

THE TRIUMF KAON FACTORY

GEORGE S. CLARK

*TRIUMF, University of British Columbia
Vancouver, British Columbia*

TRIUMF is Canada's National Meson Facility. The TRIUMF site is hidden in a rain forest on the campus of the University of British Columbia in Vancouver, British Columbia. TRIUMF's current research program uses a cyclotron to accelerate 100 micro-amperes of protons to 500 MeV. The protons are directed along 0.1 km of beam lines to fixed target stations where the properties of muons, pions, and other particles are studied.

TRIUMF has proposed to the Canadian Federal and Provincial Governments that TRIUMF be upgraded to 100 micro-amperes at 30 GeV. To house the proposed 5-ring accelerator complex the TRIUMF site will expand from 10 acres to about 70 acres. Figure 1 shows the KAON Factory site plan. Negative hydrogen ions will be extracted from the cyclotron at 452 MeV and transferred to a booster complex. The booster complex will house a 452 MeV proton storage ring (A ring) and a 50 Hz 0.452-3 GeV synchrotron (B ring). The circumference of these rings is 215 meters. Figure 2 shows the Booster Tunnel cross-section, and that we intend to stack the rings one above the other. To isolate the storage ring from any vibration caused by the very fast cycling synchrotron, the A ring magnets will have separate supports from the B ring.

After the Booster synchrotron has accelerated the protons to 3 GeV, they are transferred to a 3 GeV proton storage ring (C ring) in the main accelerator tunnel. The main tunnel houses the C, D, and E rings. The D ring is a 10 Hz 3-30 GeV synchrotron and the E ring is an extender/storage ring to allow slow extraction at 30 GeV. These rings have a circumference of approximately 1.1 km. Figure 3 shows the Main Tunnel cross-section. The C ring will be mounted directly above the D ring, while the E ring will be offset horizontally to protect the C and D rings from slow extraction losses. Again we will try to isolate the storage rings from any vibration generated by the fast cycling synchrotron.

The status of the KAON Factory Project is that we have received \$11 million for technical studies and to investigate interest from other countries in funding the project along the lines of the HERA project. Full funding is hoped for in mid-to-late 1990. TRIUMF currently is practicing alignment at the ± 1 mm level with

only one full-time surveyor. With 3.7 km of rings with alignment tolerances about 0.1 mm and a further 1.3 km of beam lines, TRIUMF will have to learn about the world of precision surveying. We will learn from other labs such as CERN, SLAC, and DESY where this work is currently being done.

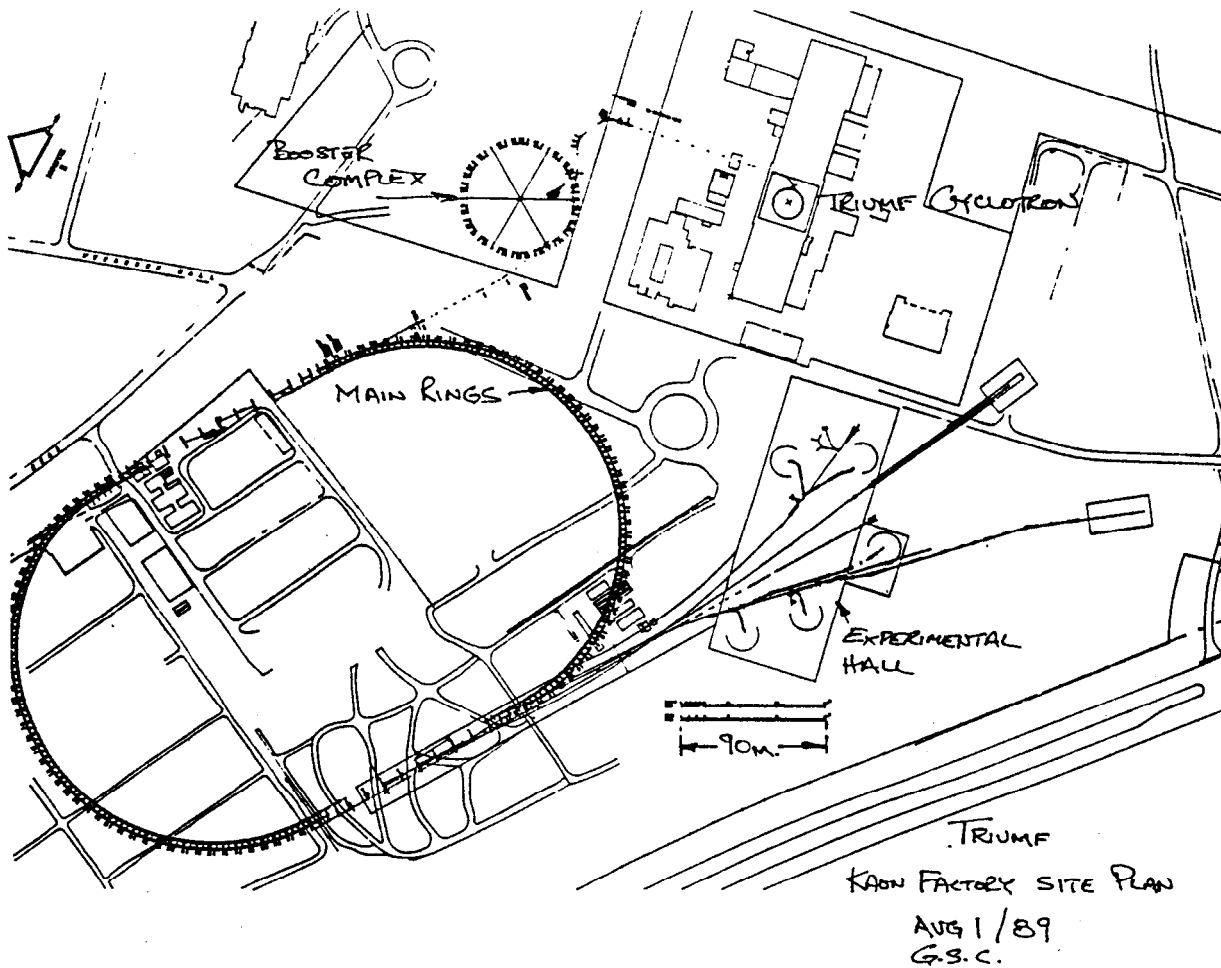


Figure 1.

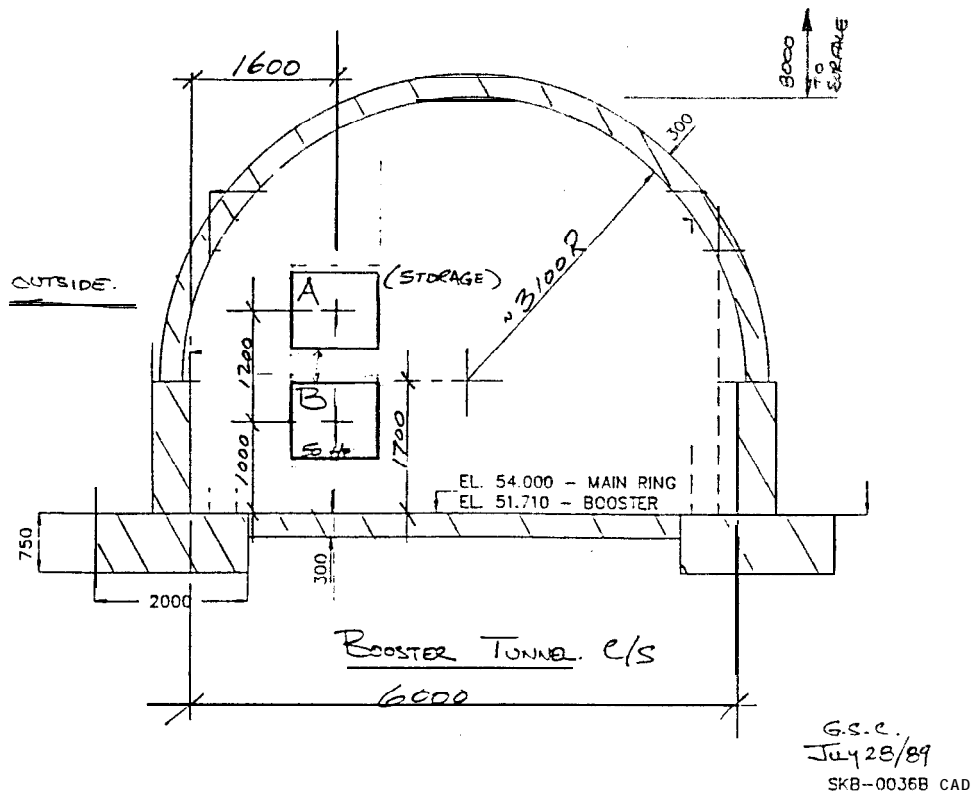


Figure 2.

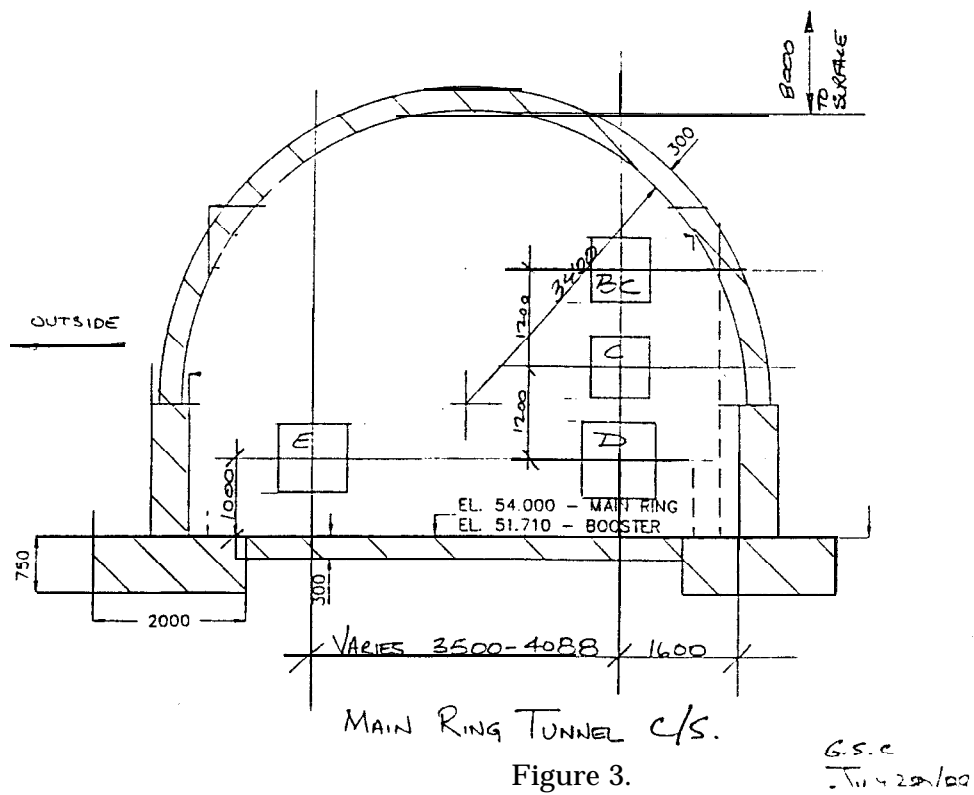


Figure 3.