

Lake Arlington Dam

Hazard Mitigation Action Plan

Project Description

Lake Arlington Dam, which forms Lake Arlington, was completed in July 1957. The dam is owned and operated by the City of Arlington and is located on Village Creek approximately seven miles west of downtown Arlington in Tarrant County. Lake Arlington has a contributing drainage area of approximately 143 square miles and has a normal water level of 550 feet mean sea level (msl). The normal pool storage is estimated to be 38,785 acre-feet with a surface area of 1,939 acres. (An acre-foot is a volume of measurement that would cover one acre to a depth of one foot.)

Lake Arlington Dam is formed by an earth fill embankment with an impervious clay core. The upstream slope of the embankment is protected by rock riprap and the downstream slope is protected with grass. The service spillway is a “morning glory” type structure that allows flows above the normal water level to flow from the lake through a concrete pipe. The emergency spillway is an excavated channel on one side of the dam.

Dam Classification

In Texas, the Texas Commission on Environmental Quality (TCEQ) is the regulatory agency responsible for the administration of the State dam safety laws. Dams are classified according to the size of the dam and the potential for loss of human life and property damages downstream from the dam in the event of a failure of the dam. The size classification of small, intermediate, or large is based on the storage in the reservoir and the height of the embankment. Large dams are those with storage greater than 50,000 acre-feet and/or a height greater than or equal to 100 feet. Lake Arlington Dam falls into the large category. The hazard classification can be low, significant, or high. A high hazard dam is usually located where failure can cause serious damage to homes, agricultural, industrial, and commercial facilities, important public utilities, main highways, and railroads with a probable loss of life. Lake Arlington Dam is rated as a high hazard dam. This rating does NOT mean that a dam is likely to fail.

Risks

Recognizing the hazards and risks of a dam are the first steps in the prevention of any potential issues associated with the dam. Generally there are three major categories of dam failure:

- Overtopping by flood,
- Foundation defects, and

- Piping (the progressive development of internal erosion by seepage through the embankment)

The primary cause of failure for earthen dam is piping or seepage. For concrete dams, the major reason for failure has been associated with the foundation on which the dam sits. Overtopping of an earth embankment where the spillway capacity is inadequate is also a major cause of failure.

For Lake Arlington Dam, modifications were made in 1996 to prevent overtopping failure of the embankment. The design storm, as specified by the TCEQ is the Probable Maximum Flood (PMF). The PMF is a hypothetical flood that can be expected to occur due to the combination of the most severe critical meteorological and hydrologic conditions possible within an area. According to State criteria, a large, high hazard structure, such as Lake Arlington Dam, is required to pass 100 percent of the PMF. In 1996 a parapet wall was constructed on top of the embankment to allow the spillways to pass the maximum flood without overtopping the embankment. The service and emergency spillways at Lake Arlington Dam will pass 100 percent of the PMF event in accordance with State criteria.

Lake Arlington Dam also has instrumentation which was installed to monitor the embankment for seepage. These instruments are called piezometers and measure potential water levels in the dam which can lead to seepage or potentially piping.

Instruments were also installed in the embankment to measure potential movement of the dam or its foundation.

Comprehensive Dam Safety Program

The safety of a dam is directly influenced by the development of a comprehensive dam safety program. A good dam safety program includes regular inspection, monitoring through instrumentation, regular maintenance of the structure, and proactive emergency planning. The City of Arlington has developed and implemented a comprehensive dam safety program that addresses each of these items.

Conclusion

The City of Arlington has implemented an effective dam safety program which results in a well maintained structure which is monitored and inspected regularly. The probability of an issue at the dam developing into a potential problem is small. The City has been proactive in emergency planning and has developed an effective program to minimize the risks associated with the dam.