Reconstruction and upgrading of the building of the Faculty of Electrical Engineering and Computing in Zagreb

Sub-Project

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

for design phase

Croatia Earthquake Recovery and Public Health Preparedness Project (P173998)

REPUBLIKA HRVATSKA
Ministarstvo prostornoga uređenja, graditeljstva i državne imovine

MINISTRY OF PHYSICAL PLANNING, CONSTRUCTION AND STATE ASSETS

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CONTENT

ABBREVIATIONS

Abbreviation	Full term
CHMP	Cultural Heritage Management Plan
EHSG	Environmental Health and Safety Guidelines
EIA	Environmental Impact Assessment
E&S/ES	Environmental and Social
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standards
FEEC	Faculty of Electrical Engineering and Computing
GIIP	Good International Industry Practice
MoPPCSA	Ministry of Physical Planning, Construction and State Assets
OHS	Occupational Health and Safety
OG	Official Gazette
NFPA	National Fire Protection Association
PPE	Personal Protective Equipment
RoC	Republic of Croatia
WB	World Bank
WHO	World Health Organization

1 INTRODUCTION

1.1 Objectives of ESMP

The main objective of Environmental and Social Management Plan (ESMP) is to ensure that the Sub-Project is compliant to national and EU regulations, as well as to World Bank Environmental and Social Framework (ESF). As this is a tiered approach, the ESMP for the next phases (construction and use phase) will be developed as the development of the design advances.
Accordingly, ESMP addresses requirements of WB Environmental Health and Safety Guidelines (EHSG) and Good International Industrial Practices (GIIP).
ESMP assesses potential environmental and social impacts associated with the proposed Sub-Project and defines mandatory measures to minimize adverse effects and risks on the biophysical and socio-economic environment during design of the Reconstruction and upgrading of the building of the FEEC in Zagreb Sub-Project.
This ESMP also provides suggestions and guidelines to mitigate negative impacts on the environment and society during both the construction and use phases (guidelines for the development of the ESMP for the next phases).
Application and content of ESMP are guided by the Project Environmental and Social Commitment Plan (ESCP) and "Croatia earthquake recovery and public health preparedness project (P173998) ESMF for component 1", WB ESSs, WB EHSG and GIIP.
Environmental and Social Mitigation Plan and Monitoring Plan for the design phase of the Sub-Project, with a purpose to supervise E&S compliance and streamline implementation of measures (and corrective actions) is an integral part of the ESMP.

1.2 Project background

The World Bank (WB) is providing support to the Government of Croatia in implementing the "Croatia Earthquake Recovery and Public Health Preparedness Project". Within the Project, WB supports The Republic of Croatia in earthquake reconstruction efforts in City of Zagreb and Sisak-Moslavina counties, by improving institutional capacity for reconstruction and strengthening national systems for public health preparedness.
The "Earthquake Recovery and Public Health Preparedness Project" consists of components and sub-components presented in Table 1.

Table 1. Project components and sub-components

Component 1: Earthquake Recovery and Reconstruction
• Subcomponent 1.1: Rehabilitation, Reconstruction and Construction of Health and Education Facilities
• Subcomponent 1.2: Support for Public Reconstruction
Component 2: Public Health Surveillance and Preparedness
• Subcomponent 2.1: Case Management and Surveillance
• Subcomponent 2.2: Public Health Preparedness
Component 3: Project Management

Component 1 activities are limited to the City of Zagreb and Sisak-Moslavina County which were directly affected by the March 22, 2020, and December 28-29, 2020, earthquakes that damaged hundreds of buildings.

Preparation of designs and associated studies for the Reconstruction and upgrading of the building of the FEEC in Zagreb for which construction works would be financed from other sources, falls under the Component 1 Subcomponent 1.1. This subcomponent finances a detailed engineering assessment of selected damaged health and education buildings, followed by the rehabilitation, reconstruction and construction of priority buildings to restore the country's ability to provide critical public health and education services. Includes rehabilitation of structures, demolition of unsafe buildings, and the in-situ reconstruction of new buildings to replace damaged buildings. The interventions must be in accordance

with requirements of Act on Reconstruction of Earthquake Damaged Buildings in the City of Zagreb, Krapina-Zagorje County, Zagreb County, Sisak-Moslavina County and Karlovac County (OG 21/23) and sub-laws and standards to which this Act refers. The works will be complemented by functional upgrades and climate-resilient designs, including improved insulation to cope with extreme temperature and energy efficiency to also address climate-related risks. Functional upgrades will be gender informed, including adequate considerations for personal safety and hygiene, and support those with disabilities to ensure universal accessibility, considering feedback from public consultations. Energy efficiency measures, such as proper insulation, energy efficient windows, LED lights, white roofs, and solar panels, will help reduce the climate footprint of health and education facilities and reduce operating costs for the Government. Project interventions also include equipment replacement and upgrades when necessary.

Regarding education sector investments, the project supports investments to ensure continuity of education services provided at primary and secondary levels through the reconstruction of earthquake-damaged buildings. Additionally, the project considers supporting the rehabilitation of some pre-primary and higher education institutions that are of strategic importance to the education sector as well as the country and the health sector. The project promotes the building-back-better approach, which comprises improvements in design standards, construction quality, and functionality. The integration of seismic and climate change consideration into the infrastructure designs of investments further enhances the resilience of infrastructure to future disaster and climate risks and helps protect people's lives, livelihoods, and assets, contributing to climate change adaptation and mitigation efforts.

1.3 Study Team

This ESMP was prepared by the Environmental and Social Specialists of the Project Implementation Unit 1 (PIU1) Team, supported also by the other team members.

1.4 Timeline

ESMP for Reconstruction and upgrading of the building of the FEEC in Zagreb will be developed in following phases:

1. First draft of ESMP (for Design Phase): December 2024;
2. Final version of ESMP (for Design Phase): February 2025;
3. Public consultations: March 2025;
4. Implementation, monitoring, and reporting: during design phase;
5. Public presentation: before final version of Detailed Design.

1.5 Policy framework

1.5.1 National environmental and social legislation

Croatian national legislation covering the field of environmental protection is fully compliant with the regulations of the European Union.

The following most relevant Croatian environmental legal acts (including stemming and/or relevant bylaws) define a legal framework for environmental management:

- Environmental Protection Act (OG 80/13, 153/13, 78/15, 12/18, 118/18);
- Nature Protection Act (OG 80/13, 15/18, 14/19, 127/19, 155/23);
- Regulation on Environmental Impact Assessment (OG 61/14, 3/17);
- Waste Management Act (OG 84/21, 142/23);
- Law on the Reconstruction of Buildings Damaged by the Earthquake in the City of Zagreb, Krapina-Zagorje County, Zagreb County, Sisak-Moslavina County and Karlovac County (OG 21/23);
- Law on the Implementation of Regulation (EU) 2019/1021 on Persistent Organic Pollutants (OG 054/2020);
- Cultural Heritage Protection Act (NN 69/99, 151/03, 157/03, 100/04, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14, 98/15, 44/17, 90/18, 32/20, 62/20, 117/21, 114/22);

- Rulebook on the management of polychlorinated biphenyls and polychlorinated terphenyls (OG 054/2023);
- Ordinance on waste management (OG 106/22);
- Air Protection Act (OG 127/19, 57/22);
- Water Act (OG 66/19, 84/21, 47/23);
- Energy Efficiency Act (OG 127/14, 116/18, 25/20, 32/21, 41/21);
- Noise Protection Act (OG 30/09, 55/13, 153/13, 41/16, 114/18, 14/21);
- Ordinance on the maximum allowed noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21);
- Ordinance on activities for which it is necessary to determine the implementation of noise protection measures (OG 91/07);
- Regulation on limit values of pollutant emissions into the air from stationary sources (42/21);
- Act on Radiological and Nuclear Safety (OG 141/13, 39/15, 130/17, 118/18, 21/22, 114/22);
- Act on Fire Protection (OG 92/10, 114/22);
- Construction Act (OG 153/13, 20/17, 39/19, 125/19);
- Technical regulation for building constructions (OG 17/17) – prescribing mandatory implementation of EU Eurocode 8: Design of structures for earthquake resistance.

Regarding national social legislation, it should be highlighted that the right to equality and non-discrimination is a fundamental human right protected by the Constitution of the Republic of Croatia. The other social legislation include:

- Constitutional Act on National Minorities Rights (OG 155/02, 47/10, 80/10, 93/11);
- Labor Act (OG 93/14, 127/17, 98/19, 151/22, 46/23, 64/23);
- Gender Equality Act (OG 82/08, 69/17);
- Anti-discrimination act (OG 85/08, 112/12);
- Occupational Safety and Health Act (OG 71/14, 118/14, 94/18, 96/18);
- Foreigners Act (OG 133/20, 114/22, 151/22);
- Law on EEA Member States Nationals and Their Family Members (OG 66/19, 53/20, 144/20, 114/22);
- Law on International and Temporary Protection (OG 70/15, 127/17, 33/23);
- Ratified International Conventions:
    - Convention Concerning Equality of Treatment for National and Foreign Workers as Regards Workmen's Compensation for Accidents (OG 11/03);
    - Employment Policy Convention (OG 11/00);
    - Discrimination (Employment and Occupation) Convention (OG 5/00);
    - The Abolition of Forced Labor Convention (OG 7/97);
    - The Equal Remuneration Convention (OG 3/00);
    - Convention Concerning Forced or Compulsory Labor (OG 5/00);
    - Convention Concerning Safety in the Use of Asbestos (OG 11/03);

More detailed description of environmental and social legislation is elaborated in environmental and Social Management Framework[1].

1.5.2 Overview of the World Bank Environmental and Social Standards (ESS)

The World Bank developed an Environmental and Social Framework (ESF) setting out the World Bank's commitment to sustainable development through application of Bank Policy (defined in the ESF) and a set of Environmental and Social Standards (ESS) that are designed to support Borrowers' projects, with the aim of ending extreme poverty and promoting shared prosperity.
There are 10 ESSs. Each of the ESSs sets out a number of objectives. The objectives describe the outcomes that each of the ESSs is intended to achieve.
The following ESSs are relevant for this Sub-Project:

[1] https://www.oporavak-i-pripravnost.hr/UserDocsImages/dokumenti/ESMF%20Component%201.pdf?vel=3169868

- ESS1 Assessment and Management of Environmental and Social Risks and Impacts;
  - It sets out the Borrower's responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of Sub-Project in order to achieve environmental and social outcomes consistent with the ESSs.
  - No EIA or E&S Study or any other E&S assessment was requested by competent authorities in the process of obtaining location permit.
- ESS2 Labor and Working Conditions;
  - Objectives of this standard are: to promote safety and health at work; the fair treatment, non-discrimination and equal opportunity of project workers; to protect health and safety of workers, to protect workers, including vulnerable workers such as women, persons with disabilities, children (working age) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate; to prevent the use of all forms of forced labor and child labor; to support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law; to provide project workers with accessible means to raise workplace concerns.
- ESS3 Resource Efficiency and Pollution Prevention and Management;
  - Objectives of this standard are: to promote the sustainable use of resources, including energy, water and raw materials; to avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; to avoid or minimize project-related emissions of short and long-lived climate pollutants; to avoid or minimize generation of hazardous and non-hazardous waste; to minimize and manage the risks and impacts associated with pesticide use.
- ESS4 Community Health and Safety;
  - Objectives of this standard are: to anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and nonroutine circumstances; to promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams, to avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials, to have in place effective measures to address emergency events; to minimize and manage the risks and impacts associated with pesticide use; to ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.
- ESS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources;
  - Objectives of this standard are to protect and conserve biodiversity and habitats; to apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity and to promote the sustainable management of living natural resources.
- ESS8 Cultural Heritage;
  - Objectives of this standards are: to protect cultural heritage from the adverse impacts of project activities and support its preservation, to address cultural heritage as an integral aspect of sustainable development, to promote meaningful consultation with stakeholders regarding cultural heritage, to promote the equitable sharing of benefits from the use of cultural heritage.
  - The Sub-Project is planned on the location classified as protected cultural good. A complex of buildings A (subject of Sub-Project), B and C together with the plot present a protected cultural property marked Z-5675 and based on Article 93 of GUP (General Urbanistic Plan) are classified under group 3.b Protected civil buildings in the area covered by the plan.
- ESS10 Stakeholder Engagement and Information Disclosure;
  - Objectives of this standard are: to establish a systematic approach to stakeholder engagement that will help Borrowers to identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties; to assess the

level of stakeholder interest and support for the project and to enable stakeholders' views to be taken into account in project design and environmental and social performance, etc.

The following ESSs are not relevant for this Sub-Project:

- ESS5 Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;
  - All construction activities will be on available publicly owned land and there will be no temporary resettlement impacts from this Sub-Project.
- ESS7 Indigenous Peoples / Sub-Saharan African Historically Underserved Traditional Local Communities;
  - This standard is not relevant since Croatia does not have distinct ethnic, social and/or cultural groups as covered by ESS7.
- ESS9 Financial Intermediaries;
  - This standard is not applicable as the Sub-Project does not envision involvement of financial intermediaries.

The ESS set out the mandatory requirements that apply to the Borrower and projects. They present set of obligatory guidelines and instructions with the main objective to foster efficient and effective identification and mitigation of potentially adverse environmental and social impacts that may occur in the development projects, with proper stakeholder engagement and sustainable management.
WB ESS, supported by WB Group Environmental, Health and safety Guidelines (EHSG), https://documents1.worldbank.org/curated/en/157871484635724258/pdf/112110-WP-Final-General-EHS-Guidelines.pdf and GIIP also mandatory under ESF, are applied in parallel to the national policies where, as a rule, the stricter one prevails.

The Ministry of physical planning, construction and state assets of RoC made an Environmental and Social Management Framework (ESMF) for Component 1. It is the environmental and social due diligence instrument made to ensure that Component 1 of the proposed Project is implemented in accordance with the World Bank operational guidelines, including WB Environmental, Health and Safety Guidelines (EHSG), GIIPs (EU Practical Guidelines for the Information and Training of Workers Involved with Asbestos Removal or Maintenance Work, best practices in Occupational Health and Safety management, EU OHS guidelines, radon emissions prevention measures, and similar guidelines of EU, other competent international organizations and relevant internationally recognized technical guidelines for good practice), World Bank Environmental and Social Standards (ESS), national legislation related to environmental and social protection, as well as a mandatory practical tool to be used during design, implementation, and monitoring of the Sub-Project activities".

2 DESCRIPTION OF THE SUB-PROJECT

2.1 General information

General information is listed in Table 2.

Table 2. General information – Reconstruction and upgrading of the building of the FEEC in Zagreb Sub-Project

Name of the Sub-Project	Reconstruction and upgrading of the building of the FEEC in Zagreb
Purpose	The goal of the project is solving the problem caused by earthquake damage and meeting the requirements of the new project program by increasing the working space and thus developing and improving teaching processes.
Beneficiary	Faculty of Electrical Engineering and Computing in Zagreb
Location (Address, City/Municipality, County)	Unska 3, City of Zagreb
Cadastral parcel and municipality	Cadastral parcel no. 615, Cadastral municipality Trnje
Landowner	Faculty of Electrical Engineering and Computing in Zagreb
Sub-Project description	Planned Sub-Project envisages reconstruction and upgrading of building within university complex (building A) of Faculty of Electrical Engineering and Computing in Zagreb. The existing building consists of 4 above-ground floors. With the reconstruction, the facade walls will be retained, the complete internal structure will be removed, and the building will be extended with 3 underground and 5 above-ground floors (in total 9 above-ground and 3 under-ground floors). On the western part of the plot, the main access square for the entire complex is planned.
Are there any associated facilities[2] related to the sub-project?	NO
Is the Sub-Project aligned with spatial planning documents?	YES Spatial plan of the City of Zagreb (OG 8/01, 16/02, 11/03, 2/06, 1/09, 8/09, 21/14, 23/14, 26/15 and 22/17) Urban General Plan of the City of Zagreb (OG 16/07, 8/09, 7/13, 9/16,12/16 and 17/24)
Is the Sub-Project located within the archaeological/cultural protection zones?	YES A complex of buildings A (subject of Sub-Project), B and C together with the plot present a protected cultural property marked Z-5675 and based on Article 93 of GUP (General Urbanistic Plan) are classified under group 3.b Protected civil buildings in the area covered by the plan.
Is the Sub-Project located within the nature protection areas or Natura 2000 sites?	NO

2.2 Background information

The Faculty of Electrical Engineering and Computing is situated in the City of Zagreb, Trnje City District. It is the largest and the leading research and higher educational facility in Croatia in the field of electrical engineering, computing and information and communication technologies. The Faculty

[2] According to the World Bank's Environmental and Social Standards (ESS), the term „Associated Facilities" means facilities or activities that are not funded as part of the project and are: (a) directly and significantly related to the project; and (b) carried out, or planned to be carried out, contemporaneously with the project; and (c) necessary for the project to be viable and would not have been constructed, expanded or conducted if the project did not exist. For facilities or activities to be Associated Facilities, they must meet all three criteria. Associated Facilities should meet the requirements of the ESSs, to the extent that the Borrower has control or influence over such Associated Facilities.

consists of 12 institutes and several services, and it is managed by the dean and the Faculty Council. The vision of the Faculty is to be integrated and competitive in the European higher education and research area, to create new forms of knowledge transfer to the economy and to initiate economic activity in Croatia.
The complex of buildings of the Faculty of Electrical Engineering and Computing was built in the period between the 1950s and 1990s. The complex is one of the central areas of Vukovarska Street, located west of Miramarska Street, the main traffic link between the center of Zagreb and Trnje, and east of Savska Street, which was the main traffic route to the southern parts of Croatia. This area is reserved for the Alley of Science, later called the Faculty Avenue, University Alley or University Axis.
The construction complex of Faculty of Electrical Engineering and Computing (FEEC) buildings in Unska 3 consists of buildings labelled A, B, C, D and E.
Buildings A, B and C were built from 1961 to 1964 according to the project of architect Božidar Tušek:

- Building A was built in 1961. It was originally a two-story volume that was subsequently upgraded in the 80s. Total gross area of the building is 3.714 m^2 with floor plan dimensions 18.40 x 53.25 m. The purpose of the building is a student building with classrooms, a library, and a dining room.
- Building B is a one-story volume with area of 8.226 m^2 with floor plan dimensions 48 x 68 m. The building consists of dean's office, large lecture halls and laboratory.
- Building C is a skyscraper with 13 floors, area of 11.026 m^2, and floor plan dimensions 15.45 x 53.05 m. The building is intended for faculty institutes.
- Building D was built in 1989. according to the project of architect Marijan Hržić.
- Building E was built in 1961, as a boiler room. It was reconstructed in 1975 when it was converted into KSET (Club of Electrical Engineering Students). It is a one-story building,

In the last twenty years, the Faculty of Electrical Engineering and Computing has been adapted several times.
Since current workspace does not enable development and improvement of teaching processes, it needs to be increased. The planned intervention is envisaged as a reconstruction of the existing Building A with further expansion. The planned reconstruction within the existing dimensions does not affect the urban matrix. The building is being upgraded within the floor plan of the existing building which respects the construction of regular cubes while maintaining the existing visual identity of the nearby area.

Documents and permits issued so far are listed in Table 3.

Table 3. Documents prepared and permits issued so far (by March 2025)

Documents/permits	**Year**	**Additional information/Comments**
Conservation Study (Author: ASK Atelier ltd.)	May 2023	/
Conceptual Solution (Author: PROARH mateković ltd.)	June 2023	IP-4-6/2023
Expert Study (Author: Radionica Statike ltd.)	June 2023	085/2023
Conceptual Design (Author: PROARH mateković ltd.)	June 2023	IP-4-6/2023
Special Conditions	November 2023	1. Special conditions in the field of fire protection (Ministry of the Interior, Civil Protection Directorate, Fire Protection Inspection). 2. Special conditions for the protection of cultural heritage property (City of Zagreb, City Institute for Cultural and Natural Heritage Conservation).

Documents/permits	Year	Additional information/Comments
		3. Special conditions in the field of traffic organization and safety (City of Zagreb, City Office for Municipal Self – Government, Transport, Civil Protection and Safety). 4. Special conditions in the field of electronic communications infrastructure (Croatian Regulatory Authority for Network Industries). 5. Special conditions for connection to the water supply (VODOVOD i ODVODNJA ltd.) 6. Special conditions for connection to the sewage system (VODOVOD i ODVODNJA ltd.) 7. Special connection conditions (HEP Toplinarstvo ltd.)
Local Permit	December 2023	CLASS: UP/I-350-05/23-01/000122 REG NUM: 531-08-2-3-23-0015

2.3 Location and building plot

Subject of planned Sub-Project, building A, is a part of the FEEC building complex on cadastral plots no. 615 in the cadastral municipality of Trnje at the address Unska 3, Zagreb. The plot is mostly regular rectangular shape with an area of 17.479 m^2.

Figure 1. Building plot cadastral parcel 615, cadastral municipality of Trnje

The plot is surrounded by private plots on the north and west sides (in the north it is partly bordered by Unska Street), in the east by Zelinska Street, and in the south by Vukovarska Street.

According to the planning guidelines of the General Urban Plan of the City of Zagreb, the planned Sub-Project is located in the use zone D - public and social purposes (higher education institutions and science, technology parks), "urban rule (1.6.) – Protection and arrangement of completed settlements".

2.4 Technical description of planned reconstruction

2.4.1 Current state

University complex consists of 4 main buildings marked A, B, C, D and building E on the northeast corner of the plot. Main buildings are connected on the ground floor by corridors. The buildings house classrooms, offices, computer laboratories, a library, a student cafeteria, and other premises essential for the functioning of the faculty institution. Existing buildings are connected to all utility infrastructure (water supply, sewage, electrical installations, telecommunications network, heating plant).

A complex of buildings A, B and C together with the plot present a protected cultural property marked Z-5675 and based on Article 93 of GUP (General Urbanistic Plan) are classified under group 3.b Protected civil buildings in the area covered by the plan. The process of complete renovation of the buildings is currently underway.

Building A of the FEEC complex was built in 1961. The load-bearing structure is concrete and reinforced concrete, with infill walls and brick partition walls. The mezzanine structures are reinforced concrete, fine-ribbed. It consists of 4 above-ground floors (P+3) and is approximately 15.6 m high in total. The gross construction area is 3.714 m^2. The third floor was subsequently built and consists of a steel load-bearing structure, steel frames, with brick wall filling.

Table 4. Spatial parameters – current state

Level	Total area
0 GROUND FLOOR	928,5 m^2
1 FIRST FLOOR	928,5 m^2
2 SECOND FLOOR	928,5 m^2
3 THIRD FLOOR	928,5 m^2
TOTAL	**3.714 m²**

The building houses predominantly lecture halls and computer labs. On the ground floor there are the Center for Research Support and the Career Center of the Faculty. In order to develop and improve teaching processes, new project programs require an increase in working space.

A cultural heritage (CH) conservation study and professional study-expertise were made for the FEEC building complex, which served as a basis for the spatial architectural study and conceptual design. Statics expertise has determined that the building has static damage caused by the earthquake, and that it is necessary to add new structural elements for stabilization and ensuring the prescribed bearing capacity against seismic action. The Conservation Study determined that with multiple interventions over a long period, the least original elements were retained on the building A and that it is the least valuable part of the entire protected complex. In addition to the upgrade, the exterior carpentry was replaced. The original wooden, vertically sheared, white windows were replaced with anthracite aluminum windows. The intervention impacted the color impression of the façade, which consisted of tones of natural concrete, light fiber cement panels and white wooden windows. Of the original elements on the building, the reinforced concrete cladding has been preserved. It was originally painted in natural concrete with an imprint of wooden formwork, but it was subsequently repainted. The fiber cement slabs on the parapets have been also preserved, but were repeatedly painted light yellow, while their original color was natural concrete. Of the original elements in the interior, a staircase with a handrail, terrazzo lining of the hallway on the first and second floors, parquet floors in two rooms on the first floor and doors to enter the rooms on the first and second floors were preserved. As a result, the planned reconstruction will retain the facade walls of the building and the complete internal structure will be removed.

2.4.2 Planned reconstruction

The idea of the main architectural concept is based on a contemporary interpretation of elements of modern architecture of the mid-20th century in Zagreb. The design refers to the volume of the existing building A as well as building C with three important elements: the 'frame' consisting of gable walls and roof, the horizontal division of the façade with the passage of windows and full parapets, and the recessed last floor. The overall analysis proposes reconstruction with an upgraded volume in the existing floor plan dimensions of building A, provided that the original architectural design is fully preserved meets the requirements of the General Urban Plan.

With the reconstruction, the facade walls of the existing 4 - storey building will be retained, the complete internal structure will be removed, and the building will be extended with 3 underground and 5 above-ground floors (9 above-ground and 3 under-ground floors in total). The proposed upgrading of building A with a total of 9 above-ground floors fits in terms of height with the "second row" of buildings on the street stretch of Vukovarska Street, which is defined by buildings with a total of up to 9 above-ground floors.

Figure 2. Second row of buildings in Vukovarska Street

With the reconstruction and extension, the existing building A will become a counterpart to the buildings on the south side of the Avenue of Science.

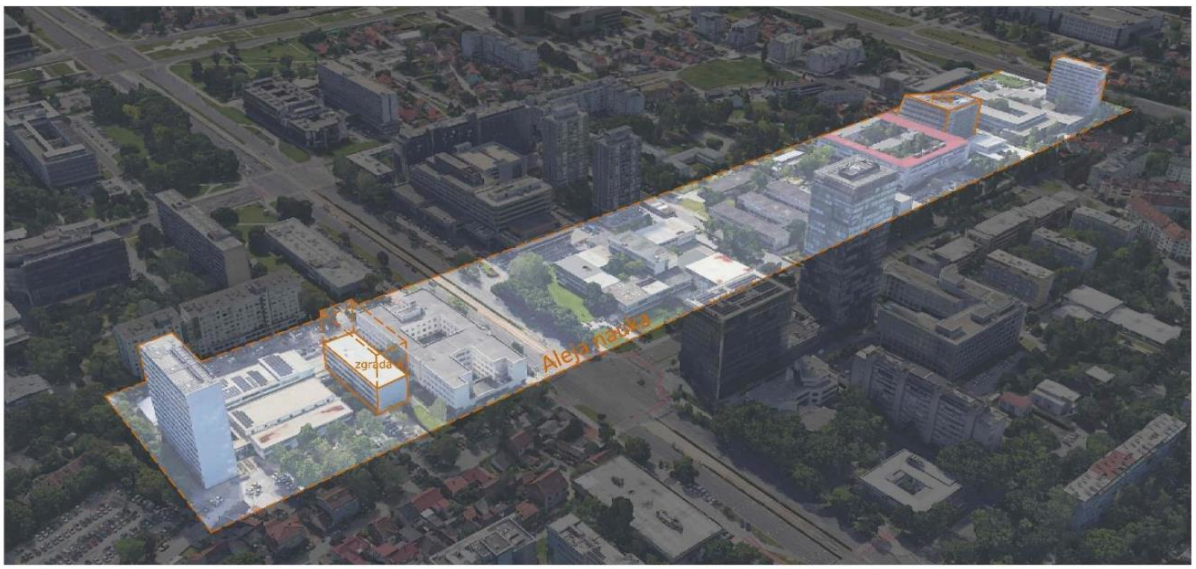

Figure 3. Avenue of Science

The main access square for the entire complex will be formed on the western part of the plot, which is currently a parking lot. Vehicular access to the plot in question is from Zelinska Street (public traffic area). The floor plan dimensions of the extended underground part (3 floors) will be 94 m x 32,5 m. The floor plan dimensions of the upgraded above-ground part (5 floors) will be the same as the existing ones, 5m x 18,5 m. The total height of the upgraded part will be 35,7 m (ground floor + 8 floors).

Planned layout

Underground floors
All underground floors will contain parking, technical spaces (sprinkler station, engine room, electric room, etc.) and storage rooms. Underground floors will be connected to the ground floor by a staircase and 2 elevators. Access to the underground garage will lead through an uncovered ramp with a slope of up to 18%.

Ground floor
Ground floors will be connected by corridors with buildings D and B and functionally divided into 3 parts: the western part with an amphitheater lecture hall with about 120 seats, the central part with a staircase with 2 elevators and a hall with exhibition space, group sanitary facilities and the eastern part with 2 classrooms.

1st, 2nd and 3rd floor
On first three floors there will be spaces for the students (lecture halls, classrooms, electric classrooms, computer classrooms, computer laboratory, multipurpose space and sanitary facilities).

4th and 5th floor
On the 4th and 5th floors there will be offices, meeting rooms, rest and dining areas, kitchenette, multi-purpose space and sanitary facilities.

6th, 7th and 8th floor
On the 6th, 7th and 8th floors there will be computer laboratory premises with associated sanitary blocks.

Next to the square 'islands', i.e., sheltered bicycle spaces are planned.

Table 5. Spatial parameters – planned situation

Level	Total area
-3 UNDERGROUND FLOOR	858,5 m²
-2 UNDERGROUND FLOOR	858,5 m²
-1 UNDERGROUND FLOOR	858,5 m²
TOTAL	2.575 m²
0 GROUND FLOOR	928,5 m²
1 FIRST FLOOR	928,5 m²
2 SECOND FLOOR	928,5 m²
3 THIRD FLOOR	928,5 m²
4 FOURTH FLOOR	928,5 m²
5 FIFTH FLOOR	928,5 m²
6 SIXTH FLOOR	928,5 m²
7 SEVENTH FLOOR	928,5 m²
8 EIGHTH FLOOR	802 m²
TOTAL	**8.230 m²**

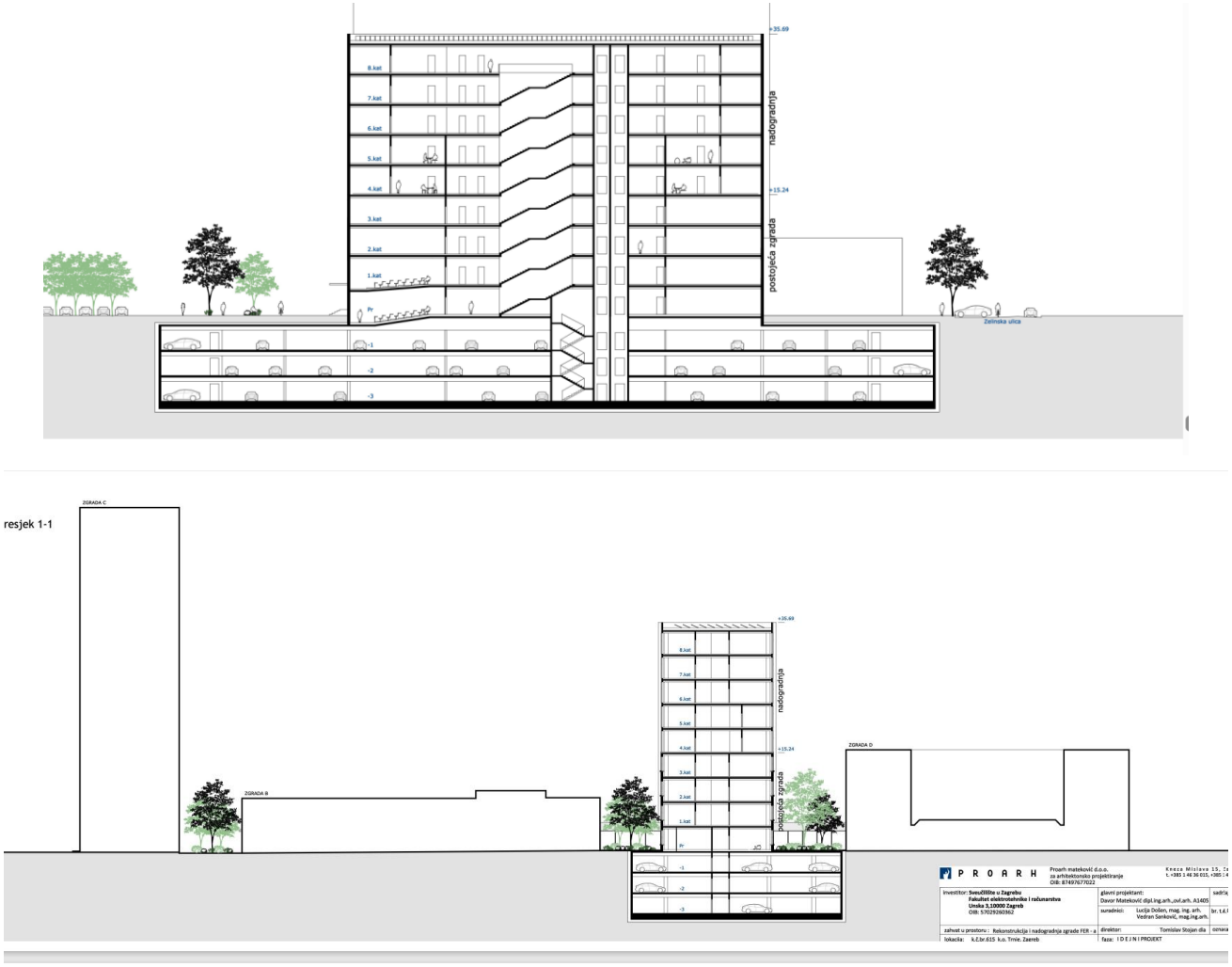

Figure 4. Cross-sections

Construction and materials

The primary load-bearing structural system consists of reinforced concrete walls, columns and ceiling slabs, with a maximum span of about 11.5 m. The clear height of the rooms in the basement is 260 cm, and on the floors 330 cm. The partition walls are made of plasterboard. The northern and southern façade of the existing part (P + 3) of the building will be retained, i.e., the existing parapets and windows will be retained, and the outer envelope (glass) will be added. On the upper floors from the 4th to the 8th floor, the façade will consist of a double glass façade (transparent on the windows, and non-transparent glass on the parapet). The gable facades of the building (east and west) will be completely closed, a concrete façade wall with an imprint. The roof will be flat and impassable. It is planned to install photovoltaic cells on the roof.

Landscape

Horticultural landscaping will contain a variety of plants, trees and shrubs of native species easy to maintain. Found trees that do not interfere with the execution of the planned procedure will be retained. The existing high-quality tall greenery (tree alleys) on the west side will be retained and integrated as an element of the access square. For arranging the outdoor terrain for pedestrian accesses, ramps, pedestrian paths, fire driveways, etc. concrete paving is planned. The existing fences in the north towards private plots will be retained, and the rest of the plot will not to be fenced.

The floor of the southern atrium is predicted as a green roof of the underground floor.

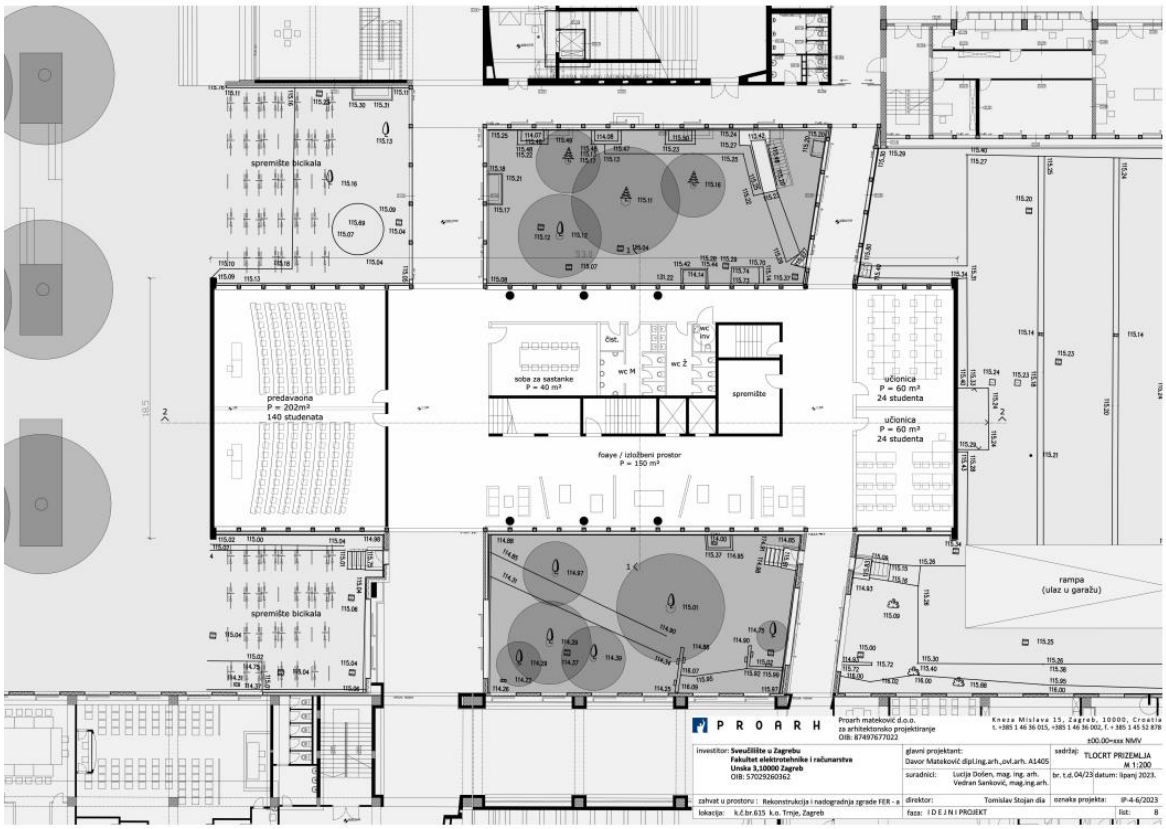

Figure 5. Ground floor plan

Traffic

Vehicular access to the building is provided from the east side from Zelinska Street. Idle traffic is solved by garage that extends through 3 underground floors. The garage will be accessed from Zelinska Street via a ramp with a slope of up to 18%.

Almost all parking spaces on the ground floor are being abolished, which improves the existing system of pedestrian areas and squares. Currnetly there are 126 parking spaces provided on the plot for the existing building, of which 124 parking spaces wil be located in the underground garage, while 2 parking spaces will be kept within the yard. According to the General Urbanistic Plan, the reconstruction increases the need for an additional 68 parking spaces. Thus, the total number of required parking spaces in accordance with the GUP is 194.

With Conceptual Design a total of 292 parking spaces is foreseen (290 parking spaces in the garage and 2 parking spaces on the plot), which fully meets existing and newly planned needs based on the General Urbanistic Plan (50% more than the existing and newly planned needs).

From the total number, 15 or minimum 5% parking spaces will be for persons with disabilities and 2 parking spaces with 1 electric charging station for passenger cars.

Installations

The building is connected to the existing infrastructure network: heating plant, water supply, drainage, electrical and telecommunications installations in accordance with connection conditions and special conditions of public-legal bodies.

HVAC

For the reconstruction of the building in question, it is necessary to design and perform mechanical installations of heating, cooling and ventilation.

Heat/cooling station

For the heating and cooling needs of the building, it is planned to connect to the existing central heating station designed for heating/cooling of buildings A, B, C and D. Water/water, air/water and air/air heat pumps are installed in the central heating station. For the backup source of thermal energy, the connection of the heat station to the remote heat supply system of HEP Toplinarstvo was also made. The heating medium will be water, in winter the 45/40° system, in the summer the 10/15°C system.

When designing heating and cooling, all workspaces will be evenly heated/cooled to a winter/summer temperature of 20/26°C. All storage rooms, toilets, corridors and staircases will be evenly heated to 18°C. In the period of high outdoor temperatures, in the areas to be cooled, a maximum temperature of 6°C lower than the outdoor temperature will be ensured.

Heating and cooling of the building

Heating/colling of all spaces is planned with valve convectors, mostly in the parapet version, and to a lesser extent in the suspended ceiling. A four-pipe system is envisaged that allows simultaneous heating (of north-facing rooms) and cooling (of south-facing rooms).

Ventilation of the building

When designing ventilation, it will be ensured that all areas for permanent stay, restaurant, cafeteria and work areas can be ventilated with conditioned air and naturally. In all these areas, conditioned air ventilation will be provided with mandatory heat recovery, with a minimum of 2 air changes per hour or 25-30 m^3 of air/h per person, with a maximum air flow speed of 0.2 m/s, as well as the possibility of natural ventilation when construction conditions allow. In areas that require it, a relative humidity in the air of 40-60% will be ensured.

In kitchenette ventilation will be provided by installing extractor hoods.

Mechanical exhaust ventilation will be provided in the sanitary facilities with the maximum possible heat recovery, and where possible, natural ventilation will be provided.

Ventilation ducts, anemostats and regulation grilles will be located above the suspended ceiling. Ventilation will be regulated via room CO^2 sensors, which will achieve significant energy savings. Exhaust ventilation of sanitary facilities with fresh air replenishment will be solved mechanically, by independent ventilation systems with heat recovery.

Garage ventilation

Mechanical ventilation of the garage, which extends through 3 underground floors, is planned.
Since the natural ventilation of underground garage is not possible, exhaust gas ventilation is planned, with compensation of exhaust air through the opening on the building - through the inlet-outlet ramp. Garage ventilation is designed to ensure air quality in the garage space below the permissible CO concentration.
In accordance with the provisions of Art. 6.3.1 of the NFPA 88A standard for fire protection in garages and open parking lots, which is conditioned in special construction conditions, the ventilation of the garage space must be ensured by means of mechanical ventilation with a capacity of 300 L/min (18 m^2/h) per m^2 of garage space. The air is exhausted under the ceiling of the garage through exhaust grilles through sheet metal ducts made of galvanized sheet metal and expelled by duct fans to the terrain (to the green area). CO sensors will monitor gas concentrations. The fans are switched on at a pulse of the CO indicator set to 200 ppm CO at a higher speed, or via a timer at a lower speed, or manually from the control cabinet.

Electrical installations

The building in question (marked A) has an existing connection derived from the main distribution cabinet GRO_FEEC which is located on the ground floor of building B. A new connection of the building is planned in accordance with the new needs of reconstruction.
The renovation project of the complex (buildings A, B, C and D) that precedes this project plans to reconstruct the connection and increase the connection capacity of the entire complex.
For the purpose of increasing the connection of the Faculty of Electrical Engineering and Computing in Zagreb to the distribution power network in the direction of take-off from the grid and in the direction of handing over to the grid, it is necessary to build a part of the meeting plant for the 10(20) kV cable connection owned by the Faculty of Electrical Engineering and Computing in Zagreb in the existing meeting plant of the FEEC-a-RTS 880 FEEC 10(20) KV building.
The increase in power in the direction of taking from the grid is from the existing 750 kW to a total of 1400 kW, for which an electricity approval has been obtained. The increase in power in the direction of transmission to the grid is from the existing 500 kW to 950 kW, for which an electric power approval has been obtained.
It is planned to build a solar photovoltaic power plant on the roof of the building for the purpose of producing electric energy for their own needs. The solar power plant will run parallel to the distribution network, and the island operation of the power plant will be disabled.

The plant consists of PV modules installed on the roof and DC/AC inverters whose photovoltaic modules are connected to the grid inside the building. The photovoltaic generator will contain photovoltaic modules made of monocrystalline silicon.

Fire alarm system

A fire alarm system will be designed for the entire building in accordance with the Ordinance on Fire Alarm Systems (OG 56/99). The system will consist of an analogue-addressable fire alarm control panel, analogue-addressable optical, thermal, manual detectors, input/output modules, external sirens with sound and light signaling, internal sirens and electrical installations.

2.4.3 Design of the building

Sub-Project design will be in accordance with all special conditions issued from the public bodies (Table 6).

Table 6. Special conditions issued from the public bodies

Field	Special conditions
Fire protection	• It is necessary to apply fire protection measures in Main Design in accordance with Croatian regulations and standards regulating fire protection and other foreign guidelines and regulations used as a rule of technical practice. Fire protection study and measures shall also be compliant to GIIP and WB EHSG. • It is necessary to prepare an Overview of all applied fire protection measures, which must at least contain data from the Fire Protection Study and the Fire Protection Study. • In the Main Design, within the quality control and assurance program, in the part of fire protection, specify the standards, regulations and the procedure for ensuring and proving quality for the works performed, installation, materials, products and equipment. • In the process of issuing a building permit, obtain an approval of compliance of the Main Design with regulations in the field of fire protection.
Cultural heritage	• The height of the reconstructed building must not exceed the planned 9 above-ground floors and it must be in line with the height of the other buildings in the second row of the street stretch of Vukovarska with which it shares the same recessed construction line (which also does not exceed 9 floors). • In terms of design, the architectural solution should be of high quality and correspond with other buildings of the FEEC complex. • A modern interpretation of the elements of modern architecture of the mid-20th century is recommended, i.e., a formal reference to the volume of the existing building A and building C (skyscraper) in the sense of retaining or reinterpreting the frame consisting of gable walls and roof, horizontal breakdown of the façade with window strokes and full parapets and recessed last floors. • The part of the plot where the parking lot is currently located should be planned as the main access square for the entire complex, and it is necessary to develop a Project for landscaping the plot. • The Project of parterre landscaping of the plot must be equipped with plans of horticultural landscaping and paving. • The parking lot currently located on the access square needs to be moved to the newly planned underground garage as much as possible. • In accordance with the provisions of the Act on the Protection and Preservation of Cultural Property, in order to obtain confirmation of the Main Design, it is necessary to submit the project to the Institute through the competent authority for construction, made by a natural person who has the prescribed permission of the Ministry of Culture and Media to perform work on the protection and preservation of cultural property in accordance with the Ordinance on the conditions for obtaining permission to perform work on the protection and preservation of cultural property (OG 98/18, 119/23).

Traffic safety	• The existing vehicular and pedestrian access to the traffic area of Zelinska Street will be used. • All extensions on the plot are planned outside the corridor and the area reserved for the extension of peripheral roads according to the Decision on the adoption of the General Urban Plan of the City of Zagreb (Official Gazette 16/07; 02/08; 06/08; 08/08; 01/09; 07113; 9116) Vukovarska Street, Zelinska and Unska streets. • It is necessary to submit a budget for idle traffic for all facilities on the plot, existing and newly planned, in accordance with the Decision on the adoption of the GUP of the City of Zagreb (OG 16/07,08/09,7/13,9/16), and show the same on the situation in the project documentation. • In the underground garage and outdoors, it is necessary to plan parking spaces in a row. Each parking space must be at least 2.50 x 5.00 m, and there must be no partitions between the spaces. The parking space for parking two vehicles between the walls should be at least 5,40 m wide and at least 5,00 m long. A parking space located next to walls/fences and a separate garage should be planned with dimensions of at least 2,80 x 5,00 m. Parking spaces for the needs of persons with mobility difficulties should be planned in accordance with the Ordinance on Ensuring the Accessibility of Buildings to Persons with Disabilities and Reduced Mobility (OG 78/13), i.e., dimensions 3,70 x 5,00 m (for one vehicle) and 5,90 x 5,00 m (for two vehicles). The maneuvering space in front of the parking and garage spaces should be at least 5,50 m. • It is recommended that the longitudinal slope of the ramp is up to 12%, and with a higher slope (up to 18%), it is necessary for the ramp to be heated. The ramp should be two-way and the same should be planned with a pavement width of at least 5,50 m. • It is necessary to comply with the Ordinance on Ensuring the Accessibility of Buildings to Persons with Disabilities and Reduced Mobility (OG 78/13). The recess of the curb in the zone of pedestrian crossings should be planned in a width of at least 1,20 m (the ramp should be made of asphalt and a tactile warning field with a cone structure should be installed). • When connecting the ramp with the garage floors and when turning the vehicle in the garage, it is necessary to ensure visibility, i.e., install traffic mirrors. • For the spaces for disabled, it is necessary to place a C39 sign (parking lot) with an additional plate Eli (disability marking). • In the garage it is necessary to draw a dotted dividing line H02, on the ramps a solid dividing line HO 1.
Wastewater collection	• To enable the reconstruction and upgrading of the building A, it is necessary to relocate the existing public canals on the east and west sides from the zone covered by the construction of underground floors. • Internal wastewater collection system must be planned and constructed in accordance with the concept of wastewater collection system of the subject area, by a mixed system, and must be performed, used and maintained in accordance with the provisions of the Water Act, the Decision on Wastewater Drainage, the Decision on Connection to Municipal Water Structures and the General and Technical Conditions for the Delivery of Water Services. • Waters containing concentrations of aggressive and harmful substances higher than the maximum permitted in accordance with the Decision on Wastewater Drainage and the Rulebook on Limit Values for Wastewater Emissions (OG 26/20) must not be released into the public sewage system. Wastewater containing harmful and toxic substances in quantities that may have a harmful effect on human health, installations, buildings and devices of public supply must not be discharged into public sewage systems, wastewater treatment and sludge digestion processes. • Internal wastewater collection system of building A can be carried out with the existing internal wastewater collection network and connected to the public drainage system through the existing connections. • For the existing internal sewerage system and the existing connection to the public sewerage, it is necessary to perform the functionality and hydraulic check, and if

	it does not meet the requirements or is of insufficient capacity, reconstruction must be carried out on the parts that do not meet the requirements. • The height of the probable stagnant water in the public sewerage system exceeds the top of the public sewer by 1.5 m. drainage of all spaces located below the mentioned stagnant water level will not be able to be connected to the public sewerage system directly by gravity, but wastewater and rainwater from these areas will have to be pumped into the internal drainage control shaft at an elevation higher than the stagnant water level. • All contaminated or potentially contaminated wastewater will be connected to the internal drainage system through an appropriate wastewater treatment device. All devices must be provided in places that can be accessed by special vehicles for the purpose of frequent maintenance in a place where they will not have a harmful impact on people and the environment and where the penetration of rainwater into certain parts of the device will be prevented. • Wastewater from garages must be treated in a settling tank for the separation of solid particles and separators of oil, grease and other petroleum products. • Tanks or devices used for the reception or purification of oil, petroleum derivatives, or polluted wastewater, must be placed in a concrete protective chamber, watertight, without outlets and overflows, and the device must be capable of collecting the separated oil. • The protective chamber must be designed in such a way as to enable organoleptic control of leakage of the installed tank or device and emptying by special vehicles, and the device must be capable of collecting the separated oil. • Rainwater from internal vehicular areas, parking and pedestrian areas must be accepted through a drain with a ground level before being connected to the public sewage system. The connection of the drain to the drainage must be made by a pipeline of watertight design, the drains must not be connected to each other. • Since the public sewage channels are located within the plot in question, the investor of the facility is obliged to ensure free access to the canals during the construction and exploitation of the facility, for the purpose of maintenance and possible reconstruction. • All buildings and structures of a permanent character should be located so that they are at least 6 m away from the outer edge of the constructed public sewerage channel. • The connection of the building in question to the public sewerage system will be possible only after the relocation of the public sewers. • Internal drainage should be designed and built as watertight, which is proven at the technical inspection by a credible document, attestation.
HEP	• If, during the reconstruction or extension of a public and social building, there is a change in the installed power of heating radiators or the reconstruction of a heating substation, it is necessary to submit to HEP-TOPLINARSTVO d.o.o. the studies of mechanical installations for inspection and approval.

The design shall reflect WB EHSG requirements and incorporate and reflect best practices in the areas of light pollution prevention (design of lighting bodies), climate change prevention (energy efficiency, insulation, light facade colors, etc.), climate change adaptation and prevention of heat islands (e.g., maximizing green spaces and tress shading, shading concrete surfaces, etc.).

Sustainability Assessments will also be part of the responsibility of the Consultant. In developing design documentation smart approach towards energy efficient and climate resilience design must be followed. The Sub-Project will be designed in accordance with chosen green building certification system (LEED, BREAM, DGNB or other internationally recognized green building standards.

While following chapter was written with LEED in mind, the requirements and principles outlined here apply to any other chosen equivalent sustainability rating system such as DGNB, BREEAM, or other recognized standards. The terminology and specific requirements will be adapted accordingly to align

with the chosen rating system. The same applies to mitigation measures prescribed for the design phase and proposed for the construction phase (subchapters 9.1 and 9.2) as well as to chapter 10.

LEED (The Leadership in Energy and Environmental Design)

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System (voluntary, third-party rating system) is a widely accepted benchmark for the design, construction and operation of high-performance green buildings designed to quantify the environmental performance of building projects while providing a framework for the implementation of green building strategies.

Designing educational facilities according to Leadership in Energy and Environmental Design (LEED) principles focuses on creating healthier, more sustainable, and energy-efficient learning environments. LEED-certified educational buildings are assessed across several categories, including acoustics, daylighting sustainable site development, water savings, energy efficiency, material selection, indoor environmental quality and innovation.

The key elements that go into LEED-certified educational facility design:

1. Sustainable Sites

LEED for educational facilities promotes sustainable site development by encouraging the use of previously developed land, preserving natural habitats, and implementing strategies to manage stormwater runoff. Projects can earn points for locating educational facilities near public transportation, creating outdoor learning spaces, and using permeable surfaces for parking lots and walkways. These measures help minimize the environmental impact of school campuses and foster a connection between students and nature.

2. Acoustic

Proper acoustics are essential in creating an optimal learning environment, as excessive noise can hinder concentration and communication. LEED for educational facilities emphasizes the importance of acoustics by offering points for implementing noise reduction strategies, such as using sound-absorbing materials, designing appropriate room layouts, and minimizing external noise intrusion. These measures help create a more conducive learning atmosphere, supporting student focus and engagement.

3. Daylighting

Access to natural daylight has been shown to improve student performance and well-being. LEED for educational facilities recognizes the value of daylighting by awarding points for incorporating strategies that optimize natural light. By maximizing daylight in classrooms and common areas, educational facilities can create visually stimulating and comfortable spaces that enhance learning and reduce reliance on artificial lighting.

4. Water Efficiency

LEED for educational facilities rewards projects that implement water-saving fixtures, irrigation systems and educational gardens. These strategies help reduce the environmental footprint of educational facilities, lower operating costs, and teach students about the importance of resource conservation.

5. Energy and Atmosphere

Implementation of energy-efficient lighting, renewable energy, efficient HVAC systems and building envelopes also reduces the environmental footprint of educational facilities and lowers operating costs.

6. Materials and Resources

Choosing sustainable building materials, reducing waste generation and prioritizing locally sourced materials can help reduce the negative impact on the environment and increase the sustainability of the project.

7. Indoor Air Quality

Maintaining a healthy indoor environment is crucial for the well-being of students and staff. LEED for educational facilities addresses indoor air quality by setting standards for ventilation, air filtration, and the use of low-emitting materials. These strategies contribute to a healthier indoor environment, reducing the risk of respiratory issues and other health problems.

8. Innovation in Design

LEED for educational facilities awards innovation in design such as green roofs and walls, flexible learning spaces, environmental education programs etc.

9. Regional Priorities

Design can be adopted to reflect local environmental challenges, like energy-efficient heating in colder regions or cooling in warmer climates.

Within each LEED category, individual strategies are defined as "prerequisites" (strategies required for all projects pursuing certification) and "credits". Each LEED credit carries a point value based on its potential positive environmental impact. Credits are generally divided into three tiers, based on the criteria of attainability, effort and cost required to achieve them. Project teams must earn points to achieve certification. Projects can earn varying levels of certification, which reflect their overall level of achievement. These levels of certification are Certified (40 to 49 points), Silver (50 to 59 points), Gold (60 to 79 points) and Platinum (80 to 110 points). All prerequisites must be achieved in order for the projects to pursue certification.

LEED feasibility assessments will be made based on each project documentation delivery (Conceptual Design, Main Design and Detailed Design), providing a detailed description of potential modalities of the project's compliance with the certification protocol requirements for obtaining a LEED® certificate. Consequently, in accordance with developed LEED feasibility assessments, separate Design LEED guidelines will be developed as a basis for the development of the Main design, Detailed design and for the construction phase.

3 ENVIRONMENTAL CONDITIONS OF SUB-PROJECT AREA

3.1 Land use

According to the Urban General Plan of City of Zagreb, subject plot is located in the area of public and social use - higher education institutions and science, technology parks (marked as "D6") and according to the Urban Rules, location belongs to Protection and arrangement of completed settlements (marked as "1.6.)

The location is surrounded by the public urban and green areas (marked as "Z") on the west, mixed residential areas (marked as "M1") and economic - business areas (marked as „K1") on the east and to the north of the plot there is an area of the same purpose as the plot in question (marked as "D6"). On the south side of the plot there is Vukovarska Street (Figure 6).

Figure 6. Excerpt from the General Urban Plan of City of Zagreb (map 1. Usage and Purpose of the area) https://geoportal.zagreb.hr/Karta

3.2 Air quality

According to the Decree on the designation of zones and agglomerations according to the levels of air pollution in the territory of the Republic of Croatia (Official Gazette 1/14), the location of the project is within the HR ZG - Industrial zone which covers the area of City of Zagreb and cities: Dugo Selo, Samobor, Sveta Nedelja, Velika Gorica and Zaprešić. The nearest measuring station for air quality measurement is Zagreb-1, which is located in Đorđićeva Street.
According to the Report on air quality monitoring on the territory of the Republic of Croatia in 2022, the air quality at the monitoring station Zagreb - 1 was assessed as I. category (clean or slightly polluted air, consistent with the limit value for 1-hourly and the limit value for 24-hour concentrations with regard to the protection of human health) for all pollutants (SO_2, NO_2, CO, benzene, $PM_{10,}$ Pb in PM_{10}, Cd in PM_{10}, Ni in PM_{10}, As in $PM_{10,}$ BaP in $PM_{10,}$).

3.3 Radon emission

Radon is formed by the radioactive decay of radium found in soil and rocks and is found everywhere in the earth's crust. Guided by various transport mechanisms, it easily exits the ground into the air. The concentration of radon in the outdoor air is small (between 5 and 15 Bqm^{-3}) and generally it does not cause any health problems. However, it can be high in indoor air (residential houses, schools, hospitals etc.) - from 10 to several thousand Bqm^{-3} and in extreme values up to one million Bqm^{-3}).
The main sources of radon in indoor air are: soil just below the building (85 - 90%), building materials (5 - 10 %), groundwater (about 5 %) and natural gas (less than 1 %). The parameters that affect the

concentration of radon in buildings can be natural (geological composition and soil structure, climatic and meteorological parameters) and technical or technological (construction methods) as well as people's habits (ventilation of rooms, way of heating, etc.). Due to such a large number of different parameters that directly or indirectly define the concentration of radon in buildings, it is practically impossible to develop a satisfactory model that will predict the concentration of radon in the house. Therefore, direct measurement is the only correct way to assess radon risk.
The national (and EU) reference level for radon concentration in indoor air is 300 Bqm^{-3}. So far, indoor measurements have been carried out with a total of about 6.000 detectors (727 schools, 228 kindergartens and 1.400 residential buildings) in 8 counties (Brod-Posavina, Virovitica-Podravina, Lika-Senj, Karlovac, Istria, Požega-Slavonia, Sisak- Moslavina and Vukovar-Srijem)[3]. Geogenic radon potential in City of Zagreb was not measured (Figure 7).

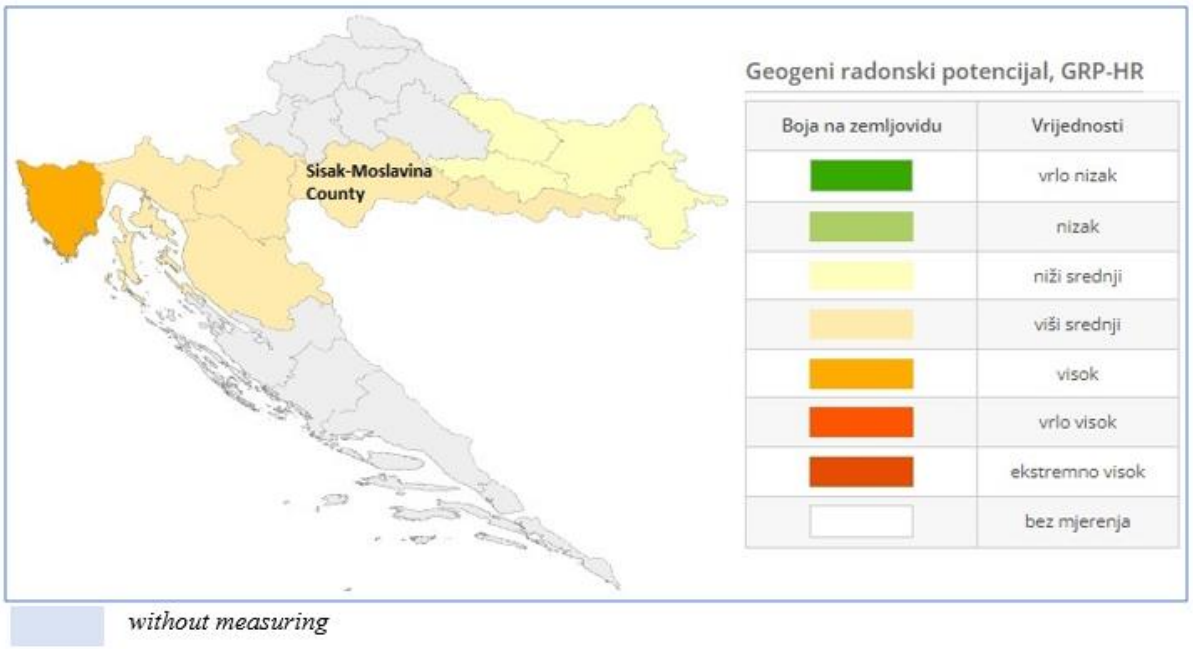

Figure 7. Geogenic radon potential in Croatia

3.4 Noise

According to Strategic noise map of the City of Zagreb (Figure 8) and according to Table 1 in Ordinance on the highest permissible noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21) (Table 7.) location of Reconstruction and upgrading of the building of the FEEC in Zagreb Sub-Project belongs to zone 2.

[3] http://radon.civilna-zastita.hr/

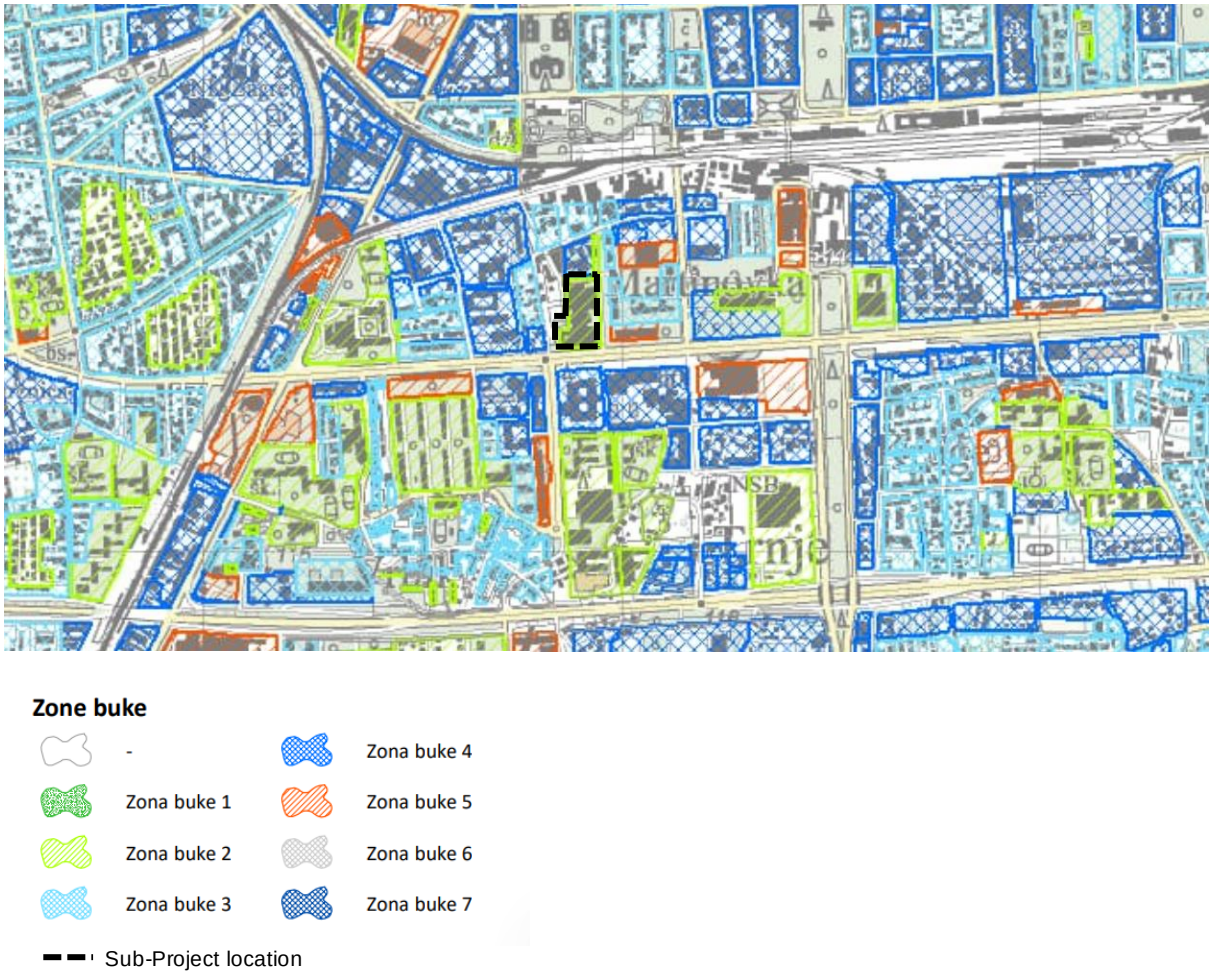

Figure 8. Strategic noise map of the City of Zagreb

Table 7. Highest permitted rated noise levels for zone 2, 3 and 4 according to *Ordinance on the highest permissible noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21)*

Noise zone	Use of area	Highest permitted rated noise levels $L_{R,Aeq}$/ dB(A)			
		L_{day}	$L_{evening}$	L_{night}	L_{den}
2	zone intended for permanent residence and/or residence, quiet areas within a populated area	55	55	40	56
3	Zone of mixed, predominantly residential use	55	55	45	57
4	Mixed, predominantly business use zone with housing, with occasional housing, predominantly agricultural holdings	65	65	50	66

According to Table 1 in Ordinance on the highest permissible noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21), FEEC is located in Zone 2 - Zone intended for permanent residence and/or residence, quiet areas within a populated area, in which the highest permitted rated noise levels $L_{R,Aeq}$ are:

- L_{day} 55 dB (A);
- $L_{evening}$ 55 dB (A);
- L_{night} 40 dB (A);
- L_{den} 56 dB (A).

The surrounding zones are classified, in accordance with the for mentioned regulation, in noise Zone 3: Zone of mixed, predominantly residential use, and Zone 4: Mixed, predominantly business use zone with housing, with occasional housing, predominantly agricultural holdings, in which the following noise levels are allowed:

Zone 3

- L_{day}=55 dB(A);
- $L_{evening}$= 55 dB(A);
- L_{night}=45 dB(A);
- L_{den}=57 dB(A).

Zone 4

- L_{day}=65 dB(A);
- $L_{evening}$= 65 dB(A);
- L_{night}=50 dB(A);
- L_{den}=66 dB(A).

The maximum permissible noise levels $L_{A,eq}$ measured in enclosed special purpose spaces are determined in accordance with the Ordinance and for lecture halls, classrooms and similar rooms are 35 dB (A).

Permissible noise level for the construction site is determined by the provisions of the Ordinance on the maximum allowed noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21). The permitted equivalent noise level of the construction site at the most exposed point of sound emission of the open living space during day and evening period is 65 dB(A). According to the mentioned ordinance, it is allowed to exceed that level for an additional 5 dB in the period from 8 to 18 hours. When performing construction works during the "night" period, the equivalent noise level must not exceed 55 dB. Exceeding the permissible noise levels shall be allowed if necessary for the technological process of the construction site and for up to three nights within a consecutive period of thirty (30) days. A minimum of two full night periods shall be provided between periods when exceeding allowable noise levels is anticipated without exceeding allowable noise levels during the night period.

3.5 Biodiversity, Nature protection areas and Natura 2000 Ecological Network

The location of the planned Sub-Project is in an urbanized area. Besides the existing Faculty buildings, the unbuilt surfaces are mainly horticulturally arranged. The surrounding area is dominated by residential and public buildings.

Therefore, the location is not considered significant from a biodiversity perspective. The Sub-Project is located outside nature protected areas and Natura 2000 sites.

According to the Register of Protected Areas, the planned intervention is located outside the areas protected under the Nature Protection Act (OG 80/13, 15/18, 14/19, 127/19, 155/23). The nearest protected area is the Monument of park architecture Botanical garden of the Faculty of Science located about 340 m north of the planned Sub-Project, while in the wider area of the project, at a slightly greater distance, there are also other Monuments of Park Architecture: Park kralja Petra Svačića (725 m), Park on Kralja Tomislava square (850 m), Park on Josip Juraj Strossmayera square (1000 m), Park on Nikola Šubić Zrinski square (1015 m), Park kralja Petra Krešimira IV (1075 m) all northeast of the Sub - Project location (Figure 9).

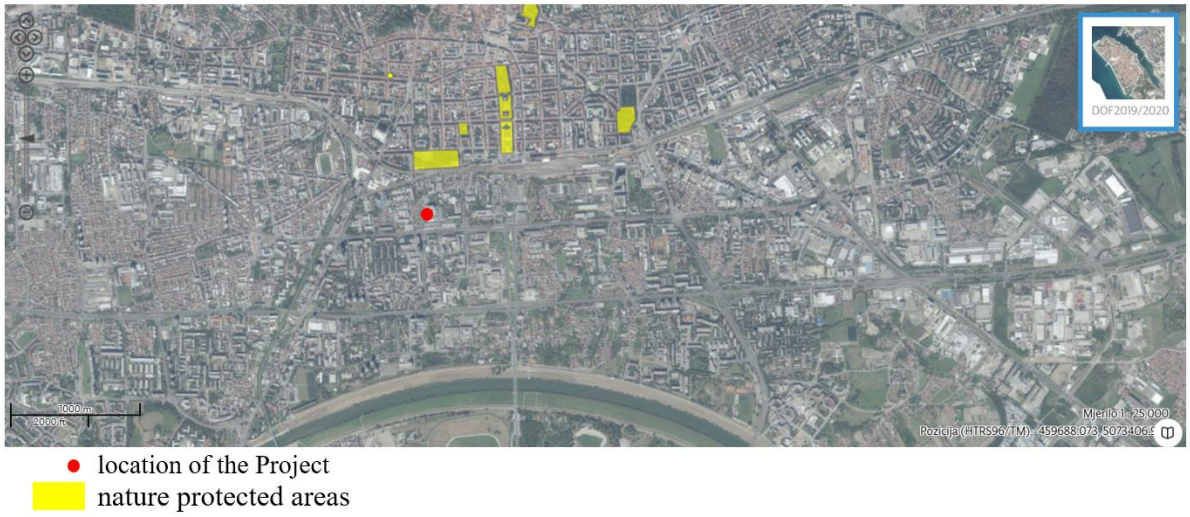

Figure 9. Nature protected areas in the wider area

According to the Regulation on the ecological network and competences of public institutions for the management of ecological network areas (OG 80/19, 119/23), the Sub-Project in question is located outside the area of the Natura 2000 ecological network. The nearest Natura 2000 ecological network is HR2000583 Medvednica (POVS; conservation areas important for species and habitat types) is located northwest of the location at a distance of about 5,5 km (Figure 10.).

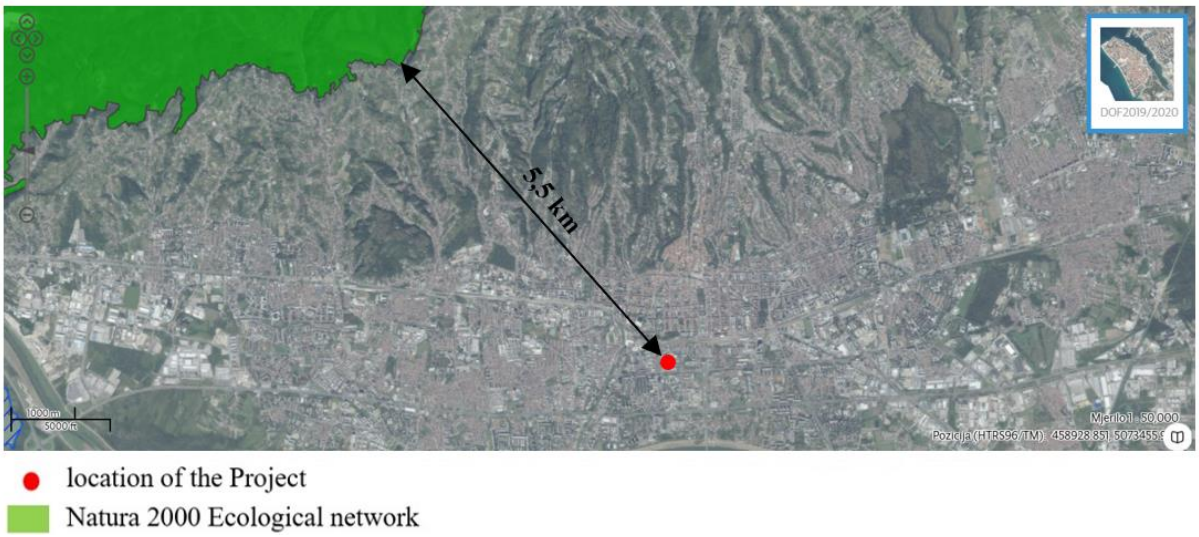

Figure 10. Natura 2000 ecological network in the wider area

3.6 Water and flood areas

According to the flood risk map, FEEC is located outside the area with a probability of floods (Figure 11).

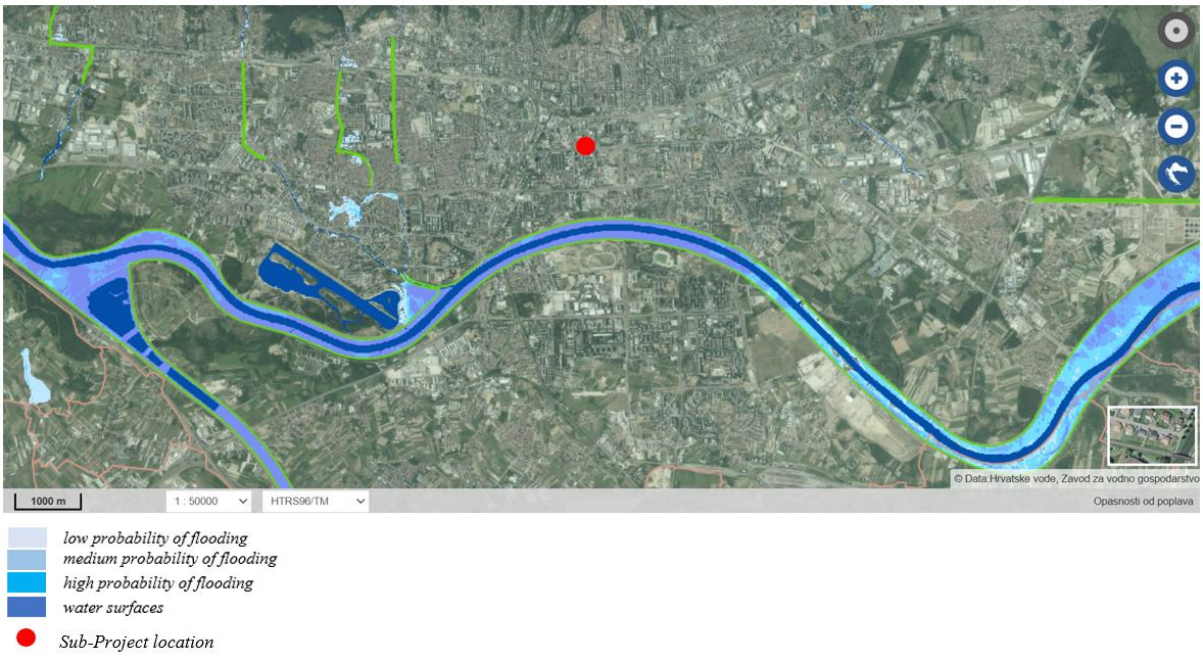

Figure 11. Flood risk map

3.7 Seismic characteristics and soil stability

According to the Seismic Map of RoC from 2012, for a return period of 475 years, the subject location belongs to the area with a peak acceleration of 0,247 g, where g is the acceleration of the gravity field, 9,81 m/s^2. The acceleration corresponds to IX. degree of the MCS (Mercalli - Cancani - Sieberg) scale (violent earthquake, great sustainable buildings are damaged, buildings fall of foundations, well designed structures thrown down). Looking at the return period of 95 years on the Seismic Map of Republic of Croatia, the peek acceleration at the location amounts 0,125 g, which corresponds to VII. level of the MCS scale (Figure 12.).

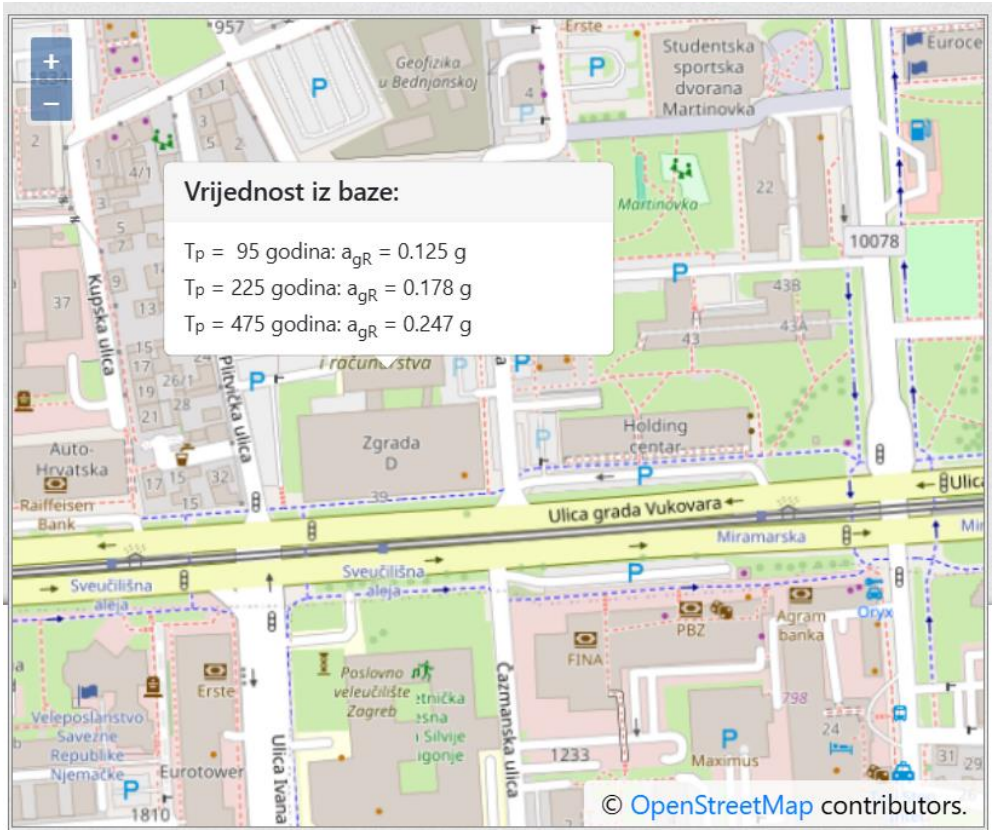

Figure 12. Seismic map of Republic of Croatia (source: [Maps of earthquake areas of the Republic of Croatia (gfz.hr)])

3.8 Climate and climate change

According to the Köppen classification, City of Zagreb has a moderately warm rainy climate, with a warm summer, without dry period, with the least amount of precipitation in the cold part of the year, and there are two maxima in the annual rainfall (marked as "Cfwbx"). The area of the City of Zagreb is mainly affected by weak winds. The position and direction of Medvednica significantly modifies the flow of winds. Medvednica generates a local circulation system that is not strong, but is steady, so during the day the wind blows along the slopes of Medvednica with a pronounced southern component, while at night the wind blows down the slopes with a pronounced northern component. The daily wind of the slopes is characterized by higher speeds and greater variability of direction compared to the nighttime wind on the hillside. The ground wind is highly modified by the configuration of the terrain. In winter, temperature inversions occur frequently in periods of silence, i.e., weak winds. In these meteorological conditions, dispersion is difficult, which causes the accumulation of pollution within the populated area, especially within the street canyon. However, in the past years, Zagreb experienced unusual storms accompanied by very strong winds, probably as a consequence of the climate change (e.g., July 2023).

With regards to climate change, expected increase in average temperature is between 1 and 1,4°C in all seasons by 2040, while by 2070, expected increase in average temperature is between 1,5 and 2,2°C. Expected increase in maximum temperature in all seasons by 2040 is between 1 and 1,5 °C, while expected maximum increase in temperature by 2070 is up to 2,2 °C in summer. By 2040 an increase in minimum temperature between 1,2 and 1,4 °C in winter is expected and by 2070 the largest increase in the minimum temperature in winter is expected between 2,1 to 2,4 °C. As for the precipitation, by the 2040 increase in precipitation is expected in winter and spring, while in summer and autumn a decrease in precipitation will prevail throughout the country. On the other hand, in the period up to 2070, a

decrease in precipitation is expected in all seasons, except in winter.[4] The increase in the highest air temperature values in urban areas has the effect of creating heat islands. The annual air temperature in a city with a million inhabitants can be 1-3 °C higher than in an area outside the city. Heat islands have an impact on increasing energy consumption, they contribute to the effect of greenhouse gases and global warming and have a negative impact on water quality and human health.

[4] Seventh national report of the Republic of Croatia according to the United Nations Framework Convention in Climate Change (UNFCCC)

4 SOCIAL-ECONOMIC BASELINE OF SUB-PROJECT AREA

4.1 Population

City of Zagreb

The city of Zagreb is the capital of the Republic of Croatia and is a separate and unique territorial and administrative unit. According to the Census from 2021, the population in the City of Zagreb counted 767 131 residents. There is a visible trend of decrease in population since the Census from 2011 when the number of residents was 790 017. The total area of the City of Zagreb is 641,24 km^2. The City of Zagreb includes 68 settlements: Adamovec, Belovar, Blaguša, Botinec, Brebernica, Brezovica, Budenec, Buzin, Cerje, Demerje, Desprim, Dobrodol, Donji Čehi, Donji Dragonožec, Donji Trpuci, Drenčec, Drežnik Brezovički, Dumovec, Đurđekovec, Gajec, Glavnica Donja, Glavnica Gornja, Glavnicica, Goli Breg, Goranec, Gornji Čehi, Gornji Dragonožec, Gornji Trpuci, Grančari, Havidić Selo, Horvati, Hrašće Turopoljsko, Hrvatski Leskovac, Hudi Bitek, Ivanja Reka, Jesenovec, Ježdovec, Kašina, Kašinska Sopnica, Kučilovina, Kupinečki Kraljevec, Lipnica, Lučko, Lužan, Mala Mlaka, Markovo Polje, Moravče, Odra, Odranski Obrež, Paruževina, Planina Donja, Planina Gornja, Popovec, Prekvrsje, Prepustovec, Sesvete, Soblinec, Starjak, Strmec, Šašinovec, Šimunčevec, Veliko Polje, Vugrovec, Vugrovec Gornji, Vurnovec, Zadvorsko, Zagreb and Žerjavinec. The settlement of Zagreb with 663 592 residents is the largest settlement in the area of the City of Zagreb, and it is also the largest settlement in the Republic of Croatia in terms of population.

Some additional statistical data relevant for the City of Zagreb (according to the Census 2021):

- population density: the population density in the area of the City of Zagreb is 1196,3 residents/km^2, with significant differences in individual settlements;
- share of women: 408 515, i.e., 53,3% of the total of number of citizens in the City of Zagreb are women;
- number of households: 300 329;
- average number of people in the household: 2,53;
- foreign citizens: 6559 (0.86%) residents of the City of Zagreb are foreign nationals:
- national minorities: 31624 (4,12%) residents of the City of Zagreb are members of national minorities;
- stateless: 93 (0,01%) residents are stateless;
- residents under 15 years of age: 166 644 (15,2%) residents of the City of Zagreb are under 15 years of age,
- residents which belong to the age group of 65+ years: 158 773 (20,7%) residents of the City of Zagreb belong to the age group of 65+ years;
- unemployment: 12551 unemployed of which 6 400 (51%) are women (only this data is from 2022).

Above presented provided broader view but also, among others, some of vulnerable groups that could be eventually present within the local community, such as: foreign citizens and national minorities, elderly residents, women, children, stateless, unemployed residents, people with disabilities. Accordingly, during the implementation of stakeholder engagement activities, care will be taken to ensure that the engagement of vulnerable groups (if applicable) is approached in an appropriate manner.

Trnje City District

FEEC is located in Trnje City District, Martinovka Local Board. The Trnje City District has 40539 residents, which is 5,3**%** of the population of the City of Zagreb. Of the total number of residents of Trnje City District, 21914 (54%) are women (Census 2021).

Students and employees of FEEC

FEEC is one of the largest and most influential scientific and educational institutions in Croatia in the field of electrical engineering, computing and information and communication technologies.

According to the FEEC's official website, the total number of students at FEEC is over 3000 at each three levels of university studies - undergraduate, graduate and postgraduate and over 500 employees - of which almost 200 are associate professors and professors.

This academic year (2024/2025), 650 freshmen enrolled in FEEC, of which almost 500 are among the 1.000 high school graduates who achieved the best results at the state high school graduation in higher level mathematics and physics. Also, this year 27% of female students enrolled in FEEC, which is more than even before. Further, there are 150 international students at FEEC who arrived in Zagreb from 31 countries (Austria, Bangladesh, Belgium, Montenegro, Egypt, Estonia, France, India, Indonesia, Italy, South Africa, Korea, Kosovo, Lebanon, Morocco, Mexico, Nigeria, Netherlands, Germany, Pakistan, Poland, Portugal, Russia, North Macedonia, Spain, Sweden, Turkey, Ukraine, Thailand and Vietnam).

The Faculty is managed by the dean and the Faculty Council, which has almost 250 members - employees from the ranks of teachers, associates and students. The Faculty Administration consists of the dean and four vice-deans elected by the Faculty Council for a term of three years. The daily functioning of the Faculty is taken care of by about a hundred faculty employees working in faculty services.

FEEC professors are on the list of the world's top scientists, more precisely, there are 82 Croatian scientists on the list of the most influential scientists in the world for their entire scientific career, three of whom are from FEEC, and on the list of the most influential scientists in the world for the year 2023 there are 116 Croatian scientists, five of whom are from FEEC[5].

4.2 Socio-economic context

About a third of the national gross domestic product (GDP) is realized in the City of Zagreb. Also, in 2023, the GDP per capita in the City of Zagreb was 33224 EUR, while national GDP per capita was 21055 EUR. For July 2024 (as latest known data), the average monthly gross salary per employee in legal entities of the Republic of Croatia was EUR 1821, while the average monthly paid net salary per employee in legal entities of the Republic of Croatia was EUR 1315. For comparison, latest known data, i.e., for July 2024, shows that the average monthly gross salary per employee in legal entities in the City of Zagreb was EUR 2146, while the average monthly paid net salary per employee in legal entities in the City of Zagreb was 1505 euros.

According to the data from 2021, the biggest influence on the increase of the total GDP in the City of Zagreb was the group of activities wholesale and retail shops, transport, and storage, providing accommodation and preparing and serving food, whose value in 2021 increased by 14,1% compared to the previous year, and had a share in the total gross value added (GVA) of 22,3%.

4.3 Buildings and infrastructure in the vicinity of the Sub-Project location

The location of planned Sub-Project belongs to the area marked as a public and social purpose area (D6) – higher education institution (according to General Urban Plan). The surrounding buildings are part of the faculty complex (buildings B, C and D).

As shown in Figure 13, the Sub-Project building (Building A) is bordered by streets on its eastern and western sides - Zelinska Street to the east and Unska Street to the west. On its northern and southern sides, it is adjacent to other buildings within the faculty complex: Building B of the FEEC complex to the north and Building D of the FEEC complex to the south. The entire complex is encircled by streets: Unska Street to the north and partially to the west, Plitvička Street to the west, Zelinska Street to the east, and Vukovarska Street to the south. Additionally, residential buildings are located to the west, northwest, and east of the site, in Plitvička, Kupska, and Zelinska Streets, separated from the FEEC complex by the aforementioned streets.

[5] https://www.fer.unizg.hr/novosti?@=30rol#news_94045

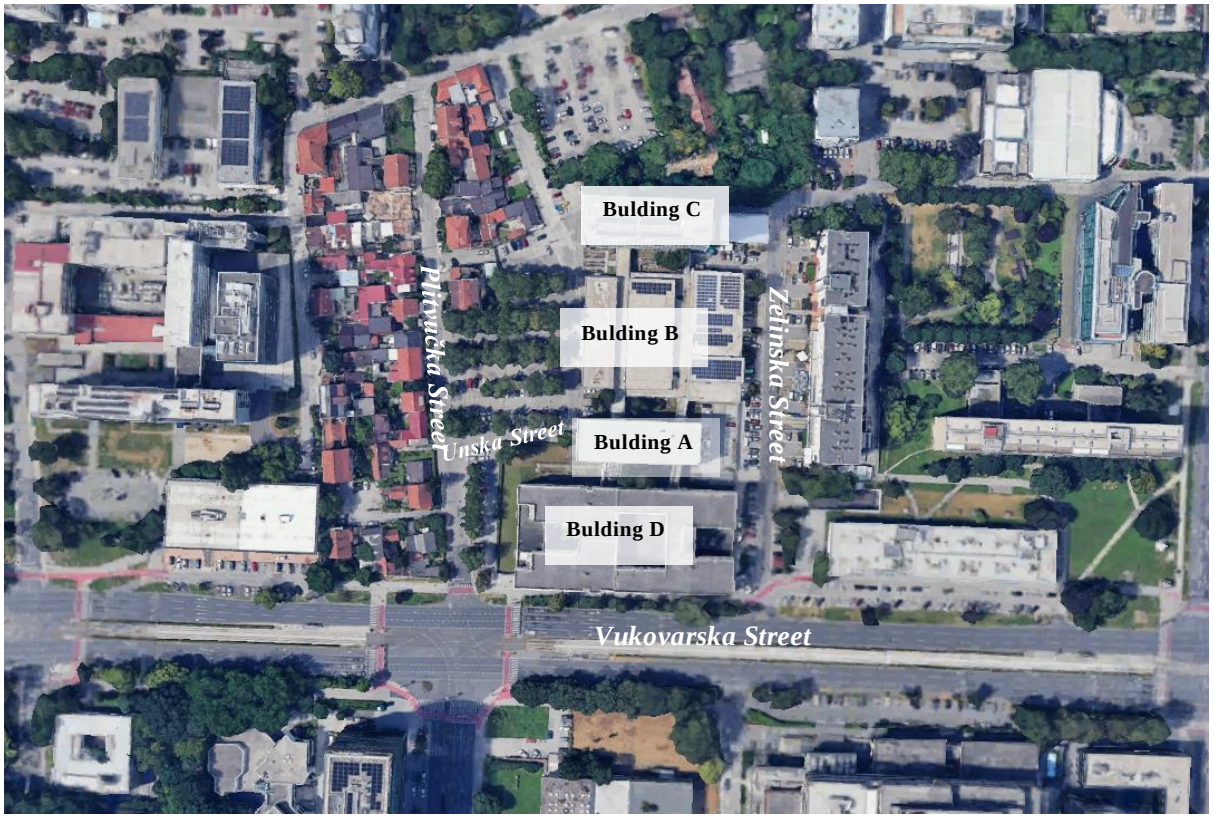

Figure 13. Buildings and infrastructure in the vicinity of building A

4.4 Cultural Heritage

As mentioned in the previous chapter (2.4.) the complex of buildings marked A, B and C together with the plot are protected as cultural heritage marked Z-5675 and based on Art. 93 of the General Urban Plan classified under group 3.b Protected civil buildings in the scope of the plan. In accordance with its provisions all operations on the cultural property can be undertaken solely in accordance with Special Requirements and Conservation Study.

The Conservation Study determined that with multiple interventions over a long period, the least original elements were retained on building A and that it is the least valuable part of the entire protected complex. In accordance with the developed Conservation Study and Expert Study planned reconstruction will retain valuable original parts (the facade walls of building A - the outer shell of the building) and complete inner structure will be replaced.

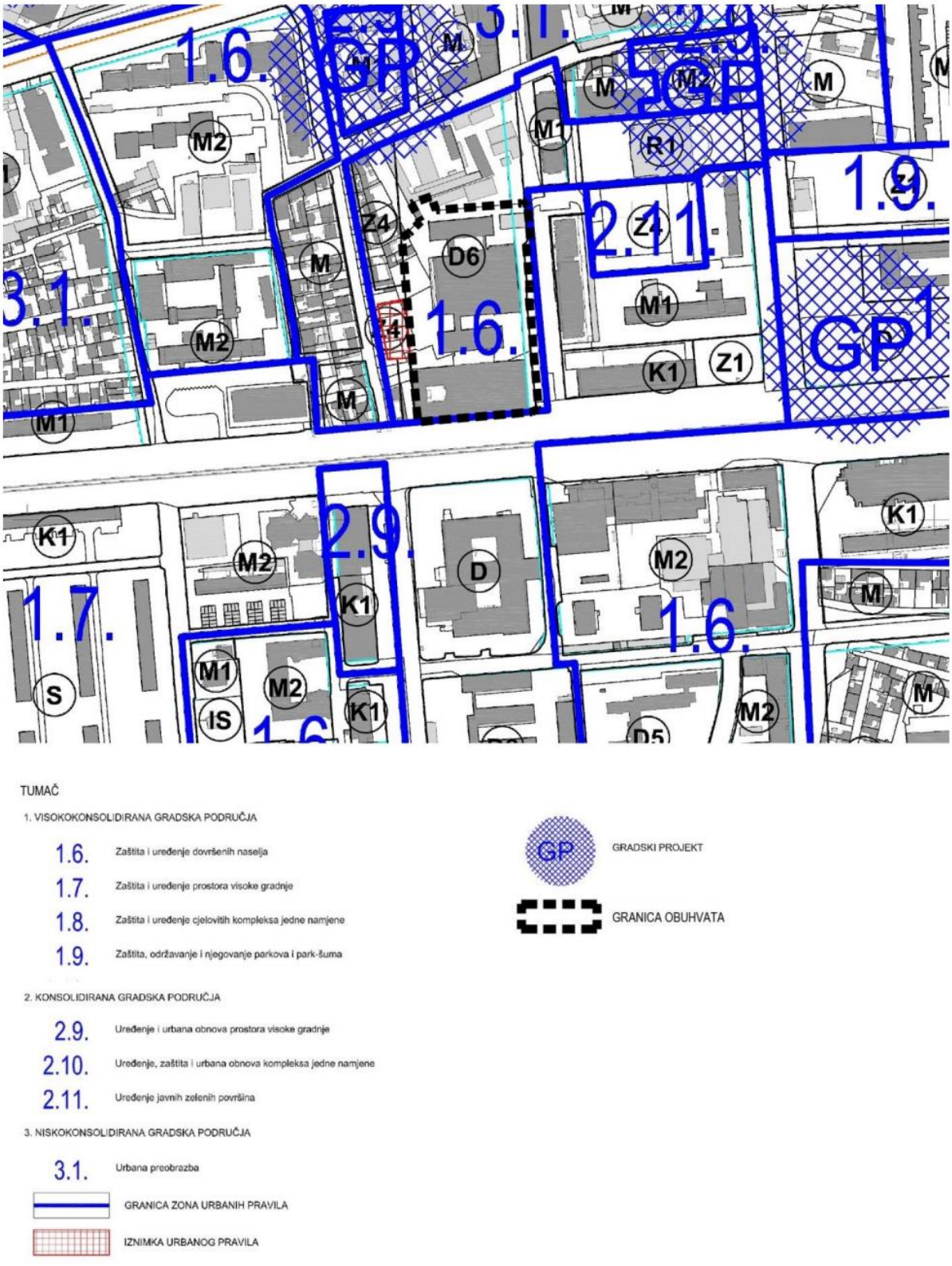

Figure 14. Excerpt from the General Urban Plan of the City of Zagreb, 4.a. Conditions for the use, arrangement, and protection of space –Urban rules

Article 93 stipulates the following:

The protection of a civil building implies complete conservation protection of all preserved original features in the exterior and interior of the building, scales, design, construction and structural elements, especially the façade, roof, staircase and the basic structural system, as well as the preserved valuable original elements of design and equipment in the interior and the original purpose.
Also, the protection includes the associated plots or property with which it forms an original quality unit.

Safeguards:

- *preservation and rehabilitation of the civil building in all its parts, architectural and typological characteristics and original purpose; together with the associated plot or property with which it forms a whole, all for the purpose of preservation and quality monumental presentation;*
- *the necessity of systematic monitoring and control of the condition of civil construction;*
- *all interventions should enable the preservation, rehabilitation and restoration of the original architectural and typological characteristics of the civil building and the associated plot or property, as a rule, while preserving the original purpose, and any new purpose must be adapted to the preserved building structure;*
- *interventions that may endanger the monumental character are not allowed, whether it is reconstruction, extension, transformation, re-parceling, or conversion into contents that are not appropriate to the character of the building, i.e. the character of the wider environment;*
- *it is not allowed to install and replace building elements, materials and equipment (PVC or metal joinery, bituminous shingles covering, etc.) that are not appropriate to the historical and monumental character of the building;*
- *all park architecture, i.e. park areas, avenues, tree groups, skyscrapers, gardens and other forms of horticultural design, should be preserved in their entirety, and only those interventions that do not disturb or change their aesthetic and cultural-historical values are allowed;*
- *park architecture cannot not be reduced or repurposed for other purposes;*
- *it is not allowed to remove the building for the purpose of building replacements, except exceptionally under the conditions prescribed by Article 64 of the Act. of the Law on the Protection and Preservation of Cultural Property;*
- *for all interventions on cultural property, it is necessary to obtain special conditions and prior approval of the competent authority for the protection of cultural property."*

5 STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

The Sub-Project Stakeholder Engagement Plan (SP-SEP) is presented in the Annex 1. It contains activities planned for stakeholder engagement in the pre-construction phase and recommendations for stakeholder engagement in further Sub-Project phases together with the stakeholder groups.

In the pre-construction phase, it is important to collect inputs and feedback to improve development of the design documentation. Therefore, stakeholder engagement activities including public presentation and information disclosure will be conducted as follows.

5.1 Stakeholder engagement

Identified stakeholders in the pre-construction phase are: Beneficiary (FEEC employees), students, local community and general public, as presented in Annex 1 Sub-Project Stakeholder Engagement Stakeholder Engagement Plan (SP-SEP). Before signing the contract for design services, public consultation will be held, and during the development of design documentation, workshops with beneficiary and designers, as well as and interview with representative of students will be conducted. Also, the GRM will be publicly available as in detailed presented in the chapter 8 GRIEVANCE REDRESS MECHANISM.

If there are vulnerable groups involved, the engagement approaches will be tailored to their specific needs. For instance, for foreign citizens, national minorities and stateless persons materials will be adapted and translated into their languages, using simple and clear language. For elderly individuals, information will be distributed physically (e.g., via leaflets), as they may not regularly use the internet. For children, specifically those under 15 years of age, information will be conveyed through their parents. For people with disabilities, accessible formats will be utilized, and cooperation with dedicated organizations, associations, or caretakers will ensure effective communication. Additionally, during public consultations, the Environmental and Social Management Plan (ESMP) will also be disclosed in English.

5.1.1 Public presentations

The public presentation of the Sub-Project and ESMP will be held before the finalization of the Detail Design.

5.1.2 Information disclosure

In pre-construction phase, following documentation, information, news and notices will be publicly disclosed on the Project's website (https://www.oporavak-i-pripravnost.hr/o-projektu/7):

- this ESMP;
- Stakeholder Engagement Report (SER) for the pre-construction phase;
- notification on the beginning of public consultations, including information on the public consultation process and their duration;
- invitation to the public presentation of the Sub-Project;
- information about the Project and Sub-Project;
- information on GRM

5.2 Results of stakeholder engagement

Results of stakeholder engagement will be presented in the SER for the pre-construction phase, which will be developed after implementation of all stakeholder engagement activities planned for the pre-construction phase.

6 POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

Although there are no direct potential environmental and social adverse impacts during design phase, if design documentation is not prepared in accordance with the environmental and social protection standards and respond to issues raised by stakeholders, implementation of the Sub-Project may cause degradation of certain components of the environmental and environment human health and safety (e.g. life and fire-safety), and adversely impact students, teachers, other users, and the surrounding community.
Main and Detail Design must be in line with WB Environmental and Social Standards, WB EHSG, GIIP, and national legislative requirements described in section *1.4. Policy framework.*

Activities during the construction phase within this Sub-Project carry moderate risks typical for all construction works:

- dust and noise emissions;
- traffic disruption;
- generation of large amounts of construction waste;
- unsafe working conditions (e.g. exposure of workers to hazardous materials such as materials containing asbestos);
- poor occupational health and safety practices;
- community health and safety;
- potential impact of labor influx;
- potential impact on protected cultural heritage;
- disruptions in utility services due to planned interventions (water, gas, electricity);
- OHS risks;
- changes related to the relocation of existing facilities and removal of existing parking lot during construction;
- risks from demolition activities and demarcation between the construction site and public areas and private land.

The potential risks and impacts are (i) predictable, (ii) medium in magnitude; (iii) mostly site-specific, and (iv) low and medium probability of serious adverse effects to human health and/or the environment. Main receptors are onsite workers, students, professors and other FEEC staff, residents in nearby neighborhood. Considering work duration, there is an increased risk of negative impact of dust and noise emissions on the surrounding recipients (students, professors, other employees, and community members). Despite the above, the Sub-Project's risks and impacts can be mitigated in a predictable manner.
Due to the project characteristics and location, most of the potential risks and impacts are expected during construction phase (moderate), and only minor potential risks and impacts during the use phase. Potential environmental and social risks during use phase are mainly related to:

- waste management;
- increased indoor radon concentration.

Following the requirements which arise from the ESMF (which adheres to the WB's ESF, WB EHSG, WHO, national regulation and GIIP), this ESMP has been prepared to analyze in more detailed potential environmental and social risks and impacts of this Sub-Project, as well as to provide appropriate mitigation measures to mitigate the potential impact to the extent possible and to establish an appropriate monitoring program.

The aim of the mitigation measures in the design is to reduce the potential negative impacts of the project realization on the environmental and social components to an acceptable level already in design phase by implementing it into the Main Design.

From the impacts identification and the evaluation of their significance (described in the following subsections), it results that key mitigation measures that must be addressed during development of design documentation are:

- radon reduction measures (problem must be analyzed in the phase of the main design and elaborated in detail through the detailed design and during construction phase);
- measures to reduce noise caused by new infrastructure (heating, ventilation, air conditioning, electric installation etc.), Noise Protection Study must be prepared and results incorporated into design documentation;
- fire safety measures compliant with Croatian laws and internationally recognized standards (in the absence of Croatian regulations for a specific area), all compliant to European regulation and standards;
- waste management measures: design spaces to facilitate future waste flows to reduce the negative impact of waste on the environment and human health;
- measures to provide adequate level of seismic resistance by application of Eurocode 8: Design of structures for earthquake resistance;
- the Sub-Project has great potential of added values regarding improving microclimatic condition and mitigate heat island effect, adaptation to future increase in temperature due to climate change, biodiversity, energy efficiency, etc. Therefore, enhancement measures are proposed for envisaging and developing Urban Nature Based Solutions (NBS) principles in Main and Detail Design: measures to increase climate changes resistance and combat climate change, including but not limited to ensuring optimal insulation, energy efficiency in heating and cooling, arranging equipment and technical support to use natural conditions (e.g. placing servers, heaters, etc. in the basement), arranging greenery and infrastructure to prevent heating of surfaces, applying light colors to facades to prevent unnecessary heating, choosing trees and planting bushes (important for small birds) avoiding those causing allergic reactions, select lighting that minimizes light pollution, etc.
- project documentation will be developed in accordance with the requirements and guidelines of the selected green building certification system in order to achieve greater sustainability of the project and to achieve the desired certification for the building in question.

Designer is obliged to implement them, and PIU is obliged to monitor their implementation according to Monitoring plan. The cost of mitigation measures is included in the project cost (designer cost).

Measures and/or procedures for construction phase are meant as a recommendation to be considered by the Contractor (including sub-contractor, good supplier, service provider or others engaged or employed by the Contractor) during the construction phases of the proposed Sub-Project, City of Zagreb, and FEEC. They include the key mitigation measures related to the indoor air quality, fire safety measures, as well as general measures related to site organization and OHS, community safety, measures to prevent the risk of pollution of surface water/ground water/soil due to spill leakage, the risk of cutting of trees, as well as the risks related to generation of construction and other waste.

Measures and/or procedures during use phase are meant as recommendations to be considered by the FEEC during the use phase of the proposed Sub-Project. The aim of these mitigation measures is to prevent and reduce the potential negative impacts during use of the project on the environmental and social components to an acceptable level. The measures include, but are not limited to, waste management measures, occupational health and safety and community protection measures, noise reduction measures and measures for storage and use of hazardous substances.

In the following sub-chapters, the impacts of the Sub-Project during construction and use phases are described according to individual environment components and social issues. To mitigate these impacts, mandatory mitigation measures for design phase are prescribed and mitigation measures for construction and use phase are recommended.

6.1 Ambient air quality

POTENTIAL IMPACT

CONSTRUCTION PHASE

Dust emissions and gaseous emissions can adversely affect air quality and cause environmental nuisance to the Sub-Project and surrounding areas.

Fugitive dust and PM will be generated during the construction of the proposed Sub-Project. This will lead to a localized reduction of air quality, which is considered to potentially affect workers on-site, students, professors, other employees and members of the community. Most of the dust generated is likely to be deposited within the Sub-Project area. However, there may also be additional dust deposited offsite during material and equipment transport in case of off-road vehicle movement.

Emissions of exhaust gases are expected to be generated from vehicles, site machinery, and heavy equipment used for construction activities.

These emissions include sulphur dioxide (SO_2); the amount of SO_2 in exhaust gases is directly dependent on the sulphur content of the used fuel, nitrogen oxides (NOx); NOx emissions from equipment or activities contribute to pollution in the form of acid rain, disturbances of the ozone layer and local health problems and carbon oxide (CO); the release of carbon monoxide (CO) occurs because of incomplete combustion of fuel in engines.

Exhaust gases will lead to a localized temporary reduction of air quality which will persist as long as the construction activities are being undertaken. The reduction of air quality is considered to potentially affect workers onsite, students, professors, other employees and offsite receptors such as surrounding communities. However, the significance of impacts from construction activities is expected to be moderate and localized.

USE PHASE

No significant increase in exhaust gases and impacts on the quality of the surrounding air are expected. The access road to garage was already in use (Zelinska Street). The number of parking spaces will increase, but almost all parking spaces will be moved to the underground garage, and the existing high-quality tall greenery on the west side will be retained. No polluting substances are expected to be released into the air. The basic source of heating will be hot water (supplied by municipal district heating).

MITIGATION MEASURES

DESIGN PHASE

There will be no emissions into the air during the use of building except emission of exhaust gases from the vehicles of the building occupants entering the underground garage. The conceptual design envisages the relocation of parking spaces to the underground garage.

CONSTRUCTION PHASE

Proposed measures to mitigate emission of dust and particulates include water sprinkle, use of screens, plastic covering, speed limitation, cleaning the construction site, etc. During construction works a mechanical barrier can be put between the construction site and other faculty buildings.
Measures to mitigate gaseous emissions include use of low sulphur content fuel, maintaining and servicing construction equipment, reduce material retention time, etc.
Detailed description of proposed mitigation measures is presented in the chapter 9.2.

USE PHASE

No mitigation measures are proposed in the Use Phase since no impact is expected.

6.2 Indoor air quality

POTENTIAL IMPACT

CONSTRUCTION PHASE

Although radon can easily migrate from the soil to the surrounding outdoor space, its concentration decreases to the level it does not pose a health risk. Therefore, no impact on human health is expected due to radon emissions during the construction phase.

USE PHASE

Every building has the potential from elevated levels of radon. The risk of getting radon-induced lung cancer increases as exposure to radon increases (either because the radon level is higher or the one lives in home longer)[6]. National (and EU) reference level is 300 Bq m^{-3}. Since no soil investigation works for measurement the concentration of radon in soil have been conducted, worst case scenario with high concentration of radon in soil is assumed. The radon protection Action plan 2019-2024 is in force in the Republic of Croatia, and all public and social facilities, especially health and educational institutions, during the phase of obtaining a usage permit, must also have a positive test result - the presence of radon in the building under prescribed limits. Radon concentrations in the soil in the area of FEEC are currently unknown, and testing can only be carried out in the excavation phase.
Other potential pollutants typical for use of buildings include PAHs, VOCs (e.g., formaldehyde sources include furniture and cooking), dichloromethane (from solvents), and others.

MITIGATION MEASURES

DESIGN PHASE

Design documentation shall develop a radon reduction system (passive or active) in order to avoid or minimize the impact on human health (students, professors and other employees) during the use of planned faculty building. During development of design documentation, the Action plan must be analyzed and all mandatory preliminary works that have an effect on the positive examination of the constructed building must be defined.
In order to maintain the concentration of CO in the air in the underground garage below the permissible level, the planned mechanical ventilation must have a capacity of 300 l/min (18 m^2/h) in accordance with the NFPA 88A standard[7], which is required in special construction conditions. An indicator of CO in the garage must be planned.

CONSTRUCTION PHASE

No special mitigation measures were foreseen in the construction phase. Workers should wear protective masks whenever possible.

USE PHASE

The radon-elimination system will be fully functioning as soon as construction is finished. The building shall be tested (indoor air quality monitored) before use.

6.3 Soil

POTENTIAL IMPACT

CONSTRUCTION PHASE

Construction activities may affect soil characteristics. Impacts on soil and land-use may be mainly the result of general site clearance and grading, construction of access roads, excavations, and foundations of buildings. Excavation and movement of heavy machinery on unpaved surface soils during site preparation and foundation-laying could cause a physical breakdown of soil particles potentially

[6] US EPA, Office of Air and Radiation, 2001: Building Radon Out, A Step-by-Step Guide On How To Build Radon-Resistant Homes
[7] NFPA 88A Standard for Parking Structures

causing destabilization of the soil structure. However, the impacts from the construction activities are expected to be negligible, restricted to localized areas throughout the construction phase. Since the site is already built, the impact on soil from these activities is considered to be low. Waste soil will be re-used safely as much as possible; the rest of the mineral waste will be deposited on a designated location with an approval form the competent authorities.

USE PHASE
No impact on soil is expected during usage phase, providing safety and good housekeeping (including waste) procedures are adhered to.

MITIGATION MEASURES

DESIGN PHASE
Protection of the construction pit is envisaged. No other mitigation measures were foreseen in the project documentation since no impacts on soil are expected.

CONSTRUCTION PHASE
Proposed measures to mitigate the risk of soil pollution due to spills or spill leakage include proper management of hazardous and non-hazardous liquid waste, proper use of oils and fuels on construction site, prevention of spillage coming from tanks, containers construction equipment and vehicles, adequate response measures in case of an accident etc.
Detailed description of mitigation measures is presented in the chapter 9.2.

USE PHASE
There will be no fueling or waste dumping at the site. No specific soil protection mitigation measures were foreseen for the Use Phase.

6.4 Water Quality

POTENTIAL IMPACT

CONSTRUCTION PHASE
Impacts on groundwater and surface water quality during the construction phase may be the result of incidental spills at onsite maintenance locations, which could result in introducing organic matter, hydrocarbons (oils), coliforms or heavy metals to the groundwater aquifer.
Organic or hydrocarbon contamination could increase the biochemical oxygen demand (BOD) load on the groundwater. The impact is expected to be of localized nature (limited to the project area). Since the Sub-Project is located outside the groundwater protection zones and sanitary protection zones, no decrease in the quality of drinking water for local communities is expected. Potential impact on groundwater is considered to be minor.
There are no watercourses near the location, so negative impacts on surface water are not expected. The risk of incidental spills can be categorized as low if all mitigation measures are in place.

USE PHASE
No impact on water bodies (surface of groundwater) is expected during use phase as all waste waters from the building will be collected, treated locally if necessary, and when neutralized and safe, processed through the public sewerage system. Public sewerage system in Zagreb has a 3- stage wastewater treatment plant. There is a risk in the case of inadequate waste management and illegal dumping which will be prevented/monitored through system of waste manifests and records.

MITIGATION MEASURES

DESIGN PHASE
When designing the water supply system and the drainage system, it is necessary to respect the obtained special conditions of the competent authorities (Vodoopskrba i odvodnja Ltd.).

CONSTRUCTION PHASE
Proposed measures to mitigate the risk of pollution of surface water and groundwater due to spill leakage include proper management of liquid waste, proper use of oils and fuels on construction site, prevention of spillage coming from tanks, containers construction equipment and vehicles, adequate response measures in case of an accident, isolation of wash down areas of concrete and other equipment from watercourses, ban on groundwater extraction on unregulated way, forbid discharge of contaminated waters into the ground od streams or rivers etc.
Detailed description of mitigation measures is presented in the chapter 9.2.

USE PHASE
It is necessary to ensure that the composition of sanitary, industrial and precipitation wastewater before discharge into the public drainage system of the Zagreb agglomeration is in accordance with the limit values of wastewater emissions prescribed by the Ordinance on wastewater emission limit values (OG 26/20).

6.5 Vulnerability of Sub-Project to the floods

POTENTIAL IMPACT

Since the Sub-Project is located outside the flooding areas the Sub-Project is not vulnerable to the floods.

MITIGATION MEASURES

No mitigation measures were foreseen since the Sub-Project is not vulnerable to the floods. Localized flooding must be prevented thought adequately designed and sized collection of surface runoff.

6.6 Biodiversity, Nature Protection Areas and Natura 2000

POTENTIAL IMPACT

CONSTRUCTION PHASE
The Sub-Project site is within area that is already built. Since the FEEC is located outside the nature protected areas and Natura 2000 sites (the nearest protected area is located at a distance of about 340 m and the nearest area of the ecological network is located at a distance of about 5.500 m from the location in question) and the location is not considered significant from a biodiversity perspective, no impact on biodiversity, nature protection areas nor Natura 2000 sites are expected.

USE PHASE
Panels of solar power plants can cause the so-called "lake effect" which implies the appearance of a water surface due to the reflection of light from the panels.

MITIGATION MEASURES

DESIGN PHASE
Use of native or drought-resistant plants to reduce irrigation needs. Select bushes and trees that are bees and bird friendly. Retain existing trees that do not interfere with the execution of the planned intervention.

CONSTRUCTION PHASE
Proposed measures to mitigate the risk of endangering flora and fauna include movement restriction of heavy machinery to the access road corridor, avoiding cutting down trees and other natural vegetation where possible etc. In order to reduce „lake effect“, Anti Reflective Coatings on the panels must be used.

Detailed description of mitigation measures is presented in the chapter 9.2.

USE PHASE
Regularly maintain landscape vegetation and green roofs.

6.7 Noise exposure

POTENTIAL IMPACT

CONSTRUCTION PHASE

Noise is an unavoidable environmental and social impact during construction works. It occurs during the operation of machines and equipment at the site (transport, loading/unloading machinery etc.). This impact will be limited to the location of the site and the narrower area around the site and will cease after completion of foreseen works.

Permissible noise level for the construction site is determined by the provisions of the *Ordinance on the maximum allowed noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21)* and amounts 65dB. According to the mentioned ordinance, it is allowed to exceed that level for an additional 5 dB in the period from 8 to 18 hours. The equivalent noise level of the construction site in the open or closed part of the building during the nighttime at the most exposed place of sound immission must not exceed 50 dB for the public and social zone. According to aforementioned Ordinance exceeding the permissible noise levels is allowed if necessary for the technological process of the construction site for up to three (3) nights within a consecutive period of thirty (30) days. A minimum of two full night periods shall be provided between periods when exceeding allowable noise levels is anticipated without exceeding allowable noise levels during the night period.

It is expected that increased noise levels will be local – the students, professors and employees at the FEEC and residents in the nearby areas (Plitvička and Unska Streets) will be directly affected as the nearest buildings. Due to the duration of construction works the impact is considered moderate.

USE PHASE

Expected impact during use of the new building include increase of noise level due to traffic (increased number of vehicles as new underground garage is planned) and building infrastructure (heating, ventilation, air conditioning, electric installation etc.). Given that no significant increase in traffic or an increase in noise levels are expected, the impact is considered low.

MITIGATION MEASURES

DESIGN PHASE

It is necessary to prepare a Noise Protection Study as part of the project documentation (Main Design) and incorporate its results in the design.

CONSTRUCTION PHASE

Mechanisms available to monitor potential impacts and introduce mitigation measures in a timely manner include adequately informing the Sub-Project-affected parties about the Sub-Project (construction schedules, progress, and safety precautions) and GRM.
It is necessary to choose and apply adequate noise protection measures: adjustment of operating time; use of temporary movable noise barriers; use of alternative working machines with lower noise emission levels.

USE PHASE

Exceeding the permissible noise values is not expected, therefore no measures are proposed.

6.8 Vibration

POTENTIAL IMPACT

CONSTRUCTION PHASE

Since the project does not foresee activities that could affect the stability of the surrounding area, there is no risk of endangering the stability of the surrounding buildings.
Vibration from operation of the equipment/vehicles can affect workers at the site (especially workers in operating machines and equipment). It is expected that potential impact from vibration during construction will be local – students, professors, other employees and residents in nearby area will be affected.
Given all above the impact is considered low.

MITIGATION MEASURES

CONSTRUCTION PHASE

During the execution of the works, it is recommended to establish GRM to submit complaints.

6.9 Traffic

POTENTIAL IMPACT

CONSTRUCTION PHASE
Delivery of construction materials and equipment to the construction site will be by road transport. The transportation of material and equipment to the construction sites will cause a temporary increase in traffic along the roads, also outside the project area. The overlap of general traffic and construction-related traffic routes poses a significant risk to traffic safety.

USE PHASE
Parking will be moved from the plot to the underground garage which improves the existing system of pedestrian areas and squares. It is planned to increase the number of parking spaces from the current 126 to 292 parking spaces. There is a possibility of increased traffic in Zelinska Street at the entrance to the garage.

MITIGATION MEASURES

DESIGN PHASE
A safe corridor for moving of pedestrians must be ensured in the garage. Spaces for bicycles spaces planned directly next to the square must be covered.

CONSTRUCTION PHASE
Proposed mitigation measures include adequate organization of temporary traffic arrangements to improve signage, visibility and overall safety of roads (enabling the safe and unhindered movement of students), timely information dissemination through media and placing of the signs and warnings at the scene of construction works. Adequate organization of temporary traffic arrangements must be performed according to Ordinance on Temporary Traffic Regulation and Signing and Safety of Road Works (OG 92/19).

USE PHASE
No mitigation measures are foreseen in the use phase.

6.10 Cultural Heritage

POTENTIAL IMPACT

Sub-Project building A together with buildings B and C and the plot presents a protected cultural property marked Z-5675 and based on Article 93 of GUP (General Urbanistic Plan) is classified under group 3.b Protected civil buildings in the area covered by the plan.

MITIGATION MEASURES

Conservation guidelines for the reconstruction, conservation and renovation of building A were given in the Conservation Study (Table 13).
Special conditions for reconstruction were issued by the City Institute for the Conservation of Cultural and Natural Heritage of City of Zagreb (Table 6.) that will be adhered during the development of Main and Detailed Design. Certificates from relevant public law bodies will be issued during the building permitting process. Following all the above, it is considered that the Sub-Project will not have a negative impact on cultural heritage.

6.11 Land acquisition

POTENTIAL IMPACT

No land acquisition is expected for the Reconstruction and upgrading of the building of the FEEC in Zagreb Sub-Project.

MITIGATION MEASURES

No mitigation measures were foreseen since no land acquisition is expected for the FEEC in Zagreb Sub-Project.

6.12 Labor and Working Conditions and Occupational Health and Safety

POTENTIAL IMPACT

CONSTRUCTION PHASE

Potential risks in the construction phase involve general occupational health and safety hazards such as:

- working at height;
- electrocutions and electrical works;
- traffic accidents;
- lifting of heavy structures;
- accidents with exposed rebars;
- exposure to construction airborne agents (dust, etc.);
- ergonomic hazards during construction;
- vibration of heavy construction equipment;
- use of rotating and moving equipment, using heavy machinery;
- noise exposure;
- lack of workers' awareness on occupational health and safety requirements such as the use of personal protective equipment (PPE) and safe workplace practices;
- exposure to hazardous substances (e.g., paints, varnishes, asbestos);
- working with heavy and dangerous machinery;
- working around pits, ditches, stacked materials, traffic, loading and unloading, etc.;
- seismic active area;
- risk of disease spreading.

Site personnel may experience heat stress (heat rush, cramps, heat exhaustion, heat stroke, etc.) due to a combination of elevated ambient temperatures and the concurrent use of PPE. This will largely depend on the type of work and the time of year. In addition, overexposure to UV radiation in sunlight can result in sunburn to exposed skin. Similarly, storms, strong wind, and other extreme weather conditions pose a risk. There is a risk of increased number of mosquitoes during the summer, but malaria or significant outbreak of other mosquito-borne diseases has not been recorded.

Also, there is a potential of labor influx, and contractor may engage migrant workers (local from outside the area or foreigners) subject to meeting national requirements for work permit or a work registration certificate and other requirements prescribed with the Act on Foreigners (OG 133/20, 114/22, 151/22). Given the growing presence of imported construction labor in the RoC, we can expect foreign workers from neighboring countries as well as workers from further afield. During construction, due to potential labor influx, there is a risk of a potential sexual exploitation and abuse and sexual harassment. Although the risk exists, it is considered small due to the local context and country norms.

Potential risks regarding labor influx are also related to:

- language barriers;
- different attitudes of foreign workers toward safety and risk perception, absence or low skills for certain types of works that can lead to accidents (H&S risks);
- exploitation and unfair treatment – contractual arrangements (unfair wages, excessive working hours, working in unsafe conditions, inadequate accommodation);
- integration in community: risks and impact on community related to foreign workers due to difficulty of their integration into community (e.g., the feelings of anxiety and fear for unsafe environment among the local residents when there are foreign workers living in the same building or in vicinity);
- potential cases of discrimination of foreign workers at the working place and within the community.

USE PHASE

Labor and working conditions and occupational health and safety include exposure to hazardous materials/waste and life and fire safety.

MITIGATION MEASURES

DESIGN PHASE

Occupational Health and Safety in the design phase is regulated by the Occupational Health and Safety Act (OG 71/14, 118/14, 154/14, 94/18, 96/18). The Act regulates the obligation to apply the appropriate OHS rules in the Main Design, the preparation of the Safety at Work Study that includes and elaborates application of OHS rules when using buildings intended for work, the appointment of an OHS coordinator (one or more) during the design development (OHS coordinator 1) and other matters related to the occupational health and safety in the design phase. Development of project documentation must also comply with relevant legislation related to labor, working conditions and occupational health and safety such as Law on standardization (OG 80/13), Act on Fire Protection (OG 92/10, 114/22), Ordinance on fire protection measures during construction (OG 141/11), in Ordinance on the highest permissible noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21), Ordinance on ensuring the accessibility of buildings for people with disabilities and reduced mobility (OG 78/13), Ordinance on conditions for fire-fighting approaches (OG 35/94, 55/94, 142/03), Ordinance on fire extinguishers (OG 101/11, 74/1) as well as with other applicable laws and regulations. Related to the fire safety measures, all new buildings accessible to the public shall be designed, constructed, and operated in full compliance with local building codes, local fire department requirements and national (EU compliant) regulations, local legal/insurance requirements, and in accordance with an internationally accepted life and fire safety (L&FS) standard (in the absence of Croatian regulations for a specific area).

Project documentation must be developed in accordance with special conditions issued by the Ministry of the Interior, Directorate of Civil Protection, Regional Office of Civil Protection Zagreb, Inspection Affairs Service.
Project sponsors' architects and professional consulting engineers should demonstrate that the building meets these life and fire safety objectives, those resulting from the national regulation as well as WB EHSG and GIIP, stricter ones prevailing. Life and fire safety systems and equipment should be designed and installed using appropriate prescriptive standards and/or performance-based design, and sound engineering practices.
Design documentation shall develop a radon reduction system as described in the Chapter 6.2.

CONSTRUCTION PHASE
In the construction phase, it is necessary to comply with overall relevant national legislation regulating labor, labor relations, working conditions, occupational health and safety and other related aspects (Occupational Health and Safety Act (OG 71/14, 118/14, 154/14, 94/18, 96/18), Labor Act (OG 93/14, 127/17, 98/19, 151/22, 46/23, 64/23), Anti-discrimination Act (OG 85/08, 112/12), Foreigners Act (OG 133/20, 114/22, 151/22), Gender Equality Act (OG 82/08, 69/17), Collective Agreement for Construction (29/24), Ordinance on fire protection measures during construction (OG 141/11) and other relevant legislation).
Also, it is recommended to implement additional measures, such as the establishment of a grievance mechanism for site workers, development of an occupational safety plan that, in addition to prescribed by the legislation such as common occupational safety measures, measures for particularly dangerous work, etc., also includes measures for the prevention of discrimination, sexual harassment, exploitation and abuse, measures and procedures for emergency situations and conducting training for all workers on measures and code of conduct. It is recommended to help foreign workers to integrate in local context. It is necessary to comply with other measures prescribed by the relevant legislation.
Detailed description of mitigation measures is presented in the Mitigation plan and subchapter 9.2.

USE PHASE
Working conditions and management of worker relationships (terms and conditions of employment, non-discrimination and equal opportunity, prohibition of child labor, etc.) must be ensured according to Labor Act (OG 93/14, 127/17, 98/19, 151/22, 46/23, 64/23). Detailed description of mitigation measures is presented in the Mitigation plan and subchapter 9.3.

6.13 Community Health and Safety

POTENTIAL IMPACT

CONSTRUCTION PHASE
Regarding community health and safety, several factors from the previous subheadings were identified that could affect community health and safety. Based on the analysis of each of these factors in the previous separate chapters, it is concluded that the construction work will have little to medium impact on the health and safety of the community.
Civil works may cause disruptions to nearby communities and inside the FEEC complex such as: increased levels of dust, emissions to air, noise and vibration (impacting mental and physical health of students, employees and local community), or temporary disruptions to traffic (safety of students, professors, other employees and local community), public safety risks during demolition and construction, risk of road accidents for pedestrians, disruptions in utility services due to accidents or planned interventions (water, gas, electricity) and poor occupational health and safety practices.
The emissions from construction activities (emissions from excavation equipment, other machinery and construction traffic, etc.) can deteriorate the ambient air quality and affect health of students, professors, other employees and community members.
One of the key potential risks associated with the construction works is the increased risk of road accidents due to increased traffic of construction vehicles and congestion as a result of diversions.

Furthermore, the project area is prone to earthquakes which poses the risk of accidents, for workers and community, if earthquake occurs (e.g., demolition of a crane or other machinery). The risk of exposure of the community to hazardous materials is limited. Management of hazardous materials, including hazardous waste, is related to construction activities and is short-term (finite duration of the construction activities).
Given the growing presence of imported construction labor in the RoC, we can expect foreign workers from neighboring countries as well as workers from further afield. During construction, due to potential labor influx, there is a risk of a potential sexual exploitation and abuse and sexual harassment within the community and/or creation of concern among local residents. Although the risk exists, it is considered small.

USE PHASE
Regarding the health of the local community, no significant impacts on the quality of the surrounding air are expected (no polluting substances are expected to be released into the air. No impacts on the soil are expected nor on water quality, biological diversity, protected nature areas and Natura 2000 areas. Regarding the safety of the local community, no significant impacts are expected. The Sub-Project is not located in a flooding area.
In use phase, positive impact on the community can be expected since reconstructed building will be complemented by functional upgrades and climate-resilient designs, including improved insulation to cope with extreme temperatures and energy efficiency.
Reconstruction of the building will be in accordance with EC8 (Eurocode 8) requirements and, for rehabilitation works, with safety provisions under the Act on Reconstruction of Earthquake Damaged Buildings in the City of Zagreb, Krapina-Zagorje County, Zagreb County, Sisak-Moslavina County and Karlovac County. Combined, these standards will enhance the current functional safety performance of building.

MITGATION MEASURES

DESIGN PHASE
Application of Eurocode 8: Design of structures for earthquake resistance. Mitigation measures for public safety risks regarding demolition and construction must be integrated into design documentation as part of design solutions and/or construction methods.
Fire safety measures during development of project documentation as described in the chapter 6.12.

CONSTRUCTION PHASE
It is recommended to establish a publicly available grievance mechanism, so that possible impacts could be minimized and/or prevented in a timely manner.
During construction, although the risk of SEA/SH is low, it is recommended to establish measures for preventing any potential sexual exploitation and abuse and sexual harassment within the community and/or creation of concern among local residents, such as to establish publicly available grievance mechanism which could also allow uptake of SEA&SH grievances, to prepare code of conduct and training on measures and code of conduct for all workers.
In case of power shortages or other disruptions in utility services (water, gas etc.) the local community should be informed in a timely manner.
All the other impacts could be managed by proper organization of work and construction site, fencing the construction site, applying defined protocols and standards as well as by proper temporary traffic regulation. Temporary traffic regulation will be established according to the Ordinance on temporary traffic regulation and marking and insurance of road works (OG 92/19).
Other recommendations/measures for potential risks such as increased levels of noise, dust, or temporary disruptions to traffic, risk of road accidents for pedestrians and poor occupational health and safety practices, generation of waste, possible sporadic decrease in air quality and issues related to labor influx, measures are covered in other sub-headings and/or in chapter 9.2.

USE PHASE
The fire alarm and fire systems must be regularly maintained and certified. Risk assessment and Operational plan of legal entities that perform activities using dangerous substances will be developed according to Law on the civil protection system (NN 82/15, 118/18, 31/20, 20/21, 114/22) if needed.

6.14 Waste Management

POTENTIAL IMPACT

CONSTRUCTION PHASE

Main waste types from the following waste groups are expected to occur:

- group 08 - wastes from the manufacture, formulation, supply and use of coatings (paints, varnishes and vitreous enamels), adhesives, sealants and printing inks;
- group 17 - construction and demolition wastes (including excavated soil from contaminated sites);
- group 13 - oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05, 12 and 19 of waste catalogue);
- group 15 - waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified;
- group 20 - municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions (paper, plastics, glass, food waste etc.).

During the construction works, asbestos waste can occur (during demolition).

USE PHASE
The planned Sub-Project is expected to generate several groups of waste, including hazardous (marked with *) during use phase:

- group 13 - oil wastes and wastes of liquid fuels (except edible oils, and those in chapters 05, 12 and 19);
- group 15 - waste packaging; absorbents, wiping cloths, filter materials and protective clothing not otherwise specified;
- group 16 - waste not specified elsewhere (waste from electrical and electronic equipment);
- group 20 - municipal wastes (household waste and similar commercial, industrial and institutional wastes) including separately collected fractions (paper, plastics, glass, food waste, discarded electrical and electronic equipment etc.).

MITGATION MEASURES

DESIGN PHASE
A separate area must be designed for separate collection of municipal and other type of waste. On each floor there must be adequate places for sorting, collecting and recycling waste and any of other waste management measures prescribed by Waste Management Act (OG 84/21, 142/23) and Ordinance on waste management (OG 106/22) must be implemented.

CONSTRUCTION PHASE

Each type of generated waste on the location must be temporarily stored in separate waste containers which have to be labelled with waste type name and waste code. All waste, including construction waste, asbestos waste, soil, must be disposed exclusively at the licensed construction waste landfills and processing plants. Whenever feasible the contractor should reuse and recycle appropriate and viable materials. Burning or illegal dumping of waste is strictly prohibited. Records (waste manifests, landfill/processing receipts, etc.) must be kept and checked.

Work and handling with asbestos must be performed by a licensed Contractor with appropriate qualifications and experiences and with not-defaulted proven past performance references, adequate

tools and protection for the safe removal of asbestos cover. The same will apply for weakly bound asbestos.

USE PHASE

FEEC must ensure separate collection of waste at the place of origin, keep records, store waste in appropriate containers and temporarily store waste in a specially separated area until processing or until handing over to an authorized person.

7 INSTITUTIONAL ARRANGEMENT

To ensure the effective implementation of this ESMP, there is need for clear roles, responsibility and reporting procedure by various institutions. As part of the environmental and social management, MoPPCSA must ensure that this ESMP is part and parcel of the contract documents for the design on the Reconstruction and upgrading of the building of the FEEC in Zagreb Sub-Project.

The Ministry of Physical Planning, Construction and State Assets, through the Project Implementation Unit (PIU) will have the responsibility to ensure that the ESMP and the monitoring plan for design phase are implemented. They must ensure that designers, are familiar with the contents of the ESMP and their roles, that they understand and adopt ESMP, that resources are available and key staff for implementing the activities are adequately trained.

Monitoring of the ESF compliance, proposed mitigation environmental and social measures for environmental protection and OH&S during design phase will be performed by the PIU team according to the Monitoring plan. That includes overall supervision of design documentation during all phases of design and the integration of ES measures prescribed in this ESMP into design, and also consultations with stakeholders.

Management and monitoring of implementation of ES measures and responsibilities during the construction phase will depend on the type of financing for the construction phase. In the case of World Bank Loan, the construction phase will very likely be managed by the formed Project Implementation Unit. If the construction is to be financed from the state budget, the supervising engineer and the state inspectorate will be in charge of supervising the implementation of ES measures prescribed by the law of the Republic of Croatia.

8 GRIEVANCE REDRESS MECHANISM

The main objective of the Grievance Redress Mechanism (GRM) is to allow the Sub-Project's stakeholders and general public to submit complaints, feedback, queries, suggestions, or even compliments related to the overall project management and implementation. The GRM should address issues and complaints reported by the stakeholders in an efficient, timely, and cost-effective manner. It should ensure transparent and credible processes for fair, effective and lasting outcomes. It should build trust and cooperation as an integral component of broader community inclusion that facilitates corrective actions.

8.1 Pre-construction phase

Considering that the designing is financed by the WB Loan 9127HR, a GRM is established in the design phase according to the WB ESS10 *Stakeholder Engagement and Information Disclosur*e.
GRM in the pre-construction phase will enable different ways in which users can submit their grievances:

- by using dedicated e-mail address (info.fer@mpgi.hr);
- by phone (+385 1 644 8819);
- by postal delivery (Savska 41, 10 000 Zagreb).

Information on GRM is also available on the Project's website.
The GRM will also allow anonymous complaints to be raised and addressed, in accordance with Croatian law.

8.2 Further Sub-Project phases

During the implementation of further Sub-Project phases (i.e., construction and post-construction) it is recommended to establish a publicly available grievance mechanism. Also, it is recommended for Contractor to establish a separate grievance mechanism for site workers.
The grievance mechanism(s) should be accessible to use and communicated to local community, public and/or site workers. Also, the grievance mechanism(s) should ensure anonymity in raising and addressing grievances, transparency and credibility as well, and that the grievances are addressed in an efficient, timely, and cost-effective manner.

9 ENVIRONMENTAL AND SOCIAL MITIGATION AND ENHANCEMENT PLAN

This section considers mitigation of the potential impacts resulting from the realization of the Reconstruction and upgrading of the building of the FEEC in Zagreb Sub-Project that were identified and evaluated in Chapter 6.

The main objective of the mitigation measures is to reduce the significance of the potential impacts to an acceptable level for all aspects of the Sub-Project in relation to the receiving environment.

Mitigation measures for preconstruction (design) phase defined with this ESMP are mandatory measures for designer to follow during development of design documentation. Measures for the construction and use phase are given as recommendations for future contractors and users.

Impacts and mitigation measures are grouped according to the various receptors (air, soil, water, and human environment).

9.1 Environmental and social mitigation plan – design phase

Environmental and social mitigation plan for design phase is presented in Table 8.

Table 8. Environmental and social mitigation plan for design phase

Environmental and Social aspect	Defined mitigation measure (Design Phase)	Responsibility	
		Implementation	Supervision
Indoor air quality	Building will be designed and constructed/reconstructed to ensure safe radon concentrations in line with Radiological and Nuclear Safety Act (OG 141/13, 39/15, 130/17, 118/18, 21/22, 114/22) and its by-laws (less than 300 Bqm^{-3}) and the radon protection Action plan 2019-2024. A radon reduction system (Passive Radon Reduction Systems, Sub-Slab Depressurization (SSD) Systems, Active Soil Depressurization (ASD) Systems or other) must be designed in order to avoid or minimize the impact on human health (students, professors and other employees) during the use of planned faculty building. Incorporate measures to be implemented during construction into the project documentation to reduce radon emissions: - examination of the concentration of radon in the soil at the construction site during the demolition and excavation phase, - testing of building materials: concrete, bricks, ceramic tiles (by competent authority), before the installation of individual materials, - measurement of radon concentration upon completion of the building (a mandatory positive result is a condition for obtaining a use permit).	Designer	PIU
	Mechanical ventilation in garage must have a capacity of 300 l/min (18 m^2/h) in accordance with the NFPA 88A standard[8], which is required in special construction conditions. An indicator of CO in the garage must be planned.	Designer	PIU
	Measures to consider for LEED[9] certification: - use high-efficiency particulate air (HEPA) filtration and ventilation systems to reduce indoor pollutants, - avoid materials with high VOCs, - design with high thermal insulation, zoned heating and cooling, and operable windows to allow for natural ventilation, - use high-efficiency heating, ventilation, and air conditioning systems to reduce energy usage, - consider advanced air filtration for better indoor air quality.	Designer	PIU

[8] NFPA 88A Standard for Parking Structures
[9] All references to LEED in this table should be interpreted as any other selected equivalent sustainability rating system such as DGNB, BREEAM or other recognized standards.

Environmental and Social aspect	Defined mitigation measure (Design Phase)	Responsibility	
		Implementation	Supervision
Water quality	When designing the water supply system and the wastewater drainage system, it is necessary to respect the obtained special conditions of the competent authorities (Vodoopskrba i odvodnja Ltd.), the Water Act (OG 66/19, 84/21, 47/23) and Regulation on wastewater emission limit values (OG 26/20).	Designer	PIU
	Measures to consider for LEED certification: - Low-Flow Fixtures: Install water-efficient fixtures (like low-flow faucets, toilets, and urinals) to reduce water consumption, - Rainwater Harvesting: Collect and store rainwater for landscape irrigation or building maintenance to reduce dependence on municipal water, - Educational Gardens: Use efficient irrigation and integrate gardens as learning tools to teach students about water conservation and plant growth cycles.	Designer	PIU
Vulnerability to flood	Localized flooding must be prevented thought adequately designed and sized collection of surface runoff.	Designer	PIU
Vibration	Integrate mitigation measures for public safety during demolition and construction as a part of design solutions and/or construction methods.	Designer	PIU
Biodiversity	Use native or drought-resistant plants to reduce irrigation needs. Select bushes and trees that are bees and bird friendly. Retain existing trees that do not interfere with the execution of the planned intervention.	Designer	PIU
	Measures to consider for LEED certification: - implement green roofs and walls, green roofs provide insulation and absorb rainwater, while green walls enhance indoor air quality and contribute to a calming, natural aesthetic.	Designer	PIU
Noise	Include measures to prevent the spread of excessive noise from: buildings into the environment and from the environment into buildings, as well as into neighboring areas applying provisions of the Noise Protection Act (OG 30/09, 55/13, 153/13, 41/16, 114/18, 14/21) and Ordinance on the maximum allowed noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21). Permissible noise levels LA,eq measured in lecture halls, classrooms and similar rooms must not exceed 35 dB (A) according to Ordinance on the maximum allowed noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21).	Designer	PIU
	Prepare a Noise Protection Study as part of the project documentation (Main Design) and incorporate its results in the design.	Designer	PIU
	Measures to consider for LEED certification: - use sound-absorbing materials, design appropriate room layouts and acoustically separate spaces to minimize noise, which is critical for optimal learning environments.	Designer	PIU
Traffic	A safe corridor for moving of pedestrians must be ensured in the garage. Spaces for bicycles spaces planned directly next to the square must be covered.	Designer	PIU

Environmental and Social aspect	Defined mitigation measure (Design Phase)	Responsibility	
		Implementation	Supervision
Cultural heritage	During the development of design documentation conservation guidelines for the reconstruction, conservation and renovation of building A (Table 13) and special conditions issued by the City Institute for the Conservation of Cultural and Natural Heritage of City of Zagreb (Table 6.) must be adhered. In the case of amendments to Location permit, it is also necessary to include changes to special conditions, if any. During the building permitting process certificates from relevant public law bodies will be issued.	Designer	PIU
Occupational health and safety	Safety at Work Study must be prepared during the design development.	Designer	PIU
	An OHS coordinator (one or more) must be appointed during the design development (OHS coordinator 1).	Designer	PIU
	Development of project documentation must also comply with relevant legislation related to labor, working conditions and occupational health and safety such as Law on standardization (OG 80/13), Act on Fire Protection (OG 92/10, 114/22), Ordinance on fire protection measures during construction (OG 141/11), in Ordinance on the highest permissible noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21), Ordinance on ensuring the accessibility of buildings for people with disabilities and reduced mobility (OG 78/13), Ordinance on conditions for fire-fighting approaches (OG 35/94, 55/94, 142/03), Ordinance on fire extinguishers (OG 101/11, 74/1) as well as with other applicable laws and regulations.	Designer	PIU
Fire safety measures	Fire safety of the building must be designed in accordance with special conditions in the field of fire protection (Ministry of the Interior, Civil Protection Directorate, Regional office of civil protection Zagreb, Fire Protection Inspection).	Designer	PIU
	Building must be designed, constructed, and operated in full compliance with local building codes, local fire department requirements and national (EU compliant) regulations, local legal/insurance requirements, and in accordance with an internationally accepted life and fire safety (L&FS) standard (in the absence of Croatian regulations for a specific area).	Designer	PIU
	Life and fire safety systems and equipment should be designed and installed using appropriate prescriptive standards and/or performance-based design, and sound engineering practices.	Designer	PIU
	Design will include sufficient access to fire protection vehicles to the building.	Designer	PIU
	All construction materials and elements will be fire-resistant including ceiling panels, any facade plates, etc.	Designer	PIU
	Project sponsors' architects and professional consulting engineers should demonstrate that the building meets these life and fire safety objectives.	Designer	PIU
Community health and safety	Application of Eurocode 8: Design of structures for earthquake resistance is mandatory.	Designer	PIU

Environmental and Social aspect	Defined mitigation measure (Design Phase)	Responsibility	
		Implementation	Supervision
	Fire safety measures during development of project documentation as described in the chapter 6.12.	Designer	PIU
	Localized flooding must be prevented thought adequately designed and sized collection of surface runoff.	Designer	PIU
	Universal access design will be applied according to *Ordinance on ensuring access to construction works for disabled persons and to persons with reduced mobility* (OG 78/13).	Designer	PIU
	Indoor quality measures (radon reduction measures and measures to prevent excessive CO concentrations in garage...) as described in the chapter 9.1.	Designer	PIU
Waste management	The waste shall be sorted and collected in the designated containers (paper, glass, plastic) and all according to the valid laws and by-laws (Waste Management Act (OG 84/21), Ordinance on the Management of Special Categories of Waste in the Fund System (OG 124/23), Ordinance on Waste Management (OG 106/22), WB EHSG and GIIP.	Designer	PIU
LEED	During development of design documentation, a smart approach towards energy efficient and climate resilience design must be followed. Design documentation will be developed taking into account the LEED guidelines and meeting all LEED prerequisites required for certification. LEED feasibility assessments will be made based on each project documentation delivery (Conceptual Design, Main Design and Detailed Design), providing a detailed description of potential modalities of the project's compliance with the certification protocol requirements for obtaining a LEED® certificate. Consequently, in accordance with developed LEED feasibility assessments, separate Design LEED guidelines will be developed as a basis for the development of the Main design, Detailed design and for the construction phase.	Designer	PIU
	Additional measures to consider for LEED certification: - daylight: implementation of solutions that optimize natural light, such as light shelves, skylights, and high-performance glazing, - energy and atmosphere: maximizing natural light through strategic window placement and install energy-efficient LED lighting with occupancy sensors to reduce energy waste, - material and resources: choosing sustainable building materials with low environmental impact, such as recycled, low-VOC (volatile organic compounds) materials, and renewable resources, - innovation in design: design spaces that can adapt to various teaching styles, from open collaborative spaces to quiet study areas.	Designer	PIU

9.2 Recommended Environmental and social mitigation plan - Construction Phase

Recommended environmental and social mitigation measures for Construction Phase are presented in Table 9.

During the construction phase the Building Contractor will be responsible for the implementation of ES mitigation measures, and the Supervising Engineer or PIU (depending on the type of financing) will be responsible for supervising the implementation of ES mitigation measures.

Table 9. Recommended environmental and social mitigation measures for Construction Phase

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
Permits and certificates	Acquire all required permits prior to works and keep them on site (e.g., building permit).
	Notify the state inspectorate of upcoming activities and keep the copy of notification available at the construction site.
	Ensure materials quality certificates, vehicles attest, certificates for working at heights, health and safety certificates for workers (e.g., to operate heavy machinery and vehicles) are in place before works commence.
	Appoint environmental and social representative/ expert after the contract signing and prior to commencement of work.
Site organization	Ensure all occupational health and safety measures:
	Keep Construction Work Plan at the construction site (in case that two or more contractors perform construction activities).
	Clearly mark temporary material storage on the construction site.
	Do not store construction materials and waste within any type of private property.
	Keep clean the surrounding area near the project and apply good housekeeping practices at the site. Carry out works in a safe way.
	Locate stockpiles away from drainage lines, natural waterways and places susceptible to land erosion.
	Keep stockpiles below 2 m in height to prevent dissipation and risk of fall. Place materials to be lifted by forks, cranes away from overhead transmission lines.
	Engage producer of asphalt, gravel, concrete that possess all necessary concessions, working and OHS permits, and emission permits, quality certifications and labor and working conditions requirements.
	Consult utility providers during earthworks (and where applicable) to avoid damages to other infrastructure.

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	Ensure all transportation vehicles and machinery are equipped with appropriate emission control equipment, regularly maintained and attested.
	When necessary, schedule night work carefully. Noise during night work must not exceed the limit values defined in the Ordinance on the maximum noise levels allowed with regard to the type of noise source, time and place of occurrence (OG 143/21).
Occupational Health and Safety and Community Safety	
Below are some of key measures and additional recommendations for the construction phase, but, in addition to that it is necessary to comply with overall relevant national legislation regulating labor, labor relations, working conditions, occupational health and safety and other related aspects (Occupational Health and Safety Act (OG 71/14, 118/14, 154/14, 94/18, 96/18), Labor Act (OG 93/14, 127/17, 98/19, 151/22, 46/23, 64/23), Anti-discrimination Act (OG 85/08, 112/12), Foreigners Act (OG 133/20, 114/22, 151/22), Gender Equality Act (OG 82/08, 69/17), Collective Agreement for Construction (29/24), Ordinance on fire protection measures during construction (OG 141/11), Act on Foreigners (OG 133/20, 114/22, 151/22) and other relevant legislation).	
Worker's safety	Prepare Safety at Work Plan that includes measures to reduce health hazards and to ensure safety at work during the execution of works according to Ordinance on occupational safety at temporary construction sites (OG 048/2018), occupational health and safety (OHS) measures during the execution of all construction works, accommodation conditions, food and transportation of workers, sanitary facilities and wardrobe, organization of first aid, personal protective equipment, workplaces with special working conditions and medical examination of workers, training for workers and visitors of construction site in occupational safety, safety measures in the work of subcontractors, measures for identified risks from weather extreme, measures for the prevention of discrimination, sexual harassment, exploitation and abuse, measures and procedures for emergency situations and etc.
	It is recommended to ensure access to safe GRM for workers and other grievance mechanisms (unions, arbitration).
	It is recommended to prepare workers code of conduct and conduct training for all workers on OHS measures and code of conduct.
	Ensure that staff are properly trained (and certified if applies) for the positions and work performed, that workers hold valid workers certificates for e.g., certificates for electrical safety (for licensed electrician), working with asbestos materials, working at heights, operating dangerous machinery, etc.
	Ensure that engaged workers use protective equipment, that workers' personal protective equipment and safety procedures comply with legislation and international good practice.
	Inform workers (and authorized visitors) with appropriate informative and warning signposting of the sites of key rules and regulations to follow.
	Ensure appropriate marking in and out of the construction sites /section by section and speed-reduction signs.
	Clearly mark and fence all dangerous spots in the working sites such as pits, trenches, etc.

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	Prepare Fire Safety plan which includes a list of major workplace fire hazards, their proper handling and storage procedures, potential ignition sources and control procedures, and a description of fire protection, trainings documentation, equipment, and system s.
	Ensure that devices, equipment and fire extinguishers are attested and functional, so in case of need they could be used rapidly and efficiently. Their position must be communicated to workers and marked. The level of fire-fighting equipment must be assessed and evaluated through a typical risk assessment.
	First aid kits shall be available on the site and personnel trained to use it.
	Adequate sanitary facilities (toilets and washing areas) shall be provided at the construction site with adequate supplies of hot and cold running water and soap.
	Align work with weather conditions which can factor in safe organization of works and OHS measures.
	OHS coordinator 2 must be appointed.
Worker's health due to improper asbestos handling	Procedures for removing materials containing asbestos must be prepared according to Ordinance on the protection of workers from risk related to exposure to asbestos (OG 40/7), Rulebook on construction waste and waste containing asbestos (OG 69/16), Instructions on handling waste containing asbestos (OG 89/2008) and the Law on waste management (OG 84/21) and according to the rules of the profession.
Discrimination against women/vulnerable groups in the hiring process of workers	It is recommended to inform the workers on their rights and on grievance redress mechanism.
	It is recommended to establish safe grievance redress mechanism for contractor and sub-contractor workers.
	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	The foreign workers should be informed about their rights and responsibilities, on GRM and code of conduct, as well as the resources they can access if they encounter exploitation or discrimination, all in local language and language accessible to foreign wo rkers.
	Workers must be hired through national employment service in order to avoid hiring "at the gate" and therefore to discourage spontaneous influx of job seekers.
	Workers must be hired in accordance with the Act on Foreigners.
	A child younger than the minimum age (determined by the Labor Law) will not be employed or engaged in the project.

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	It is recommended to apply Guide for foreign workers from the Labor and Occupational Safety Act available in Croatian, English, Hindi, Nepali, Filipino and bilingual versions (Croatian-English): https://uznr.mrms.hr/vodic-za-strane-radnike-iz-zakona-o-radu-i-zastite-na-radu/
	It is recommended to help foreign workers to integrate in local context
	It is necessary to comply with other measures prescribed by the relevant legislation.
Sexual Exploitation and Abuse (SEA)/ Sexual Harassment (SH)	Contractor's Personnel shall not engage in Sexual Harassment, which means unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel.
	Workers shall not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another.
	Workers shall not engage in Sexual Abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions.
	Workers shall not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage.
	It is recommended to establish grievance redress mechanism for receiving and resolving complaints. Complaints received must be dealt with in accordance with the article 34. of Labor Act (OG 93/14, 127/17, 98/19, 151/22).
	Established grievance mechanism shall also allow uptake of SEA&SH grievances.
	It is recommended to perform SEA/SH sensitization, for example as part of the training on the worker code of conduct.
Community safety	Notify all relevant competent authorities of commencement of works.
	Establish publicly available grievance mechanism so preventing any potential sexual exploitation and abuse and sexual harassment within the community and/or creation of concern among local residents. With establishment of publicly available grievance mechanism, all other possible impacts could be minimized and/or prevented in a timely manner.
	Grievance mechanism must allow anonymous complaints to be raised and addressed.
	Inform the workers on prohibition of any potential sexual exploitation and abuse and sexual harassment within the community and/or creation of concern among local residents, for example as part of worker code of conduct.
	Inform local community timely in case of disruption in utility services (power, water, gas shortages).
	Properly fence and mark the construction site.
	Provide safe passages for the pedestrians.
	Prohibit entry for unemployed person within the construction site (within the warning tapes and fences when/where deem needed).

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	Keep clean the surrounding area near the construction site. No temporary storage of construction materials and waste cannot occur within any type of private property.
	Scaffolds and other protection installations install in line with the regulation, and best industry practices (GIIP). Consider past climate change extremes such as strong winds.
	In case of relocation of existing facilities and removal of the existing parking lot of FEEC, provide adequate replacement premises/facilities and conditions (if applicable).
	Measures to minimize dusts, noise, or temporary disruptions to traffic, risk of road accidents for pedestrians and poor occupational health and safety practices, generation of waste, possible sporadic decrease in air quality and issues related to labor influx.
LEED certification	
LEED guidelines	It is recommended to implement LEED measures during the construction phase according to LEED guidelines for construction phase.
Air quality	
Reduced air quality in the nearby construction area and access road due to emission of dust and particulates	Sprinkle water near the construction materials and non-asphalted roads when needed (e.g., during dry and/or windy periods).
	Cover load (surfaces) with plastic coverings during material storage and transportation to avoid dust spreading. Cover bulk materials were not in use.
	Establish adequate locations for storage, mixing and loading of construction materials.
	Limit vehicles speed (30 km/h) in the construction area and on the access roads near the residential houses.
	Regularly clean construction site and access roads from debris.
	Prevent offsite spread of dust using appropriate screens - a mechanical barrier between the work site and the functional part of the faculty complex.
	Avoid unnecessary journeys.
Reduced air quality in the nearby area due to gaseous emissions	Use modern attested construction machinery to minimize emissions, provided with mufflers and maintained in good and efficient operation condition.
	Use low sulphur content fuel, when possible, for machinery and equipment to reduce SO_2 emissions from engines whenever possible.
	Switched off machinery and equipment when not in use (idle mode).

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	To minimize dust (mainly PM_{10}) from construction material collection, reduce material retention time at the site to a minimum, in order to minimize exposure to wind.
	Burning of waste at the site (or elsewhere) is strictly forbidden.
Noise	
Increased noise level in the nearby area	Ensure that generated noise levels do not exceed the maximum permitted noise levels defined in Ordinance on the maximum allowed noise levels with regard to the type of noise source, time and place of occurrence (OG 143/21).
	Adequately inform the Sub-Project-affected parties about the Sub-Project (construction schedules, progress, and safety precautions) and GRM.
	Apply adequate noise protection measures: adjustment of operating time; use of temporary movable noise barriers; use of alternative working machines with lower noise emission levels
	Maintain all equipment maintained in good operating condition.
	Close the engine covers of generators, air compressors and other powered mechanical equipment during operations, and place equipment as far as possible from the residential houses.
Water and groundwater quality / Soil quality	
Risk of pollution of surface water, groundwater and soil due to spill leakage	Collect hazardous liquid waste separately (by type) and in containers that have secondary containment system (e.g., double walled or bunded containers) with sufficient volume to contain a spill from the largest fuel tank in the structure (minimum 110%) and are protected from impact of weather conditions. Hand over the hazardous waste to an authorized company.
	Do not discharge non-hazardous liquid waste into nature without a prior treatment.
	Handle fuel and oil on impermeable surfaces with retention in safe and responsible manner. Avoid storing fuel and other hazardous liquids and materials on construction site. If installation of fuel storage tanks is needed, they should be secondary tanks with sufficient volume to contain a spill from the largest fuel tank in the structure (minimum 110%) and protected from impact of weather conditions.
	Handle and manage all materials in accordance with instructions included in Material Safety Data Sheets (MSDS) and Technical Data Sheets (TDS) which must be available at the construction site.
	In case of an accident, remove hazardous liquid from the soil using adsorption materials such as sand, sawdust or mineral adsorbents. Collect such waste material in tanks, store it in a space provided for hazardous waste storage and hand over to authorized companies for hazardous waste.
	Isolate wash down areas of concrete and other equipment from watercourse by selecting areas for washing that are not draining directly or indirectly into watercourse as well as those that are placed on impermeable surfaces and equipped with/connected to municipal water collection system.

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	Do not extract groundwater on unregulated way, or discharge cement slurries, or any other contaminated waters into the ground or adjacent streams or rivers.
Biodiversity (flora and fauna)	
Risk of endangering flora and fauna by removing vegetation and polluting water and soil	Restrict the movement of heavy machinery to the access road corridor. Construction site should take up only necessary space.
	Limit work along watercourses and canals to as small area as possible.
	Avoid cutting down trees and other natural vegetation.
	In order to reduce „lake effect“, use Anti Reflective Coatings on the solar panels.
Traffic disturbance	
Increased road traffic	Adequate organization of temporary traffic arrangements must be performed according to Ordinance on Temporary Traffic Regulation and Signing and Safety of Road Works (OG 92/19).
	Organize traffic in a safe manner. Limit access road speed to 30 km/h. Avoid major transport activities during rush hours.
	Ensure safe passages and crossings for pedestrians and workers where construction traffic interferes.
	Protect all materials prone to dusting and susceptible to weather conditions from atmospheric impacts either by windshields, covers, watered or other appropriate means.
	Keep roads swept and cleaned at critical points. Immediately remove and clean spilled material from the road.
	Strictly control access of the construction and material delivery vehicles, especially during the wet weather.
	Organize alternative routes in an event where the traffic will be interrupted and timely announce alternative traffic regulation to the local communities.
Waste generation and management	
Waste generation	Develop waste management procedures at the construction site for each category of waste generated during construction and determine the place of storage of individual categories of waste.

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	Store temporarily each type of generated waste on the location in separate waste containers which have to be labelled with waste type name and waste code and locate them at the solid surface foreseen for that purpose on the construction site.
	Dispose mineral (soil) waste exclusively at the designated locations, approved by competent authorities, or reuse it.
	Keep records on waste streams and amounts for each type of waste generated at the location.
	Hand over all waste with appropriate documentation to the companies authorized for the waste management (companies that have adequate waste management permit). Waste can be disposed/processed only at licensed landfills/processing plants.
	For all waste, information on handing over waste to the final destination must be obtained.
	Reuse and recycle whenever feasible appropriate and viable materials (except asbestos).
	Conduct transportation of hazardous substances and waste in line with Act on the Transport of Dangerous Goods (OG 79/07, 70/17) and other relevant national legislation.
	Ensure proper handling (removal, storage and handing over) of asbestos waste according to waste management regulations.
Accidents and emergencies	
Accident/ incident	Prepare procedures for emergencies which includes a list of all emergency equipment at the construction site, alarm systems, decontamination equipment, contacts of responsible persons, competent authorities, other emergency numbers, communication procedures and evacuation plan. Train staff in all emergencies, waste management, first aid and firefighting and other relevant procedures. Keep procedures available at the site.
Cultural heritage	
Cultural property	Observe the measures for the protection of cultural assets during construction prescribed by the project documentation.
Stakeholder engagement	
Engagement of Local Community	Inform public through appropriate notification in the media and/or at publicly accessible communication channels on the works (including the site of the works).

Environmental and Social aspect	Recommended mitigation measure (Construction Phase)
General conditions	
	Established Grievance Redress Mechanisms for local community (separate from the grievance mechanism intended for site workers) for receiving and resolving complaints.
	Engage the stakeholders in accordance with the recommendations provided in the Annex 1.
Social conflicts arising from presence of construction personnel and construction works	Prepare, distribute, sign and implement the Code of Conduct for workers.
	Prepare and implement Grievance Redress Mechanisms for workers.
	Organize training courses on the Code of Conduct and GRM for all workers.
	Assign the person who oversees communication with and receiving requests/complaints from workers and the person who oversees communication with and receiving requests/complaints from local community/public.

9.3 Recommended Environmental and social mitigation plan - Use Phase

Recommended environmental and social mitigation recommendation measures for use phase are presented in Table 10.

In the use phase FEEC will be responsible for the implementation of ES mitigation measures, and the City of Zagreb and State Inspectorate will be responsible for supervising the implementation of ES mitigation measures.

Table 10. Recommended environmental and social mitigation plan for use phase

Environmental and Social aspect	Recommended mitigation measure (Use Phase)
Occupational Health and Safety and Community Safety	
Worker's health and safety and labor and working conditions	It must be ensured that indoor levels of natural radon during the use phase are in line with Act on Radiological and Nuclear Safety (OG 141/13, 39/15, 130/17, 118/18, 21/22, 114/22) and its by-laws (less than 300 Bqm-^{3}). The building must be tested before use (measure radon emission).
	Use and occupation of the premises must be preceded by obtaining the use permit.
	The fire alarm and fire systems must be regularly maintained and certified.
	Safety and maintenance plan for all equipment will be prepared before use and regularly implemented.
	Space will be reserved for access of fire protection vehicles to the building at any time.
	Ensure working conditions and management of worker relationships (terms and conditions of employment, non-discrimination and equal opportunity, prohibition of child labor, etc.) according to Labor Act (OG 93/14, 127/17, 98/19, 151/22 , 46/23, 64/23)
Waste management	
Waste generation, collection and storage	Waste will be collected separately, kept and temporarily stored in the safe manner and handed over for processing and disposal to licensed companies, all in line with the EU regulation and best practices.
	It must be ensured that the local municipal company regularly collects waste for recovery or disposal in authorized facilities.

Environmental and Social aspect	Recommended mitigation measure (Use Phase)
Occupational Health and Safety and Community Safety	
	The oil and grease separator must be regularly maintained and emptied. The emptied sludge must be disposed of in accordance with the waste legislation and secondary regulations.
	Manage EE waste according to Ordinance on the Management of Special Categories of Waste in the Fund System (OG 124/23).
Water quality	
Wastewater	It is necessary to ensure that the composition of sanitary, industrial and precipitation wastewater before discharge into the public drainage system of the Zagreb agglomeration is in accordance with the limit values of wastewater emissions prescribed by the Ordinance on wastewater emission limit values (OG 26/20).
Community health and safety	
Fire safety Management of dangerous substances	The fire alarm and fire systems must be regularly maintained and certified. In case of hazardous substances use or storage in quantities exceeding those prescribed by the Regulation on the prevention of major accidents involving dangerous substances (OG 44/14, 31/17, 45/17), it is necessary to prepare a Risk Assessment of legal entities that perform activities using hazardous substances and a Plan of legal entities that perform activities of used hazardous substances.
Stakeholder engagement	It is recommended to engage the stakeholders in accordance with the recommendations provided in the Annex 1.
	It is recommended that the publicly available grievance mechanism remains available for few months after beginning of use.
Noise	
Increased noise emission	It must be ensured that the noise does not exceed the permitted levels during regular day and night work. In case that generated noise levels exceed the maximum permitted noise levels, it is necessary to choose and apply adequate noise protection measures (design of noise barriers around major noise sources).
Biodiversity	
Vegetation	Regularly maintain landscape vegetation and green roofs.

10 ENVIRONMENTAL AND SOCIAL REPORTING AND MONITORING PLAN

The designer will be responsible for implementation of mitigation measures described by this ESMP (in chapter 9.1.) and for monthly reporting to PIU Environmental and Social Specialists on the implementation of the ESMP.
PIU Environmental and Social Specialists are responsible for monitoring and supervision of implementation of mitigation measures for environmental protection and OH&S according to the Monitoring plan and reporting to the WB on the results.

Table 11. Environmental and social monitoring plan – Design Phase

	What (is the parameter to be monitored?)	**How (is the parameter to be monitored?)**	**When (Define the frequency / or continuous?)**	**Why (Is the parameter being monitored?)**	**Who (Is responsible for implementation and monitoring?)**	
					Implementation/reporting	**Monitoring**
PRE-CONSTRUCTION PHASES						
1.	Indoor air quality	By reviewing design documentation (Mechanical and HVAC Design)	During development of design documentation and before beginning of construction works	To ensure alignment of the design documentation with the ESMP regarding radon reduction system and ventilation system and LEED requirements on indoor air quality.	Designer	PIU
2.	Water quality	By reviewing design documentation (Plumbing, Water Distribution, Wastewater and Drainage, and Hydrant Network Installations Design)	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding wastewater system and LEED requirements on water efficiency.	Designer	PIU
3.	Landscape	By reviewing design documentation (Landscape and Horticulture Design)	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding landscape design and LEED requirements on biodiversity.	Designer	PIU
4.	Noise	By reviewing design documentation (Noise Protection Study)	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding excessive noise mitigation measures and LEED requirements on acoustic.	Designer	PIU

	What (is the parameter to be monitored?)	How (is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Who (Is responsible for implementation and monitoring?)	
					Implementation/reporting	Monitoring
5.	Traffic	By reviewing design documentation (Traffic Design)	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding idle traffic organization.	Designer	PIU
6.	Cultural heritage	By reviewing design documentation	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding mitigation measure for protection of cultural property.	Designer	PIU
7.	Occupational health and safety	By reviewing design documentation (Safety at Work Study)	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding mitigation measure for occupational health and safety.	Designer	PIU
8.	Fire safety	By reviewing design documentation (Fire Protection Study)	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding fire safety measures.	Designer	PIU
9.	Community health and safety	By reviewing design documentation	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding mitigation measures for community health and safety (earthquake resistance, universal accessibility, fire safety measures, mitigation measures for ensuring public safety during demolition and construction).	Designer	PIU
10.	Waste management	By reviewing design documentation	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding hazardous and nonhazardous waste management.	Designer	PIU
11.	LEED	By reviewing design documentation	During development of design documentation	To ensure alignment of the design documentation with the ESMP regarding achieving LEED requirements and gaining credits required for certification.	Designer	PIU

ANNEXES

ANNEX 1. SUB-PROJECT STAKEHOLDER ENAGAGEMENT PLAN (SP-SEP)

Type of stakeholder(s)	Stakeholders	Topic(s) of engagement	Phase I (PRE-CONSTRUCTION) Method(s) used/Planned activities/Period of implementation/Indicators/	RESPONSIBILITY FOR IMPLEMENTATION
AFFECTED PARTIES	FACULTY OF ELECTRICAL ENGINEERING AND COMPUTING employees of the Faculty; Faculty dean.	information on the Project, Sub-Project, GRM and Project's website (information about them and their availability); inputs for the development of the design documentation; t he eventual need for some of the information signs and boards to be also (partially) in English or other relevant language for improved accessibility; impact of construction works on the activities that normally took place in the area of intervention (change management for FEEC staff, including relocation of existing facilities and removal of the existing parking lot), informing students if existing facilities will be relocated during construction; universal design/accessibility.	Information dissemination and engagement methods: • public consultations and public presentation; • available GRM; • information available on the Project's website; • workshops with beneficiary and designers; • if there will be vulnerable groups, the approaches for their engagement will be adapted to this groups (examples are provided below this Table). Period of implementation: • public consultations – before signing the contract for design services; • public presentation – before Detail Design finalization; • workshops: during the development of design documentation. Indicators: • public consultations enabled; • public presentation conducted; • representatives participated in the workshops; • available GRM; • information published on Project's website; • ESMP is also published in English; • information is also shared in English; • approaches for engaging vulnerable groups (if any) are adapted.	PIU social team
	Students of Faculty	information on the Project, Sub-Project, GRM and Project's website (information about them and their availability); informing students if existing facilities will be relocated during	Information dissemination and engagement methods: • public consultations and public presentation; • available GRM; • information available on the Project's website; • interview with representative of students;	The FEEC will be responsible for informing students about the relocation of existing facilities during construction, and PIU for monitoring activities.

		construction; foreign students; students with disabilities.	• if there will be vulnerable groups, the approaches for their engagement will be adapted to this groups (examples are provided below this Table). Period of implementation: • public consultations – before signing the contract for design services; • public presentation – before Detail Design finalization; • interview: during the development of design documentation. • information about the relocation of existing facilities during construction: before the construction. Indicators: • public consultations enabled; • public presentation conducted; • representative participated in the interview; • available GRM; • information published on Project's website; • ESMP is also published in English; • information is also shared in English; • approaches for engaging vulnerable groups (if any) are adapted.	The PIU social team will be responsible for the implementation of other presented activities.
INTERESTED PARTIES	LOCAL COMMUNITY – nearby residents; – Martinovka Local Board; – other residents of the Trnje City District; – Trnje City District.	information on the Project, Sub-Project, GRM and Project's website (information about them and their availability).	Information dissemination and engagement methods: • public consultations; • public presentation; • available GRM; • information available on the Project's website; • if there will be vulnerable groups, the approaches for their engagement will be adapted to this groups (examples are provided below this Table). Period of implementation: • public consultations – before signing the contract for design services; • public presentation – before Detail Design finalization. Indicators: • public consultations enabled; • public presentation conducted;	PIU social team

			• available GRM; • information published on Project's website; • ESMP is also published in English • information is also shared in English; • approaches for engaging vulnerable groups (if any) are adapted.	

Approaches for engaging vulnerable groups

If there are vulnerable groups involved, the engagement approaches will be tailored to their specific needs. For instance, for foreign citizens, national minorities and stateless persons materials will be adapted and translated into languages understandable to them, using simple and clear language. For elderly individuals, information will be distributed physically (e.g., via leaflets), as they may not regularly use the internet. For children, specifically those under 15 years of age, information will be conveyed through their parents. For people with disabilities, accessible formats will be utilized, and cooperation with dedicated organizations, associations, or caretakers will ensure effective communication. Additionally, during public consultations, the Environmental and Social Management Plan (ESMP) will also be disclosed in English.

Recommendations for stakeholder engagement in further Sub-Project phases

In the construction phase potentially, affected stakeholders are as follows: the local community (nearby residents, Martinovka Local Board, other residents of the Trnje City District, Trnje City District), FEEC (students and employees) and site workers.
Given that the World Bank Loan 9127HR finances only the design, a detailed plan for the implementation of stakeholder engagement activities in the further phases of the Sub-Project has not been developed, but the following recommendations are given.

During construction:

- information on the Sub-Project should be publicly disclosed (information on the beginning of the construction works and other important information);
- grievance mechanism should be established, available and communicated to local community and general public (more detailed recommendations for grievance mechanism are provided in chapter 8);
- separate grievance mechanism for site workers should be established and communicated to the site workers (more detailed recommendations for grievance mechanism are provided in chapter 8).

After construction:

- information on the Sub-Project should be publicly disclosed (notice of completed works etc.)
- beneficiary satisfaction testing should be conducted.

ANNEX 2. CULTURAL HERITAGE MANAGEMENT PLAN (CHMP)

Required approvals according to national legislation during design phase are listed in following table.

Table 12. Required approvals

Document	Approval by the Ministry of Culture and Media, Osijek Department for Conservation
Conceptual Design	Conservation Guidelines, issued 13 July 2017, and 19 March 2028
Local Permit	Special Conditions
Main Design	Approval of Main Design

CONSERVATION GUIDELINES

Table 13. Conservation guidelines

Conservation guidelines	Mitigation measures
Conservation Study (Author: ASK Atelier ltd.) May 2023	During the development of project documentation and reconstruction, conservation and renovation, it is necessary to comply with the provisions for implementation set by the valid spatial planning documentation, i.e., the Master Plan of the City of Zagreb, and for all further interventions and for all works, special conditions and approval of the City Institute for Cultural and Natural Heritage Conservation must be obtained.
	The building, regardless of subsequent interventions in the interior and façade, should be presented and interpreted as a whole in terms of design in accordance with the time of its creation in the middle of the 20th century.
	The building needs to be renovated according to current construction and legal standards for the premises in which people work and reside, taking into account the provisions of the Act on the Protection and Preservation of Cultural Property (OG 69/99, 151/03, 157/03-amended, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14, 44/17, 90/18, 32/20, 62/20, 117/21 and 114/22) by which the building can be partially or fully exempted from construction and legal standards during renovation, if the intervention may violate its integrity and purpose of protection.
	The building can be equipped with all modern installations for introducing a new purpose, with the placement of installations in unexposed places and the prevention of deterioration of the properties of cultural property.
	All designers who will work on the renovation project must have the permission of the Ministry of Culture to perform work on the protection and preservation of cultural property (OG 69/99, 151/03, 157/03 - amended, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14, 44/17, 90/18, 32/20, 62/20, 117/21 and 114/22).
	During development of project documentation, it is necessary to develop Construction Project; the concept of remediation must not affect the monumental properties of the building; the consent for the project of constructive rehabilitation of the building is issued by the City Institute for Cultural and Natural Heritage Conservation, if the conditions of maximum possible preservation of the original substance of the building and its design are met.
	All new interventions on the building should be carried out with the aim of preserving the historical substrate of the building, its structures and materials, design and decorative elements, and as a whole the preservation of the historical ambience of the urban complex.
	In accordance with the cultural, historical and environmental value of the building, it is necessary to take into account its historical, design and spatial features and reconstruct and rehabilitate individual parts of the façade accordingly, it is necessary to carry out restoration and investigation works on all parts of the façade in order to determine whether the original tones and design of the façade have been changed.
	During the renovation of building A, it is recommended to preserve all elements that have been valorized with a prominent architectural value; primarily the façade, terrazzo cladding of the first and second floor corridors, stairs and stair handrail.
	Given the numerous interventions on building A since its construction, it has been valorized as the least valuable part of the FEEC complex, and in that sense, it is possible to reconstruct

	building A in such a way that the original façade of the ground floor and the first two floors are presented by the facsimile method, with the possibility of building a basement and adding above-ground floors, and in accordance with Article 64 of the Act on the Protection and Preservation of Cultural Property (OG 69/99, 151/03, 157/03 - amended, 87/09, 88/10, 61/11, 25/12, 136/12, 157/13, 152/14, 44/17, 90/18, 32/20, 62/20, 117/21 and 114/22) and the provisions of the General Urban Plan of the City of Zagreb.

SPECIAL CONDITIONS

Special Conditions issued for the planned Sub-Project from City of Zagreb, City Institute for Cultural and Natural Heritage Conservation are listed in the Table 14.

Table 14. Special conditions

Special conditions for the protection of cultural property (City of Zagreb, City Institute for Cultural and Natural Heritage Conservation). November 2023	• The height of the reconstructed building must not exceed the planned 9 above-ground floors and it must be in line with the height of the other buildings in the second row of the street stretch of Vukovarska with which it shares the same recessed construction line (which also does not exceed 9 floors). • In terms of design, the architectural solution should be of high quality and correspond with other buildings of the FEEC complex. • A modern interpretation of the elements of modern architecture of the mid-20th century is recommended, i.e., a formal reference to the volume of the existing building A and building C (skyscraper) in the sense of retaining or reinterpreting the frame consisting of gable walls and roof, horizontal breakdown of the façade with window strokes and full parapets and recessed last floors. • The part of the plot where the parking lot is currently located should be planned as the main access square for the entire complex, and it is necessary to develop a Project for landscaping the plot and landscaping. • The Project of parterre landscaping of the plot must be equipped with plans of horticultural landscaping and paving. • The parking lot currently located on the access square needs to be moved to the newly planned underground garage as much as possible. • In accordance with the provisions of the Act on the Protection and Preservation of Cultural Property, in order to obtain confirmation of the Main Design, it is necessary to submit the project to the Institute through the competent authority for construction, made by a natural person who has the prescribed permission of the Ministry of Culture and Media to perform work on the protection and preservation of cultural property in accordance with the Ordinance on the conditions for obtaining permission to perform work on the protection and preservation of cultural property (OG 98/18, 119/23).

Simplified view of CHMP measures is described in the following table.

Table 15. CHMP measures (Tables 13. and 14.)

Phase	Mitigation measure	When should the measure be implemented	Implementation responsibility	Supervision
Conceptual Design	Conservation guidelines from the Conservation Study	implemented	Designer of Conceptual Design	City of Zagreb, City Institute for Cultural and Natural Heritage Conservation
	Special conditions for the protection of immovable property	issued	City of Zagreb, City Institute for Cultural and Natural Heritage Conservation	/
Main & Detailed Design	Implementation of special conditions	To be implemented into Main Design and Detailed Design	Designer of Main and Detailed Design	City of Zagreb, City Institute for Cultural and Natural Heritage Conservation