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HANOI ARCHITECHTURAL UNIVERSITY

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ARCHITECTURE OF RESIDENTIAL QUARTER OUTSIDE THE RED RIVER DIKE FROM THE GEOCULTURAL APPROACH

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CODE: 9580101

SUMMARY OF DISSERTATION

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The dissertation will be defended at university-level council for dissertation grading, in Hanoi Architectural University, at……o'clock, date.....month .....year.....

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INTRODUCTION

1. Reason for choosing the topic

The Red River flows through many terrains, creating areas with different geographical and natural environmental conditions. The Red River dike system was built to cope with annual floods but also creates an area have different natural conditions. Under the impacts of society and economy, the population has gathered on the alluvial riverside outside of dike (AROD) to establish residential quarter (RQ) that have many differences from the residential areas in the Northern Delta region. When the Red River flood controling is improved, the need for exploitation and economic development in the riverbank area is promoted. However, because it is a specific management area, the projects lack legal conditions to deployment. To overcome that difficulty, the Prime Minister issued "Planning on flood prevention and dike planning of the Red River and Thai Binh River systems" attached to Decision 257/QD-TTg dated February 18, 2016 for permission to study construction on AROD. This is an important legal basis for researching and determining architectural orientation for the region. To have a sustainable development orientation for architecture, research to find out the characteristics of architecture is necessary. Traditional architectural research methods often approach from a narrow perspective, so the results are not generalizable. Research methods from the geocultural approach can place the architecture of the region in the relationship of geographical conditions, natural environment and cultural characteristics, thus being highly general, helping to have directions. , solutions for preserving, inheriting and promoting the characteristics of regional architecture, ensuring the diversity of architecture in different conditions of geography, natural environment and cultural characteristics.

Therefore, the dissertation topic is necessary to solve the above problems.

2. Research purpose: Find out the architectural characteristics of traditional residential quarter (TRQ) outside the Red River dike, thereby proposing architectural solutions for existing and newly developed residential quarter on the basis of the Geo-Cultural (GCR) approach.

3. Research object: Architecture of residential quarter (RQ) outside the Red River dike, including: From architectural characteristics of TRQ outside the dike according to the GCR area, applied to new RQ to inherit and promote those characteristics.

4. Limitation and scope of research: Regarding the research time, the TRQ outside the dike takes the date 1986 and earlier; with the remaining RQ proposing architectural solutions with a vision to 2050. The scope of the research is the area Outside the dike, the Red River passes through 6 provinces including Vinh Phuc, Hanoi, Hung Yen, Ha Nam, Thai Binh and Nam Dinh.

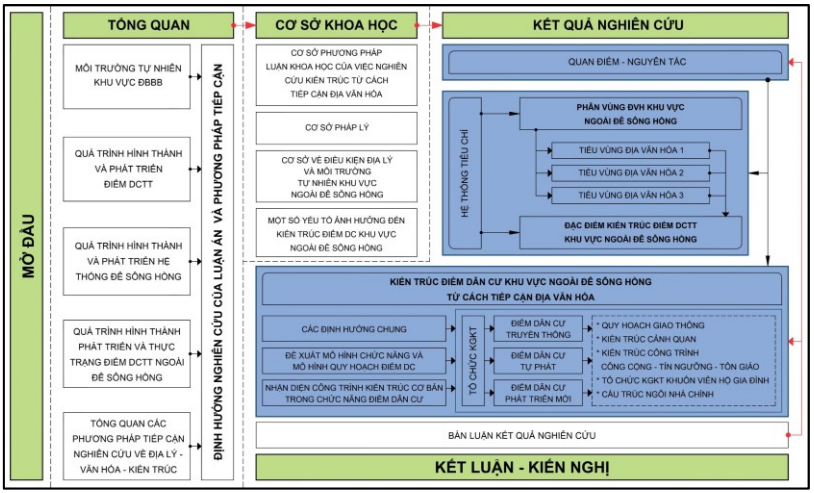
5. Research methods: Geo-cultural method, survey and assessment method of the current situation, inheritance method, analysis and synthesismethod, expert method, structural analysis comparison method based on on maps, and forecasting method.

6. Scientific and practical significance: Building a basis for zoning and identifying typical elements of areas outside river dikes in the Northern Delta from the GRC approach. Build theoretical bases for the relationship between geographical conditions, natural environment and cultural characteristics with architecture, identify the characteristics of architecture under those influences and impacts. Supplementing theoretical and architectural research methods from the GRC approach in renovating and gentrification existing residential quarters; orienting the planning, design and build residential quarters outside river dikes with locations corresponding to the Northern Delta (NTD) region.

7. New contributions of the dissertation:

- Determining the characteristics of the GRC environment and zoning residential quarters outside the Red River dike according to GRC characteristics.
- Determine the relationship between the GRC environment and the architecture of TRQ and find out the characteristics of traditional residential architecture in the corresponding GRC areas outside the Red River dike.
- Propose viewpoints, principles, and propose architectural solutions for renovating and gentrification existing residential quarters.
- Proposing functional models and architecture spacial organization of newly developed residential quarters outside the Red River dike on the basis of inheriting and promoting architectural features in GRC areas.

8. The structure of the dissertation: Research diagram



CHAPTER 1. ARCHITECTURAL OVERVIEW OF RESIDENTIAL QUARTER OUTSIDE THE RED RIVER DIKE FROM GEOCULTURAL APPROACH

1.1. Overview of the natural environment in the Northern Delta region

1.1.1. The role of the Red River in forming the Northern Delta region

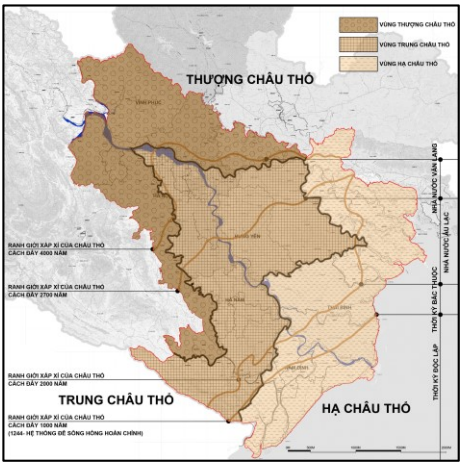
Originating from the mountains of Yunnan - China, the river is 1149km length, the part in Vietnam is 510km, reaching the Northern Delta (NTD) with more than 200km and 2-3km width in the flood season; with an average 114,000m³ water, 100 million tons alluvium transported per year. The Northern Delta is divided into three typical geographical regions: Upper Delta, Central Delta and Lower Delta.

1.1.2. Geography and natural environment in the NTD region

● Upper Delta: The Red River has a wide river bed with sharp bends river banks with long dimensions. The climate is influenced by the northern and western mountains, the average annual temperature is about 20°C, rainfall is 1500mm - 2000mm, concentrated in May, the rain is often heavy.

● Central Delta region: From the Viet Tri area down to the river mouth, alluvium spreads out over a large area at a height of 6-8m near the river and 2-3m towards the sea. The terrain is mostly swamp with low-lying areas in Ha Nam - Nam Dinh. The climate is tropical humid monsoon, the average annual temperature is about 23.5°C,

the large difference is about 14°C, the average annual rainfall is 1600mm - 1800mm.



The formation process and terrain characteristics of the Northern Delta region

● Lower Delta: This is a young alluvial area, includes rows of "coastal sand dunes" running in the NE-SW direction with TRQs above. The ARODs are about 500-700m wide, divided by a system of rivers and artificial canals connecting from the inside of the dike to the area affected by the tide, where residents develop aquaculture and sedge growing. The area has an oceanic tropical climate, average annual temperature of about 23.5°C, rainfall of 1200mm - 2200mm, and is affected by an average of 6-10 storms every year.

1.2. Development process of TRQs and the Red River dike system

1.2.1. Overview of the cultural environment and people in the NTD region

● People: Intelligent, hard-working, tolerant of hardship, highly community-minded, connected to each other within the framework of Village Conventions, Village Rules, synthetic thinking, generalization of events phenomena, worship of natural and supernatural forces, high conservatism.

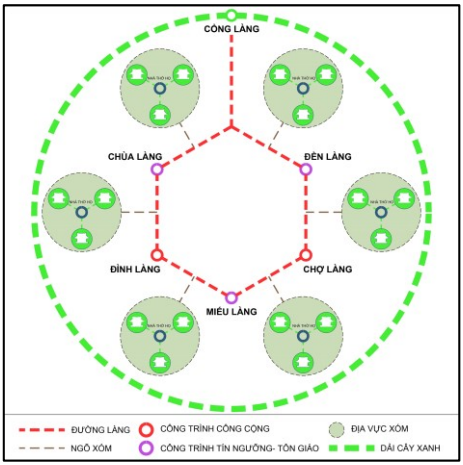
● Characteristics of production methods: Agricultural production focuses on "intensive rice cultivation", developing traditional handicrafts.

● Characteristics of beliefs and religions: Characteristics of multiple beliefs-religions (BL-RL) "consensus and integration", diversification and pluralism.

1.2.2. Structural and architectural characteristics of TRQs in the NTD region

● Traffic planning: There is 1 main traffic axis and branch traffic routes in a herringbone or harrow shape, creating a "closed" structure for RQs.

● Multi-layered, iconic vegetation, with many natural and artificial water surfaces formed due to the characteristics of geographical conditions and the process of improving the living environment of residents.



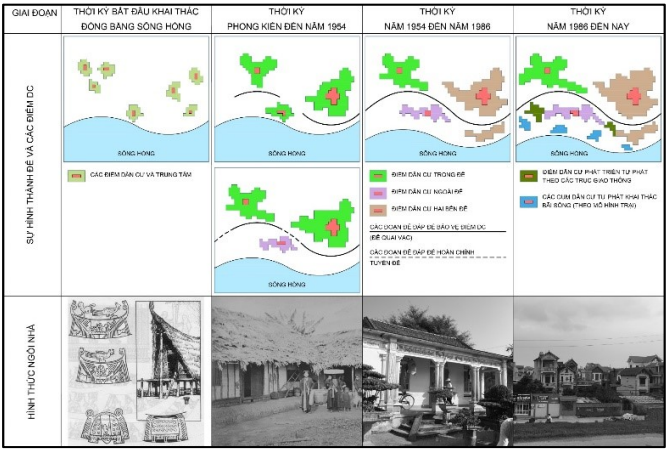
Basic structure of TRQ in the NTD region

- Public architecture includes many components such as: Gates, communal houses, wells, markets, in addition to the function of use, also has the function of cultural exchange. BL-RL's architecture reflects the "agricultural origin" thinking in the organization of worship space.
- Architectural space of household precinct: Is a miniature ecosystem with characteristics of "agricultural" culture and personality of the population. The main house has an odd number of rooms, showing the attachment to the Ancestors through the worship space, the structure and covering system are separate and easy to move, the roof form changes according to the area, the decoration is philosophical and reflects the aspirations of the residents.

1.2.3. The formation of the Red River dike system in history

Dikes first appeared in the 3rd century BC in Phong Khe and Long Bien districts; in history, dikes were first mentioned around 521 during the reign of Ly Bi. In March 1108, King Ly Nhan Tong built the Co Xa dike to protect Thang Long citadel from flood waters. In March 1244, King Tran Thai Tong ordered the construction of dikes on both sides of the Red River to the seaport; The dike system was basically complete at this time. This led to more ferocious Red River floods, breaking the dike causing a lot of flooding. The dike system formed creates two regions with different geographical conditions, natural environment, culture and society. The area within the dike develops "intensive rice farming", handicrafts, and RQs develop at high density, which is where traditional cultural characteristics are formed and preserved. The area outside the dike is often affected by the river and the land is fertile, but social discrimination has created a relatively isolated area in the NTD region.

1.3. The development process and current status of TRQ architecture outside the Red River dike



The process of developing Red River dikes and the formation of RQs outside the dikes

1.3.1. The process of developing regional TRQs outside the Red River dike

● The period when ancient Vietnamese residents began to exploit the NTD region.

● The feudal period came before 1954.

● Period 1954- 1986.

● Period 1986- now.

1.3.2. Types of RQs in the area outside the Red River dike

● TRQs: Having existed for a long time, according to the survey, there are 54 TRQs with an area of 3,223 hectares and a population of about 223,858 people. Through historical periods, along with changes in geographical conditions, natural environment, people, beliefs, and religions, the region has its own cultural nuances and RQs with specific characteristics. including: According to position on AROD, main economic occupations.

● RQ develops spontaneously: According to the camp model, there are small groups of 4-5 houses to live and take care of the fields. In the period 1954 - 1986, there was no new development, but only following the model of camps and residential clusters (hamlets) to reduce population dénity. In the period 1986 to present, AROD was expanded to create an economic development area, but the RQs were only spontaneous. According to current statistics, the area outside the Red River dike has 56 RQs with an area of about 3,743 hectares and a population of 165,480 people.

1.3.3. Current status of architecture of RQs outside the Red River dike

● TRQ: The traffic structure is broken due to the development and expansion of residential areas and farms, and branch routes are concreted but not synchronized.

River wharves lose their function due to changes in residents' transportation habits. Big trees, green strips to prevent floods, trees in alleys were demolished and replaced, lakes and ponds lost connection to the river, systems of ponds, lakes, and ditches in the RQ were filled in, becomes a place to store wastewater, causing pollution. Public and BL-RL spaces have been invaded and can no longer retain their traditional beauty. The trend of sticking close to the street to develop services and commerce disrupts the landscape space of the precinct and alleys, the precinct is divided, the layout of the premises changes to focus and loses interaction with the natural space. The main house structure has been replaced by urban tube houses and divided-lot houses, losing the nuance of the area.

● Spontaneous RQ: develop with many different models such as urban sprawl areas, craft village service areas, new model specialized farming areas... but most still stick to the existing infrastructure system, leading to the intertwining situation of new - old architecture, infrastructure overload. The traffic routes are extensions of TRQ's alleys so they are narrow and inconsistent, the landscape is not paid attention to, social infrastructure works still use the existing, RQs associated with local projects have an asynchronous structure, the precinct is divided into lots, high construction density, functional combine block and vertical development, trees and water surface are narrowed, loss of interaction between architecture and nature.

1.4. Researchs that is relevant to the area

There has not been any general research to see the impact of geographical conditions, natural environment and culture of the area outside the Red River dike, but only studies on the Northern Delta region. The studies have the following characteristics:

● Research method: Approach in narrow specialization.

● Research results: has not cover all the characteristics of the region's architecture.

1.5. Research orientation and approach

● Research orientation: Research the architecture of TRQs in the area outside the Red River dike to find characteristics from which to propose perspectives, principles, and architectural solutions for existing RQs and new development RQs on the AROD is intended to suit the GCR environment.

● Approach: Architecture is associated with geography and the natural environment,

reflects the way people deal with nature (what is available) and society (created by humans), is a phenomenon of culture. The dissertation chooses the researching direction of RQ's architecture in the area outside the Red River dike from cultural approach, this is an interdisciplinary approach from factors of geographical conditions, natural environment, and people (personality, lifestyle), cultural behavior and characteristics of BL-RL). Establishing the relationship between these elements and the RQ's architecture, thereby finding the GCR characteristics in the architecture and the changing trend of the TRQ's architecture in the area outside the Red River dike, to transform into the new development RQs in a sustainable way.

CHAPTER 2. SCIENTIFIC BASIS OF ARCHITECTURE OF RESIDENTIAL QUARTER OUTSIDE THE RED RIVER DIKE FROM GEO-CULTURAL APPROACH

2.1. Methodology of architectural research from a cultural geography approach

2.1.1. Elements that constitute the GCR environment

● Elements that make up the research method: Geography and natural environment (topography, climate, soil properties, natural resources). Cultural characteristics (residential characteristics, cultural manifestations). Aesthetic characteristics (use of images, decorative symbols, use of colors and materials).

● Research object and implementation method: Research object (traffic organization, landscape architecture, public architecture, BL-RL, spatial organization of household precinct architecture, house structure main house) of RQ. Using survey method, current status assessment, inheritance method, analysis and synthesismethod, expert method, comparison method, map-based structural analysis.

● Research results and scope of application of the results: Identify the architectural characteristics of RQ in specific geographical conditions, natural environment and cultural environment. Recognize the changing trend of architecture under the impact of the above conditions, identify problems and challenges for RQ's architecture; From there, propose architectural perspectives, principles and solutions in preserving and developing RQs, ensuring diversity and sustainable development of architecture.

2.2. Legal documents

Dike management law, Architecture law, Construction standards, decrees, circulars

and decisions, orientation criteria, irrigation planning programs and residential development on both sides of the Red River.

● Calculate the scale and determine the nature of RQs on AROD according to Decision 257/QD-TTg dated February 18, 2016 of the Prime Minister:

- RQs in urban and rural areas with a population of 8,000 people (1600 households) ≤ Population ≤ 18,000 people (3600 households): Belong to Ward and Commune level administrative units.

- RQs in urban areas with a population of 1,500 people (300 households) ≤ Population ≤ 8,000 people (1600 households): Belonging to administrative units at the Residential Group level (neighborhood, block, hamlet, sub-area), Hamlet level.

- RQs in rural areas with a population of ≤ 1,500 people (300 households): Residential areas serving population expansion and resettlement from existing RQs.

CÁC ĐIỂM DÂN CƯ PHÁT TRIỂN MỚI / CÔNG TRÌNH TRONG TRUNG TÂM ĐIỂM DÂN CƯ PHÁT TRIỂN MỚI		CÁC NHÓM CHỨC NĂNG CƠ BẢN TRONG ĐIỂM DÂN CƯ				
		ĐIỂM DÂN CƯ QUY MÔ LOẠI 1		ĐIỂM DÂN CƯ QUY MÔ LOẠI 2		ĐIỂM DÂN CƯ QUY MÔ LOẠI 3
		CẤP PHƯỜNG	CẤP XÃ	CẤP TỔ DÂN PHỐ	CẤP THÔN	PHỤC VỤ GIÃN DÂN VÀ TÁI ĐỊNH CƯ
QUY MÔ ĐIỂM DÂN CƯ	QUY MÔ DÂN SỐ	8.000 <DS <1.8000		1.500 <DS < 8.000		DS < 1.500
	SỐ HỘ DÂN	1600 HỘ <DS <3600 HỘ		300 HỘ <DS < 1600 HỘ		DS < 300 HỘ
CÁC CÔNG TRÌNH DỊCH VỤ TRONG TRUNG TÂM	TRỤ SỞ CƠ QUAN HÀNH CHÍNH	●	●	○	○	○
	NHÀ TRẺ	●	●	●	●	○
	TRƯỜNG TIỂU HỌC	●	●	○	○	○
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	TRẠM Y TẾ	●	●	○	○	○
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	BƯU ĐIỆN	○	●	○	○	○
GHI CHÚ		● CÓ		○ KHÔNG CÓ		

RQ scale and functional architectures

Thus, it has 03 scales and functions for new development RQs in the AROD area allowed for construction research in Decision 257/QD-TTg including:

- RQ has scale of type 1: Ward level, Commune level.
- RQ has scale of type 2: Residential group level, Hamlet level.
- RQ has a scale of type 3: Serving population expansion and on-site resettlement.

2.3. Basis of geographical conditions and natural environment outside the Red River dike

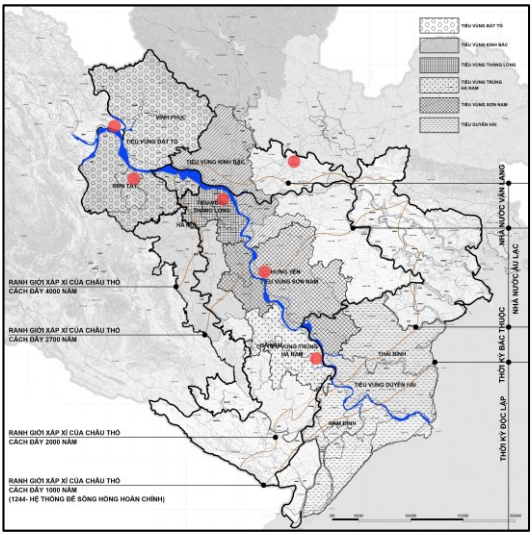
● Geographical environment in the area outside the Red River dike: Terrain characteristics (types of mudflats), climate characteristics, soil conditions, natural resources (water resources, fisheries, location).

● Impacts of the Red River (floodwater, sedimentation and landslides).

● Requirements for irrigation planning on riverbanks: Beaches with and without auxiliary dikes for protection, zoning on riverbanks according to irrigation planning,

structure and characteristics of AROD allowed for construction

2.4. Basis for the cultural environment outside the Red River dike



Ancient cultural centers in the NTD area

● Cultural environment in the Northern Delta region: The ancient Vietnamese originated from the Viet-Muong language group, the original culture has intersected with the Mai Pha, Ha Long, Cai Beo, Go Bong, Hoa Loc culture became Vietnamese in the Red River Delta with rice cultivation developing very early and forming the "Rice Culture". Formation of cultural sub-regions: Dat To, Thang Long, Son Nam, Ha Nam low-lying, and Coastal cultural sub-region.

● Cultural characteristics of the area outside the Red River dike: People are open, liberal, hard-working, tolerant of hardship, highly communal and supportive, easily receptive to new things and flexible in dealing with others. natural and social environment, characterized by "Water Culture", "BL-RL" diversification, seasonal farming.

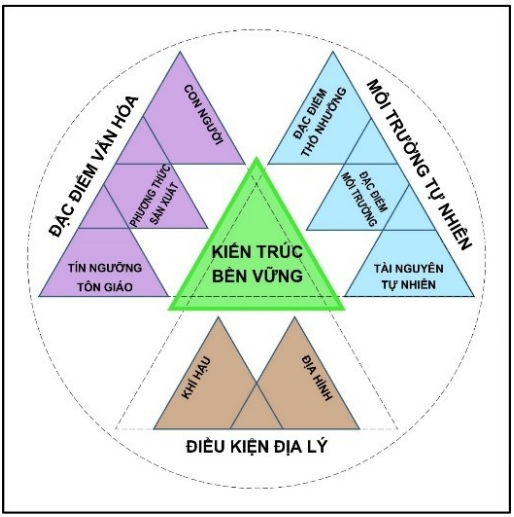
● Theory of the formation of TRQs: Including resources, methods of exploiting resources, organizing internal and external transportation, organizing governance and organizing life. Thereby showing the relationship between geographical conditions and natural environment to the formation of TRQs, these are the basis for recognizing the differentiation of culture in different geographical and natural environments. and create features in the TRQ architecture

2.5. Basis of the relationship between architecture and the GCR environment

● Sustainable architecture theory from the GCR approach: Sustainable with geographical conditions, natural environment and cultural characteristics

● Relationship between architecture and GCR environment: Relationship with

geographical conditions and natural environment; with cultural environment



Sustainable architecture from the GCR approach

● Expression of GCR in TRQ architecture in the area outside the Red River dike: Many main traffic axes connect the dike with the river, branch traffic routes depend on the width of the riverbank combined with the base dike. Trees carry symbols, prevent floods and landslides, have flood drainage canals and create an ecosystem for RQ. Public and BL-RL buildings facing the river, worshiping figures associated with "water culture", the precinct develops into the core of the land, with a water channel separating the road from the precinct, building layout scattered. The main house faces the road and river, with solutions to respond and adapt to the natural environment of the area.

2.6. Some factors affecting RQ architecture besides the Red River dike

● Need for land fund exploitation: outside the dike on both sides of the Red River currently has 50 areas, total of 20,350 ha area, 7,827 ha have been exploited, the remaining 12,523 ha have not been exploited due to the impact of the river. There are 110 existing RQ (including spontaneous TRQ and RQ) with 6,965 ha area and 389,338 population.

● Trend of developing RQ functional model in areas outside the Red River dike: AROD near large urban areas or urban development areas and AROD in rural areas. Models for RQ built on a functional basis include: Model 1 (function for living in high-end villas, garden houses), model 2 (function for living combined with single-function industry groups), Model 3 (residential function combined with multi-functional industry group including the main function).

● Influence of other factors: Impact of climate change (rainfall, sea level rise).

Impact of existing functionality on AROD and surrounding area. Scientific and technical elements in irrigation and construction

CHAPTER 3. ARCHITECTURAL SPACIAL ORGANIZATION OF RESIDENTIAL QUARTER OUTSIDE THE RED RIVER DIKE FROM THE GEOCULTURAL APPROACH

3.1. Perspectives - principles for architectural spacial organization of residential quarter outside the Red River dike from the geocultural approach

3.1.1. Perspective

● Perspective 1: Continuing development of existing architectural features in the GCR environment outside the Red River dike.

● Perspective 2: Solutions in spatial organization of RQs to meet sustainable development oriented from the GCR approach.

● Perspective 3: Exploiting location advantages in accordance with the Red River development planning strategy.

3.1.2. Principle

● Principle 1: Promote the characteristics of regional GCR elements in architectural and landscape organization.

● Principle 2: gentrification the architectural space of existing RQs on AROD.

● Principle 3: Develop RQ with appropriate professions to exploit AROD's cultural, historical and environmental specific advantages.

● Principle 4: Suitable for dike structure, AROD and Red River flow.

● Principle 5: Create environment and green space for landscape architecture on both sides of the Red River.

● Principle 6: Flexibly adapt to the characteristics of the Red River, climate change conditions and sea level rise scenarios.

3.1.3. General orientations for solutions

● General directions for RQ architectural solutions: Organize traffic in compliance with Standards and Regulations, encourage the use of local materials, trees, and water surfaces; exploit and inherit the characteristics of regional architecture.

Khu vực	Chức năng ô đất	Các chỉ tiêu		
		Diện tích ô đất (m2)	Mật độ xây dựng (%)	Chiều cao tối đa (m)
Khu vực đô thị và phát triển đô thị	Ở	125	50 - 60	12
	Ở cao cấp	500	30 - 40	12
	Ở + chức năng khác	250	40 - 50	12
Khu vực nông thôn	Ở	250	40 - 50	12
	Ở + chức năng khác	250	50 - 60	12

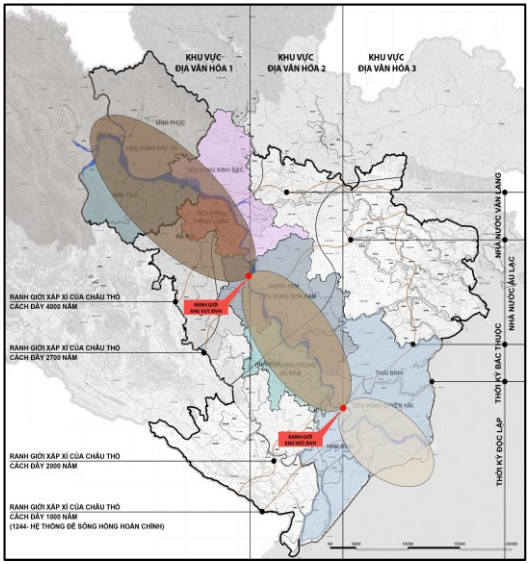
Norm of land lot for housing construction and functions

● Orientation for public, BL-RL architecture: Facing rivers, lagoons, natural lakes, master layout according to Dinh and Cong characters. Use new structural solutions, modern environmentally materials, structural forms need to be traditional stylized and simulated; use typical colors of traditional architecture, combined with construction forms and materials to increase the attractiveness of specific projects. Use traditional decorative motifs typical of GCR elements with appropriate stylization.

● Orientation for the architectural spacia organization of household precinct and main house structure: Proposed criteria for land lots for housing construction based on current regulatory documents, land lots with area 125m2 - 500m2, building height ≤ 12m (to not overwhelm the trees), construction criteria in the land lot depends on the function on the precinct and the type of RQ but must not exceed 60% of the land area. The architectural space of the household precinct has an open structure, green trees in tiers creating a transition space from the road to the house, and a water surface space within the precinct according to regional characteristics. The layout of the main and minor house is in a "square ruler" shape, separated to increase the contact area with the natural environment. The distance from the house to the main road is 3m and the branch road is 5m. The architectural form of the main house is consistent with the characteristics of the GCR element.

● Architectural orientation of buildings serving production: 50m separation or 20m thick green strip from cultivated fields. The architectural form is oriented same as public architecture and is suitable for production equipment.

3.2. GCR areas outside the Red River dike and architectural features of TRQ in each area



GCR areas outside the Red River dike

3.2.1. Division of residential areas outside the Red River dike according to GCR characteristics

From 3 basic elements of the GCR environment (geographical conditions, natural environment and cultural characteristics), criteria for GCR zoning are developed and 03 GCR areas outside the Red River dike are proposed:

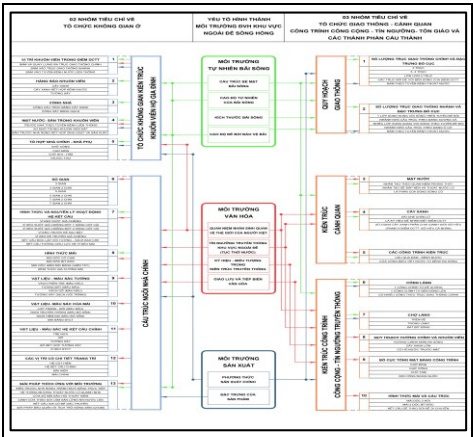
● GCR1 area: From Km 0 of the Red River's left bank dike (Viet Tri bridge) and of the Red River's right bank dike (Trung Ha bridge), to about Km 95 of the left bank dike, Tu Dan commune, Khoai Chau district - Hung Yen.

● GCR2 area: From about Km 95 of the Red River's left bank dike in Tu Dan commune - Khoai Chau district - Hung Yen to about Km 165 of the Red River's left bank dike in Bach Thuan commune - Vu Thu district - Thai Binh

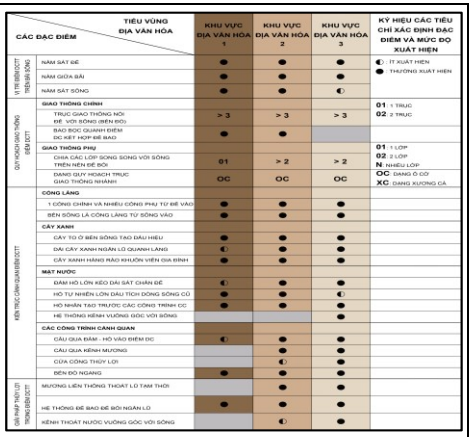
● GCR3 area: From about Km 165 of the Red River's left bank dike in Bach Thuan commune - Vu Thu district - Thai Binh to about Km 200+2 in Nam Binh commune - Kien Xuong district - Thai Binh, and with the side of the right bank dike reach to Km 219 belongs to Giao Huong commune - Giao Thuy - Nam Dinh.

3.2.2. Identify TRQ architectural features in the GCR region.

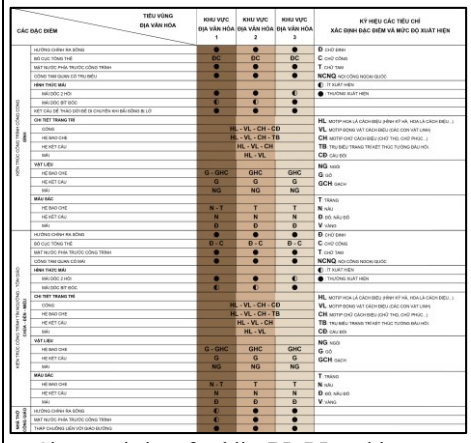
● From the characteristics of AROD's natural, cultural and production environment, build a system of criteria to identify architectural characteristics of TRQs in the GCR region. Features include traffic planning, landscape architecture, public architecture, BL-RL architecture, spatial organization of precinct architecture and main house structure and solutions to cope with natural conditions of AROD.



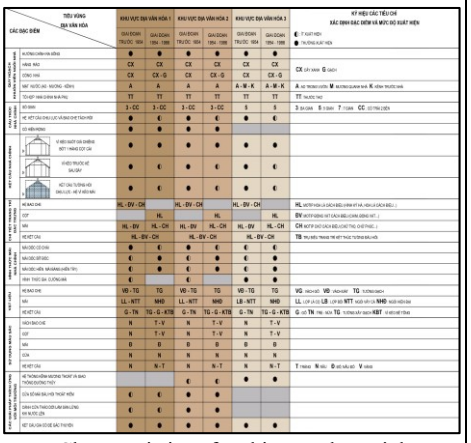
Criteria for identifying architectural features TRQ in GCR regions



Characteristics of traffic organization and landscape architecture



Characteristics of public, BL-RL architecture



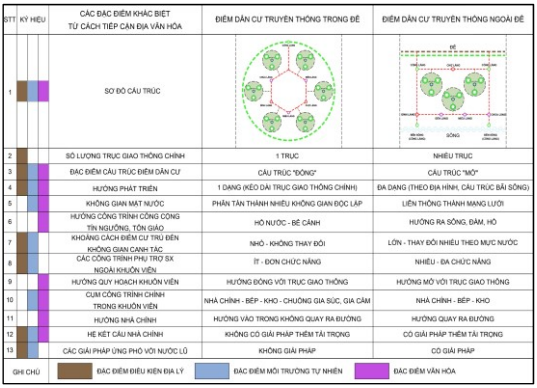
Characteristics of architectural spacial organization of the precinct and main house

● Different characteristics of TRQ structure inside and outside the Red River dike from the GCR approach.

- "Open" structure, development direction follows many main traffic axes (connecting the dike with the river wharf) and follows the natural terrain of AROD.

- Large lakes and ponds close to dikes and canals in the RQ are connected to create an ecological network to serve production and cope with flood waters.

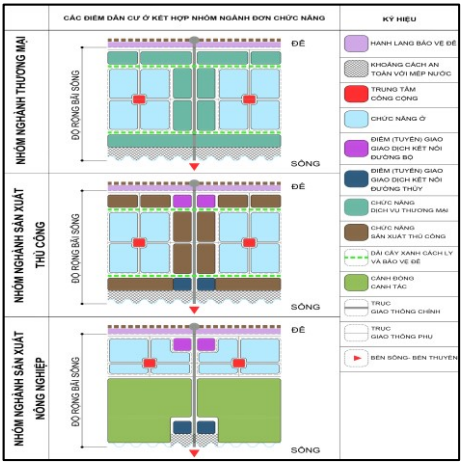
- The house faces the road and the river. The houses have a scattered layout. The main house has solutions to cope with flooding (attic floors, easily removable doors, emergency exit doors at the gable end).



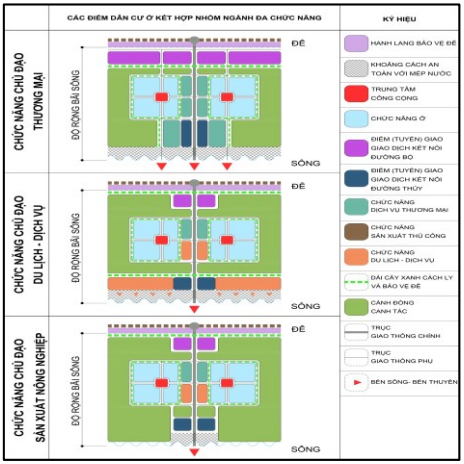
Comparison of RQ structure inside and outside the dike from the GCR approach

3.2.3. Functional components in RQ

Including basic components: Transportation, trees - water surface, public buildings, buildings serving beliefs - religion, residential functions, production - commercial service functions (in and off-precinct). Propose 02 RQ models based on the combination of functions.



RQ organizational solution has a living function combined with a single-function industry group

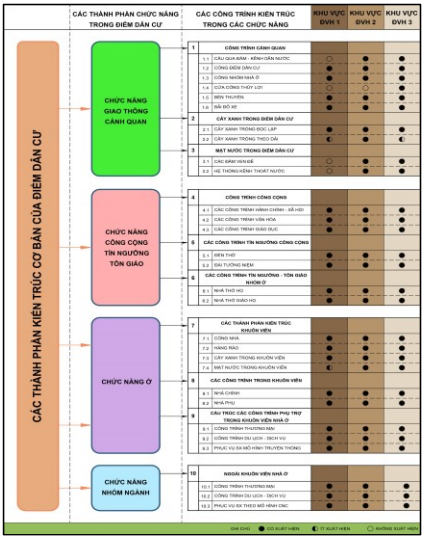


RQ organizational solution has a living function combined with a multi-function industry groups

● RQ combined with single-functional industry group: Commercial functions, handicraft production, agricultural production.

● RQ combined with a multi-functional industry group (with main functions): Main function of trade, of tourism-service, of agricultural production.

● Basic functional components of RQ by GCR area: Functional groups in RQ: Based on the proposals for organizing the functional space of RQ, the diserstation proposes to select basic architectural works in functions to provide architectural solutions suitable for GCR elements in each area.



Basic functional components of RQ according to GCR region

Those buildings are divided into functional groups of RQ including: Landscape functions, public functions, belief-religious functions, residential functions, industry group functions. Within these functional groups, There are basic architectural buildings, thereby forming the identity of regional architecture; Therefore, its structure needs to express the typical values of the GCR factor in the area where the RQ is built.

3.3. Propose architectural solution for existing RQ on AROD from the GCR approach

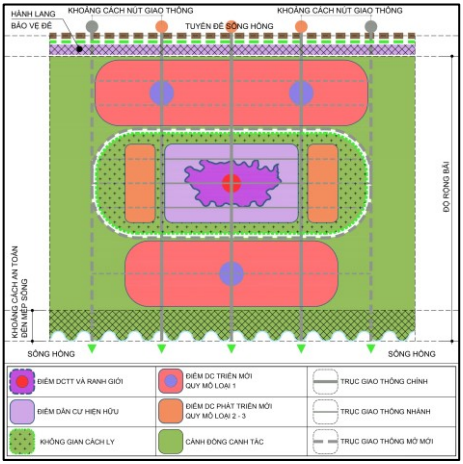
3.3.1. Space for organizing RQ types on AROD

- Existing RQ space: Includes TRQ and spontaneously developed RQ: In this space, it is necessary to delineate the specific boundaries of TRQ to have solutions to gentrification the architectural space for TRQs, renovate the architectural space spontaneous RQs to preserve and promote the region's GCR characteristics.

- Buffer space: Functions as a space linking the existing RQ with the newly developed RQ. The components in this space are mainly green trees and water surface (as an isolation space and landscape space), farming fields with traditional models for existing RQ. In this space, it is also possible to plan RQs of type 2-3 scale to serve as a transition space in terms of architectural form from TRQ to RQ points of type 1 scale.

- New RQ development space: In addition to the buffer space for research and construction of RQs.

- Farming space: Is the remaining space on the riverbank to serve the economic function of RQ with a modern, large-scale model (agricultural production following a high-tech model...)



Spaces to organize RQ on AROD

- Irrigation planning spaces: Includes dike protection corridors, safety distance to river edge.

3.3.2. Architectural solution for TRQ

Zoning the area based on a survey of the number of traditional houses in the pre-1954 period (as the central area), houses built from 1954 - 1986 (as the belt area) along with public architecture. and traditional BL-RL architecture to have appropriate planning and architectural solutions. Organize architectural space for specific functions and economic production models for this area according to sustainable trends from the GCR approach.

- Gentrification the main traffic axes of RQ (connecting the dike - river wharf, belt traffic axes, secondary traffic axes in RQ), architecture on the traffic axis (bridges across the water, motels, irrigation sluice gates...), plant trees to restore the architectural space of this function.

- Restore large trees according to the nature and method of using trees, green strips to prevent floods and protect dikes. Renovate and embellish the water surface, apply technical solutions to improve water quality, clear canals and ditches to restore characteristics in the TRQ architectural space. When building new RQs, it is necessary to exploit the water surface into the landscape to integrate into the typical landscape of the area.

- Regulations on the minimum area for the precinct when dividing land lots and construction norms depending on the functions and activities on the precinct.

- Form of gates, fences, trees, overall precinct planning, paying attention to typical constructions of the area (bridges over water canals...).

- Maintain the traditional garden-pond-barn precinct according to the VAC model so that each household precinct is a closed ecologically balanced unit.

- Develop economic models following "green - sustainable" trends on precinct such

as tourism, production, and product introduction according to traditional, small-scale models suitable for the area and nature of TRQ.

- Protect and preserve traditional houses (before 1954); houses of the period 1954-1986 with the "Western porch" architectural style, should be renovated, repaired and restored to their form, structure, without expansion or additional construction.

3.3.3. Architectural solution for spontaneous RQ

Statistics, relocation of households located in irrigation planning for resettlement, establishment of regulations on norms for construction land lots when there is a need to divide and separate (based on local decisions with adjustments to suit specific locations), investing in a synchronous, modern technical infrastructure system to ensure environmental sanitation.

- Renovate traffic axes close to the TRQ boundary, ensuring size for all types of vehicles to operate, synchronizing lighting and technical infrastructure, maintaining water canal systems according to the characteristics of the GCR region. Planting trees along traffic axes, combining trees with parking lots and marinas, renovating existing public building to increase green space in the area, uniform regulations on boards, billboards, and awnings for commercial and service activities

- Zoning and preserving traditional belief-religious architecture, renovating the landscape within existing public buildings, and if necessary, relocating to new locations to meet usage needs.

- Renovate and embellish the architectural space of the precinct, create green layers from outside to the house, comply with the setback from the road. Relocate the buildings which violating into the conservation space of BL-RL architecture, renovate the facade to match the area’s landscape. There are architectural solutions to integrate with the building's equipment systems so as not to expose these systems.

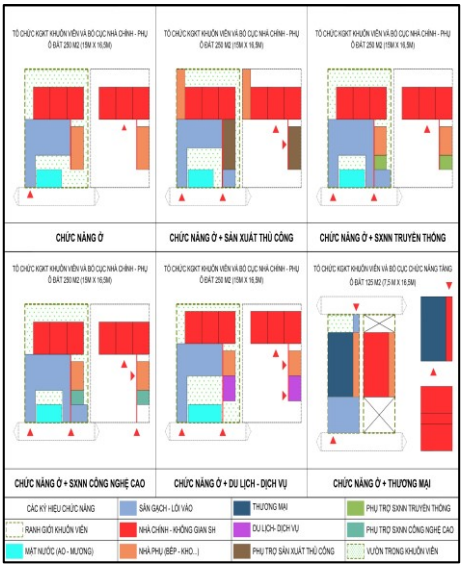
3.3.4. Architectural solution for new RQ development

● **RQ scale type 3**: Planning in buffer space, isolated from existing RQ with new development RQs, model is a cluster of houses with residential functions and small-scale production activities on precinct, shared infrastructure with existing RQ. Architectural solutions for the functionality of RQs according to RQ proposals have a scale of type 1 of the GCR region.

● **RQ has scale type 2**: mainly for residential purposes, using existing infrastructure or in new RQs, so need to pay attention to distance. Organize traffic synchronously and completely, organize parking lots, boat wharves combined with landscape. Green space combined with traditional religious buildings and public architecture serves as the nucleus for the RQ, exploiting natural and artificial water surface elements and typical buildings of the area into landscape architecture. Ensure the scale of central public buildings according to regulations and are arranged in convenient locations for access and operations. Architectural solutions for the functionality of RQs according to type 1 scale RQ proposals of the GCR region.

Loại quy mô điểm DC	Chức năng ô đất	Các chỉ tiêu		
		Diện tích ô đất (m2)	Mật độ xây dựng (%)	Chiều cao tối đa (m)
Điểm DC quy mô loại 1	Ở (15m x 16,5m)	250	50 - 60	12
	Ở cao cấp (20m x 25m)	500	40 - 50	12
	Ở + SX trong khuôn viên (DL- DV; SXTC; SXNNTT; SXNNCNC) (15m x 16,5m)	250	≤ 70	12
	Ở + TM (7,5m x 16,5m)	125	≤ 50	12
Điểm DC quy mô loại 2	Ở (7,5m x 16,5m)	125	≤ 50	
	Ở + SX trong khuôn viên (DL- DV; SXTC; SXNNTT; SXNNCNC) (15m x 16,5m)	250	≤ 70	12
	Ở + TM (7,5m x 16,5m)	125	≤ 50	
Điểm DC quy mô loại 3	Ở (7,5m x 16,5m)	125	≤ 50	12
	Ở + SX trong khuôn viên (DL- DV; SXTC; SXNNTT; SXNNCNC) (15m x 16,5m)	250	≤ 70	12
	Ở + TM (7,5m x 16,5m)	125	≤ 50	12

Minimum residential landlot norm in RQ type 1



Organization of architectural space of household pretinct in RQ type 1

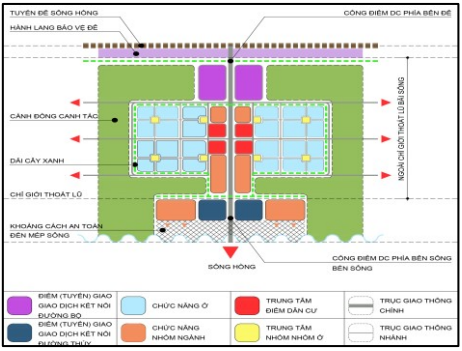
● **RQ scale type 1:** This is an RQ with a relatively complete scale (residential space with functions on precinct, functional buildings in the center...). On the basis of AROD's topographical characteristics, and on the basis of inheriting and promoting architectural characteristics in GCR areas, the diserstation proposes:

- Overall architectural solution for: Landscape architecture, public architecture, belief-religious architecture and supporting off-precinct production architecture (in summary tables of architectural solutions).

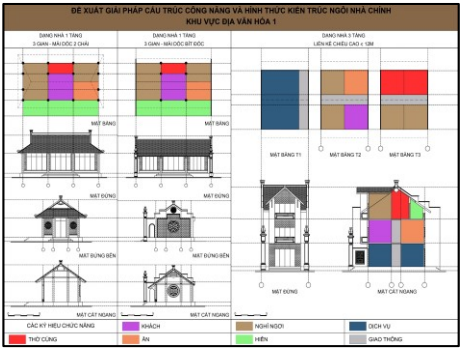
- Architectural solution for residential space: Proposing criteria for residential land

plots, solutions for organizing architectural space of precinct (residential houses and production auxiliary buildings, trees, water surface on the precinct). Propose detailed architectural solutions for the main house (functional space and form of the house).

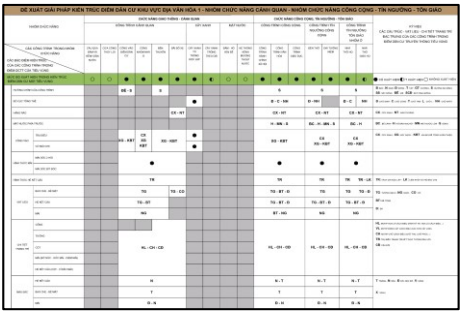
- GCR 1 area:



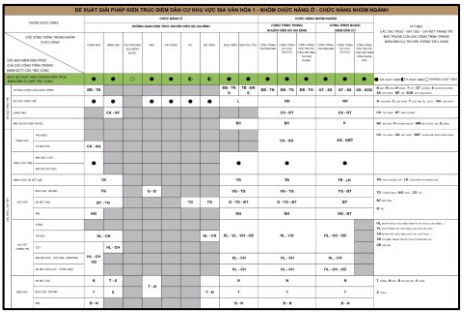
Organize RQ on AROD



Architectural solution for the main house

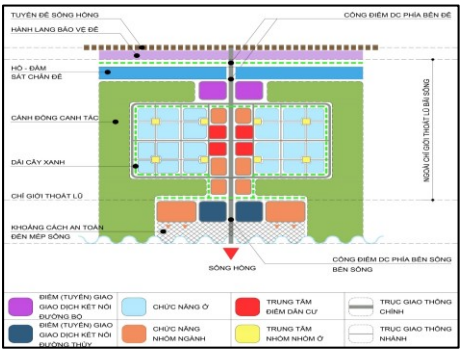


Architectural solutions for group funtion of landscape, public, and BL-RL architectures

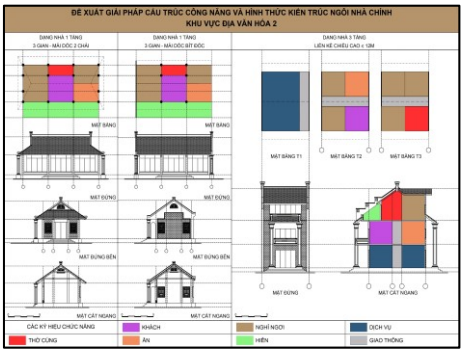


Architectural solutions for group funtion of living and serving prodution architectures

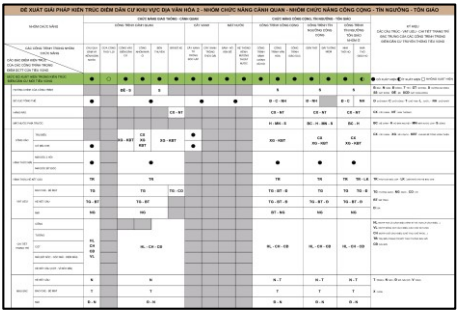
- GCR 2 area:



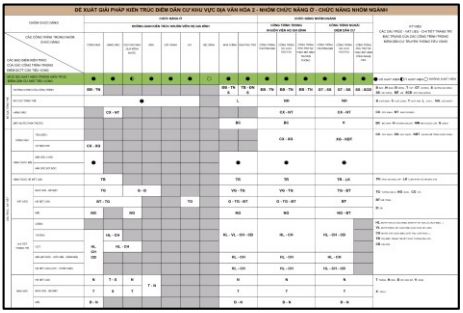
Organize RQ on AROD



Architectural solution for the main house

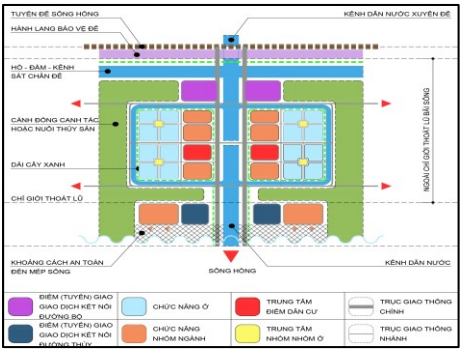


Architectural solutions for group funtion of landscape, public, and BL-RL architectures

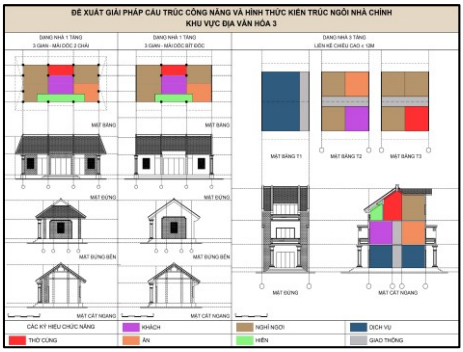


Architectural solutions for group funtion of living and serving prodution architecture

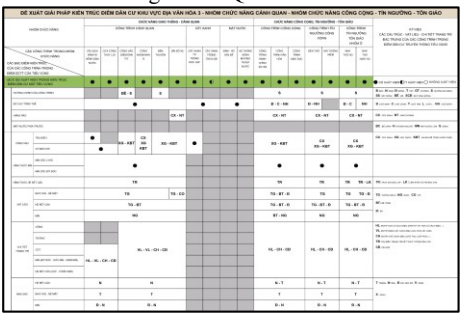
- GCR 3 area:



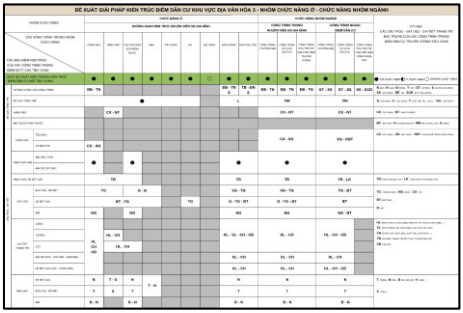
Organize RQ on AROD



Architectural solution for the main house



Architectural solutions for group funtion of landscape, public, and BL-RL architectures



Architectural solutions for group funtion of living and serving prodution architectures

● Other proposed solutions: Because the study area is highly specific and affected by the flood waters of the Red River, in addition to the proposed solutions, there should be solutions to help the works adapt, such as: solutions for houses on poles, houses on floats, solutions for assembly materials.

3.4. Discuss research results

● Architectural research method from the GCR approach: is to place architecture in the space of interaction between geographical conditions, natural environment and cultural characteristics of the area to highlight architectural features. Thus, it can be applied to architectural research in many different areas, especially areas with specific conditions.

● Divide the GCR area and determine the architectural features of the TRQ:

The proposed criteria system is highly general and universal, and can be changed for determining GCR region and architectural characteristics of areas outside the dikes of the Northern Delta

● Calculate the scale of RQ areas outside the Red River dike: As a controlled development area, determining the scale for DC development points on AROD is necessary, highly quantitative and practical, suitable consistent with the legal basis, helping to build functional structures in RQs to have appropriate planning and architectural solutions.

● Proposing a functional model and planning model of RQs on ARODs from the GCR approach: Proposing a model with high generality and diversity to meet the requirements of each region and each characteristic of the RQ.

● Propose architectural solutions for RQs from the GCR approach: Attach basic architecture to RQ functions, based on the level of appearance of building from TRQ functions in each region, propose architectural solutions principled and feasible: preserving architectural values (TRQ) - inheriting architectural values (existing RQ) - developing architectural values (new RQ).

CONCLUSIONS AND RECOMMENDATIONS

Conclusion: The dissertation has fully completed the research objectives and achieved results that meet the set research objectives, including:

● The dissertation proposes 3 perspectives and 6 principles in the organization of architectural space, which are the orientation for exploiting and promoting the architectural features of the GCR element for RQ areas outside the Red River dike.

● Proposal to divide 03 RQ areas outside the Red River dike based on the characteristics of GCR.

● Calculate and create 03 scales for RQ on ARODs allowed for construction research in Decision 257/TTg of the Prime Minister.

● Propose 2 functional models of RQ and 06 solutions to organize RQ for those 2 functional models.

● The dissertation proposes principled architectural solutions for renovating and gentrification existing TRQs and RQs in accordance with regional GCR characteristics.

● The dissertation proposes a comprehensive architectural solution for traffic organization, landscape architecture and public architecture, belief-religious architecture for new development RQs.

● Propose 06 solutions for organizing the architectural space of the household precinct and 03 detailed solutions for the main house on the precinct on the basis of inheriting and promoting the architectural features of each GCR area.

Recommendation: In order for the research results to be applied in practice and promote effectiveness, the dissertation recommends:

● The Ministry of Agriculture and Rural Development and the Dike Management Department need to have specific regulations on irrigation planning and landmarks to identify areas on AROD. The Ministry of Construction and functional agencies need to conduct a general survey on the situation of architectural development in the area outside the Red River dike, provides a database of TRQ spatial structures, design standards for housing, and public architecture with areas based on the GCR approach. Establish a specialized agency to manage the area outside the Red River dike with inter-sectoral participation under inter-ministries to have consistency and continuity in policies, regulations and supervision of projects in the area. Conduct an experimental project to research planning and construction on a specific AROD according to the proposals of the dissertation, as a reference basis for similar projects on river banks in the area outside the Red River dike.

LIST OF PUBLISHED SCIENTIFIC WORKS OF THE AUTHOR RELATED TO THE DISSERTATION

1. Le Hong Manh (2021), "*The influence of geocultural factors on the architecture of traditional residential quarter in the Lower Red River Delta*", Science Journal of Architectureand Construction, No. 41- **ISSN 1859 - 350X**.

2. Le Hong Manh (2021), "*Orientation for the development of Vietnamese architecture from the perspective of traditional residential quarter outside the Red River dike in Hanoi area with geocultural elements*", Journal of Construction, No. 49 -2021- **ISSN 2734- 9888**.

3. Le Hong Manh (2023), "*Tien Yen Town from a geocultural perspective - An orientation for planning and architectural development*", Science Journal of Construction and Urban, No. 88- **ISSN 1859- 3119**.

4. Le Hong Manh (2023), "*Architecture adapted to the natural environment of traditional residential quarter outside the Red River dyke from a geocultural perspective*", Proceedings of the scientific conference: Architecture and planning sustainable, continuing traditional values, looking towards the future - Hanoi University of Civil Engineering April 2023, **ISBN: 978-604-472-150-7**.

5. Le Hong Manh (2023), "*Organizing the architectural space of new residential quarter outside the Red River dike approaching from geocultural factors*", Architecture Magazine - Vietnam Association of Architects No. 9/2023, **ISSN: 0866- 8617**.