

REMEDIATION OF DOWNSTREAM RIPRAP APRON RED RIVER FLOODWAY INLET CONTROL STRUCTURE

Manitoba Conservation, Water Resources Branch

Winnipeg, Manitoba



Project Description

KGS Group completed a preliminary assessment and final design for the remediation of a 7-m deep scour hole downstream of the City of Winnipeg Floodway Control Structure. KGS Group was responsible for preliminary design, detailed design and construction management for the \$2.5 Million project. Work included:

- Review of historic flow conditions, assessment of Froude numbers and the hydraulic jump conditions for a range of discharge and tailwater conditions. The range in tailwater levels fluctuated by 6 m and discharges up to 20,000 m³/s were considered.
- Review of the existing riprap design to determine the erosion protection failure mode of the existing limestone riprap which was up to 2.5 m in diameter. The failure mode was assessed to be poorly graded material which allowed the smaller material and fines from below to be “flushed out” over time. The floodway structure is operated every spring to control flood levels in the City of Winnipeg.
- Assessment of alternate means of the remediation including rip-rap and “fabriform concrete bags”. The fabriform bags were considered to be the most cost effective and reliable method of remediating the scour hole and were recommended.
- Final design, preparation of contract drawings and supervision of construction remediation works. The \$2.2 million (1998 \$) remediation consisted of excavating the existing bars and refilling the scour hole in the wet (6 m depth) in preparation for the fabriform concrete bags. Prior to placing the bags, the surface area was covered with filter fabric by divers. Bags were then placed over top of the filter fabric to protect the surface. In the highest velocity zone, immediately downstream of the structure, bags 6 m x 2 m were placed in a staggered overlap pattern. Further downstream mats 200 mm thick were placed. The bags and mats were placed underwater and filled with a tremie grout from the shore using divers.
- The work was completed over 2 seasons to allow the flow to be diverted around the work area.