The Practice of TOD in the Urban Eco-Renaissance-CADRE Skyscraper & New GZ North Railway Station | 都市绿色复兴背景下的TOD实践——以凯达尔超高层综合体与新北站城市开发设计为例

Abstract | 摘要

The scarcity of land in the downtown area, in addition to the deterioration of urban environments, has led to urban sprawl and a lack of development in an old city zone. The planning and development mode of the Transit Oriented Development (TOD) provides new power for Guangzhou’s next stage of urban growth. In the meantime, it accelerates Guangzhou’s city management towards a combination of “induction” and “constraint” modes, as well as “market operations” and “legal management.” The creative designs of the CADRE skyscraper complex and the Guangzhou north railway station bring us inspiration not only in the aspect of architectural design, but also in the aspect of “market operations” in city management. The start of the TOD project is the practice of green building design and a chance for a systematic revival of the city.

Keywords: City Revival, Civilization, Eco-renaissance, TOD Practice and Walkable City

城市中心区域土地的稀缺和城市生态环境的恶化导致了城市的无序扩张蔓延和旧城区的发展乏力等种种城市问题。TOD的规划与发展模式为广州在新一轮城市生长过程中带来了新的动力。同时，也将广州推向了“诱导式”与“约束式”相结合、“市场运营”与“法制管控”相结合的更新城市管理模式进程中。凯达尔枢纽文化广场和广州新北站规划设计的设计,不仅从建筑设计方面,同时也在“市场运营”进程中为我们带来了思考。TOD项目的启动不只是绿色建筑设计的实践,也是城市系统性复兴的契机。

城市问题与城市发展规划的背景

城市问题
面对城市中心区域土地的稀缺，农田被占，城市生态环境的恶化，城市无序扩张不断蔓延和旧城区的发展乏力等种种城市问题。城市化进程逐渐由高速建设以吸引人口到城市用地功能转型，城市结构优化的过程。

广州城市发展结构转变的背景
广州进入新的发展时期，工业生产型企业，特别是污染类产业分期搬离沿江区域和城市中心区域，通过自然和交通资源将原工业性土地整合起来，形成新的商贸、居住区和景观保护带。原有以增量项目为主的旧城区新区开发，转变为以存量改造项目为主的旧城区更新或是城市复兴之路。

广州战略规划向注重集约化、生态化方向转变。三大战略枢纽，一二江两岸三带、多点支撑”这样的战略规划策略。一是优化提升一江两岸三带。构建一江两岸三带，就是以珠江为纽带，把沿岸的优势资源、创新要素串珠成链，构筑两岸经济带、创新带和景观带。二是着力建设三大战略枢纽。三大战略枢纽指国际航运枢纽、国际航空枢纽和国际科技创新枢纽。三是形成多点支撑格局，形成广州总部、金融、科技集聚区。特别是高水平规划建设和琶洲互联

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黄慧菁是教授级高级建筑师及一级注册建筑师,同时也是中国高层建筑国际交流委员会(CIECTB)的副主任和世界高层建筑与都市人居协会(CTBUH)的会员。黄慧菁专门研究几种不同的建筑类型，包括摩天大楼，TOD商业综合体以及酒店。她的关注点集中在城市设计和绿色建筑方面，比较有特色的代表作品有珠江大厦和凯达尔国际广场。

The Urban Problems and the Background of Urban Development

The Urban Problems
In the face of the scarcity of urban land and farmland, in the face of the deterioration of the urban ecological environment, and in the face of the massive spread of urban sprawl and the development of Old Town being flabby and weak, the aim of urbanization has changed to a plan for functional transformation of land use and urban structure optimization, from the attraction of an urban population and high construction speeds.

The Background of the Urban Development Structure – Transformation in Guangzhou
In the new period of Guangzhou today, the industrial enterprises, especially enterprises that produce environmental pollution, have moved away from the areas both along the Pearl River Delta (PRD) and in the city center. Through integration with natural and traffic resources, industrial lands have renewed as the new formation of commercial and residential areas with landscaped protective belts. The mode of urban development, which is mainly based on new development, has been switched to a new transformational plan for functional urban structure optimization, from the attraction of urban population and high construction speeds.
projects, is transformed into one of urban renovation and revival.

Today, Guangzhou has changed its focus to intensive and ecological planning. Strategic planning concepts include three strategic, integrated transportation hub modes – “one river-two banks-three belts,” with multi-point bracing. This plan is optimized to enhance the riverbanks by three zones.

The “One river-two banks-three belts” concept can be explained as follows. Think of the Pearl River as a link, which integrates the riparian resource and elements of innovation. Just like stringing beads into a chain, it builds across the strait economic, innovative, and landscape belts.

Three strategic transportation hub modes include the International Shipping Transportation Hub, the International Air Transportation Hub, and the International Technology Innovation Hub. This multi-point support pattern means the formation of Guangzhou’s headquarters, finance, and science and technology gathering areas. Particularly, the formation of Pazhou High-Level Internet Innovation Area contributes an extension of the Internet industry chain, accelerating the formation of the “Internet plus” industrial innovation clusters.

TOD Model and the Opportunity of Different Parts of Guangzhou City Developments

The Transit Oriented Development (TOD) model is a “public transport-oriented” development model. Based on public transportation – which includes the rail transit, the bus lines, and pedestrian walkways – the integrated urban development strategy of businesses, commercial centers, culture and education centers, and residential districts can be established in an area of 400 to 800 meters (about a five to 10-minute walking) distance from the TOD project. The TOD model aims to reduce the dependence of citizens on motor vehicles, especially the use of private vehicles, to encourage people to choose public transport and/or pedestrian traffic (Figures 1 through 3).

Independent Transformation has Gone into Network Traffic

Inter-city railway will play the aorta role in the transportation hub system, and integration

Traffic network independent transformation becomes network combination

The intercity railway will become the主动脉 of the strategic hub system, and integrates the transport and public transport systems to form a network. The traffic network no longer operates in isolation. It is a combination of intercity, regional, and urban transport systems, forming a network of transport systems that is efficient, comprehensive, and diverse. (Figures 4, 5).
of the MTR transport system, bus lines, and pedestrian walkways will build a well-developed microcirculation while promoting the development of the urban economy and extending the population. Inter-city traffic and external city traffic are no longer independent transport systems, but a traffic network. This traffic network, woven from high-speed railway, inter-city railway, the MTR transport system, bus lines, and pedestrian walkways, has three major characteristics of a highly efficient, comprehensive and complex. The progressively refined urban grid (20 kilometers, one kilometer, and half a kilometer) make up the traffic network system (Figures 4 & 5).

The TOD Model Promotes the Evolution of Land Development

In TOD projects, the leading of project developments has changed hands from the government to private enterprises. The land use right, which was originally owned by publicly owned enterprises such as the Ministry of Railways or the High Speed Rail Company, now has been changed to include a combination of private and publicly owned enterprises.

The land nature of projects is transformed into commercial, residential, and tourist land – a kind of multi-functional composite land – from simple traffic land. Abandoning the traditional layout of flat spaces and streamlines, a TOD space becomes more open and fuller of activity, and is a mode of complex three-dimensional space. It also contributes to human being’s sense of direction and spatial-recognition. Above all, the TOD mode promotes the development of cities in a more open and fair direction.
The Urban Development—Opportunity

The TOD model is a sustainable development opportunity to combine traffic with land development. It is also an opportunity of remodeling and diversifying urban community atmospheres around a public transport core. Urban morphology and structure is presented as an organic coordination model for the compact development of urban agglomeration (refer to Figure 5).

Historic Districts – “Inducing Type” Green Renaissance

TOD projects can drive the renovation and renewal of the “Old Town.” First of all, it is more important to balance the infrastructure of renovation and cultural protection. In the next place, it will bring environmental improvement and drive the appreciation of land. Last, but not least, it will promote the increase of vitality and attraction in the “Old Town.” (Figure 6).

Case Study of Guangzhou North Station

The concept of Guangzhou North Station planning includes the following: measures of ecological compensation; procedures and measures of compensation for demolition; optimization measures of urban motorized traffic; conservation and restoration of historical and cultural architecture. Each of these elements is detailed below:

- Measures of Ecological Compensation: These include the development of high-strength, high-density, and ecological compensation modes across about four square kilometers of continuous wetland park in the Guangzhou North Station. The most important aspect of this is the ecological self-healing function of the wetland park. In addition, the station building roof garden becomes a part of the city’s slow system.

- Procedures and Measures of Compensation for Demolition: Social fairness means that the order of land development depends on the degree of difficulty and the potential for land appreciation. Mixed lands will be divided into three periods, in which each will have a different purpose – commercial land, residential land, and so on.

- Optimization Measures of Urban Motorized Traffic: This uses “4 + 1” optimization measures. The capacity of transport systems in the new urban planning must meet the new traffic demand. This includes two sub-measures:

  - Measure 1: The number eight subway line going in the north-south direction and the number nine subway line going in the east-west direction will transfer on the same floor level. This can solve the traffic needs in north-south direction of the Huadu “Old Town,” as well as the transportation between hub and cohesion.

  - Measure 2: Forming the road network system will be a traffic system

  - Tourist development/旅游业发展

  - Appreciation of land value; Price leverage to induce economic development/土地价值提升,价格杠杆诱发经济开发行为

  - Market operators to appreciate the land value; Upgrade the attractiveness of development and employment/市场运营者可以通过土地价值提升，开发商及就业吸引力提升

  - Economic balance of compensation for demolition and relocation/拆迁补偿的经济性平衡

  - Appreciate the land value; Upgrade the attractiveness of development and employment/土地价值提升, 开发与就业吸引力提升

  - Change between private and public land ownership/私有化、公有化土地权属变更

  - Resource sharing; Intensive land use; Promotion of development/资源共享,集约型土地利用,推动发展

  - Privatization of land or high-speed train company /高铁公司私有化

  - Project land nature from single traffic land to commercial, residential, and tourism multi-functional composite land. Abandon the traditional plane space and flow line layout,转变为立体交错模式的活力开放空间。这些模式的变革都促进城市向更为开放、公平的方向发展。
**Regulations and Design Work**

<table>
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<th>1</th>
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**Pre-Guidelines 先导性**

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2. The design and construction of transportation and infrastructure should be prioritized
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3. Ecological planning should be prioritized
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4. Government coordination services; Development fund services and platforms; Privatization of land ownership; Complex land development rights; Stimulation of radiation lead roles of the development
   - Resource-sharing guidelines

**New Town Area – The Improvement Restriction and Avocation Measures of Codes & Regulations**

With TOD the model, there are several key points of land development changes suggested to the guideline of regulations’ renovation (Figure 7).

**Figure 7. Regulation Renovation Table (Source: Huijing Huang)**

| 7. | The case of planning for the ecological park in Guangzhou North Station (Source: Huijing Huang and related government departments) |

**Figure 8. The case of planning for the ecological park in Guangzhou North Station (Source: Huijing Huang and related government departments)**

- **Historic streets—Emphasis on ‘诱导式’ green renewal**
  - The traffic带动旧城区的复苏与更新, 首要的是基础设施的更新和文化保护的问题。其次将带来环境改善和土地升值, 最终推动旧城区活力复兴和居住、就业吸引力的增加（图6）。

**Guangzhou North Station Case Analysis**

广州北站规划包含以下：生态补偿措施; 拆迁补偿的程序与措施; 交通带动旧城区更新, 历史文化建筑的保护和修缮。各项细节如下：

- **Ecological Compensation Measures:**
  - The wetland park in the four-square-kilometer area has a self-regulation system of ecology and landscape. It also forms a complete riverside expressway.

- **Conservation and Restoration of Historical and Cultural Architecture:**
  - To emphasize on the protection of cultural architecture and the industry consolidation offers a wide range of advantages. The agricultural characteristics of a culture tourist town can be created by combining Zizheng Dafu ancestral temple with the surrounding geographical landscapes.

**Figure 8. Guangzhou North Station Case Analysis**

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A Combination of Information and the TOD Model in the Era of Big Data

**Big Data Integration = Aggregation & Divergence + Information Statistics & Transfers**

Based on the application of Internet information technology, the integration of information technology and industrialization greatly promotes the efficiency of industrial production. The “magic” of Big Data is not only to collect along traffic lines, but also to conduct to highly efficient transportation through “Custom Style,” while also to providing credit and safety information through data analysis for the government in addition to highly efficient production information and fast-business, and avoiding the imbalance between supply and demand in the modern industrial age (Figure 8).

### A Case Study of CADRE International TOD Plaza

CADRE International TOD Plaza is located in the Xintang district of Guangzhou in the eastern residential and industrial area (Figures 9 through 11). There are two towers:

**a.** In the west side, the Yajiao Expressway will be set up. In the near future, a fast双向 road will be built linking the Yajiao Expressway and Guangzhou North Station. The original road connecting Yajiao Expressway and Xingxin Street will remain the same. This will reduce the commuting time by 10 minutes and alleviate the traffic pressure on Xingxin Street and the planning area.

**b.** The Wanheng Road will be reconstructed as an underground tunnel at the railway and Wanheng Road intersection.

**c.** Waihua Road and the Jiawei Road will be widened and the traffic on the Yunshan Avenue will be diverted to this area to strengthen the联系 between the west.

**d.** Adjust the南部 of the riverside road to ensure that the square kilometers of water bodies can be automatically regulated.
the West Tower is 245 meters tall and the East Tower is 215 meters tall. This project includes a 50-meter-high podium holding 110,000-square-meter shopping mall. There are four floors in the underground space, which has two floors of commercial areas. The most interesting thing is that this gigantic space also features two kinds of railway transport stations: one is Sui Wan Shen inter-city traffic, which will connect the Guangzhou Baiyun airport, the Shenzhen airport, and the Hong Kong airport with two platforms and four rails; and the other is a transfer station between the number thirteen subway and the number sixteen subway, which will connect the urban town of Guangzhou and the Zengcheng district area. The significant character of CADRE International TOD Plaza is that the inter-city traffic goes through the shopping mall on the fourth floor.

**Design Focus**

The characteristics of the hub and the turning point of the Xintang development is that it is the first case of TOD in China.

**Concept**

The concept is inspired by a rocky mountain and canyon, featuring a high-tech, green architectural design.

**Regional and Transportation Planning Problems of the Project:**

**Function Goal of Roads Around the Site**

When urban land is limited, it is necessary to migrate and evacuate transit traffic based on regional traffic management instead of site traffic management.

**Transfer Facilities – The Station Core and the City Corridor**

The regional coordination of parking and the intelligent traffic control should contribute to the public transfer of the TOD (Figure 12).

**Change of Social Values from the Start of CADRE International TOD Plaza:**

The concept of green travel is utilized by...
encouraging citizens to reach destinations by bicycle or by foot.

**Concept of Space:** The Station Core and the City Corridor provided are also available for zero-transfer (Figure 13).

**Fire Protection Design:** The Station Core and the City Corridor provide safe spaces for people and a huge storage area for smoke. They are also easily recognizable.

**Structure and Vibration Isolation:** The avoidance of transit vibration and noise from the railway is the most important quality guarantee of TOD project.

**Other Problems**

**Roles Innovation:** First of all, the government should provide a platform for resource-integration and resource, instead of the leader roles. Secondly, developers and real estate personnel play the main role of resource integration from the single role of investment. It is worthy that architects will play the role of integrating the multiple needs of both the public and private sectors, instead of working only as designers.

**Institutional Improvement:** This includes organization, policy, and system improvements. The Government provides policy guidelines and attracts private organizations or civil societies involved in projects and urban innovation activities, according to a Public Private Partnership (PPP) model.

**Policy and Codes Improvement:** This includes policy and codes improvement of examination (Figure 14).

**Summary**

The TOD model will bring a new driving force for the social advancement and urbanization process of Guangzhou. At the same time, it will push Guangzhou to integrate between “inducing” and “restriction” types, to a combination of “market operation” and “legal system control” in the processes of urban innovation. Two TOD projects in Guangzhou bring us these new concepts, not only in the field of architectural design, but also showcase opportunities for urban revival.

道, 通过两个站点和四条轨道连接广州白云机场，深圳机场和香港机场；另一个是广州地铁13号线和16号线的中转站，将连接广州城镇和增城区。位于商场四层的城际交通是凯达尔枢纽国际广场最突出的特征。

**设计关注点**

枢纽特性，新塘发展的转折点，中国TOD模式转变的第一案例。

**概念**

灵感来源于山与峡谷，高科技绿色建筑设计。

**区域规划与交通**

道路的功能目标
当用地有限时，需发挥城市交通规划的统筹性，将过境交通的外移，并通过立体交通方式解决多点到达与多点疏散问题。

**换乘配套**
考虑一定数量的公共换乘中转站问题，并对应区域性统筹停车，智能管控枢纽区交通峰值（图12）。

**价值观转变**
绿色出行概念需通过鼓励市民使用自行车或步行方式抵达目的地来实现。

**空间构思**
车站核与城市走廊“交通”中的人提供空间，实现“零换乘”（图13）。

**消防设计**
“零换乘”车站核与城市走廊消防设计的突破，步行街概念，光导通风空间提供天然的导向指引，并提供自然排烟的安全空间。

**结构与隔振**
品质保障，控制轨道交通振动及噪音的不利干扰。

**其它问题**

**角色变革**
首先，政府角色由领导转变为资源与服务供给方，并提供资源整合的平台。第二，开发商角色由单纯的开发转变为资源整合。值得关注的是建筑师角色，由单纯的设计角色转变为多方需求的整合方以及公共利益需求的平衡者。

**制度变革**
包括机构的变革、政策的变革和体系的变革。政府提供政策的指引，引入民间团体、私人公司等非政府机构（PPP公私合营模式）。

**政策和规范变革**
包括审批方式的政策和规范的变革（图14）。

**总结**

TOD规划与发展模式为广州在新一轮城市生长过程中带来了新的动力，同时，也将广州推向了“诱导式”与“约束式”相结合、“市场运作”与“法制管控”相结合的更新城市管理模式进程中。凯达尔枢纽文化广场和广州新北站规划设计的创新，不仅从建筑设计领域为我们带来了思考，也在“市场运作”的城市管理层面为我们带来了思考。TOD项目的启动不仅是绿色建筑设计的实践，也是城市系统性复兴的契机。