WP4

Platy limestone as cultural heritage

Supplement 3.I

Cultural heritage and limestone. – General overview

Appendix 3.I.4

Final report for the project area in Croatia (Istria)

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1. Introduction: Limestone in the history of Istria

In the long and intense Mediterranean history limestone was the dominant building material to which the Mediterranean owes its appearance, features and life as it is. For the Istria peninsula, like many other places in the Mediterranean, one can say that it is practically made of stone.

All coastal cities, villages and the hinterland in Istria as well as sites on the islands were built in limestone. A material with such a widespread use has many features, elements and characteristics to study. In the ways of construction, design and materials, it is possible to clearly define differences when considering construction of urban seats and those of rural area. More monumental and popular it is certainly the urban architecture about which is already much said and written. Somewhat less researched and studied is the rural architectural heritage, which hides many features, materials and riddles which remain to be solved and explored, and because of their progressive disappearance, for that research remains less and less time.

Picture 1. Abandoned homestead in Vrhi (northern Istria)

2. State of the Art in the research on limestone as cultural heritage in Istria

The history of architecture, the architectural styles as well as the changes appeared in the ways of building on the territory of the Istrian peninsula in different periods and under diverse regimes, even though have been studied and presented by several authors, has not been studied in a systematic and inclusive way. Regarding the characteristics of the materials, processes and manufacturing techniques, workshops and the typological specificity of stone materials in this area, the information available are still too sparse. The above reflects on the conservation-restoration practices for the correct carrying out of which a detailed knowledge of the technical characteristics of the materials that we are going to conserve is indispensable. In the existing studies can be found hints on the manufacture processes and uses or events about the history of limestone from the prehistoric period to the present (Matijašić 1998, Bertoša 2009.). In those past researches, for what concern the material itself, the emphasis have always been placed to those used in the urban architecture, which, as it often happens, it is better studied and more thoroughly than the one in the rural territory of the same region. The provenance of the stone of the buildings, largely limestone, is generally known since in Istria there are numerous deposits of limestone many of which have been exploited for centuries and some still are.

As what concern rural architecture, there is no shortage of studies that analyze the house and other buildings typologies present in Istria (Starec 2012, Lago 1994). What instead is a gap that has to be filled up, in order to preserve the traditional Istrian architecture in its physical reality, are specific studies on the construction materials and techniques and their availability today, which have been neglected by the most of the scientific community.

Picture 2. An abandoned rural house in Filarija (northern Istria)

The research in this direction, as well as a scientific approach nowadays achievable due to the technologies available, should take into account and explain the choices made for materials and techniques used in the traditional architecture. At first glance, we can explain everything through a few aspects: availability for example, or the limited cost. Often choices made in the past have been characterized by several factors, which could be quite difficult for us today to spot having lost the awareness of the materials that surround us, their characteristics, functions and provenance. The ways, customs, techniques, technical choices, processing methods of the materials with which the Istrian men built their houses a century ago, represent a key information to understand, preserve and valorise what now remains of the traditional architecture, assuming that there is a willingness to pass everything on to future generations. The reasons for this gradual disappearance are different, some authors connect them with a considerable effort of desiring to cancel our historical and cultural tradition and origins because it is all so outdated, so old-fashioned and baldly while the tendency toward modernity and richness becomes stronger and stronger (Orbanić Sapundzić 1997).

Generally, the main reasons for the mentioned above, is certainly connected with the socio-economic situation, which, in most of the cases represents the trigger of the massive depopulation of the hinterland that we have been witnessing of in the last fifty years. On the other hand, who remains too often doesn't have financial opportunities to maintenance the property suitably so besides sadly depopulated villages, remakes with improvised methods

and materials can be seen (Starec 2012) or oppositely, new or renewed houses made in an tactless way which often compromises the architectural value of the entire area.

Pictures 3 and 4. Examples of bad practice in using stone slates for decorative purposes (south Istria)

The fieldwork along the Istrian peninsula included surveying along the whole region in order to determine the representation of buildings containing elements of platy limestone. This research was pointed specifically to document the different uses and installation techniques, detect non-sacral buildings to be considered and studied more in detail, document its typical damages, carry out laboratory tests in its chemical, petrological and mechanical properties, provide evidence of good and bad examples of use and renewal.

In interviewing the inhabitants, an additional aim was to record their knowledge and experience about this material as its installation is still present and to discover where platy limestone was being (locally) extracted.

3. Platy limestone in Istria

3.1. Disappearing remains of an unexplored material

The oldest inhabitants of the rural Istria can hardly imagine by now that all the roofs in their village and in all the surrounding villages were once covered exclusively with stone. The memory as the evidence of that is disappearing fast. One of the reasons is surely the negligence toward the rural architectural heritage. In the wake of sadly abandoned villages, cheap rework or other less rough but inappropriate repairs, one wonders what will be the future of the traditional architecture of the Istrian countryside. The answer to this question, as mentioned above, one could search only taking into account several aspects.

Picture 5. View of Laganisi hamlet (northern Istria)

The ambition here is not to study the demographic changes and its causes, but to study what our countryside once was, to educate and, hopefully, to teach how the grandfathers of our fathers built their houses, the way they did it and why, understanding once for all that they had a reason for that, like everything that happens in nature after all. The modern man is poorly or is not conscious at all about the nature of the materials surrounding him and what

his home is actually made of. It seems big changes occurred, since just fifty years ago, in the nearby hamlets, people used to reorder from time to time the stones slates on the roof of their houses and barns, in order to preserve them better. If they had to replace some of them with new ones, they knew where to get them or whom to ask...

Picture 6. A storehouse or barn in Grota (north-western Istria)

To go back in time with regard to the way of life, at this moment, is surely not possible and is not even natural. Every time carries its distinctiveness and we have to accept and live with them but it is our duty to learn from the past and even apply maybe some approaches that turned out to be good to the people before us. At least try to understand and have a kind of regard for the past of which our present is made of, not assuming a priori that everything that bring the future is undoubtedly better than what it was before.

In order to protect one must first understand and recognize the specificities of what is about to preserve and as we are talking about architecture there are walls, roofs, doors and other elements to be considered in their material reality, not only ideological. The first step is therefore defined: to know, to recognize and to understand the material aspect of what we want to protect.

Picture 7. View of Filarija hamlet (northern Istria)

Platy limestone represents today a forgotten building material of the rural Istrian architecture. Its uses are today visible only sporadically and on site, inasmuch in literature systematic studies about it do not exist. Because of its occurrence in nature, platy limestone represents a particular material, closely connected with the territory and the local people who knew where to find and how to exploit it best.

Without making a serious reflection about the way of life, the logic applied in construction, not only edifices but of the community in general, we would hardly visualize the neatness, the smartness actually, of how our grandfathers lived their lives and built their homes. In half a century, it became impossible to build a house without a huge amount of money, without assigning the project to a specialized firm and without knowing, in fact, what it will be made of.

Local availability of building materials is an important factor for the development of a community, as water is. The possibility to get fresh water free anytime or stone to build ourselves a house, if preceded by the awareness that it is a right for all, will make us use it with parsimony, in the quantity we actually need. The establishment of a system of rules, right and duties, laws and regulation need to make us behave in a determined way, supposing that not all of us will behave in the same way, which unfortunately is true, but it also means that we are increasingly moving away from a sustainable way to live. As we are distancing more

and more from nature, behaving like we are doing today, that much the law system is becoming bigger and more complicated. Even though at the same time we are becoming aware that in fact, there is no law or norm that will make us behave sustainably, we have to think like this. Maybe we have only to look back a bit, at the time when the word sustainability did not even exist, when ordinary people built roofs over their heads matching among their needs, resources availability and functionality.

Picture 8. View of a homestead in Vrhi (northern Istria)

When we will truly understand how smart, cheap, immediate, luckily, ecologic, healthy and simple is to use local sources, as much as we actually need, we could affirm to behave sustainably. Until then, there is a lot of work to do, especially as regards the education.

3.2. The findings (delves) of platy limestone once and today

The use of platy limestone slate is a product of the area's history and geology. Its use and exploitation was strongly connected to the development of settlements, residential building traditions and landscape moulding.

Platy limestone outcrops are usually small, delimitated areas that not resemble the classical stone quarry. Through conversations with the local people, especially in the northern Istria, it was possible to

collect interesting information about their location, period of use and stone typology. Also, which area an outcrop supplied in the past or if it was on a private property so that there was an owner from whom the stone could be bought from.

Picture 9. An outcrop of platy limestone in central Istria

Picture 10. Detail of an outcrop and exploitation method (northern Istria)

Of the widespread use and exploitation of this particular stone the etymology of some settlements in the north Istria, e.g. Kava or Kave (Cava in Italian) which means *quarry,* gives testimony. In this little hamlet a big abandoned outcrop of platy limestone is still visible.

3. Rural edifices and their architectonical elements in platy limestone

The typical Istrian house is entirely made of stone, mostly limestone and more seldom of sandstone. The roof, habitually gabled, is covered with stone slates but also thatched houses may be encountered, even today although only in accessory buildings, especially in the east part of the county (Starec, 2007). The introduction of tiles for roof covering happened centuries ago, so by now the appearance of the original houses has changed radically. The more modest homes were not plastered even on the outside, probably almost exclusively for economic reasons, as the process of production of lime was practiced in several places (Tommasini, 1837) and the benefits of living in a plastered house and its durability were certainly known. The flooring inside the houses were mostly of wooden boards or stone slates, if there was one, if not on the pavement there was soil only. The settlements structure was determined by several factors such as geographical location, the characteristics of the territory, defence needs. Many inland villages developed where forts of the Bronze Age first were and their elevated position, on top of hills, reveals their origin. Because of geographical physiognomies, characterized by flat zones, in the south and west area of Istrian peninsula, the villages had evolved around the church or the main square.

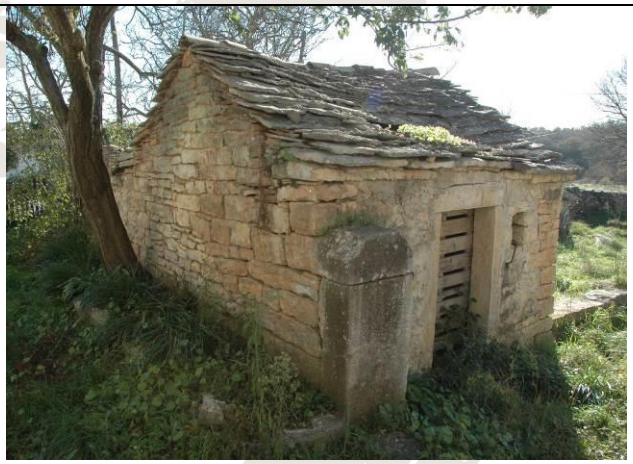
4.3. Typical elements in platy limestone

Given the reduce thickness; slabs of platy limestone were used in many architectural elements in the rural Istrian house. Changing the size and modelling the shape, platy limestone slabs were like panels, made of stone, installed in several parts of the building assuming the function of self-standing element, like shelves, or as a junction between two or more elements as in the eave. The assembly of specific elements with platy limestone slabs, in a practically identical or very similar manner all over the territory of Istria, evidences its widespread and established use. On the other side, different assembling techniques found during the fieldwork, especially in roof covering, witnesses about specificities of some areas or single hamlets that could be related with the properties of the limestone from a nearby excavation site.

4.3.1 Roofs

Roof covering represents the most important use of platy limestone along the whole project area. The number of eaves made from stone slates still present in most of the houses of the rural Istria testifies to this fact and can give an estimation of how widespread the use of platy limestone was.

Table 1. Examples of different roofing techniques

	
Kurili (south Istria)	Dolinci (north-west Istria)
	
Šaini (central Istri)	Gornja Gomila (central Istria)

	
Vižinada (north-west-central Istria)	Brnozi (central Istri)

For what concern the representation of the roofs covered with platy limestone still intact, the case encountered in most of Istria, is one in which the roofs of the accommodation units were restored or enlarged, by replacing the stone slabs with tiles. On the other hand, the roofs of trade premises, such as warehouses and stables, were renewed, probably several times in the course of time, but using the original material, stone, and possibly by installing some new stone slabs where needed. This choice was obviously determined by the cheapness and availability of this material. Sometimes, in place of replacing or adding other stone slabs, the introduction of different “new” materials occurred, such as cement, plastic or asbestos panels etc.

	
Kaščergani	Pamići supetarski

	
Badnjevari	Mužići

4.3.2. Chimneys

As elements located on the roof, very often chimneys were assembled with several platy limestone slates.

Picture 11. Chimneys in Fradelani and Radetići (central-western Istria)

As on the roofs of buildings, platy limestone states were used to form small chimneys' roofs. Dimensions, shapes and designs encountered are vary and over the imagination of their constructers, show disparate and interesting methods of assembling platy limestone slates with other materials.

Picture 12. Chimney in Vežnaveri

Picture 13. Chimney in Melnica

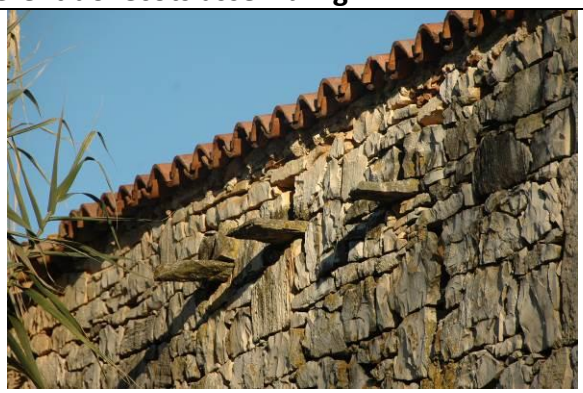
4.3.3. Dovecotes

According to some authors, in addition to their primary function, dovecots incorporated in the walls of the rural houses would have had even a second, decorative one (Živković, 2013). In

fact, observing the many forms, combinations and arrangements, one cannot deny their decorativeness and the artistic touch they give to the fronts.

Table 2. Examples of different dovecots assembling

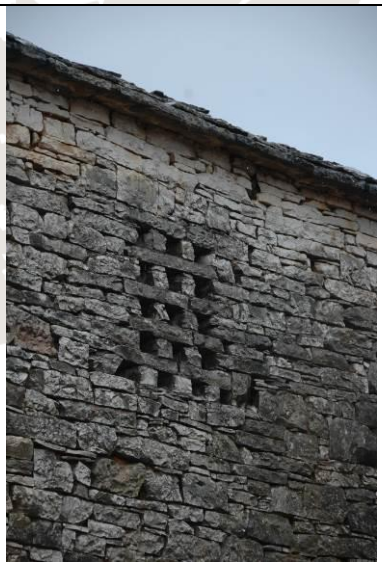
Pavičini



Medvidići

Markovci

Grgani



Pilati

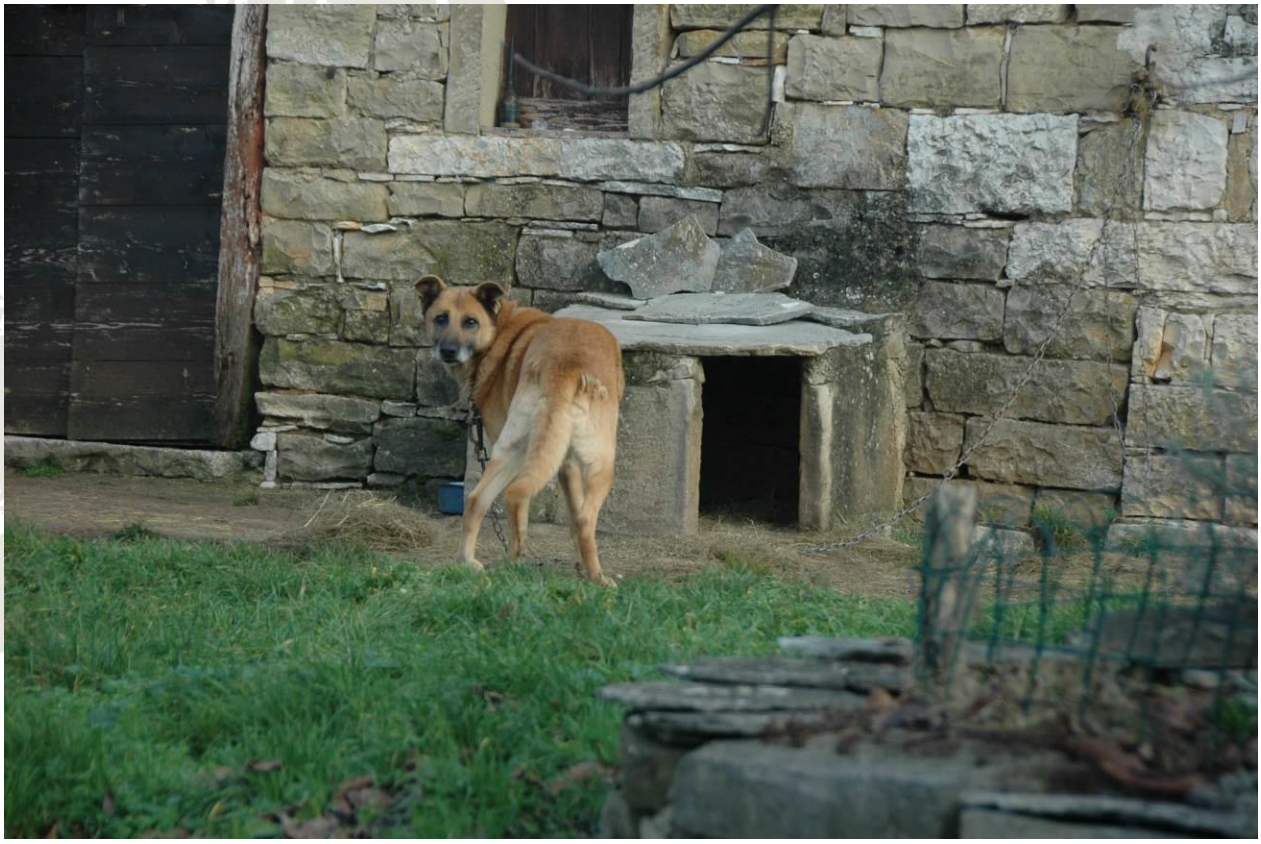
Zrenj

4.3.4. Other elements in platy elements

What we can make out of stone slates? Today we can best imagine if we first conceive that slates made of other materials (except for wood) are not available. That there are no shopping malls where we can buy everything - difficult to visualize ... We should have in mind that everything we can buy today to renovate or build our houses, once people were fabricating with materials that were them available in the natural surroundings. Then it becomes a bit easier to find a response: with platy limestone we can make almost everything; a roof, a pavement, a balcony, a kennel …

Picture 14. A balcony on the entrance of a house, Bonaci

Picture 15. A kennel, and its owner, Markovac.



Picture 16. Another kennel (and its owner), Rovini.

Picture 17. Shelves for potties or stairs to reach the roof? Kavran

Picture 18. Stairs to reach the roof. Mrgani

Picture 19. Shelves for the potty or for jars with flowers. Mrgani.

Picture 20. A shelf of a window, still in use… in Labinci



Picture 21, 22,23. Window shelf in Pirelići, window shelf with corbels made with stone slates in Radetići and a stone shelf incorporated in a window in Badnjevari.

4. Rural churches

In the second half of the 6th century, an intensification of building activities that included the construction of churches was registered. Their number increases no longer just in the urban area and suburbs, but also outside the town walls area. Because of the economic stability of agriculture and the dense population as its consequence, there was a need to build parish and cemetery churches in the moment of the most intense Christianization of rural areas (Zgrablić 2012). Churches have been built along the roads or as part of numerous Roman *villa rustica* and represented the core of many today missing and poorly known settlements.

Many remains of old churches we can find today in Istria. Several rural churches are preserved and some of them still in a very good conservation state, other appears only as ruins. These are simple shaped, one-nave, modest small buildings, frescoed in the inside, with gable roofs and mostly one, more rarely with more than one apse, sometimes inscribed sometimes semicircular on the external side. According to the state of preservation and their location along the Istrian peninsula, we can assume that most of them originally had the roof, as well as other architectural elements, made of stone slabs. To cover

As for the typology of the traditional house and churches along the Istrian territory, Giacomo Filippo Tommasini wrote in the 17th century:

> *" …* (la popolazione dell'Istria rurale) *usano li pavimenti delle case fatti di tavole quasi per tutti I luoghi, e sopra li coperti da poco in qua hanno introdotto li coppi di terra cotta, che prima facevano con lastre di pietra viva cavate sottili in alcuni luoghi, e se ne vedono tutte le case antiche, ed anco le chiese coperte di queste tegole di pietra".*
>
> *"…they* (the population in the rural Istria) *used to plate the floors inside the houses with planks almost everywhere, and cover the roofs with tiles only recently, previously they covered them with thin slabs of stone quarried in some places, and you can see them on the old houses and also the roofs of the churches were covered in these stone plates".*

Picture 24. Church of s. Leonard, located on the road from Vižintini Vrhi to Oprtalj (northern Istria)

Today in Istria rural churches with elements or roofs in platy limestone are 39, seven of them are not protected as cultural heritage, 32 are protected but two of these protection were only temporary and have expired.

Some of them are still in use as churches or chapels, as the ones located in cemeteries, like St. Elysium in Draguć (Crkva sv. Elizeja u Draguću) or St. Rocco in Sv.Petar u Šumi (crkva sv. Roka), the later represents also the biggest church with the roof covered with platy limestone existing in Istria.

Picture 25. Church of St. Elysium in Draguć

A large number of those churches are located away from today's settlements, often in the woods or in the middle of the fields. Their position in relation to the surrounding and to the rural community, originally was different, but the depopulation and the changes occurred in the countryside have located them away even from the main roads, making some of them difficult to reach.

CHURCHES with platy limestone in Istria				
	PLACE	**ORIGINAL NAME OF THE CHURCH**	**MARK IN THE REGISTER CULTURAL HERITAGE OF CROATIA**	**GEO COORDINATES**
1	BALE	SV. ANDRIJA	-	E= 286848,6 N= 4994296,3
2	BALE	SV. ANTON OPATA	**Z-5635 (AS PART OF BALE)**	E= 290557,1 N= 4982984,9
3	BALE	SV. DUH	**Z-873**	
4	BALE	SV. JAKOV	-	
5	BALE	SV. KATARINA	-	E= 286884,7 N= 4993124,5
6	BALE	SV. MARIJA MALA	**Z-8724**	E= 285014,3 N= 4993108,1
7	BALE	SV. NIKOLA	**Z-4812**	
8	BARBAN	SV. ANTUN	**Z-2198**	E=304449,5 N=4994621,4
9	BERAM	SV. MARIJA NA ŠKRILJINAH	**Z-858**	E= 296498,6 N= 5016227,7
10	DRAGUĆ	SV. ELIZEJA	**Z-573**	E= 304472,2 N= 5024235,0
11	FAŽANA	SV. ELIZEJA	**Z-866**	E= 287729,3 N= 2980246,5
12	GRAČIŠĆE	SV. MARIJA NA PLACI	**Z-5323 AS PART OF GRAČIŠĆE**	E=304401,5 N=5011922,9
13	KANFANAR	SV. AGATA	**Z- 591**	E= 291202,4 N= 5003061,9
14	KANFANAR	SV. ILIJA	**Z-588**	E= 289076,9 N= 5002221,9
15	LABIN	SV. NIKOLA	**Z-352**	E= 312607,3 N= 4998779,3
16	LINDAR	SV. SEBASTIJAN	**RRI-0050-1963 AS PART OF LINDAR**	E= 300749,3 N= 5013588,5
17	LIŽNJAN, VALTURA	MAJKA BOŽJA OD KOSTANJICE	**Z-4642**	E= 298215,6 N= 4976213,9
18	MEDNJAN	SV. GERMAN	**P-2683, PREVENTIVELY PROTECTED MONUMENT, PROTECTION EXPIRED**	
19	MEDNJAN	SV. MARTINA	**RRI-0099-1966**	E= 287583,5 N= 4987094,1
20	OPRTALJ	SV. JELENA	**Z-1840**	E= 290579,7 N= 5029271,1
21	POMER	SV. FLORA (CVITKA)	**Z-2199**	E= 294044,4 N=4968507,1
22	RAKALJ	SV. AGNEZA	**Z-1764 AS PART OF RAKALJ**	E= 308445.5 N= 4984874.6
23	ROČ	SV. ROK	**Z-585**	E=307880,3 N=5031120,7
24	ROVINJ, OKOLICA	SV. EUFEMIJA	**Z-2832**	E=273311,6 N= 5001656,8
25	ROVINJ, OKOLICA	SV. KRIŠTOFORA	-	E=275301,6 N=5000875,5
26	ROVINJ, OKOLICA	SV. TOMA	-	E=276334,0 N= 5000296,1
27	SV. PETAR U ŠUMI	SV. ROK	**Z-3265**	E=292054,3 N=5008382,7
28	ŠKITAČA	SV. MATEJ NA PRODOLU	**Z-2430**	E= 312791,4 N= 4987356,5
29	TONČIĆI, BUTONIGA	SV. KRIŽ	**Z-856**	E= 3011745,5 N= 5019709,5
30	TRVIŽ	SV. PETAR	**RRI-0051-1963 AS PART OF TRVIŽ**	E= 294003,0 N= 5017151,3
31	VIŠNJAN	SV. ANTUN	**Z-5389**	E= 281872,4 N= 5018896,4
32	VIŽINTINI VRHI, OPRTALJ	SV. LEONARD	-	E=288495,9 N=5030580,7
33	VODNJAN - GURAN	SV. CECILIJA	**Z-4014, P-1367 – as archaeological complex**	E=293981,3 N=4985084,2
34	VODNJAN	SV. FRANJO	**Z-871**	E=290670,4 N=4984440,5

35	VODNJAN	SV. KATARINA	**Z-859**	E= 291003,7 N=4983282,1
36	VODNJAN	SV. MARGARETA	**Z-860**	E=290428,8 N= 4986733,5
37	VODNJAN - PEROJ	SV. MIHOVIL	**P-625, PREVENTIVELY PROTECTED MONUMENT, PROTECTION EXPIRED**	E= 287646,0 N= 4984796,6
38	VODNJAN	SV. TOMA	-	E= 288965,4 N= 4986552,1
39	VOLME	MAJKA BOŽJA OD ZDRAVLJA	**Z-8724**	E= 292191,4 N= 4966921,6