

(Session- 2018-19)

## Collection and Distribution of Waters

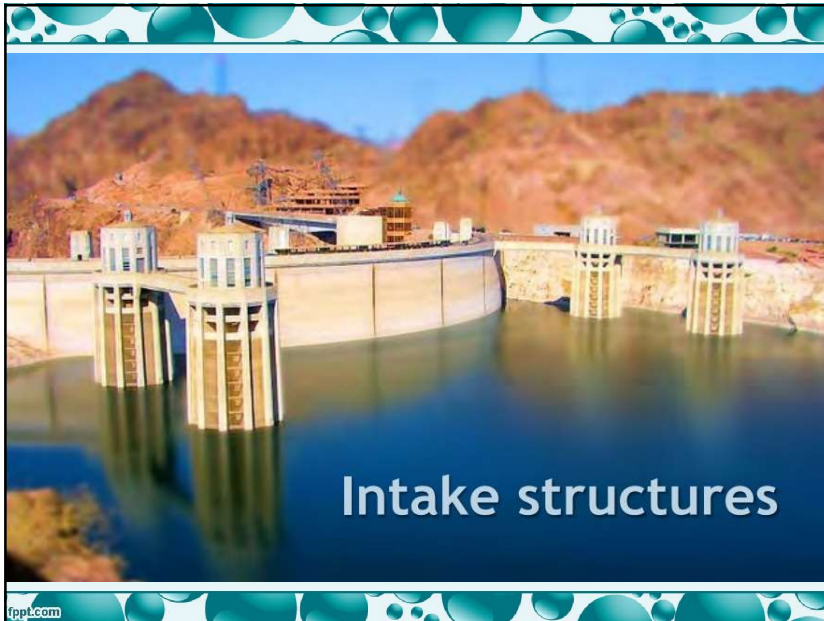
### Intakes



## Introduction

- In any water supply project the first step is to select the **source of water from which water is drawn**. The device installed for the purpose of drawing water from the source of water are called **Intakes**.

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## Intakes / Intake Structures

The basic function of intake structure is to help in safely withdrawing water from the source and then to discharge this water in to the withdrawal conduit, through which it reaches the water treatment plant.

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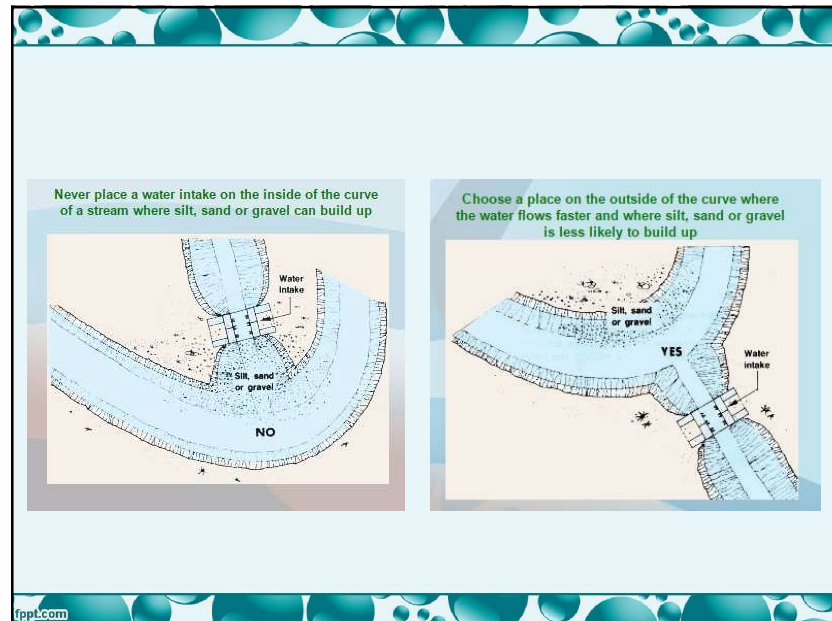
- It is **constructed at the entrance** of the withdrawal conduit and thereby protecting it from being **damaged/clogged by ice, debris**.
- Some times from **reservoirs where gravity flow is possible**, water is directly transmitted to the **treatment through intake structure**.
- If **gravity flow is not possible**, **water entering intake structure is lifted by pumps** and taken to the treatment plant.

## Selecting Location for Intake Structure

- Site **should be near the treatment plant to reduce conveyance cost**.
- **Intake must be located in the purer zone** of the source so that the best quality water is **withdrawn from source to reduce the load on the treatment plant**.
- Intake **must never be located near the vicinity of waste water disposal point**.
- Intake **must never be located near the navigation channels** so as to reduce chances of pollution due to waste discharge from ships.

## Selecting Location for Intake Structure

- Intake must be located at a place from **where it can draw water even during the driest period of the year.**
- **The intake site should remain easily accessible during floods and should not get flooded.**
- **In meandering rivers, the intakes should not be located on curves or at least on sharp curves.**



## Types of intakes

According to type of source

- River Intake
- Canal Intake
- Reservoir Intake
- Lake Intake

## Types of intakes

According to position of Intake

- Submerged Intake
- Exposed Intake

## Types of intakes

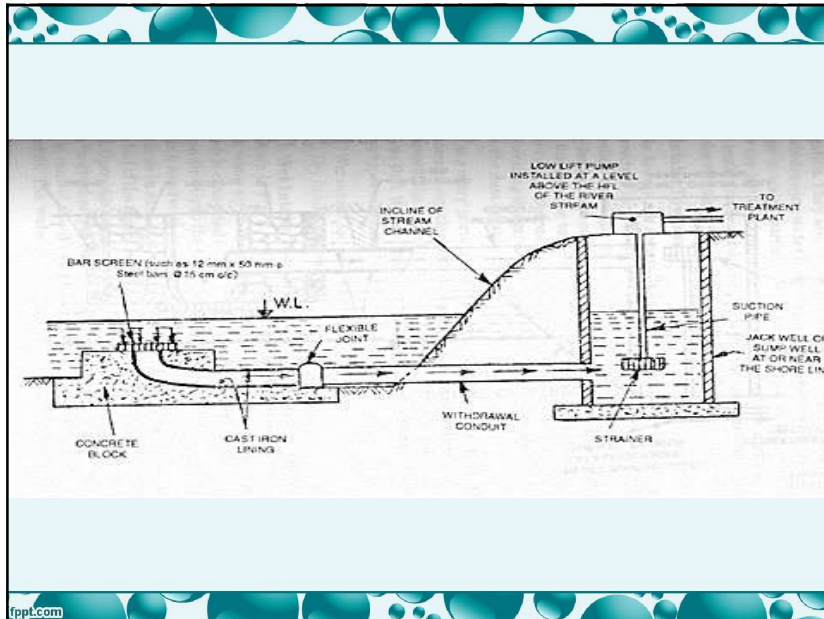
According to presence of water in the tower

- Wet Intake
- Dry Intake

## Types of intakes

**Submerged Intake**

- **The submerged Intake structures are those which are constructed entirely under water. They are less expensive to construct but are difficult to maintain. Such intakes are commonly used to obtain water from lakes**



## Types of intakes

### Exposed Intake

- The Exposed intakes is in the form of well or tower constructed near the bank of river or in some cases even away from the bank of river. They are more common due to ease in operation and maintenance



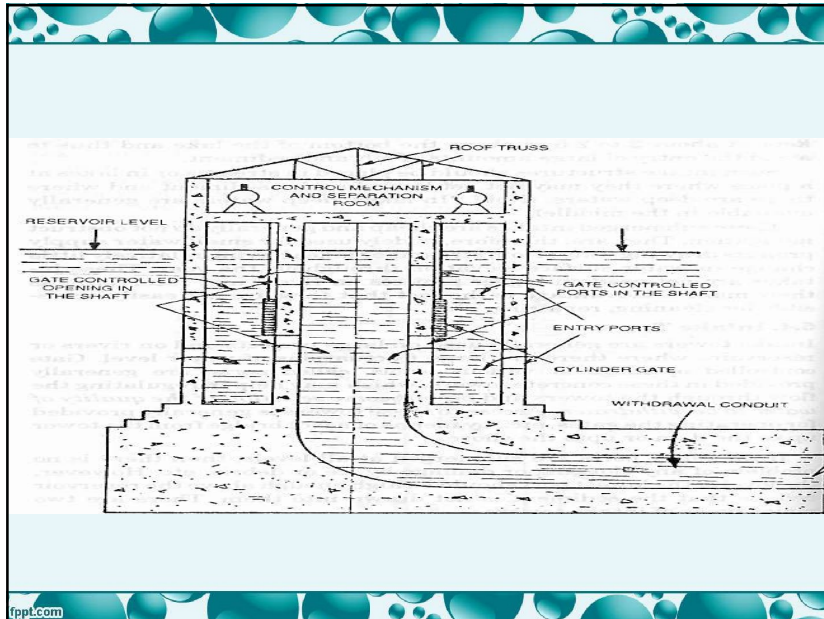


## Types of intakes

### Wet Intake Towers

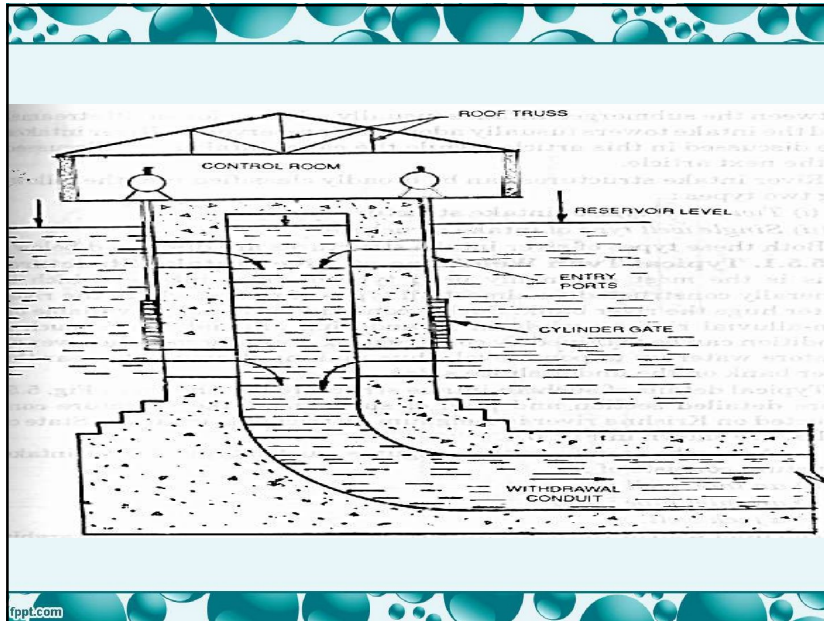
- It consist of a concrete circular shell filled with water up to the reservoir level.
- Openings are made in to the outer concrete shell as well as, in to the inside shaft.
- Gates are usually placed on the shaft, so as to control the flow of water in to the shaft and the withdrawal conduit.
- The water coming out of the withdrawal pipe may be taken to pump house for lift (if treatment plant is at high elevation) or may be directly taken to treatment plant (at lower elevation).





### Dry Intake Towers

- The water is directly drawn in to the withdrawal conduit through the gated entry ports.
- It has no water inside the tower if its gates are closed.
- When the entry ports are closed, a dry intake tower will be subjected to additional buoyant forces.
- Hence it must be of heavier construction than wet intake tower.
- They are useful since water can be withdrawn from any selected level of the reservoir by opening the port at that level.



## Types of intakes

### River Intake

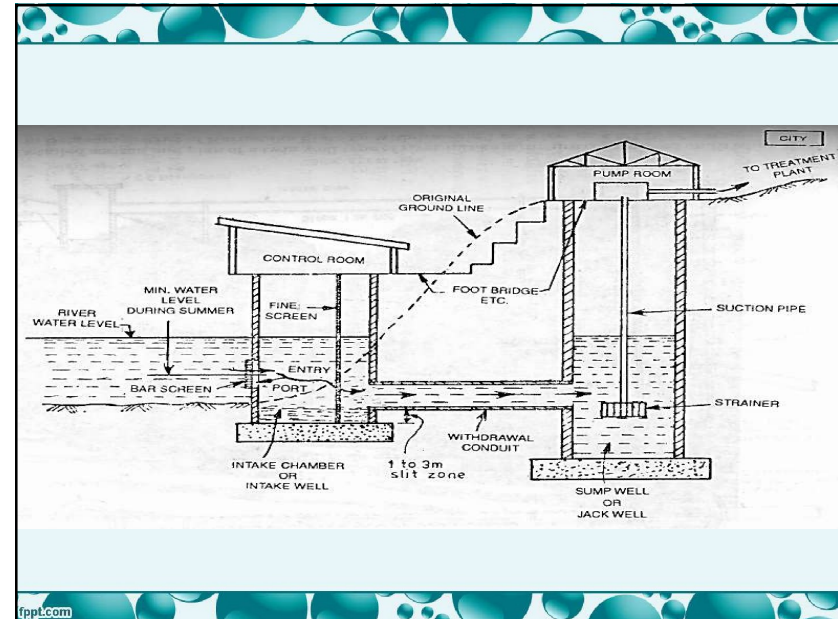
- They are generally constructed for withdrawing water from almost all rivers.

They can be classified in to two types

- (1) Twin well type of intake structure
- (2) Single well type of intake structure

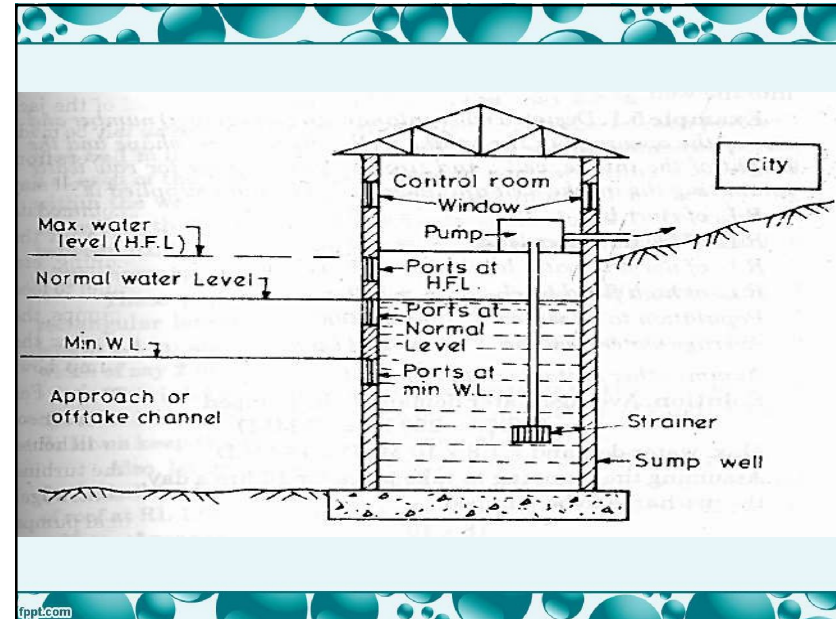
## Twin Well Type Intakes

- They are constructed on almost all types of rivers, where the river water hugs the river bank.
- A typical river intake structure consists of 3 components:
  - (a) An inlet well
  - (b) An inlet pipe (intake pipe)
  - (c) A jack well



## Single Well Type Intakes

- No inlet well & inlet pipe in this type of river intake.
- **Opening or ports fitted with bar screens** are provided in the jack well itself.
- The silt entering the jack well will partly settle down in the bottom silt zone of jack well or may be lifted up with the pumped water since pumps can easily lift sedimented water.
- The jack well can be periodically cleaned manually, by stopping the water entry in to the well.



## Single Well Type Intakes

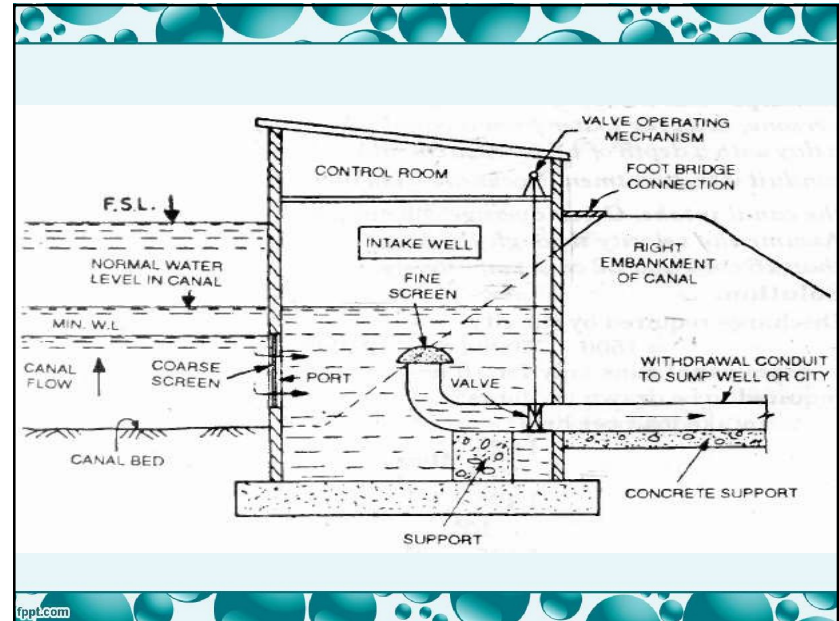


## Types of intakes

### Canal Intakes

- **A nearby Irrigation Canal can be used as the source of water.** The Intake Well is generally located in the bank of the Canal. Since water level is more or less constant there is no need of providing inlets at different depth. **It essentially consist of concrete or masonry intake chamber or well.**



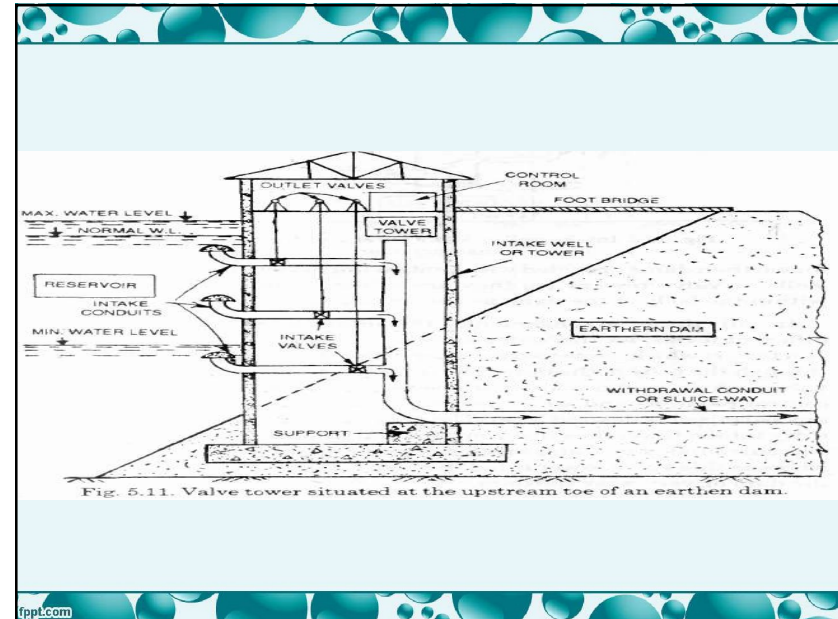


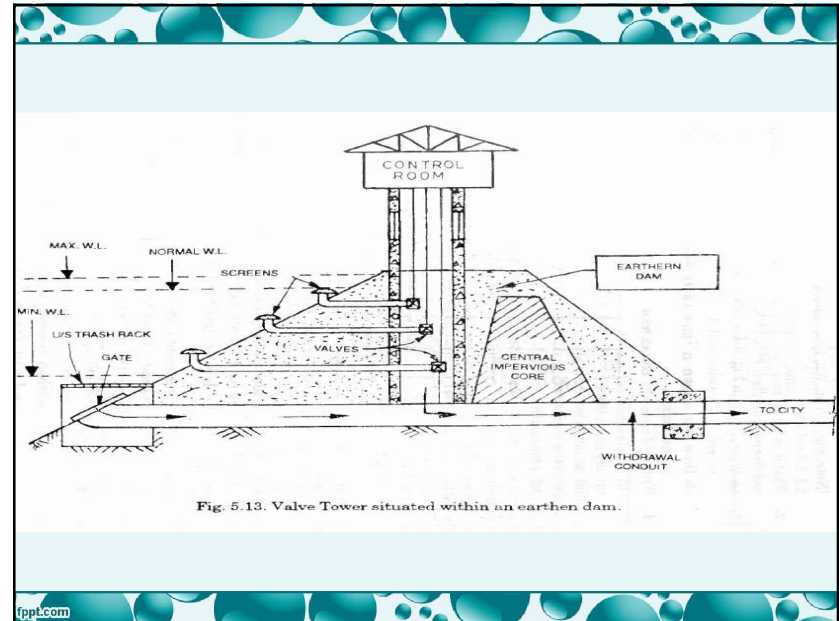
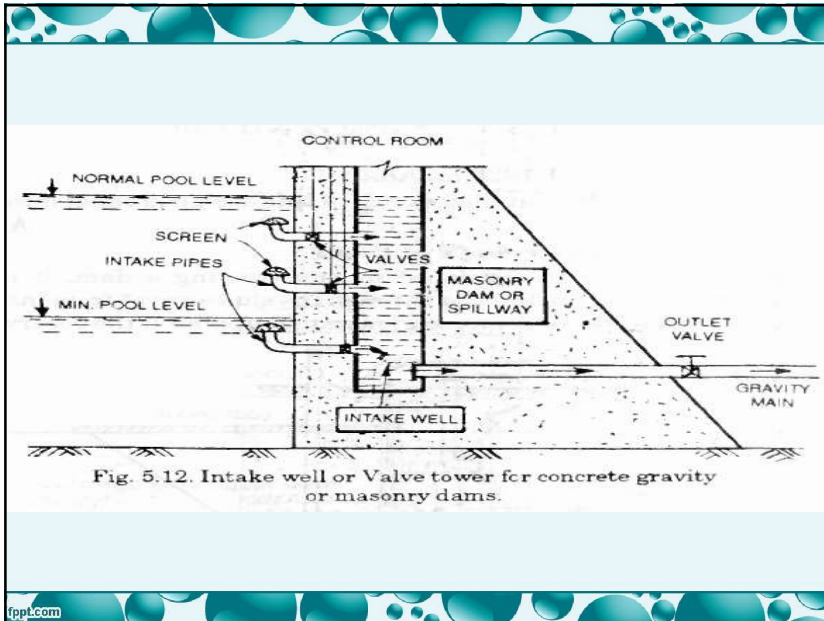


## Types of intakes

### Reservoir Intake

- **When the flow in the river is not guaranteed throughout the year, a dam is constructed across the river to store the water in the reservoir so formed.**
- **Reservoir Intakes essentially consists of an Intake tower constructed on the slope of Dam at such a place where Intake can draw water in sufficient quantity even in the driest period. Intake pipes are fixed at different levels, so as to draw water near the surface in all variations of water levels.**





## Types of intakes

### Lake Intake

- These **Intakes** are constructed in the bed of lake below the low water level so as to draw water even in dry season.
- It mainly consist of a pipe laid in the bed of the lake. **One end of the pipe which is in middle of the lake is fitted with bell mouth opening covered with a mesh and protected timber or concrete crib.**
- The water enters in the pipe through the bell mouth opening and flows under gravity to the bank where it is collected in a sump well and then pumped to the treatment plant for necessary treatment.



