

## HOW TO REGISTER CADASTRAL OBJECTS LOCATED ON MARINE AREA?

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**Key words:** coastal zone, coastline, dry-land, higher line of breakers, marine area, structures.

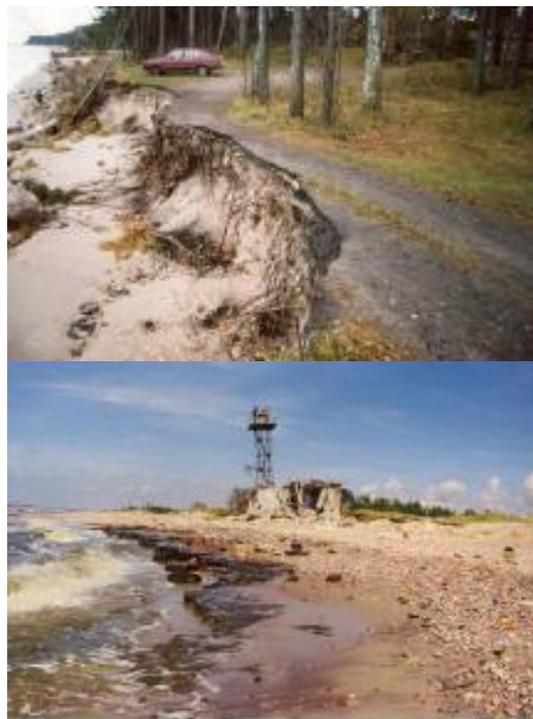
### Introduction

In modern dynamic and changing world both society and the state should guarantee environment for successful development with arranged and modern legislative base. There have been issued laws which govern not only the current, but also the forecasted situation. As an example can be mentioned Regulation No 631 (14.10. 2014) "Construction regulations for structures in the internal waters, territorial waters and exclusive economic zone of the Republic of Latvia" governing the construction process on marine area, too. Also, in long-term planning documents are planned areas for placement of various civil engineering structures on marine area, like wind turbines, heat pumps, etc. Also cadastre should be able to register such properties not only random, but to provide the necessary facilities for registration of each property. Already have been detected cadastral objects, situated on marine area, but they are not registered in cadastre. Consequently, it is impossible to register their property rights also in Land Register [4].

One of the problems is that location of coastline due to coastal erosion is changing. It is the line that forms boundary between dry-land and coastal waters. Seacoast, and in particular the marine coast line is characterized by a strong sensitivity to a variety of external factors, and consequently-the variability and volatility. Due to coastal erosion area of dry-land steps back, and arises the situation when different real estate objects are surrounded by the sea, including the declining area of land parcels adjacent to the sea area[7].

Newest investigations indicate that by 2060 territory of Latvia can decrease by about 9.2 km<sup>2</sup>. Serious troubles to stability sea shore create the ports. It is found that coastline changes for 0.1 - 0.5 m/ year on 120 km distance, for 0.6-1.5 m/ year-50 km distance and 1.6-3.5 m/ year-10 km distance. Erosion creates changes not only washing

away the coast, but also affects the boundaries of properties. Coastline (highest line of breakers) is moved, thereby changing the area of the beach (Fig.1). The beach is public property and land parcel as private ownership begins behind the continuous line of vegetation or highest line of breakers. However, with development of coastal erosion processes in some locations of beach arises the situation where land parcels now are situated on the beach or even at sea [7]. Problem arises also in the fact that there is the conflict between indefinitely defined public interests in the ownership rights to the beach and ownership rights to the land parcels.



*Fig.1. Examples of coastal erosion*

In the article is assessed necessity of cadastral registration of structures located on marine area, compiled information on such existing and perspectives objects, is analyzed existing cadastral property registration process and made proposals

for delimitation of cadastral territories on marine area.

**Necessity of cadastral registration of structures located on marine area.** According to the law “On the State Border of the Republic of Latvia” (2009) the territory of Latvia includes both area of dry-land and marine area. Currently acquisition, maintenance and use of the data on the territory of Latvia is providing State Real Estate Cadastre.

For representation of spatial data is maintained cadastral map. Now cadastral map covers only territory of dry-land of the State. Information about objects on marine area is not represented, except such structures as Kolkaligh thousand single portpiers. Today was not necessary to cover marine area with cadastral map. But, considering that new legislative acts regarding construction procession marine area are accepted, it is possible situation where new cadastral objects on marine area can be constructed. Planning management of marine area and coastal zone in the future, it is necessary to consider that number of objects of marine area can rise. So will appear need for data registration in cadastre, including there presentation of the cadastral map.

**State Border of the Republic of Latvia located on the Baltic Sea.** In order to register cadastral objects, it is necessary to represent State border on **Baltic Sea** and identify operational area. Borders of the State usually are determined by national legislation and international agreements. Under international law the state border is viewed as necessary element - external border of national territory. So, national territory is part of the Earth, which is subordinated to national sovereignty and territorial jurisdiction [1].

State border of Latvia is defined as continuous and closed line and vertical surface matching with this line, which marks off Latvian territory of dry-land and water, entrails of the earth and air space from neighboring countries and from exclusive economic zone in the Baltic Sea [3]. State border the Baltic Sea, if international agreements do not provide otherwise, matches with external border of the territorial sea, which is located on distance of 12 nautical miles or 22.224 km away from the baseline (Fig. 2).

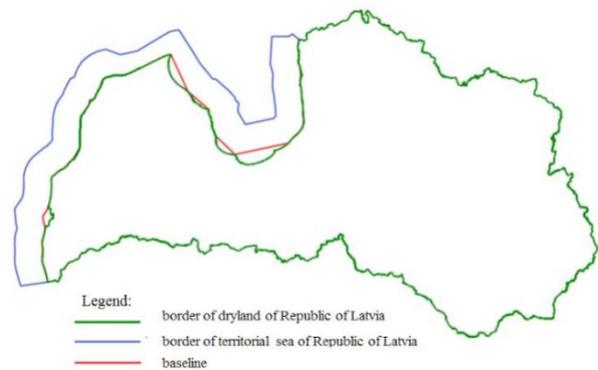


Fig.2. Baseline, border of dry-land and border of the territorial sea of Republic of Latvia

The baseline is non-existent in nature, but it is on the basis of international laws the analytically determined line with legal effect. Based on methodology described by United Nations, Government of Latvia has determined location of baseline, and has specified and defined coordinates of base line points [5]. Coordinates of base line points are specified in two coordinate systems – World Geodetic System (WGS84) and Latvian geodesic coordinate system 1992 (LKS-92).

**National Real Estate Cadastre.** Cadastre is a single registration system, which, fulfilling administrative, organizational and technological processes, ensure acquisition, maintenance and use of data on real estates and their objects within national territory. To ensure cadastral activities, there is maintained Cadastre Information System, which contains official cadastral data. This system is managed and maintained by the State Land Service. Into Cadastre information system should be recorded and maintained cadastral text data and spatial data on all cadastral objects located throughout the country (Fig.3).

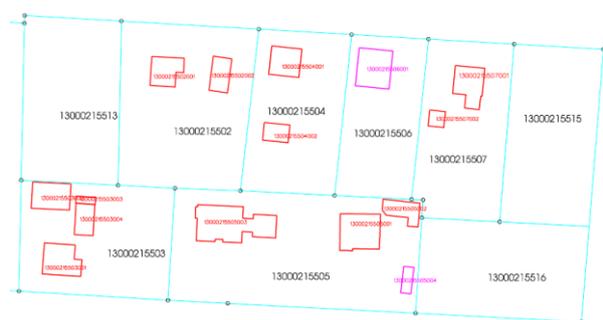


Fig.3. Example of cadastral map

Cadastre spatial data consists of:

- cadastral map;
- spatial data obtained in land and structures cadastral surveying.

Cadastral map is designed as a digital overview map using digital data of land and structures cadastral surveying in vector form. It is the information system consisting of graphical elements which keeps official graphic information about whole dry-land territory of Latvia, it is managed according cadastral territories and is continuous maintained in accordance with the actual situation [6]. Orthogonal grid of cadastral map corresponds to the Latvian geodesic coordinate system LKS-92™. Accuracy of cadastral map corresponds to cadastral survey data accuracy. Precision of cadastral map scale in area of towns and villages is 1:2000, but in rural areas 1:10000.

At present the cadastral map covers only area of dry-land but should be covered both area dry-land and territorial sea. Therefore current situation on the sea area is not fixed on cadastral map.

**Cadastral objects located on marine area.**

Historically, the boundaries, real estates, land and cadastre are related to the dry-land, however, by expansion and development of the understanding of the cadastre and its ability, we come to the conclusion that there are objects, mainly engineering structures, located on marine area which should be registered in cadastre. On marine area of Latvia currently are located navigation related objects – structures, e. g., lighthouses, light signs, guiding lights, as well as variety of engineering structures, e. g., piers, breakwaters, bridges, moles, landings, etc. (Fig.4 and Fig.5). There are fixed even some residential buildings (Fig.6).



*Fig.4. Lighthouse in Kolka*



*Fig.5. Landing of boats in Kolka*



*Fig.6. Dwelling house in Kaltene*

In order to investigate how many objects already have been constructed on sea area, there remote sensing (orthophoto) materials were combined with the cadastral map, and in the field was surveyed coastal zone. On western coast of Latvia (excluding large ports - Ventspils, Liepaja and Riga) were found more than 15 cadastral objects (Fig.7).

It is expected that number of cadastral objects on marine area in future will increase, because in developed long-term planning documents is designed their intended place in the Baltic Sea. Already is accepted a number of laws, which will promote efficient use of marine area in future, because their framework deal with various issues, e.g. receipt of construction permit and determination of license area on territorial water [4] [2].

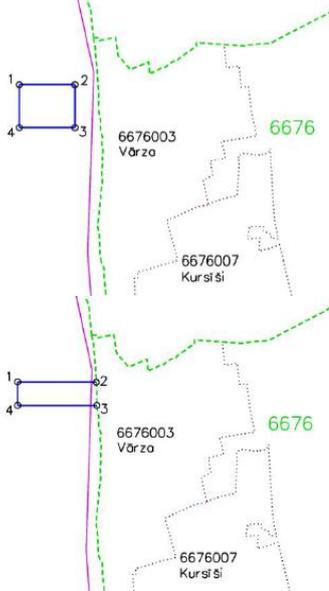


Fig.7. Location of existing cadastral objects coastal zone

### Zoning of cadastral territories.

To ensure identification of cadastral objects, State Land Service should determine the cadastral territories. Cadastral territory is a conditional territory displayed on a cadastral map. Cadastral territory is divided into cadastral groups. Currently, Latvia is divided into 591 cadastral territories and 5205 cadastral groups. To arrange the cadastral map of the marine area, it is necessary to establish cadastral territories and display them on a cadastral map. In this way, squares would be created, which are connected with the existing cadastral territories, and would facilitate a variety of registration of related issues, such as assignment of cadastral designations, etc.

As a key element can be used the coastline, because it is clearly visible and identifiable in the field. Cadastral territories can be created, displaying their boundaries as a perpendicular continuation of cadastral territories on the dry-land. However, the coastline is highly variable and can cause doubts according to its true position. Consequently, the coastline cannot be taken as a reference from which to project the boundaries of cadastral

territories. Therefore, can be used other elements - the baseline (Fig.8) and existing boundaries of cadastral territories (Fig.9). Using these elements, the boundary line can be obtained, constructing the boundary as perpendicular to the baseline or extending an existing boundary line of a cadastral territory, maintaining its direction.

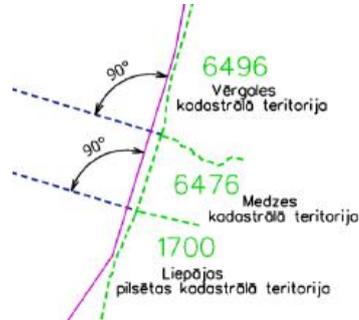


Fig.8. Using the baseline

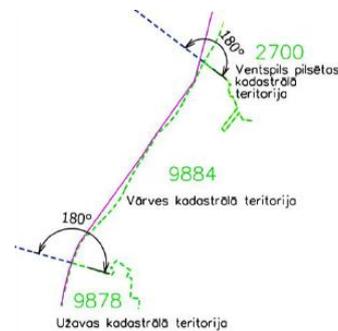


Fig.9. Using existing boundaries

The investigation shows that it is appropriate to develop cadastral territories on the marine area between the border of dry-land (coastline) and the border of the territorial sea. In this case, it is not necessary to create new cadastral territories on the marine area, but to broaden existing cadastral territories, adjacent to the sea area. In this way, cadastral territories are formed, which consist of dry-land and marine area (Fig.10).

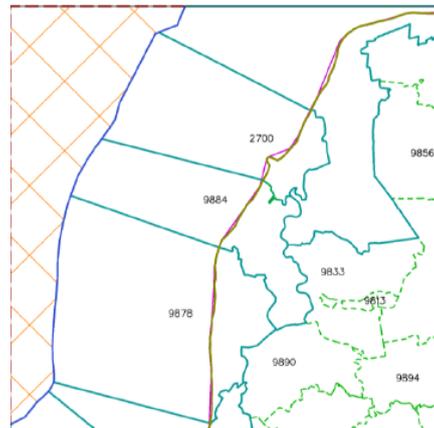


Fig.10. Expanding of existing cadastral territories to the exclusive economic zone

## Conclusions

1. Existing cadastralmap does not coverall territory of Latvia, because marine area is not covered by cadastral territories.
2. With development of legalframework, becomes possible broadest economic activity on area of sea. There will be created newcadastralobjects and therefore they should be recordedin cadastre.
3. It is not necessary tocreate newcadastralterritories on marine area. Instead of it should be expanded existingcadastral territories tothe exclusive economic zone.

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