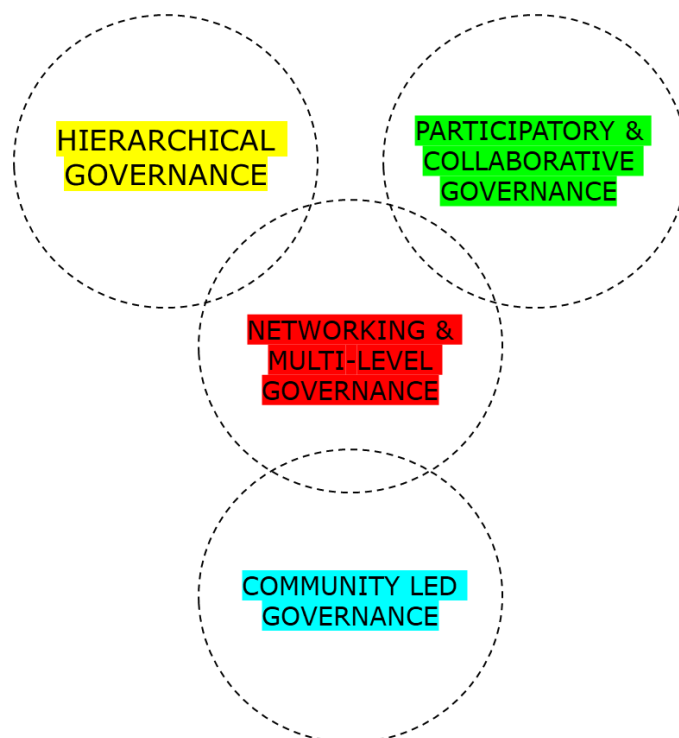


Figure 3: Conceptual modern of the four distinct governances that may occur within Cultural heritage sites

4.5 Good practices in national listing system: Italian cultural heritage Catalogue and *Carta del Rischio*

The research for this specific section mainly focused on the analysis of two among the Italian national listing systems, strictly related one to another: the asset dossiers of the **Cultural Heritage Central Institute for Catalogue and Archive Material**, ICCD – *Istituto Centrale per il Catalogo e la Documentazione* and the **Italian risk map project**, *Carta del Rischio*. This section particularly related to the Ravenna OL that focusses on the area of Santa Croce.

Cultural Heritage Central Institute for Catalogue and Archive Material

The Italian ICCD is an institution pertaining to the national Ministry of Cultural Heritage, Culture and Tourism (*MiBACT – Ministero per i Beni e le Attività culturali e per il Turismo*). The Institute exercises its activities with scientific and administrative autonomy carrying out functions of research, direction, technical-scientific coordination aimed at developing standardized methodologies and procedures for the documentation and cataloguing of CH, managing the Central Catalogue of archaeological, architectural, historical, ethnoanthropological, scientific and technological heritage. The national cataloguing is regulated by the art. 17 of the Cultural Heritage and Landscape Code (Legislative Decree 42/2004 and subsequent integrations and modifications) which defines the ways to regulate, enrich and update the **Cultural Heritage General Catalogue**. The national system cataloguing was established in 2001 under the framework of the "State - Regions Agreement", with the common purpose of ensuring the enhancement and public use of information on CH, consequently implementing structural and operative cooperation. In fact, as stated in the Italian Cultural Heritage and Landscape Code, the adoption of common practices is the prerequisite for the sharing of information among the many actors, both public and private, operating in the CH sector. The very articulated and detailed system of cataloguing standards defined by the ICCD consists of the method principles (procedures and specific application methods), the regulations (models for data recording), terminological tools (codified languages, definitions, vocabularies and thesaurus) and indications for additional documentation.

The ICCD operates as the coordination institution of the local authorities, sharing cataloguing methodologies and managing operational activities of the institutions dealing with CH. The objectives of the cataloguing are then agreed each year among the regional and local Institutions for CH, as the *SABAP - Soprintendenze Archeologiche Belle Arti e Paesaggio*, and the ICCD which dictates the guidelines for the execution of the local activities in accordance with the programme for interventions. Further than the local SABAP, there are other regional institutions cooperating with the ICCD, as it would be for example for the Cultural Heritage Institution of Emilia-Romagna (*IBC Emilia Romagna – Istituto dei Beni artistici, culturali e naturali of Emilia Romagna*), which adopt the Central Catalogue standards, simplifying it and integrating it in case of lack of national guidelines.

The entire cataloguing flow is managed by the ICCD through a web-based platform, the **SIGEC web [92] - Catalogue General Information System** (*Sistema Informativo Generale del Catalogo*), that can be accessed by allowed registered users who are associated to an accredited institution. The platform collects all the data needed by users for the cataloguing, from the production and dissemination of cataloguing standards, to the assignment of unique catalogue codes that identify each registered good, the cataloguing of heritage, the publication of the catalogue sheets to be inserted on the site of the open access CH General Catalogue [93]. The SIGEC has been designed for integration with the systems used by the Ministry and the other Institutions that cooperate in the field of CH [94].

In the specific case of the Church and archaeological area of Santa Croce, the SHELTER Open Lab, the cataloguing informative sheets are published by IBC, the regional institution. The information included in the sheets report much more synthetic information compared to those required by the national cataloguing template (Figure 4).

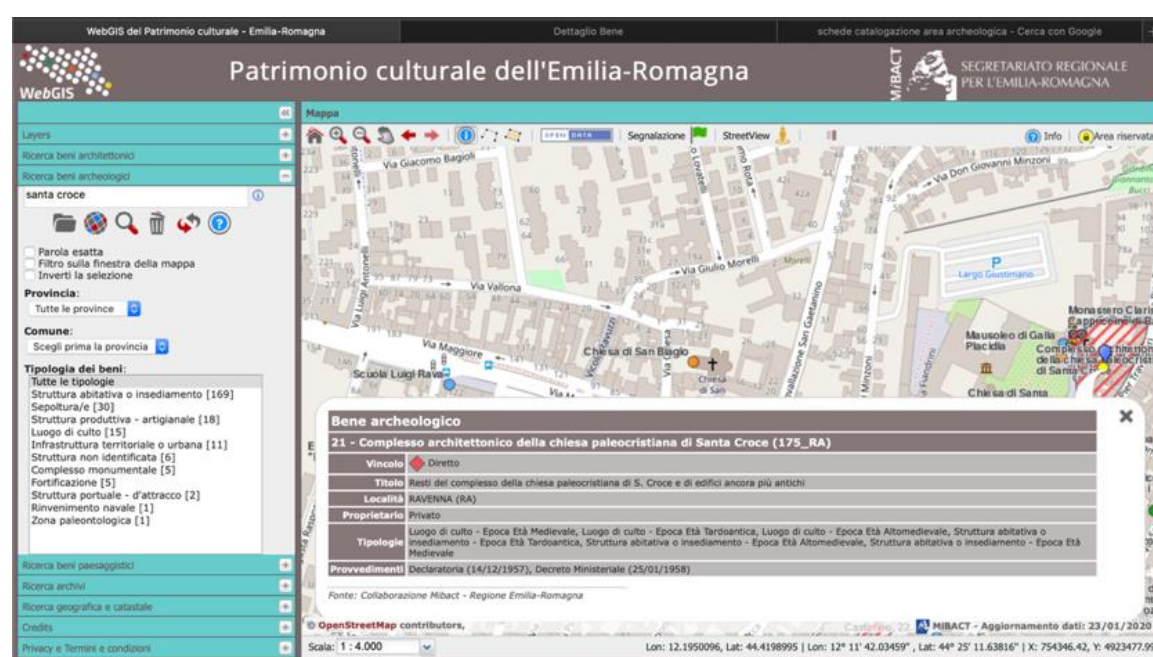


Figure 4: WEBgis Informative system of the IBC of Emilia-Romagna developed starting from the General Catalogue of Cultural Heritage structure. The synthetic information shown are related to the Open Lab of the Church and archaeological area of Santa Croce.

Therefore, the Catalogue of CH, combining protection and valorisation purposes, plays both a regulatory role with the identification of cultural assets for protection and valorisation, and also a service for the community, providing public access to the knowledge of CH [95].

The Italian risk map project: "Carta del Rischio"

The *Italian risk map* project, developed in the '90s by the National Institute of Restoration [96] (*ICR - Istituto Centrale per il Restauro*), has implemented a single

informative system which collects the data and knowledge of different security agencies and Institutions active on the national territory. The project, following the preventive conservation notion elaborated by Cesare Brandi in *Theory of Restoration* [97], had the objective of defining a system to quickly identify the assets most exposed to the risk of degradation or loss, in order to plan and prioritize the interventions to be carried out with greater urgency with the aim of the prevention of the degradation process. The result is the creation of a Geographic Information System (GIS) with a multi-hazard approach capable of collecting, processing and managing information and data relating to the entire national heritage, the physical-chemical and social phenomena that affect the process of degradation of the assets, as well as information on the state of conservation of the latter. The information stored is not related to the type of intervention needed by each asset, but it serves as a practical tool for institutions and administrations to prioritize assets in need of intervention.

The *Risk map* project uses a georeferenced tool to show the assets on a map, probably the most suitable and of immediate comprehension technology for the purpose. It allows to consider the state of conservation of each monument located in a given territory not only as a singular or individual phenomenon but as a case related to a wider group of monuments with characteristics comparable to each other and subject to certain hazard due to their location. The **MARIS** [98] (*MAppa del RISchio*) GIS tool (Figure 5) implemented in the framework of the *Risk map* project introduces the possibility to produce thematic cartographic representations allowing the visualization and analysis of the hazards to which the heritage is exposed to. As the maps are continuously updatable, the system allows to have a temporal dimension of the probability of deterioration or loss of the single assets. It is, in this case, of fundamental importance the accuracy and coherence of the collection and cataloguing of the data as the intensity of the risk does vary in relation to the state of conservation of each asset and is different depending on the surrounding environment. As a remark, the analysis and the information that highlight the hazardous situation of the assets are to be considered still as quite general indications since the informative system does not include operative information, as for example no information on what static and structural operations the asset needs, and the process to evaluate risk for some hazards could be too simplistic. Nevertheless, it is to be considered a quite relevant support tool for the Public Administration when planning maintenance and conservation interventions on the national heritage.



Figure 5: The geo-referenced and catalogued Italian cultural heritage and related vulnerability shown on the MARIS system of the risk map project.

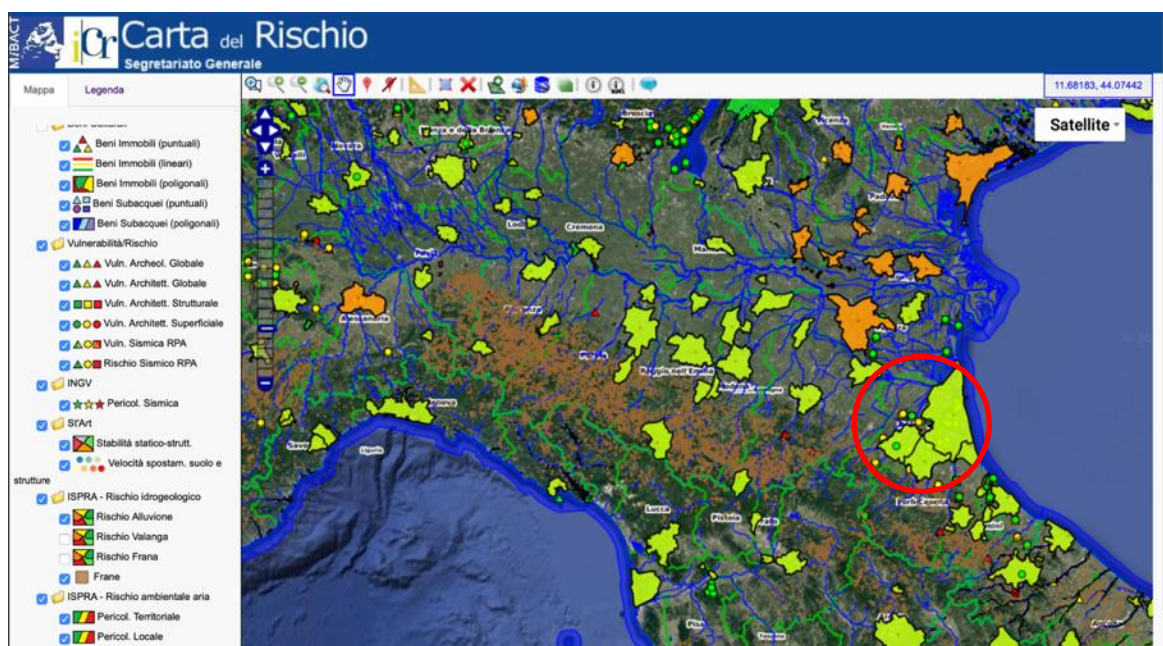


Figure 6: Focus on the Emilia Romagna region. Highlighted the structural-static hazards (hydrogeologic and seismic risk) color-classified by the level of risk the territory is exposed to. Ravenna, as showed in the picture, is affected by a medium level of flood.

The informative system analyses the *risk* to which each asset is exposed to through a statistic point of view, combining the potential entity of the damage to the asset of an event and the probability that the event will occur, with the addition of some variables (time $[t]$ and location $[x,y,z]$) related to the risk factors [99]. The *potential risk* is therefore composed and determined by two main components:

- The **territorial risk** which describes the level of the hazards affecting the determined geographical area. This component is independent from the presence or not of cultural assets in the area, it considers the possibility or probability that an event occurs. Under these components the following parameters are considered:
 - Environmental risk: climatic, microclimatic, air polluting factors
 - Structural and static risk: Soil and subsoil geomorphological characterization.
 - Anthropic risk: demographic and socioeconomical factors
- The **individual vulnerability** describes the potential level of exposure of an asset based on its state of conservation. The parameters evaluated to measure this component are:
 - Structural, static and building technique characteristics
 - The use and level of security of the asset
 - Surface appearance

The territorial risk is made available thanks to the integration in the system of other national institutes and Ministries databases, which were acquired by the ICR during the implementation of the informative system. For what concerns the structural and static phenomena the informative system includes information on seismic, landslide and avalanches, floods, coastal dynamics and volcanic risks (Figure 6). The environmental risk is analyzed under two phenomena: the erosion index and the stress-physical indicator. Lastly, the phenomena described for the anthropic analysis are intended as the dynamics of population density (depopulation and overpopulation), tourist pressure and susceptibility to theft. For each phenomenon one or more related thematic maps were developed, integrated and available for users in the MARIS tool.



Figure 7: In the circle the archaeological area of Santa Croce classified as an area affected by high risk of loss and damage.

In order to match the territorial hazard and individual vulnerability it was necessary to have all the assets georeferenced on the national territory, constantly updated. The *risk map* project made use of the already existing CH catalogue on a GIS system available: the ICCD SIGEC web. In fact, the cataloguing model of MARIS provide for each asset dossier two separate descriptions: the information section related to the knowledge of the asset, provided by the Central Catalogue, and a second one with a strict codified analysis of the state of conservation. In this last section, for each monument the materials and techniques of construction are collected. In addition, the management conditions and the urban environment of the monument itself are analysed:

- Generical damage
- Material disaggregation
- Humidity
- Biological Attacks
- Surface Layers Alteration
- Missing Parts

Each typology is then assessed through criteria of entity of the damage (codified scale from 1 to 3), extension of the damage (%), urgency of intervention (codified scale from 1 to 5) [100].

The localization sees on the territory the classification of the immovable heritage, architectural and archaeological assets, while as far as movable heritage is concerned, as it would not be univocally linked to a place, it has been inserted in the catalogue and the risk classified according to their "container" (e.g. museum, gallery, warehouse, collection). The system also provides information on historical centres and urban units by defining the levels of transformation that affect the complexity of the asset (global) or only its finishing, also specifying whether this transformation is static or dynamic.

The sharing of information during emergencies due to natural disasters is essential to ensure timely preservation of cultural heritage. The Risk Charter has proven to be of great utility and relevance not only in the prevention phase but also after the occurrence of some disastrous events. An example is the seismic emergency that occurred within the area of Lazio, Abruzzo and Marche, started in 2016 and extended until 2020, during which the information system was used to manage data related to the recovery, transfer and intervention on works of art removed from the affected areas. Its use helps to clarify the origin of cultural goods taken from the rubble and avoid accidental dispersion, at the same time allowing to monitor the conservation of artifacts in storages and laboratories.

Although not yet integrated in the *risk map* system, the MiBACT, after the earthquake of 2016, has also developed and integrated in its post-disaster operational procedures a specific sheet called "Rubble survey report sheet" through which the constructive and decorative elements of "interest" related to the damaged and/or collapsed built heritage are catalogued. The codified

cataloguing of the rubble allows the following repair/reconstruction of the heritage damaged by the earthquake [101].

In conclusion, the contribution of the *Risk Map* project is the merging of the databases of other national institutes in the field of cultural heritage and natural and social hazards which allows a comprehensive overview of the current state of the assets.

During 2013, a new system, **VIR - Vincoli in Rete**, was also developed thanks to the cooperation of the MiBACT, ICCR and ICCD, the main Italian institutions in the field of CH. The system uses interoperability services to create a cooperative platform between the *Risk map* project, Protected Heritage (*Beni Culturali*, another Italian project related to CH) and the SIGEC web systems. The objective, achieved through the sharing of the informative data of the assets, is to integrate the procedures for the management of protection measures, making the information on the assets available to different types of users. At present, in the VIR system cultural assets (essentially architectural, but also archaeological) are managed and the cooperative platform has been populated, as far as SIGEC web is concerned, with the architectural characterization dossiers available in the system. The platform includes therefore, further than the risk analysis and the informative data sheets for each asset, also other additional components, such as the legal binding information of each cultural asset.

The contribution of Vincoli in Rete is the possibility to have a cooperation platform that integrates the different existing computer applications allowing a unique access point for professionals and citizens in which all the personal and administrative information related to the immovable cultural heritage can be found [102].

The attributes in the Italian cataloguing system are selected according to their relevance to the project and are included in the interactive template that can be found in the link: <https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

4.6 Steps towards a collective characterisation for CNH assets in the Sava River Basin: the OL perspective

The OL perspectives have been an important input for the development of the methodology. In order to strive the process and to collectively categorize the CNH assets, a draft version of the methodology has been presented in the Second Stakeholder Workshop of the Sava River Basin OL which took place online in a GoToMeeting platform on 28 May 2020 (the workshop was provisionally planned to take place in Bosnia and Herzegovina, but then the physical event was cancelled due to the COVID19 pandemic).

The Sava River OL was considered as one of the best case studies because of its huge and complex HA transboundary basin scale. Sava OL (which covers the largest area among the five SHELTER OLs) thanks to its cross-regional scale offers both examples of each CNH Macrocategory and HA scales. Moreover, it includes cultural and natural heritage, and different size of human settlements together with a diversified tangible and intangible heritage. Working together with this OL also gave a chance to understand the complexity of its governance and managerial challenges since it is composed of an international consortium, the International Sava River Basin Commission (ISRBC).

With the contribution from the Sava River OL focal points, a selection of CH assets are presented below to exemplify the diversity of CH asset categories in the Sava River Basin. The focus was on area that were hit in May 2014 by the heaviest rains and floods in more than a century. These area and assets will be the subject of more detailed analysis of the flood impact on CH that will be performed by the Sava OL within the project.

Vijećnica, Brčko (The Town Hall in Brčko): The Vijećnica building in Brčko is one of the most valuable edifices in the pseudo-Moorish manner in Bosnia and Herzegovina. The entire composition of the building is composed on the principle of strict symmetry with a central, pronounced projection and two angular projections. Thus, in addition to the horizontal division, there is a division of the front façade along the vertical axis. The designer of the Town Hall, Ćiril Iveković, used this principle to suggest the segmentation of forms of more complex Ottoman Turkish architecture. The Town Hall building consists of a basement, ground floor and upper floor. The basement originally housed a wood store, butler's pantry and storage space for lamps and paraffin oil. The outside doors to the basement premises to the north, from the office courtyard, with access from the interior the central stairway. The main double-flight staircase with landing is situated in the central part of the building and faces the courtyard (north). Access to the lateral wings of the building and other rooms is from the central corridor which, like the basement corridor, runs east-west. Every room in the Town Hall is entered from the central corridor. The entire Town Hall building is made of bricks of Austrian format and later plastered with lime cement mortar. The south façade of the building of particular value, with its strongly pronounced horizontal expression, underlined by an even sequence of windows, and strongly emphasized floor cornices and its treatment in imitation of alternating layers of stone and brick. The Town Hall in Brčko is an outstanding example of the interpolation of a monumental structure of Austro-Hungarian architecture that has not resulted in disharmony, disproportion and defiance of the laws of the existing fabric.

Džamija Azizija u Brčkom (Azizija mosque with harem in Brčko): The Azizija mosque was of the centrally domed type of mosque with covered sofas and stone minaret. It was perfectly symmetrical in form and it was the only mosque in BiH with very distinct features deriving from the influence of the baroque on Ottoman architecture. The mosque was entered through open sofas. The interior

of the mosque was basically circular in form, with four semi-circular niches projecting towards the south, north, east and west. There was a dome over the central area, resting on an octagonal drum, with the thrust transferred to structural arches via pendentives. The stone minaret was located to the right of the entrance to the mosque, alongside the south-west wall. It was built of sandstone from one of the northern Bosnian quarries. The minaret was 30 m high without the *alem*. The *mihrab*, which was in line with the portal, was set between structural pillars with richly moulded capitals, thereby occupying an entire field of the arch widthwise. The wooden *mimber* was highly ornate and its proportions were in harmony with the space. The *mimber* consisted of an entrance section, steps and *baldaquin*. To the left of the *mihrab* was a simply decorated *ćurs*. The wooden *mahfil* extended along the entire inner side of the north-east wall. It was reached via the staircase to the minaret. The central part of the *mahfil* (the place for the *muezzin*) was set above the entrance to the mosque and was four steps higher than the left and right sections of the *mahfil*. Hrem of the mosque: Alongside the *Azizija* mosque is a graveyard with a considerable number of the *nišan* tombstones dating from various periods from the late nineteenth century on.

Spomen kompleks "Sremski front" kod Adaševaca (Memorial complex "Sremski Front" near Adasevac): In the final phase of the Second World War, the Germans, in order to ensure the withdrawal of their army to the northwest, formed the Sremski Front as part of the general strategic plan in Yugoslavia. The war operations were conducted from October 21, 1944 to April 13, 1945, and ended with the liberation of Vinkovci and the whole of Srem. The monument complex, dedicated to the Sremski Front, was erected in 1988 and is located near village of Adaševac, on the right side of the Belgrade-Zagreb road. It consists of three parts:

1. Gathering point, with 70 vertical sub-walls in which plaques with the names of all the units that participated in the fighting on the Sremski front are built in, and with three reliefs showing the layout of our and enemy defensive lines;
2. Alley of the honour, on which 15,000 names of fallen soldiers of the Yugoslav, Red and Bulgarian armies are carved;
3. The Museum which contains: plaster sculptures made by Jovan Soldatović (the author of the whole complex), the museological exhibition of the Military Museum from Belgrade, two reliefs of oak planks with scenes from the front and a composition from the destroyed and broken enemy weapons, Kragujevac rifles and symbols of eternal flame.

The entire complex, and especially the Museum, was severely damaged and demolished during 1992/1993, and it was be rebuilt in 1994 and, with minor changes, restored to its original condition.

Arheološki lokalitet "Gradina na Bosutu" (Archaeological site "Gradina na Bosutu"): The Gradina site is located in the area of the village of Vašice near Šid, on the left bank of the Bosut River. With its position and height, it dominates the surrounding terrain. The results of previous research have shown that this is a multi-layered prehistoric settlement with the following chronological-stratigraphic picture:

1. Neolithic - a settlement of the Sopot-Lendelj culture;
2. Eneolithic - Bolerias Černavoda II culture;
3. Early and Middle Bronze Age - Vinkovci and Vatina culture;
4. Early Iron Age - material of the Bosut culture with three development stages;
5. Early Iron Age - the settlement of Scordiscus.

The vertical stratigraphy reaches to a thickness of about 6 m. Within the Early Iron Age (which is stratigraphically represented at 3.15 m), the Bosut cultural group was singled out. During this period, above-ground houses were built with floors formed of several layers of bog clay, which were then polished. The foundations of the furnace and larger hearths are based on ceramics and other materials. In the Middle Ages, there was a necropolis in a small part of Gradina, and a late medieval settlement was formed around the site. Archaeological excavations of this site were carried out in two stages: during 1964/65. and between 1975-88. Today, Gradina was damaged by the construction of the modern road Batrovci - Šid.

Arheološko nalazište Paljevina (Archaeological site of Paljevina): About 1.5 km northeast of the village, along the Sava River bank, there is the land of "Paljevina" on which in the Late Iron Age the Celts built a fortified settlement of the closed type – oppidum. The fort was circular or elliptical in shape (partly eroded by the Sava River) with a rampart made of soil (3 m wide and 0.80 m high (today's height)). As for the archaeological material, the following were discovered: coarse comb ceramics, then finer grey (ceramics), made on a potter's wheel, fragments of glass bracelets embossed and made of cobalt blue glass decorated with white and yellow inlaid ornaments. All these findings are a typical inventory of Celtic settlements in our region.

Podvodno arheološko nalazište Poloj kod Slavonskog Broda u rijeci Savi (Underwater archeological site Poloj near Slavonski Brod in the river Sava): Poloj is located on the left bank of the Sava River, in a position after a sharp left river bend downstream from Slavonski Brod. A protective feather (hydro-construction embankment) was made ten years ago as a protection against erosion of the beach and the riverbank. On a flat, sandy-gravel bottom on the surface or just below the surface there are the remains of ceramic pots. The pots are densely lined one next to the other or one above the other, which indicates that it is a carefully stacked cargo carried by the ship. Another thing that has been noticed is the grouping of ceramics according to the type of pots, which also indicates the classification of cargo during transport. During the dive, three types

of pots were identified, smaller and larger pots with a curved rim, and low pots with a flat bottom. Pottery can be dated to the 16th-17th centuries. Due to the arrangement and density of ceramic findings, it is most likely that the findings are in situ, i.e. that there was no major movement and / or relocation of the findings due to the river current. The flat gravel bottom descends steeply from a depth of 1.8 meters to a depth of 4 meters. In this steep profile, two groups of shallow pots were observed at a depth of 3.1 and 3.8 meters. It is assumed that the mentioned findings came here from a shallower part of the site. Possible shipwrecks could be expected under layers of in situ pottery in the shallower part of the site. The second position found is the monoxyl position. The assumed length of the monoxyl is 13-14 meters. The monoxyl extends parallel to the shore and is located about 20 meters in front of the elevated pedestal of the rescue service on the beach. According to the information obtained from the divers, there is a rib-like thickening at the ends of the monoxyl.

Zgrada Merkadić (Merkadić building): One-storey house with a hall, built in the late 19th century with a richly decorated facade decor, historicist pattern. The house was built by the entrepreneur Salamon Merkadić, the owner of a brickyard and a steam mill. The design of the house is divided into a slightly prominent entrance area with a luxurious balcony, ground floor, first floor and superstructure, with a grading from rougher processing of lower zones to finer decor in higher zones. Monumental proportions, ornamental stucco decorations and drawn profile figures in plaster speak eloquently about the taste and achievement of the building owner. The basic materials from which the house is built are brick, steel and timber.

Vila Brlićevac (Villa Brlićevac): Villa Brlićevac, a summer house and historical garden of the respectable family Brlić, in which Ivana Brlić-Mažuranić created her works, is located in Brodski Vinogorje, on the slopes of Dilj-gora. At the time of its construction in 1880, this picturesque area was filled with vineyards and landscape architecture. The irregularly shaped building, made of indigenous materials, brick on the ground floor, and on the first floor with a construction with a brick infill. The horizontal separation is achieved by a balcony supported by wooden carved consoles. The high aesthetics of the building is given by the decorative carpentry on the facades with details of high-quality craftsmanship.

As seen in these examples, the diversity of CNH assets in the Sava River Basin provides a valid input from the OL perspectives. During the Second Sava River Basin OL Stakeholder Workshop 28 participants from six different countries in the basin (Albania, Bosnia and Herzegovina, Croatia, Montenegro, Serbia, Slovenia) learnt about the methodology under development for the CH categorization and characterization in a Risk Informed Thinking.

One crucial point of the methodology stressed during the workshop was the need for a new understanding of CH for DRM and a general framework that should cover a dynamic model in which the knowledge about CH categories in the regions under

risk and hazard will increase each time a disaster would happen. Furthermore, a new phase of prevention should start from the same point of the previous knowledge but from a new state of the art with more data, more information, and more awareness.

The participants gave feedback on mainly the identification of CH characterizations of the HA considered priority at local level and also shared intangible heritage in such multicultural areas. Languages in this context were considered both a weakness but also a further local information. The questions posed were:

Q1: In your opinion could the language be a challenge? Could the different languages of existing documentation be a gap for extracting information? (Yes/No)

Q2: Do you think that industrial heritage exists in your region that should be preserved? (Yes/No)

Q3: To your knowledge, are there existing exploitable any kind of datasets (not specific for CH assets) for extracting data to be used for the purpose of CH categorisation? (Y/N), And at which level (local, national, international).

The response rate is presented below.

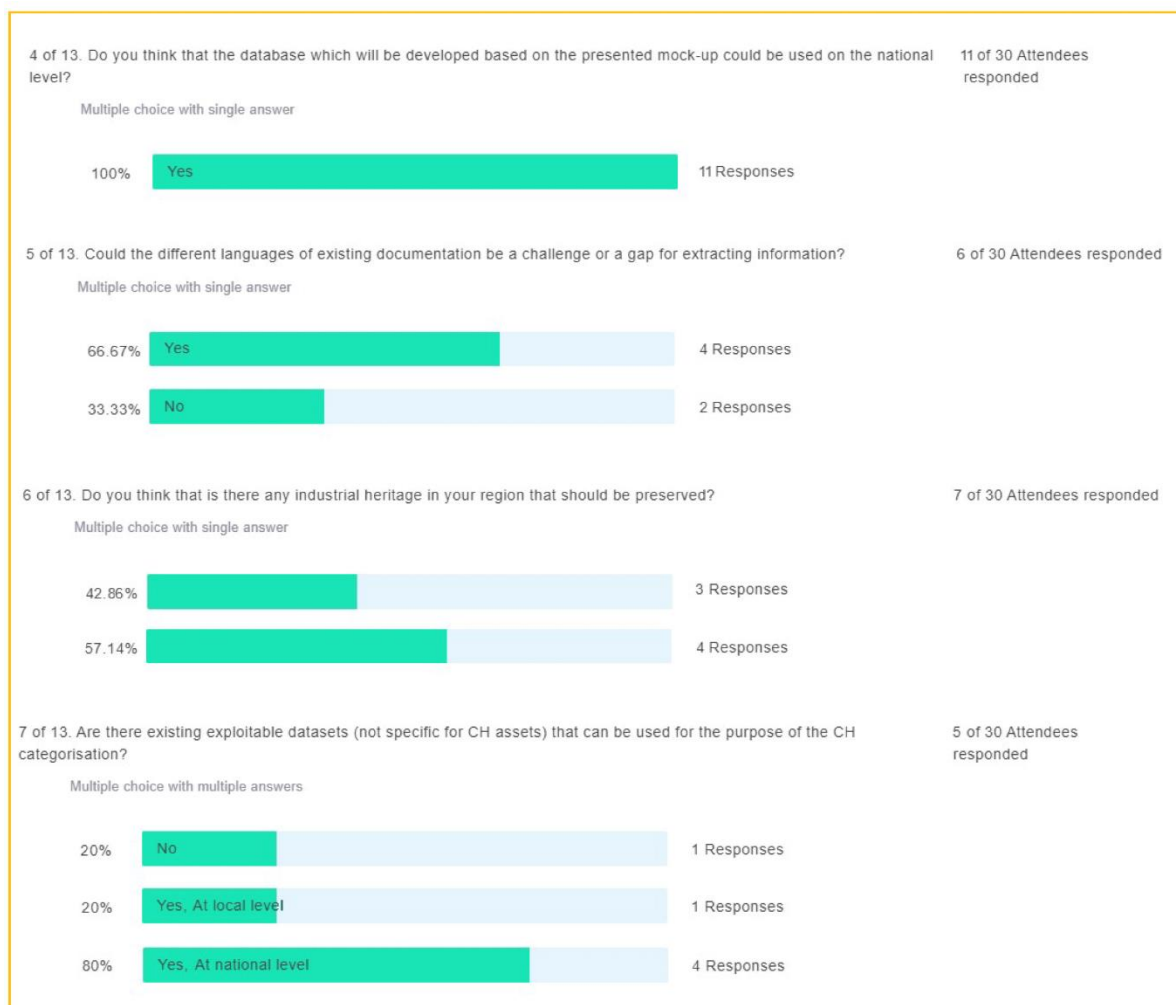


Figure 8: Responses of the participants of the Second Stakeholder Workshop

In addition to simultaneously asked questions, a list of further set of questions were also submitted to be responded within a week. The second set of questions was aimed to take into account the systemic process of knowledge to be created and consolidated in a framework of CH cataloguing at its first steps. These questions are as follows:

Q: How do you think that ethnicities and their traditions should be taken into account?

- 1. By asking more than one contributor to fill in the CH asset categories identification and descriptions
- 2. By including specific fields in the template to identify ethnic point of view
- 3. Both

Q: To your knowledge, are there architectural archives where it is possible to find historical cartography and architectural drawings (Y/N)

- At local level
- At national level
- At international level

Q: Are there any libraries and historical archives that have a collection for collecting this information? (Y/N)

Q: To your knowledge, do they provide digitised materials (Y/N)

Q: To your knowledge, when safeguarding measures did start in your country?

- Before 1900
- After 1900
- After WWII
- After 1980s

Q: To your knowledge, when safeguarding measures did start in the Sava Rivers area?

- Before 1900
- After 1900
- After WWII
- After 1980s

Q: In your opinion, is the authenticity of CH assets in your region preserved? (Y/N)

- At local level

- At national level
- At international level

According to the reflections received from the Sava River OL, these are the main outputs of 'Testing collective characterisation for CH assets in Sava River OL':

- For collective characterisation of CNH assets, **language** is a main parameter that needs to be taken into accounts. This becomes an even more urgent consideration in the cases of international collaboration processes. Language is also a cultural expression as well as a basic source of information for heritage and for risks to be considered.
- The '**interoperability**' of existing databases is an important aspect of the methodology defined in this deliverable. However, regarding the international collaboration organizations such as ISRBC, it is necessary to take into consideration variations among different countries as well as **varying levels of information and data stored** in local, national, and international levels.
- Particularly for Sava River OL, there is an urgent need for a systematic CH categorization that should be organised and characterised by a Risk informed thinking to become **a systemic approach**. The mock-up inventory form that is developed as a first stage is helpful for a building registration system, but a risk informed thinking into CH assets should be developed with the methodology developed for building a new knowledge approach.

5 Multi-layered Methodology for CNH characterisation in Disaster Risk Management perspective

Beyond the state of the art, Chapter 5 introduces the conceptualization of the **CNH assets categorization into a Risk Informed Thinking**. It conceptualises a **new systemic and dynamic approach** for CNH assets characterisation to face multi-hazards scenarios in a range of different HA scales and types .

The report provides a step toward a systematization of CNH characterisation for a sharable framework to be addressed to the identification of specific attributes in a DRM perspective. Reports and Recommendations have developed relevant but scattered information for a better disaster Preparedness. Developments address many parts of the world and many risks as well as some CNH asset specific types and some specific spatial scales. Related references are quoted in the notes of this chapter. The literature review includes:

- (i) References specifically addressing the matter of DRR for CNH such as the instructions for "Risk Management Approach to the Preservation of Cultural Heritage" by ICCROM (2000-20015) [103];
- (ii) References addressing different kinds of heritage assets at risk such as the UNESCO document "Managing Disaster Risks for World Heritage" [104] and the ICOMOS "Heritage at risk worlds reports on monuments and sites in danger" [21];
- (iii) References addressing different kinds of HA hazards assessment such as the United Nations Institute for Training and Research (UNITAR)-UNESCO assessment "Five Years of Conflict. The State of Cultural Heritage in the Ancient City of Aleppo" (2018); [105]
- (iv) References addressing the output of research projects on the matter of CNH assets in danger such as the online toolkit "Post-Disaster Recovery of Urban CH" developed by The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) under the umbrella of Archaeological Heritage Network (ArchHetNet); [106]
- (v) References addressing different kinds of environments such as the documentation developed by ICOMOS national committees such as ICOMOS Australia (2020) [107];
- (vi) References addressing DRR documentation not specifically addressing HA (2019) [108]
- (vii) References addressing conservation principles such as the ICOMOS Charter on Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage (2003) and conservation assessment of HAs such as the Case studies on Conservation and Management of Historic Cities developed by UNESCO with several international organisations [19].

5.1 Conceptualising CNH assets categorization in a Risk Informed Thinking

In the complex and non-linear categorization of HA, heritage plays an important role. It contributes to characterise local communities and identities of these areas and the overall quality of life and environments. It is also an economic resource and can contribute to sustainable economic development. In parallel with available technological tools and data on hazards, an approach to improve knowledge of HA with its CNH characterisation targeted to risks is highly needed.

Hazards can create severe damages to heritage with different kind of threats and risks. The implementation of a generic DRM model could create misunderstandings and a lack of coordination of knowledge and efforts. The HA management in DRM perspective should specifically address CNH assets requirements. In this aim, a DRM specification is needed for CNH assets specific requirements considering the principles relevant to CHN management. We consider that a detailed CNH assets characterisation would help in DRR to develop a new awareness in CNH vulnerability and increase HA resilience against earthquakes, floods, wildfire, heatwaves, rainfalls, subsidence and other natural disasters also related to climate change.

For this purpose, the methodology defines a **CNH ID_Risk characterization** as the analytical knowledge for the anatomy of HA in a DRM perspective. This perspective integrates the relationships between risks and cultures, traditions, heritage and resilience in HA. The approach considers several recommendations about the threats to heritage places and the need for public awareness about their fragility and the irreversibility of their loss. [21] Furthermore, it takes into account that heritage - both tangible and intangible - is not just a passive resource liable to be affected and damaged by disasters. Rather **CNH assets have a proactive role in resilience**. [109]

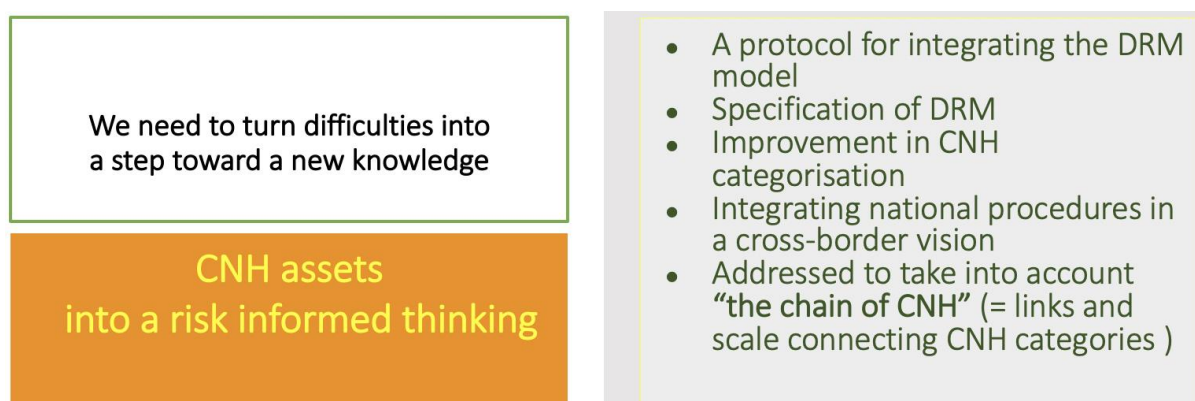


Figure 9: Illustration "CH assets into a Risk Informed Thinking" developed by POLITO for the webinar "Methodology to categorize CH assets", organised by the Science Unit of the UNESCO Regional Bureau for Science and Culture in Europe, Politecnico di Torino project partner, TECNALIA project coordinator on June 20th, 2020

Figure 9 summarizes the conceptualisation of the move from difficulties generated by risks and specific requirements of CNH to a new knowledge that is the approach for categorizing CNH into a Risk Informed Thinking. It shows the main objective of this approach is to conceive a protocol for integrating DRM with CNH requirements to be achieved through the specification of DRM and the improvement of CNH categorization. For this purpose, the CNH categorization has to take into account different kinds and spatial scales of CNH assets by connecting them as a chain. For the achievement of the main objective, there is a need for a cross-border vision that can integrate national procedures.

CNH assets are defined by their own tangible and intangible layers. But they are also characterised by contextual factors identifying the site/setting with geo-physical features, the historical setting, the environment, the historical setting, the cultural significance, the anthropic socio-economic attributes and cultural, anthropologic, intangible values, the local and traditional knowledge, the system of governance, the related policies. To characterize HA according to a Risk informed approach, the attributes need not only to include vulnerabilities and exposures of these areas but also several other parameters. We consider that **CNH assets need to be understood in their contexts**. Contexts amplify the HA understandings and extend CNH assets knowledge (Figure 10).

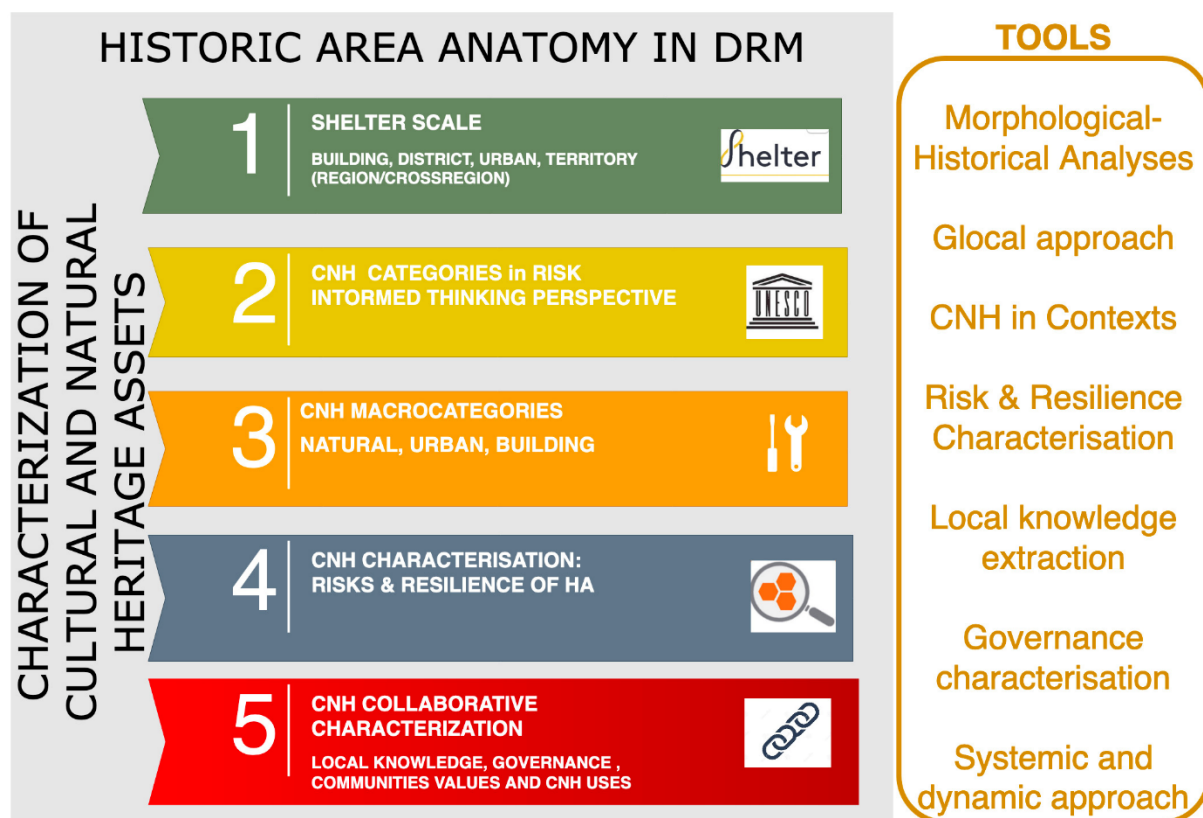


Figure 10: Anatomy of Historic Areas in DRM perspective

Key Contexts include: Denomination, Location, Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation,

Knowledge assessment, HA type, HA characterisation, HA Scale (according to SHELTER), Macrocategory, CNH Category / Property Type, Classification / Registration Status, Overall identification and assessment of the HA in the current situation, Overall identification and assessment of the CNH asset in the current situation, Material and Techniques, Restauration and Reinforcements, Natural/Territorial Ways and techniques of cultivation, Design and management works, Techniques of Reinforcements and ways of traditional maintenance, Urban Public facilities and services, Urban Fabric Type, Historical Information, Function and uses, Quantitative Data, Links with other CNH assets, Defining Risk (Hazard Type, Exposure Type, Vulnerability, Resilience Indicators according to SHELTER indicators, Monitoring Time, Disaster Past events), Environmental Context and Risk Exposure, Geographical Context and Physical Asset, Local and Traditional Knowledge, Cultural significance, Uses by communities, Cultural, Historical, Anthropological and Social Context /other Intangible values, Governance, Anthropic and Economic Context, Policies and Planning context, Existing Inventories.

Some other contexts especially address **collective characterization**. They are:

- **Integrating Governance** and management systems. This characterisation provides some essential and mandatory information that refer to the governance type (i.e. participative or collaborative, networking and /or multilevel, hierarchical, community-led). More specific information can be available by collective characterisation at local level. The D6.3 will develop this approach and OLs will provide further specifications. Local actors holding an interest in the heritage of their area, better understand their interactions and conflicts, can recognize and then implement more effective institutional arrangements and regulations. [110]
- **Integrating local and traditional knowledge** will allow including HA local information and the local systems for dealing with hazards and providing strategical information about resilience at local level and related indicators. It also integrates intangible values such as traditions and know-how that are an important component of local cultural identities and collective memories. In this aim, the *D 6.5 Methodology for Local knowledge extraction* will be validated in the framework of this methodology for the HA Anatomy.
- **Integrating cultural significance** (the Burra Charter) [111]. The collective characterization finally has to “capture” the value of the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects, and value attributed by communities (including the community uses of CNH assets). Places may have a range of values for different individuals or groups. [3] It is relevant also for cultural continuity.

A very detailed identification of categories and attributes for the range of CNH assets and their contexts have been developed with the methodology presented

in this deliverable. The tool allows combining short-term and long-term strategies in order to:

- integrate the information with existing lists/catalogues
- collect information step by step
- implement the characterization over time

5.2 Macrocategories: Natural, Urban, Building

The multiscale SHELTER approach shapes a very articulated scenario including building and surroundings, urban areas, natural HAs at regional and cross-region scales. HAs include, thus, built and unbuilt areas in urban, natural and mixed sites. On one side, each HA with its articulation of a wide range of components requires detailed analysis. On the other side, a comparative perspective is also important. To manage this complexity, the results of the analysis suggest identifying some main **Macrocategories** to be specified according to the needs of each HA and its specific scale. The major Macrocategory will enable the characterization of the HA and address related analysis. According to SHELTER Project approach, the final Macrocategories have been identified as **Urban, Building, Natural**.

Macrocategories have been identified to manage the HA complexity together with the range of linkable heritage categories. We also consider that HAs include both tangible and intangible categories and that - among tangible heritage - also movable heritage needs to be included. Indeed, both museums and the objects exhibited and stored within them, as well as archaeological artifacts and art assets need to be considered. Moreover, a proper survey/assessment about heritage under risk should include intangible heritage since it is also affected by hazards.

The Macrocategories approach has been preferred also as a useful expedient for the Data Model design (D1.4) and visualisation in HA Resilience Dashboard (D5.4) by combining the CNH assets categorisation with other parallel patterns of SHELTER Project knowledge buildings (see Chapter 5). The identified categories have been organised for the structure of the spatialized database (which will be produced through CityGML) in order to provide a list of attributes that can reflect the approach and methodology presented in this report.

The Macrocategories tool enable:

- **the highest level of the anatomy** by identifying the characterisation of human settlements and natural areas;
- **a second level of the anatomy** by detailing the CNH assets accordingly to attributes that can express more in detail risk exposure and assets characters that can be linked to resilience indicators (D. 2.2) [67].

By means of Macrocategories, complex sites at different scales can be linked to attributes characterizing CNH assets by risk as well as connected to other assets for a combined but articulated understanding and Anatomy of HAs. In Figure 11,

we have **visualized a heritage holistic approach HA anatomy by Macrocategories** by identifying some relevant heritage matter for HA linkable categories. Moreover, in the same table, we have also visualized how – on the other side - a heritage category also can include diverse HA (Figure 11).

[illegible]

Figure 11: Illustration of HA Anatomy by Natural/Urban/Building Macrocategories. The image visualises the relations between each Macrocategory and CNH categories and relations among Macrocategories for the HA anatomy. It has been created by POLITICO in the framework of presentations for the Task 2.3 and the SHELTER Project.



The Natural Macrocategory refers to natural heritage assets of different sizes and types. It also includes those CNH categories of human settlements, buildings sites and shelters where natural landscape component is a relevant priority of characterization of the site (e.g. cultural landscapes, cultural routes). It also includes natural areas and trees in urban areas. It encompasses heritage sites and other HA of cultural significance that are important for local cultural identities and collective memories, recent processes of heritage-making by multicultural communities. The categorization is especially addressed to risks and resilience characterization of related inhabited and urbanized areas. Links to other Macrocategories provide contextualised information.

It has been estimated that only around 9% of the world's 98,400 terrestrial protected areas are in the strictest IUCN categories of I and II. [10] Moreover, it has been noticed that protecting and restoring natural areas in and around cities enhance resilience to storms, flooding, sea rise, ocean storm surges and mudslides, thus protecting millions of people. With their large impermeable surfaces, cities can quickly accumulate large volumes of storm water runoff. The assessment of natural elements in urban areas has shown that natural areas can disperse or divert these floodwaters. [112] Moreover, natural areas moderate the urban heat island effect. In addition, there is much evidence that biodiversity itself enhances the resilience of ecosystems. They are important part of local cultural and social identities also including symbolic and spiritual values. However, they also can represent a risk factor.

Categories identified among the NATURAL Macrocategory refers to the international standards and their more recent developments in identifying and categorizing natural areas. They especially aim at specifying the integration of natural elements with human interactions that have produced specific historic characterisations (e.g. prehistorical caves, mines, energy productions). Here below we provide a short reference list of those standards and categorizations:

According to the 1972 UNESCO Convention, the "natural heritage" is intended as referred to [113]:

- **natural features** consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view;
- **geological and physiographical formations** and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation;
- **natural sites** or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

This notion has been further elaborated in the World Heritage Operational Guidelines, which also contain the specific criteria and conditions of integrity for assessing Outstanding Universal Value(s) of prospective World Natural Heritage properties. [114]

By confirming this understanding, the UNESCO (2009) has also specified that this framework also refers to:

- **private and publicly protected natural areas, zoos, aquaria and botanical gardens, natural habitat, marine ecosystems, sanctuaries, reservoirs etc.** [115]

The NATURAL Macrocategory includes the recent understanding of landscape and natural areas with awareness about the cultural relevance of human interactions. In particular, it refers to the definition of natural heritage that has been provided by the survey of Cultural Heritage in EU policies at the occasion of the 2018 Cultural Heritage year. It includes:

- **cultural landscapes, geological, biological and physical formations.** [116]

Cultural landscapes fall in three **main categories** (UNESCO 2008) [117]:

- the **clearly defined landscape designed and created intentionally by man.** This embraces garden and parkland landscapes constructed for aesthetic reasons which are often (but not always) associated with religious or other monumental buildings and ensembles.
- the **organically evolved landscape.** This results from an initial social, economic, administrative, and/or religious imperative and has developed its present form by association with and in response to its natural environment. Such landscapes reflect that process of evolution in their form and component features. This category includes:
 - a relict (or fossil) landscape: an evolutionary process that came to an end at some time in the past, either abruptly or over a period. Its significant distinguishing features are, however, still visible in material form.
 - continuing landscape: it retains an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress. At the same time, it exhibits significant material evidence of its evolution over time.
- the **associative cultural landscape.** The inclusion of such landscapes on the World Heritage List is justifiable by virtue of the

powerful religious, artistic or cultural associations of the natural element rather than material cultural evidence, which may be insignificant or even absent.

This report recognition also builds on European contribution to cultural and natural heritage enhancement. We include the **NATURA 2000 sites** which are a network of “core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right”. They are recognized by the European Commission across 27 countries in the framework of biodiversity strategy. [118]

Furthermore, we identify in the programme established by CoE the category of **Cultural Routes**. The definition refers to a *programme*, launched in 1987:

“to demonstrate, via journeys through space and time, how the heritage of the different countries in Europe contributes to a shared cultural heritage”.
[119]

The programme has identified a crosscutting natural-cultural as well as transnational CNH categories. It refers to categories relevant for European characterization and aren’t included in other CNH world categories. Categories include: Historical streets, Ancient pilgrim ways, Architectural Promenades, Historical Gardens, Olive tree Routes etc. [120]

Other categories that have been provided by some national contribution and that can provide characterisations are the “Tranquillity Areas” of England; the “Areas of Outstanding Beauty” in Scotland, England, and Wales; and the “Silence Areas” in the Netherlands.

Furthermore, for a homogeneous analysis of natural elements in order to identify its attributes in relation to DRR characterization, the Macrocategory also includes natural heritage in urban and rural settlements (such as urban parks and secular trees) as well as other relevant natural elements for local cultural identities and biodiversity.

Main categories that are identified under the Natural Macrocategory are listed in the Table 5:

Protected Natural Heritage areas
Agricultural Heritage
Cultural Landscape
Cultural Routes Define
Geological monument
Geopark
Heritage Canal
Historic Garden
Historic Landscape
Natura 2000 site
Natural Heritage
Prehistoric site

Protected area-Strict Nature Reserve
 Protected area-Wilderness Area
 Protected area-National Park
 Protected area-Natural Monument
 Protected area-Habitat/ Species management area
 Protected Landscape/ Seascape
 Protected Area with Sustainable Use of Natural Resources
 Protected area-Marine
 Protected Area Global Geopark
 Protected area-Ramsar site
 Protected area-Biosphere reserve
 World Heritage site
 Sacred Natural Site
 Silence Area
 Underwater heritage

Other relevant CNH asset types

Canal/Lagoon/River/ Water Basin
 Cemetery
 Conventional urban park/with lawns/flowerbeds
 Designed Park/Garden (vegetal architecture)
 Embankment
 Garden as a part of historic building
 Green Infrastructure
 Green infrastructure into the built
 Holiday resort site (e.g. beach, etc)
 Hermitage Site
 Historic zoo
 Land Art
 Local park
 Memorial park
 Monumental tree
 Natural area that includes designed park/garden
 Natural route and path
 Non protected Historic or traditional planting
 Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, roadtracks, water and channel network)
 Pilgrimage Route
 Playground and sports field
 Planting (historic/traditional)
 Quayside
 Regional Park
 Scenic point
 Spiritual Site
 Street trees
 Other site of cultural natural significance.

Table 5: Main categories of the Natural CNH Macrocategory

The Table NATURAL Macrocategory in the **ANNEX 2** delivers the detailed complete categorization and characterisation for URBAN Macrocategory.



The Urban Macrocategory refers to a human settlement of different size (in particular to a city). It refers both to historical cities as a whole and urban areas. The Macrocategory assumes that **safeguarding and recovery of CNH in historic cities go beyond the collection of individual monuments and objects and related actions**. It details the identification of CNH assets by considering the complex relationship among heritage assets in urban areas, urban development and urban heritage resilience. It includes heritage sites and other HA of cultural significance that are important for local cultural identities and collective memories, recent processes of heritage-making by multicultural communities, as well as urban and architectural characterising elements such as urban form, urban fabric and public space. We finally assume that in the case of urban destructions a CNH asset and HA assessment should consider the loss of those qualifying attributes that allow still identifying it as a cultural heritage by assessing the level of quantitative and qualitative loss. For this purpose, it includes a range of valuation approaches including cultural values, economic costs, community benefits, and resilience. Urban Macrocategory also identifies categories to be linked to Natural and Building Macrocategories.

The Urban Macrocategory takes into account that the majority of the world's cultural heritage remains urban, more than 70% of cultural heritage properties inscribed on the World Heritage List are either located in urban areas or have urban areas within their nominated areas, the 1,092 properties on the World Heritage List include more than 2,700 cities/towns in 624 cultural and mixed heritage properties. [4] In this scenario, European historic cities represent the most important cultural, commercial and tourist asset. They provide citizens a sense of ownership, belonging and cultural identity. Historic cities and HA in cities are challenged not only by urbanization but also by other factors that should be taken into account for creating a framework of interpretative characterisation.

HAs in cities are constantly changing more than ever. The pressures of urban change on monuments, archaeological landscapes and historical regions, are an increasing concern. Also, renovation and regeneration projects produce other changes at different level of uses, governance, structural and aesthetic such as gentrification of neighbourhoods, migration flows that are changing the experience of places, 'public' squares created and managed by private investors, facadism (demolition of structure by maintaining only the façade), conflicting functions, unsustainable land-use. Beyond different possible hazards, thus, HA and their heritage were and are under the threat of being destroyed due to the nature of urban development.

Urban Macrocategory details the identification of CNH assets by considering the complex relationship among heritage assets in urban areas, urban development and urban heritage resilience. Recent surveys about 40 cities have noticed the large variety of historic urban areas categories and discontinuous and terminology

the difficult to reach meaningful quantitative data on categorization of urban areas. [19] A meaningful example is the various terminology linkable to the expression of "historic centre/core". Categories and terminology build on critical studies by exploring terms provided by international organisations literature and the state of the art on the matter of risk and urban resilience. According to HUL approach, the Macrocategory also considers the change and some new features relevant for **urban heritage** such as the inherited urban fabric, urban space and urban intangible heritage as constitutive elements of cities and its collective values and identities. It also considers unlisted historic buildings and heritage that are under threat in European cities. The urban layout and property structure should serve as the reference point for reconstruction.

In particular, the Urban Macrocategory departs from the recognition of the important role of HAs in modern societies and the '**environment**' definition provided by the *Recommendation on the HUL* stating that:

"Human settlements have constantly adapted to climatic and environmental changes, including those resulting from disasters. However, the intensity and speed of present changes are challenging our complex urban environments"

and highlighting that

"Changes to historic urban areas can also result from sudden disasters and armed conflicts. These may be short lived but can have lasting effects. The historic urban landscape approach may assist in managing and mitigating such impact." [3]

The methodology especially takes into account by the specification of **urban heritage categorization** in the *HUL Recommendations* that identifies:

- Monumental heritage of exceptional cultural value;
- Non-exceptional heritage elements but present in a coherent way with a relative abundance;
- New urban elements to be considered (for instance): The urban built form; The open space (streets, public open spaces); Urban infrastructures: material networks and equipment

Furthermore, recent recommendations relevant for defining the categorization are:

- The categories identification of international policies on architectural heritage that makes a distinction among (i) monuments, (ii) groups of buildings and (iii) sites. Moreover, although the HUL has been conceived as a methodology, the *Vienna Memorandum on World Heritage and Contemporary architecture* also defines HUL as:
"ensembles of any groups of buildings, structures and open spaces, in their natural and ecological context" that "has shaped modern society and has great value for our understanding of how we live today." [18]

- Literature refers to HUL as an identification of the “**contemporary historic urban landscape**” that also allows interpret the meaning of traditions in the contemporary built environment. [121]
- The UNESCO document titled *Culture, Urban, Future. Global Report on Culture for Sustainable development* clearly defines how to identify attributes:

“A city’s vulnerability to geophysical hazards is not only determined by its location and the quality of its built assets, but also by its economy, population and governance for taking into account these issues in the understanding the anatomy of urban HA and categorizing their conservation areas.” [20]
- Some assessment experiences also come from other disaster framework that refer to “urban cultural heritage”. The **International conventions on urban cultural heritage** which includes the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict, the World Heritage Convention of 1972, and numerous other recommendations, charters and accords relating to urban conservation, restoration, disaster risks and management have provided important improvements to the CNH categorization in urban HA.
- An urban heritage approach has been developed in the case of huge destruction due to the recent Syria war by the project entitled ‘*Urban Cultural Heritage in Conflict Regions*’, funded by the German Foreign Office, and implemented by GIZ under the umbrella of the Archaeological Heritage Network (ArcHerNet). It provides relevant assessment criteria for HAS assessment at urban scale. “Urban Cultural Heritage in Conflict Regions”
- Some recent examples are in the compilation of *case studies on the conservation and management of historic cities* by the Organization of World Heritage Cities, City of Lyon, World Heritage Centre, France-UNESCO Convention, CoE, The Getty Conservation Institute, ICOMOS [19] and the ongoing activities of the International Committee on Historic Towns and Villages with its published case studies. [122]
- Furthermore, for a wider framework for CNH characterization in Risk informed thinking and an integrated understanding of HA in cities, the literature review and the analysis developed suggests some more CNH identification. A reference has also been a pilot experience on Turin CH (Beni Culturali e ambientali nel Comune di Torino/Turin’s Cultural and environmental heritage[123]) that was developed by the Politecnico di Torino as baseline for the conservation areas in the city planning with its ongoing update.

The Figure 11 provides a visualization of main heritage categories that can be linked as a chain to URBAN Macrocategory.

Main categories that are identified under the Urban Macrocategory are listed in the Table 6:

<p>Urban CNH Assets</p> <p>Archaeological site</p> <p>Architectural ensemble</p> <p>Groups of Buildings</p> <p>Historic Area</p> <p>Historic neighborhood</p> <p>Historic Town</p> <p>Historic village</p> <p>Historic Core/City Centre</p> <p>Historical urban landscapes (HUL)</p> <p>Military heritage and Fortifications</p> <p>Rock Art</p> <p>Scientific Heritage</p> <p>Urban Heritage</p> <p>Urban Archaeological areas</p> <p>World Heritage site</p> <p>Other relevant CNH asset types:</p> <p>Arsenal</p> <p>Canal front/ lagoon front/ riverfront/seafront/ Define</p> <p>Designed neighbourhood /district (architectural work): Social Housing/Working class/Garden city/Siedlungen etc.</p> <p>Designed square</p> <p>Historic industrial heritage district</p> <p>Historic Market place site</p> <p>Historic neighbourhood</p> <p>Historic settlement</p> <p>Historic square</p> <p>Historic street</p> <p>Lakefront/Lagoon front/Riverfront/Seafront</p> <p>Memorial Site</p> <p>Military site with local relevance</p> <p>New urban elements to be considered. Define:</p> <p>Non-exceptional heritage elements but present in a coherent way with a relative abundance</p> <p>Open space: streets / public open spaces</p> <p>Street front (homogeneous/regular/with porticos)</p> <p>Thermal bath site</p> <p>Urban Art (e.g. artistic installation)</p> <p>Urban built form</p> <p>Urban infrastructure: material network and equipment (e.g. historic bridge, historic road)</p> <p>Urban layout</p> <p>Urban bunker</p> <p>Other site of cultural natural significance.</p>
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Table 6: Main categories of the Urban CNH Macrocategory

A higher level of the categorisation, size and degree of urbanisation (which are features shared by all human settlements) should be defined before the main categories in order to identify the system of relations, urban network, governance and stakeholders.

The Table URBAN Macrocategory in the **ANNEX 3** delivers the detailed complete categorization and characterisation for URBAN Macrocategory.



The **Building Macrocategory** refers to any kind of monuments and historical buildings both urban and rural, including complex buildings such as monasteries and industrial heritage and historical barracks and other buildings of cultural significance that are important for local cultural identities and collective memories, recent processes of heritage-making by multicultural communities, as well as architectural characterising elements such as infrastructure and institutional buildings. It also includes the movable CH assets that are eventually stored in the building such as museums objects. Moreover, it includes related intangible heritage.

BUILDING anatomy allows identifying CNH settings and contexts and integrating risk characterisation. It provides the anatomy of HA at the building scale by considering the relationships among building components and the impact of historical buildings changes over time. It also considers the relations with other scales and nature of heritage assets in human settlements and natural areas. The link to the HA type allows providing information about the setting and the other **key-contexts** at the larger scale. The Macrocategory can be understood as a specification at building scale of other Macrocategories to identify characterization of the material culture.

Buildings assets identification baseline is anchored in literature and heritage institutions codification at national and international level. Efforts in systematization at building scale have been developed by architectural culture since the of Renaissance treatises and 19th century historical dictionaries (e.g. the Viollet-le-Duc's *Dictionnaire*[124]). The methodology also learnt by national good practices (see section 4.5) and some regional inventories for identifying the conservation areas in city planning.

Main categories that are identified under the Building Macrocategory are listed in the Table 7:

Buildings CNH assets:

Archaeological Heritage
Architectural Heritage
Habitation urbaine
Historic Building
Industrial and technical heritage
Monuments
Vernacular architecture

World Heritage
Other relevant CNH assets
Aquarium building
Architectonic painting
Architectonic inscription
Architectonic sculpture
Archive (including sound, photographic and cinematographic archive)
Building holding collection
Cinema
Collection
Building relevant to local history and tradition (civic/ educational/health/leisure/ military/religious/etc.)
Chapel
Historic factory
Historic farm
Historic/designed holiday resort
Historic rural construction
Librarie
Market building
Memorial and traditional local monument
Monastery
Monumental sculpture
Museum
Refuges cultural property
Rural architecture
Sanctuary
Theater
Thermal building
Town hall
Traditional local building or construction
Underground architecture (bunker /cistern etc.)
Other building of cultural natural significance.

Table 7: Main categories of the Building CNH Macrocategory

The Table BUILDING Macrocategory in the **ANNEX 4** delivers the detailed complete categorization and characterisation.

5.3 CNH assets specific requirements in main international standards

Capitalizing on some essential principles relevant to CNH assets management identifications reflected in main international standards, it is seen that there is a need to better specify the methodology in relation to the DRM. The Sendai framework emphasizes that

"It is urgent and critical to anticipate, plan for and reduce disaster risk in order to more effectively protect persons, communities and countries, their livelihoods, health, cultural heritage, socioeconomic assets and ecosystems, and thus strengthen their resilience." [125].

However, the need for a better integration of CNH in DRM is highlighted also by the European Commission in the comparative analysis developed in the document entitled *Safeguarding Cultural Heritage from Natural and Man-Made Disasters*. [1]

This report aspires to contribute to a step forward in this sense. To do so, we have identified the following crucial points and criteria:

- **The least harm to heritage**

The principle of “*the least harm to heritage values*” should be the aim of each action that targets preserving and conserving CNH assets. This principle is defined by ICOMOS *Charter of the Principles for the analysis, conservation and structural restoration of architectural heritage* [126]:

“Each intervention should be in proportion to the safety objectives set, thus keeping intervention to the minimum to guarantee safety and durability with the least harm to heritage values” (art. 3.5) [126].

“*The least harm to heritage values*” principles should inspire any characterisation and action for CNH management in a DRM perspective. To achieve this goal, we should consider the needs of a Recovery phase and the need of scientific information for accurate diagnosis of damages and processes of conservation and/or structural retrofitting. In this aim the most detailed qualitative and quantitative information is needed to be collected and organised as well as related data sources.

- **A resilient recovery**

Recovery phase should be considered as the last one of an overall cycle of extending knowledge and increasing awareness in order to reduce and mitigate risks and impacts as well as to avoid further damages. On the matter of tangible heritage, among other principles, the above mentioned ICOMOS Charter points out the relevance of structure, including earlier states, and historical developments and the techniques that were used in the construction, the alterations and their effects, the events that have occurred, and, finally, the present state. This information, thus, has to be mandatory for the CNH characterization.

- **A reactive monitoring**

A specific process for monitoring the state of conservation of World Heritage sites has been established as follows: “*the States Parties shall submit specific reports and impact studies each time exceptional circumstances occur or work is undertaken which may have an impact on the Outstanding Universal Value of the property or its state of conservation.*”[16]. As highlighted in the report “Managing Disaster Risks for World Heritage”: “*This reactive monitoring should be extended to CH assets in areas under risks. It is indeed important to follow a systematic process of damage assessment, taking into account the local context and the resources available*” [1]

- **“Build Back Better” in CNH assets**

The “Build Back Better” (BBB) concept refers to actions to be undertaken after a disaster. BBB is defined as:

“The use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of nations and communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies, and the environment” [156]

According to Sendai Framework:

“Disasters impacted countries and communities are oftentimes much better equipped to Build Back Better during the extended period of recovery, rehabilitation, and reconstruction when they have taken actions to strengthen recovery capacity and decision-making effectiveness prior to the onset of disaster”. [128]

However, any action – such as the action related to the terms “Reconstruction”, “Recovery”, “Rehabilitation” used in BBB - has to consider HAs management procedures and practices. The identified values and characters need to be taken into account with high accuracy. It should be noted that in the case of World Heritage sites, the lack of this accuracy in preserving outstanding values can implicate the elimination from the list. Furthermore, according to SHELTER Project ‘GLOBAL’ approach, the BBB approach should be better combined also with a local perspective of cultural significance of CNH assets.

- **Authenticity**

The ICOMOS *Charter of the Principles for the analysis, conservation and structural restoration of architectural heritage* [126] specifies the approach to value and authenticity to be considered in cultural context that can be extended also to intangible heritage:

“value and authenticity cannot be based on fixed criteria because the respect due to all cultures also requires that its physical heritage be considered within the cultural context to which it belongs” (art. 1.2) [126].

However, the Charter also identifies some criteria for building CNH assets. It admonishes that:

“The value of architectural heritage is not only in its appearance, but also in the integrity of all its components as a unique product of the specific building technology of its time” (art. 1.3) [126]

In the notion of ‘integrity’ «*its form, materials, function, management system, location, spirit...*» are included.

5.4 Shaping a holistic framework for CNH characterisation in DRM: Methodology for CNH_DRM

The challenge for “improving the integration of cultural heritage in national platforms for Disaster Risk Reduction” [1] is confronted by the development of the CNH_DRM methodology to create an effective and practical approach. For this purpose, the methodology is combined with the iterative DRM phases and shape a systemic and dynamic approach for a changing scenario. According to the SHELTER Project approach, the identified phases are: Prevention, Preparedness, Response, Recovery.

The methodology identifies **factors to be taken into account to combine HA management** with a DRM perspective and characterize them in **each phase** of the cycle. Factors include specificity and diversity of CNH assets. Specificity complies with an inclusive categorisation. Diversity complies with the range of attributes for the characterisation according to CNH categories.

An operative template is provided in interactive digital form for the CNH assets characterisation in the SHELTER OLS. It is shaped as a flexible and customizable tool to adapt to different spatial scale and CNH assets categories. For this purpose, the **template is shaped as a digital interactive tool in an Excel Google digital form and available at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

An Excel printed form of the template is also delivered in the Annex 6.

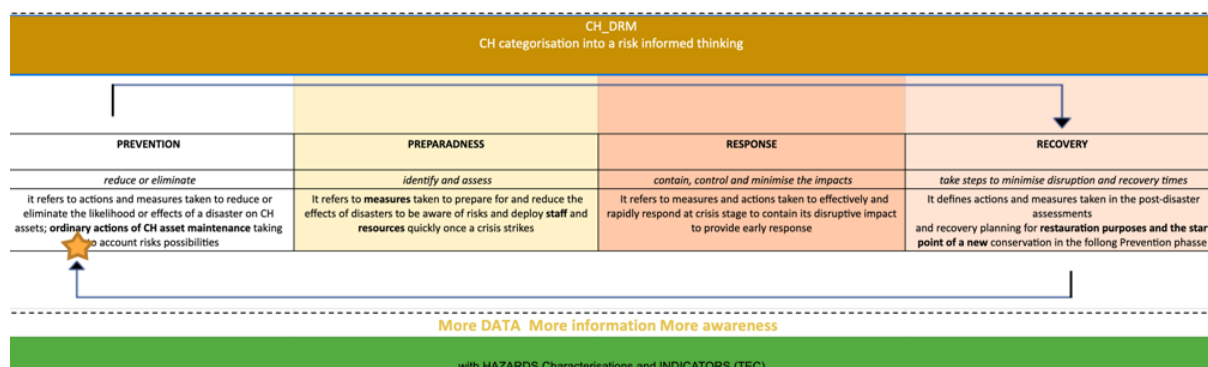


Figure 12: Four phases specified for CNH requirements.

Figure 12 above shows a screenshot of the Google excel sheet with the 4 phases specified for CNH requirements. The arrows emphasize the dynamic cycle. The arrows show the iterative process and the new knowledge developed after a cycle. The star shows the new departing point with an increased knowledge. The complete form is available **in the Annex 6 and at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

The template offers an approach to integrate and finalize extensive and heterogeneous information and easily collect and organize the available knowledge (scientific knowledge, local and traditional knowledge, oral knowledge) in a shared framework. The tool enables a dynamic and systemic approach for CNH categorisation and characterisation by taking into account four DRM phases.

A	B	C	D
PREVENTION	PREPARADNESS	RESPONSE	RECOVERY
<i>reduce or eliminate</i>	<i>identify and assess</i>	<i>contain, control and minimise the impacts</i>	<i>take steps to minimise disruption and recovery times</i>
it refers to actions and measures taken to reduce or eliminate the likelihood or effects of a disaster on CH assets; ordinary actions of CH asset maintenance taking into account risks possibilities	It refers to measures taken to prepare for and reduce the effects of disasters to be aware of risks and deploy staff and resources quickly once a crisis strikes	It refers to measures and actions taken to effectively and rapidly respond at crisis stage to contain its disruptive impact to provide early response	It defines actions and measures taken in the post-disaster assessments and recovery planning for restauration and new conservation purposes

Figure 13: Screenshot of the template with four phases specified for CNH requirements.

Figure 13 shows a screenshot of the Google Excel sheet with the 4 phases specified for CNH requirements. The complete form is available **in the Annex 6 and at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

The fundamental idea is that the model should be continuously implemented for the best conservation of CNH assets against hazards and collateral damages. The approach to CNH characterisation should include procedures for the *modus operandi* in the Response/Recovery phases. In order to ascertain **the most achievable benefit** for CNH conservation, an enhancement of each step of DRM is needed to take all safeguard measures.

Prevention to *reduce or eliminate*: It refers to actions and measures ongoing and taken to reduce or eliminate the likelihood or effects of a disaster on CNH assets. It defines an ordinary actions of CNH asset maintenance and implementing adaptative solutions taking into account risks possibilities.

Preparedness to *identify and assess*. It refers to measures taken to prepare for and reduce the effects of disasters to be aware of risks and deploy staff and resources quickly once a crisis strikes. It defines new measures addressed by identifying the weakness

Response to *contain, control and minimise the impacts*: It refers to measures and actions taken to effectively and rapidly respond at crisis stage to contain its disruptive impact to provide early response without compromising the CH asset.

Recovery to *take steps to minimise disruption and recovery times*: It defines actions and measures taken in the post-disaster assessments and recovery planning. It defines extraordinary actions including restauration purposes.

The model should be understood as an iterative process by considering the repercussion of each action in the following phase. Because of the exposure to natural risks, the phases are not only considered in their interval. **The Recovery phase is also the starting point of a new stage of conservation in the following Prevention phase of a new cycle** (see Figure 12 and Figure 13).

The methodology identifies a **dynamic procedure** for specifying each step of DRM and takes into account safeguard measures in line with the Shelter approach (Figure 14). It shapes a process in relation to which CNH assets has to be continuously monitored:

Prevention → Preparedness → Response → Recovery

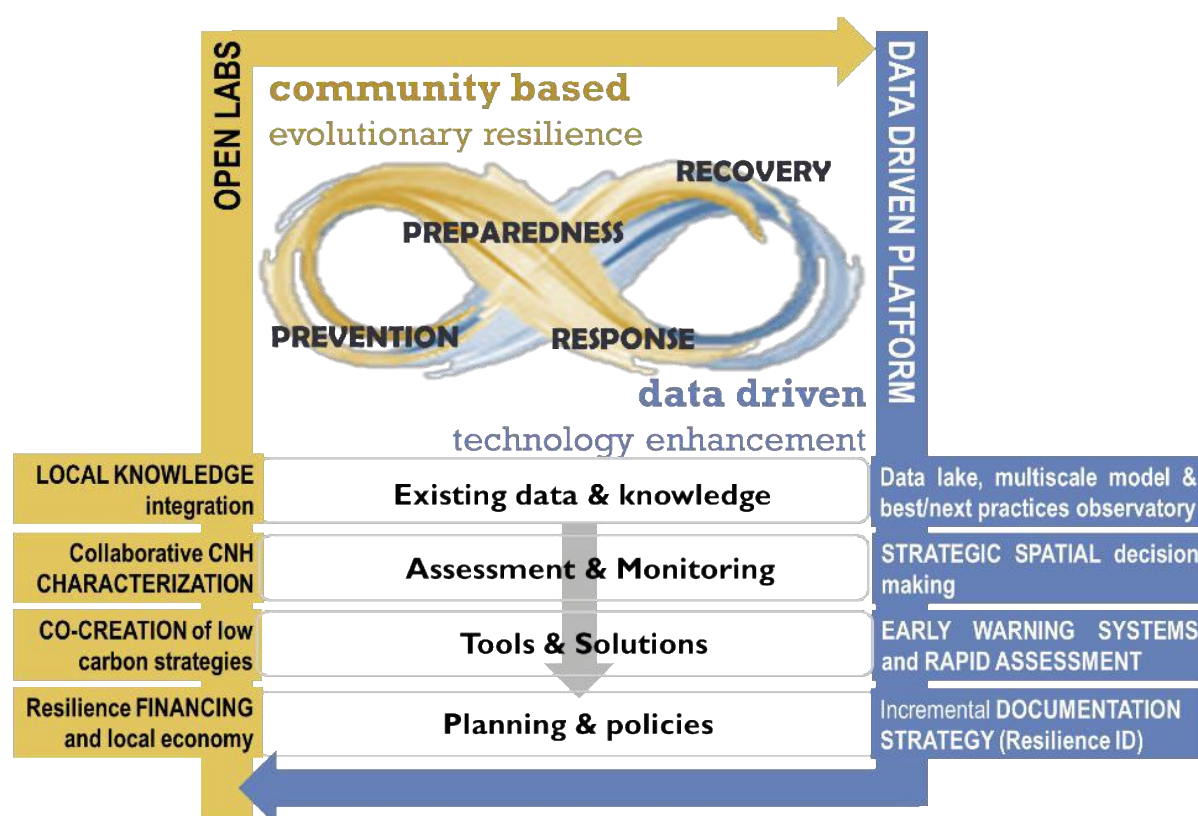


Figure 14: Shelter Approach (Document of Agreement, p.3)

For making effective the implementation of this model, the methodology should adopt a:

- **Mapping approach:** CNH assets and its chain should be mapped in the Prevention/Preparedness phases with a data management approach and a geolocalised information (to be linked to the Data model D1.4).
- **Dynamic Mapping approach:** The information mapped in the Prevention/Preparedness phases should be updated in the Response and Recovery phases.
- **Resilience understanding:** In the Prevention phase, a focus on risk impact reduction and mitigation should be promoted by a wider understanding of CNH resilience. Resilience understanding also should include intangible values and cultural significance to integrate systematically the values and perspectives that are attributed to CNH assets including the community uses. This approach also includes improving the citizens awareness about CNH at risks and building on local identities and sense of place by engaging citizens and providing training for volunteers.
- **Risk-awareness in Preparedness:** A robust enhancement of the Preparedness *phase* is especially important for improving the existing CNH assets information.
- **Collective CNH characterization:** CNH heritage asks for inclusiveness and participation at local level. In Prevention/Preparedness phases communities should be engaged by collaborative approach to CNH assets characterization and cultural significance identification by local communities.
- **GLOCAL** approach: the methodology is to be customized at local level to take into account CNH diversities and specificities and their values in the local communities.

The Template CNH_DRM identifies the systemic and dynamic approach to CNH assets in the four phases. We've specified **4 clusters of information** that allow to assume and finalise diversity and specificity of HA for implementing the model:

- **CNH asset ID_Risk**
- **Data and Information Resources**
- **Equipments, Tools and Procedures**
- **Human Resources**

The 4 Clusters of information appear in the Template in its first page as in the below.

DRM PHASES ▾	CH ASSET ID ▾	RESOURCES ▾	EQUIPMENTS AND PROCEDURES ▾	HUMAN RESOURCES ▾		

Figure 15: Four clusters of information.

Figure 15 above shows a screenshot of the Google excel sheet with the 4 Clusters of information. The complete form is available in the Annex 6 and at the link: <https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

Each cluster includes strategic actions that should be tested and implemented in Prevention, Preparedness, Response, Recovery phases. By surveying, data and information can be collected and integrated phase by phase. In the template each cluster is identified by one sheet. A digital GIS based approach could be eventually integrated in order to link data and create a continuous dynamic update by rationalizing the analysis. This cluster defines a methodology to be understood as **a scalable approach**.

The clusters of information are for:

- (i) *Identifying* and characterising CNH assets in the PREVENTION phase
- (ii) *Addressing* the risk this knowledge in the PREPAREDNESS phase
- (iii) *Reacting* with emergency measures in the RESPONSE phase
- (iv) *Re-establishing* with lesser possible damages to CNH assets in the RECOVERY phase

The CHN_DRM methodology creates a protocol model for identifying the CNH assets attributes, but also for minimizing impacts, and assessing CNH assets in a post disaster (Response/Recovery) condition. This approach also facilitates **scientifically based and culturally sensitive conservation** and restoration. It facilitates avoiding **further damage to heritage** in a critical phase by taking into account debris, shelters and basic services in emergency/post emergency steps. It is important to note that this approach creates entry points for the OLs through the use of a digital, flexible and customizable tool. The interactive digital template form includes:

- Sheet 1: Cover
- Sheet 2: CNH asset ID_Risk
- Sheet 3: data and information resources
- Sheet 4: equipment, tools and procedures
- Sheet 5: human resources
- Sheet 6: instructions for the template
- Sheet 7: a glossary (also presented in Annex 9.6) for CNH asset categories, definitions, relevant terminology and the damage assessment categorisation.

By applying the methodology, the HA 'Anatomy' is enabled for different kinds and at different spatial scales of HAs to categorise and characterise CNH assets in DRM perspective. In particular, the **CNH ID_Risk** is for the CNH categories identification and characterisation.

Within the template, the macrocategories are identified by colours. The colours are:

- brown for the BUILDING macrocategory
- light blue for the URBAN macrocategory
- green for the NATURAL macrocategory

In the Template key contexts create the characterisation at different categories/scales. Table 8 illustrates CNH asset ID_Risk schema with metadata.

Defining CNH asset ID and its significance
<ul style="list-style-type: none"> • Denomination • Location • GIS system • Cadastral Data • Land Cover • Pre/Post Disaster Assessment according the Indicators of State of Conservation (ISC) • Knowledge assessment • Photograph • Site Plan/map • HA type • HA characterization • HA scale • Macrocategory • CNH type • Category List (Select from the table) According to Glossary • Other Cultural Natural Pro pert type for BUILDING Macrocategory • Other Cultural Natural Pro pert type for URBAN Macrocategory • Other Cultural Natural Pro pert type for NATURAL Macrocategory • Classification / Registration Status • Simple/Complex CNH asset • Detailed list of CNH components in the case of composite CNH classification • Movable Heritage in CNH Asset List of components • CNH hosting event, festival, fair • Site hosting events, festivals, fairs, other • Overall description of the HA in the current situation with its relevant values and physical components listed and defined that will allow directly linking to specifi analysis and detailed information in the Clusters of Resources • Overall description of the CNH asset in the current situation with its relevant values and physical components listed and defined that will allow directly linking to specifi analysis and detailed information in the Clusters of Resources • Materials and Techniques for Built Environment and Archeological sites -BUILDING Macrocategory • Restoration and reinforcement for Built Environment and Archeological sites - BUILDING Macrocategory • Natural/territorial ways and techniques of cultivation for NATURAL Macrocategory • Design and management works for NATURAL Macrocategory • Techniques of reinforcements and ways of traditional maintenance for NATURAL Macrocategory • Public facilities and services for URBAN Macrocategory • Urban fabric Type for URBAN Macrocategory • Historical Information • Functions and uses • Quantitative Data for BUILDING Macrocategory • Quantitative Data for URBAN Macrocategory • Quantitative Data for NATURAL Macrocategory • Links with Other CNH assets • Inspection Information
Defining its Risks

<ul style="list-style-type: none"> • Hazard type according to SHELTER indicators • Exposure Type • Vulnerability • Resilience indicators according to SHELTER indicators • Monitoring Time • Disaster Past events
Defining the CNH asset in its context
<ul style="list-style-type: none"> • Environmental Context and risk Exposure. • Geographical Context and Physical Asset • Local and Traditional Knowledge • Cultural, Historical, Anthropological and Social Context /Intangible Heritage • Governance • Anthropic and Economic Context • Policies and Planning context • Existing Inventories • Links to other CNH catalogues and inventories and interoperability

Table 8: HA Anatomy: key contexts for CNH characterisation

The **Data and information resources** sheet refers to analytical information and documentation available to be collected or linked to CNH assets. It provides CNH Resources in form of analytical information in the aim of: (i) identifying and actioning (Prevention/Preparedness phases) (ii) exploiting and updating (Response/Recovery phases). If the CNH_ID Risk provides the main data and descriptions, then, they need to be linked to the related information available and data sources. However, HAs and CNH assets need analyses to face risk. Information and documentation are fundamental resources for CNH assets both for better understanding its exposures and vulnerabilities as well as its tangible and intangible values. The attributes address:

Collecting Existing Documentation, including its update, its storage places, its digitization. The following description is provided as an example of the methodology procedure:

- In the Prevention phase, it refers to **mapping** existing databases and inventories
- In the Preparedness phase it refers to **taking an action** by **producing** a *corpus* of specific documentation for a CNH asset 'anamnesis'. This phase also includes the digitisation of relevant documentation. Initiatives could be creating digital archives and a bank of materials.
- In the Response phase/ Recovery phase it refers to **exploiting/benefitting** from the corpus of documentation/thematic maps for early 'diagnosis'. It also enables 3D virtual reconstruction of lost/damaged components of the affected HA.

The **Equipments, tools and procedures** sheet is for tools and equipments that are in use. As specific knowledge on the matter of equipment, tools and procedures is provided by other specific Tasks in the SHELTER Project, this methodology creates entry points for an integrated mapping. The list thus, is exemplificative for the description of the methodology. Among useful information

and tools should be considered those existing tools (also provided by the D1.2 review).

The **Human Resources** sheet refers to community engagement and the network of stakeholders. It is for including all stakeholders of HA on the matter of CNH asset and Risk management and other stakeholders who play/can play a role in improving CNH safeguard, conservation and uses. Stakeholders to be identified also are cultural institutions, universities and research centres as well as cultural associations and volunteers and businesses, non-profit organizations. Moreover, contacts with the inhabitants of the buffer zone should be activated in the Prevention/Preparedness phases. Training and activities for capacity building and awareness increasing should be provided. CNH_DRM experts should be trained at different levels of responsibilities. The template also identifies simulations to be performed by activating all levels of responsibilities in CNH rescue programs. In the Response /Recovery phases the trained people can be activated to collaborate by avoiding wrong behaviours.

RESOURCES							
Analytical Information, Documentation, Studies and Data							
Collecting Existing Documentation, including its updates, its storage places, its digitisation	Existing Databases	CH databases local databases risk database	Creating a corpus of specific documentation (finalised to the CH asset Anamnesis) through: - its completion - its conservations - its management - its availability	Digitisation of all documentation	Exploiting/Benefitting from the corpus of documentation/Dbs/ for a reflective Diagnosis and Control	Visual 3D Reconstructions	
	Inventories	CH inventories Catalogues etc. (digitalized? y/n)		Addressed documentation completion			
	Type (To be Integrated by other tasks):	Fire		Addressed documentation completion on Risks			
	Data on Risk component (To be Integrated: by other tasks)	Hazard characterization					
	Historical data (values registered in past events)				Exploiting/Benefitting from the Dbs/thematic maps for a early Diagnosis	Collecting new data and Update documentation	
	Economic Data						
		Current Maps Technical Maps Risk Maps Historical maps		CH asset organized Digital Archive			

Figure 16: Screenshot of the Google excel of the Analytical Information and Data Resources (1).

Figure 16 above shows a screenshot of the Google excel sheet of the Analytical Information and Data Resources. The complete form is available **in the Annex 6 and at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

Visual Records and Spatial Data	Current Maps	Creating a database	CH asset organized Digital Archive	Exploiting/Benefitting from the Dbs/thematic maps for a early Diagnosis	Collecting new data and Update documentation
	Technical Maps				
	Risk Maps				
	Historical maps				
	Photogrammetry Survey				
	Architectural Survey	Creating Thematic Maps	Maps of the area or region in which the property is located, such as a hazard vulnerability map	Exploiting/Benefitting from Thematic Maps	Updating Thematic Maps
	Architectural drawings				
	Technical details drawings				
	Photographs				
	Aerial photographs				
	Videos				
	Historical graphic/iconographic records				

Figure 17: Screenshot of the Google excel of the Analytical Information and Data Resources (2).

Figure 17 shows a screenshot of a detail of the Google excel sheet of the Analytical Information and Data Resources. The complete form is available **in the Annex 6 and at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

Digital born records	e-sources	Creating a Bank of materials samples	Tangible heritage samples of materials/colors/textures	Exploiting/Benefitting from the Bank of Materials	Using and Implementing the Bank of materials and cataloguing post disaster ruins	Extracting and collecting new materials,
	3D models					
Conservation and restoration data, records and reports (Intrinsic resilience characteristics)	Social media data					
	Year of Intervention					
	Type of Intervention (Suggested values: conservation (structural), conservation (chemical), re-plastered/whitewashed, restoration, reconstruction, excavation, other (specify))					
	Main materials used in intervention					
	Object of intervention (Description)					
	Previous investigation and report* (Suggested values: documentation, field observation, survey, technical report, other (specify)) (Description)					
	Natural elements documentation					

Figure 18: Screenshot of the Google excel of the Analytical Information and Data Resources (3).

Extracting main aspects of CH assets and its vulnerabilities by Scientific studies and Local Knowledge extraction including its updates, its storage places, its digitisation	Historical reports	Designing a datalake and providing its availability for remote accessing	Creating CH assets	Exploiting/Benefitting from scientific studies	Damages Surveys and Reports
	Research output		Digital libraries		
	Academic Research and Thesis				
	Archaeological Surveys and Reports		Digitisation of specific studies		
	Social engagement Reports		Extracting information		
	Museums reports		Taxonomy		
	Oral Records				
	Preventive studies about CH asset vulnerability and related past events		Onthologies		
	Environmental/geological/meteorologic al assessing studies/monitorin				

Figure 19: Screenshot of the Google excel of the Analytical Information and Data Resources (4).

EQUIPMENTS, TOOLS AND PROCEDURES Documentation, Information, Studies and Data							
Monitoring for a safeguarding Maintenance	Ordinary condition of CH asset definition	Reactive monitoring systems and safeguarding measures	Impact Analysis	Reactive crisis strategic safeguarding Response	Provisional safeguard systems	Extraordinary safeguarding Interventions: Restoration, Conservation, Rehabilitation in conservation areas (strategies, diagnosis, practices, priorities) and Controls (ICOMOS definitions)	Measure against imminent collapse of the structures (avoid modifying the site in an irreversible way)
	monitoring system sensors for CH asset		Specify vulnerabilities through structural analyses		Videos and sensors recordingS		Conservation and reinforcement measures
			Measures for Protection of tangible CH assets		Shoring up Systems		Remedial measures
	Ordinary condition of CH asset definition	Specific tools	Measures for Evacuation of all movable CH assets		Urgent site-structural-solutions measures to stabilise the structure		Catalogue of damages/changed occurred to the CH
		Digital Heritage	Specific digital Apps and tools (for real time communication, training, advices, indications)				Providing Explanatory reports on decisions and interventions made
			Creating Digital CH projects for digital exploitation of CH assets	Providing Digital CH asset uses	Providing CH assets information and exploitation	Engaging experts and citizens in CH Recovery	Digital
Continuously Risks assessment and Pre-disaster recovery planning	Seismic tests	Immediate Risk identification and assessment	Attained Risk manager	Early assessment	Assessing priorities through videos and sensors recording	Safety evaluation and Diagnosis (based on historical, qualitative and quantitative approaches)	Direct observation of the structural and material damages
	Other experiments and tests		Risk Assessment Report				Determine the secondary causes (specifically internal to the structure) of damage and decay
	Structural stability tests		Risk Management Plan				Evaluate the safety level of the structure
	Sensors tests		Recommended actions vs DRM phase		Crowdsourcing		Providing Diagnosis Reports
			Risk assessment based on common threats				
	Social Media crowdsourcing		Material and structural tests				
		Social media news philtering services for collective CH Hazard characterization To be integrated (LINKS)					
Existing equipment and facilities for management systems in the CH assets	Specify Kind of equipment needed related to each risk type	Equipping CH assets with specific management systems and facilities	Establishing specific procedures	Emergency Response Plans	Providing First Aid to CH assets	Recovery Plans	CH damages assessment according to protocol
	Identifying the protocols		Providing guidelines for CH assets First Aid		Applying CH First Aid procedures		Adopting the specific procedures for each CH asset in HA
	Identifying the international						
	system of rescue of CH assets		Provide shelter for the evacuation of movable CH assets		avoiding further damage to heritage		Assign building materials and elements to the buildings from which they originate
	provide guidelines for maintenance	health management in HA	Providing Guidelines for Recorey				Record the places from which debris and materials are recovered
	established procedures for maintenance		Drills in CH assets and its frequency				Recording materials and debris in a central digital database
	specific instructions for safe procedures		Providing Shelters guidelines		Creating Shelters		Providing specific procedures to owners, residents, builders and workers
	ordinary drills in the area and its frequency	instructions for guidelines, advice and assistance			providing advices and assistance		providing assistance for the owners, residents, builders and workers engaged in clearing rubble and debris

Figure 20: Screenshot of the Google excel of the Equipment, Tools, Procedures (1)

Figure 20 above shows a screenshot of the Google excel of the Equipment, Tools,

Organising Geolocalised information and digital tools	Identify existing tools for the area	Conceiving and realizing GIS linked to databases: Geolocalised information about each CH asset including information about:	Mapping of all the factors including Historic Events	Exploiting/Benefitting from GIS and DBs for localizing impacts	Updating Geolocalised post disaster data
			Topographical characterisation (Site configuration)		
			Geo-Morphology characterisation (Soil configuration)		
			CH asset Boundaries		
			CH asset Buffer zone		
			Access		

Figure 21: Screenshot of the Google excel of the Equipment, Tools, Procedures (2)

Figure 21 above shows a screenshot of the Google excel with a detail of the Equipment, Tools, Procedures sheet.

PREVENTION		PREPARADNESS		RESPONSE		RECOVERY	
HUMAN RESOURCES							
Stakeholders, staff, risk management managers and responsible, citizens and communities involved at different level in CH management and/or risk management							
Stakeholders and relevant players analyses including its updates	Mapping governance and national/local management for DRM	Deploy stakeholders' connections	Direct link to the area chain of orders	Activating the CH assets Emergency chain		Organising the governance chain in the Recovery phase for avoiding damages to CH assets	
	Mapping the CH asset governance and management responsibilities		Identifying the Internal (to CH asset) CH_Risk responsible and chain of orders among the staff	Activating direct CH management responsibilities			
	Identifying detailed direct responsibilities for CH asset safeguarding in Emergency phase (e.g. for each department) and creating cooperation		Creating connections among the existing relevant institutions and the community within and around the property.			Organising CH assets and Cultural Institutions coordinating	
	Identifying the Cultural stakeholders		Activating collaboration among the CH assets management and staff and cultural institutions, the academic and research centers	Activating all collaborators for collecting information			
	Mapping local CH association and volunteers		Engaging Volunteers	Activating volunteers for crowdsourcing information		Cultural associations and Research institutions coordinated	
Training experts and aware users	Training Staff activities on CH assets vulnerabilities	Specialised Training in DRM in CH assets	Training the Staff	Activating the Staff for CH assets Emergency and First Aid	First aid providing and coordinating volunteers	providing reports	
	Provide clarifications and communication about CH assets vulnerabilities through communication activities and materials for citizens (activities and documentation)		Training the volunteers	Activating Volunteers for CH First Aid	organising groups	working under the direction of the staff	
	Provide clarifications and communication about CH assets vulnerabilities through communication (documentation materials for tourists and visitors) Organise joint courses for schools and young		Simulations	Applying the procedures			

Figure 22: Screenshot of the Google excel of the Human Resources Human resources

Figure 22 above shows a screenshot of the Google excel of the Human Resources sheet. The complete form is available **in the Annex 6 and at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

PREVENTION <i>reduce or eliminate</i> it refers to actions and measures taken to reduce or eliminate the likelihood or effects of a disaster on CH assets; ordinary actions of CH asset maintenance taking into account risks possibilities.		PREPARADNESS <i>identify and assess</i> It refers to measures taken to prepare for and reduce the effects of disasters to be aware of risks and deploy staff and resources quickly once a crisis strikes		RESPONSE <i>contain, control and minimise the impacts</i> It refers to measures and actions taken to effectively and rapidly respond at crisis stage to contain its disruptive impact to provide early response		RECOVERY <i>take steps to minimise disruption and recovery times</i> It defines actions and measures taken in the post-disaster assessments and recovery planning for conservation and restoration purposes	
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CULTURAL HERITAGE ASSET ID							
Description of the CH asset, its components and its context							
Defining the CH asset	<ul style="list-style-type: none"> General description of the CH asset and its 		<ul style="list-style-type: none"> The condition of 				

RESOURCES							
Documentation, information, studies and data							
PREVENTION		PREPARADNESS		RESPONSE		RECOVERY	
Collecting Existing	<ul style="list-style-type: none"> Inventories 	Creating a corpus of	<ul style="list-style-type: none"> Digitisation of all 	Operationalizi		Collecting new	

EQUIPMENTS, TOOLS AND PROCEDURES							
Including monitoring procedures, risks assessment, facilities and tools							
PREVENTION		PREPARADNESS		RESPONSE		RECOVERY	
Monitoring for safeguarding maintenance	<ul style="list-style-type: none"> Ordinary condition of CH asset definition monitoring system sensors for CH asset monitoring records 	Reactive monitoring systems and safeguarding measures	<ul style="list-style-type: none"> Specify vulnerabilities through structural analyses Measures for Protection of 	Reactive crisis strategic safeguarding actions	<ul style="list-style-type: none"> videos and sensors recording provisional safeguard 	Extraordinary safeguarding interventions: Restoration, Conservation, Rehabilitation,	-Measure against imminent collapse of the structures (avoid modifying the site in an irreversible way)

HUMAN RESOURCES							
Stakeholders, staff, risk management managers and responsible, citizens and communities involved at different level in CH management and/or risk management							
PREVENTION		PREPARADNESS		RESPONSE		RECOVERY	
Stakeholders and relevant players analyses including its updates	<ul style="list-style-type: none"> Detailed analyses of all external (to CH assets governance) (ULIEGE) responsibilities Detailed internal (CH assets) identification of responsibilities 	<ul style="list-style-type: none"> Deploy stakeholders' connections 	<ul style="list-style-type: none"> Direct link to the area chain of orders internal (to CH asset) chain of orders among the staff The existing relevant institutions and the community within 				

Figure 23: Screenshot of the sheets of the Google excel of the CNH for DRM

The illustration above shows screenshots of the sheets of the Google excel CNH for DRM. The complete form is available **in the Annex 6 and at the link:**

<https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

6 Multi-layered Methodology prioritizations

This chapter represents the correlated uses of the interactive digital template. The methodology aims at integrating the key information in a template and link it to the available documentation in the aim of HA management in DRM perspective. On the other side, it also creates a framework for customizable uses in the framework of the SHELTER building knowledge. The template interactively provides several menus for the compilation of information and allows users to add more information and further identifications. Also as for collective characterisation of CNH assets, it allows to include community perspective towards CNH assets and their cultural significance among local communities. Furthermore, the template can be customized and prioritized to adapt to the diversity of OLs.

6.1 Attributes prioritization for the assessment of Historic Areas

The template provides **a methodology for including and organizing related useful information for assessing and enhancing CNH asset resilience in a system**. It creates a tool for customizable surveys that can provide CNH assets assessments at different levels by different stakeholders (e.g. for volunteers, NGO, institutions network).

This chapter is based on the literature review with a particular focus on the aspects related to preventive and post disaster heritage assessment. Among others, an important reference on the matter is the 2016 manual *ABC Method* [103] – *A risk management approach to the preservation of cultural heritage* co-published by the Canadian Conservation Institute and ICCROM. This manual offers a comprehensive understanding of risk management applied to the protection of CNH, whether collections, buildings or sites. It provides a step-by-step procedure and a variety of tools to guide the users (CNH professionals) in applying the *ABC method* to their own context. The *ABC method* can be applied to a range of situations, from the analysis of a single risk to a comprehensive risk assessment of the entire heritage asset. The approach proposed by the manual is based on a five-step risk management cycle (establish the context, identify risks, analyse risks, evaluate risks, treat risks) and, for each step, three or more tasks are identified. In addition, the 2016 *Guide to Risk Management of Cultural Heritage* [129] is an abridged version of the manual presenting the *ABC method*. It explains the *ABC method* using several images, basic examples and simple exercises. This document was designed to introduce the risk-based approach to decision-makers and to promote its use by heritage professionals and a younger generation of conservators.

Another important reference regarding preventive and post disaster heritage assessment is the document *Five Years of Conflict. The State of Cultural Heritage in the Ancient City of Aleppo* developed by UNESCO - the United Nations Institute for Training and Research (UNITAR) [130]. **Error! No se encuentra el origen de la referencia.** This document extends assessment criteria that is relevant to

the scope of D2.3. It is especially useful for a post-disaster preliminary evaluation of URBAN and NATURAL Macrocategories. For a further evaluation especially at the BUILDING Macrocategory scale, the *Rischio map* (section 4.5) is assumed to assess vulnerabilities of CNH assets by identifying its “geographical area” and “state of conservation of a CNH asset” and the outcome is presented below in *D. Response/Recovery further assessment*.

The Post Disaster Needs Assessment (PDNA) methodology is very capillary and requires a combination with other knowledge baseline of the SHELTER Project. The PDNA defines a pre-disaster baseline data about the culture sector (this includes collecting information on the type, number and condition of tangible and intangible CNH assets – including people – in the disaster-affected area, framing their historic and geographical setting) and a *Post Disaster Needs Assessment* (which is a need already addressed in D1.2) [130] It also defines a “baseline information sector” that identifies three groups information (It also provides an indicative list of potential sources).

A. Knowledge assessment

Capitalizing on this state of art, the proposed methodology for CNH_DRM provides attributes and procedure to enable a specific knowledge assessment **both in Pre-Disaster and in Post-Disaster phases**.

By referring to the Eurocode 8 for earthquake resistance, [132] the knowledge gaps assessment is identified with the following key **Knowledge gaps**:

- Lack of consistent and comparable data
- Little scientific understanding/measurement of significant attributes
- Few knowledge of critical vulnerability factors

Accordingly, key **Knowledge levels** assessment identifies:

KL1: Limited knowledge

KL2: Normal knowledge

KL3: Full knowledge

B. Prevention/Preparedness preliminary assessment

In the Prevention phase, the template enables a preliminary survey to highlight the CNH assets vulnerabilities.

The template identifies the categorization of CNH assets according to their scale, their exposure to main hazards, and their cultural and natural values. Moreover, it allows considering several factors including (as suggested by the UNESCO 2016 *Culture Urban Future: Global Report*) but not being limited to **location, built assets, economy, population, governance**.

Furthermore, information related to the material culture (such as materials, construction techniques, and changes), the state of conservation, historical information, and cultural and natural values together with intangible values allow identifying CNH vulnerability by highlighting some weaknesses. Information related to the location, geo-morphological, environmental and anthropic condition identify the exposures. It highlights some other detailed weaknesses (e.g. distance by trees). This CNH asset preliminary assessments identify elements and values to be estimated in case of future damages.

Based on the preliminary assessments, in the Preparedness phase improvements should be undertaken by identifying data and information, improving the state of conservation, providing preventive measures in the site.

For a finalized risk assessment, this survey should be combined with Resilience ID indicators (Deliverable 2.2), Data Lake Model (D1.4) and analysis provided by the visualization in the Historic Areas Resilience Dashboard (D5.4).

C. Response/Recovery assessment

The methodology enables a knowledge assessment of qualitative and quantitative information available about the damages. The template suggests criteria for collecting related documentation. For the damage assessment, finally, it also provides the following categorisations addressing the prioritisation by Macrocategory (site to building scale) and the survey level. According the UNITAR [130], categories for a preliminary CNH Loss Assessment are:

Critical Loss: Site destroyed. All or most of the visible key elements of the assessed site have collapsed (80–100 per cent of structure destroyed). All of the main historically valuable elements inside the cultural heritage site are destroyed.

Severe Loss: Site severely damaged. A significant part of the visible key elements of the site has collapsed or is partially damaged (40–80 per cent of structure damaged) or significant military or civilian activity has contributed to extensive damage at the site. Many of the main historically valuable elements of the cultural heritage site are severely damaged causing severe loss.

Moderate Loss: Site moderately damaged. Limited damage observed relating to key elements of the site (5–40 per cent of structure damaged) or where military or civilian activity has contributed to damage. Some of the main historically valuable structures inside the cultural heritage site are moderately damaged causing moderate loss

Minimal Loss: Site possibly damaged. Assessed site structures do not appear to be damaged, but debris is visible around key site structures. None of the main historically valuable elements of the cultural heritage site are damaged.

D. Response/Recovery further assessment

According to *Carta del Rischio*, categories for further Loss assessment are:

General Damage typologies considered in the *Risk Map* project are:

- Material disaggregation
- Humidity
- Biological Attacks
- Surface Layers Alteration
- Missing Parts

Each typology is then assessed through criteria of entity of the damage (codified scale from 1 to 3), extension of the damage (%), urgency of intervention (codified scale from 1 to 5) [100] **Error! No se encuentra el origen de la referencia..**

6.2 Combining CNH assets characterisation with the (Shortlist) Resilience Indicators

As mentioned above, the methodology provides a system for *Multiscale multisource data model* (D 1.4) in which CH Macrocategories are georeferenced with their defined attributes. For the prioritization of the defined attributes (presented in Chapter 4), indicators defined in D 2.2 [6] are used. Each attribute that corresponded to an indicator became prioritized for the purpose of creating a GIS database within the framework of Data Model. The tables presenting this correspondence is provided in the Appendices.

6.3 CNH assets characterisation taking in consideration International INSPIRE standard for multi scale data model design

INSPIRE data specifications, in addition to the indicators, also provide an important input for the prioritization of attributes and the creation of the GIS database to be included in the Data Model (Del 1.4). For this GIS database, CityGML have been selected (D1.4) and the INSPIRE data specifications facilitated the prioritization of attributes. The finalisation of the prioritization is presented in D1.4.



Figure 24: The approach to define correspondence of attributes to the INSPIRE data specifications



Figure 24 shows the process of prioritization according to INSPIRE data specifications. Each attribute that corresponds to INSPIRE specification become prioritized. D1.4 presents the full presentation.



Figure 25: The approach to define correspondence of attributes to the indicators.

Figure 25 shows the process of prioritization according to indicators. Each attribute that corresponds to an indicator become prioritized. Annex 5 delivers the full detailed list for all three macrocategories.

6.4 Macrocategorie Attributes finalisation

As mentioned above, a rigorous literature review and the input received from other SHELTER tasks as well as Shelter partners and OLs were defined the multi-layered methodology to categorise CH assets. The defined attributes for each category have been prioritized to meet the needs of the Shelter project. The finalisation of these attributes are presented in the table below.

Macro category	BUILDING	URBAN	NATURAL
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DEFINING THE CNH ASSET AND ITS SIGNIFICANCE

Defining the CNH asset and its significance	Denominations Current Formal Name Local Name Name in other languages Location Country City Geographic Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system) Height above sea level (m) GIS System Cadastral Data Photograph Site plan /map (Drawing or attachment)	Denomination Current Formal Name Local Name Name in other languages Location Country Region-state Geographic Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system) Height above sea level (m) GIS System Cadastral Data Photograph Site plan /map (Drawing or attachment)	Denominations Current Formal Name Local Name Name in other languages Location Country/Countries City Geographic Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system) Height above sea level (m) GIS System Cadastral Data Photograph Site plan /map (Drawing or attachment)
	Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary) Value categories for Integrity Value categories and Conservation Status for Authenticity Value categories and Conservation Status for Cultural Significance Other eventual value categories	Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary) Value categories for Integrity Value categories and Conservation Status for Authenticity Value categories and Conservation Status for Cultural Significance Other eventual value categories	Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary) Value categories for Integrity Value categories and Conservation Status for Authenticity Value categories and Conservation Status for Cultural Significance Other eventual value categories
	Knowledge Assessment Knowledge gap -Lack of consistent and comparable data (KL1: Limited	Knowledge Assessment Knowledge gap -Lack of consistent and comparable data (KL1: Limited	Knowledge Assessment Knowledge gap -Lack of consistent and comparable data (KL1: Limited

	<p>knowledge, KL2: Normal knowledge, KL3: Full knowledge) Knowledge gap -Few evaluations of critical vulnerability factors (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge) Final knowledge assessment evaluation (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)</p>	<p>knowledge, KL2: Normal knowledge, KL3: Full knowledge) Knowledge gap -Few evaluations of critical vulnerability factors (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge) Final knowledge assessment evaluation (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)</p>	<p>knowledge, KL2: Normal knowledge, KL3: Full knowledge) Knowledge gap -Few evaluations of critical vulnerability factors (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge) Final knowledge assessment evaluation (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)</p>
	<p>HA Type Macro/Single Site Mixed site (Yes/No) Building in Human settlement. Building in Natural Site, define.</p>	<p>HA Type Macro/Single Site Mixed site (Yes/No) Human settlement size</p> <ul style="list-style-type: none"> • Megapolis or mega-region, • Megacity, • Urban agglomeration or conurbation, • Metropolis, • Micropolis, • City, • Town, • Village or commune, • Hamlet/Isolated dwelling <p>Human Settlement in CNH Size. Define: Human Settlement in Protected Area. Define:</p>	<p>HA Type Macro/Single Site Mixed site (Yes/No) Protected Area type:</p> <ul style="list-style-type: none"> • Geoparks, • Strict Nature Reserve, • Wilderness Area, • National Park, • Natural Monument or Feature,Habitat/Species Management Area, • Protected Landscape/Seascape, • Protected area with sustainable use of natural resources, • Marine Protected Area, • World Heritage site, • Global Geopark, • Ramsar site, • Biosphere eserve, • Natura2000 site, • River Basin, • Green Infrastructure <p>Natural Area in Human Settlement. Define. Natural area in Building Plot. Define. (e.g. historic garden related to building).</p>
	<p>HA Characterization</p> <p>Single Building / Complex building</p>	<p>HA Characterization</p> <p>Degree of urbanisation:</p>	<p>HA Characterization</p> <p>Degree of Naturalness</p> <ul style="list-style-type: none"> • 0 Artificial system,

		<ul style="list-style-type: none"> • Very strongly urbanized, • Strongly urbanized, • Moderately urbanized, • Weakly urbanized, • Not urbanized 	<ul style="list-style-type: none"> • 1 Transformed system, • 2 Semi-transformed system, • 3 Highly intervened system, • 4 Cultural assisted system, • 5 Cultural self-maintained system, • 6 Semi-natural system, • 7 Quasi-natural system, • 8 Sub-natural system, • 9 Natural system, • 10 Natural virgin system
	SHELTER Scale Building District City Region Cross-regional	SHELTER Scale Building District City Region Cross-regional	SHELTER Scale Building District City Region Cross-regional
	Macrocategory Building Urban Natural/Territorial	Macrocategory Building Urban Natural/Territorial	Macrocategory Building Urban Natural/Territorial
	CNH Type Tangible Heritage (Immovable), Tangible Heritage (Movable/Object) Intangible Heritage	CNH Type Tangible Heritage (Immovable) Tangible Heritage (Movable/Object) Intangible Heritage	CNH Type Tangible Heritage (Immovable) Tangible Heritage (Movable/ Object) Intangible Heritage
	CNH Category (Glossary) Archaeological Heritage Architectural Heritage Habitation urbaine Historic Building Industrial and technical heritage Monuments	CNH Category (Glossary) (registered Heritage urban area as a whole) (world/ national /local) Archaeological site Architectural ensemble	CNH Category (Glossary) Agricultural Heritage Cultural Landscape Cultural Routes Define Geological monument Geopark Heritage Canal Historic Garden Historic Landscape

	<p>Vernacular architecture World Heritage</p>	<p>Groups of Buildings Historic Area Historic neighborhood Historic Town Historic village Historic Core/City Centre Historical urban landscapes (HUL) Military heritage and Fortifications Rock Art Scientific Heritage Urban Heritage Urban Archaeological areas World Heritage site</p>	<p>Natura 2000 site Natural Heritage Prehistoric site Protected area-Strict Nature Reserve Protected area-Wilderness Area Protected area-National Park Protected area-Natural Monument Protected area-Habitat/Species management area Protected Landscape/Seascape Protected Area with Sustainable Use of Natural Resources Protected area-Marine Protected Area Global Geopark Protected area-Ramsar site Protected area-Biosphere reserve Protected Area World Heritage site Sacred Natural Site Silence Area Underwater heritage</p>
	<p>Other CNH asset Type</p> <p>Aquarium building Architectonic painting Architectonic inscription Architectonic sculpture Archive (including sound, photographic and cinematographic archive) Building holding collection Cinema Collection Building relevant to local history and tradition (civic/educational/health/leisure/military/religious/etc.) Chapel Historic factory Historic farm Historic/designed holiday resort Historic rural construction Library Market building Memorial and traditional local monument</p>	<p>Other CNH asset Type</p> <p>Arsenal Canal front/ lagoon front/ riverfront/seafront/ Define Designed neighbourhood /district (architectural work): Social Housing/Working class/Garden city/Siedlungen etc. Designed square Industrial heritage district Historic Market Place Historic neighbourhood Historic settlement Historic square Historic street Memorial Site Military site with local relevance New urban elements to be considered. Define: Non-exceptional heritage elements but present in a coherent way with a relative abundance</p>	<p>Other CNH asset Type</p> <p>Canal/Lagoon/River/ Water Basin Cemetery Conventional urban park/with lawns/flowerbeds Designed Park/Garden (vegetal architecture) Embankment Garden as a part of historic building Green Infrastructure Green infrastructure into the built environment Holiday resort site (e.g. beach, etc) Hermitage Site Historic zoo Land Art Local park Memorial park Monumental tree Natural area that includes designed park/garden Natural route and path</p>

<p>Monastery Monumental sculpture Museum Refuges cultural property Rural architecture Sanctuary Theatre Thermal building Town hall Traditional local building or construction Underground architecture (bunker /cistern etc.)</p> <p>Other building of cultural natural significance. Define:</p>	<p>Open space: streets / public open spaces Street front (homogeneous/regular/with porticos) Thermal bath site Urban Art (e.g. artistic installation) Urban built form Urban infrastructure: material network and equipment (e.g. historic bridge, historic road) Urban layout Urban bunker</p> <p>Other site of cultural natural significance. Define:</p>	<p>Non protected Historic or traditional planting Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, road tracks, water and channel network) Pilgrimage Route Playground and sports field Planting (historic/traditional) Quayside Regional Park Scenic point Spiritual Site Street trees</p> <p>Other site of cultural natural significance. Define:</p>
<p>Classification/ registration status</p> <p>Listed in the UNESCO WHS (with Ref no and Link) Listed in IUCN Protected site (with Ref no and Link) Listed European Heritage site (with Ref no and Link) Listed National Heritage Site (with Ref no and Link) Local Heritage Site (with Ref no and Link) Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (with Ref no and Link)</p> <p>Other classification/registration. Detail:</p>	<p>Classification / registration status</p> <p>Listed in the UNESCO WHS (with Ref no and Link) Listed in IUCN Protected site (with Ref no and Link) Listed European Heritage site (with Ref no and Link) Listed National Heritage Site (with Ref no and Link) Local Heritage Site (with Ref no and Link) Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (with Ref no and Link)</p> <p>Other classification/registration. Detail:</p>	<p>Classification / registration status</p> <p>Listed in the UNESCO WHS (with Ref no and Link) Listed in IUCN Protected site (with Ref no and Link) Listed European Heritage site (with Ref no and Link) Listed National Heritage Site (with Ref no and Link) Local Heritage Site (with Ref no and Link) Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (with Ref no and Link)</p> <p>Other classification/registration. Detail:</p>
<p>Simple / Complex CNH asset</p>	<p>Simple / Complex CNH asset</p>	<p>Simple / Complex CNH asset</p>
<p>Movable Heritage in the CNH asset</p>	<p>Movable Heritage in the CNH asset</p>	<p>Movable Heritage in the CNH asset</p>

Detailed list of CNH components in the case of composite CNH classification	Detailed list of CNH components in the case of composite CNH classification	Detailed list of CNH components in the case of composite CNH classification
CNH asset hosting events, festivals, fairs, other	CNH asset hosting events, festivals, fairs, other	CNH asset hosting events, festivals, fairs, other
Overall identification and assessment of the HA in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	Overall identification and assessment of the HA in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	Overall identification and assessment of the HA in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)
Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)
BUILT Environment and archaeological sites Material and Techniques 300 words max Overall description of the historical Materials and Techniques of CNH asset in relation to its components. Link to Related Resources Main material of the structure Secondary material of the structure (if any)	URBAN Public facilities and services (if of historical/architectural interest type and number) (e.g. Bank Educational/Health/ /Institution /Leisure / Religious centres/ School Shopping mall Railway station Other. Define:	NATURAL/TERRITORIAL ways and techniques of cultivation Farming Fish farming Vineyard Other. Define Design and management works Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, road

<p>Primary structure construction technique (rubble masonry, sack masonry, load-bearing masonry, adobe, adobe and timber, reinforced concrete pillars, etc..)</p> <p>Horizontal structure material</p> <p>Roof material</p> <p>Canopy/shelter for archeological sites</p>		<p>tracks, water and channel networks)</p> <p>Terracing</p> <p>Retaining wall</p> <p>Drainage work</p> <p>Canal</p>
<p>BUILT environment and archaeological site' restauration and reinforcements</p> <p>Latest Intervention Date and Type Link to Related Ressources</p> <p>Reinforced-concrete slab: Roof (yes/no)</p> <p>Reinforced-concrete slab:vault (yes/no)</p> <p>Reinforced-concrete slab:horizontal structures (yes/no)</p> <p>Regeneration of walls with concrete injections (yes/no)</p> <p>Tie bars (yes/no)</p> <p>Concrete underpinning or plinth (yes/no)</p> <p>Prestressed cables - walls or other elements (yes/no)</p> <p>Micropile underpinning bracket (yes/no)</p> <p>Roof/floor edge beam (yes/no)</p> <p>Canopy/shelter for archeological sites</p>	<p>URBAN fabric type</p> <p>(from high to low)</p> <p>High Density Cluster (Urban Centre)</p> <p>Dense Urban Cluster</p> <p>Semi-Dense Urban Cluster (Town/Urban)</p> <p>Suburban Grid Cell (Suburban)</p> <p>Rural Cluster</p> <p>Low Density Rural Grid Cell</p> <p>Very Low Density Grid Cell</p>	<p>NATURAL/TERRITORIAL Techniques and Reinforcements and ways of traditional maintenance</p> <p>Reforestation works</p> <p>Maintenance forest works Reestablishment/restoration works System recovery</p>

	Historical Information	Historical Information	Historical Information
	Date of construction/Century	Date of construction/Century	Date of construction/Century
	Historical period	Historical period	Historical period
	Overall description of Territorial and Environmental transformations	Overall description of Territorial and Environmental transformations	Overall description of Territorial and Environmental transformations
	Timeline	Timeline	Timeline
	Architects/Engineer/Landscapers/Archaeologist/Artist	Architects/Engineer/Landscapers/Archaeologist/Artist	Architects/Engineer/Landscapers/Archaeologist/Artist
	Patronage	Patronage	Patronage
	Archaeological excavations (repeatable field)	Archaeological excavations (repeatable field)	Archaeological excavations (repeatable field)
	CNH Historical Name	CNH Historical Name	CNH Historical Name
	Name of historical territorial area	Name of historical territorial area	Name of historical territorial area
	Function and uses	Function and uses	Function and uses
	Current function	Current function	Current function
	Number of CNH asset staff	Number of CNH asset staff	Number of CNH asset staff
	Number of CNH asset	Number of CNH asset	Number of CNH asset
	Open to public (Y/N)	Open to public (Y/N)	Open to public (Y/N)
	Presence of inhabitants	Presence of inhabitants	Presence of inhabitants
	Touristic use and system of admittance and management	Touristic use and system of admittance and management	Touristic use and system of admittance and management
	Used by Local citizen	Used by Local citizen	Used by Local citizen
	Quantitative Data	Quantitative Data	Quantitative Data
	Dimensions	Current land cover	Built area surface
	Land cover	Demographics	Connectivity with other green areas
	Number of floors	Human Settlements size	Demographics
	Volume	Water surface	Green areas surface shaded area
		Land Use percentage	Farming surface
		Residential area	Road and rail surfaces
		Commercial area	Total Surface of Natural areas hectare
		Industrial area	
		Excavation area	
		Tourist-leisure area	

		Infrastructural Connectivity Urbanization degree (from high to low): <ul style="list-style-type: none"> • Very strongly urbanized • Strongly urbanized • Moderately urbanized • Weakly urbanized • Not urbanized 	Water surface
	Links with other CNH assets	Links with other CNH assets	Links with other CNH assets
	Inspection Information Inspector(s) Name Inspector(s)' institution/affiliation Inspection Date: Type of inspection <ul style="list-style-type: none"> • Assessment • Emergency • Rainy season inspection • Regular • Other. Define: Inspection management <ul style="list-style-type: none"> • Private • Public • Other. Define: Responsible. Define: Accessibility on inspection: <ul style="list-style-type: none"> • Day open access • Closed • Guarded • Other. Define: Weather condition on inspection <ul style="list-style-type: none"> • Raining • No raining • Other. Define: 	Inspection Information Inspector(s) Name Inspector(s)' institution/affiliation Inspection Date: Type of inspection <ul style="list-style-type: none"> • Assessment • Emergency • Rainy season inspection • Regular • Other. Define: Inspection management <ul style="list-style-type: none"> • Private • Public • Other. Define: Responsible. Define: Accessibility on inspection: <ul style="list-style-type: none"> • Day open access • Closed • Guarded • Other. Define: Weather condition on inspection <ul style="list-style-type: none"> • Raining • No raining • Other. Define: 	Inspection Information Inspector(s) Name Inspector(s)' institution/affiliation Inspection Date: Type of inspection <ul style="list-style-type: none"> • Assessment • Emergency • Rainy season inspection • Regular • Other. Define: Inspection management <ul style="list-style-type: none"> • Private • Public • Other. Define: Responsible. Define: Accessibility on inspection: <ul style="list-style-type: none"> • Day open access • Closed • Guarded • Other. Define: Weather condition on inspection <ul style="list-style-type: none"> • Raining • No raining • Other. Define:

DEFINING ITS RISKS

Defining the CNH asset and its significance	Hazard Type Earthquake Flood Heatwave Subsidence Storm Wildfire <ul style="list-style-type: none"> • Directly natural • Exacerbated by natural factors • Generated by human Other. Define	Hazard Type Earthquake Flood Heatwave Subsidence Storm Wildfire <ul style="list-style-type: none"> • Directly natural • Exacerbated by natural factors • Generated by human Other. Define	Hazard Type Earthquake Flood Heatwave Subsidence Storm Wildfire <ul style="list-style-type: none"> • Directly natural • Exacerbated by natural factors • Generated by human Other. Define
	Exposure Type Hazard characterization, Exposure to hazard Sensitivity (component of vulnerability) Capacity of response (component of vulnerability)	Exposure Type Hazard characterization, Exposure to hazard, Sensitivity (component of vulnerability), Capacity of response (component of vulnerability)	Exposure Type Hazard characterization Exposure to hazard Sensitivity (component of vulnerability) Capacity of response (component of vulnerability)
	RESILIENCE INDICATORS (according to SHLTER). Define:	RESILIENCE INDICATORS according to SHLTER) Define:	RESILIENCE INDICATORS according to SHLTER) Define:
	Monitoring Time Existing Monitoring Scheme	Monitoring Time Existing Monitoring Scheme	Monitoring Time Existing Monitoring Scheme

	Disaster Past Events	Disaster Past Events	Disaster Past Events
	<p>Frequency</p> <p>Intensity and scale</p> <ul style="list-style-type: none"> • Earthquake • Flood • Heatwave • Subsidence • Storm • Wildfire scale • Windstorm • Other. Define: <p>Hectares affected (burned/flooded, etc.)</p> <p>Loss of human life</p> <p>Period of the year</p>	<p>Frequency</p> <p>Intensity and scale</p> <ul style="list-style-type: none"> • Earthquake • Flood • Heatwave • Subsidence • Storm • Wildfire scale • Windstorm • Other. Define: <p>Hectares affected (burned/flooded, etc.)</p> <p>Loss of human life</p> <p>Period of the year</p>	<p>Frequency</p> <p>Intensity and scale</p> <ul style="list-style-type: none"> • Earthquake • Flood • Heatwave • Subsidence • Storm • Wildfire scale • Windstorm • Other. Define: <p>Hectares affected (burned/flooded, etc.)</p> <p>Loss of human life</p> <p>Period of the year</p>

DEFINING THE CNH ASSET IN ITS CONTEXT

Environmental Context

ENVIRONMENTAL CONTEXT	Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.	Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.	Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.
	Ecosystem Type Terrestrial - Urban, Terrestrial - Cropland, Terrestrial - Grassland, Terrestrial - Woodland and forest Terrestrial - Heathland and shrub Terrestrial - Sparsely vegetated land Terrestrial - Wetlands Fresh water - Rivers and lakes, Marine - Marine inlets and transitional waters Marine - Coastal Marine - Shelf Marine - Open ocean	Ecosystem Type Terrestrial - Urban, Terrestrial - Cropland, Terrestrial - Grassland, Terrestrial - Woodland and forest Terrestrial - Heathland and shrub Terrestrial - Sparsely vegetated land Terrestrial - Wetlands Fresh water - Rivers and lakes, Marine - Marine inlets and transitional waters Marine - Coastal Marine - Shelf Marine - Open ocean	Ecosystem Type Terrestrial - Urban, Terrestrial - Cropland, Terrestrial - Grassland, Terrestrial - Woodland and forest Terrestrial - Heathland and shrub Terrestrial - Sparsely vegetated land, Terrestrial - Wetlands, Fresh water - Rivers and lakes, Marine - Marine inlets and transitional waters Marine - Coastal Marine - Shelf Marine - Open ocean
	Meteorological and climatological features	Meteorological and climatological features	Meteorological and climatological features
	Ecosystem <ul style="list-style-type: none"> Natural semi-natural Ecosystem Services. Define:	Ecosystem <ul style="list-style-type: none"> Natural semi-natural Ecosystem Services. Define:	Ecosystem <ul style="list-style-type: none"> Natural semi-natural Ecosystem Services. Define:
	Drought and high temperatures events	Drought and high temperatures events	Drought and high temperatures events
	Storm wind	Storm wind	Storm wind

	Dry days number for year	Dry days number for year	Dry days number for year
	Rain days number for year	Rain days number for year	Rain days number for year
	Water quality: surface and groundwater	Water quality: surface and groundwater	Water quality: surface and groundwater
	Air quality	Air quality	Air quality
	Noise	Noise	Noise
	Soil degradation mechanism	Soil degradation mechanism	Soil degradation mechanism
	Air degradation mechanism	Air degradation mechanism	Air degradation mechanism
	Water degradation mechanism	Water degradation mechanism	Water degradation mechanism
	Inappropriate development	Inappropriate development	Inappropriate development
			Agricultural encroachment
			Deforestation works
			Illegal logging
			Invasive species
			Mining
			Oil spills
			Resource extraction damages
			Poaching
			Threats induced by armed conflict and war
			Threats induced by natural hazards. Define:

Geographical Context and Physical Asset

GEOGRAPHICAL CONTEXT AND PHYSICAL ASSET	Overall description of CNH asset surroundings including Immediate neighbourhood, village, district, natural asset	Overall description of CNH asset surroundings including Immediate neighbourhood, village, district, natural asset	Overall description of CNH asset surroundings including Immediate neighbourhood, village, district, natural asset
	Physical Infrastructures above ground and networks in the surroundings (e.g. dam) (Repeatable field): Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)	Physical Infrastructures above ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field): Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)	Physical Infrastructures above ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field): Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)
	Physical Infrastructures below ground and networks in the surroundings (e.g. tunnel) (Repeatable field): Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)	Physical Infrastructures below ground and networks in the surroundings (e.g. tunnel) (Repeatable field): Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)	Physical Infrastructures below ground and networks in the surroundings (e.g. tunnel) (Repeatable field): Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)

	Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)
	Energy-efficient facilities	Energy-efficient facilities	Energy-efficient facilities
	Water use efficiency at its facilities	Water use efficiency at its facilities	Water use efficiency at its facilities
	Topographical characterisation <ul style="list-style-type: none"> • Coastal • Interland • Island • Marshland • Mountain • Plateau • Riverside 	Topographical characterisation <ul style="list-style-type: none"> • Coastal • Interland • Island • Marshland • Mountain • Plateau • Riverside 	Topographical characterisation <ul style="list-style-type: none"> • Coastal • Interland • Island • Marshland • Mountain • Plateau • Riverside
	Site <ul style="list-style-type: none"> • Mountains overhead • Mountain underhead • Waterfront • Other. Define 	Site <ul style="list-style-type: none"> • Mountains overhead • Mountain underhead • Waterfront • Other. Define 	Site <ul style="list-style-type: none"> • Mountains overhead • Mountain underhead • Waterfront • Other. Define
	Distance from water basin Distance from overheading land	Distance from water basin Distance from overheading land	Distance from water basin Distance from overheading land
	Access to CNH asset	Access to CNH asset	Access to CNH asset
	Access to the surroundings -This should be linked to communication/transport network	Access to the surroundings -This should be linked to communication/transport network	Access to the surroundings -This should be linked to communication/transport network
	Disabled people accessibility (wheelchair)	Disabled people accessibility (wheelchair)	Disabled people accessibility (wheelchair)
	Disabled people accessibility (visually)	Disabled people accessibility (visually)	Disabled people accessibility (visually)

	Disabled people accessibility (hearing impaired)	Disabled people accessibility (hearing impaired)	Disabled people accessibility (hearing impaired)
	Direct public transportation services	Direct public transportation services	Direct public transportation services
	Isolated area (Yes/not)	Isolated area (Yes/not)	Isolated area (Yes/not)
	Natural barriers (in the surroundings)	Natural barriers (in the surroundings)	Natural barriers (in the surroundings)
	Geo-Morphology characterization (Soil configuration and slope)	Geo-Morphology characterization (Soil configuration and slope)	Geo-Morphology characterization (Soil configuration and slope)
	CNH asset Boundaries (legal boundaries as i.e. property of land)	CNH asset Boundaries (legal boundaries as i.e. property of land)	CNH asset Boundaries (legal boundaries as i.e. property of land)
	CNH asset Buffer zone	CNH asset Buffer zone	CNH asset Buffer zone
	Hydrological classification information	Hydrological classification information	Hydrological classification information
	Geology classification	Geology classification	Geology classification
	Soil type	Soil type	Soil type
	Soil Degradation mechanism	Soil Degradation mechanism	Soil Degradation mechanism
	Distance of tree from building and tree species		Park with gateways
			Presence of orientation signs
			Presence of a range of languages in signs
			Presence of crossed by public roads
			Presence of well-mapped and clearly marked pathways
			Random path-making policy
			Presence of hiking paths
			Presence of bicycle routes
			Presence of walking trails

			Presence of picnic ground areas
			Presence of campgrounds areas
			Surroundings communities
			Biodiversity in the HA Select below <ul style="list-style-type: none"> • Main variety identification • Vegetation types Native of the area • Other Vegetation type • average of species types • Rare species • century-old trees • fire-adapted and fire-dependent vegetation • Trunk diameter of the top five most common species • Animals species type with huge numbers • Animals species with low numbers • Rare species • Presence of Erosion areas • ancient wooded area

Local and Traditional Knowledge

LOCAL AND TRADITIONAL KNOWLEDGE	Hazards local knowledge	Hazards local knowledge	Hazards local knowledge
	Construction techniques and materials traditional knowledge	Construction techniques and materials traditional knowledge	Construction techniques and materials traditional knowledge
	Resilient behaviours	Resilient behaviours	Resilient behaviours
	vernacular architecture and local traditions	vernacular architecture and local traditions	vernacular architecture and local traditions
	Cultural significance	Cultural significance	Cultural significance
	Multicultural belongings and collective memories	Multicultural belongings and collective memories	Multicultural belongings and collective memories
	Sense of Place	Sense of Place	Sense of Place

Cultural, Historical, Anthropological And Social Context /Intangible Heritage

CULTURAL, HISTORICAL, ANTHROPOLOGICAL AND SOCIAL CONTEXT /INTANGIBLE HERITAGE	Cultural significance to community and social resilience	Cultural significance to community and social resilience	Cultural significance to community and social resilience
	Overall Description Historical readings	Overall Description Historical readings	Overall Description Historical readings
	Main Historical references	Main Historical references	Main Historical references
	Linked Collective Memories and Traditions	Linked Collective Memories and Traditions	Linked Collective Memories and Traditions
	Intangible values	Intangible values	Intangible values
	Ethnic traditions	Ethnic traditions	Ethnic traditions
	Ethnographic information	Ethnographic information	Ethnographic information
	Architectonic Heritage	Industrial Heritage	Natural Heritage
		Urban Heritage	Landscape Perception

Governance

GOVERNANCE	Property Ownership (if applicable)	Property Ownership (if applicable)	Property Ownership (if applicable)
	Governance system	Governance system	Governance system
	Authorities. Define	Authorities. Define	Authorities. Define
	Management <ul style="list-style-type: none"> • Including Private • Private • Public 	Management <ul style="list-style-type: none"> • Including Private • Private • Public 	Management <ul style="list-style-type: none"> • Including Private • Private • Public
	Open to public: (Y/N)	Open to public: (Y/N)	Open to public: (Y/N)
	Governance Type <ul style="list-style-type: none"> • Hierarchical governance, • Participatory or collaborative governance, • Networking and/or multi-level governance, • Community led governance 	Governance Type <ul style="list-style-type: none"> • Hierarchical governance, • Participatory or collaborative governance, • Networking and/or multi-level governance, • Community led governance 	Governance Type <ul style="list-style-type: none"> • Hierarchical governance, • Participatory or collaborative governance, • Networking and/or multi-level governance, • Community led governance
		Design/Plan for future urban growth	Public agencies
		Regional policies	Wildlife Service
		Urban planning rules	Responsible for fire prevention and control
		Urban conservation plans	Municipal Council involvement
		Rehabilitation rules	National and regional governmental agencies
			NGOs
			Community Groups
			Local associations
			A watershed organization composed of representatives of stakeholders
			Organizations
			Control policies

Anthropic and Economic Context

ANTHROPIC AND ECONOMIC CONTEXT	CNH asset revenues	CNH asset revenues	CNH asset revenues
	CNH asset insurance costs	CNH asset insurance costs	CNH asset insurance costs
	Provide a description of CNH asset in its HA in term of economic situation	Provide a description of CNH asset in its HA in term of economic situation	Provide a description of CNH asset in its HA in term of economic situation
	GDP in the region	GDP in the region	GDP in the region
	CNH economic relevance in the region	CNH economic relevance in the region	CNH economic relevance in the region
	Tourism revenues	Tourism revenues	Tourism revenues
	Main economic sector in the region	Main economic sector in the region	Main economic sector in the region
	Main revenues type in the region	Main revenues type in the region	Main revenues type in the region
	CNH asset approximately yearly investment costs	CNH asset approximately yearly investment costs	CNH asset approximately yearly investment costs

Policies and Planning Context

POLICIES AND PLANNING CONTEXT	Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc	Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc	Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc
	Pre-disaster Recovery planning	Pre-disaster Recovery planning	Pre-Disaster Recovery planning

Links to Other CNH Catalogues and Inventories and Interoperability

LINKS TO OTHER CNH CATALOGUES	Existing National catalogues information. Indicate language and if the translation is available and Link	Existing National catalogues information. Indicate language and if the translation is available and Link	Existing National catalogues information. Indicate language and if the translation is available and Link
	Building inventory: Detailed historical survey	Local Inventories: for Conservation areas	Existing Inventories: Vegetarian species inventory

Table 9: Finalisation of attributes of Building, Urban, Natural Macrocategories

7 Conclusions

By providing the methodology for anatomizing HA in OLS and building the CNH assets categorisation for the HA, this report contributes to the SHELTER Project theoretical and practical methodological framework. It provides a methodological conceptual and practical approach and tools for the CNH assets characterisation and assessment of their resilience and vulnerability at different spatial scales and heritage types.

Building on an intense review of the state of the art of CNH assets identification and DRR and assessment, it contributes to a better identification and definition of the concept of HA and the specification of DRM for CH assets by the conceptualisation of CNH assets characterisation in a Risk Informed Thinking. By enhancing the approach to face risks in HA, it also integrates the approach for CNH diversity and richness safeguard and conservation. The report also fosters the holistic understanding of ecosystems through an integrated vision of cultural and natural values for CNH characterisation. It provides a contribution by shaping a strict but flexible methodological approach that is verified with international standards. The methodology can adapt and deal with the wide range of CNH categories and with the different HA scales and features, from a building to a site, from a small area to a territorial scale. It makes available this methodology as a customizable tool for the prioritization in the SHELTER HA pilots for their specificities in exploring and assessing heritage-led resilience against natural disasters. To properly articulate and identify the huge variety of CNH assets, it provides a scientific knowledge baseline and delivers a Glossary.

More specifically, the present report provides a methodology for characterising the CNH assets in the DRM model that complement the approach shaped by Sendai framework by considering and addressing specifically CH and HA specifications. In the context of the Sendai framework recommendations, it identifies and provides a new systemic vision to address the huge variety of CNH assets.

The methodology provided integrates a holistic approach to cultural and natural heritage assets and the governance and the local and traditional knowledge with those factors that contribute to the understanding of risks and resilience CH characterisation. Finally, it delivers a theoretical and practical specification of DRM model for the requirements of CH assets. Moreover, it also provides an interactive digital template for the exemplification of a possible procedure that combines CNH assets requirements with the DRM phases of the Prevention, Preparedness, Response and Recovery. For this purpose, it delivers a template to be customised and validated by the SHELTER OLS. While the Sendai framework has provided directions for the implementation, this report identifies some conceptual crux and some critical contribution for a further development of the BBB approach.

Furthermore, it contributes to verifying the CNH assets characterisation with the INSPIRE standard for data model design. Beyond other previous developments that focused on the building scale, such as the Rescue Project, the report identifies the attributes agreement at different scales till the CNH assets at territorial scale. Moreover, the report also contributes to create a merge by providing key elements for confronting and

combining other developments of SHELTER project. In this aim, it delivers tables for crosscutting combinations with Resilience Shortlist Indicators and the INSPIRE standard.

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9 Appendices

9.1 Annex 1: CNH Glossary

Agricultural Heritage: In 2002, during the World Summit on Sustainable Development in Johannesburg, a Global Partnership Initiative was launched for the conservation and adaptive management of 'Globally Important Agricultural Heritage Systems'. According to this initiative, agricultural heritage systems are outstanding landscapes of aesthetic beauty that combine agricultural biodiversity, resilient ecosystems and a valuable cultural heritage and agricultural systems constitute the foundation for contemporary and future agricultural innovations and technologies. Located in specific sites around the world, they sustainably provide multiple goods and services, food and livelihood security for millions of small-scale farmers [133].

Archaeological Heritage: As outlined in the Valetta Convention [134], archaeological heritage includes all remains and objects and any other traces of mankind from past epochs, the preservation and study of which helps to retrace the history of mankind and

its relation with the natural environment. Excavations or discoveries and other methods of research into mankind and the related environment for archaeological heritage are the main sources of information. The archaeological heritage shall include structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water. According to the European Charter of the Architectural Heritage, the **European architectural heritage** consists not only of our most important monuments: it also includes the groups of lesser buildings in our old towns and characteristic villages in their natural or manmade settings [135].

Archaeological sites: According to the 1990 ICOMOS Charter for the Protection and Management of the Archaeological Heritage, "archaeological heritage" is that part of the material heritage in respect of which archaeological methods provide primary information. It comprises all vestiges of human existence and consists of places relating to all manifestations of human activity, abandoned structures, and remains of all kinds (including subterranean and underwater sites), together with all the portable cultural material associated with them [135].

Architectural ensembles: According to ICOMOS Open Archive, *Architectural ensembles* are among the 'heritage typologies'. [12]

Architectural Heritage: Definition of the architectural heritage is provided the Article 1 of the Granada Convention [135]. Accordingly, the expression "architectural heritage" shall be considered to comprise the following permanent properties: 1. monuments: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings; 2. groups of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest which are sufficiently coherent to form topographically definable units; 3. sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogeneous to be topographically definable and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest.

Archaeological sites: Definition of the architectural heritage is provided the Article 1 of the Granada Convention. Accordingly, the expression "architectural heritage" shall be considered to comprise the following permanent properties: 1. monuments: all buildings and structures of conspicuous historical, archaeological, artistic, scientific, social or technical interest, including their fixtures and fittings; 2. groups of buildings: homogeneous groups of urban or rural buildings conspicuous for their historical, archaeological, artistic, scientific, social or technical interest which are sufficiently coherent to form topographically definable units; 3. sites: the combined works of man and nature, being areas which are partially built upon and sufficiently distinctive and homogeneous to be topographically definable and are of conspicuous historical, archaeological, artistic, scientific, social or technical interest [135].

Architectonic inscription: Architectonic inscriptions are words, texts, lettering, or symbols marked on a work, including texts, legends, documentation notes, or commemoration [135].

Archives: Institutions that store, maintain, and care for non-active public records or other important historical documents that are arranged as an organized body. The documents in an archive were received or originated in connection with the activities of an organization, institution or individual, and are preserved because of their continuing value.

Authenticity: According to The Operational Guidelines for the Implementation of the World Heritage Convention, depending on the type of cultural heritage, and its cultural context, properties may be understood to meet the conditions of authenticity if their cultural values (as recognized in the nomination criteria proposed) are truthfully and credibly expressed through a variety of attributes including: form and design; materials and substance; use and function; traditions, techniques and management systems; location and setting; language, and other forms of intangible heritage; spirit and feeling; and other internal and external factors. According to Guidance on heritage impact assessments for Cultural World Heritage Properties, authenticity relates to the way attributes convey OUV and integrity relates to whether all the attributes that convey OUV are extant within the property and not eroded or under threat.

City: City is a large, relatively dense settlement of heterogeneous people, with a large population and many services. It is relatively permanent and highly organized center of population, of greater size or importance than a town or village. The concept of city refers to the urban community, and its culture, known as “urbanism.” The name city may be given to certain urban communities by virtue of some legal or conventional distinction that can vary between regions or nations. In some classifications, the population of a city may be between 100,000 and 300,000 people, while a term “large city” is used when city has population less than one million people but over 300,000 people [139].

Collections (movable): According to *UNESCO Recommendation Concerning the Protection and Promotion of Museums and Collections, Their Diversity and Their Role in Society* [140], the term collection is defined as “an assemblage of natural and cultural properties, tangible and intangible, past and present”. The recommendation also highlights that the protection and promotion of cultural and natural diversity are major challenges of the twenty-first century. In this respect, museums and collections constitute primary means by which tangible and intangible testimonies of nature and human cultures are safeguarded.

Conurbation: Conurbation is a term coined by Patrick Geddes to describe towns and cities uniting into vast city-regions. It is a built-up area created through the coalescence of two or more once-separate urban settlements through development along the main inter-urban routes. [139].

Cultural landscape: In the UNESCO Expert Group Meeting on Cultural Landscapes in 1992, it was decided that 'cultural landscapes' fall under the definition of 'cultural heritage' made by Convention Concerning the Protection of the World Cultural and Natural Heritage [16] because the Article 1 states that 'the combined works of nature and man' should be considered as cultural heritage. The term "cultural landscape" embraces a diversity of manifestations of the interaction between humankind and its natural environment. Cultural landscapes often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to nature. They are illustrative of the evolution of human society and settlement over time, under the influence of the physical constraints and/or opportunities presented by their natural environment and of successive social, economic and cultural forces, both external and internal [34].

Also in the European Landscape Convention (2000) it is stated that the landscape has an important public interest role in the cultural, ecological, environmental and social fields, and constitutes a resource favourable to economic activity and whose protection, management and planning can contribute to job creation [36].

Cultural routes: According to the International Committee on Cultural Routes of ICOMOS (CIIC-ICOMOS), a cultural route is a land, water, mixed or other type of route, which is physically determined and characterized by having its own specific and historic dynamics and functionality; showing interactive movements of people as well as multi-dimensional, continuous and reciprocal exchanges of goods, ideas, knowledge and values within or between countries and regions over significant periods of time; and thereby generating a cross-fertilization of the cultures in space and time, which is reflected both in its tangible and intangible heritage [141].

In addition, the CoE has launched the Cultural Routes in 1987. According to CoE, the Cultural Routes demonstrate, by means of a journey through space and time, how the heritage of the different countries and cultures of Europe contributes to a shared and living cultural heritage [141].

Cultural significance: Cultural significance means aesthetic, historic, scientific, social or spiritual value for past, present or future generations. Cultural significance is embodied in the place itself, its fabric, setting, use, associations, meanings, records, related places and related objects. Places may have a range of values for different individuals or groups [142].

Ecosystem: According to the UN's CBD, an ecosystem is a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Geological Monument: Geological Monument can be found as a component of Geodiversity. Geodiversity terminology includes geoheritage which is defined as "components of natural geodiversity of significant value to humans, including scientific research, education, aesthetics and inspiration, cultural development, and a sense of

place experienced by communities” and Earth Heritage which is defined as “the inheritance of rocks, soils and landforms (active and relict) and the evidence they contain that enables the history of the Earth to be unravelled” [157].

Geological interest is one of the major criteria for inscription on the World Heritage List. The Man and the Biosphere (MAB) Program is a particularly important compliment to the World Heritage List in that it recognizes representative sites. A similar official UNESCO designation does not yet exist for geological sites although the ‘Geoparks’ concept has been developed to fit this role. UNESCO currently supports the use of the concept to recognize representative sites.

Geopark: According to European Geoparks Network, “a European Geopark is a territory, which includes a particular geological heritage and a sustainable territorial development strategy supported by a European program to promote development. It must have clearly defined boundaries and sufficient surface area for true territorial economic development.” [143]

Global Geopark: Global Geoparks are designated by UNESCO and they are single, unified geographical areas where sites and landscapes of international geological significance are managed with a holistic concept of protection, education and sustainable development. A UNESCO Global Geopark uses its geological heritage, in connection with all other aspects of the area’s natural and cultural heritage, to enhance awareness and understanding of key issues facing society, such as using our earth’s resources sustainably, mitigating the effects of climate change and reducing natural disasters-related risks.

Group of buildings: The 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, in its Art. 1, defines groups of buildings as “groups of separate or connected buildings which, because of their architecture, their homogeneity or their place in the landscape, are of outstanding universal value from the point of view of history, art or science” [16]

Group of urban buildings: The World Heritage Committee has adopted guidelines concerning the inclusion of groups of urban buildings in the World Heritage List. Paragraph 27 of the Operational Guidelines refers to groups of urban buildings as falling into three main categories - the towns which are no longer inhabited but provide unchanged archaeological evidence of the past, historic towns which are still inhabited (inhabited historic towns) and new towns of the twentieth century

Habitat: According to the UN’s CBD, a habitat is the place or type of site where an organism or population naturally occurs.

Habitat/Species Management Area: IUCN defines ‘Habitat/Species Management Area’ as protected areas aim to protect particular species or habitats and management reflects this priority.

Hamlet/Isolated dwelling in Geopark: A A settlement smaller than a village. In different jurisdictions and geographies, hamlets may have different sizes and be considered a smaller settlement or subdivision of a larger, or be treated as a satellite entity to a larger settlement. [139]

Heritage canals: In the report on the Expert Meeting on Heritage Canals [139] that took place in September 1994 in Ontario, Canada, a canal is a human-engineered waterway. It may be of outstanding universal value from the point of view of history or technology, either intrinsically or as an exceptional example representative of this category of cultural property. The canal may be a monumental work, the defining feature of a linear cultural landscape, or an integral component of a complex cultural landscape. The significance of canals can be examined under technological, economic, social, and landscape factors.

Historic area: According to the 1976 UNESCO Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas, "Historic and architectural (including vernacular) areas" shall be taken to mean any groups of buildings, structures and open spaces including archaeological and palaeontological sites, constituting human settlements in an urban or rural environment, the cohesion and value of which, from the archaeological, architectural, prehistoric, historic, aesthetic or sociocultural point of view are recognized. Among these "areas", which are very varied in nature, it is possible to distinguish the following in particular: prehistoric sites, historic towns, old urban quarters, village and hamlets as well as homogeneous monumental groups, it being understood that the latter should as a rule be carefully preserved unchanged. A management approach is framed also in the Recommendation on HUL.

Historic buildings: Even though 'historic buildings' are listed in the heritage categories of UNESCO, there is no official definition regarding the term. However, the word 'historic' does not necessarily address a time limit (age limit) for the recognition of the structure as 'cultural heritage', rather it refers to the inclusion of the structure in the local/national/international listings. Even though different countries define a certain age limit for historic structures, the age of the building is not the only criterion for the inclusion in the listing. In the 1976 UNESCO Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas [30], it is stated that Historic and architectural (including vernacular) areas" shall be taken to mean any groups of buildings, structures and open spaces including archaeological and palaeontological sites, constituting human settlements in an urban or rural environment, the cohesion and value of which, from the archaeological, architectural, prehistoric, historic, aesthetic or sociocultural point of view are recognized. Among these "areas", which are very varied in nature, it is possible to distinguish the following in particular: prehistoric sites, historic towns, old urban quarters, villages and hamlets as well as homogeneous monumental groups, it being understood that the latter should as a rule be carefully preserved unchanged.

Historic farm: Historic farm buildings are an integral part of the agricultural landscape and an important cultural and economic resource. Some continue to play a part in agricultural production and, increasingly, they have a role in farm diversification as places to live and work. However, they are also a threatened resource. Many have been poorly converted, to the detriment of their historic character and interest. Many more are no longer appropriate for their original purpose and, within the context of a changing rural economy, are becoming redundant and vulnerable to neglect and subsequent demolition. [145]

Historic garden: According to the 1981 Florence Charter [146], a historic garden is an architectural and horticultural composition of interest to the public from the historical or artistic point of view. As such, it is to be considered as a monument. The historic garden is an architectural composition whose constituents are primarily vegetal and therefore living, which means that they are perishable and renewable. Thus, its appearance reflects the perpetual balance between the cycle of the seasons, the growth and decay of nature and the desire of the artist and craftsman to keep it permanently unchanged. The Florence Charter also refers to the Venice Charter and states that the care for monuments in the Venice Charter should be presented for historic gardens as well.

Historic Landscape: Again in the Florence Charter, it is stated that a historic site is a specific landscape associated with a memorable act, as, for example, a major historic event; a well-known myth; an epic combat; or the subject of a famous picture.

Historic towns and villages: According to the Valletta Principles [147], historic towns and urban areas are made up of tangible and intangible elements. The tangible elements include, in addition to the urban structure, architectural elements, the landscapes within and around the town, archaeological remains, panoramas, skylines, view-lines and landmark sites. Intangible elements include activities, symbolic and historic functions, cultural practices, traditions, memories, and cultural references that constitute the substance of their historic value. ICOMOS has the specific sub-committee the International Committee on Historic Towns and Villages (CIVVIH) [148] regarding historic towns and villages.

Historic rural constructions: According to ICOMOS-IFLA Principles Concerning Rural Landscapes As Heritage, rural landscapes as heritage refers to “the tangible and intangible heritage of rural areas. Rural landscape as heritage encompasses physical attributes – the productive land itself, morphology, water, infrastructure, vegetation, settlements, rural buildings and centers, vernacular architecture, transport, and trade networks, etc. – as well as wider physical, cultural, and environmental linkages and settings”[158].

Historic town centres: According to the 1987 ICOMOS Charter For The Conservation Of Historic Towns And Urban Areas, also known as the Washington Charter, historic urban areas, large and small, including cities, towns and historic centres or quarters, together with their natural and man-made environments. Beyond their role as historical documents, these areas embody the values of traditional urban cultures. Today many

such areas are being threatened, physically degraded, damaged or even destroyed, by the impact of the urban development that follows industrialisation in societies everywhere.

Historic Urban Landscape: The definition of 'Historic Urban Landscape' is outlined in the Recommendation on the Historic Urban Landscape as "the urban area understood as the result of a historic layering of cultural and natural values and attributes, extending beyond the notion of "historic centre" or "ensemble" to include the broader urban context and its geographical setting." and it is stated that this definition "provides the basis for a comprehensive and integrated approach for the identification, assessment, conservation and management of historic urban landscapes within an overall sustainable development framework" [3].

Human settlements: The characteristics that define human settlements have been variously listed. The categories finalized to a climatic analysis, could be useful in the context of HA identification for natural hazard characterisation. Živković has listed them as: site, location, size, function, form, and structure. [139] **Site** refers to the exact location of where a settlement first started. **Situation** refers to the location of a settlement in relation to the surrounding area. **Size** refers to the number of people living in a settlement or it can refer to the area that settlement occupies. **Function** of the settlement describes all the main activities that occur in it. These can be grouped into a number of headings, such as residential, recreational, retail, government, entertainment, and industrial. **Form** refers to physical characteristics that make up built-up areas, including the shape, size, density, and configuration of settlements. **Structure** describes the spatial arrangement and configuration of elements of streets, blocks, and buildings.

By size, human settlements are **Megapolis** or mega-region: a large urban region that is highly connected and counts more than ten million people. **Megacity:** an urban agglomeration of 10 million people or more. **Urban agglomeration or conurbation:** a central city with neighbouring cities linked to it. **Metropolis:** an important city and the densely populated surrounding areas that are socially and economically integrated with it. **Micropolis:** a growing smaller city. **City:** a large populated urban agglomeration. **Town:** a compactly settled area. **Village or commune:** a rural community a borgo (Italian), **Hamlet:** a small settlement, **Isolated dwelling:** 1 or 2 buildings.

Indicator of the state of conservation: The indicator of the State of Conservation is used to express the level of conservation of heritage assets. It is determined by three key performance indicators are significance, integrity and authenticity [3].

According to the Glossary of World Heritage Terms, the State of conservation reports for natural and cultural properties included in the World Heritage List and the List of World Heritage in Danger are examined by the World Heritage Committee and its Bureau. State of Conservation reports are by the advisory bodies IUCN and ICOMOS, the World Heritage Centre and States as part of the system of monitoring of World Heritage properties.

Industrial and technical heritage: According to the ICOMOS International Committee for the Conservation of the Industrial Heritage (TICCIH) [150], Industrial heritage consists of the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to industry such as housing, religious worship or education.

Intangible Cultural Heritage: Intangible Cultural Heritage includes traditions or living expressions inherited from our ancestors and passed on to our descendants, such as oral traditions, performing arts, social practices, rituals, festive events, knowledge and practices concerning nature and the universe or the knowledge and skills to produce traditional crafts [151]. The importance of intangible cultural heritage is not the cultural manifestation itself but rather the wealth of knowledge and skills that is transmitted through it from one generation to the next.

Integrity: According to The Operational Guidelines for the Implementation of the World Heritage Convention, Integrity is a measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes. By considering the range of cultural heritage asset categories, more specifically they refer to: "Building, architectural or technological ensemble or landscape properties; traditional human settlement; the physical fabric of the property and/or its significant features should be in good condition, and the impact of deterioration processes controlled. A significant proportion of the elements necessary to convey the totality of the value conveyed by the property should be included. Relationships and dynamic functions present in cultural landscapes, historic towns or other living properties essential to their distinctive character should also be maintained; bio-physical processes and landform features, Biological diversity and cultural diversity."

Megapolis or mega-region: A group of conurbations, consisting of more than ten million people each. It is generally understood as a specific settlement type that has been consolidated across the "Third World" or the "global South" under conditions of rapid urbanization, hyper-congestion, and resource scarcity.

Memorial: Structures built to preserve the memory of beings or events. For other objects created, issued, or worn to commemorate persons or events, use "commemoratives."

Metropolis (or Metropolitan area): A large major city together with its suburbs and nearby cities, towns, and environs over which the major city exercises a commanding economic and social influence. Sometimes there may be two or more linked cities (Tokyo – Yokohama Metropolitan Area in Japan) or an agglomeration of metropolitan boroughs (Greater London, England). The population is usually one to three million.

Military Heritage and Fortification: According to the Charter on Fortifications and Military Heritage; Guidelines for Protection, Conservation and Interpretation by ICOFORT (the ICOMOS International Scientific Committee on Fortifications and Military Heritage, which was established by ICOMOS in 2005), military heritage and fortifications comprise of any structure built with either natural (i.e. botanical or geological) or artificial materials, by a human community to protect themselves from assailant, such as: works of military engineering, arsenals, harbors and naval battlefields, barracks, military bases, testing fields, and other enclaves and constructions built or used for military, offensive and defensive purposes. Military cultural landscapes include but not limited to battlefields, territorial or coastal defense installations and earth works and have values similar to other heritage buildings and sites, but also possess unique values that need to be carefully studied, analyzed and preserved.

Monuments: The 1972 UNESCO Convention Concerning the protection of the World Cultural and Natural Heritage, in its Art. 1, defines monuments as "architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings and combinations of features, which are of outstanding universal value from the point of view of history, art or science."

Monumental Sculpture: Sculptures of very large size, usually but not always sculpture in the round, often but not always outdoors. For large sculptures of figures of extraordinary size, use "colossi."

Natural2000 site: Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. It stretches across all 27 EU countries, both on land and at sea.

Natural Heritage: According to the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, the following shall be considered as "natural heritage":[16] **natural features** consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; **geological and physiographical formations** and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science or conservation; **natural sites** or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty

National Park: IUCN defines 'National Park' as large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.

Natural Monument or Feature: IUCN defines 'Natural Monument or Feature' as areas that protect a specific natural monument, which can be a landform, sea mount,

submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove.

Natural Site: According to the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage, [16] **natural sites** are precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

New urban elements to be considered: According to the Research report no. 16, SUI: Sustainable Development of Urban Historical Areas through an Active Integration within Towns, one of three elements that constitute urban heritage is New urban elements to be considered. Examples of these new urban elements are:

- o The urban built form;
- o The open space: streets, public open spaces;
- o Urban infrastructures: material networks and equipments.

The same classification is referred also in the Recommendation on the Historic Urban Landscape.

Non-exceptional heritage elements but present in a coherent way with a relative abundance: According to the Research report no. 16, SUI: Sustainable Development of Urban Historical Areas through an Active Integration within Towns, one of three elements that constitute urban heritage is Non-exceptional heritage elements but present in a coherent way with a relative abundance. The same classification is referred also in the Recommendation on the Historic Urban Landscape.

Prehistoric Sites: According to ICOMOS Open Archive, *Prehistoric Sites* are among the 'heritage typologies'. [12]

Protected area: International Union for Conservation of Nature (IUCN) defines protected area as "a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values" [16].

Protected area with sustainable use of natural resources: IUCN defines 'Protected area with sustainable use of natural resources' as protected areas that conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems.

Protected Landscape/ Seascape: IUCN defines 'Protected Landscape/ Seascape' as protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value: and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.

Rock Art: According to ICOMOS Open Archive, *Rock Art* are among the 'heritage typologies'. [12]

Sacred Natural Site: Sacred natural sites include areas recognized as sacred by indigenous and traditional peoples and areas recognized by religions or faiths as places for worship and remembrance. They are the world's oldest conservation areas and contain high levels of biological and cultural diversity and often included in ICCAs. They protect a wide variety of habitats, guard traditional customs, practices and knowledge related to biodiversity conservation and promote mutual respect between people and nature [159].

Scientific heritage: According to ICOMOS Open Archive, *Scientific heritage* are among the 'heritage typologies'. [12]

Setting: The setting of a heritage structure, site or area is defined as the immediate and extended environment that is part of, or contributes to, its significance and distinctive character.

Significant personalities (heritage related to-): According to ICOMOS Open Archive, *Significant personalities (heritage related to-)* are among the 'heritage typologies'. [12]

Silent Area: A silent area is an area where the noise nuisance should be so low that the sounds that occur there naturally are hardly disturbed, if at all (stand still principle).

Sites: The 1972 UNESCO Convention Concerning the protection of the World Cultural and Natural Heritage, in its Art. 1, defines sites as works of man or the combined works of nature and man, and areas including archaeological sites which are of outstanding universal value from the historical, aesthetic, ethnological or anthropological point of view.

Strict Nature Reserve: IUCN defines 'Strict Nature Reserve' as a category of protected area "areas set aside to protect biodiversity and also possibly geological/geomorphical features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values."

Underwater Cultural Heritage: As outlined in the Records of the 2001 UNESCO General Conference [152], "underwater cultural heritage" means all traces of human existence having a cultural, historical or archaeological character which have been partially or totally under water, periodically or continuously, for at least 100 years such as: i. sites, structures, buildings, artefacts and human remains, together with their archaeological and natural context; ii. vessels, aircraft, other vehicles or any part thereof, their cargo or other contents, together with their archaeological and natural context; and iii. objects of prehistoric character.

Urban built form: According to the Research report no. 16, SUI: Sustainable Development of Urban Historical Areas through an Active Integration within Towns, one

of three elements that constitute urban heritage is New urban elements to be considered. Examples of these new urban elements are:

- o The urban built form;
- o The open space: streets, public open spaces;
- o Urban infrastructures: material networks and equipments.

The same classification is referred also in the Recommendation on the Historic Urban Landscape.

Urban HA included in Protected area: Historic urban areas, large and small, include cities, towns and historic centres or quarters, together with their natural and man-made environments. Beyond their role as historical documents, these areas embody the values of traditional urban cultures.

Urban heritage: Although the attention on protecting cultural heritage in cities has been attained and integrated in policies especially after the WWII [153], the International conventions and other recommendations also referring to urban conservation, disaster risks and management don't provide an exhaustive identification of urban heritage. On the other side, The *Culture Urban Future* Global Report (2016) has defined the urban heritage as "a European concept at the heart of urban identities". [154] By surveying the Europe, in the Report, Europe clearly appears with its developed urban system that is the output of "a layering process, whereby pre-existing structures were continuously transformed or reused."

Urban Infrastructure: material networks and equipment: Urban infrastructures are urban elements that constitute urban heritage.

Value assessment: In the ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties, a value assessment category system (Very High, High, Medium, Low, Negligible, Unknown potential) is defined for categories Archaeology, Built heritage or Historic Urban Landscape, Historic landscape, Intangible Cultural Heritage. See p.13 of the Guidance document.

Vernacular Architecture: According to the ICOMOS Charter On The Built Vernacular Heritage [155], Vernacular building is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints. The survival of this tradition is threatened world-wide by the forces of economic, cultural and architectural homogenisation. How these forces can be met is a fundamental problem that must be addressed by communities and also by governments, planners, architects, conservationists and by a multidisciplinary group of specialists.

Wilderness Area: IUCN defines 'Wilderness Area' as a category of protected area "usually large unmodified or slightly modified areas, retaining their natural character and

influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.”

World Heritage: The heritage assets in the UNESCO World Heritage List. This heritage assets have an Outstanding Universal Value.

9.2 Annex 2: Table of Natural Macrocategory

NATURAL MACROCATEGORY ATTRIBUTES

Defining The Cnh Asset And Its Significance

Denomination	Current Formal Name
	Local Name
	Name in other languages
Location	Country
	City
	Location
	Geographic Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system)
	Height above sea level (m)
	GIS System
	Cadastral Data
	Photograph
Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary)	Site plan /map (Drawing or attachment)
	Value categories for Integrity
	Value categories and Conservation Status for Authenticity
	Value categories and Conservation Status for Cultural Significance
Knowledge Assessment	Other eventual value categories
	Knowledge gap -Lack of consistent and comparable data (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
	Knowledge gap -Few evaluations of critical vulnerability factors (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
	Final knowledge assessment evaluation (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
HA Type	Natural/Territorial Size
HA Characterization	Degree of Naturalness: <ul style="list-style-type: none"> • 0 Artificial system, • 1 Transformed system, • 2 Semi-transformed system, • 3 Highly intervened system, • 4 Cultural assisted system, • 5 Cultural self-maintained system, • 6 Semi-natural system, • 7 Quasi-natural system, • 8 Sub-natural system,

	<ul style="list-style-type: none"> • 9 Natural system, • 10 Natural virgin system
HA Type	Macro/Single Site
	Mixed site (Yes/No)
	Protected Area type: <ul style="list-style-type: none"> • Geoparks • Strict Nature Reserve • Wilderness Area • National Park • Natural Monument or Feature, Habitat/Species Management Area • Protected Landscape/ Seascape • Protected area with sustainable use of natural resource • Marine Protected Area • World Heritage site • Global Geopark • Cultural Landscape • Ramsar site • Biosphere reserve • Natura2000 site • River Basin • Green Infrastructure
	Natural Area in Human Settlement. Define.
	Natural area in Building Plot. Define. (e.g. historic garden related to building).
HA Characterization	Degree of Naturalness: <ul style="list-style-type: none"> • 0 Artificial system, • 1 Transformed system • 2 Semi-transformed system • 3 Highly intervened system • 4 Cultural assisted system • 5 Cultural self-maintained system • 6 Semi-natural system • 7 Quasi-natural system • 8 Sub-natural system • 9 Natural system • 10 Natural virgin system
SHELTER Scale	Building
	District
	City
	Region
	Cross-regional
Macrocategory	Building
	Urban

	Natural/Territorial
CNH Type	Tangible Heritage (Immovable),
	Tangible Heritage (Movable/Object)
	Intangible Heritage
CNH Category (Glossary)	Agricultural Heritage Cultural Landscape Cultural Routes Define Geological monument Geopark Heritage Canal Historic Garden Historic Landscape Monumental tree Natura 2000 site Natural Heritage Prehistoric site Protected area-Strict Nature Reserve Protected area-Wilderness Area Protected area-National Park Protected area-Natural Monument Protected area-Habitat/ Species management area Protected Landscape/ Seascape Protected Area with Sustainable Use of Natural Resources Protected area-Marine Protected Area Global Geopark Protected area-Ramsar site Protected area-Biosphere reserve Protected Area World Heritage site Sacred Natural Site Silence Area Underwater heritage
Other CNH asset Type	Canal/Lagoon/River/ Water Basin Cemetery Conventional urban park/with lawns/flowerbeds Designed Park/Garden (vegetal architecture) Embankment Garden as a part of historic building Green Infrastructure Green infrastructure into the built environment Holiday resort site (e.g. beach, etc) Hermitage Site Historic zoo Land Art Local park Memorial park Natural area that includes designed park/garden Natural route and path Non protected Historic or traditional planting

	<p>Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, road tracks, water and channel network)</p> <p>Pilgrimage Route</p> <p>Playground and sports field</p> <p>Planting (historic/traditional)</p> <p>Quayside</p> <p>Regional Park</p> <p>Scenic point</p> <p>Spiritual Site</p> <p>Street tree</p> <p>Other site of cultural natural significance. Define:</p>
Classification / registration status	Listed in the UNESCO WHS (with Ref no and Link)
	Listed in IUCN Protected site (with Ref no and Link)
	Listed European Heritage site (with Ref no and Link)
	Listed National Heritage Site (with Ref no and Link)
	Local Heritage List (with Ref no and Link)
	Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (with Ref no and Link)
	Other classification/registration. Detail:
Simple / Complex CNH asset	
Movable Heritage in the CNH asset	
Detailed list of CNH components in the case of composite CNH classification	
CNH asset hosting events, festivals, fairs, other	
Overall identification and assessment of the HA in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	
Overall identification and assessment of the CNH	

asset in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	
Natural/territorial ways and techniques of cultivation	Farming
	Fish farming
	Vineyard
	Other. Define
Design and management works	Drainage work
	Canal
	Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, roadtracks, water and channel network)
	Retaining wall
	Terracing
Techniques and Reinforcements and ways of traditional maintenance	Maintenance forest works Reestablishment/restoration works
	Reforestation works
	System recovery
Historical Information	Date / Century
	Historical period
	Overall description of Territorial transformations
	Timeline
	Thematic maps
	Architects/Engineer/Landscapers/Archaeologist/Artist
	Patronage
	Archaeological excavations (repeatable field)
	CNH Historical Name
	Name of historical territorial area
	Historical functions
CNH Uses and communities	Current function
	Number of CNH asset staff
	Number of CNH asset inhabitants
	Open to public (Y/N)
	Presence of inhabitants
	Touristic use and system of admittance and management
	Used by Local citizen. Define:

	Other modalities of use by communities:
Quantitative Data	Built area surface
	Connectivity with other green areas
	HA demographics Specify (age/gender)
	Green areas surface shaded area
	Farming surface
	Road and rail surfaces
	Total Surface of Natural areas hectare
	Water surface
Links with other CNH assets	Inspector(s) Name
Inspection Information	Inspector(s)' institution/affiliation
	Inspection Date:
	Type of inspection <ul style="list-style-type: none"> • Assessment • Emergency • Rainy season inspection • Regular • Other. Define:
	Inspection management <ul style="list-style-type: none"> • Private • Public • Other. Define:
	Responsibles. Define:
	Accessibility on inspection: <ul style="list-style-type: none"> • Day open access • Closed • Guarded • Other. Define:
	Weather condition on inspection <ul style="list-style-type: none"> • Raining • No raining
	Other. Define:

DEFINING ITS RISKS

Hazard Type	Earthquake Flood Heatwave Subsidence
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	Storm Wildfire <ul style="list-style-type: none"> • Directly natural • Exacerbated by natural factors • Generated by human Other. Define
Exposure Type	Hazard characterization Exposure to hazard Sensitivity (component of vulnerability) Capacity of response (component of vulnerability)
RESILIENCE INDICATORS according to SHELTER	
Monitoring Time Existing Monitoring Scheme	
Disaster Past Events	Frequency Intensity and scale <ul style="list-style-type: none"> • Earthquake • Flood • Heatwave • Subsidence • Storm • Wildfire scale • Wind storm • Other. Define: Hectares affected (burned/flooded, etc.) Loss of human life Period of the year
More information on past events	Levels of damage of past event Progressive Code Country Code Event General Info Classification of Disaster Severity Damage on Population Economic Damage Damage on Physical Environment General Fields

DEFINING ITS CONTEXTS

Environmental Context

Overall description of prevalent situation according to Geological, hydrological, and	
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meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.	
Ecosystem Type	Terrestrial - Urban, Terrestrial - Cropland, Terrestrial - Grassland, Terrestrial - Woodland and forest Terrestrial - Heathland and shrub Terrestrial - Sparsely vegetated land, Terrestrial - Wetlands, Fresh water - Rivers and lakes, Marine - Marine inlets and transitional waters Marine - Coastal Marine - Shelf Marine - Open ocean
Meteorological and climatological features	
Ecosystem	<ul style="list-style-type: none"> Natural Semi-natural
Ecosystem Services. Define:	
Drought and high temperatures events	
Storm wind	
Dry days number for year	
Rain days number for year	
Water quality: surface and groundwater	
Air quality	
Noise	
Soil degradation mechanism	
Air degradation mechanism	
Water degradation mechanism	
Inappropriate development	
Agricultural encroachment	
Deforestation works	
Illegal logging	
Invasive species	
Mining	

Oil spills	
Resource extraction damages	
Poaching	
Threats induced by armed conflict and war	
Threats induced by natural hazards. Define:	

Geographical Context and Physical Asset

Overall description of CNH asset surroundings including Immediate neighbourhood, village, district, natural asset	
Physical Infrastructures above ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field):	Energy infrastructures (generation, transformation)
	Energy networks (distribution)
	Transport network (roads, paths, waterways)
	Water management and sanitation (drainage, sewage system)
Physical Infrastructures below ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field):	Energy infrastructures (generation, transformation)
	Energy networks (distribution)
	Transport network (roads, paths, waterways)
	Water management and sanitation (drainage, sewage system)
Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	
Energy-efficient facilities	
Water use efficiency at its facilities	
Topographical characterisation	Coastal
	Interland
	Island
	Marshland
	Mountain
	Plateau
	Riverside

Site:	Mountains overhead
	Mountain underhead
	Waterfront
	Other, Define:
Distance from water basin Distance from overheading land	
Access to CNH asset	
Access to the surroundings -This should be linked to communication/transport network	
Disabled people accessibility (weelchair)	
Disabled people accessibility (visually)	
Disabled people accessibility (hearing impaired)	
Direct public transportation services	
Isolated area (Yes/not)	
Natural barriers (in the surroundings)	
Geo-Morphology characterisation	Soil configuration and slope
	Erosion area/ coastal erosion
	Landslide
	Geology classification
	Soil type
	Soil Degradation mechanism
	Hydrological classification information
CNH asset Boundaries (legal boundaries as i.e. property of land)	
CNH asset Buffer zone	
Park with gateways	
Presence of orientation signs	
Presence of a range of languages in signs	
Presence of crossed by public roads	

Presence of well-mapped and clearly marked pathways	
Random path-making policy	
Presence of hiking paths	
Presence of bicycle routes	
Presence of walking trails	
Presence of picnic ground areas	
Presence of campgrounds areas	
Surroundings communities	
Biodiversity in the HA	Animals species type with huge numbers
	Animals species with low numbers
	Ancient wooded area
	Average of species types
	Century-old trees
	Fire-adapted and fire-dependent vegetation
	Main variety identification
	Other Vegetation type
	Presence of Erosion areas
	Rare species
	Trunk diameter of the top five most common species
	Vegetation types Native of the area

Local and Traditional Knowledge

Hazards local knowledge
Construction techniques and materials traditional knowledge
Resilient behaviours
vernacular architecture and local traditions
Gathering local significance
Multicultural belongings and collective memories
Sense of Place

Cultural, historical, anthropological and social context /Intangible heritage

Cultural significance to community and social resilience
Overall Description Historical readings
Main Historical references
Linked Collective Memories and Traditions
Intangible values

Ethnic traditions
Ethnographic information
Natural Heritage
Landscape Perception

Governance

Property Ownership (if applicable)	
Governance regime. Define:	
Authorities. Define	
Management	<ul style="list-style-type: none"> • Including Private • Private • Public
Open to public: (Y/N)	
Governance Type	<ul style="list-style-type: none"> • Hierarchical governance, • Participatory or collaborative governance, • Networking and/or multi-level governance, • Community led governance
Public agencies	
Wildlife Service	
Responsibles for fire prevention and control	
Municipal Council involvement	
National and regional governmental agencies	
NGOs	
Community Groups	
Local associations	
A watershed organization composed of representatives of stakeholders	
Organizations	
Control policies	

Anthropic and Economic Context

CNH asset revenues	
CNH asset insurance costs	

Provide a description of CNH asset in its HA in term of economic situation	
GDP in the region	
CNH economic relevance in the region	
Tourism revenues	
Main economic sector in the region	
Main revenues type in the region	
CNH asset approximately yearly investment costs	

Policies and planning context

Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc	
Pre-Disaster Recovery planning	
More information	<p>local/regional/policies for Heritage</p> <p>local/regional/policies and measures for DDR</p> <p>Cooperation among institutions that have complementary missions</p> <p>Take advantage of volunteers and support groups</p> <p>Demonstrate, facilitate and promote good environmental behaviour</p> <p>Measures facilitating communication and cooperation between the stakeholders, in particular between the public institutions; and between the public and private stakeholders for DDR in HA</p> <p>Measures to promote capacity-building activities involving main stakeholders in Heritage and DDR</p> <p>Measures aimed at mitigating the impacts of climate change on HA</p> <p>Legislative and regulatory measures to safeguard intangible values</p> <p>Measures Promoting intercultural dialogue</p> <p>Measures and Initiatives promoting cultural diversity</p>

	<p>Measures and Initiatives promoting processes and participation, keeping active and facilitating dialogue (in planning, heritage identification and awareness)</p> <p>Measures in place to include heritage in impact assessments</p> <p>Measures in place supporting capacity building efforts (educational programmes for professionals on heritage, ...</p> <p>Measures for improving Information and Digital Technologies in Heritage and DDR</p> <p>Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media</p> <p>Mechanisms in place to assess the vulnerability of attributes of building to disasters.</p> <p>Mechanisms in place to assess the vulnerability of attributes of building to climate change.</p> <p>Mechanisms in place to assess the vulnerability of Heritage attributes of building to socio-economic pressures</p> <p>Mechanisms in place to assess the existing local skills</p> <p>Mechanisms in place to assess the vulnerability of attributes of building to climate change.</p> <p>Mechanisms in place to assess the vulnerability of Heritage attributes of building to socio-economic pressures</p> <p>Mechanisms in place to assess the existing local skills</p>
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Links to other CNH catalogues and inventories and interoperability

Existing catalogues Indicate language and if the translation is available and Link	National information.	
Existing Vegetarian inventory	Inventories: species	

ASSESSMENT

CNH assessment criteria

DEGREE OF NATURALNESS (from the most natural to the least)	<p>10 Natural virgin system (only natural elements and processes are present)</p> <p>9 Natural system (few exotic species are present)</p> <p>8 Sub-natural system (there is possibly an extended presence of wild exotic species, but with low impact)</p> <p>7 Quasi-natural system (extensive human activities, but with low physical impact)</p> <p>6 Semi-natural system (human infrastructure is scarce or concentrated; wild exotic species are possibly dominant, with native species considerably reduced)</p> <p>5 Cultural self-maintained system (processes are conditioned by extensive human activities, with native species altered and occasionally managed)</p> <p>4 Cultural assisted system (there are important infrastructures and/or conditioning of the physical environment, with forced biological production and moderate addition of matter, usually with pollution added)</p> <p>3 Highly intervened system (still includes areas with natural, cultivated, or breeding biological production, mixed in a mosaic with buildings and other infrastructure)</p> <p>2 Semi-transformed system (biological production is not dominant; human elements predominate)</p> <p>1 Transformed system (human processes govern, with clear dominance of artificial elements)</p> <p>0 Artificial system (there is no self-maintained macroscopic life; microscopic life is absent or in containers)</p>
MONITORING ASSESSING	<p>AND</p> <p>Specific Rules and Law restrictions</p> <p>Control of urban sewage, runoff and solid waste</p> <p>Environmental education programs</p> <p>Compliance signs</p> <p>Stern warnings (to stop people setting fires)</p> <p>fire roads</p> <p>Preventing littering that harms or kills wildlife</p> <p>Controlling poaching</p> <p>Control encroachment</p> <p>Waste system</p> <p>managing water quality and quantity (to protect biodiversity from pollution and extremes of drought and flooding) Guideline 15)</p> <p>Vegetation Management</p>

	Managing wildfires i(n ways that protect native species and ecosystems) (Guideline 16);
	Fire-safe landscaping
	Nearby fire-prone areas
	Watershed (also called a catchment area or drainage basin)
	Pollution monitoring
	Controllers
	Direct link with responsables for fire prevention and control
	in site
	in neighbouring urban areas
	Wifi
	Telephone
	Shelter
	predictive modelling
	spatially explicit
	assess land use change
	Landslide management By re-grading of slopes;
	connections among heritage sites
	conservation priorities
	Cooperation among institutions that have complementary missions
	Cooperation of heritage sites with universities
	Take advantage of volunteers and support groups
	Local sense of ownership
	Control encroachment
	Monitor and manage water
	Manage wildfires
	Promote connections to natural areas
	Promote rules and organizational culture
	Take advantage of international organizations and exchanges
	Promote and defend and expand urban heritage
	Improve urban heritage through research and evaluation
	Prevent and prosecute crime against people and property
	Demonstrate, facilitate and promote public health and well-being
	Demonstrate, facilitate and promote good environmental behaviour
	Critical Loss

CNH ASSESSMENT CATEGORIES	LOSS	Site destroyed: all or most of the visible key elements of the assessed site have collapsed (80–100 per cent of structure destroyed). All of the main historically valuable elements inside the cultural heritage site are destroyed.
		<p>Severe Loss</p> <p>Site Severely damaged: a significant part of the visible key elements of the site has collapsed or is partially damaged (40–80 per cent of structure damaged) or significant military or civilian activity has contributed to extensive damage at the site. Many of the main historically valuable elements of the cultural heritage site are severely damaged causing severe loss.</p>
		<p>Moderate Loss</p> <p>Site Moderately damaged. Limited damage observed relating to key elements of the site (5–40 per cent of structure damaged) or where military or civilian activity has contributed to damage. Some of the main historically valuable structures inside the cultural heritage site are moderately damaged causing moderate loss.</p>
		<p>Minimal Loss</p> <p>Site Possibly damaged. Assessed site structures do not appear to be damaged, but debris is visible around key site structures. None of the main historically valuable elements of the cultural heritage site are damaged.</p>

Table 10: NATURAL Macrocategory Attributes

9.3 Annex 3: Table of Urban Macrocategory

Denomination	Current Formal Name
	Local Name
	Name in other languages
Location	Country
	Region-State
	Location
	Geographic Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system)
	Height above sea level (m)
	GIS System
	Cadastral Data
	Photograph
Demographics	Site plan /map (Drawing or attachment)
	<ul style="list-style-type: none"> • Total population • Population in cities by sex and age • Vulnerable groups • Population density for neighbourhood/interested urban area • Urban growth trend
Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary)	Value categories for Integrity
	Value categories and Conservation Status for Authenticity
	Value categories and Conservation Status for Cultural Significance
	Other eventual value categories
Knowledge Assessment	Knowledge gap -Lack of consistent and comparable data (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
	Knowledge gap -Few evaluations of critical vulnerability factors (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
	Final knowledge assessment evaluation (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
HA Type	Macro/Single Site

	Mixed site (Yes/No)
	Human settlement size <ul style="list-style-type: none"> • Megapolis or mega-region, • Megacity, • Urban agglomeration or conurbation, • Metropolis, • Micropolis, • City, • Town, • Village or commune, • Hamlet/Isolated dwelling
	Human Settlement in CNH Size. Define:
	Human Settlement in Protected Area. Define:
HA Characterization	Degree of urbanization: <ul style="list-style-type: none"> • Very strongly urbanized • Strongly urbanized • Moderately urbanized • Weakly urbanized • Not urbanized
SHELTER Scale	Building
	District
	City
	Region
	Cross-regional
Macrocategory	Building
	Urban
	Natural/Territorial
CNH Type	Tangible Heritage (Immovable)
	Tangible Heritage (Movable/Object)
	Intangible Heritage
CNH Category (Glossary) (registered Heritage urban area as a whole)	Archaeological site Architectural ensemble Groups of Buildings Historic Area Historic neighborhood Historic Town Historic village Historic Core/City Centre Historical urban landscapes (HUL) Military heritage and Fortifications Rock Art Scientific Heritage Urban Heritage Urban Archaeological areas World Heritage site
Other CNH asset Type	Arsenal Canal front/ lagoon front/ riverfront/seafront/ Define Designed neighbourhood /district (architectural work): Social Housing/Working class/Garden city/Siedlungen etc.

	<p>Designed square</p> <p>Industrial heritage district</p> <p>Historic Market Place</p> <p>Historic neighbourhood</p> <p>Historic settlement</p> <p>Historic square</p> <p>Historic street</p> <p>Memorial Site</p> <p>Military site with local relevance</p> <p>New urban elements to be considered. Define:</p> <p>Non-exceptional heritage elements but present in a coherent way with a relative abundance</p> <p>Open space: streets / public open spaces</p> <p>Street front (homogeneous/regular/with porticos)</p> <p>Thermal bath site</p> <p>Urban Art (e.g. artistic installation)</p> <p>Urban built form</p> <p>Urban infrastructure: material network and equipment (e.g. historic bridge, historic road)</p> <p>Urban layout</p> <p>Urban bunker</p> <p>Other site of cultural natural significance. Define:</p>
Classification / registration status	Listed in the UNESCO WHS (with Ref no and Link)
	Listed in IUCN Protected site (with Ref no and Link)
	Listed European Heritage site (with Ref no and Link)
	Listed National Heritage Site (with Ref no and Link)
	Local Heritage Site (with Ref no and Link)
	Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (with Ref no and Link)
	Other classification/registration. Detail:
Simple / Complex CNH asset	
Movable Heritage in the CNH asset	Detailed list of CNH components in the case of composite CNH classification
CNH asset hosting events, festivals, fairs, other	Define
Overall identification and assessment of the HA in the current situation with its	It will allow directly linking to specific analyses and detailed information in the Clusters of Resources

relevant values and physical components listed and defined	
Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined	It will allow directly linking to specific analyses and detailed information in the Clusters of Resources
Public facilities and services	<p>(if of historical/architectural interest type and number)</p> <p>(e.g. Bank Educational/Health/ /Institution /Leisure / Religious centres/ School Shopping mall Railway station</p> <p>Other. Define:</p>
Urban fabric type	<p>(from high to low)</p> <p>High Density Cluster (Urban Centre) Dense Urban Cluster Semi-Dense Urban Cluster (Town/Urban) Suburban Grid Cell (Suburban) Rural Cluster Low Density Rural Grid Cell Very Low Density Grid Cell</p>
Historical Information	Date / Century
	Historical period
	Overall description of Territorial transformations
	Timeline
	Thematic maps
	Historic fabric: Define
	Architects/Engineer/Landscapers/Archaeologist/Artist
	Patronage
	Archaeological excavations (repeatable field)
	CNH Historical Name
	Name of historical territorial area
Function and uses	Historical function
	Current function
	Number of CNH asset staff
	Number of CNH asset inhabitants
	Open to public (Y/N)
	Presence of inhabitants
	Touristic use and system of admittance and management
Quantitative Data	Used by Local citizen
	Current land cover
	Demographics
	Human Settlements size

	Water surface
	Land Use percentage Residential Commercial Industrial Infrastructural Tourist-leisure Park and blue/green areas Area of green public spaces (ha)/inhabitant (or every 1,000 inhabitants)
	Connectivity <ul style="list-style-type: none"> High connectivity (finer grain systems with smaller blocks that allow frequent changes in direction; distances tend to be shorter) Low connectivity
	Urbanization degree (from high to low): <ul style="list-style-type: none"> Very strongly urbanized Strongly urbanized Moderately urbanized Weakly urbanized Not urbanized
Links with other CNH assets	
Inspection Information	Inspector(s) Name
	Inspector(s)' institution/affiliation
	Inspection Date:
	Type of inspection <ul style="list-style-type: none"> Assessment Emergency Rainy season inspection Regular Other. Define:
	Inspection management <ul style="list-style-type: none"> Private Public Other. Define:
	Responsibles. Define:
	Accessibility on inspection: <ul style="list-style-type: none"> Day open access Closed Guarded Other. Define:
	Weather condition on inspection <ul style="list-style-type: none"> Raining No raining Other. Define

DEFINING ITS RISKS

Hazard Type	Earthquake
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	Flood
	Heatwave
	Subsidence
	Storm
	Wildfire
	<ul style="list-style-type: none"> • Directly natural • Exacerbated by natural factors • Generated by human • Other. Define
Exposure Type	Hazard characterization
	Exposure to hazard
	Sensitivity (component of vulnerability),
	Capacity of response (component of vulnerability)
RESILIENCE INDICATORS	According to SHLTER)
	Define
Monitoring Time	
Existing Monitoring Scheme	
Disaster Past Events	Frequency Intensity and scale <ul style="list-style-type: none"> • Earthquake • Flood • Heatwave • Subsidence • Storm • Wildfire scale • Wind storm • Other. Define: Hectares affected (burned/flooded, etc.) Loss of human life Period of the year
More information on Past events	Levels of damage of past event Progressive Code Country Code Event General Info Classification of Disaster Severity Damage on Population Economic Damage Damage on Physical Environment General Fields

DEFINING THE CNH ASSET IN ITS CONTEXT

Environmental Context

Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any),	
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water table, surface water such as a river, etc.	
Ecosystem Type	Terrestrial - Urban, Terrestrial - Cropland, Terrestrial - Grassland, Terrestrial - Woodland and forest Terrestrial - Heathland and shrub Terrestrial - Sparsely vegetated land Terrestrial - Wetlands Fresh water - Rivers and lakes, Marine - Marine inlets and transitional waters Marine - Coastal Marine - Shelf Marine - Open ocean
Meteorological and climatological features	Ecosystem <ul style="list-style-type: none"> Natural semi-natural Ecosystem Services. Define:
	Drought and high temperatures events
	Storm wind
	Dry days number for year
	Rain days number for year
	Water quality: surface and groundwater
	Air quality
	Noise
	Soil degradation mechanism
	Air degradation mechanism
	Water degradation mechanism
	Inappropriate development

Geographical Context and Physical Asset

Overall description of CNH asset surroundings including Immediate neighbourhood, village, district, natural asset	
Physical Infrastructures above ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field):	Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)
Physical Infrastructures below ground and networks in the surroundings (e.g.	Energy infrastructures (generation, transformation)

tunnel) (Repeatable field):	<p>Energy networks (distribution)</p> <p>Transport network (roads, paths, waterways)</p> <p>Water management and sanitation (drainage, sewage system)</p>
Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	Define
Energy-efficient facilities	
Water use efficiency at its facilities	

Topographical characterisation

Geographical Characterisation	<ul style="list-style-type: none"> • Coastal • Interland • Island • Marshland • Mountain • Plateau • Riverside
Site	<ul style="list-style-type: none"> • Mountains overhead Mountain underhead • Waterfront • Other. Define • Distance from water basin Define • Distance from overhanging land Define
Access to CNH asset	Description
Access to the surroundings	Link to communication/transport network
	Direct public transportation services
Disabled people accessibility	<ul style="list-style-type: none"> • Wheelchair • Visually • hearing impaired
Isolated area (Yes/not)	•
Natural barriers (in the surroundings)	•
Geo-Morphology characterisation	Erosion area
	Landslide area
	Soil configuration and slope
	Soil infiltration capacity (permeable surface)
	Inappropriate development
	Morphology derived by Regrading of slopes
	CNH asset Boundaries (legal boundaries as i.e. property of land)

	CNH asset Buffer zone
	Hydrological classification
	Geology classification
	Soil type
	Soil Degradation mechanism
	Plots-blocks morphology and parcel structure (e.g. Regular blocks/ grid iron streets / small rectilinear city block/ narrow lots and building setbacks/ prominent civic spaces)
	Public spaces, roads, and paths morphological skeleton and main orientation

Local and Traditional Knowledge

Hazards local knowledge	
Construction techniques and materials traditional knowledge	
Resilient behaviours	
vernacular architecture and local traditions	
Cultural significance	
Multicultural belongings and collective memories	
Sense of Place	

Cultural, Historical, Anthropological And Social Context /Intangible Heritage

Cultural significance to community and social resilience	
Overall Description Historical readings	
Main Historical references	
Linked Collective Memories and Traditions	
Intangible values	Ethnic traditions Ethnographic information Industrialisation Heritage Urban Heritage

Governance

	Property Ownership (if applicable)
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Administrative Info	Governance system:
	Authorities:
	<ul style="list-style-type: none"> • Management Including Private • Private • Public
	Open to public: (Y/N):
Governance Type	<ul style="list-style-type: none"> • Hierarchical governance, • Participatory or collaborative governance • Networking and/or multi-level governance • Community led governance
Policies and Planning Context Prioritization	Design/Plan for future urban growth Regional policies Urban planning rules Urban conservation plans Rehabilitation rules Pre-disaster Recovery planning
	Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc
More information	Measures aimed at mitigating the impacts of climate change on urban HA ocal/regional/policies and measures for DDR National/local policies linking culture, urban development and DRR Measures facilitating communication and cooperation between the stakeholders, in particular between the public institutions; and between the public and private stakeholders for DDR in HA Measures to promote capacity-building activities involving main stakeholders in Heritage and DDR Measures aimed at mitigating the impacts of climate change on urban HA Policies and initiatives integrating urban HA and the natural environment Legislative and regulatory measures to safeguard intangible values of urban heritage Measures Promoting intercultural dialogue Measures and Initiatives promoting cultural diversity in HA

	<p>Measures and Initiatives promoting processes and participation, keeping active and facilitating dialogue (in planning, heritage identification and awareness)</p> <p>Measures in place to include of heritage in impact assessments</p> <p>Measures in place for monitoring of height controls in the historic urban fabric</p> <p>Measures supporting innovative income rooted in heritage and local tradition</p> <p>Public policies in place to learn from the traditions and perceptions of local communities</p> <p>Measures in place for tourism services in urban HA</p> <p>Measures in place for fostering understanding of heritage vulnerability</p> <p>Measures in place supporting capacity building efforts (educational programmes for professionals on urban heritage, ...)</p> <p>Measures for improving Information and Digital Technologies in Heritage and DDR</p> <p>Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media)</p> <p>Measures in place supporting capacity building efforts (educational programmes for professionals on urban heritage, ...)</p> <p>Measures for improving Information and Digital Technologies in Heritage and DDR</p> <p>Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media)</p> <p>Mechanisms in place to assess the vulnerability of attributes of urban HA to disasters</p> <p>Mechanisms in place to assess the vulnerability of attributes of urban HA to climate change.</p>
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	<p>Mechanisms in place to assess the vulnerability of Heritage attributes of urban HA to socio-economic pressures</p> <p>Mechanisms in place to assess the existing local skills</p> <p>Mechanisms in place to assess the human resources of urban HA</p> <p>Mechanisms in place to assess natural resources in urban HA</p> <p>Mechanisms in place to assess cultural resources in urban HA</p>
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Anthropic and Economic Context

Human Settlements Size:	<p>Human Settlements Size:</p> <p>Megapolis or mega-region: a large urban region that is highly connected and counts more than ten million people</p> <p>Megacity: an urban agglomeration of 10 million people or more</p> <p>Urban agglomeration or conurbation: a central city with neighbouring cities linked to it</p> <p>Metropolis: an important city and the densely populated surrounding areas that are socially and economically integrated with it</p> <p>Micropolis: a growing smaller city</p> <p>City: a large populated urban agglomeration</p> <p>Town: a compactly settled area</p> <p>Village or commune: a rural community a borgo (Italian),</p> <p>Hamlet: a small settlement</p> <p>Isolated dwelling</p>
Human settlement size prioritization	<ul style="list-style-type: none"> • Urban conurbation • Metropolis • City • Town • Village • Isolated dwelling
Degree of urbanization in detail	<ul style="list-style-type: none"> • Urban centre (or high density cluster): contiguous grid cells with a density of at least 1,500 inhabitants per

	<p>km2. An urban centre has population of at least 50,000.</p> <ul style="list-style-type: none"> Urban cluster (or moderate density clusters): Town, Suburban. Consists of contiguous grid cells with a density of at least 300 inhabitants per km2 and has a population of at least 5,000 in the cluster Rural grid cells (mostly low density cells) : Village, Dispersed Rural Areas
	<ul style="list-style-type: none"> Very strongly urbanized, with an address density of 2,500 addresses or more per km2; Strongly urbanized, with an address density of 1,500 to 2,500 addresses per km2; Moderately urbanized, with an address density of 1,000 to 1,500 addresses per km2; Weakly urbanized, with an address density of 500 to 1,000 addresses per km2 Not urbanized, with an address density of less than 500 addresses per km2
Economic	CNH asset revenues
	CNH asset insurance costs
	Provide a description of CNH asset in its HA in term of economic situation
	GDP in the region
	CNH economic relevance in the region
	Tourism revenues
	Main economic sector in the region
	Main revenues type in the region
	CNH asset approximately yearly investment costs

Links to other CNH catalogues and inventories and interoperability

Existing National catalogues information. Indicate language and if the translation is available and Link	
Existing Inventories: Vegetarian species inventory	

ASSESSING AND MONITORING HA

CNH loss assessment categories	<p>Critical Loss</p> <p>Site destroyed: all or most of the visible key elements of the assessed site have collapsed (80–100 per cent of</p>
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		<p>structure destroyed). All of the main historically valuable elements inside the cultural heritage site are destroyed.</p> <p>Severe Loss</p> <p>Site Severely damaged: a significant part of the visible key elements of the site has collapsed or is partially damaged (40–80 per cent of structure damaged) or significant military or civilian activity has contributed to extensive damage at the site</p> <p>Many of the main historically valuable elements of the cultural heritage site are severely damaged causing severe loss</p> <p>Moderate Loss</p> <p>Site Moderately damaged. Limited damage observed relating to key elements of the site (5–40 per cent of structure damaged) or where military or civilian activity has contributed to damage.</p> <p>Some of the main historically valuable structures inside the cultural heritage site are moderately damaged causing moderate loss.</p> <p>Minimal Loss</p> <p>Site Possibly damaged Assessed site structures do not appear to be damaged, but debris is visible around key site structures.</p> <p>None of the main historically valuable elements of the cultural heritage site are damaged.</p>
Monitoring assessing	and	predictive modelling spatially explicit
		assess land use change
		Landslide management By re-grading of slopes;
		connections among heritage sites
		conservation priorities
		Cooperation among institutions that have complementary missions
		Cooperation of heritage sites with universities
		Take advantage of volunteers and support groups
		Local sense of ownership

	Control encroachment
	Monitor and manage water
	Manage wildfires
	Promote connections to natural areas
	Promote rules and organizational culture
	Take advantage of international organizations and exchanges
	Promote and defend and expand urban heritage
	Improve urban heritage through research and evaluation
	Prevent and prosecute crime against people and property
	Demonstrate, facilitate and promote public health and well-being
	Demonstrate, facilitate and promote good environmental behaviour

Table 11: URBAN Macrocategory Attributes

9.4 Annex 4: Table of Building Macrocategory

BUILDING MACROCATEGORY ATTRIBUTES

DEFINING THE CNH ASSET AND ITS SIGNIFICANCE

Denomination	Current Formal Name
	Local Name
	Name in other languages
Location	Country
	City
	Location
	Geographic Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator)
	Spatial reference system)
	GIS System
	Height above sea level (m)
	Cadastral Data
	Photograph
Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary)	Site plan /map (Drawing or attachment)
	Value categories for Integrity
	Value categories and Conservation Status for Authenticity
	Value categories and Conservation Status for Cultural Significance
	Other eventual value categories
Knowledge Assessment	Knowledge gap -Lack of consistent and comparable data (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
	Knowledge gap -Few evaluations of critical vulnerability factors (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
	Final knowledge assessment evaluation (KL1: Limited knowledge, KL2: Normal knowledge, KL3: Full knowledge)
HA Type	Macro/Single Site
	Mixed site (Yes/No)
	Building in Human settlement.
	Building in Natural Site, define.
HA Characterization	Single Building / Complex building
SHELTER Scale	Building
	District
	City

	Region Cross-regional
Macrocategory	BUILDING
CNH Type	Tangible Heritage (Immovable) Tangible Heritage (Movable/ Object) Intangible Heritage
CNH Category (Glossary)	<p>Monumental heritage of exceptional cultural value Archaeological Heritage Architectural Heritage Habitation urbaine Historic Building Industrial and technical heritage Monuments Vernacular architecture World Heritage</p> <p>Other CNH asset Type Aquarium building Architectonic painting Architectonic inscription Architectonic sculpture Archive (including sound, photographic and cinematographic archive) Building holding collection Cinema Collection Building relevant to local history and tradition (civic/ educational/health/leisure/ military/religious/etc.) Chapel Historic factory Historic farm Historic/designed holiday resort Historic rural construction Librarie Market building Memorial and traditional local monument Monastery Monumental sculpture Museum Refuges cultural property Rural architecture Sanctuary Theater Thermal building Town hall Traditional local building or construction Underground architecture (bunker /cistern etc.)</p> <p>Other building of cultural natural significance. Define</p>
Classification / registration status	Listed in the UNESCO WHS (with Ref no and Link) Listed in IUCN Protected site (with Ref no and Link) Listed European Heritage site (with Ref no and Link) Listed National Heritage Site (with Ref no and Link) Local Heritage Site (with Ref no and Link)

	<p>Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity (with Ref no and Link)</p> <p>Other classification/registration. Detail</p>
Simple / Complex CNH asset	
Movable Heritage in the CNH asset	
Detailed list of CNH components in the case of composite CNH classification	
CNH asset hosting events, festivals, fairs, other	
Overall identification and assessment of the HA in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	
Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined (that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	
BUILT Environment and archaeological sites Material and Techniques	<p>300 words max Overall description of the historical Materials and Techniques of CNH asset in relation to its components. Link to Related Resources</p> <p>Main material of the structure Secondary material of the structure (if any) Primary structure construction technique (rubble masonry, sack masonry, load-bearing masonry, adobe, adobe and timber, reinforced concrete pillars, etc..) Horizontal structure material Roof material Canopy/shelter for archeological sites</p>

Built environment and archaeological site' restauration and reinforcements	<p>Latest Intervention Date and Type</p> <p>Link to Related Resources</p> <p>Reinforced-concrete slab:</p> <p>Roof (yes/no)</p> <p>Vault (yes/no)</p> <p>Horizontal structures (yes/no)</p> <p>Regeneration of walls with concrete injections (yes/no)</p> <p>Tie bars (yes/no)</p> <p>Concrete underpinning or plinth (yes/no)</p> <p>Prestressed cables - walls or other elements (yes/no)</p> <p>Micropile underpinning bracket (yes/no)</p> <p>Roof/floor edge beam (yes/no)</p>
Historical Information	<p>Date / Century</p> <p>Historical period</p> <p>Overall description of Territorial transformations</p> <p>Timeline</p> <p>Thematic maps</p> <p>Historic fabric: Define</p> <p>Architects/Engineer/Landscapers/Archaeologist/Artist</p> <p>Patronage</p> <p>Archaeological excavations (repeatable field)</p> <p>CNH Historical Name</p> <p>Name of historical territorial area</p> <p>Historical function</p>
Function and uses	<p>Current function</p> <p>Number of CNH asset staff</p> <p>Number of CNH asset inhabitants</p> <p>Open to public (Y/N)</p> <p>Presence of inhabitants</p> <p>Touristic use and system of admittance and management</p> <p>Used by Local citizen</p>
Quantitative Data	<p>Dimensions</p> <p>Land cover</p> <p>Number of floors</p> <p>Volume</p>
Links with other CH assets	
Inspection Information	<p>Inspector(s) Name</p> <p>Inspector(s)' institution/affiliation</p> <p>Inspection Date:</p> <p>Type of inspection</p> <ul style="list-style-type: none"> • Assessment • Emergency • Rainy season inspection • Regular • Other. Define: <p>Inspection management</p> <ul style="list-style-type: none"> • Private • Public • Other. Define:

	Responsible. Define: Accessibility on inspection: <ul style="list-style-type: none"> • Day open access • Closed • Guarded • Other. Define: Weather condition on inspection <ul style="list-style-type: none"> • Raining • No raining Other. Define:
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DEFINING ITS RISKS

Hazard Type	Earthquake Flood Heatwave Subsidence Storm Wildfire <ul style="list-style-type: none"> • Directly natural • Exacerbated by natural factors • Generated by human Other. Define
Exposure Type	Hazard characterization, Exposure to hazard Sensitivity (component of vulnerability) Capacity of response (component of vulnerability)
RESILIENCE INDICATORS	according to SHLTER). Define:
Monitoring Time	
Disaster Past Events	Frequency Intensity and scale <ul style="list-style-type: none"> • Earthquake • Flood • Heatwave • Subsidence • Storm • Wildfire scale • Wind storm • Other. Define: Hectares affected (burned/flooded, etc.) Loss of human life Period of the year

DEFINING THE CNH ASSET IN ITS CONTEXT

Environmental Context

Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.	
Ecosystem Type	Terrestrial - Urban, Terrestrial - Cropland, Terrestrial - Grassland, Terrestrial - Woodland and forest Terrestrial - Heathland and shrub Terrestrial - Sparsely vegetated land Terrestrial - Wetlands Fresh water - Rivers and lakes, Marine - Marine inlets and transitional waters Marine - Coastal Marine - Shelf Marine - Open ocean
Meteorological and climatological features	Ecosystem <ul style="list-style-type: none"> Natural semi-natural Ecosystem Services. Define: Drought and high temperatures events Storm wind Dry days number for year Rain days number for year Water quality: surface and groundwater Air quality Noise Soil degradation mechanism Air degradation mechanism Water degradation mechanism Inappropriate Development

Geographical Context and Physical Asset

Overall description of CNH asset surroundings including Immediate neighbourhood, village, district, natural asset	
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Physical Infrastructures above ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field):	Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)
Physical Infrastructures below ground and networks in the surroundings (e.g. tunnel) (Repeatable field):	Energy infrastructures (generation, transformation) Energy networks (distribution) Transport network (roads, paths, waterways) Water management and sanitation (drainage, sewage system)
Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	Define
Energy-efficient facilities	
Water use efficiency at its facilities	
Topographical characterization	Coastal, Mountain, Riverside, Interland, Island, Marshland, Plateau
Site	Waterfront, Seafront, Canalfront, Mountain Underhead, Other
Distance from water basin/over heading mountains	
Access to CNH asset (attach a map and/or photos)	Description
Access to the surroundings (attach a map and/or photos) This should be linked to communication/transport network	
Disabled people accessibility (wheelchair)	
Disabled people accessibility (visually)	
Disabled people accessibility (hearing impaired)	
direct public transportation services	
Isolated area (Yes/not)	

Natural barriers (in the surroundings)	
Distance of tree from building and tree species	
Geo-Morphology characterization (Soil configuration and slope)	
CNH asset Boundaries(legal boundaries as i.e. property of land)	
CNH asset Buffer zone	
Hydrological classification information: :	
Geology classification	
Soil type	
Soil Degradation mechanism	

Local and Traditional Knowledge

Cultural significance to community and social resilience
Overall Description Historical readings
Main Historical references
Linked Collective Memories and Traditions
Intangible values
Ethnic traditions
Ethnographic information
Cultural significance to community and social resilience
Architectonic Heritage

Cultural, Historical, Anthropological And Social Context /Intangible Heritage

Cultural significance to community and social resilience	
Overall Description Historical readings	
Main Historical references	
Linked Collective Memories and Traditions	
Intangible values	Ethnic traditions Ethnographic information Industrialisation Heritage Urban Heritage

Governance

Administrative Info	Property Ownership (if applicable)
	Governance system:
	Authorities:
	• Management Including Private

	<ul style="list-style-type: none"> • Private • Public
	Open to public: (Y/N):
Governance Type	<ul style="list-style-type: none"> • Hierarchical governance, • Participatory or collaborative governance • Networking and/or multi-level governance • Community led governance
Policies and Planning Context Prioritization	Design/Plan for future urban growth Regional policies Urban planning rules Urban conservation plans Rehabilitation rules Pre-disaster Recovery planning Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc)
More information	Measures aimed at mitigating the impacts of climate change on urban HA ocal/regional/policies and measures for DDR National/local policies linking culture, urban development and DDR Measures facilitating communication and cooperation between the stakeholders, in particular between the public institutions; and between the public and private stakeholders for DDR in HA Measures to promote capacity-building activities involving main stakeholders in Heritage and DDR Measures aimed at mitigating the impacts of climate change on urban HA Policies and initiatives integrating urban HA and the natural environment Legislative and regulatory measures to safeguard intangible values of urban heritage Measures Promoting intercultural dialogue Measures and Initiatives promoting cultural diversity in HA Measures and Initiatives promoting processes and participation, keeping active and facilitating dialogue (in planning, heritage identification and awareness) Measures in place to include of heritage in impact assessments Measures in place for monitoring of height controls in the historic urban fabric Measures supporting innovative income rooted in heritage and local tradition Public policies in place to learn from the traditions and perceptions of local communities Measures in place for tourism services in urban HA Measures in place for fostering understanding of heritage vulnerability Measures in place supporting capacity building efforts (educational programmes for professionals on urban heritage, ...) Measures for improving Information and Digital Technologies in Heritage and DDR Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media) Measures in place supporting capacity building efforts (educational programmes for professionals on urban heritage)

	<p>Measures for improving Information and Digital Technologies in Heritage and DDR</p> <p>Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media)</p> <p>Mechanisms in place to assess the vulnerability of attributes of urban HA to disasters</p> <p>Mechanisms in place to assess the vulnerability of attributes of urban HA to climate change.</p> <p>Mechanisms in place to assess the vulnerability of Heritage attributes of urban HA to socio-economic pressures</p> <p>Mechanisms in place to assess the existing local skills</p> <p>Mechanisms in place to assess the human resources of urban HA</p> <p>Mechanisms in place to assess natural resources in urban HA</p> <p>Mechanisms in place to assess cultural resources in urban HA</p>
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Anthropic and Economic Context

Human Settlements Size:	<p>Human Settlements Size:</p> <p>Megapolis or mega-region: a large urban region that is highly connected and counts more than ten million people</p> <p>Megacity: an urban agglomeration of 10 million people or more</p> <p>Urban agglomeration or conurbation: a central city with neighbouring cities linked to it</p> <p>Metropolis: an important city and the densely populated surrounding areas that are socially and economically integrated with it</p> <p>Micropolis: a growing smaller city</p> <p>City: a large populated urban agglomeration</p> <p>Town: a compactly settled area</p> <p>Village or commune: a rural community a borgo (Italian),</p> <p>Hamlet: a small settlement</p> <p>Isolated dwelling</p>
Human settlement size prioritization	<ul style="list-style-type: none"> • Urban conurbation • Metropolis • City • Town • Village • Isolated dwelling
Degree of urbanization in detail	<ul style="list-style-type: none"> • Urban centre (or high density cluster): contiguous grid cells with a density of at least 1,500 inhabitants per km². An urban centre has population of at least 50,000. • Urban cluster (or moderate density clusters): Town, Suburban. Consists of contiguous grid cells with a density of at least 300 inhabitants per km² and has a population of at least 5,000 in the cluster • Rural grid cells (mostly low density cells) : Village, Dispersed Rural Areas • Very strongly urbanized, with an address density of 2,500 addresses or more per km²;

	<ul style="list-style-type: none"> • Strongly urbanized, with an address density of 1,500 to 2,500 addresses per km²; • Moderately urbanized, with an address density of 1,000 to 1,500 addresses per km²; • Weakly urbanized, with an address density of 500 to 1,000 addresses per km² • Not urbanized, with an address density of less than 500 addresses per km²
Economic	CNH asset revenues
	CNH asset insurance costs
	Provide a description of CNH asset in its HA in term of economic situation
	GDP in the region
	CNH economic relevance in the region
	Tourism revenues
	Main economic sector in the region
	Main revenues type in the region
	CNH asset approximately yearly investment costs

Links to other CNH catalogues and inventories and interoperability

Existing National catalogues information. Indicate language and if the translation is available and Link
Existing Inventories: Vegetarian species inventory

ASSESSING AND MONITORING HA

CNH loss assessment categories	<p>Critical Loss Site destroyed: all or most of the visible key elements of the assessed site have collapsed (80–100 per cent of structure destroyed). All of the main historically valuable elements inside the cultural heritage site are destroyed.</p> <p>Severe Loss Site Severely damaged: a significant part of the visible key elements of the site has collapsed or is partially damaged (40–80 per cent of structure damaged) or significant military or civilian activity has contributed to extensive damage at the site Many of the main historically valuable elements of the cultural heritage site are severely damaged causing severe loss</p> <p>Moderate Loss Site Moderately damaged. Limited damage observed relating to key elements of the site (5–40 per cent of structure damaged) or where military or civilian activity has contributed to damage. Some of the main historically valuable structures inside the</p>
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	<p>cultural heritage site are moderately damaged causing moderate loss.</p> <p>Minimal Loss</p> <p>Site Possibly damaged Assessed site structures do not appear to be damaged, but debris is visible around key site structures.</p> <p>None of the main historically valuable elements of the cultural heritage site are damaged.</p>
Monitoring and assessing	predictive modelling
	spatially explicit
	assess land use change
	Landslide management By re-grading of slopes;
	connections among heritage sites
	conservation priorities
	Cooperation among institutions that have complementary missions
	Cooperation of heritage sites with universities
	Take advantage of volunteers and support groups
	Local sense of ownership
	Control encroachment
	Monitor and manage water
	Manage wildfires
	Promote connections to natural areas
	Promote rules and organizational culture
	Take advantage of international organizations and exchanges
	Promote and defend and expand urban heritage
	Improve urban heritage through research and evaluation
	Prevent and prosecute crime against people and property
	Demonstrate, facilitate and promote public health and well-being
	Demonstrate, facilitate and promote good environmental behaviour

Table 12: BUILDING Macrocategory Attributes

9.5 Annex 5: Table of Prioritization of Macrocategories Attributes according to the Shortlist of Indicators

NATURAL MACROCATEGORY

		PREVENTION	
NATURAL MACROCATEGORY ATTRIBUTES			CORRESPONDENCE IN INDICATORS
		(text)	
Defining the CH asset and its significance	Denomination	Current Formal Name	
		Local Name	
		Name in other languages	
		Historical Name	
	Location	Country	
		City	
		Location	
		Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system)	
		Cadastral Data	
		Land Use	
		Height above sea level (m)	
	Total Population (more detailed below in Data)	total population	PREVENTION/ADAPTION PHASE – Exposure – individuals – Demographic – Population in hazard area
	SHELTER Scale	District/Urban	

	Environmental context and regime (Together with the cell below)	<p>Natural protected heritage</p> <p>Protected natural area*</p> <p>Historic Garden and plantings (vegetal architectures)</p> <p>Natural monument</p> <p>Cultural Landscape</p> <p>Geological monument</p> <p>Natura 2000 sites</p> <p>Geopark</p> <p>"Silence Areas" (in the Netherlands)</p> <p>Other Natural areas**</p>	<p>PREVENTION/ADAPTION PHASE</p> <p>Coping capacity</p> <p>o protection of natural resources</p> <p>§ Urban characterization</p> <ul style="list-style-type: none"> • Share of the protected lands • Share of ecological corridors <p>§ Risk reduction</p> <ul style="list-style-type: none"> • Management of river basins and environmental protection • Updating and enforcement of safety standards and construction codes
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	NATURAL AREA TYPE Classification / Registration Status and Current Protection Status	<div> Natural § IUCN o I a. Strict Nature o Ib. Wilderness o II. National Park o III. Natural Monument o IV . Habitat/ Species o V. Protected Landscape/ Seascape o VI. Protected Area with Sustainable Use of Natural Resources § Marine Protected Areas § World Heritage sites § Global Geoparks § Ramsar sites § Biosphere reserves Other Natural Areas / green spaces Conventional urban park, with lawns, flowerbeds, playgrounds and sports fields Garden linked to historic buildings River Basin Non protected Historic or traditional planting Designed Park/Garden (vegetal architecture) Natural area that includes designed park/garden Green Infrastructure Component of a green infrastructure into the built urban environment Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, roadtracks, water and channel </div>	<div> protected heritage Area*** Reserve Area Park Monument Species Seascape Resources Areas sites Geoparks sites reserves PREVENTION/ADAPTION PHASE Coping capacity o protection of natural resources § Urban characterization • Share of the protected lands • Share of ecological corridors § Risk reduction • Management of river basins and environmental protection • Updating and enforcement of safety standards and construction codes PREVENTION/ADAPTION PHASE Coping capacity Protection of natural resources PREVENTION/ADAPTION PHASE Coping capacity Natural Capital </div>
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		<p>networks)</p> <p>historic</p> <p>anthropic</p> <p>zoos</p> <p>aquaria and botanical</p> <p>natural gardens</p> <p>marine habitat</p> <p>sanctuaries</p> <p>reservoirs</p> <p>landscapes,</p> <p>landscapes</p> <p>ecosystems</p>	
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	<p>DEGREE OF NATURALNESS (from the most natural to the least)</p>	<p>10 Natural virgin system (only natural elements and processes are present)</p> <p>9 Natural system (few exotic species are present)</p> <p>8 Sub-natural system (there is possibly an extended presence of wild exotic species, but with low impact)</p> <p>7 Quasi-natural system (extensive human activities, but with low physical impact)</p> <p>6 Semi-natural system (human infrastructure is scarce or concentrated; wild exotic species are possibly dominant, with native species considerably reduced)</p> <p>5 Cultural self-maintained system (processes are conditioned by extensive human activities, with native species altered and occasionally managed)</p> <p>4 Cultural assisted system (there are important infrastructures and/or conditioning of the physical environment, with forced biological production and moderate addition of matter, usually with pollution added)</p> <p>3 Highly intervened system (still includes areas with natural, cultivated, or breeding biological production, mixed in a mosaic with buildings and other infrastructure)</p> <p>2 Semi-transformed system (biological production is not dominant; human elements predominate)</p>	<p>PREVENTION/ADAPTION PHASE</p> <p>Coping capacity of protection of natural resources</p>
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		<p>1 Transformed system (human processes govern, with clear dominance of artificial elements)</p> <p>0 Artificial system (there is no self-maintained macroscopic life; microscopic life is absent or in containers)</p>	
	Overall Description	Made of... wild areas, terracing, tree rows, forests, farming, canals, roads, built areas ...	
	Uses	<p>Hunting areas</p> <p>Sanctuaries</p> <p>Natural/Loisir</p> <p>park facilities</p> <p>loisir infrastructures</p> <p>Farming</p> <p>Industrial activity</p> <p>within</p> <p>nearby</p>	

	Detailed list of NATURAL components wild areas, terracing, tree rows, forests, farming, canals, roads, built areas	min 300 - max 500 words (fill in according to the indications)	
	NATURAL/URBAN area included in urban areas area including urban areas	Urban areas Within nearby buildings within	PREVENTION/ADAPTION PHASE Sensitivity Environmental sensitivity Urban characterization • Buildings in hazard area • Street pattern

		<p>Other Areas:</p> <p>Archaeological areas</p> <p>Architectural works</p> <p>Art works (e.g. land art, sculptures)</p> <p>Dam</p> <p>Geoparks</p> <p>Geological formation</p> <p>Historic structures or manufacts</p> <p>Infrastructures:</p> <p>road and rail</p> <p>waterways</p> <p>Industrial archaeology</p> <p>Memorial, Monument</p> <p>Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, roadtracks, water and channel networks)</p> <p>Reservoirs</p> <p>Resource extraction areas</p> <p>specific building techniques and materials</p> <p>Transmission towers.</p> <p>microwave transmission towers of radio and television stations, mobile telephone services and governmental agencies.</p> <p>Vernacular architecture</p>	<p>PREVENTION/ADAPTION PHASE</p> <p>Coping capacity</p> <p>Protection of natural resources</p> <p>PREVENTION/ADAPTION PHASE</p> <p>Adaptive capacity</p> <p>natural capital</p>
	Garden/Park designer		

	Natural area design and management works	§ § § § Canals	Retaining Drainage	Terracing walls works	
	Resource extraction				
	Reforestation works				
	System recovery				
	Reestablishment/restoration				
	Maintenance forest works				
	Category List UNESCO (Select from the table by clicking on arrow)	Cultural landscapes			
	TYPE (In the order Main and All Included Types)	Tangible Heritage (Movable)			
	Type specification	Museum			
		If Other, define:			
	Classification / Registration Status and Current Conservation Status	Listed in the UNESCO WHS: Ref no: Link			
		Listed in European Heritage Label Ref no: Link			
Listed in the National List/Lists Replicable Field if Cross-Country					

		Ref link	no	
		Listed in Local List/Lists Replicable Field if Cross-Country Ref Link	no:	
		Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity Ref Link	no:	
	PROTECTED SITES AND URBAN HERITAGE WITHIN THE BOUNDARIES OF NATURAL AREA	Protected parks, gardens, monumental tree		PREVENTION/ADAPTION PHASE – Coping Capacity – Protection of natural resources – ecological capacity: • Vegetation density • Share of the protected lands • Share of ecological corridors • Structural connectivity of green infrastructure • Functional connectivity of green infrastructure • Area of habitats restored

			<ul style="list-style-type: none"> ▪ Habitat functional composition (relative abundance of functional features) ▪ Green space proportion ▪ Vegetation water content ▪ Habitat-suitability index under climate change scenarios
		Parks and green areas	
		Cemetery	
		Monuments, architectural heritage at building scale -> BUILDING MACROCATEGORY	
		Other heritage assets at urban scale -> URBAN MACROCATEGORY	

	Overall description of the CH asset in the current situation with its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)	min 300 - max 500 words (fill in according to the indications)	Sensitivity -> building characteristics -> Urban characterization -> <ul style="list-style-type: none"> • Land Take • Land cover • Urban growth, avg. annual rate (%). • Average slope • Average elevation • Thermal diffusivity • Solar reflectance Sensitivity -> environmental sensitivity -> Urban characterization -> Buildings in hazard area
	Simple/Complex CH asset	Simple site: Specify according to the UNESCO Thesaurus for descriptive terms [e.g. http://vocabularies.unesco.org/thesaurus/concept17008 for Churches]	
		Complex Site: Specify in the cell below, indicate detailed list of CH components (see the cell below)	
	Detailed list of CH components in the case of composite CH categorization (e.g. Cultural Routes)	List Components and related Types Specify according to the UNESCO Thesaurus for descriptive terms (e.g.	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – building characterization

		http://vocabularies.unesco.org/thesaurus/concept17008 for Churches)	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – urban characterization
Main Historical Information			
	Characterizing Historical period		
	Timeline		
	Name of historical territorial area		
	Historical information <ul style="list-style-type: none"> • Ancient denomination • Earliest Urban Features • Roman site 		
	territorial environmental transformations		
	geological		
	archeological		
	land uses		
	parceling		
	material culture		
	designs and artworks		

	vernacular and local architecture		
	rural and peasant culture		
	canals and waterways		
	ancient wooded area		
	ways of use (productive or recreational)		
	ways and techniques of cultivation		
	ways of traditional maintenance		
	feasts, historic events, local cultural traditions		
	Garden/Park designer		
DATA (DIMENSIONS)	Total Surface of Natural areas hectare (Surface and ground water providing sources for surroundings urban areas, dumps or factories)		
	Green areas surface shaded area (relationship between total leaf area and trunk diameter) vegetation growth rate class		

	Water surface		
	Built areas Surface		
	Farming Surface		
	Inhabitants number		
	Road and rail surfaces		

	Demographics	<ul style="list-style-type: none"> • Total population • population in cities by sex and age • vulnerable groups • population density for neighborhood/interested urban area • urban growth trend 	<p>PREVENTION/ADAPTION PHASE – Exposure – individuals – Demographic – Population in hazard area</p> <p>PREVENTION/ADAPTION PHASE – Exposure – economic characteristics – unemployment rate</p> <p>PREVENTION/ADAPTION PHASE – Sensitivity – Social/demography characteristics:</p> <ul style="list-style-type: none"> • Population density • Percentage of population below 65 years of age • Percentage of population 17 years of age or younger • Percentage population without sensory, physical, or mental disability • Percentage of female
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			<ul style="list-style-type: none"> • Percentage of one-person household • Net international migration
	Climate TYPE		

CLIMATE CHARACTERIZATION	Ecosystems Type		PREVENTION / ADAPTION PHASE Source/hazards Magnitude § Flood Characterization • Flood depth • Water velocity (in the flooded area) • Combinations of flood depth and water velocity in the flood area • Flood frequency: linked with the return period § Soil characterization • Surface runoff § temperature characterization • Annual Mean Temperature • Mean Diurnal Range (Mean of monthly (max temp - min temp)) • Isothermality (P2/P7) (*100) • Temperature Seasonality (standard deviation *100) • Max Temperature of Warmest Month
	Mediterranean		
	Polar		
	Mountain zone		
	Tundra		
	Temperate Forest		
	Grasslands		
	Tropical Rainforest		
	Desert		
	Marine		
	Freshwater		
	drought and high temperatures events		
	storm wind		
	invasive species		
	Deforestation works		
	resource extraction damages mining, illegal logging		
	oil spills		
	poaching		
	agricultural encroachment		
	threats induced by armed conflict and war, earthquakes		

	inappropriate development		<ul style="list-style-type: none"> • Min Temperature of Coldest Month
	Erosion areas		<ul style="list-style-type: none"> • Temperature Annual Range (P5-P6)
	<p>property faced with danger: decline in the population of the endangered species Severe deterioration of the natural beauty or scientific value of the property Human encroachment on boundaries or in upstream areas planned resettlement or development projects</p>		<ul style="list-style-type: none"> • Mean Temperature of Wettest Quarter • Mean Temperature of Driest Quarter • Mean Temperature of Warmest Quarter • Mean Temperature of Coldest Quarter • Daily mean temperature • Thermal shock [Tmax-Tmin] § hygrometric conditions • Mean relative humidity • Daily humidity cycle shocks [RH(n)-RH(n+1)>25%] • Relative humidity concentration [nRH>75%] § Rainfall characterization • Daily maximum precipitation corresponding to the return period T • Hourly maximum precipitation for a return

			<p>period (relevant for pluvial flood)</p> <ul style="list-style-type: none"> • Annual Precipitation • Precipitation of Wettest Month • Precipitation of Driest Month • Precipitation Seasonality (Coefficient of Variation) • Precipitation of Wettest Quarter • Precipitation of Driest Quarter • Precipitation of Warmest Quarter • Precipitation of Coldest Quarter
TOPOGRAPHY AND GEOMORPHOLOGICAL CHARACTERISATION			
	Geomorphological Information		<p>PREVENTION/ADAPTION PHASE</p> <p>Source/hazards</p> <p>Sensitivity</p> <p>Environmental sensitivity</p> <p>§ land characterization</p> <ul style="list-style-type: none"> • land take • average ground slope • land cover • Height above sea level

	Topographical information Including Lakes Rivers Mountains Seacoasts Canyon Dam Scenic Scenic waterfall	Cliffs	PREVENTION/ADAPTION PHASE Source/hazards Sensitivity Environmental sensitivity § land characterization • land take • average ground slope • land cover • Height above sea level
	Soil Types		PREVENTION/ADAPTION PHASE Source/hazards Sensitivity Environmental sensitivity § Soil • Soil stability • Soil water content § Soil characterization • Relative water content in the top few centimetres of soil (usually up to 5 or 7 cm) • Soil stability index • Soil water content

	Land Uses		<p>PREVENTION/ADAPTION PHASE</p> <p>Source/hazards</p> <p>Sensitivity</p> <p>Environmental sensitivity</p> <p>§ land characterization</p> <ul style="list-style-type: none"> • land take • average ground slope • land cover • Height above sea level
	Topographical characterisation		<p>source/hazards -></p> <p>magnitude -> Urban</p> <p>characterization -></p> <p>Subsidence rate</p>
	Geo-Morphology characterisation		<p>PREVENTION/ADAPTION PHASE</p> <p>Source/hazards</p> <p>Sensitivity</p> <p>Environmental sensitivity</p> <p>§ land characterization</p>
	Coastal city/area		<p>PREVENTION/ADAPTION PHASE</p> <p>Source/hazards</p> <p>Sensitivity</p> <p>Environmental sensitivity</p> <p>§ land characterization</p>

	Mountain city/area		PREVENTION/ADAPTION PHASE Source/hazards Sensitivity Environmental sensitivity § land characterization
	River city/area		PREVENTION/ADAPTION PHASE Source/hazards Sensitivity Environmental sensitivity § land characterization
	Forest Nearby		PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – land characterization: slope
	Slope		PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – land characterization: slope
	Morphology derived by Regrading of slopes		
	Soil type		PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – soil characterization

	Soil infiltration capacity (permeable surface)		PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – soil characterization
GOVERNANCE	Ownership:		
	Governance system:		
	Authorities:		
	Management Public/Private		
	Open to public: (Y/N):		
	Pre-Disaster Recovery Planning		
	Public agencies		
	Landowners		PREVENTION / ADAPTION Adaptive capacity o social capital/learning § Infrastructure • Psychosocial support facilities per 10,000 persons § Social capital • Civic organizations per 10,000 persons • Red cross volunteers per 10,000 persons • Budget of volunteer
	Wildlife Service		
	Responsibles for fire prevention and control		
	Municipal Council involvement		
	National and regional governmental agencies		
	NGOs		
	Community Groups		
	Local associations		
	A watershed organization composed		

	of representatives of stakeholders		organizations
	Organizations		<ul style="list-style-type: none"> # of registered volunteers <p>PREVENTION / ADAPTION PHASE</p> <p>Adaptive capacity</p> <p>o education</p> <p>§ Percentage of people with disasters preparedness education</p> <p>o human capital/education</p> <p>§ Number of participants in training courses executed by authorities, institution, corporations or other bodies, specific for DRM</p>
	Control policies		

	Local/regional/policies for Heritage conservation areas		<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – institutional capital/governance – institutional: The extension to which risk is taken into account in land use and urban planning</p> <p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – economic capital – activities: Percentage of firms implementing international risk management standards in the organisation structure and processes</p> <p>PREVENTION/ADAPTION PHASE – Coping Capacity – Awareness/information: - education: Number of participants in training courses executed by authorities, institution, corporations or other</p>
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			bodies, specific for DRM
	Local/regional/policies and measures for DDR		PREVENTION/ADAPTION PHASE – Adaptive Capacity – institutional capital/governance – institutional: Mechanisms for

			communities to engage with government
	National/local policies linking culture, natural development and DRR		<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – institutional capital/governance – institutional:</p> <p>Mechanisms for communities to engage with government</p>
	Measures facilitating communication and cooperation between the stakeholders, in particular between the public institutions; and between the public and private stakeholders for DRR in Natural Area		<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – human capital – education: Percentage of people with disasters preparedness education</p> <p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – human capital – training: Number of professionals trained in post-disaster recovery</p>

			and preservation of cultural heritage
	Measures to promote capacity-building activities involving main stakeholders in Heritage and DDR		PREVENTION/ADAPTION PHASE – Coping Capacity –living with uncertainty/improvising – communication – Existence of a platform for information sharing and networking using tools and routines and number of unique users
	Measures aimed at mitigating the impacts of climate change on Natural HA		
	Policies and initiatives integrating natural HA		

	and the natural environment		
	Legislative and regulatory measures to safeguard intangible values of natural heritage		
	Measures Promoting intercultural dialogue		
	Measures and Initiatives promoting cultural diversity in HA		<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity- social capital/learning – social capital:</p> <ul style="list-style-type: none"> • Civic organizations per 10,000 persons • Red cross volunteers per 10,000 persons • Budget of volunteer organizations • Number of registered volunteers

	Measures and Initiatives promoting processes and participation, keeping active and facilitating dialogue (in planning, heritage identification and awareness)		PREVENTION/ADAPTION PHASE – Coping Capacity – Protection of natural resources – risk reduction: Environmental impact assessment of heritage sites
	Measures in place to include of heritage in impact assessments		PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – asset characterization: sky view factor
	Measures supporting innovative income rooted in heritage and local tradition		PREVENTION/ADAPTION PHASE – Transformative Capacity- social memory – local knowledge - Existence of mechanisms for integration local knowledge and local perceptions of risk and scientific knowledge, data and assessment methods
	Public policies in place to learn from the traditions and		

	perceptions of local communities		
	Measures in place for tourism services in natural HA		
	Measures in place for fostering understanding of heritage vulnerability		PREVENTION/ADAPTION PHASE – Coping Capacity – Awareness/information – education: Number of professionals trained in post-disaster recovery and preservation of cultural heritage
	Measures in place supporting capacity building efforts (educational programmes for professionals on natural heritage, ...)		
	Measures for improving Information and Digital Technologies in Heritage and DDR		PREVENTION/ADAPTION PHASE – Adaptive Capacity- social capital/learning – social capital: • Budget of volunteer organizations • Number of registered

			volunteers
	Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media)		
	Mechanisms in place to assess the vulnerability of attributes of natural HA to disasters		
	Mechanisms in place to assess the vulnerability of attributes of natural HA to climate change.		
	Mechanisms in place to assess the vulnerability of Heritage attributes of natural HA to socio-economic pressures		

	Mechanisms in place to assess the existing local skills		
	Mechanisms in place to assess the human resources of natural HA		
	Mechanisms in place to assess cultural resources in natural HA		
Defining RISKS	Hazard Type According to SHELTER Indicators shortlist	Earthquake	source/hazards -> frequency -> Flood Hazard source/hazards -> frequency -> Hazard Characterization
		Definition:	
		individuals	

	Hazard Exposures and Threats (threatening effects of climatic, geological or other environmental factors)	invasive species Deforestation works resource extraction damages mining, logging illegal oil spills poaching agricultural encroachment threats induced by armed conflict and war, earthquakes inappropriate development Erosion areas	PREVENTION / ADAPTION Exposure § hazard area characterization • Land take in hazard characterization • Buildings in hazard area • Critical facilities in hazard area
	property faced with danger	decline in the population of the endangered species Severe deterioration of the natural beauty or scientific value of the property Human encroachment on boundaries or in upstream areas planned resettlement or development projects	RECOVERY Damages Damages in ecosystem
	Vulnerability	Sensitivity Definition:	

	Vulnerable areas for location	Definition:	PREVENTION/ADAPTION PHASE – Adaptive Capacity – natural capital – ecological capacity: • Area under vegetation and wetlands • Total carbon sequestered (Mg C) and carbon sequestration rate (Mg C/ha/yr) p
	Monitoring Time	Vulnerable areas for location • Proximity to water basins, from sea/river; • Proximity to forest/ • Tree/Tree lines nearby	
ACCESSIBILITY	Access by gateways		
	Presence of park boundaries/transected areas		
	Disabled people accessibility wheelchair access visually hearing impaired		
	Direct public transportation services		

	Presence of orientation signs		
	A range of languages in signs and publications		
	Reach out to diverse ethnic group approach Areas zoned (for intensive use, for quieter use, for a more remote experience and as wilderness zones)		
	Crossed by public roads		
	well-mapped and clearly marked pathways walking trails hickory paths bicycle routes random path-making policy		
	picnic ground areas		
	campgrounds areas		
	hosting events festivals fairs		
	Erosion areas		
	Connectivity with other natural areas		

	energy-efficient facilities water use efficiency at its facilities		
BIODIVERSITY	VEGETATION TYPES PLANT SPECIES	number of varieties. (biodiversity itself enhances resilience of ecosystems)	PREVENTION/ADAPTION PHASE
		Main variety identification	Source/hazards
		Native of the area Yes/not	Sensitivity
		Rare species	No sub category
		Fire-adapted and fire-dependent vegetation	• Structural connectivity of green infrastructure
		Century-old trees	• Functional connectivity of green infrastructure
		Exceptionally large trees species	• Number of non-native species of flora introduced (total number)
		Average of species types drought deciduous evergreen monoculture species trees	
		Trunk diameter of the top five most common species or genera	
		Flowers	
		Turfs	
		Turfgrass	
		Vegetation species inventory	
		Animals species type with huge numbers	Number of native bird species within a defined urban area

		Animals species with low numbers	Number of native bird species within a defined urban area
		Number of variety	
		Rare species	
		Native of the area Yes/not	
CULTURAL, ANTHROPOLOGICAL AND SOCIAL CONTEXT (INTANGIBLE HERITAGE)	linkable Writers works		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
	linkable Artwork		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
	linkable Explorers		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory

	linkable events	exploration		<p>PREVENTION/ADAPTION PHASE</p> <ul style="list-style-type: none"> transformative capacity/inherent resilience <p>§ Social memory</p> <p>§ Living with uncertainty/improvising</p> <p>§ Self-organisation, reflective and shared learning</p>
	linkable religious beliefs			<p>PREVENTION/ADAPTION PHASE</p> <ul style="list-style-type: none"> transformative capacity/inherent resilience <p>§ Social memory</p> <p>§ Living with uncertainty/improvising</p> <p>§ Self-organisation, reflective and shared learning</p>
	linkable traditions			<p>PREVENTION/ADAPTION PHASE</p> <ul style="list-style-type: none"> transformative capacity/inherent resilience <p>§ Social memory</p> <p>§ Living with</p>

			uncertainty/improvising § Self-organisation, reflective and shared learning
	linkable scientific discovery		PREVENTION/ADAPTION PHASE • transformative capacity/inherent resilience § Social memory § Living with uncertainty/improvising § Self-organisation, reflective and shared learning
	Anthropological and ethnographic information Ways of lives and work		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
	specific techniques and materials	for natural areas management for terracing for farming for hunting for materials for farming for fire protection	

	Indigenous communities Villages Park gateway Communities (Numbers) Surrounding Communities Visitors (Numbers a year) Settlements		PREVENTION/ADAPTION PHASE Coping capacity • networks/solidarity/Community preparedness § Public information and community participation • transformative capacity/inherent resilience § Social memory
	Historical readings		
	Historical references		
	Periodic Cultural event		
	Traditions		
	Collective Memory		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
	Local Knowledge information TASK 6.5 POLITO		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent

			resilience § Social memory
	Intangible Heritage Balance of cultural and natural values in the natural environment		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
	Ethnic traditions		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
	Ethnographic information		PREVENTION/ADAPTION PHASE Coping capacity • transformative capacity/inherent resilience § Social memory
PAST EVENTS	wildfires scale, frequency and intensity of wildfires		PREVENTION / ADAPTION PHASE Source/hazards

	period (spring fires cause different and more severe changes in many biological processes)		Frequency
	hectares burned		§ Flood hazard
	loss of human life		• Flood area corresponding to the return period T
	storms/storm wind		• Flood frequency: linked with the return period
	specific techniques and materials for natural areas management for terracing for farming for hunting for materials for farming for fire protection		§ Hazard characterization
			• Frequency of disaster event
			§ Storm characterization
			• Number of storms per month
POLICIES AND PLANNING	Ecosystem management plan		
	Management of water resources		
	Integrated watershed management		
	Nearby park fire-prone areas		
	Wildland hazard building codes		

	buffer zones between the park and urbanized areas		
	Monitors sounds in parks		
	River systems and floodplains, riparian systems, regional greenspace systems, greening major transportation corridors		
	'prescribed fire' (intentional burning to reduce fuel in the potential paths of destructive wildfires or to maintain natural processes)		
	territorial planning structure - territorial /regional Plans/strategies (overall but also specific to natural areas)		adaptive capacity -> built capital/infrastructure -> Infrastructure -> Hospital beds per 10,000 persons adaptive capacity -> built capital/infrastructure -> Sub-category (non) -> Percentage of existing infrastructures provided with back-up systems

			adaptive capacity -> natural capital
ECONOMIC CONTEXT	Fee for entry (park)		PREVENTION / ADAPTION PHASE Adaptative capacity o economic capital § activities • Percentage of firms implementing international risk management standards in the organisation structure and processes § Economic • Economic Resilience Index adapted based on Disaster Deficit Index o institutional capital/governance § institutional • Percentage population covered by a mitigation plan
	Number of visitors attracting (also for nearby areas income		
	Number of local visitors		
	Engaged workers		
	Income from farming		
	CH asset revenues in Euros		
	CH asset insurance costs		
	Provide a description of CH asset in its HA in term of economic situation		
	Income per capita		
	GDP in the region		
	Economic Resilience Index		
	Tourism revenues in the HA		

	Main economic sector		<p>§ Economic</p> <ul style="list-style-type: none"> • Budget allocation and mobilization <p>PREVENTION / ADAPTION PHASE</p> <p>Sensitivity</p> <ul style="list-style-type: none"> o economic characteristics <p>§ Per capita income</p> <p>§ Percentage of population above poverty line</p> <p>§ Unemployment rate</p> <p>§ Gini coefficient</p> <p>§ Ratio of large to small businesses</p>
MONITORING AND ASSESSING	Specific Rules and Law restrictions		
	Control of urban sewage, runoff and solid waste		
	Environmental education programs		
	Compliance signs		
	Stern warnings (to stop people setting fires)		
	fire roads		
	Preventing littering that harms or kills wildlife		

	Controlling poaching		
	Control encroachment		
	Waste system		
	managing water quality and quantity (to protect biodiversity from pollution and extremes of drought and flooding) (Guideline 15)		
	Vegetation Management		
	Managing wildfires i(n ways that protect native species and ecosystems) (Guideline 16);		
	Fire-safe landscaping		
	Nearby fire-prone areas		
	Watershed (also called a catchment area or drainage basin)		
	Pollution monitoring		
	Controllers		
	Direct link with responsables for fire prevention and control in site in neighbouring urban areas		

	Wifi		
	Telephone		
	Shelter		
	predictive modelling		
	spatially explicit		
	assess land use change		
	Landslide management		
	By re-grading of slopes;		
	connections among		
	heritage sites		
	conservation priorities		
	Cooperation among		
	institutions that have		
	complementary		
	missions		
	Cooperation of heritage		
	sites with universities		
	Take advantage of		
	volunteers and support		
	groups		
	Local sense of		
	ownership		
	Control encroachment		
	Monitor and manage		
	water		
	Promote connections to		
	natural areas		
	Promote rules and		
	organizational culture		

	Take advantage of international organizations and exchanges		
	Promote and defend and expand urban heritage		
	Improve urban heritage through research and evaluation		
	Prevent and prosecute crime against people and property		
	Demonstrate, facilitate and promote public health and well-being		
	Demonstrate, facilitate and promote good environmental behaviour		
TOOLS			
	website information		
	App for mobile devices		
	GIS data based		
	print publications		
	social media		
	multimedia presentations		

	pollution monitoring systems		
	sensors		
RESOURCES			
HUMAN RESOURCES			

Table 13: Prioritization of Attributes according to the Shortlist of Indicators for NATURAL Macrocategory

URBAN MACROCATEGORY

	PREVENTION		
URBAN MACROCATEGORY ATTRIBUTES			CORRESPONDENCE IN INDICATORS
		(text)	
Defining the CH asset and	Denomination	Current Formal Name	
		Local Name	
		Name in other languages	
		Historical Name	

its significance	Location	Country	
		City	
		Location	
		Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system)	
		Height above sea level (m)	
	Demographics	<ul style="list-style-type: none"> • Total population • population in cities by sex and age • vulnerable groups • population density for neighborhood/interested urban area • urban growth trend 	<p>PREVENTION/ADAPTION PHASE – Exposure – individuals – Demographic – Population in hazard area</p> <p>PREVENTION/ADAPTION PHASE – Exposure – economic characteristics – unemployment rate</p> <p>PREVENTION/ADAPTION PHASE – Sensitivity – Social/demography characteristics:</p> <ul style="list-style-type: none"> • Population density • Percentage of population below 65 years of age • Percentage of population 17 years of age or younger • Percentage population without sensory, physical, or mental disability • Percentage of female • Percentage of one-person household • Net international migration

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	HUMAN SETT. SIZE PRIORITIZATION	<ul style="list-style-type: none"> Urban conurbation Metropolis City Town Village Isolated dwelling 	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – urban characterization
	DEGREE OF URBANIZATION To be checked with TEC to understand which prioritization is more effective	<ul style="list-style-type: none"> Urban centre (or high density cluster): Consists of contiguous grid cells with a density of at least 1,500 inhabitants per km². An urban centre has population of at least 50,000. Urban cluster (or moderate density clusters): Town, Suburban. Consists of contiguous grid cells with a density of at least 300 inhabitants per km² and has a population of at least 5,000 in the cluster Rural grid cells (mostly low density cells) : Village, Dispersed Rural Areas 	PREVENTION/ADAPTION PHASE – Sensitivity – Building Characteristics – urban characteristics: Street Pattern
		<ul style="list-style-type: none"> Very strongly urbanized, with an address density of 2,500 addresses or more per km²; Strongly urbanized, with an address density of 1,500 to 2,500 addresses per km²; Moderately urbanized, with an address density of 1,000 to 1,500 addresses per km²; Weakly urbanized, with an address density of 500 to 1,000 addresses per km² 	

		<ul style="list-style-type: none"> Not urbanized, with an address density of less than 500 addresses per km² 	
URBAN SCALE	HA	Historic city Historic Town Historic Villages District Urban ensemble Urban Archaeological areas Urban area included in Protected area City/ Town/Village in Cultural routes City/ Town/Village in Cultural routes Village/Hamlet/Isolated dwelling in Cultural landscape Hamlet/Isolated dwelling in Geopark	PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – building characterization
Category List UNESCO (Select from the table by clicking on arrow)		Cultural landscapes	
TYPE (In the order		Tangible Heritage (Movable)	

	Main and All Included Types)		
	Type specification	Museum	
		If Other, define:	
	Classification / Registration Status and Current Conservation Status	Listed in the UNESCO WHS: Ref no: Link	
		Listed in European Heritage Label Ref no: Link	
		Listed in the National List/Lists Replicable Field if Cross-Country Ref no link	
		Listed in Local List/Lists Replicable Field if Cross-Country Ref no: Link	
		Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity Ref no: Link	

	PROTECTED SITES AND URBAN HERITAGE	<p>Monumental heritage of exceptional cultural value (registered urban area in world/national /local lists)</p> <ul style="list-style-type: none"> • Conservation area • World Cultural Heritage site • European label site • Historical urban landscapes HUL • Archaeological site • Historic industrial heritage site • Architectural ensemble/site • Historic site (e.g. City walls and defensive towers, Citadel, Military) • Ethnic/Ethnographic/Anthropological site • Historic infrastructure • Memorial and Monument • Urban Art (e.g. Statues, artistic installations) 	<p>PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – building charactererization</p>
		<p>Monuments, architectural heritage at building scale -> BUILDING MACROCATEGORY</p>	<p>PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – building charactrerization:</p> <ul style="list-style-type: none"> • Daily hillside of roofs • Daily hillside of façades • Vibrations generated on cultural heritage by vehicular traffic

		<p>Monumental open spaces (also defined by the built fronts):</p> <ul style="list-style-type: none"> • Historic/designed square • Historic street (with Porticos, with continuous street-front) • Historic court/ Cloister • Religious heritage site 	<p>PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity -natural heritage characterization</p>
		<p>Parks, gardens, monumental tree -> NATURAL MACROCATEGORY</p>	<p>PREVENTION/ADAPTION PHASE – Coping Capacity – Protection of natural resources – ecological capacity:</p> <ul style="list-style-type: none"> • Vegetation density • Share of the protected lands • Share of ecological corridors • Structural connectivity of green infrastructure • Functional connectivity of green infrastructure • Area of habitats restored • Habitat functional composition (relative abundance of functional features) • Green space proportion • Vegetation water content • Habitat-suitability index under climate change scenarios

		<p>Other urban elements important for cultural identities and collective memories</p> <ul style="list-style-type: none"> • Continuous regular architectural ensemble • Historic urban fabric • regeneration area • Social Housing/Working class district (architectural work) • Cistern • Seafront /Riverfront /Lake shore front 	
		Other at building scale -> BUILDING MACROCATEGORY	PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – building characterization
		<p>Other open spaces important for cultural identities and collective memories:</p> <ul style="list-style-type: none"> • Continuous regular architectural street-front • Square/Market square/Suk • Courtyard • Thermal bath • Mall 	
		<p>New urban elements to be considered:</p> <ul style="list-style-type: none"> • The urban built form (e.g. Compact fabric, urban sprawl, suburban sprawl) • Urban infrastructures: material networks and equipments • Infrastructures (e.g. Airport, Harbor, Railway, bridges, walkway, quayside, embankment, Main road) 	

		<ul style="list-style-type: none"> Leisure area/parks Industrial park 	
		Parks and green areas -> NATURAL MACROCATEGORY	
		Cemetery -> NATURAL MACROCATEGORY	
	Overall description of the CH asset in the current situation with its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)	Sensitivity -> building characteristics -> Urban characterization -> <ul style="list-style-type: none"> Land Take Land cover Urban growth, avg. annual rate (%). Average slope Average elevation Thermal diffusivity Solar reflectance Sensitivity -> environmental sensitivity -> Urban characterization -> Buildings in hazard area
	Simple/Complex CH asset	Simple site: Specify according to the UNESCO Thesaurus for descriptive terms [e.g.	

		http://vocabularies.unesco.org/thesaurus/concept17008 for Churches]	
		Complex Site: Specify in the cell below, indicate detailed list of CH components (see the cell below)	
	Detailed list of CH components in the case of composite CH categorization (e.g. Cultural Routes)	List Components and related Types Specify according to the UNESCO Thesaurus for descriptive terms (e.g. http://vocabularies.unesco.org/thesaurus/concept17008 for Churches)	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – building characterization PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – urban characterization
	Material and Techniques (an open description is good but it would be very useful if we ask also about a category of material, so we can use this parameters in the evaluations)	300 words max Overall description of the historical Materials and Techniques of CH asset in relation to its components Link to Related Ressources	
	Restauration and Reinforcements	Latest Intervention Date and Type Link to Related Ressources UNIBO	

		Reinforced-concrete slab: Roof (yes/no), vault (yes/no), horizontal structures (yes/no)	
		Placcaggi armati in cls: muri (yes/no)	
		Pilastri in cls armati in murature/in elementi architettonici antichi (yes/no)	
		Chiodature armate con iniezioni Regeneration of walls with concrete injections (yes/no)	
		Tie bars (yes/no)	
		Concrete underpinning or plinth (yes/no)	
		Prestressed cables - walls or other elements (yes/no)	
		Micropile underpinning bracket (yes/no)	
		Roof/floor edge beam (yes/no)	
		Main Historical Information	Date/period of construction
	Characterising Historical period		
	Timeline		
	Architects/Artists		
	Patronage		
	Archaeological excavations (repeatable field)		
	Name of historical territorial area		
	Historical information <ul style="list-style-type: none"> • Ancient denomination • Earliest Urban Features • Roman site 		
	HA LAND USE FUNCTIONS,	Current function	
		Historical function (repeatable field)	

	CHARACTERISATION	Open to public (Y/N)	
		Used by Local citizen	
		Touristic use and system of admittance and management	
		Number of CH asset staff	
		Number of CH asset inhabitants	
		Conversion/regeneration area	
		Educational	
		Entertainment area	
		Excavation area	
		Industrial area/ex industrial area	<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity - built capital/infrastructure – infrastructure: Hospital beds per 10,000 persons</p> <p>PREVENTION/ADAPTION PHASE – Adaptive Capacity- social capital/learning – infrastructure: Psychosocial support facilities per 10,000 persons</p>
		Medical facilities	<p>PREVENTION/ADAPTION PHASE – Coping Capacity – Awareness/information – infrastructure: Infrastructure Redundancy</p> <p>PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure –</p>

			infrastructure: Road and traffic disturbance
		Infrastructure	
		Parking lots	
		Parks and recreation	PREVENTION/ADAPTION PHASE – Sensitivity – Building Characteristics – urban characteristics: Percentage of residential buildings
		Residential area	
		Shopping areas	
		Pedestrian Zones	
		Sports complex	PREVENTION/ADAPTION PHASE – Coping Capacity – Shelter capacity – infrastructure: Hotels/motels per 10,000 persons
		Tourist-leisure area	PREVENTION/ADAPTION PHASE – Exposure – Ecosystems – hazard area characterization – Productive areas in hazard area
		Production areas	
		Warehouses area	
	CH significance to community in terms of social resilience	if significant	

	Inspection Information	Periodic inspections	
		Inspector(s)' institution/affiliation	
		Inspection Date:	
		Inspection timing (indicating the duration of the inspection)	
		Type of inspection* (Suggested value: regular Inspection, emergency condition assessment, rainy season inspection)	
		Inspection Management Public/Private and responsables	
		Accessibility on inspection Day (Suggested values: open access, guarded, closed)	
Defining its RISKS	Hazard Type According to SHELTER Indicators shortlist	Weather condition on inspection day (Suggested values: raining, no raining)	source/hazards -> frequency -> Flood Hazard source/hazards -> frequency -> Hazard Characterization
		Earthquake	
	Exposure Type	If More, Define:	
		individuals	
	Vulnerability	Glossary Definition	
		Sensitivity	

	Vulnerable areas for location	Glossary:	PREVENTION/ADAPTION PHASE – Adaptive Capacity – natural capital – ecological capacity: <ul style="list-style-type: none"> • Area under vegetation and wetlands • Total carbon sequestered (Mg C) and carbon sequestration rate (Mg C/ha/yr) <p>p</p>
	Monitoring Time	Vulnerable areas for location <ul style="list-style-type: none"> • Proximity to water basins, from sea/river; • Proximity to forest/ • Tree/Tree lines nearby 	
Defining the CH asset in its context	Environmental Context Vulnerabilities (terminology to be updated with ontologies) (TEC)	Existing Monitoring Scheme	<p>exposure -> object/buildings/infrastructure -> Urban characterization -> Buildings in hazard area</p> <p>exposure -> object/buildings/infrastructure -> Urban characterization -> Critical facilities in hazard area</p> <p>exposure -> object/buildings/infrastructure -> Urban characterization -> Land take in hazard area</p>

		Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.	<p>source/hazards -> magnitude -> rainfall characterization -> Daily maximum precipitation corresponding to the return period T</p> <p>source/hazards -> duration -> Storm characterization -> Storm duration</p> <p>source/hazards -> duration -> Heatwave characterization -> Temperature above 35°C for more than 3 consecutive days</p> <p>source/hazards -> duration -> Heatwave characterization -> The daily maximum temperature of more than 5 consecutive days exceeds the average maximum temperature by 5°C, the normal period being 1961–1990</p>
		<p>Environmental Conditions</p> <p>references to geology and hidrology should be allocated under next section on Geography</p>	<p>PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – land characterization</p>

		Topographical information	<p>source/hazards -> magnitude -> heatwave characterization -></p> <ul style="list-style-type: none"> • ONRN indicators for heatwave • Daily mean temperature • Thermal shock [Tmax-Tmin] • Daily sun hours • Mean relative humidity • Daily humidity cycle shocks [RH(n)-RH(n+1)>25%] • Relative humidity concentration [nRH>75%] <p>source/hazards -> Intenstiy, duration and frequency -> Rainfall characterization -> IDF (intensity duration frequency) curves</p>
		Meteorological and climatological conditions	<p>source/hazards -> magnitude -> Storm characterization -> Wind speed (Hurricane, violent storm, heavy storm, storm)</p> <p>source/hazards -> magnitude -> Storm characterization -> gust strength</p> <p>source/hazards -> magnitude -> Storm characterization -> wind pressure</p> <p>source/hazards -> magnitude -> Storm characterization -> Lifted index</p> <p>source/hazards -> magnitude -> Storm characterization -> Wind speed (meter /second)</p>

		Water quality: surface and groundwater	exposure -> Ecosystems -> Pollution -> Air quality
		air and noise quality	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity – soil characterization
		soil quality	source/hazards -> magnitude -> evaluation of ecological niche -> Annual Mean Temperature source/hazards -> magnitude -> evaluation of ecological niche -> Annual Precipitation
		Hydrological general information: water cycle, networks	source/hazards -> magnitude -> Earthquake characterization -> Peak Ground Acceleration (PGA) source/hazards -> magnitude -> Earthquake characterization -> Level of Seismic Hazard source/hazards -> magnitude -> Earthquake characterization -> Earthquake intensity (Modified Mercalli scale)

		<p>Geology general information</p>	<p>sensitivity -> environmental sensitivity -> No subcategory -></p> <ul style="list-style-type: none"> • Structural connectivity of green infrastructure • Functional connectivity of green infrastructure • Number of non-native species of flora introduced (total number) • Number of non-native faunal species introduced (total number) • Species diversity within defined area per Shannon Diversity Index • Number of species within defined area per Shannon Evenness Index • Number of veteran trees per unit area (no./ha) • Quantity of dead wood per unit area (m3/ha) • Extent of habitat for native pollinator species (ha) • Proportion of natural areas within a defined urban zone (fraction or %) • Number of conservation priority species (no./ha) • Number of native/local provenance species (no./ha) • Number of native bird species within a defined urban area
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			<ul style="list-style-type: none"> • Change in number of native species compared to a baseline number of species • Area of habitats restored (ha) • Habitat functional composition (relative abundance of functional features) • Shannon Index: This indicator corresponds to the proportion of bare, turf grass, rough grassland and herbs, shrubs, trees and of built environment • Urban Green Space proportion. This indicator is defined as the simple ratio of the natural areas (A_n) per the total area (A_c). The objective is to determine if the NBS solution increases or maintains the proportion of areas supporting biodiversity in the city or neighbourhood • Plant/root decay rate
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		Ecosystems services and biodiversity conditions	source/hazards -> Intensity -> Storm characterization -> Heavy rain
		Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	
		Degradation mechanisms	
		Flood defenses	
		Vegetation barriers separating built areas from the sea/water basins	
		Drainage systems	PREVENTION/ADAPTION PHASE – Sources/hazard – magnitude: temperature characterization
		Climate type	PREVENTION/ADAPTION PHASE – Sources/hazard – magnitude
		Dry days number for year	PREVENTION/ADAPTION PHASE – Sources/hazard – intensity: rainfall characterization
	TOPOGRAPHY AND GEOMORPHOLOGICAL CHARACTERISATION	Rain days number for year	
		Topographical characterisation	source/hazards -> magnitude -> Urban characterization -> Subsidence rate
		Geo-Morphology characterisation	
		Coastal city/area	
		Mountain city/area	
		River city/area	

		Forest Nearby	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity -land characterization: slope
		Slope	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity -land characterization: slope
		Morphology derived by Regrading of slopes	
		Public spaces, roads, and paths morphological skeleton and main orientation	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity -land characterization: land take
		Plots-blocks morphology and parcel structure (e.g. Regular blocks/ grid iron streets / small rectilinear city block/ narrow lots and building setbacks/ prominent civic spaces)	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity - soil characterization
		Soil type	PREVENTION/ADAPTION PHASE – Sensitivity – environmental sensitivity - soil characterization
		Soil infiltration capacity (permeable surface)	
	Geographical Context and Physical Asset	Erosion area/ coastal erosion	Sensitivity -> building characteristics -> Urban characterization -> <ul style="list-style-type: none"> • Land Take • Land cover • Urban growth, avg. annual rate (%). • Average slope • Average elevation • Thermal diffusivity • Solar reflectance

		Description of CH asset surroundings including Immediate neighborhood, village, district, infrastructures, natural asset	
		HA Urban area current land cover	<p>PREVENTION/ADAPTION PHASE – Sensitivity – Building Characteristics – urban characteristics: Average annual rate of change of the percentage urban</p> <p>PREVENTION/ADAPTION PHASE – Sensitivity – Building Characteristics – urban characteristics: Building alignment rate</p>
		<p>Urban density (the measure of the HA per area unit)</p> <ul style="list-style-type: none"> • population/city • population/blocks • Floor area on a parcel 	<p>PREVENTION/ADAPTION PHASE – Sensitivity – Building Characteristics – urban characteristics: Street pattern</p> <p>PREVENTION/ADAPTION PHASE – Sensitivity – Building Characteristics – urban characteristics: Average annual rate of change of the percentage urban</p>

		<p>Connectivity (street density and design.)</p> <ul style="list-style-type: none"> • High connectivity (finer grain systems with smaller blocks that allow frequent changes in direction; distances tend to be shorter) • Low connectivity 	<p>sensitivity -> infrastructure characteristics -> communication -> Percent population with a telephone</p> <p>sensitivity -> infrastructure characteristics -> communication -> % Population with access to broadband internet service</p> <p>sensitivity -> infrastructure characteristics -> urban characterization -> Average percent perviousness</p> <p>sensitivity -> infrastructure characteristics -> urban characterization -> Dam capacity</p> <p>adaptive capacity -> social capital/learning -> Infrastructure -> Psychosocial support facilities per 10,000 persons</p> <p>adaptive capacity -> social capital/learning -> Social capital -> Red cross volunteers per 10,000 persons</p> <p>adaptive capacity -> social capital/learning -> Social capital -> # of registered volunteers</p>
		<p>Physical Infrastructures and networks in the surroundings (e.g. dam, tunnels) (Repeatable field)</p> <p>include here: transport network (roads, paths), water management and sanitation (drainage, sewage system), energy</p>	

		infrastructures (generation, transformation), energy networks (distribution)	
		Sidewalk Dimension	PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – hazard area characterization: <ul style="list-style-type: none"> • Land take in hazard area • Major accident risk factories in hazard area
		Land Use percentage <ul style="list-style-type: none"> • Residential • Commercial • Industrial • Infrastructural • Tourist-leisure • Park and blue/green areas • Area of green public spaces (ha)/inhabitant (or every 1,000 inhabitants) 	
		Number of CNH sites	
		Isolated area (Yes/not)	
		Natural barriers (in the surrounding)	
		CH asset Boundaries (legal boundaries as i.e. property of land?) or social boundaries?	

		CH asset Buffer zone- What would it be the buffers 's role here? For evaluation?	PREVENTION/ADAPTION PHASE – Sensitivity –infrastructure characteristics – transport/access
		Access to CH asset (attach a map and/or photos) This should be linked to communication/transport network	PREVENTION/ADAPTION PHASE – Sensitivity –infrastructure characteristics – transport/access
	Cultural, Anthropological and Social Context (Intangible Heritage)	Access to the area (attach a map and/or photos) This should be linked to communication/transport network	
		Historical readings	
		Historical references	
		Periodic Cultural event	
		Collective Memory and Traditions	
		HAZARD Past Events Levels of damage of past event	
		Local Knowledge information TASK 6.5 POLITO	PREVENTION/ADAPTION PHASE – Adaptive Capacity – cultural capital/identity – cultural capital: <ul style="list-style-type: none"> • Intangible cultural values • Presence of a traditional culture

		Intangible Heritage Balance of cultural and natural values in the urban environment	transformative capacity/inherent resilience - > o Social memory o Living with uncertainty/improvising o Self-organisation, reflective and shared learning o Resourcefulness/Efficiency/ o Collaboration/inclusive/diversity/inter sectoriality o Innovation o Robustness/Strength/appropriately connected o Coupled with Local Natural Capital
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		Ethnic traditions	<p>PREVENTION/ADAPTION PHASE – Exposure – individuals – Demographic – Population in hazard area</p> <p>PREVENTION/ADAPTION PHASE – Exposure – economic characteristics – unemployment rate</p> <p>PREVENTION/ADAPTION PHASE – Sensitivity – Social/demography characteristics:</p> <ul style="list-style-type: none"> • Population density • Percentage of population below 65 years of age • Percentage of population 17 years of age or younger • Percentage population without sensory, physical, or mental disability • Percentage of female • Percentage of one-person household • Net international migration
		Ethnographic information	
	Economic context		
		CH asset revenues in Euros	
		CH asset insurance costs	<p>PREVENTION/ADAPTION PHASE – Sensitivity – Economic characteristics – per capita income</p>

		Provide a description of CH asset in its HA in term of economic situation	
		Income per capita	PREVENTION/ADAPTION PHASE – Adaptive Capacity – economic capital – economic: Economic Resilience Index adapted based on Disaster Deficit Index
		GDP in the region	
		Economic Resilience Index	sensitivity -> economic characteristics adaptive capacity -> cultural capital / identity
		CH economic relevance in the Historic area (Please indicate what "area" means here. Does it mean the CH within its legal boundaries or the region in which the CH is located?)	
		Tourism revenues in the HA (What does "area" means here?)	
		Main economic sector (related to the CH or in general in the "area"?)	
	Policies and Planning context	Main revenues type in the Historic area	
		CH asset approximately yearly investment costs	adaptive capacity -> institutional capital/governance
		Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc	adaptive capacity -> built capital/infrastructure -> Infrastructure -> Hospital beds per 10,000 persons adaptive capacity -> built capital/infrastructure -> Sub-category (non) -> Percentage of existing infrastructures provided with back-up

			systems adaptive capacity -> natural capital
		The physical planning (transport, infrastructure) of the area in which the property is located- The physical characteristics of the area in which the CH is located, has been already characterized above, under Geographycal and Physical Context in terms of infrastructures and networks- have been already	
	GOVERNANCE	Pre-Disaster Recovery Planning	
		Ownership	
		Management	
		Plans for future urban growth	

		Local/regional/policies for Heritage conservation areas	<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – institutional capital/governance – institutional: The extension to which risk is taken into account in land use and urban planning</p> <p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – economic capital – activities: Percentage of firms implementing international risk management standards in the organisation structure and processes</p> <p>PREVENTION/ADAPTION PHASE – Coping Capacity – Awareness/information: - education: Number of participants in training courses executed by authorities, institution, corporations or other bodies, specific for DRM</p>
		Local/regional/policies and measures for DDR	<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity – institutional capital/governance – institutional: Mechanisms for communities to engage with government</p>

		National/local policies linking culture, urban development and DRR	PREVENTION/ADAPTION PHASE – Adaptive Capacity – institutional capital/governance – institutional: Mechanisms for communities to engage with government
		Measures facilitating communication and cooperation between the stakeholders, in particular between the public institutions; and between the public and private stakeholders for DRR in HA	PREVENTION/ADAPTION PHASE – Adaptive Capacity – human capital – education: Percentage of people with disasters preparedness education PREVENTION/ADAPTION PHASE – Adaptive Capacity – human capital – training: Number of professionals trained in post-disaster recovery and preservation of cultural heritage
		Measures to promote capacity-building activities involving main stakeholders in Heritage and DRR	PREVENTION/ADAPTION PHASE – Coping Capacity –living with uncertainty/improvising – communication - Existence of a platform for information sharing and networking using tools and routines and number of unique users
		Measures aimed at mitigating the impacts of climate change on urban HA	

		Policies and initiatives integrating urban HA and the natural environment	
		Legislative and regulatory measures to safeguard intangible values of urban heritage	
		Measures Promoting intercultural dialogue	
		Measures and Initiatives promoting cultural diversity in HA	<p>PREVENTION/ADAPTION PHASE – Adaptive Capacity- social capital/learning – social capital:</p> <ul style="list-style-type: none"> • Civic organizations per 10,000 persons • Red cross volunteers per 10,000 persons • Budget of volunteer organizations • Number of registered volunteers
		Measures and Initiatives promoting processes and participation, keeping active and facilitating dialogue (in planning, heritage identification and awareness)	<p>PREVENTION/ADAPTION PHASE – Coping Capacity – Protection of natural resources – risk reduction: Environmental impact assessment of heritage sites</p>
		Measures in place to include of heritage in impact assessments	<p>PREVENTION/ADAPTION PHASE – Exposure - object/buildings/infrastructure – asset characterization: sky view factor</p>

		Measures in place for monitoring of height controls in the historic urban fabric	PREVENTION/ADAPTION PHASE – Transformative Capacity- social memory – local knowledge – Existence of mechanisms for integration local knowledge and local perceptions of risk and scientific knowledge, data and assessment methods
		Measures supporting innovative income rooted in heritage and local tradition	PREVENTION/ADAPTION PHASE – Transformative Capacity- social memory – local knowledge – Existence of mechanisms for integration local knowledge and local perceptions of risk and scientific knowledge, data and assessment methods
		Public policies in place to learn from the traditions and perceptions of local communities	
		Measures in place for tourism services in urban HA	
		Measures in place for fostering understanding of heritage vulnerability	PREVENTION/ADAPTION PHASE – Coping Capacity – Awareness/information – education: Number of professionals trained in post-disaster recovery and preservation of cultural heritage
		Measures in place supporting capacity building efforts (educational programmes for professionals on urban heritage, ...)	

		Measures for improving Information and Digital Technologies in Heritage and DDR	PREVENTION/ADAPTION PHASE – Adaptive Capacity- social capital/learning – social capital: <ul style="list-style-type: none"> • Budget of volunteer organizations • Number of registered volunteers
		Measures for developing a specific communication strategy toward the civil society (outreach and information sharing through social media)	
		Mechanisms in place to assess the vulnerability of attributes of urban HA to disasters	
		Mechanisms in place to assess the vulnerability of attributes of urban HA to climate change.	
		Mechanisms in place to assess the vulnerability of Heritage attributes of urban HA to socio-economic pressures	
		Mechanisms in place to assess the existing local skills	
		Mechanisms in place to assess the human resources of urban HA	
		Mechanisms in place to assess natural resources in urban HA	
		Mechanisms in place to assess cultural resources in urban HA	

	<p>CNH LOSS ASSESSMENT CATEGORIES</p>	<p>Critical Loss Site destroyed: all or most of the visible key elements of the assessed site have collapsed (80–100 per cent of structure destroyed). All of the main historically valuable elements inside the cultural heritage site are destroyed.</p> <p>Severe Loss Site Severely damaged: a significant part of the visible key elements of the site has collapsed or is partially damaged (40–80 per cent of structure damaged) or significant military or civilian activity has contributed to extensive damage at the site. Many of the main historically valuable elements of the cultural heritage site are severely damaged causing severe loss.</p> <p>Moderate Loss Site Moderately damaged. Limited damage observed relating to key elements of the site (5–40 per cent of structure damaged) or where military or civilian activity has contributed to damage. Some of the main historically valuable structures inside the cultural heritage site are moderately damaged causing moderate loss.</p> <p>Minimal Loss Site Possibly damaged. Assessed site structures do not appear to be damaged, but</p>	<p>RECOVERY – Damages – Damages in buildings</p> <p>RECOVERY – Damages – Damages in ecosystem</p>
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		debris is visible around key site structures. None of the main historically valuable elements of the cultural heritage site are damaged.	
	MONITORING AND ASSESSING	predictive modelling spatially explicit	
		assess land use change	
		Landslide management By re-grading of slopes;	
		connections among heritage sites	
		conservation priorities	
		Cooperation among institutions that have complementary missions	

		Cooperation of heritage sites with universities	PREVENTION/ADAPTION PHASE – Adaptive Capacity- social capital/learning – social capital: • Civic organizations per 10,000 persons • Number of registered volunteers
		Take advantage of volunteers and support groups	PREVENTION/ADAPTION PHASE – Coping Capacity – Awareness/information – social capital: Risk Perception
		Local sense of ownership	
		Control encroachment	
		Monitor and manage water	
		Manage wildfires	
		Promote connections to natural areas	
		Promote rules and organizational culture	
		Take advantage of international organizations and exchanges	
		Promote and defend and expand urban heritage	
		Improve urban heritage through research and evaluation	
		Prevent and prosecute crime against people and property	
		Demonstrate, facilitate and promote public health and well-being	

		Demonstrate, facilitate and promote good environmental behaviour	
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Table 14: Prioritization of Attributes according to the Shortlist of Indicators for URBAN Macrocategory

BUILDING MACRECATEGORY

1. HA ANATOMY AND BUILDING CATEGORIZATION	
IDENTIFIED ATTRIBUTES	CORRESPONDENCE IN INDICATORS
<u>DEFINING THE CH ASSET AND ITS SIGNIFICANCE (ID)</u>	
Denominations <ul style="list-style-type: none"> • Current Formal Name • Local Name • Name in other languages • Historical Name 	
Location <ul style="list-style-type: none"> • Country • City • Location • Location local name • Coordinates (Latitude / Longitude in WGS84 (Pseudo / Mercator) Spatial reference system) • Height above sea level (m) • Add one comprehensive photograph of the CH asset with surrounds 	
Site plan /map	
Administrative Info <ul style="list-style-type: none"> • Ownership: • Governance system • Authorities • Management Public/Private • Open to public: (Y/N): 	
Category List UNESCO <ul style="list-style-type: none"> • Agricultural heritage • Archaeological sites • Architectural ensembles • Collections (movable) • Cultural landscapes • Cultural routes • Heritage canals • Historic buildings • Historic gardens • Historic landscapes • Historic towns and villages • Historic town centres • Historic urban landscapes • Human settlements 	

<ul style="list-style-type: none"> • Industrial and technical heritage • Intangible cultural heritage • Mixed sites • Natural sites • Polar heritage • Prehistoric sites • Rock art • Scientific heritage • Significant personalities (heritage related to-) • Underwater cultural heritage • Habitations urbaines • Vernacular architecture • World Heritage 	
<p>Classification / Registration Status and Current Conservation Status</p> <ul style="list-style-type: none"> • Listed in the UNESCO WHS: <ul style="list-style-type: none"> ◦ Ref no: ◦ Link • Listed in European Heritage Label <ul style="list-style-type: none"> ◦ Ref no: ◦ Link • Listed in the National List/Lists Replicable Field if Cross-Country <ul style="list-style-type: none"> ◦ Ref no ◦ link • Listed in Local List/Lists Replicable Field if Cross-Country <ul style="list-style-type: none"> ◦ Ref no: ◦ Link • Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity <ul style="list-style-type: none"> ◦ Ref no: ◦ Link 	
<p>Links with other CH assets (i.e. Tangible and Intangible heritage related CH assets in the area)</p>	
<p>Overall description of the CH asset in the current situation with its main features and components (to be listed in the field below) that will allow to directly link to specific analyses and detailed information in the Clusters of Resources)</p>	<p>Sensitivity -> building characteristics - > Urban characterization -></p> <ul style="list-style-type: none"> • Land Take • Land cover • Urban growth, avg. annual rate (%)

	<ul style="list-style-type: none"> • Average slope • Average elevation • Thermal diffusivity • Solar reflectance <p>Sensitivity -> environmental sensitivity -> Urban characterization -> Buildings in hazard area</p>
<p>Simple/Complex CH asset (Single Building or Complex Building)</p> <ul style="list-style-type: none"> • Simple site: Specify according to the UNESCO Thesaurus for descriptive terms [e.g. http://vocabularies.unesco.org/thesaurus/concept17008 for Churches] • Complex Site: Specify in the cell below, indicate detailed list of CH components 	
<p>Detailed list of BUILDING Components</p> <p>List Components and related Types Specify according to the UNESCO Thesaurus for descriptive terms (e.g. http://vocabularies.unesco.org/thesaurus/concept17008 for Churches)</p>	<p>Sensitivity -> building characteristics -> Building characterisation</p> <ul style="list-style-type: none"> • New buildings rate • # of one floor houses • % of buildings complying with hazard-resistant building codes and/or standards <p>Sensitivity -> environmental sensitivity -> Urban characterization -> Buildings in hazard area</p>
<p>Material and Techniques</p> <ul style="list-style-type: none"> • 300 words max • Overall description of the historical Materials and Techniques of CH asset in relation to its components • Link to Related Resources 	
<p>Materials List</p> <ul style="list-style-type: none"> • Main material of the structure • Horizontal structure material • Roof material • Roof type • Secondary material of the structure (if any) 	
<p>Techniques List</p>	
<p>Restoration and Reinforcements</p> <ul style="list-style-type: none"> • Latest Intervention Date and Type • Link to Related Resources 	

<ul style="list-style-type: none"> Reinforced-concrete slab: Roof (yes/no), vault (yes/no), horizontal structures (yes/no) Placcaggi armati in cls: muri (yes/no) Pilastri in cls armati in murature/in elementi architettonici antichi (yes/no) Chiodature armate con iniezioni Regeneration of walls with concrete injections (yes/no)" Tie bars (yes/no) Concrete underpinning or plinth (yes/no) Prestressed cables - walls or other elements (yes/no) Micropile underpinning bracket (yes/no) Roof/floor edge beam (yes/no) 	
Main Historical Information <ul style="list-style-type: none"> Date of construction/Century Historical period Timeline Architects/Artists Patronage Archaeological excavations (repeatable field) Name of historical territory 	
Function and uses <ul style="list-style-type: none"> Current function Historical function (repeatable field) Open to public (Y/N) Used by Local citizen Touristic use and system of admittance and management Number of CH asset staff Number of CH asset inhabitants 	exposure -> individuals -> Demographic exposure -> Population in hazard area exposure -> Community exposure -> processes activities
Links with other CH assets	
CH significance to community in terms of social resilience (this should be collaborative)	
Inspection Information <ul style="list-style-type: none"> Inspector(s) Name Inspector(s)' institution/affiliation Inspection Date: Inspection timing (indicating the duration of the inspection) 	

<ul style="list-style-type: none"> Type of inspection* (Suggested value: regular Inspection, emergency condition assessment, rainy season inspection) Inspection Management Public/Private and responsables Accessibility on inspection Day (Suggested values: open access, guarded, closed) Weather condition on inspection day (Suggested values: raining, no raining) 	
2. DEFINING THE RISK	
Hazard Type According to SHELTER Indicators shortlist	source/hazards -> frequency -> Flood Hazard source/hazards -> frequency -> Hazard Characterization
Exposure Type	
Vulnerability	
Monitoring Time	
3. DEFINING THE CH ASSET IN ITS CONTEXT	
3.1 Environmental Context Vulnerabilities (terminology acc to. ontologies) (TEC)	
Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.	exposure -> object/buildings/infrastructure -> Urban characterization -> Buildings in hazard area exposure -> object/buildings/infrastructure -> Urban characterization -> Critical facilities in hazard area exposure -> object/buildings/infrastructure -> Urban characterization -> Land take in hazard area
Environmental Conditions to Climate Change	source/hazards -> magnitude -> rainfall characterization -> Daily maximum precipitation corresponding to the return period T source/hazards -> duration -> Storm characterization -> Storm duration source/hazards -> duration -> Heatwave characterization ->

	<p>Temperature above 35°C for more than 3 consecutive days</p> <p>source/hazards -> duration -> Heatwave characterization -> The daily maximum temperature of more than 5 consecutive days exceeds the average maximum temperature by 5°C, the normal period being 1961–1990</p>
Meteorological and climatological conditions	<p>source/hazards -> magnitude -> heatwave characterization -></p> <ul style="list-style-type: none"> • ONRN indicators for heatwave • Daily mean temperature • Thermal shock [Tmax-Tmin] • Daily sun hours • Mean relative humidity • Daily humidity cycle shocks [RH(n)-RH(n+1)>25%] • Relative humidity concentration [nRH>75%] <p>source/hazards -> Intensity, duration and frequency -> Rainfall characterization -> IDF (intensity duration frequency) curves</p>
Water quality: surface and groundwater	<p>source/hazards -> magnitude -> Storm characterization -> Wind speed (Hurricane, violent storm, heavy storm, storm)</p> <p>source/hazards -> magnitude -> Storm characterization -> gust strength</p> <p>source/hazards -> magnitude -> Storm characterization -> wind pressure</p> <p>source/hazards -> magnitude -> Storm characterization -> Lifted index</p> <p>source/hazards -> magnitude -> Storm characterization -> Wind speed (meter /second)</p>
Air and noise quality	<p>exposure -> Ecosystems -> Pollution -> Air quality</p>
Soil quality	<p>source/hazards -> magnitude -> Urban characterization -> Subsidence rate</p> <p>sensitivity -> environmental sensitivity</p> <p>-> Soil -> Soil stability</p>

	sensitivity -> environmental sensitivity -> Soil -> Soil water content sensitivity -> environmental sensitivity -> No subcategory -> Soil Water Index (SWI)
Hydrological general information: water cycle, networks	source/hazards -> magnitude -> evaluation of ecological niche -> Annual Mean Temperature source/hazards -> magnitude -> evaluation of ecological niche -> Annual Precipitation
Geology general information	source/hazards -> magnitude -> Earthquake characterization -> Peak Ground Acceleration (PGA) source/hazards -> magnitude -> Earthquake characterization -> Level of Seismic Hazard source/hazards -> magnitude -> Earthquake characterization -> Earthquake intensity (Modified Mercalli scale)
Ecosystems services and biodiversity conditions	sensitivity -> environmental sensitivity -> No subcategory -> <ul style="list-style-type: none"> • Structural connectivity of green infrastructure • Functional connectivity of green infrastructure • Number of non-native species of flora introduced (total number) • Number of non-native faunal species introduced (total number) • Species diversity within defined area per Shannon Diversity Index • Number of species within defined area per Shannon Evenness Index • Number of veteran trees per unit area (no./ha) • Quantity of dead wood per unit area (m3/ha) • Extent of habitat for native pollinator species (ha) • Proportion of natural areas within a defined urban zone (fraction or %)

	<ul style="list-style-type: none"> • Number of conservation priority species (no./ha) • Number of native/local provenance species (no./ha) • Number of native bird species within a defined urban area • Change in number of native species compared to a baseline number of species • Area of habitats restored (ha) • Habitat functional composition (relative abundance of functional features) • Shannon Index: This indicator corresponds to the proportion of bare, turf grass, rough grassland and herbs, shrubs, trees and of built environment • Urban Green Space proportion. This indicator is defined as the simple ratio of the natural areas (An) per the total area (Ac). The objective is to determine if the NBS solution increases or maintains the proportion of areas supporting biodiversity in the city or neighbourhood • Plant/root decay rate
Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)	
Degradation mechanisms	
3.2 Geographical Context and Physical Asset	
Description of CH asset surroundings including Immediate neighborhood, village, district, infrastructures, natural asset	<p>Sensitivity -> building characteristics -> Urban characterization -></p> <ul style="list-style-type: none"> • Land Take • Land cover • Urban growth, avg. annual rate (%). • Average slope • Average elevation • Thermal diffusivity • Solar reflectance

Topographical characterisation (Site configuration)	
Geo-Morphology characterisation (Soil configuration)	source/hazards -> magnitude -> Urban characterization -> Subsidence rate
Physical Infrastructures and networks in the surroundings <ul style="list-style-type: none"> • transport network (roads, paths) • water management and sanitation (drainage, sewage system) • energy infrastructures (generation, transformation) • energy networks (distribution) 	sensitivity -> infrastructure characteristics -> communication -> Percent population with a telephone sensitivity -> infrastructure characteristics -> communication -> % Population with access to broadband internet service sensitivity -> infrastructure characteristics -> urban characterization -> Average percent perviousness sensitivity -> infrastructure characteristics -> urban characterization -> Dam capacity sensitivity -> infrastructure characteristics -> urban characterization -> Thermal diffusivity sensitivity -> infrastructure characteristics -> urban characterization -> Solar reflectance adaptive capacity -> social capital/learning -> Infrastructure -> Psychosocial support facilities per 10,000 persons adaptive capacity -> social capital/learning -> Social capital -> Red cross volunteers per 10,000 persons adaptive capacity -> social capital/learning -> Social capital -> # of registered volunteers
Isolated area (Yes/not)	
Natural barriers (in the surroundings)	
CH asset Boundaries	
CH asset Buffer zone	
Access to CH asset (attach a map and/or photos) This should be linked to communication/transport network	

Access to the area (attach a map and/or photos) This should be linked to communication/transport network	
3.3. Cultural, Anthropological and Social Context (Intangible Heritage)	
Historical readings	transformative capacity/inherent resilience -> o Social memory o Living with uncertainty/improvising o Self-organisation, reflective and shared learning o Resourcefulness/Efficiency/ o Collaboration/inclusive/diversity/intersectoriality o Innovation o Robustness/Strength/appropriately connected o Coupled with Local Natural Capital
Historical references	
Collective Memory and Traditions	
Local Knowledge information TASK 6.5 POLITO	
Ethnic traditions	
Ethnographic information	
3.4. Economic context	
CH asset revenues in Euros	
CH asset insurance costs	
Provide a description of CH asset in its HA in term of economic situation	
GDP in the region	adaptive capacity -> economic capital
CH economic relevance in the Historic area	sensitivity -> economic characteristics adaptive capacity -> cultural capital / identity
Tourism revenues in the HA	
Main economic sector	
Main revenues type in the Historic area	
CH asset approximately yearly investment costs	
3.5. Policies and Planning context	
Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites et	adaptive capacity -> institutional capital/governance
The physical planning (transport, infrastructure) of the area in which the property is located- The physical	adaptive capacity -> built capital/infrastructure -> Infrastructure -> Hospital beds per 10,000 persons

characteristics of the area in which the CH is located, has been already characterized above, under Geographical and Physical Context in terms of infrastructures and networks- have been already	adaptive capacity -> built capital/infrastructure -> Sub-category (non) -> Percentage of existing infrastructures provided with back-up systems adaptive capacity -> natural capital
Pre-Disaster Recovery Planning	
3.6. LINKS TO OTHER CH ID Catalogues and Inventories (Interoperability) TASK 1.3 (ISMB)	

Table 15: Prioritization of Attributes according to the Shortlist of Indicators for BUILDING Macrocategory

9.6 Annex 6: Template for CNH_DRM

The link for the interactive digital template is available at: <https://docs.google.com/spreadsheets/d/1Dp1jAOHrmkXUIIVXM-9FnP49w1wLbdHzcjVEm-Fh1eU/edit?usp=sharing>

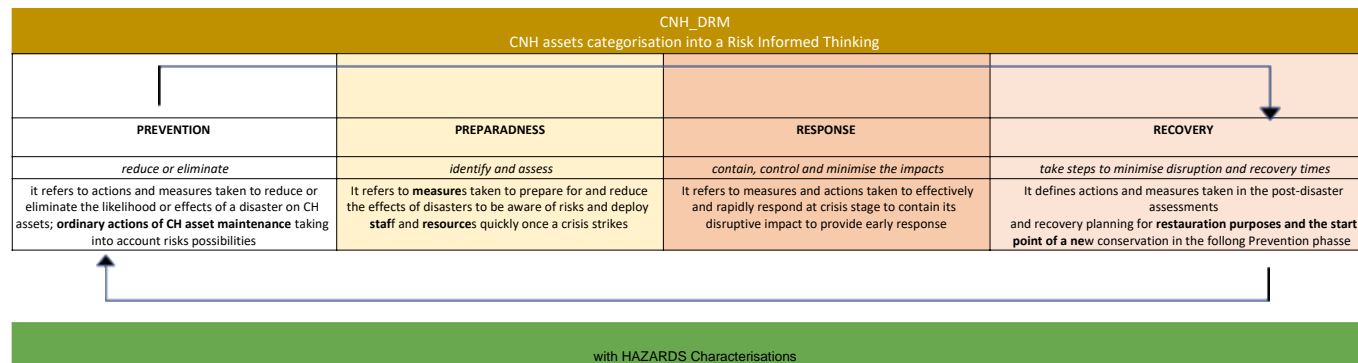
Sheet 1: Cover - Anatomy of HA in DRM perspective



DELIVERABLE 2.3

ANNEX 6

Deliverable Authors:	Rosa TAMBORRINO Mesut DINLER	POLITO
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Sheet 2: CNH asset ID_Risk

		PREVENTION	PREPARADNESS	RESPONSE	RECOVERY		
CULTURAL and NATURAL HERITAGE ASSET ID							
Description of the CNH asset, its components and its context							
	(text)	Defining CNH asset with special measures taking into account its vulnerabilities		Update data and Information	Provide new state of the art		
Defining the CNH asset and its significance	Denomination	Current Formal Name					
		Local Name					
		Name in other languages					
	Location	Country					
		City					
		Location/address					
		Geographic Coordinates (Latitude / Longitude)					
		Spatial reference system in WGS84 (Pseudo / Mercator)					
		Height above sea level (m)					
	GIS system	Geometry type (polygon, line, point)					
	Cadastral Data						
	Conservation Status and pre/post disaster assessment according to the Indicators of State of Conservation ISC (Glossary)	Add List of Value categories for Integrity	Baseline statement on Integrity	Preliminary pre-disaster assessment evaluation of Conservation Status ISC based	Damages list according to List for Integrity	Preliminary Response/Recovery assessment ISC based	Preliminary Overall Post Disaster assessment evaluation (select below)
		Add List of Value categories and Conservation Status for Authenticity according to Glossary	Baseline statement on Authenticity	High	Damages list according to List for Authenticity	Preliminary Response/Recovery assessment for Authenticity	Severe Loss
		Add List of value categories and Conservation Status for Cultural Significance according to Glossary	Baseline Statement on Cultural Significance	Medium	Add List of value categories and Conservation Status for Cultural Significance	Preliminary Response/Recovery assessment for Cultural	
		Add other eventual value categories to be considered according to Glossary				Post Disaster detailed assessment	Further Post Disaster evaluation (select below)
							Biological Attacks
	Knowledge assessment	Knowledge gap -Lack of consistent and comparable data	improvements provided	Preparedness Knowledge gap -Lack of consistent and comparable data			Recovery Knowledge gaps - Lack of consistent and comparable data
		KL1: Limited knowledge		KL1: Limited knowledge			KL2: Normal knowledge
		Knowledge gap - Little scientific understanding/measurement of significant attributes in past events		Preparedness Knowledge gap - Little scientific understanding/measurement of significant attributes in past			Recovery Knowledge gap - Little scientific understanding/measurement of significant attributes in past
		KL3: Full knowledge		KL1: Limited knowledge			KL1: Limited knowledge

	Knowledge gap -Few evaluations of critical vulnerability factors		Preparedness Knowledge gap -Few evaluations of critical vulnerability factors				Recovery Knowledge gap -Few evaluations of critical vulnerability factors
	KL2: Normal knowledge		KL2: Normal knowledge				KL2: Normal knowledge
	Final knowledge assessment evaluation		Preparedness Final knowledge assessment evaluation				Final Recovery knowledge assessment evaluation
Photograph	Add one comprehensive photograph	Photographs	Photograph of area under risks	Photographs	Photograph of area during the occurred Hazard event	Photographs	Photograph of the area after the occurred Hazard
Site plan/Map	Add a plan of CNH asset in its surroundings	Site plan	Indicating the access to the asset				
HA type	Macrosite/Single site						
	Mixed site Yes/no						
	Human Settlement size (Select City)						
	Human Settlement in CNH site. Define:						
	Human Settlement in Protected Area. Define:						
	Protected area type (Select below)						
	Global Geopark						
	Natural area in Human Settlement. Define:						
	Natural area in Building Plot. Define: (e.g. historic garden related to Building)						
	Building in Human settlement						
HA characterisation	Building in Natural site. Define:						
	Natural/Territorial-Degree of Naturalness (Select below)						
	4 Cultural assisted system						
	Urban: Degree of urbanisation (Select below)						
	Moderately urbanized						
HA Scale (according to SHELTER)	Single Building / Complex building						
	District						
Marcocategory	Urban						
CNH Type	Tangible Heritage (Movable)						
Category List Glossary (Select from the table by clicking on arrow)	Agricultural heritage						
	Architectonic inscription						
Other Cultural Natural Property Type	If Other, define:						

Type	Provide definition:						
Other Cultural Natural Property Type	Historic neighborhood						
	If Other, define:						
	Provide definition:						
Other Cultural Natural Property Type	Cemetery						
	If Other, define:						
	Provide definition:						
Classification / Registration Status	Listed in the UNESCO WHS: Ref no: Link						
	Listed in IUCN Protected site Classification/Registration Details (Select below) Ref No: Link						
	I a. Strict Nature Reserve						
	Listed European Heritage site Ref No: Link						
	Listed National Heritage Site Ref No: Link						
	Local Heritage Site Ref No: Link						
	Listed in the UNESCO Representative List of the Intangible Cultural Heritage of Humanity Ref no: Link						
	Other classification						
	More classification and Classification/Registration Details						
	Other site of cultural natural significance						
Simple/Complex CNH asset	Simple site: Specify according to the UNESCO Thesaurus for descriptive terms [e.g. http://vocabularies.unesco.org/thesaurus/concept17008 for Churches]						
	Complex Site: Specify in the cell below, indicate detailed list of CNH components (see the cell below)						
Movable Heritage in the CNH asset (Repeatable)	Specify List of Movable Heritage						

Detailed list of CNH components in the case of composite CNH classification	List Components and related Types Specify according to the UNESCO Thesaurus for descriptive terms (e.g. http://vocabularies.unesco.org/thesaurus/concept17008 for Churches)						
CNH asset hosting events, festivals, fairs, other	Specify Periodic Events hosted, Period of the year, number of visitors						
Overall identification and assessment of the HA in the current situation with its relevant values and physical components listed and defined that will allow directly linking to	Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	Overall description of the HA in the preparedness condition with its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)	Overall description of the HA asset in the case of disaster in the Response phase with specification of the condition of its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)	Overall description of the HA in the case of disaster in the Post Disaster condition with its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)
Overall identification and assessment of the CNH asset in the current situation with its relevant values and physical components listed and defined that will allow directly link to	min 300 - max 500 words (fill in according to the indications)	Overall description of the CNH asset in the preparedness condition with its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)	Overall description of the CNH asset in the case of disaster in the Response phase with specification of the condition of its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)	Overall description of the CNH asset in the case of disaster in the Post Disaster condition with its main features and components that will allow to directly link to specific analyses and detailed information in the Clusters of Ressources)	min 300 - max 500 words (fill in according to the indications)
BUILT Environment and archeological sites Material and Techniques	300 words max Overall description of the historical Materials and Techniques of CH asset in relation to its components Link to Related Ressources						
	Main material of the structure						
	Secondary material of the structure (if any)						
	Primary structure construction technique (rubble masonry, sack masonry, load-bearing masonry, adobe, adobe and timber, reinforced concrete pillars, etc...)						
	Horizontal structure material						
	Roof material						
	Canopy/shelter for archeological sites						

BUILT Environment and archeological sites Restoration and Reinforcements	Latest Intervention Date and Type Link to Related Ressources						
	Reinforced-concrete slab: Roof (yes/no)						
	Reinforced-concrete slab:vault (yes/no)						
	Reinforced-concrete slab:horizontal structures (yes/no)						
	Regeneration of walls with concrete injections (yes/no)						
	Tie bars (yes/no)						
	Concrete underpinning or plinth (yes/no)						
	Prestressed cables - walls or other elements (yes/no)						
	Micropile underpinning bracket (yes/no)						
	Roof/floor edge beam (yes/no)						
	Canopy/shelter for archeological sites						
Natural/Territorial Ways and techniques of cultivation	Farming areas						
	Fish farming						
	Vineyard						
	Other Define						
Design and management works	Permanence of historic land planning (e.g. centuriation, rural land parcelling, settlement location, roadtracks, water and channel networks)						
	Terracing						
	Retaining walls						
	Drainage works						
Techniques of Reinforcement and ways of traditional maintenance	Canals						
	Reforestation works						
	System recovery						
	Reestablishment/restoration						
URBAN Public facilities and services	Maintenance forest works						
	Public facilities and services (number, types, and if of historical/architectural interest) e.g. Municipality and administrative buildings, movie theaters, hospitals, religious centers, schools, banks, shopping malls, market building, museums, libraries, religious centers, schools						
	High Density Cluster (Urban Centre)						
	Dense Urban Cluster						
Urban Fabric Type	Semi-Dense Urban Cluster (Town/Urban)						
	Suburban Grid Cell (Suburban)						
	Rural Cluster						

	Low Density Rural Grid Cell						
	Very Low Density Grid Cell						
Historical Information	Date of construction/Century						
	Historical period						
	Overall description of Territorial and Environmental transformations						
	Timeline						
	Architects/Engineer/Landscapers/Archaeologist/Artist						
	Patronage						
	Archaeological excavations (repeatable field)						
	CNH Historical Name						
	Name of historical territorial area						
Function and uses	Current function						
	Historical function (repeatable field)						
	Open to public (Y/N)						
	Used by Local citizen						
	Touristic use and system of admittance and management						
	Number of CNH asset staff						
	Number of CNH asset inhabitants						
Quantitative Data	Land cover						
	Dimensions						
	Volume						
	Number of floors						
Quantitative Data	Total Surface of Natural areas hectare						
	Green areas surface shaded area						
	Water surface						
	Built areas Surface						
	Farming Surface						
	Demographics						
	Road and rail surfaces						
	Connectivity with other green areas						
	Current Land Cover						
	Demographics						
	Human Settlements size (Select below)						
	Metropolis						

	Quantitative Data	Urbanization degree (Select below)						
		Moderately urbanized						
		Water surface						
		Land Use percentage						
		Residential area						
		Commercial area						
		Industrial area						
		Excavation area						
		Tourist-leisure area						
		Infrastructural						
		Connectivity						
	Links with other CNH assets	Movable						
		Intangible						
		Other Tangible						
	Inspection Information	Inspector(s) Name			Disaster occurred Description		Post Disaster Condition	
		Inspector(s)' institution/affiliation						
		Inspection Date:						
		Type of inspection* (Suggested value: regular inspection, emergency condition assessment, rainy season inspection)						
		Inspection Management Public/Private and responsables						
		Accessibility on inspection Day (Suggested values: open access, guarded, closed)						
		Weather condition on inspection day (Suggested values: raining, no raining)						
	Defining its Risks	Hazard Type According to SHELTER Indicators						
		If Other, Define:						
		Exposure Type						
		Hazard characterization Define:						
		Vulnerability						
		Historic building environment resilience Define:						
	RESILIENCE INDICATORS according to SHELTER indicators							
		Monitoring Time						
		Existing Monitoring Scheme						
		wildfires scale						

	Disaster Past events	frequency and intensity of wildfires					
		period (spring fires cause different and more severe changes in many biological processes)					
		hectares burned					
		loss of human life					
		storms/storm wind					
	Environmental Context and RISK Exposure	Overall description of prevalent situation according to Geological, hydrological, and meteorological information on the nature of the climate, soil, fault lines (if any), water table, surface water such as a river, etc.					
		Ecosystem Type (Select below)					
		Terrestrial - Heathland and shrub					
		Meteorological and climatological features					
		Ecosystem natural, semi-natural, and Ecosystem Services					
		drought and high temperatures events					
		Storm wind					
		Dry days number for year					
		Rain days number for year					
		Water quality: surface and groundwater					
		Air quality					
		Noise					
		Soil degradation mechanism					
		Air degradation Mechanism					
		Water degradation mechanism					
		inappropriate development					
		resource extraction damages					
		oil spills					
		mining					
		Deforestation works					
		illegal logging					
		poaching					
		agricultural encroachment					
		threats induced by armed conflict and war					
		threats induced by earthquakes					
		invasive species					
		Overall description of CNH asset surroundings including immediate neighborhood, village, district, natural asset					

Geographical Context and Physical Asset	Physical Infrastructures above ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field):transport network (roads, paths), waterways, water management and sanitation (drainage, sewage system), energy infrastructures (generation, transformation), energy networks (distribution)					
	Physical Infrastructures below ground and networks in the surroundings (e.g. dam, tunnels) (Repeatable field):transport network (roads, paths), water management and sanitation (drainage, sewage system), energy infrastructures (generation, transformation), energy networks (distribution)					
	Energy infrastructures with potential risk (energy centrals, nuclear centrals, trafos, etc.)					
	energy-efficient facilities					
	water use efficiency at its facilities					
	Topographical characterisation (region configuration). (Select below)	Terrain Digital Model	Roads transportation infrastructure			
	Coastal					
	Site (Select below)					
	Canalfront					
	If Other, define:					
	Dsistance from water basin/overheading mountains					
	Access to CNH asset (attach a map and/or photos)					
	Access to the surroundings (attach a map and/or photos) This should be linked to communication/transport network					
	disabled people accessibility (Accessibility)					
	disabled people accessibility (visually)					
	disabled people accessibility (hearing impaired)					
	direct public transportation services					
	park with gateways					
	Presence of orientation signs					
	Presence of a range of languages in signs					
	Presence of crossed by public roads					
	Presence of well-mapped and clearly marked pathways					
	random path-making policy					
	Presence of hicking paths					
	Presence of bicycle routes					

Defining the CNH asset in its context	Presence of walking trails						
	Presence of picnic ground areas						
	Presence of campgrounds areas						
	Surroundings communities						
	Isolated area (Yes/not)						
	Natural barriers (in the surroundings)						
	Distance of tree from building and tree species						
	Geo-Morphology characterisation (Soil configuration and slope)		Utilities or service infrastructure				
	CNH asset Boundaries(legal boundaries as i.e. property of land)						
	CNH asset Buffer zone						
	Hydrological classification information: :						
	Geology classification						
	Soil type						
	Soil Degradation mechanism						
	Biodiversity in the HA Select below						
	Main variety identification						
	Vegetation types Native of the area						
	Other Vegetation type						
	average of species types						
	Rare species						
	century-old trees						
	fire-adapted and fire-dependent vegetation						
	Trunk diameter of the top five most common species						
	Animals species type with huge numbers						
	Animals species with low numbers						
	Rare species						
	Presence of Erosion areas						
	ancient wooded area						
Local and Traditional Knowledge	Hazards local knowledge						
	Construction techniques and materials traditional knowledge						
	Resilient behaviours						
	vernacular architecture and local traditions						
	Cultural significance						
	Multicultural belongings and collective memories						
	Sense of Place						
	Cultural significance to community and social resilience						

Cultural, Historical, Anthropological and Social Context /Intangible Heritage	Overall Description Historical readings						
	Main Historical references						
	Linked Collective Memories and Traditions						
	Intangible values						
	Ethnic traditions						
	Ethnographic information						
	Architectonic Heritage						
	Natural Heritage						
	Landscape Perception						
	Industrial Heritage						
Governance and Administrative Info	Urban Heritage						
	Property Ownership (if applicable)						
	Governance system						
	Authorities:						
	Management Public/Including Private/Private						
	Open to public: (Y/N)						
	Governance Type (Select below)						
	Community led governance						
	Public agencies						
	Wildlife Service						
	Responsibles for fire prevention and control						
	Municipal Council involvement						
	National and regional governmental agencies						
	NGOs						
	Community Groups						
	Local associations						
	A watershed organization composed of representatives of stakeholders						
	Organizations						
	Control policies						
	design for future urban growth						
Antropic and Economic Context	regional policies						
	Urban planning rules						
	urban conservation plans						
	rehabilitation rules						
	CNH asset revenues						
	CNH asset insurance costs						
	Provide a description of CNH asset in its HA in term of economic situation						
	GDP in the region						
	CNH economic relevance in the region						
	Tourism revenues						
	Main economic sector in the region						

LINKS TO OTHER CNH Catalogues and Inventories and Interoperability	Policies and Planning context	Main revenues type in the region						
		CNH asset approximately yearly investment costs						
		Spatial and Urban planning structure - Urban /regional Plans/strategies (overall planning but also specific to squares, sites etc	Emergency (planning and strategies)	Emergency exit planning				
		Pre-Disaster Recovery Planning						
	Exisisting Inventories	Vegerarian species inventory						
	Building inventory	Detailed historical survey						
	Local Inventories	Inventories for Conservation areas						
	Existing National catologues information. Indicate language							

Sheet 3: Data and Information Resources

PREVENTION			PREPARADNESS		RESPONSE	RECOVERY	
RESOURCES							
Analytical Information, Documentation, Studies and Data							
Collecting Existing	Existing Databases	CH databases local databases risk database	Creating a <i>corpus</i> of specific documentation (finalised to the CH asset Anamnesis) through: - its completion - its conservations - its management - its availability	Digitisation of all documentation	Exploiting/Benefitting from the <i>Dbs/thematic maps for a early Diagnosis</i>	Exploiting/Benefitting from the corpus of documentation/ Dbs/ for a reflective Diagnosis and Control	Visual 3D Reconstructions
	Inventories	CH inventories Catalogues etc. (digitalized? y/n)		Addressed documentation completion			
	Type (To be Integrated by other tasks): [1]	Fire		Addressed documentation completion on Risks			
	Data on Risk component (To be Integrated: by other tasks) [2]	Hazard characterization					
	Historical data (values registered in past events)						
	Economic Data						
	Visual Records and Spatial Data	Current Maps	Creating a database	CH asset organized Digital Archive	Exploiting/Benefitting from Thematic Maps	Updating Thematic Maps	
		Technical Maps					
		Risk Maps					
		Historical maps					
		Photogrammetry Survey					
		Architectural Survey	Its availability in remote				
		Architectural drawings					
		Technical details drawings					
		Photographs					
		Aerial photographs					
	Videos	Creating Thematic Maps	Maps of the area or region in which the property is located, such as a hazard vulnerability map				
	Historical graphic/iconographic records						
	CH asset materials chemical documentation						

Documentation, including its updates, its storage places, its digitisation	Technical Records	CH asset Colors chemical documentation	Creating a Bank of materials samples	Tangible heritage samples of materials/colors/textures	Intangible heritage samples through videos, audios	Natural environment samples (i.e. Flora and Fauna inventory)	Exploiting/Benefitting from the Bank of Materials	Using and Implementing the Bank of materials and cataloguing post disaster ruins	Extracting and collecting new materials,
		Textures							
		Reposts on construction techniques							
	Digital born records	e-sources							Providing samples
		3D models							
		Social media data							
	Conservation and restoration data, records and reports (Intrinsic resilience characteristics) TO BE COMPLETED (Unibo)	Year of Intervention							
		Type of Intervention (Suggested values: conservation (structural), conservation (chemical), re-plastered/whitewashed, restoration, reconstruction, excavation, other (specify))							
		Main materials used in intervention							
		Object of intervention (Description)							
		Previous investigation and report* (Suggested values: documentation, field observation, survey, technical report, other (specify)) (Description)							
		Natural elements documentation							
		Agricultural data (grapes)							

<i>Extracting</i> main aspects of CH assets and its vulnerabilities by Scientific studies and Local Knowledge extraction including its updates, its storage places, its digitisation	Historical reports	<i>Designing a datalake and providing its availability for remote accessing</i>	Creating CH assets Digital libraries	<i>Exploiting/Benefitting from scientific studies</i>	Damages Surveys and Reports
	Research output				
	Academic Research and Thesis				
	Archaeological Surveys and Reports		Digitisation of specific studies		
	Social engagement Reports		Extracting information		
	Museums reports		Taxonomy		
	Oral Records				
	Preventive studies about CH asset vulnerability and related past events		Onthologies		
	Environmental/geological/meteorologic al assessing studies/monitorin				
<i>Organising</i> Geolocalised information and digital tools	Identify existing tools for the area	<i>Conceiving and realizing GIS linked to dabases: Geolocalised detailed information about each CH asset including information about:</i>	Mapping of all the factors including Historic Events	<i>Exploiting/Benefitting from GIS and DBs for localizing impacts</i>	Updating Geolocalised post disaster data
			Topographical characterisation (Site configuration)		
			Geo-Morphology characterisation (Soil configuration)		
			CH asset Boundaries		
			CH asset Buffer zone		
			Access		

Sheet 4: Equipment, Tools and Procedures

PREVENTION		PREPARADNESS		RESPONSE		RECOVERY	
EQUIPMENTS, TOOLS AND PROCEDURES Documentation, Information, Studies and Data							
Monitoring for a safeguarding Maintenance	Ordinary condition of CH asset definition	Reactive monitoring systems and safeguarding measures	Impact Analysis	Reactive crisis strategical safeguarding Response	Provisional safeguard systems	Extraordinary safeguarding Interventions: Restoration, Conservation, Rehabilitation in conservation areas (strategies, diagnosis, practices, priorities) and Controls (ICOMOS definitions)	Measure against imminent collapse of the structures (avoid modifying the site in an irreversible way)
	monitoring system sensors for CH asset		Specify vulnerabilities through structural analyses		Videos and sensors recording		Conservation and reinforcement measures
	Ordinary condition of CH asset definition		Measures for Protection of tangible CH assets		Shoring up Systems		Remedial measures
		Specific tools	Measures for Evacuation of all movable CH assets		Urgent site-structural-solutions measures to stabilise the structure		Catalogue of damages/changed occurred to the CH
			Digital Heritage				Creating Digital CH projects for digital exploitation of CH assets
				Providing Digital CH asset uses	Providing CH assets information and exploitation	Engaging experts and citizens in CH Recovery	Digital
Continuously Risks assessment and Pre-disaster recovery planning	Seismic tests	Immediate Risk identification and assessment	Attained Risk manager	Early assessment	Assessing priorities through videos and sensors recording	Safety evaluation and Diagnosis (based on historical, qualitative and quantitative approaches)	Direct observation of the structural and material damages
	Other experiments and tests		Risk Assessment Report				Determine the secondary causes (specifically internal to the structure) of damage and decay
	Structural stability tests		Risk Management Plan				Evaluate the safety level of the structure
	Sensors tests		Recommended actions vs DRM phase	Crowdsourcing	Providing Diagnosis Reports		
			Risk assessment based on common threats				
	Social Media crowdsourcing	Material and structural tests					
		Social media news philtering services for collective CH Hazard characterization To be integrated (LINKS)					
Existing equipment and facilities for management systems in the CH assets	Specify Kind of equipment needed related to each risk type	Equipping CH assets with specific management systems and facilities	Establishing specific procedures	Emergency Response Plans	Providing First Aid to CH assets	Recovery Plans	CH damages assessment according to protocol
	Identifying the protocols		Providing guidelines for CH assets First Aid		Applying CH First Aid procedures		Adopting the specific procedures for each CH asset in HA
	Identifying the international						
	system of rescue of CH assets		Provide shelter for the evacuation of movable CH assets		avoiding further damage to heritage		Assign building materials and elements to the buildings from which they originate
	provide guidelines for maintenance		Providing Guidelines for Recoreoy				Record the places from which debris and materials are recovered
	established procedures for maintenance		Drills in CH assets and its frequency				Recording materials and debris in a central digital database
	specific instructions for safe procedures	health management in HA	Providing Shelters guidelines		Creating Shelters		Providing specific procedures to owners, residents, builders and workers
	ordinary drills in the area and its frequency	instructions for guidelines, advice and assistance			providing advices and assistance		providing assistance for the owners, residents, builders and workers engaged in clearing rubble and debris

Sheet 5: Human Resources

PREVENTION		PREPARADNESS		RESPONSE		RECOVERY	
HUMAN RESOURCES							
Stakeholders, staff, risk management managers and responsible, citizens and communities involved at different level in CH management and/or risk management							
Stakeholders and relevant players analyses including its updates	Mapping governance and national/local management for DRM	Deploy stakeholders' connections	Direct link to the area chain of orders	Activating the CH assets Emergency chain		Organising the governance chain in the Recovery phase for avoiding damages to CH assets	
	Mapping the CH asset governance and management responsibilities		Identifying the Internal (to CH asset) CH_Risk responsible and chain of orders among the staff	Activating direct CH management responsables			
	Identifying detailed direct responsibilities for CH asset safeguarding in Emergency phase (e.g. for each department) and creating cooperation		Creating connections among the existing relevant institutions and the community within and around the property.			Organising CH assets and Cultural Institutions coordinating activities	
	Identifying the Cultural stakeholders		Activating collaboration among the CH assets management and staff and cultural institutions, the academic and research centers	Activating all collaborators for collecting information			
	Mapping local CH association and volunteers		Engaging Volunteers	Activating volunteers for crowdsourcing information		Cultural associations and Research institutions coordinated	
Training experts and aware users	Training Staff activities on CH assets vulnerabilities	Specialised Training in DRM in CH assets	Training the Staff	Activating the Staff for CH assets Emergency and First Aid	First aid providing and coordinating volunteers	providing reports	
	Provide clarifications and communication about CH assets vulnerabilities through communication activities and materials for citizens (activities and documentation)		Training the volunteers	Activating Volunteers for CH First Aid	organising groups	working under the direction of the staff	
	Provide clarifications and communication about CH assets vulnerabilities through communication (documentation materials for tourists and visitors) Organise joint courses for schools and young people		Simulations	Applying the procedures			

Sheet 6: Instructions for the template

Template for CH assets characterization in CH_DRM	Process for CH_DRM characterization	MACROCATEGORIES and scales	CH assets categorisation for Risk Assessment
<p>The template enables a methodology for DRR in Historic Areas through the characterisation of CH assets for Risk Informed Thinking.</p> <p>It identifies features and actions for safeguarding CH assets against and mitigating the impact of natural disasters. It introduces a systemic vision of CH assets within the Disaster Risk Management model by characterising the DRM model with its specific understanding for Historic Areas.</p> <p>The template is conceived as a methodology for collecting and integrating a wide range of information. It can be customized and prioritized to adapt to the SHELTER Project and OLS acquirments according to general and local strategies</p> <p>It is also intended to guide a continuous monitoring at each phase of DRM model by updating the information as a "self" assessment procedure. It can be managed at local level by heritage professional and conservators. It introduces a "Risk Informed Thinking" especially addressing CH assets to help decisions makers in identifying priorities.</p> <p>The template identifies 4 CLUSTER of relevant information that are defines by the attributes in 4 sheets through the phases of the DRM model.</p> <p>The CH asset ID sheet includes metadata intended for defining:</p> <ol style="list-style-type: none"> 1. CH asset significance by its tangible and intangible features 2. Its Risks characterization 3. CH asset contexts (Environmental with Risk exposure, Geographical and Physical, Anthropic and Economic, Cultural Historical Anthropological including Local and Traditional knowledge, Governance) 4. Link other CH Catalogue and Inventories <p>The RESOURCES sheet refers to Analytical Information and Documentation available to be collected or linked</p> <p>The EQUIPMENTS TOOLS AND PROCEDURES sheet requires collecting specific information for DRR</p> <p>The HUMAN RESOURCES sheet enables a survey on governance and management of CH asset and Risks and also allows identifying the network of stakeholders.</p> <p>A sheet with a GLOSSARY provides the CH categories identification</p>	<p>The template provides a survey methodology for including and organizing a related system of useful information for assessing and enhancing CH asset resilience</p> <p>The template shapes a process for the characterisation of CH assets. It is intended for identifying the measure of the Risk in CH asset. The sheets identify a step by step process. The template shapes descriptors which require to fill in data and information.</p> <p>The process is intended to be performed first at the Prevention/Preparedness phases. The attributes allow customizing the process of characterisation for the specificities of each HA, for different kind of natural hazards, and for a collective characterisation</p> <p>Step by step characterisation approach:</p> <p>Step 1 ESTABLISHING THE CONTEXT Step 2 IDENTIFYING THE RISK Step 3 ANALYSING Step 4 EVALUATING</p>	<p>Historic Areas are complex systems including a range of CH assets and are CH assets in itself. They require analysis. Macrocategories allow take into account different range of scales and sites (complex sites to simple building) and cultural and natural features and values. They enable how to anatomize the HA by specifying its heritage characterization and other factors that are relevant for vulnerability and resilience.</p> <p>3 Macrocategory are identified: NATURAL by dark green color URBAN by blue color BUILDING by brown color</p>	<p>The methodology provides attributes and procedures that enable Pre and Post Disaster assessments.</p> <p>Pre and Post Disaster Knowledge assessment. KNOWLEDGE GAPS ASSESSMENT It enables to assess the type of knowledge lack and grade KL1 LIMITED KL2 NORMAL KL3 FULL</p> <p>PREVENTION/PREPAREDNESS PRELIMINARY ASSESSMENT to identify identify those elements and values to be estimated in case of future damages. RESPONSE/RECOVERY PRELIMINARY ASSESSMENT to identify qualitatively and quantitatively (information available about and) the damages</p> <p>POST DISASTER PRELIMINARY ASSESSMENT for sites</p> <p>CRITICAL LOSS: Site destroyed. All or most of the visible key elements of the assessed site have collapsed (80–100 per cent of structure destroyed). All of the main historically valuable elements inside the CH site are destroyed.</p> <p>SEVERE LOSS: Site Severely damaged. A significant part of the visible key elements of the site has collapsed or is partially damaged (40–80 per cent of structure damaged) or significant military or civilian activity has contributed to extensive damage at the site. Many of the main historically valuable elements of the cultural heritage site are severely damaged</p> <p>MODERATE LOSS: Site Moderately damaged. Limited damage observed relating to key elements of the site (5–40 per cent of structure damaged) or where military or civilian activity has contributed to damage. Some of the main historically valuable structures inside the cultural heritage site are moderately damaged.</p> <p>MINIMAL LOSS: Site Possibly damaged. Assessed site structures do not appear to be damaged, but debris is visible around key site structures. None of the main historically valuable elements of the cultural heritage site are damaged</p> <p>POST DISASTER FURTHER ASSESSMENT for BUILDING</p>