

Community-led Urban Strategies in Historic Towns (COMUS)



Community Managed Urban Strategies in Historical Cities (COMUS)

The Area of Geophysical Observatory

Preliminary Technical Assessment



Dusheti, Georgia 2016

1. Introduction

- 1.1. Country or territory: Georgia
- 1.2. Name of the organization, which collects information: The municipality of Dusheti
- 1.3. Contact name: Tornike Asabashvili
- 1.4. E-mail address:



torkineasabashvili@gmail.com

- 1.5. Name and address of the object: Geophysical Observatory, Theater St., 1, (former Observatory St.), Dusheti, Georgia.
- 1.6. Indicated inventory number/numbers: #6935, 08.01.2014
<http://dataherita.ge/uploads/files/uZravi%20Zeglebis%20reestri%20www%2029-09-16.pdf>
- 1.7. Building/monument/site type:
Engineering, landscape architecture
- 1.8. Main dates: 1935, 1953, 1960 years.
- 1.9. Current use: Geophysical Observatory

2. Summary: The Object and its Management.

The Dusheti Geophysical Observatory is one of the sightseeing spots of the city. The subject of its research is continuous registration of the Earth's magnetic field variations and determining the absolute value of its formers.



Observatory was initially founded in Tbilisi in 1836, after the electrization of Tbilisi it was moved to Karsan. Later, in 1935, due to railway line construction, it was moved to Dusheti. The Observatory was one of the most important scientific centers that contributed to the magnetism of the Earth, hydrometeorology, atmospheric electricity and other scientific studies in the former Russian Empire and the Soviet Union.

Administrative building, temporary and permanent pavilions and small laboratories are located in the former Karangozishvili garden and cemetery territory. Gravestones from the 19th century are still preserved. Legend says that this is the place of death of the famous Russian poet Al. Pushkin's nurse, which is again linked to the old military path of Georgia and demonstrates historical and cultural significance of the territory.

Scientific activity reduced to a minimum after the collapse of the Soviet system. Today, only a few employees work at the Observatory, physical state of which is extremely poor. The area is hardly indicative of the existence of any kind of scientific function, although observations are still being conducted with the help if modern equipment and information is provided in a permanent manner through the Internet to the Institute of Geophysics in Tbilisi and also the World Scientific Network.

The convenient location of around 8 hectares of land and a perfect view makes it an attractive housing destination. However, it needs to be taken into consideration that any intervention that may impact the magnetic field of the Earth and prevent precise functioning of the equipment of the observatory within 500m around the observatory and within at least 100m radius is inadmissible.

The task of the project team was to find an optimal solution for the area. Significant role was played by the negotiations held by the Institute of Geophysics and local government on transfer of the

present dysfunctional part of the territory to the local government, with regard to the development of its alternative and compatible social function.

The main idea is to maintain and expand public access to the territory and prevent its privatization and division into small plots. With this regard, the use of the territory is a family-leisure zone managed by the municipality where the existing wooden cottages can be rehabilitated and rented seasonally, and the area can be well-equipped and be equipped with children's playgrounds and other outdoor arrangements, with attractions that are compatible with the functionality of the Observatory. At the same time all these interventions should help to demonstrate the primary scientific function of the territory, visibility and representation of the history of the territory, through introduction of external banners, interactive communication panels and interpreter space, which can be placed in the former administration building.

In case of successful functioning of the territory, the Observatory administration may consider the possibility of adding wooden cottages without interfering with the observation processes, which will also traditionally host students and scientists who come to practice.

This idea is backed up with the fact that despite the growing demand, today there is a shortage of comfortable and affordable rental apartments / houses in Dusheti. There is only one private hotel in the city, which is very low quality and high price compared to the quality. On the other hand, Dusheti's convenient location near the capital, with the World Bank funding rehabilitation works in the historic part and revitalization activities within the COMUS, together with the environment and heritage values, make Dusheti an attractive recreation center throughout the year.

3. Administrative Information

3.1 Responsible Authorities

The Observatory area and its buildings belong to the Dusheti Geophysical Observatory, which is the part of M. Nodia Institute of Geophysics. The Institute of Geophysics is an independent scientific-research structural unit of Ivane Javakishvili Tbilisi State University. The territory is not officially transferred to these agencies and therefore, it is managed by the Ministry of Economy and Sustainable Development of Georgia as state property.

One wooden cottage is used by the Georgian National Environmental Agency of Hydrometeorology Department. This facility is registered for temporary use by the organization.

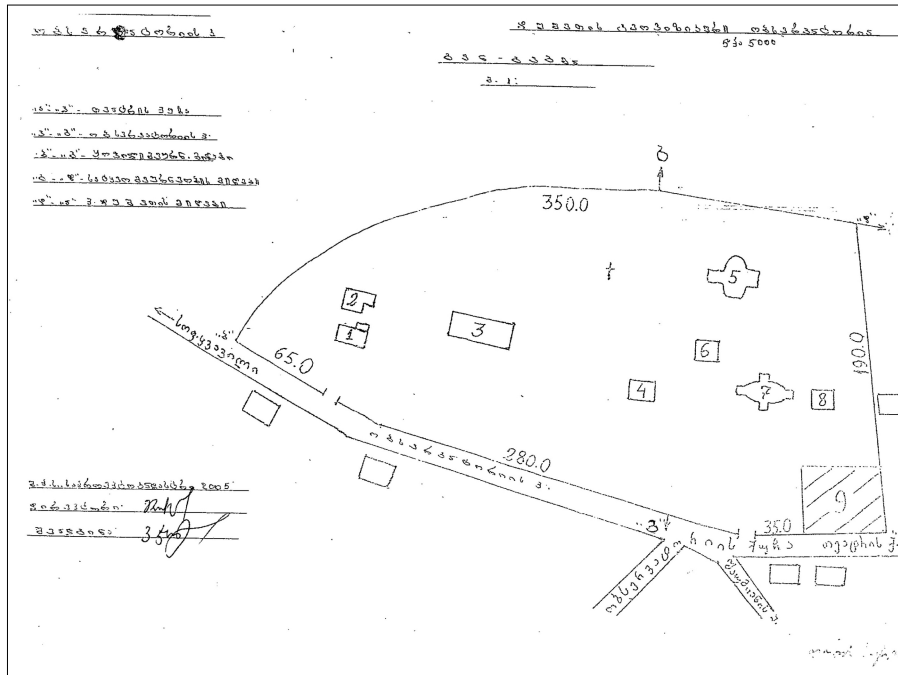
Because the Observatory Complex is granted the cultural heritage status, it is also the responsibility of the Ministry of Culture and Monument Protection and the National Agency for Cultural Heritage Preservation.

3.2 Building/Territory, Name and Address

Geophysical Observatory

1, Theater St. (former Observatory St.), Dusheti, Dusheti municipality, Mtskheta-Mtianeti region, Georgia.

X:
Y:



3.3 Cartographic Information

42 089180
44 701771

3.4 Type of Monument

Engineering,
landscape
architecture.

3.5 Property

Ministry of

Economy of Georgia

3.6 Mandatory Protection/Restrictions

Based on the arrangement and functionality of Geophysical Observatory, the Observatory and its surrounding area (500 m or no less than 100 m radius) should be protected from any intervention and use of materials that may possibly impact the magnetic field the Earth.

In accordance with the Georgian Law on Cultural Heritage, Dusheti Geophysical Observatory Complex has been granted the status of cultural heritage monument in 2014. Thus, the legislation establishes, that the monument of culture is automatically assigned physical protection at the area of at least 50 meters, and visual protection at the area of 150 meters, and the regimes of protection are defined by the Law on Cultural Heritage. A permit for intervention on the building is issued by the National Agency for Cultural Heritage Preservation.

4. Conclusion on Physical Condition

4.1 Evaluation of Physical Condition – from very bad to good

(ruined, very bad, bad, average, good, very good)

Very bad, bad.

4.2 Risk Assessment – A-H

(high risk- A, average - B, low - C, no risk -D)

A

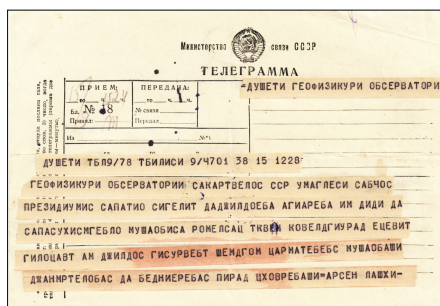
4.3 Priority for intervention - high/average/low

High

5. Available Information

5.1 Documentary resources

Working reports of Dusheti Geophysical Observatory and other documentary materials are preserved in the archives of the Institute of Geophysics, State Archives of Georgia, National Agency for Cultural Heritage Preservation, the National Parliament Library of Georgia.



pic 2,3,4,5: Documents protected in Dusheti Observatory Archive: 1938 Variation (right) and large magnetic (left) pavilions, 1970 Diploma and congratulations for the 125th anniversary

times. Among them are various dissertation

works, newspaper articles, scientific publications, works of Georgian Institute of Geophysics, rules issued in different periods, instructions and laws, etc. As to modern research, most distinguished is the work on Tbilisi Geophysical Observatory, written by M. Mania, architecture historian, in which

work he also mentions moving of the Observatory first to Karsan and then to Dusheti, and also his latest book on Dusheti architectural and urban heritage.

- Observatory jubilee, celebration of the 125th anniversary of Dusheti Observatory, Communist, 19.09.1970, Tbilisi
- Gogua R., (2009) The Dusheti Observatory is the only one in the Caucasus, Phudznari, Dusheti.
- Gogua, R. (2013) Geophysical Observatory of Dusheti (Tbilisi): Past and Present, Works of Mikheil Donia of Institute of Geophysics, vol. Lxiv, 2013
- Ioramashvili G. 05.07.2011, Dusheti Observatory - Scientific Institution without any Attention, Mtskheta-Mtianeti Information Center. http://ick.ge/articles/6828-2011-07-05-06-12-25.html?format=html&Itemid=69&option=com_content&id=6828:2011-07-05-06-12-25&view=article&month=6&year=2011
- Okruashvili, D. 29.05.2011, "Dusheti Observatory Trouble", all news <http://www.ambebi.ge/sazogadoeba/36774-dushethis-geofizikuri-observatoriis-gasatciri.html?sesAjax=yes&rand=>
- Nodia, M., (1970) Tbilisi is one of the oldest fundamental geophysical centers in the USSR and the world. Collection of Works of Historical Council of Natural Sciences and Techniques, 1-2, Tbilisi
- Nodia, M., (1958), Tbilisi Magnetic Observatory – Worldwide Magnetic Observatory Network, Tbilisi 1500, Anniversary Collection, Tbilisi
- Nodia M., and Didebulidze A., (1927), written reports, SAHES und das magnetische Observatorium in Karssani, Tiflis, p. 7-14, 15-25.
- Nodia, M., (1946), Magnetic Field in the Dusheti Magnetic Observatory, Bulletin of the Georgian Academy of Sciences, T. VII, # 4, Tbilisi, p.157-158.
- Katsiashvili, N.A. Magnetic Observations in Georgia
- Mania, M., (2010) Tbilisi Geophysical Observatory - History and Architecture. Tbilisi
- Mania M., (2016), Dusheti: Urban and Architectural Heritage, Tbilisi
- Negaev, S.N., Rasson, J.L. (1962), Guidelines for Stationary Geomagnetic Observations, Academy of Sciences of Russia, Sun and Earth Physics Institute

5.3 Conducted field work

Evaluation of the Observatory Complex was conducted in the framework of Cultural Heritage in 2011 under the Dusheti Urban Heritage Inventory Project.

Due to lack of finances, the Institute of Geophysics did not conduct engineering research on the condition of buildings. The visual assessment of the territories and buildings was performed by the PTA Group under the COMUS Project in 2016.

5.4 Ongoing Projects

No ongoing projects.

5.5 Planned Projects

According to the verbal agreement between the municipality local government and the Institute of Geophysics, a part of the territory and execution of non-functional and damaged buildings will be probably transferred to Dusheti municipality for their further rehabilitation and usage for public purposes.

5.6 Performed Financial Cost Estimates

Non existent

6. PTA Scope

6.1 Evaluation Volume/Content

Complex group of local and national experts, architects, engineers and culture policy specialists worked on the card. The card was created based on consultancy provided by the administration of the Institute of Geophysics and Robert Gagua, Director of Dusheti Geophysical Observatory. For the card the group also used the information given in the registration card, drawn up in 2011 and preserved in the archive of Cultural Heritage Preservation (author: Maya Mania).

6.2 Research Limitations

Due to the lack of time for the research, it was not possible to study archived documents of the observatory or conduct detailed engineering-geological research of buildings.



pic 6: Finnish cabin: Meteo observation station



pic 7: Temporary Absolute and Variation Pavilion

7. PTA

7.1 Context: Form, Function and Evolution.

7.1.1 *Summary description:*

The Observatory Complex is located at the height of the old town, near the road to the Tianaantakari and Kvavili or other neighboring villages to the west from the Kurko Forest, in former Karangozishvili's garden. The Observatory Complex buildings are:

1. Temporary Absolute and Variation Pavilion (see pic 6.)
 2. Meteorological observation station, Finnish cabin (see pic 5)
 3. Large Pavilion for Absolute Observation (see picture on the cover)
 4. So-called nuclear pavilion
 5. Finnish cabin (former laboratory)
 6. Administration building
 7. Guest house
1. In the first years of establishment of Dusheti Observatory, in 1935-1937, temporary absolute and variable and large magnetic pavilions (pic 3 and 2) were built on one of the highest points of the Observatory territory. As for today, these facilities are not preserved, as in the next phase of construction, in the 1950s, new modern buildings were built on the territory. Presently, the temporary absolute and variation pavilion represents a structure composed of two concrete two-circuit plan parts, with its back in the ground. Its walls are not reinforced. The peculiarity of the building is that its back side is deeply cut into the ground and the only facade looks down on the damping relief of the observatory area. From the narrow middle part of the concrete facade counterforce-like "arms" are projected and make an obtuse angle with the surface of facade. On the symmetry axis of the facade, there is a doorway with raised arch on top. The upper middle part of the facade is finished with a brick laid, semicircular fronton. Specific is the roofing of the construction deeply cut into the relief. It is concrete, following the shape of the bump. From the plastic roof, oblong rectangular section pillars are erected. Outside the side walls of the engineering construction underground, fragments of developed walls follow the relief stepwise.
 2. In 1935, the so-called Finnish cabin was built at the road edge. This is a traditional Finnish house, covered with two-wing tile roof, with wooden walls and framed rectangular window openings. The eastern facade of the one-storey construction has a one-wing tile-covered gallery, which is the main entrance of the cabin.

The Finnish Cabin was used for meteorological data processing and its immediate surrounding area represented a meteorological platform, which is still preserved with equipment for metallurgical observations.
 3. The Big Magnetic Pavilion of the Dusheti Observatory is located almost in the center of the Observatory. It was used for magnetic observations. The construction was completed in the

summer of 1953. In October of the same year, installation of absolute magnetic devices was completed.

It is noteworthy that the Dusheti pavilion for absolute observations was constructed with the material of Karsani magnetic pavilion and precisely repeats its shape. The Dusheti pavilion oblong octagonal building is placed on a paved surface with its back cut into the relief. The slope of the relief is cut and on it a stone supporting wall is erected. With the southern facade the pavilion building is turned towards the territory of the observatory and the city.

The basement is made of limestone from nearby Zhinvali quarry mixed with lime and cement. Its walls are built with limestone. The construction stones are fixed with Saskhori lime and – due magnetism of Caspian sand – Caspian sand mixture. The Dusheti Big Pavilion is covered with Karsani Pavilion copper roof and aluminum sheets specially brought from Moscow. The main hall of the building itself is outlined by a one-meter-wide outer bypass, the purpose of which was to maintain the precise temperature within the building; the upper lighting with a fenestrated lamp is also essential. In the central part of the pavilion there are poles of different thickness and height are erected. A few limestone poles were moved from the Karsani Pavilion to the Dusheti pavilion, the alabaster ones were made specifically for Dusheti pavilion in 1953. The poles are of various height and are constructed for different tools to be placed on them.

4.

5. To the south-west of the Great Absolute Pavilion there is a one-storey building of the so-called Nuclear Pavilion (1970s).

5, 6. On the territory of the Observatory, near the former Karangozishvili palace, two Finnish cabins are located. They were built in the 1960s. Laboratory observations were conducted in these buildings.

7.1.2 Historical development

Dusheti Magnetic (later geophysical) Observatory is the successor of Tbilisi Magnetic-Meteorological Observatory founded in 1844. In 1904, the electrification of Tbilisi streets delayed full magnetic observations in physical observatory, causing the whole observatory to move with all their equipment to Karsani near Mtskheta. In 1935, due to construction of Zahesi Power Plant and electrification of Tbilisi-Khashuri Railway Section, the observatory was moved from Karsani to Dusheti.

The first buildings of the existing complex – temporary absolute and variation pavilion and large magnetic pavilion, also the Finnish cabin designed for meteorological observations – were constructed in 1935-1937. Presumably, administrative building also belongs to the same period.

In 1953 the new Absolute Observatory Pavilion was added to the complex, in the 1960-1970s, the scientific works kept expanding on the territory, which was the reason for construction of additional laboratories and the Nuclear Pavilion.

Since the 1990s, with the collapse of the Soviet system, the funding of the scientific institution was brought down to minimum. This led to almost complete devastation of the formerly active scientific-research center of nationwide importance during the last 25 years. Today only the pavilion and meteorological station of absolute observations are functional, most of the area is covered with bushes, wooden buildings are partially destroyed, administrative building, pavilions of nuclear and temporary variation are in the extremely poor condition. The Institute of Geophysics does not have sufficient financing to address these problems, on the other hand, due to development of technologies the number of tools, equipment and staff required has reduced. Currently data is collected automatically, by means of modern tools handed over by the Japanese government in 2011 and they continuously deliver information through the Internet to the International Center of the Tbilisi Institute of Geophysics, as well as to international partners. The Observatory in Dusheti employs one scientist and three laboratory workers, who randomly check the condition of the tools.

7.2 The Value

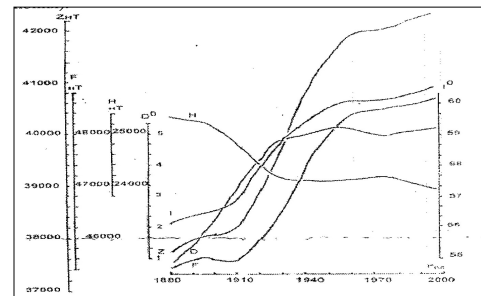
Dusheti Observatory, as the successor of Tbilisi and Karsani Observatories, has a history of nearly two centuries. It serves the entire Caucasus and the bordering sea areas. As part of the World Meteorological Network, Dusheti Observatory contributes to the development of universal scientific knowledge in the field of Earth studies.

Dusheti Observatory played most important role in the development of Georgian science. It represented a geophysical research hub and with its powerful scientific personnel, the continuous magnetic observations and scientific products, it was always referred to as part of a unified scientific chain of world observatories.

Dusheti Observatory has inherited a number of tools from the Magnetic Observatory of Karsani. Bauer's universal theodolite, manufactured in 1874, Rohrdanz declination compass, similar to Pavlovsky and Sverdlovsky declination compasses, manufactured specially for Karsani Observatory, which in 1935, after abolition of Karsani Observatory, was dissembled and moved first to Tbilisi and in 1953 to Dusheti, were preserved in Dusheti Observatory. The induction inclination compass was the property of Dusheti Big Magnetic Pavilion. The tools, which are used for observation of magnetism of the Earth, served for increasing of historical importance of Dusheti Magnetic Observatory complex due to their historical and artistic value. After opening of the Museum of Geophysical Equipment in Tbilisi in the 1980s, the historical tools were handed over to the museum, which was robbed in the 1990s and as for today all of their equipment is lost. Today in Dusheti Observatory, only the tools of the 1970s-80s are kept, and currently modern equipment is used for observations.



Pic 8. Prof. M. Nodia, 1941, Dusheti Geophysical Observatory



The territory of Dusheti Observatory is also very important in local and urban terms. As a scientific hub, it has the potential to maintain the most important functions of the city and become a hub for young scientists nationally, regionally and internationally.

Pic 9. Dusheti Observatory Data 1880-2013

On the other hand, it is built in the former Karangozishvili Garden, where the gravestones from the 19th century are preserved. Legend says that this is the place of death of the famous Russian poet Al. Pushkin's nurse, which is again linked to the old military path of Georgia and demonstrates historical and cultural significance of the territory.

With its vegetation and the vicinity to the Kurko forest, the Observatory area is also an important recreational resource for the city.

7.3 Vulnerability / Risk Evaluation

The major part of the observatory complex is destroyed or in extremely poor condition. Presently, out of the buildings included in the complex, only the pavilion of absolute observation is functioning. However, the lack of temperature regulation hampers its functioning. The building is not heated, therefore in winter the devices operate in extreme conditions and that affects accuracy of the data.

Due to the lack of care, the temporary absolute and variation pavilion is almost destroyed. The building was constructed without using metal and other highly magnetic materials, and accordingly, despite the fact that it is there for more than 70 years now, the risk of collapsing is very high.

The construction of private residential buildings nearby creates additional threat to the functioning of the Observatory. The territory should be protected from the use of high magnetic materials and earth works in general.

Another threat is the unregulated legal framework for ownership and use of the territory. Currently the territory is state owned and is disposed of by the Ministry of Economy and Sustainable Development, which prevents the actual user – the Dusheti Geophysical Observatory from performing any work. In addition, based on the harmful practice of privatization of state property introduced during the last decade, there is a risk of alienation of the territory without an agreement with its actual user.

7.4 Technical Condition

The major part of the observatory complex is destroyed or in extremely poor condition. Presently, out of the buildings included in the complex, only the pavilion of absolute observation is functioning. However, the lack of temperature regulation hampers its functioning. The building is not heated, therefore in winter the devices operate in extreme conditions and that affects accuracy of the data.

The temporary absolute and variation pavilion is abandoned. Over the last decades, infiltration of water from the roof has almost destroyed the roofing. The building has lost the doorway frames. The so-called foundations, on which various installations were erected, have collapsed. The building was

constructed without using metal and other highly magnetic materials, and accordingly, despite the fact that it is there for more than 70 years now, the risk of collapsing is very high.

The fence surrounding the territory of the observatory is needs restoration. Two Finnish cabins in which labs and a guest-house were arranged, are preserved in the form ruins.

The administrative building is also in extremely poor condition. The water from the roof has been leaking for years. The building is dysfunctional and abandoned.

The only building, which has been rehabilitated/repared during the last years, is one Finnish cabin, which is being used by the National Environmental Agency and where the meteorological station is arranged.

7.5 Summary of Requested Repairs

1. The priority measure, which should serve as the basis for further rehabilitation, is regulation of legal papers on ownership and use: the territory should be transferred from the Ministry of Economy to Geophysical Observatory and the municipality based on an agreement between them.
2. The temporary absolute and variation pavilion, due to the specificity of its construction techniques, requires detailed engineering research, which would help to determine whether it is possible to physically preserve this historical building.
3. Based on preliminary assessment, it is feasible to restore/rehabilitate the big pavilion of absolute observations. As the administration of the Observatory indicates, the primary and urgent task here is to regulate the temperature control in order to ensure accurate data collection, which is the primary objective of the observatory. The building needs engineering evaluation, and very careful restoration, fully complying with the needs of the Observatory.
4. The administration building needs detailed engineering assessment with regard to its stability. The roofing, doors and windows need to be replaced and rehabilitation-adaptation must be conducted based on the future function of the building.
5. The state of the buildings preserved as ruins should be studied with regard to their future rehabilitation-reconstruction or dismantling.
6. The fancying of the territory needs to be improved, the yard should be cleaned from bushes and equipped with all necessary amenities. Paths and lighting need to be recovered. Restoration of communications (gas supply, lighting, sewage, water supply, drainage, etc.) is required. Toilets need to be installed
7. The 19th century gravestones that are preserved within the yard need to be examined and restored.

7.6 Conservation / rehabilitation policy and offer

7.6.1 Vision of the territory development

The main objective of development of the territory is to maintain and expand public access to it and prevent its privatization and fragmentation. With this regard, it has been proposed to use the territory as a municipality-managed family-recreation zone within which the existing wooden

cottages can be rehabilitated and rented out seasonally, and the territory itself can be properly, to arrange playgrounds and other outdoor arrangements compatible with the operation of the Observatory. At the same time, all these interventions should facilitate the demonstration of the primary scientific function of the territory, visibility and representation of the history of the territory, by means of outdoor banners, interactive communication panels and interpretation space, which can be located within the former administration building.

In case of successful functioning of the territory, the Observatory administration may consider the possibility of adding wooden cottages without interfering with the observation processes.

This idea is backed up with the fact that despite the growing demand, presently there is a shortage of comfortable and affordable rental apartments / houses in Dusheti. There is only one quite low-quality private hotel in the city with pretty high prices, compared to the quality. On the other hand, convenient location of Dusheti close to the capital, with the World Bank funded rehabilitation works in the historical part and revitalization activities identified within the framework of COMUS, together with the environment and heritage values, make Dusheti an attractive recreation center throughout the year.

7.6.2 Conservation philosophy

Rehabilitation of the complex and adapting of the territory to new functions sets new requirements for the complex. However, the basic principle for intervention, due to the historic significance of the complex, is still retention of the authenticity and maintenance/rehabilitation of the existing structures.

Since granting of status does not specify the object which is specifically assigned the status, the whole complex is now considered as a cultural heritage monument. However, based on the recommendations of the registration card we can assume that the objects of special protection are the temporary variation and absolute observation pavilion, the main pavilion and the meteorological station as well as the whole territory as a landscape monument.

Rehabilitation of the above facilities should be conducted in compliance with the national legislation on monument protection and international methodology, exercising the restoration and conservation approaches, maintaining the maximum of authentic materials. In cases where it is impossible to maintain authentic materials, usage of maximally compatible modern material alternatives should be considered.

Buildings, which had already been ruined by the moment of inventory, may be considered as reconstruction objects, however, due to the physical condition of the preserved material, usage of the authenticity maintenance principle for this material is irrelevant. Reconstruction of these facilities should be performed in compliance with the monument protection legislation, in accordance with the scale and nature of historical objects, with the task to restore the original materials and exterior as far as possible, for the purpose of their harmonic integration in the environment.

7.6.3 Level of Intervention

The level of interventions should be determined on the basis of detailed engineering-geological studies of each object of the complex.

Based on initial examination, we may say that restoration of the main pavilion, as well as the administrative building, is feasible. Water should be diverted from the roof, amenities should be installed and temperature should be regulated.

The physical condition of temporary pavilion is much worse. Physical survival of the building is questionable, therefore the level of intervention should be determined based on detailed assessment.

As to the already destroyed buildings (Finnish cabins, guest-house and nuclear pavilion), their reconstruction can be done using compatible modern materials.

7.6.4 Preliminary proposals for possible use

The basic principle of rehabilitation and development of the complex is to maintain its accessibility for public and extension of its scientific function. Although the scope of scientific research has been reduced to a minimum, presence in the city of such a scientific-research function of worldwide importance is critical for the development of Dusheti. This can serve as a precondition for employment of highly qualified specialists of young generation.

Since the Institute of Geophysics is not capable of mobilizing funds for rehabilitation of the whole complex, there is an option to hand over part of the territory to the municipality with the view of development of compatible social functions.

In this context, it is crucial to retain public ownership of the territory and leave it in the disposal of the municipality with new functions compatible with the functioning of the Observatory.

While determining the new functions, it is also important to note that any fundamental construction works within the territory will hamper functioning of the observatory.

Based on the above considerations, the possibilities include following:

- Reconstruct the ruined Finnish cabins and former guest-house and rent them out as family-recreation spaces. These buildings will be used by visitors of Dusheti, as well as students and scientists who came to practice in the observatory.
- Organize Dusheti observatory visitor center, which will introduce the history of the Observatory with modern interpretation techniques.
- Organize the territory with paths and lighting, play and sports grounds, other outdoor activities, signs and interpretation panels.

The rehabilitation of the Observatory's territorial facilities will attract regular tourists, as well as young people to Dusheti. This will positively affect the Dusheti economy, improve quality of life and will help to form the image of the city.

7.6.5 Social use and sustainable development opportunities

The basic principle of rehabilitation and development of the complex is to maintain its accessibility for public and extension of its scientific function. Although the scope of scientific research has been reduced to a minimum, presence in the city of such a scientific-research function of worldwide importance is critical for the development of Dusheti. This can serve as a precondition for employment of highly qualified specialists of young generation.

7.6.6. General evaluation of consolidation, repair, conservation, restoration, rehabilitation

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Buildings, which had already been ruined by the moment of inventory, may be considered as reconstruction objects, however, due to the physical condition of the preserved material, usage of the authenticity maintenance principle for this material is irrelevant. Reconstruction of these facilities should be performed in compliance with the monument protection legislation, in accordance with the scale and nature of historical objects, with the task to restore the original materials and exterior as far as possible, for the purpose of their harmonic integration in the environment.

7.6.7 Public access

The Observatory is a public site of national importance, where access of the public is provided by retention of public functions, as well as affordable prices, with diverse offers, including infrastructure for people with special needs.

7.6.8 Other benefits

The rehabilitation and revitalization of the territory of the Observatory territory and its successful functioning will enhance the sense of identity of the local population, increase the interest of young people and trigger the city's economic development by attracting visitors, including scientists. Thus the rehabilitation of the territory will help not only Dusheti development, but also introduce the significance of Dusheti Observatory, to support the survival of this scientific site of international level and to attract financing for its further development.

7.7 Financing

7.7.1 Broad assessment of budget needs and phasing

The following main phases are needed to calculate the budget. Pre-project expenses (geological research, engineering-technical research, archive/bibliographic research, etc.), concept development, where the future function of the complex will be implemented and preparation of necessary technical tasks for projecting. Project development and project implementation costs.

Job title	Estimated value in GEL
Pre-project research and projecting development costs for buildings and territory	200 000 ₾
Concept development for the complex and	350 000 ₾

development of relevant projects	
Cottage reconstruction works	1 000 000€
Arrangement of Visitor Center	400 000€
Arrangement of the yard and engineering communications	200 000 €
Total	2 150 000 €

7.7.2 Evaluation of possibilities to attraction of investment

The plan for attracting funds has not yet been developed for this project.

7.7.3 Evaluation of income generation possibilities

Operation of the complex can generate incomes from following activities: renting out cottages seasonally to tourists, scientific residence, operating of the Visitor Center of the Observatory, organizing various outdoor activities (e.g., air balloons competition, marathon within Kurko forest infrastructure, etc.). The possibilities of income generation will be reviewed in the technical-economic research. The indirect benefits are discussed above in 6 chapters of this document.

7.7.4 Have you attempted to raise funds for this site or monument?

No

7.7.5 Have you received funding for this monument or site?

No

7.8 Management

7.8.1 Short-term management of the project

In accordance with the agreement concluded between the Institute of Geophysics and local government, management of the territory and buildings' rehabilitation project will be implemented by Dusheti municipality.

7.8.2 Long-term management of the project

The options for long-term management of the project will be considered during the phase of technical-economical study. It is possible that the management of the above object will be handed over to the Dusheti Municipal Fund, which was specially created by the Dusheti local government.

Maintenance expenses will be financed by the local budget, as well as by the budget of the Ministry of Culture and Monument Protection and by various international funds.

8. Documentation

Graphical documentation for the territory of the Observatory existing in the archive of Dusheti Observatory is very scarce. Due to the lack of time, initial projects/measurements could not be found in the National Archive or other funds.