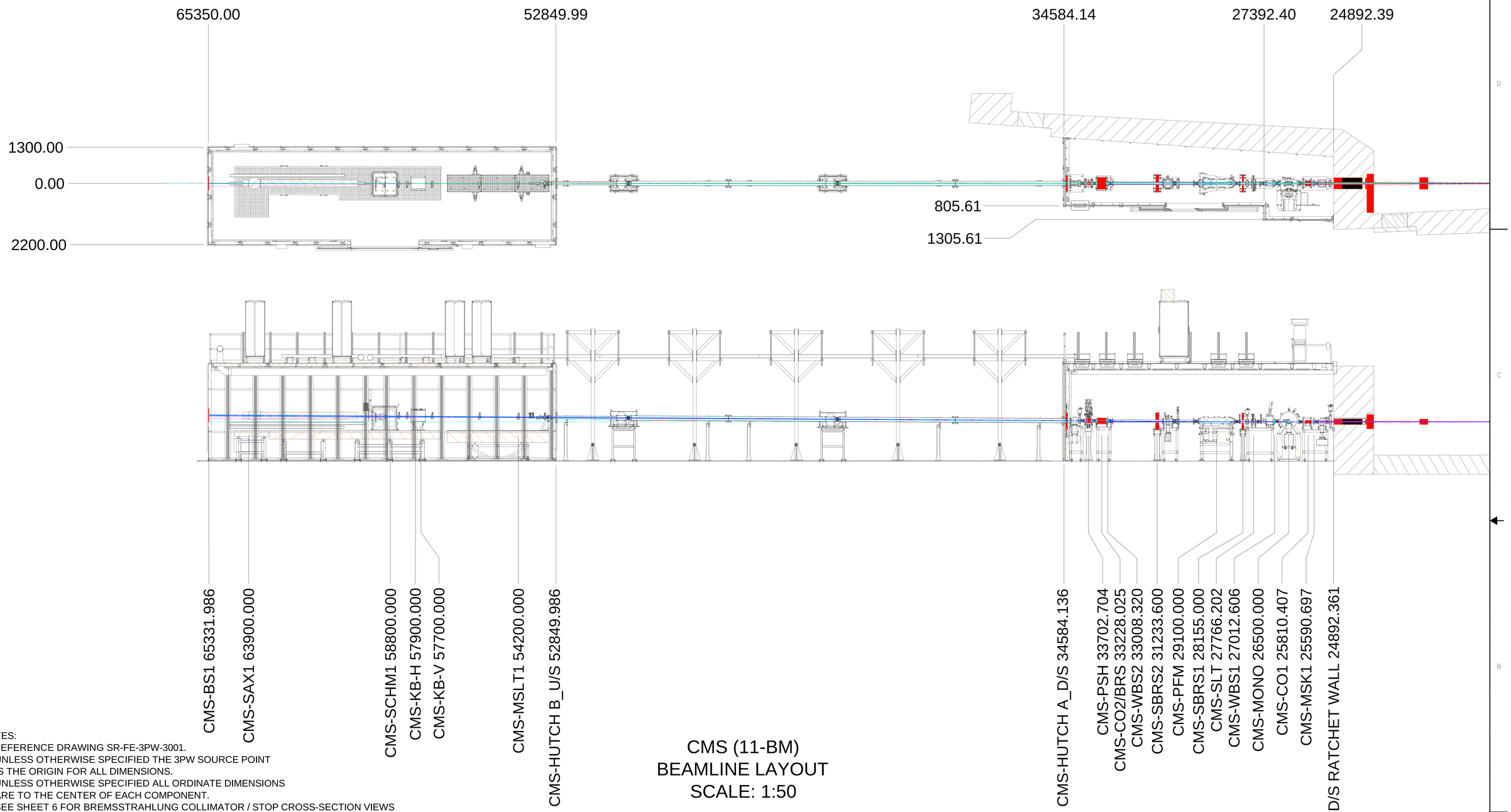
REVISION HISTORY					
REV	DESCRIPTION	DATE	DESIGNER	CHECKED BY	ENGINEER
A	RELEASE PER ECO-003407	7/2016	M. JOHANSON	L. LIENHARD	L. LIENHARD



CMS (11-BM)
BEAMLINE LAYOUT
SCALE: 1:50

NOTES:
1. REFERENCE DRAWING SR-FE-3PW-3001.
2. UNLESS OTHERWISE SPECIFIED THE 3PW SOURCE POINT IS THE ORIGIN FOR ALL DIMENSIONS.
3. UNLESS OTHERWISE SPECIFIED ALL ORDINATE DIMENSIONS ARE TO THE CENTER OF EACH COMPONENT.
4. SEE SHEET 6 FOR BREMSSTRAHLUNG COLLIMATOR / STOP CROSS-SECTION VIEWS AT U/S FACE OF LEAD / TUNGSTEN.
5. WHITE BEAM STOP 2 (WBS2) IS DESIGNED TO STOP POSSIBLE WHITE BEAM LEAKAGE THRU WHITE BEAM STOP 1 (WBS1) DUE TO MINIMUM EDGE DISTANCE.
6. SEE SHEET 7 FOR VERTICAL SYNCHROTRON MISSTEER RAYTRACING. THIS TRACE SHOWS THE MAX BEAM SPREAD ON THE BEAM STOP BY TRACING THE MAX MONO FAN REFLECTED THRU THE MAX APERTURE AT WBS2 AND TRIMMED AT THE SHIELDED BEAM PIPE.

* THIS SHEET IS FOR REFERENCE ONLY*

SPECIFICATIONS		REFERENCE
Project	BDN PROJECT	LT-EDP-015-041
Source	Three Pole Wiggler (3PW)	LT-C-SPC-SR-ID-BL-3PW-001 VERSION 1
Beam Line Name	Complex Materials Scattering	LT-EDP-015-041
Abbreviation	CMS	LT-EDP-015-041
Period of insertion device	N/A	LT-EDP-015-041
Cell	11BM	LT-EDP-015-041
Length of Source	250 mm	LT-C-ASD-RSI-002
Location of Source (from Start of Bending Magnet)	366 mm	LT-EDP-015-041
Ray Tracing Procedure		PS-C-XFD-PRC-008 VERSION 2
Front End Ray Tracing Drawing		SR-FE-3PW-3001 REV C

ABBREVIATIONS:
BRS - BREMSSTRAHLUNG STOP
BS - BEAM STOP
CO - BREMSSTRAHLUNG COLLIMATOR
D/S - DOWNSTREAM
MONO - MONOCHROMATER
MSK - FIXED MASK
MSLT - MONOCHROMATIC SLIT
PFM - PHOTON FOCUSING MIRROR
PSH - PHOTON SHUTTER
SAX - SAXS DETECTOR
SBRS - SECONDARY BREMSSTRAHLUNG SHIELD
SCHM - SAMPLE CHAMBER
SLT - SLIT
SSA - SECONDARY SOURCE APERTURE
U/S - UPSTREAM
WBS - WHITE BEAM STOP

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN MILLIMETERS
DIMENSIONS IN BRACKETS [xx.x] (WHERE PRESENT) ARE INCHES AND ARE FOR REFERENCE ONLY
INTERPRET DRAWING AS PER ANSI Y14.5-1994 OR Y32.2-1975

DIMENSIONAL TOLERANCES: X ± 1.500, .X ± 0.750, .XX ± 0.400, .XXX ± 0.120
ANGULAR TOLERANCE: ± .5
FINISH: 3.2
BREAK EDGES & SHARP CORNERS 0.120 MIN. TO 0.750 MAX.
THIRD ANGLE PROJECTION

BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN SCIENCE ASSOCIATES
UPTON, NEW YORK 11973
Exploring Life's Mysteries, Protecting its Future

NSLS II NATIONAL SYNCHROTRON LIGHT SOURCE II

DRAWN BY	M. JOHANSON	7/11/2016
CHECKED BY	L. LIENHARD	7/2016
VACUUM APPROVAL	-	-
RADIATION APPROVAL	L. LIENHARD	7/2016
SUPERVISOR APPROVAL	M. FUKUTO	7/2016
ES&H APPROVAL	L. STIEGLER	7/2016
QA APPROVAL	J. ZIPPER	7/2016

PHOTON DIVISION
CMS BEAMLINE
CMS BEAMLINE RAYTRACE

NEXT ASSY:	N/A		
PROJECT: BDN		SCALE: SEE VIEW	WBS# 6.05.02
SHEET SIZE: E	DRAWING/PART NUMBER: PD-CMS-RAYT-0001	REVISION: A	
ES&H RISK LEVEL: A-1		SHEET 1 OF 7	

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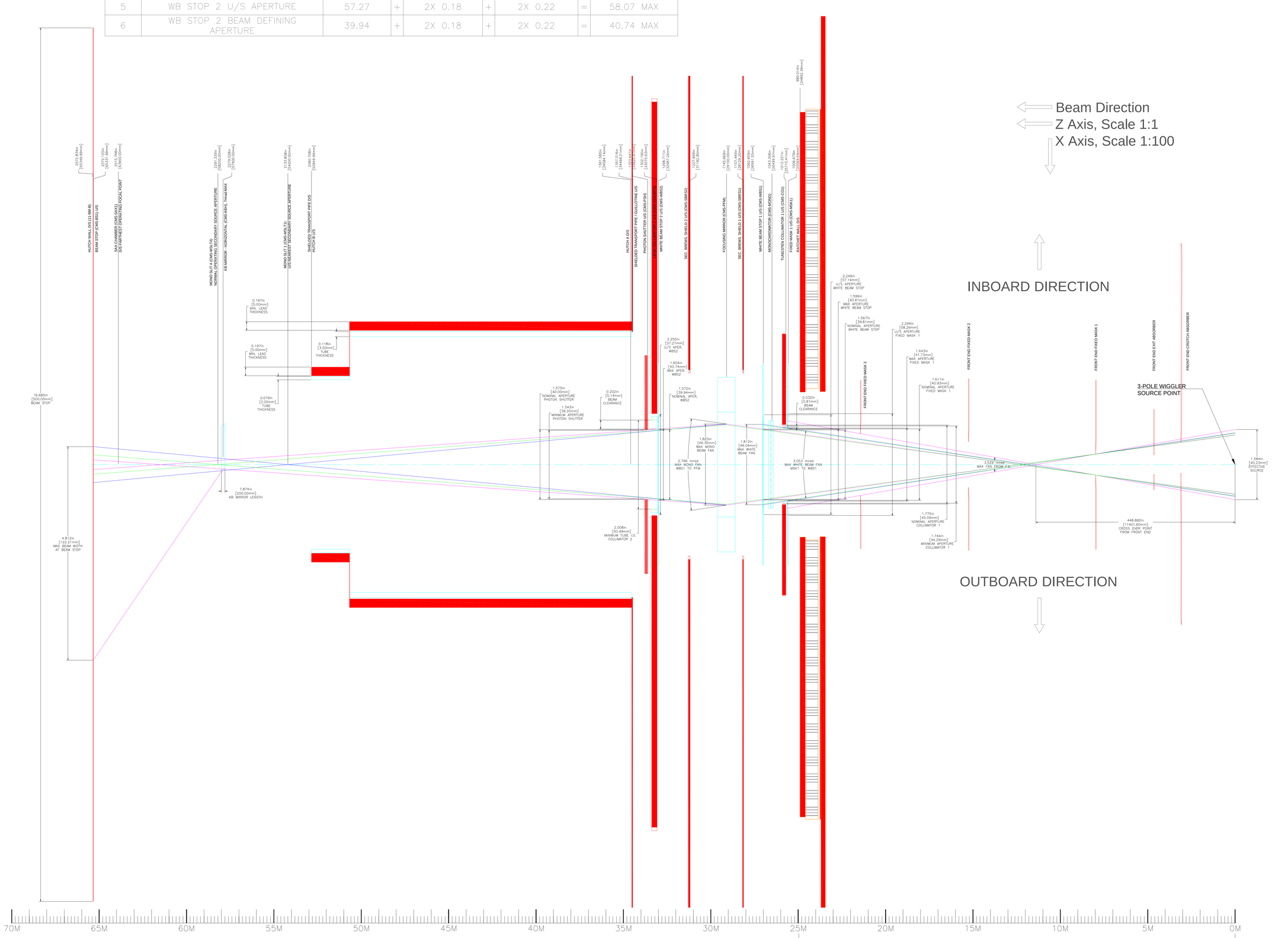
RELEASED – EFFECTIVE

TABLE OF TOLERANCED DIMENSIONS (mm)

LINE	DESCRIPTION	NOMINAL	±	FABRICATION	±	POSITION	=	TOTAL
1	FIXED MASK 1 U/S APERTURE	58.26	+	2X 0.18	+	2X 0.22	=	59.06 MAX
2	FIXED MASK 1 BEAM DEFINING APERTURE	40.93	+	2X 0.18	+	2X 0.22	=	41.73 MAX
3	WB STOP / MONO U/S APERTURE	57.14	+	2X 0.18	+	2X 0.22	=	57.94 MAX
4	WB STOP / MONO BEAM DEFINING APERTURE	39.81	+	2X 0.18	+	2X 0.22	=	40.61 MAX
5	WB STOP 2 U/S APERTURE	57.27	+	2X 0.18	+	2X 0.22	=	58.07 MAX
6	WB STOP 2 BEAM DEFINING APERTURE	39.94	+	2X 0.18	+	2X 0.22	=	40.74 MAX

TABLE OF TOLERANCED DIMENSIONS (mm)

LINE	DESCRIPTION	NOMINAL	±	FABRICATION	±	POSITION	=	TOTAL
7	TUNGSTEN COLLIMATOR (CO1)	45.09	–	2X 0.18	–	2X 0.22	=	44.29 MIN
8	BREMSSTRAHLUNG STOP (CO2/BRS)	51.79	–	2X 0.18	–	2X 0.22	=	50.99 MIN
9	PHOTON SHUTTER APERTURE	40.00	–	2X 0.18	–	2X 0.22	=	39.20 MIN



Synchrotron Ray Tracing - HORIZONTAL

Scale 1:75

SEE FRONT END RAY TRACING
SR-FE-3PW-3001

E SHEET SIZE	PD-CMS-RAYT-0001 DRAWING/PART NUMBER	A REVISION
ESH&Q RISK LEVEL A-1		SHEET 2 OF 7

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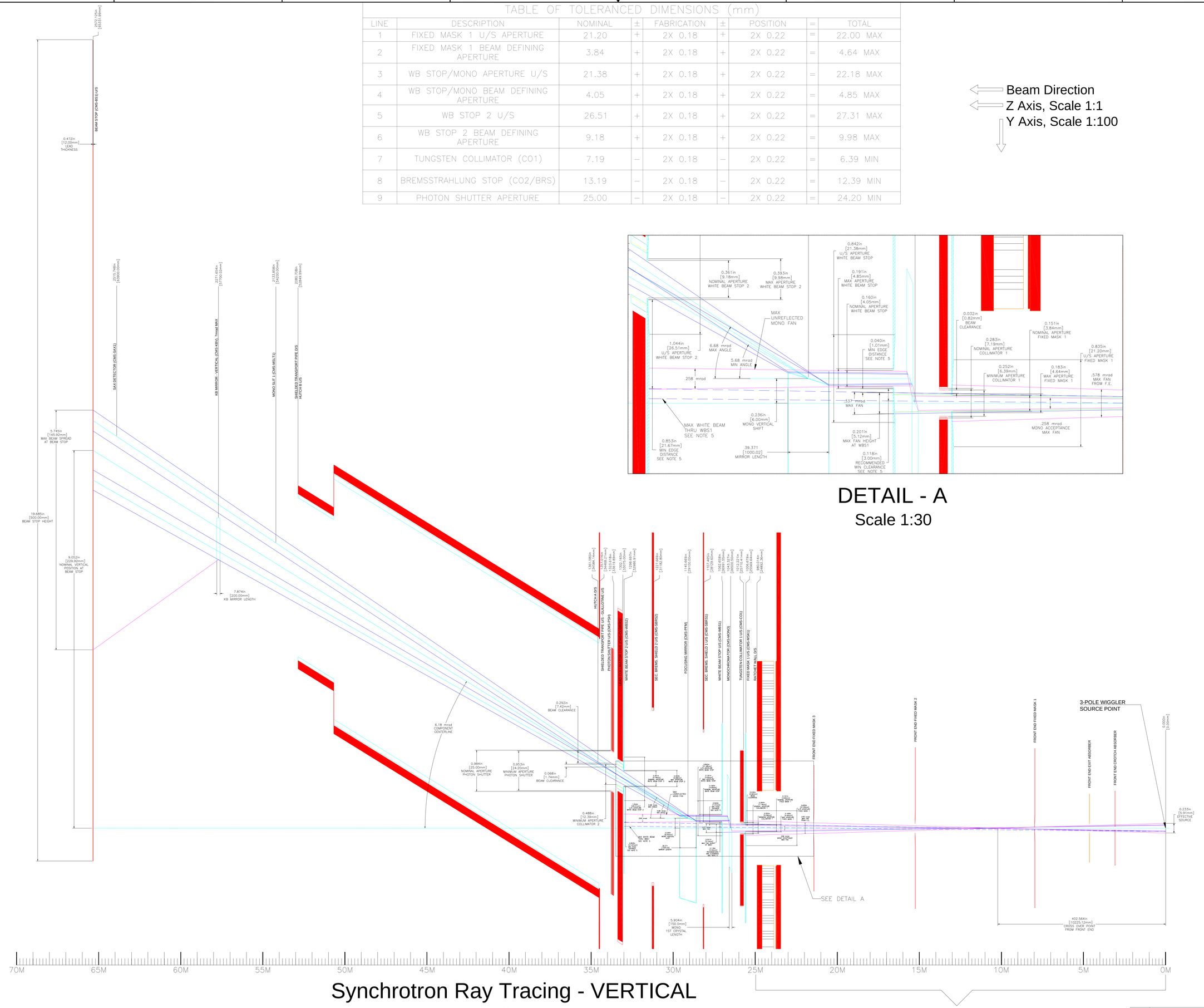
RELEASED – EFFECTIVE

TABLE OF TOLERANCED DIMENSIONS (mm)								
LINE	DESCRIPTION	NOMINAL	±	FABRICATION	±	POSITION	=	TOTAL
1	FIXED MASK 1 U/S APERTURE	21.20	+	2X 0.18	+	2X 0.22	=	22.00 MAX
2	FIXED MASK 1 BEAM DEFINING APERTURE	3.84	+	2X 0.18	+	2X 0.22	=	4.64 MAX
3	WB STOP/MONO APERTURE U/S	21.38	+	2X 0.18	+	2X 0.22	=	22.18 MAX
4	WB STOP/MONO BEAM DEFINING APERTURE	4.05	+	2X 0.18	+	2X 0.22	=	4.85 MAX
5	WB STOP 2 U/S	26.51	+	2X 0.18	+	2X 0.22	=	27.31 MAX
6	WB STOP 2 BEAM DEFINING APERTURE	9.18	+	2X 0.18	+	2X 0.22	=	9.98 MAX
7	TUNGSTEN COLLIMATOR (CO1)	7.19	–	2X 0.18	–	2X 0.22	=	6.39 MIN
8	BREMSSTRAHLUNG STOP (CO2/BRS)	13.19	–	2X 0.18	–	2X 0.22	=	12.39 MIN
9	PHOTON SHUTTER APERTURE	25.00	–	2X 0.18	–	2X 0.22	=	24.20 MIN

Beam Direction
Z Axis, Scale 1:1
Y Axis, Scale 1:100

DETAIL - A
Scale 1:30



Synchrotron Ray Tracing - VERTICAL
Scale 1:75

SEE FRONT END RAY TRACING
SR-FE-3PW-3001

E SHEET SIZE	PD-CMS-RAYT-0001 DRAWING/PART NUMBER	A REVISION
ESH&Q RISK LEVEL A-1	SHEET 3 OF 7	

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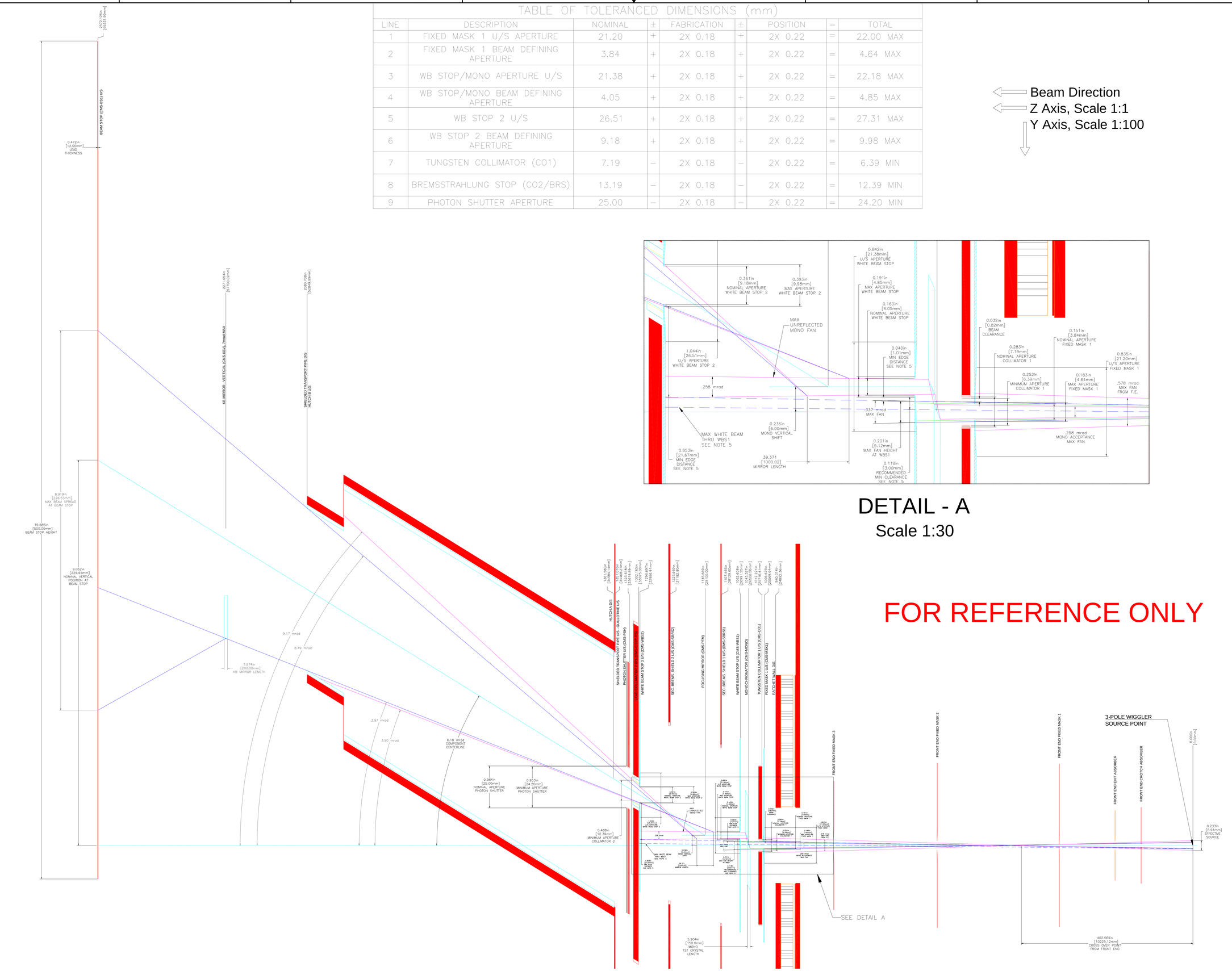
RELEASED – EFFECTIVE

TABLE OF TOLERANCED DIMENSIONS (mm)								
LINE	DESCRIPTION	NOMINAL	±	FABRICATION	±	POSITION	=	TOTAL
1	FIXED MASK 1 U/S APERTURE	21.20	+	2X 0.18	+	2X 0.22	=	22.00 MAX
2	FIXED MASK 1 BEAM DEFINING APERTURE	3.84	+	2X 0.18	+	2X 0.22	=	4.64 MAX
3	WB STOP/MONO APERTURE U/S	21.38	+	2X 0.18	+	2X 0.22	=	22.18 MAX
4	WB STOP/MONO BEAM DEFINING APERTURE	4.05	+	2X 0.18	+	2X 0.22	=	4.85 MAX
5	WB STOP 2 U/S	26.51	+	2X 0.18	+	2X 0.22	=	27.31 MAX
6	WB STOP 2 BEAM DEFINING APERTURE	9.18	+	2X 0.18	+	2X 0.22	=	9.98 MAX
7	TUNGSTEN COLLIMATOR (CO1)	7.19	–	2X 0.18	–	2X 0.22	=	6.39 MIN
8	BREMSSTRAHLUNG STOP (CO2/BRS)	13.19	–	2X 0.18	–	2X 0.22	=	12.39 MIN
9	PHOTON SHUTTER APERTURE	25.00	–	2X 0.18	–	2X 0.22	=	24.20 MIN

Beam Direction
Z Axis, Scale 1:1
Y Axis, Scale 1:100

DETAIL - A
Scale 1:30

FOR REFERENCE ONLY



Synchrotron Ray Tracing - VERTICAL MISSTEER
Scale 1:75

SEE FRONT END RAY TRACING
SR-FE-3PW-3001

E SHEET SIZE	PD-CMS-RAYT-0001 DRAWING/PART NUMBER		A REVISION
ESH&Q RISK LEVEL	A-1	SHEET 7 OF 7	

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