

Nighttime Construction Noise Disturbance Compensation in Beijing: Taking the Tongzhou New Campus Project of Renmin University of China as an Example

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Abstract: By examining a specific case of compensating for nighttime construction noise in Beijing's construction projects, we explored how the costs of mitigating construction noise disturbance could be fairly distributed among multiple construction projects near residential areas. In this process, the local government played a crucial coordinating role. According to regulations, construction units must include the costs of preventing and controlling construction noise pollution in the project cost. The construction contract should clearly specify the construction unit's responsibility for noise pollution prevention and control. After signing the contract, the construction unit should promptly undertake relevant measures to minimize disturbances caused by nighttime construction, aiming to reduce the adverse impacts on the community and ensure the smooth progress of the construction project.

Keywords: Construction noise disturbance compensation; Construction management; Noise; Civil disturbances

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1. Introduction

The Tongzhou New Campus of Renmin University of China is a major project for the coordinated development of Beijing, Tianjin, and Hebei. The project was approved by the National Development and Reform Commission and the State Council. It is located in the 0902 Block of Beijing Sub-Center, with a land area of 110 hectares (approximately 1,652 acres) and a construction scale of 1.05 million square meters. Its boundaries extend from Chunming West Road to the east, Yunhe East Street to the south, Qianbeiyong Road to the west, and Zhaoshan Street to the north. The northern boundary of the Tongzhou New Campus land is adjacent to the Houbeyong Homestead, accommodating 5,813 households. On the east side, it is adjacent to the Qingyun Beili Residential Area, which includes 809 households (actually more than 2,000 households). Residents of the community complained through the 12345-citizen service hotline that the construction process had disturbed residents, and they blocked the construction site and office area many times. To overcome this issue, Renmin University of China fully considered factors such

as the investment scale, the scale of construction, the construction period, the distance from the residential area, etc. In collaboration with the Lucheng Town Government and following legal procedures, the planning unit coordinated with nearly 20 construction projects in Tongzhou New Campus and adjacent plots. The initiative aimed to provide construction noise nuisance fees to residents to ensure the smooth progress of the construction.

2. Basis for nighttime construction noise compensation to residents

According to the “Notice of the Beijing Municipal Housing and Urban-Rural Development Commission and the Beijing Municipal Ecological Environment Bureau on Strengthening the Prevention and Control of Noise Pollution during the Construction of Housing and Municipal Infrastructure Projects” (Beijing Construction Law [2021] No. 5), the construction unit is required to allocate a sufficient amount in the project cost for construction noise pollution prevention and control measures. The calculation of this cost should be based on the total amount allocated to the construction unit as per relevant regulations, with supervision over its utilization. If the residents would be affected by nighttime construction noise, the construction unit must compensate the residents within the affected scope. This process involves signing a compensation agreement with the residents^[1].

According to Article 40 of the “Noise Pollution Prevention and Control Law of the People’s Republic of China,” which was implemented on June 5, 2022, the construction unit shall include noise pollution prevention and control costs in the project cost and the contract should include the noise pollution prevention and control measures taken^[2].

The construction contract signed by the Renmin University of China and relevant construction units stipulated the following: The contractor shall be responsible for handling construction disturbance issues. The contractor shall also take appropriate measures to appease residents and people around the construction site by minimizing construction noise, vibration, light, and other disturbances. The contract specifically emphasizes the residential buildings situated on the north, east side, and adjacent areas of the project. The contractor is required to thoroughly consider and implement measures to prevent disturbances to the residents. The quoted fee encompasses this aspect and will not be subject to adjustment during settlement. According to the contract, the construction unit was responsible for handling construction disturbances and nuisances and bearing corresponding expenses.

3. Compensation standards for nighttime construction noise nuisance to residents

As per the “Notice of the Beijing Municipal Housing and Urban-Rural Development Commission and the Beijing Municipal Ecological Environment Bureau on Strengthening the Prevention and Control of Noise Pollution from the Construction of Housing Construction and Municipal Infrastructure Projects” (Beijing Construction Law [2021] No. 5), construction units are required to adhere to the “Reference Standard for Compensation Fees for Noise Disturbance from Nighttime Construction Projects (Trial).” According to this standard, financial compensation, ranging from 70 yuan to 277 yuan per household per month, will be provided based on the noise level during nighttime construction. The compensation fee for nighttime construction noise nuisance will be calculated on a monthly basis, considering any part of the month as a full month for calculation purposes^[1]. After consultation and by the recommendations of the Lucheng Town Government of Tongzhou District, the residents within the adjacent plots of the Tongzhou New Campus area were compensated at the rate of 150 yuan/month for construction noise nuisance in the Yangtuo Village plot.

4. Compensation fee sharing plan for nighttime construction noise nuisance to residents

Taking into account the involvement of numerous units in the construction of Tongzhou New Campus and

adjacent land, variations in the distance from residential areas, and the differing impact of construction noise on residents, a comprehensive approach was employed. This included considering factors such as the scale coefficient of the construction project (contract amount), the distance coefficient of residential areas (**Figure 1**), the contract duration coefficient, and other relevant factors. The aim was to develop a compensation cost-sharing plan for construction noise nuisance that takes into consideration the specific circumstances of each year.



Figure 1. Schematic diagram of the distance coefficient range between the Tongzhou New Campus construction project area and residential areas

4.1. Nighttime construction disturbance compensation cost-sharing plan in 2021

There were four projects under construction in Tongzhou New Campus in 2021. Through friendly negotiation and coordinated efforts by the Lucheng Town Government, an agreement was reached among all parties, considering factors such as scale, distance from residential areas, construction period, and other relevant aspects. The construction unit agreed to share the compensation cost for nighttime construction noise nuisance, amounting to a total of 3 million yuan. Specific details of the allocation method can be found in **Table 1**.

4.2. Nighttime construction disturbance compensation cost-sharing plan (2022–2023)

The Renmin University of China collaborated with the Lucheng Town Government, combining the status of 19 projects initiated in Tongzhou New Campus and surrounding land from 2022 to 2023. Comprehensively considering factors such as the construction project scale coefficient (contract amount), distance coefficient to residential areas, contract duration coefficient, and other relevant aspects, a compensation plan for construction noise nuisance to residents in Tongzhou New Campus and surrounding plots was formulated for 2022–2023. The construction units of 11 projects under construction in Tongzhou New Campus bore a total compensation fee of 6.27 million yuan in 2022 and a total compensation fee of 7.55 million yuan in 2023. Specific details can be found in **Table 2**. Projects that are included in the apportionment of nuisance fees for 2022–2023 will be included in the apportionment for those years and will no longer be subject to apportionment for nuisance fees after 2024. Each village committee would be responsible for explaining and communicating effectively with the villagers.

Table 1. Details of compensation costs for nighttime construction noise nuisance in 2021 for Tongzhou New Campus land

| Project name | Construction area (m ²) | Investment/contract amount (yuan) | Coefficient 1 (project size) | Coefficient 2 (distance from the residential area) | Coefficient 3 (construction period) | Comprehensive consideration of project size, distance, and construction period | Comprehensive coefficient | Cost (10,000 yuan) | Actual fees paid (10,000 yuan) |
|---|-------------------------------------|-----------------------------------|------------------------------|--|-------------------------------------|--|---------------------------|--------------------|--------------------------------|
| North District Student Dormitory Phase I | 37495 | 209821806.87 | 0.1437 | 0.7500 | 1.0000 | 0.1078 | 0.1222 | 36.6581 | 37 |
| Faculty of Social Sciences and Demography Building | 31025 | 250312379.88 | 0.1189 | 0.7500 | 1.0000 | 0.0892 | 0.1011 | 30.3325 | 30 |
| West District Faculty Building Phase I | 54500 | 431874421.13 | 0.2089 | 0.7500 | 1.0000 | 0.1567 | 0.1776 | 53.2835 | 53 |
| North District Student Dormitory Phase II and Canteen | 137872 | 954633163.41 | 0.5285 | 1.0000 | 1.0000 | 0.5285 | 0.5991 | 179.7260 | 180 |
| Total | 260892 | | 1.0000 | | | 0.8821 | 1.0000 | 300.0000 | 300 |

Table 2. Details of compensation costs for nighttime construction noise nuisance in the Tongzhou New Campus land in 2022–2023

| Serial number | Project name | Architecture area (m ²) | Contract amount, Gn (10,000 yuan) | Distance coefficient, Rn from residents | Construction period (months) | Disturbance fees shared in 2022: $F22$ (10,000 yuan) | Disturbance fees shared in 2023: $F23$ (10,000 yuan) | Total disturbance fee apportionment, F (10,000 yuan) |
|---------------|--|-------------------------------------|-------------------------------------|---|------------------------------|--|--|--|
| | | | | | | | | $F = Rn/Total Rn \times Total disturbance fee$ |
| 1 | School of Social and Demographic Building | 31025 | 25031.24 | 0.5 | 22 | 22 | 0 | 22 |
| 2 | West District School Building Phase I | 54500 | 43187.44 | 0.75 | 32 | 66 | 25 | 91 |
| 3 | North District Student Dormitory Phase II and Canteen | 137872 | 95463.32 | 1 | 37.6 | 150 | 86 | 236 |
| 4 | West District School Building Phase II | 30540 | 25385.76 | 0.5 | 15.8 | 25 | 30 | 55 |
| 5 | North District School Building Phase I | 57644 | 46633.44 | 1 | 24 | 90 | 113 | 203 |
| 6 | Student Affairs Center and Public Teaching Building Phase II | 76332 | 64615.11 | 0.75 | 18 | 90 | 121 | 211 |
| 7 | Southern District School Building, Phase I of the Public Teaching Building, and the West District Canteen | 92030 | 70513.87 | 0.75 | 20.7 | 100 | 131 | 231 |
| 8 | Central Canteen | 23475 | 19130.84 | 0.75 | 15.8 | 20 | 43 | 63 |
| 9 | Campus Operation Center, Campus Hospital | 33456 | 28532.41 | 1 | 16.9 | 34 | 90 | 124 |
| 10 | Campus Ring Road | 5345 | 14700.00 | 0.75 | 12 | 10 | 38 | 48 |
| 11 | Administrative Service Center Building Group (including Administrative Service Center, Concert Hall, and Academic Report Center) | 47730 | 44460.35 | 0.5 | 17.3 | 20 | 77 | 97 |
| 12 | Total projects under construction at Renmin University of China | | 477653.78 | 8.25 | 627 | 755 | | 1381 |

4.3. Cost-sharing plan for disturbance caused by nighttime construction in 2024 and beyond

The Renmin University of China will cooperate with the Lucheng Town Government to supervise the construction units of new projects after 2024. The compensation fees for construction noise nuisance will be fixed according to the requirements for the construction projects started in **Table 2**. The calculation principle for determining the corresponding compensation fee is based on the construction noise nuisance compensation fee of the construction project closest to the newly started construction project within the same distance coefficient value range. Additionally, the construction project that commenced in 2023 contributes to the apportionment based on the construction contract amount of the project closest to its location. The apportionment amount is calculated proportionally using the following formula:

Compensation fee for construction noise nuisance of newly started construction projects

$$= \frac{\text{Compensation fee for construction disturbance that is closest to the project within the same distance coefficient value range}}{\text{Contract amount of the construction that is closest to the project within the same distance coefficient value range}}$$

\times *Contract amount of newly started construction projects*

The construction noise nuisance compensation fee calculated based on the above formula is a fixed lump sum fee, which will not be adjusted during the subsequent implementation. The construction unit will no longer bear any related compensation fees after paying the fee in full. For newly started projects, the construction disturbance compensation fee is calculated according to the above formula, and the total amount is fixed and paid once.

5. Transferring and distribution of nighttime construction compensation fees

According to the “Notice of the Beijing Municipal Housing and Urban-Rural Development Commission and the Beijing Municipal Ecological Environment Bureau on Strengthening the Prevention and Control of Noise Pollution from the Construction of House Construction and Municipal Infrastructure Projects” (Beijing Law [2021] No. 5), the construction unit is required to communicate with the residents receiving compensation, sign a compensation agreement, and the compensation fee will be distributed by the sub-district office (township government) where the project is located. Considering that the Tongzhou New Campus plot involved many construction units and compensated residents, Beijing Luyang Yuantong Operation Management Co., Ltd. was entrusted through negotiation by all parties to collect and distribute the disturbance compensation fees. The company signed a compensation agreement with each construction unit and charged a 3% service fee, which was included in the construction disturbance compensation fee. Each construction unit uniformly paid the compensation fee to the bank account provided by the company and then transferred it to Beijing Luyang Yuantong. The Operation Management Co., Ltd. was responsible for uniformly distributing compensation fees to residents for construction noise disturbance. This method of entrusting the agency to send and receive construction noise nuisance compensation fees greatly reduced the time cost of participating units.

6. Case analysis

The compensation agreement with residents affected by night construction noise is a prerequisite for obtaining the night construction certificate for the construction project. Both the construction unit and the construction unit must make ample preparations regarding time, funds, and procedures. It is crucial to collaborate with the local government to effectively communicate with residents, preventing disruptions to project construction progress and minimizing public disturbance. Additionally, the construction unit should incorporate construction

noise reduction measures in the bidding documents and include the cost of noise pollution prevention and compensation for construction noise nuisance to residents in the overall construction cost^[3]. Taking the Tongzhou New Campus project as an example, numerous individual buildings and construction units were involved, leading to a broad scope of noise pollution and the involvement of many residents. The process of initiating compensation for noise disturbance caused by night construction, reaching a consensus, and finalizing the compensation agreement involved various stages, spanning at least half a year. Therefore, the construction unit should promptly compensate for the noise disturbance caused by nighttime construction after the construction unit has signed the contract. The responsibilities in the prevention and control of construction noise pollution should be clearly stated in the bidding documents and contracts of construction and supervision units, and the costs related to construction noise nuisance to residents should be fully considered by the construction unit and included in the quotation. It is challenging to implement nighttime construction disturbance compensation just based on the impact scope and noise level measured by inspection and testing agencies. For example, the construction unit of Tongzhou New Campus, which is adjacent to Houbeiying Homestead, commissioned an inspection and testing agency to conduct inspections at different points in the residential area. The measured impact range of nighttime construction noise was limited to the first row of buildings adjacent to the campus. Besides, the noise level measured was much lower than the level required for a compensation of 150 yuan/household per month. However, residents did not recognize or accept these measured data. They continued to express their demands through the 12345-citizen service hotline and by blocking the gates of construction sites and office areas. Consequently, the local government referred to the compensation standard of 150 yuan/household per month for other construction projects in the jurisdiction to distribute the fees to the entire community.

Compensation fees for nighttime construction noise only serve as a psychological placebo. Construction noise has to be analyzed from the root cause, and targeted prevention and control measures should be taken. The Tongzhou New Campus was a major project, it had a long construction period and was close to residential areas. The construction noise disturbance was mainly manifested in the following aspects: Firstly, the foundation of large-volume concrete required continuous pouring operations, which resulted in long-lasting noise. Secondly, the loading, unloading, and installing of prefabricated structural components also generated a huge amount of noise. Third, due to local regulations, large construction vehicles were prohibited from traveling on the road during the day, so the construction operations were mostly performed at night. The noise generated affected the surrounding residents.

In response to the challenges posed by noise disturbances around the Tongzhou New Campus area, we propose a comprehensive strategy combining “source control + compensation” to effectively mitigate noise-related issues. This multifaceted approach involves the establishment of a specialized call reception team and a dedicated station for handling resident communications within the construction unit. To actively address noise concerns, we suggest measures such as using silent or low-pitched construction machinery to minimize noise generation. Collaboration with the local government to expedite permits for transport trucks, along with avoiding nighttime and peak-hour construction, further contributes to noise reduction. Additionally, strict controls on the use of certain materials and strengthened measures at the construction site aim to prevent disturbances and improve the overall living conditions for affected residents.

Disclosure statement

The author declares no conflict of interest.

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