

## Design of Trench Construction Project

Xubo Sun

<sup>1</sup>Shaanxi Provincial Land Engineering Construction Group Co., Ltd.

<sup>2</sup>Institute of Land Engineering and Technology, Shaanxi Provincial Land Engineering Construction Group Co., Ltd.

<sup>3</sup>Key Laboratory of Degraded and Unused Land Consolidation Engineering, the Ministry of Natural Resources

<sup>4</sup>Shaanxi Provincial Land Consolidation Engineering Technology Research Center

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*Abstract: Land remediation comprehensively controls the fields, water, roads and forests, comprehensively improved the agricultural production conditions and ecological environment, increased the effective arable land area and farmland infrastructure; basically controlled the soil erosion, and achieved water retention, soil conservation and fertilizer conservation. "Sanbaotian" has great. improved the quality of cultivated land, comprehensively improved the production capacity of basic farmland, and achieved the overall goal of coordinated development of quantity, quality and ecology of cultivated land.*

*Keywords: Aable land; alance; and engineering; overning the land.*

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### 1. INTRODUCTION

In line with the principle of achieving the balance of total cultivated land and maintaining the balance of land resources, we will fully implement the basic national policy of "cherishing and rationally utilizing land and effectively protecting cultivated land". Focusing on Fangtian Construction, comprehensive management of fields, water, roads and forests during the process of consolidation, basic control of soil erosion, comprehensive improvement of agricultural production conditions and ecological environment, and achievement of dry energy irrigation, Tian Chengfang, Lu Nengtong Lin Chengwang, the low-yield field is a high-yield field, which greatly improves the quality of cultivated land and achieves the overall goal of coordinated development of quantity, quality and ecology of cultivated land.

### **1.1 Project construction scale**

The total area of the project area is 253.44 hm<sup>2</sup>, of which the total scale is 230.84hm<sup>2</sup>, the cultivated land is 218.99hm<sup>2</sup>, the roads and ditches occupy 12.32hm<sup>2</sup>, and the unground areas such as garden land, forest land, villages and special land are 22.14hm<sup>2</sup>.

The project is a key project for land development and consolidation.

### **1.2 Landform type of project area**

It is divided into three geomorphic units, with the hills and valleys in the north, the hills and valleys in the south, and the loess ruins in the south. The terrain is undulating, the channel is deep, the branch is developed, and the ditch is ditch. Slope hydraulic and gravity erosion development, gully slope and bilge gully, soil erosion, landslide, collapse phenomenon. The detailed investigation and confirmation of land in the project area has been completed, involving villagers' land in Nanniwan Town, Panlong Village, Fanzhuang Village, Gaofang Village, Taobaoyu and Hongtuo Kiln in Baota District, Yan'an City. The land boundary is clear and the boundaries are clear. No rights to disputes.

### **1.3 Project construction content and investment**

There are more arable land in the project area, and the area is large. The current field roads are washed away by rain, and some areas are seriously damaged, which seriously affects the agricultural production activities in the project area. According to field investigations, the paddy fields in the project area have been abandoned due to serious salinization, and there is an urgent need for remediation. The specific construction contents are as follows:

(1) The project mainly focuses on the consolidation of basic farmland and supporting water conservancy facilities, and at the same time constructing field roads, constructing farmland shelterbelts, and discharging flood channels. The designed elevation of the flood drainage channel is lower than the field design standard of 1.5 m.

(2) The total planned land area of the project area is 253.44hm<sup>2</sup>, of which the cultivated land area is 230.84hm<sup>2</sup>, accounting for 91.08% of the total planned land area of the project area.

(3) 1.11km of field roads are constructed in the project area, 4.49 km of production roads; 12 bridges and culverts, 4 culverts, 2 banziku; 0.51km of irrigation and drainage channels, 0.21km of diversion channel, 4 inverted siphons; 14.71km, intercepting ditch 1.55km.

(4) One reservoir.

(5) After the implementation of the project, the project area will all realize Fangtianhua, comprehensively improve the basic farmland production capacity, promote the coordination of the quantity, quality and ecology of the supplementary cultivated land, and organize it into "Sanbaotian" for water conservation, soil conservation and fertilizer conservation.

(6) Strengthen the construction of farmland protection and protect the quality of the ecological environment. Construction of gully slope shelterbelts, riverbank shelterbelts and farmland shelterbelts, planting 10,981 seedlings.

The estimated total investment of the project is 2,652.28 million yuan, with an investment of 7760 yuan/mu per unit area. Among them, the construction cost is 22,818,500 yuan, accounting for 86.03% of the total investment; the other expenses are 2,931,900 yuan, accounting for 11.05% of the total investment; the unforeseen expenses are 772,500 yuan, accounting for 2.91% of the total investment.

## **2. ENGINEERING DESIGN**

### **2.1 Land leveling project**

The task of the land leveling project is: through land leveling, it is more conducive to increasing cultivated land, agricultural planting, field farming, road drainage and so on. When designing the land leveling project, the earthwork should be properly allocated, and the balance of the excavation and filling in the leveling unit should be kept as much as possible to reduce the amount of earth moving work. The project area belongs to the gully area, and the terrain is undulating. The methods for dividing the fields by different topography and geomorphology are different. It is necessary to adjust the field range scientifically and reasonably according to local conditions, so as to achieve the maximum uniformity of net increase of cultivated land and minimum investment.

#### **2.1.1 Field design**

1) Daping and the whole plan. The irrigation area is controlled by the canal as the land leveling unit. The advantage of this kind of scheme is that the field area is large, the field is small, and the increase rate of cultivated land is relatively high, which is conducive to the cultivation of large-scale agricultural machinery, but the amount of mobile earthwork is large and the investment is large.

2) Local leveling scheme. That is, the production side is the land leveling unit. The advantage of this kind of scheme is that the amount of moving earthwork is small, the investment is saved, and the construction is convenient. The disadvantage is that the field area is small and the field ridge is relatively increased, which is not conducive to increasing the land.

According to the characteristics of the project area “Daping Xiaoping” and the thickness of the soil layer, after the analysis and comparison, the local land leveling plan is selected.

3) For the unconformity, the small area, the narrow field, the field is too low and the layout is messy, the flats are merged and leveled. According to the height difference of the terrain, the nearest merger method can be adopted. The earthwork volume adopts the southern CASS7.0. The DTM method in the software performs calculations.

#### **2.1.2 Earthwork calculation**

Therefore, the land leveling is mainly a small block and a large block, and the local area is leveled in the field, and finally the balance of excavation and filling inside the field is realized. Reduce the amount of land leveling, and the field will be flat along a slope.

The design elevation of the land leveling of the plot is calculated by the grid method to calculate the design elevation and the amount of earthwork to be excavated. On the 1:2000 measured topographic map, a 20m×20m square grid (the size of the grid) is arranged, and the ground elevation represented by the four corners of the square is determined by interpolation, and the design elevation of the square corners is calculated according to the designed slope of the field. Calculate the depth of the excavation and fill of the grid points and the amount of excavation and fill in the squares. Finally, the amount of excavation and fill of each field is summarized.

### **2.2 Irrigation and Drainage Engineering**

#### **2.2.1 Water source engineering**

There are 2 water source projects in the project area.

(1) Water storage in the floodgate

Since the construction of the dam in the existing arable land does not conform to the local situation and is not conducive to the effective use of the land, combined with the relevant terrain and field investigation data of the project area, considering the village group agreement, the location of the flood ditches in the project area is larger. When the canal is combined, and the irrigation demand is large, the design of the sluice is arranged. When the land is irrigated during the water shortage period, the gate is filled with water, and the flood drainage ditch is used for irrigation and drainage. The irrigation land is nearby, the area occupied by the cultivated land is reduced, and the area is increased. Utilization of engineering facilities. During the flood period, keep the flood discharge communication smooth, keep the gate open, and prepare for flood control and flood control.

#### (1) Ecological fish pond

There is an abandoned reservoir in Hongtu Yao Village in the remediation area. There is a certain amount of water stored all year round. However, it is in disrepair and needs to be dredged, excavated and expanded to increase the water storage capacity. This water source can be used as irrigation water supply source for rice fields.

#### 2.2.2 Water Transfer Project

The water conveyance project in the project area uses open channels to deliver water.

##### (1) Channel arrangement

In order to meet the rice field water demand in the project area, through field investigation and visits, combined with the local water source situation, the water source and the rice fields in the project area are linked in the form of irrigation and drainage integrated channels to ensure the irrigation and drainage of crops.

##### (2) irrigation and drainage integrated channel arrangement

In order to meet the irrigation and drainage requirements of rice fields, the Nanniwan rice paddy landscape is created and the channel is saved. Combined with on-site measurement, planting experience and construction conditions in the project area, an integrated irrigation and drainage channel is arranged in the Nanniwan paddy field to meet irrigation and drainage.

### **3. FARMLAND PROTECTION AND ECOLOGICAL ENVIRONMENT MAINTENANCE PROJECT**

#### **3.1 Farmland Shelterbelt**

Because the project area is located in arid areas, winds and winds are mostly in the northwest. Therefore, it is particularly important to establish farmland ecological protection forest belts and improve the ecological environment. In order to make full use of the light and heat resources, there are no shelterbelts in the channels and production roads, and shelter forests are planted along the sides of the field roads. The road protection forest is set on both sides of the field road, planted on each side, and the plant spacing is 5.0m. The tree species are selected according to the principle of appropriate tree planting, and the Chinese pine and juniper are suitable for local planting and landscape.

#### **3.2 Riverside shelter forest**

The revetment forest is located on both sides of the river in the shallow water and slow river section. With reference to the flood peak flow standard of the river channel in 10 years and 20 years, the flood width of the river channel is set according to the specific conditions in the field. The river bank is planted on the side of the mountain, with a plant spacing of 3m. The tree species chooses willow trees.

After finishing, the farmland shelterbelt is higher than the pre-construction standard. The survival rate and preservation rate of the three-year planting are over 80%.

#### **4. ANALYSIS OF CULTIVATED LAND QUALITY**

The land remediation strictly follows the "High Standard Basic Farmland Design Code (Trial)", planning land remediation, and achieving the goal of effectively improving the ecological environment and agricultural production conditions of the project area through project construction in the project area. Through the implementation of the project, the land in the project area will be fully and reasonably effectively utilized, and will have significant social, economic and ecological benefits for Nanniwan Town. First, the implementation of the project will increase the effective cultivated land area in the project area, improve the quality of cultivated land, improve the agricultural production conditions in the project area, and contribute to the dynamic balance of the total cultivated land. Secondly, the improvement of agricultural production conditions and the adjustment of planting structure in the project area are conducive to the organization of large-scale and specialized production, and can lay a solid foundation for the sustainable development of the project area. Finally, through the comprehensive management of the channel of the project area, the forest coverage rate will be improved and the ecological environment of the project area will be improved.

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