



## APPLICATION OF “VBDLIS QUYHOACHKHSDD” SOFTWARE IN SUPPORTING THE BUILDING OF PLANNING DATABASE AND LAND USE PLAN OF QUANG BINH DISTRICT, HA GIANG PROVINCE

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### Abstract

*Based on research and practice, this study has applied information technology to support the development of databases of planning and land-use plans, helping the State Management Agency of Land catch the information quickly, as well as complete the information system of planning and land-use plans for the construction of land databases in Quang Binh district, Ha Giang province. While conducting research, the authors used primary and secondary investigation, legacy method, method of information technology software application, and modeling method for building the database. Initially, the authors constructed a database of district planning and land-use plans. The study shows that the data and documents collected in Quang Binh district meet the requirements for building databases of planning and land-use plans. However, the collected data still needs to be standardized according to the provisions of Circular No. 75/2015/TT-BTNMT by using MicroStation V8i software and VBDLIS QUYHOACHKHSDD software to build and complete a database of planning and land-use plans [2]. The authors compared the software's advantages and disadvantages to find solutions during practical application to improve the efficiency of Quang Binh district planning and land-use information data management and exploitation.*

**Keywords:** VBDLIS; Database; Land use planning; Quang Binh province.

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### 1. Introduction

There are many countries around the world applying advanced science and technology in land management and use through the effective use of specialized software for land management and monitoring. Therefore, acquiring and choosing experiences applying advanced technologies will improve land management capacity. In particular,

building a database of planning and land-use plans is one of the priorities that must be implemented.

Currently, many software support the development of a database of planning and land-use plans. The VBDLIS software is a technical solution to help localities build, manage, store, and operate land databases, in which the construction of a database of planning and land-use plans ensures

conformity to basic data standards. The Ministry of Natural Resources and Environment has used the “VBDLIS QUYHOACHKHSDD” software to build a nationwide database of planning and land-use plans. Quang Binh district, Ha Giang province, is one of the notable areas for investors because this is an area in the province’s master plan, which has led to some changes in land use. Therefore, the district’s land management needs to develop reasonable and effective planning and land-use plans. The development and application of software supporting the construction of the district’s planning and land-use plans is essential for the manager to grasp the information of planning and land-use plans quickly and help complete and synchronize the land database.

## 2. Research methods

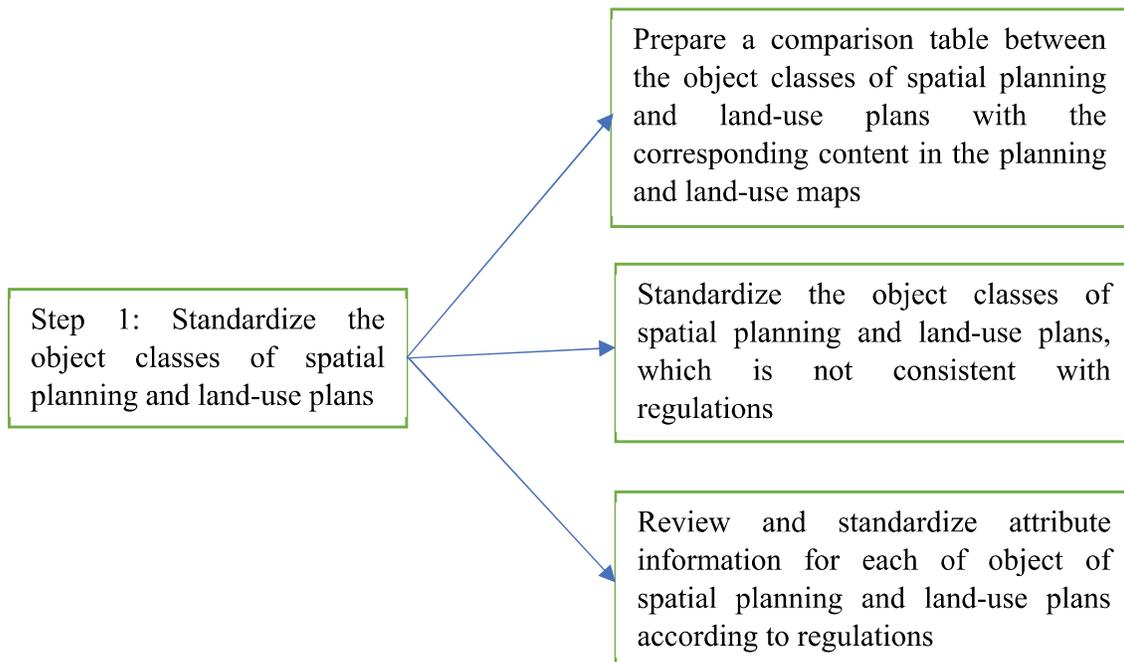
The following methods are used in this paper:

(1) *Methods of data and documents investigation, analysis, evaluation, and*

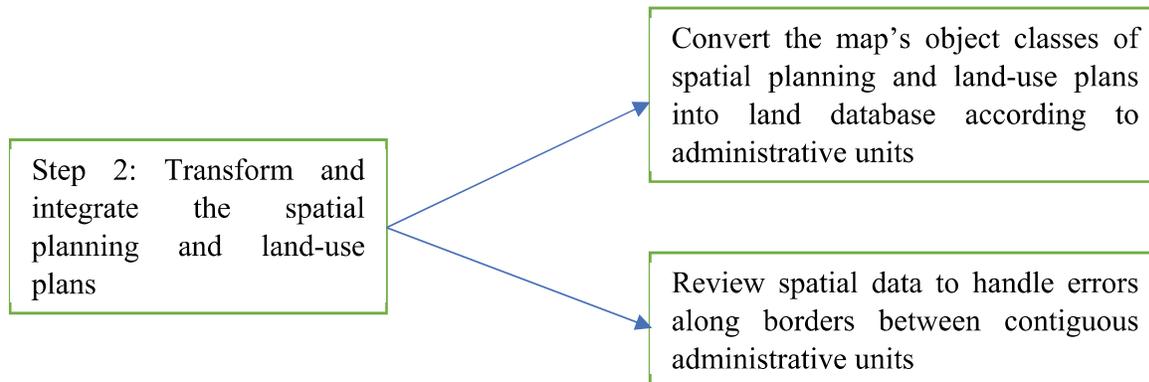
*collection:* Collect data, documents related to natural and socio-economic conditions, and information related to planning projects will be implemented in Quang Binh district, Ha Giang province [4].

(2) *Legacy method:* Using the cadastral maps and the current maps provided by specialized agencies, combining selective inheritance and supplementing information on planning and land-use plans during the field surveys.

(3) *Methods of information technology software application:* MicroStation, Vietmap, VBDLIS QuyhoachKHSDD, and Microsoft Office are used mainly to write reports. The database of planning information and land-use plans (spatial data) is a digital map standardized by the MicroStation and Vietmap software. Besides, the Excel Microsoft software is used to enter and process the attribute data.



**Figure 1: Standardization the spatial object classes of planning and land-use plans**



**Figure 2: Transformation and integration of spatial planning and land-use plans**

### 3. Research results

#### 3.1. Land database and its role

According to Circular No. 05/2017/TT-BTNMT dated April 25th, 2017, the land database includes the following component databases [1]: Cadastral database, Land-use planning database, Land price database, Land statistics database.

The land database is a tool that serves the state management of land and provides information to the people, ensuring land transparency. A land database can take on the following roles: (1) Not only does it support the State in understanding the land-use situation and managing land in a unified manner from the central to local levels, but it also helps the State inspect and supervise the land use and management, plan land policies, distribute land funds, and regulate land resources; (2) Is a tool for assessing land-use and mapping land-use status; (3) Map data in the land database is the basis for building a map of the current land-use status of the planning year. On that basis, we can orient the development of different types of land-use; (4) As a tool for planning as well as decisions on planning and land-use plans that are effective and reasonable for the goals of planning and socio-economic development, national security

and defense; (5) Land database provides essential information to make decisions about land, especially decisions about planning and land-use plans. The authors combined spatial analysis with multi-criteria methods from land databases and related factors to find the optimal location for planning objects. And vice versa, based on planning and land-use plans, the authors can evaluate the suitability and impacts of the planning on the economy, society, and environment; (6) Providing land information for the land-use rights market and real estate market; (7) The land database provides complete and consistent information about land plots, especially information related to land prices, helping people in need or investors access real estate information quickly and accurately; (8) Help the organizations and individuals using land to access information quickly and easily, enhancing land transparency.

#### 3.2. Standardize planning maps and land-use plans using MicroStation V8i software

To build the study area's database of planning and land-use plans, the authors first standardized the spatial objects in planning and land-use plans. The classes of spatial objects in planning and land-use plans are classified and shown in Table 1.

**Table 1. Creating a classification table**

No	Names of object class	Layer, color, sharp force	Classification according to the Circular
1	Planning plot boundary	2, 203, 1	6, 203, 1
2	Current boundary	10, 0, 0	5, 0, 0
3	Current boundary	6, 0, 1	5, 0, 0
4	Traffic notes	30, 0,	20, 0
5	Soil color	6, 14	30, 14
6	Current boundary	30, 0, 0	5, 0, 0

Standardizing land-use planning maps of Quang Binh district helps push data into “VBDLIS QUYHOACHKHSDD” software quickly and avoid errors during data conversion. Separating levels into each file makes converting data into the “VBDLIS QUYHOACHKHSDD” software more accessible and faster and avoids errors when pushing data due to high-capacity planning files.

### 3.3. Application of “VBDLIS QUYHOACHKHSDD” software

VBDLIS software is the solution for land management developed by Viettel Military Industry and Telecoms Group, under the “Strengthening Land Management and Land Database” project to provide technical support for localities in building, storing, and operating land database, including online public land services at the central to local levels [3].

**Step 1: Create a new database for the planning period or land-use plan:** Select the “Tạo mới” tool from the Map menu, the new window to create a new map will appear on the screen and give results as shown below:

+ “Đường dẫn” will lead to the location where the database file is stored with the extension \*.vdf. When creating a new file .vdf, the file name is up to the user, and the extension .vdf is required after the file name;

+ The default “Tên vùng làm việc” is WORKSPACE and cannot be changed at this time;

+ “Hệ tọa độ hiện hành” is used to select the coordinate systems and units. Here, select the coordinate system VN\_2000\_Hgiang\_3\_150.5. Finally, select OK to complete creating a new database for a map.

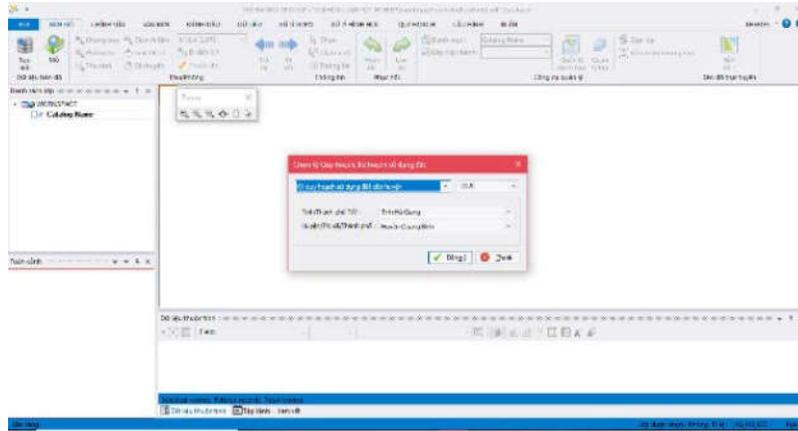
**Step 2: Select planning period and land-use plan:** Selecting the planning period and land-use plan allows the software to determine the year of planning and land-use plan accurately.

After completing the process of creating a new database for the map, the “Chọn kỳ quy hoạch, kế hoạch sử dụng đất” dialog box appears and gives results as shown in Figure 3.

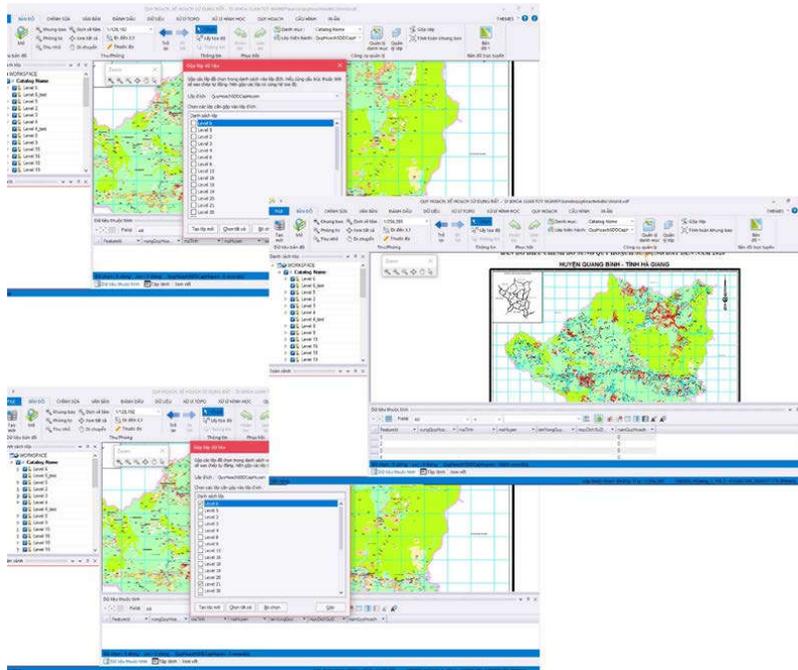
**Step 3: Convert data layers from \*DGN file:** From the “Công cụ”, select the “Thêm dữ liệu tool”, set it up, and give results.

**Step 4: Create planning layers based on the structure specified in Circular No.75/TT-BTNMT:** From the software, select the “Tạo QHKHSDD” => the “QHKHSDD cấp huyện” to create planning layers.

**Step 5: Merge planning layers, hydro systems,... into the “QuyHoachSDDCapHuyen” layer:** Select the “trộn lớp” toolbar to merge data of the selected layers. From there, combine the planning layers, hydrosystems,... into the “QuyHoachSDDCapHuyen” layer and get the results as shown in Figure 4.



**Figure 3: Selecting the planning period**



**Figure 4: Images of planning layers are merged into the “QuyHoachSDDCapHuyen” layer**

**Step 6: Update planning uses for regions:** Because land-use purposes have yet to be wholly entered into the software, like the use purposes of hydro systems, it is essential to update more values of this attribute field. Set up the “Cập nhật giá trị của trường thuộc tính” tool and output the results.

**Step 7: Update planning use purposes and names for areas using the text layer extraction tool:** Get the information from the Text layers and add it to the data fields of the Vector layers.

Because the text layer needs to be taken from the planning code layer, we will fill in the attributes from this layer. From the software, select the “Điền thuộc tính từ Text” tool so that the system displays the dialog box the “Điền thông tin thuộc tính từ Text” and get the results.

**Step 8: Update planning use purposes by using the RGB color code scanning tool:** During the data conversion process, some purposes may not be included in the software, the user can update purposes by using the RGB color

system from the RGB color code scanning tool. Select the function according to the RGB color on the screen, add the values of the “QuyhoachSDDCapHuyen” layer and the “vungQuyHoachCapHuyenID” field, and output the results.

**Step 9: Update other attributes:** ID, province code, district code: Click the “Nhập Metadata” and add the information related to province code, district code,... From the “Công cụ”, select the ID update function to look up data and determine the location of land plots faster.

**Step 10: Add the attributes of Metadata for the data of planning and land-use plan:** Update the attributes for the data of planning and land-use plans is essential. Summarizing the basic information of the data to support searching and working with more specific cases. Manually created Metadata will be more accurate and contain crucial information than automatically created Metadata. On the toolbar, select the “Nhập Metadata” and set up.

**Step 11: Create the project facility layer based on the planning area and land-use plans:** Select the “taolopCTDA” toolbar and create the project facility data, including Source layer: QuyHoachSDDCapHuyen, Target layer: CongTrinhDuAnCapHuyen, Quantity: 3, and give the results.

**Step 12: Export planning and land-use plans layers to \*GML file:** The land data and land metadata exchange and distribution are determined according to the geography markup language GML. Therefore, the file \*GML is required for updating data on the national database system. On the software, select the “Xuất dữ liệu” tool and choose to export the \*GML file.

**Step 13: Export Metadata attributes to the \*XML files:** The exchange and distribution of land data and land metadata is defined according to the extensible markup language XML. Therefore, the \*XML file must update data to the national database system. On the software, select the “Xuất dữ liệu” tool and choose to export the \*XML file.

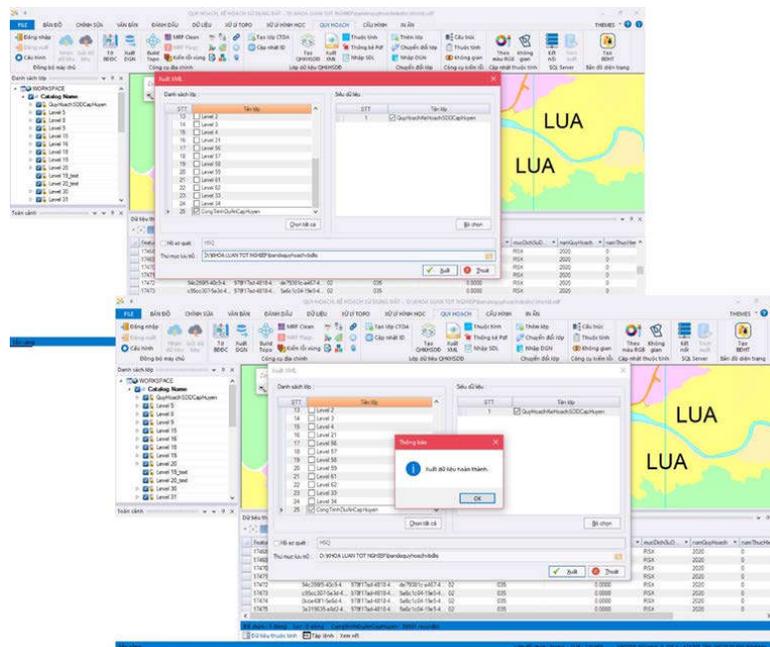


Figure 5: Export attributes of METADATA to \*.XML FILES

CongTrinhDuAnCapHuyen	11/06/2021 11:26 AM	XML Document	21,943 KB
QuyHoachKeHoachSDDCapHuyen	11/06/2021 11:26 AM	XML Document	1 KB
QuyHoachSDDCapHuyen.gml	11/06/2021 11:24 AM	GML File	19,274 KB
QuyHoachSDDCapHuyen.xsd	11/06/2021 11:24 AM	XSD File	2 KB
World.vdf	11/06/2021 11:18 AM	VDF File	1,651,904 KB

**Figure 6: Data file after successful export**

From the program's available data layers, export other files with compatible format, such as: \*.GML file, \*.XSD file, etc. to store data related to planning, land-use plans. Land data and land metadata are exchanged, distributed in the form of data files through data storage devices and data transmission services.

### **3.4. Advantages and disadvantages of the “VBDLIS QuyhoachKHSDD” software**

#### **3.4.1. Advantages of the “VBDLIS QuyhoachKHSDD” software**

- The “VBDLIS QuyhoachKHSDD” software is a tool to display, build, and edit map data entirely on personal computers. Additionally, it can also perform complex geographic analysis tasks.

- With cloud computing, users can update and adjust spatial and land databases on the “VBDLIS QuyhoachKHSDD” software anywhere.

- The “VBDLIS QuyhoachKHSDD” software not only meets the requirements of primary and spatial data standards but also ensures safety and speed.

- Currently, there is no software to store the planning database, so the “VBDLIS QuyhoachKHSDD” software is considered the first to store data related to planning and land-use plans.

- The software's primary language is Vietnamese, which is one of the important advantages for planning quickly and conveniently.

- The information technology

application in developing planning data and land-use plans helps people access public, transparent, and accurate information.

#### **3.4.2. Disadvantages of the “VBDLIS QuyhoachKHSDD” software**

- Due to the “VBDLIS QuyhoachKHSDD” software being applied nationwide since January 21<sup>st</sup>, 2021, the staff is currently implementing and researching instead of receiving basic training from the beginning, so there are still many difficulties in operating the software.

- The “VBDLIS QuyhoachKHSDD” software is a paid software, users need to have a key through payment to be able to use it, so the application software is still limited.

- The information technology application in planning and land-use plans still needs improvement due to limited qualifications.

- When this software operates on the X86 platform, running data is still more difficult because the maximum storage capacity is only 4GB, so data conversion often fails.

## **4. Conclusions**

The study has implemented and achieved the following results: (1) Assessing the current data of planning and land-use plans in Quang Binh district, Ha Giang province. Regarding document sources, the collected data initially met the building planning and land-use plans

database requirements. However, some collected data must still be standardized according to the regulation; (2) A database of district planning and land-use plans has been built as a basis for the following years' land-use plans on the information technology platform. Users can operate online on the electronic information portal or work on software running on the Desktop; (3) Export essential data such as the current land-use map of Quang Binh district, land data set as background data for software in the VBDLIS group such as LIS Editor, VBDLIS TK Desktop, VBDLIS GIADAT.

This software has yet to be applied widely in land management, so investing in human resources and facilities is necessary to use the “VBDLIS QuyhoachKHSDD” software in practice to promote industrialization and modernity.

## REFERENCES

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