

SLOVAKIA CATCHING-UP REGIONS 4

OPEN DATA IN REGIONAL LAND USE PLANNING

A technical note prepared
for the Self-governing Region of Košice
as part of the Slovakia Catching-up
Regions Initiative



SLOVAKIA CATCHING-UP REGIONS 4

OPEN DATA IN REGIONAL LAND USE PLANNING

A technical note prepared
for the Self-governing Region of Košice
as part of the Slovakia Catching-up
Regions Initiative

September 2023

© 2023 International Bank for Reconstruction
and Development / World Bank
1818 H Street NW
Washington DC 20433
Telephone: +1-202-473-1000
Internet: www.worldbank.org

This work is a product of the staff of the World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of the World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy of the data included in this work. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

Rights and Permissions

The material in this work is subject to copyright. Because the World Bank encourages dissemination of its knowledge, this work may be reproduced, in whole or in part, for non-commercial purposes as long as full attribution to this work is given.

Any queries regarding rights and licenses, including the right to reproduce the work in another format or to process the work, should be addressed to World Bank Publications, The World Bank Group, 1818 H Street NW, Washington, DC 20433, USA; fax: +1-202-522-2625; e-mail: pubrights@worldbank.org.

TABLE OF CONTENTS

Acknowledgements	4
List of Tables	5
List of Figures	5
List of Boxes	5
Acronyms and Abbreviations	6
EXECUTIVE SUMMARY	9
INTRODUCTION	13
LAND USE PLANNING IN THE SELF-GOVERNING REGION OF KOŠICE	17
WHY PUBLISH LAND USE PLANS AS OPEN DATA?	21
Value Added for Municipalities and Self-governing Regions	22
INSPIRE and High-Value Datasets	24
CURRENT PRACTICE	27
Institutional Structure	28
Data Quality	29
BASIC LEGISLATIVE FRAMEWORK	33
Changes Brought by the New Act on Land Use Planning	35
LOCAL AND EU EXAMPLES OF OPEN DATA LAND USE DATASETS	39
EU EXAMPLES OF THE STANDARDS FOR THE DIGITIZATION OF LAND USE PLANS	43
Inspirations From the National Level	44
Germany—XPlanung	44
The Czech Republic—Methodology of Digital LUP-D Standardization	45
Inspirations from the Regional Level	48
Italy—“Paperless Urban Planning”	48
France—GéoBretagne	49
Ireland—Government Portal for the Land Use Plan	51
SELECTED OPEN DATA SOURCES FOR LAND USE PLANNING	53
Use of the OpenStreetMap (OSM) Database for Preliminary Analyses in the Processing of Land Use Plans	55
RECOMMENDATIONS FOR IMPROVEMENT	57
Recommendations for the Košice Self-governing Region and State Entities:	58
References	61
Annex I	63
Notes	66

ACKNOWLEDGMENTS

This technical note has been prepared by a World Bank team composed of Iveta Hupková (Open Data Policy Consultant), Miloslav Michalko (Geospatial Data Consultant), Peter Hanečák (Open Data Consultant), Pierre Chrzanowski, (Disaster Risk Management Specialist), and Andrea Millington (Local Project Coordinator). Jean Pommier and Florent Gravin, both Geospatial Consultants, also contributed through technical inputs.

The note was developed during the implementation of the third and fourth phases of the Catching-up Regions Initiative (CuRI), under the supervision of Christoph Pusch, Practice Manager at the World Bank (SCAUR Unit), with the support of the World Bank CuRI project team, including Ellen Hamilton (Lead Urban Specialist), Grzegorz Aleksander Wolszczak (Urban Development Specialist), Yondela Tembakazi Silimela (Senior Urban Specialist), Vladimír Benč (Urban Specialist), Michala Puškárová (Project Coordinator), Veronika Zimanová (Project Coordinator), and Adela Delcheva Nachkova (Project Assistant).

The note was prepared through desk research and consultations with the Self-governing Region of Košice (KSK), including inputs from Martin Pukančík (Head of the GIS Unit at the KSK), Oliver Siksa (GIS Officer at the KSK), and Peter Serfözö (Head of the Department of Land Use Planning and Environment at the KSK).

The team of authors would further like to thank the following reviewers for their valuable feedback and suggestions: Ivana Bortalová from the Unit of the Regional Centers and Strategic Planning at the Ministry of Investment, Regional Development and Informatization of the Slovak Republic; Narae Choi, and Paul Prettitore, both Senior Urban Specialists from the World Bank; as well as Sylvia Stoynova, Operations Officer at the World Bank.

The authors would also like to thank the team from the Authority for Spatial Planning and Construction of the Slovak Republic for their valuable inputs and support: Milota Sidorová, Vice President for Spatial Planning; Zuzana Kordošová, Director of the Department of Spatial Planning; and Ján Valuška.

LIST OF TABLES

TABLE 1.	Examples of Municipalities and Regions in the SR and abroad that have published data on the layers of their land use plan in open data format	40
TABLE 2.	Recommendations for the Košice Self-governing Region and State Entities in the context of the KSK's agenda	58

LIST OF FIGURES

FIGURE 1.	KSK Map Application on the Availability of Land Use Plans in the Region	28
FIGURE 2.	Example of Data Transformation Into an INSPIRE Schema	45
FIGURE 3.	Example of a Data Model Structure That Defines Feature Classes (point, line, polygon), Attributes, and Data Types	46
FIGURE 4.	Example of Data Model Attributes for the "VU Areas" Layer	47
FIGURE 5.	Illustration of the Piedmont SDI Structure	49
FIGURE 6.	Example Drawing of a Functional Land Layout	50
FIGURE 7.	MyPlan.ie Interface Screenshot	51
FIGURE 8.	Example of Data Model Attributes for the "Zone Types" Layer of the Land Use Plan of Ireland	51
FIGURE 9.	Example of Selected Elements of the OSM Data Model for the Purpose of Urban Analyses	55

LIST OF BOXES

BOX 1.	What is Open Data?	22
BOX 2.	Quality of (Geospatial) Data	29
BOX 3.	Regional Land Use Plan Scale	34
BOX 4.	Call-out Box: Xplanung	45
BOX 5.	Call-out Box: Methodology of Digital LUP-D Standardization	47
BOX 6.	Call-out Box "Paperless Urban Planning"	49
BOX 7.	Call-out Box: GéoBretagne	50
BOX 8.	Call-out Box: Government Portal for the Land Use Plan	51
BOX 9.	Data Policy Directive of the Magistrate of the Capital City of the Slovak Republic, Bratislava: Art. XII Special provisions on the publication of data from public contracts	59

ACRONYMS AND ABBREVIATIONS

- API** Application Programming Interface
- CR** Czech Republic
- CuRI** Catching-up Regions Initiative
- EC** European Commission
- EU** European Union
- FAIR data** Findable, Accessible, Interoperable, Reusable Data
- GCCA** Geodesy, Cartography and Cadastre Authority of the Slovak Republic
- GIS** Geographic Information System
- HTU** Higher Territorial Unit
- HVD** High-Value Dataset
- IS** Information System
- IT** Information Technology
- JRC** Joint Research Centre
- KSK** Košice Self-governing Region
- LUP-D** Land Use Plan Documentation
- MIRDI** Ministry of Investment, Regional Development and Informatization of the Slovak Republic
- MoE** Ministry of the Environment of the Slovak Republic
- OGC** Open Geospatial Consortium (an international standards organization)
- OSM** OpenStreetMap
- OSS** Open-source Software
- PSI** Public Sector Information
- PSK** Prešov Self-governing Region
- SDI** Spatial Data Infrastructure
- RSDI** Regional Spatial Data Infrastructure
- SR** Slovak Republic
- TSES** Territorial System of Ecological Stability
- WMS** Web Map Service

EXECUTIVE SUMMARY

Land use planning is one of the most important policy instruments for urban and regional development aiming to meet the needs of the populations while considering various factors such as environmental sustainability, economic development, and social well-being.

The process of land use planning relies on working with geospatial data from different sources and often, these data are difficult to find, manage, and process together. Hence, this technical note aims to argue that opening up relevant data in open and standardized formats can lead to better decisions regarding land use planning while reducing the cost and complexity of the entire process.

This note has been primarily written for the Self-Governing Region of Košice (KSK) in the Slovak Republic, which has requested assistance in preparing its next land use plan and is considering how to improve the procurement process. It is part of the European Commission's Catching-up Regions Initiative (CuRI) and was written by a World Bank team providing technical assistance in the area of geographic information systems (GIS).

The broader objective of the note is to provide practical examples and recommendations on land use planning and data management that could be considered by any Self-Governing Region in the Slovak Republic or any other local or national government.

Until now, the policy and legal framework in the Slovak Republic has lacked clear instructions regarding the digitization and publication of land use plans, often resulting in inconsistent information across regions and municipalities. However, this might soon change with the establishment of the Authority for Spatial Planning and Construction of the Slovak Republic, along with an upcoming legislation on land use planning in 2024. Therefore, there is an opportunity for enhancing data management in land use planning in the Slovak Republic, and this technical note intends to contribute to it.

There are, however, existing good practices in the country. For instance, some municipalities such as Banská Bystrica and Prešov have already taken steps by publishing GIS layers from their land use plans as open data. The note also presents examples from Italy, France, Germany, the Czech Republic and Ireland, demonstrating the significant benefits of opening and standardizing data used in land use plans.

The note concludes with suggestions for improving land use planning at the regional level through better data management. These include conducting a detailed inventory of GIS layers, analyzing and extending copyright and license terms, ensuring technical interoperability through data standards, developing in-house databases, and incorporating open data and standard clauses into procurement contracts.

Finally, this technical note should be of interest to regional and urban planners, GIS experts and land use plan developers. It might also be relevant to government professionals involved in proposing legislation related to land use planning, as well as the broader Open data and GIS communities.

INTRODUCTION

Land use planning is one of the most important policy instruments for urban and regional development. It aims to meet the needs of communities while considering factors such as environmental sustainability, economic development, and social well-being. The process of land use planning relies on collecting and combining geospatial information from different sources. However, the current practice in the Slovak Republic shows that data used for land use plans are often 'closed'—locked in drawings on paper or in PDF files, and frequently unavailable for further re-use by public authorities or citizens. The lack of standardized data layers and the difficulties in accessing them often result in inconsistent land use plans across regions and municipalities. Additionally, this issue leads to costly and lengthy processes when procuring and developing new plans.

One potential solution to address this issue is to implement the concept of open data across relevant institutions. Public authorities with the mandate to collect and share information on plots of land, as well as companies (including utilities that manage data on behalf of the government) can actively support better data exchange by publishing land use plans as open data. Open data refers to data that is openly accessible, exploitable, editable, and shared by anyone for any purpose. By doing so, regions and municipalities in the Slovak Republic can ensure consistency among land use plans, improve the overall quality of the final output (the actual land use plan), and reduce the cost and time required for the planning process itself (developing, agreeing upon, and implementing land use plans).

In the Slovak Republic, land use plans guide and influence the development of territories and cities. According to the law, land use planning “creates the conditions for the permanent harmony of all activities in the territory with particular regard to care for the environment, achieving ecological balance, ensuring sustainable development, environmentally sound use of natural resources, and protecting natural, civilizational, and cultural values” (Act No. 50/1976 Coll. on land use planning and building order, also known as the “Building Act”).¹

With the recent establishment of its geographic information system (GIS) unit, the Self-governing Region of Košice (KSK) now possesses a functioning and well-resourced spatial data infrastructure. The Department of Land Use Planning and Environment of the KSK aims to leverage these new GIS capacities to play a more active role in new land use plan development. Specifically, the GIS unit and the Department of Land Use Planning and Environment have expressed interest in receiving guidance and practical examples on the following points: i) the benefits of opening up land use plan data, ii) the technical requirements for doing so, iii) examples from other regions and municipalities, and iv) concrete steps for the KSK to enhance its land use planning processes with open data.

The presented technical note serves as a response to that request. Its objective is to explore the possibilities of improving the quality of the land use planning process at the regional level in the Slovak Republic by making land use plans and related datasets available as open data. The note examines both the current and upcoming legislation, available datasets, the needs and issues expressed by the Košice Self-governing Region, as well as similar initiatives in other regions of the European Union (EU). The note concludes with recommendations on how to enhance land use planning at the regional level in the Slovak Republic through the introduction of open data standards, policies, or regulations for land use planning.

The background of the entire page is a repeating pattern of green triangles in various shades, creating a textured, geometric effect.

**LAND USE PLANNING
IN THE SELF-GOVERNING
REGION OF KOŠICE**

The Self-governing Region of Košice (KSK), as well as other higher territorial units (HTUs) in the Slovak Republic (SR), procure, discuss, and approve land use planning materials and land use plans of the self-governing region, its amendments, and supplements. Currently, the KSK has in force the Land use plan of the Košice region HTU—amendments and supplements 2017.² The last time the region procured a comprehensive land use plan was in 2009. The KSK plans to procure a new land use plan within the next four to five years and is already considering how to improve the procurement process.

One of its objectives is to ensure the technical compatibility of the data supplied with its new regional geoportal³, as well as promoting the re-use of data for further land use analyses and decision-making, including the creation of map outputs. The KSK aims to publish data related to land use planning under an open license and for public use. To enable the publication of land use data as open data, it is important to consider the procurement of geospatial data in formats that ensure interoperability and free re-use⁴, and the modification of terms of use to guarantee the self-governing region the right to access, use, and share the data.

From a technical viewpoint, the KSK is currently facing several challenges: i) migrating the existing data of the land use plan to the new geoportal⁵, in raster or vector format; ii) starting the public procurement procedure in order to procure a company which will process new changes and amendments to the regional land use plan in accordance with open standards, after receiving suggestions from 55 institutions⁶ and requests from 51 municipalities, as part of the 2019 review of the land use plan; and iii) setting up and starting the process of procuring a new land use plan, which will be governed by the newly approved Act on Land Use Planning of April 2022.

The background of the entire page is a repeating pattern of small, light green triangles pointing upwards, set against a slightly darker green background. The triangles are arranged in a grid-like fashion, creating a textured, geometric effect.

WHY PUBLISH LAND USE PLANS AS OPEN DATA?

The argument for making land use planning data available to citizens and other entities in the form of open data starts with the current legislation of the SR:

- The constitution, which specifies the obligation for public authorities “to provide information on their activities in the official language in an adequate manner”⁷
- The Act on Free Access to Information⁸ (the “InfoAct”), which guarantees citizens the right to information and transposes the Directive of the European Parliament and of the Council on Open Data and the Re-use of Public Sector Information (PSI)^{9,10}
- Specific legislation such as the INSPIRE Directive (transposed in the SR through Act No. 3/2010 Coll., for instance)¹¹, which focuses on the effective geospatial data exchange among public administration entities

BOX 1: What is Open Data?

By definition, open data is data that anyone can re-use for any purpose. This means data which is open both technically (available online in open machine-readable format) and legally (thanks to an open license).

Geospatial data is among the most needed types of open data as it forms the baseline of data analyses. See the Open Data Handbook <http://opendatahandbook.org/guide/en/why-open-data/>.

VALUE ADDED FOR MUNICIPALITIES AND SELF-GOVERNING REGIONS

The availability of accurate, high quality and trustworthy open data can drastically reduce the costs and complexity of the land use planning process (Agrawal, 2019) and foster innovation based on geospatial data.

Access to open data simplifies data exchange among public authorities and land use plan developers, and supports the creation of derived products and services, such as visualizations, map applications, and analytical outputs. The following are some of its benefits:

- **Effective data exchange improves the cooperation of various public authorities and supports the consistency of land use plans:** Examples of this are when there is a need to align the land use plans of neighboring municipalities or regions, or a need to ensure compliance of municipalities’ land use plans with the land use plan of an HTU¹² (for instance, a region).
- **Visualizations, map applications, analytical outputs, and tools based on open data** enable less technically skilled people to work with, analyze, and understand land use planning data more easily. Some of these outputs can be created directly by public authorities¹³ or other entities.

Publishing land use plans as open data and introducing open data standards could also bring other important benefits to self-governing regions and municipalities:

- **High quality data archives:** Procured authorized persons that develop land use plans for municipalities produce and process huge amounts of valuable data related to the specific territory. This data represents a valuable and unique source that can be used for further geospatial analyses within municipalities or by other stakeholders in the region. By ensuring that the data can be later re-used for other purposes and shared without any restrictions, municipalities have an opportunity to continuously build their own open data archive and to create outputs driven by this data. By ensuring that the data is available in relevant structured formats, municipalities are able to measure and manage the quality of the data.¹⁴
- **Reducing the cost of contracts:** Municipalities can reduce the cost of contracts with authorized persons by providing them access to their open data archives. Authorized persons can spare resources when gathering data from different public sources, thus reducing the final cost of the contract.
- **Elimination of vendor lock-in:** Procuring land use plan data in accordance with open standards could reduce the risk of vendor lock-in. First, data from land use plans may be locked in commercial GIS systems that provide data outputs in formats not supported by open-source software (OSS) technologies, which therefore require one to purchase specific commercial technology. The handover of open land use data would enable municipalities to change vendors at any time, thanks to the technological neutrality. Second, there have been cases when municipalities procured the same authorized person multiple times to develop a new land use plan. Compared to others, this person had an advantage as they were in possession of all the data that was generated during the entire process of the previous land use plan development. By publishing data as open data, municipalities can support fair competition among authorized persons and possibly choose a different land use plan developer.
- **Better regional collaboration and policies through data compatibility and interoperability:** All self-governing regions have the same agenda, which can be also interdependent, such as the road network, transport, and management of environmental issues. Access to open data from land use plans can improve the quality of regional regulations and policies based on collaboration and data-driven decisions/policies.

It is in the interest of all stakeholders to have access to high quality and accurate digitized land use planning data.¹⁵ These include the following: officials of the relevant construction authority and the municipality, who assess compliance with the land use plan; the applicants trying to obtain a construction permit; as well as members of the general public, who have the right to intervene in zoning proceedings in specific cases. Free access to quality data allows for mutual control, mitigation of conflict and noncompliance, and can lead to an improvement of the whole process and its outputs. The current legislation provides relatively broad opportunities for citizens to participate in the land use planning process in terms of addressing comments, attending public hearings, the right to object to inconsistencies, and so on. (Via Iuris, 2011). Since any and all construction affect the physical structure of an area, there is a great need for citizens and other stakeholders to have data which can drive and justify decisions for approving all construction. Unavailability of such data might lead to the public not being able to enter the proceedings, which may in turn invalidate those proceedings, and thus even invalidate the construction permits resulting thereof (Kováč, 2020).

Along with the need to publish open datasets from land use plans there is also a need to consider proper technical solutions for making this data accessible to the public. In accordance with the principles of openness, the KSK¹⁶ and the Prešov Self-governing Region (PSK)¹⁷, with the support of the European Commission (EC) and the World Bank, implemented data platforms (geoportals), using open-source software and technology. Both self-governing regions use these platforms for publishing datasets related to the territory, including several datasets from land use plans. Both geoportals provide advanced tools for further data analyses and map creations.

INSPIRE AND HIGH-VALUE DATASETS

As mentioned in the previous chapter, the EU Directive on open data and the re-use of public sector information (Open Data Directive) and the INSPIRE Directive represent an important rationale for publishing data related to land use planning as open data.

The Open Data Directive defines high-value datasets (HVDs) in six thematic categories—geospatial, earth observation and environment, meteorological, statistics, companies and company ownership, and mobility. In December 2022, the EC issued implementing regulation 2023/138¹⁸, which defines a list of specific high-value datasets with arrangements for their publication and re-use. A significant part of the HVDs listed overlaps with land use planning data, for example:

- Geospatial data: national and regional maps, satellite and other imagery
- Mobility data: roads and road signs, and waterways

The INSPIRE Directive (transposed in the SR through Act No. 3/2010 Coll., for instance)¹⁹ with its aim of “making available relevant, harmonized and quality geographic information that support policies and activities impacting the environment” (European Environment Agency)²⁰ defines 34 geospatial data themes which should be accessible throughout EU Member States via a network of services. These also include themes with a significant overlap with land use planning and high-value datasets, such as the following:

- Address points
- Administrative units
- Buildings
- Cadastral parcels
- Geographical names
- Hydrography
- Land use
- Orthoimagery

Since specific Slovak legislation related to land use planning (Act No. 50/1976 Coll. on land use planning and building order²¹, the “Building Act”) defines obligations (most importantly, the obligation to publish land use plans for municipalities and zones), but does not specify further details, both the public sector information (PSI) and the INSPIRE Directives (as transposed in the Slovak law) can be used as guidelines providing the necessary details, thus leading to such data being available as open data.

Public authorities that hold HVDs must ensure that such datasets are available in machine-readable formats via application programming interfaces (APIs) (and, when indicated, made available also as a bulk download), and they must make HVDs available for re-use under the conditions of the Creative Commons Public Domain Dedication (CC0) or, alternatively, the Creative Commons BY 4.0 license.²² The same requirements also pertain to obligations arising from the INSPIRE Directive; the INSPIRE legislation goes further and defines more detailed technical specifications for services, protocols and formats, such as the formats standardized by the Open Geospatial Consortium (OGC).²³

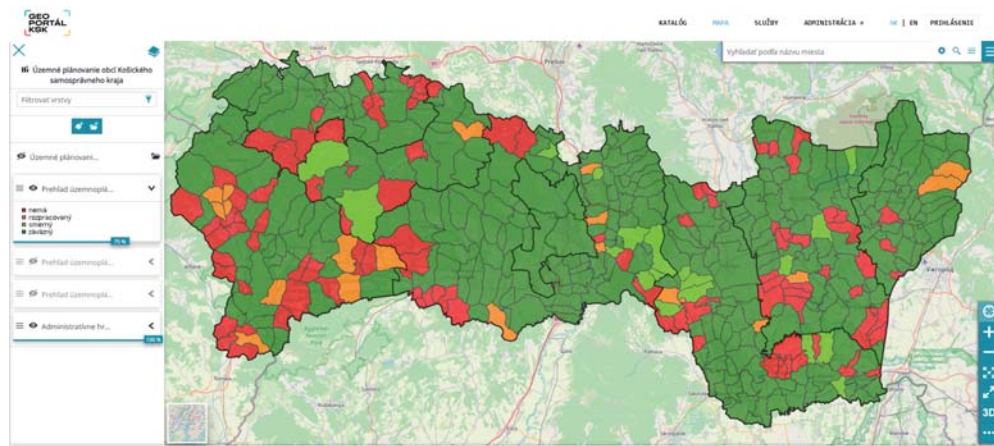
Currently, there is only a limited amount of open data published by the public authorities via the national geoportal²⁴ or the open data portal²⁵ that can be used by municipalities and land use plan developers. The transposition of the EU implementing regulation into the Slovak legislative framework will most probably have a positive impact on the amount and accessibility of HVDs that can be used as a primary data source when developing land use plans. If the HVDs become effectively accessible in one place (for example, on the national geoportal) in machine-readable formats under an open license, municipalities and land use plan developers could rapidly reduce their data collection costs (Agrawal, 2019). On the other hand, municipalities will probably be among the public authorities obliged to share their own HVDs, including datasets from land use plans; for example, they will benefit from the increased availability of more and higher quality data, but they themselves will also have to provide them.

Please refer to Annex I for a more detailed list of HVDs, based on the current information from the EC and the Slovak Government.

CURRENT PRACTICE

More than half of municipalities in the Slovak Republic do not have their own land use plan²⁶ (Authority for Spatial Planning and Construction of the Slovak Republic, 2023). The reason behind this is partially rooted in the current legislation which only requires the development of a land use plan from municipalities with over 2,000 inhabitants.²⁷ Municipalities with less inhabitants are only supposed to have a land use plan if it is necessary “to solve the concept of their territorial development, carry out large-scale new construction and reconstruction in the municipality or place public buildings, or if this arises from the binding part of the land use plan of the region” (Building Act, § 11). In Košice Region, a large majority of municipalities have their own land use plans but there are a few without them. A spatial representation of municipalities in the KSK Region with a) a valid land use plan, b) a land use plan under development, or c) no land use plan is presented in the map application below²⁸, developed by the GIS Unit of the KSK.

FIGURE 1. KSK Map Application on the Availability of Land Use Plans in the Region



Source: The KSK Geoportal, 2023.

INSTITUTIONAL STRUCTURE

In the context of the Slovak Republic, the Geodesy, Cartography and Cadastre Authority of the Slovak Republic (GCCA) acts as the central state-level body for geodesy, cartography, and real estate cadaster. It is responsible for public administration and professional supervision in the aforementioned fields.

Institutional connections with regional or local governments are important. This is particularly true in the case of the KSK, which requires updated cadastral data for effective land use and planning. However, there have been some issues in this area. The agreement between the KSK and the GCCA which facilitated access to cadastral data for the region has expired and is currently pending renewal. This is partly due to the lack of capacity to proceed with it and also because it has not been prioritized by the KSK. Consequently, the KSK has been using an outdated version of the cadastral data for its territory.

Furthermore, while the GCCA has made strides in unlocking certain attributes and creating a customer portal for downloading data from specific areas, access to cadastral data on a larger scale, such as at the regional level, remains an issue. This is due to the requirement of agreements and adherence to legislative processes. In regional planning and management, especially for entities like the KSK, it is crucial to have comprehensive cadastral data on plots with more open licensing.

In light of these developments, it would be worthwhile to delve deeper into exploring how institutional structures, particularly between state-level bodies like the GCCA and local government entities such as the KSK, can be strengthened. This could potentially involve looking at models from other EU countries, assessing the challenges and bottlenecks in data-sharing agreements, and proposing strategies for streamlining access to up-to-date geospatial data for regional planning purposes.

DATA QUALITY

The availability of land use plans in a digitized, structured, and machine-readable form, downloadable in bulk, is currently low, but not zero. The most common practice, especially in small municipalities in the Slovak Republic, is to publish land use plans in the form of PDF files with unstructured data that are hard to work with, accompanied by a set of other PDF files (for example, the municipalities of Komárno, Nové Zámky, and Pezinok)²⁹. A better approach is visible in the case of self-governing regions and larger municipalities, some examples of which are the following: the Košice Self-governing Region, which has published its land use plan³⁰ as a set of raster layers with web map services (WMS) API available; the Žilina Self-governing Region, which has published the regional land use plan in the form of a GIS application³¹ with various views; the capital city of the Slovak Republic, Bratislava, which has its land use plan available in a GIS with a WMS service³²; the municipality of Trenčín with its comprehensive GIS portal³³; and the city of Prešov, which has published some of its land use plan layers as open data (areas susceptible to floods and landslides)³⁴. The disadvantages of publishing land use plans in an unstructured way are that it complicates the re-use of data, supports inconsistencies between the land use plans of adjacent municipalities or with the regional land use plans, and that it does not allow for the assessment and improvement of data quality.

Apart from that, in the context of the INSPIRE Directive, the low availability of land use planning data is consistent with the overall low availability of geospatial data from regions, as well as the low rate of available datasets being registered at the registry of geospatial information (portal rpi.gov.sk—RPI), thus contributing to lower monitoring indicators in the EC country fiche for the Slovak Republic.³⁵

BOX 2: Quality of (Geospatial) Data

Despite ongoing efforts from the Ministry of Investment, Regional Development and Informatization of the Slovak Republic (MIRDI) to introduce the concept of data quality management across public administration, local evidence on actual data quality of various registers and data sources for land use planning is missing. MIRDI published some methodological guidelines on data quality management, conducted pilot testing of selected registers and datasets (for example, the Register of Addresses, Central Register of Contracts, Register of Legal Entities, Entrepreneurs, and Public Authorities), and published assessment reports³⁶ from the testing.

Among the tested registers within the first complex data measurement in public administration, only the Register of Addresses is thematically close to land use planning. The assessed business rules achieved the following results (key performance indicators [KPIs]) (Office of the Deputy Prime Minister for Investment and Informatization, 2019)³⁷:

- Address points (latitude) must be located within the interval between the westernmost/easternmost point of the SR—99.99%
- Latitude is a required attribute—73.48%
- Address points (longitude) must be located within the interval between the northernmost/southernmost point of the SR—99.99%

The Register of Addresses is also accessible in open data format and it is considered one of the best registers.

Despite this testing, regular reports from the EC on the status of the INSPIRE Directive implementation³⁸ is still the best source for finding up-to-date information on the quality of data, services, and compliance of geospatial data in the Slovak Republic with the INSPIRE Directive.

In the Slovak Republic, it is still rare to find land use plans or their selected layers published as open data. Among the few examples are the land use plans of the town of Prešov and the self-governing regions of Banská Bystrica and Prešov. All of these entities have published some of the layers from their approved land use plans in open, machine readable formats under open licenses (Creative

Commons), available for download. Compared to others, the Banská Bystrica Self-governing Region makes use of the national geospatial infrastructure (<https://rpi.gov.sk/>) and the support from the Ministry of the Environment of the Slovak Republic (MoE) for data publishing. The town of Prešov and the PSK use different technical solutions—the town of Prešov provides open geospatial datasets through the procured services of a commercial company, while the PSK uses its own regional geoportal, which was developed within the CuRI, and is based on OSS. Metadata on the national geoportal (<https://rpi.gov.sk/>) show that the Bratislava Self-governing Region provides some of the layers from its land use plan as open data as well—for example, the railway network (planned lines) and cycling routes. These datasets are currently not accessible via the national geoportal. A brief evaluation of some of these examples from the perspective of licensing and INSPIRE compliance is available in the section “Examples of Open Data Land Use Datasets” in this note.

Another challenge relates to licensing terms. In practice, both citizens and public servants encounter the limits of some institutions to make data available in a fully open data format. These limits are related to the issue of the Slovak Copyright Act³⁹, which distinguishes a *sui generis* right to some, but not all, databases and which complicates the licensing of databases⁴⁰. For example, the GCCA limits the use and re-use of provided datasets in contracts signed with municipalities⁴¹. Such limitations (for both kinds of databases) can be overcome by applying open (public) licenses, but this is the responsibility of the public bodies publishing the data.

BASIC LEGISLATIVE FRAMEWORK

Act No. 50/1976 Coll. on land use planning and building order (the Building Act)⁴² is currently in force. It sets out rules regarding the procurement of land use plans. Under the act, municipalities and self-governing regions must ensure the procurement of land use planning materials and land use planning documentation through a professionally qualified person. The register of professionally qualified persons is kept at the newly established Authority for Spatial Planning and Construction of the Slovak Republic. In order to select the processor of land use planning documentation, the HTU proceeds in accordance with the generally applicable regulations on public procurement, while “the main selection criterion is not the lowest price offered [...] but above all the professional competence of the candidates and the quality of their previous work in land use planning. The selection of the supplier should take place before the preparation of surveys and analyses for the (municipality’s) land use planning documentation” (UzemnePlany.sk, 2022). A design competition may also be used for the selection of a professionally qualified person.

The HTUs procure regional land use plans. A regional land use plan shall in particular provide for the following (the Building Act):

- Principles and regulations of settlement structure, spatial arrangement and functional use of the territory, transport, technical equipment, environmental protection, territorial system of ecological stability (TSES), cultural monuments and use of natural resources in terms of sustainable development, as well as the determination of public utility buildings
- The interconnectivity of the spatial development of the region and its municipalities with the neighboring regions
- In the binding part, a proposal of spatial development regulations with principles of spatial arrangement and functional use of the territory as a basis for the document for approval. The self-governing region approves the regional land use plan and promulgates the binding parts by means of a generally binding regulation.

A regional land use plan is processed for a part of the country with several municipalities and contains the solution of specific developmental plans or activities significantly affecting the spatial and functional use of the territory. The regional land use plan must be in accordance with the binding part of the Slovak Spatial Development Perspective and must be based on its guiding sections. The delimitation of the boundaries of the area to be addressed shall be determined in the assignment by the land use planning authority which procures the regional land use plan (the Building Act).

BOX 3: Regional Land Use Plan Scale

The regional land use plan is processed in the scale of 1:100,000; 1:50,000 or 1:25,000 (main drawings) and 1:500,000; 1:200,000 (broader relations).

In light of the above-mentioned INSPIRE Directive, which places emphasis on the interoperability of geospatial data, it is also important to mention the recommendation of the EC elaborated by the Joint Research Centre (JRC), entitled the “**European Union Location Framework Guidelines for public procurement of geospatial technologies**”⁴³, which talks about specifications for the conditions of the public procurement of services related to geospatial data and the processes associated with them. This technical recommendation has been developed in the context of the **Interoperability**

Solutions for European Public Administrations (ISA) program⁴⁴ and the **Establishment of the European Union Location Framework** (EULF) activity⁴⁵, which identifies barriers and possible solutions to the consistent and interoperable use of location information and services, while promoting the re-use of INSPIRE, where possible and feasible.

The following are other legal norms that regulate land use planning:

- Act No. 416/2001 Coll. on the transfer of certain competencies from the state administration to municipalities and higher territorial units, Article 1(3)(f)⁴⁶ – transfer of competencies to self-governing regions in the field of land use planning: the procurement of land use planning materials and land use planning documentation of the region, the competence of the land use planning authority, the approval of the assignment for the processing of a regional land use plan, and the approval of regional land use plans and the promulgation of their binding parts
- Decree of MoE No. 55/2001 on land use planning materials and land use planning documentation⁴⁷
- Decree of MoE No. 55/2001 on land use planning materials and land use planning documentation, § 11⁴⁸ - defines the contents of a regional land use plan

CHANGES BROUGHT BY THE NEW ACT ON LAND USE PLANNING

At the time of conducting this note, a new act on land use planning⁴⁹ was approved by the National Council of the SR, which is set to come into force on April 1, 2024. The new act aims to “strengthen research in the field of land use planning and the transfer of the results of the research into land use planning principles, which will be issued as generally binding in the procurement and processing of land use planning documentation [...] professionalization of the state administration, reduction of administrative burden in activities related to land use planning, in particular its computerization and digitization of data used as inputs [...] and the subsequent integration of the zoning decision into the building plan proceedings” (Explanatory Memorandum)⁵⁰. The core of the new act is the digitization and **computerization of land use planning processes**.

The act introduces, among others, the following changes (“Explanatory Memorandum, 2022”):

- It defines the competencies of the newly established Authority for Spatial Planning and Construction of the Slovak Republic, which will act mainly as a coordinator of a unified approach and processes of land use planning, through methodological guidelines (also in relation to municipalities).
- It introduces a new type of standardized land use planning documentation, namely the **land use plan of a microregion**.
- It introduces the computerization of land use planning processes in a unified methodology and in a single information system (IS) for land use planning and construction, in which relevant data will be stored and published.
- An IS shall be set up to ensure the exchange of data via standard interfaces.
- Simplification of procedural steps
- Concept of Territorial Development of the Region, which will replace the regional land use plan

- Decree of MoE will be replaced by a new Decree of the Authority for Spatial Planning and Construction of the SR⁵¹

In the context of data sharing and standardization, the Explanatory Memorandum states:

- All input data will be standardized and will subsequently be machine-processable.
- The output will be referenced and processed data available as open data.
- Open APIs will be created to allow data inputs from other systems.
- Data will be available based on roles and relevant permissions for registered, unregistered, and authenticated users of the system.

The new IS will hold, among other things, data of the land registry in the scope necessary for land use planning and construction activities, a basic database for GIS, spatial data and spatial data services, including their metadata, transport infrastructure data, and technical infrastructure data (Explanatory Memorandum). Although the application practice is not clear from the act, access to the IS could relieve the KSK and other local governments from obtaining these data on the basis of an agreement with the institutions concerned.

Given that the new act on land use planning will not come into force until April 1, 2024, it is not possible to predict how it will be applied in practice at this time. On the positive side, however, there is an effort to standardize processes and data, and to computerize land use planning processes.

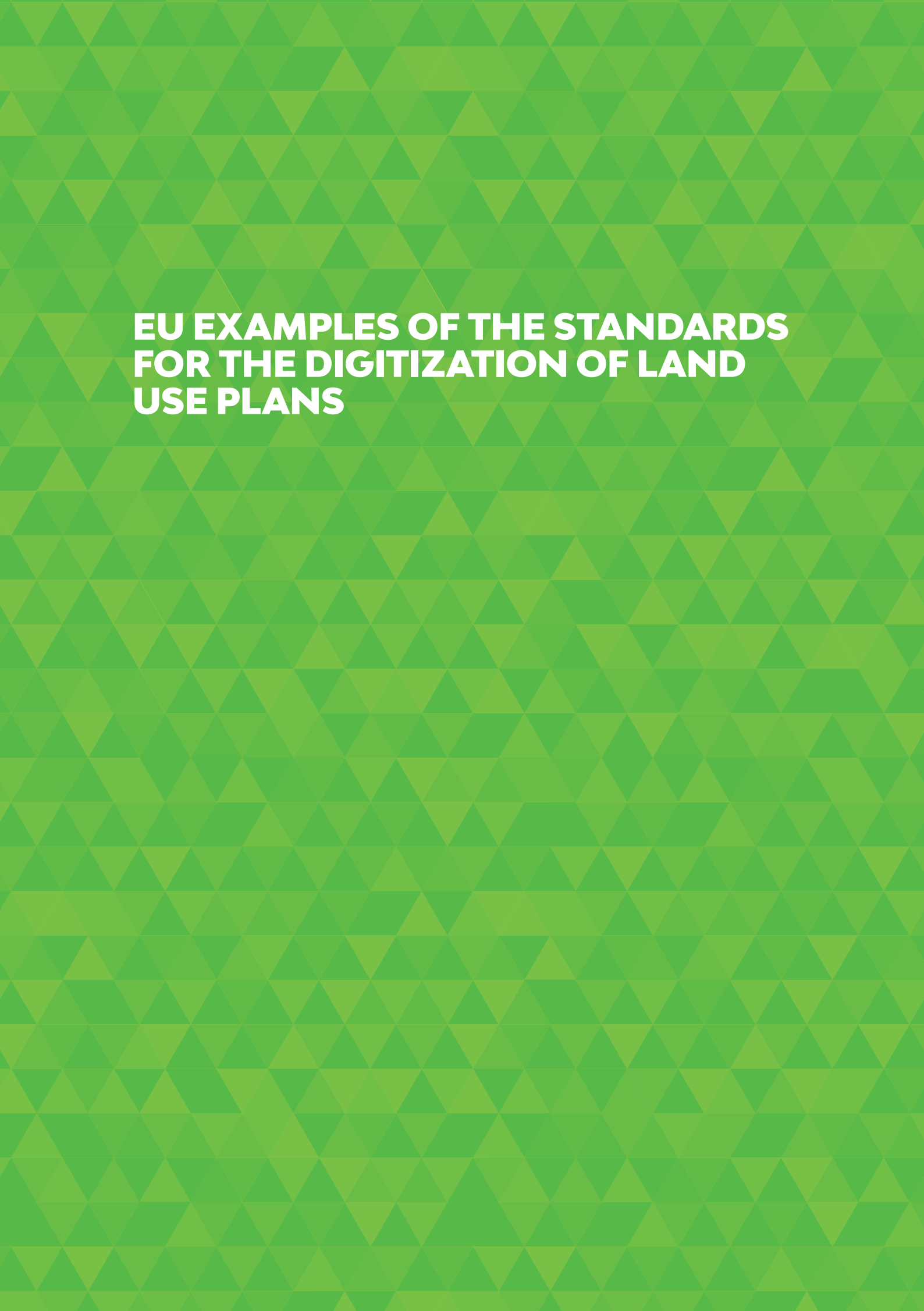
The background of the entire page is a repeating pattern of green triangles in various shades, creating a textured, geometric effect.

LOCAL AND EU EXAMPLES OF OPEN DATA LAND USE DATASETS

Table 1 lists examples of municipalities and regions in the SR and abroad that have published some of the layers of their land use plan in open data format, including a brief evaluation:

TABLE 1. Examples of Municipalities and Regions in the SR and abroad that have published data on the layers of their land use plan in open data format

Region	Name	License	Evaluation
SR, Banská Bystrica Self-governing Region (BBSK)	Selected layers of the LUP and others ⁵²	Creative Commons (CC) BY 4.0	<ul style="list-style-type: none"> –MoE shares its spatial data infrastructure (SDI) for the needs of the BBSK geospatial data, or for any obliged person according to the Act on National Infrastructure for Spatial Information –The geoserver stores data –Partial INSPIRE compliance
SR, PSK	International cycle route EUROVELO 11 –Proposal according to the PSK LUP of 2019 ⁵³	CC BY 4.0	<ul style="list-style-type: none"> –The dataset is also registered at the national geoportal rpi.gov.sk⁵⁴ –OGC standardization
SR, Prešov Municipality	Landslides ⁵⁵	CC Attribution	<ul style="list-style-type: none"> –Geospatial data published in SHP, GeoJSON, and KML formats –Also publishes metadata –The data are not created directly by the IT unit at the town office and are partially outsourced –Partial INSPIRE compliance
France, Brittany Region	Functional landscape layout drawing ⁵⁶	Open License ⁵⁷	<ul style="list-style-type: none"> –More than 100 layers published for the land use plan –Geospatial data published in OGC, SHP, GML, etc. –Full INSPIRE compliance
Czech Republic (CR), Hradec Králové Region	Thematic layers of the spatial development principles ⁵⁸	n/a	<ul style="list-style-type: none"> –Geospatial data published in the ArcGIS Hub, Dataset/GeoService, GeoJSON, CSV formats –Also publishes metadata –No INSPIRE compliance
CR, South Bohemia Region	Data from the spatial development principles ⁵⁹	CC0 (public domain)	<ul style="list-style-type: none"> –Geospatial data published in the ArcGIS Hub, Dataset/GeoService, GeoJSON, CSV formats –Also publishes metadata –No INSPIRE compliance
Italy, Piedmont Region	Land use planning data ⁶⁰	Creative Commons Attribution 4.0 international	<ul style="list-style-type: none"> –More than 200 layers published for the LUP –Geospatial data published in OGC, SHP, GML, etc. –Full INSPIRE compliance

The background of the entire page is a repeating pattern of green triangles in various shades, creating a textured, geometric effect.

EU EXAMPLES OF THE STANDARDS FOR THE DIGITIZATION OF LAND USE PLANS

For local governments, land use planning documentation (LUP-D) represents a basic operational, but also argumentative basis for spatial decision-making and planning.

To support the re-use of datasets of land use plans within or beyond the regions, the standardization of digitization and data outputs is crucial. The efficient work and **data interoperability** of documents and data can thus bring quick and spatially accurate decisions. Below, we present some examples of LUP-D standardization from abroad.

After each example we define ‘call-out boxes’ with useful takeaways in particular areas such as, Resource Management and Collaboration, Centralized Data Management, Data Standards and Accessibility and Increased Clarity and Comparability. These takeaways can be useful for the KSK, the self-governing regions, municipalities and governmental organizations.

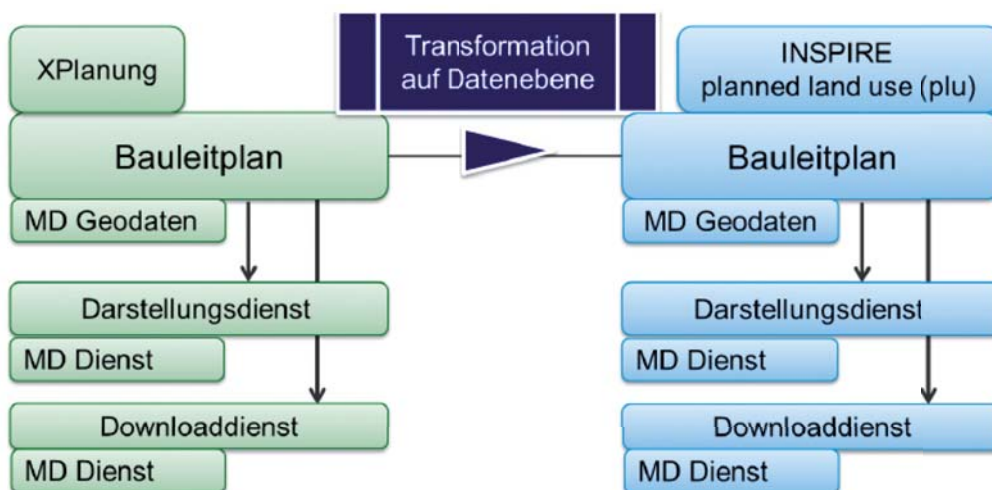
INSPIRATIONS FROM THE NATIONAL LEVEL

Germany—XPlanung

XPlanung is a legally binding data standard to be used as a data exchange format for IT processes in Germany related to land use planning, state and regional planning, and landscape planning. XPlanung supports the lossless transfer of planning data between different IT systems. The transformation rules support the fully automatic generation of INSPIRE datasets. The platform further provides external codebooks that make it possible to map detailed content in planning that was previously not available in the standard (<https://xleitstelle.de/>, 2022).

The XPlanung data transformation process begins at the “Bauleitplan” stage, which represents the foundational planning data in German urban planning. This data is processed and transformed to align with the INSPIRE directive, ensuring consistency and interoperability at the European level. Once the data is transformed, it is made accessible through the “Darstellungsdienst” or display service, which visualizes the spatial information for users. To further enhance accessibility, the transformed data is also available for download via the “Downloaddienst” or download service. This streamlined flow ensures that the data from its origin in the “Bauleitplan” is seamlessly transformed and made available in a manner compliant with the INSPIRE standards, facilitating efficient spatial information management and dissemination.

FIGURE 2. Example of Data Transformation Into an INSPIRE Schema:



Source: XLeitstelle, n.d.

BOX 4: Call-out Box: XPlanung

In Standardized Data Exchange: With a legally binding data standard like XPlanung, the Slovak Republic could ensure uniformity and consistency in land use planning across different IT processes. This could significantly reduce data misinterpretation and enhance overall efficiency in planning procedures.

In Seamless Data Transfer: The adoption of a platform that supports lossless data transfer between various IT systems could help maintain the integrity of planning data. This could lead to more accurate decision-making and higher quality outcomes in urban and regional planning.

The Czech Republic—Methodology of Digital LUP-D Standardization

Regarding the compatibility of data exchange and work with data, a unified standard for graphical outputs of binding drawings and their consolidated data model represent one of the key attributes of correctly digitizing LUP-D: “A unified standard of selected parts of the land use plan will bring better clarity and comparability of individual land use plans, higher standards in the organization of data transfer and presentation, easier usability of data in spatial-analytical documents and other documents, and it is a basic prerequisite for the digitization of construction management and land use planning. The single standard fulfills the Government’s programme declaration and will contribute to the implementation of the INSPIRE Directive” (Ministry for Regional Development of the CR, 2022).⁶¹

The methodology of standardization of the digital version in the CR focuses on the following parts (Ministry for Regional Development of the CR, 2022):

- The way of graphical representation and description of individual phenomena is defined.
- The standard includes characteristics of individual areas with various uses, corridors, and overlay markings.
- The standard further specifies requirements for digital vector data processing, divided into requirements for processors working in GIS and CAD systems.
- The standard also defines the standard vector data of the land use plan, including layer contents, graphic type, and descriptive attributes.

- Requirements for the mutual consistency of layers, for the processing of raster equivalents of drawings, and for the arrangement of digitally transmitted data are specified.
- In addition to the methodological guidance and description of the data model, the standard is supplemented with example drawings, sample data structures, and a library of graphical symbols for the standard representation of phenomena in the ArcGIS environment.

Figure 3 and 4 shows an example of a data model that defines object classes for a built-up area, defining selected attributes such as “name”, “type/domain”, “description”, and “allowed values”. It also points out the legal regulations that are linked to the given dataset together with an example of a graphic representation.

FIGURE 3: Example of a Data Model Structure That Defines Feature Classes (point, line, polygon), Attributes, and Data Types

ZastaveneUzemi_p

Atributy:


Název	Typ/doména	Popis	Připustné hodnoty
SHAPE	Polygon	Geometrie.	
Obec_Kod	Integer	Identifikační číslo obce RÚIAN.	

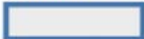
zastavěné území

Definice: Území vymezené územním plánem podle postupu definovaného stavebním zákonem. Na území obce se vymezuje jedno případně více zastavěných území.

Právní předpisy:

- SZ § 2, odst. 1, písm. d)
- SZ § 58

Symbolika HLV: 

Symbolika ZČÚ: 

Source: Ministry for Regional Development of the CR, 2019.⁶²

The standard also defines basic layers such as:

- The area addressed
- Built-up area
- VU (Various uses) areas
- Areas of change
- Territorial system of ecological stability (TSES)

FIGURE 4: Example of Data Model Attributes for the “VU Areas” Layer:

PlochyRZV_p

Atributy:

Název	Typ/doména	Popis	Připustné hodnoty
SHAPE	Polygon	Geometrie.	
CasH	cas_h	Časový horizont.	1 - stav 2 - návrh
Typ	typ_vyuziti	Typ využití (realizuje 2. úroveň členění ploch RZV).	BV - bydlení venkovské BI - bydlení individuální BO - bydlení všeobecné BH - bydlení hromadné BX - bydlení jiné RI - rekreace individuální RZ - rekreace-zahrádkové osady RO - rekreace-oddechové plochy RH - rekreace hromadná - rekreační areály RX - rekreace jiná OV - občanské vybavení veřejné OK - občanské vybavení komerční OS - občanské vybavení-sport OL - občanské vybavení lázeňské OH - občanské vybavení-hřbitovy OX - občanské vybavení jiné PP - vybraná VP s převahou zpevněných ploch PZ - vybraná VP s převahou zeleně PX - vybraná VP jiná ZU - zeleň-parky a parkové upravené plochy ZZ - zeleň-zahrady a sady ZS - zeleň sídelní ZO - zeleň ochranná a izolační ZP - zeleň přírodního charakteru ZX - zeleň jiná SV - smíšené obytné venkovské SM - smíšené obytné městské SC - smíšené obytné centrální SX - smíšené obytné jiné DS - doprava silniční DD - doprava drážní DV - doprava vodní DL - doprava letecká DP - doprava-překladiště, logistická centra DX - doprava jiná TW - vodní hospodářství TE - energetika TS - spoje, elektronické komunikace TO - nakládání s odpady TX - technická infrastruktura jiná VT - výroba těžká a energetika VL - výroba lehká VD - výroba drobná a služby VS - skladové areály VZ - výroba zemědělská a lesnická VE - výroba energie z obnovitelných zdrojů VX - výroba jiná HK - smíšené výrobní-obchodu a služeb HS - smíšené výrobní-výroby a služeb HX - smíšené výrobní jiné WT - vodní plochy a toky WX - vodní a vodohospodářské jiné AZ - zemědělské AP - pole AL - louky a pastviny AT - trvalé kultury AX - zemědělské jiné LE - lesní LX - lesní jiné NP - přírodní NX - přírodní jiné MN - smíšené nezastavěného území MX - smíšené nezastavěného území jiné GD - těžba nerostů - dobývání GZ - těžba nerostů - stavby a zařízení GX - těžba nerostů jiná XZ - specifické zvláštního určení XX - specifické jiné

Source: Ministry for Regional Development of the CR, 2019.

BOX 5: Call-out Box: Methodology of Digital LUP-D Standardization

In Increased Clarity and Comparability: Implementing a unified standard for graphical outputs and consolidated data models could enhance the clarity of land use plans. It would also facilitate comparability between different plans, improving their analysis and potential integration.

We recommend the use of the ISO 19110:2016 standard (1), which defines the methodology for cataloguing feature types.⁶⁵

INSPIRATIONS FROM THE REGIONAL LEVEL

Italy—“Paperless Urban Planning”

“Urbanistica Senza Carta (USC) aims to simplify the process of urban planning by the authorities involved, promoting a gradual and integral transition to computer-based processes.” (Regione Piemonte, 2022)

The Power of Regional Legislation

Thanks to the general revision of the Urban Planning Act *l.r.* 56/1977⁶⁴, which was implemented through *l.r.* 3/2013⁶⁵, regional administrations actively work with the following objectives:

- To unify a set of procedures for environmental, hydrogeological, and seismic assessment as well as regional planning
- **To dematerialize the processes** of building and urban planning in the strong belief that this represents the most effective way of reorganizing, which seeks to **simplify public action and make it transparent**

The Regional Act 21/2017⁶⁶ establishes the regional spatial data infrastructure (rSDI) to share geospatial information underlying general and sectoral planning and programming with local authorities and other public and private entities. By a specific provision, regional councils define the procedures for access by all citizens to the regional GIS (Regione Piemonte, 2022).

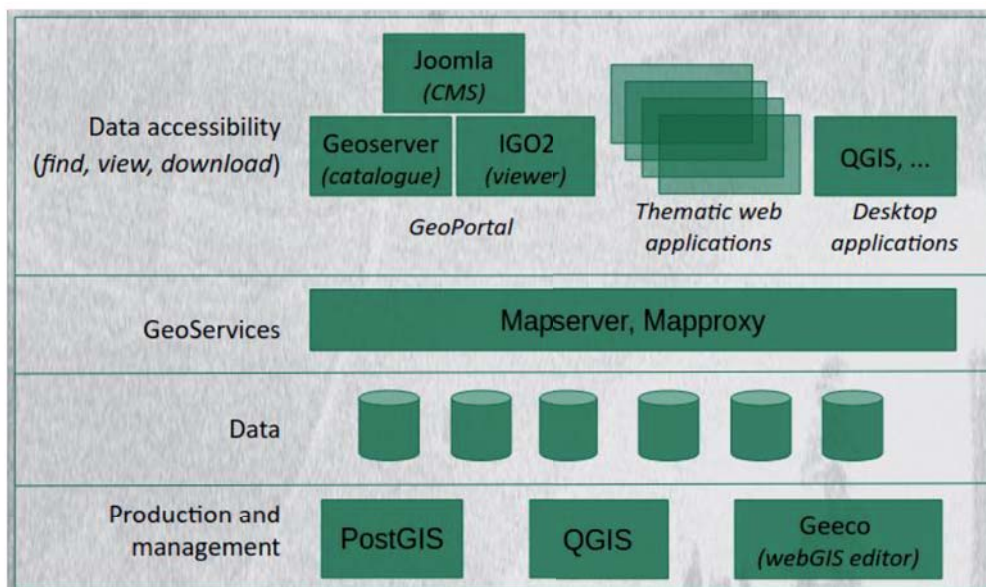
Building on these regulatory provisions, the goal of paperless urban planning is expressed within a broader planning vision that includes the process of **digitization, specification, standardization**, and **aspects of collaboration** in implementing a system of geographic knowledge aimed specifically at **implementing a regional GIS**.

The Piedmont Region’s SDI

The rSDI fulfills general and sectoral planning and programming in accordance with the Infrastructure for Spatial Information in the European Community (INSPIRE), as well as its Italian implementing decree (D.Lgs. 32/2010). Act 21/2017 on rSDI strengthened the central role of the Regional Geotopographic Database of Piedmont (BDTRE) and the Piedmont SDI open data approach.

Figure 5 shows the architecture of the spatial data infrastructure deployed in the regional administration of the Piedmont region in four layers. The basis consists of production applications such as PostGIS, QGIS and a web editor. This level interacts with the data warehouse, which, with the help of the third GeoServices layer, communicates with the end user through the geoportal’s interface, thematic web applications or through desktop applications.

FIGURE 5: Illustration of the Piedmont SDI Structure



Source: Geoportale Piemonte, 2022, FOSS4G 2022.

Piedmont SDI data is managed by CSI Piemonte, a domestic IT company based in the Piedmont region, with all technologies being exclusively OSS.

BOX 6: Call-out Box “Paperless Urban Planning”

In Resource Management and Collaboration: Going paperless would result in significant cost and resource savings, while a shared regional spatial data infrastructure would enhance collaborations between various entities involved in urban planning in the Košice Region.

INSPIRE: Alignment of the local rSDI infrastructure with the European INSPIRE Directive would ensure better policy-making across boundaries (regional, national) and fulfillment of responsibilities defined by INSPIRE (as transposed into the legislation of the Member States).

Regional policies: Compared to the other EU regions, the self-governing regions in the Slovak Republic have limited competencies. Despite this, the self-governing regions have the necessary competency to propose general binding regulations and internal orders. These tools could be used in order to set up data policy rules—how to collect and store data, how to procure services with data outputs in accordance with the further re-use of data, how to introduce standardizations etc. This could support data-driven land use planning.

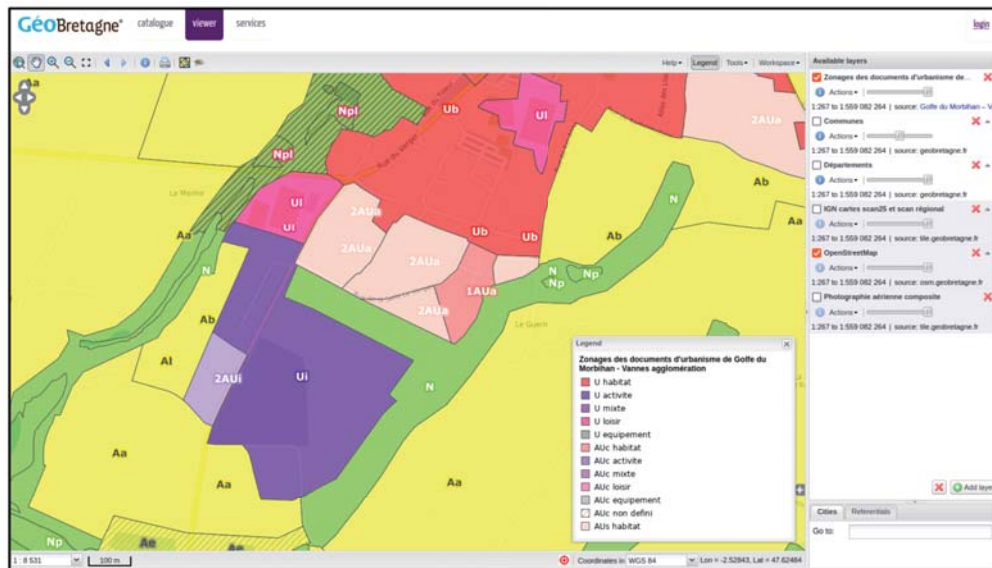
France—GéoBretagne

GéoBretagne is the regional spatial data infrastructure (rSDI) for the Brittany region. It was created to improve knowledge about this French region, with the regional and state administration creating a **partnership approach to exchange data with public interest actors** in regional planning. This platform was also motivated by the EC’s efforts to create uniform standards for the exchange of geospatial data, that is, **INSPIRE**. The GéoBretagne platform offers its partners and the public the following services: to search, view, download, and transform data in accordance with the INSPIRE Directive. The target audience of the platform is mainly citizens, public groups, and all entities acting in the public interest. Activities are mainly aimed at the public participation in the formulation of developmental policies. The output thus becomes ‘horizontally’ oriented data, **FAIR data (Findable, Accessible, Interoperable, Reusable)**.

One of the components of the platform is the **working group for the digitization of urban development plans (Pôle métier urbanisme)**⁶⁷, which has the following objectives:

- To promote good integration of the digitization tasks devolved to government services with those devolved to communities
- To monitor and participate in the national process of the digitization of urban documents and support its dissemination/implementation at the local level
- To adhere to the regulatory context
- To raise awareness and communicate the work of the business unit with elected officials, project offices, and engineers
- To organize the dissemination of geospatial data related to urban planning on GéoBretagne
- To monitor and update the information panel regarding the digitization of land use planning documents
- To find resources of updated data from network administrators and share them within the partnership
- To study the possibilities of extending the work and reflection of the cluster to other planning documents and land issues

FIGURE 6: Example Drawing of a Functional Land Layout



Source: GéoBretagne, 2022.

BOX 7: Call-out Box: GéoBretagne

In Improved Data Standards and Accessibility: Using uniform data standards like INSPIRE and prioritizing FAIR data can improve the quality and usability of the regional spatial data infrastructure. This not only facilitates data exchange but also makes the data more useful for planning purposes. The KSK and other self-governing regions and municipalities could benefit from the cooperation with MoE, which provides methodological support for entities responsible for data publishing in accordance with INSPIRE.

In Effective Coordination and Collaboration: The establishment of a dedicated working group could help integrate digitization tasks across different levels of the KSK administration. This could result in better synchronization, resource sharing, and awareness-raising, contributing to a smoother implementation of urban planning strategies.

Ireland—Government Portal for the Land Use Plan

Data for land use planning at the regional and local levels are managed by the **myplan.ie** platform, which falls under the central portal for government services and information—**gov.ie**. The mission of gov.ie is to connect the web portals of Irish government departments, thus becoming a trusted resource that makes interactions with the government more user-centered. The aim of gov.ie is to present information in a clear, understandable, and accessible way. The platform is being developed by a team from the Office of the Government Chief Information Officer (OGCIO)⁶⁸ at the Department of Public Expenditure and Reform.

FIGURE 7: MyPlan.ie Interface Screenshot



Source: Myplan.ie, 2022.

FIGURE 8: Example of Data Model Attributes for the “Zone Types” Layer of the Land Use Plan of Ireland:

#	Key	Value
1	OBJECTID	113
2	PLAN_NAME	Elphin AP - Roscommon County Development Plan 2014 - 2020
3	ZONE_ORIG	Peripheral Town Centre
4	PHASE	
5	ZONE_GZT	M4
6	ZONE_DESC	See Pages 20-23 of the Elphin Area Plan 2014-2020.
7	ZONE_LINK	http://www.roscommoncoco.ie/en/Services/Planning/Plans/County_Development_Plan_2014_-_2020/
8	COLOUR	Red1,Fill,Medium
9	SHAPE_STArea__	0
10	SHAPE_STLength__	0
11	Shape_Area	20306.1640319824
12	Shape_Length	937.881501164682

Source: Local Area Plans—Myplan GZT Zoning Types, 2022.

BOX 8: Call-out Box: Government Portal for the Land Use Plan

In Centralized Data Management: The creation of a central platform for managing land use data can enhance efficiency, accessibility, and user-friendliness. By adopting a similar approach, the Slovak administration could provide a more streamlined and user-centered service for regional and local land use planning.

The background of the entire page is a repeating pattern of green triangles in various shades, creating a textured, geometric effect.

SELECTED OPEN DATA SOURCES FOR LAND USE PLANNING

The current legislation in the Slovak Republic does not limit (or strictly define) what data sources municipalities can use when developing land use plans. The KSK and other self-governing regions or municipalities can re-use their own open data archives or a number of open data sources that can assist in land use planning—be it open WMS services or open datasets available for download. Several such resources are listed below, even though the following is not a comprehensive list:

The following examples were chosen from inspire.gov.sk and data.gov.sk as map services (most with OGC standard):

- National Geoportal (INSPIRE) <http://geoportal.gov.sk>
- ZBGIS Map Client—<https://zbgis.skgeodesy.sk/mkzbgis>
- Geoportal of the Prešov Self-governing Region—<https://geopresovregion.sk/home/>
- GIS of the Žilina Self-governing Region—<http://www.zilinskazupa.sk/sk/gis-zsk/>
- Geoportal of the Košice Self-governing Region—<https://info.vucke.sk/page/geoportal-ksk>
- ENIPI Registry System—<http://registre.enviroportal.sk/geo/>
- Landscape Atlas of the SR—<https://app.sazp.sk/atlassr/>
- Corine Land Cover—<http://geo.enviroportal.sk/corine>
- Catalogue of Protected Trees of the Slovak Republic—<https://www.enviroportal.sk/stromy>
- NATURA 2000—Special Protection Areas—<http://webgis.biomonitoring.sk/>
- NATURA 2000—Sites of Community Importance—<http://geo.enviroportal.sk/uev/>
- State list of specially protected nature areas of the Slovak Republic— <http://uzemia.enviroportal.sk>
- Web mapping application IS EZ—Environmental Burden IS— <https://envirozataze.enviroportal.sk/Mapa/>
- Attributes of the Cadastral Register—<https://ako.vugk.sk/>
- Orthomosaic—<https://data.gov.sk/dataset/inspire-ukladacie-sluzb>
- Protected areas—<https://data.gov.sk/dataset/inspire-chranene-uzemia>
- Elevation—<https://data.gov.sk/dataset/inspire-ukladacie-sluzby>
- Buildings—<https://data.gov.sk/dataset/inspire-ukladacie-sluzby>

- Administrative units—<https://data.gov.sk/dataset/inspire-ukladacie-sluzby>
- Cadastral plots—<https://data.gov.sk/dataset/katastralne-mapy-zobrazovacie-sluzby-wmts>; <https://data.gov.sk/dataset/inspire-ukladacie-sluzby>
- Various statistical data— https://slovak.statistics.sk/wps/portal/ext/Databases/Open_data/!ut/p/z1/jY_BCslwGIMfqandbD12wrpCFX9Hu9mL9CQFnR7E51eGV-tyC3xJCIt sZHFkr3xJz3yf0vXjT3F9Du6gmoZrKB4kbNtTRX7HDdVsmIGt0V0lHaCcqWF1548bEgJasLgkxjx_SWJYvALFcP7A4I5qlhcCTFi1slb7L0HWvkFSHF_jTxu3o_19g2cryaW/dz/dz/d5/L2dJ2dJQSEvUUut3QS80TmxFL1o2X1ZZMUDhCQjFBMDBVDVTDkwQVVVJEMzE4SjYyQ1Mx/
- Healthcare facilities—<https://data.gov.sk/dataset/zd3004rr>
- Address Register—<https://data.gov.sk/dataset/register-adries-register-budov>
- Road network—<https://data.gov.sk/dataset/inspire-ukladacie-sluzby> ; <https://www.cdb.sk/sk/poskytovanie-udajov/poskytovanie-vektorovych-udajov-CTEPK.alej>
- Railway network—<https://data.gov.sk/dataset/zoznam-zeleznicnych-trati>
- Water infrastructure—<https://data.gov.sk/dataset/inspire-ukladacie-sluzby>

Use of the OpenStreetMap (OSM) Database for Preliminary Analyses in the Processing of Land Use Plans

The OSM platform can provide support in the land use planning process in several areas:

- Preliminary research (survey and analysis phase of the land use plan)
- Community mapping of social phenomena as input for the land use plan—participatory data, (public consultation phase of the draft land use plan)
- OSM-derived application (fork) for the land use plan agenda (land use plan publication phase)

#	OSM Key	OSM values	Destination class
1	building	ALL except bunker / cabin / construction / farm_auxiliary / hut / shed / stable	buildings
2	waterway	river / riverbank / stream / canal / ditch	water
2	natural	wetland / water	water
2	landuse	reservoir	water
3	natural	tree / tree_row / wood	tall vegetation
3	landuse	forest	tall vegetation
4	landuse	orchard / vineyard / scrub / farm / farmland / greenfield	low vegetation
5	landuse	grass / meadow / pasture	grass
6	leisure	garden / park	mixed vegetation
7	surface	ground / earth / dirt / mud / sand	bare ground
7	natural	bare rock / mud / sand / beach	bare ground
8	surface	asphalt	asphalt
9	surface	concrete	concrete
10	highway	ALL except track / path / footway / bridleway / steps / proposed	roads
11	landuse	construction / garages, industrial / military / railway	industrial

Figure 9: Example of Selected Elements of the OSM Data Model for the Purpose of Urban Analyses

RECOMMENDATIONS FOR IMPROVEMENT

The activities below have been identified as having the potential to increase the quality of land use planning in the KSK from the perspective of open data collection, use, and sharing. The following recommendations are made on the basis of the legislative status quo, at a time when the new act on land use planning is not yet in force.

RECOMMENDATIONS FOR THE KOŠICE SELF-GOVERNING REGION AND STATE ENTITIES:

The recommendations are presented in Table 2 below in the context of the KSK's agenda, followed by a more detailed description of the most important ones:

TABLE 2: Recommendations for the Košice Self-governing Region and State Entities in the context of the KSK's agenda

KSK Agenda	Recommendations
1. Terminate contractual services (if any) with the prior GIS supplier for the land use plan for the KSK Publish the current land use plan on the geoportal	Assess the quality of existing data related to the current land use plan and the possibility to publish it on the KSK's geoportal Publish existing land use plan data in vector format, or at least in raster format
2. Identify and collect data from different sources for the purpose of land use plan development Provide data to the authorized person responsible for land use plan development	Conduct a detailed audit of the land use plan layers to identify data owners and the terms and conditions regarding external databases (open vs. limited) Analyze and modify terms and conditions for the use of data from third parties Support the development of an in-house database for land use plans
3. Prepare and publish the terms of reference for the procurement of new land use plans	Ensure technical compatibility of data with the KSK geoportal: open standards, open licenses and standardization Ensure compliance with INSPIRE technical requirements on land use data and requirements from national legislation (e.g., registration of metadata at https://rpi.gov.sk/) Develop procurement specification based on recommendations from the EC
4. Cooperate with other self-governing regions within the SK8 ⁶⁹ group in the field of land use planning	Propose the adoption of a template for public procurement of land use plans that includes requirements for open standards
5. Make new land use plans publicly available as open data—drafts and final versions	Publish land use plan data as open data with appropriate open licenses on the KSK geoportal with detailed metadata description Publish various versions and changes of the land use plan in order to track differences Register metadata at https://rpi.gov.sk/ following INSPIRE requirements (as transposed into the national legislation through the NIPI Act)

The most important recommendations are as follows:

Conduct a detailed audit of the land use plan layers

We suggest that a detailed audit of the layers of the land use plan, including the associated data sources, be carried out. In the case of external sources, the method by which the KSK obtains access to the data—license agreement, open access, cooperation agreement, and others—should be identified.

The audit output should be regularly updated with new open sources replacing the original ones under a license agreement. The KSK's professional capacity in data collection and processing is growing; therefore, there is an assumption that selected external sources of data (for example, on cycle routes) will be gradually replaced by internal source databases.

Analyze and modify terms and conditions for the use of data from third parties in cooperation with the KSK's legal department

We suggest that the KSK enshrine in its contracts with third parties that the rights to the database are not to be exercised by the contractor, but by the client as the investor (the KSK). In the case of contracts with state institutions on the basis of which the KSK gains access to data (for example, the GCCA and the Geodetic and Cartographic Institute), it would be advisable to extend the conditions of use to include the possibility of making data available to the public in vector form under open licenses⁷⁰ with the indication of the author (for bulk download) in accordance with the protection of personal data. By default, the license conditions are limited for the purposes of land use planning, the creation of a GIS, and the exercise of local administration and delegated state administration.

It is advisable for the KSK to continue to involve their legal department in the drafting of contracts with data suppliers in order to achieve long-term compliance of the supplied data with open standards and the transfer of rights to the KSK.

The KSK can take inspiration from the Data Policy Directive of the Magistrate of the Capital City of the Slovak Republic, Bratislava⁷¹, which addresses the publication of data from public contracts in Article XII:

**BOX 9: Data Policy Directive of the Magistrate of the Capital City of the Slovak Republic, Bratislava:
Art. XII Special provisions on the publication of data from public contracts**

(1) In the event that a public tender is carried out by the Magistrate of the Capital City of the SR Bratislava, the direct or indirect result of which are data files and/or the data files are part of the subject of the contract and/or there are data files through which the subject of the contract was developed, it is necessary that the delivered subject of the contract includes both the source and the resulting data.

(2) In the event that a public tender is carried out by the Magistrate of the Capital City of the SR Bratislava, the direct or indirect result of which is an information system containing data files, it is necessary that the delivered subject of the contract includes the possibility to publish selected data as Open data.

(3) In the description of the subject of the procurement contract, it is recommended to insert text that directly obliges the supplier to deliver the data files under the contract, for example, in the following wording:

"As part of the delivery of the contract, we require the delivery of both the source and the resulting data files, including the transfer of the rights referred to in Section 135(1) of the Copyright Act, and the rights to their distribution. The data shall be delivered in standard open formats, e.g., CSV, TXT, XLSX, JSON or XML, or in GeoJSON, SHP or other machine-readable and standard formats." (Directive of the Municipality of the Capital of the Slovak Republic Bratislava on data policy)

Ensure technical compatibility of data with the KSK geoportal: Open standards and standardization

For data compatibility and interoperability, it is advisable to use open technical standards, for example, OGC⁷², or others. As Slovak legislation does not yet regulate the rules for the digital creation of land use plans, the structured data model can be based on models from abroad, as well as the proposal for standardization of styles in relation to the geoserver of the region.

If a service whose output is data is procured (for example, land use plan, datasets, or IT system) the requirements for data formats should be stated in the public procurement documentation.

Support the development of an in-house database for land use plans

The acquisition of relevant data for the processing of the land use plan can often be time-consuming but also costly for both the client and the processor.

Since a large number of different datasets enter the process of land use plan creation, it is advisable to build one's own databases, either for the primary purpose as inputs to the land use plan, or for secondary use for other strategic documents or projects. Due to their longevity, the value of databases can lie in the chronology of the records held within them and thus, in capturing the evolution of different values or indicators. The database would also allow for the extraction of differences from two (time) versions of the same land use plan in vector format. For example, a database of orthophotos or tracking data on the development of tourism, or other subject matter, can be of great importance for decision-making on the development of the territory.

Likewise, a specific type of LIDAR data⁷³ that offers significant accuracy for various morphometric and spatial simulations has the potential to be stored in a local database. This dataset is relatively invariant over time but is storage-intensive (several tens of gigabytes [GBs] per region).

In order to reduce costs and increase efficiency in the process of building in-house databases, the KSK should engage municipalities and other stakeholders from the region in community mapping. This could bring more accurate and detailed data or even enrich existing data from national authorities by new attributes or values (for instance, mapping the housing quality of Roma settlements in the region)⁷⁴.

Develop procurement specification based on recommendations from the EC

The “European Union Location Framework Guidelines for public procurement of geospatial technologies”⁷⁵ discusses specifications for the conditions of public procurement of services regarding geospatial data and related processes, also with regard to the INSPIRE Directive.

Support standardization of formats, styles, processes, and licenses—Authority for Spatial Planning and Construction of the Slovak Republic and MIRDl

The current legislation does not yet regulate and standardize the rules for the digital creation of land use plans (inputs, outputs, or processes). Undefined digital standards may pose a problem, as the legislation assumes consistency between municipal and regional land use plans (for example, interoperability in exchange standards, consistent data models, or correct cartographic representation of phenomena and objects).

When designing the standardization of data models and styles, we would suggest following existing laws and regulations (for example the INSPIRE Directive transposed through the NlPl Act)⁷⁶ and registering metadata of land use plans and other geospatial datasets at RPl, since this would be the most visible and thus, also the most impactful improvement. Subsequently, advisable standards for data formats are open standards (for instance, OGC) and the use of public (open) licenses for further data use (preferably Creative Commons). All of these support cross-border compatibility.⁷⁷

It is also possible to draw inspiration from examples of good practice, for example, from the CR, and adapt the Czech standard⁷⁸ to local specificities and conditions.

REFERENCES

- Act No. 200/2022 Coll. on land use planning. <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2022/200/>
- Act No. 416/2001 Coll. on transfer of certain competences from the state administration to municipalities and higher territorial units. <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2001/416/20140701.html>
- Act No. 50/1976 Coll. on land use planning and building order (the Building Act), as amended. <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/1976/50/>
- Adamová, Z. (2021). Why licensing is important. Alvaria. <https://www.alvaria.sk/kurz/otvorene-data-v-samosprave/lekcia/preco-je-dolezite-licencovat/>
- Agrawal, M. (2019). *Data Protection Law and City Planning: Role of Open Data in Climate Resilience and Governance of National Capital Territory of Delhi, India*. In: Geertman, S., Zhan, Q., Allan, A., Pettit, C. (eds) *Computational Urban Planning and Management for Smart Cities*. CUPUM 2019. Lecture Notes in Geoinformation and Cartography. Springer, Cham. https://doi.org/10.1007/978-3-030-19424-6_3
- Authority for Spatial Planning and Construction of the Slovak Republic. 2023. www.stavebnyurad.gov.sk/
- Chocholová, M. (n.d.). Stages of the process of preparation and implementation of the land use plan according to the provisions of the applicable building act. <https://www.uzemneplany.sk/priprava-a-realizacia-upn>
- Commission Implementing Regulation (EU) 2023/138 (of 21 December 2022) on laying down a list of specific high-value datasets and the arrangements for their publication and re-use. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32023R0138&from=EN>
- Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information (recast). <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L1024>
- Department of Housing, Local Government and Heritage in conjunction with Irish Local Authorities. 2022. www.myplan.ie
- Deputy Prime Minister for Investment and Informatization (2019). *Presentation of the first comprehensive measurement of data quality in public administration (Output No. 4)* <https://datalab.digital/wp-content/uploads/Prezent%C3%A1cia-prv%C3%A9ho-komplexn%C3%A9ho-merania-a-d%C3%A1tovej-kvality-vo-verejnej-spr%C3%A1ve-1.pptx>
- Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on open data and the re-use of public sector information (recast). <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1561563110433&uri=CELEX:32019L1024>
- Directive of the Bratislava Magistrate of the Capital City of the Slovak Republic on Data policy. <https://opendata.bratislava.sk/page/data>
- European Commission - Joint Research Centre. (n.d.). *INSPIRE Geoportal*. <https://inspire-geoportal.ec.europa.eu/>
- European Commission, Joint Research Centre, Boguslawski, R., Vandenbroucke, D., Vancauwenberghe, G. (2016). *European Union Location Framework : guidelines for public procurement of geospatial technologies*, Publications Office. <https://data.europa.eu/doi/10.2788/374047>
- European Environment Agency (2023). *INSPIRE*. <https://www.eea.europa.eu/about-us/what-archived/seis-initiatives/inspire-directive,2023>
- Explanatory Memorandum to the land use planning Act. <https://www.nrsr.sk/web/Dynamic/DocumentPreview.aspx?DocID=505548>
- GéoBretagne Catalogue. (2022). <https://geobretagne.fr/geonetwork>
- GéoBretagne. (2022). cms.geobretagne.fr
- Geoportal KSK. (2023). www.geoportalsk.sk
- Geoportal psk. (2023) www.geopresovregion.sk
- INSPIRE Transformation | XLeitstelle. (n.d.). <https://xleitstelle.de/xplanung/transformation>
- Kováč, B. (2020). *Permitting Constructions*. FA STU. https://www.fad.stuba.sk/buxus/docs/uu/PREDNASKY/LEGISLATIVA_POVOLOVANIE_STAVIEB.pdf

- Ministry for Regional Development of the Czech Republic - *Unified standard of spatial planning documentation*. (n.d.). <https://www.mmr.cz/cs/ministerstvo/stavebni-pravo/stanoviska-a-metodiky/stanoviska-odboru-uzemniho-planovani-mmr/2-uzemne-planovaci-dokumentace-a-jejich-zmeny/jednotny-standard-uzemne-planovaci-dokumentace>
- Ministry for Regional Development of the Czech Republic. (2019). *Standards of selected parts territorial plan Documentation of the data model*. Prague. https://www.mmr.cz/getmedia/085375a9-d78a-4f94-8d4b-dd444aa3cb7c/StandardUP_dokumentace.pdf.aspx?ext=.pdf
- National Agency for Network and Electronic Services: Open Data Portal. (2023). data.gov.sk
- National infrastructure of geospatial data. (2023). *Inspire na Slovensku*. www.inspire.gov.sk
- Office of the Government Chief Information Officer. (2022). [OGCIO.ie](https://ogcio.ie),
- Open Geospatial Consortium. (2023). *Standards - Open Geospatial Consortium*. <https://www.ogc.org/standards/>
- Regione Piemonte. (2022). <https://www.regione.piemonte.it/web/temi/ambiente-territorio/territorio/urbanistica/urbanistica-senza-carta>
- Regione Piemonte. (2022). <https://www.geoportale.piemonte.it/cms/>
- Samsonov, T., Konstantinov, P. (2014). *OpenStreetMap data assessment for extraction of urban land cover and geometry parameters required by urban climate modeling*. *ResearchGate*. <https://doi.org/10.13140/RG.2.1.3556.7128>
- Self-governing region Košice. (2023). <https://web.vucke.sk>
- Sieber, R. (2019). Geospatial. In T. Davies, S. Walker, M. Rubinstein, & F. Perini (Ed.), *The State of Open Data: Histories and Horizons* (p. 137-150). Cape Town and Ottawa: African Minds and International Development Research Centre. https://library.oapen.org/viewer/web/viewer.html?file=/bitstream/handle/20.500.12657/24884/The_State_of_Open_Data_9781928331957_web.pdf?sequence=1&isAllowed=y
- Spatial Data Register. (2022). <https://rpi.gov.sk/>

ANNEX I

This section covers examples of datasets which are related to land use planning and are specified either by EU or Slovak legislation.

EU Legislation

Commission Implementing Regulation (EU) 2023/138 (of 21 December 2022) laying down a list of specific high-value datasets and the arrangements for their publication and re-use⁷⁹—this regulation aligns the PSI with the INSPIRE Directive and specifies details for concrete datasets, for example:

- **Geospatial data:** “The geospatial thematic category includes datasets within the scope of the INSPIRE data themes - Administrative units, Geographical names, Addresses, Buildings and Cadastral parcels as defined in Annex I and Annex III to Directive 2007/2/EC of the European Parliament and of the Council. In addition, it includes Reference parcels and Agricultural parcels as defined in Regulation (EU) No 1306/2013 of the European Parliament and of the Council and of Regulation (EU) No 1307/2013 of the European Parliament and of the Council and the related delegated and implementing acts.”
 - Key datasets include the following: administrative units, geographical names, addresses, buildings, cadastral parcels, reference parcels, and agricultural parcels.
 - Key attributes include the following: unique identifier, type, geometry, status, national identification code, official name, country code, name in multiple languages (only for countries with more than one official language) including a language with Latin characters, address locator, number of floors, type of use, land cover, land uses, and others.
- **Earth Observation and Environment:** “The earth observation and environmental category includes earth observation, including space-based or remotely-sensed data, as well as ground-based or in situ data, environmental and climate datasets within the scope of the INSPIRE data themes listed in the first table below and defined in Annexes I-III to Directive 2007/2/EC, and datasets produced or generated in the context of the legal acts listed [...]”
 - Key dataset themes include the following: hydrography, protected sites, elevation, geology, land cover, orthoimagery, area management/restriction/regulation zones and reporting units, biogeographical regions, energy resources, environmental monitoring facilities, habitats and biotopes, land use, mineral resources, natural risk zones, oceanographic geographical features, production and industrial facilities, sea regions, soil, and species distribution.
- **Statistics:**
 - Key datasets relevant for land use planning include the following examples: population, fertility, mortality, environmental accounts, and statistics.
- **Mobility:** “The mobility thematic category includes datasets within the scope of the INSPIRE data theme ‘Transport networks’ as set out in Annex I to Directive 2007/2/EC”
 - Key datasets include the following: data about road, rail, air, and water transport networks.

The regulation also re-iterates several key attributes for availability and re-use of this information:

- Licensing: “Creative Commons Public Domain Dedication (CC0) or, alternatively, the Creative Commons BY 4.0”

Technical aspects: the datasets should be made available in “machine-readable format and via application programming interfaces (APIs)” and “shall also be made available as a bulk download”.

Slovak Legislation

In line with EU activities and legislation, MIRDI is currently working on a detailed list of high-value datasets (HVDs), which will contain concrete mapping of topics to datasets and datasets to publishers.⁸⁰

Topics which are already covered to some degree and are also related to land use planning are the following:

- Geospatial data
- Earth observation and environment

The following are examples of concrete mappings (for example, organizations in charge of publishing, and concrete datasets):

- GCCA: cadastral parcels, geographical names, orthoimagery, and others
- MoE: protected areas, flood prone areas, and others
- Ministry of Interior: Register of Addresses, and others

The list (and thus also examples mentioned here) is not complete since the mapping is still in progress (as of June 2023).

NOTES

- 1 See Act No. 50/1976 Coll. on land use planning and building order (the “Building Act”), available at <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/1976/50/>
- 2 See the Land Use Plan of the Košice Region HTU available at <https://web.vucke.sk/sk/kompetencie/uzemne-planovanie/uzemny-plan-regionu/rok-2017/>
- 3 See <https://www.geoportalsk.sk/home/>
- 4 There is often the problem of limited possibilities to reuse geospatial data. “The vast diversity of geospatial data may be more or less open along a number of dimensions. Data may be free to browse but not to download. Or data may be free to download but provided under restrictive licences that limit reuse. Or data may be openly licensed but only available in formats that require proprietary software or that use proprietary referencing systems” (Renée Sieber, *Geospatial*, p. 140).
- 5 The KSK visualized selected layers of its land use plan in its old GIS from the company NESS. However, their service contract with NESS expired in December 2021. The KSK has the data of the original land use plan (without amendments and supplements), which are in the original GIS system from NESS on the KSK’s own server.
- 6 Among these 55 institutions, 32 are public administration entities, 18 are legal persons concerned, and five are representatives of the public.
- 7 See the Constitution of the Slovak Republic at <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/1992/460/>
- 8 See Act No. 211/2000 Coll. on free access to information and amendments of some acts (the “Freedom of Information Act”) available at <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2000/211/>
- 9 The InfoAct transposed Directive 2003/98/EC on the re-use of public sector information (PSI) and its revised versions, Directive 2019/1024 on Open Data and the re-use of public sector information available at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019L1024>
- 10 See Annex 1.
- 11 The implementation of the INSPIRE Directive in the Slovak Republic is secured by the Ministry of the Environment of the Slovak Republic (MoE), see, for example, <https://www.minzp.sk/inspire/> and <https://geoportal.gov.sk/>
- 12 Land use plans of the municipalities have to be in accordance with the binding part of the land use plan of the HTU.
- 13 See various already existing applications on the KSK geoportal <https://www.geoportalsk.sk/home/aplikacie/> or on the Karlova Ves geoportal, related to climate change <https://mapy-karlovaves.hub.arcgis.com/>
- 14 See training materials from the ESPUS project implemented by MoE, related to the quality of data and services <https://drive.geocloud.sk/s/Ed9yKboFcy5PMP2#pdfviewer>
- 15 Whether in the form of a map visualization in a GIS or in the form of downloadable data for bulk processing.
- 16 See www.geoportalsk.sk
- 17 See www.geoportalsk.sk
- 18 See <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32023R0138&from=EN>
- 19 The implementation of the INSPIRE Directive in the Slovak Republic is secured by MoE, see, for example, <https://www.minzp.sk/inspire/> and <https://geoportal.gov.sk/>
- 20 See <https://www.eea.europa.eu/about-us/what-archived/seis-initiatives/inspire-directive>
- 21 See <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/1976/50/20230701.html>
- 22 See Article 3 of Implementing regulation available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32023R0138&from=EN>
- 23 See <https://inspire.ec.europa.eu/good-practice/ogc-compliant-inspire-coverage-data-and-service-implementation>
- 24 See <https://tppi.gov.sk/>
- 25 See <http://data.gov.sk>
- 26 See <https://stavebnurad.gov.sk/uzemne-planovanie>
- 27 The new legislation brings changes also in these requirements.
- 28 See <https://www.geoportalsk.sk/mapstore/#/viewer/openlayers/1139>
- 29 See the following municipal land use plans: Komárno <https://komarno.sk/mesto-2/o-meste/buducnost/uzemny-plan-mesta/>, Nové Zámky <https://www.novezamky.sk/>

- uzemny-plan-mesta-nove-zamky/ds-1297, Pezinok <https://www.pezinok.sk/stranka/uzemny-plan-mesta>
- 30 See https://www.geoportalsk.sk/geonetwork/srv/slo/catalog.search#/search?facet.q=topic-Cat%2FplanningCadastre&resultType=details&sortBy=relevance&from=1&to=20&fast=index&_content_type=json
- 31 See <http://gis.zask.sk/FrontController?project=upn&extentMinX=-442830.11807601&extentMinY=-1170374.37982161&extentMaxX=-412808.22813973&extentMaxY=-1156749.42194756>
- 32 See <https://geoportal.bratislava.sk/pfa/apps/webappviewer/index.html?id=6f055b1431754b09aa3fcb5e5bb5734a>
- 33 See https://geoportal.trencin.sk/pages/uzemny_plan
- 34 See <https://egov.presov.sk/Default.aspx?NavigationState=1200:0>
- 35 See the DSI1.4 indicator (regional datasets) in the section “Monitoring of availability of spatial data and services” in https://inspire.ec.europa.eu/sites/default/files/fiche_inspire_-_slovakia_-_2022.pdf
- 44 See Interoperability Solutions for European Public Administrations (ISA) available at https://ec.europa.eu/isa2/home_en
- 45 See Establishment of a European Union Location Framework (EULF) available at http://ec.europa.eu/isa/actions/02-interoperability-architecture/2-13action_en.htm
- 46 See <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2001/416/20140701.html>
- 47 See <https://www.epi.sk/zz/2001-55#f2594252>
- 48 See <https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2001/55/>
- 49 The new Act on Land Use Planning available at https://www.slov-lex.sk/pravne-predpisy/SK/ZZ/2022/200/vyhlasene_znenie.html
- 50 See the Explanatory Memorandum available at <https://www.nrsr.sk/web/Dynamic/DocumentPreview.aspx?DocID=505548>
- 51 The Decree of MoE No. 55/2001 on land use planning materials and land use planning documentation will be replaced by the decree on land use plan documentation which is currently in the consultation process. Draft of the new decree is available at <https://www.slov-lex.sk/legislativne-procesy/SK/LP/2023/74>
- 52 See https://inspire-geoportal.ec.europa.eu/download_details.html?view=downloadDetails&resourceId=%2FINSPiRE-da77b119-9d6e-11e7-b5a7-52540023a883_20230316-155802%2Fservices%2F1%2FPullResults%2F501-520%2Fdatasets%2F4&expandedSection=metadata and <https://maps.geocloud.sk/geoserver/web/wicket/bookmarkable/org.geoserver.web.demo.MapPreviewPage?6&filter=bbsk>
- 53 See <https://geopresovregion.sk/geonetwork/srv/slo/catalog.search#/metadata/27a-79164-5217-46da-832a-e58d3301cd2f>
- 54 See <https://rpi.gov.sk/metadata/c96101e9-c722-4694-bffb-8d0efefc2d78>
- 55 See <https://egov.presov.sk/Default.aspx?NavigationState=1200:0>
- 56 See <https://geobretagne.fr/geonetwork/srv/eng/catalog.search#/metadata/5ab6ce1e-7331-4134-9337-0f01d0dbc424>
- 57 See <https://www.etalab.gouv.fr/licence-ouverte-open-licence/>
- 58 See <https://data.gov.cz/datov%C3%A9-sady?dotaz=Z%C3%A9AR&poskytovatel=https%3A%2F%2Frpp-opendata.egov.gov.cz%2Fodrpp%2Fzdroj%2Forg%C3%A1nve%C5%99ejn%C3%A9-moci%2F70889546>
- 59 See <https://geoportal.kraj-jihocesky.gov.cz/portal/uzemni-planovani/jihocesky-kraj/zasady-uzemniho-rozvoje-jihoceskeho-kraje/data-ze-zur>
- 60 See https://www.geoportale.piemonte.it/geonetwork/srv/eng/catalog.search#/search?facet.q=topicCat%2FplanningCadastre%26sourceCatalog%2F4d23be17-57d9-4049-976c-4082036611a5%26pubblicaAmministrazione%2FRegione%2520Piemonte&resultType=details&sortBy=title&sortOrder=reverse&fast=index&_content_type=json&from=1&to=20
- 61 Ministry for Regional Development of the Czech Republic, 2022, available at: <https://www.mmr.cz/cs/ministerstvo/stavebni-pravo/stanoviska-a-metodiky/stanoviska-odboru-uzemniho-planovani-mmr/2-uzemne-planovaci-dokumentace-a-jejich-zmeny/standard-vybranych-casti-uzemniho-planu>
- 62 Standard for selected parts of the land use plan 2019, available at: https://www.mmr.cz/getmedia/085375a9-d78a-4f94-8d4b-d444aa3cb7c/StandardUP_dokumentace.pdf.aspx?ext=.pdf
- 63 See <https://www.iso.org/standard/57303.html>
- 64 See Urban Planning Act Ir 56/1977. <https://www.google.com/url?q=https://www.geoportale.piemonte.it/&sa=D&source=docs&ust=1681636360416379&usq=AOvVaw-1gAMLBmNG3ZosZ7jIQkoD>
- 65 See Regional Act Ir 3/2013. <http://arianna.cr.piemonte.it/iterlegcoordweb/dettaglioLegge.do?urnLegge=urn:nir:regione.piemonte:legge:2013;3>

- 66 See Regional Act 21/2017 https://arianna-cr-piemonte-it.translate.google.com/translate/iterlegcoordweb/dettaglioLegge.do?urnLegge=urn:nir:regione.piemonte:legge:2017;21&_x_tr_sch=http&_x_tr_sl=auto&_x_tr_tl=sk&_x_tr_hl=sk&_x_tr_pto=wapp
- 67 See <https://cms.geobretagne.fr/content/pole-metier-urbanisme-feuille-de-route>
- 68 See <https://www.ogcio.gov.ie/en/>
- 69 SK8 is a nongovernmental organization established in 2006. All self-governing regions in the SR are members of the SK8. One of its aims is to defend the interests of self-governing regions and their residents and to unify the approaches toward the tasks in their competencies.
- 70 For the purpose of the alignment of open data and INSPIRE modes, MoE has defined the preferred open licenses as follows: “For sources with access in Open Data mode, the CC0 or CC BY license should be used”, see “Guidelines for the creation and revision of metadata in spatial data registry” – <https://gitlab.com/mzpsr/podpora-inspire-implement-cie/ostatn-t-my/navody/-/wikis/Usmernenie-pre-tvorbu-a-rev%C3%ADziu-meta%C3%BAadajov-v-RPI>.
- 71 See data policy in the City of Bratislava at <https://opendata.bratislava.sk/page/data>
- 72 OGC—The Open Geospatial Consortium is an international consortium of more than 500 businesses, government agencies, research organizations, and universities whose goal is to make geospatial (location) information and services “FAIR”—findable, accessible, interoperable and reusable. See more at <https://www.ogc.org/docs/is>
- 73 Since 2017, GCCA has been supplying a new DTM 5.0 digital relief model of the entire territory of the SR, created from aerial laser scanning data (LIDAR). The projected completion date of the project is 2023. See <https://www.geoportal.sk/sk/zbgis/lls-dmr/> and <https://zbgis.skgeodesy.sk/mkzbgis/sk/teren?pos=48.800000,19.530000,8>
- 74 See community mapping that took place in the Prešov self-governing region in 2020 concerning the quality of Roma settlements <https://geopresovregion.sk/home/2021/01/21/komunitne-mapovanie-chybajuce-priestorove-data/>
- 75 JRC 2016, European Union Location Framework Guidelines for public procurement of geospatial technologies <https://op.europa.eu/en/publication-detail/-/publication/3a325e79-effa-11e5-8529-01aa75ed71a1>
- 76 Following general principles and fulfilling concrete obligations of existing INSPIRE transposition, <https://inspire.gov.sk/o-inspire> is recommended as a good starting point.
- 77 See, for example, the already mentioned “Guidelines for creating and revising metadata in spatial data registry” <https://gitlab.com/mzpsr/podpora-inspire-implement-cie/ostatn-t-my/navody/-/wikis/Usmernenie-pre-tvorbu-a-rev%C3%ADziu-meta%C3%BAadajov-v-RPI>
- 78 See <https://www.mmr.cz/cs/ministerstvo/stavebni-pravo/stanoviska-a-metodiky/stanoviska-odboru-uzemniho-planovani-mmr/2-uzemne-planovaci-dokumentace-a-jejich-zmeny/standard-vybranych-casti-uzemniho-planu>
- 79 See Commission Implementing Regulation (EU) 2023/138 (of 21 December 2022) on laying down a list of specific high-value datasets and the arrangements for their publication and re-use available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32023R0138&from=EN>
- 80 <https://wiki.vicepremier.gov.sk/display/opendata/Zoznam+HVD+datasetov>

