DELIVERABLE D.T4.2.2

Setting up of emergency plans for the target heritage sites - Hungary

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CONTENT

I. DESCRIPTIVE PART

I.1 General information

Plan name:

Cultural Heritage Protection Action Plan against natural disasters (flash floods)

Plan area:

Hungary, Baranya county - Pécs city; Cella Septichora (Early Christian Tombs)

I.2. Site description and hazard analysis

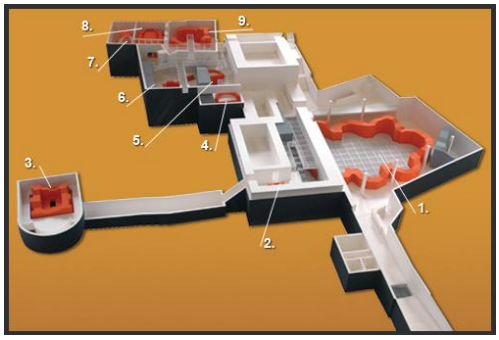
The center of Pécs carries the cultural and architectural memories of more than a thousand years of history. The Cella Septichora and its environment also represent monuments over the underground memories.

The Cella Septichora Visitor Center presenting the ancient Christian (Early Christian) relics/remains opened its doors in March 2007. The unique, visitable late Roman tombs/sepulchral structures - which have been part of the World Heritage since 2000 - have been featured in a single complex. The Early Christian Mausoleum and the Apáca street Tombs/Sepulchral constructions form a separate island in the area of the World Heritage Site.

The Cella Septichora Square - an underground building covering the preservation of an early Christian monument, is a 509 m2 reinforced concrete space, partly with a glass and reinforced concrete slab. Within it are the cultural heritage monumental building remains, tombs, murals (frescoes). The values to be protected cannot be moved, they must be protected locally.

The slab above the gallery level has a steel structure, which consists of 3 layers of heat-insulated glass panels. The floor level has an iron lattice design. Equipped with optical smoke detectors. From Cella Septichora you can reach the other units by lift and on foot.

1. Cella Septichora



2. Sarchophagus
3. Wine pitcher burial chamber
4. Burial chamber No. XX
5. Burial chamber No. XIX
6. Burial chamber No. III
7. Burial chamber No. IV, entrance of Peter-Paul burial chamber
8. Peter-Paul burial chamber
9. Octagonal burial chamber

Following a bottom-up principle, the basis of planning is the risk analysis prepared for each settlement of Hungary, where the factors include natural and civilizational dangers as well, thus every settlements are ranked into disaster management classes (category) I-III.

Pécs, as our pilot site belongs to the following classification due to the disaster protection class (Hazardous effects):

ID	Settlement	Elemental disasters, natural hazards											Industrial accident, danger of civilization						Hazards of other origin			Critical infrastructure risk			RANKING
		Water damage				Extraordinary weather	Geological hazards						Dangerous plant (factory)	Other facility, hazardous material	Distance from Nuclear		Traffic routes		Military plants	Vulnerability of surface and groundwater	Human epidemic, animal epidemic	Air pollution reaching the alert threshold	Basic care infrastructure for the population	Traffic vulnerability	Vulnerability of infrastructure indirectly supplying public administration and population	
		Flooding	inland water	Local water damage	Flashflood		Earthquake	Landslide	collapse	subsidence	Coastline collapse	TOTAL GEOLOGY			nuclear Power Plant	Research Reactor	Transport of dangerous goods	Significant traffic								
213.	Pécs		II.	I.	I.	I.	III.	III.	I.	III.	II.	1	I.	II.			I.	I.		I.	II.	II.	II.	I.	I.	I.

After the risk assessment can be stated that the main threat is the flashflood caused by heavy rain. Besides the flashflood accompanied by the destructive effects of stormy winds and soil movement due to precipitation.

Due to the accumulation of sediment, the water can get to the underground spaces. In this circumstances, the construction of the drainage system and the insulation of drainage are a major architectural task. In previous years, the reconstruction of drainage system has began.

There is a deterioration of the walls on the ground floor of buildings and below. Due to climate change, the problem is not only the intensity of rainfall and its drainage, but the stormy wind also damages the roof structure of the older buildings.

Pécs is relatively distant from the boundaries of tectonic plates, so the risk of earthquakes is lower. On the other hand, the movement of the subsoil, the slip and the bursting of the ancient cellar system located under Pécs have an impact on the surface structures.

The historical center of Pécs basically has a rainfall collection network. During heavy rainfall this system becomes saturated (especially when the sediment are accumulated), and water penetrates the spaces below the surface.

City of Pécs has water damage protection plan from year 2016, but it mainly contains flooding emergency protection procedures affected public citizens.

Due to the heavy rainfall that occurred in Pécs between May 30 2010 and May 16, on July 22, 2012, and July 10, 2013, at Cella Septichora Visitor Center, water intrusion of different strengths happened in the following places:

The water and the mud flowed in through several points of the concrete protecting wall and of the glass roof, which directly affected the interior of the Cell Septichora, the south-western corner of Tomb III, and flooded the other places of the visitor center (corridor, elevator shaft).

The surface of the paved area located outside the building, to the north of the glass ceiling collapsed in several places.

At the locations described above, the contracted service provider (contractor) performs warranty repairs, but unfortunately, in case of extraordinary rainfall the water penetration can be repeated.



I. 3. List of historic buildings with instructions for their protection

Immovable monuments:

No.	Characteristics of the historic object: - name - location / address - short description with the specification of the most valuable elements	Proposed method of protection (Divided into threats if there are differences in proceedings)	Necessary forces: - number of people: what services, volunteers, who else? - equipment: belonging to whom / stored where?	Estimated time needed for protection
1	Cella Septichora (CS): H-7621 Pécs, Sétatér – (46°04'40.0"N 18°13'28.6"E) Protection of building remains, tombs, murals on site	• Flood diversion: Due to the flash flood, build temporary dam with sandbags along the glass roof to prevent rainwater from entering the subterranean space. • For emergency exits: prevent water from entering the site with foil and sandbags • The accumulated water in site must be pumped outside. • Spreading foil over the ruin of the building, creating a sump from sandbags, pumping out water • Collecting and sorting the debris, remains of buildings and placing them outside the site • Exploration, saving lives (disaster medic), lifting the injured victims over the ruins of monuments – without causing damage to them	Total of 12 people Professional (state) fire brigades Uniform firefighting equipment - fitted to a fire truck Volunteer rescue teams- „Mecsek Rescue Team” Search and rescue equipment - mounted on a motor vehicle Police Basic police equipment - worn individually Facility managers materials required for damage prevention and protection - stored on site	2-3 hours

Movable monuments:

No.	Artifact characteristics: - name / type - short description - location - quantity, size, weight	Monument protection: - proposed method of protection - quantity and type of packaging	Necessary forces: - Number of people: what services, volunteers, who? - equipment: belonging to whom / stored where? - transport to a safe place/storage - how ?	Estimated time needed for protection	A safe place to which artifacts will be evacuated
1	CS: CH values cannot be moved, must be protected locally (on site) The amount of displaced stones cannot be determined.	• Parts detached due to damage must be marked for identification (location, position, etc.) and, if possible, left on site, if this is not practical, placed in boxes that can be stacked in a container in front of the main entrance. • Stackable boxes (quantity depending on the degree of damage), • closed container	Application of forces according to the above Temporary (container) disposal of salvaged building remains in the city lapidary	2-3 hours (or more)	„Dóm Kőtár” - Lapidary (7621 Pécs, Káptalan utca 8.) Dóm Kőtár (7621 Pécs, Káptalan utca 8.)

I. 4. Materials and equipment necessary for protection

Members of the primary intervention professional and volunteer firefighters and members of search and rescue organizations shall be provided with personal protective equipment (clothing, helmets, gloves). These organizations basically use their own tools (hand tools, pump, ladder, lighting, etc.).

That material should be provided to rescuers that are used on site to protect cultural heritage.

These materials should be stored in a way that is accessible to institutional managers so that interveners can use them immediately.

At Cella Septichora, the following tools must be stored ready in the storage room next to the showroom;

- electric submersible pump (20m hose),
- protective tarpaulin (8x10 m),
- wooden slats (5x5 - 4m - 10pcs),
- sandbag (200 pcs.),
- Chest (E40 - 12 pcs.) -

The staff of the Zsolnay Heritage Center working at the reception is responsible for handing over the materials, their manager;

Zsolnay Heritage Center - Dániel Poulet - tel: +36204798566

I. 5. List of the evacuation / protection order

There are a small number of movable art objects on the site (mainly for illustration purposes only) that are not of significant ideological value. The value to be protected is the remains of the historic building and their frescoes. Therefore, rescue units should place parts of the building detached during an accident in a safe place. After or at the same time as the evacuation, you must perform other rescue operations - these are as follows:

1. Exploration, saving lives (disaster medic), lifting the injured victims over the ruins of monuments – without causing damage to them
2. At the relief, preventing flooding by the downpouring water with sandbags (build temporary dam) in front of the broken glass ceiling.
3. Supporting, shoring damaged parts of the building (the arch of the main entrance doorway) with DOCA elements
4. Allocating a safe location for the storage and wrapping of recovered objects – preparing them for transportation, the other venue where those were packaged for protection.
5. Spreading foil over the ruin of the building, creating a sump from sandbags, pumping out water
6. Collecting and sorting the debris, remains of buildings and placing them outside the site Parts detached due to damage must be marked for identification (location, position, etc.) and, if possible, left on site, if this is not practical, placed in boxes that can be stacked in a container in front of the main entrance.
    - Stackable boxes (quantity depending on the degree of damage),
    - closed container
7. Pumping out water from the basement
8. Salvaging a heavy artefact from the Lapidary

I. 6. List of rescue units, institutions and organizations that are intended to provide assistance

Accidents must always be reported to the emergency number (112) or the fire brigade (105). These calls are ultimately answered at the Baranya County Regional Information Center (TIK) at 7/24. In Hungary the professional Fire brigade must be alerted in case of all fire or damage incidence. The number of intervention units determined by the General Inspectorate who alerts the units. Extensive or time-consuming accidents require the involvement of voluntary forces.

This center notifies the organizations involved in the defense (police, volunteers, other forces) as well as the experts, so;

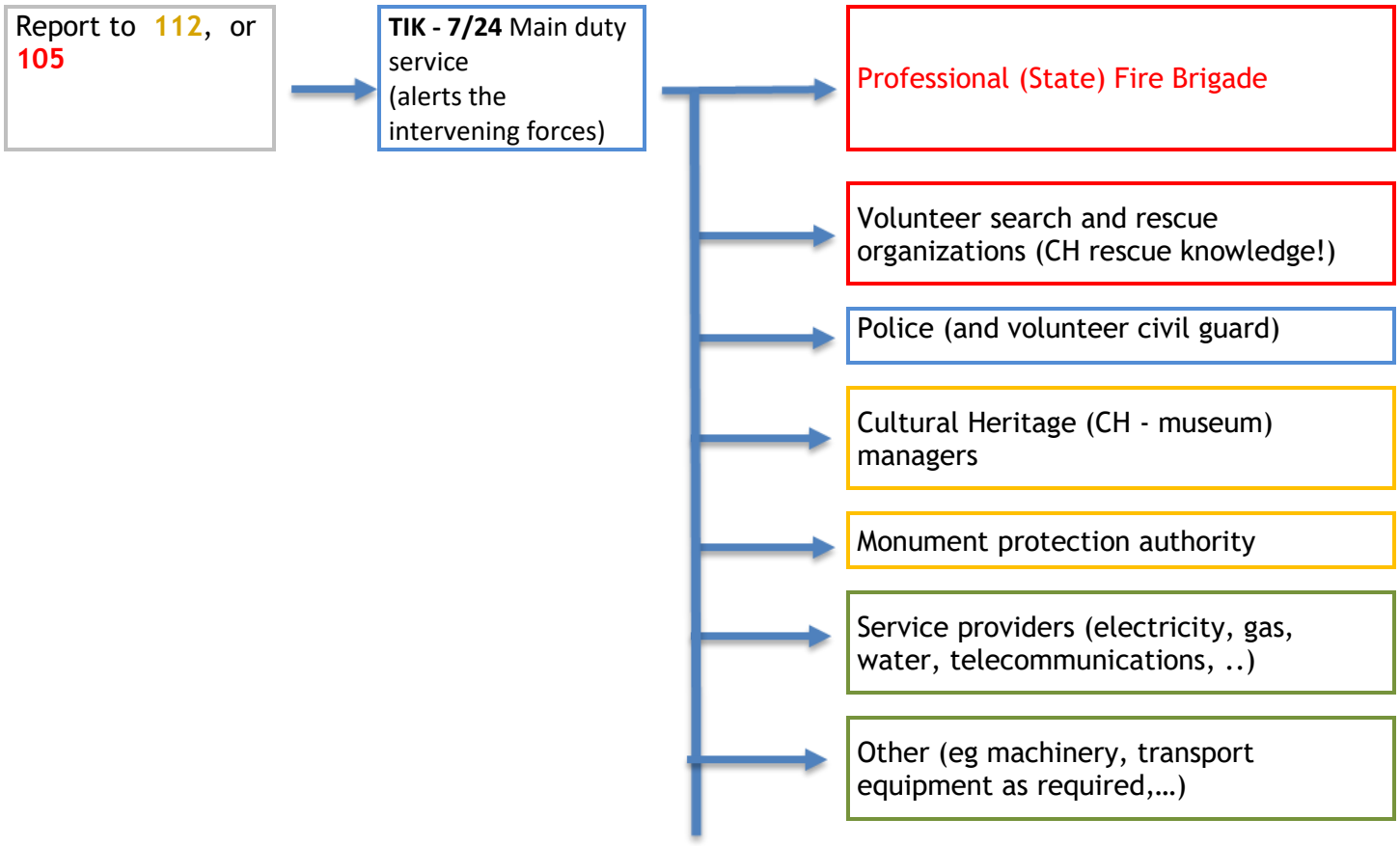
1. Monument Protection Authority - Krisztián Szigetvári +36302943775
2. Institution (museum) operators -Zsolnay Heritage Center: - Dániel Poulet +36204798566
3. Providers

- Electricity: EON South Transdanubia Electricity Network Ltd. + 3672 / 421-700
- Gas: E-ON South Transdanubia Gas Network Ltd. + 3672 / 441-022
- Water: TETTYE FORRÁSHÁZ Zrt. + 3672 / 503-290

4. Other

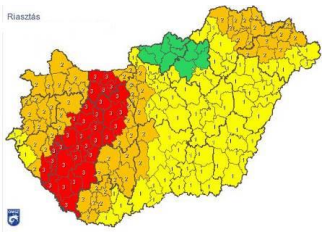
- Pécs Professional Fire Brigade +3672 587-190
- Pécs Disaster Management Office Krisztián Egri Civil Protection Supervisor +3670466-3201
- Pécs Research Rescue and Fire Fighting Association President Csaba Bodor +3630941-2580
- President of the St. Florian Volunteer Firefighters Association Tamás Vas +3620966-2785

I. 7. Diagram of the alarm / notification system



I. 8. Operational Instructions

According to the weather forecast of the National Meteorological Service (OMSZ), based on the weather parameter exceeding the limit value, it will issue a warning forecast 24-48 hours before the event, and then specify a meteorological alert available to everyone a few hours before the event.



https://www.met.hu/en/idojaras/veszelyjelzes/

Accordingly to that, the managers of institution must ensure the operation of institution.

In general, the OMSZ alert is assessed by the Disaster Management Directorate and the competent mayors are informed, who activate their defense supplies, mobilize persons, and set up a monitoring service at known critical points. At the same time, the county headquarters informs that organizations that can be involved in the defense (police, road operator, and voluntary rescue organizations), so that they can prepare for protection immediately in the event of an alarm.

General rules;

1. The operators of the institution, in consultation with the competent fire brigade, shall elaborate a Fire and Rescue Plan for each object, which shall be adopted/incorporated by professional firefighters.
2. Exhibition halls and storage rooms must be operated in accordance with the applicable official legislation, taking into account the fact that how the exhibited objects can be evacuated.
3. The staff of the institutions can be available for emergency.
4. It is recommended to create key safes to which rescue participants have access.
5. The availability of tools and materials necessary for salvage must be ensured.
6. A safe place must be determined where salvaged objects can be placed.
7. Personal protective equipment (helmets, gloves, work clothes, first aid equipment…) must be provided for facility managers.
8. The conditions for radio communication to control rescue operations shall be provided
9. In the event of a damage, efforts should be made to avoid secondary effects; the object must be separated from the supply infrastructure (water, gas, electricity), localization must prevent the spread of damage.
10. Rescue operations must be carried out in accordance with fire and technical rescue legislation. The activity of the commander (Firefighter) should be supported by an expert of the institution.

I. 9. Organization of exercises and training in the field of cultural heritage protection.

The trainings have several levels and are built on each other.

1. During the training of institution managers, employees must be trained on how to prevent possible events, as well as learn emergency rules and procedures.
2. In the case of firefighters performing the first intervention, the tactical and technical knowledge necessary for rescuing CH must be included in their training schedule.
3. The situation is similar for Voluntary Rescue Organizations working with professional firefighters. Here, it is possible to complement the management unit of rescue organizations with experts in the protection of CH.

4. The success of the intervention depends largely on the participants 'knowledge of the site'. It is useful if the professional firefighters visit the sites in advance, to know the significance of the presented cultural heritage, therefore it is recommended to hold site knowledge sessions and inspections.
5. The thematic exercises provide an opportunity for the cooperating intervening organizations to get to know each other's abilities, to divide the tasks, to practice communication.
6. One of the important elements of the trainings and exercises is the sharing and evaluating the experiences, and taking the corrective measures on the basis of these, which means the modification of the plans if necessary.

II. GRAPHIC PART

II.1 Organizational Map

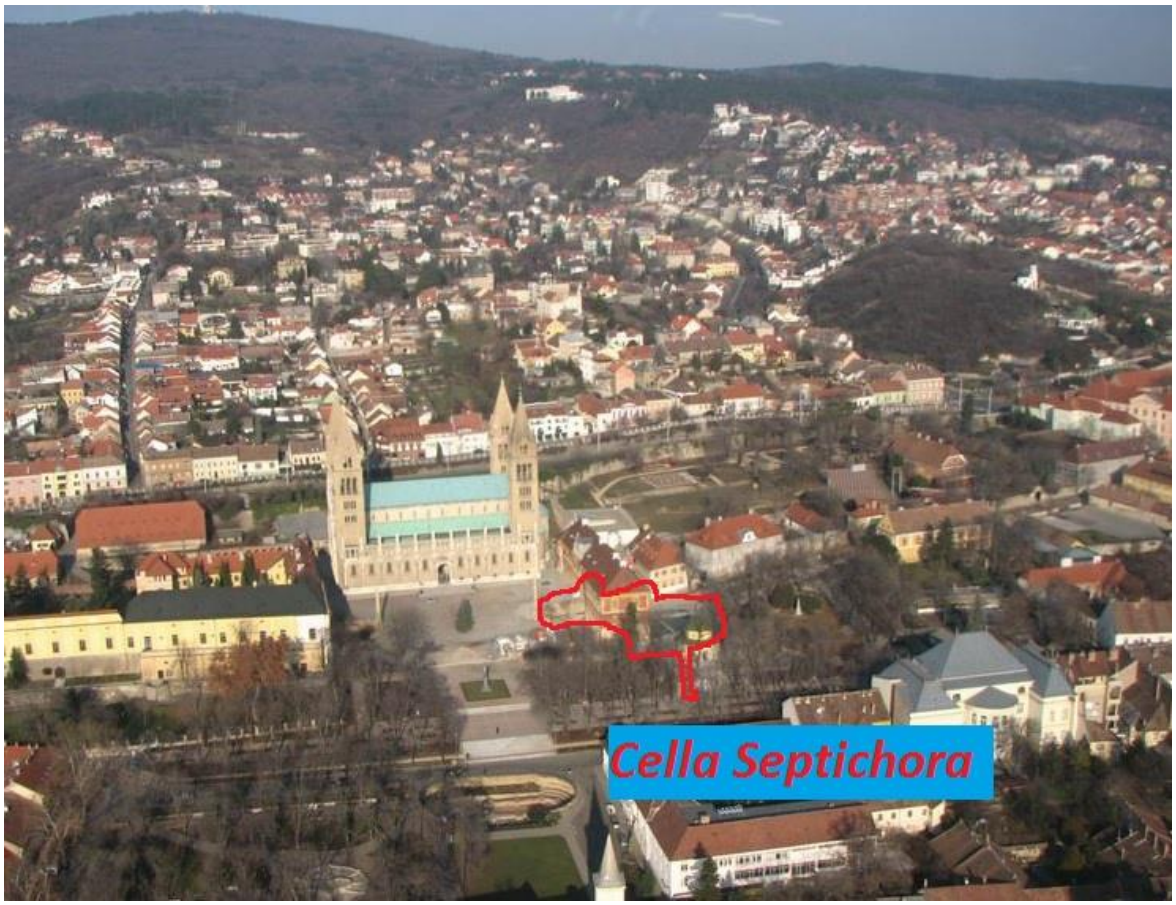
A map including:
- immovable monuments,
- places with movable monuments,
- headquarters / location of rescue units and/or organizations,
- potential threats that can be shown on the map, e.g. rivers, landslides.

Pécs is located in the Carpathian Basin, in a southern Hungarian county of Baranya, near to the border of Croatia. Its southern part is rather plain whereas its northern part belongs to slope of the Mecsek mountain (400–600 meters high).

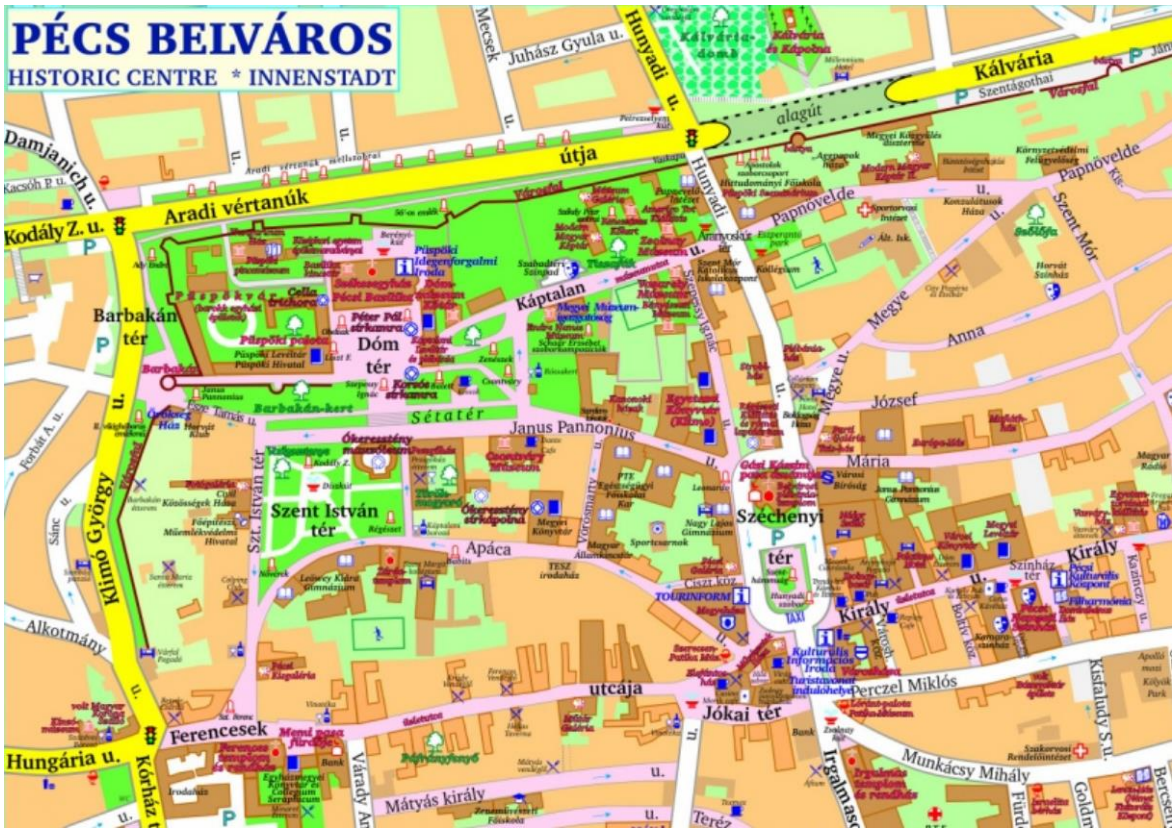
The city Sopianae was founded by Romans at the beginning of the 2nd century, in an area peopled by Celts and Pannoni tribes. By the 4th century, it became the capital of Valeria province and a significant early Christian center. The early Christian necropolis is from this era which became a UNESCO World Heritage Site in December 2000.

Pécs has a significant mining past. It has a very favorable climate by the border of a still flourishing woody area. Woody areas generally start from about 300 m height. Mecsek is divided by several valleys which have key role in ameliorating the climate of the city without lakes and rivers. Waters coming down from Mecsek are collected by Pécsi water leading them eventually to the Danube.

The historical center of Pécs basically has a rainfall collection network. During heavy rainfall this system becomes saturated (especially when the sediment is accumulated), and water penetrates the spaces below.



view of Pecs (Cella Septichora) from the background of the Mecsek Mountains



II. 2. Map of evacuation routes

Cella Sptichora (CS)