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## Livable Street Design and Management Requirements: An Example of Kunming Street Guideline

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**Abstract:** Urban street design guidelines play an important role in building high-quality public spaces and promoting urban areas' low carbon and green development. Taking Kunming as an example, this paper introduces the objective-oriented and result-oriented thinking in Kunming Street Guideline development that matches local community characteristics. The paper summarizes the main features of Kunming Street Guideline development, which includes the high standards for the protection of right-of-way and quality improvement and provides solutions to address challenges in the practice of the "guideline + checklist + department version" package to facilitate department management. The technical index and form of deliverables of the Guideline are made to best fit Kunming's specific needs and aim to better serve city management. **DOI:** 10.13813/j.cn11-5141/u.2019.0205-en

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### 0 Introduction

An urban environment of high quality enables a city to seize more development opportunities, acquire more resources, attract more economic growth elements, and build its own strength to be more competitive. Streets, key components of urban public space and infrastructure, generally cover 15% to 25% of urban land used for construction purposes. A research from the United Nations Human Settlements Program found that a pleasant city should have around 50% of its space as the public space (including libraries, stadiums, theaters and other activity places for residents)<sup>[1]</sup>, in which streets account for one third or even half. Therefore, more and more urban administrators, designers, planners and ordinary street users have come to a consensus that efforts shall be made to boost the low-carbon, green and sustainable development of a city by making full use of street space, exploiting its social and cultural functions in addition to its transportation function, and creating urban public space of high quality.

In recent years, there has been a worldwide wave of developing street design guidelines. New York City in the United States introduced the *Street Design Manual* in 2009 and updated it in 2016, which received widespread attention. Other American cities, including Seattle (2005), Los Angeles (2008, 2011) and San Francisco (2010) also issued their own

guidelines for street design from 2005 to 2011<sup>[2–4]</sup>. Most European countries have street design guidelines, among which the most famous one is *Manual for Streets*, promulgated by London. It emphasizes that streets are not only traffic corridors but also places where people are willing to hang out and stay<sup>[5]</sup>. In Asia, United Arab Emirates' capital Abu Dhabi (2010) and India's capital New Delhi (2009) published transportation design guidelines for streets, pedestrians and bicycles<sup>[6–8]</sup>. Japan unveiled the *White Paper on Land, Infrastructure, Transport and Tourism* in 2009, proposing to advance the construction of streets with priority for pedestrians and bicycles, including building space with priority for pedestrians around schools and setting up 98 bicycle environment demonstration areas nationwide<sup>[9]</sup>.

Over the past two decades, China has witnessed a great development of motorization in which the decision-making power in urban transportation was dominated by motor vehicle traffic mainly consisting of cars. It was generally believed that roads were not only built to facilitate the motor vehicle traffic but to serve people, which is actually the basic value of a city. The State Council of China issued the *Opinions on Enhancing Urban Infrastructure Construction* (Guo Fa [2013] No.36) in 2013, clearly stipulating that cities should effectively transform the transportation development mode that overwhelmingly depended on cars. The Central Committee of the Communist Party of China and the State

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Council also put forward the urban road layout concept of “narrow roads and dense road networks” in the *Several Opinions on Further Strengthening Urban Planning and Construction Management* (Zhong Fa [2016] No.6) in 2016. It promoted the development of open, convenient and appropriately scaled urban blocks with complete supporting facilities and harmonious neighborhood. President Xi Jinping proposed in 2017 that “urban management should be as elaborate as embroidery.” In the context of the above macroeconomic policies, Beijing issued the *Code for Planning & Design on Urban Road Space* (DB11/1116—2014), proposing to plan and design road space as a whole and to allocate more space to pedestrian and bicycle transportation. Shanghai released the *Shanghai Street Design Guidelines*, which focused on the design guidance on elements pertinent to people’s activities in street space and put forward four transformations: from emphasizing motor vehicle traffic to fully taking into account people’s exchanges and lifestyle, from controlling road red lines (setback lines) to controlling street space, from engineering design to overall space environment design, and from stressing the transportation function to promoting the development of urban blocks. Shenzhen published the *Shenzhen Road Design Guidelines (Trial)*, aiming to directly guide street construction with more attention on road design details, material selection and engineering practices.

Surrounded by mountains and lakes, the city of Kunming, Yunnan Province, China has a long history and enjoys abundant natural resources, and its streets have appropriate scales and diversified forms. The compact urban structure and pleasant weather help shape a sound tradition of green travel. Kunming is one of the first batch of national demonstration cities for public transportation and for pedestrian and bicycle transportation recognized by the Ministry of Housing and Urban-Rural Development of the People’s Republic of China (MOHURD). Its Chenggong District of Low-carbon Urban Demonstration Area, well known for “narrow roads and dense network”, is included in the first batch of national green ecological urban areas. However, Kunming is still confronted with many challenges in street space and environmental quality. In addition, the relevant general guidelines and standards issued by MOHURD are not totally applicable to Kunming, a city with distinctive characteristics. Kunming still lacks a guiding document for local road design and basically follows national standards for related technical specifications. In this context, the Kunming Municipal Party Committee and the Municipal Government initiated the development of the *Kunming Street Design Guideline* (hereinafter referred to as the Guideline) in early 2017. The motivation is to uphold the fundamental development philosophy of returning from “automobile-orientation” to “people-orientation” in the urban transformation stage and to establish a long-term and unified high standard for the construction, reconstruction and expansion of streets in Kunming.

## 1 Basic issues related to the development of the guideline

### 1.1 Target and orientation

#### 1.1.1 Clear street functions

First, as the main spatial carriers of local public life, the streets in Kunming are the most frequently used public spaces. The commercial and landscape streets, such as Nanpingjie Street and Cuihulu Road, carry special functions, which are the landmark destinations. Also, the streets for daily use, such as Qianjujie Street and Wujinglu Road, provide spaces for residents’ activities, including neighborhood communication, walking and resting, retail sales, and discussions of community affairs. Therefore, streets call for environmental quality and service facilities to meet the needs of public life, just like parks and plazas.

Second, the streets in Kunming also link to public facilities such as parks, plazas, business centers, libraries, theaters and bus stations, thus directly influencing their accessibility, use efficiency and service quality. When more people are attracted to the urban streets, there will be a significant increase in pedestrians and roaming walkers, which not only improves the safety of the city but also promotes the growth of social and economic activities in public spaces. This is followed by the orderly or spontaneous emergence of more quality public spaces, thus attracting more people to urban public spaces and further supporting diversified and vibrant urban life.

Third, the streets in Kunming are also important carriers of the city’s image and vividly embody the city’s spirit, culture and history. Is Kunming a bustling business center represented by Nanping Street and Jinbi Road or a scenic countryside marked by Cuihu Road and Dianchi Road? Different streets can reflect the characters of the city from different perspectives at different time periods. Protecting the cultural heritage of the streets and making them a materialized manifestation of the rich historical and cultural details and landscaping sentiments play a significant role in demonstrating the image and personality of Kunming amongst other counterparts worldwide.

#### 1.1.2 Complete street elements

To foster a harmonious street atmosphere and highlight the sense of place, it is necessary to comprehensively shape and control the road space among the red lines (building setback lines), the setback space and the street façade. Traditionally, street design only covered the space between the red lines while overlooking the space between the red line and the street facade, in which it was often to see different elevations, pavements, greening and street facilities. On the other hand, the lack of uniform planning and design caused blurred functional positioning of the space between buildings and the street. Much of the space in front of roadside stores was used for the purposes of parking, peddling or commercial

advertisement, affecting pedestrians and the urban landscape. With the popularization of the street design philosophy of “people-orientation”, the concept of complete street has been widely accepted industry-wide in recent years. It refers to the uniform planning and allocation of street space resources (see Figure 1) after the expansion of the street design scope to be between street façades (including walls and handrails).

1.1.3 Diversified target readers

The ideas and style for the preparation of the Guideline are directly affected by the positioning of the Guideline: as a supporting reference book for professionals or as a popular science book to promote the “people-oriented” street philosophy to the public. Facing the rare opportunity to develop an urban technical guideline, the guideline team clarified at the very beginning that the Guideline should consider decision-makers, planners, designers and residents: the Guideline should start with seeking a consensus and focus on the road planning and design as well as practical operations of engineering technicians, while playing the role of publicity and education.

1.2 Selection of the style

Differences in the target readers’ focus will lead to differences in the style of a guideline, such as the framework style, the text-to-image ratio and the language style. Among them, the framework style has the top priority and should be

determined at the earliest stage. A review of several influential and relatively complete street design guidelines showed that the framework fell into two categories: (1) organize the guideline by targets; (2) organize the guideline by street elements (see Table 1). The former sets up several specific and tangible targets for the street first, such as safety, convenience, comfort or greenness and then lists the necessary strategies, conditions and requirements under each target in the form of articles. The latter is organized by street elements, such as traffic space, separation forms, street facilities, greenery landscape, lighting and signage and lists basic principles and conditions for each element’s space, positions and type selection in the form of articles.

Table 1 Comparison of contents for different street design guidelines

Category	Organized by targets	Organized by elements
Framework	Safety, convenience, comfort, greenness	Traffic space, separation forms, street facilities, greenery landscape, lighting, signage
Advantages	Easy to understand for the public; Highly readable for decision-makers; Seeking a consensus and easy to promote	Easy to search for technical staff; Simple and clear category-based structure
Disadvantages	An element might be scattered in different parts of the guideline, and therefore it is difficult for technical staff to find what they need	The content is boring, hard to read, and not easy to promote the concepts and philosophy
International Case	New Zealand, Toronto	New York, London, Abu Dhabi
China’s Case	Shanghai	Beijing



Figure 1 Typical street elements illustrated on the U-type road cross-section

To sum up, a guideline organized by targets is more suitable for cities that are relatively unfamiliar with related concepts, and it can be released as a government report or document as the first step of refined management to dismantle the general concept to the specific value orientation of street design and management. On the other hand, a guideline organized by elements is more suitable for cities that have already had one or more rounds of related publications. In such cities, a consensus on the concept level has already been established in the industry and even in the public, and what is needed is a technical document to guide specific and complex situations encountered in the daily work.

According to the principle of diversified target readers determined at the beginning, the Guideline finally sets its focus on the target framework to firstly address the consensus issue. Four targets, namely “safety and order, convenience and pleasantness, culture and energy, and ecology and green”, were proposed after considering the features, development phases and outstanding challenges of the streets in Kunming. Then, the guideline team followed the step-by-step technical thinking to break a complex issue into several simple issues and proposed a three-level system of “target–strategy–article”. In this system, the four targets were broken down into 18 strategies, such as “to protect the right-of-way so that each transportation mode should take its own way” and “to improve the quality of street shading, taking into account the needs of activities and landscapes”. This system made the main design points clear and categorized elements strategically to make it easier for technical staff to use.

## 2 Main features of development of Kunming street design guideline

### 2.1 Reflect local characteristics of Kunming

Kunming is a distinctive city, and its streets should be able to highlight the characteristics of the city. Therefore, this paper summarizes six features that are related to the street space environment requirements in Kunming and refers them to corresponding parts in the Guideline respectively.

#### 2.1.1 Street view amidst scenic beauty

“Street view amidst scenic beauty” vividly depicts the street layout of Kunming’s old town, featuring “three mountains and one river” with Yuantong Mountain and Green Lake at its heart and several waterways including Panlong River and Baoxiang River passing through the city and flowing into Dianchi Lake. Therefore, the Guideline clarified the development strategy of highlighting the scenic environmental characteristics and integrating mountains and rivers into urban life through streets and focused on and detailed the design principles for greenways especially waterfront greenways. It also made special regulations on “scenic greenway” as a special road category in the street

classification and further carried out an exemplary design with the case of Binjianglu Road along Panlong River.

#### 2.1.2 Long history and rich culture

Endowed with a development history of more than 2,200 years and rich historical and cultural heritage, Kunming is among the first 24 national historic and cultural cities announced by the State Council. In particular, the Wenming Street Historical Block preserves all of its traditional street styles. Although many of other downtown blocks have experienced modernized updates, their street textures are still rooted in the traditional network interspersed with some historic buildings. Streets, as a display window for urban context, shall be a manifestation of the rich historical heritage of Kunming. As stipulated in the Guideline, the protection of Kunming’s historic style shall be practiced from three regards: preserve the historic block layout, protect the street style as a whole, and embody historical and cultural features by street elements.

#### 2.1.3 Flourishing tourism driven by numerous tourists

Street service facilities are of vital significance to Kunming where tourism serves as a major industry boosted by countless tourists. However, China’s cities generally fail to include street service facilities in planning, which are not restricted by the existing codes. In terms of design, the principles and standards to set up street service facilities are missing, so it is inconvenient to use. In terms of operation and management, it is not clear who should be responsible and street service facilities are likely to be removed or misplaced in a municipal engineering reconstruction. Hence, the standards and principles for these street service facilities shall be clarified in the Guideline, such as emphasizing a complete signage system and recommending a diversified array of advanced service facilities for tourists. In particular, there have multiple systems of pedestrian directional signage in Kunming, which are required to be integrated pursuant to the Guideline.

#### 2.1.4 Perfect weather and leisure lifestyle

On this land endowed by the nature, the weather is like spring all year round and a strong tradition of relaxed and slow lifestyle prevails. Pocket parks can provide the public with a space for daily activities. Therefore, the Guideline specified the requirements for the layout and scale of activity spaces and the design principles for the activity and public service facilities to encourage the construction of pocket parks and promote the establishment of active street façades.

With vitalization of setback space as an example, its quality plays a particularly vital role in shaping the overall quality of the street as it connects the street to buildings and needs to accommodate a relatively concentrated population. However, in accordance with the *Technical Specifications of Urban and Rural Planning and Management of Kunming*



(2016), the minimum building setback distance shall be 10 m–50 m for urban roads, whose range is too large to form a continuous and perceivable street façade. To tackle this issue, the Guideline specially stipulated that (1) no passage or parking space for motor vehicles is allowed in the building setbacks; (2) it is inappropriate to set up inaccessible lawns and shrub green space within the setbacks; (3) the setbacks shall not block the communication between buildings and sidewalks. Besides, to vitalize street atmosphere by introducing effective functions, it is encouraged to make flexible arrangements of the setback spaces based on their scales, such as the places for leisure and social contact, movable vending booths, outdoor stalls, container-type stores, places for square dance, sports grounds, children's playgrounds, small green parks and community plazas (see Figure 2).

### 2.1.5 Strong sunshine and abundant solar and wind energy resources

The sunshine in Kunming is strong, and the wind and solar energy resources are abundant. On the one hand, street facilities can be used to enhance the use of renewable energy resources such as wind and solar energy. On the other hand, special attention should be paid to street shading. According to a survey, women in Kunming need to use parasols for up to eight months in a year. Therefore, the Guideline stipulated stricter requirements on street shading. For example, as mentioned in the Guideline, priority shall be given to

construct three-section roads (a type of road whose cross-section has three sections: motor vehicle lanes in the middle and non-motor vehicle lanes on both sides), which are easier to be shaded; expanding street space by cutting down roadside trees shall be prohibited; and tree shading shall be continuous at intersections and facility entrances. At the same time, the Guideline also strictly controls the size of intersections and facility entrances.

Diversified street greening has become one of the urban highlights in Kunming, benefited from its mild subtropical climate and long-term focus on urban greening, especially, efforts in building a national garden city and a forest city in recent years. Like many built-up areas in other cities, however, Kunming has also been plagued by a one-size-fits-all national standard—25% even 30% of ratio of green for roads, required by the *Code for Planting Planning and Design on Urban Road* (CJJ75-97) issued in 1997. Meanwhile, Kunming neglected to provide comfort for peoples' activities with excessive emphasis on the ornamental value of street greening. However, the fundamental purpose of street greening is to serve people. In the case of limited street space, providing shade and improving street environment are still the top priorities. Therefore, planting tall trees is way more important than growing inaccessible lawns or shrubs. In light of this issue, the Guideline put forward to replace the ratio of green with the ratio of greening coverage (see Figure 3) to encourage growing tall trees to replace lawns and shrubs.



a Install chairs around greenery in setbacks less than 10 m wide



b Arrange commercial stalls outside the store in setbacks less than 10 m wide



c Place for artistic and cultural activities in setbacks more than 10 m wide



d Sports ground in setbacks more than 10 m wide

**Figure 2** Vitalizing urban functions within the setback space



a Street with a high ratio of greening coverage



b Street with a high ratio of green

**Figure 3** Ratio of greening coverage vs. ratio of green

### 2.1.6 Subtropical climate featuring distinct rainy season and dry season

Located in the Type II climate zone in China, Kunming has high annual rainfall and is largely subject to the negative impact of built-up environment on underground water and surroundings. Presently, roads cover 10.45% of Kunming's main urban area and the number is still increasing. The Guideline proposed to build a greening system that is oriented to streets to effectively control, filter rainfall runoff and shave the peak through multiple technical means, thus significantly expanding the city's capacity of flood and disaster relief as well as increasing groundwater replenishment.

## 2.2 Provide solutions to address challenges in the practice

The development of the Guideline should pay attention not only to the characteristics of the city's resources but also to the most outstanding challenges in the current phase of urban street use and the actual obstacles in the process of urban construction. Therefore, the guideline team analyzed and summarized the main urban street issues through field exploration, travel behavior surveys of pedestrians and bicycles, questionnaires and departmental discussions.

### 2.2.1 Limited street space resources

Similar to the built-up areas of many China's cities, Kunming's streets have taken a gradual course of formation over time, instead of being planned in a master plan. Over the past two decades, Kunming has witnessed a sharp increase in population and an explosive growth in the participation of motor vehicles and electric bicycles, and the growth of road space resources has obviously lagged behind. However, this does not mean that the expansion of urban roads needs to be accelerated since countless worldwide cases have proven that addressing traffic congestion via road expansion is much the same as drinking poison to quench thirst. The core issue of road resources lies in the allocation of road space and the protection of right-of-way, which basically depends on a broad consensus on the priorities of traffic participants.

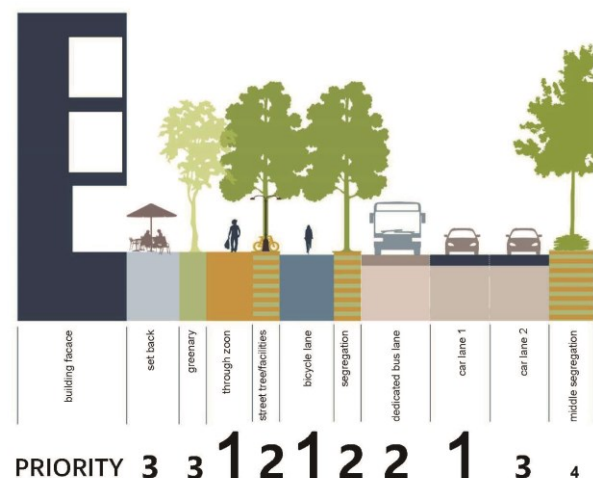
After multilateral discussions and arguments, the guideline eventually put forward high standards in the protection of

right-of-way. For example, all urban roads shall provide continuous sidewalks and non-motorized vehicle lanes; the primary and secondary arterial roads shall establish physical separation between motor vehicles and non-motorized vehicles; the minimum width for a single motor vehicle lane is decreased from 3.5 m/3.25 m (road dedicated for passenger cars) to 3.25 m; and the minimum turning radius is reduced to 10 m.

In addition, the Guideline clarified the priority order for road reconstruction and expansion in the case of insufficient space. When the cross-section is unable to satisfy the section requirements due to limited space in a road reconstruction, priorities shall be given to the arrangements in the following order: (1) bus lane, bicycle lane, pedestrian space, and one motor vehicle lane, (2) separation strip between motor vehicle lanes and non-motorized vehicle lanes, roadside trees/facility strip, (3) other motor vehicle lanes, (4) landscape strip and median strip (see Figure 4).

### 2.2.2 Impact of new transportation modes on the traditional street order

Kunming, with moderate urban scale and mild climate, has seen an upsurge in electric bicycles in recent years. Their number stood at 1.11 million in 2015, increasing by 4.1 times



**Figure 4** Priority level of street space



compared with a decade ago <sup>[12]</sup>. The emergence of electric bicycles shattered the original order of the street and caused many conflicts. Their right-of-way shall be paid attention to at the street space level or the planning design level, mainly including parking, passing and waiting at intersections. Hence, the Guideline expanded the width of a single bicycle parking space from 0.4 m to 0.6 m in accordance with the size of electric bicycles and laid out principles for the arrangement of scattered parking along the street and concentrated parking at special locations such as metro stations and business centers. Through designation of the front waiting zone and the left turn waiting zone for electric bicycles at intersections, it aimed to clarify the right-of-way of electric bicycles to the maximum extent (see Figure 5).

2.2.3 Poor street quality in key districts

Kunming shows uneven urban construction levels, with mixed quality of street network in the urban center area and at tourist hotspots. It is often for a pedestrian to make a turn at a corner and find himself/herself suddenly step from a clean and pleasant street environment into a chaotic alleyway. Therefore, the Guideline highlighted that efforts shall be made to improve the accessibility of the street network in key districts with unified construction standards in each district, such as adopting a unified style of pavement and public service facilities.

2.2.4 Disordered street service facilities

After conducting a comprehensive field exploration of the roads within the Second Ring of Kunming, the guideline

team found that there were few seats and bicycle parking spaces on the streets. Therefore, it could be seen everywhere in the street that people sit on whatever they could find or on seats they bring with them. On the other hand, various municipal facilities were so ubiquitous that they even interrupt tactile paving or occupy the passage space of sidewalks on some occasions. Given this situation, the Guideline underlined the intensive setting of municipal facilities, specified the areas where municipal facilities shall not be installed in the form of a negative list, and advised that related authorities should remove the existing municipal facilities that do not meet the placement requirements as soon as possible after inventory and verification. Meanwhile, the Guideline proposed that government should accelerate the advances of complex municipal projects such as converting overhead wires and cables to underground, consolidating poles, and laying comprehensive pipes.

2.3 Put forward the “Guideline + Self-evaluation Sheet + Department Edition” application mode to facilitate department management

There are many elements in a street. Apart from differences in the ownership within and outside of the red line, the construction and maintenance of various facility elements within the street are managed by different departments (see Table 2). In practice, related administrative departments have their own work manuals, but there is often a lack of unification and coordination between them. Even the standards and regulations that need to be referenced in the daily work in the same department are not unified.



a Before renovation, e-bikes waiting at intersections in chaos



b After renovation, e-bikes waiting orderly in the left turn waiting zone

Figure 5 E-bike waiting zone at the crossing

Table 2 Administrative offices’ responsibility for various street facilities (incomplete)

Facility element	Authority in charge	Facility element	Authority in charge
Barrier-free facilities	Housing and Construction Bureau	Street furniture	Municipal management + Landscaping and Greenery Bureau
Public art	Planning Bureau (Office of Construction and Administration of City Sculptures)	Traffic police box	Traffic police
Greening vegetation	Landscaping and Greenery Bureau	Security monitoring	Police
Municipal facilities	Authorities in corresponding industries	Shared bikes	Municipal management
Lighting	Housing and Construction Bureau + Landscaping and Greenery Bureau	Pavement, sidewalk	Housing and Construction Bureau
Bicycle parking	Traffic police	Trash cans	Sanitation Bureau
Road traffic	Transport Bureau	Bus stations	Bus Company
Signage system	Police + Transport Bureau	Fire hydrants	Fire Department
Billboards and signs	Shop owners		

In addition, since departments like landscaping and greenery bureau or municipal management focus on the management of specific elements or scope of the street, much of the content of the Guideline is not relevant to their functions. In order to make the Guideline easy to use, the guideline team provided department editions for six departments including housing and construction, transportation, traffic police, municipal management, and landscaping and greenery, which only include regulations related to their management rights and responsibilities. The guideline team also checked the standards and regulations commonly used in the daily work of these departments and clarified any ambiguities or contradictions in the department editions. Therefore, the department editions of the Guideline are more concise and efficient and are easier to refer in the daily work.

In addition to the text, the Guideline also designed the “Street Design Self-evaluation Sheet” (see Table 3) which extracts the most important indicators and requirements from the Guideline and categorizes them by elements. On the one hand, this sheet helps competent authorities incorporate key contents of the Guideline into their respective work management manuals. On the other hand, it is encouraged that design agencies self-evaluate road schemes based on this sheet and submit it along with the selected road scheme for approval. It is also proposed to incorporate this sheet in the

approval procedure of urban road construction to promote the implementability of the Guideline.

### 3 Conclusion

The guideline team has learned from successful cases and advanced experiences of cities in the world, including New York, London, Copenhagen, Beijing, Shanghai and Shenzhen, connected with the “city betterment and ecological restoration” program. They considered Kunming’s local characteristics and practical problems and established full partnership with all related functional departments to make the Guideline practical and easy to use. Compared with first-tier cities such as Beijing, Shanghai and Shenzhen, Kunming is still lagging in urban development stage, city management efficiency and citizen awareness. Therefore, the Guideline aims at adapting to the actual situation in Kunming through various efforts, such as deciding to organize the Guideline by targets at the initial stage of the development effort, emphasizing quantitative instead of qualitative requirements while developing the Guideline (even at a cost of losing the design flexibility to some extent), and developing various tools such as the self-evaluation sheet and department editions after the Guideline is completed.

**Table 3** Street design self-evaluation sheet (partial)

Category	Element	Requirements	Evaluation (Whether the requirements are met or not)		
			Yes (√)	No (×)	Reasons
Traffic space	Sidewalk	1. The sidewalk is continuous, and the pavement elevations at the entrance and exit of the street block remain unchanged 2. The width of the sidewalk meets the minimum width requirements of the corresponding road level and region 3. Make an overall planning of the sidewalk within and outside of the red line with uniform elevation and pavement 4. Barrier-free design is incorporated at intersections and at the entrance and exit of street segments			
	Non-motorized vehicle lane	1. Non-motorized vehicle lanes are continuous 2. The width of non-motorized vehicle lanes meets the minimum width requirements of the corresponding road level and region			
Street crossing facilities	Pedestrian crossings	1. The distance between pedestrian crossing facilities meets the requirements for roads of all levels 2. Provide overhead crossing facilities only when necessary 3. Provide refuge islands at intersections with crossing length more than 16 m 4. The distance between the motor vehicle stop line and the pedestrian crossing line is not less than 4 m 5. Provide “yield to pedestrians” signs at crossings with heavy pedestrian crossing traffic			
	Non-motorized vehicle crossings	1. Provide pavement markings to guide non-motorized vehicle crossings 2. Provide the left turn waiting zone for non-motorized vehicles			
	Traffic signals	1. Provide dedicated traffic signal phases for pedestrians and non-motorized vehicles 2. The pedestrian crossing waiting time is not more than 60 s			
	Street corners	1. The turning radius at intersections should not be too big (for specific values, refer to related requirements of the Guideline) 2. The street corner space is not occupied by facilities or greenery			
	Pavement	1. Provide anti-slip pavement in pedestrian zones and non-motorized vehicle lanes			
Safety facilities	Barrier-free facilities	1. Avoid unnecessary elevation differences in pedestrian zones; if the elevation differences do exist, barrier-free facilities such as curb ramps should be provided 2. Use the elevation of the sidewalk to ensure continuous pavement when providing ramps for motor vehicles at the entrance and exit 3. Tactile paving should be continuous and smooth, avoiding partial absence, interruption or unnecessary turns			
	Traffic calming facilities	1. Provide traffic calming facilities on urban local roads, road segments near residential areas and school gates, and roads inside residential areas			
	Separation facilities	1. Provide physical separation facilities for non-motorized vehicle lanes on the primary and secondary arterial roads			
Environmental facilities	Street greening	1. Plant roadside trees along the street with an interval of not more than 8m 2. Tree beds should be even with the pavement (do not use raised tree beds) 3. Roadside trees should be planted continuously to the tangent line of the road corner without blocking the road signs and drivers’ sights			
	Lighting	1. Provide dedicated lighting for the sidewalk wider than 8 m, which can provide lighting for non-motorized vehicles as well 2. Provide adequate lighting in places with prominent security problems such as back streets and underground passages			
	Signage	1. Street light poles, road name signs and traffic sign posts should be designed in an integral manner			
	Service facilities	1. Street facilities should not occupy the sidewalk and the street crossing waiting zone			



However, the pace of urban development has never stopped and Kunming is undergoing continuous changes to its spatial appearance. For instance, at the beginning of the development of the Guideline, Kunming was trapped in a dilemma of lack of parking spaces for bicycles. However, as shared bicycles mushroomed citywide, the municipal government started to add a lot of bicycle parking spaces in streets, which basically addressed the bicycle parking issues faced by citizens. Therefore, the Guideline will certainly advance with the times and move forward with creative efforts. On the other hand, the implementation of good original intentions and philosophies of the Guideline also calls for the cooperation of municipal administrators, builders, planners, designers and the general public. The Guideline can neither be achieved overnight, nor can it iron out all problems. Urban construction will surely experience a relatively long process. Instead of being a phased battle, street design requires daily and continuous efforts to stay true to the original mission.

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