



#### Overview of the Topographic map in scale 1:10K

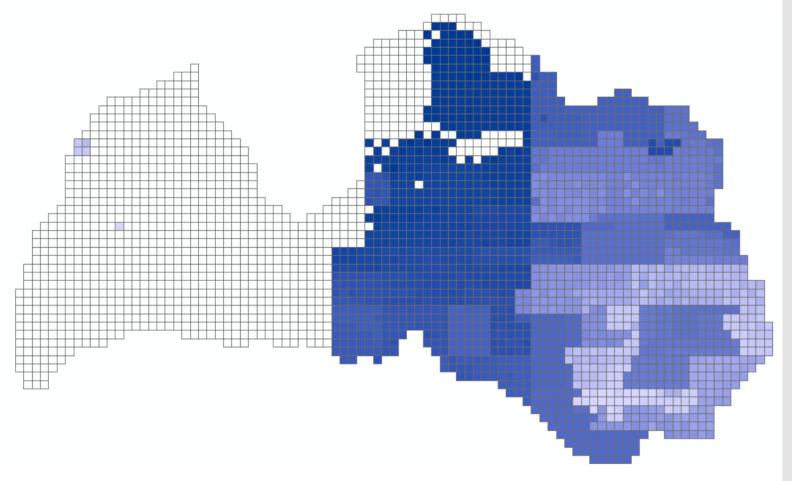
- Topographic map in scale
  1:10K is the basemap for all of the area of Latvia
- The last edition was completed in 2017
- Currently there is ongoing production of the 4th edition of the map which started in 2019
- The current plan is to update the basemap for all of the country every 6 years





## Overview of the Topographic map in scale 1:10K

- LGIA is on shedule to start producing data for the 5th edition of the map this year
- The production of the 5th edition will continue per map sheets, but the data will be less
- Around 1/3 of the data of the 4th cycle is still in the final steps of production – editing, validating and publishing of the data





#### **Steps of production for the Topographic map in scale 1:10K**

- Decrypion of data from previous edition that has been converted to the new data structure
- First data check
- Correction of the data after the first check
- Field work and editing of the data after field work, addition of new objects, correction of mistakes detected
- Second data check and edge matching
- Correction of the data after the second check
- Editing of the map content
- Correction of the mistakes detected during the editing
- Place name clarification
- Data checks with automatic tools and topology validation
- Final editing of the map content
- Data correction after the final editing
- Data validation
- Placing the data into the central database and backup storage
- Publishing the data



#### **Steps of production for the Topographic map in scale 1:10K**

- The steps in production that my division is responsible for:
  - Data validation
  - Placing the data into the central database and backup storage
- Mostly the timespan between the first step of production and time when the data is available for validation is around 6 months



#### **Changes introduced in the 4th edition**

- The 4th edition of Topographic map in scale 1:10K of Latvia introduced lot of changes:
  - The production was moved from Bentley Microstation to ArcGIS platform
  - The data structure was changed according to DFDD (DGIWG Feature Data Dictionary) which could later be used for all topographic maps in scale range from 1:10K to 1:100K
  - o There were many new rules for spatial relations of the data layers and also for filling in the attribute data
  - Due to introduction of the DFDD structure there was an increase of data layers (from 32 to 130 layers) that needed to be both processed and validated and there was also an increase in the amount of the attribute information for the data



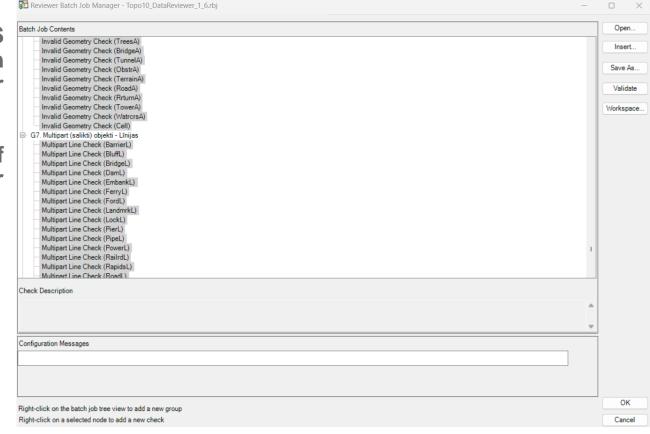
#### **Changes introduced in the 4th edition**

- The 4th edition of Topographic map in scale 1:10K of Latvia introduced lot of changes:
  - The increase in the amount of the data and new rules for the placement of the data layers required development of new tools, that would help process the data more efficiently
  - The first tool customized for our needs was ArcGIS Data Reviewer which has a list of Data Cheks that was continously updated for around 3 years and the last set of rules for the 4th edition of Topographic Map in scale 1:10K is being used since June 2022
  - As a large part of the errors detected at last data validation were errors on the edges of the map sheets, the second set of tools we got included an ArcGIS add-in developed internally at LGIA that compares data on the map sheet edges and also an ArcGIS add-in developed internally for the data completeness checks
  - Also for the 4th edition the set of topology rules had to be expanded to around 450 checks



#### **Data Reviewer**

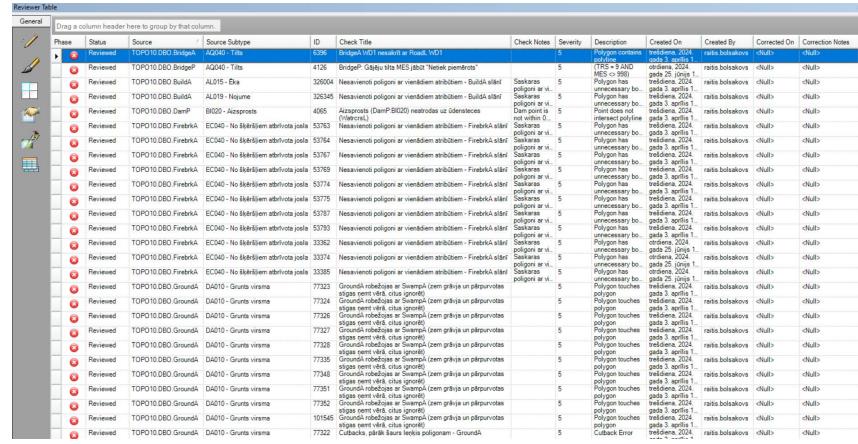
- Data Reviewer tool is available as ArcGIS extension with preset list of data checks which were both edited and supplemented to our needs
- Current list of data checks for the 4th edition of Topographic map in scale 1:10K includes over 610 checks
- The checks can be divided into 4 main groups:
  - Default checks
  - General attribute validation
  - Validation of attributes used for data visualisation
  - Object placement validation





#### **Data Reviewer**

- End result of each DR session is a table with a list of errors detected
- Data can be sorted by error type
- Each error can be marked as an exception if it is a false positive, it will still pop up after every check, but this way it can be processed faster
- DR currently is available at most stages of production and it shows in data quality improvement





#### **Edge Matching tool**

A powerful toolbar for ArcGIS that allows to:



- Copy and paste attributes between objects in selected map sheets useful for DFDD as it has large attribute tables
- Check line and polygon feature concordance between 2 adjacent map sheets
- The toolbar also allows to check, if the adjacent map sheets are marked as finished
- The line and polygon checks generate temporary feature layers with attributes describing the error type, which allows to quickly zoom to errors and correct them



## Polygon completeness tool

An even simpler toolbar than Edge matching toolbar

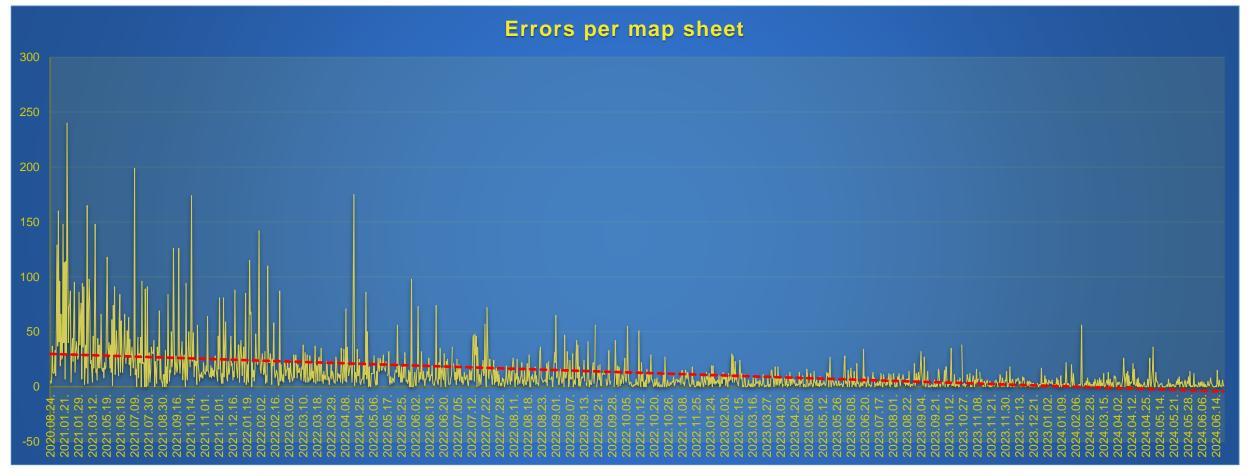


- Still it packs more than the simple design might suggest:
  - The tools cheks if all the base level polygons form a continous foundation for the map and identifies any holes
  - The tool also checks the minimal object size conformance
  - The polygon completeness tool also checks if all of the base level polygons are within the map sheet borders
- The tools also generates temporary feature layers with attributes describing the error type, allowing to zoom to errors to make corrections



- Not all of the tools mentioned above were available from the beginning of the 4th edition
- The Data Reviewer was available from the start, but it needed lots of fine-tuning
- Other tools were designed per requests of data producers and validators

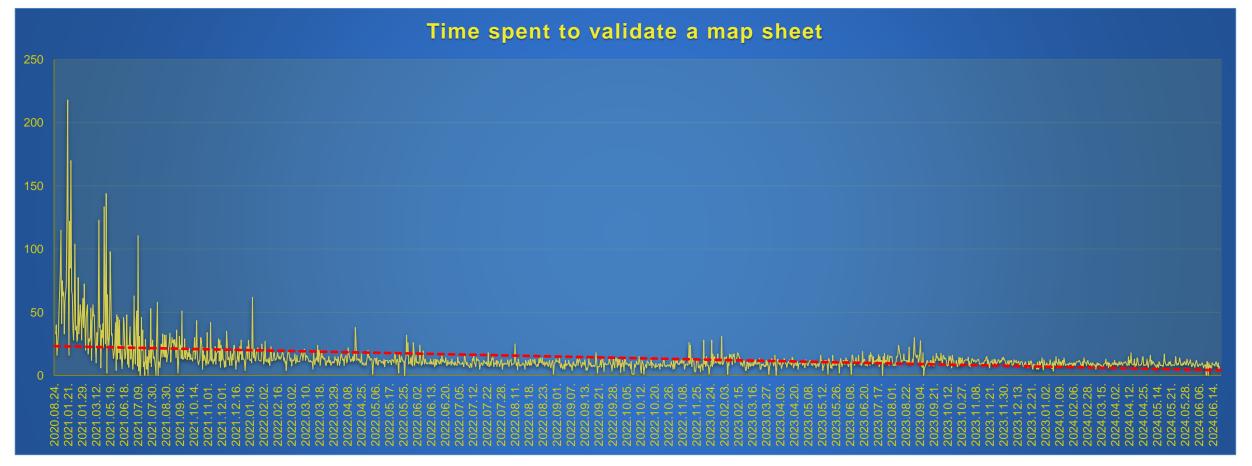






- The data production started early in 2019, the first test map sheets were available for validation at the end of 2019, but more or less steady data flow was estabilished only in 2021 as we had to get rid of the initial systematic errors detected at the data validation
- Stable production phase basically can be defined from 2022 onwards, when the last DR and patches for other tools were released
- Spikes in errors detected after 2021 correlate with releases of new tools and patches for existing,
  which allowed to find more unconformities in the data







• The improvement of automatic tools has allowed not only to increase the data quality, but also save time on data validation

	Average time to validate a map sheet (hours)	Average count of errors in a map sheet detected during validation
2020	64.2	41.2
2021	28.1	35.2
2022	11.1	13.3
2023	10.8	5.5
2024	9.4	3.7
Overall	13.9	13.1

Currently most of the errors detected during data validation are uncformities in the attribute data



# Thank you for listening!

Any questions?