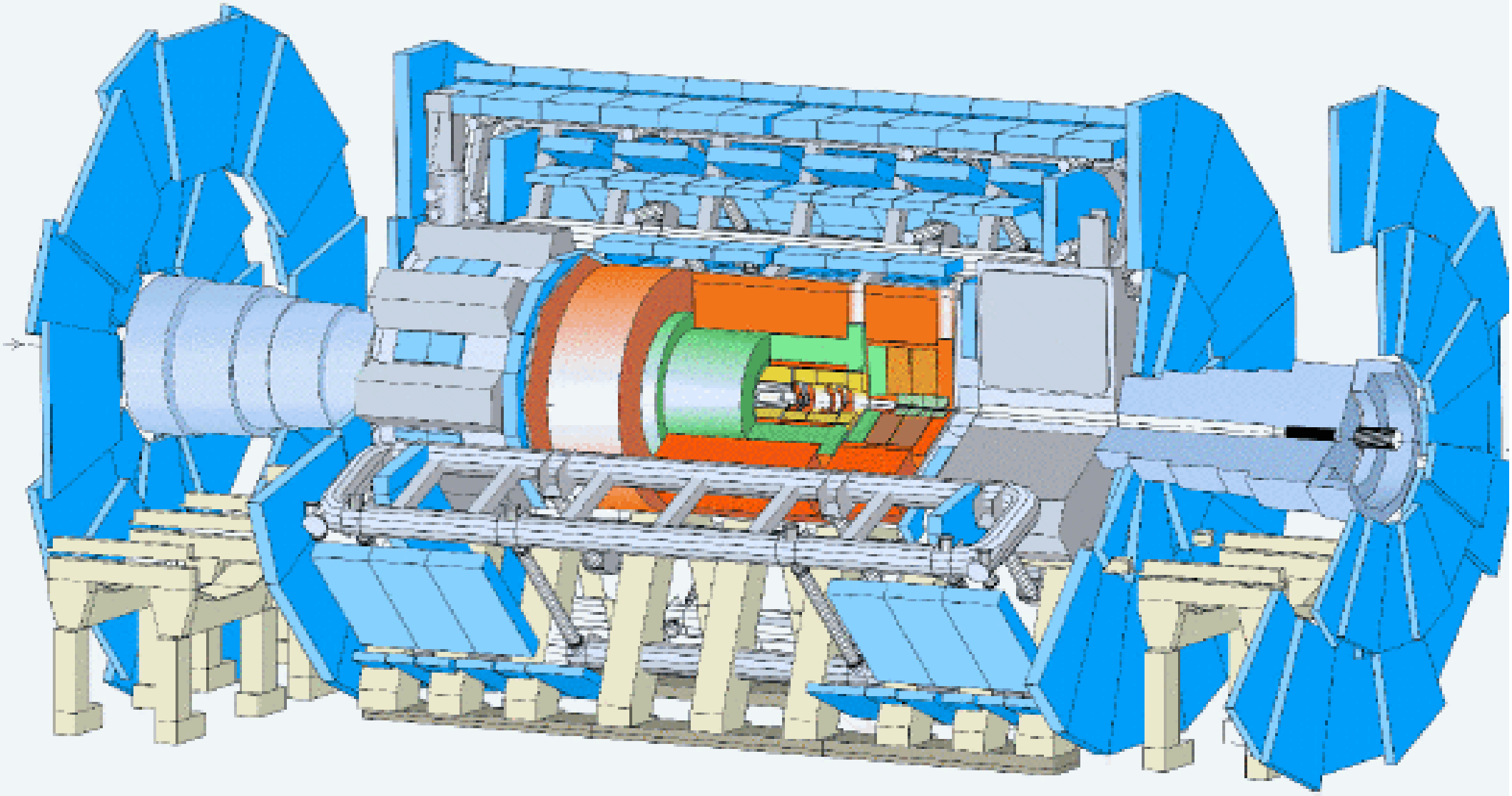
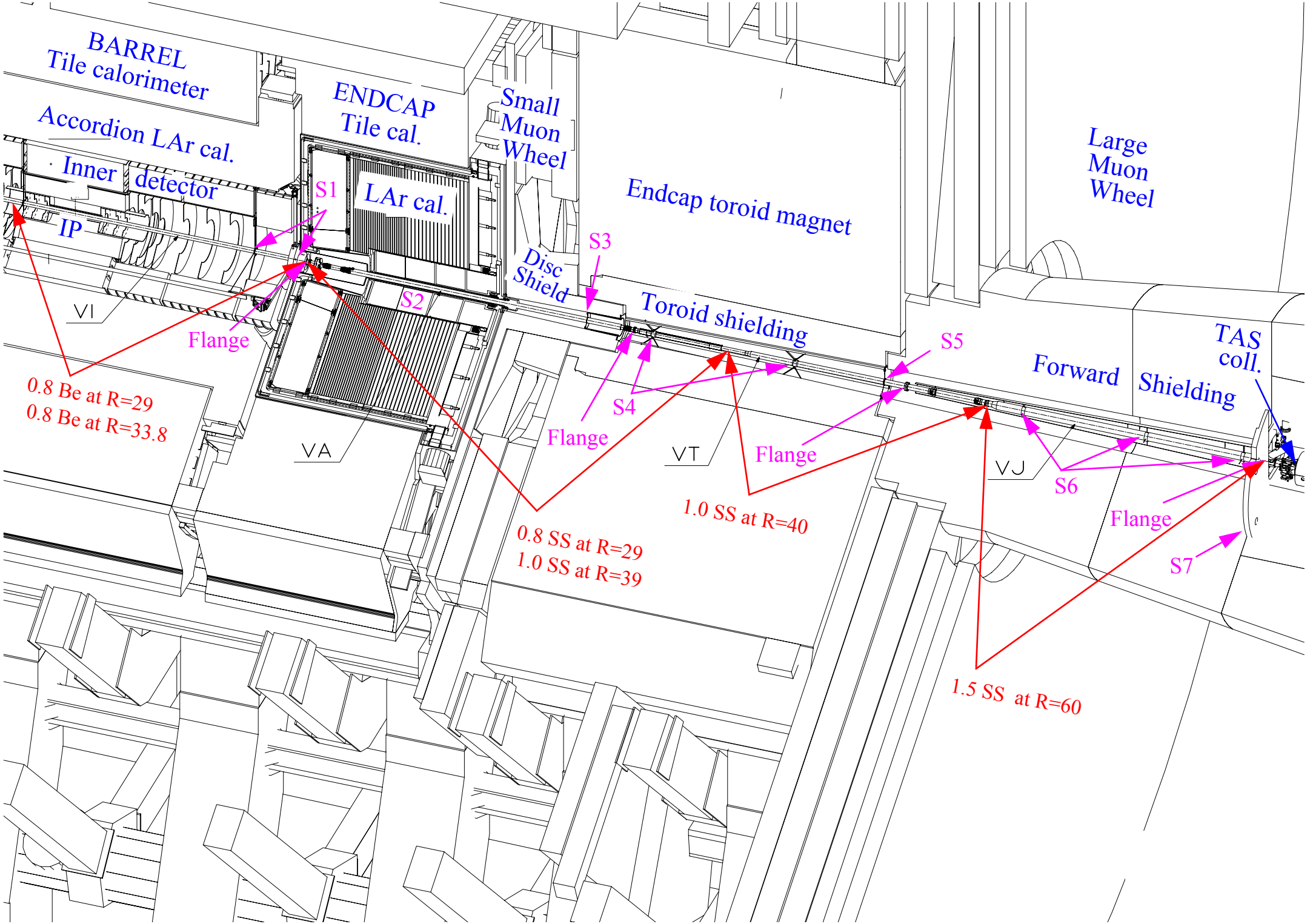
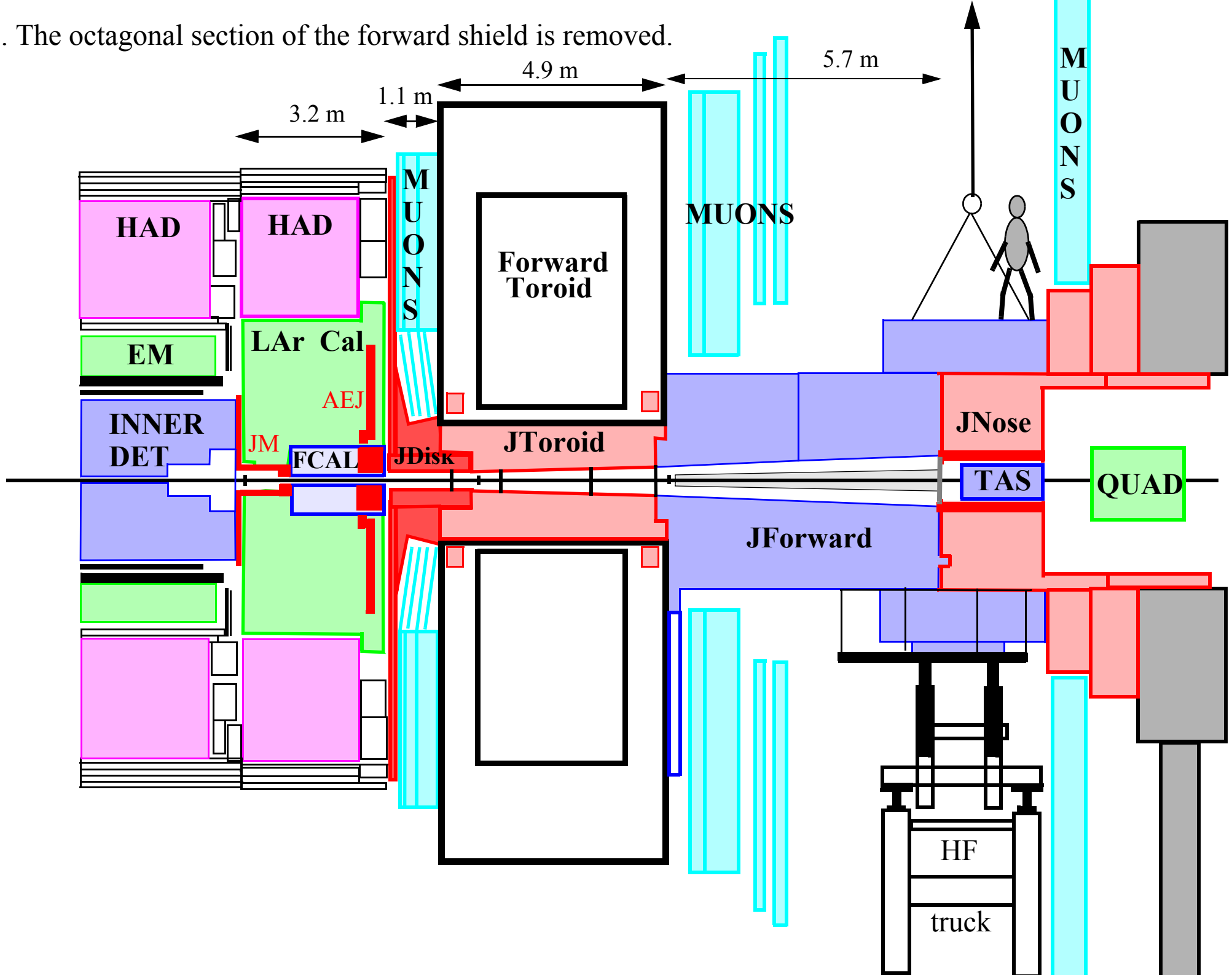
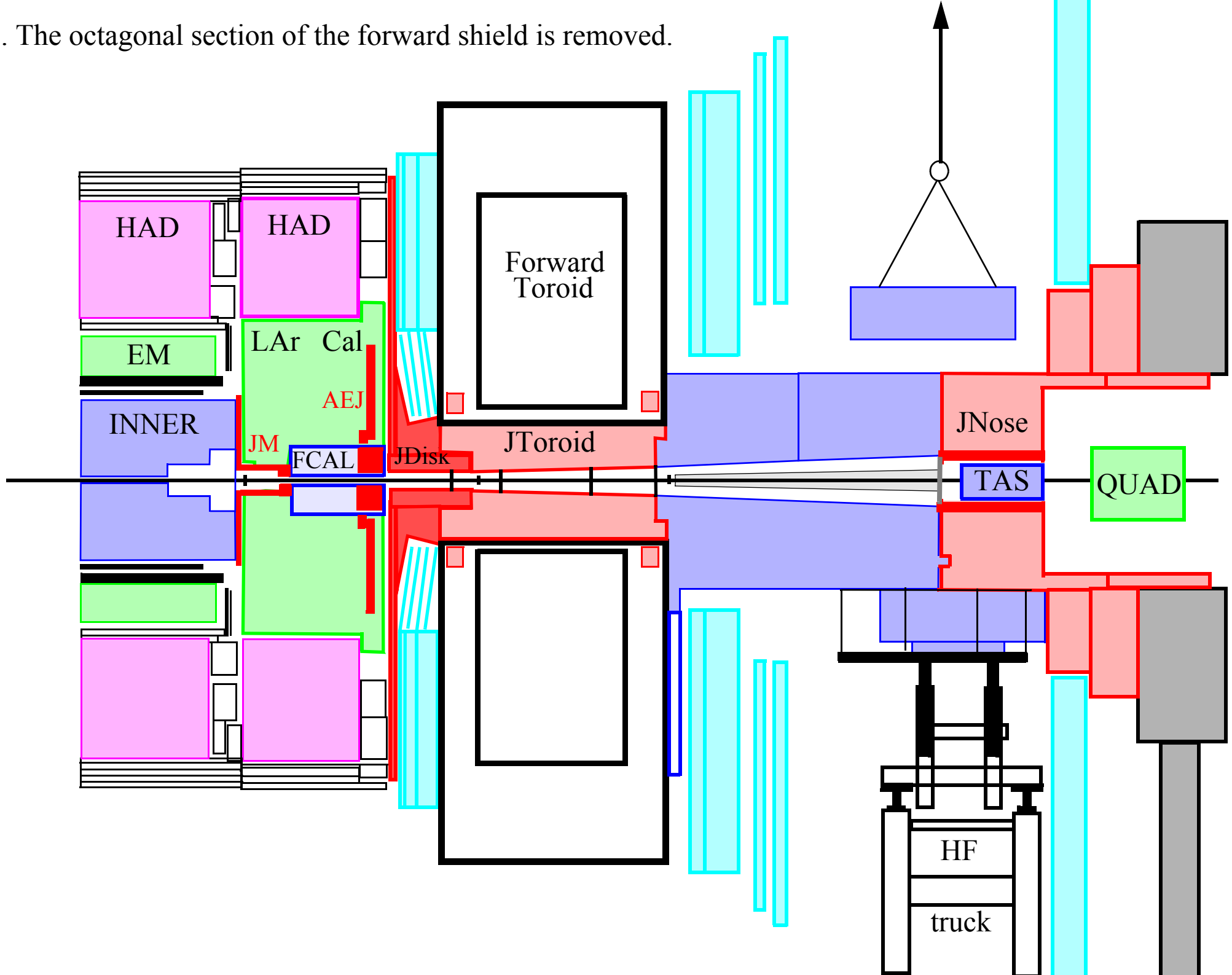



BARREL
Tile calorimeter
Accordion LAr cal.
Inner detector
IP
ENDCAP
Tile cal.
LAr cal.
Small
Muon
Wheel
Endcap toroid magnet
Large
Muon
Wheel
Disc
Shield
Toroid shielding
Forward
Shielding
TAS
coll.
VI
VA
VT
VJ
S1
S2
S3
S4
S5
S6
S7
Flange
Flange
Flange
Flange
Flange
0.8 Be at R=29
0.8 Be at R=33.8
0.8 SS at R=29
1.0 SS at R=39
1.0 SS at R=40
1.5 SS at R=60

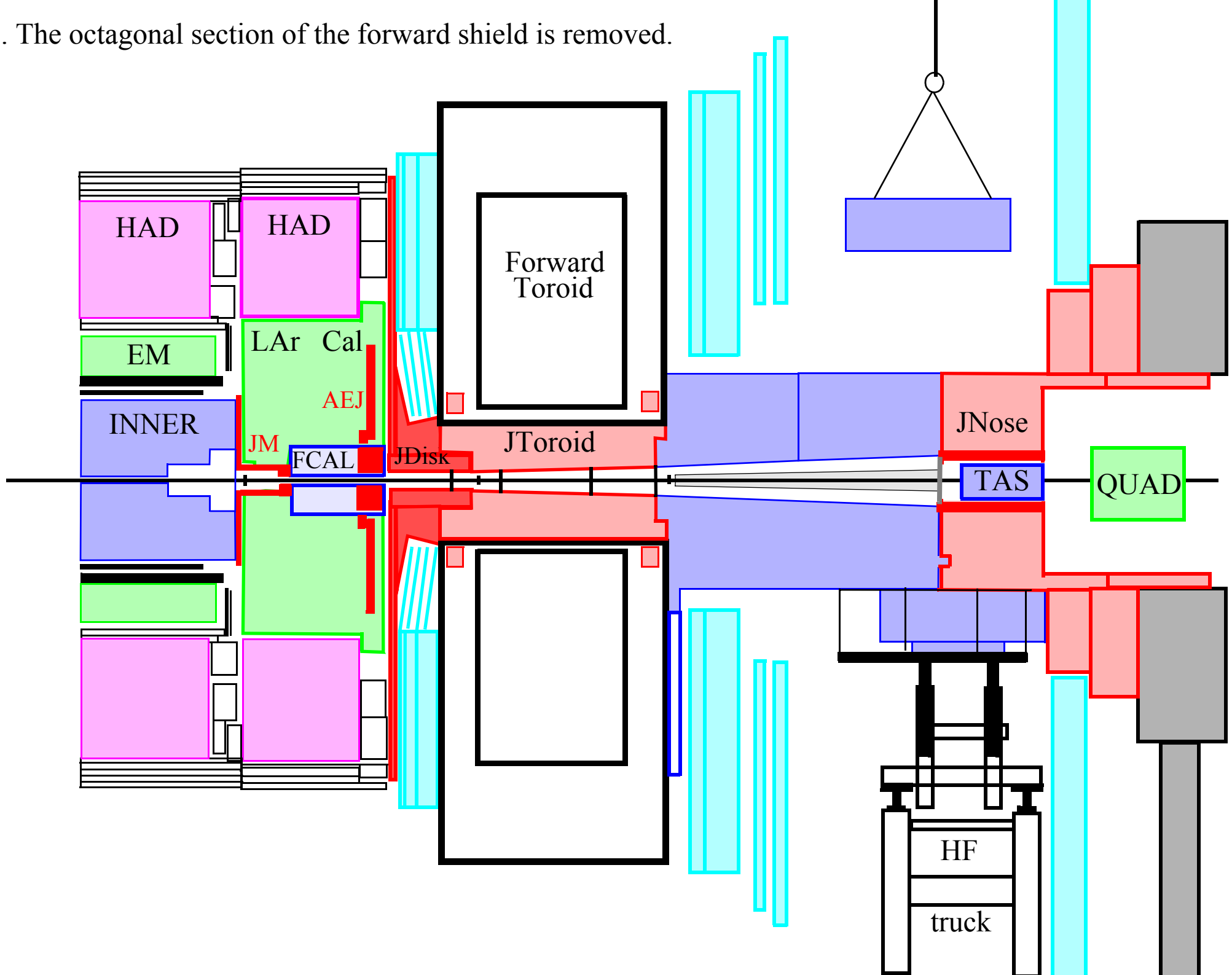
1. The octagonal section of the forward shield is removed.



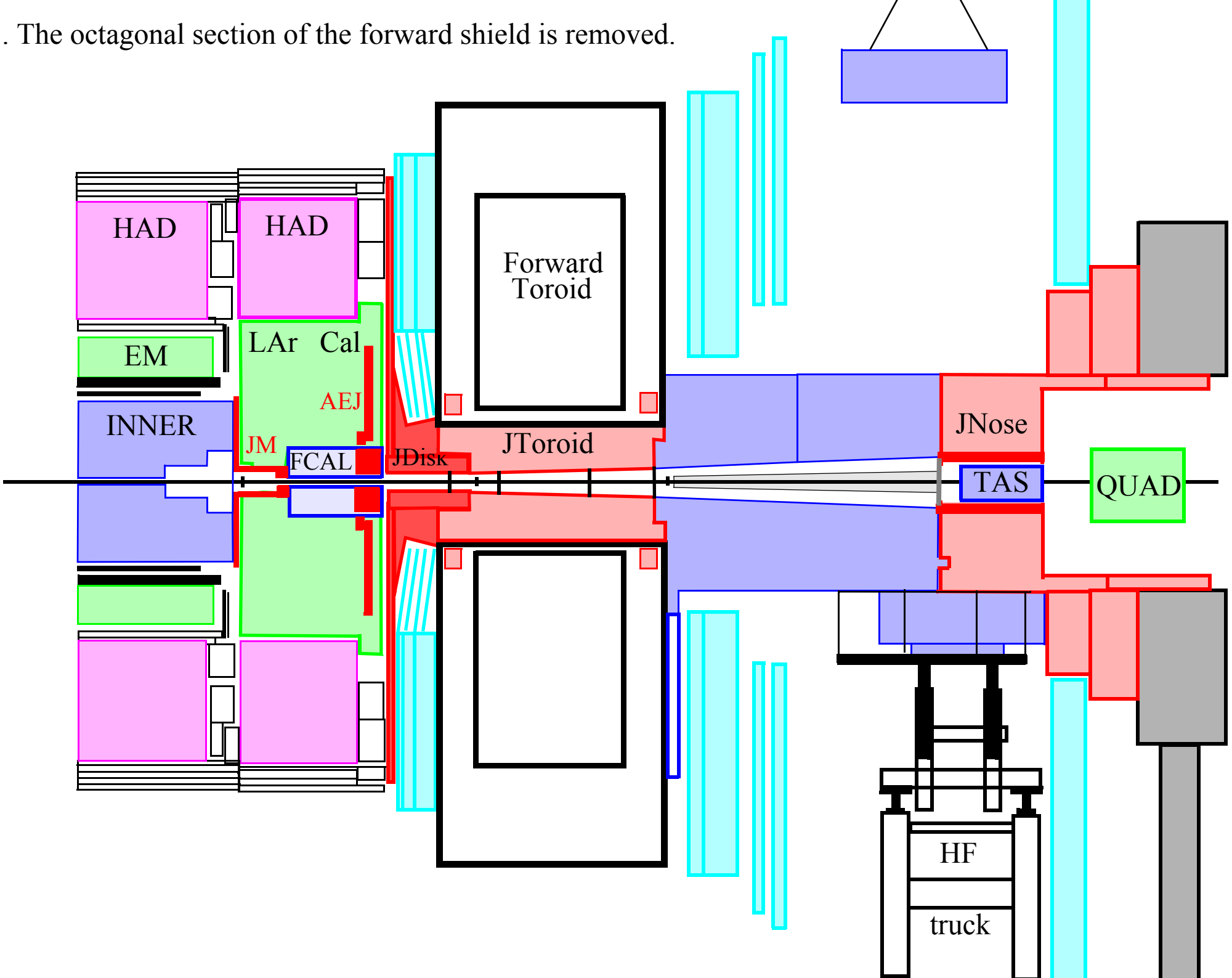
1. The octagonal section of the forward shield is removed.



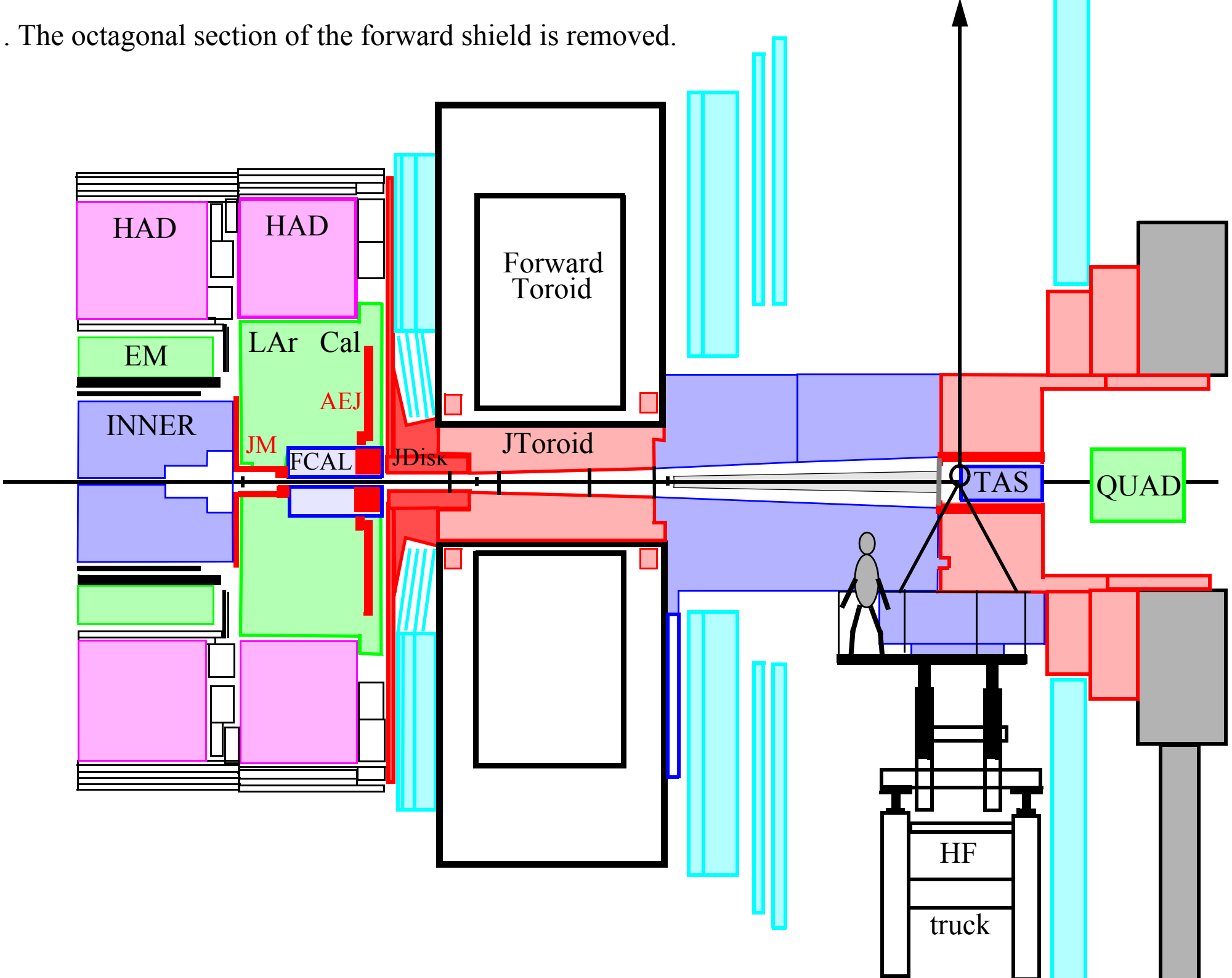
1. The octagonal section of the forward shield is removed.



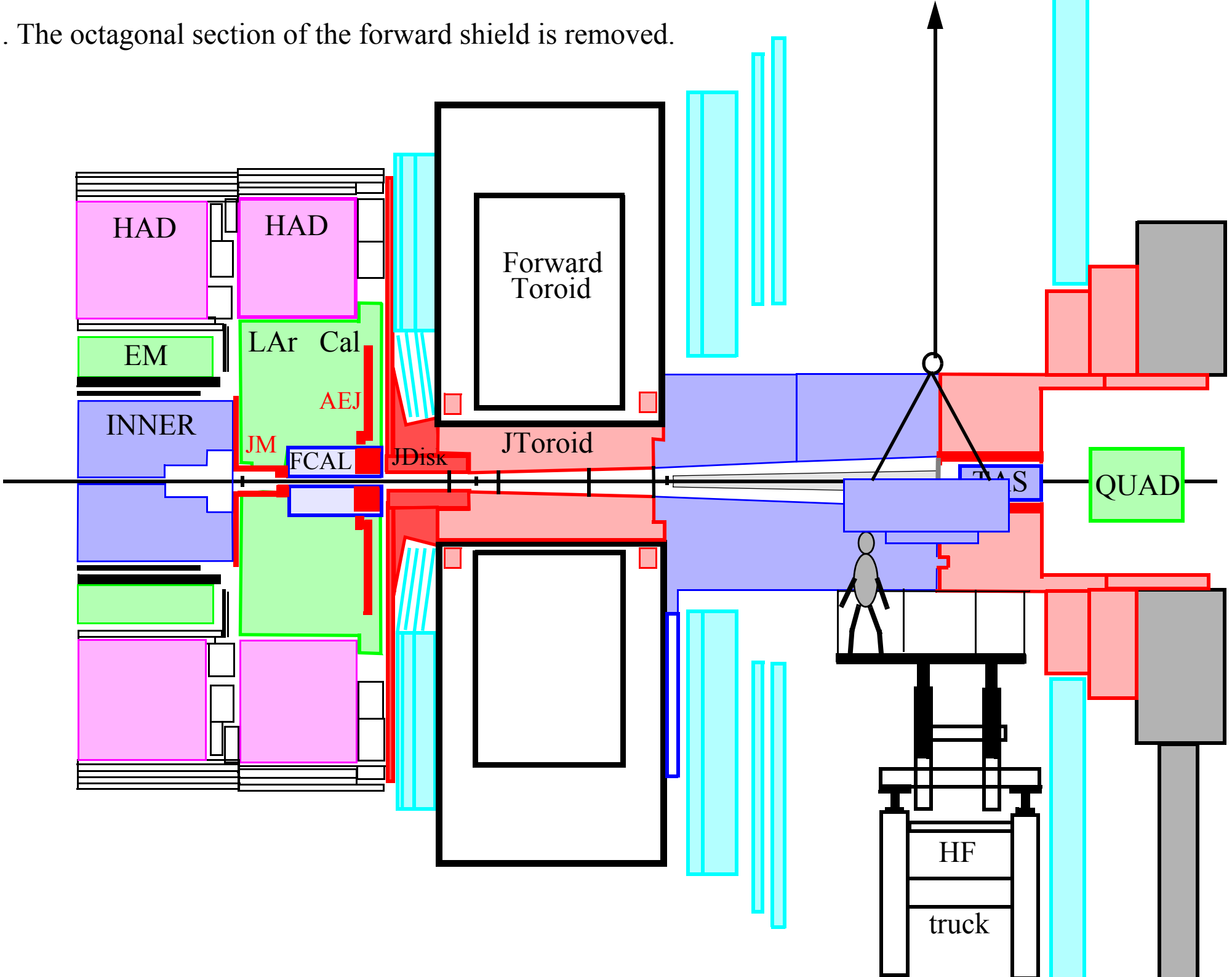
1. The octagonal section of the forward shield is removed.



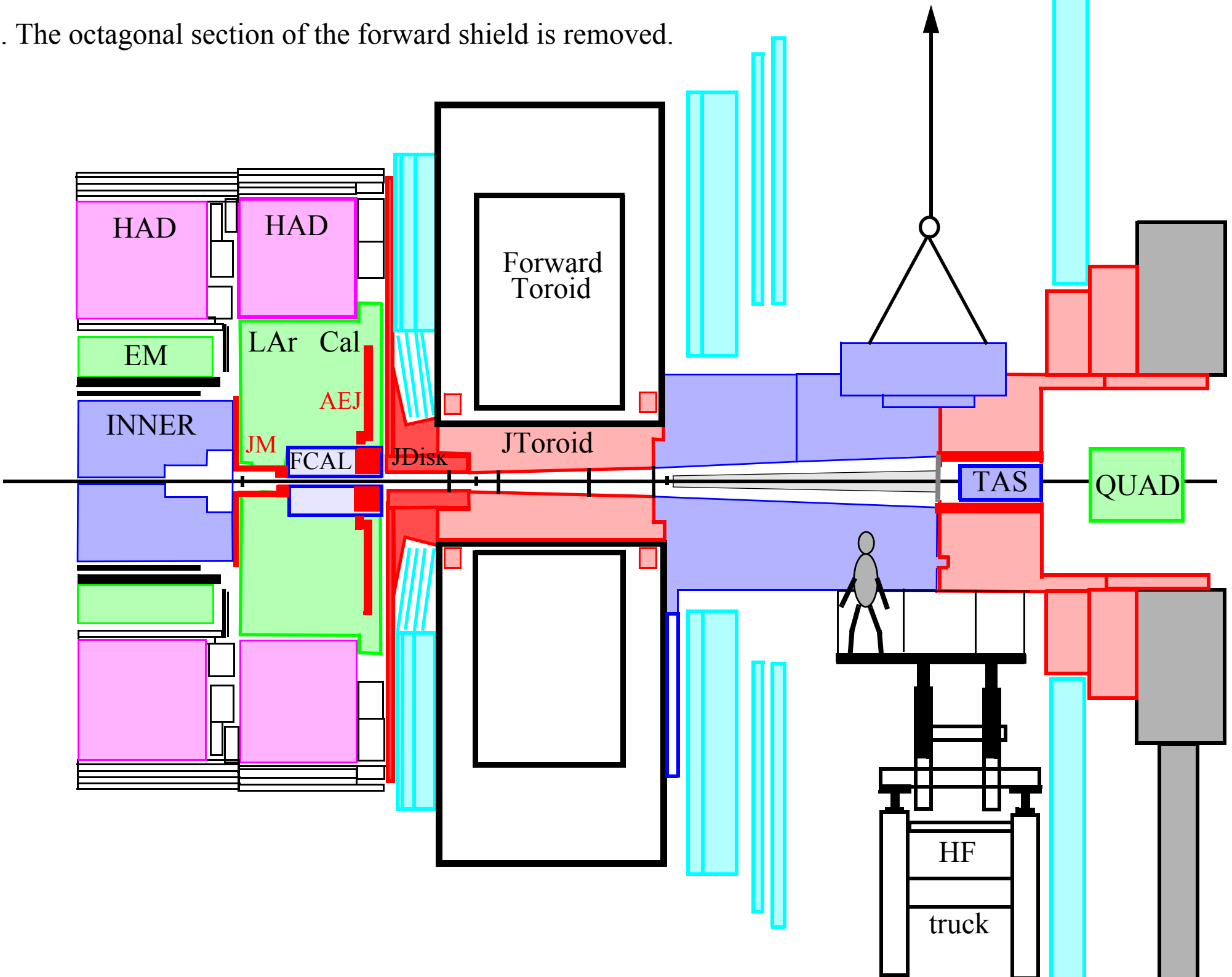
1. The octagonal section of the forward shield is removed.



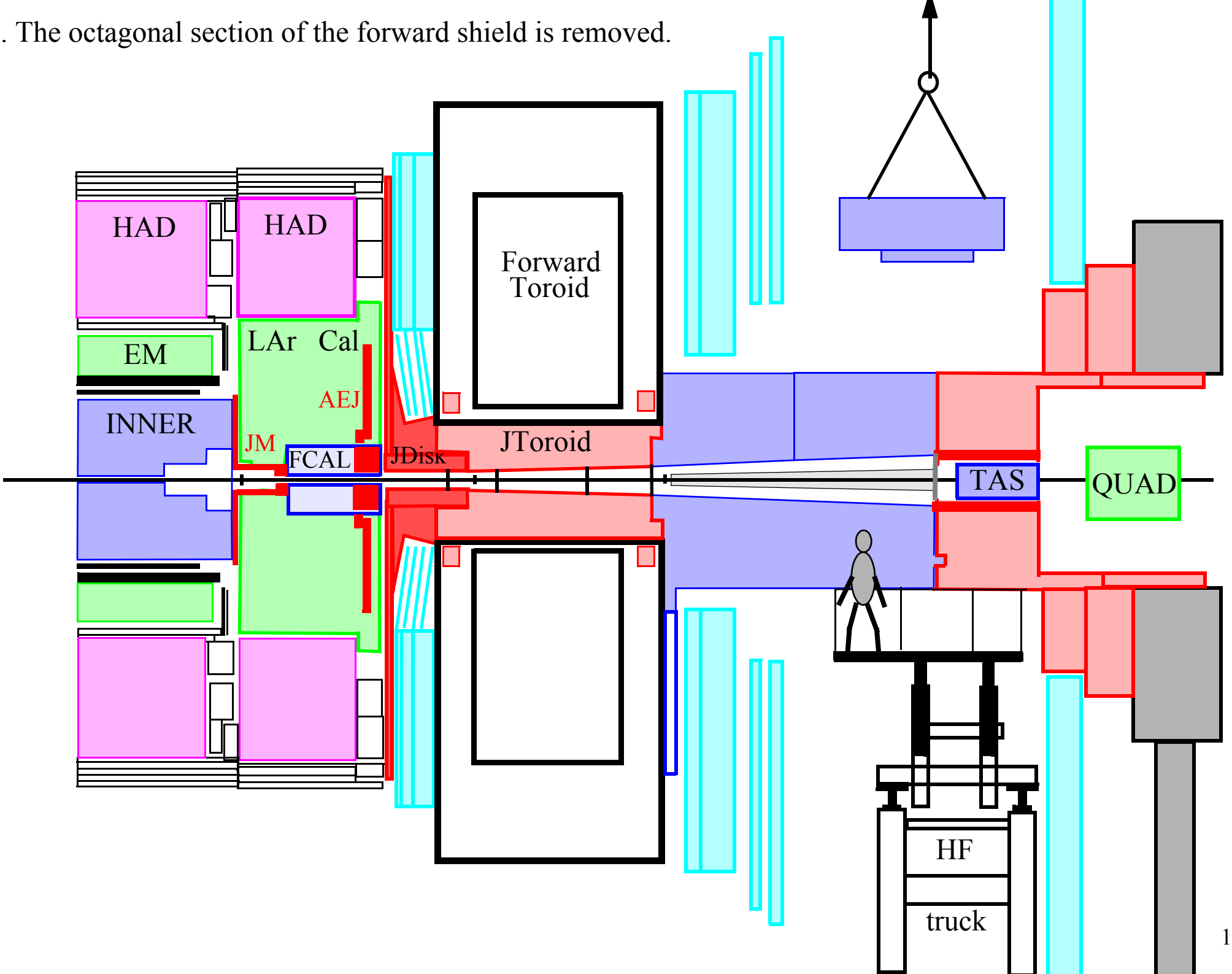
1. The octagonal section of the forward shield is removed.



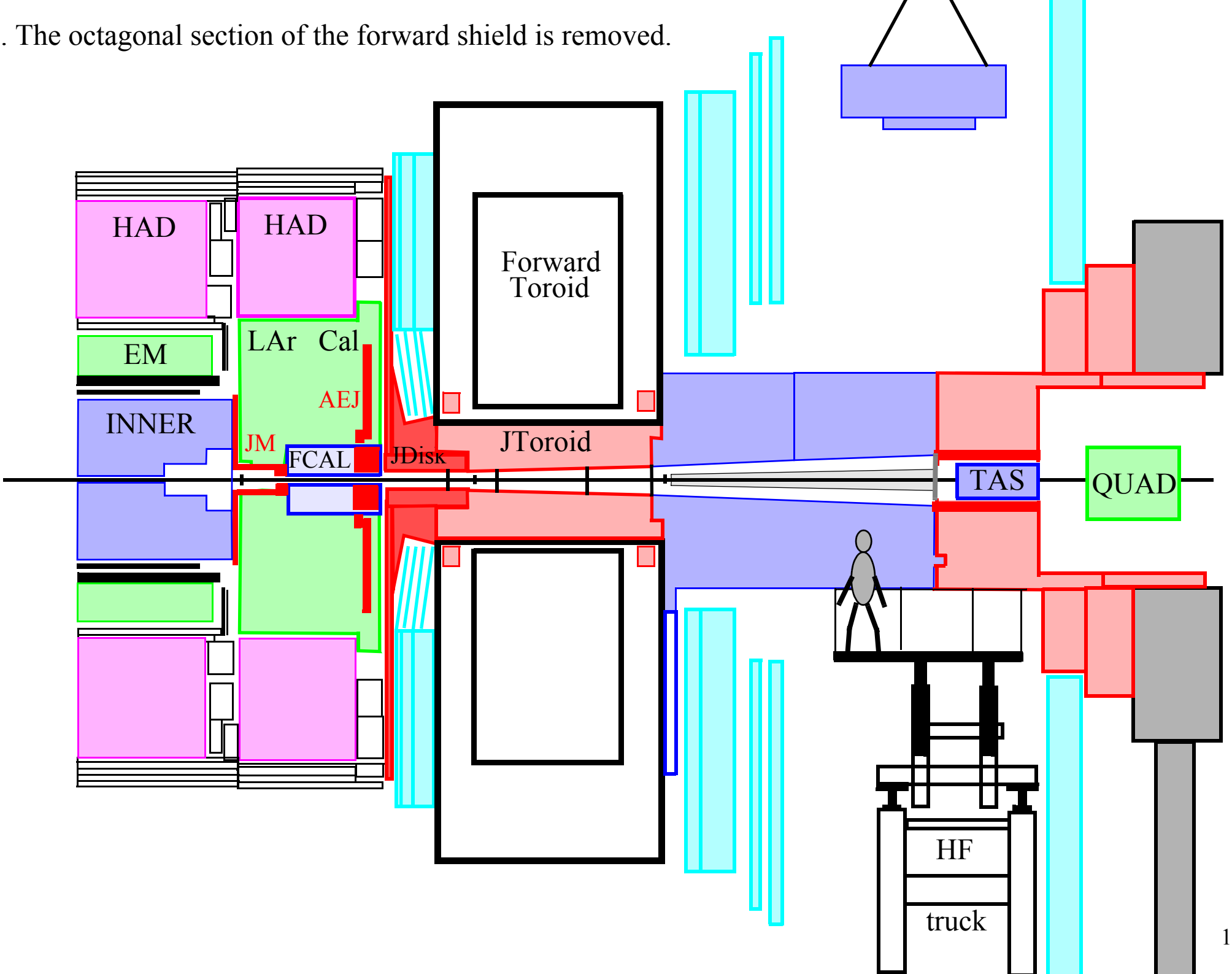
1. The octagonal section of the forward shield is removed.



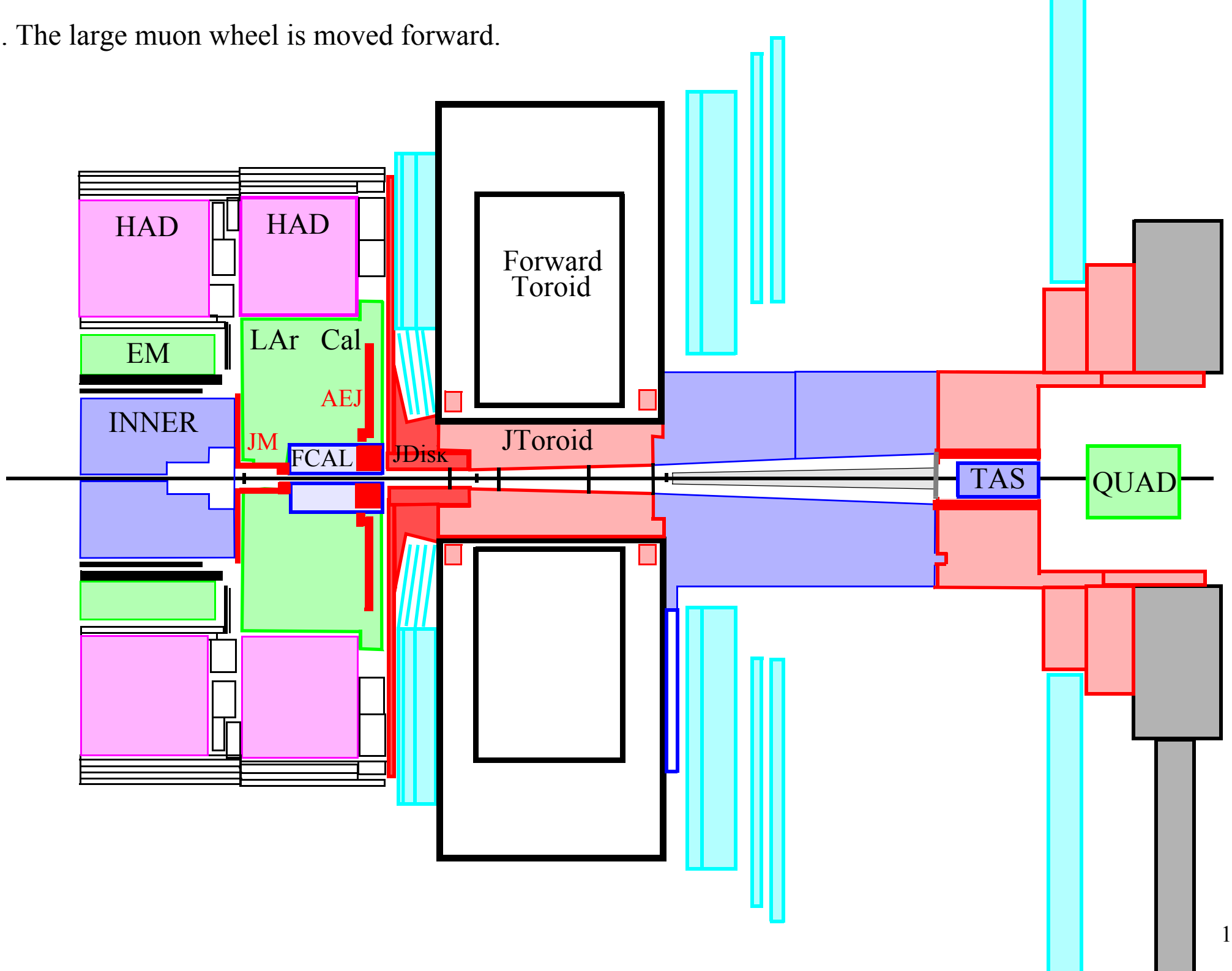
1. The octagonal section of the forward shield is removed.



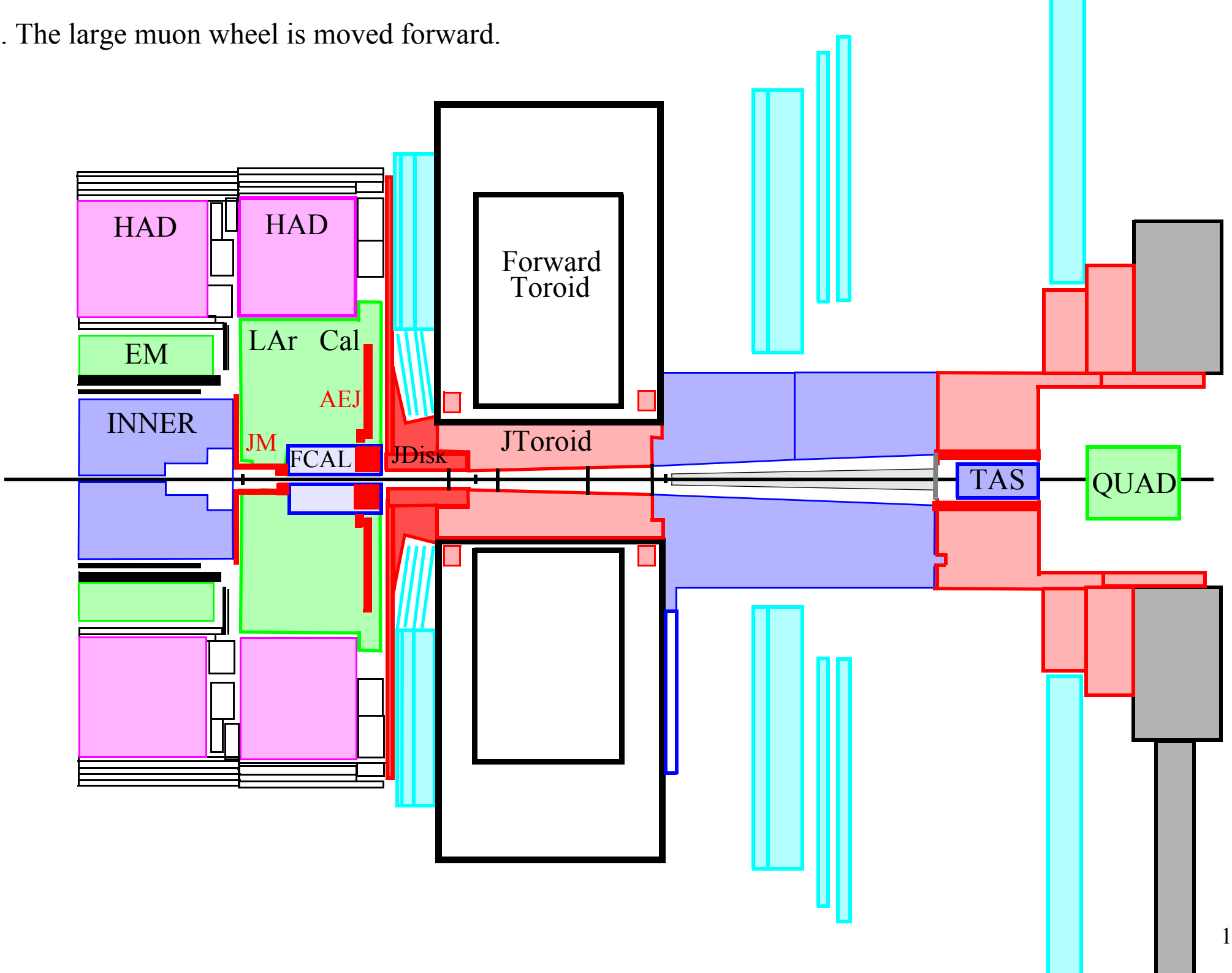
1. The octagonal section of the forward shield is removed.



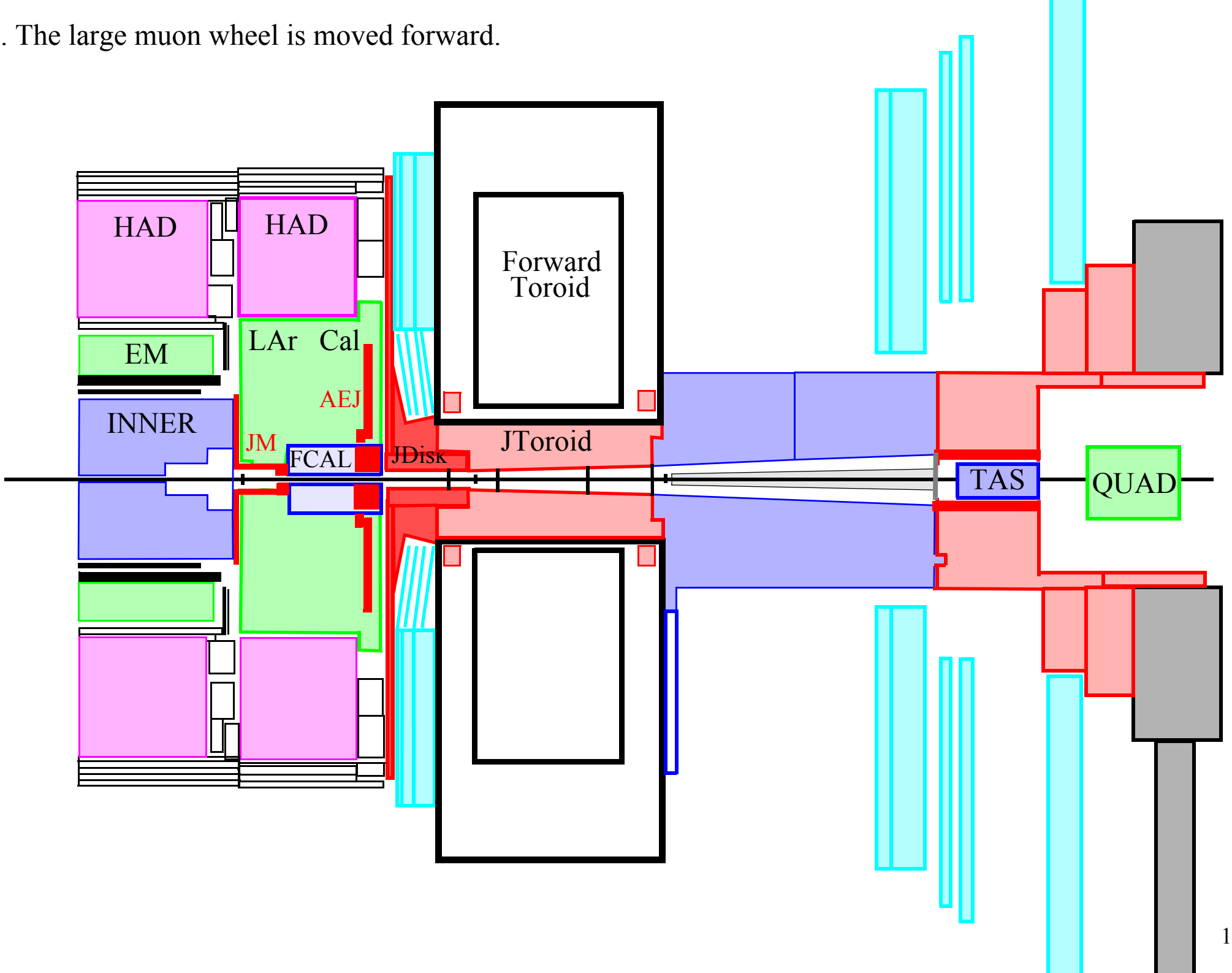
2. The large muon wheel is moved forward.



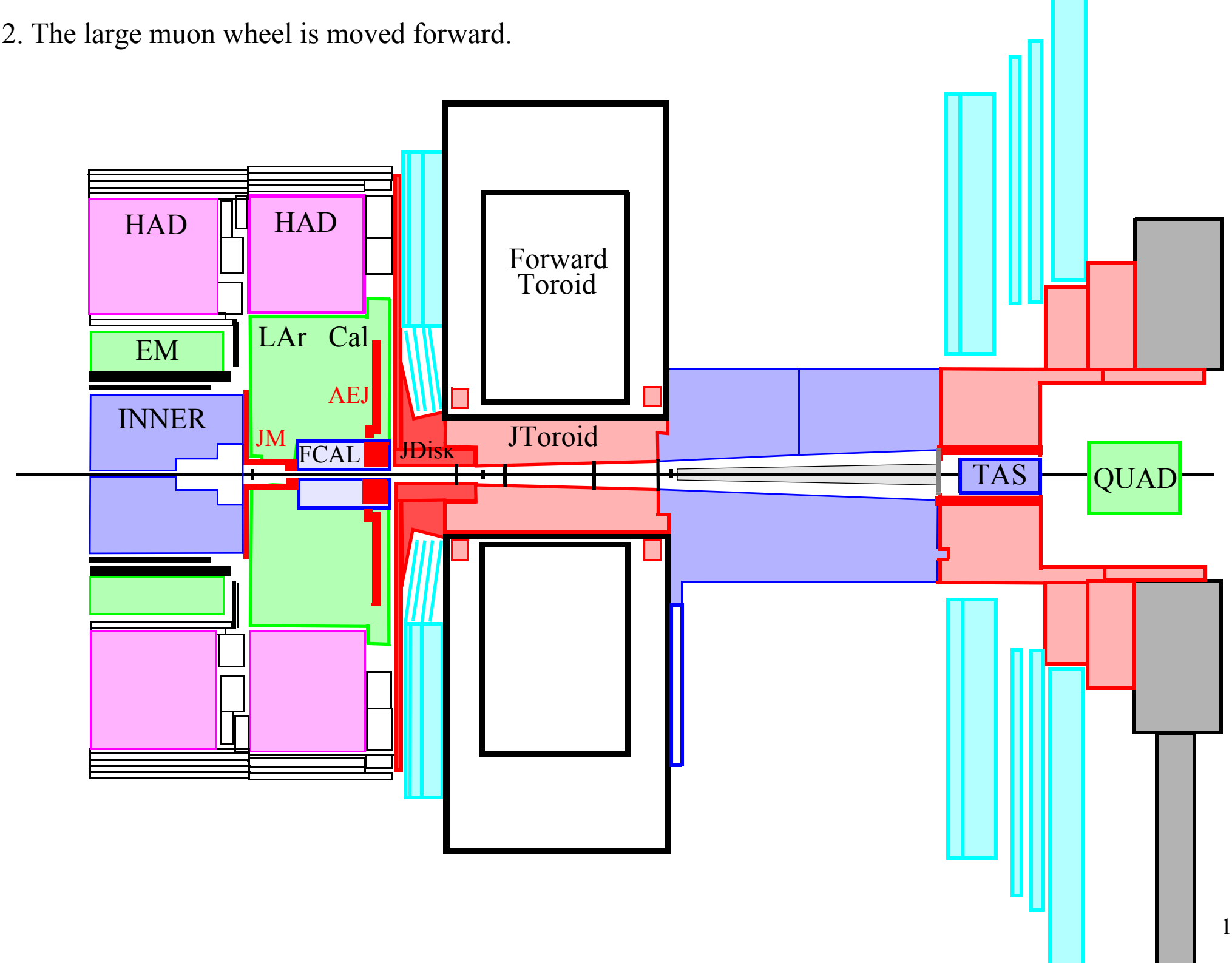
2. The large muon wheel is moved forward.



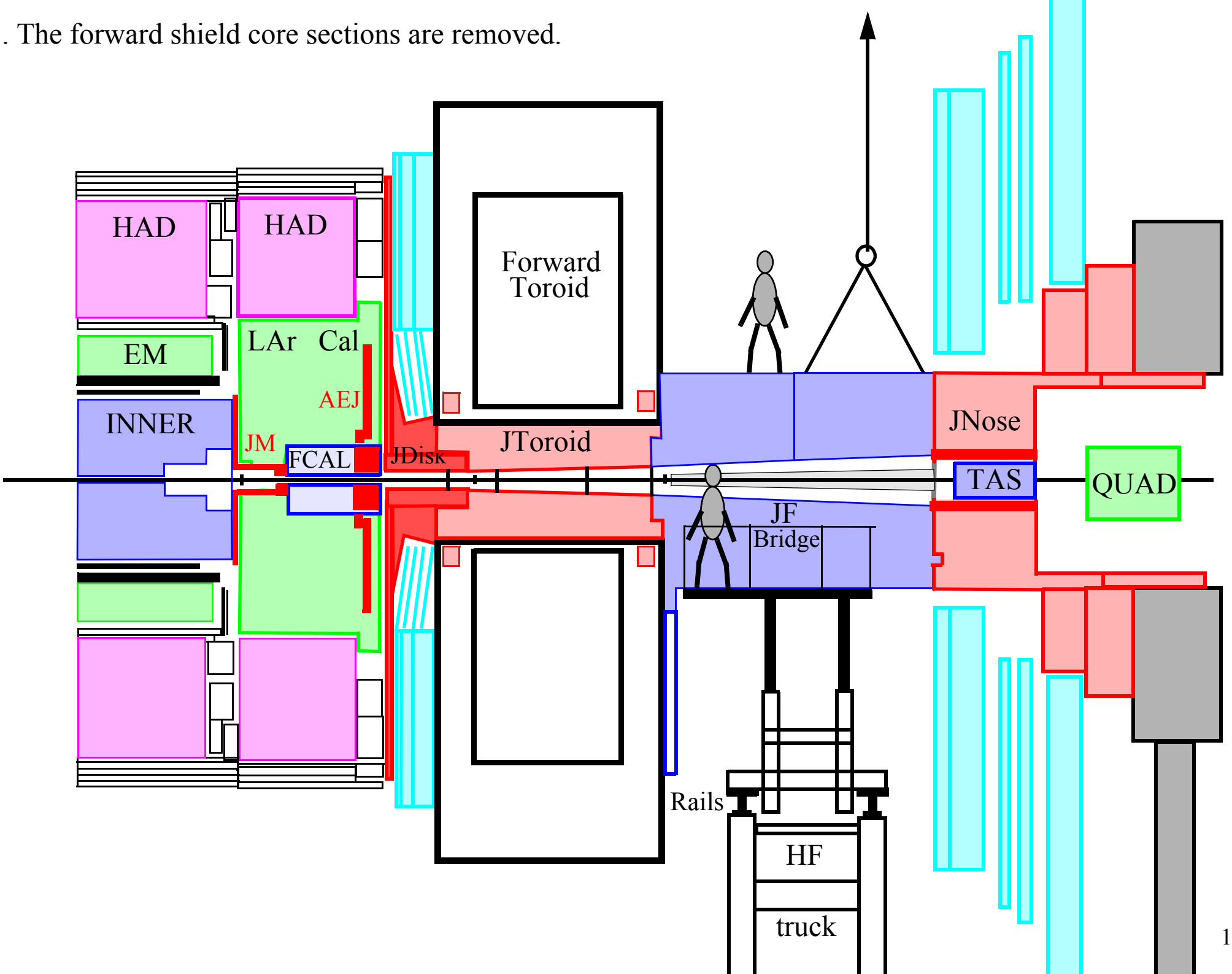
2. The large muon wheel is moved forward.



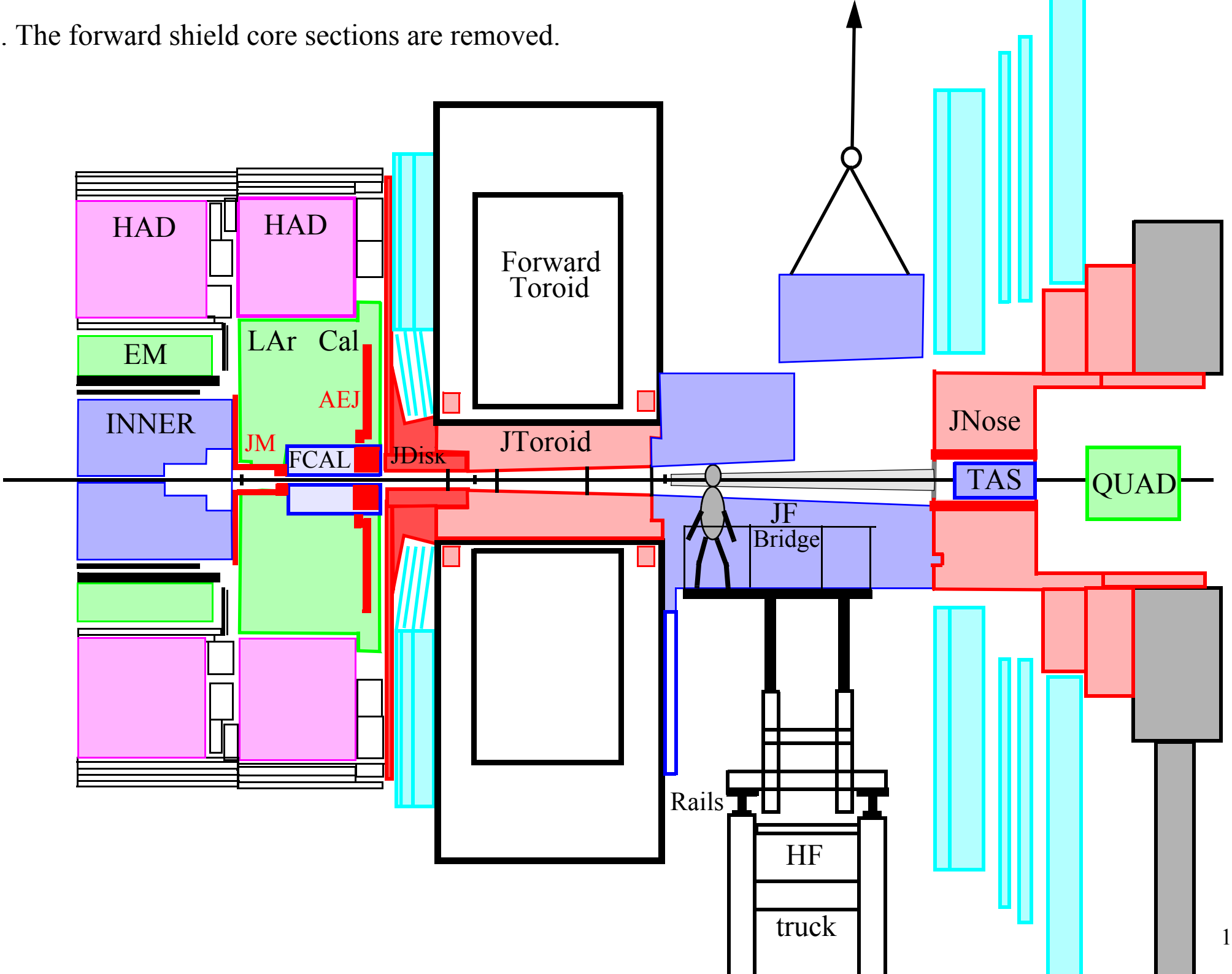
2. The large muon wheel is moved forward.



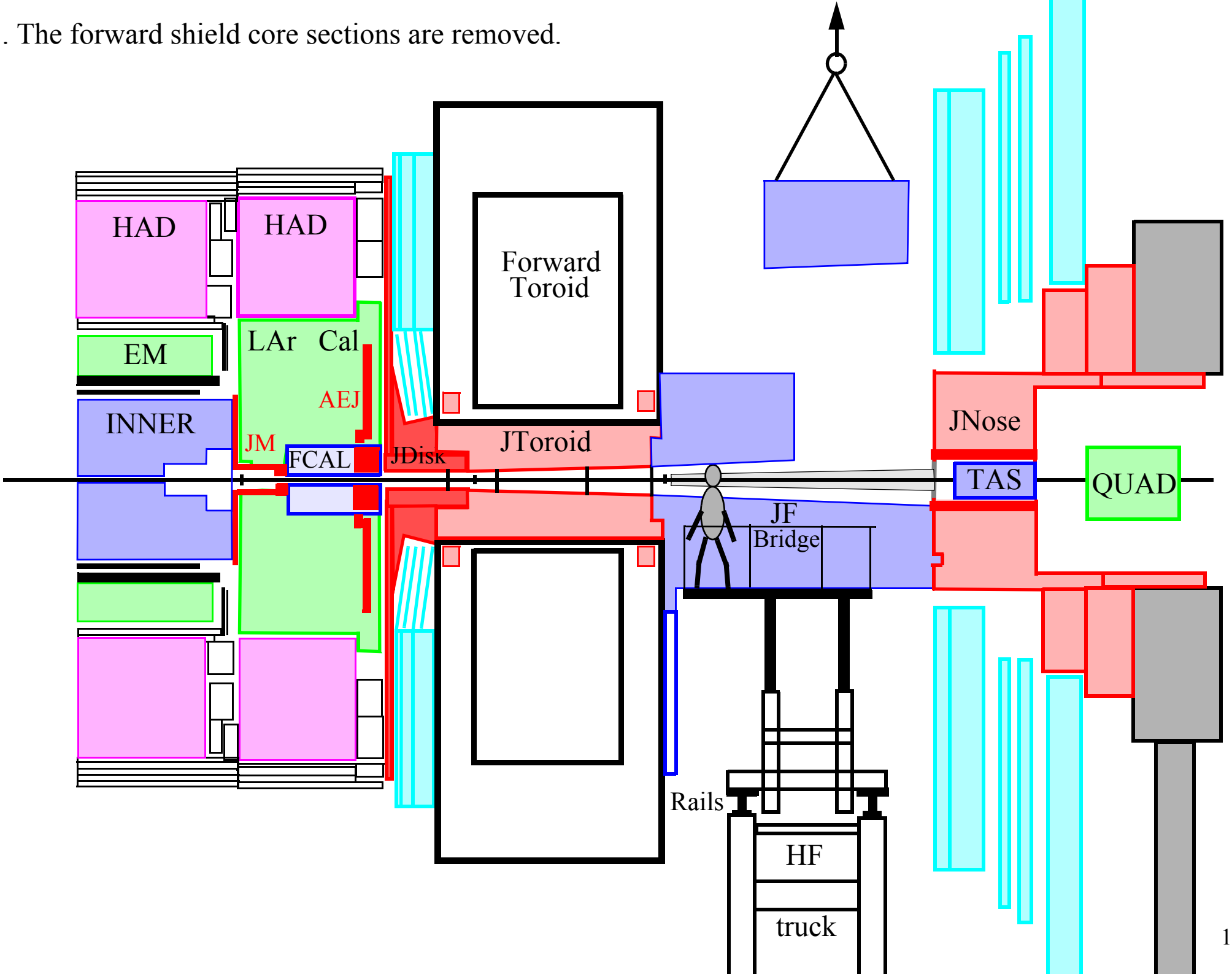
3. The forward shield core sections are removed.



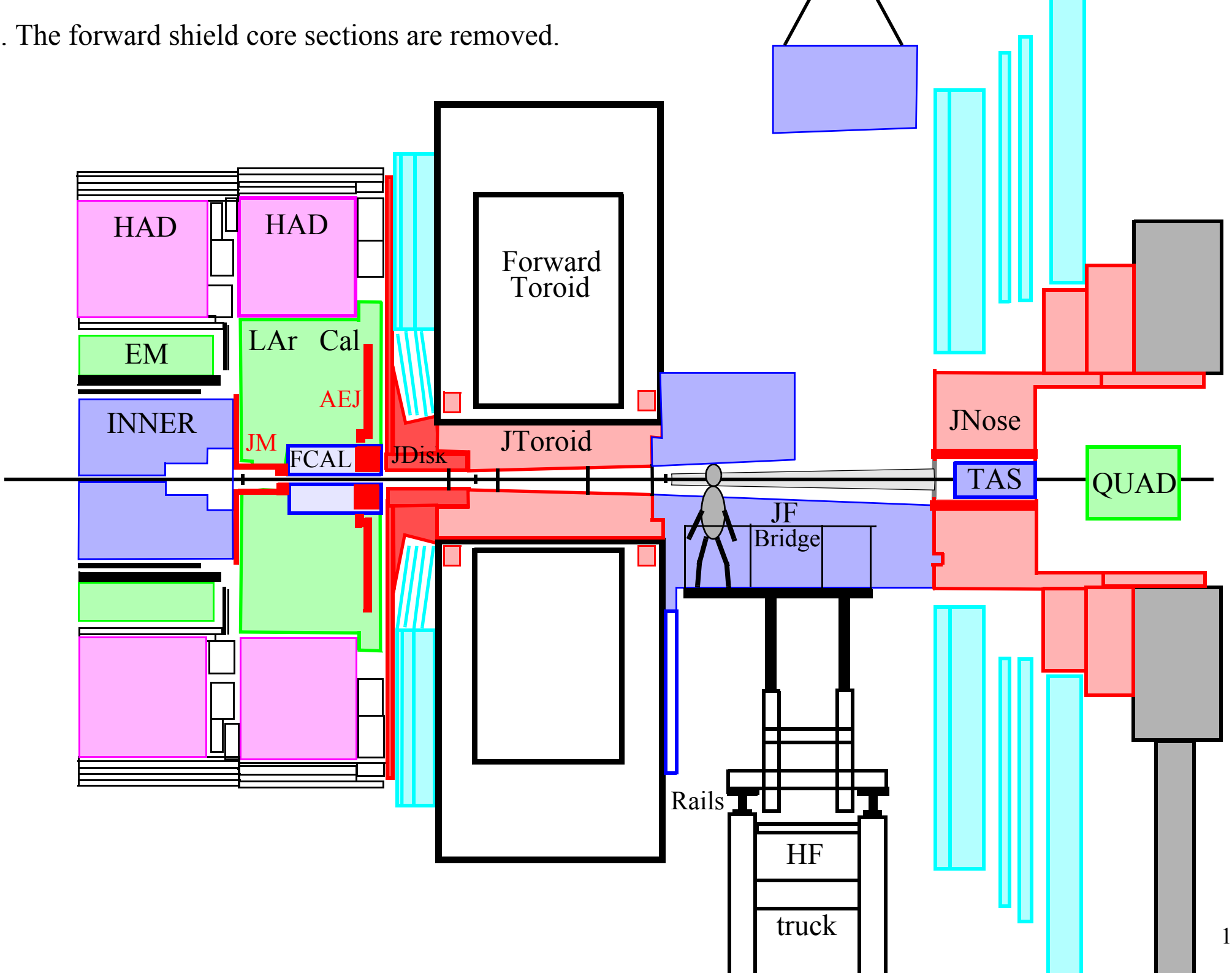
3. The forward shield core sections are removed.



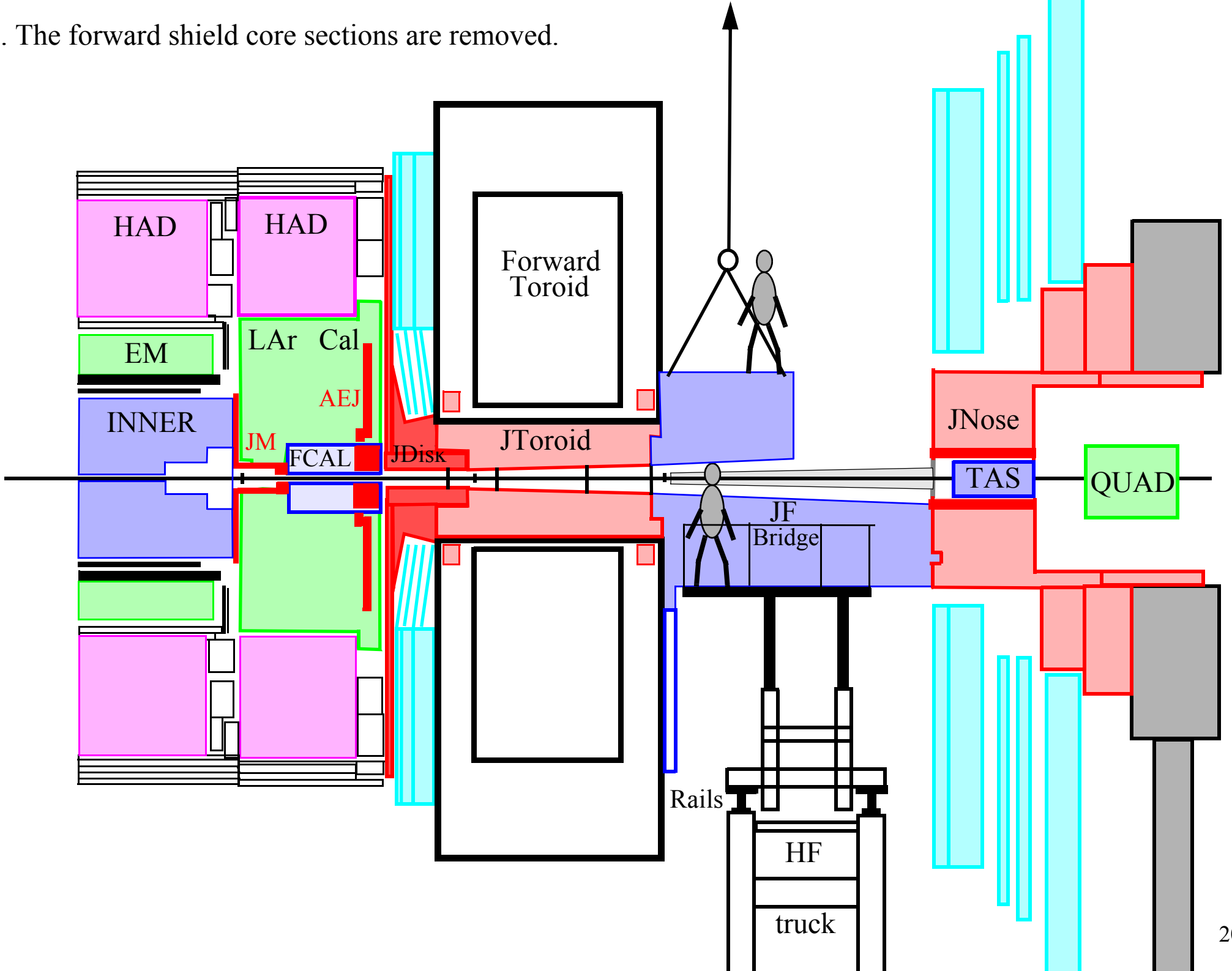
3. The forward shield core sections are removed.



3. The forward shield core sections are removed.

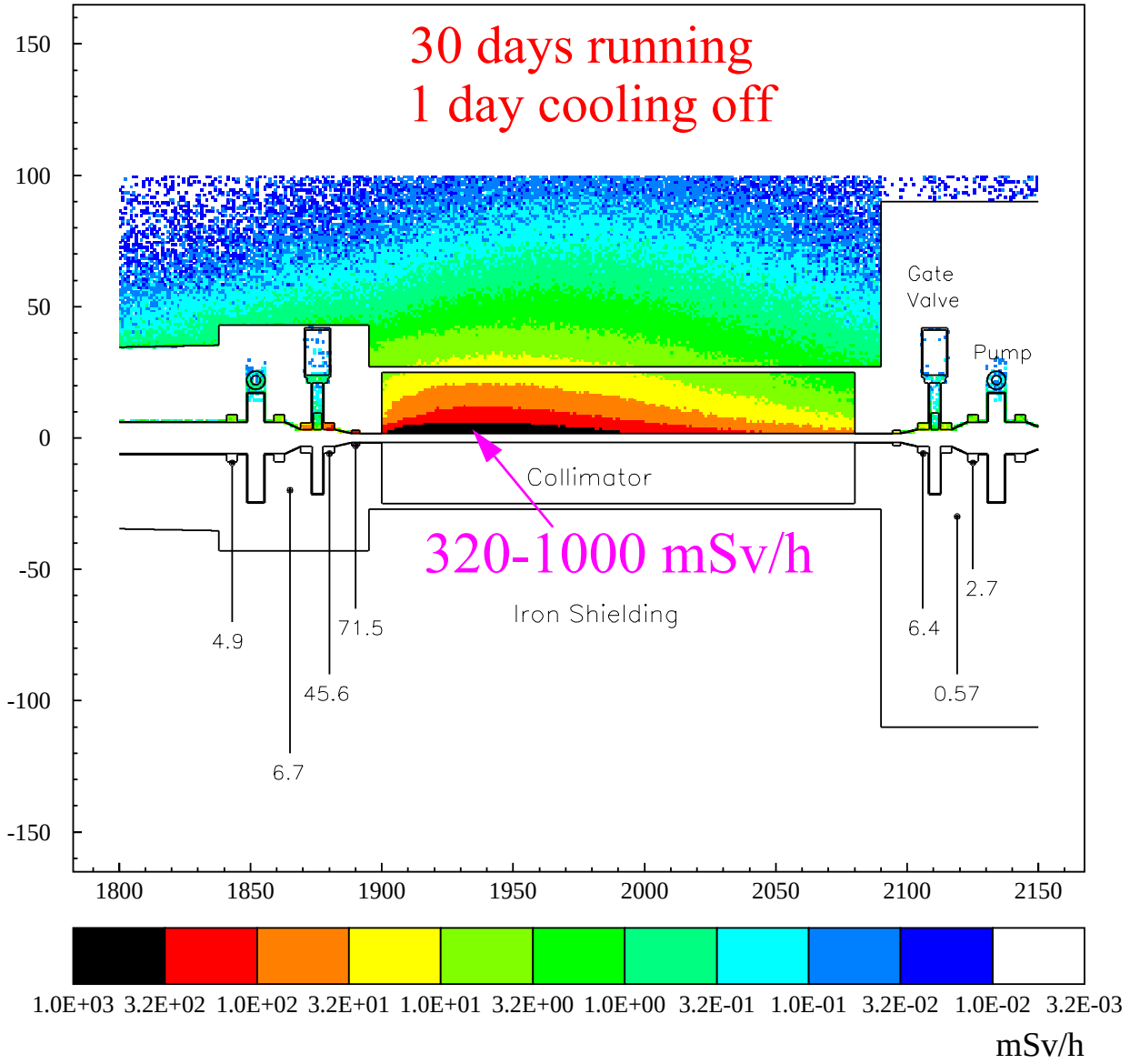


3. The forward shield core sections are removed.

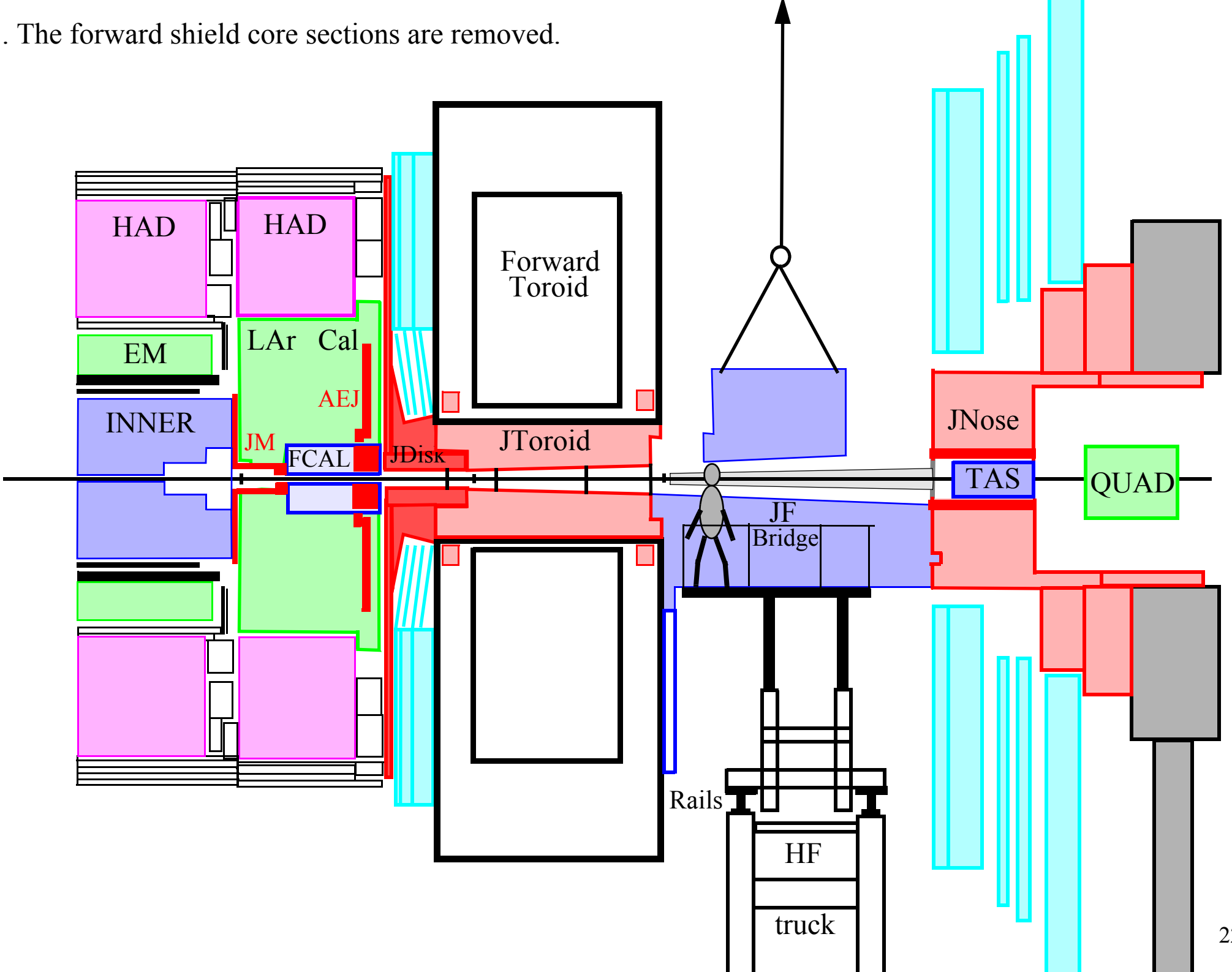


Dose rates in mSv/h around the TAS collimator

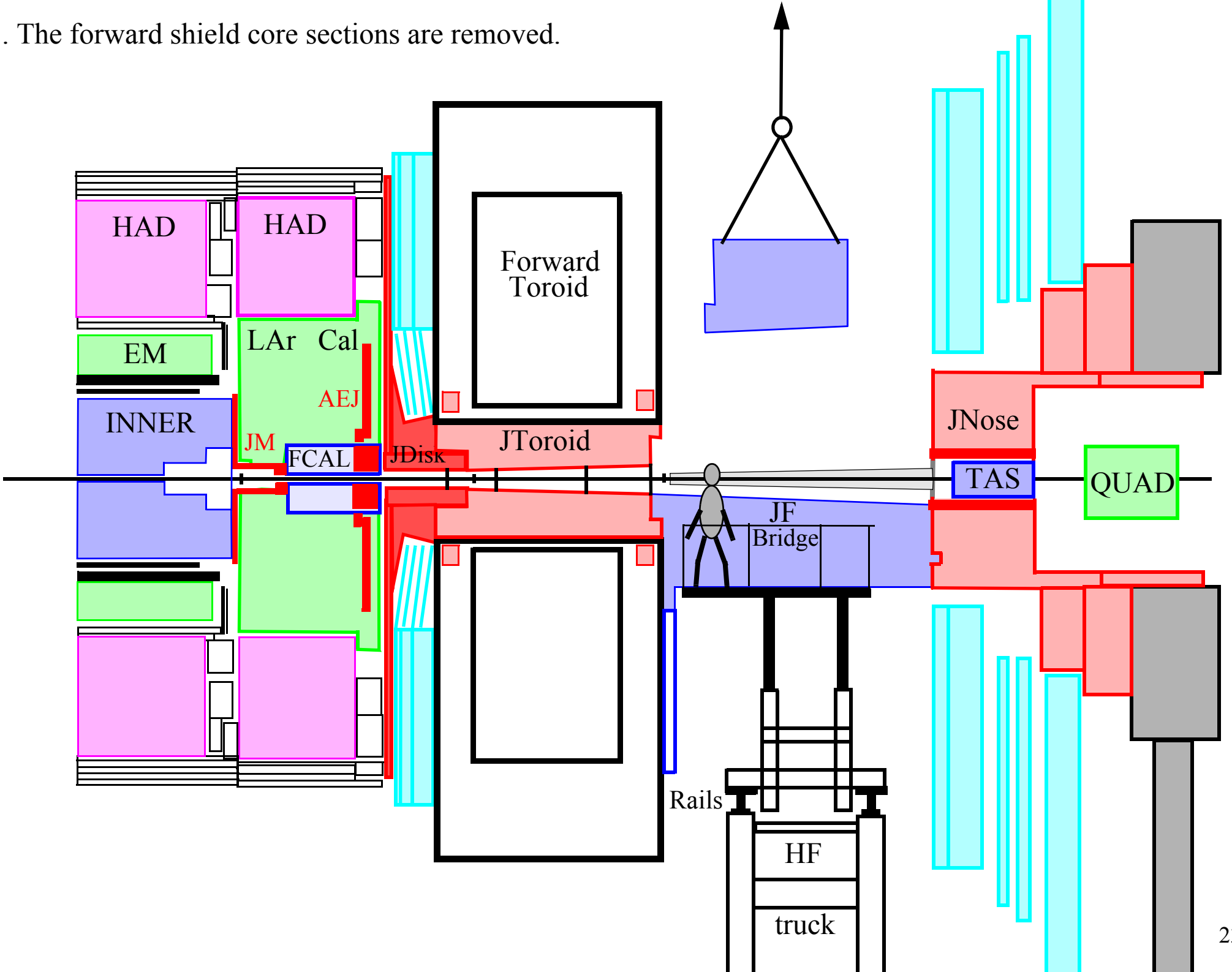
(calculation by I. Dawson and G. Stevenson using omega factors)



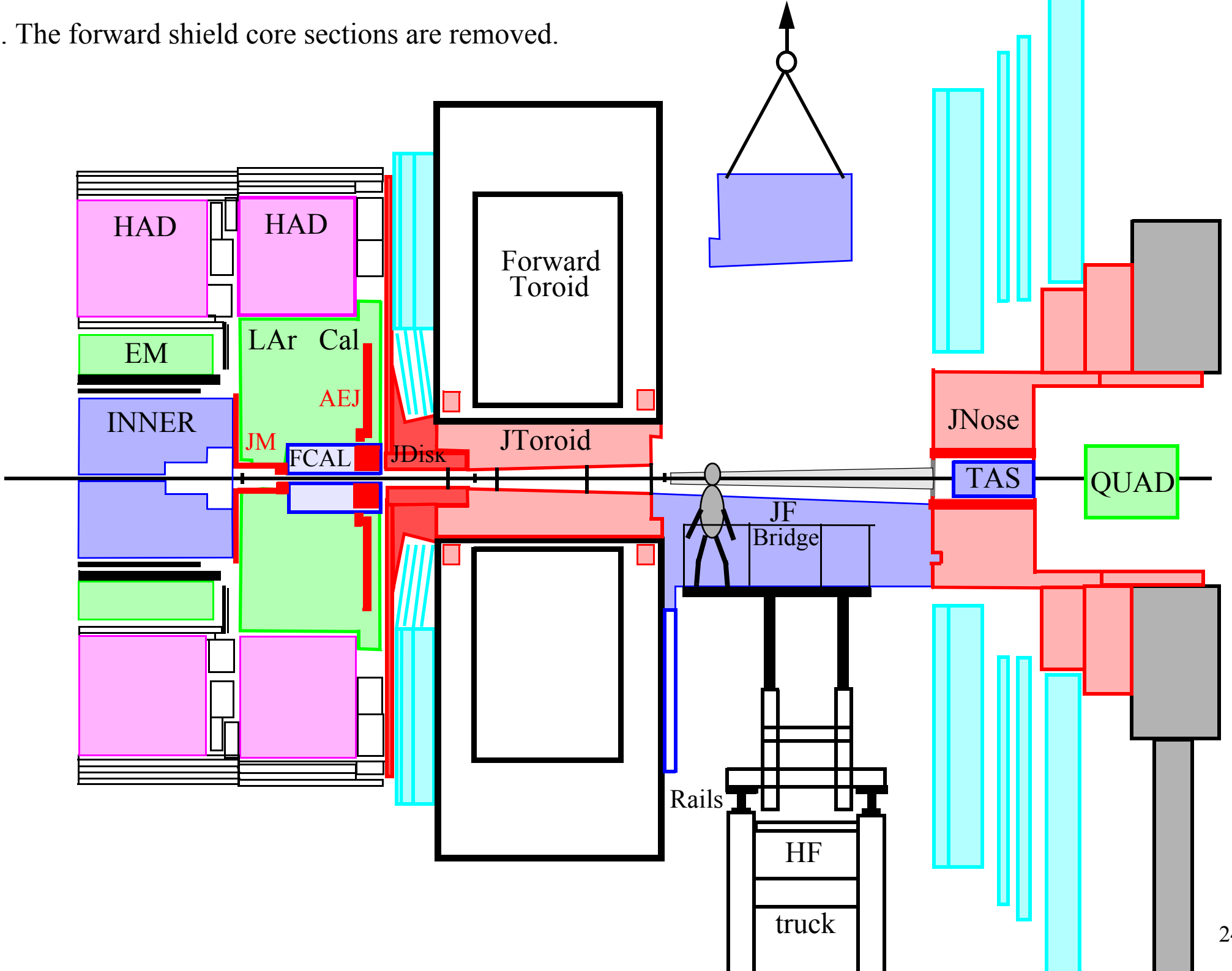
3. The forward shield core sections are removed.



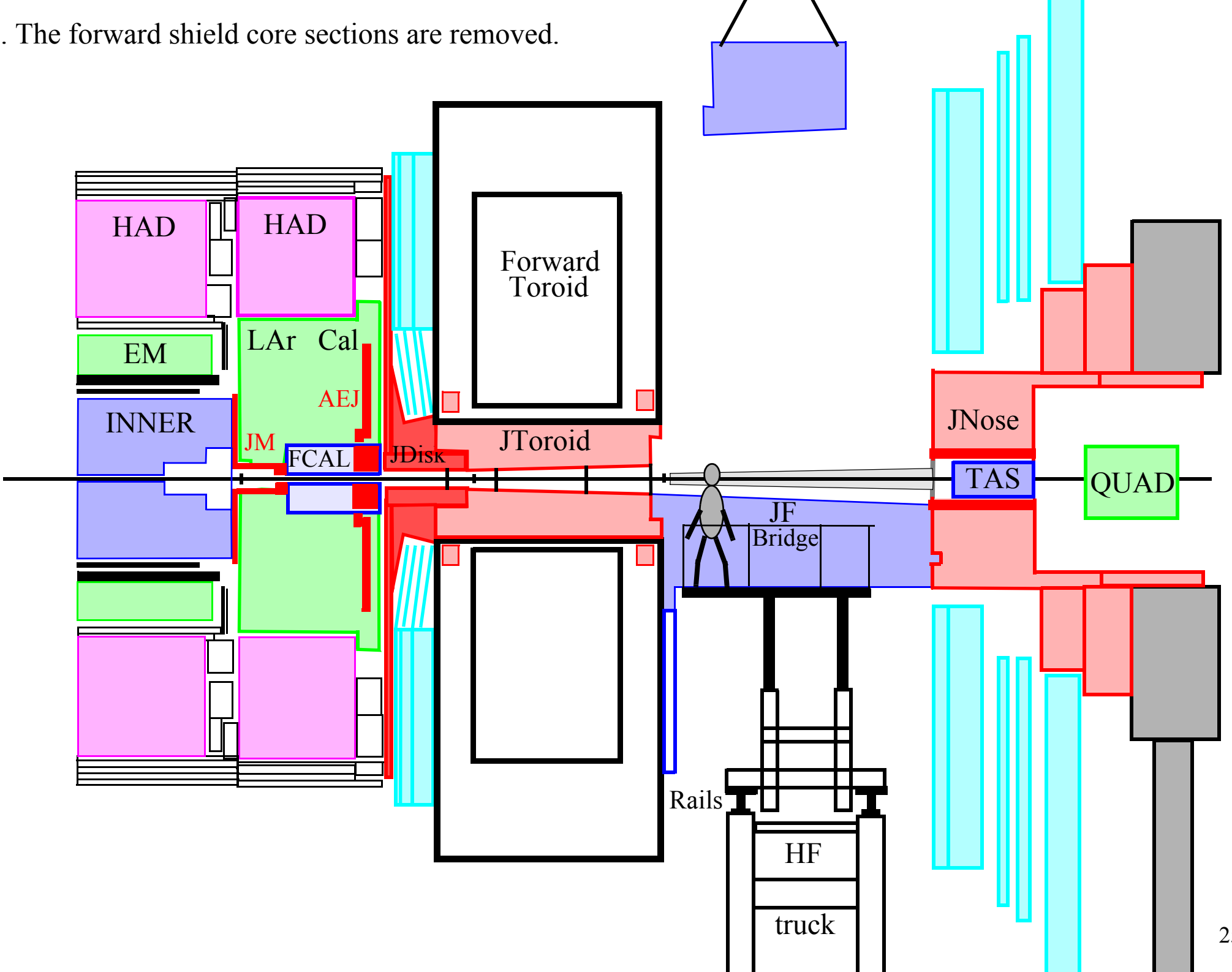
3. The forward shield core sections are removed.



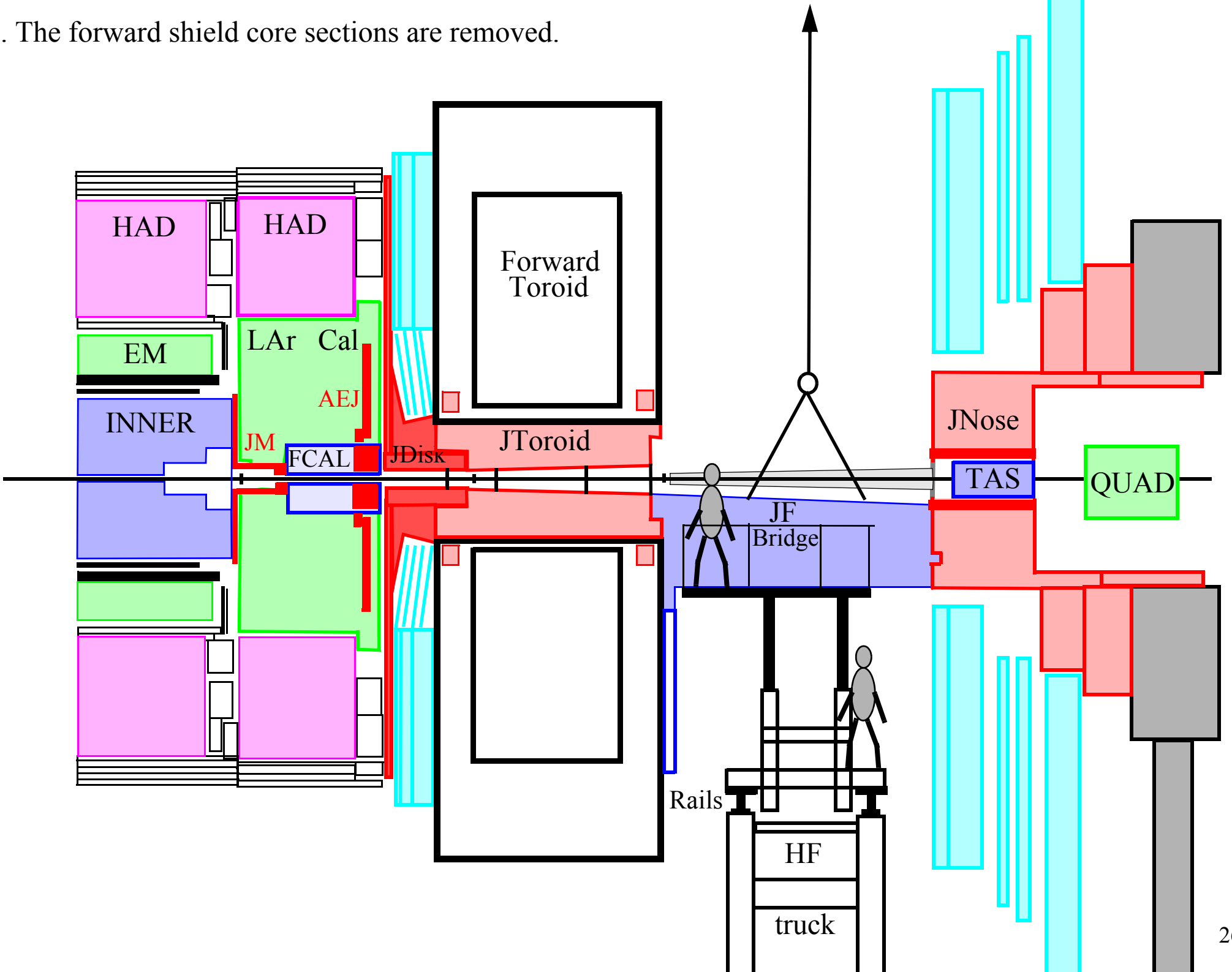
3. The forward shield core sections are removed.



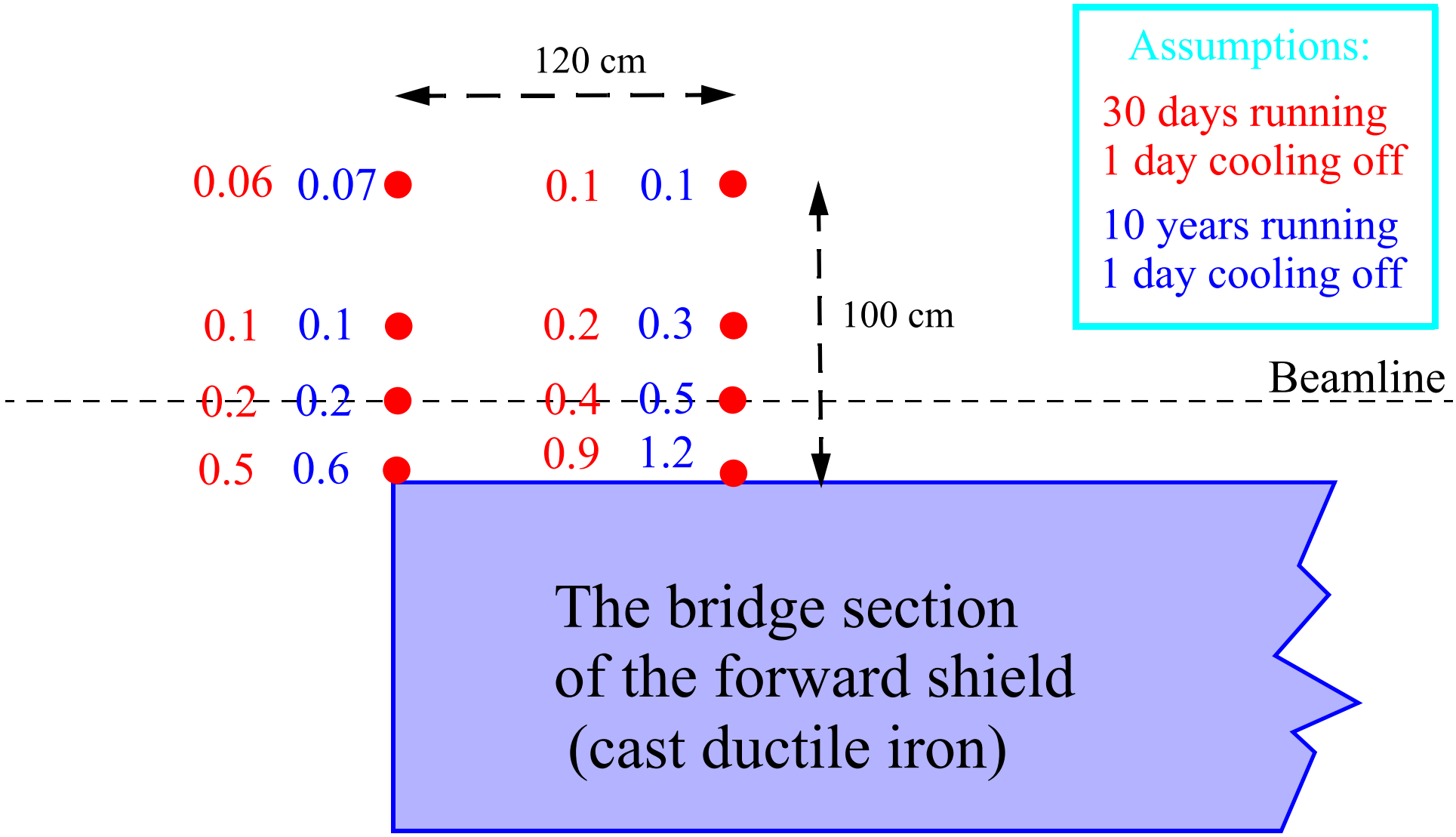
3. The forward shield core sections are removed.



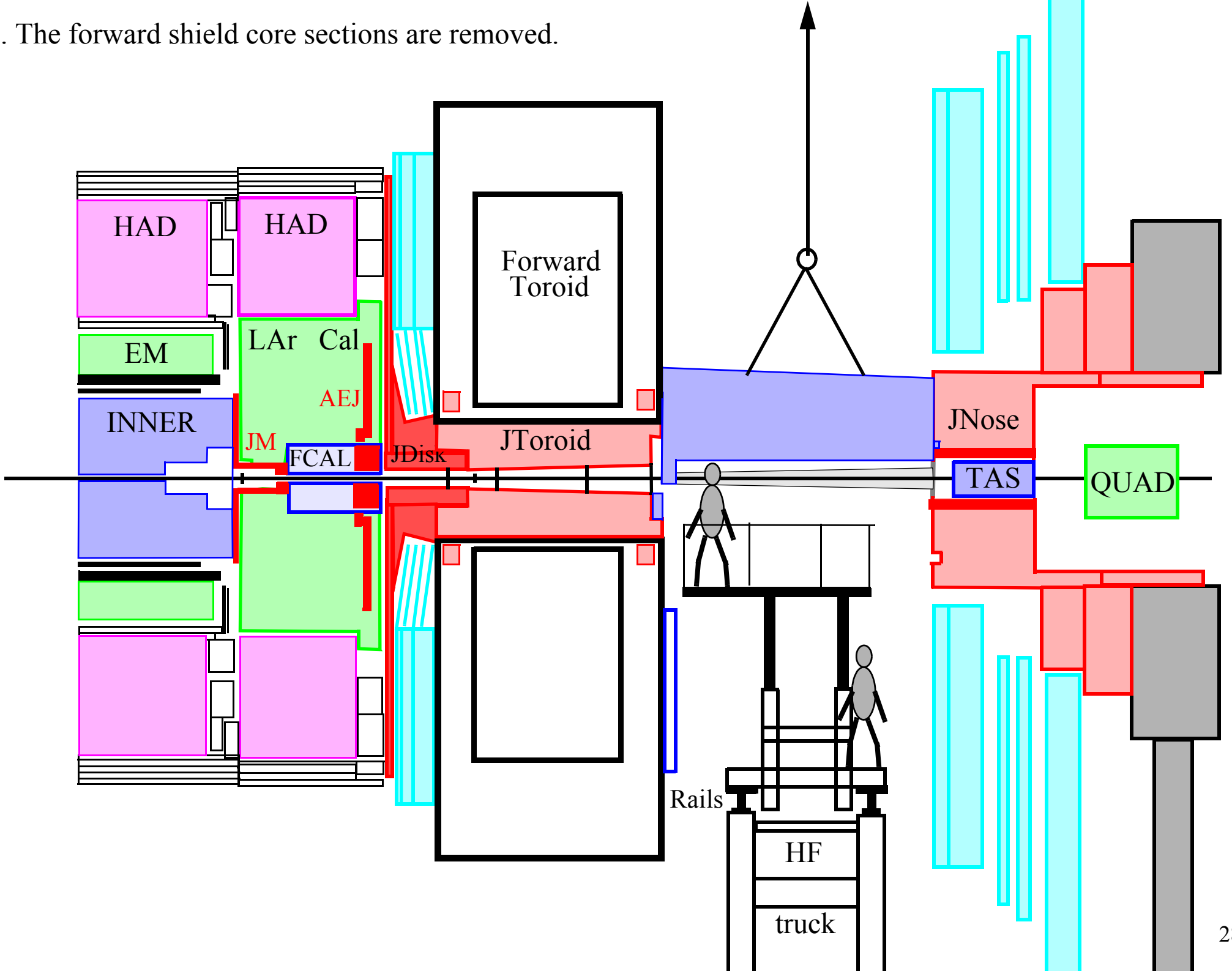
3. The forward shield core sections are removed.



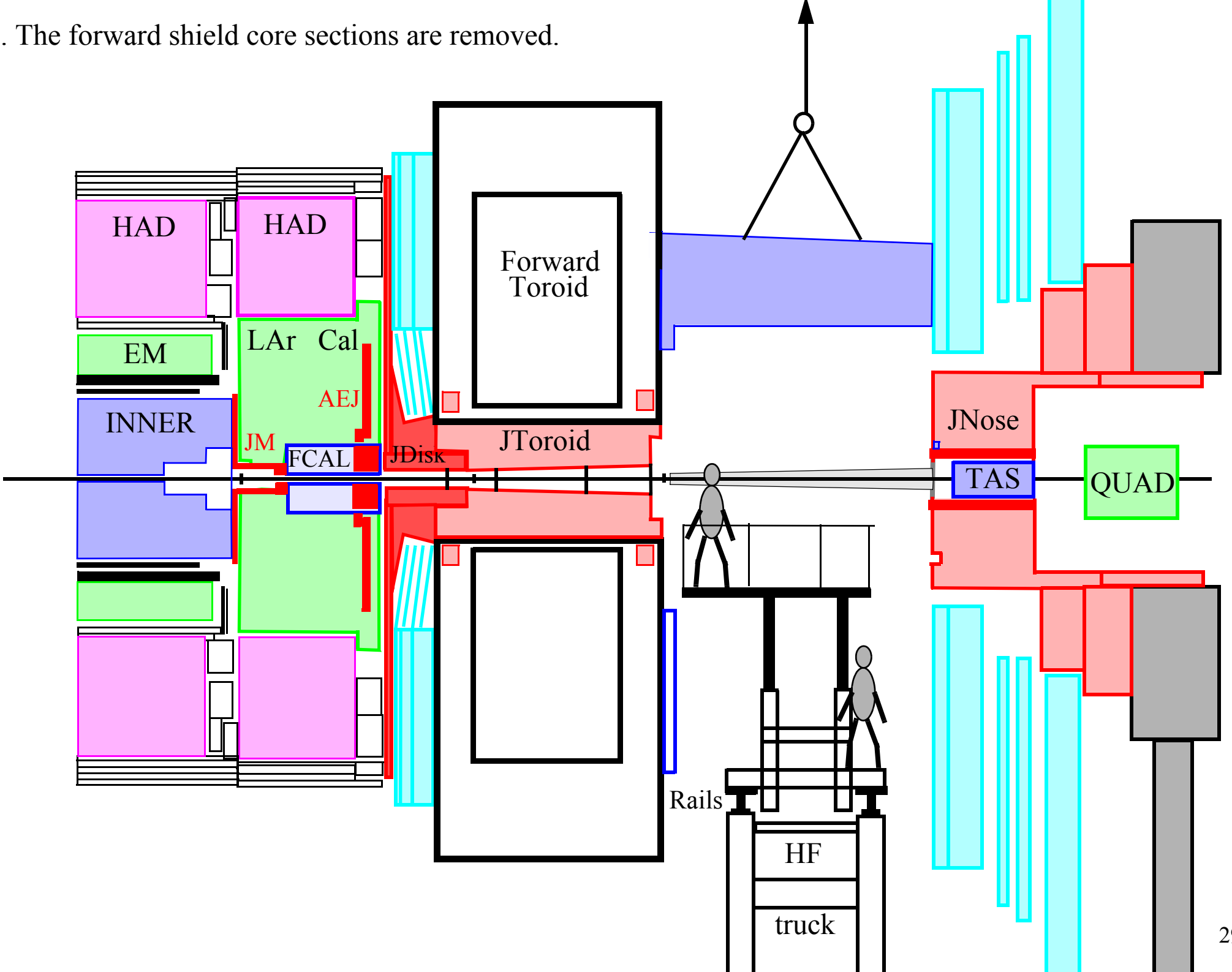
Dose rates in mSv/h around the bridge section of the forward shield. (Calculation by M. Morev)



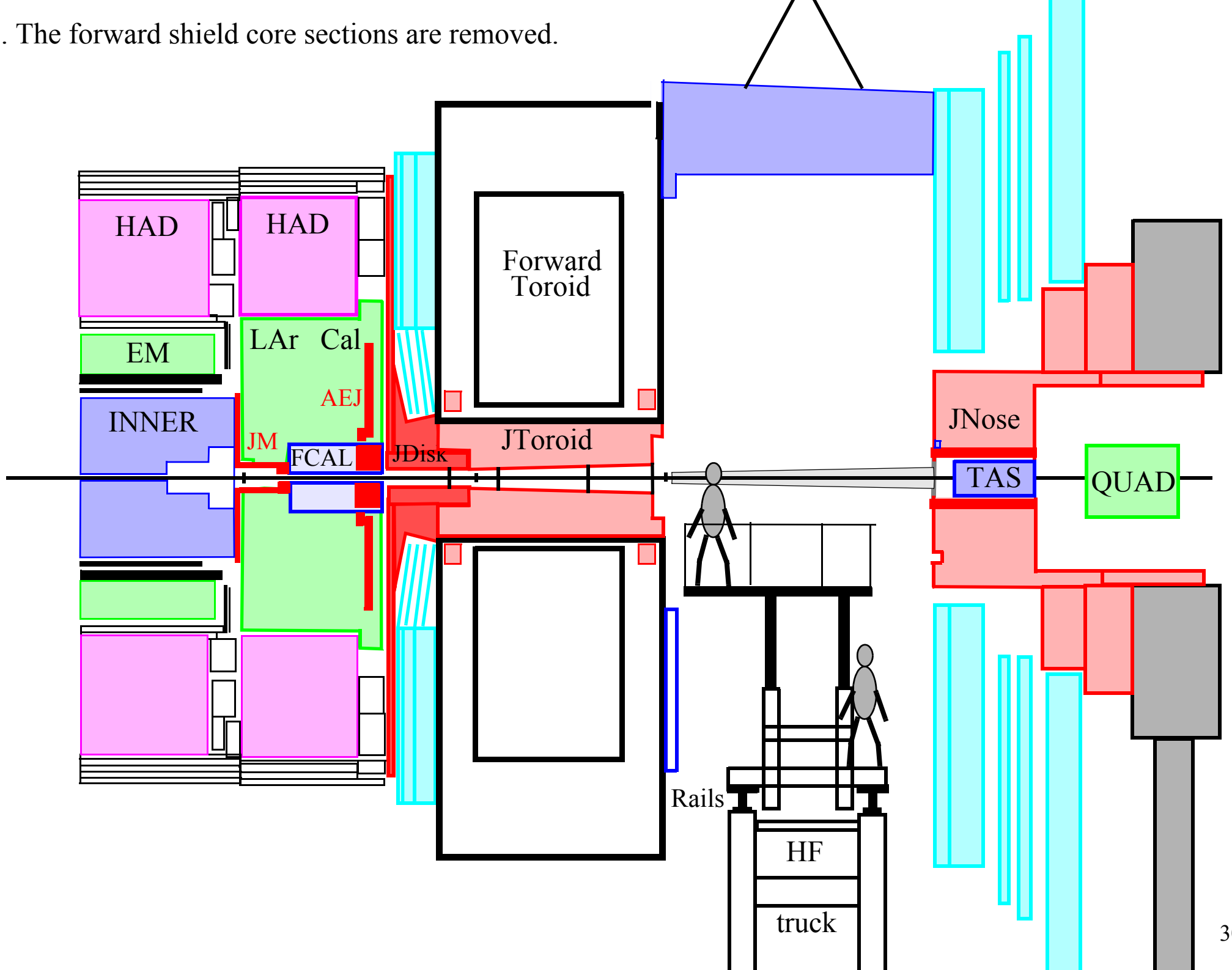
3. The forward shield core sections are removed.



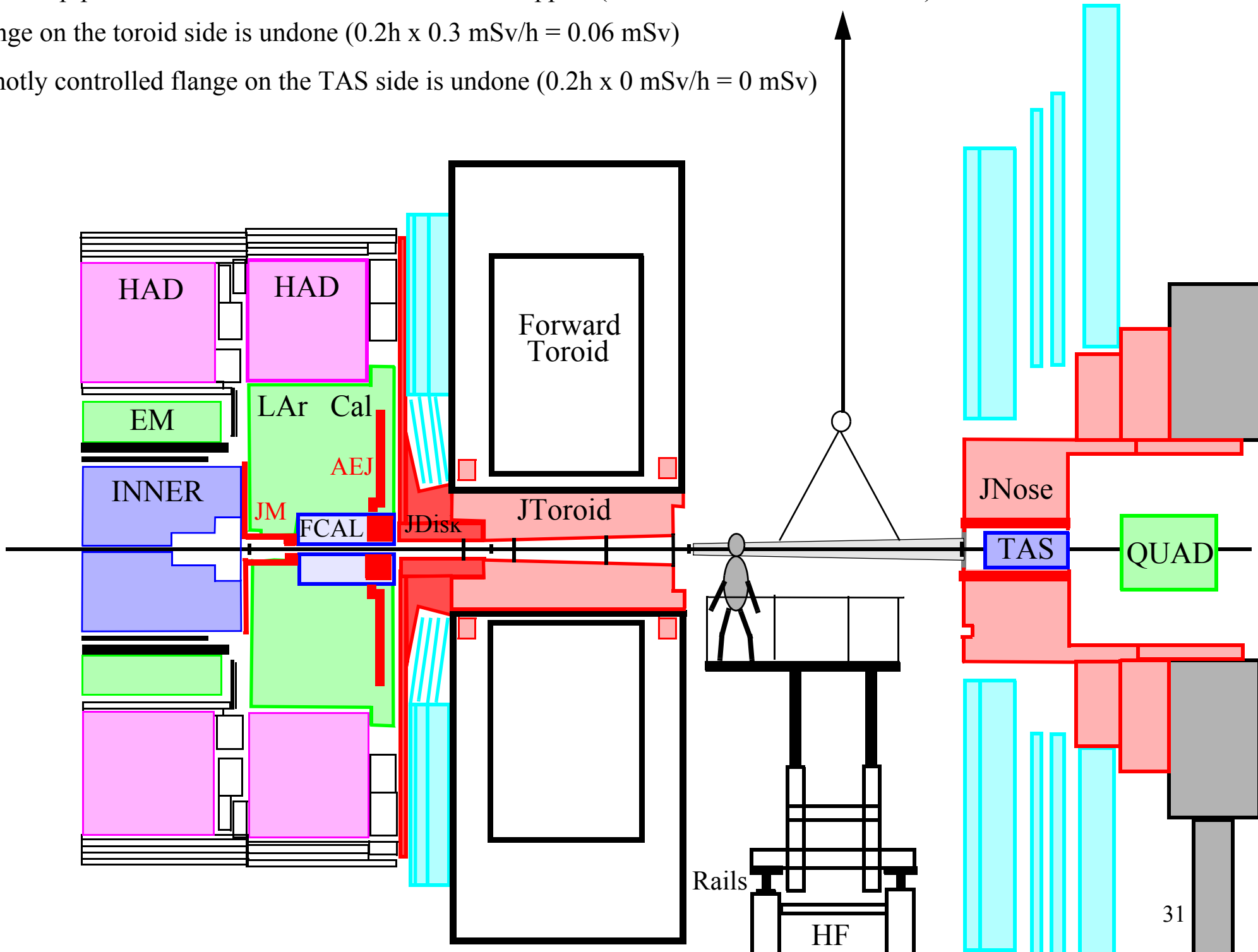
3. The forward shield core sections are removed.



3. The forward shield core sections are removed.



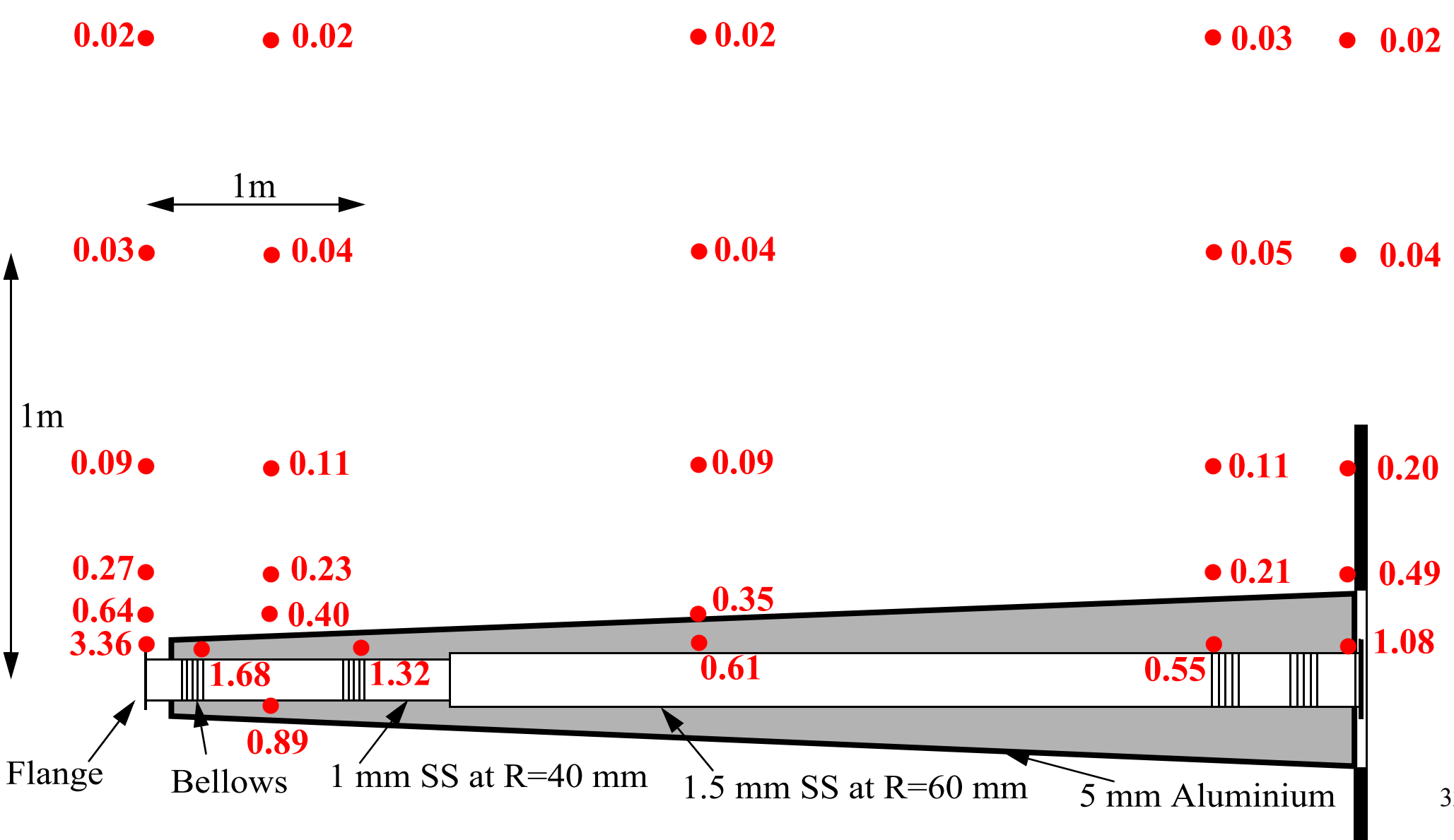
4. The VJ beampipe is attached to the crane or to another support (0.1h x 0.2 mSv/h = 0.02 mSv)
5. The flange on the toroid side is undone (0.2h x 0.3 mSv/h = 0.06 mSv)
6. The remotly controlled flange on the TAS side is undone (0.2h x 0 mSv/h = 0 mSv)



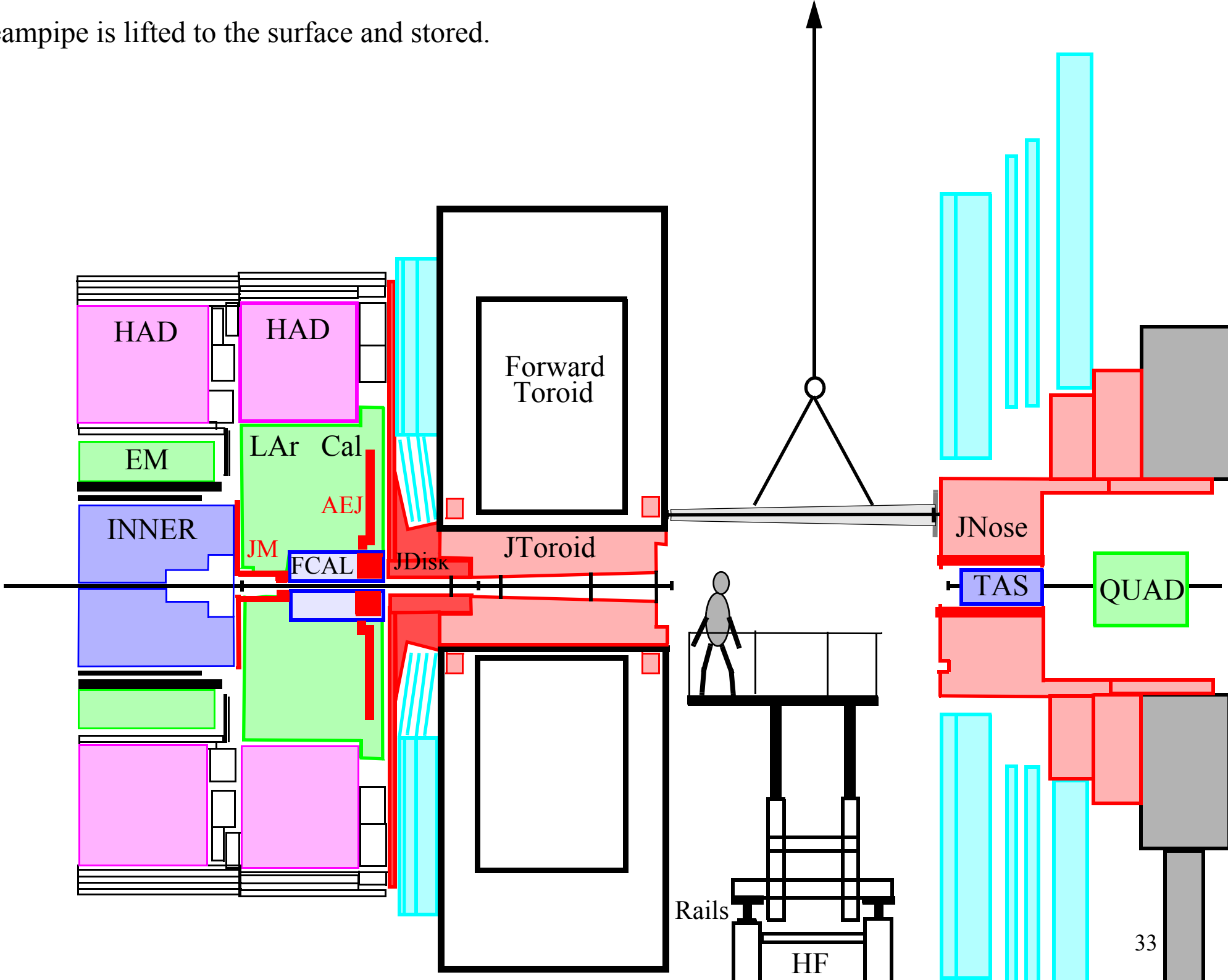
Dose rates in mSv/h after 100 days of running and 1 day of cooling

(M. Morev et al.)

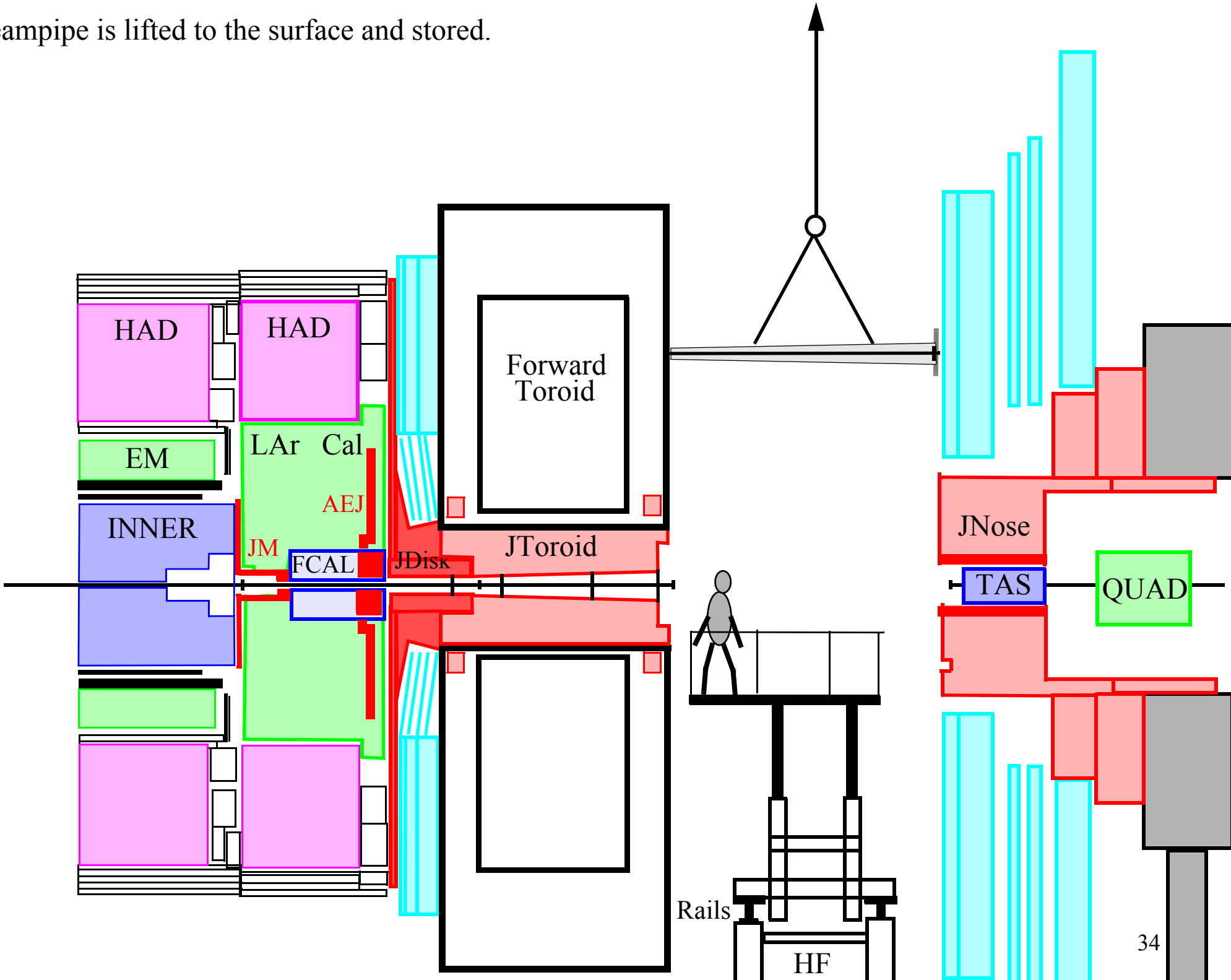
Dose rates from only the VJ beampipe



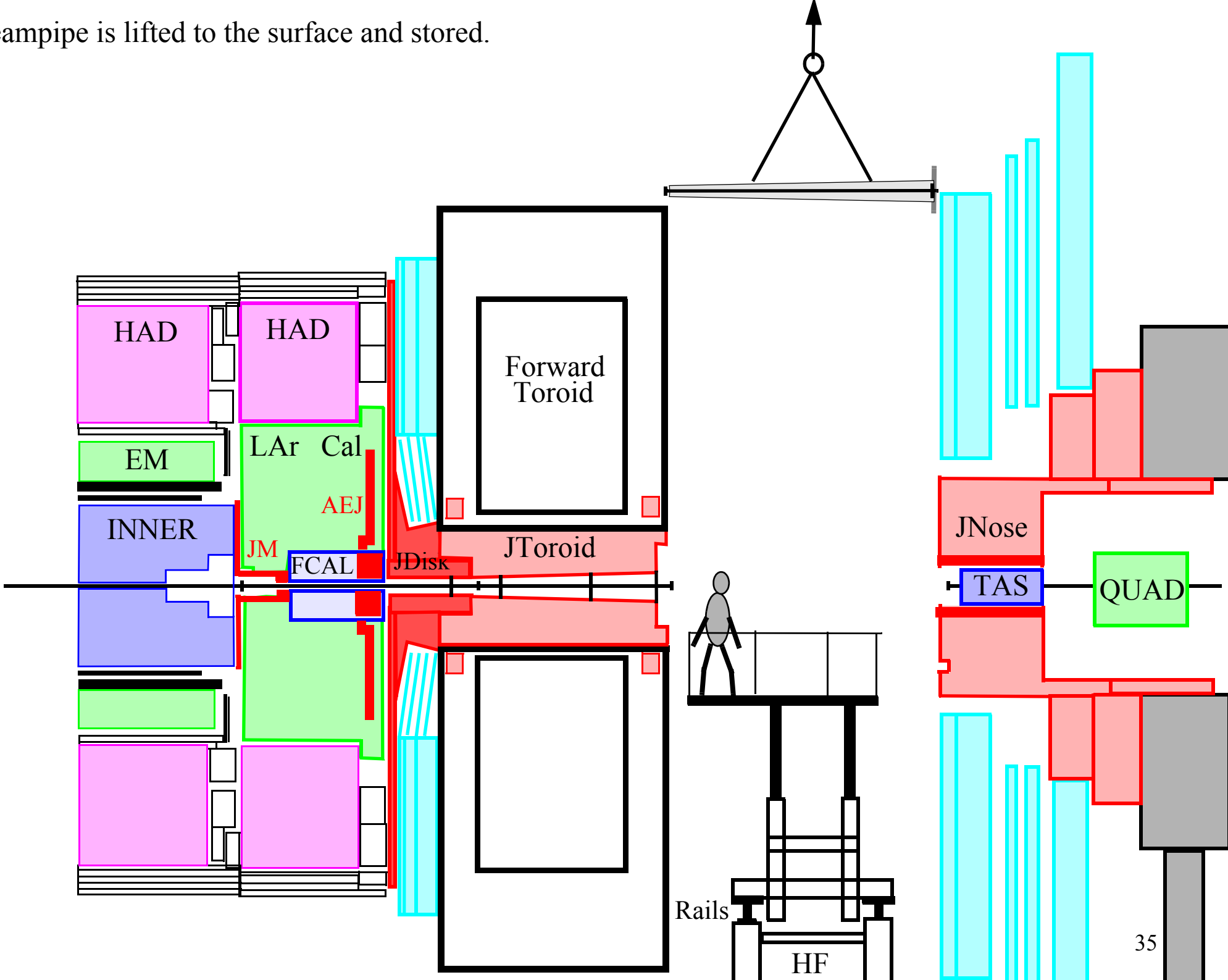
7. The beampipe is lifted to the surface and stored.



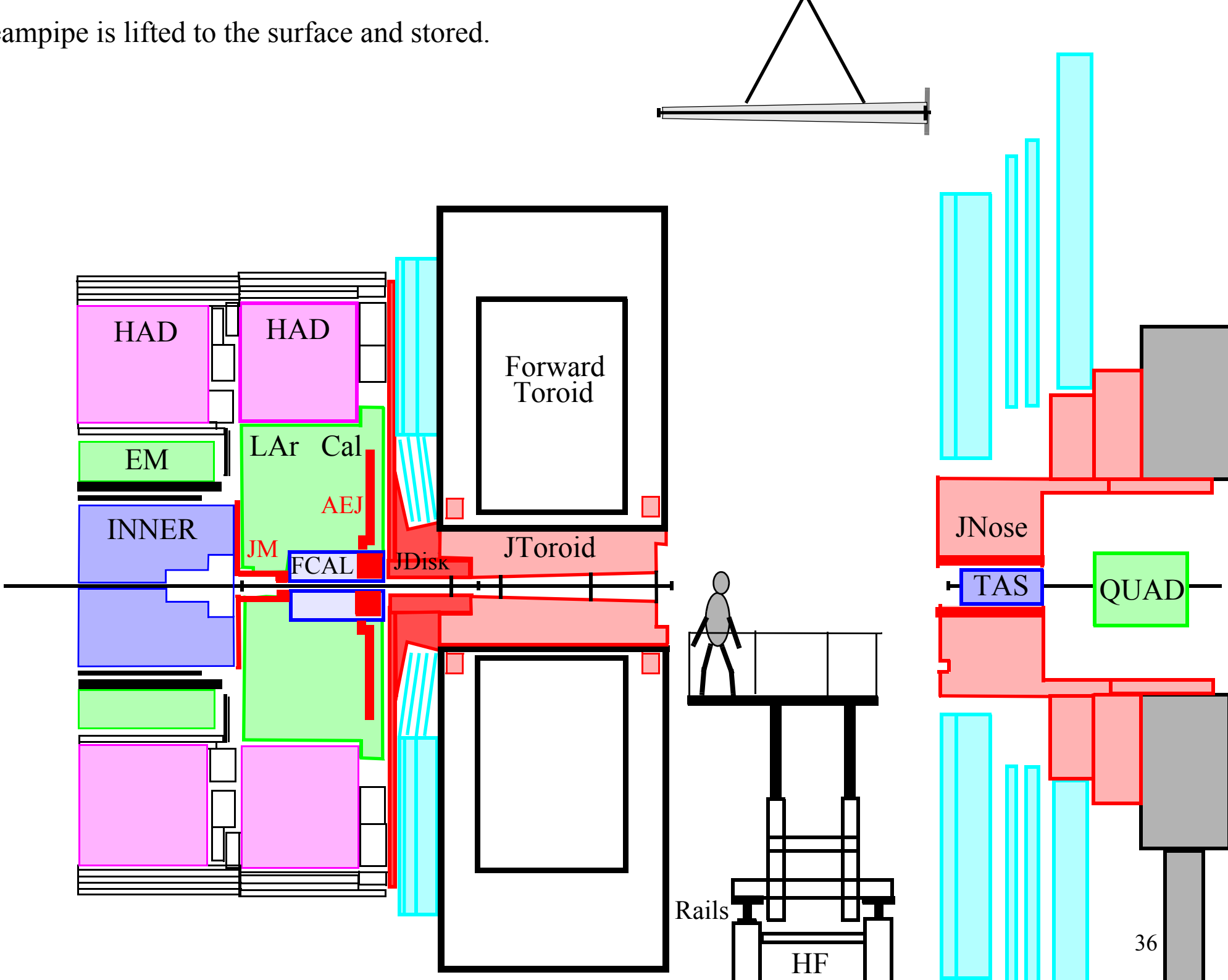
7. The beampipe is lifted to the surface and stored.



7. The beampipe is lifted to the surface and stored.

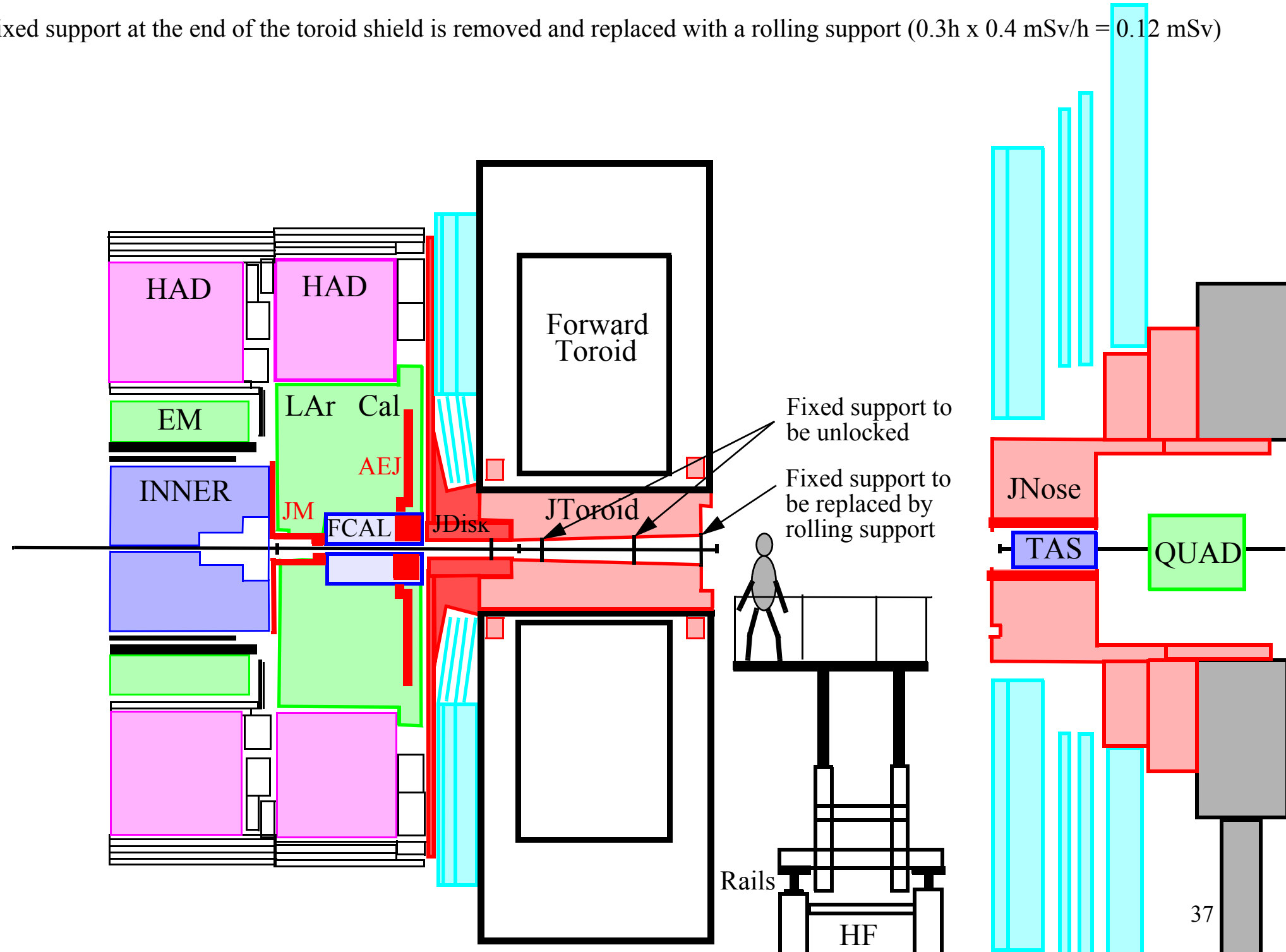


7. The beampipe is lifted to the surface and stored.

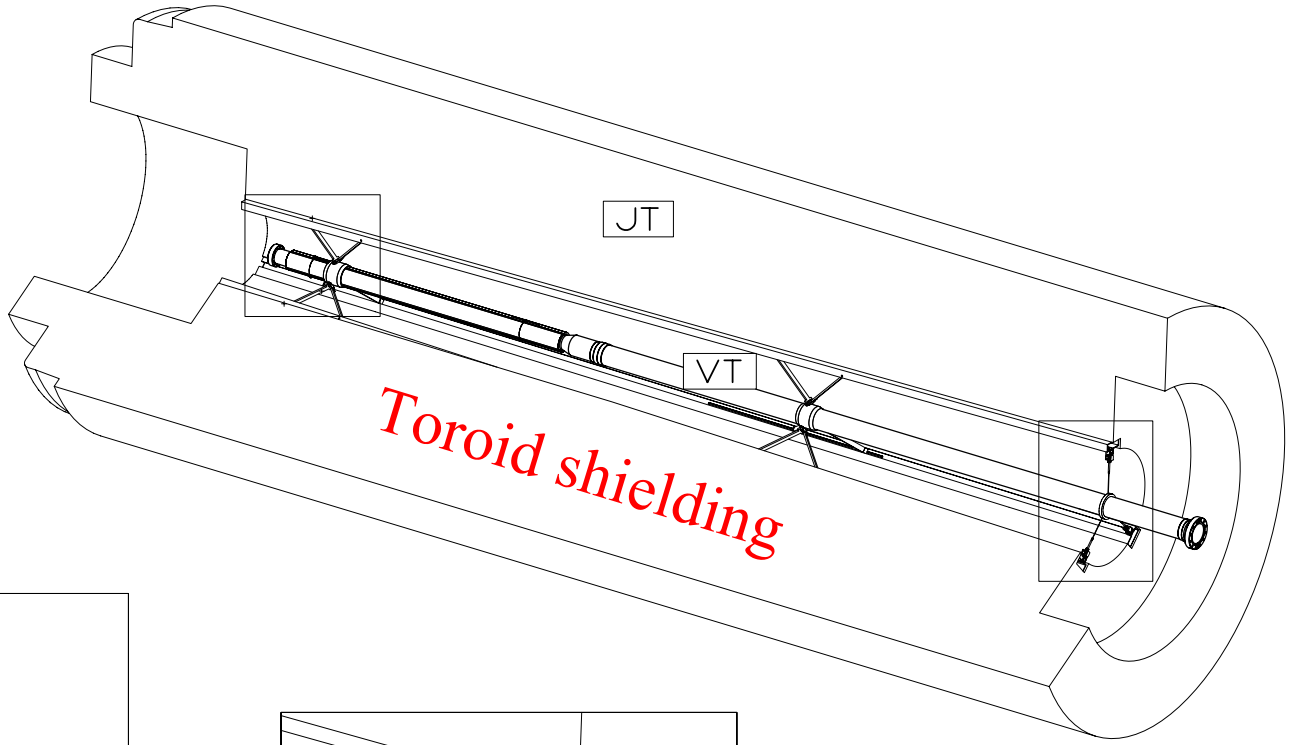


8. The two fixed supports inside the toroid shielding are unlocked (0.2h x 0.3 mSv/h = 0.06 mSv)

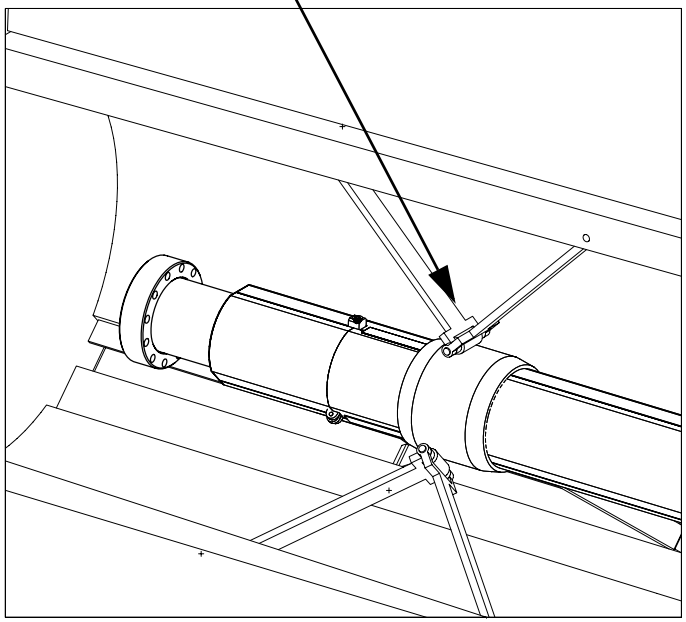
9. The fixed support at the end of the toroid shield is removed and replaced with a rolling support (0.3h x 0.4 mSv/h = 0.12 mSv)

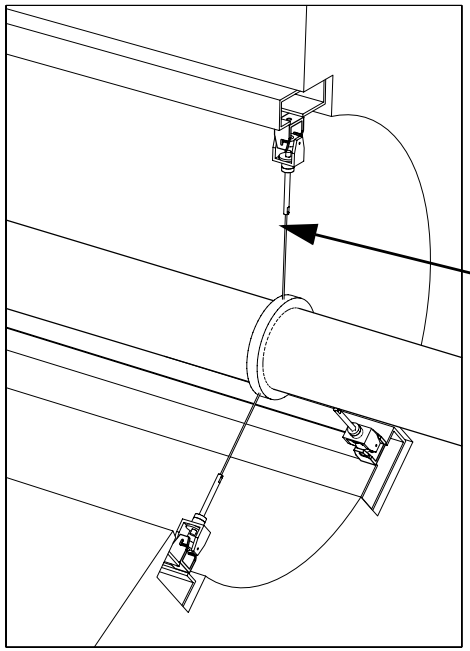


Beampipe supports



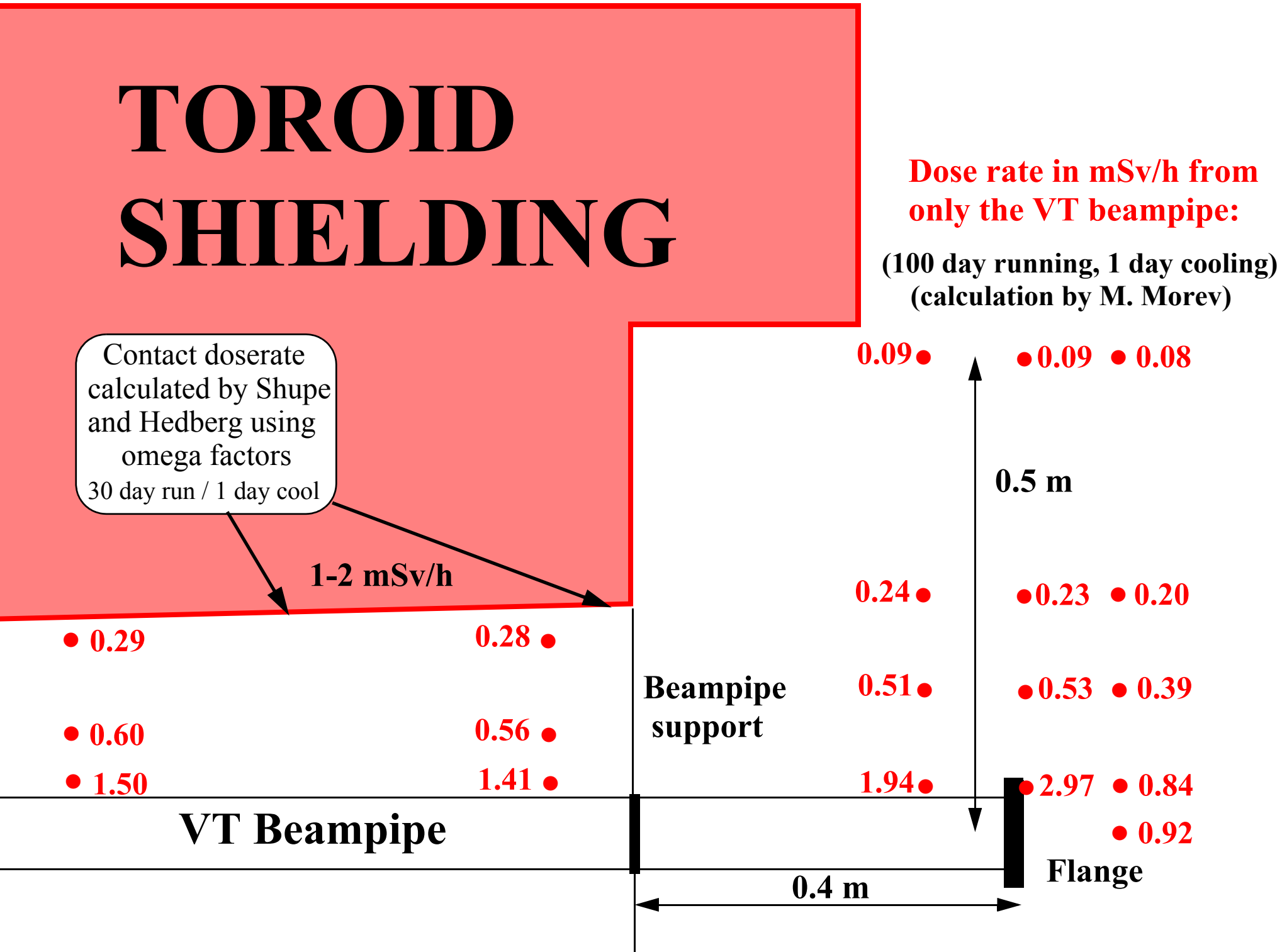
This support has to be retracted.



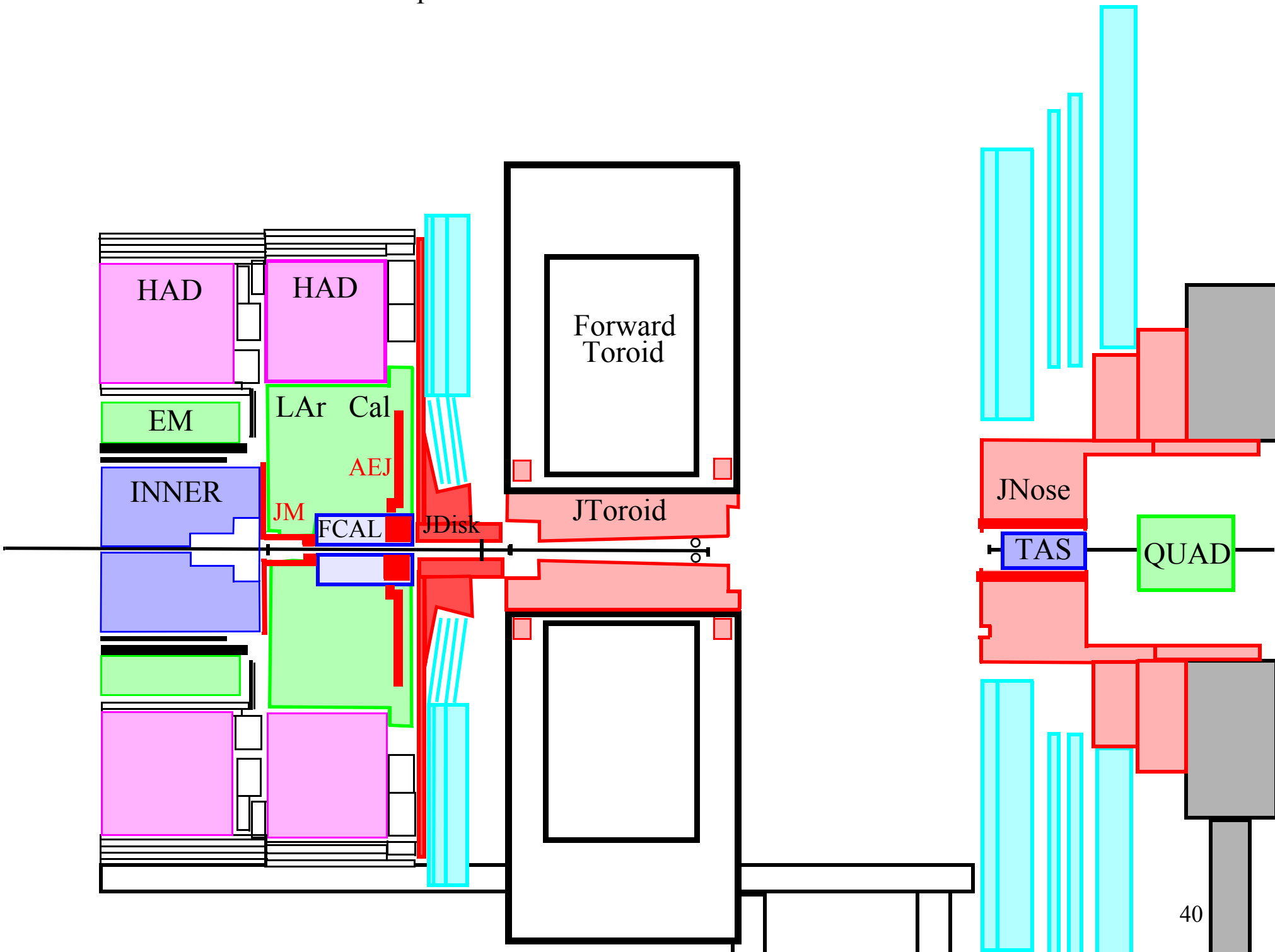


This support has to be removed and replaced by a support that rolls against the shielding.

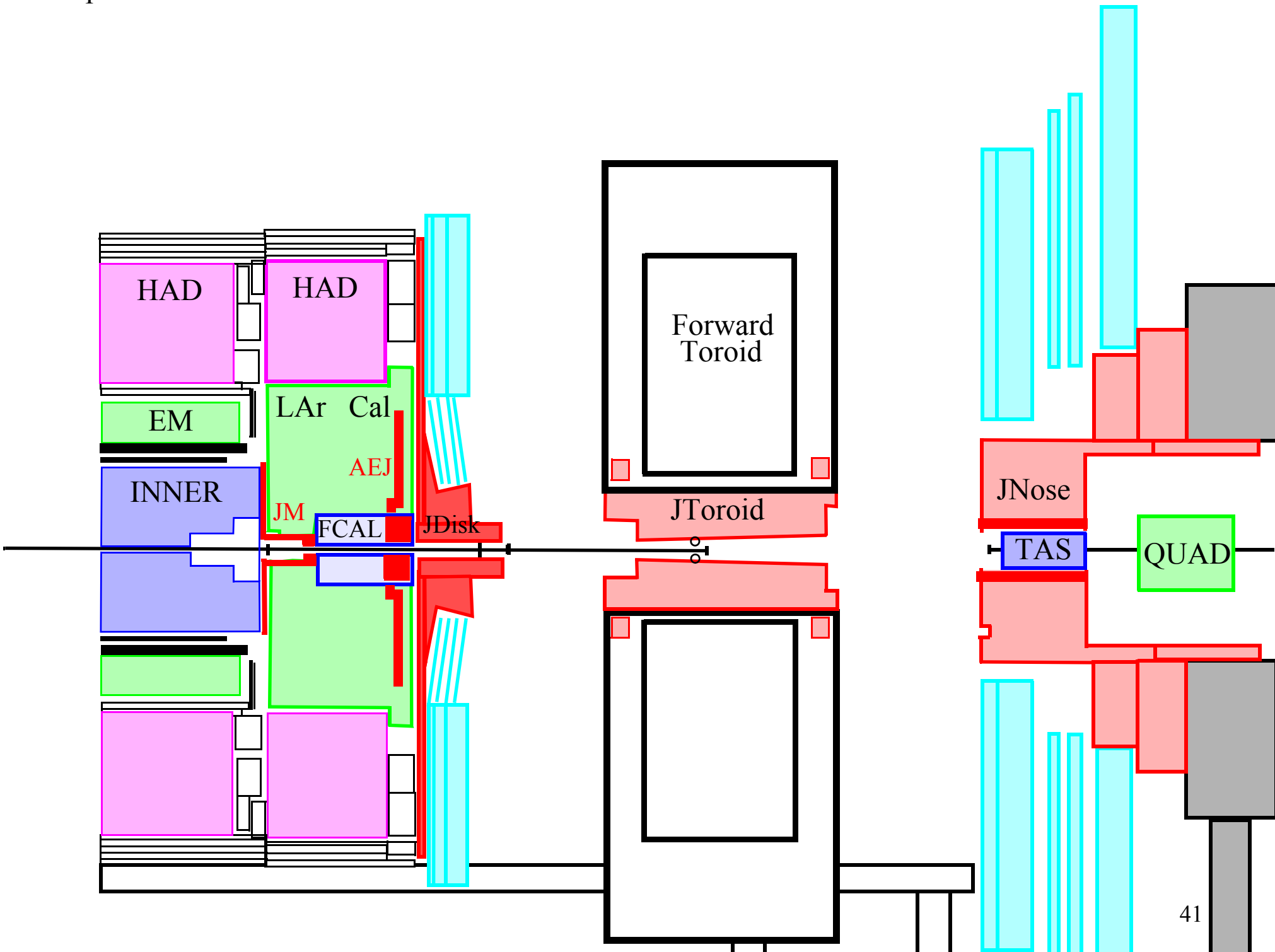
TOROID SHIELDING



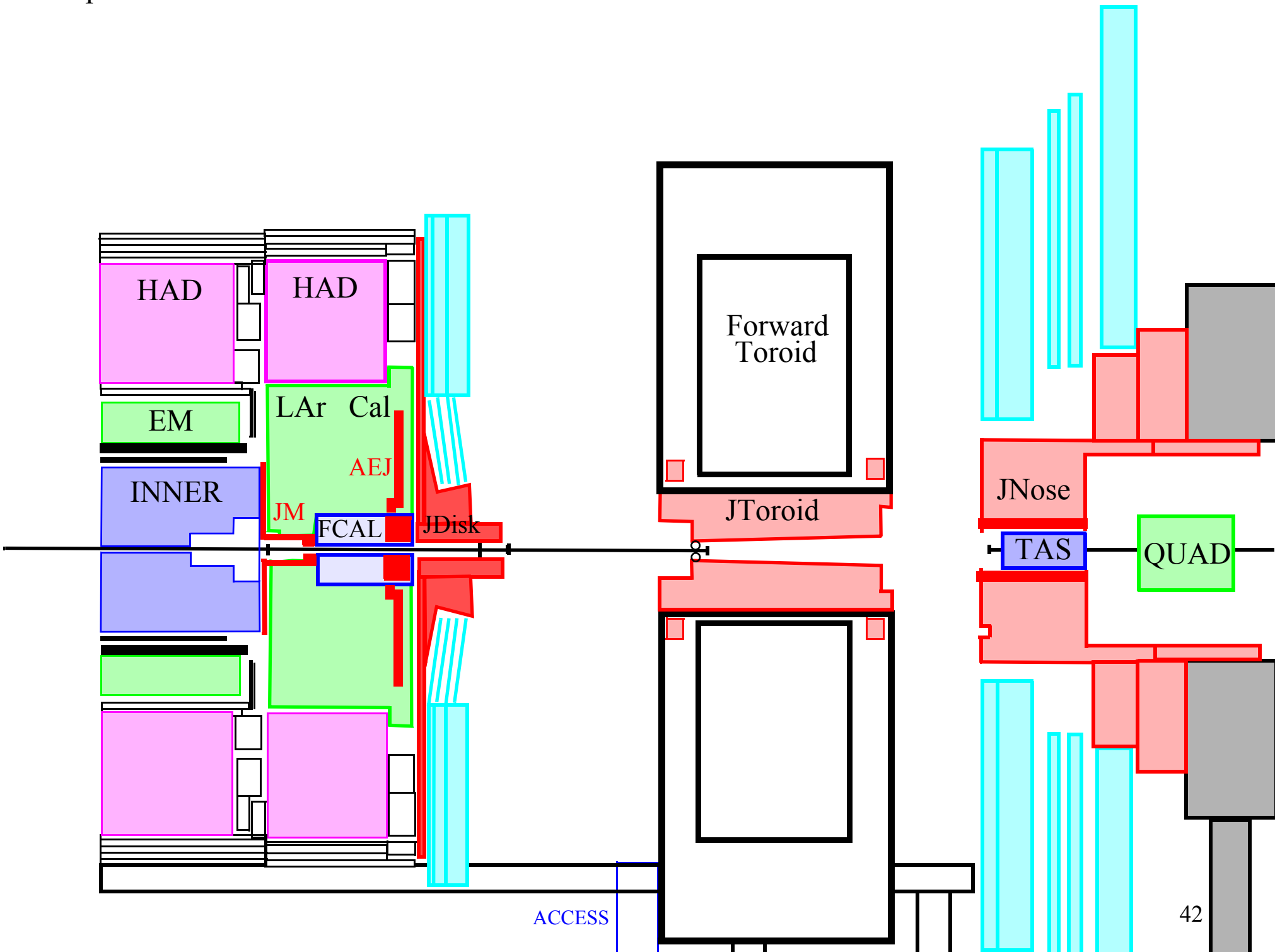
10. The HF truck is rotated and the endcap toroid is moved forward onto it.



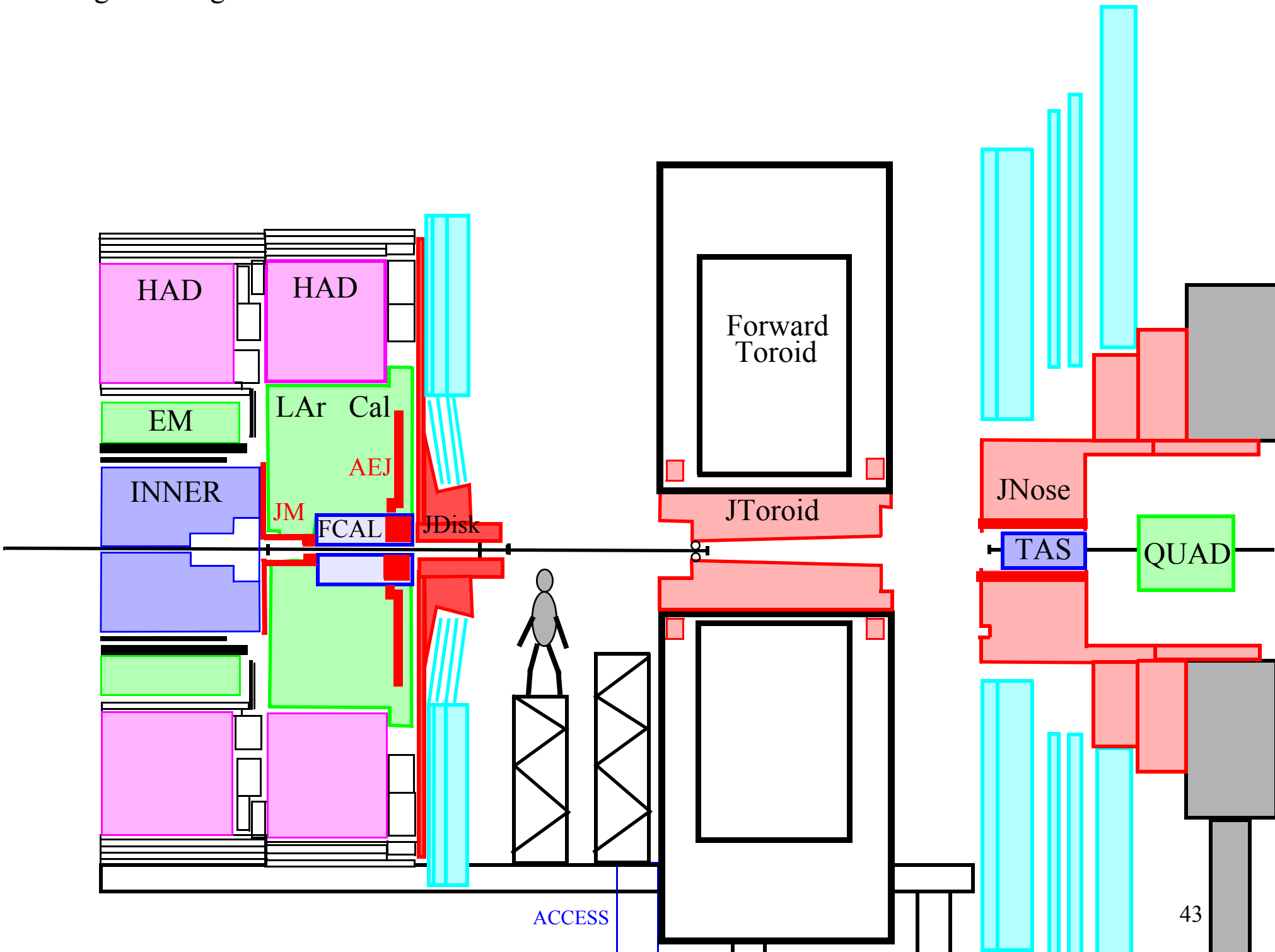
10. The endcap toroid is moved forward.



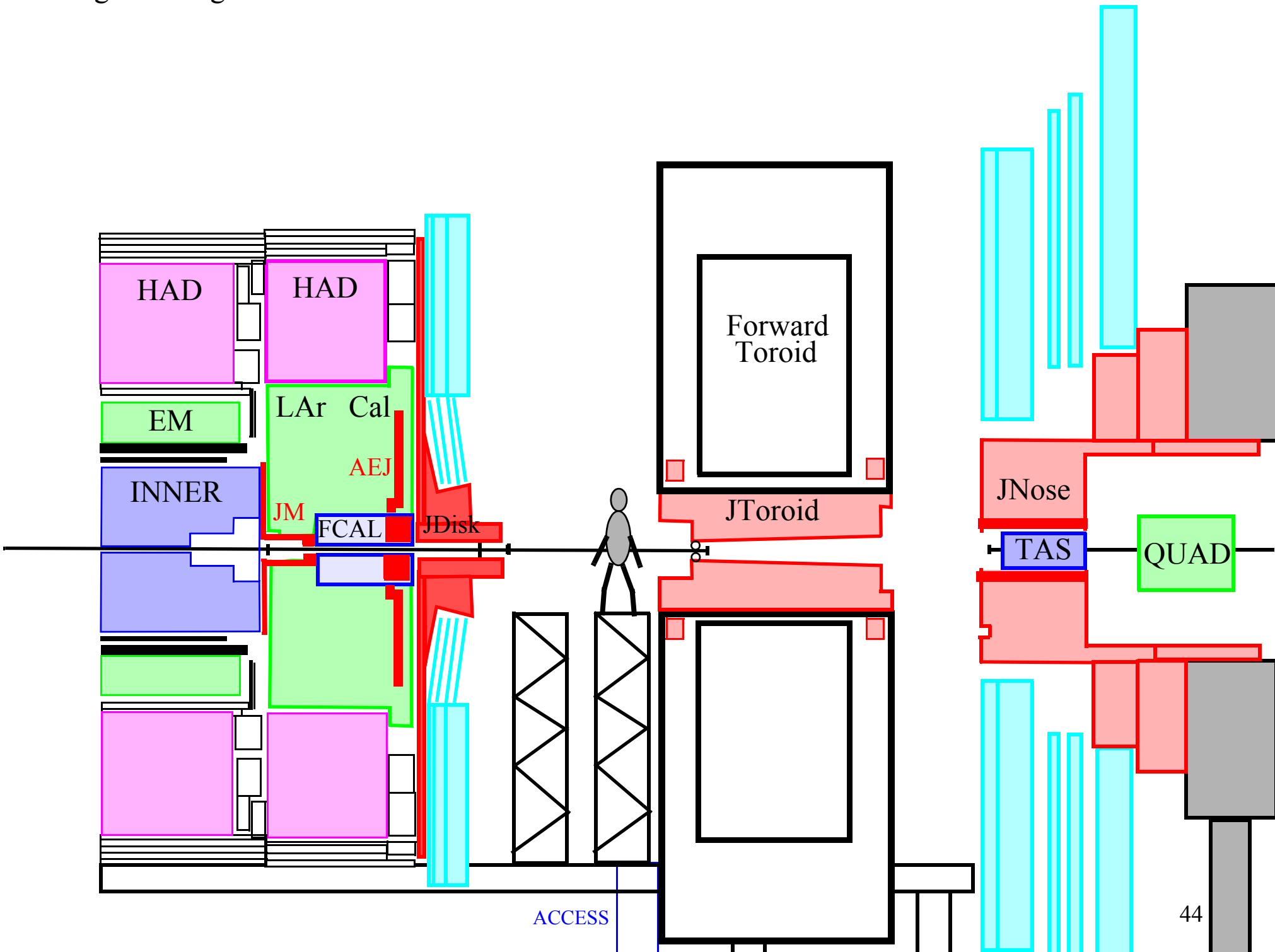
10. The endcap toroid is moved forward.



11. Scaffolding is beeing built.

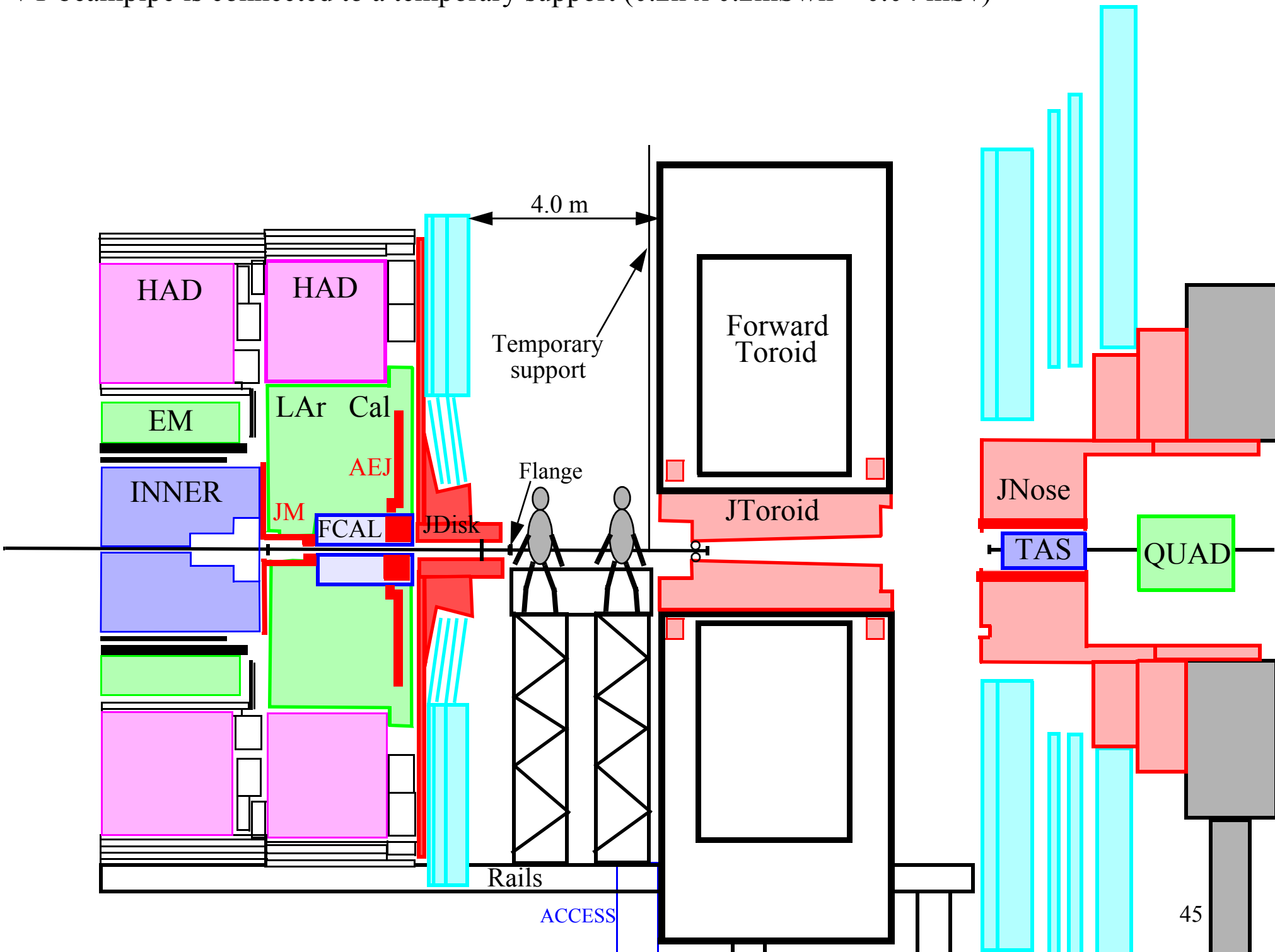


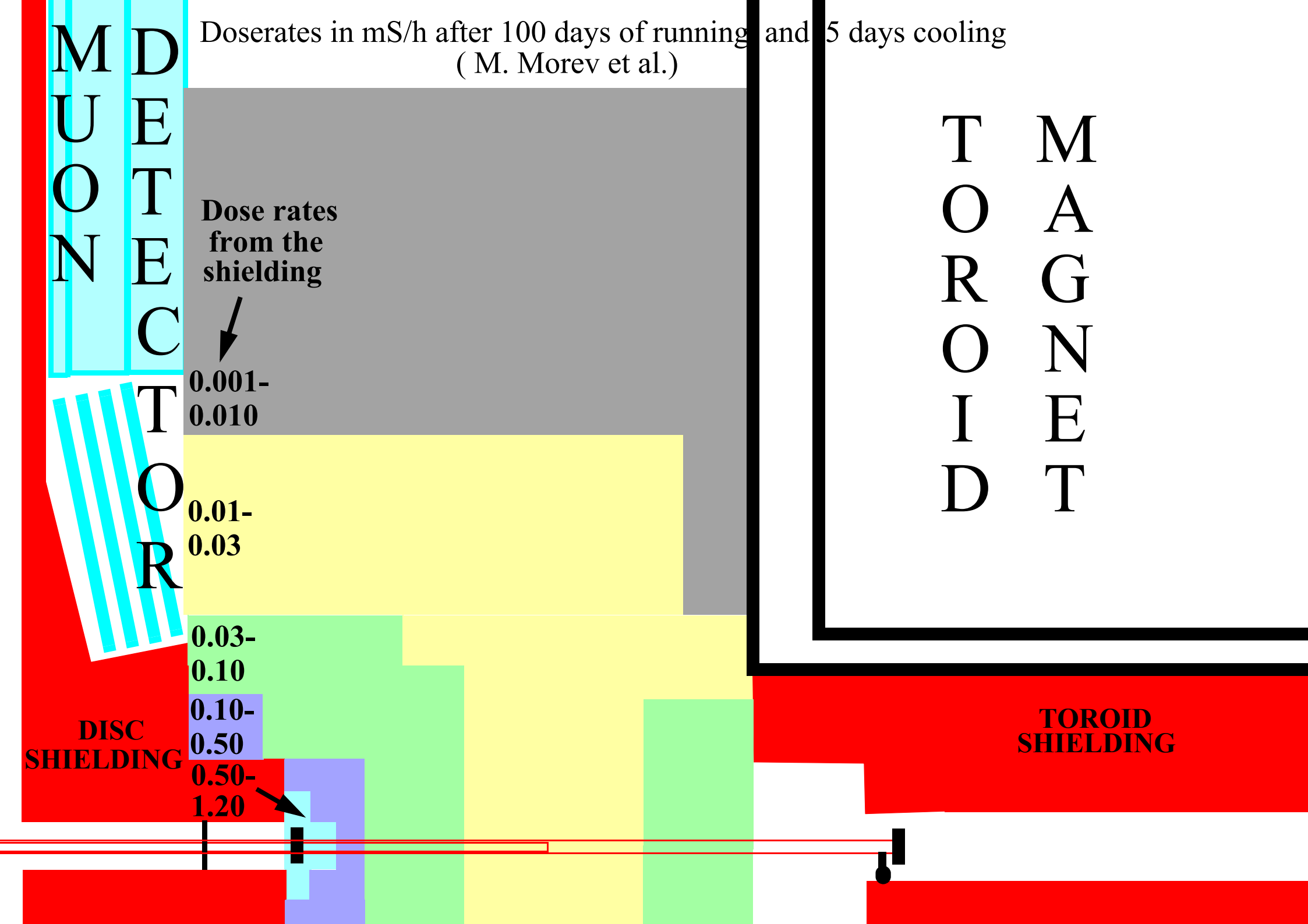
11. Scaffolding is beeing built.

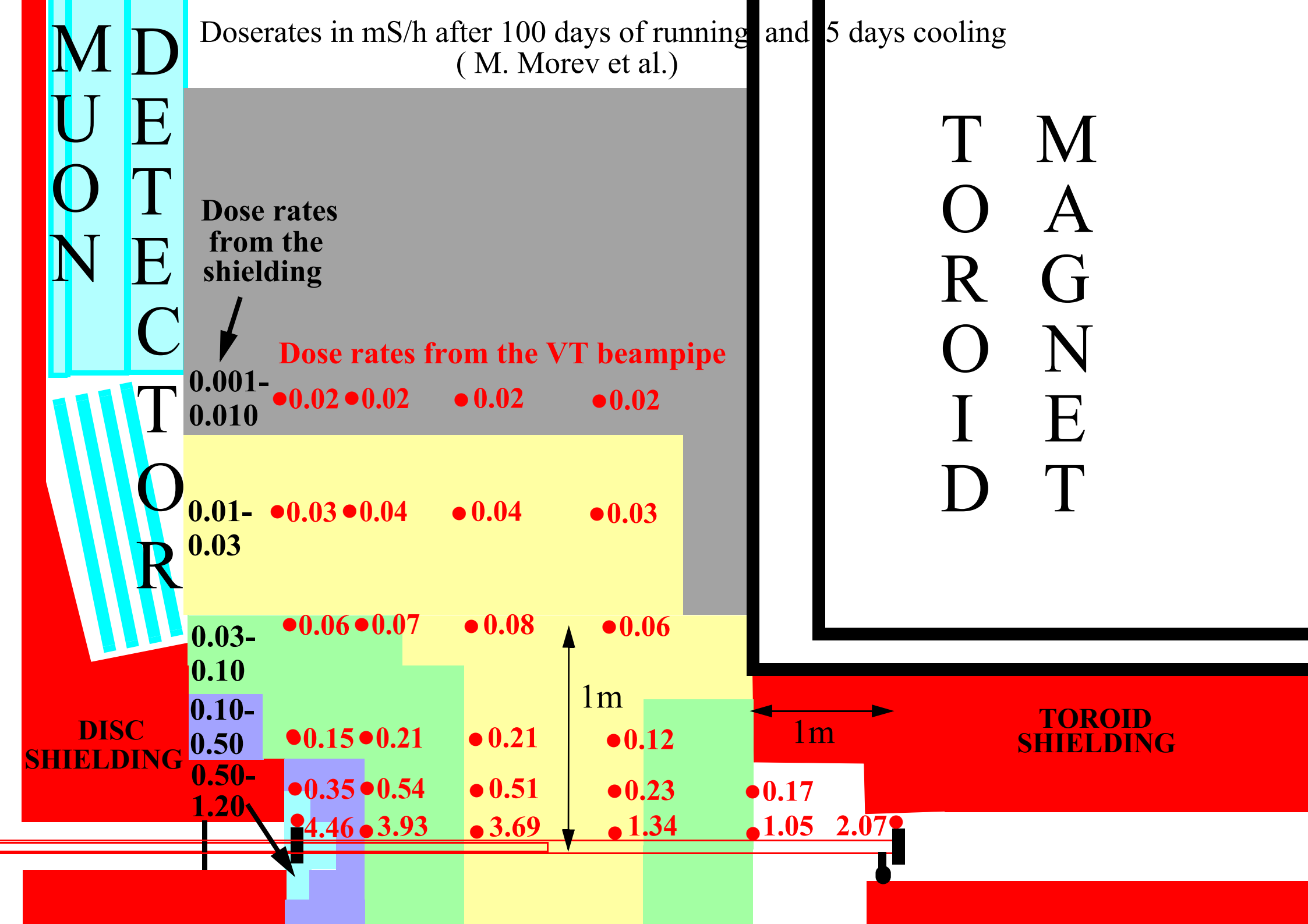


12. The VT beampipe is connected to a temporary support (0.2h x 0.2mSv/h = 0.04 mSv)

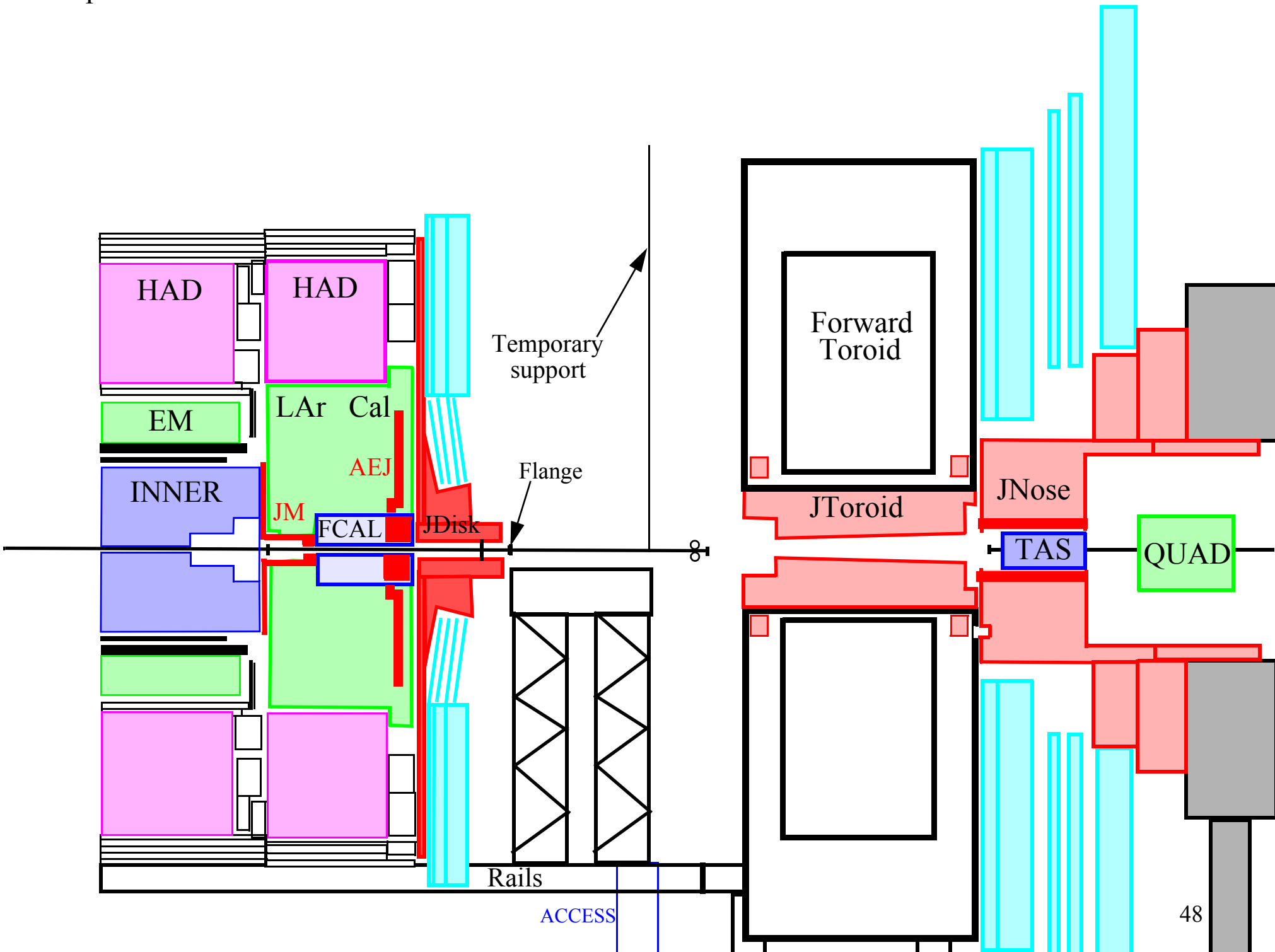
.



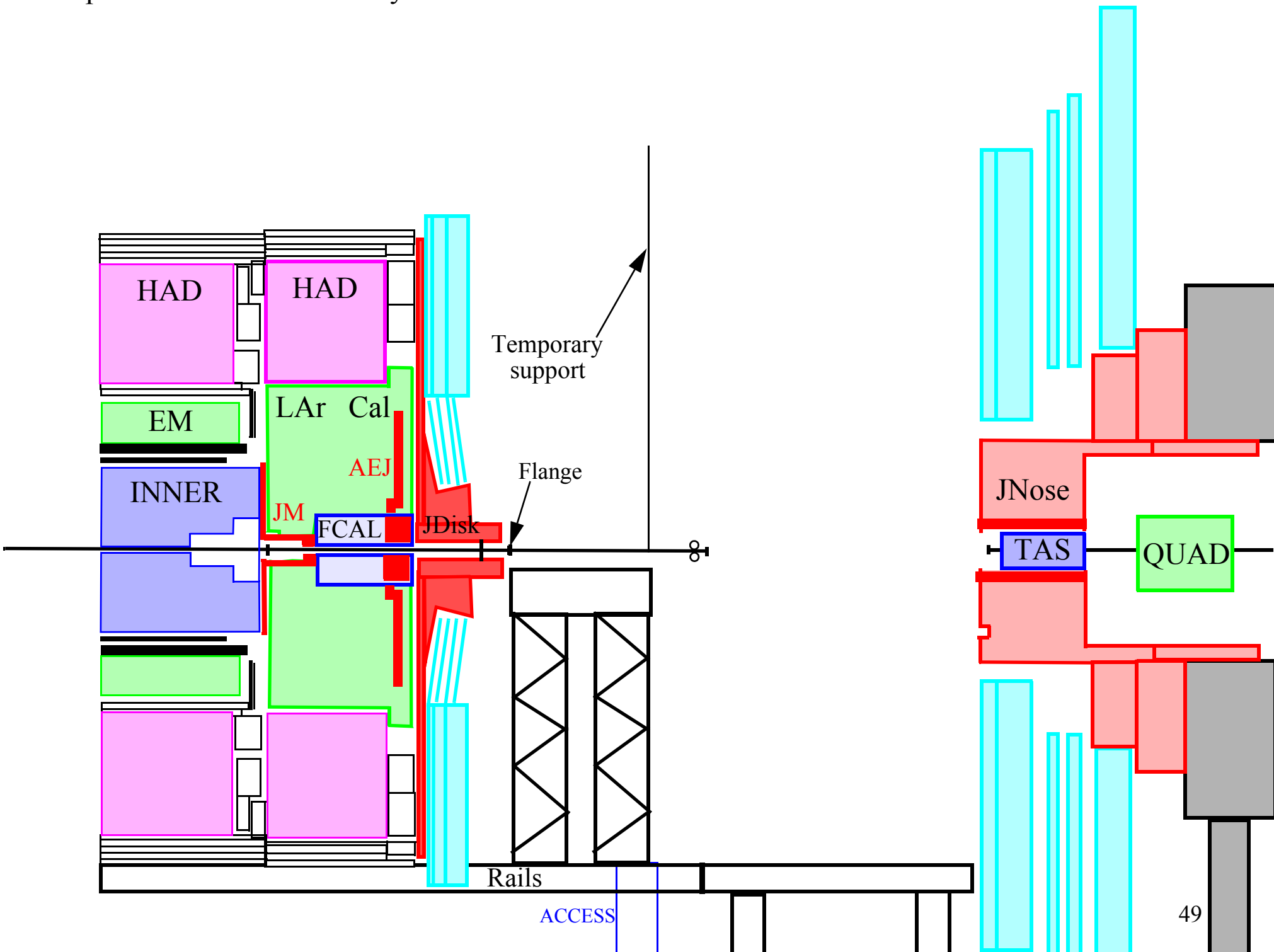

Doserates in mS/h after 100 days of running and 5 days cooling
(M. Morev et al.)
MUON DETECTOR
TOROID MAGNET
Dose rates from the shielding
0.001-0.010
0.01-0.03
0.03-0.10
0.10-0.50
0.50-1.20
DISC SHIELDING
TOROID SHIELDING


Doserates in mS/h after 100 days of running and 5 days cooling
(M. Morev et al.)
MUON DETECTOR
TOROID MAGNET
Dose rates from the shielding
Dose rates from the VT beampipe
0.001-0.010
0.01-0.03
0.03-0.10
0.10-0.50
0.50-1.20
0.02 0.02 0.02 0.02
0.03 0.04 0.04 0.03
0.06 0.07 0.08 0.06
0.15 0.21 0.21 0.12
0.35 0.54 0.51 0.23 0.17
4.46 3.93 3.69 1.34 1.05 2.07
1m
1m
DISC SHIELDING
TOROID SHIELDING

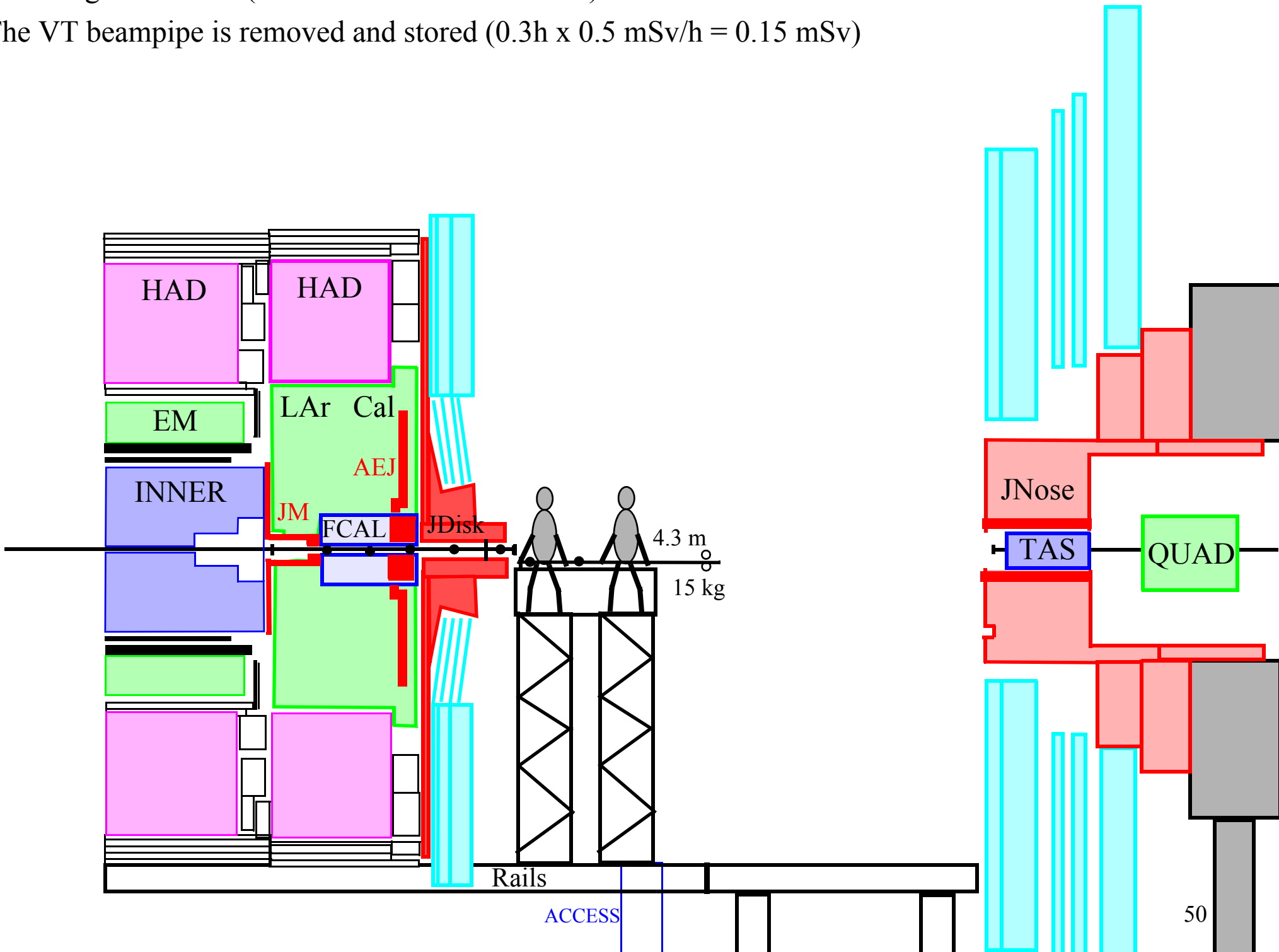
13. The endcap toroid is moved forward.



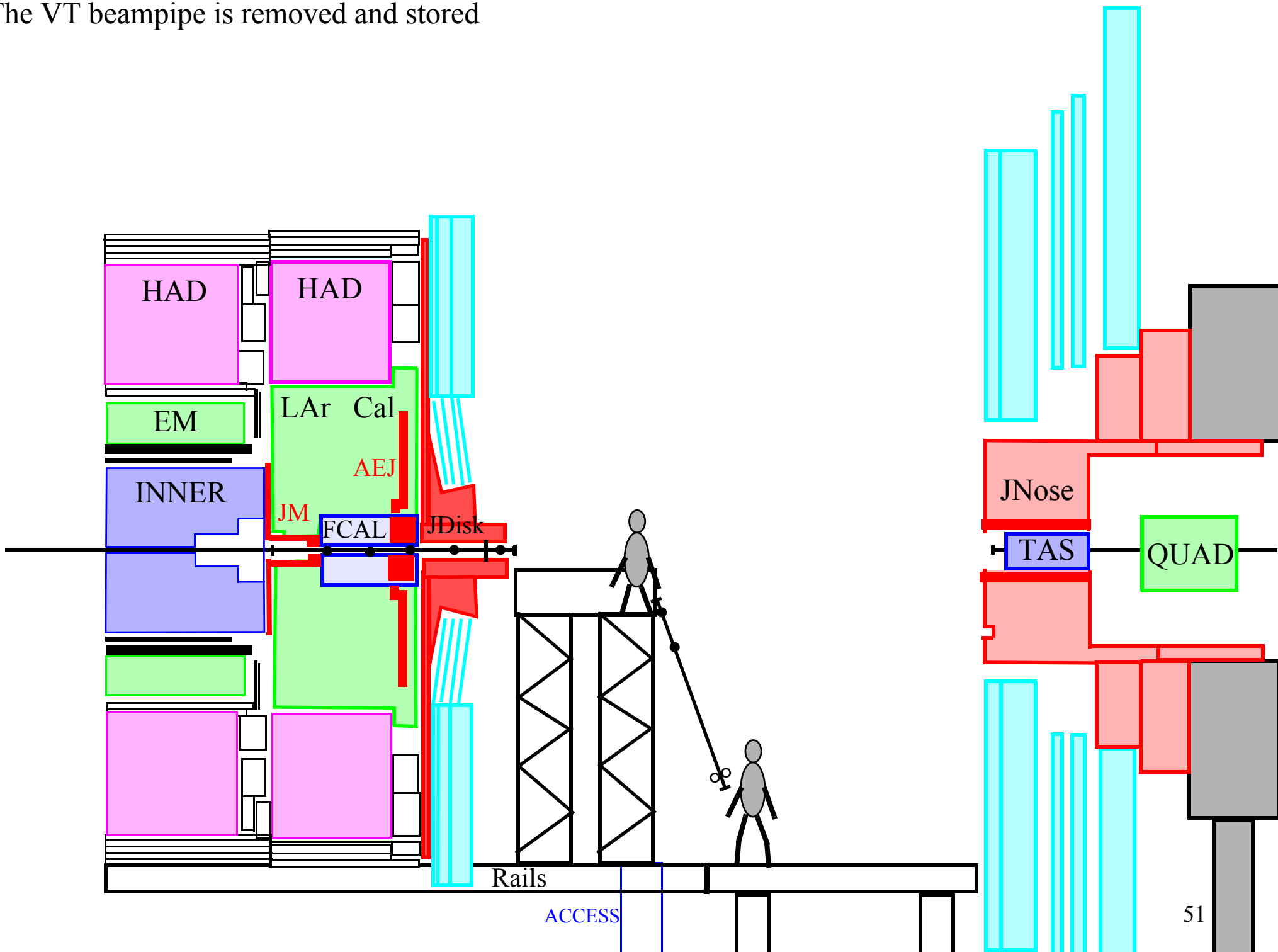
14. The endcap toroid is moved sideways.



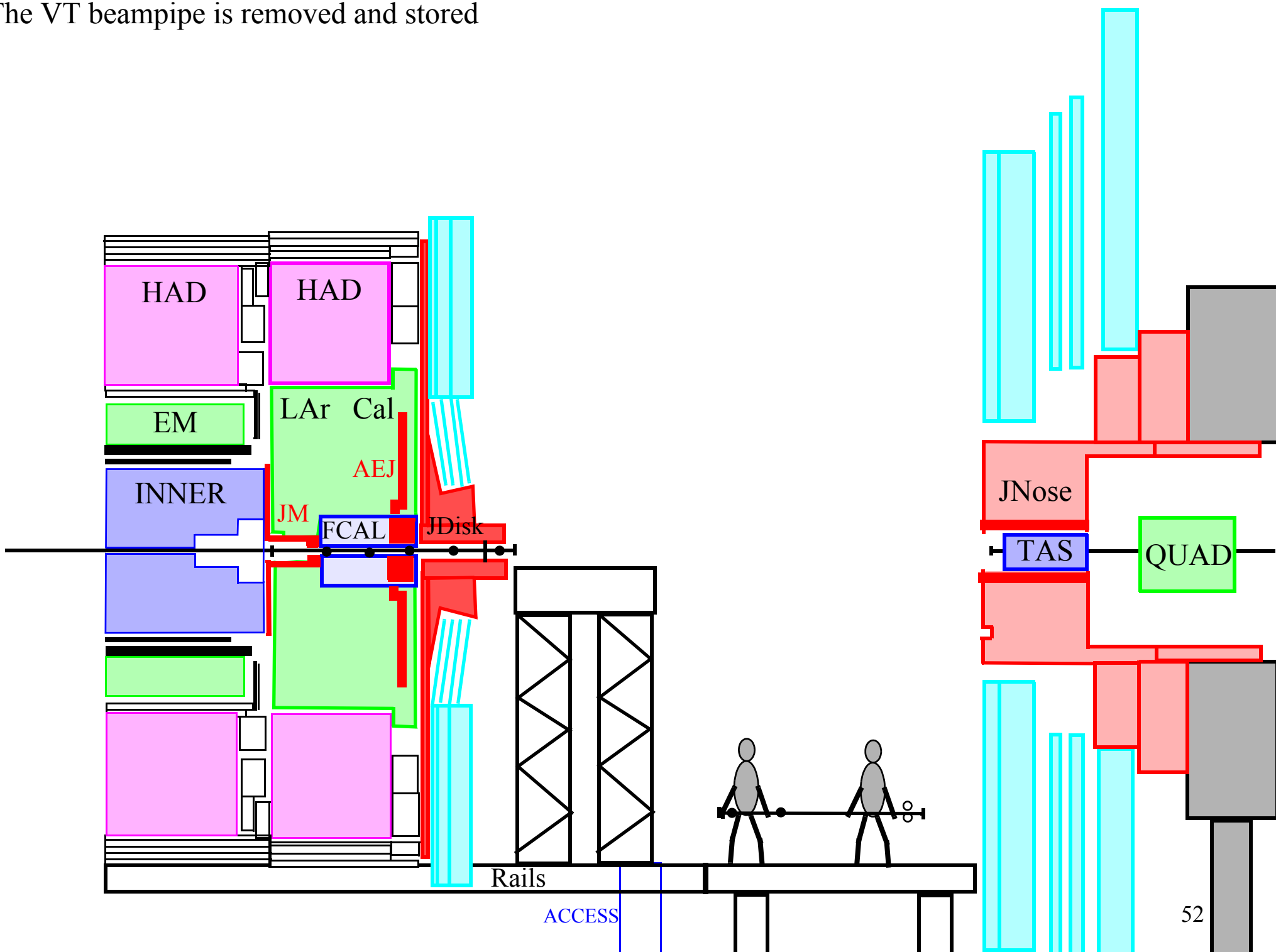
15. The flange is undone (0.2h x 0.5mSv/h = 0.1 mSv)
16. The VT beampipe is removed and stored (0.3h x 0.5 mSv/h = 0.15 mSv)



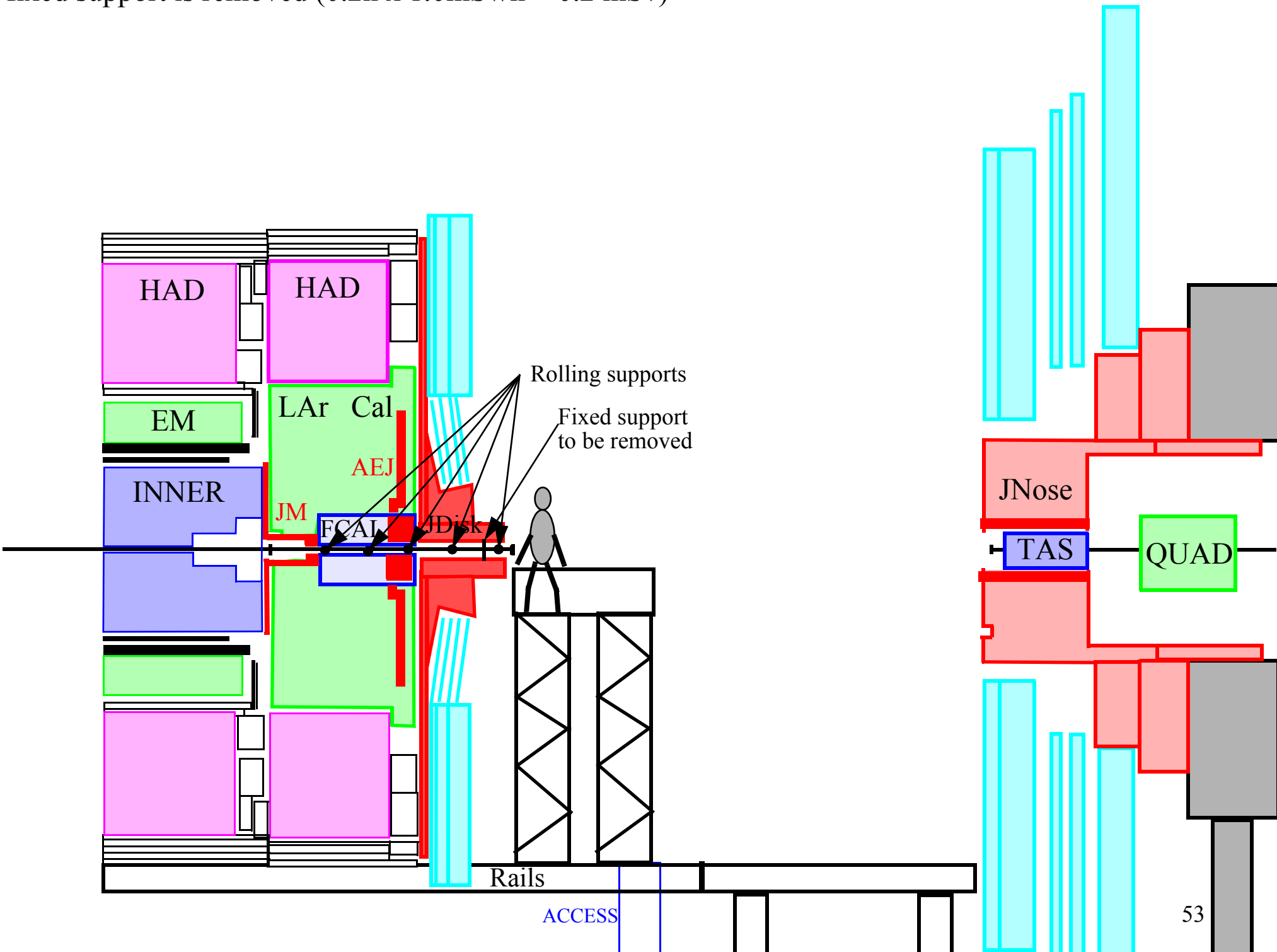
16. The VT beampipe is removed and stored



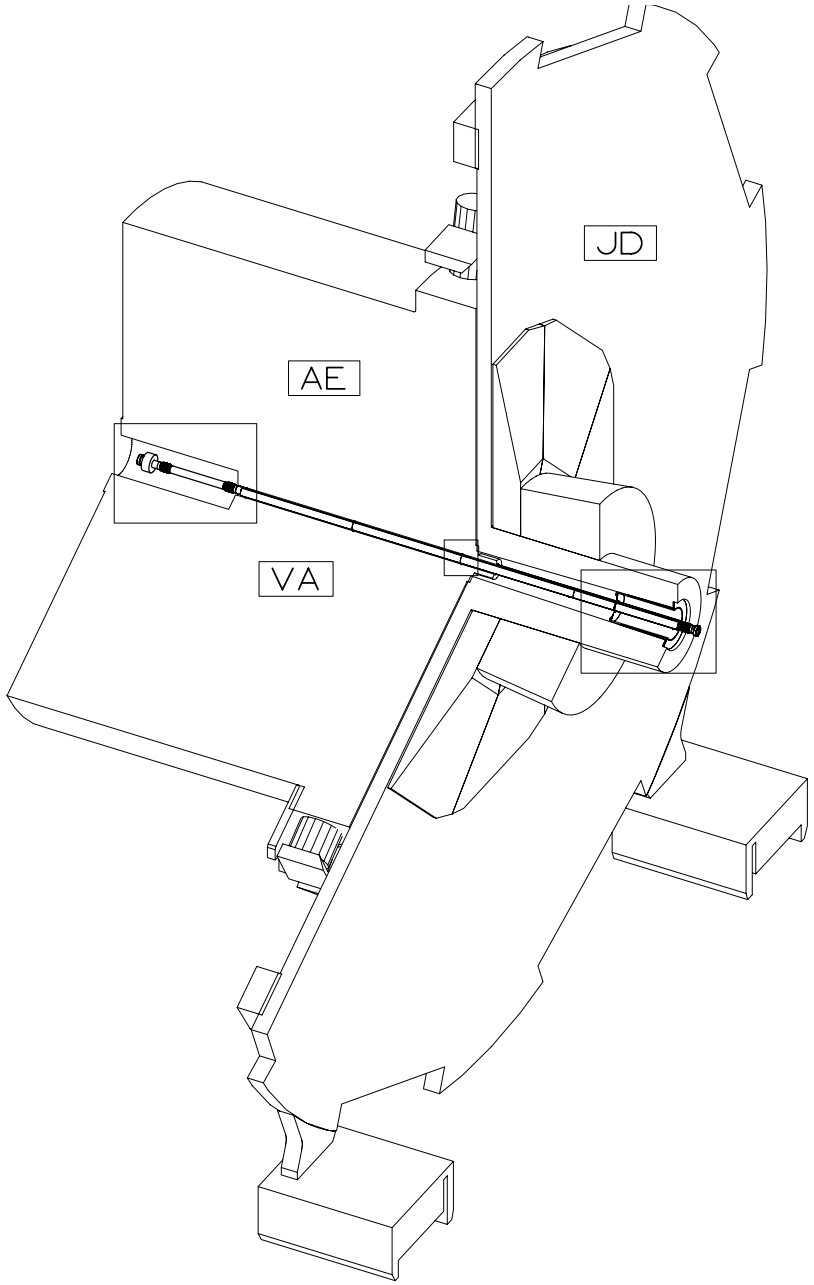
16. The VT beampipe is removed and stored

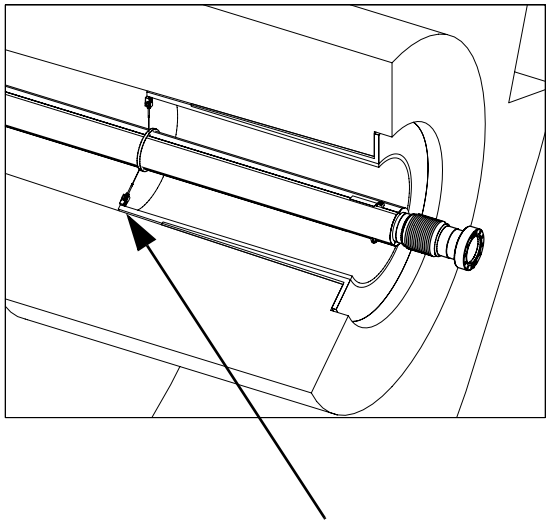


17. The fixed support is removed (0.2h x 1.0mSv/h = 0.2 mSv)

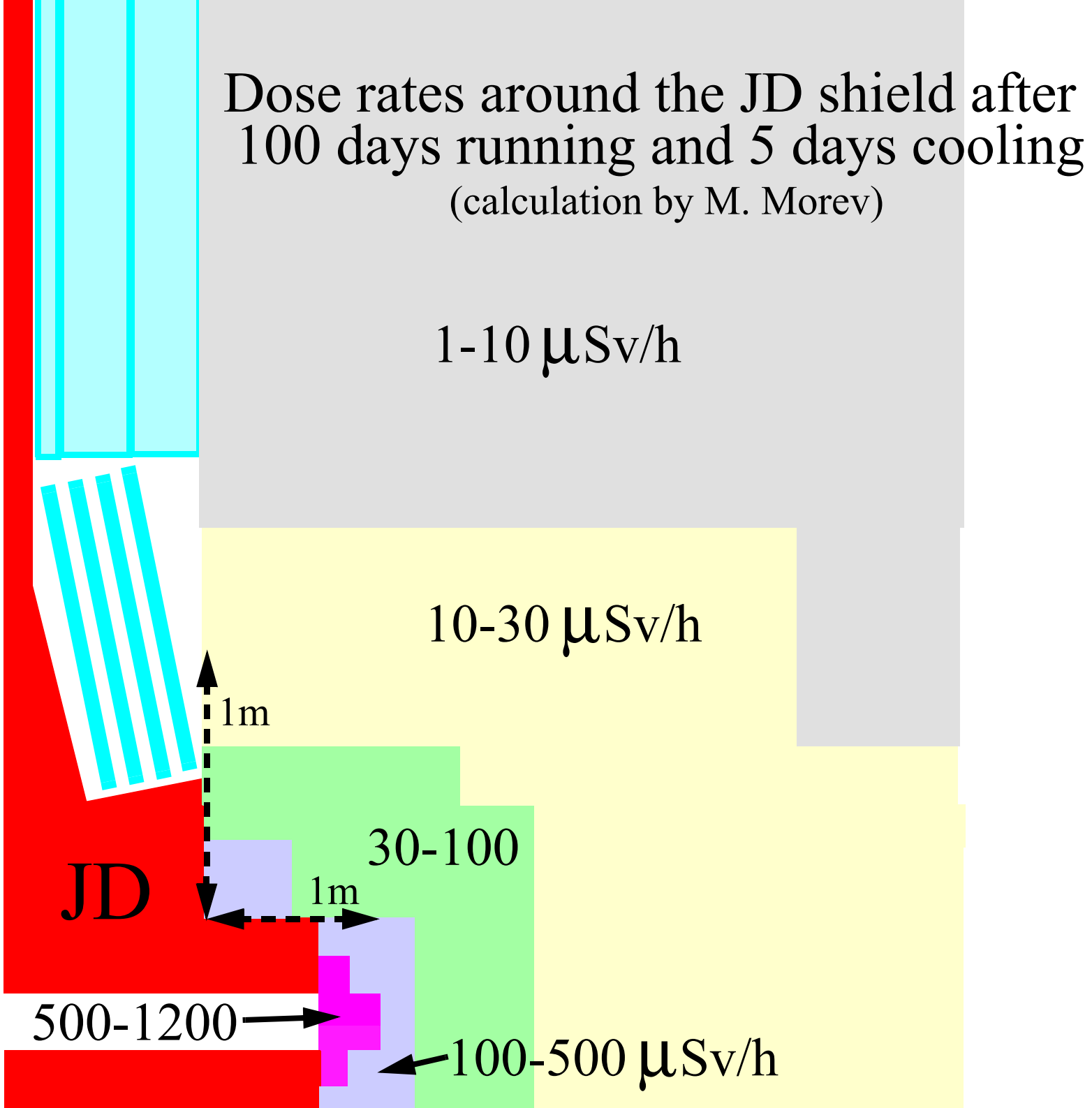


Beampipe supports



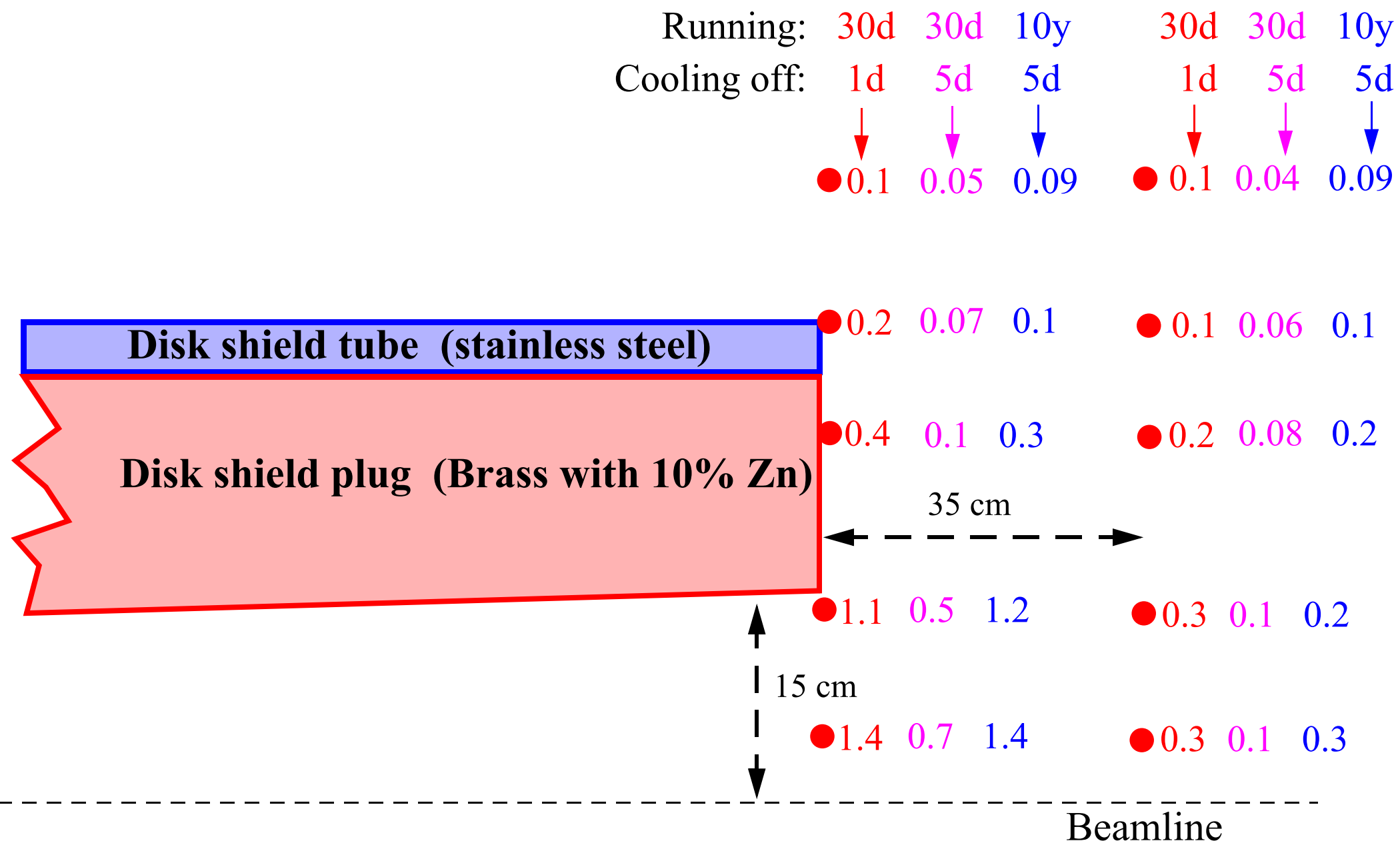


This support has to be removed.

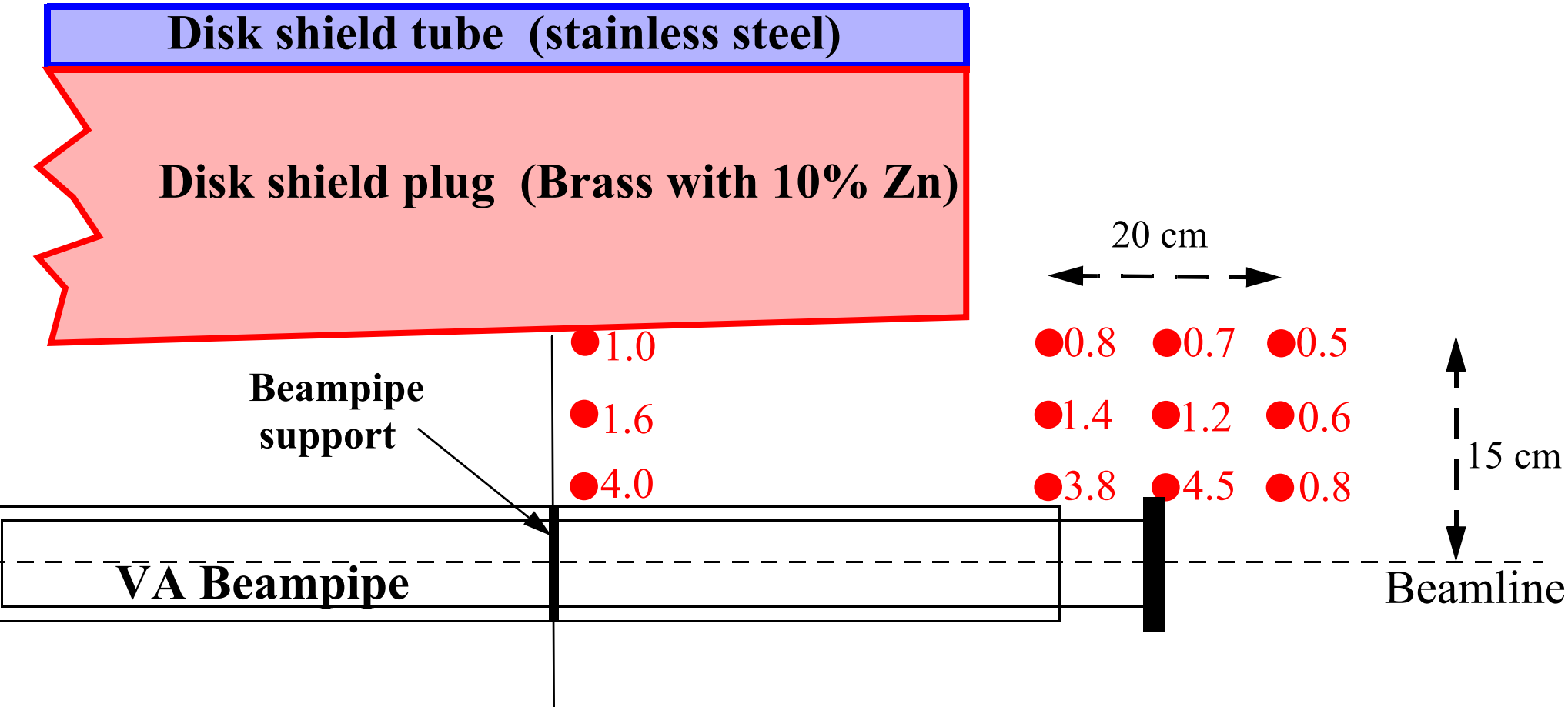

Dose rates around the JD shield after
100 days running and 5 days cooling
(calculation by M. Morev)
1-10 μSv/h
10-30 μSv/h
1m
30-100
JD
1m
500-1200
100-500 μSv/h

Dose rates in mSv/h at the back of the disk shield plug

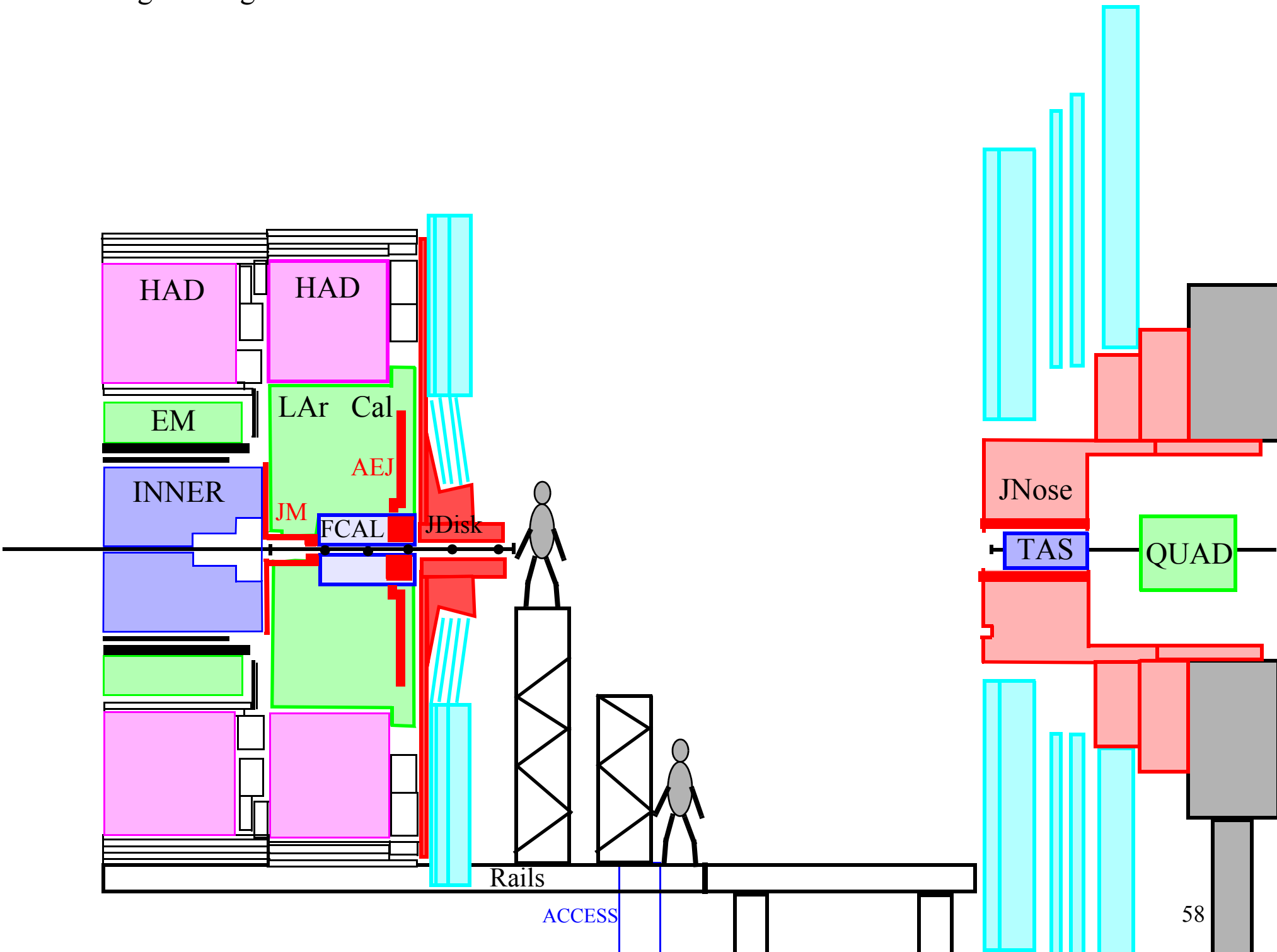
(calculation by M. Morev)



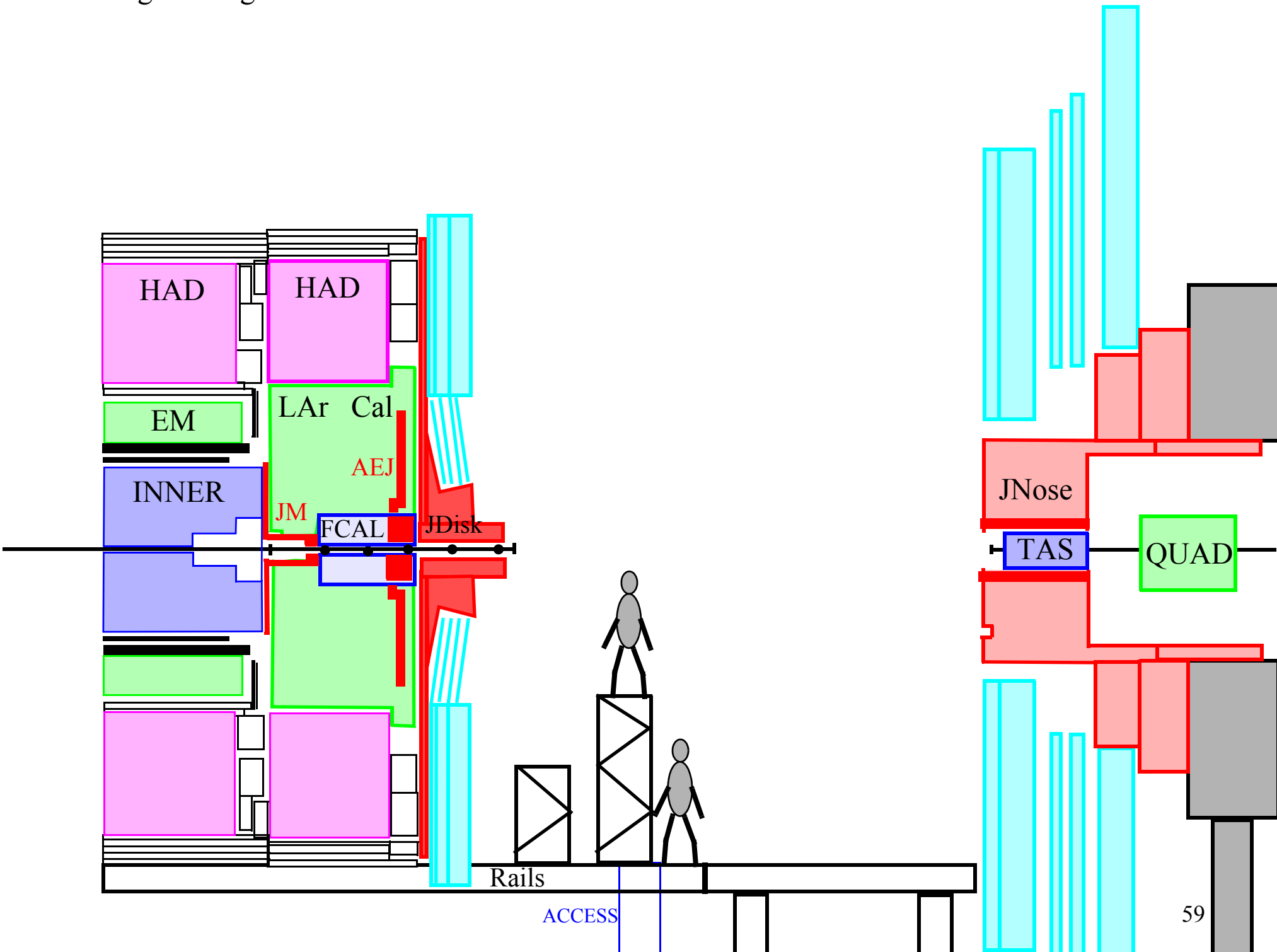
Dose rates in mSv/h at the back of the disk shield plug from only the VA beampipe. (Calculation by M. Morev)



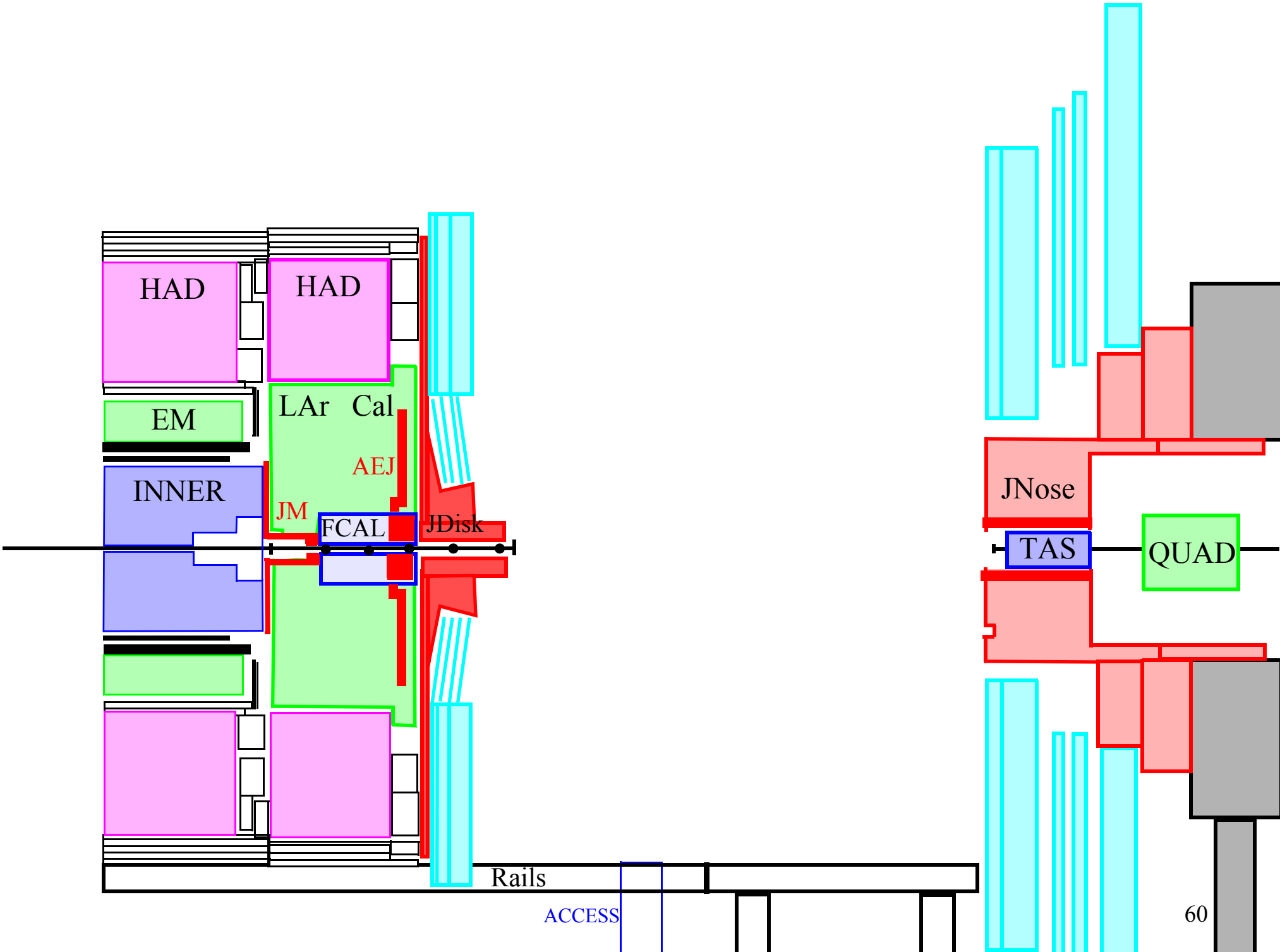
18. The scaffolding is being removed.



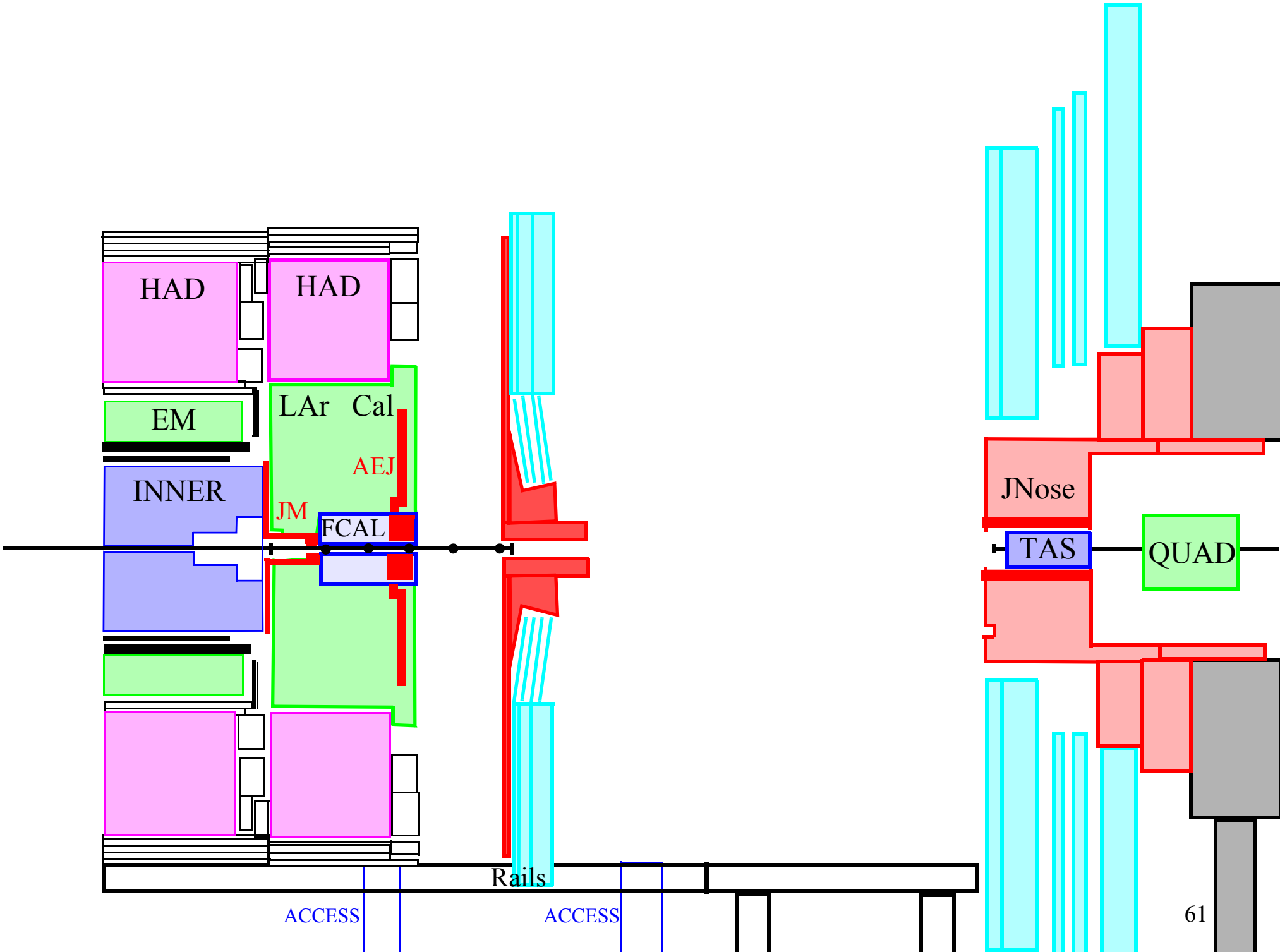
18. The scaffolding is being removed.



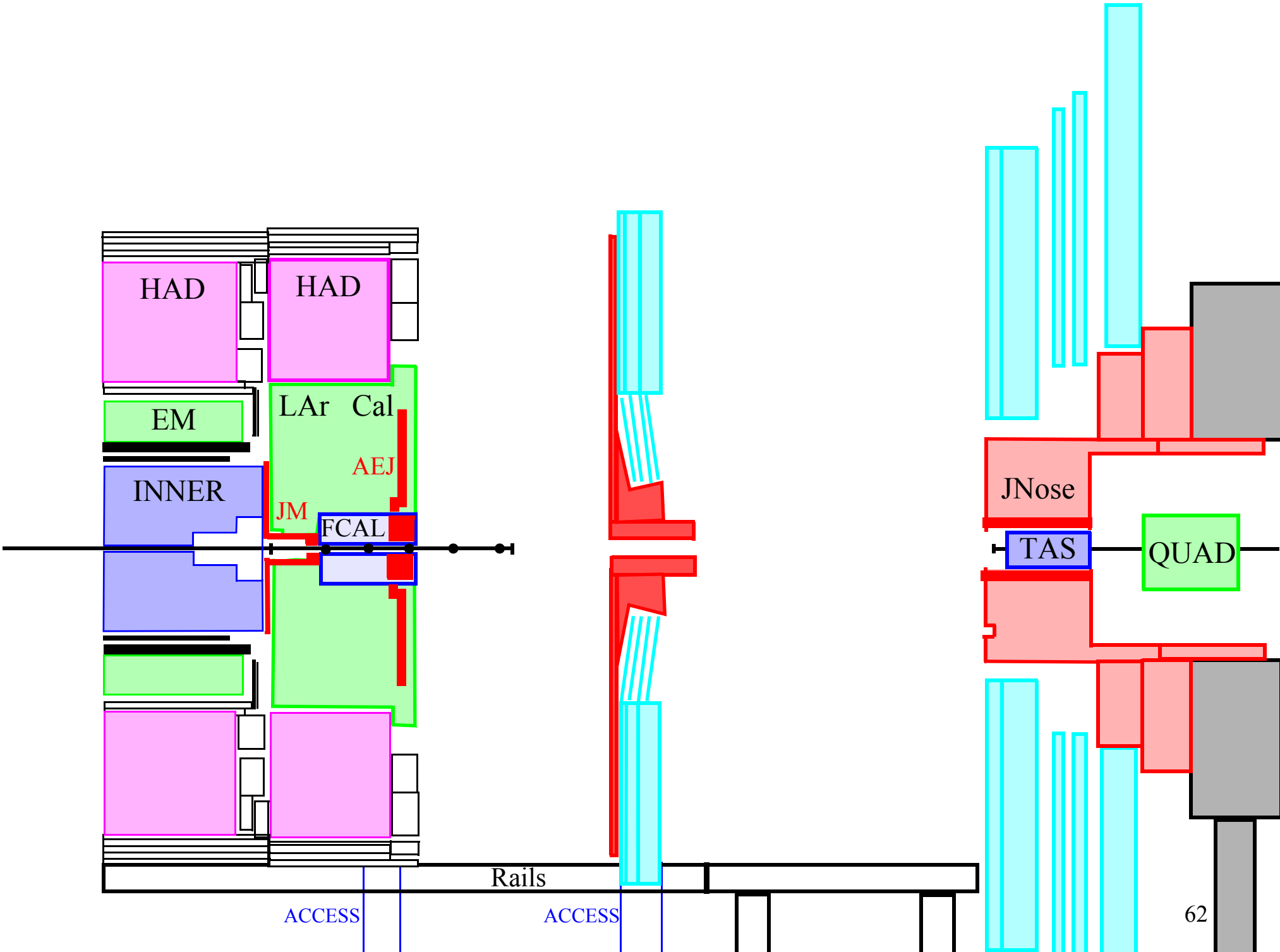
19. The small wheel is moved forward.



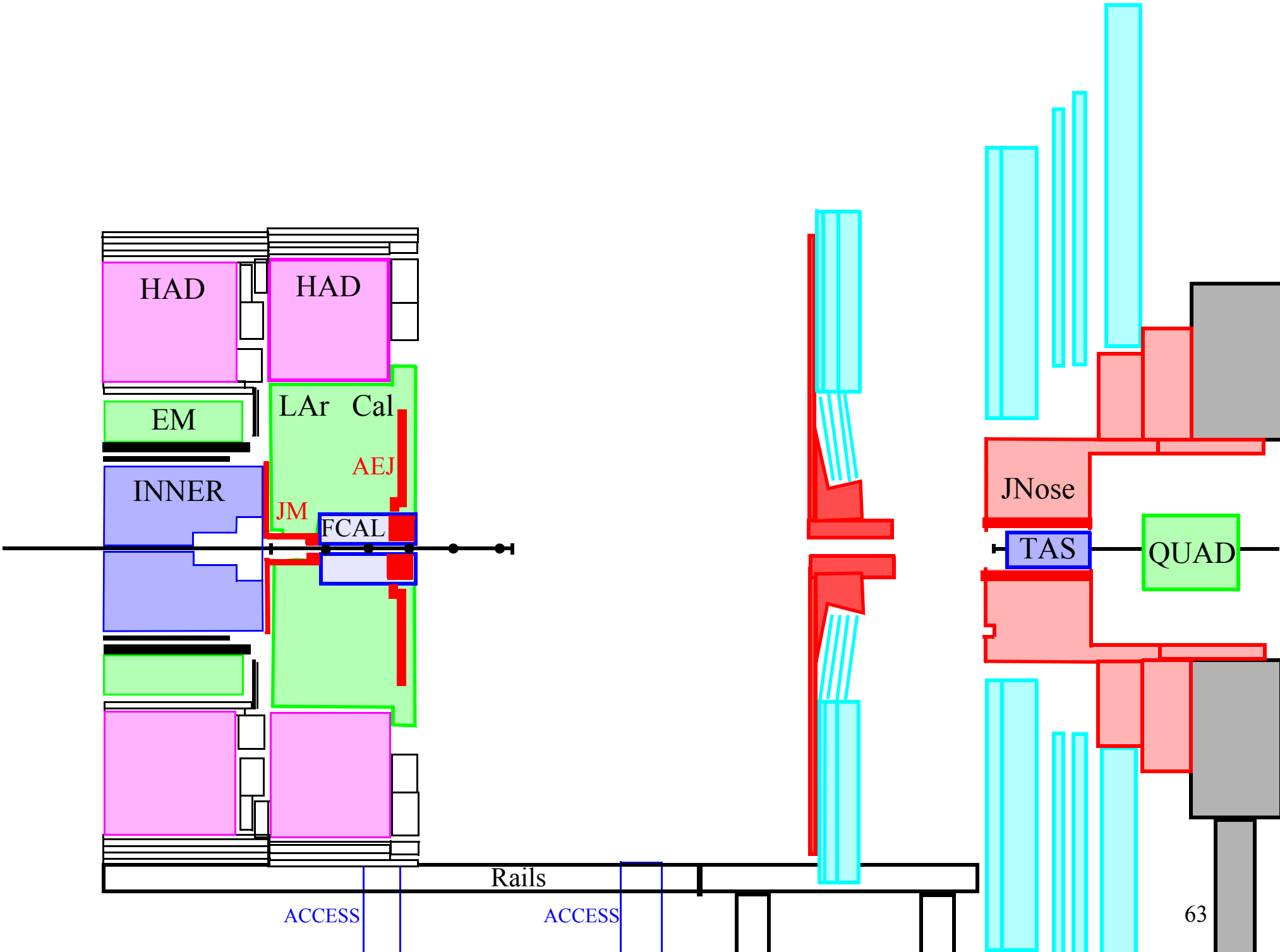
19. The small wheel is moved forward.



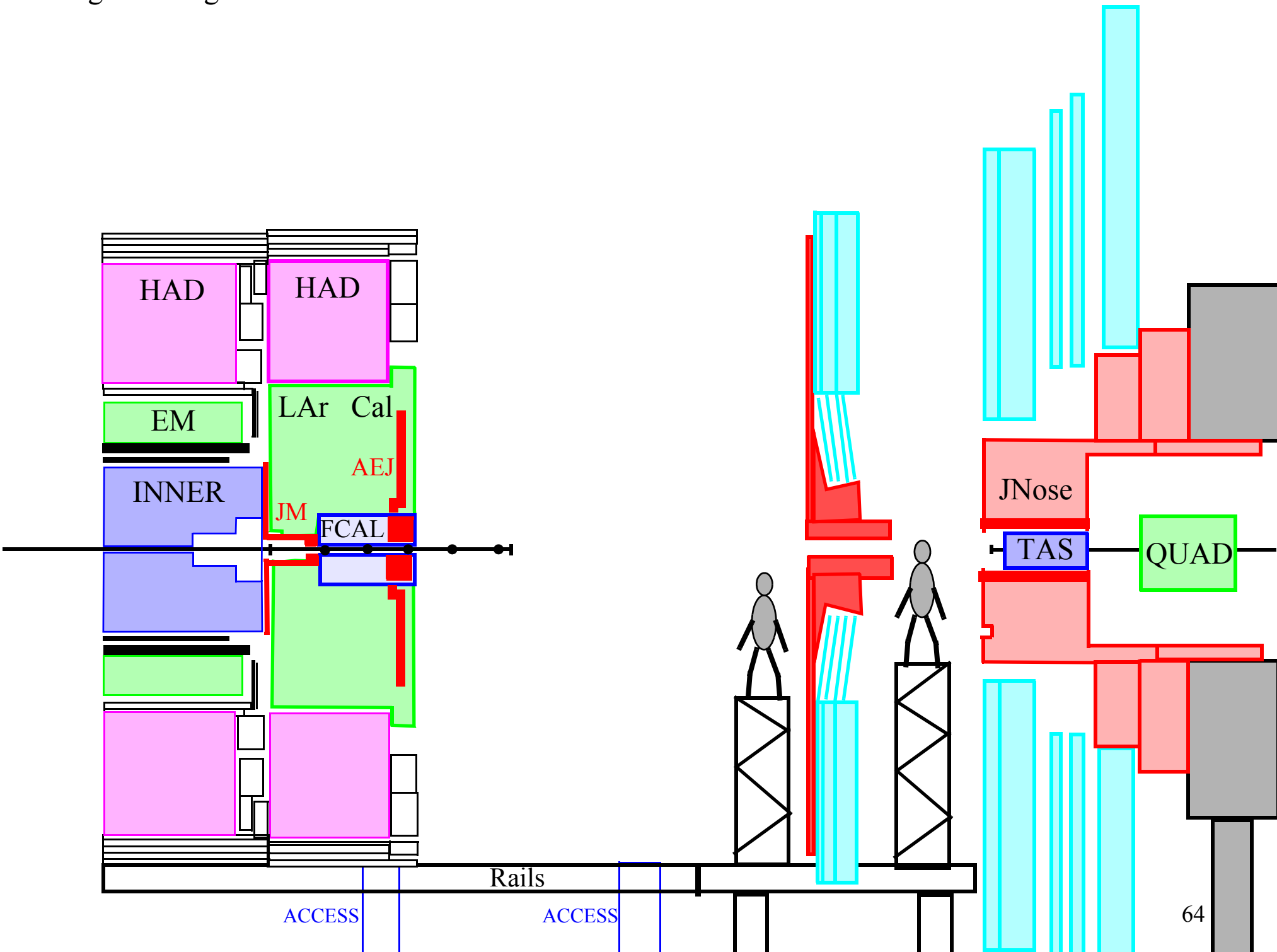
19. The small wheel is moved forward.



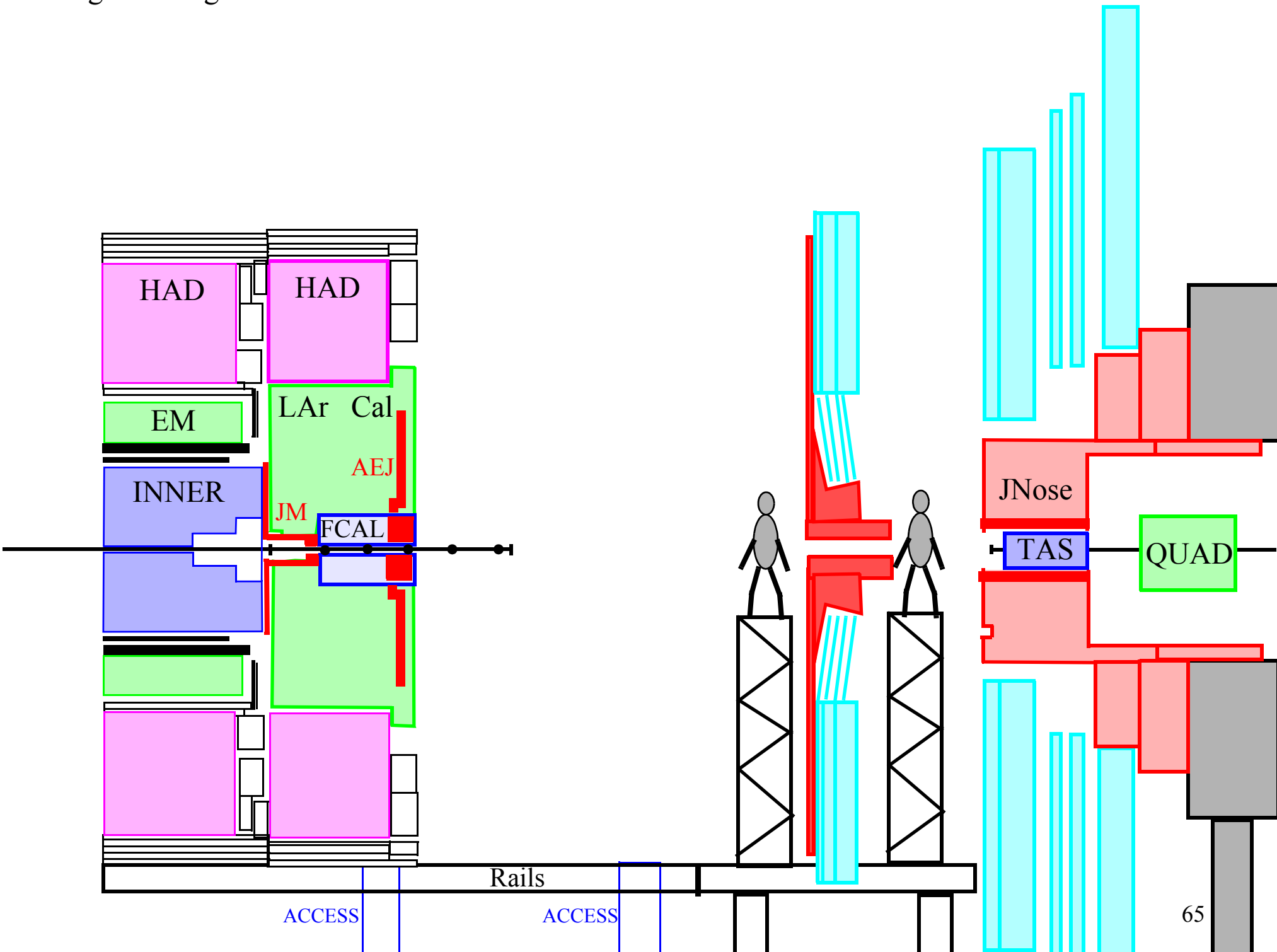
19. The small wheel is moved forward.



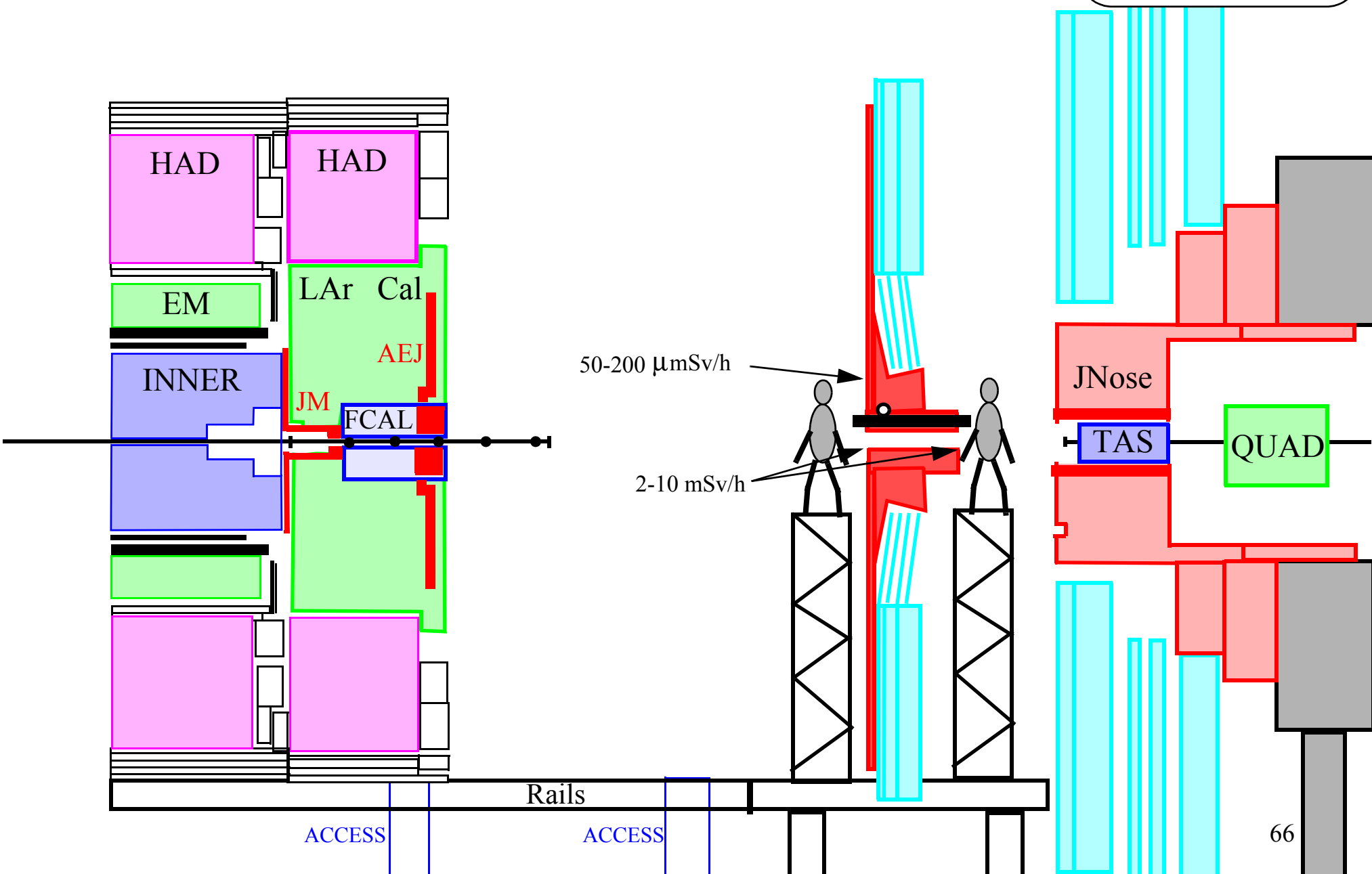
20. Scaffolding is beeing built.



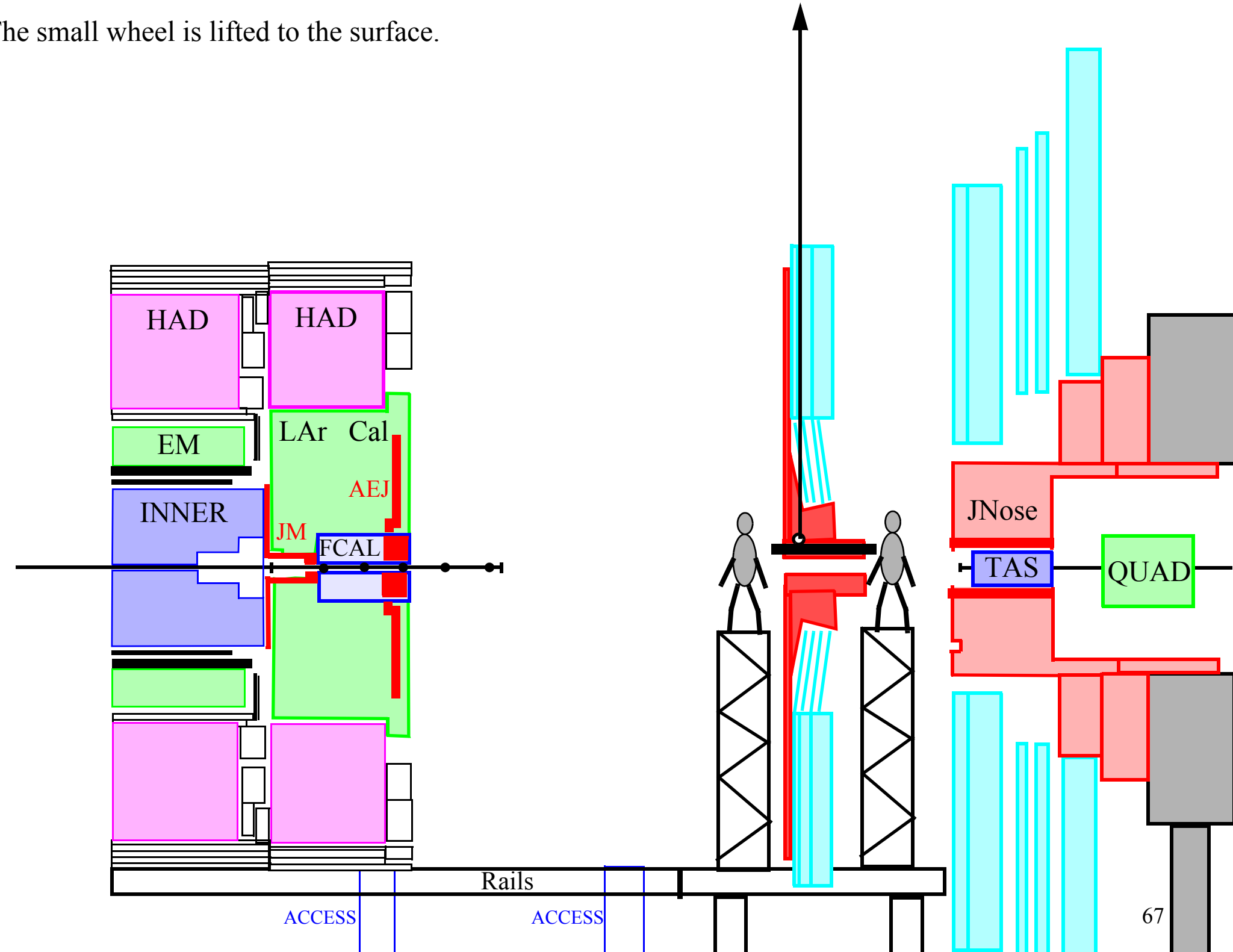
20. Scaffolding is beeing built.



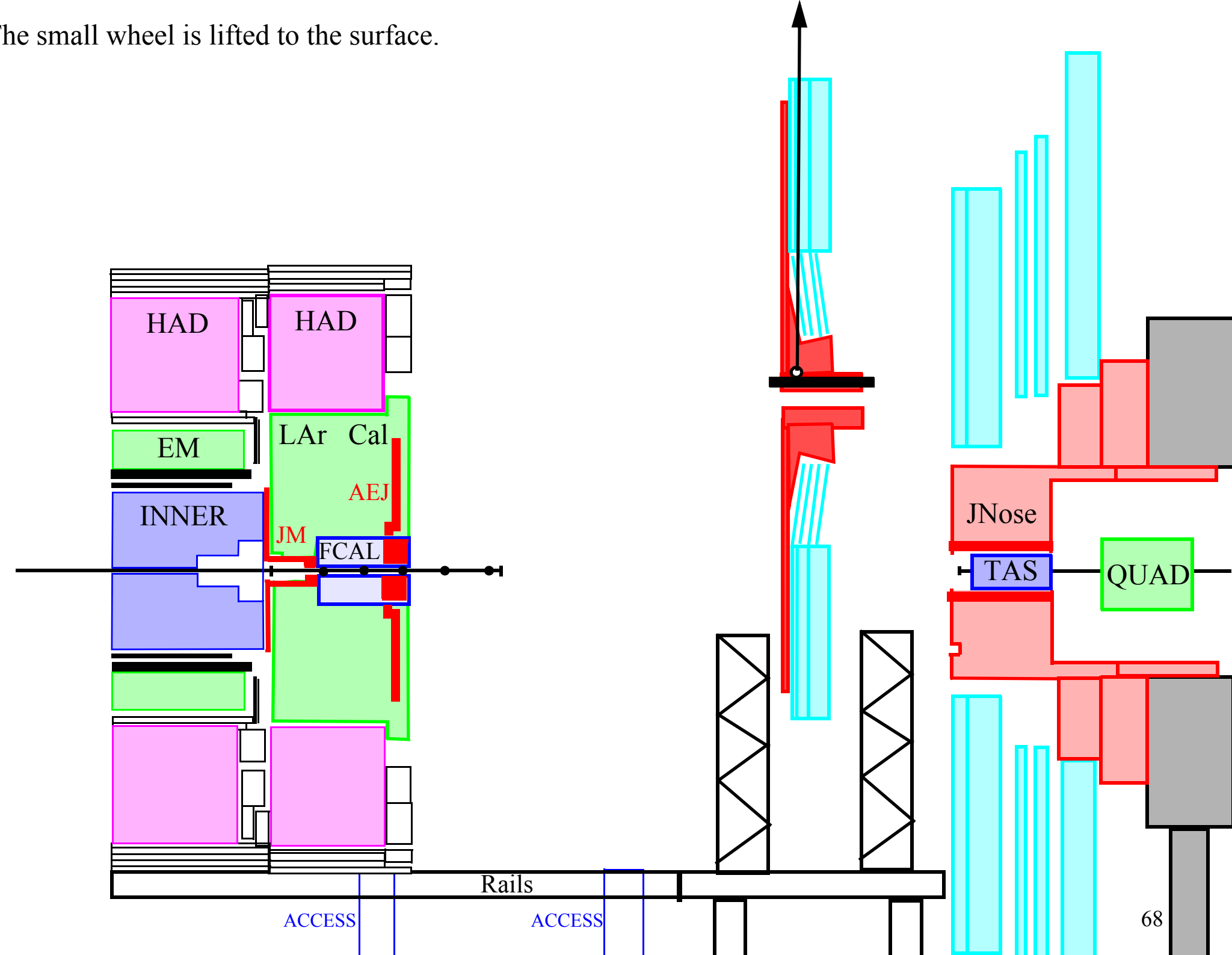
21. A lifting frame is attached to the disk shield



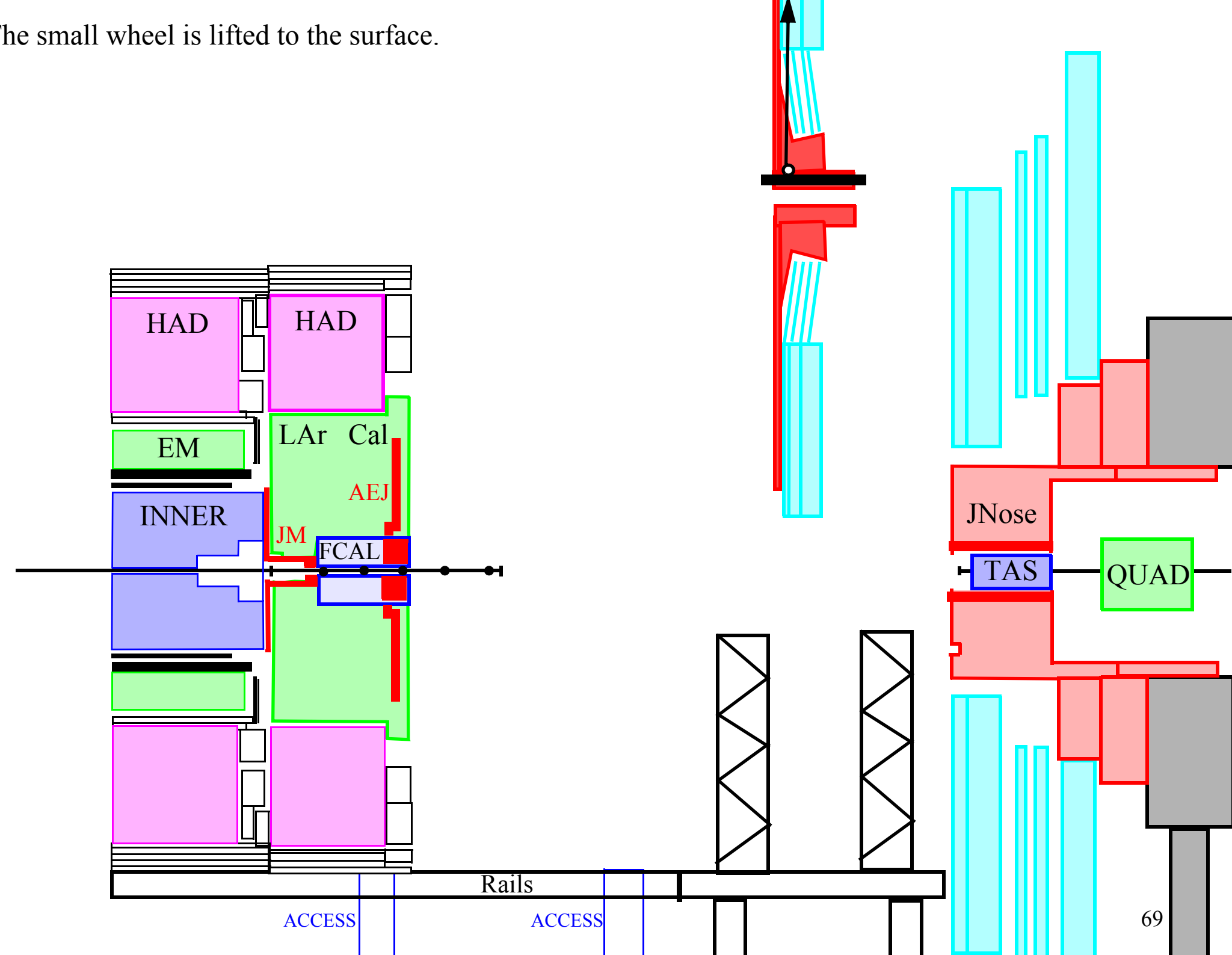
22. The small wheel is lifted to the surface.



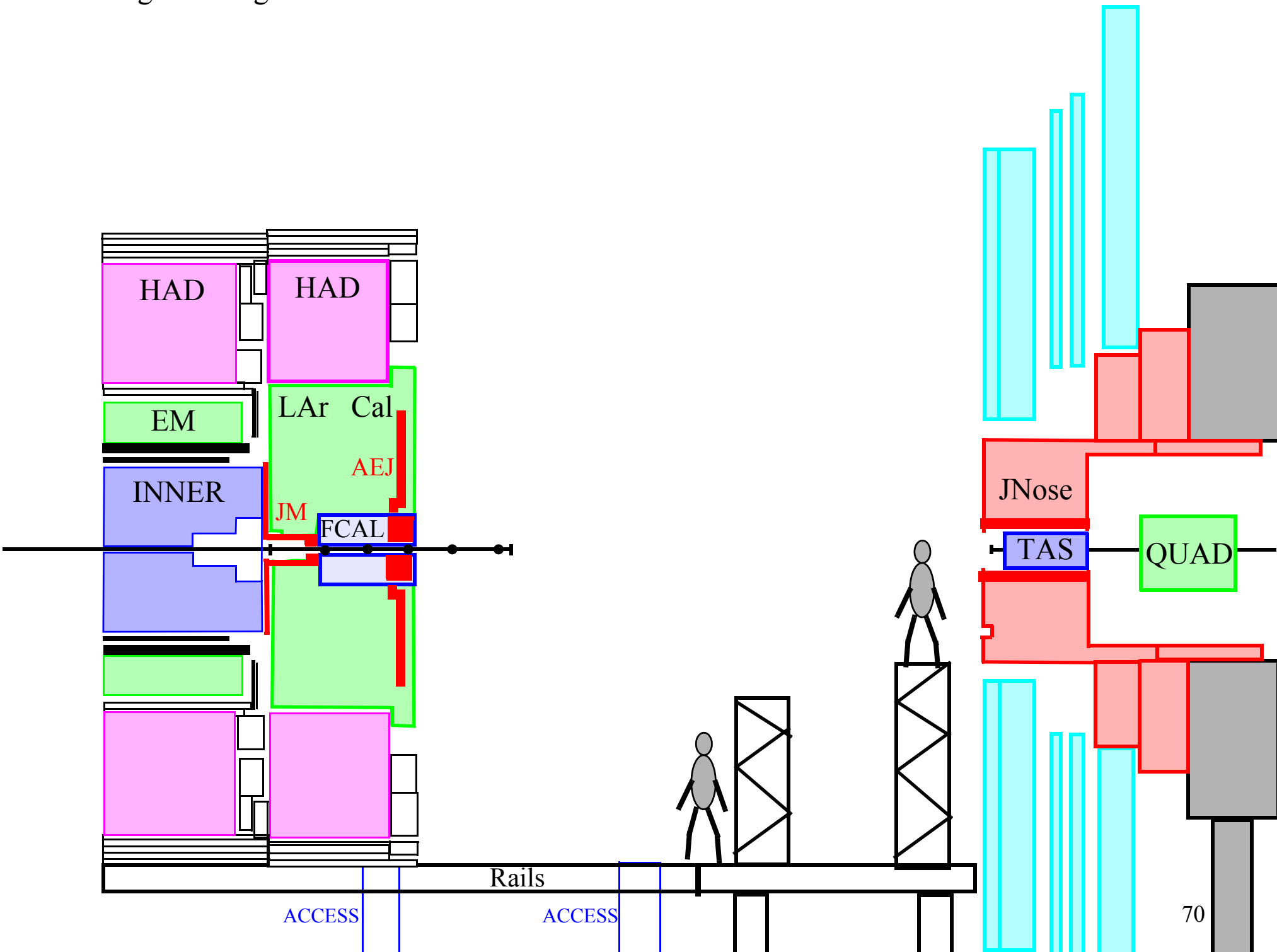
22. The small wheel is lifted to the surface.



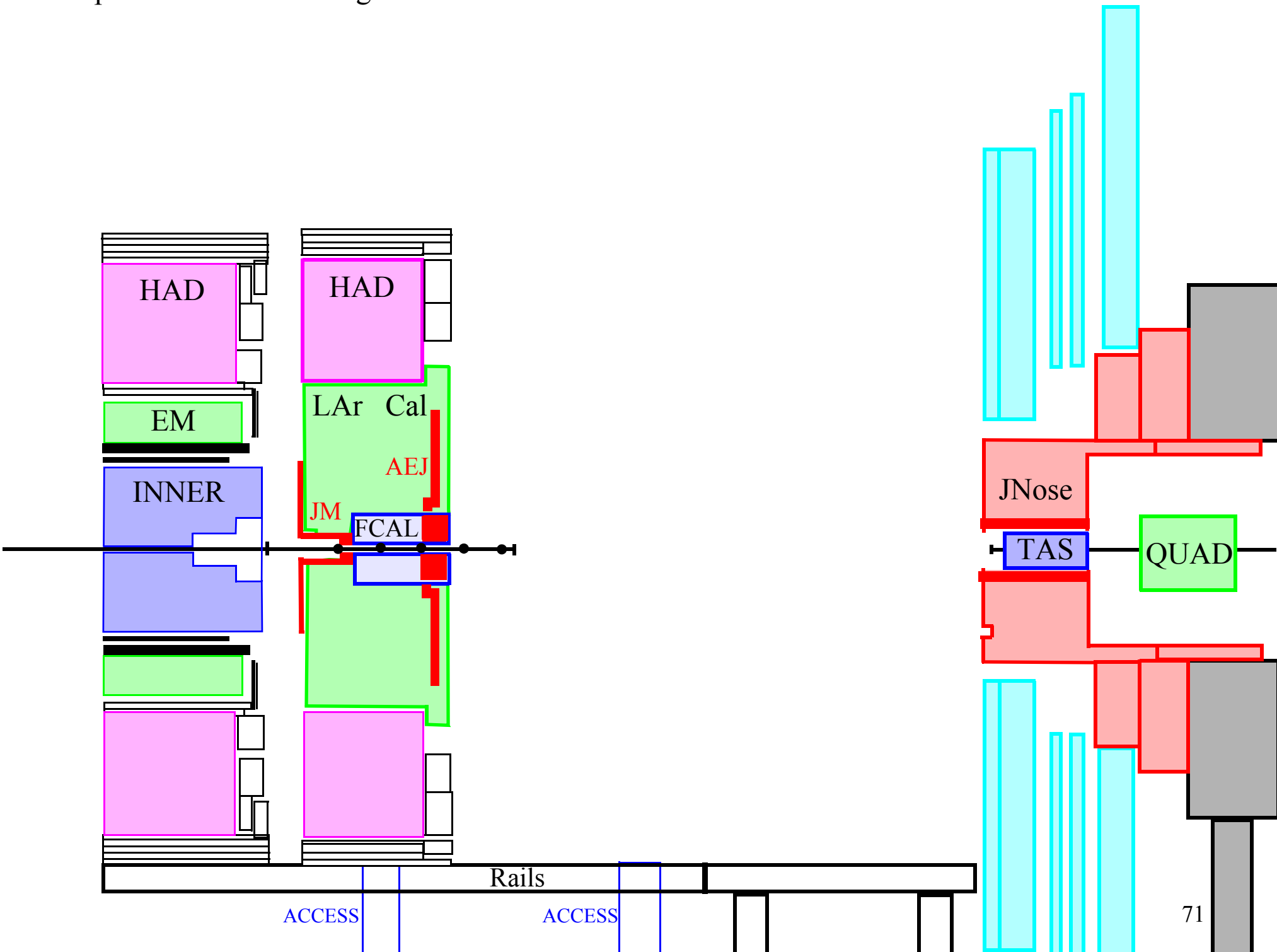
22. The small wheel is lifted to the surface.



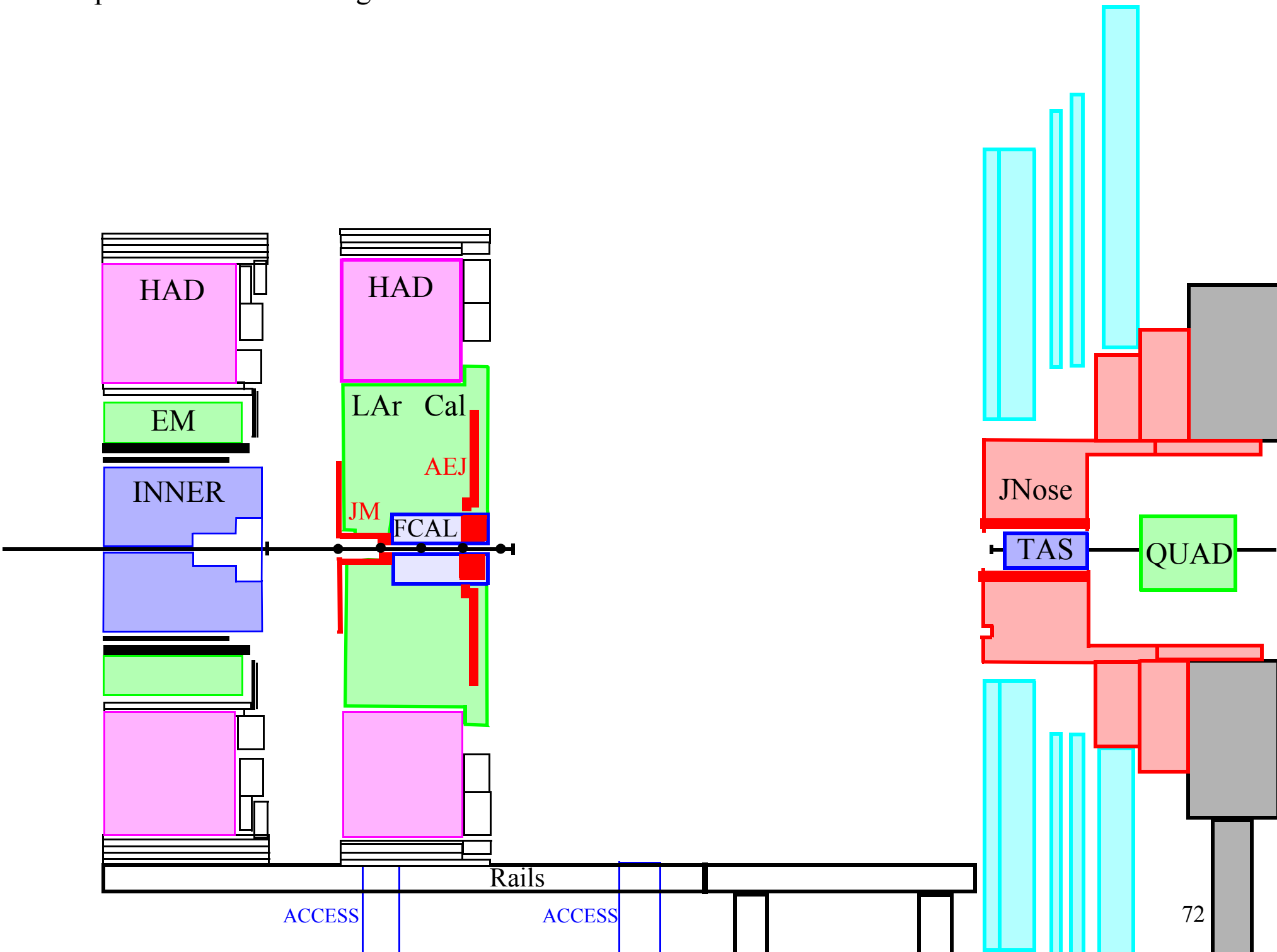
23. The scaffolding is beeing removed.



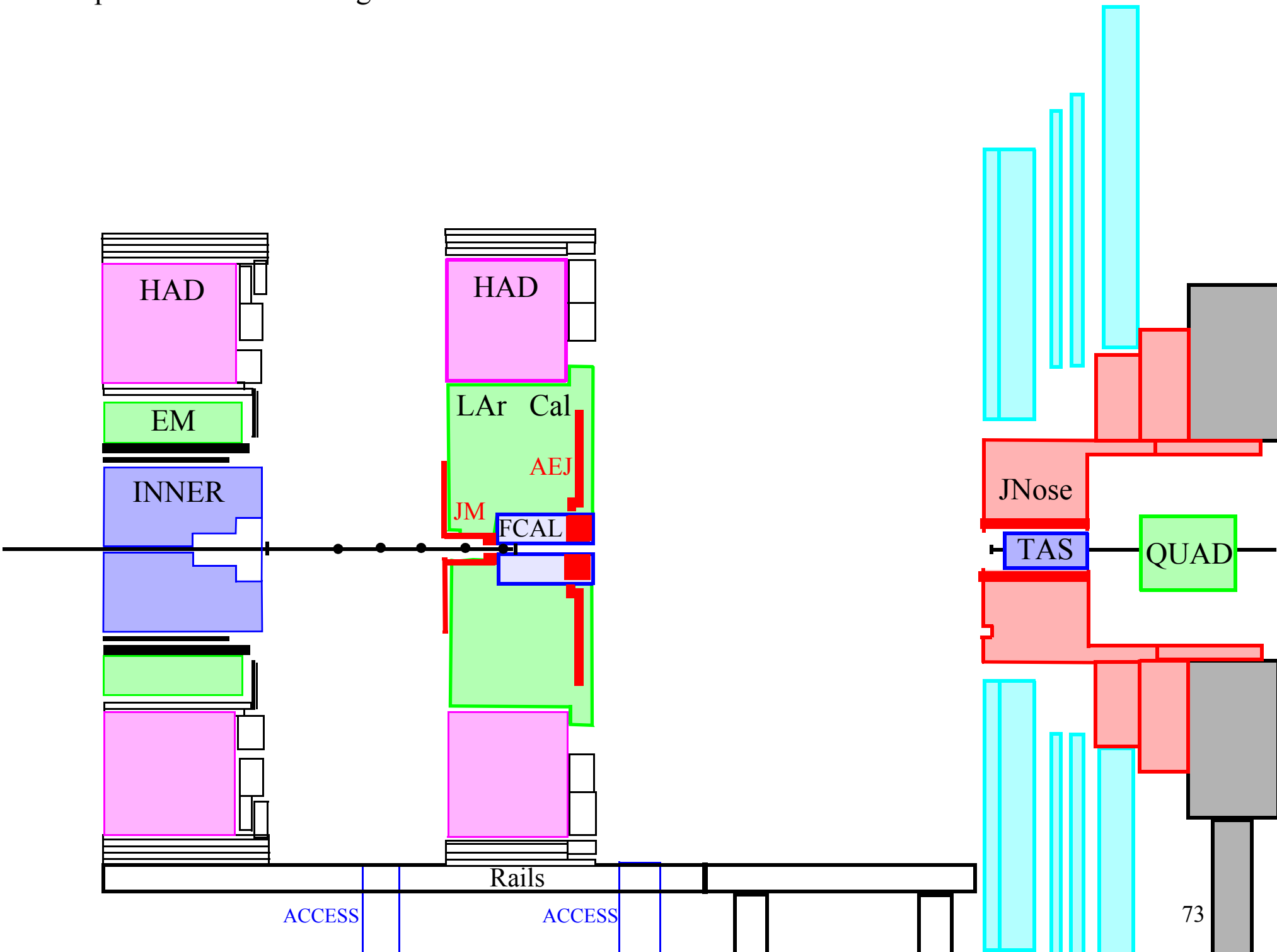
24. The endcap calorimeter is beeing moved forward.



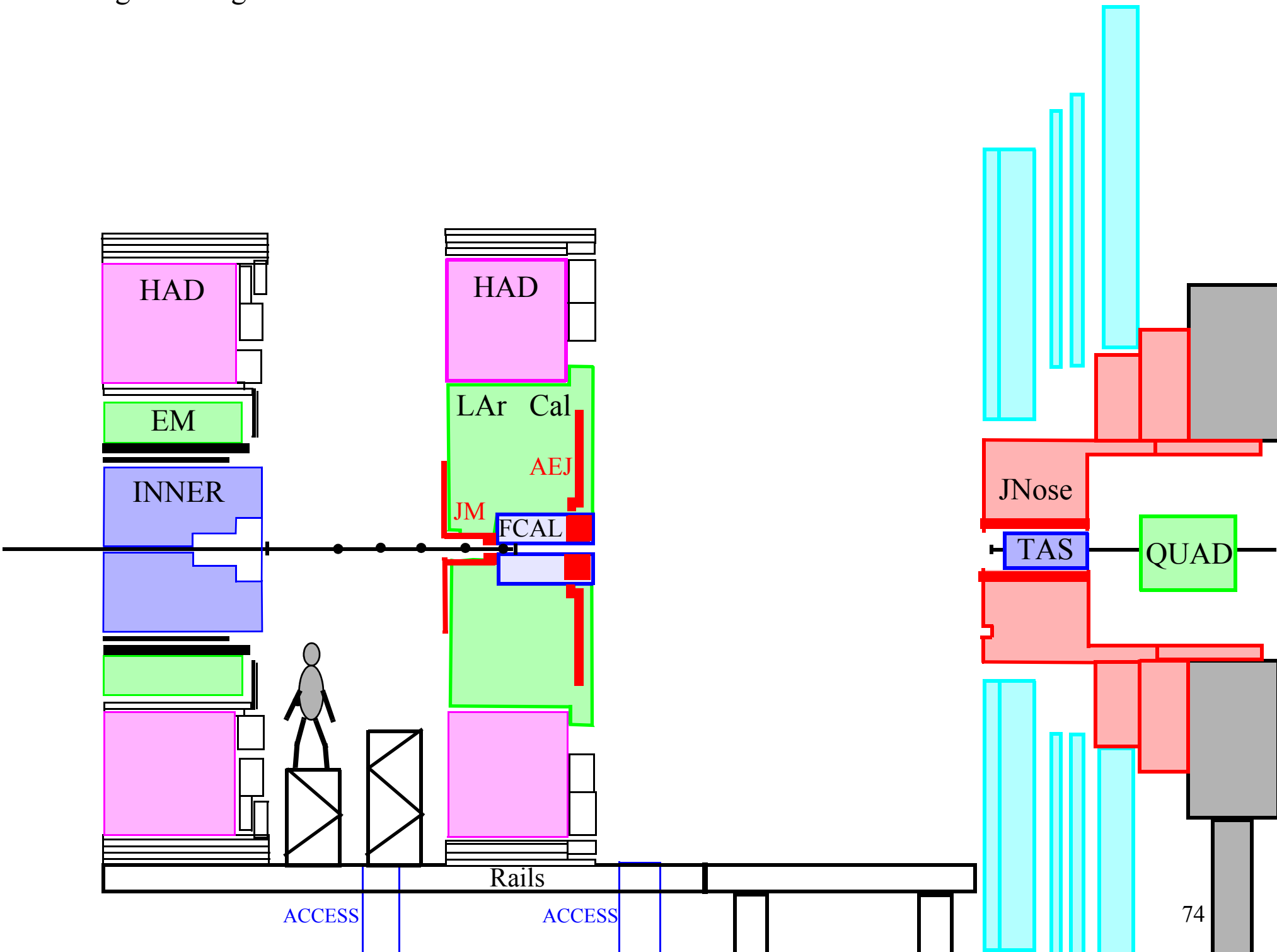
24. The endcap calorimeter is beeing moved forward.



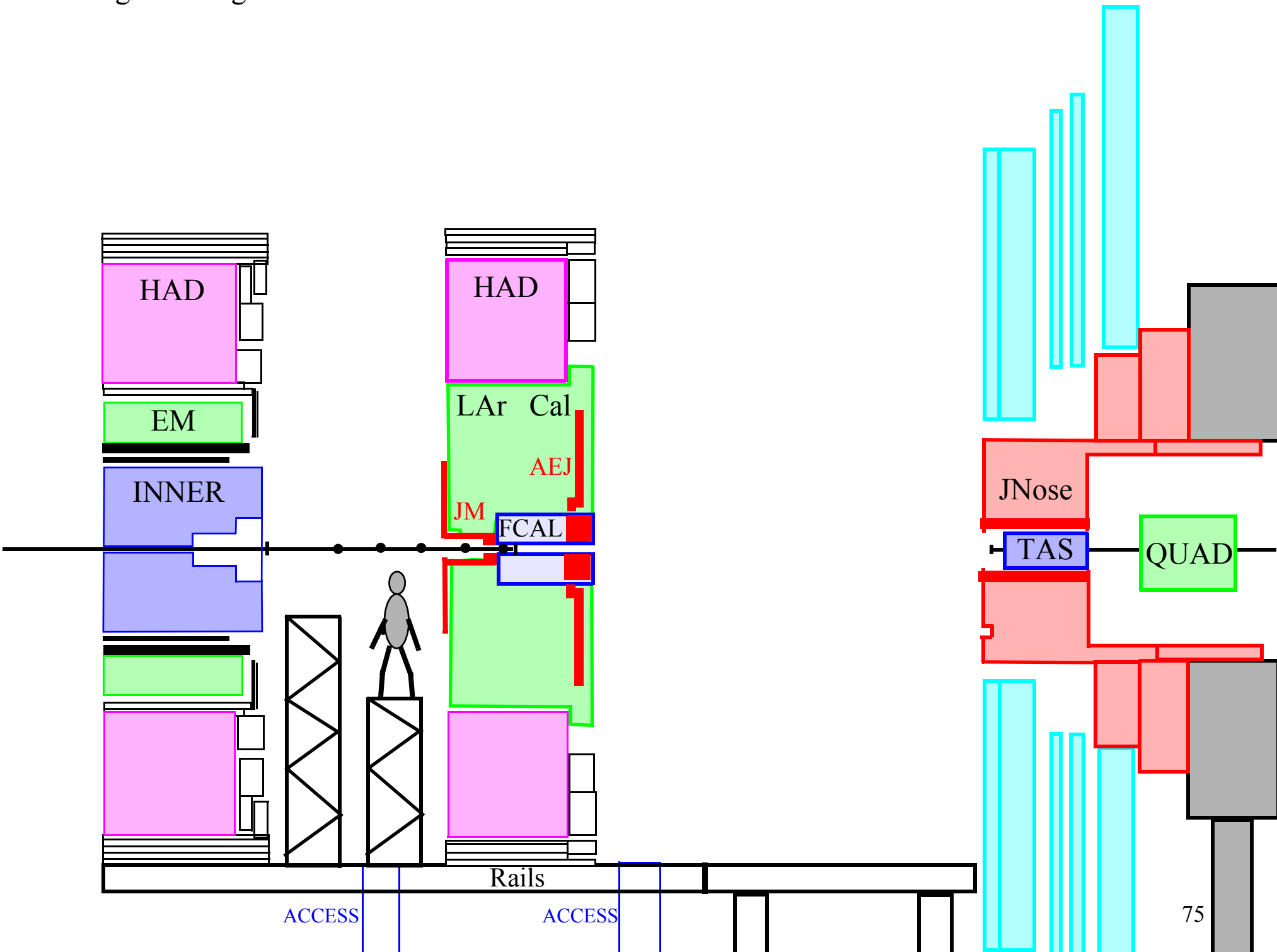
24. The endcap calorimeter is beeing moved forward.



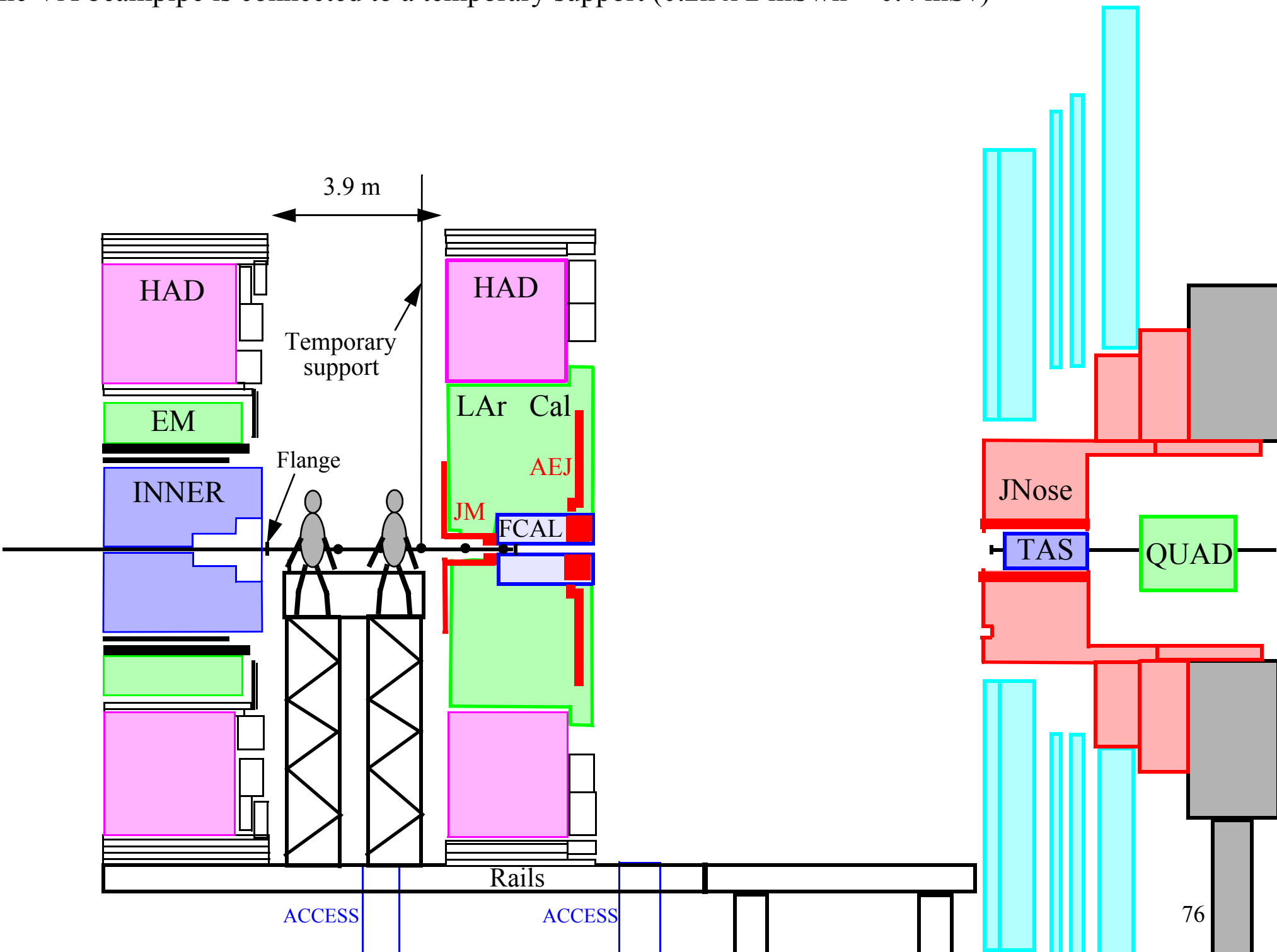
25. Scaffolding is beeing built.

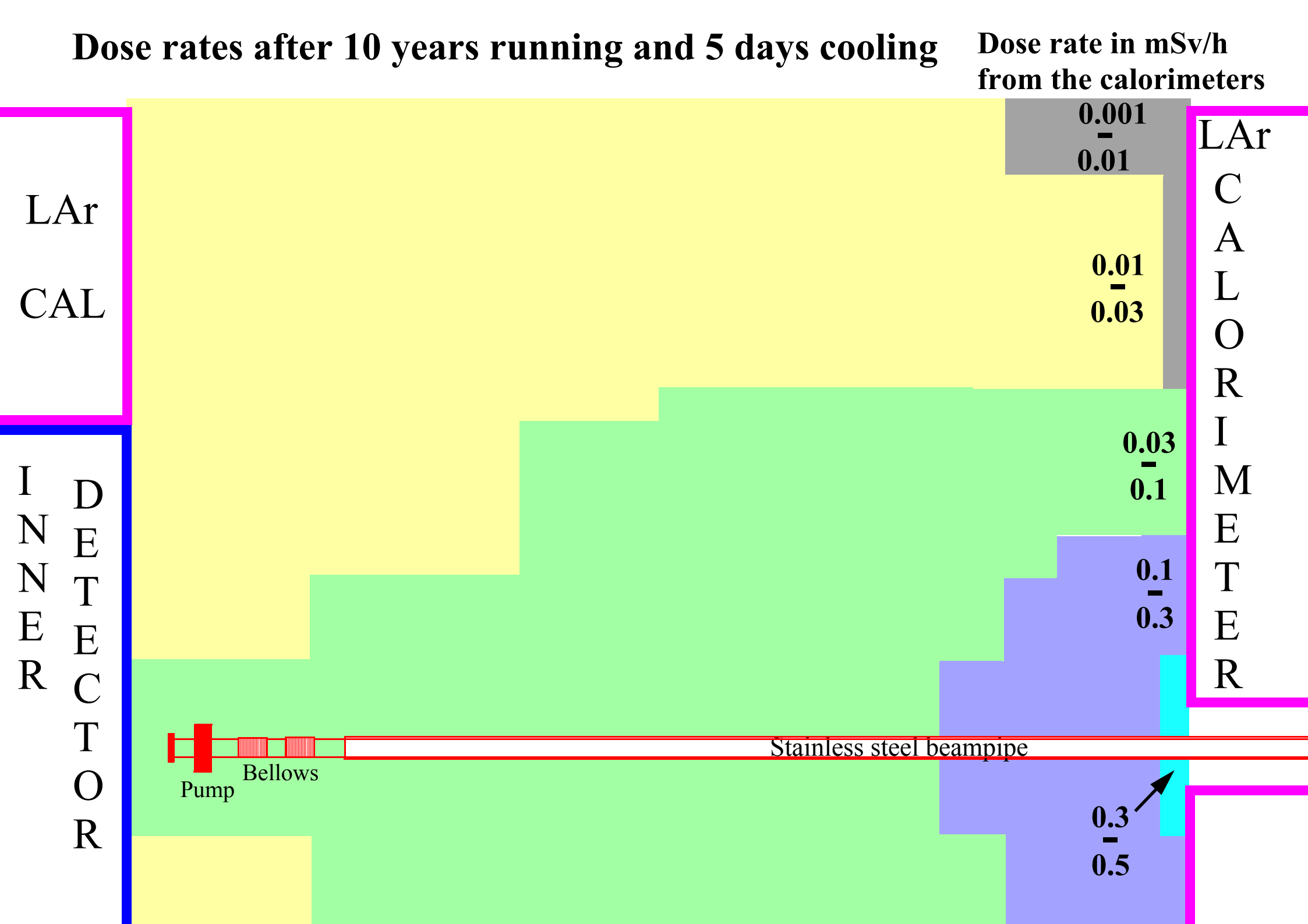


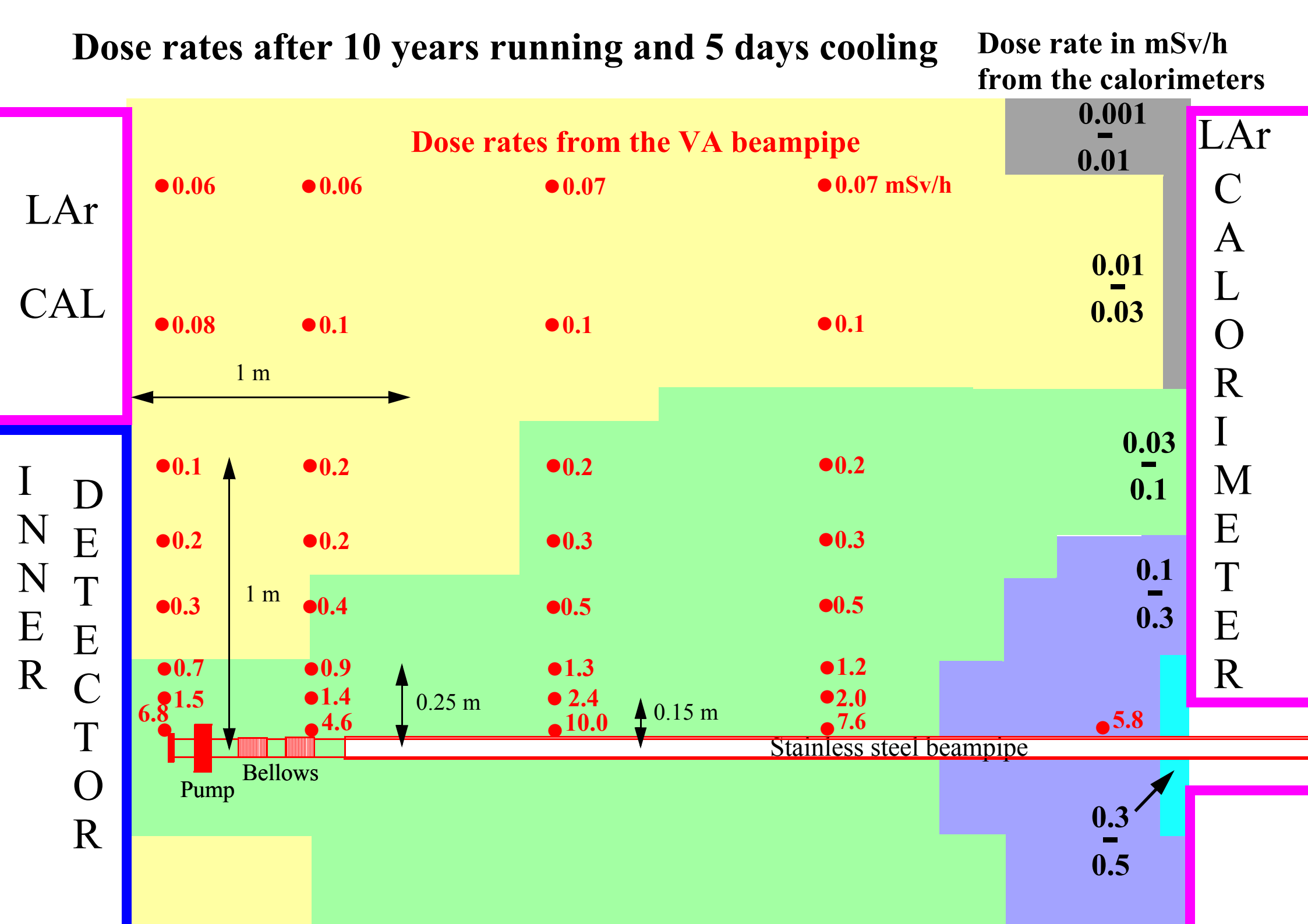
25. Scaffolding is beeing built.



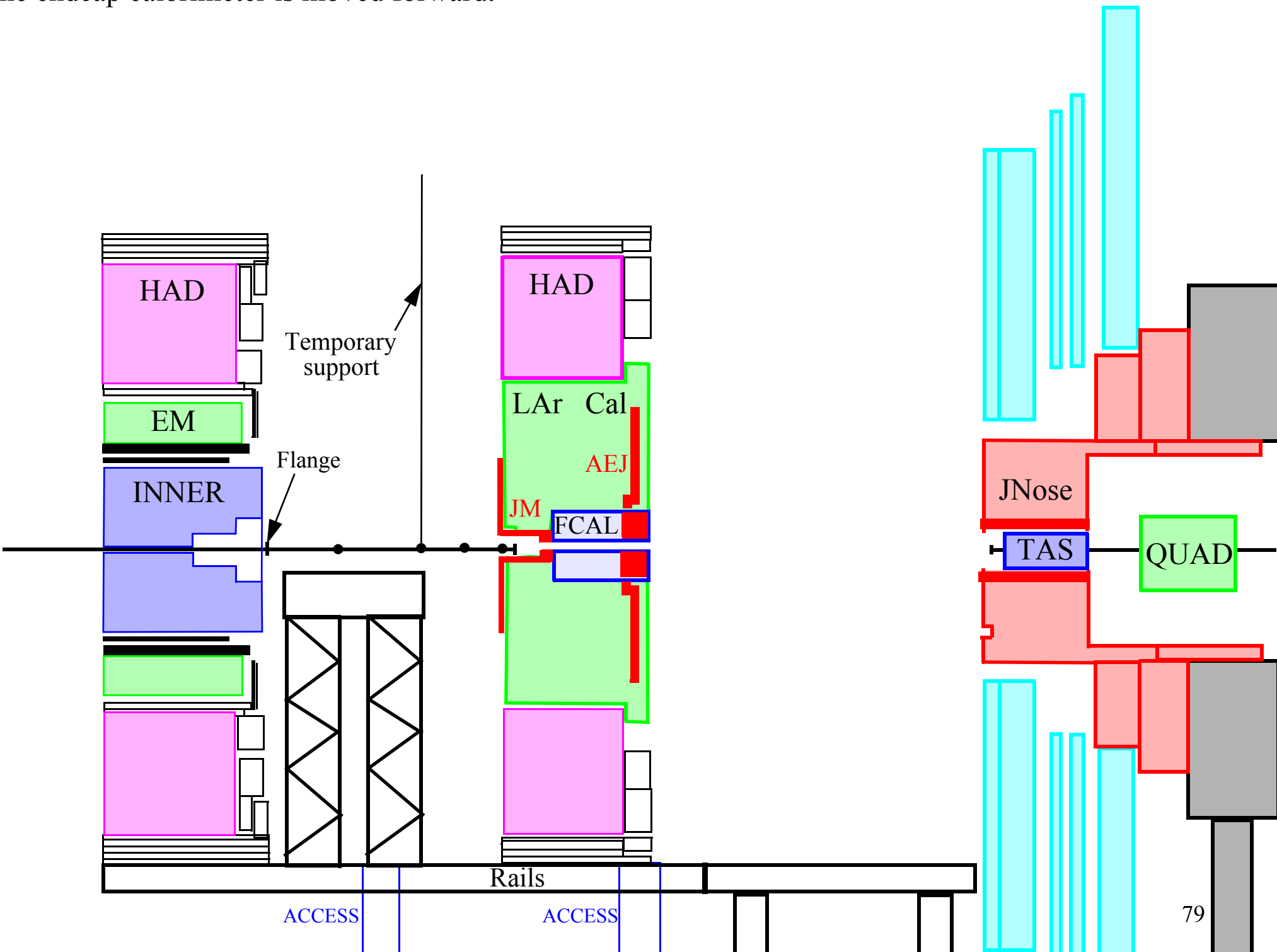
26. The VA beampipe is connected to a temporary support (0.2h x 2 mSv/h = 0.4 mSv)



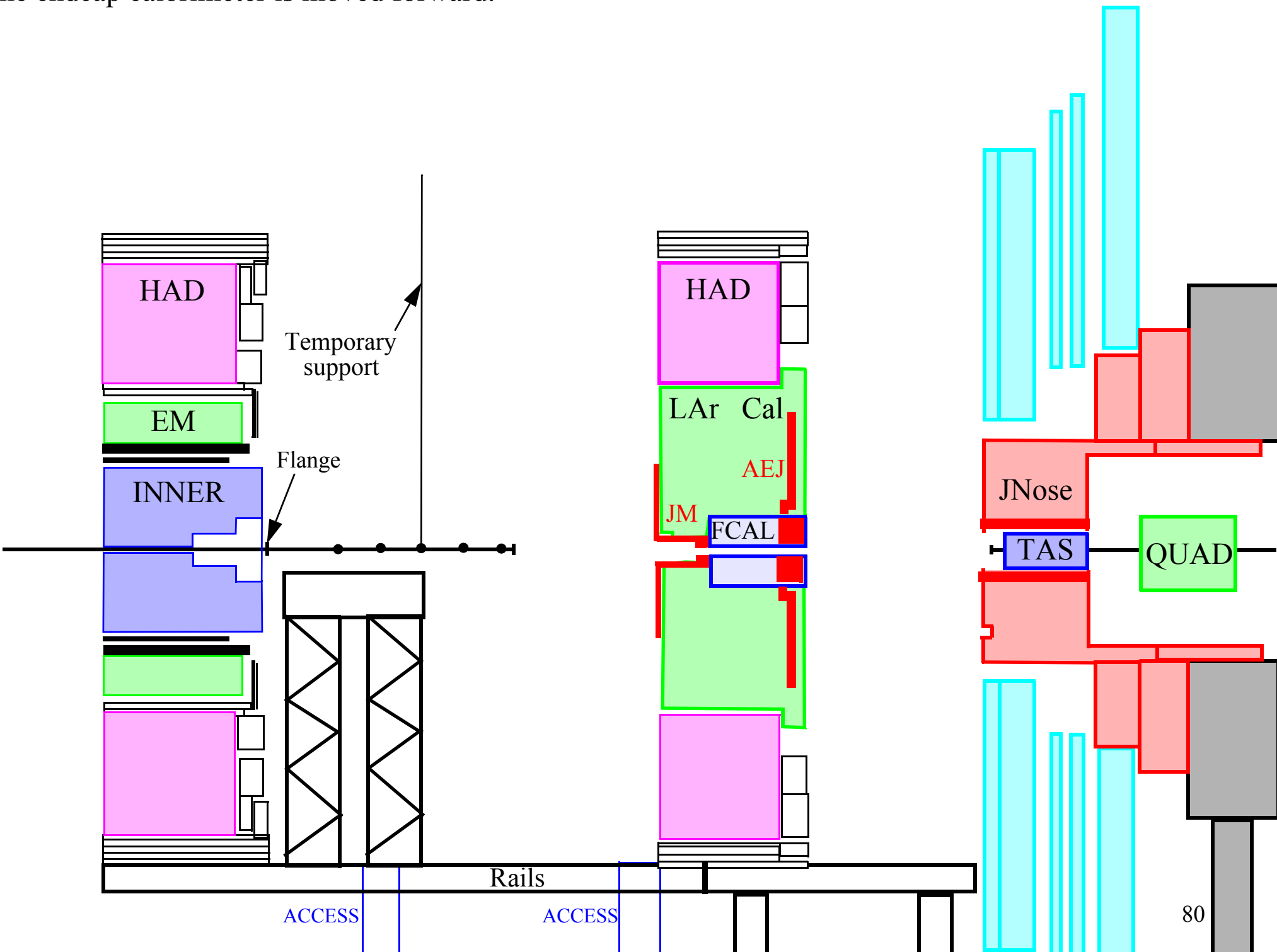

Dose rates after 10 years running and 5 days cooling
Dose rate in mSv/h from the calorimeters
0.001 – 0.01
0.01 – 0.03
0.03 – 0.1
0.1 – 0.3
0.3 – 0.5
LAr CAL
LAr CALORIMETER
INNER DETECTOR
Stainless steel beampipe
Pump
Bellows


Dose rates after 10 years running and 5 days cooling
Dose rate in mSv/h from the calorimeters
Dose rates from the VA beampipe
LAr CAL
INNER DETECTOR
LAr CALORIMETER
0.001 – 0.01
0.01 – 0.03
0.03 – 0.1
0.1 – 0.3
0.3 – 0.5
0.06
0.06
0.07
0.07 mSv/h
0.08
0.1
0.1
0.1
1 m
1 m
0.1
0.2
0.2
0.2
0.2
0.2
0.3
0.3
0.3
0.4
0.5
0.5
0.7
0.9
1.3
1.2
1.5
1.4
2.4
2.0
6.8
4.6
10.0
7.6
5.8
0.25 m
0.15 m
Stainless steel beampipe
Bellows
Pump

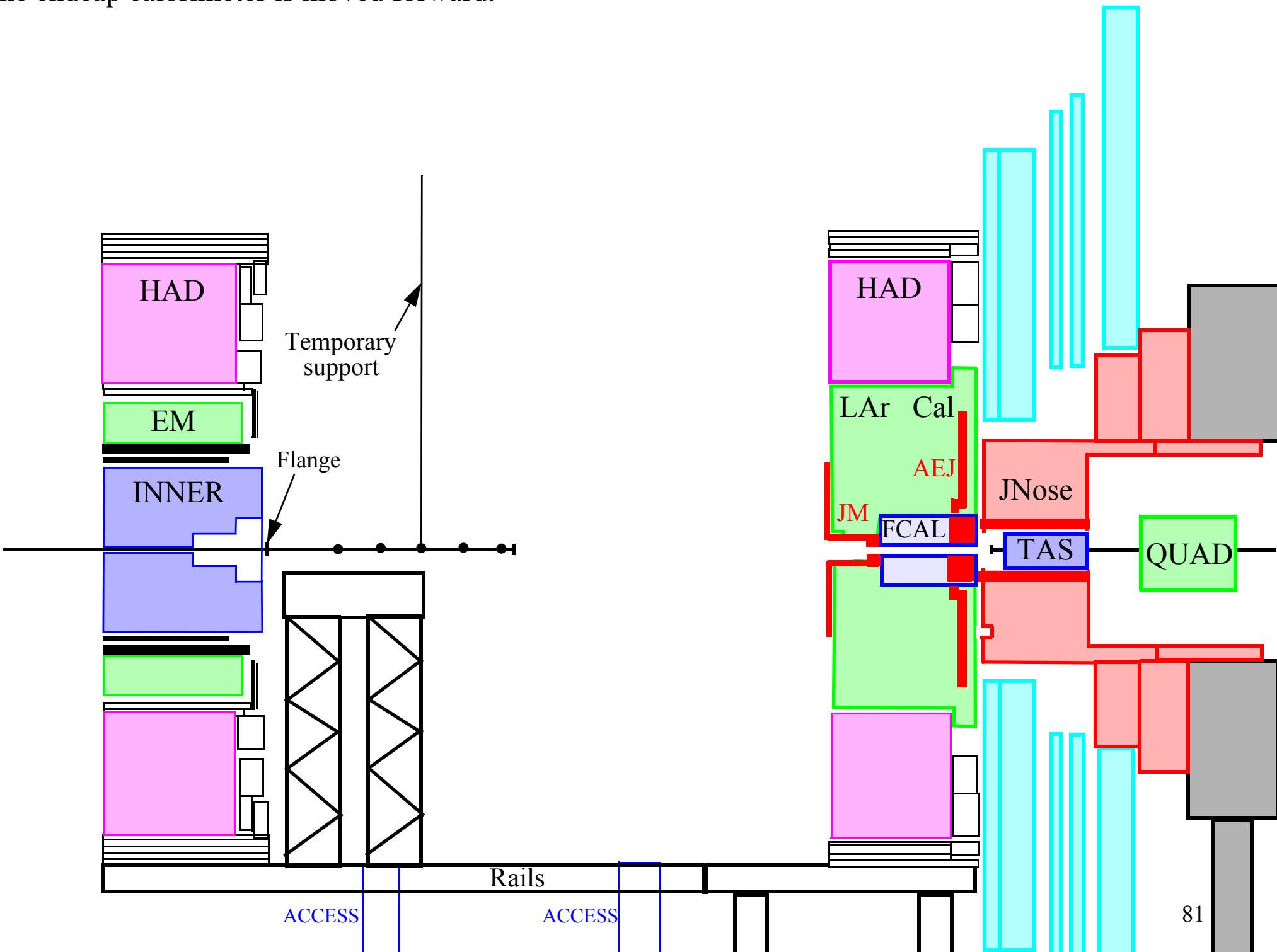
27. The endcap calorimeter is moved forward.



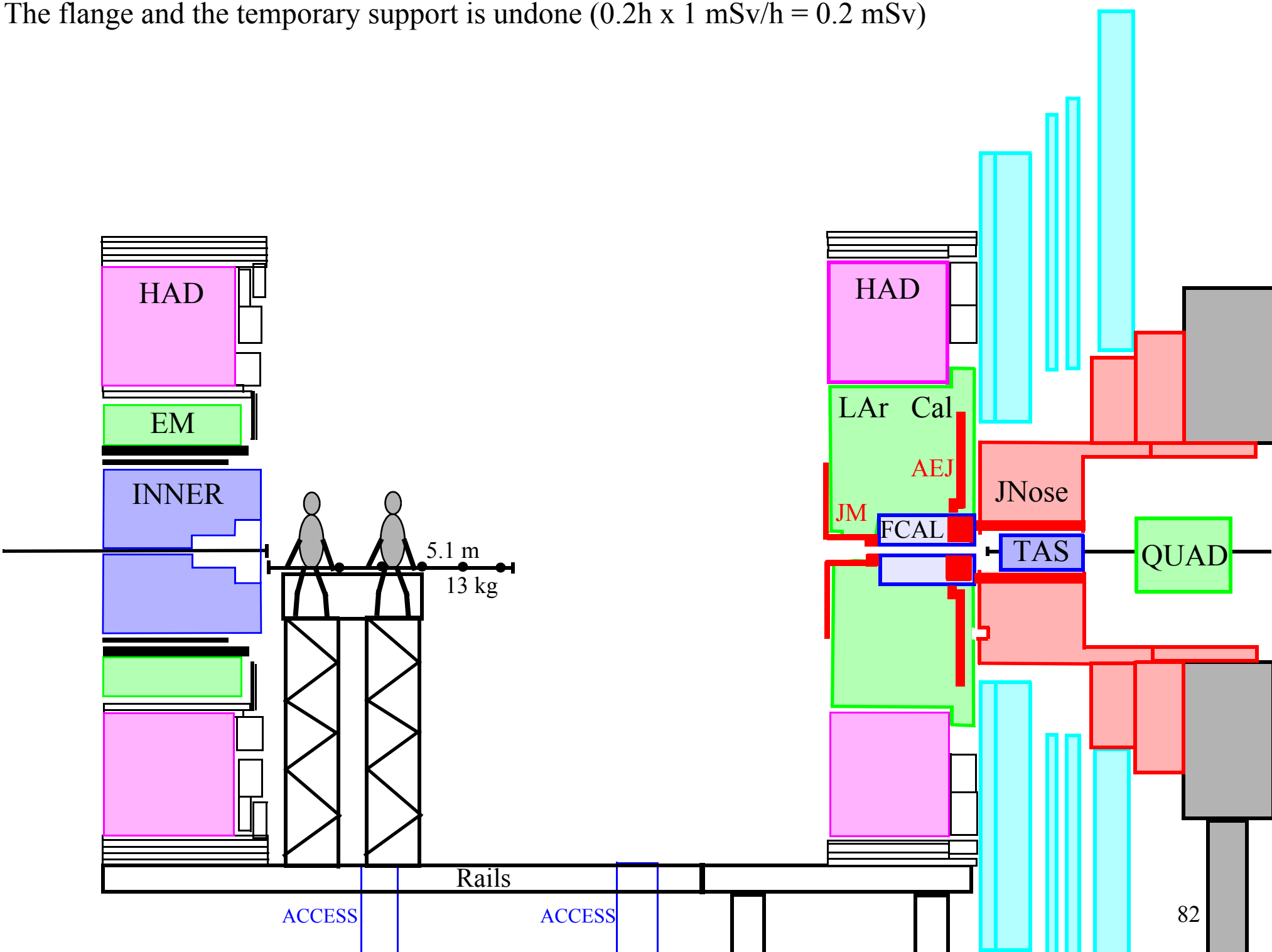
27. The endcap calorimeter is moved forward.



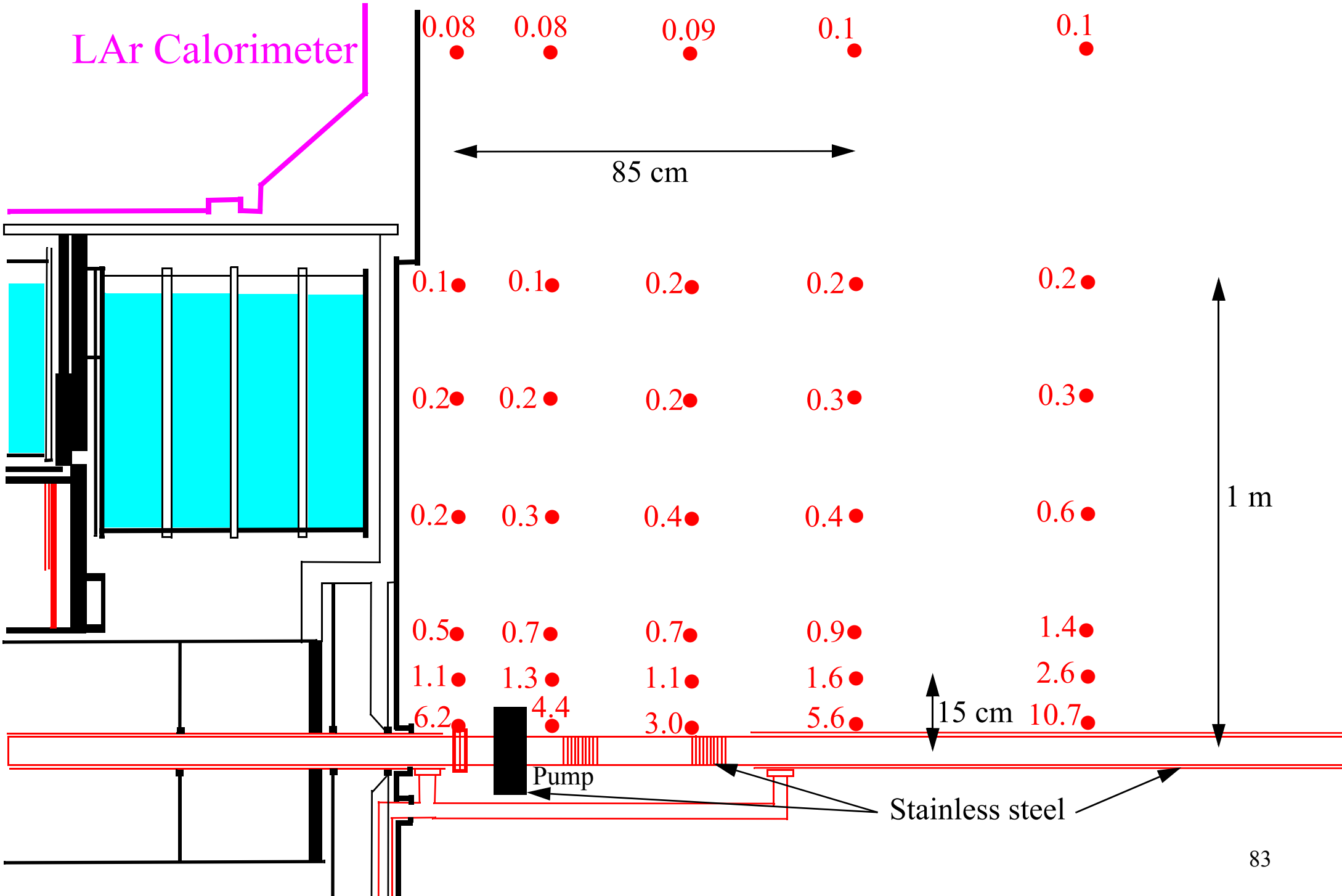
27. The endcap calorimeter is moved forward.



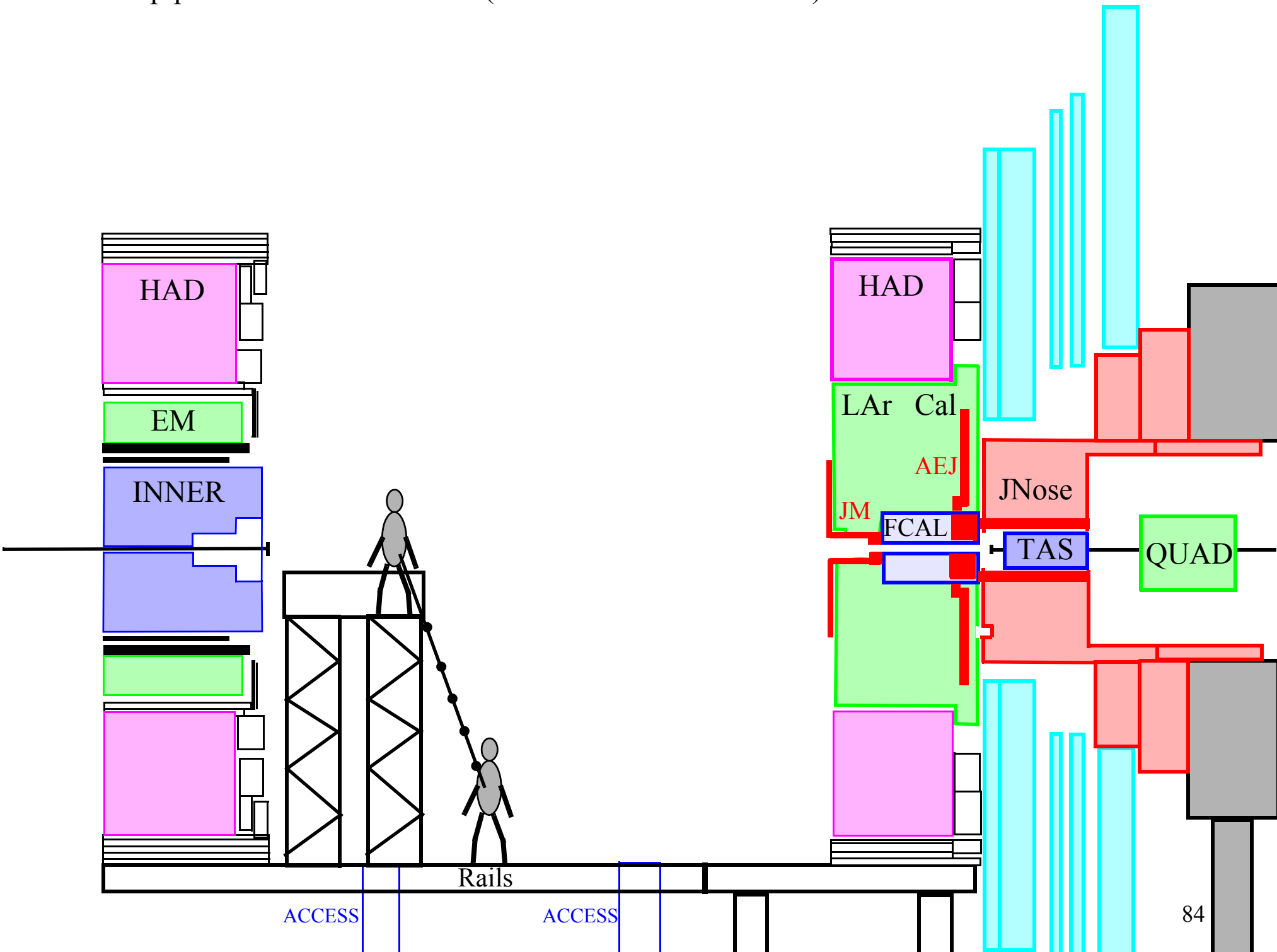
28. The flange and the temporary support is undone (0.2h x 1 mSv/h = 0.2 mSv)



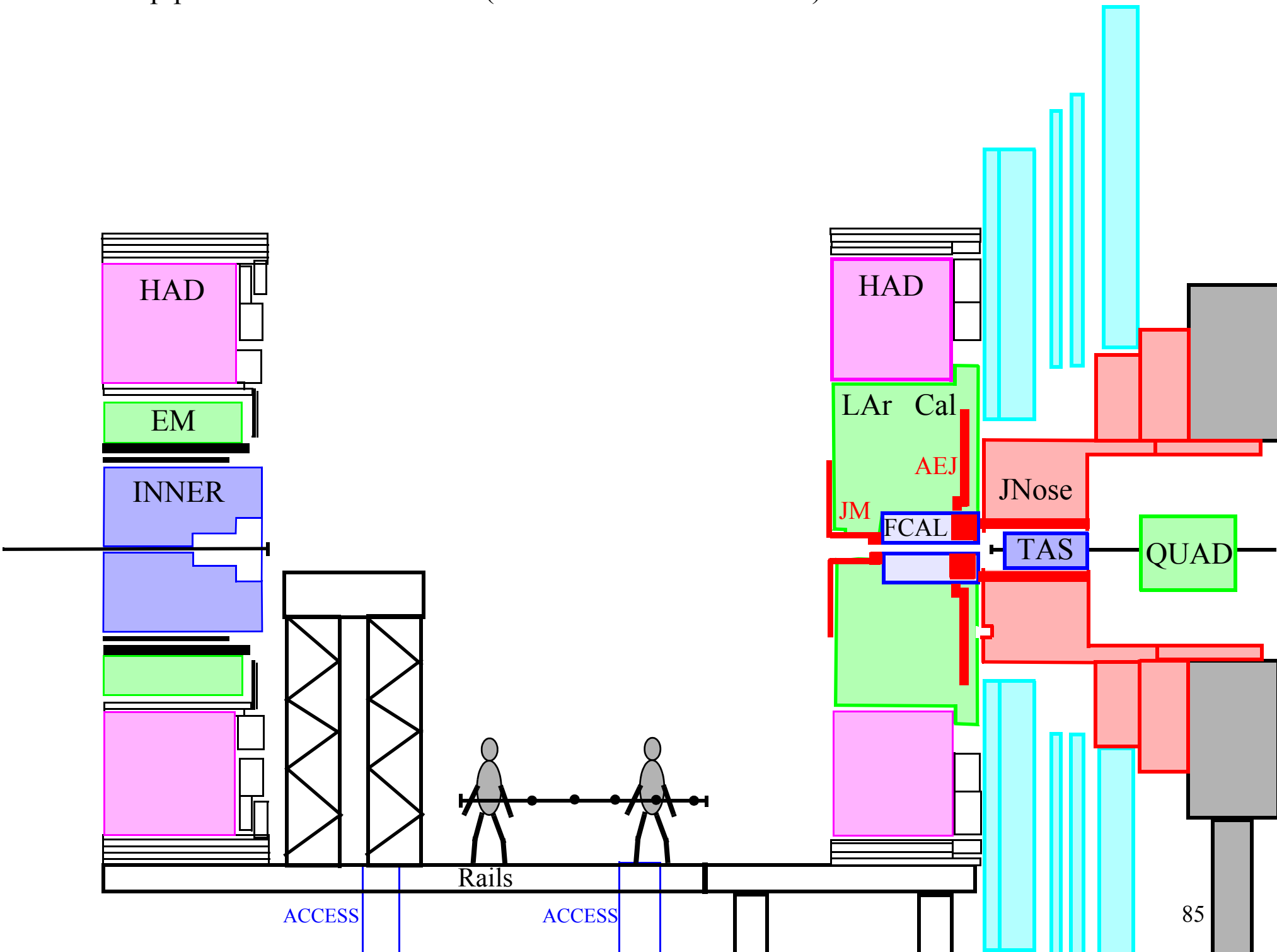
Dose rates in mSv/h from the VA beampipe after 10 years running and 5 days cooling.

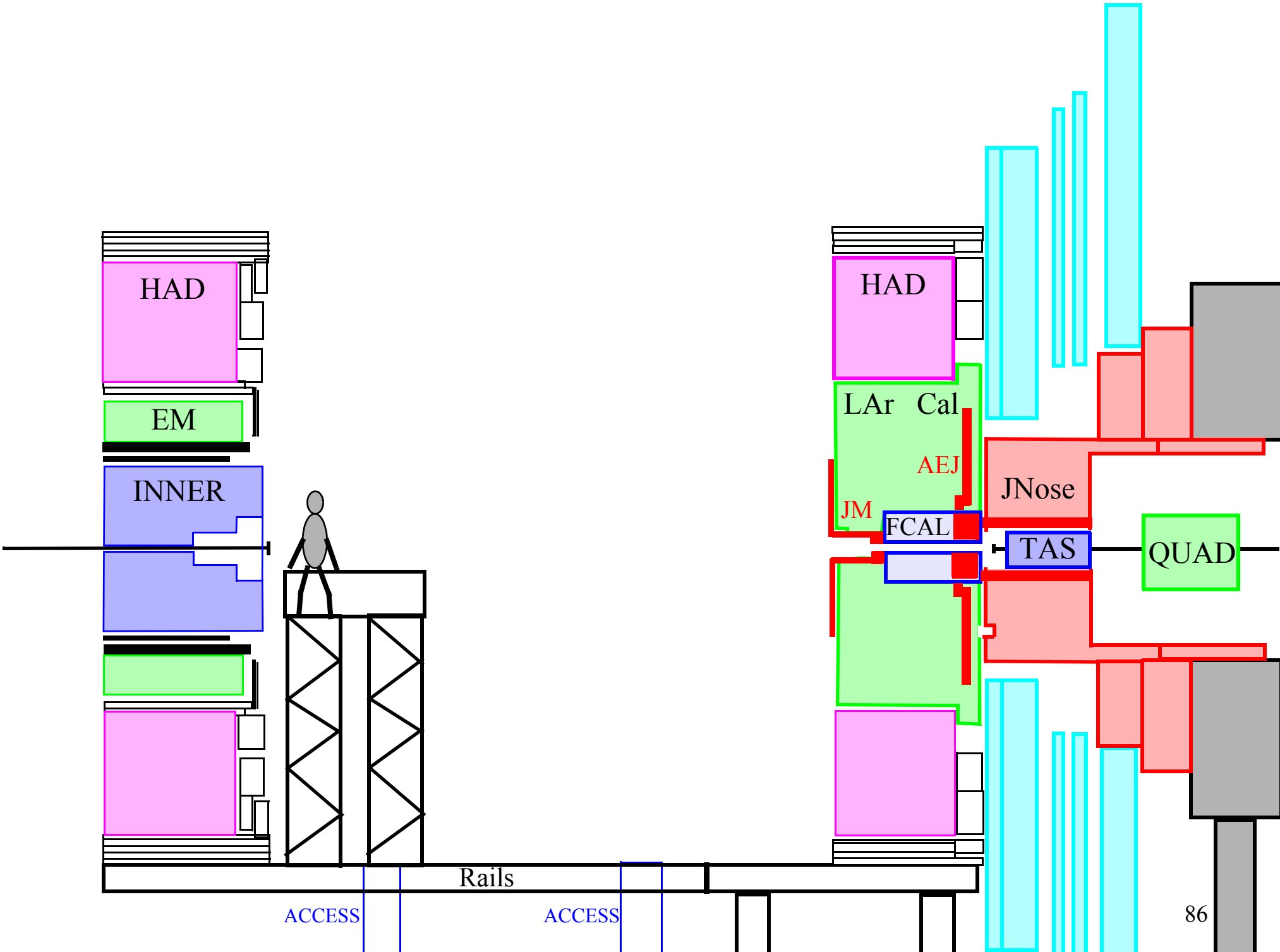


29. The VA beampipe is removed and stored (0.3h x 1 mSv/h = 0.3 mSv)



29. The VA beampipe is removed and stored (0.3h x 1 mSv/h = 0.3 mSv)




HAD
EM
INNER
HAD
LAr Cal
AEJ
JM
FCAL
JNose
TAS
QUAD
Rails
ACCESS
ACCESS

Dose rates in μSv/h from the Pixels+SCT+TRT+LAr cal.+VI beampipe after a 100 day run and 5 days cooling. Calculation by M. Morev.