

DIGITAL, INNOVATION, AND GREEN TECHNOLOGY PROJECT (DIGIT PROJECT)



DIGIT

DIGITAL, INNOVATION, AND GREEN TECHNOLOGY PROJECT



REPUBLIC OF CROATIA
MINISTRY OF SCIENCE, EDUCATION AND YOUTH

Donje Svetice 38, Zagreb 10 000, Croatia

**DIGITAL, INNOVATION, AND GREEN TECHNOLOGY PROJECT (DIGIT
PROJECT)**

IBRD LOAN NO. 9558-HR

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ESMP CHECKLIST

DIGIT.2.1.02 CHALLENGE PROGRAM

**DIGIT.1.2.03 PROFESSIONALIZATION OF RESEARCH
CENTERS**

DIGIT 2.2.01. SEAL OF EXCELLENCE

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Introduction

The template presented below will be revised for specific projects to reflect scope of works and E&S concerns.

The ESMP Checklist provides “pragmatic good practice”, and it is designed to be user friendly and compatible with WB safeguard requirements. The checklist-type format attempts to cover typical mitigation approaches to common civil works contracts with localized impacts.

This document will help assess potential environmental impacts associated with the proposed project, identify potential environmental improvement opportunities and recommend measures for the prevention, minimization and mitigation of adverse environmental and social impacts.

ESMP Checklist is a document prepared and owned by final beneficiaries. The Beneficiaries are responsible for the implementation of the ESMP Checklist as well as any subsequent corrective measures prescribed by PIU and WB.

The ESMP Checklist shall be part of the consortium agreement between the beneficiary, and all partners.

The ESMP Checklist shall be part of all contracts for works, goods and services regarding project activities (including contracts with outsourced laboratories, to explicitly ensure that environmental and social instrument requirements are applied).

Partners, contractors, sub-contractors, service providers or suppliers are responsible for the implementation of the ESMP Checklist as well as any subsequent corrective measures prescribed by the PIU and WB.

ESMP Checklist covers multiple projects under the Calls DIGIT.2.1.02 Challenge Program, DIGIT.1.2.03 Professionalization of Research Centers and DIGIT 2.2.01. Seal of Excellence under the Synergies Program.

Significant and/or recurring non-compliance with the requirements set out in this document may result in delays in payments and/or suspension of reimbursement.

Eligible activities under Call **DIGIT.2.1.02 Challenge Program** are as follows:

1. Adaptation works and infrastructure equipping: This includes modifications and upgrades (small-scale adaptation works carried out in accordance with the Ordinance on simple and other construction works and works (OG 112/17, 34/18, 36/19, 98/19, 31/20, 74/22, 155/23) to existing facilities (research infrastructure). It covers the procurement and the installation of necessary equipment to support mission-oriented research activities, ensuring that the physical infrastructure is capable of supporting innovative solutions.

2. Research activities (mandatory): Applicants are expected to base their project proposals on at minimum a validated proof-of-concept (PoC). Eligible activities involve conducting scientific research and developing new or improved mission-oriented solutions in digital transformation, and green transition. Eligible activities include industrial research and experimental development aimed at exploring new or existing products, processes, and services, such as prototype testing and pilot projects. Data collection and analysis support

these efforts, while innovation and technology assessments evaluate the impact and scalability of emerging solutions. Together, these activities are essential for advancing technological progress and achieving the project's mission-driven objectives.

3. Capacity building and dissemination of research findings and technologies: These activities focus on strengthening the skills and knowledge necessary for the effective implementation of mission-oriented projects. They include the dissemination of research findings and technologies through workshops, training sessions, and the development of collaborative platforms to promote the practical application of research outputs.

4. Knowledge and technology transfer (mandatory): This category covers involves activities related to the transfer of intellectual property (IP), licensing, and technology to ensure that innovations reach the market. Eligible activities include managing IP-related costs, such as patent fees and licenses, as well as facilitating technology transfer agreements.

5. Market analysis and business validation (mandatory): These activities include assessing the economic viability of research outcomes, developing commercialization strategies, conducting market analyses, and preparing other relevant documents to support the transition of developed solutions to the market.

6. Promotion and visibility (mandatory): Activities aimed at raising awareness of the project and its outcomes among stakeholders and the public. This includes organizing events, and other promotional activities to showcase the project's impact and relevance.

7. Project management activities (mandatory): Covering all administrative and managerial aspects necessary for the successful execution of the project, including planning, coordination, monitoring, and reporting. This also includes procurement activities. Effective project management ensures that the project stays on track, within budget, and achieves its objectives.

Eligible activities under Call **DIGIT.1.2.03 Professionalization of Research Centers** are as follows:

1. Organizational strengthening and process optimization

- Assessment and mapping of existing internal processes,
- Developing standardized operating procedures for key functions,
- Development of internal collaboration mechanisms,
- Defining procedures for collaboration with external stakeholders,
- Establishing procedures for technology transfer and commercialization, such as frameworks, guidelines, IP protocols, etc.

2. Optimization of access to infrastructure and services

- Conducting periodic surveys to gather user feedback and improve processes and protocols (mandatory sub-activity),
- Creating a digital inventory of research equipment and/or resources such as data, technologies, etc.: it should involve developing a structured, searchable database that provides comprehensive, up-to-date information on available infrastructure and/or assets, enabling efficient management, internal planning, and improved accessibility for all users,
- Developing and optimizing protocols for equipment use, access, and resource sharing

between internal teams and external partners, or any other users, based on FAIR (Findable, Accessible, Interoperable, Reusable) principles,

- Developing and/or implementing advanced software solutions for resource optimization and utilization (e.g., pricing, service offerings, available services, online scheduling/booking systems, data-sharing platforms, monitoring, and tracking systems for usage of facilities and equipment, such as number of users and hours, etc.),
- Maintenance and upgrades of existing research infrastructure (such as servicing and maintenance of existing research equipment).

3. Capacity building and competence development

- Organizing and participating in trainings, workshops, conferences, etc., on business development, intellectual property (IP) management, technology transfer, commercialization strategies, project management and leadership skills and related topics for academic and non-academic staff,
- Engaging external advisors (local or international) to provide mentorship in collaboration and partnership development.

4. Networking and collaboration

- Promoting the Research Centre's capabilities and collaboration opportunities to the private sector (e.g., marketing materials, digital campaigns),
- Organizing and participating in conferences, workshops, networking events, and industry days to showcase the infrastructure's capabilities,
- Establishing partnerships with similar infrastructures (national, EU and/or international) to share best practices,
- Developing and implementing a database to monitor existing and new collaborations between academic institutions and the private sector,
- Regular reporting and data analysis to support the management and improvement of collaboration activities,
- Technology scouting services – identifying and connecting relevant research teams with industry,
- External services related to collaboration agreements, intellectual property management, and business model development, technology transfer, etc.

5. Promotion and visibility

- Developing marketing materials such as brochures, videos, and case studies showcasing success stories,
- Launching targeted campaigns to attract new users from academia and industry,
- Maintaining an active online presence through social media and a dedicated website,
- Publication of research papers and disseminating research findings (e.g., organizing public events, developing media content), organizing and/or participating at national and international conferences, meetings, seminars and workshops.

6. Project management

- Encompasses all administrative and managerial aspects necessary for the successful execution of the project, including planning, coordination, monitoring, and reporting. Procurement activities are also included. Effective project management ensures that the project remains on track, within budget, and meets its objectives.

Eligible activities under Call **DIGIT.2.2.01 Seal of Excellence under Synergies Program** are only activities eligible within the ERC PoC Grant and MSCA PF calls for proposals are eligible for funding under this Sub-program.

1. ERC Poc Grant – eligible activities are those aimed at verifying the innovation potential of results generated within an ERC project, including:

- Establishing proof of concept
- Testing and validating the underlying idea
- Demonstration activities
- Clarifying the innovation potential of the results
- Assessing the commercial and/or societal potential
- Identifying a pathway to market or further development
- Developing intellectual property (IPR) protection strategies
- Conducting market research and business case development
- Supporting activities for further development, uptake, or commercialization

2. MSCA Postdoctoral Fellowships (FP) – Eligible activities are those forming part of an individual research and training project for the fellow, including:

- Implementation of a research and innovation project
- Advanced training through research
- Transfer of knowledge between sectors and countries
- Development of research and transferable skills
- Secondments to partner organizations
- Placements in the non-academic sector (where applicable)
- Dissemination and exploitation of research results
- Communication activities towards stakeholders and the public
- Networking activities
- Supervision and mentoring

Eligible projects are projects that have received the Seal of Excellence certificate under Horizon Europe ERC PoC Grant or MSCA PF.

The checklist is structured as follows:

- A. Projects Description
- B. Mitigation Measures
- C. Monitoring and Reporting

Part A. Project Description – constitutes a descriptive part that describes the projects specifics in terms of project objective and activities, environmental and social impact identified and the list of mitigation measures to comply with.

Part B. Mitigation Measures – includes the environmental and social mitigation measures structured according to the categories and aspects they address.

Part C. Monitoring and Reporting is a monitoring plan for activities during project implementation. It retains the same format required for standard World Bank ESMPs.

ESMP Checklist will be publicly disclosed and consulted by publishing on the DIGIT web page and on the beneficiary's web page for two weeks.

ESMP Checklist implementation report will be submitted to WB semi-annually if not agreed differently.

Workers code of conduct (subject to WB approval) will be a part of bidding documentation and contracts with Contractors. Code of conduct will extend to sub-contractors and be a part of Contractor's contractual agreements.

Part B and Part C of the ESMP Checklist must be included as bidding documents for contractors.

GRM related obligations are included in procurement / bidding procedures for acquiring services of technical design, supervising engineer, construction project management, occupational health and safety (OHS) specialist and every other relevant service as well as during construction as contractor and subcontractor obligations.

Project activities shall comply with the ethical provisions outlined in the Code of Ethics and uphold the highest ethical standards.

A. Projects Description

DIGIT.2.1.02.001 A comprehensive AI powered early warning system for digital management of water supply security, resilience, and sustainability (AquaGuardian)

Program	DIGIT.2.1.02 CHALLENGE PROGRAM
Reference No	DIGIT.2.1.02.001
Project Title	A comprehensive AI powered early warning system for digital management of water supply security, resilience, and sustainability (AquaGuardian)
Beneficiary	University of Zagreb – Faculty of Chemical Engineering and Technology (FCET)
Partners	<ul style="list-style-type: none"> – University of Zagreb Faculty of Civil Engineering – University of Zagreb Faculty of Electrical Engineering and Computing – Endress+Hauser Ltd. – Genos Ltd.
Project Objective(s)	<p>The overall objective of the AquaGuardian project is to contribute to the digitalization of the water sector by addressing key challenges related to efficiency and safety of drinking water distribution networks, thereby fostering stronger cross sectoral collaboration and innovation driven growth.</p> <p>Development and implementation of an integrated, AI driven intelligent monitoring system for drinking water distribution networks that enhance water safety and public health, ensures high water quality consistence, promotes resources efficiency and supports predictive maintenance. The solution provides real time, data driven decision making which quickly identifies and mitigates risks to protect human health. The system will integrate advanced sensors, secured communications and predictive analytics to reduce water loss, support resource efficient management and improve infrastructure resilience, especially in areas sensitive to climate risks, environmental disasters or legacy conflict damage. It will also accelerate digital and green transformation of water supply systems in alignment with the EU Green Deal and the Zero Pollution Action Plan.</p> <p>The AquaGuardian project supports Croatia’s Smart Specialization Strategy (S3) 2029 and the National Development Strategy (NDS) 2030, contributing to a green, digital and health protective transformation of drinking water services. It aligns with four S3 Thematic Priority Areas: Digital Products and Platforms (AI-based monitoring and decision systems), Smart and Clean Energy (energy efficient water management), Personalized Healthcare (health protection through safe drinking water) and Security and Dual-Use</p>

	<p>(early-warning system for prevention, response, and remediation of water incidents). AquaGuardian also supports NDS 2030 Development Direction 3 – Green and Digital Transition, through ecological and energy transition, sustainable infrastructure and digitalization of essential services.</p>
<p>Project Activities</p>	<p><u>Adaptation work and infrastructure equipping:</u></p> <p>Minor interior adaptation works in existing laboratories and pilot facilities.</p> <p>Installation of monitoring stations, electrical/mechanical connections and equipment. (pilot infrastructure in the Sisak Water Utility area; two laboratories: at the University of Zagreb at Faculty of Chemical Engineering and Technology and Faculty of Civil Engineering.)</p> <p><u>Development and optimization of monitoring technologies:</u></p> <p>Laboratory work with chemicals, calibration solutions and analytical instruments.</p> <p><u>Advanced bioanalytical platform for proactive health risk assessment:</u></p> <p>In vitro tests using non-pathogenic immortalized human cell lines (HepG2).</p> <p><u>Pilot implementation and real-time data collection</u></p> <p>Field installation of sensors and monitoring stations within existing water utility infrastructures.</p> <p><u>AI-supported monitoring, modelling and prediction</u></p> <p>UAV (drone) inspections (thermal/RGB).</p> <p>Deployment of geotechnical EWS sensors.</p> <p><u>Development of the digital twin and system integration</u></p> <p>Real-time data integration with field equipment.</p> <p><u>Platform development and communication infrastructure</u></p> <p>IoT communication systems and data transmission.</p> <p><u>Field trials, system validation and optimization</u></p> <p>Testing of the full system in operational conditions.</p> <p><u>Capacity building and dissemination</u></p> <p>Training on safe operation of equipment and field procedures.</p> <p><u>Promotion and Visibility</u></p> <p>Public communication of water-related information.</p> <p><u>Project Management Activities</u></p> <p>Oversight of procurement and contractors</p>

<p>Environmental Impacts Identified</p>	<p>Environmental risks are moderate in magnitude, site-specific, predictable and easily manageable. All activities take place within existing laboratory facilities and the existing operational footprint of the Sisak Water Utility, with no greenfield construction and no interventions outside already developed areas. Minor construction and installation works will be carried out indoors and are limited to small-scale laboratory adaptations and the installation of monitoring stations. These activities may generate short-term dust, noise and small quantities of non-hazardous construction waste, but no heavy machinery or excavation is foreseen, and impacts will be effectively controlled through standard good construction practices. Laboratory activities involve the use of small quantities of chemical reagents, including acids, bases, solvents and calibration solutions, all of which will be handled under established institutional procedures and national/EU chemical safety regulations. As a result, only small amounts of hazardous laboratory waste will be generated and will be disposed of through licensed waste management systems, ensuring full compliance with safety standards. Biological work is limited to the use of non-pathogenic immortalized human cell lines (HepG2) in BSL-1 conditions; no pathogens, primary tissues or high-risk biological agents will be used, and biosafety risks remain minimal and adequately controlled with routine laboratory procedures. Field deployment of sensors and monitoring equipment will occur exclusively within the existing utility infrastructure areas, without the need for land acquisition or disturbance to natural habitats, including Natura 2000 sites. These activities may generate small amounts of packaging or calibration waste and may cause minor, temporary disturbance during installation, but impacts are negligible and easily mitigated. The procurement and use of electronic monitoring equipment may produce limited amounts of electronic waste over the project lifetime; this will be managed in accordance with EU WEEE (Waste Electrical and Electronic Equipment Directive) requirements. UAV (Unmanned Aerial Vehicles) operations for leak detection and aerial inspection have no meaningful environmental impact beyond battery use and short-term presence in the airspace.</p> <p>The project does not introduce any new sources of pollution to air, water or soil. On the contrary, by improving monitoring, early warning and operational response, it contributes to reducing the risk of accidental contamination events and improving environmental protection.</p>
<p>Social Impact Identified</p>	<p>Minor adaptation works of research infrastructure, and installation of monitoring and auxiliary equipment within existing premises and utility areas are foreseen. Potential adverse social impacts are limited in scope and are considered manageable. Temporary nuisances may occur during the installation of pilot equipment, such as short-term noise, dust or minor traffic disruptions during the placement of prefabricated containers.</p>

	<p>Standard OHS risks may also be present, especially if external contractors are involved. They are planned to be mitigated through compliance with national labor regulations and the Labor Management Procedures.</p> <p>The Project involves the development of AI-based mathematical models for predicting conditions within the water supply system using only measured technical data. No personal data is used or processed as part of this work.</p> <p>Research activities may touch on topics that are sensitive to the public (e.g. water safety, contamination, infrastructure vulnerability), which will be addressed through transparent communication, stakeholder engagement and information sharing with local communities, water users and authorities.</p>
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Mitigation Measures Categories
Civil Works (1.)
Equipment (2.)
Occupational Health and Safety (OHS) (3.)
Waste Management (4.)
Animal Material (5.)
Hazardous Chemicals Management (6.)
Biodiversity and Environment Protection (7.)
Community Health and Safety (8.)
Intellectual Property (9.)
Data Protection (10.)
Artificial Intelligence and Cybersecurity (11.)
Procedures and Reporting in Case of Accident (12.)
Stakeholder Engagement (13.)

DIGIT.2.1.02.004 ToxiCode: Transforming Venom Peptides into Precision Therapies by Deciphering and Refining their Evolutionary Code

Program	DIGIT.2.1.02 CHALLENGE PROGRAM
Reference No	DIGIT.2.1.02.004
Project Title	ToxiCode: Transforming Venom Peptides into Precision Therapies by Deciphering and Refining their Evolutionary Code
Beneficiary	University of Zagreb – Faculty of Food Technology and Biotechnology (FFTB)
Partners	<ul style="list-style-type: none"> – University of Zagreb Faculty of Food Technology and Biotechnology (FFTB, RO) – Institute Ruđer Bošković (IRB, RO) – In Silico d.o.o. (In silico, SME) – Impuls savjetovanje d.o.o. (Impuls, SME)
Project Objective(s)	<p>Overall Objective(s)</p> <p>To develop and validate an innovative, AI-driven generative platform for the de novo design of therapeutic peptides.</p> <p>To establish a paradigm-shifting, digitally-native R&D pipeline that accelerates the discovery of novel biotechnological solutions, contributing directly to digital transformation and green transition goals.</p> <p>To create a fully integrated R&D solution able to cut discovery times by up to 50%, reduce animal use and environmental impact by at least 70%, and place Croatia and the EU on a competitive trajectory in the rapidly expanding peptide therapeutics and synthetic biology markets.</p> <p>Specific Objective(s)</p> <p>The project achieves its mission through five research objectives (Months 1-36):</p> <p>(Months 1-12): Develop a proprietary knowledge graph integrating global public data (UniProt, ToxProt, STRING) with local, ethically sourced datasets (e.g., novel Croatian proteomics via King’s College London partnership).</p> <p>(Months 6-20): Build and validate a hybrid LLM+GNN predictive engine capable of accurately scoring peptide-target interactions, achieving ROC-AUC \geq 0.9 on validation datasets.</p> <p>(Months 16-30): Develop constrained generative AI framework for de novo peptide design, targeting generation of at least 2,000 candidate peptides and computational optimization for efficacy, safety, and manufacturability.</p> <p>(Months 20-36): Experimentally validate and characterize selected peptide candidates via chemical synthesis and a comprehensive suite</p>

	<p>of enzymatic, in vitro, and cell-based assays, targeting at least three candidates advancing to precommercial validation.</p> <p>(Months 24–36): Translate validated expertise into a market-ready, scalable platform, with dissemination activities, technology transfer actions, and commercialization strategy integrated. (*It is relevant to highlight that this objective aims for milestone achievement including the Platform validated at TRL-5, and at least three industry collaborations and/or LOIs established)</p>
<p>Project Activities</p>	<ul style="list-style-type: none"> – Minor interior civil works for installation of new analytical instruments (Tandem MS/MS, SPPS robot), generating small amounts of construction waste and short-term indoor dust/noise. – Procurement of research equipment includes an Automated SPPS Robot, Flow Cytometer, Tandem Mass Spectrometer (MS/MS), High-Resolution Fluorescence Microscope, and relevant IT equipment. – Chemical safety and hazardous waste from Solid Phase Peptide Synthesis (SPPS), solvents and reagents, and chromatography waste streams. – Biological and cell-culture waste from in vitro and cell-based assays, requiring BSL-1/2 procedures and proper segregation and disposal. – Marine sampling impacts (minimal) related to ethically approved low-impact collection of local invertebrate species; biodiversity risks considered low and strictly mitigated. – Standard OHS risks associated with chemical synthesis, handling reagents, operating flow cytometers, mass spectrometers and pressure/vacuum systems. – E-waste generation due to procurement of complex laboratory and IT equipment (MS/MS, flow cytometer, AI/HPC systems). – Energy consumption impacts from cloud computing and local HPC resources for AI model training. – Data security risks (limited) linked to handling biological/chemical datasets—no personal data are used, full GDPR compliance confirmed.
<p>Environmental Impacts Identified</p>	<p>The project presents moderate environmental risk due to minor interior adaptation works, the use of chemicals and solvents in Solid Phase Peptide Synthesis (SPPS), and the generation of chemical and biological laboratory waste during in vitro and cell-based assays. Additional impacts include low-intensity marine sampling, operation of specialized laboratory equipment such as the Flow Cytometer and Tandem Mass Spectrometer (MS/MS), and increased energy use linked to High-Performance Computing (HPC) resources for Artificial Intelligence (AI) model training. All activities take place within existing laboratory facilities under established chemical safety measures, Biosafety Level 1 and 2 (BSL-1/BSL-2) procedures, and hazardous-waste management protocols. Identified impacts are localized, predictable and effectively mitigated through standard laboratory</p>

	<p>safety practices and strict biodiversity protection measures. The project has no interaction with protected areas, no outdoor emissions and no expected impacts on surrounding communities. The project includes minimal-impact marine sampling of local non-protected invertebrate species, conducted outside protected areas and under strict ethical and biodiversity-preservation protocols. Sampling is small in scale, does not affect species populations or habitats, and is fully compliant with national and EU regulations. Marine sampling does not cause pollution or species disturbance, as it is small-scale, non-destructive, limited to non-protected invertebrates, and conducted under strict ethical and biodiversity-preservation protocols.</p>
<p>Social Impact Identified</p>	<p>Minor adaptation works are planned mainly for the installation of the Tandem Mass Spectrometer and SPPS Robot in existing laboratories. Expected and standard OHS risks are related to chemical synthesis (A4), handling reagents (A5), and operating new high-tech research equipment.</p> <p>Data security risks (limited) linked to handling biological/chemical datasets-no personal data are used, full GDPR compliance confirmed.</p> <p>A digitally-native generative Artificial Intelligence (AI) platform for the de novo design of venom-inspired therapeutic peptides, leveraging a hybrid Large Language Model (LLM) and Graph Neural Network (GNN) is to be established. The AI system primarily uses biological, chemical, and proteomics data without any personal data.</p> <p>The Project carries moderate social risk due to the minor adaptation works of existing facility, equipment installation, development of AI platform for the de novo design of venom-inspired therapeutic peptides and standard OHS risks.</p>
<p>Mitigation Measures Categories</p>	
<p>Civil Works (1.)</p>	
<p>Equipment (2.)</p>	
<p>Occupational Health and Safety (OHS) (3.)</p>	
<p>Waste Management (4.)</p>	
<p>Animal Material (5.)</p>	
<p>Hazardous Chemicals Management (6.)</p>	
<p>Biodiversity and Environment Protection (7.)</p>	
<p>Community Health and Safety (8.)</p>	
<p>Intellectual Property (9.)</p>	
<p>Artificial Intelligence and Cybersecurity (11.)</p>	
<p>Procedures and Reporting in Case of Accident (12.)</p>	
<p>Stakeholder Engagement (13.)</p>	

DIGIT.2.1.02.012 Accelerated mineral carbonation of secondary raw materials as a strategy for carbon storage in construction products – ACCEL

Program	DIGIT.2.1.02 CHALLENGE PROGRAM
Reference No	DIGIT.2.1.02.012
Project Title	Accelerated mineral carbonation of secondary raw materials as a strategy for carbon storage in construction products – ACCEL
Beneficiary	University of Zagreb Faculty of Civil Engineering
Partners	<ul style="list-style-type: none"> – Croatian Geological Survey (HGI) – Indeloop – Nexe – Beton Lučko (BL) – Urbanex
Project Objective(s)	<p>The core research objective of ACCEL is to transform 50-100% of underutilised regional secondary raw materials into at least 2 net-zero construction products by permanently sequestering 10% CO₂ through accelerated mineral carbonation. This approach not only enables long-term carbon storage, but also creates value-added products from waste, contributing to the decarbonisation and circular economy of the construction sector.</p> <p>Specific objectives of the project are:</p> <p>SO1 – within 1 year of the project, identify at least 3 secondary raw materials with at least 30% CO₂ storage capacity and sufficient availability to replace 30% of supplementary cementitious materials used in Croatia (approx. 60,000 tons/year),</p> <p>SO2 – within 3 years of the project, design at least two construction products based on carbonated secondary raw materials with equivalent technical performance and at least 70% lower attributed CO₂ emissions compared to conventional products on the market, validated through the objective Life Cycle Assessment (LCA),</p> <p>SO3 – within 3 years of the project, conduct market needs analysis (current and within 5 years), based on this analysis create commercialization strategy of developed construction products, targeting at least 20% market uptake of currently produced chosen products with equivalent technical performance,</p> <p>SO4 – at the end of the project, propose at least one viable business model covering the entire value chain and the production logistics (consisting of secondary raw material producer with adequate quantity of raw material, accelerated carbonation procedure and construction product manufacturer producing targeted construction product),</p> <p>SO5 – throughout the project, organize 3 dedicated workshops with at</p>

	<p>least 30 participants, to build awareness and foster collaboration among all stakeholders in the construction value chain about consumer responsibility, while showcasing ACCEL as a leading example of collaborative, multi-stakeholder innovation.</p>
<p>Project Activities</p>	<p>Activity 1 Infrastructure equipping (A1)</p> <p>Only small pieces of equipment will be acquired, while the rest of the costs connected to the equipment are rather maintenance and consumables, which are used to ensure that the tests are performed according to the established protocols in cooperation with EU leading institutions.</p> <p>Activity 2 Research activities (A2)</p> <p>The core research objective of ACCEL is to transform 50-100% of underutilized regional secondary raw materials into at least 2 net-zero construction products by permanently sequestering 10% CO₂ through accelerated mineral carbonation.</p> <p>Activity 3 Capacity building and dissemination of research findings and technologies (A3)</p> <p>Activity 4 Knowledge and technology transfer (A4)</p> <p>Activity 5 Market analysis and business validation (A5)</p> <p>Activity 6 Promotion and visibility (A6)</p> <p>Activity 7 Project management (A7)</p>
<p>Environmental Impacts Identified</p>	<p>The environmental risk is assessed as Moderate. Project activities are primarily laboratory-based and focus on research, testing, and validation of accelerated mineral carbonation processes using secondary raw materials, without civil works or field interventions in sensitive areas. Potential environmental risks are mainly associated with the handling, testing, and processing of secondary raw materials and laboratory-scale carbonation experiments, including potential generation of non-hazardous waste streams, limited use of chemicals for material characterization, and occupational exposure to fine particulate matter and CO₂ in controlled laboratory settings.</p> <p>These risks are site-specific, predictable, and manageable, and can be effectively mitigated through the application of standard laboratory safety procedures, proper waste management practices, and compliance with national environmental, OHS, and chemical safety regulations. The project is expected to deliver net positive environmental impacts, including reduced CO₂ emissions and diversion of construction and industrial waste from landfilling, which outweigh the limited and temporary environmental risks during implementation.</p>

Social Impact Identified	<p>From a social perspective, the project is assessed as Moderate Risk, primarily due to its laboratory research activities that include material pre-screening – identifying and prioritizing secondary materials, physical and chemical characterization of chosen materials, AI-driven data integration and predictive modelling – building a decision-making framework to classify and rank waste materials, carbonation potential assessment – quantifying CO₂ uptake capacity under controlled conditions. OHS risks are considered manageable and within the normal range for R&D projects.</p> <p>Purchase of equipment is limited to small pieces as all activities are planned to be carried out in the established laboratories.</p>
Mitigation Measures Categories	
Equipment (2.)	
Occupational Health and Safety (OHS) (3.)	
Waste Management (4.)	
Hazardous Chemicals Management (6.)	
Biodiversity and Environment Protection (7.)	
Intellectual Property (9.)	
Artificial Intelligence and Cybersecurity (11.)	
Procedures and Reporting in Case of Accident (12.)	
Stakeholder Engagement (13.)	

DIGIT.2.1.02.014 Autonomous Robotic Technology for Environmental Monitoring, Intervention and Safety (ARTEMIS)

Program	DIGIT.2.1.02 CHALLENGE PROGRAM
Reference No	DIGIT.2.1.02.014
Project Title	Autonomous Robotic Technology for Environmental Monitoring, Intervention and Safety (ARTEMIS)
Beneficiary	University of Zagreb Faculty of Electrical Engineering and Computing
Partners	<ul style="list-style-type: none"> – Centre of Excellence MARBLE – University of Rijeka, Faculty of Maritime Studies – ISKRA Shipyard 1 LLC – Visage Technologies L.t.d. – DOK-ING d.o.o.
Project Objective(s)	<p>Overall objective is development of a green, autonomous surveillance and preservation system to be deployed in protected areas. The project consists of two main scenarios related to protected maritime and land areas, connected by a common infrastructure of energy, communication, situational awareness, surveillance, and manipulation systems.</p> <p>Specific objectives are:</p> <ul style="list-style-type: none"> – Autonomous USV platform – Autonomous UGV platform – Perception system capable of perceiving different situations in the environment Control system for USV – Control system for UAV – Cooperative UAV exploration and mapping system – UAV recharging platform – Manipulation system for picking up different objects – Green energy base stations for recharging autonomous land and maritime vehicles – Secure and reliable communication for heterogeneous robot units. – Radio signal triangulation
Project Activities	<ul style="list-style-type: none"> – Research activity: <ul style="list-style-type: none"> - WP1 Requirements and specifications location is at applicant and partner headquarters (Zagreb, Rijeka, Šibenik) - WP2 USV and UGV platform preparation – Location is at Iskra and Dok-ing facilities. Iskra shipyard (located in Šibenik) will be in charge of producing USV, Dok-ing (located in Zagreb) for producing UGV. There will be no hazardous substances used. - WP3 Environmental perception and secure communication – Location will be Rijeka and Zagreb at headquarters of applicant and partners. Several experimental videos will be gathered in protected areas (Krka, Kornati, Lonjsko polje)

	<ul style="list-style-type: none"> - WP4 Methods for controlling robots – Location will be Rijeka and Zagreb at headquarters of applicant and partners. - WP5 Energy management – Location will be Zagreb, Rijeka and Šibenik at headquarters of applicant and partners. - WP6 Integration – Location is at Iskra and Dok-ing facilities. Iskra shipyard (located in Šibenik) will host integration of systems on USV, Dok-ing (located in Zagreb) will host integration of systems on UGV - WP7 Validation – Initial validation of USV will be done in Iskra facilities in Šibenik and UniRi facilities in Rijeka, while final will include validation in Krka and Kornati National Parks. Initial validation of UGV will be done in Dok-ing facilities, as well as new applicant outdoor testing arena, while final validation will include Lonjsko polje nature park and Krka National Park. - Adaptation works and infrastructure equipping – Location will be applicant facilities in Zagreb - Capacity building and dissemination of research findings and technologies - Knowledge and technology transfer - Market analysis and business validation - Promotion and visibility - Project management
<p>Environmental Impacts Identified</p>	<p>The environmental risk of the project is assessed as moderate. Project activities primarily involve research, development, testing and validation of autonomous robotic systems, with limited adaptation works and equipment installation in existing facilities. Environmental risks are mainly associated with field testing in protected natural areas, including the use of unmanned aerial, ground and surface vehicles, temporary disturbance to habitats, noise, and potential unintended interactions with sensitive ecosystems. Additional risks relate to equipment testing, battery systems, and laboratory activities, which may generate limited amounts of waste and require proper handling of materials, as well as data security and privacy considerations linked to drone operations and monitoring systems. These risks are site-specific, temporary, and reversible, and can be effectively managed through adherence to permitting requirements, coordination with protected area authorities, implementation of biodiversity protection measures, and application of established environmental, safety, and monitoring procedures.</p>
<p>Social Impact Identified</p>	<p>Identified social impacts are related to OHS due to laboratory research, equipment installation and field work. The project involves data protection issues of videos collected during experiments taken in public space that may contain vehicles and people. The measure regarding AI should be implemented during development of autonomous surveillance and preservation system to be deployed in protected areas.</p>

Mitigation Measures Categories
Equipment (2.)
Occupational Health and Safety (OHS) (3.)
Waste Management (4.)
Animal Material (5.)
Hazardous Chemicals Management (6.)
Biodiversity and Environment Protection (7.)
Community Health and Safety (8.)
Intellectual Property (9.)
Data Protection (10.)
Artificial Intelligence and Cybersecurity (11.)
Procedures and Reporting in Case of Accident (12.)
Stakeholder Engagement (13.)

DIGIT.2.1.02.016 Smart Optimization of the Electrical Distribution System through Multidisciplinary Data Analytics and AI

Program	DIGIT.2.1.02 CHALLENGE PROGRAM
Reference No	DIGIT.2.1.02.016
Project Title	Smart Optimization of the Electrical Distribution System through Multidisciplinary Data Analytics and AI
Beneficiary	Faculty of Science, University in Zagreb – PMF
Partners	<ul style="list-style-type: none"> – Faculty of electrical engineering and computing, University in Zagreb – FER – Adnet d.o.o. za inženjerstvo, proizvodnju i trgovinu – HEP – Operator distribucijskog sustava d.o.o. – HEP ODS
Project Objective(s)	Innovative Software Solution for Optimization of the EDS Improvement of the DSOs business processes
Project Activities	<p>WP1 – Infrastructure Setup and Data Integration</p> <p>WP2 – Research activities</p> <p>WP2.1 – Data Integration and Modeling</p> <p>WP2.2 –AI and Advanced Analytics Development</p> <p>WP2.3 – Prototype Development and Validation</p> <p>WP2.4 – Business Case Definition</p> <p>WP3 – Knowledge and Technology Transfer</p> <p>WP4 – Capacity Building and Dissemination</p> <p>WP5 – Market analysis and business validation</p> <p>WP6 – Promotion and visibility</p> <p>WP7 – Project Management and Coordination</p>
Environmental Impacts Identified	<p>Environmental risks associated with the project are assessed as Low. Project activities are exclusively digital and software-oriented and are implemented within existing institutional facilities and a local data center. The project does not involve civil works, land acquisition, field activities, laboratory work involving chemicals or biological materials, nor any interventions in protected natural areas.</p> <p>The only identifiable environmental aspects are related to electricity consumption associated with the operation of high-performance computing infrastructure (GPU server) and the potential generation of electronic waste at the end of the equipment life cycle. No direct emissions to air, water or soil are generated, and no impacts on biodiversity, water bodies, soil or natural habitats are expected. Environmental impacts are therefore indirect, limited in scale and fully contained within existing developed infrastructure.</p>

<p>Social Impact Identified</p>	<p>From a social perspective, the project is assessed as Moderate Risk, primarily due to its systemic and cross-sectoral nature, rather than direct physical or community-level impacts.</p> <p>Project activities include work in an IT laboratory environment and the operation of high-performance computing infrastructure, which implies the presence of standard occupational health and safety (OHS) risks typical for IT and server-room environments. These risks are not exceptional in nature but are relevant within the overall social risk profile.</p> <p>The project applies advanced artificial intelligence and machine learning methods, including deep learning, time-series forecasting and clustering, to predict system behavior and optimize electricity distribution operations. In addition, socio-environmental analytics are introduced through the integration of meteorological, demographic and behavioral data into technical grid models. This multidisciplinary data integration represents a step change beyond conventional DSO analytics, which traditionally operate within isolated technical domains.</p> <p>Although no personal data are processed, and all datasets provided by HEP ODS are fully anonymized and aggregated at the level of feeders or substations, the project still operates at the interface between digital decision support systems and critical energy infrastructure. Potential social relevance therefore stems from the indirect influence of AI-based analytics on operational decision-making, grid resilience, service reliability and public trust, rather than from direct interaction with individuals or communities.</p> <p>No project activity requires interaction with individuals or groups of people, and no stakeholder displacement, access restriction or direct social disturbance is anticipated.</p>
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<p>Mitigation Measures Categories</p>
<p>Equipment (2.)</p>
<p>Occupational Health and Safety (OHS) (3.)</p>
<p>Waste Management (4.)</p>
<p>Intellectual Property (9.)</p>
<p>Data Protection (10.)</p>
<p>Artificial Intelligence and Cybersecurity (11.)</p>
<p>Procedures and Reporting in Case of Accident (12.)</p>
<p>Stakeholder Engagement (13.)</p>

DIGIT.1.2.03.011 FSB LINK – Professionalization and Linking of FSB Research Centers with Industry

Program	DIGIT.1.2.03 PROFESSIONALIZATION OF RESEARCH CENTERS
Reference No	DIGIT.1.2.03.011
Project Title	FSB LINK – Professionalization and Linking of FSB Research Centers with Industry
Beneficiary	University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture
Project Objective(s)	<p>The overall objective of FSB LINK is to improve research infrastructure management at FSB, both through process optimization, digitalization, and raising capacity of staff; and intensify and professionalize the collaboration of FSB's research centers CRTA and ORCHID, and other FSB research groups, with the private sector.</p> <p>This holistic managerial approach and the implementation of the project's activities will lead to the increase of project- and business-oriented skills of both administrative and supporting staff, minimization of the administrative burden and optimization of equipment utilization.</p> <p>The long-term impact of the project is a change of mindset of researchers towards innovation and technology transfer measured through a significant increase of intellectual property applications filled, technology transfers realized and increase of collaboration projects and services realized with the private sector.</p>
Project Activities	<p>Activity 1. Organizational strengthening and process optimization</p> <p>FSB will establish clear and standardized procedures for internal and external collaborations, ensuring transparency and legal certainty in cooperation with industry. The activity builds on the ongoing process mapping (launched in 2023 and intensified within the ERP implementation in 2025) and the existing Intellectual Property (IP) regulations and practices already developed in cooperation with CTT Ltd.</p> <p>Activity 2 Optimization of access to infrastructure and services</p> <p>Activity 3 Capacity building and competence development</p> <p>Activity 4 Networking and collaboration</p>
Environmental Impacts Identified	<p>Environmental risk is low. The project supports basic servicing and annual maintenance of existing equipment (robots, CNC, 3D printers, towing tank), which generates small quantities of technical waste and requires limited use of lubricants and replacement consumables. All operations remain within established institutional OHS and licensed waste disposal procedures.</p> <p>However, due to the direct manipulation of materials during equipment servicing, preparation of a short ESCOP is recommended in order to</p>

	document PPE use, storage of technical consumables, waste segregation and take-back arrangements for spent parts.
Social Impact Identified	<p>Risks are low but relate to inclusiveness, stakeholder participation, and data protection. There is a possibility of low engagement from external stakeholders or uneven participation across different groups. This will be addressed through proactive outreach. Strict procedures will be enforced to ensure compliance with GDPR.</p> <p>Although the stakeholders have not been engaged during project preparation the stakeholder engagement during project implementation is well elaborated.</p> <p>The risk regarding the social aspect is assessed as low.</p>
Mitigation Measures Categories	
Equipment (2.)	
Occupational Health and Safety (OHS) (3.)	
Waste Management (4.)	
Intellectual Property (9.)	
Data Protection (10.)	
Procedures and Reporting in Case of Accident (12.)	
Stakeholder Engagement (13.)	

DIGIT.1.2.03.019 Professionalization of the Research Center for Medical Bionics (RCMB)

Program	DIGIT.1.2.03 PROFESSIONALIZATION OF RESEARCH CENTERS
Reference No	DIGIT.1.2.03.019
Project Title	Professionalization of the Research Center for Medical Bionics (RCMB)
Beneficiary	University of Split, Faculty of Science
Project Objective(s)	<p>To professionalize and strengthen the management, accessibility, and sustainability of the Research Center for Medical Bionics (RCMB), positioning it as a nationally relevant and internationally competitive hub for clinical and translational research in medical bionics, with a particular focus on hearing and neuroelectronics.</p> <p>The impact of the project will be reflected in the recognition of RCMB as a nationally relevant and internationally competitive hub for clinical and translational research in medical bionics.</p>
Project Activities	<p>WP1 – Capacity Building and Professionalization</p> <p>WP2 – Networking and Collaboration</p> <p>WP3 – Technology Transfer and Innovation Exploitation</p> <p>WP4 – Promotion and Visibility</p> <p>WP5 – Project Management</p>
Environmental Impacts Identified	<p>The project involves small volumes of hazardous substances and BSL-2 laboratory activities, but all activities occur within an existing licensed laboratory environment under established SOPs, certified waste handling, and institutional OHS controls. However, due to the direct manipulation of hazardous materials (e.g. solvents, solder alloys, Li-ion cells) within BSL-2 laboratory workflows, PPE requirements, waste segregation (chemical / e-waste / battery), ventilation controls and spill response arrangements.</p>
Social Impact Identified	<p>The project activities include laboratory research (BSL-2). Personal data will be collected with explicit informed consent, GDPR DPIA if needed. Vulnerable groups involved are people with hearing loss.</p> <p>During project preparation prior consultations with clinical partners and internal university consultations were held.</p> <p>The stakeholder groups and methods of engagement during project implementation are well elaborated.</p> <p>The risks regarding the social aspect are assessed as moderate due to the terminal use of laboratory animals, which requires strict compliance with animal welfare, ethical standards, and applicable regulatory requirements, OHS risks related to BSL-2 laboratory, involvement of vulnerable groups. However, the financing will primarily support staff,</p>

	<p>training, and capacity building.</p> <p>Overall ES risk is moderate.</p>
Mitigation Measures Categories	
Equipment (2.)	
Occupational Health and Safety (OHS) (3.)	
Waste Management (4.)	
Animal Material (5.)	
Hazardous Chemicals Management (6.)	
Intellectual Property (9.)	
Data Protection (10.)	
Procedures and Reporting in Case of Accident (12.)	
Stakeholder Engagement (13.)	
Vulnerable Groups (14.)	

DIGIT.2.2.01.007 Dwelling at the Edge between Land and Sea (DELS)

Program	DIGIT.2.2.01 SEAL OF EXCELLENCE
Reference No	DIGIT.2.2.01.007
Project Title	Dwelling at the Edge between Land and Sea: An isotope reading of breeding and fishing from the Po Delta to the Adriatic shores, 1st–16th c. CE
Beneficiary	Institute for Anthropological Research
Project Objective(s)	<p>Overall Objective(s)</p> <p>To investigate human subsistence strategies and ways of living at the interface between land and sea from the 1st to the 16th century CE, using isotopic and biomolecular analysis of archaeological faunal remains.</p> <p>To provide new scientific insights into historical breeding and fishing practices in the Po Delta and Adriatic region through advanced analytical techniques.</p> <p>Specific Objective(s)</p> <p>The project will:</p> <ul style="list-style-type: none"> - Apply isotopic analysis to reconstruct diet, mobility, and environmental interactions of past populations. - Use ZooMS and related biomolecular methods to identify faunal remains and refine species attribution. - Integrate zooarchaeological, environmental, and biochemical data to better understand long-term human–environment interactions; including ecological adaptation across wetland and coastal landscapes. - Contribute to scientific knowledge and dissemination in the fields of archaeology, bioarchaeology, and environmental history.
Project Activities	<p>WP1 – Faunal Sampling & Zooarchaeological Analysis</p> <p>WP2 – Zooarchaeology by Mass Spectrometry (ZooMS) peptide fingerprinting to refine taxonomic identification</p> <p>WP3 – Multi-Isotope Analyses</p> <p>WP4 – Project Management and Dissemination</p> <p>WP5 – Data Integration & GIS-Based Spatial Modelling</p> <p>All laboratory activities (zooarchaeological, proteomic and isotopic) will be conducted at the Institute for Anthropological Research in Zagreb, using specialised facilities for bioarchaeological and biomolecular analyses. The project applies well-established, minimally invasive analytical techniques (e.g. ZooMS and stable isotope analysis), following standard international protocols and best practices. Sampling</p>

	<p>is limited to very small quantities of material and prioritises already fragmented or non-diagnostic areas to preserve the integrity of archaeological specimens.</p>
<p>Environmental Impacts Identified</p>	<p>The project is associated with a low environmental risk. All activities are limited to laboratory-based analysis of archaeological faunal remains conducted within existing institutional facilities.</p> <p>The project does not involve civil works, emissions, discharges, or significant waste generation, nor does it include the use of hazardous substances or high-risk laboratory procedures. Energy and resource consumption are minimal and within standard operational levels.</p> <p>There is no interaction with natural habitats, protected areas, or biodiversity, as no fieldwork or environmental sampling is conducted.</p> <p>The only specific consideration relates to minimally invasive sampling of archaeological materials, which is carried out under appropriate permits and in accordance with cultural heritage protection requirements. Sampling follows a conservation-first approach, including case-by-case authorisation by competent institutions and authorities, use of minimally invasive techniques, and full documentation to ensure traceability and preservation of material integrity.</p> <p>Given the low risk profile, no standalone environmental assessment instrument is required. However, the project will implement the applicable measures from the generic ESMP Checklist, including those related to occupational health and safety, handling of biological (archaeological) material, and cultural heritage protection.</p>
<p>Social Impact Identified</p>	<p>The project carries low social risk, as it is limited to laboratory-based research without interaction with communities, human subjects, or vulnerable groups, and without impacts on community health and safety or personal data processing.</p> <p>The research involves the analysis of archaeological faunal remains, requiring careful handling of cultural heritage and biological materials in accordance with applicable legal frameworks and institutional procedures. All sampling and analysis activities are subject to formal authorisation by responsible institutions and competent heritage authorities, ensuring compliance with cultural heritage protection regulations.</p> <p>Associated occupational health and safety risks are minimal and managed through established institutional procedures.</p> <p>Potential impacts are low in scale and confined to controlled laboratory conditions, while positive impacts relate to scientific advancement and knowledge dissemination. The project is aligned with the principles of the MSCA Green Charter through sustainable research practices.</p> <p>Given the overall low-risk profile and absence of significant impacts, social risks will be addressed through the implementation of applicable measures from the generic ESMP Checklist, including specific measures to manage minor risks related to cultural heritage.</p>
<p>Mitigation Measures Categories</p>	

Occupational Health and Safety (OHS) (3.) Applicable: 1-3, 5-13, 17-19, 21-24
Waste Management (4.) Applicable: 1-3, 10-14
Animal Material (5.) Applicable: 1-2, 4-5, 10-18, 20-26
Community Health and Safety (8) Applicable: 1-2, 4-5, 11-13
Intellectual Property (9)
Procedures and Reporting in Case of Accident (12.)
Stakeholder Engagement (13.) Applicable: 1-7, 9, 11-13
Cultural Heritage (15.)

B. Mitigation Measures

1. Civil Works

Category	CIVIL WORKS
Aspect	Proposed mitigation measures
Scope of Works and Legal Compliance	1. Civil works shall be limited to existing buildings and/or plots under the legal use of the project beneficiary.
	2. Civil works shall not involve land acquisition, involuntary resettlement, or physical or economic displacement of people
	3. The scope, location, scale, and duration of civil works shall be clearly defined and documented prior to implementation.
	4. All applicable national construction, environmental, and occupational safety regulations shall be complied with.
	5. All required permits, approvals, and notifications shall be obtained prior to the commencement of works, where applicable.
	6. Civil works shall be carried out exclusively by licensed and authorized contractors.
Site Planning, Organization, and Access Control	7. Construction sites shall be clearly demarcated and physically separated from areas accessible to staff, students, patients, or visitors.
	8. Access to construction areas shall be restricted to authorized personnel only.
	9. Construction activities shall be scheduled to minimize disruption to normal facility operations.

Category	CIVIL WORKS
Aspect	Proposed mitigation measures
	10. Safe pedestrian routes and emergency evacuation paths shall be maintained at all times.
	11. Temporary utilities (electricity, water, IT) shall be safely installed, clearly marked, and regularly inspected.
Occupational Health and Safety (OHS)	12. A site-specific Occupational Health and Safety Plan shall be prepared and implemented by the contractor.
	13. All workers shall receive appropriate OHS training prior to engaging in construction activities.
	14. Personal protective equipment (PPE) appropriate to the task shall be provided and used at all times.
	15. High-risk activities (e.g. work at height, electrical works, confined spaces) shall be subject to additional control measures and supervision.
	16. Construction activities carried out in operational laboratories or technical areas shall be subject to enhanced safety procedures.
Community Health, Safety, and Protection of Users	17. All subcontractors and their employees are required to comply with the same occupational health and safety (OHS) and labor standards as the main contractors, and compliance will be subject to regular monitoring and inspections.
	18. Construction activities shall not pose risks to the health and safety of staff, students, patients, visitors, or the surrounding community.
	19. Measures shall be implemented to prevent unauthorized access by third parties, including vulnerable persons.

Category	CIVIL WORKS
Aspect	Proposed mitigation measures
	20. Additional protection measures shall be applied in facilities used by vulnerable groups (e.g. patients, persons with disabilities).
	21. Facility users shall be informed in advance about the scope, timing, and duration of construction works.
Noise, Dust, and Air Emissions Management	22. Measures shall be implemented to limit construction noise to legally permissible levels.
	23. Noisy activities shall be restricted to defined working hours
	24. Dust generation shall be minimized through appropriate measures such as wetting, covering of materials, and enclosure of work areas.
	25. Construction materials prone to dust generation shall be stored and transported in a manner that prevents dispersion.
Soil and Water Protection	26. Air emissions from machinery and equipment shall be minimized through proper maintenance and operation.
	27. Measures shall be implemented to prevent contamination of soil during construction activities.
	28. Storage of fuels, oils, paints, solvents, and chemicals shall be carried out on impermeable surfaces with secondary containment.
	29. Direct discharge of wastewater, sludge, or contaminated liquids into soil, drainage systems, or water bodies shall be prohibited.
	30. Construction activities shall be managed to prevent pollution of surface water and groundwater.

Category	CIVIL WORKS
Aspect	Proposed mitigation measures
	31. Spill prevention and response procedures shall be available at the construction site.
Waste Management	32. A construction waste management approach shall be implemented, including waste minimization and segregation.
	33. Construction waste shall be temporarily stored in designated areas in a safe manner.
	34. Hazardous construction waste, if generated, shall be handed over to licensed waste management operators.
	35. Records of waste generation, transport, and disposal shall be maintained.
Protection of Existing Assets and Infrastructure	36. Existing buildings, equipment, installations, and utilities shall be protected from damage during construction works.
	37. Construction activities shall not compromise the structural integrity or safety of buildings
	38. Any damage to existing assets shall be promptly repaired and reported to the responsible authority.
Emergency Preparedness and Incident Management	39. Emergency response procedures covering fire, injuries, spills, and other incidents shall be defined and communicated to workers.
	40. Emergency contact details shall be clearly displayed at the construction site.
	41. All accidents, near-misses, and incidents shall be recorded and reported in accordance with project procedures.

Category	CIVIL WORKS
Aspect	Proposed mitigation measures
	42. Environmental incidents involving pollution of air, soil, or water shall trigger immediate corrective and remedial actions.
Completion of Works and Site Restoration	43. Upon completion of construction works, all debris, waste, and temporary facilities shall be removed from the site.
Discrimination against women/vulnerable groups in the hiring process of workers and during Sub-project implementation	44. The project will adopt accessible communication measures to ensure inclusion of vulnerable groups. This includes provision of sign language interpretation, alternative text, captions, or other appropriate communication aids as needed.
	45. All activities involving children will comply with EU requirements for safeguarding in research, including the handling of images and personal identifying information. Any data collection or dissemination will ensure the privacy and protection of child participants
	46. Any future project activities involving children will require documented parental or legal guardian consent prior to participation.
	47. Project staff and contractors will receive training on interacting appropriately with vulnerable groups, including children and persons with disabilities, ensuring respect, dignity, and safety at all times.
	48. Mechanisms will be in place to monitor compliance with safeguarding requirements and accessible communication provisions. Any concerns or incidents involving vulnerable groups will be documented and addressed promptly.
	49. Access to safe GRM for workers (Contractor GRM) must be ensured and other grievance mechanisms (unions, arbitration). The workers have to be explicitly informed of their rights and GRM.

Category	CIVIL WORKS
Aspect	Proposed mitigation measures
	50. Wages and contract conditions offered to all staff should be in keeping with Croatian labor laws or higher set standards which should be competitive in all categories of workers including foreign workers.
Labor influx	51. All Information materials regarding workers' rights, safety, Code of Conduct and information on GRM availability and access must be provided in local language and language accessible to foreign workers
	52. All workers, including foreign workers, must undergo mandatory training on occupational health and safety, workers' rights, and procedures in case of accidents or non-compliance
	53. Workers should be hired through national employment service to avoid hiring "at the gate" and therefore to discourage spontaneous influx of job seekers. The contractors employing the foreign workers directly should guarantee that foreign workers are provided with working conditions and accommodation that comply with both national laws and ESS2 (fair recruitment): employment contracts are comprehensible, equitable, and transparent, and are given in a language that the worker can understand. The foreign workers should be informed about their rights and responsibilities, as well as the resources they can access if they encounter exploitation or discrimination. All contractors and their sub-contractors must respect and implement the World Bank Group Code of Ethics. Any such complaint or shared information shall be subject of Ethics Review by the DIGIT project.
	54. Accommodation must meet the minimum space, sanitation, and safety standards set by national regulations and do independent inspections confirm compliance with hygiene, occupancy limits, heating, ventilation, and fire safety standards.

2. Equipment

Category	EQUIPMENT
Aspect	Proposed mitigation measures
Equipment Selection and Procurement	1. Equipment shall be appropriate for the approved project activities and aligned with the defined project scope.
	2. Procurement of equipment shall comply with applicable national legislation and World Bank procurement requirements.
	3. Preference shall be given, where feasible, to equipment with higher energy efficiency, durability, and lower environmental footprint.
Delivery, Handling, and Installation	4. Equipment shall be delivered, handled, and stored in accordance with manufacturer instructions.
	5. Installation and commissioning shall be carried out by qualified and authorized personnel.
	6. Functional testing shall be completed prior to operational use of the equipment.
Safe Use and Operational Control	7. Equipment shall be operated only for its intended purpose and within defined operational limits.
	8. Operating instructions and user manuals shall be available to all authorized users.
	9. Access to specialized or high-risk equipment shall be restricted to trained and authorized personnel.
Digital, Automated, and AI-Enabled	10. Digital and automated equipment shall be configured to ensure secure, reliable, and controlled operation.

Category	EQUIPMENT
Aspect	Proposed mitigation measures
Equipment	11. AI-enabled equipment shall be implemented in line with approved project objectives and ethical principles, with appropriate human oversight.
Maintenance, Asset Management, and Decommissioning	12. Preventive maintenance and servicing shall be performed in accordance with manufacturer recommendations.
	13. An inventory of procured equipment shall be maintained, and responsibilities for equipment management clearly assigned.

3. Occupational Health and Safety (OHS)

Category	OCCUPATIONAL HEALTH AND SAFETY (OHS)
Aspect	Proposed mitigation measures
OHS Management and Responsibilities	1. The project shall comply with applicable occupational health and safety legislation and institutional OHS procedures.
	2. OHS roles and responsibilities for project activities shall be clearly assigned within the project team.
	3. Project-specific occupational health and safety risks shall be identified prior to the start of project activities and reviewed periodically.
	4. Non-routine or high-risk research activities shall be subject to a documented risk assessment before implementation.
Laboratory and Research Activities	5. Laboratory and research activities shall be conducted in accordance with approved laboratory safety procedures.
	6. Access to laboratories and research facilities shall be restricted to authorized and trained personnel only.
	7. Project personnel shall be informed of health and safety risks associated with their specific research activities.
	8. Access to laboratories shall be subject to appropriate supervision, particularly for students, early-career researchers, and new staff.
	9. New project personnel shall receive site-specific safety induction prior to engaging in laboratory or research activities.
Biosafety and Exposure Prevention	10. Activities involving biological material shall be conducted in accordance with approved biosafety procedures and ethical approvals.

Category	OCCUPATIONAL HEALTH AND SAFETY (OHS)
Aspect	Proposed mitigation measures
	11. Measures shall be applied to minimize exposure to hazardous substances during routine project activities.
	12. Biosafety procedures shall include defined containment, hygiene, and decontamination practices relevant to the project activities.
	13. Emergency procedures related to biological exposure shall be known to laboratory personnel.
Field Work and Non-Routine Activities	14. Field work and sampling activities shall be planned to minimize risks to project staff.
	15. Site-specific risks shall be assessed prior to field activities, and appropriate preventive measures applied.
	16. Pilot-scale experiments and experimental setups shall be conducted under controlled conditions and appropriate supervision.
	17. Changes to experimental procedures shall be reviewed from an OHS perspective prior to implementation.
Ergonomics and Digital Work	18. Ergonomic risks related to laboratory, desk-based, and computer-intensive work shall be identified and mitigated.
	19. Measures shall be implemented to reduce ergonomic and work-related strain associated with prolonged laboratory or computer-based activities.
Clinical and Human-Subject Activities	20. Activities involving patients or human subjects shall follow approved protocols, including informed consent procedures.
Incident Reporting and Training	21. Procedures for reporting occupational incidents and near-misses related to project activities shall be in place and communicated to staff.

Category	OCCUPATIONAL HEALTH AND SAFETY (OHS)
Aspect	Proposed mitigation measures
	22. Project personnel shall receive appropriate OHS training relevant to their assigned tasks.
	23. Reported incidents and near-misses shall be reviewed to identify corrective and preventive actions.
Communication and language accessibility	24. Important information and particularly related to safety must be presented in language(s) accessible to these researchers and staff.

4. Waste Management

Category	WASTE MANAGEMENT
Aspect	Proposed mitigation measures
Waste Identification and Segregation	1. The project shall identify all waste streams generated through laboratory, research, and pilot activities, including chemical, biological, and electronic waste.
	2. Laboratory waste shall be segregated at the point of generation according to hazard classification and laboratory biosafety procedures.
	3. Non-hazardous laboratory waste shall be collected and disposed of through authorized institutional or municipal systems.
Hazardous Chemical Waste Management	4. Hazardous chemical waste shall be handled separately, stored in compatible and clearly labeled containers, and managed in accordance with safety data sheets (SDS).
	5. Temporary storage of hazardous chemical waste shall be limited in time and carried out in designated, secured areas with appropriate containment.
	6. Disposal of hazardous chemical waste shall be carried out exclusively through licensed waste management operators.
Biological and Biosafety Waste Management	7. Biological and potentially infectious waste shall be segregated, contained, and treated or disposed of in accordance with applicable biosafety regulations.
	8. Sharps, contaminated materials, and biohazardous waste shall be collected in appropriate puncture-resistant and clearly marked containers.
	9. Temporary storage of biological waste shall be limited in time and managed in designated biosafety-compliant areas.

Category	WASTE MANAGEMENT
Aspect	Proposed mitigation measures
Biological and Biosafety Waste Management	10. Waste electrical and electronic equipment (WEEE) generated by laboratory activities shall be managed separately from other waste streams.
	11. Data-containing equipment shall undergo secure data removal prior to disposal or transfer.
Training, Documentation, and Oversight	12. Laboratory staff involved in waste handling shall receive appropriate training on waste segregation, labeling, and safe handling procedures.
	13. Records of hazardous laboratory waste disposal shall be maintained in accordance with institutional and legal requirements.
	14. Waste management practices shall be periodically reviewed to ensure continued compliance with laboratory safety and environmental requirements.

5. Animal Material

Category	ANIMAL MATERIAL
Aspect	Proposed mitigation measures
Ethical Approval and Compliance	1. Activities involving animals or animal-derived biological material shall be conducted only after obtaining all required ethical approvals and permits from competent authorities, and in accordance with the principles of Replacement, Reduction, and Refinement (3R).
	2. The use of animal material shall comply with applicable national legislation, EU standards, institutional ethical policies, and follow humane procedures to minimize suffering.
	3. Ensure that any procedures involving laboratory animals, including terminal procedures in laboratory rodents where applicable, are conducted exclusively under approved ethical permits and in accordance with institutional animal welfare protocols.
Source and Traceability	4. Animal material shall be obtained exclusively from authorized and legally compliant sources.
Ethical Use of Animals and Application of the 3Rs Principle	5. No protected species or species listed on the IUCN Red List shall be sampled or used unless ethically approved, minimal, and targeted sampling is conducted, and it is conclusively demonstrated that such sampling has a negligible impact on the individual or on biodiversity. Sampling must not result in death, significant harm, or major stress or disturbance to the organism.
	6. Other non-mammalian species may be sampled only in very small laboratory quantities.
	7. All activities shall adhere to the 3Rs principles (Replacement, Reduction, Refinement), and where feasible, AI-driven platforms and alternative models should be used to minimize reliance on live animal-derived samples.
	8. Whenever possible, experiments shall incorporate alternative models, such as organoids or in vitro systems, to reduce the use of live animals.
	9. Procedures involving live animals shall be performed humanely according to approved protocols.

Category	ANIMAL MATERIAL
Aspect	Proposed mitigation measures
Documentation	10. Documentation on the origin and traceability of animal material shall be maintained. Records shall include information on ethical approvals, compliance with humane procedures, and justification for the use of animal material.
Handling and Use	11. Animal and biological material shall be handled in accordance with approved laboratory safety and biosafety procedures.
	12. Access to areas where animal material is handled shall be restricted to authorized and trained personnel only.
	13. Animal material shall be used strictly for the purposes defined in the approved project protocols.
	14. Areas where animal or biological material is handled shall be subject to defined access control and zoning procedures, where relevant.
	15. Procedures shall be in place to ensure integrity, labeling, and identification of biological samples throughout their use.
Biosafety and Containment	16. Mixing or misidentification of samples shall be prevented through defined handling protocols.
	17. Appropriate biosafety levels and containment measures shall be applied based on the nature of the animal or biological material.
	18. Measures shall be implemented to prevent cross-contamination between samples, experiments, or laboratories.
	19. Relevant decontamination procedures shall be defined and applied.

Category	ANIMAL MATERIAL
Aspect	Proposed mitigation measures
	20. Project activities involving animal or biological material shall be classified according to the applicable biosafety level prior to implementation.
	21. Any change in the nature or risk level of biological material shall trigger a review of biosafety measures.
Storage and Internal Transport	22. Animal and biological material shall be stored under controlled conditions appropriate to the material type, with secured and access-controlled storage areas.
	23. Internal transport of animal material within facilities shall follow defined biosafety and containment procedures.
Training and Incident Management	24. Personnel involved in handling animal material shall receive appropriate training on ethical, biosafety, and handling procedures. Personnel shall receive training not only on biosafety and handling procedures but also on ethical treatment of animals and application of 3R principles.
	25. Procedures shall be in place to respond to and record incidents involving animal or biological material.
	26. Emergency biosafety procedures shall be defined for accidental exposure, spills, or loss of biological material.

6. Hazardous Chemicals Management

Category	HAZARDOUS CHEMICALS MANAGEMENT
Aspect	Proposed mitigation measures
Regulatory Compliance and Chemical Inventory	1. The project shall comply with applicable national legislation, EU regulations (e.g. REACH/CLP), and institutional chemical safety procedures.
	2. All hazardous chemicals used within the project shall be identified and listed in a project-specific chemical inventory.
	3. Safety Data Sheets (SDS) shall be available and accessible for all hazardous chemicals used in project activities.
Procurement and Authorization of Hazardous Chemicals	4. Hazardous chemicals shall be procured only for approved project activities and in quantities necessary for their intended use.
	5. Use of restricted or particularly hazardous substances shall require prior authorization in accordance with institutional procedures.
Handling and Use of Hazardous Chemicals	6. Hazardous chemicals shall be handled strictly in accordance with approved laboratory safety procedures and SDS instructions.
	7. Access to hazardous chemicals shall be restricted to trained and authorized personnel only.
	8. Chemical handling procedures shall aim to minimize exposure risks during routine project activities.
	9. Hazardous chemicals (e.g., strong acids and bases) and compressed gases used in laboratory procedures must be handled according to established safety protocols, including the use of fume hoods, proper storage, securing of gas cylinders, leak checks, and communication of Material Safety Data Sheets (MSDS) to staff. Personnel must be trained, and safety procedures strictly followed to prevent exposure and

Category	HAZARDOUS CHEMICALS MANAGEMENT
Aspect	Proposed mitigation measures
	accidents
Storage and Labeling	10. Hazardous chemicals shall be stored in designated, secure areas appropriate to their hazard classification.
	11. Containers of hazardous chemicals shall be clearly labeled with content, hazard information, and relevant warnings.
	12. Incompatible chemicals shall be stored separately to prevent hazardous reactions.
Exposure Prevention and Operational Controls	13. Appropriate operational controls (e.g. fume hoods, containment practices) shall be used when handling hazardous chemicals.
	14. Chemical handling activities shall be planned to reduce the likelihood of spills, releases, or accidental exposure.
Incident Prevention and Emergency Response	15. Procedures shall be in place to respond to accidental spills, exposure, or other incidents involving hazardous chemicals.
	16. Project personnel shall be informed of emergency procedures related to hazardous chemical use.
	17. Incidents involving hazardous chemicals shall be recorded and reviewed in accordance with project procedures
Training and Competency	18. Personnel involved in handling hazardous chemicals shall receive appropriate training on chemical safety and risk prevention.
	19. Refresher training shall be provided where required by institutional or project procedures.

Category	HAZARDOUS CHEMICALS MANAGEMENT
Aspect	Proposed mitigation measures
Monitoring and Review	20. Compliance with hazardous chemicals management procedures shall be periodically reviewed during project implementation.
	21. Chemical management procedures shall be updated if the scope or nature of chemical use changes.

7. Biodiversity and Environment Protection

Category	BIODIVERISTY AND ENVIRONMENT PROTECTION
Aspect	Proposed mitigation measures
Protection of Natural Habitats and Sensitive Areas	1. Project activities shall not involve the conversion, degradation, or significant disturbance of critical natural habitats, legally protected areas, or areas of high biodiversity value, and shall be designed to avoid any adverse impacts on natural habitats.
	2. Project activities conducted in protected or environmentally sensitive areas shall be carried out only with prior authorization from competent authorities.
	3. Activities in protected areas shall comply with site-specific management plans and protection requirements.
	4. Ensure minimal human presence in the field by using automated, autonomous, or remote systems wherever feasible, in order to reduce disturbance to wildlife and habitats.
	5. Apply environmentally sensitive planning of movement and activities, based on environmental assessments, to avoid sensitive areas and zones with high wildlife activity.
	6. Use low-noise, low-emission equipment and vehicles, and limit their operation to the minimum necessary.
	7. Implement measures for the detection and avoidance of wildlife during activities, including adaptation or temporary suspension of operations when animals are present.
	8. Plan and carry out activities during environmentally appropriate time periods, avoiding sensitive phases of wildlife life cycles such as nesting, breeding, or feeding periods.
Environmental Screening of Project Activities	9. Prior to conducting field work, sampling, or pilot activities, potential impacts on local biodiversity and ecosystems shall be considered and avoided where feasible.
	10. Field activities shall be limited in scope, duration, and spatial extent to minimize disturbance to flora, fauna, and natural habitats

Category	BIODIVERSITY AND ENVIRONMENT PROTECTION
Aspect	Proposed mitigation measures
Biological Sampling and Use of Natural Resources	11. Collection of biological samples from the environment shall be conducted only where permitted and in compliance with applicable environmental regulations and permits.
	12. Project activities shall not involve the use of endangered, protected, or threatened species unless explicitly authorized by competent authorities.
	13. Collection of marine organisms or biological material shall be limited to the minimum quantity necessary to achieve project objectives.
	14. Sampling methods shall be selected to minimize harm to organisms and disturbance to marine habitats.
Prevention of Ecological Risks	15. Introduction or spread of invasive alien species through project activities shall be avoided through appropriate preventive measures.
	16. Measures shall be applied to prevent accidental release of biological material or substances that could negatively affect ecosystems.
	17. Use of recording, monitoring, or survey equipment (e.g. cameras, drones, acoustic devices) shall not cause disturbance to wildlife or sensitive habitats.
Environmental Good Practice, Monitoring, and Awareness	18. Environmental good practices shall be applied during field and pilot activities to prevent soil, vegetation, or water body disturbance beyond the immediate project needs.
	19. Any unexpected environmental impacts or damage to biodiversity observed during project implementation shall be reported and addressed in accordance with project procedures.
	20. Project teams involved in field or environmental activities shall be informed of relevant environmental protection requirements and good practices.

8. Community Health and Safety

Category	COMMUNITY HEALTH AND SAFETY
Aspect	Proposed mitigation measures
General Community Risk Prevention	1. Project activities shall be designed and implemented to avoid creating health or safety risks for surrounding communities and non-project personnel.
	2. Project activities shall not result in increased exposure of community members to project-related hazards beyond what is unavoidable for implementation.
	3. Use of drones, cameras, acoustic devices, or other recording and monitoring equipment shall be conducted in a manner that avoids disturbance to wildlife, risks to community safety, and violations of applicable privacy or protected area regulations.
Presence in Public or Semi-Public Spaces	4. Where project activities take place in public or semi-public spaces (e.g. campuses, ports, coastal areas, public facilities), measures shall be applied to ensure the safety of non-project personnel.
	5. Access to areas where project activities pose potential risks to the public shall be controlled or clearly communicated, as appropriate.
Field, Pilot, and Demonstration Activities	6. Field work, pilot testing, and demonstration activities shall be conducted in a manner that minimizes risks, disturbance, or nuisance to local communities.
	7. Project field and pilot activities shall be conducted in a manner that minimizes nuisance, including noise or disturbance, to nearby communities and sensitive environments.
	8. Temporary project activities shall not interfere with essential community services, livelihoods, or normal use of public spaces.
Interaction with Communities	9. Project personnel shall conduct interactions with community members in a respectful manner and in line with applicable institutional and project rules.

Category	COMMUNITY HEALTH AND SAFETY
Aspect	Proposed mitigation measures
	10. Activities that are sensitive to nearby communities or cause temporary disturbances will be addressed through transparent communication and timely information sharing.
Incident Response and Complaints	11. Procedures shall be in place to respond to incidents related to community health and safety arising from project activities.
	12. Community-related complaints or concerns shall be received, recorded, and addressed through the project's grievance mechanism.
Cross cutting obligations	13. Project activities shall comply with all applicable community health and safety-related measures defined elsewhere in this checklist, including those related to biodiversity protection, hazardous materials, animal and biological material handling, data protection, and other project-specific risk management measures.

9. Intellectual Property

Category	INTELLECTUAL PROPERTY
Aspect	Proposed mitigation measures
Legal Compliance and Ownership	1. Appropriate intellectual property protection measures (e.g. copyright registration, patents, trade secrets) shall be identified and implemented where applicable.
	2. All project activities shall comply with the Act on Copyright and Related Rights (OG 111/21) and other applicable intellectual property legislation.
Identification and Protection of Intellectual Property	3. Intellectual property generated through project activities shall be identified and assessed for appropriate protection measures, such as copyright, patents, trade secrets, or other forms of protection, where applicable.
	4. Appropriate steps shall be taken to protect intellectual property prior to public disclosure, publication, or dissemination of project results.
Commercialization and Knowledge Transfer	5. All innovations generated under the project, including software tools, numerical models, technical reports, methodologies, or design code recommendations, shall be evaluated for their potential commercialization or transfer to practice.
	6. Commercialization or exploitation of project results shall be conducted in accordance with applicable intellectual property rules and institutional technology transfer procedures.

10. Data Protection

Category	DATA PROTECTION
Aspect	Proposed mitigation measures
Data Protection	1. The General Data Protection Regulation in Croatia is based on the General Data Protection Regulation (GDPR) of the European Union and ensures the protection of privacy and personal data of citizens. All entities processing personal data, whether in the public or private sector, are required to align their activities with the provisions of the law and implement data protection measures to prevent misuse or insecurity of data.
	2. The GDPR principles of data minimization and proportionality shall be strictly applied.
	3. Only personal data strictly necessary for achieving the specific research or project objectives shall be collected. Any additional or unrelated data collection is prohibited.
	4. Regular review of collected data will be conducted to ensure relevance, necessity, and compliance with the principle of proportionality. Unnecessary data will be deleted immediately.
Informed Consent and Voluntary Participation	5. Strict procedures, encryption, access controls, and staff training must be enforced to ensure compliance.
	6. Consent protocols must be in full compliance with EU Regulation 536/2014 and the General Data Protection Regulation (GDPR).
	7. Participation in research shall be entirely voluntary and documented informed consent shall be obtained in advance.
	8. Documentation shall confirm the consent, data sharing, storage duration, and destruction upon withdrawal of consent.
Privacy and Confidentiality	9. Confidentiality of personal data shall be ensured, and tissue samples shall be anonymized or de-identified.
	10. Data associated with human samples must be de-identified or anonymized before transfer and processing, in full compliance with GDPR and national regulations.

	11. Strict procedures, encryption, access controls, and staff training will ensure data protection.
	12. Only project staff with a clear operational need will have access to personal data. Access logs will be maintained for audit purposes.
	13. Personal data will be stored only for the minimum period necessary for the research purpose. After this period, data will be securely destroyed or anonymized.

11. Artificial Intelligence and Cybersecurity

Category	DATA PROTECTION
Aspect	Proposed mitigation measures
Regulatory Compliance and Ethical Framework	1. All artificial intelligence–related activities shall comply with applicable EU legislation, including the Artificial Intelligence Act (Regulation (EU) 2024/1689), and shall align with the OECD AI Principles.
	2. AI systems shall be developed and used in accordance with ethical principles, including transparency, accountability, human oversight, and non–discrimination.
Governance, Oversight, and Responsible Use	3. AI–based tools and systems shall be used only for purposes consistent with approved project objectives and shall not be deployed for unintended or high–risk uses without prior review.
	4. Appropriate human oversight shall be ensured for AI–supported or automated decision–making processes relevant to project activities.
Capacity Building and Awareness	5. Project staff involved in the development, use, or supervision of AI systems shall receive appropriate training on responsible AI use, ethical considerations, and associated risks.
Cybersecurity and Information Systems Protection	6. Cybersecurity measures shall be implemented in compliance with the EU NIS2 Directive and relevant national cybersecurity regulations to protect project–related digital systems, data, and infrastructure.
	7. Measures such as access controls, authentication mechanisms, secure configurations, and incident response procedures shall be applied to prevent unauthorized access, data breaches, or system misuse.

12. Procedures and Reporting in Case of Accident

Category	PROCEDURES AND REPORTING IN CASE OF ACCIDENT
Aspect	Proposed mitigation measures
Incident Identification and Reporting	1. Procedures shall be in place for the timely identification and reporting of accidents, incidents, near-misses, and unexpected events arising from project activities.
	2. Project personnel shall be aware of their obligation to report incidents in accordance with project and institutional procedures.
	3. Roles and responsibilities for incident reporting, internal notification, and follow-up actions shall be clearly defined within the project team.
	4. Incident reporting procedures shall apply to all project activities, including laboratory work, field activities, pilot testing, digital activities, and interactions with external stakeholders or communities.
Incident Response, Documentation, and Follow-up	5. Reported incidents shall be documented and assessed to determine their causes, impacts, and required corrective or preventive measures.
	6. Serious incidents with potential or actual environmental, health, safety adverse effects, that affects communities, public or workers shall be reported without delay, not later than 24 hours, to the Project Implementation Unit (PIU) and other relevant authorities, in line with World Bank requirements.
	7. Incident reports will provide sufficient detail regarding the scope, severity, and possible causes of the incident or accident, indicating immediate measures taken or that are planned to be taken to address it.
	8. Corrective actions identified following an incident shall be implemented and monitored until closure.
	9. Incident reporting and response procedures shall be coordinated with relevant thematic procedures defined elsewhere in this checklist (e.g. OHS, hazardous chemicals, biodiversity protection, community health and safety).

13. Stakeholder Engagement

Category	STAKEHOLDER ENGAGEMENT
Aspect	Proposed mitigation measures
Public Consultation	1. Publish the notice on the beneficiary web page on draft ESMP Checklist consultations for minimum of two weeks.
Dissemination	2. Dissemination of research results will be conducted through scientific events, peer reviewed publications, webinars and digital platforms etc.
	3. The low engagement from external stakeholders or uneven participation across different groups. will be addressed through proactive outreach, targeted recruitment strategies, and continuous communication.
	4. Open science practices will be applied whenever appropriate to support early dissemination and transparency, while ensuring that sensitive or potentially exploitable project outputs are protected prior to release.
	5. Clear licensing terms (e.g., Creative Commons or open-source software licenses) will be applied to those outputs intended for public sharing.
	6. The dissemination activities will enable the exchange of scientific, safety, and ethical practices.
GRM	7. Grievance Redress Mechanism (GRM) shall be established by appointing a person in charge and providing and publishing on the website e-mail address where the interested public, either groups or individuals, could send complaints, comments and/or suggestions. The e-mail address shall be reported to the DIGIT GRM of the CSF at grmdigit@hrzz.hr for project under DIGIT.2.1.02. Challenge Program.
	8. Grievance Redress Mechanism (GRM) shall be established by appointing a person in charge and providing and publishing on the website e-mail address where the interested public, either groups or

	<p>individuals, could send complaints, comments and/or suggestions. The e-mail address shall be reported to the DIGIT GRM of the CSF at grmdigit@mzom.hr for project under DIGIT.1.2.03. Professionalization of Research Centers Call.</p>
	<p>9. Information on such received complaints, comments, and suggestions should be archived in a logical framework database and reported to the DIGIT Project GRM of the CSF on monthly basis, together with information on the measures taken following received complaints, comments, and/or suggestions</p>
	<p>10. Contractor's Grievance Redress Mechanism (GRM) shall be established and reported to project's GRM.</p>
Internal Procedure for Reporting of Irregularities	<p>11. The procedure for internal reporting of irregularities and the method of appointing a confidential person and the protection of whistleblowers shall be published on the website with the reporting instructions.</p>
Capacity Building	<p>12. Training on safe operation of equipment will be conducted.</p>
	<p>13. Capacity building will be carried out based on research findings and technologies.</p>

14. Vulnerable Groups

Category	VULNERABLE GROUPS
Aspect	Proposed mitigation measures
Identification and Risk Awareness	1. Project activities shall identify whether vulnerable or disadvantaged groups may be affected or involved, directly or indirectly.
	2. Vulnerable groups may include, where relevant, persons with disabilities, elderly persons, children, patients, economically disadvantaged persons, and other groups with reduced capacity to avoid or cope with project-related risks.
Inclusive Design of Project Activities	3. Project activities shall be designed and implemented in a manner that avoids disproportionate risks or negative impacts on vulnerable groups.
	4. Where project activities take place in public, semi-public, or shared facilities, reasonable measures shall be applied to ensure safe and inclusive access for vulnerable persons.
Interaction and Participation	5. Interaction with vulnerable groups shall be conducted in a respectful, non-discriminatory, and culturally appropriate manner.
	6. Participation of vulnerable groups in project activities (e.g. testing, pilots, demonstrations) shall be voluntary and based on informed consent, where applicable.
Protection from Harm and Exploitation	7. Project activities shall not expose vulnerable groups to increased health, safety, or security risks.
	8. Any activities involving children or other highly vulnerable persons shall follow applicable legal and institutional protection requirements including the use of images and personal identifying data.
	9. Code of Ethics for Research Involving Children (2003) and other applicable EU regulations shall be

Category	VULNERABLE GROUPS
Aspect	Proposed mitigation measures
	followed.
Information, Communication, and Grievances	10. Information relevant to project activities shall be communicated in a manner accessible to vulnerable groups, where relevant. Accessible communication measures, including facilitation (e.g., sign language) or other appropriate communication aids, as needed, will be implemented.
	11. Vulnerable groups shall have access to the project's grievance mechanism without barriers or risk of retaliation.
Monitoring and Adaptive Measures	12. Any issues or incidents affecting vulnerable groups shall be monitored and addressed through appropriate corrective measures.

15. Cultural Heritage

Category	CULTURAL HERITAGE
Aspect	Proposed mitigation measures
Legal Compliance and Authorization	1. All activities involving archaeological materials shall comply with applicable legislation and institutional requirements.
	2. Necessary permits and approvals shall be obtained prior to analysis.
	3. The origin, ownership, and legal status of materials shall be documented and verified.
	4. Sampling of archaeological materials shall be subject to prior written authorisation by the legally responsible institutions (including the excavation director/scientific lead, the curating institution, and, where applicable, the competent heritage authority), obtained before any sampling activity.
Sampling and Impact Minimization	5. Sampling shall be limited to the minimum quantity necessary to achieve project objectives.
	6. Non-destructive or minimally invasive methods shall be used wherever feasible.
	7. Any destructive analysis shall be justified, documented, and approved in advance.
	8. Sampling shall follow a conservation-first approach, prioritising already fragmented or non-diagnostic material and minimising impact on archaeological specimens.
	9. Sampling of unique or complete specimens shall only be undertaken on a case-by-case basis, where it can be demonstrated that no damage to integrity, scientific value, or curatorial significance will occur.

Category	CULTURAL HERITAGE
Aspect	Proposed mitigation measures
	10. Where no suitable low-impact sampling strategy can be applied, the specimen shall not be sampled and alternative material shall be used where possible.
Handling, Preservation, and Storage	11. Materials shall be handled in accordance with conservation standards to prevent damage, contamination, or loss.
	12. Appropriate storage conditions shall be ensured to maintain material integrity.
	13. Access shall be restricted to authorized and trained personnel.
Documentation, Traceability and Use	14. All sampling and analyses shall be properly documented.
	15. Full traceability of samples shall be ensured through labeling, storage, and tracking procedures.
	16. Documentation shall include sampling location, quantity, method, and analytical purpose to ensure full traceability.
Return and Incident Management	17. Materials and associated data shall be used only within the approved project scope and in accordance with agreements.
	18. Materials shall be returned to the originating institution or managed in line with agreed conditions. 19. Any damage, loss, or incident shall be promptly reported and addressed in accordance with project procedures.

C. Monitoring and Reporting

The Project Beneficiary shall be responsible for monitoring the implementation of all applicable environmental and social (E&S) measures throughout the duration of project implementation.

Monitoring shall cover compliance with each E&S measure applicable to the project, as identified through the project screening and checklist process.

The Project Beneficiary shall submit semi-annual Environmental and Social Monitoring Reports to the Project Implementation Unit (PIU). Each report shall provide a clear and structured assessment of compliance with the applicable E&S measures, including identification of any non-compliance, challenges, corrective actions taken, and planned follow-up measures.

Monitoring and reporting shall be conducted in a manner proportionate to the nature and risk level of the project activities. Where an E&S measure is assessed as not applicable, a brief justification shall be provided.

Any significant incidents, accidents, or cases of non-compliance with potential environmental, health, or safety implications shall be reported to the PIU without delay, in accordance with the incident reporting procedures.

Incident reports will be submitted to the Project Implementation Unit (PIU) immediately, and not later than 24 hours, after any serious event which has, or is likely to have, a significant adverse effect on the environment, communities, public or workers. Incident reports will provide sufficient detail regarding the scope, severity, and possible causes of the incident or accident, indicating immediate measures taken or that are planned to be taken to address it. Reporting requirements will be in line with the Environmental and Social Commitment Plan (ESCP).

Annex 1. E&S Monitoring and Reporting Template

No.	E&S measure	Applicable (YES/NO)	Compliance status (compliant/non-compliant/partially compliant)	Description of Implementation/Findings	Corrective action /if applicable	Timeline for correction	Comments
1.	<i>[insert measure]</i>	YES	<i>compliant</i>	<i>Measure implemented in line with requirements [description of implementation of measure]</i>	N/A	N/A	
2.	<i>[insert measure]</i>	YES	<i>non-compliant</i>	<i>Delay in implementation due to [reason]</i>	<i>[description of corrective action]</i>	<i>[date]</i>	
3.	<i>[insert measure]</i>	NO	N/A	<i>Measure not applicable to project scope</i>	N/A	N/A	

Annex 2. Incident / Accident Report Form

DIGITAL, INNOVATION, AND GREEN TECHNOLOGY PROJECT (DIGIT PROJECT)	
IBRD LOAN NO. 9558-HR, PROJECT ID: P180755	
INCIDENT / ACCIDENT REPORT FORM	
Program	
Name and No. of the Project	
Beneficiary	
Incident / Accident No.	
Date	
Time	
Reported by	
SCOPE OF INCIDENT / ACCIDENT	
Type of Incident / Accident	<input type="checkbox"/> Environmental <input type="checkbox"/> Social <input type="checkbox"/> Occupational Health and Safety
Place	
Date	
Time	
DESCRIPTION OF THE INCIDENT / ACCIDENT	
Detailed description of the incident / accident	<i>What is the incident? / What were the conditions or circumstances under which the incident occurred (if known)? / Are the basic facts of the incident clear and uncontested, or are there conflicting versions? What are those versions? / Is the incident still ongoing or is it contained? / Have any relevant authorities been informed?</i>
Duration of the incident / accident	
Possible causes of the incident / accident	
RESPONSE ACTIONS FOR THE INCIDENT / ACCIDENT	
Status of Actions	<input type="checkbox"/> Implemented <input type="checkbox"/> In Progress <input type="checkbox"/> Other
Description of Response Actions	<i>Responsible party / Expected date if action(s) are in progress</i>
IMPACT ON THE PROJECT	
Does the event affect the project activities?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Elaboration of the impact on project activities	

DIGITAL, INNOVATION, AND GREEN TECHNOLOGY PROJECT (DIGIT PROJECT)

IBRD LOAN NO. 9558-HR, PROJECT ID: P180755

INCIDENT / ACCIDENT REPORT FORM

SEVERITY LEVEL

- Low
- Medium
- High

Annex 3. Public Consultations Report

Information Disclosure

The Public Consultations on Draft ESMP Checklist covering multiple projects under the Calls Challenge Program (DIGIT.2.1.02) and Professionalization of Research Centers (DIGIT.1.2.03) were held from January 20 to February 2, 2026.

The Draft ESMP Checklist was disclosed both in English and Croatian.

Notice on the Public Consultations and the method of submitting questions, concerns and comments, were disclosed on the DIGIT website, and the web sites of the beneficiaries as follows:

DIGIT web page	https://digit.mzom.hr/en/news-and-events/public-consultations-esmp-checklist/ https://digit.mzom.hr/novosti-i-dogadaji/javno-savjetovanje-esmp-checklist/
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Project Title	Beneficiary	web address
DIGIT.2.1.02.001 A comprehensive AI powered early warning system for digital management of water supply security, resilience, and sustainability (AquaGuardian)	University of Zagreb – Faculty of Chemical Engineering and Technology (FCET)	https://www.fkit.unizg.hr/vijesti/?@=23lx7#news_57353
DIGIT.2.1.02.004 ToxiCode: Transforming Venom Peptides into Precision Therapies by Deciphering and Refining their Evolutionary Code	University of Zagreb – Faculty of Food Technology and Biotechnology (FFTB)	https://www.pbf.unizg.hr/novosti/obavijest_o_javnom_savjetovanju_esmp_checklist_digit
DIGIT.2.1.02.012 Accelerated mineral carbonation of secondary raw materials as a strategy for carbon storage in construction products – ACCEL	University of Zagreb Faculty of Civil Engineering	https://www.grad.unizg.hr/novosti_i_objave/?@=2b5h2#news_8980

DIGIT.2.1.02.014 Autonomous Robotic Technology for Environmental Monitoring, Intervention and Safety (ARTEMIS)	University of Zagreb Faculty of Electrical Engineering and Computing	https://www.fer.unizg.hr/novosti/novosti?@=32ljf#news_94045
DIGIT.2.1.02.016 Smart Optimization of the Electrical Distribution System through Multidisciplinary Data Analytics and AI	Faculty of Science, University in Zagreb – PMF	https://www.pmf.unizg.hr/aktualnosti?@=1oxfs#news_26883
DIGIT.1.2.03.011 University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture	University of Zagreb, Faculty of Mechanical Engineering and Naval Architecture	https://www.fsb.unizg.hr/index.php?fsbonline&novosti&id=40629
DIGIT.1.2.03.019 Professionalization of the Research Center for Medical Bionics (RCMB)	University of Split, Faculty of Science	https://www.pmfst.unist.hr/kontrolne-liste-plana-upravljanja-okolisnim-i-drustvenim-rizicima-esmp-checklist-za-digit-pozive/

Method of Comments Submission

The public could submit their questions, concerns, and comments on the Draft ESMP Checklist during the Public Consultations by e-mail to grmdigit@mzom.hr.

Comments Resolution

One comment was received during the Public Consultations from January 20 to February 2, 2026.

Date	Question / Comment / Concern	Answer / Resolution
January 22, 2026	The Beneficiary raised the question regarding the method of meeting the provision of the Draft ESMP Checklist: 'The ESMP Checklist shall be part of the consortium agreement between the beneficiary, and all partners.'	The answer by the PIU was sent to the Beneficiary on the January 23, 2026 was: 'Environmental and Social Management Plan (ESMP) Checklist is currently in the process of Public Consultations. Since all projects that will be

		<p>financed are required to be compliant with Environmental and Social Management Framework of the World Bank it is important to ensure that all project participants are obliged to comply with Environmental and Social requirements during project implementation.</p> <p>Therefore, applicants are requested to include following paragraph into their partnership agreements.</p> <p>All project activities carried out by the applicant and the project partners shall be fully compliant with the Environmental and Social Management Plan Checklist (ESMP) Checklist applicable to the project. The applicant shall be responsible for providing all project partners with the final, officially published ESMP Checklist and for ensuring that the partners are informed of their obligations arising therefrom. Evidence of delivery of the final ESMP Checklist to all project partners shall be submitted to the DIGIT Project Implementation Unit (PIU).'</p>
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