

OUTPUT T3.5

Pilot Action (P13)

Matrica (Százhalombatta) - Hungary

Title Increasing the Visibility of the Roman Danube Limes	Finalversion 06/2022
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1. Introduction

This paper summarises the various efforts taken and activities organised in the framework of the project Living Danube Limes contributing to the increase of visibility and conveyance of the Roman past at the individual national project pilot sites (listed downstream the Danube): Gunzenhausen (Germany), Comagena/Tulln in combination with Cannabiaca/Zeiselmayer (Austria), Iža (Slovakia), Matrica/Százhalombatta (Hungary), Ad Labores/Kopačevo (Croatia), Lederata/Ram (Serbia), Bononia/Vidin in combination with Sinagovtsi (Bulgaria) and Sacidava (Romania).

2. General Information on the Pilot Site

Please provide a short introductory description of your national pilot site (name, type, dating, museums, infrastructure, presentation etc.).

The area of Százhalombatta occupied by the Romans quite late contrary to other parts of Pannonia. The need for construction of the military camp revealed after Emperor Traianus' (98–117 CE) conquest in Dacia and the Sarmatians attacked Pannonia several times, and the land became strategic point. Therefore, an auxiliary castellum was erected around 106 CE, and became the third auxiliary castellum south of the legionary fort of Aquincum (after Nagytétény-Campona and Érd) with connection to the Danube. This auxiliary fort was an earth and timber palisade in the period of 106–179 CE. Matrica, the name of the settlement is originated from the language of the Celtic inhabitants.

Around 178 CE, during the great Marcomanic-Sarmatian wars this fort was destroyed. After the peace the camp was rebuilt from stone. The stone camp was erected on the same place with the same size where the palisaded camp was situated. It was a 155x155 m camp, the thin forth walls were strengthened from inside with 4 m wide inner earth-work and piers. These inner wall-piers were rare in Roman forts, however, in the territory of Pannonia it can also be observed in Aquincum and in the camp of Celamantia (Leányvár).

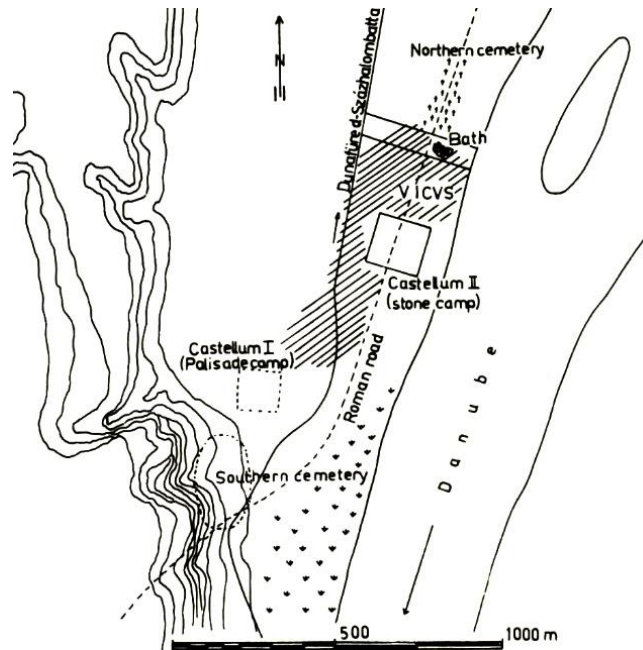


Fig 1. Matrica. Camps, settlement, cemeteries. Source: Topál 1981. p. 8.

In the surroundings of the fort, a military vicus was located. Its assumed area was app. 900x400 m. Merchants, craftsmen and relatives of the soldiers were settled here with native Celtic population even in the beginning of 3rd century (names: Adnamatia, Turuna). Under the rule of Hadrianus (110–138 CE), the settlement got its own land (territorium) governed by an organization (veterani et cives) consisting of Roman citizens with the help of elected officers. An altar stone excavated in the territory of the vicus records this fact.

The area of the roman fort is located directly on the western bank of the River Danube and the southern part of the residential area of Százhalombatta called 'Dunafüred'. A long dam separates the archaeological site from the residential area, however, some weekend houses are located directly at the edges of the site.

The walls of the Roman forth stood even during the last century of the 19th century. The stones of the buildings were used by the inhabitants for various constructions. During the Napoleonic wars in 1809 a bridge-head was built on the territory of the camp with longitudinal ramparts.

Nowadays, only the restored remains of the roman bath are visible from the Roman bath. The other parts of the fort, military vicus, the limes and the cemeteries which were excavated in 1943, 1971–75 and 1993–96 are covered with soil. The ramparts of the Napoleonic wars are visible and still survived to a considerable height.

On the Northwestern and western sides, private plots are located with small weekend houses – it partially covers the former area of the camp. The northern neighbouring area belongs to a camp with sport facilities. This area and a canal separate the area of the former Matrica camp from the remains of the bath. The military vicus on the Northwestern part of the

camp is partially covered with private houses, however, two major coherent territories are ploughlands where the research can be carried out.

Mainly, during the excavation of 1993–1996 lead by P. Kovács, several parts of the fort were unearthed and documented. There were two cemeteries on the northern and southern side of the camp. Between 1971 and 1974 the southern cemetery of Matrica was excavated by Judit Topál. (Topál 1981.) These were cremation graves from the 2nd and 3rd centuries CE. A smaller grave group refers to the late Roman inhabitants from the 4th and 5th centuries CE.

In our present day, all the aforementioned territories are covered with soil, only the remains of the bath are visible. The findings can be found at the exhibition and the archives of the Matrica Museum in Százhalombatta.

The Matrica Museum of Százhalombatta has a rich exhibition on the history of the city. Therefore, the finds of the excavations of the Matrica castellum and the vicus (building fragments: cornice, ceramics, roof-coverings, altars, tools, tablewares) can be seen both at the exhibition and the archives of the Museum. These findings can be used as evidences for the possible virtual reconstruction of the site.

The city of Százhalombatta literally means "One hundred tumuli" referring to the tumulus field at the edge of the town. This feature carries back the visitors to the earliest era of the city since the plateau stretching over the River Danube was inhabited since the Early Bronze Age. In the 7th-6th centuries BC it was the eastern branch of the Hallstatt culture that appeared in the region. Significant noblemen are buried in the tumulus graveyard. The 3,5-hectare territory presently functions as an Archaeological Park that is part of the Matrica Museum. It is in this prehistoric open-air museum that a 2,700-year-old tumulus was excavated, reconstructed and opened for the visitors. The Archaeological Park of Százhalombatta was the first interactive display site presenting prehistoric monuments in Hungary established with a two-fold purpose. First, to offer visitors a personal experience of prehistoric life offering family days, craft activities and workshops. Second, the Park is simultaneously a setting for archaeological experiments where, in addition to the authentic reconstructions of prehistoric buildings, experiments are conducted using prehistoric techniques and copies of prehistoric tools and implements.

Consequently, apart from the bath there is not any existing visualisation, presentation, conservation or information tool about the castellum on the direct site. However, according to the aforementioned description, there is a rich source of Roman archaeological constructions under the ground that was found and identified by the survey of Ludwig Boltzmann Institute in November, 2021. The fieldwork in Százhalombatta was carried out between the 3rd and 5th of November 2021. On the first day, GPR surveys were conducted within the Roman vicus. On the second day, one agricultural field to the north around the Roman bath and two further fields in the area around the Roman fortress were surveyed. On the third day, the survey of the most southern field was completed. The survey conditions can be described as rather favourable, with the exception of the heavy rain on the second survey day. All fields were harvested, or free of higher vegetation upon arrival, they thus provided relatively smooth surface conditions. Altogether, 5.24 ha could be surveyed with GPR. The fieldwork at Százhalombatta yielded very good results, including probable Roman houses with adjoining agricultural fields. large pits with diameters between 1.5 m and 3.5 m, and massive Roman walls, pillars, and buildings. With very high

probability, some of the structures can be assigned to the phase of the Roman fortress, showing typical ground plans comparable to known Roman building elements.

The Matrica Museum, which institution provides detailed information about the history of the city, including the Roman times is at the centre of the city, app. 2,5 kms from site. Therefore the improvement of the visibility is necessary on the site. for this reason, the following steps were implemented within the Living Danube Limes project so far.

3. Documentation of Selected Visibility Measure(s) Implemented On-Site

The Virtual reconstruction of the pilot site of Hungary consists of 3D model of the Roman baths with its interiors. The model was created by 7reasons with cooperation with Ludwig Boltzmann Institut für Archäologische Prospektion und Virtuelle Archäologie (LBI ArchPro), which provided the input materials from geophysical prospecting, and the 3D point cloud that has been prepared by the Students and Lecturers of Budapest University of Technology and Economics (PP BME) with the coordination of Slovak University of Technology in Bratislava – STUBA (see: D.2.3.1 Virtual Reality reconstructions for pilot sites).

Since the still visible Roman structure on the site is the Roman bath, this can be a n important starting point of the possible visiting scenario on the site (see: D.T3.2.2 Identification of the Visibility Measures). For this reason, the VR was placed on this building according the following method and form (see: D.T2.3.2):

1: The installation of the VR board on the site.

24th June 2022, 13:30

A newly designed VR Board was created for the project. The Board is prepared with 3D printer, therefore it is a product that can use for other buildings both in Százhalombatta and further sites.

The board contains:

- the engraved image of the VR
- the name of the site in English – Hungarian – Latin
- brief information about the history of the building
- the Virtual Reconstruction of the monument can be reached by a QR code
- the website of the Living Danube Limes project can be reached by a QR code
- if the visitors place a piece of paper on the 3D printed board, and colour it, the drawing of the bath can be copied and taken to home.

The participants of the placement of the VR Board:

- PP's of Living Danube Limes Project (PP6 BME Budapest University of Technology and Economics and PP17 KÖME Association of Cultural Heritage Managers)
- external expert Spatialist Ltd.
- local stakeholders and civils of Százhalombatta

- invited guests from cities alongst the Danube (Vice-Major of Baja, Chief Architect of Dunaújváros).

The reason for the choice: the board provides offline and online visibility for the VR on the Pilot Site for the public.

This way of implementation provides an easy way to give information on site with long durability for the widest spectrum of target groups (different generations : the children with colouring, the adults with online material via the QR code – therefore the methodology of gamification was used within the design of this board). The material can be developed in a flexible way (other QR codes can be placed on it. The size of the board let it work in a harmonious way with its environment – with the idea of sustainability and reversibility. Therefore this VR tool is completing the understanding and visibility of the pilot site in a complex form.

The dimension of the 'VR Stone' is
10 digiti x 10 digiti (18,5 cm x 18,5 cm)

Divided into 10 digiti
(Roman unit - 1 digitus is 0,0185 m)

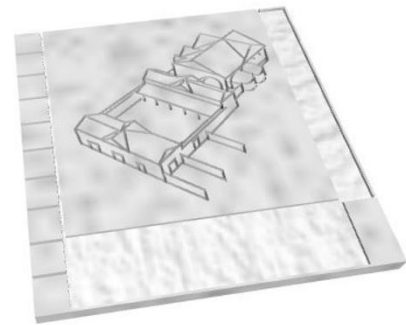
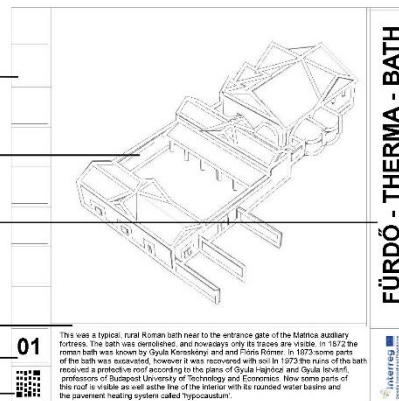
VR of the building
(if visitors put a paper on it, they can draw the
contour of the building)

name of the building
/Hungarian, English, Latin/
(glued on paper)

Description of the building
(on paper and glued on the surface)

No. of the building (glued on paper)

QR code to the LDL app (glued on paper)



'VR' stone is printed of plastic and can be placed on the ruin or glued on concrete / stone block and placed on the exact location of the former building surveyed by LBI Arch Pro

Fig. 1: the design of the VR Board (Prepared by PP BME).



Annexes:

The installation of the VR board on the site.



Fig 2: the traces of the Roman Bath on the Hungarian Pilot Site of the Living Danube Limes Project in Matrica – Százhalombatta.



Fig 3.: Installation of the VR Board



Fig 4.: The VR Board

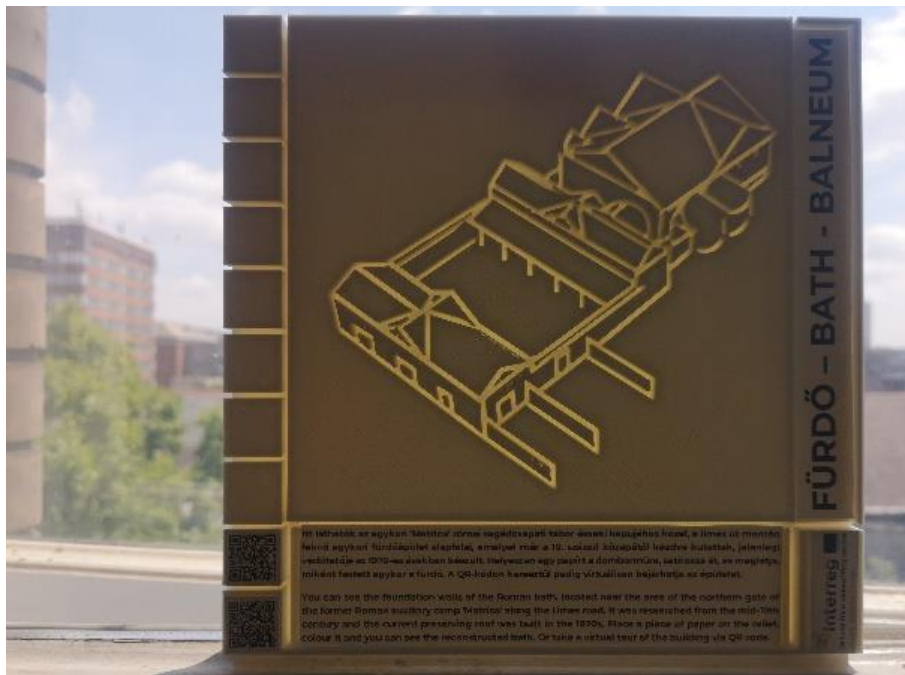


Fig 5.: The VR Board

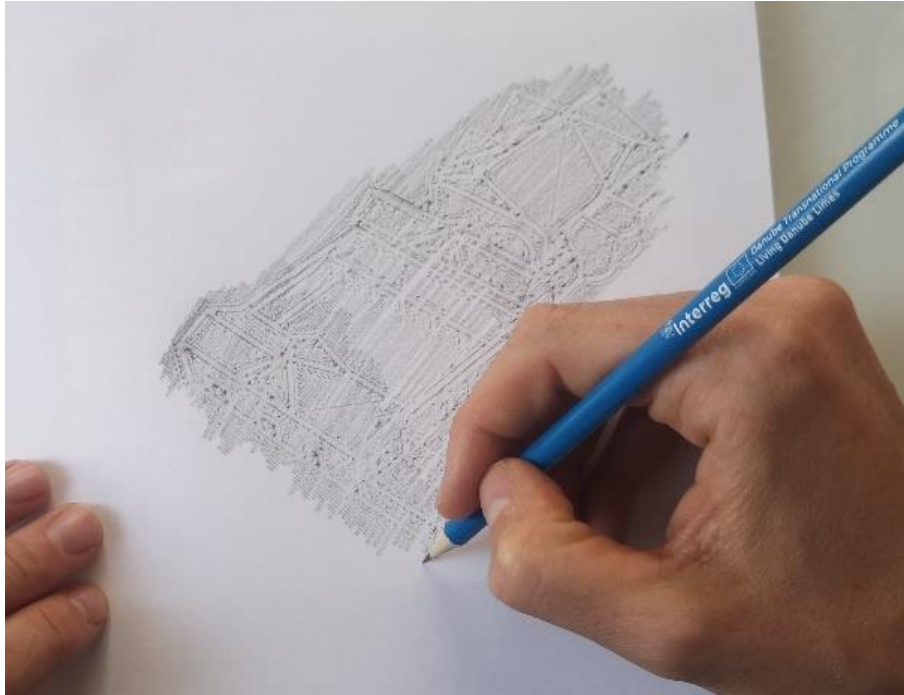


Fig 6.: By colouring the VR Board, the picture of the Bath can be copied on paper.



Fig 7.: The VR Board on site – containing the name of the building in Hungarian, English and Latin, a brief description and QR for the VR and the Living Danube Limes project.

4. Visibility Workshop

The Visibility workshop was organised with the thematic of Word Café following both theoretical and practical approaches – to have a benchmark on different aspects how to make the site more visible. Different stakeholders and members of target groups are invited to discuss the possible interpretation possibilities of the Pilot Site. The main organizer was the external expert Spatialist Ltd with the cooperation of PP6 BME - Budapest University of Technology and Economics, PP17 KÖME - Association of Cultural Heritage Managers and ASP Hungarian Society for Urban Planning.

The workshop contains site visit, presentation and moderated group discussions. It is also a registered education day by the Hungarian Society for Urban Planning, therefore the participants receive official credit points for the participation.

The workshop had a dual purpose. Firstly, to draw attention to the Roman Heritage of the Hungarian Pilot Site (Matrica, Százhalombatta) and prepare for the Connecting cruise of the reconstructed Roman lusoria type vessel. Secondly, to present the contemporary aspects of the research and touristic potential of the Roman frontier system, the limes research and results related to the project and to induce a conversation and brainstorming with the experts and stakeholders with cities that have Roman heritage along the Danube (see: D.T3.4.2.).

The workshop contained pilot site visit, implementation of virtual reality reconstructions on pilot sites, thematic presentation, moderated group work (brainstorming and discussion), summary and evaluation of the developed concepts.

The covered topics: D.T2.3.1 (VR reconstruction), D.T2.3.1 (VR reconstruction), D.T3.2.2 (visibility measure), WP I1 (Fully functional Roman Danube Ship), D.T2.2.2 (Connecting Danube River Cruise), D.T1.1.2 (Identification Pilot Sites), D.T2.1.1 (Identification and establishment of the museum structure in the Danube Limes region),

13:00 Registration

13:30 Pilot Site Visit and Implementation of virtual reality reconstructions on pilot sites

-The ruins of a Roman bath on the northern side of the area separated by water management in the 1970s, are underdeveloped in terms of both aesthetics and tourist reception. The nearly 50-year-old restoration and representation structures are now damaged, its environment is neglected and no information boards report what can be seen here. As part of the LDL project, a 3D printed VR board was placed that contains the main information of the building, the Living Danube Limes project and by QR code, visitors can visit the virtual reconstruction of the Bath (see D.T.2.3.2: Implementation of virtual reality reconstructions on pilot sites).

-The other destination of the site visit was the site of the Roman Auxiliary castellum of Matrica. On the site the remains are not visible. Through the territory of the camp, a monumental rampart was erected in the Napoleonic era to protect the settlement. Between the 3rd and 5th of November 2021, PP LBI Arch Pro carried out a fieldwork on the site. During this fieldwork, on the first day, GPR surveys were conducted within the

Roman vicus. On the second day, one agricultural field to the north around the Roman bath and two further fields in the area around the Roman fortress were surveyed. On the third day, the survey of the most southern field was completed. The survey conditions can be described as rather favourable, with the exception of the heavy rain on the second survey day. All fields were harvested, or free of higher vegetation upon arrival, they thus provided relatively smooth surface conditions. Altogether, 5.24 ha could be surveyed with GPR. The fieldwork at Százhalombatta yielded very good results, including probable Roman houses with adjoining agricultural fields. large pits with diameters between 1.5 m and 3.5 m, and massive Roman walls, pillars, and buildings. With very high probability, some of the structures can be assigned to the phase of the Roman fortress, showing typical ground plans comparable to known Roman building elements. The research found new, large-scale building remains in a part of the camp area that has received less attention so far.

14:30 Thematic presentations

After the programme, in two thematic presentation the following topics were presented to the participants:

- 1: The principles, holistic approach of the Living Danube Limes, with both the already finished outputs and the aims in the future.
- 2: The outputs of the filed survey of the LBI Arch Pro, where the participants could see the invisible buildings structures of the visited site.

15:15 Brainstorming and discussion

After the presentations, the moderated group workshop in Word Café Thematics began. In the ensuing workshop, participants took turns to discuss and express their thoughts on the following two topics:

1. By what means can we make the Roman heritage visible to the local population? How can we bring this legacy closer to living an everyday identity for the people of Százhalombatta? What are the physical, legal and human resource barriers that make these processes more difficult today, and what can advance the cause of local heritage protection and presentation?
2. How can we make the Roman heritage here visible to regional and national tourism? How could this location be included in active tourist routes? What improvements would be needed? Which marketing elements are suggested?

16:30 Evaluation of the concepts

The ideas were collected on boards, and the two groups have presented their results of their brainstorming.

17:00 Exhibition at Matrica Museum and Archaeological Park with the title: “Making the Matrica Camp Visible - Possibilities for re/exploring a Roman historical site”

After the programme, all the participants were invited to the Matrica Museum and Archaeological Park for the exhibition with the title: “Making the Matrica Camp Visible - Possibilities for re/exploring a Roman historical site” (see D.T.2.3.2 Implementation of virtual reality reconstructions on pilot sites).



Fig 8: Poster of the programme at the entrance of the venue that is located at the Pilot Site of Százhalombatta and the stop of the Connecting Cruise.



Fig 9: Site Visit on the Pilot Site – the traces of the Roman Bath of Matrica, Százhalombatta, Hungary.



Fig 9: Installation of the VR Board on the Pilot Site – the traces of the Roman Bath of Matrica, Százhalombatta, Hungary.
(see D.T.2.3.2: Implementation of virtual reality reconstructions on pilot sites).



Fig 10: Site Visit on the Pilot Site – the area of the auxiliary castellum of Matrica, Százhalombatta, Hungary.



Fig 11: Thematic presentation of the principles, holistic approach of the Living Danube Limes, with both the already finished outputs and the aims in the future as well as the outputs of the field survey of the LBI Arch Pro, where the participants could see the invisible buildings structures of the visited site.



Fig 12: Thematic presentation of the principles, holistic approach of the Living Danube Limes, with both the already finished outputs and the aims in the future as well as the outputs of the field survey of the LBI Arch Pro, where the participants could see the invisible buildings structures of the visited site.



Fig 13: Brainstorming and discussion - moderated group workshop in Word Café thematics.



Fig 14: Brainstorming and discussion - moderated group workshop in Word Café thematics.



Fig 15: Brainstorming and discussion - moderated group workshop in Word Café thematics.



Fig 16: Brainstorming and discussion - moderated group workshop in Word Café thematics.



Fig 17: Presentation and evaluation of the results of the thematic group brainstorming.



Fig 18: Participants of the workshop in front of the poster of the programme.

5. Virtual Reality Reconstruction and 3D Models

In parallel with the implementation of the VR on the site described at Point 3, the VR and 3D Model was presented at a complex exhibition at 'Matrica' Museum. This exhibition provided an opportunity for the understanding of the used methodology for the preparation of the VR (true-to form survey and 3D point cloud of the Roman Bath, the survey of LBI Arch Pro, and the VR both online and offline).

2: Implementation of the VR within the exhibition at Matrica Museum and Archaeological Park with the title: "Making the Matrica Camp Visible - Possibilities for re/exploring a Roman historical site"

24th June 2022, 17:00

The VR of the Roman bath was also disseminated within a complex exhibition at the 'Matrica' Museum of Százhalombatta. The exhibition provided an insight into the history of the "Matrica" Roman auxiliary camp with

- archaeological findings excavated on the Pilot Site that have never been exhibited,
- the survey fulfilled by LBI Arch Pro (Output T2.2)
- virtual reconstruction of the Roman baths created in the Living Danube Limes project

- survey drawings and conceptual designs for the development of the heritage site by students of architecture and specialised engineers of monument preservation of Budapest University of Technology and Economics (Output T1.2 Learning Interaction).

The opening ceremony was organized with the participants of LFG Meeting 2:

- with the opening speech of the Vice Major of Százhalombatta, Mr. Sándor Török, the Director of Matrica Museum and Archaeological Park Ms. Gabriella T. Németh and the Head of Department of History of Architecture and Monument Preservation of PP BME, Dr. János Krähling.
- PP's of Living Danube Limes Project (PP6 BME Budapest University of Technology and Economics and PP17 KÖME Association of Cultural Heritage Managers)
- external expert Spatialist Ltd.
- local stakeholders and civils of Százhalombatta
- invited guests from cities alongst the Danube (Major of Ercsi, Vice-Major of Baja, Chief Architect of Dunaújváros).

The exhibition is opened until the end of September.

Within the exhibition, the VR is visible:

- offline, on printed pictures with survey drawings
- offline, with the multifunctioning VR board
- offline with a game prepared for children
- online, presented via projector with silicon statue installations

The reason for the choice: the board provides offline and online visibility for the VR on the professional institution related to the Hungarian Pilot Site (Matrica Museum), that can reach the attention of both experts and both the public.

This way of implementation within an exhibition contains

- historical descriptions
- original, archaeological findings
- historical photos of the site
- survey of the site

provide a more informative and complex way to make understandable the context of the VR. Besides, the exhibition gives an insight of its preparation process – from the survey and archaeological excavation to the prepared reconstruction.

Implementation of the VR within the exhibition at Matrica Museum and Archaeological Park with the title: “Making the Matrica Camp Visible - Possibilities for re/exploring a Roman historical site”



Fig. 19: The overview of the exhibition.



Fig. 20: The overview of the exhibition.



Fig 21: The corner of the VR with the phases of its preparation from excavation and survey to the realisation, and the projected interior where the visitors can explore themselves the Bath. It is framed with two silicon statues with reconstructed clothes.



Fig 22: The corner of the VR with the phases of its preparation from excavation and survey to the realisation, and the projected interior where the visitors can explore themselves the Bath. It is framed with two silicon statues with reconstructed clothes.



Fig 23: The corner of the VR with the phases of its preparation from excavation and survey to the realisation

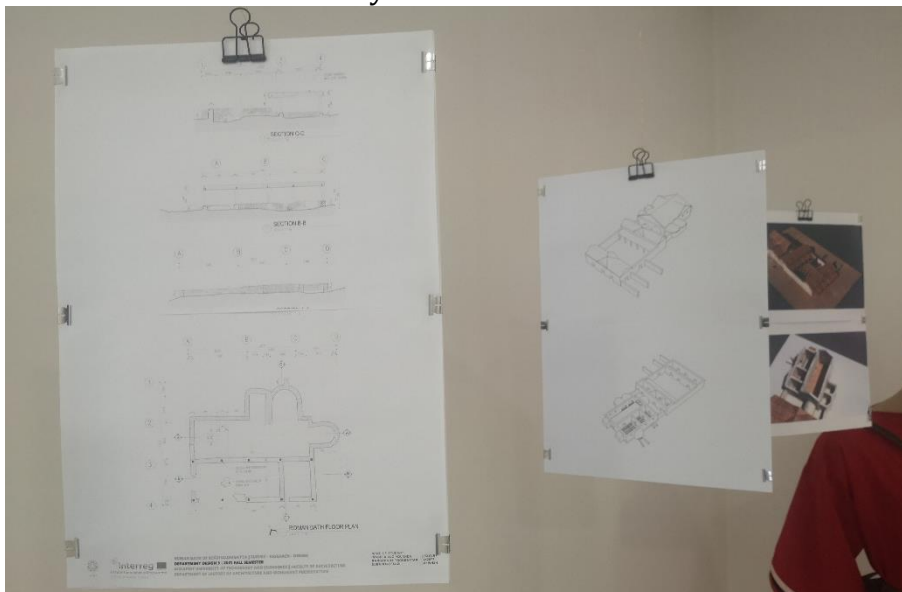


Fig 24: The corner of the VR with the phases of its preparation from excavation and survey to the realisation.



Fig. 25: The corner where the survey method of LBI Arch Pro is explained to make understandable the scientific input of the VR.



Fig. 26: Archaeological findings from the site that have been never exhibited. The original evidences makes the VR more understandable.



Fig. 27: Game for children: on the left: explore the site as an archaeologists. By opening the different places, children can see VR photos of the buildings and descriptions. Among them the VR of the bath is visible. On the right: the VR board – the same that has been placed on the site.



Fig. 28: Opening speech of of the Vice Major of Százhalombatta, Mr. Sándor Török, the Director of Matrica Museum and Archaeological Park Ms. Gabriella T. Németh and the Head of Department of History of Architecture and Monument Preservation of PP BME, Dr. János Krähling with the participation of experts, local stakeholders (members of LFG Meeting 2).

6. Interplay between the 3D Models and Physical Visibility Measure

Please describe how the 3D models and visibility measures are related to each other. How do they interact during a visit? Are their contents related to each other? Etc.

The design process of the VR Board that provides a physical visibility measure on the site is based on the VR reconstruction. The design process was the following:

The VR reconstruction was prepared according to different survey methods (see DT. 2.2):

- TLS Scanning of the ruin of the bath which was resulted in a 3D point cloud prepared by Learning interactions.
- Archaeological descriptions and findings collected by Learning interactions.
- Field Survey implemented by LBI Arch Pro.

	Objectives - phases	Activity	Deliverable
PREPARATORY PHASE	1. survey and benchmark of the historical features of the site and its present urban and touristic conditions	Learning interaction no. 1	DT.1.2.
		Learning interaction no. 2.	DT.1.2.
		GPR Survey of the Site	
		Creating the 3D Point Cloud of the site	Within D.T.1.2.
		Preparation of VR of the site	D.T.2.3.1.
DISSEMINATION PHASE	2. improvement of the visibility of the site	Implementation of virtual reality reconstruction on the pilot site	D.T.2.3.2.
		External events	D.C.3.3.
	3. creating synergies and cooperations prior to the improvement of the visibility, the preservation and management of natural and cultural heritage	LFG Event 1	D.C.3.5.
		LFG Event 2	D.C.3.5.
		Roman Danube Limes Day Visibility Workshop	D.T.3.4.2.

The visibility measure contains both offline and online contents for different target groups using the methodology of gamification:

	ONLINE	OFFLINE
for experts, adults	the website of the LDL Project	the name of the site in English - Hungarian - Latin
	the QR code of the LDL App can be placed on it	brief information about the history of the building

for children gamification -	the Virtual Reconstruction of the monument can be reached by a QR code	the engraved shape of the VR - if the visitors place a piece of paper on the 3D printed board, and colour it, the drawing of the bath can be copied and taken to home.
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7. Further Project Initiatives and Activities Fostering the Visibility of the Pilot Site

The further aims that can realise on the site are the followings (see: DT. 3.2.2.):

- **Within the LDL project: Roman Danube Limes Day (see: D.C.3.4.)**
 Within this public event, the organisers highlighted the roman heritage of the city of Százhalombatta that is hardly known among locals as it is slightly visible on its spot. During the event, we presented roman gastronomy and roman tools for measuring (e.g. a „groma“). Besides, we invited roman reenactors who presented the lifestyle, suits and equipment of the people of an auxiliary camp just as Százhalombatta was in the ancient times. The event provided craft making programs (e.g. stamp making of Matrica), a concert and a venue where we presented the project, the new visibility measures of the roman bath (VR reconstruction, 3D printed tool) the Roman vessel called Danuvina Alacris, and the upcoming Connecting Cruise and its Hungarian sections were promoted. The programme was organised in line with the well-known „Nights of Museums“ initiative to find beneficiary synergies with the museum of the Hunagrian pilot site.



Fig. 29-30: Preparation of Roman Brick with ‘Matrica’ stamp, according to an original finding that was exhibited at the Matrica Museum at the Visibility Exhibition, on 24th July 2022 (see: D.2.3.2 VR) and the presentation of reenactors of Legio Leonum Valentiniani.



Fig. 31: Children playing with the ‘archaeologist game’. With this game, the children can explore the Matrica Castrum. By opening the small windows, they can find the reconstructed buildings that was identified by the field survey of LBI Arch Pro within the Living Danube Limes Project, and they can see the VR of the Roman Bath of Matrica that was implemented within the Living Danube Limes project (D.T2.3.1). This game was prepared especially for the project, and will be found at Matrica Museum for gamification.



Fig 32-33: The archaeological game prepared within the project with the logo of the ‘Matrica’ brick.



Fig. 34-35: The presentation of reenactors and the information desk of Living Danube Limes project, where visitors can learn the holistic approach and principles of the project as well as the further programmes and events (especially the connecting cruise). At the info point of Living Danube Limes project, the visitors could explore the VR of the Roman Bath online (D.T2.3.1), as well as the VR board that was placed on the Pilot Site could be tried (D.T2.3.2 VR) with the official pencil of the Living Danube Limes project (promotion material – D.C.4.1.).



Fig. 36-37: The table for Roman dinner (“Matius’ dinner) prepared according to the original Roman recipe, and a poster on the reconstructed lusoria by the project as well as the principles of the Connecting Cruise.



Fig. 38-39: Traditional market and colouring of the lusoria that is implemented by the project (I4) for the promotion of the Connecting Cruise for families.



Fig 40: A Roman groma for trying the traditional Roman architectural tools. The groma was reconstructed for the Living Danube Limes project according to the experience within the Archaeological Summer School (D.T1.3.1.)

- **Within the LDL project: Connecting cruise**

The information and principles of the reconstruction of the Roman vessel and its cruise were presented at almost all the events – therefore the participants and stakeholders of the events at point 9 can meet and be involved to the Cruise.

8. (Future) Initiatives at the Pilot Site Triggered Through *Living Danube Limes*

- **Following the LDL project (on the site):**

The visibility measure that was prepared during the project for the Roman bath can be prepared for other buildings of the Pilot Site. Also, further VR's can be prepared to make all the castellum visible.

There is already a need on behalf of the director of the Sport Centre to prepare a small exhibition on the site on its Roman history. That can be the first step to create a visitor centre at the Pilot Site in the long future.

- **Following the LDL project (see: DT. 3.2.2.):**

Following up on the already existing measures of presenting a less-well-known Roman site, present circumstances, including the UNESCO World Heritage nomination process of the eastern part of the Roman Danube Limes and numerous types of cooperation within international projects and participation in the formation of cultural routes, offer outstanding potential for the city of Százhalombatta. At Százhalombatta this cross-cutting approach connects Roman history to the 21st century and offers new possibilities for not only the well-known sites in Hungary, such as Aquincum (Budapest), Brigetio (Szőny) or Lussonium (Paks-Dunakömlőd) but also for the areas that are rarely in the spotlight, because, for example, there is not very much to be seen above grounds.

- **Following the LDL project (see: DT. 3.2.2.):**

The development of the site can provide synergy between the historical site and other disciplines (sport, well being). It has direct connection to the Danube, therefore the access from the side of water is also an advantage. Besides, since the site contains not only Roman findings but also historical structures from a Medieval town and Napoleonic Ramparts, the area can be a hub to meet with different ages at one site, close to an important Archaeological Park with Early Bronze Age thematics. Nevertheless, since the site is the 3rd auxiliary castellum from Aquincum/Óbuda – it can be developed in connection with the other similar sites: Campona/Nagytétény and Érd. The site survey of PP LBI Arch Pro and the evaluation of the graduate and postgraduate students of BME and the different events and workshops organized with PP KÖME, ASP Hungarian Society for Urban Planning and External Expert Spatialist Ltd gave an insight to the architectural and archaeological potential of the site.

9. Existing Synergies Capitalised and New Synergies Generated

During the programmes the following stakeholders were involved, that could create possibility for cooperations and synergies that can lead towards the project (see DT. 2.2):

Objectives phases	Activity	Description
1. survey and benchmark of the historical features of the site and its present urban and touristic conditions	Learning interaction no. 1	PP BME (lecturers and graduate students) ASP János Banner Foundation of Archaeology (Expert of Archaeology and Museology) Municipality of Százhalombatta (Chief Architect) Matrica Museum and Archaeological Park (Százhalombatta) Katalin Wollák (heritage expert)
	Learning interaction no. 2.	PP BME (lecturers and postgraduate students from different fields) PP KÖME (survey of stakeholders) PP LBI Arch Pro ASP János Banner Foundation of Archaeology (Expert of Archaeology and Museology) Municipality of Százhalombatta (Chief Architect) Matrica Museum and Archaeological Park (Százhalombatta) Katalin Wollák (heritage expert)
	GPR Survey of the Site	PP LBI Arch Pro ASP János Banner Foundation of Archaeology (Expert of Archaeology and Museology) Matrica Museum and Archaeological Park (Százhalombatta)
	Creating the 3D Point Cloud of the site	PP BME (lecturers and graduate students)
2. improvement of the visibility of the site	Preparation of VR of the site	7 reasons in cooperation with PP LBI Arch Pro PP STUBA PP BME
	Implementation of virtual reality reconstruction on the pilot site	PP BME PP KÖME ASP János Banner Foundation of Archaeology ASP Hungarian Society for Urban Planning External Expert Spatialist Ltd Municipality of Százhalombatta (Deputy Mayor, Chief Architect, PR and Communication Manager) Matrica Museum and Archaeological Park with the participation of the representatives of Municipality of Ercsi (Mayor) Municipality of Baja (Deputy Mayor) Municipality of Dunaújváros (Chief Architect) Municipality of Óbuda Director of Club Sirály (Sport centre at the pilot site) Headmaster of the Arany János Secondary School of Százhalombatta Civils of Százhalombatta
	External events	PP BME PP KÖME ASP Hungarian Society for Urban Planning ASP János Banner Foundation of Archaeology Danube-Ipoly Natural Park

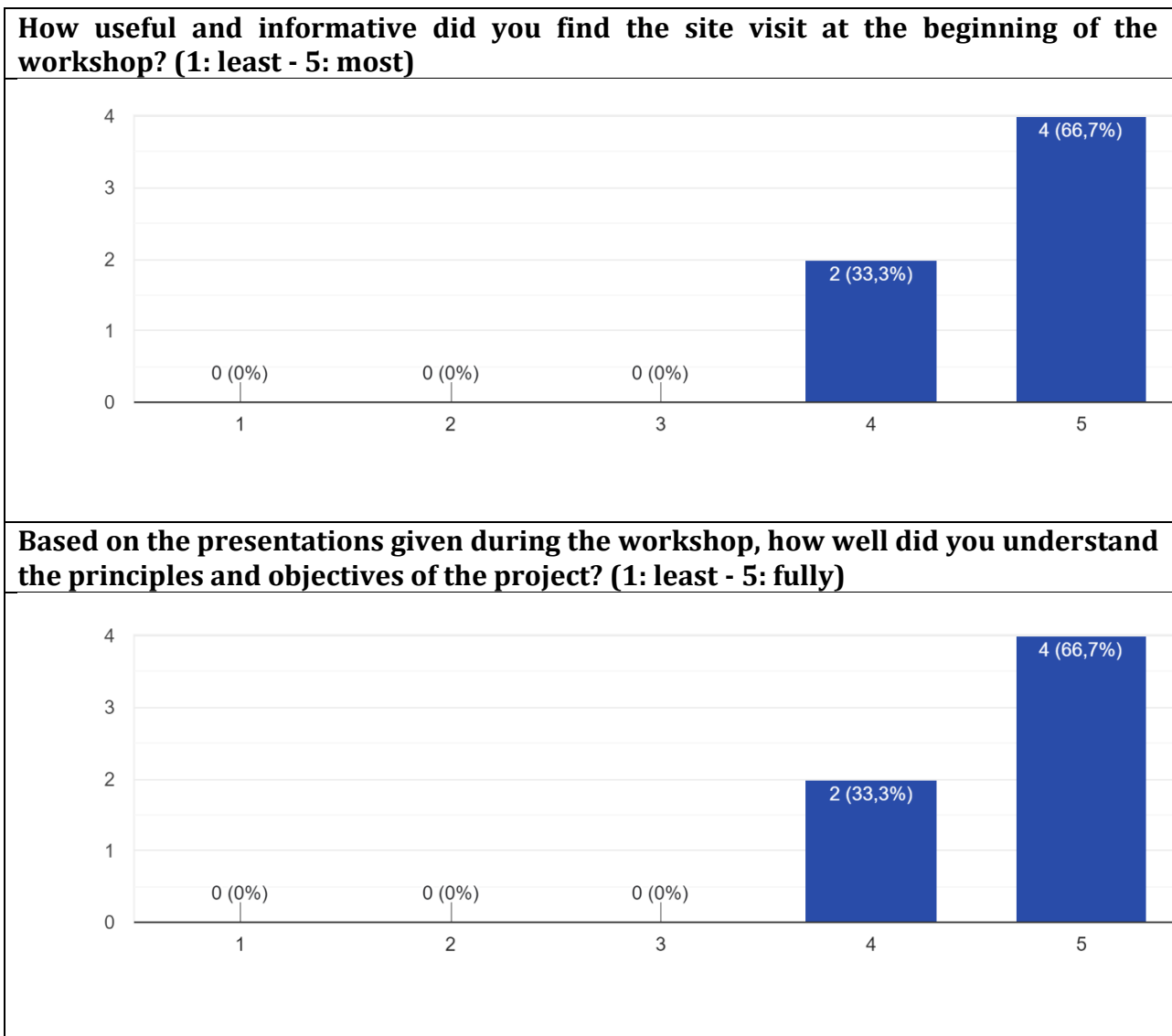
		Hungarian National Museum ICOMOS Hungary European Association of Archaeologists Hungarian Society of Archaeologists and Art Historians
3. creating synergies and cooperations prior to the improvement of the visibility, the preservation and management of natural and cultural heritage	LFG Event 1	PP BME ASP Hungarian Society for Urban Planning Archaeological Park of Százhalombatta Civils of Százhalombatta
	LFG Event 2	PP BME PP KÖME External Expert Spatialist Ltd Municipality of Százhalombatta (Deputy Mayor and Chief Architect), Matrica Museum and Archaeological Park (Director and Colleagues), experts from different professions (Architects, Archaeologists, Restorators)
	Roman Danube Limes Day	PP BME PP KÖME External Expert Spatialist Ltd Municipality of Százhalombatta (Deputy Mayor and Chief Architect), Matrica Museum and Archaeological Park (Director and Colleagues), experts from different professions (Architects, Archaeologists, Restorators) Civils Reenactors
	Visibility Workshop	PP BME PP KÖME ASP János Banner Foundation of Archaeology ASP Hungarian Society for Urban Planning External Expert Spatialist Ltd Matrica Museum and Archaeological Park with the participation of the representatives of Municipality of Baja (Deputy Mayor) Municipality of Dunaújváros (Chief Architect) Municipality of Óbuda Director of Club Sirály (Sport centre at the pilot site) Headmaster of the Arany János Secondary School of Százhalombatta Civils of Százhalombatta
	Museum Cluster	The Museums and Visitor Centres that has already joined to the Museum Cluster, therefore the formation of synergy has begun: Matrica Múzeum (Matrica Museum and Archaeological Park, Százhalombatta BTM Aquincumi Múzeum (Budapest History Museum Aquincum Museum and Archaeological Park, Budapest Paksi Városi Múzeum (Town Museum of Paks), Paks Hansági Múzeum (Hanság Museum), Mosonmagyaróvár Római Kőtár/Lapidarium Brigetionensia, Komárom Balassa Museum, Esztergom Intercisa Múzeum, Dunaújváros Gorsium Régészeti Park (Gorsium Archaeological Park and Open Air Museum), Tác Lussonium, Paks-Dunakömlőd, Paks
	Preparatory meetings for the Connecting Cruise	Ministry for Internal Affairs – Deputy State Secretary of Water Management Hungarian Tourism Agency PP BME PP KÖME ASP Hungarian Society for Urban Planning



		External Expert Spatialist LTD Budapest Historical Museum Aquincum Museum Hungarian National Museum Klapka György Museum (Komárom) Balassa Museum (Esztergom) Municipality of Százhalombatta Matrica Museum and Archaeological Park of Százhalombatta Municipality of Adony Municipality of Dunaújváros Municipality of Baja Municipality of Mohács Territorial Directorates of Water Affairs
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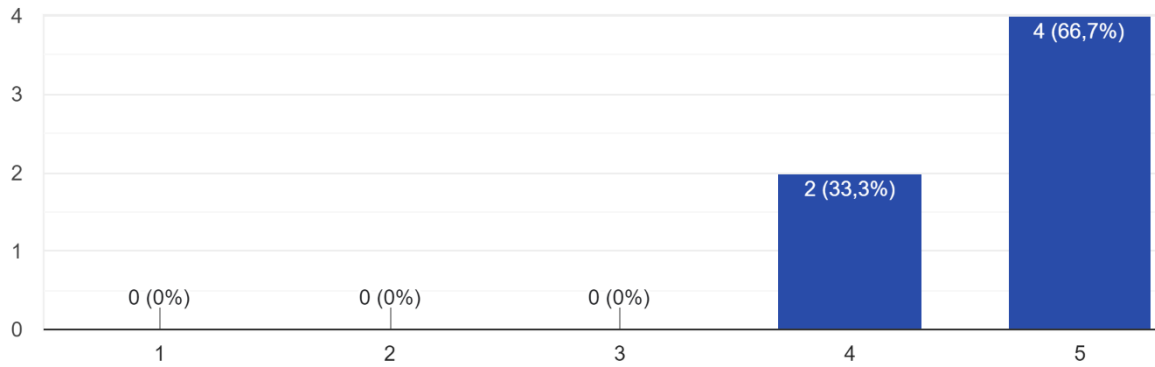
10. Feedback of Participants

After the described programmes the following survey was sent to the participants:

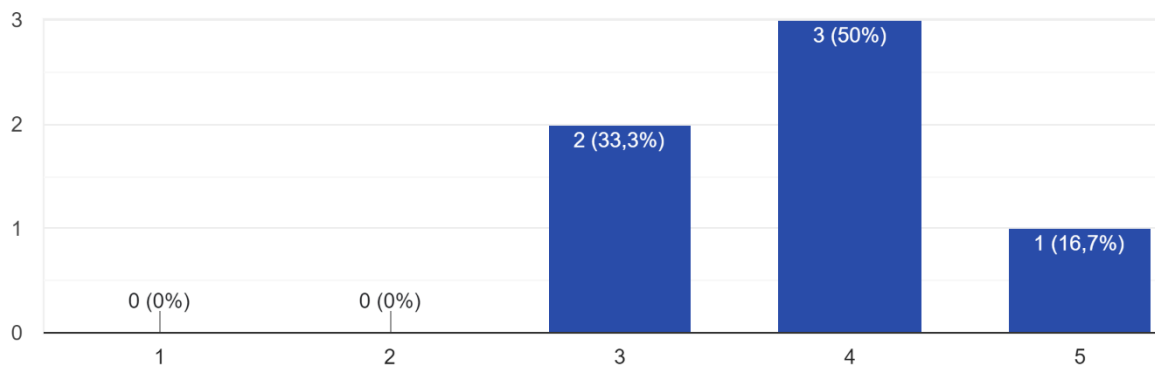




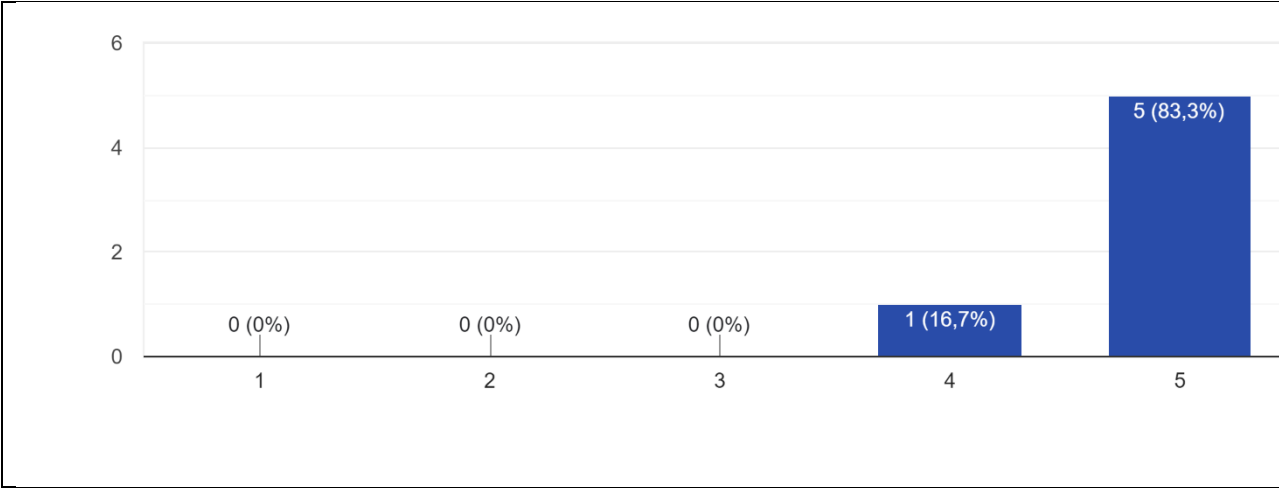
The workshop presented the ground-penetrating radar survey carried out by the Ludwig Boltzmann Institute at the 100 Halombatta site. In your opinion, to what extent could the non-destructive detection/excavation of unknown Roman monuments still underground today be a promising and feasible solution in Hungary, and to what extent could it help to promote the presentation of a heritage site? (1: least - 5: most)



The workshop included two thematic round tables with moderated discussion and brainstorming based mainly on the information gathered on the pilot site in Hundred Halombatta. To what extent do you think that the contributions and suggestions made help to improve the visibility and presentability of the heritage elements of a municipality, and to what extent can you "take home" what was said here, and generalise certain elements? (1: least - 5: most)



Please rate the organisation and preparation of the workshop (1: lowest possible score - 5: highest possible score)



Please provide a short feedback or idea for our work in the future.

- Some more, further, similar creative and operational workshops are necessary on the site.
- The project should be taken forward. The area of the castellum should be preserved for posterity, of course with a status reservation. A programme in August with a larger demonstration hunt to make the radar-verified condition more spectacular would go a long way to protecting it.
- We will be interested partners in the following phases of the project, as already discussed.