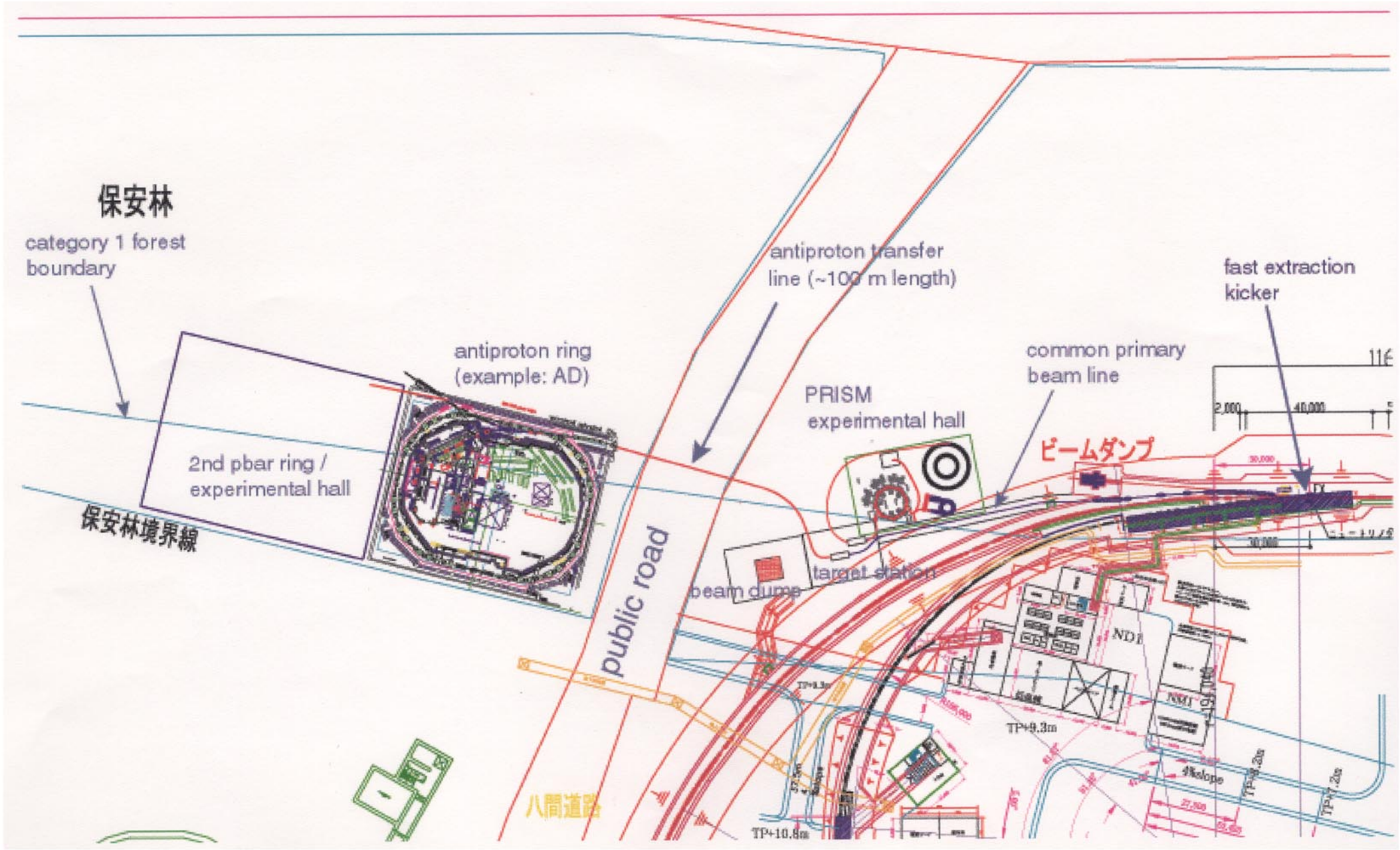
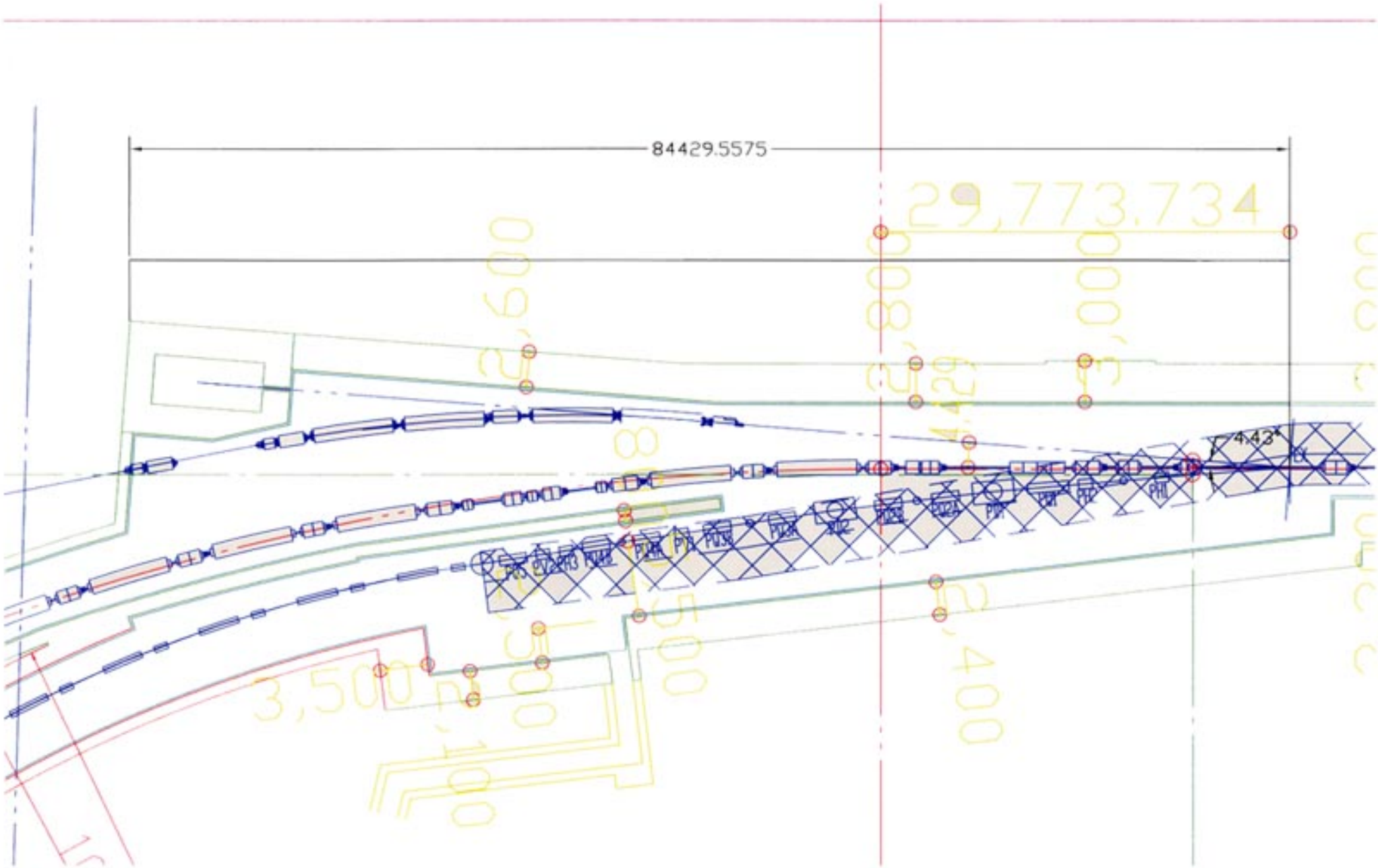

保安林
category 1 forest boundary
antiproton transfer line (~100 m length)
fast extraction kicker
antiproton ring (example: AD)
common primary beam line
PRISM experimental hall
ビームダンプ
2nd pbar ring / experimental hall
保安林境界線
public road
beam dump
target station
八間道路
TP+10.8m
TP+9.3m
4%slope


84429.5575
29,773.734
4.43°

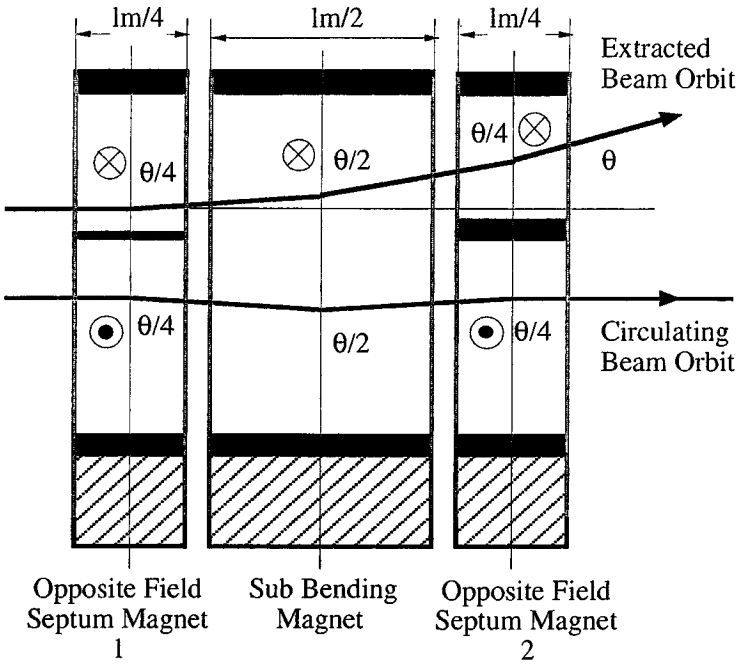


Fig. 3.3.2.2.1 Opposite field septum magnets system (SM3-1) for the slow extraction

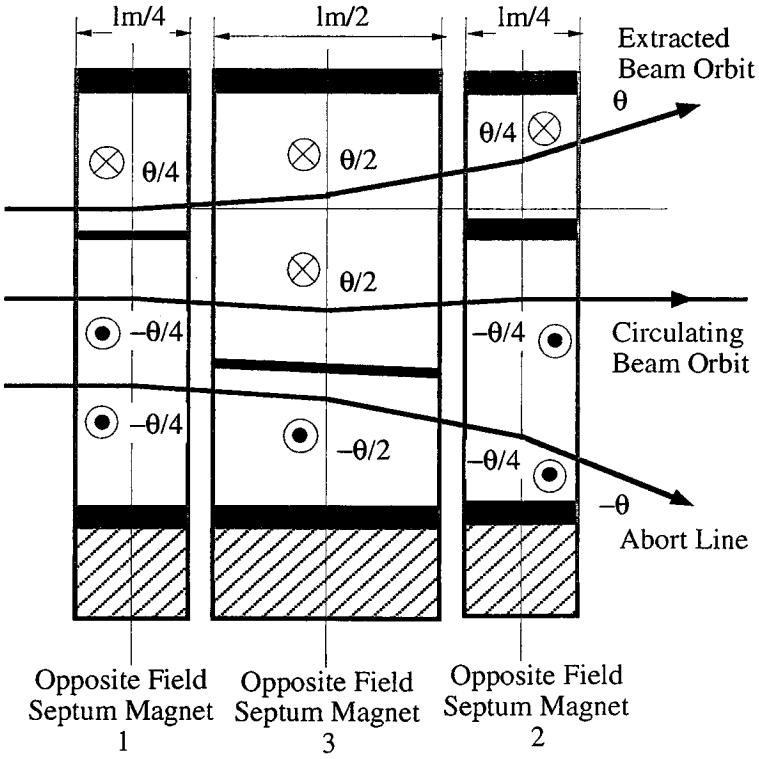


Fig. 3.3.2.2.2 Opposite field septum magnets system (SM3-1) for the fast extraction and the abort line

Table 3.3.2.1.4 Current designed parameters for the fast extraction kickers

Item	Symbol	Derived from:	Unit	KMF1-6
Aperture Height	h		[mm]	100
Aperture Width	w		[mm]	100
Aperture Length	l		[mm]	1500
PFN Operating Voltage	V_{PFN}		[kV]	40.00
(Maximum Cable Voltage)	V_{max}		[kV]	80.00
(Cable Impedance)	R_{Cable}		[Ω]	20.00
(Parallel # of Cables)	n			4
PFN Impedance	R_0	$= R_{Cable} / n$	[Ω]	5.00
Flat-top Kicker Current	I	$= V_{PFN} / R_0$	[kA]	8.00
Kicker Field	B	$= \mu_0 \cdot I / h$	[T]	0.1005
B·l Product	B·l	$= B \cdot l$	[T·m]	0.1508
Kick Angle	θ	$= B \cdot l / (B\rho)_{50GeV}$	[mrad]	0.8876
Inductance	L	$= \mu_0 \cdot w \cdot l / h$	[μH]	1.8850
Time Constant (Blumlein)	τ_0	$= L / 2R_0$	[nsec]	188.50
0-99% Rise-time	$\tau_{0\text{-}99\%}$	$= 4.6 \cdot \tau_0$	[nsec]	867.08
Switch Turn-on Time	τ_{SW}	(supposed value)	[nsec]	150.00
Total Rise-time	τ_{Total}	$= \tau_{0\text{-}99\%} + \tau_{SW}$	[nsec]	1017.08

is shown in Table 3.3.2.1.4.

Recently a new requirement emerged to the fast extraction line, which can be called as the 'fast reverse' of the kick direction. This requirement comes mainly from the fact that the downstream beam line of the fast extraction, which leads to the neutrino oscillation experiment line, is designed to employ superconductive magnets. These magnets might get quenched at anytime, even just very short time --- milliseconds or shorter --- before the fast extraction of the 50 GeV beam. In order to avoid damaging the quenched magnets and the downstream ones, the fast extraction line should have the function of the fast reverse. Then the beam can be extracted in the reverse direction, where another beam line, an abort line at 50 GeV, is provided. The fast extraction kicker systems, therefore, are now requested to achieve the reverse of the kick direction within a possible shortest time.

One of the possible candidates of the PFN scheme to realize the fast reversible kicker is shown in Figure 3.3.2.1.4. This scheme is based on the Blumlein configuration, which is

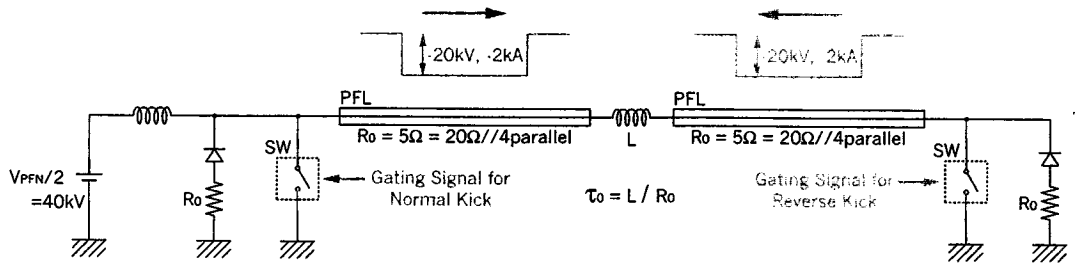


Figure 3.3.2.1.4 Possible fast extraction PFN scheme with a reversible polarity.