

# ODTÜ KIBRIS'LA BİLİM EĞLENCELİDİR.

## Weir Design For Girne To Protect The City From Flooding Event

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### Introduction and Statement of the Problem

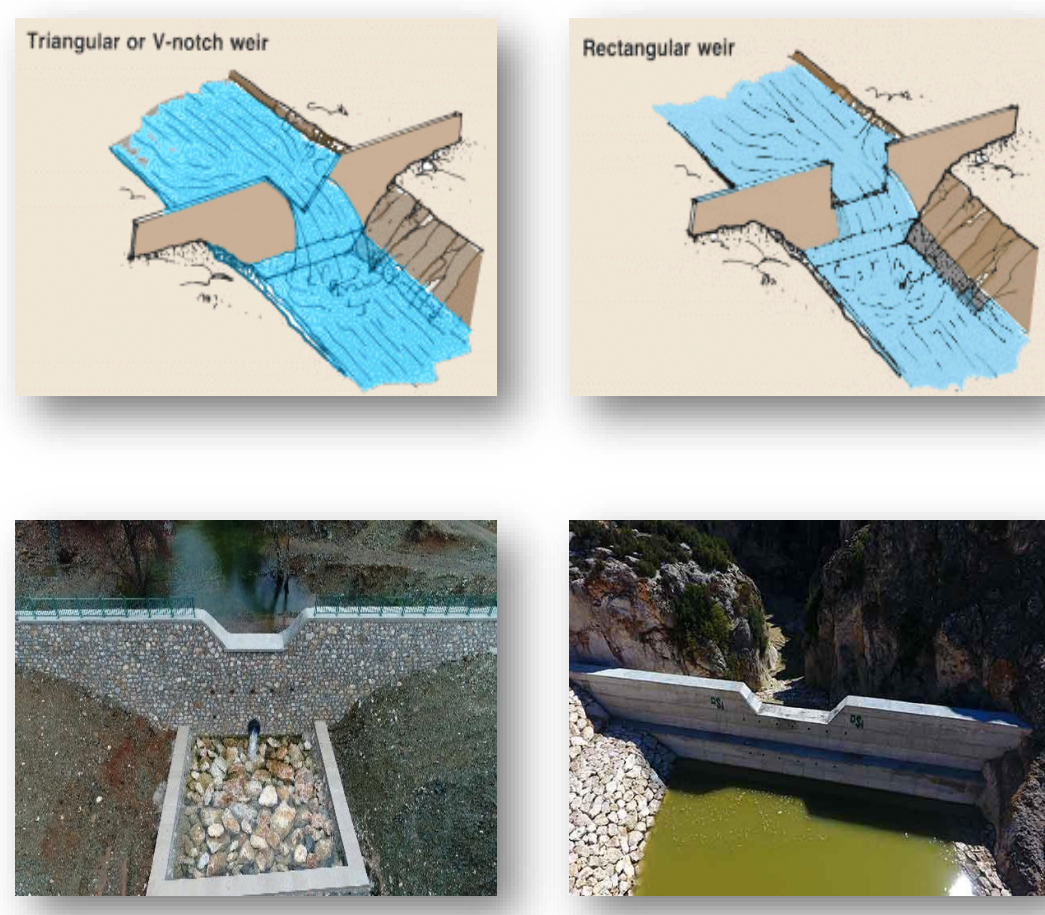
Flooding is one of the biggest natural disaster which causes several negative effects such as loss of lives, economic effects, etc. Girne has been suffering from flooding in recent years due to increasing rainfall events. Since controlling the water in the city center is hard and expensive by changing the existing pipeline system or adding some channels, to control the water coming to the city center has taken as a solution. According to observations, the natural stream beds in the Beşparmak Mountain are bringing plenty amount of water. Therefore, the Project aims to control and stop the water coming from Beşparmak Mountain. The solution is to construct weirs to the streams to keep and store some amount of water to protect the city.

### Effect of flood in Girne



### How does the weirs prevent flooding? What are the major parameters and important steps to design a weir?

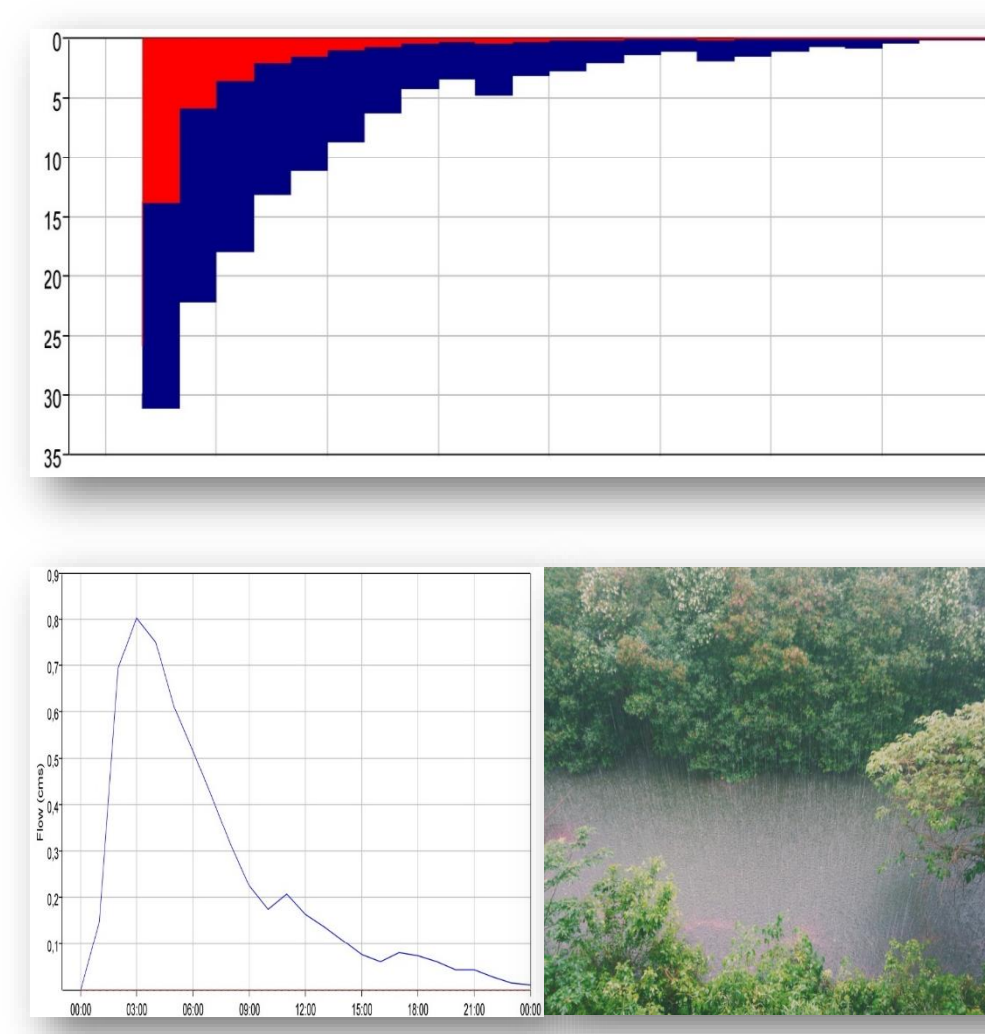
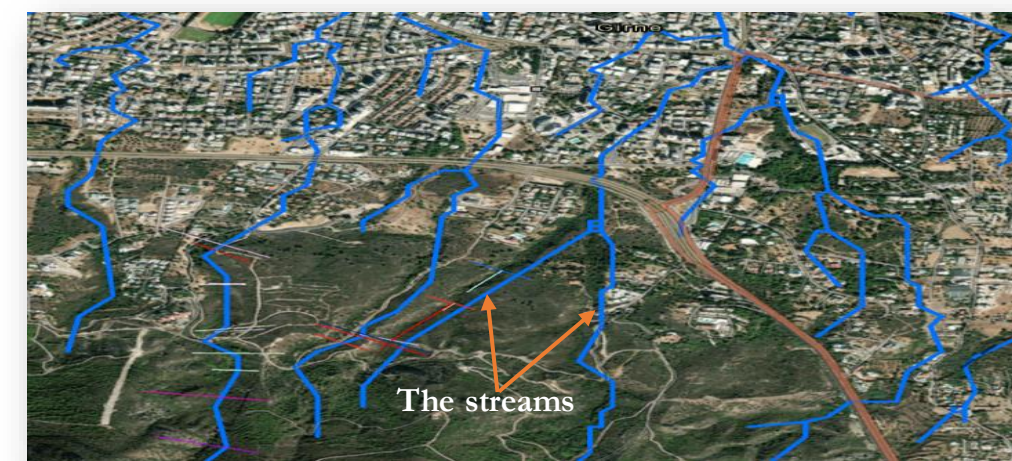
#### Working Mechanism of Weirs



Weirs are the structures that are designed perpendicular to the flow direction in the stream beds to decrease the velocity of water and to keep some amount of water behind them. This causes a decrease in the volume of flowing water and that is helpful in sudden flood events. They have generally an open part on the top which lets water to flow when it reaches a certain level. Permitting flow rate is defined by the dimensions and the shape of the opening. Typical types of openings are trapezoidal, rectangular, and triangular.

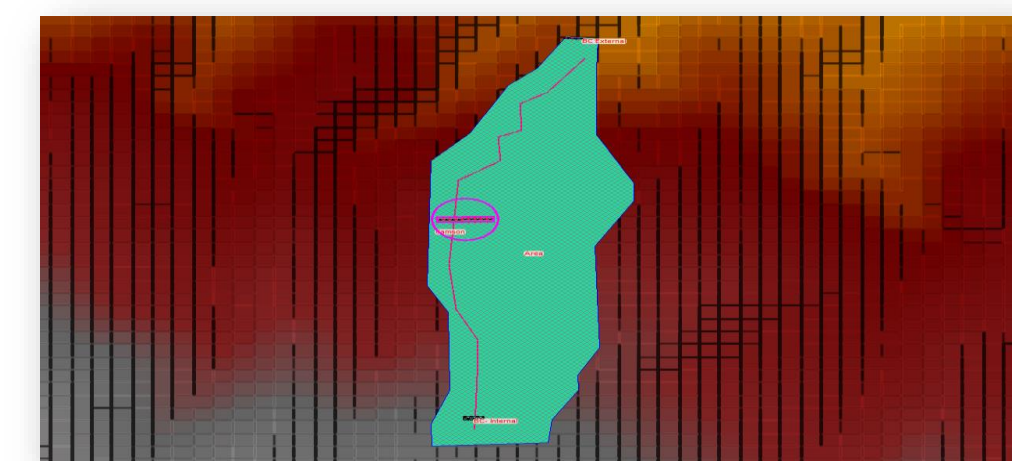
#### Steps of Designing a Weir :

- **Determining the streams which reach the area of interest:**  
The streams are important parameters that help to determine the location of the weir which will be designed.
- **Determining the basin and subbasin:**  
The basin and the subbasin of a stream help to understand the amount of water that will flow in that stream. Area, length, slope, soil characteristics should be obtained so that the flow can be estimated accordingly. Obtaining these parameters can be possible with some computer applications such as ArcGIS.

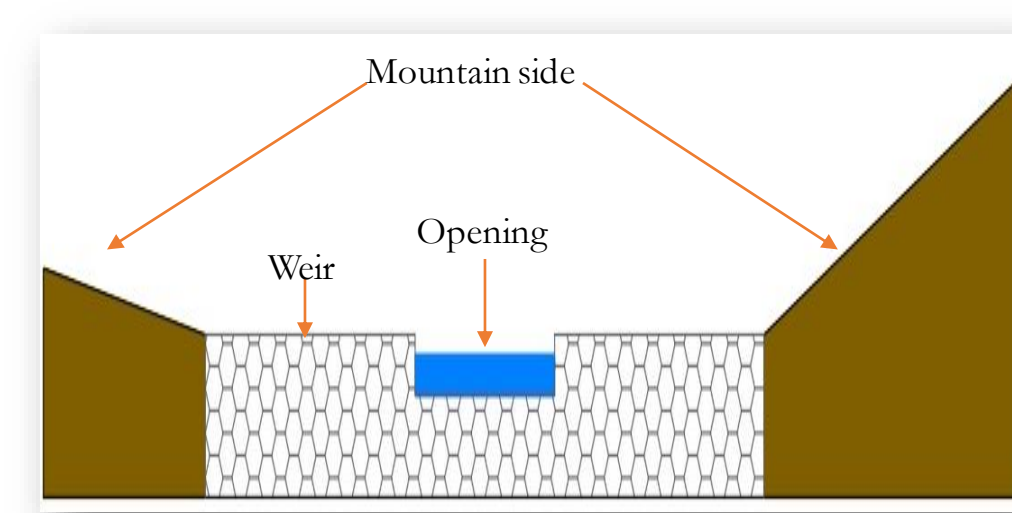


- **Obtaining the rainfall data of the most critical event in a decided return period:**  
Rainfall intensity is the determinant parameter of the flood events. The weir are designed according to the most critical rainfall event
- **Determining the peak discharge in the stream due to rainfall:**  
The important parameters to obtain the discharge in the stream are the rainfall intensity, basin characteristics such as infiltration capacity of the soil, surface cover of the basin, slope, and length of the basin. Some computer applications help to obtain the peak discharge due to rainfall such as HEC-HMS.

- **Finding the exact location of the weir**  
The location of the weir can be chosen according to the water amount that can accumulate behind it. HEC-RAS computer program can be used to determine the amount of water.



- **Obtaining the dimensions and deciding the type of the weir**  
The place where the weir is located in the stream bed determines the dimension of the weir. The type is chosen by the specific discharge demand.



To see the illustration of designing a weir which had been prepared by DSI Kastamonu 23. Bölge Müdürlüğü, please scan the following code or enter the following link → <https://bit.ly/3zTMJ2l>

