

Flood protection for the Danube in Lower Austria - development and outlook

Dietmar Pichler, Dipl.-Ing.¹; Norbert Knopf, Dipl.-Ing.¹

INTRODUCTION

This paper reports on the development of the measures taken to protect against floods along the Danube River in Lower Austria (starting with the cut-off in Vienna and the mobile flood protection systems currently being implemented along the Danube River in Lower Austria), taking into account the essential framework conditions (World Heritage site).

HISTORICAL DEVELOPMENT

Areas along the Danube River in Lower Austria have always been exposed to what have been at times, devastating floods. The following floods in particular are referred to here (see photo showing past flood levels):

- 1501: The highest floods ever observed on the Danube, formed the basis for assessing improvements to flood protection systems in Vienna (discharge approximately 14,000 m³/s)
- 1862: (~ 2002) Premise for launching the 1st Vienna Danube regulation
- 1954: The worst flood in the 20th century triggered the action to improve the flood protection systems in Vienna (2nd Vienna Danube regulation „Danube Island“)
- 1991: (approx. HQ30), premise for launching the Krems/Stein flood protection project for the mobile flood management system
- 2002: (approx. HQ100), premise for the intensive expansion of the existing flood protection facilities along the Danube in Lower Austria.

Localised measures were enforced in the 14th and 15th century in order to safeguard the shipping on the Danube.

The first concrete plans designed at providing flood protection were drawn up at the beginning of the 19th century and subsequently implemented in 1875 with the cut-off in Vienna. The protective

structures only began to expand on a nationwide basis after the floods of 1991 and 2002.

In Lower Austria (NÖ), the individual municipalities are responsible for the construction of flood protection systems, however, if the facilities are to spread over several municipalities, it is also possible for water associations to be set up. According to the Hydraulic Engineering Assistance Act (WBFG), federal funds can be granted for the Danube representing as much as up to 80% of the overall cost. According today's point of view, a large part of the flood protection measures along the Danube River in Lower Austria should be completed by 2020.

FRAMEWORK CONDITIONS AND OUTLOOK

The complexity involved in implementing flood prevention measures along the Danube River in Lower Austria stems from the actual location of the towns and villages; many are in the UNESCO World Heritage site of Wachau or they contain old Towns and sites that are centuries-old (Ybbs, Melk or Stein). That is why it would be simply inconceivable to erect a classic flood protection system in these areas, such as a dam or permanent wall. In order to find a satisfactory solution for all the parties involved, an advisory design council was set up with representatives from ICOMOS AUSTRIA (Austrian National Committee of the International Council on Monuments and Sites), experts on the preservation of the townscape and nature conservation, as well as the Federal Ministry for Education, Arts and Culture. This council followed the entire construction process from its planning phase to the actual construction.

The facility in Krems/Stein was built in the mid 1990s as the first mobile flood protection measures along the Danube in Lower Austria after the floods of 1991. Feasibility studies were initially carried out in the other Danube municipalities - there were no actual structural implementations of the measures.

It was only after the floods of 2002 and the positive example set by the Krems/Stein facility as to the successfully tried and tested operability and control of these mobile systems, that the remaining municipalities in Lower Austria began to realise their corresponding systems. After the first agreement was concluded in 2006 in accordance with Article 15a of the B-VG (Federal Constitutional Act) between the Federal Government and provinces of Lower Austria, Upper Austria and Vienna, concerning flood protection projects in the area of the Austrian Danube (and in 2013 the identical second agreement) to secure the funds, they began in 2007 with the successive upgrading of the flood protection facilities along the Danube River in Lower Austria. The aim behind this effort was to fully extend and develop the protection systems along

the Danube River in Lower Austria by 2023. After the flood of 2013 this target was revised to 2019. The funding to render all the settlement areas along the Danube River in Lower Austria flood-proof would amount to over € 400 million. At the time of the „flood of the century“ in June 2013, many measures were already in place and as a result it was possible to prevent significant damages in the local area (e.g. the Ybbs flood protection, where an investment of approximately € 24.0 million was able to prevent damages of around € 39.0 million, basing the figures on the flood of 2002). The largest facility in Lower Austria is the one in Weißenkirchen i. d. Wachau. It is almost 3,000 m long and is made up of approx. 6,500 m² mobile elements when fully constructed.

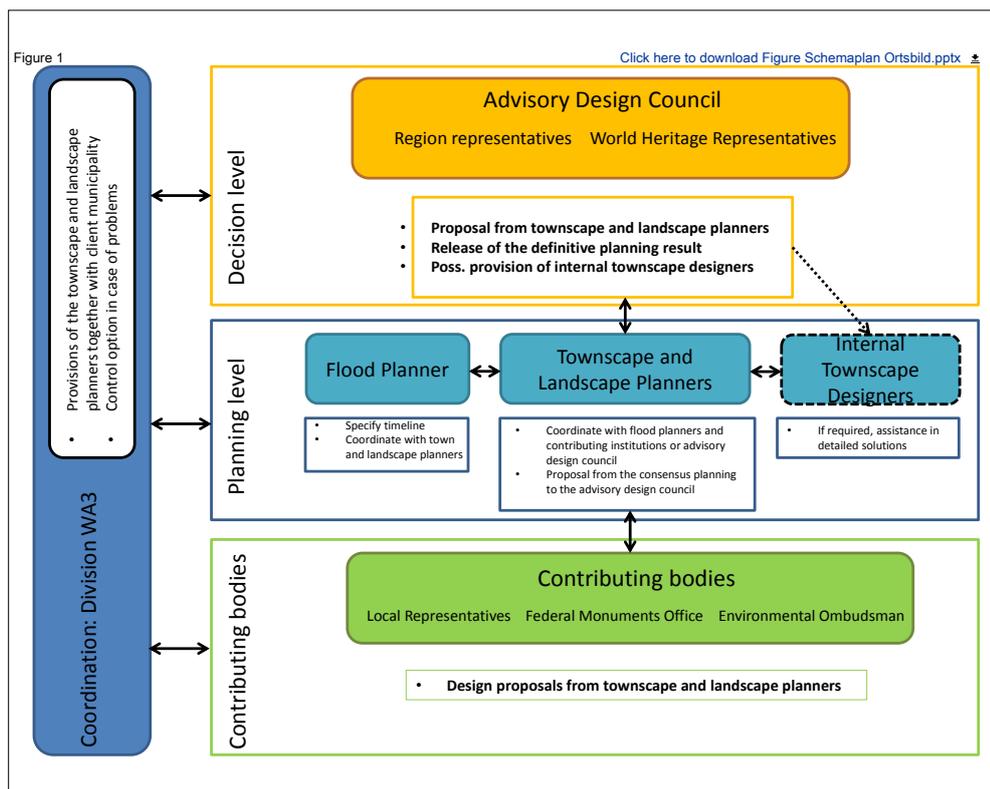


Figure 1. Advisory Design Council



Figure 2. Past floods on the Danube

KEYWORDS

flood protection; Danube; Lower Austria; Historical development; Framework conditions and Outlook

1 Regional Government of Lower Austria, Department of Hydraulic Engineering, St. Pölten, AUSTRIA, dietmar.pichler@noel.gv.at