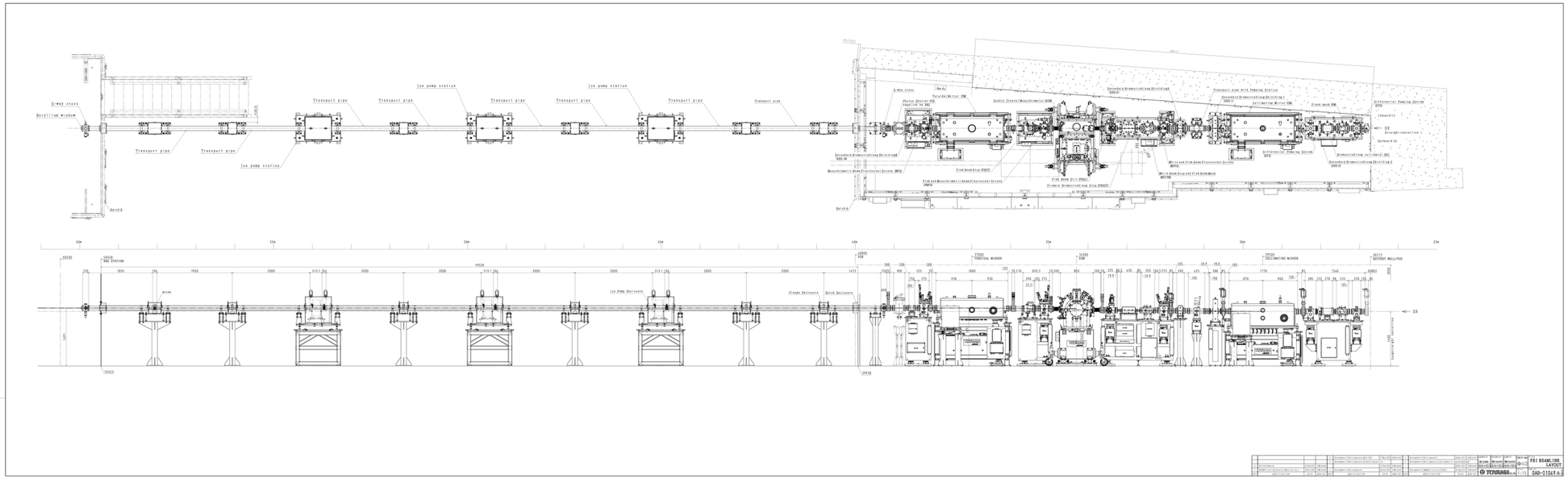
REVISION HISTORY					
REV	DESCRIPTION	DATE	DESIGNER	CHECKED BY	ENGINEER
A	RELEASE PER ECO-005040	4/26/2017	C. LONGO	C. STELMACH	S. COBURN

NOTES:

1. THE FRONT END, FXI BEAMLINE RAY TRACING SR-FE-DW18-1001, REV. B WAS REVISED TO REV. C, NEAR VENDOR BEAMLINE RAY TRACE COMPLETION, WHICH HAS BEEN REVIEWED BY THE RSC (RADIATION SAFETY COMMITTEE). IT HAS BEEN DETERMINED TO HAVE A NEGLIGIBLE IMPACT ON FXI BEAMLINE RAY TRACES COMPLETED UNDER REV. B. THE RSC RECOMMENDED THE VENDOR PROVIDED (TOYAMA), FXI BEAMLINE RAY TRACE IS ACCEPTABLE USING THE SR-FE-DW18-1001, REV. B FRONT END, FXI BEAMLINE RAY TRACING.



UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN BRACKETS [xx.xx] ARE REF. PRESENTS AND MUST BE CHECKED AFTER MACHINING
INTERPRET DRAWING AS PER ASME Y14.5-1994 OR YSLS-1978

DIMENSIONAL TOLERANCES	REGULAR TOLERANCE
X ± 1.500 .X ± 0.750 .XX ± 0.400 .XXX ± 0.120	± 5°
BREAK EDGES & SHARP CORNERS 0.125 MIN. TO 0.750 MAX	FINISH 3.2

NEXT ASSY:

PROJECT:

THIRD ANGLE PROJECTION

SCALE: SEE DWG VIEW

BROOKHAVEN NATIONAL LABORATORY

BROOKHAVEN NATIONAL LABORATORY
P.O. BOX 5000
UPTON, NEW YORK 11973

Exploring Life's Mysteries
Protecting our Future

NSLS II NATIONAL SYNCHROTRON LIGHT SOURCE II

DRAWN BY	C. LONGO	4/26/2017
CHECKED BY	C. STELMACH	5/2016
VACUUM APPROVAL		
ENGINEERING APPROVAL	S. COBURN	5/2016
SUPERVISOR APPROVAL	W. LEE	5/2016
ISSM APPROVAL	L. STIEGLER	5/2016
QA APPROVAL	J. ZIPPER	5/2016

PHOTON DIVISION
FXI BEAMLINE
RAY TRACING, FXI BEAMLINE, 18-ID

SIZE E | DRAWING/PART NUMBER PD-FXI-RAYT-1000 | REVISION A

WBS# 6.13.02

ESH&Q RISK LEVEL A1

SHEET 1 OF 6

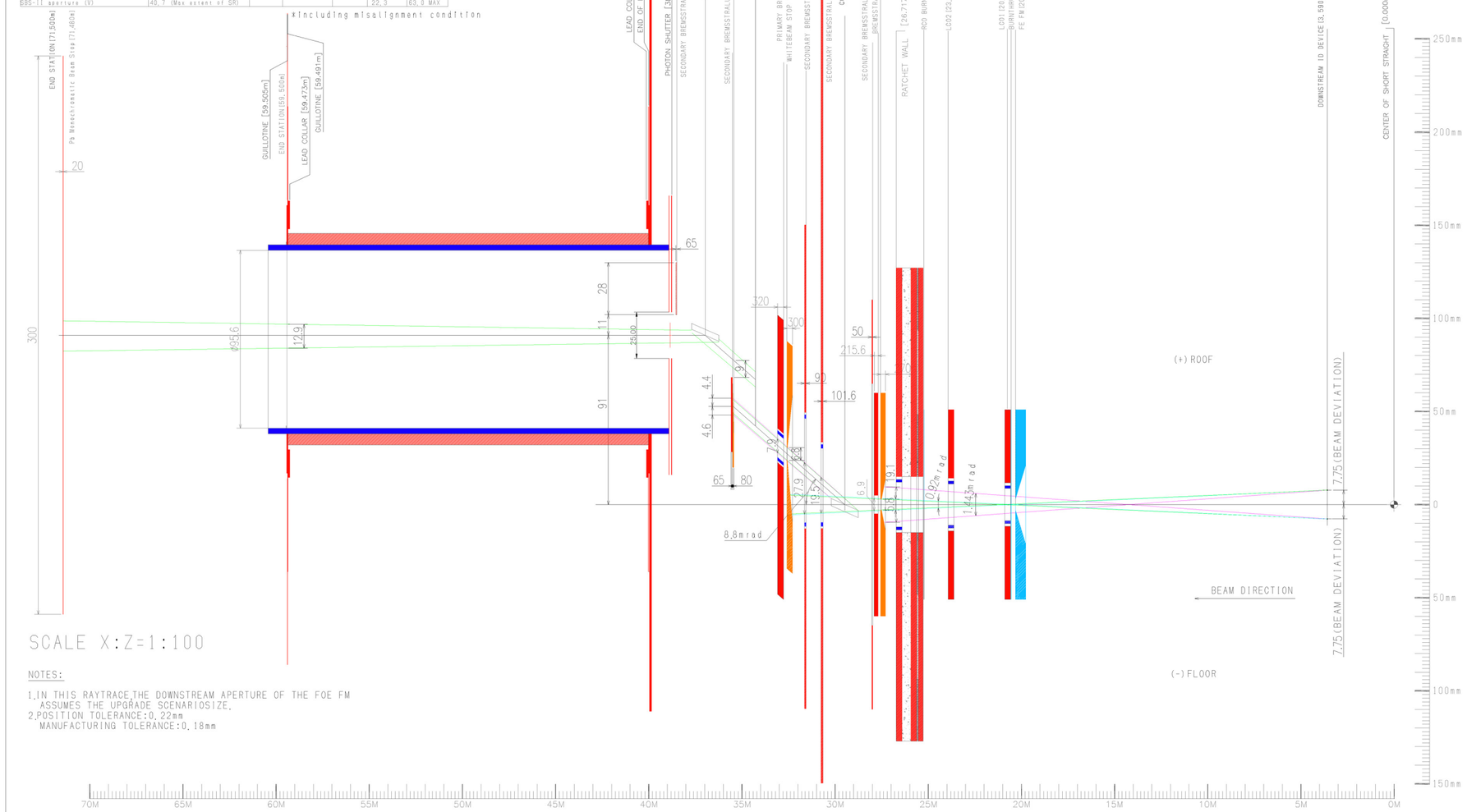
C:\Mach-Eng\TYDP\WBS\TYDP-D-BART-1.000.dwg

RELEASED → EFFECTIVE

TABLE OF TOLERANCED DIMENSIONS(mm)

	Minimum	Nominal	Fabrication	Position	Clearance	Total
FM US aperture (H)	30.4 (Max extent of SR)				11.6	42
FM DS aperture (H)		11.3	0.36	0.44		12.1 MAX
FM US aperture (V)	19.1 (Max extent of SR)				8.9	28
FM DS aperture (V)		5.8	0.36	0.44		6.6 MAX
WBSPBM US aperture (H)	27.5 (Max extent of SR)				18.5	46
WBSPBM DS aperture (H)		6.8	0.36	0.44		7.6 MAX
WBSPBM US aperture (V)	49.7 (Max extent of SR)				18.3	68
WBSPBM DS aperture (V)		6.8	0.36	0.44		7.6 MAX
n-vac BC aperture (H)	13.2 (Max extent of SR)				3.8	17.0 MAX
n-vac BC aperture (V)	6.9 (Max extent of SR)				3.6	10.5 MAX
Primary Brehm Stop aperture(H)	8.8 (Max extent of SR)				10.2	19.0 MAX
Primary Brehm Stop aperture(V)	10.1 (Max extent of SR)				8.9	19.0 MAX
SBS-I aperture (H)	22.2 (Max extent of SR)				24.8	47.0 MAX
SBS-I aperture (V)	30.5 (Max extent of SR)				16.5	47.0 MAX
SBS-II aperture (H)	25.9 (Max extent of SR)				21.0	46.0 MAX
SBS-II aperture (V)	45.7 (Max extent of SR)				22.3	68.0 MAX

*including misalignment condition



NOTES:

1.IN THIS RAYTRACE,THE DOWNSTREAM APERTURE OF THE FOE FM
ASSUMES THE UPGRADE SCENARIOSIZE.
2.POSITION TOLERANCE:0.22mm
MANUFACTURING TOLERANCE:0.18mm

Reference:PD-FXI-RAYT-0001 SHEET1 REV.2
SR-FE-DW18-1001 SHEET2 REV.B

REV	MODIFICATION	DATE	MOD/BY
9	Table of tolerance	16/Mar/2016	S.Watanabe
8	Vertical Scale is corrected	03/Mar/2016	S.Watanabe
7	Pipe thickness and Lead aperture of SBS-I, Pipe thickness of SBS-II		
6	ROD pipe is included,Several dimensions are added.		
5	In Beam transport, leads and SUS pipe are included and they are colored.		
4	Photon shutter apertures are and endstation beam stop(pillinline)Included.		
3	ROD Burn through is Included,SBS-0 is Included.		
11	Add Pb Monochromatic Beam Stop	05/Jun/2017	S.Watanabe
10	Final check of all component	31/Oct/2016	S.Watanabe
1	Table of Toleranced dimensions	12/Feb/2016	S.Watanabe
6	Table of toleranced dimensions	17/Dec/2015	S.Watanabe
5	Rearrangement of components as latest layout.	19/Nov/2015	S.Watanabe
4	ROD Burn through is Included,SBS-0 is Included.		
3	Rearrangement of components as latest layout.	24/Nov/2015	S.Watanabe
2	Rearrangement of components as latest layout.		
1	Rearrangement of components as latest layout.	05/Jun/2017	S.Watanabe
1	Burn through device,LOD1,LOD2,ROD and Ratchetwall is Included.		
1	Rearrangement of components as latest layout.		
1	lines are colored.		
1	SR lines are extended to the end of the end station.	05/Nov/2015	S.Watanabe

CHECKED BY: Mochizuki
DESIGNED BY:
DRAWN BY: Watanabe 05/Jun/2017
UNIT: mm
TITLE: FXI RAYTRACING MAXIMUM SYNCHROTRON RAYTRACE VERTICAL
TOYAMA CO.,LTD.
SCALE
DWG No. 1AA-00057 A
LCD

E | PD-FXI-RAYT-1000 | A
DRAWING/PART NUMBER | REVISION
ESH&Q RISK LEVEL A1 | SHEET 4 OF 6

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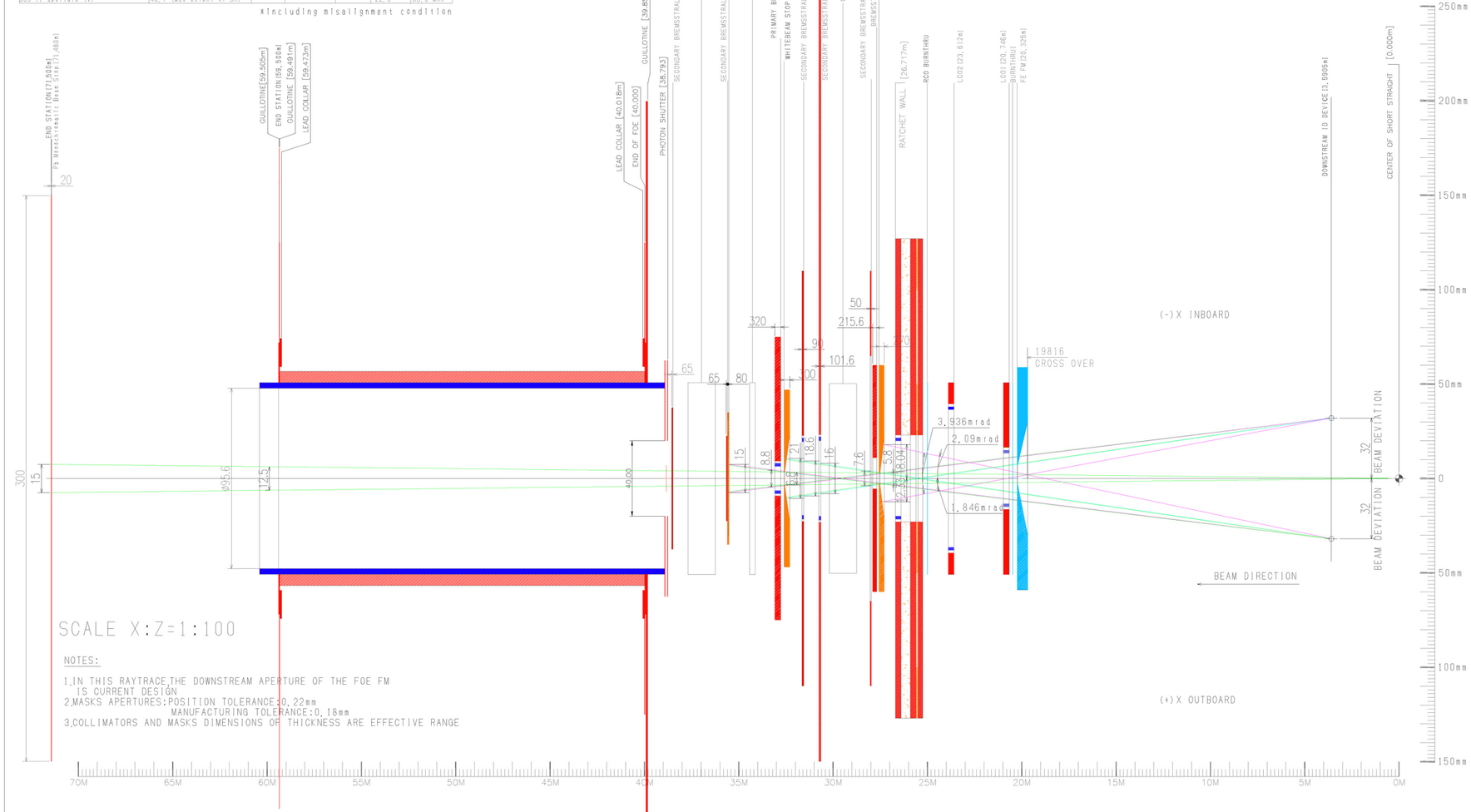
TABLE OF TOLERANCED DIMENSIONS(mm)

	Minimum	Nominal	Fabrication	Position	Clearance	Total
FM US aperture (H)	30.4 (Max extent of SR)				11.6	42
FM DS aperture (H)		5.8	0.36	0.44		6.6 MAX
FM US aperture (V)	19.1 (Max extent of SR)				8.9	28
FM DS aperture (V)		5.8	0.36	0.44		6.6 MAX
WBSPBM US aperture (H)	21.3 (Max extent of SR)				24.7	46
WBSPBM DS aperture (H)		6.8	0.36	0.44		7.6 MAX
WBSPBM US aperture (V)	49.7 (Max extent of SR)				18.3	68
WBSPBM DS aperture (V)		6.8	0.36	0.44		7.6 MAX
h-vac BC aperture (H)	13.2 (Max extent of SR)				3.8	17.0 MAX
h-vac BC aperture (V)	6.8 (Max extent of SR)				3.6	10.5 MAX
Primary Brehm Stop aperture(H)	8.8 (Max extent of SR)				10.2	19.0 MAX
Primary Brehm Stop aperture(V)	10.1 (Max extent of SR)				8.9	19.0 MAX
SBS-I aperture (H)	22.2 (Max extent of SR)				24.8	47.0 MAX
SBS-I aperture (V)	30.5 (Max extent of SR)				16.5	47.0 MAX
SBS-II aperture (H)	25.9 (Max extent of SR)				21.0	46.0 MAX
SBS-II aperture (V)	40.7 (Max extent of SR)				22.3	63.0 MAX

*including misalignment condition



Reference:PD-FXI-RAYT-0001 SHEET1 REV.2
SR-FE-DW18-1001 SHEET2 REV.B

REV	MODIFICATION	DATE	MOD/BY	REV	MODIFICATION	DATE	MOD/BY	REV	MODIFICATION	DATE	MOD/BY	REV	MODIFICATION	DATE	MOD/BY
11	ADDED GUILLOTINES AND LEAD COLLAR, UPDATED PSH	9/8/17	C. LONGO												
10	Add Pb Wanschenwitz Beam Stop	05/Jun/2017	S.Watanabe	6	Table of tlerance	16/Mar/2016	S.Watanabe	3	FE components are reviised,ROD pipe is Included,Several dimensions are added.			2	Rearrangement of components as latest layout.	24/Nov/2015	S.Watanabe
9	Corrected rays	26/Jun/2017	S.Watanabe	5	Vertical Scale is corrected	03/Mar/2016	S.Watanabe		In Beam transports, leads and SBS pipe are Included and they are colored.			1	Lines are maximum synchrotron radiation, (Not nominal condition)		
8	Corrected rays	19/Jun/2017	S.Watanabe	4	Pipe thickness and Lead aperture of SBS-I, Pipe thickness of SBS-II				Photon shutter apertures are and endstations beam stop Included.				ROD Burn through is Included, SBS-II is Included.		
7	Final check of all component	31/Oct/2016	S.Watanabe		Table of Tolerenced dimensions	12/Feb/2016	S.Watanabe		Table of tolerenced dimensions	17/Dec/2015	S.Watanabe		Rearrangement of components as latest layout.	19/Nov/2015	S.Watanabe

CHECKED BY: Mochizuki	DESIGNED BY:	DRAWN BY: Watanabe 05/Jun/2017	UNIT:mm
TITLE: FXI RAYTRACING MAXIMUM SYNCHROTRON HORIZONTAL CURRENT DESIGN			
SCALE	DWG No. 1AA-00062	TOYAMA CO.,LTD.	1/0A

E (SIZE)	PD-FXI-RAYT-1000 (DRAWING/PART NUMBER)	A (REVISION)
ESH&Q RISK LEVEL A1	SHEET 5 OF 6	

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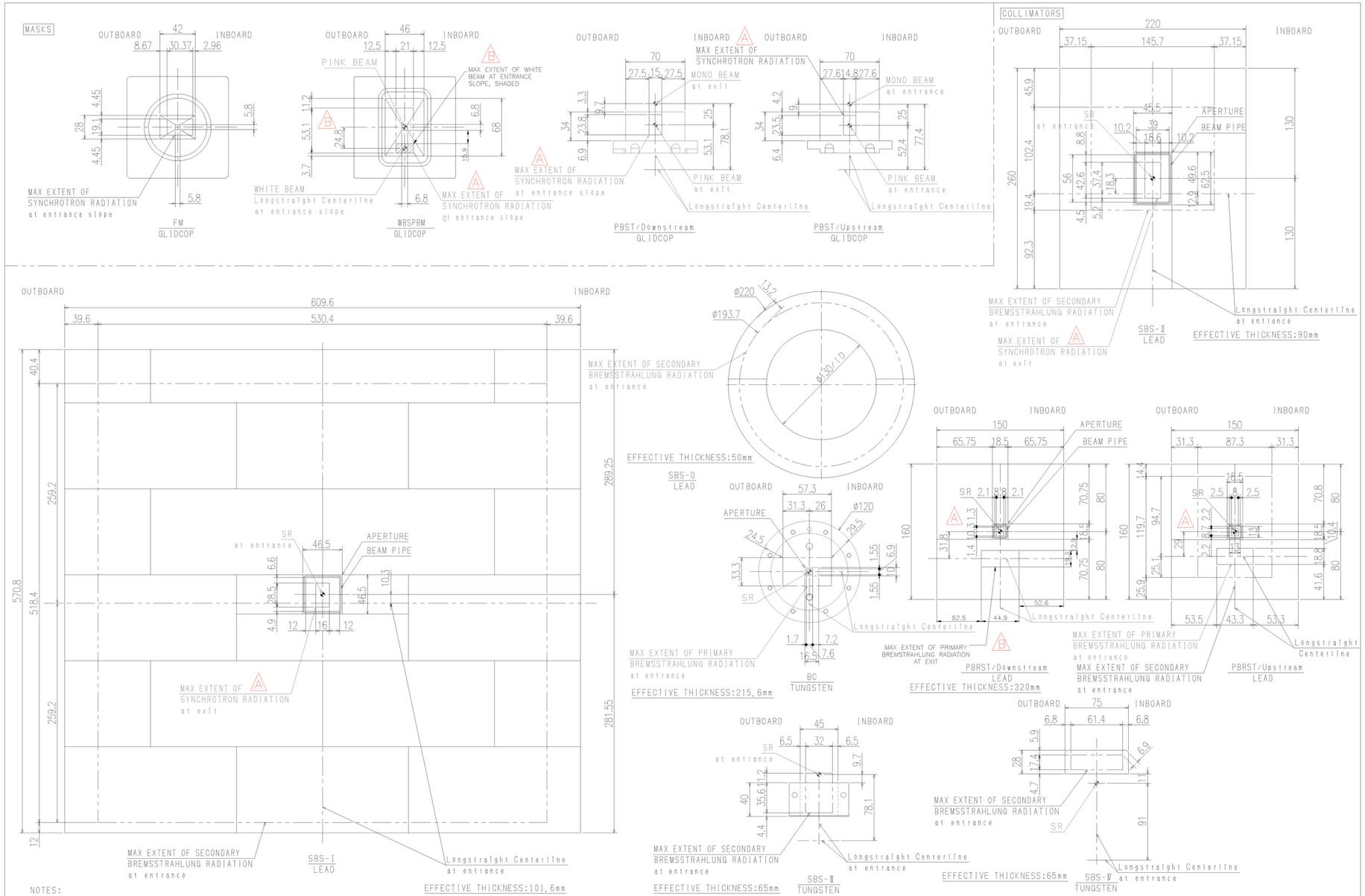

NOTES:
1. THESE ARE VIEW FROM UPSTREAM LOOKING DOWNSTREAM.
2. MAX EXTENT OF SYNCHROTRON RADIATION INCLUDES MISSARRAIGNMENT OF COLLIMATING MIRROR AND TROIDAL MIRROR.
3. THE DOWNSTREAM APERTURE OF THE FOE FM IS CURRENT DESIGN SIZE.
4. FOR SYNCHROTRON RAY: POSITION TOLERANCE: 0.22mm
MANUFACTURING TOLERANCE: 0.18mm

REV	MODIFICATION	DATE	MOD/BY
B	ADDED BREM FOOTPRINT	9/8/17	C.LONGO
A	REVISED FOOTPRINTS	2/16/17	C.LONGO

CHECKED BY: Mochizuki 20/Jan/2017
DESIGNED BY:
DRAWN BY: Watanabe 20/Jan/2017
UNIT: mm
TITLE: FXI RAYTRACING Masks and Collimators Detail Corrent Design
TOYAMA CO., LTD.
SCALE: 1:2
DWG No. 1AA-00063 A
1 OF 6

E | PD-FXI-RAYT-1000 | A
DRAWING/PART NUMBER | REVISION
ESH&Q RISK LEVEL A1 | SHEET 6 OF 6

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