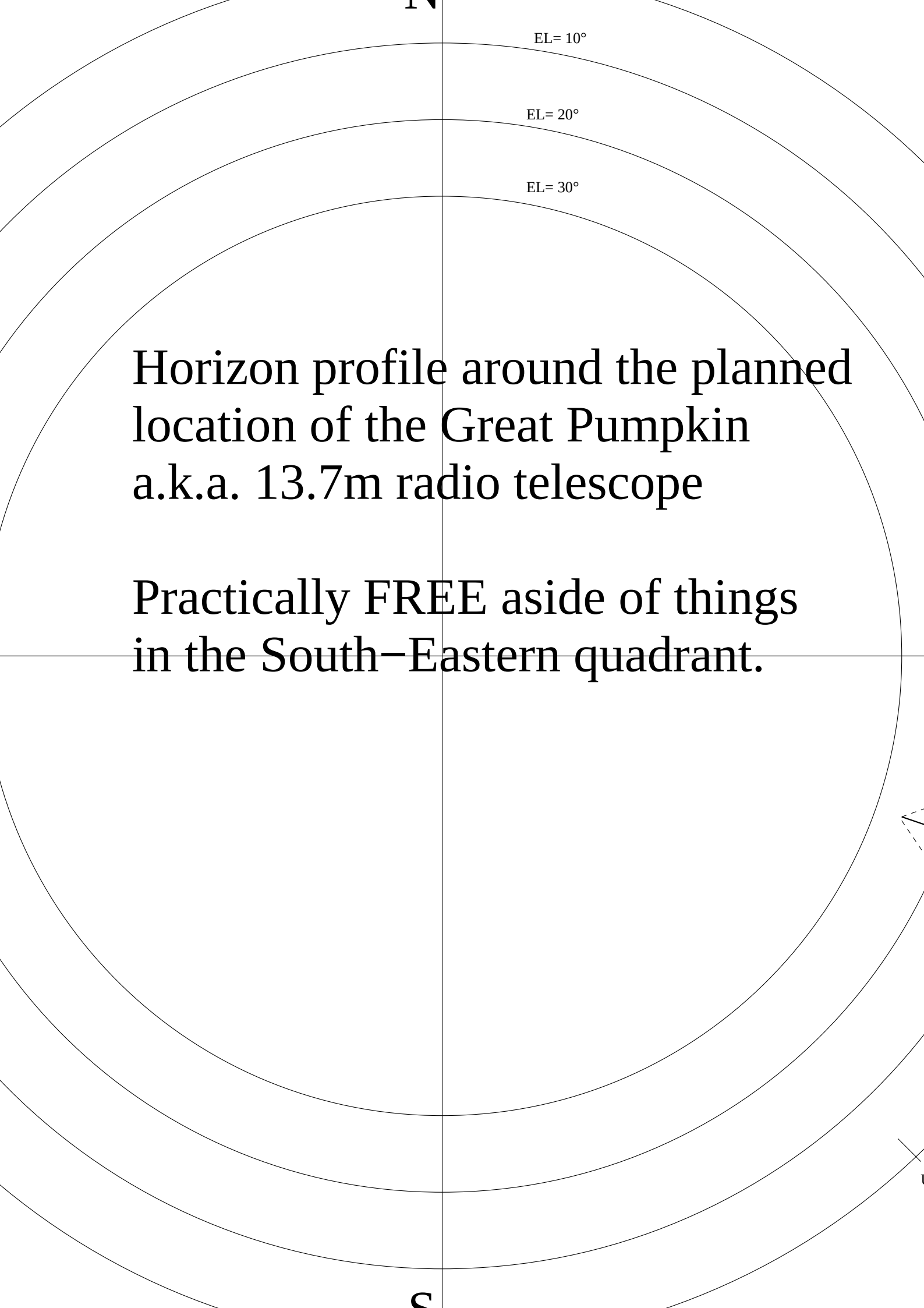


Horizon profile around the planned location of the Great Pumpkin a.k.a. 13.7m radio telescope

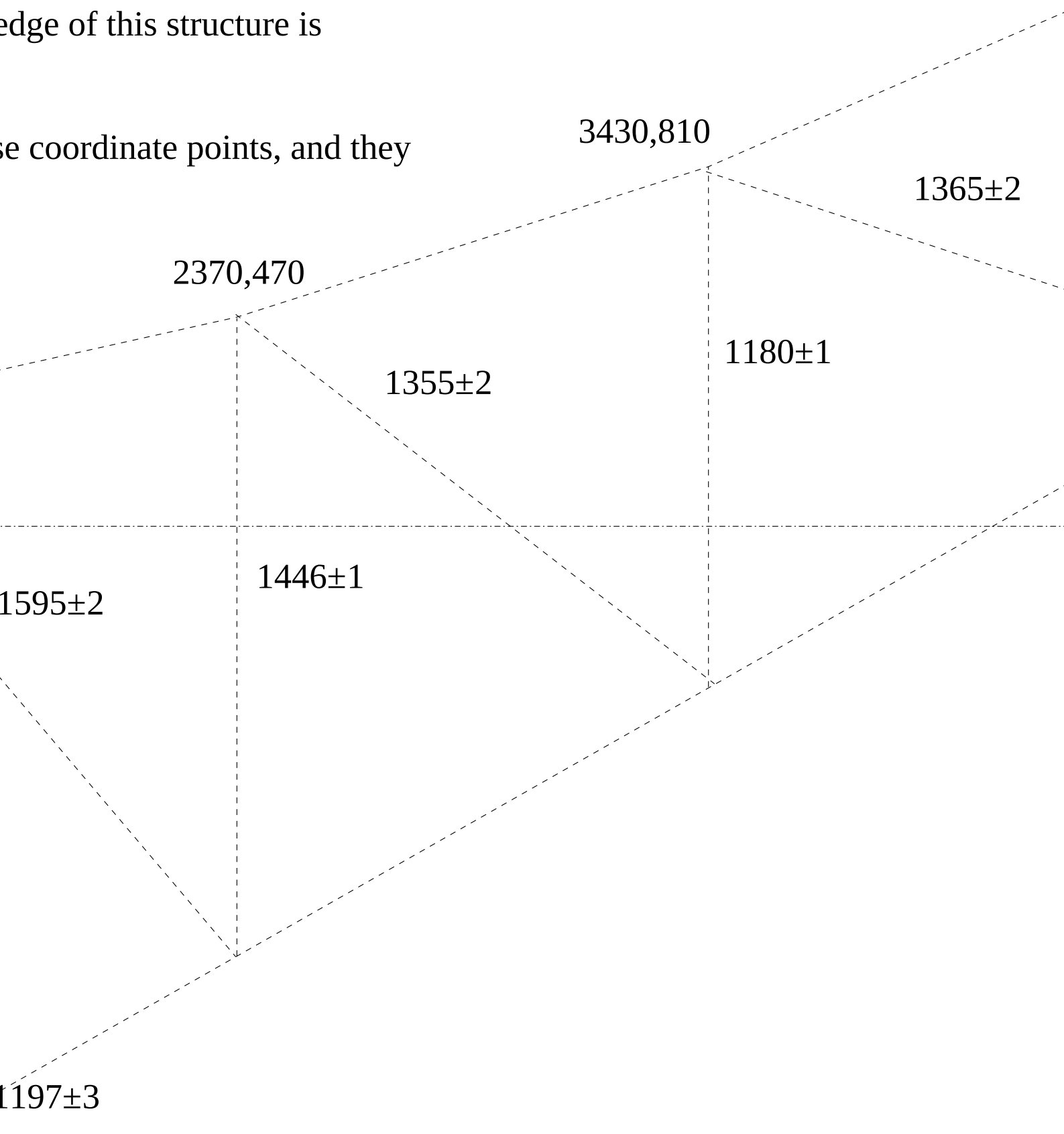
Practically FREE aside of things in the South−Eastern quadrant.

us, distance along rotation axis).

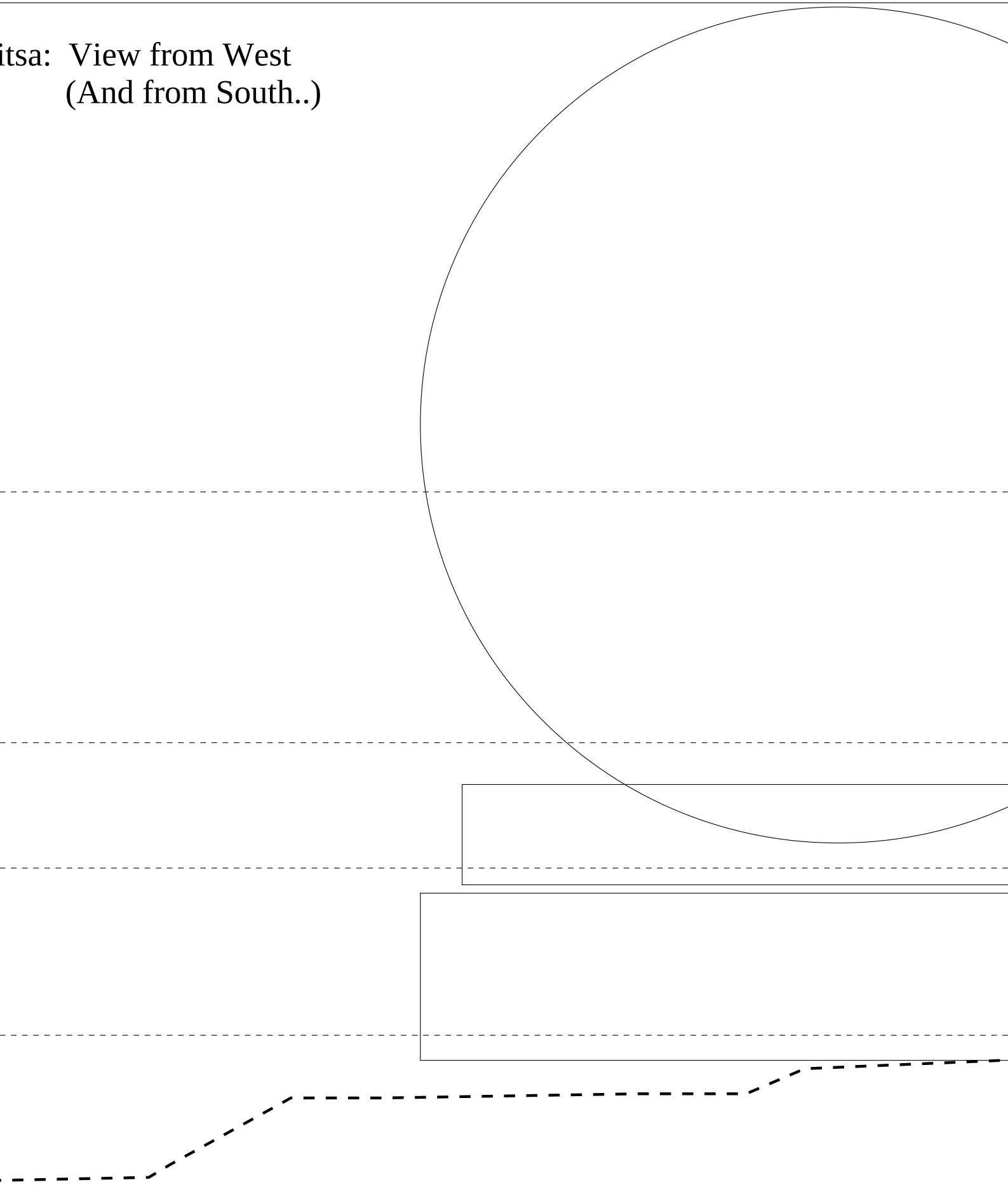
’ marker sits is ROUGHLY

west structural point, and
be some 0.3 meters above
edge of this structure is

se coordinate points, and they

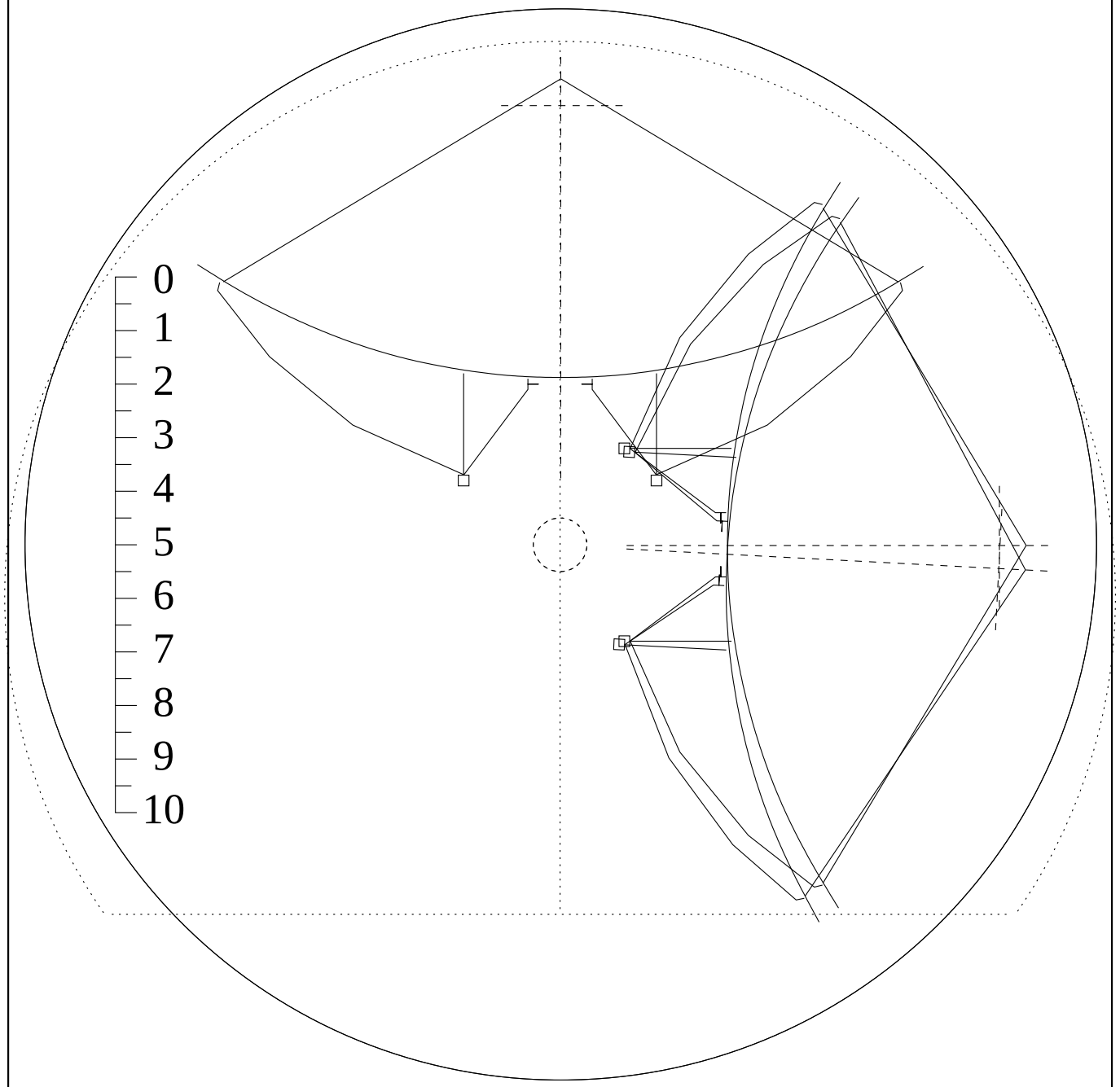


itsa: View from West
(And from South..)



www.viestikallio.fi −− "Great Pumpkin" Fig01

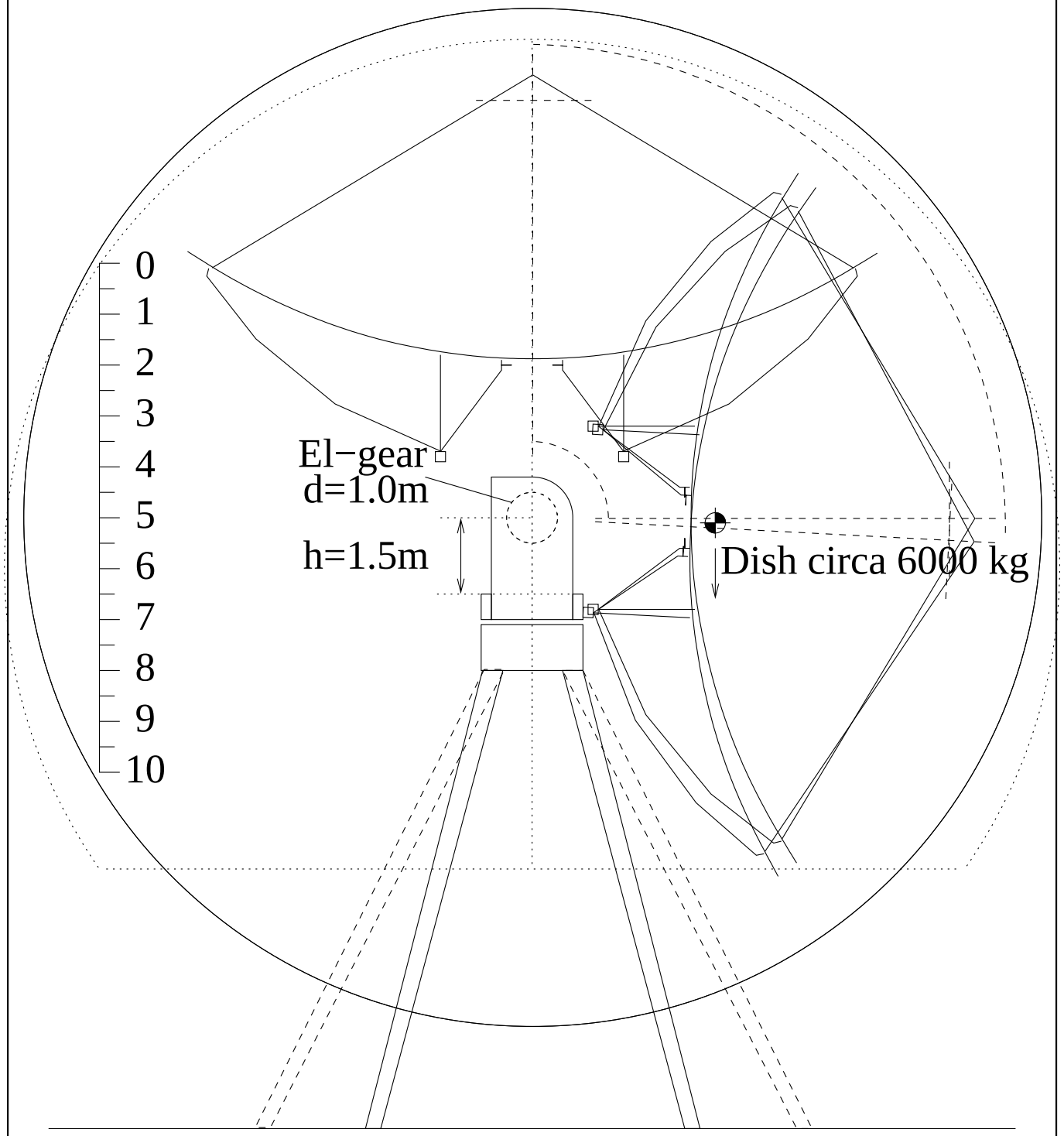
1:100



Matti Aarnio http://www.viestikallio.fi/kurp/kurpitsa.html

www.viestikallio.fi −− "Great Pumpkin" Fig02

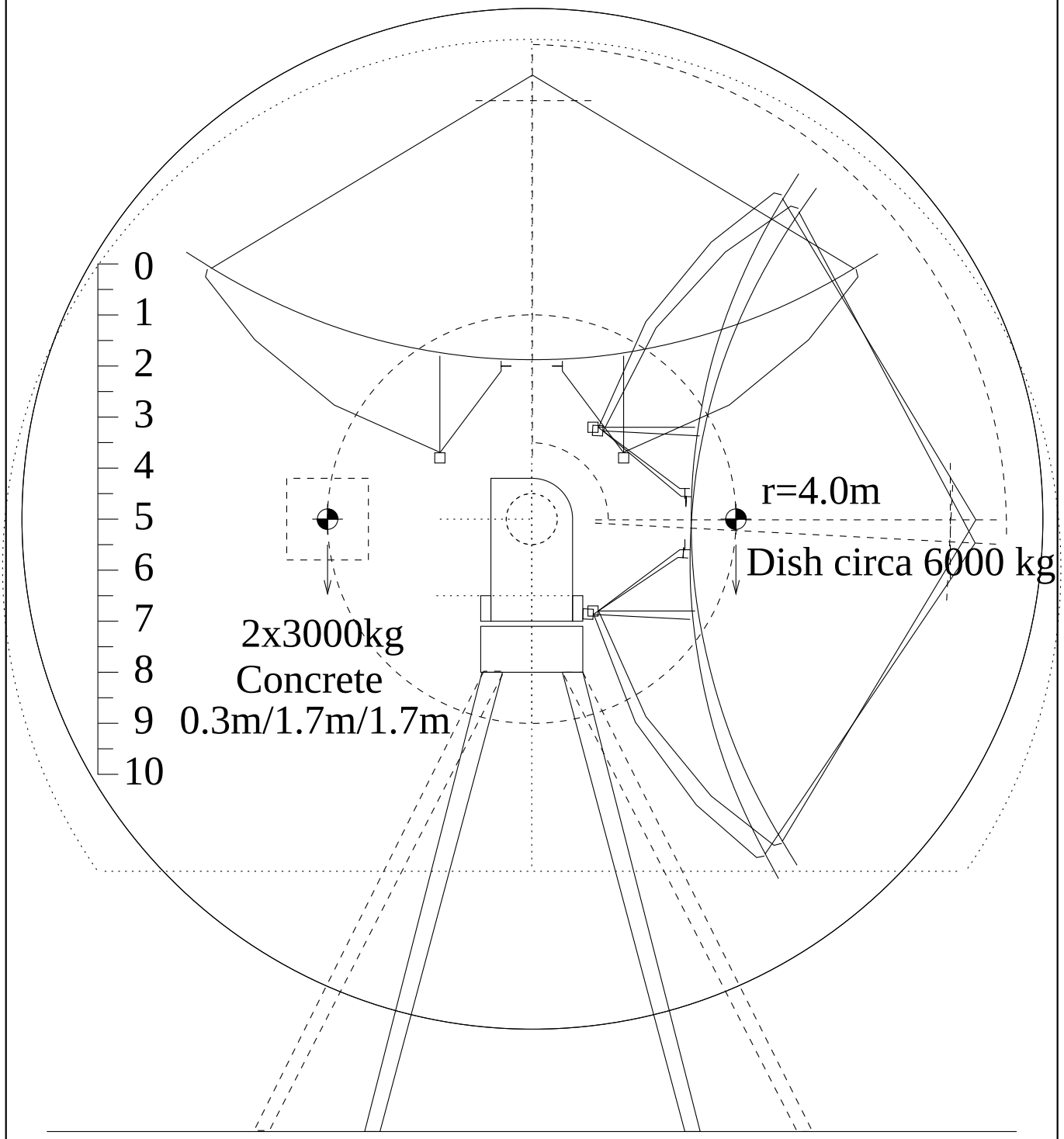
1:100



Matti Aarnio http://www.viestikallio.fi/kurp/kurpitsa.html

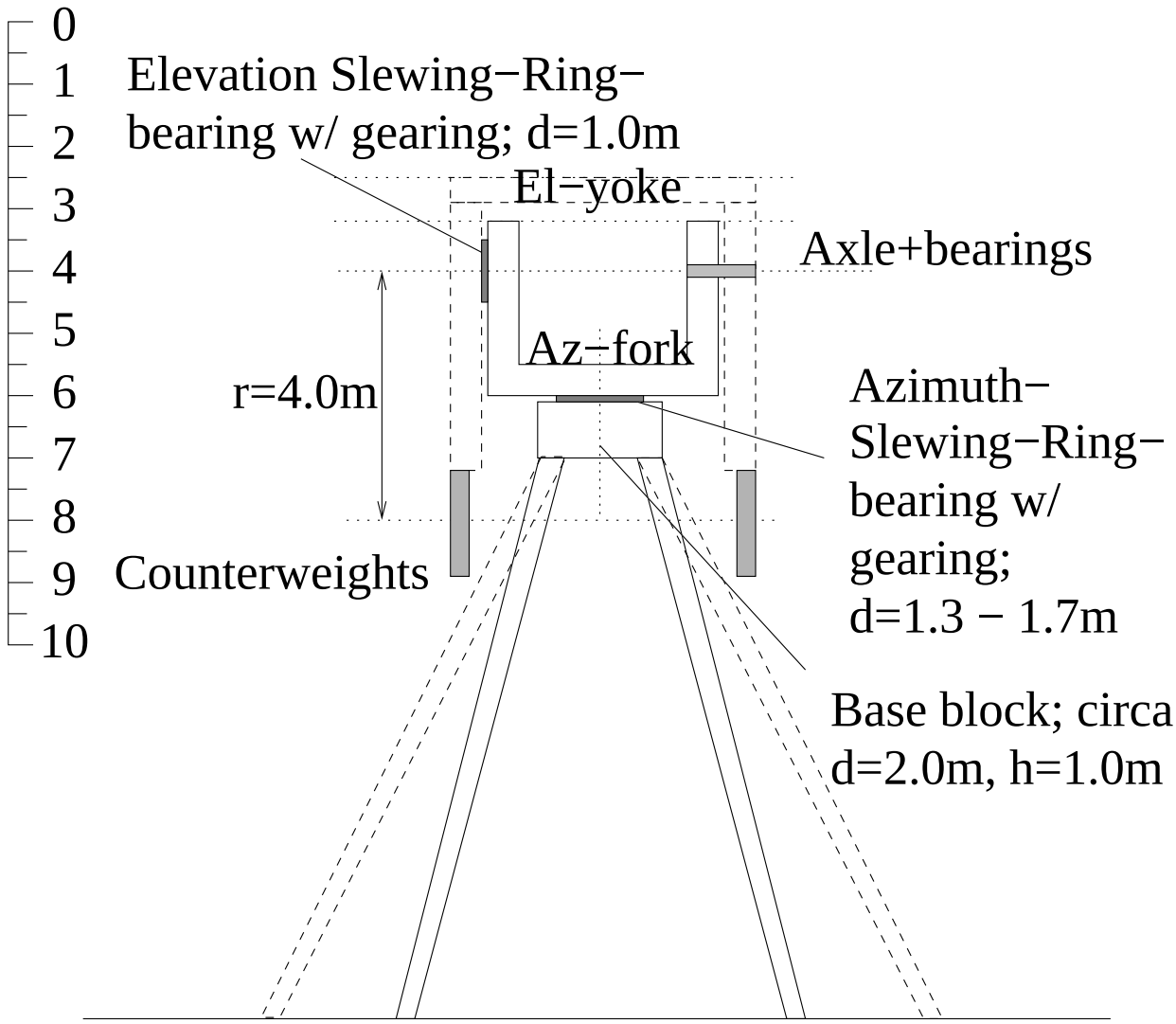
www.viestikallio.fi −− "Great Pumpkin" Fig03

1:100

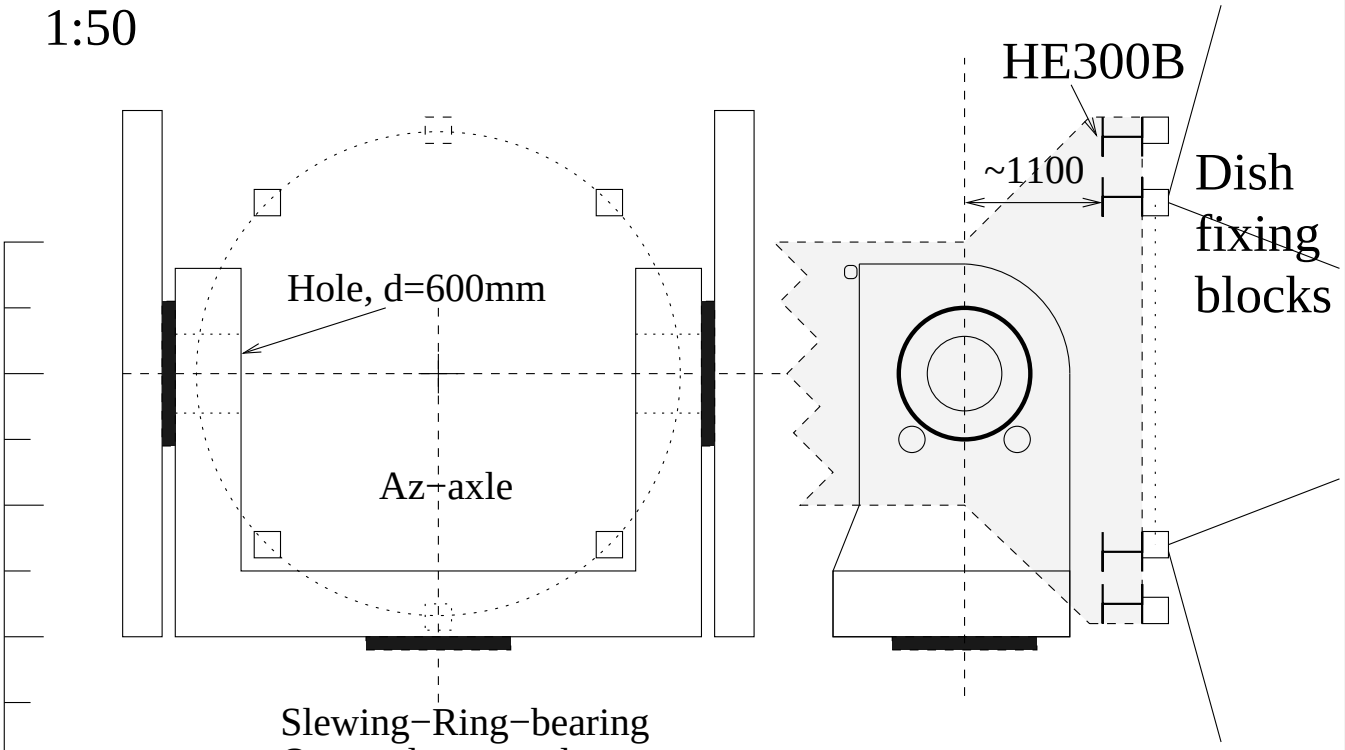


Matti Aarnio http://www.viestikallio.fi/kurp/kurpitsa.html

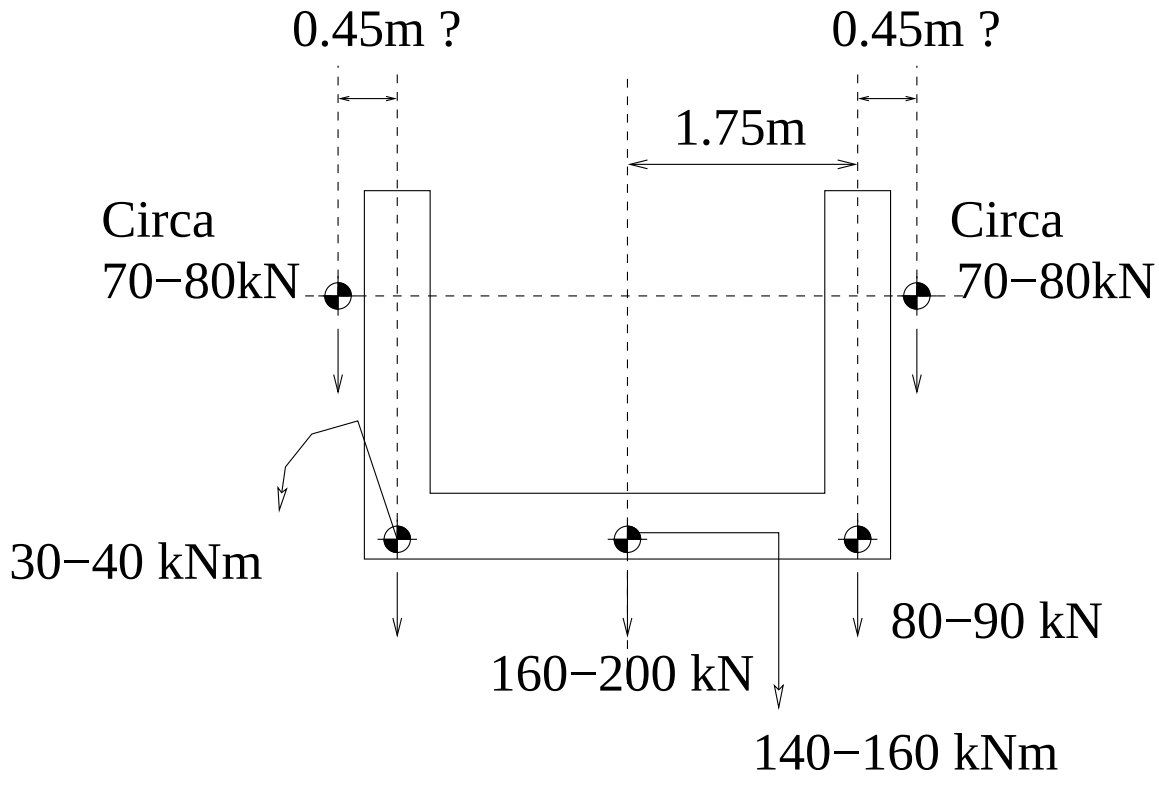
1:100


0
1
2
3
4
5
6
7
8
9
10
Elevation Slewing−Ring−
bearing w/ gearing; d=1.0m
El−yoke
Axle+bearings
Az−fork
r=4.0m
Azimuth−
Slewing−Ring−
bearing w/
gearing;
d=1.3 − 1.7m
Counterweights
Base block; circa
d=2.0m, h=1.0m

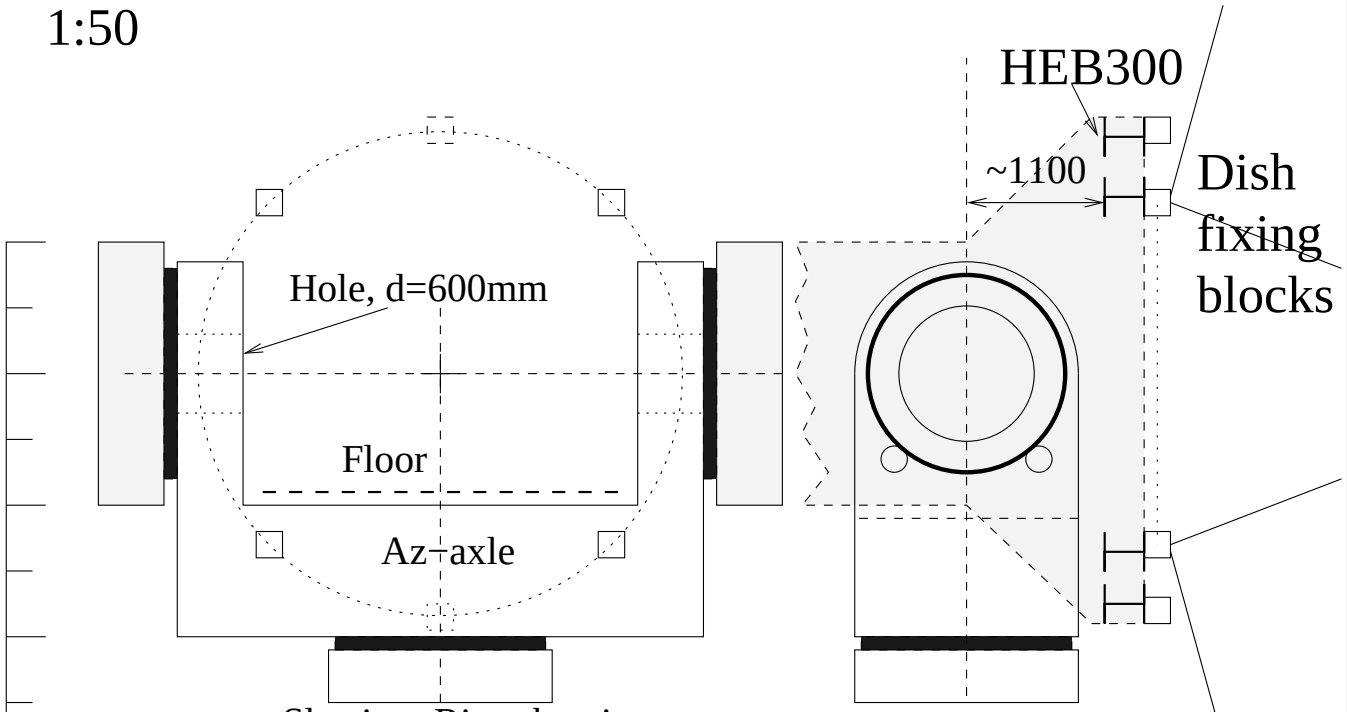
1:50



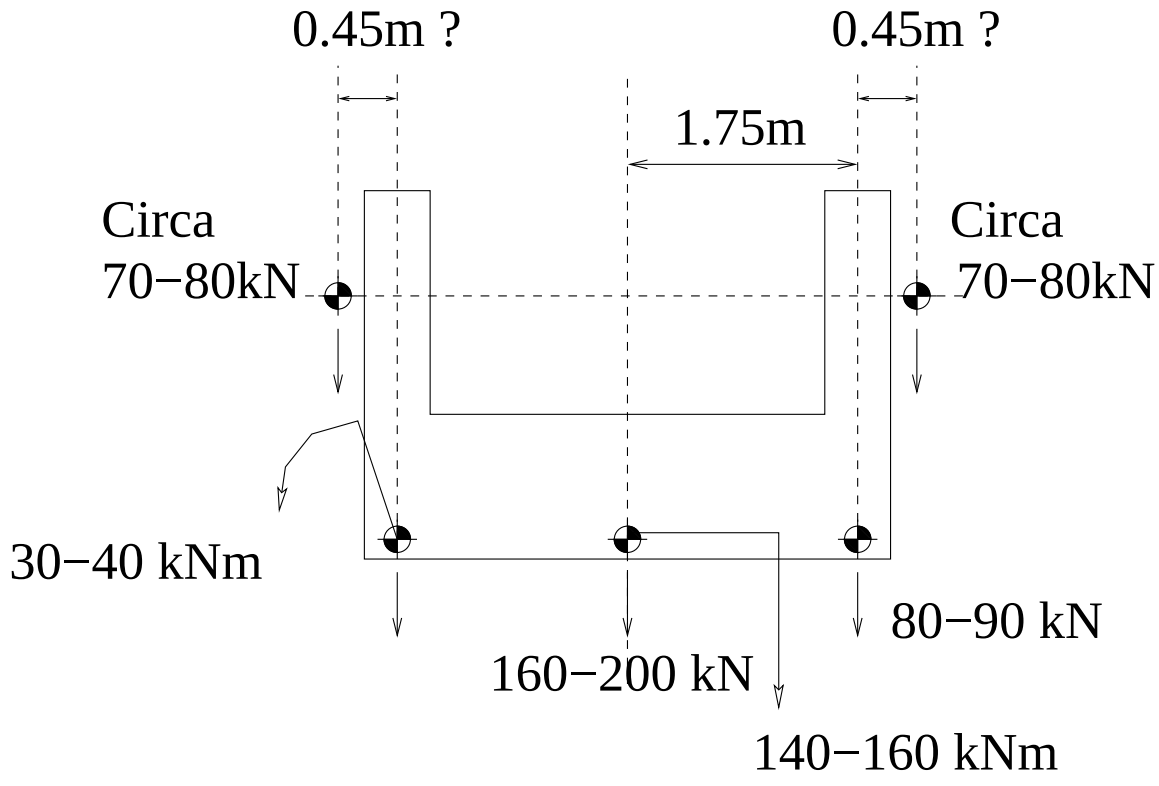
Slewing−Ring−bearing
Outer edge geared
Upper(outer) attached to Az−fork
Loswer/inner attached to the base block
(Metsähovi has all motors in the Az−fork!)



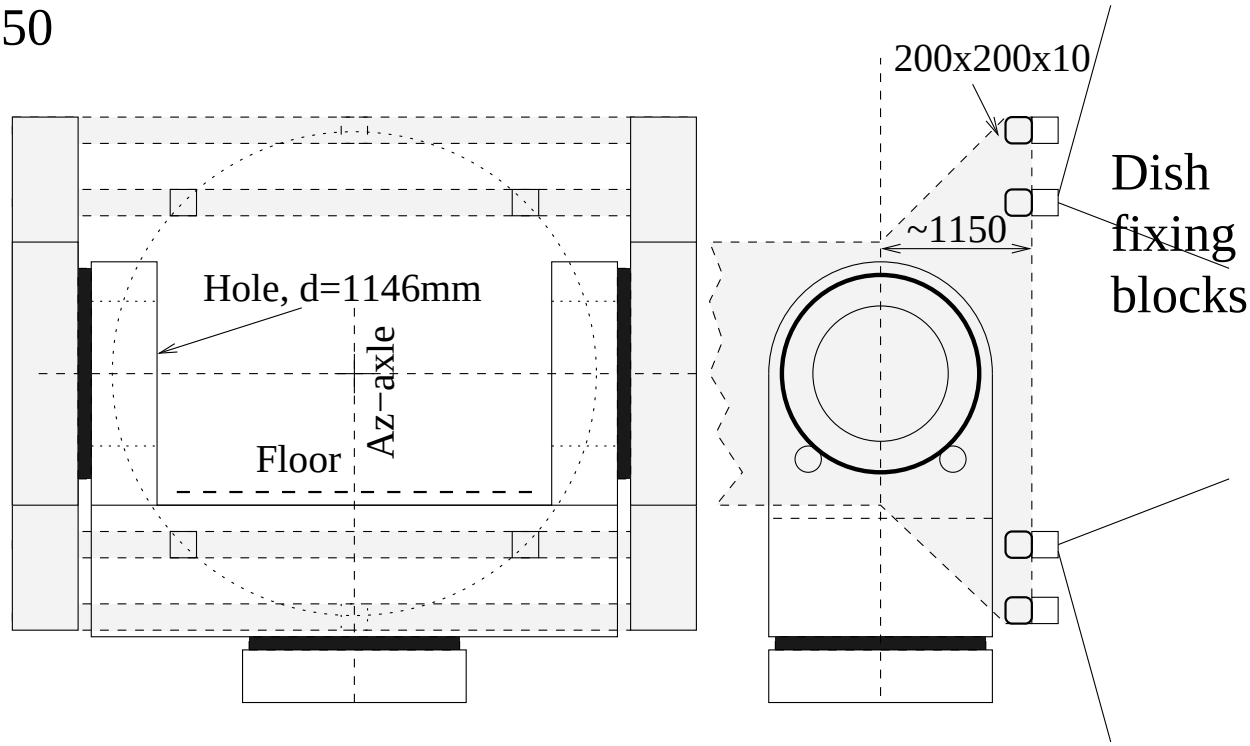
1:50



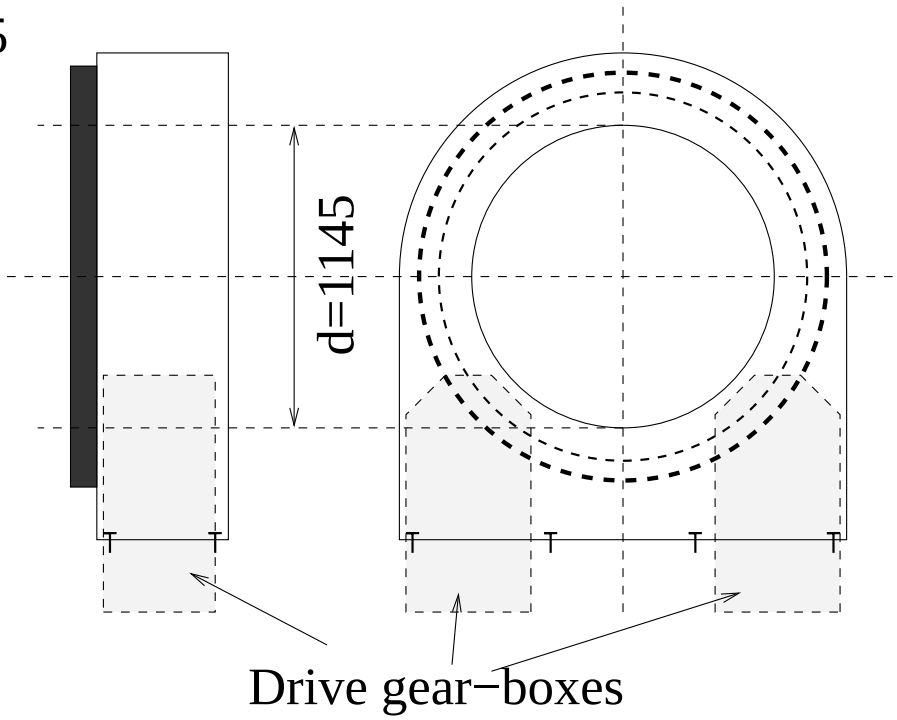
Slewing−Ring−bearing
Outer edge geared
Upper(outer) attached to Az−fork
Loswer/inner attached to the base block
(Metsähovi has all motors in the Az−fork!)



1:50


200x200x10
Dish
fixing
blocks
~1150
Hole, d=1146mm
Az−axle
Floor

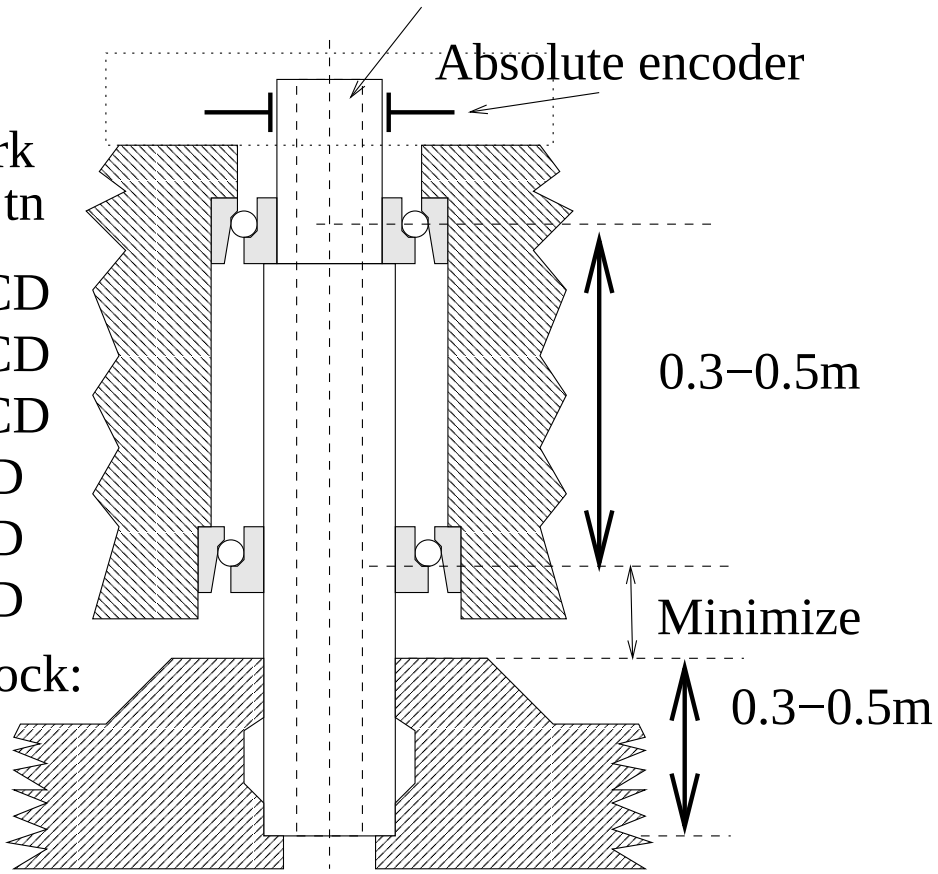
~ 1:25


d=1145
Drive gear−boxes

1:50

Alternate Az−axle:

Cable channel; d=130−150mm

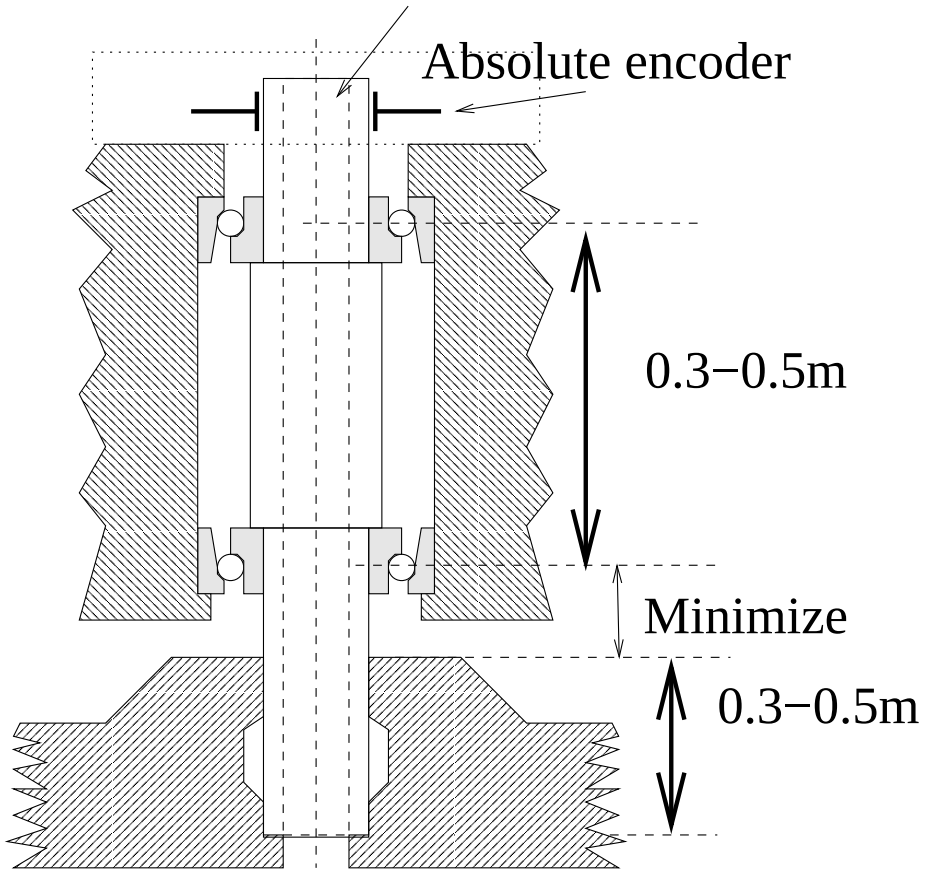


1:50

Alternate Az−axle:

Az−fork
16−20 tn

Cable channel; d=130−150mm

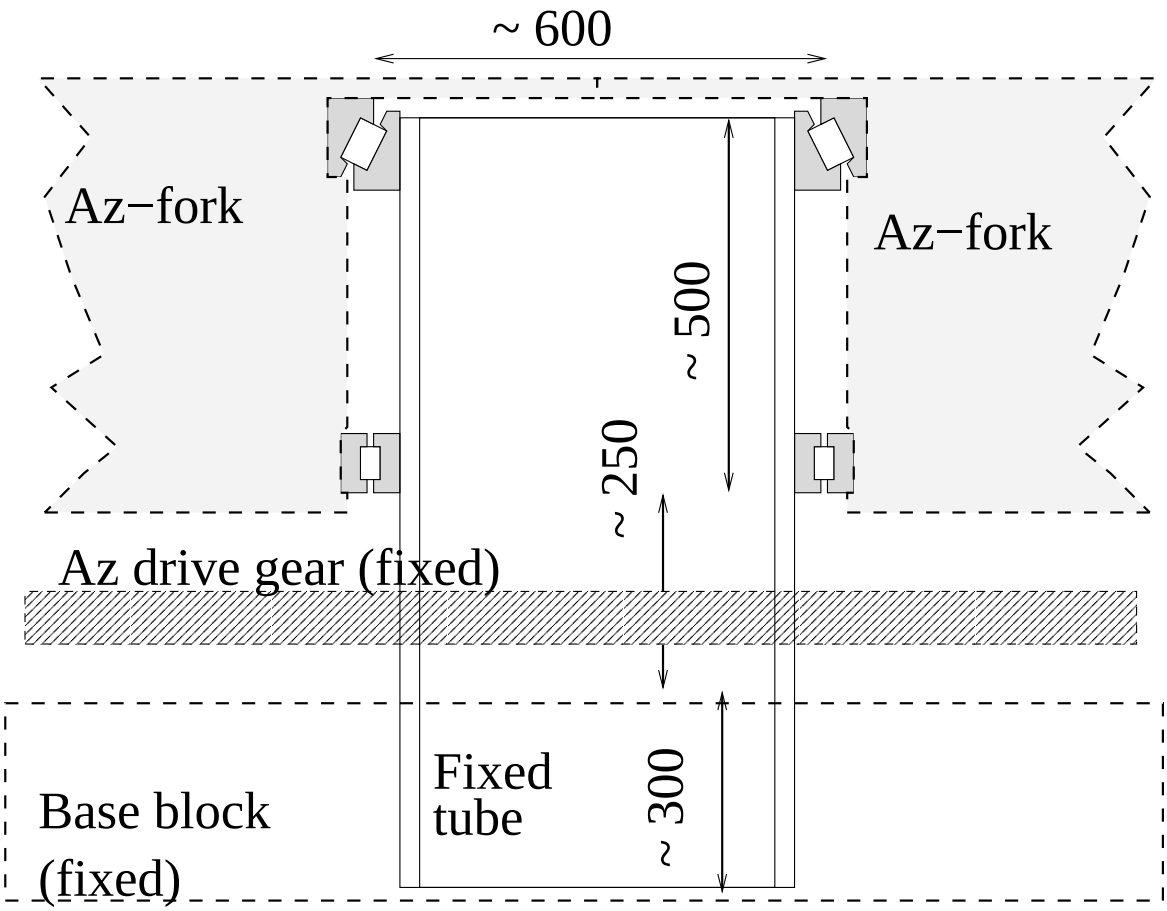


Base block:

Axle FIXED to
the base block!

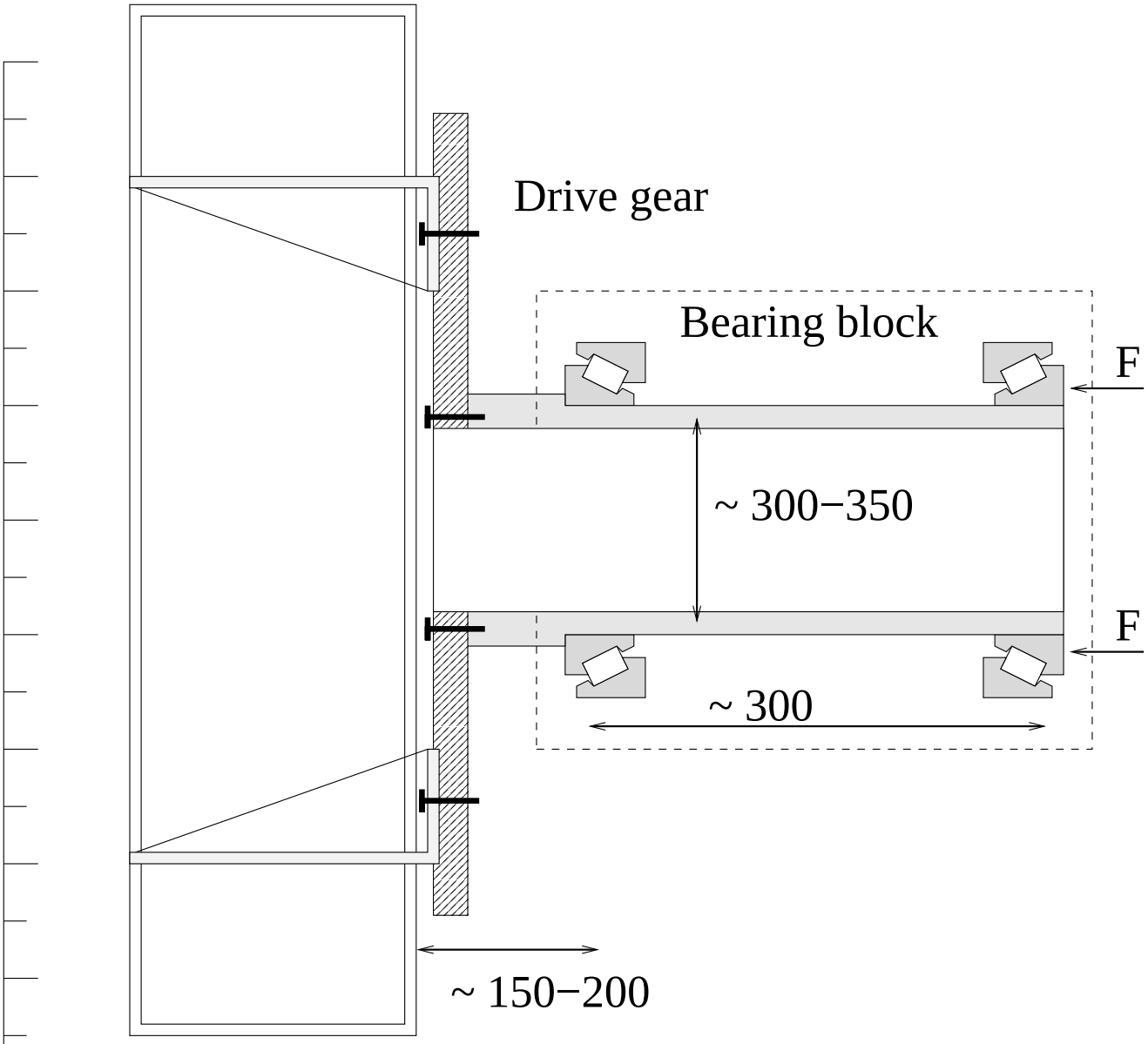
~ 1:10

Old pedestal Az bearings



~ 1:10

Old pedestal El bearings

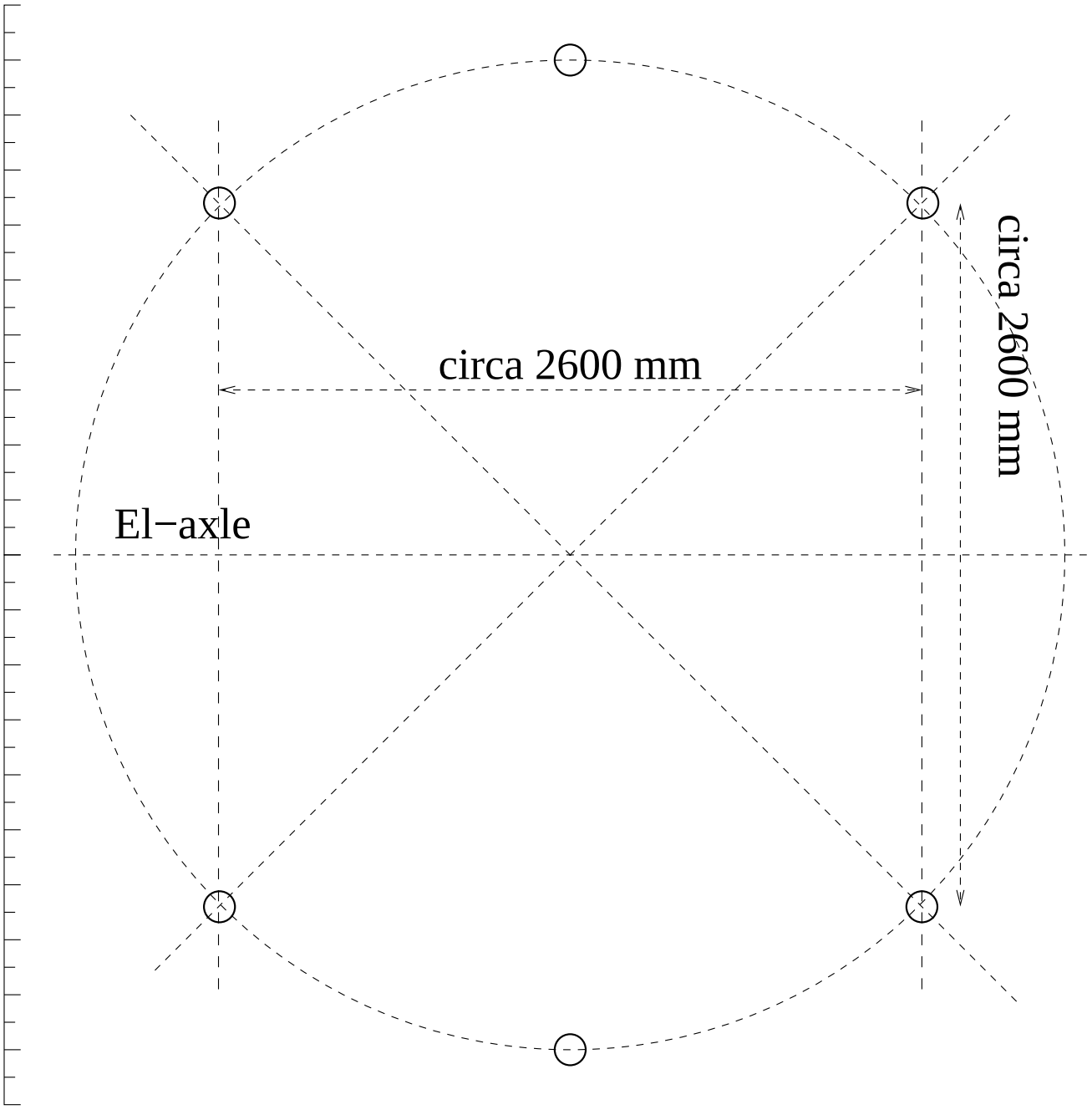


www.viestikallio.fi −− "Great Pumpkin" Fig10

1:20

Dish attachment point geometry

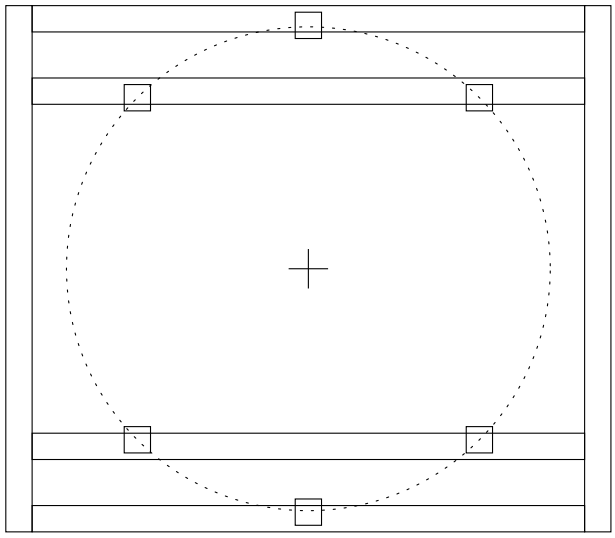
Diameter is 12.000 feet = 144.00 inch

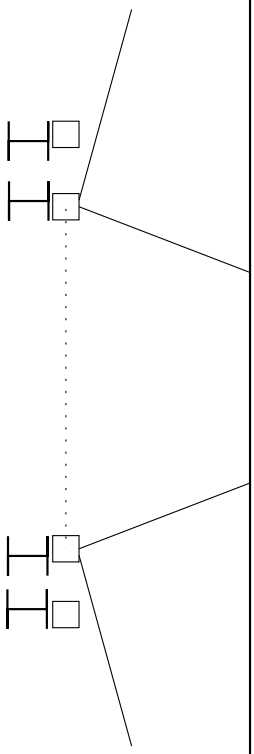


1:50

Material: HE200B/S355 (fine−grain high−tensile steel)

El−yoke dish fixture: grid of HE200B I−beams





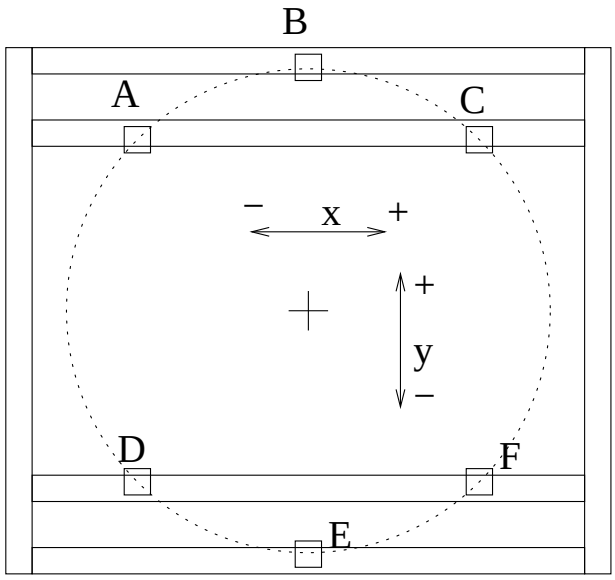
circa 4.6 x 4.0 meters by outer edge

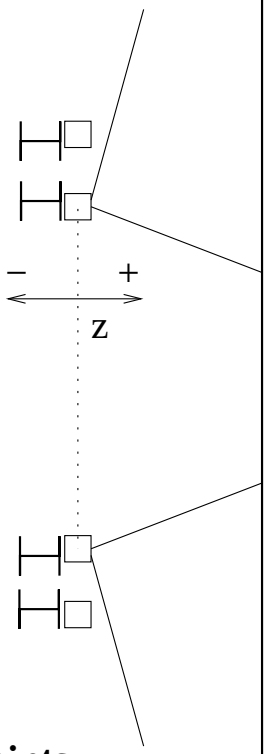
1:50

Material: HE200B/S355 (fine−grain high−tensile steel)

El−yoke dish fixture: grid of HE200B I−beams

circa 4.6 x 4.0 meters by outer edge



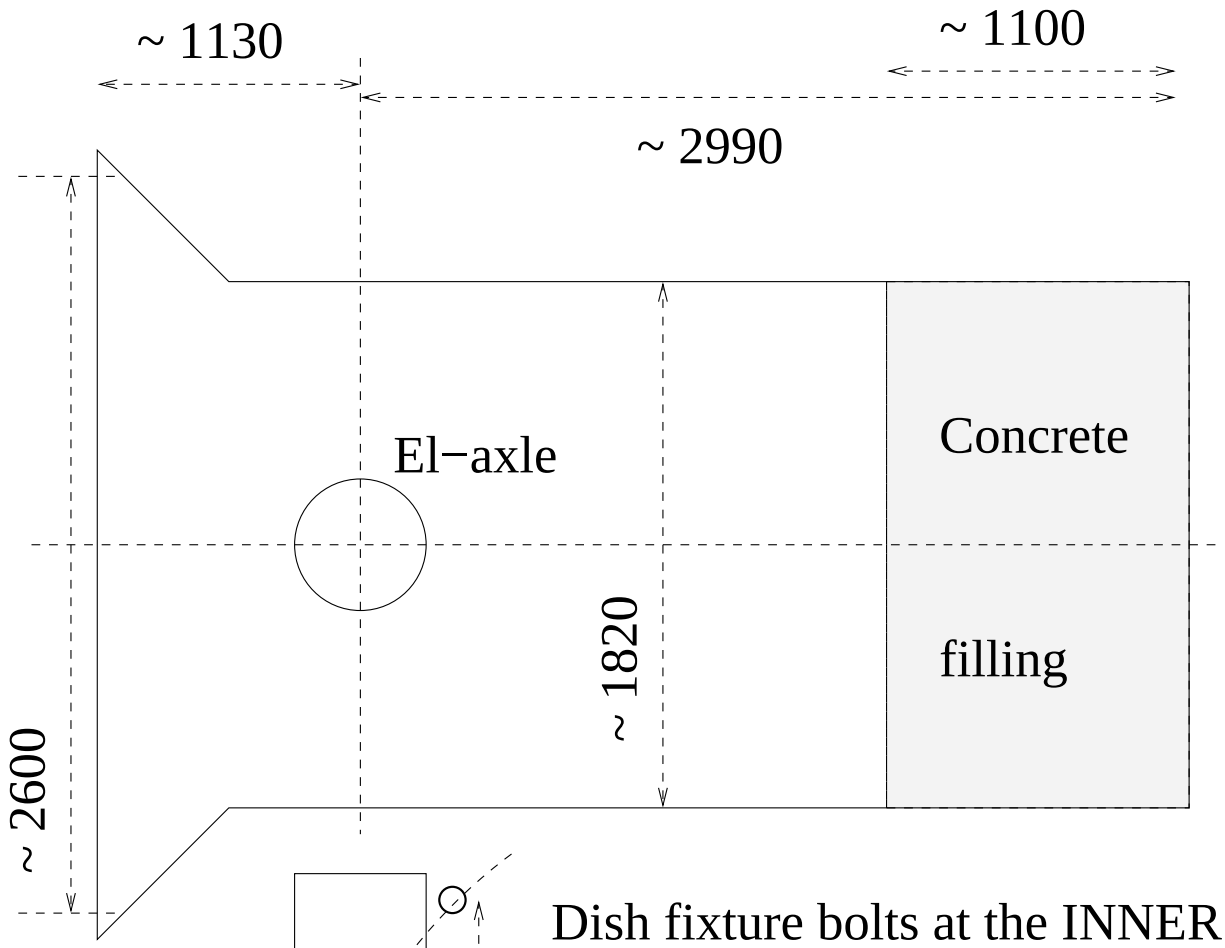


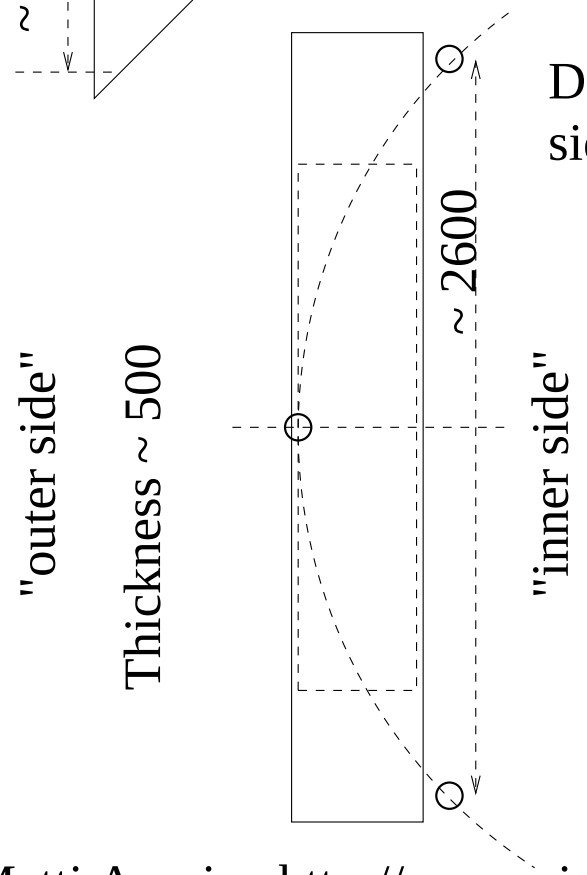
Estimates of forces at various elevation angles at the fixing points

	El: 0°			El: 45°			El: 90°		
	x	y	z	x	y	z	x	y	z
A	−3	−20	+2	?	?	?	+3	−3	−20
D	−3	−20	−2	?	?	?	+3	+3	−20
B	0	−15	+3	0	?	?	0	−5	−15
E	0	−15	−3	0	?	?	0	+5	−15
C	+3	−20	+2	?	?	?	−3	−3	−20
F	+3	−20	−2	?	?	?	−3	+3	−20

1:20

Old pedestal Elevation structure





Dish fixture bolts at the INNER side of the elevation arms

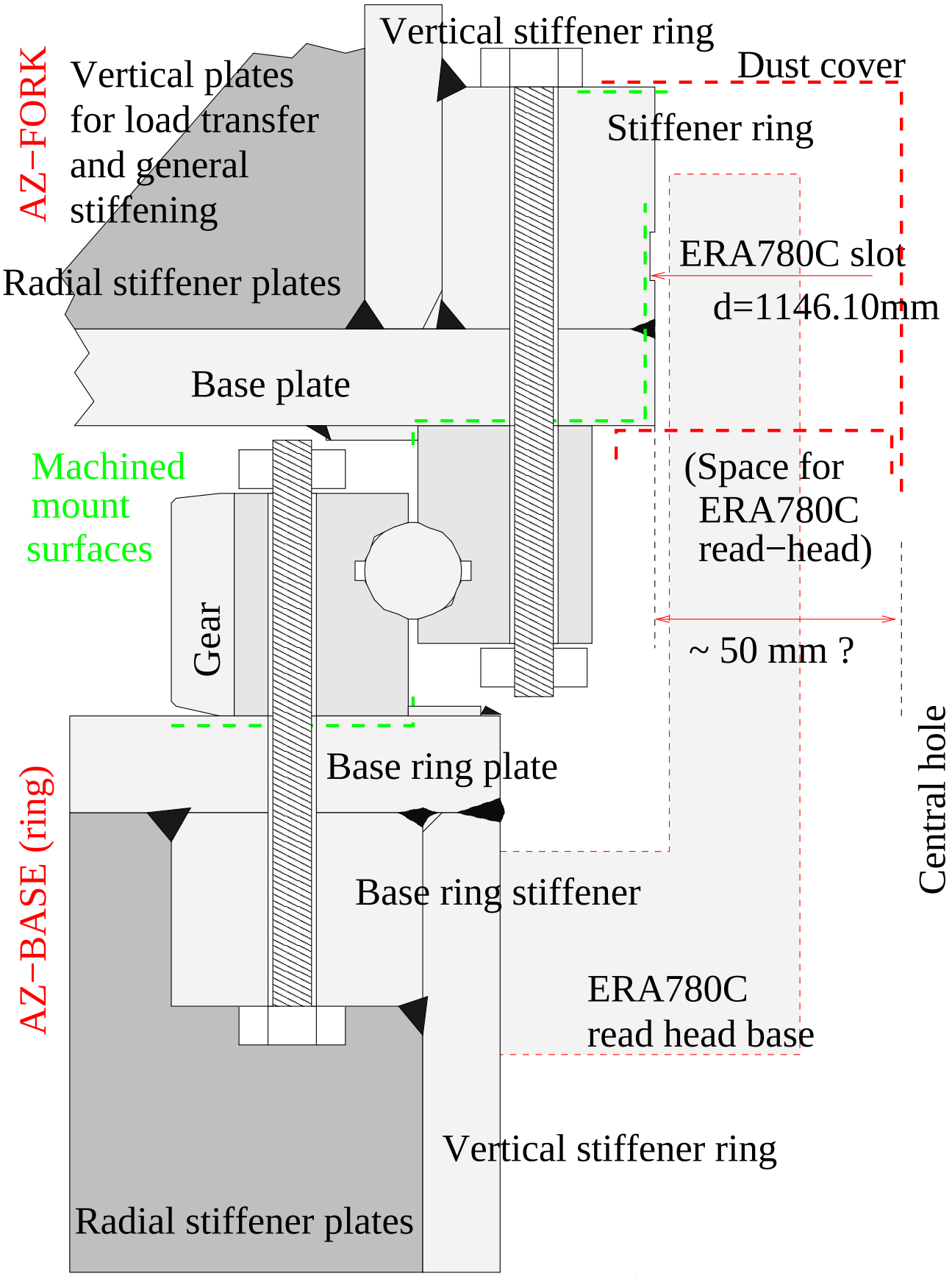
Original dish fixing points are at 45° directions, and at LATERAL direction.

To make the dish stiffer, rotating the thing by 90° MIGHT help a bit.

(See fig 11)

www.viestikallio.fi −− "Great Pumpkin" Fig13

Az−bearing as a slewing ring



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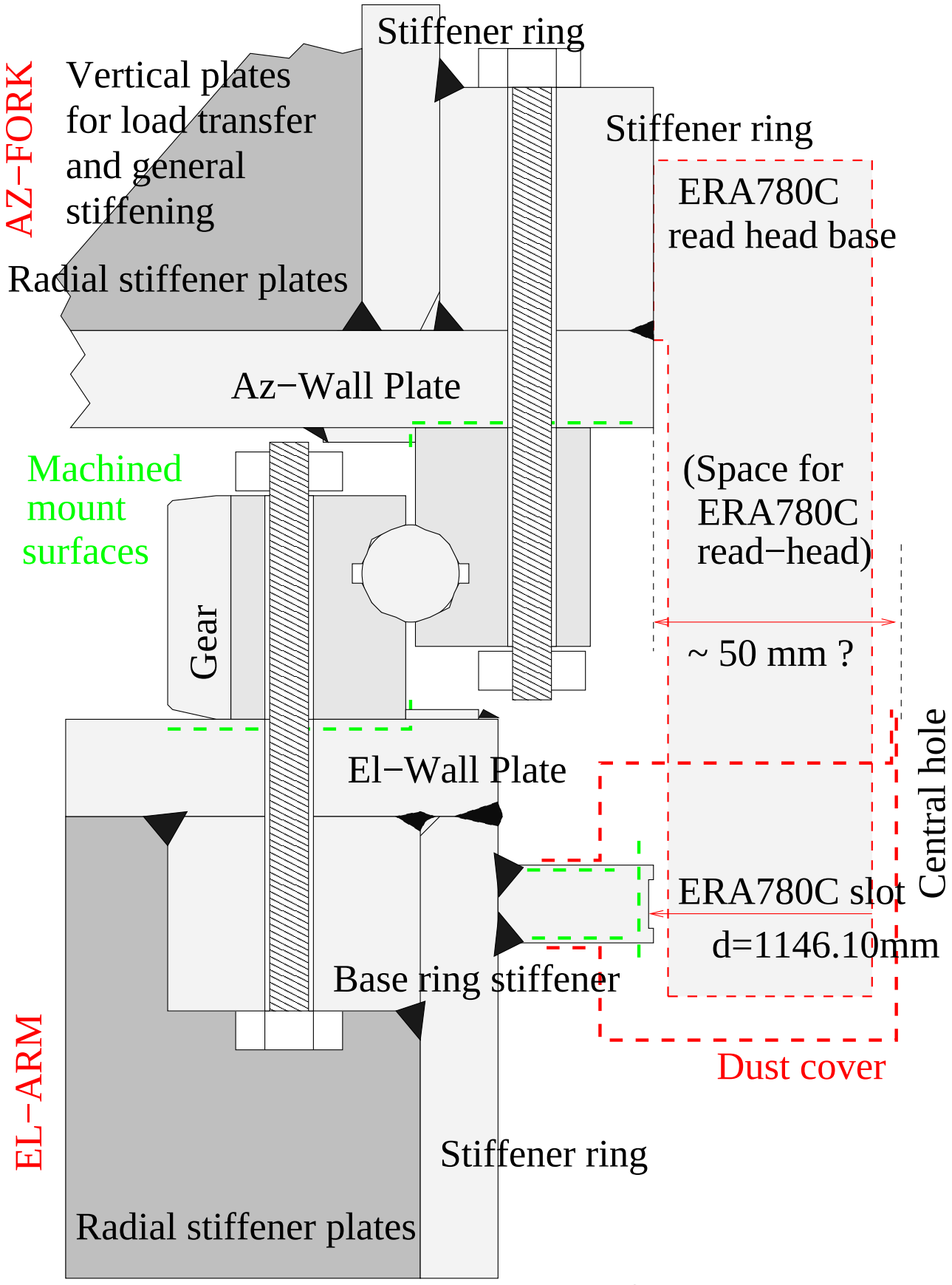
www.viestikallio.fi −− "Great Pumpkin" Fig13B

EL−bearing as a slewing ring



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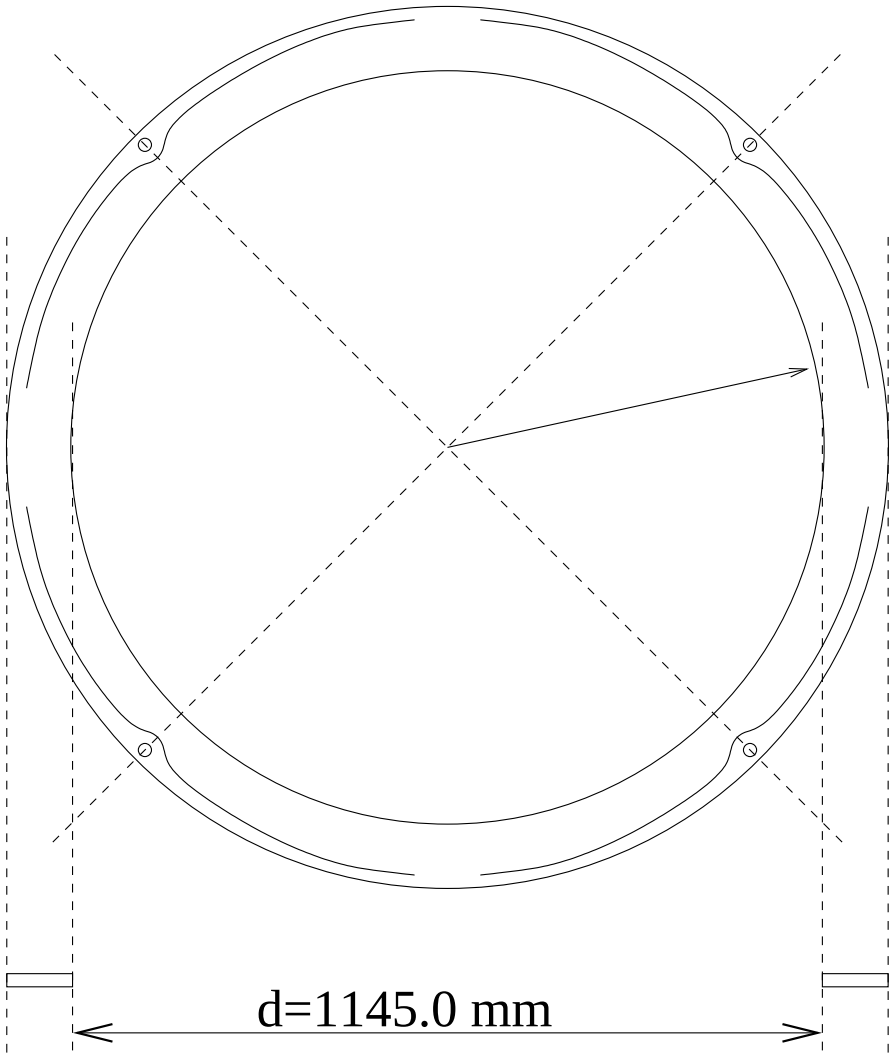
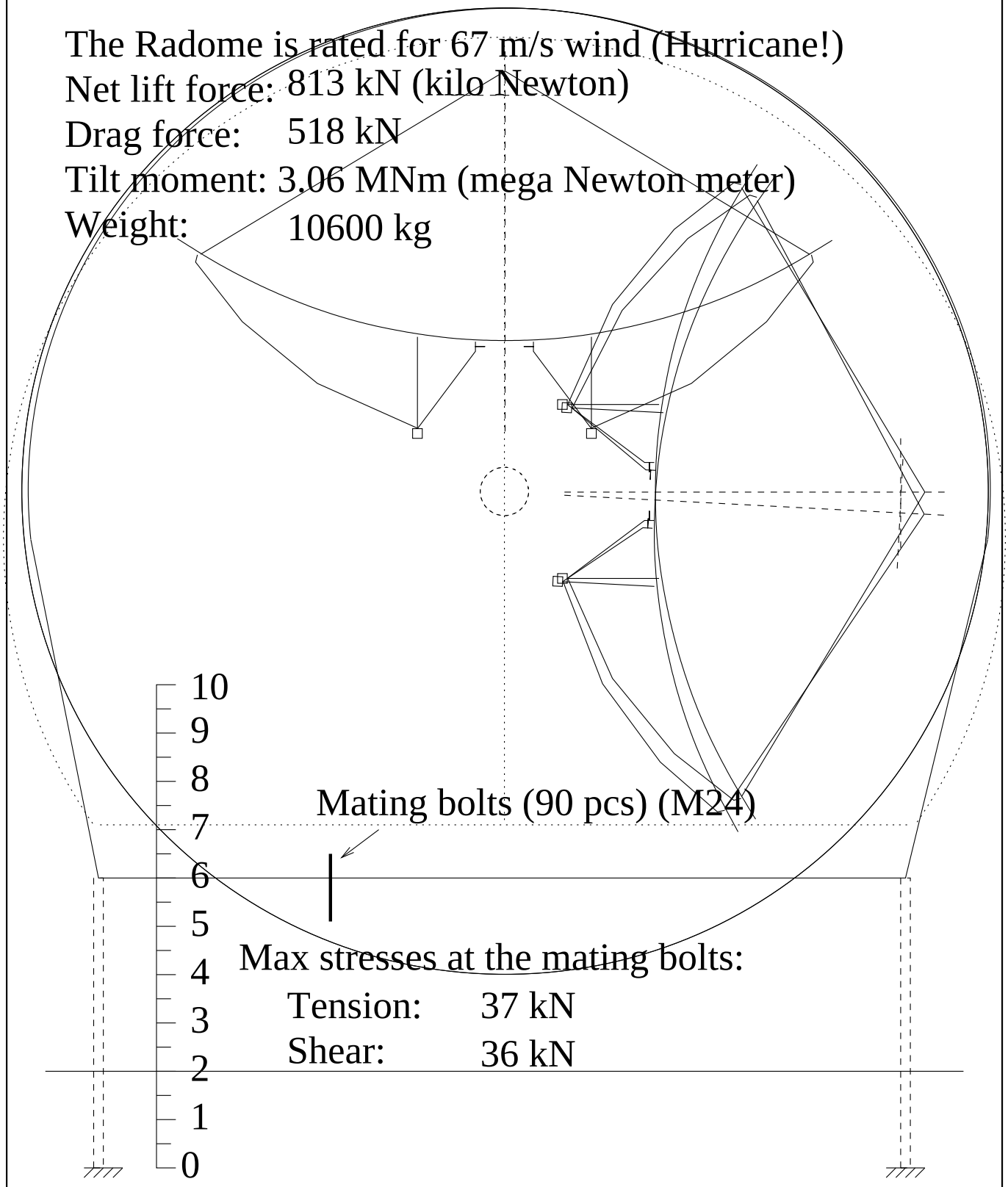
Alloyed steel with 5−27% Chromium
−−> Thermal expansion coefficient ~ 10.5 ppm/K
A flat bar of 25x125 mm cross−section forged into round loop, and circularized, and laser/waterjet cut to have thermal movement slits (Exact shape to be determined...)



1:100

Wind−force estimate (survivability)

The Radome is rated for 67 m/s wind (Hurricane!)
Net lift force: 813 kN (kilo Newton)
Drag force: 518 kN
Tilt moment: 3.06 MNm (mega Newton meter)
Weight: 10600 kg



Max stresses at the mating bolts:
Tension: 37 kN
Shear: 36 kN

1:100

Wind−force estimate (survivability)

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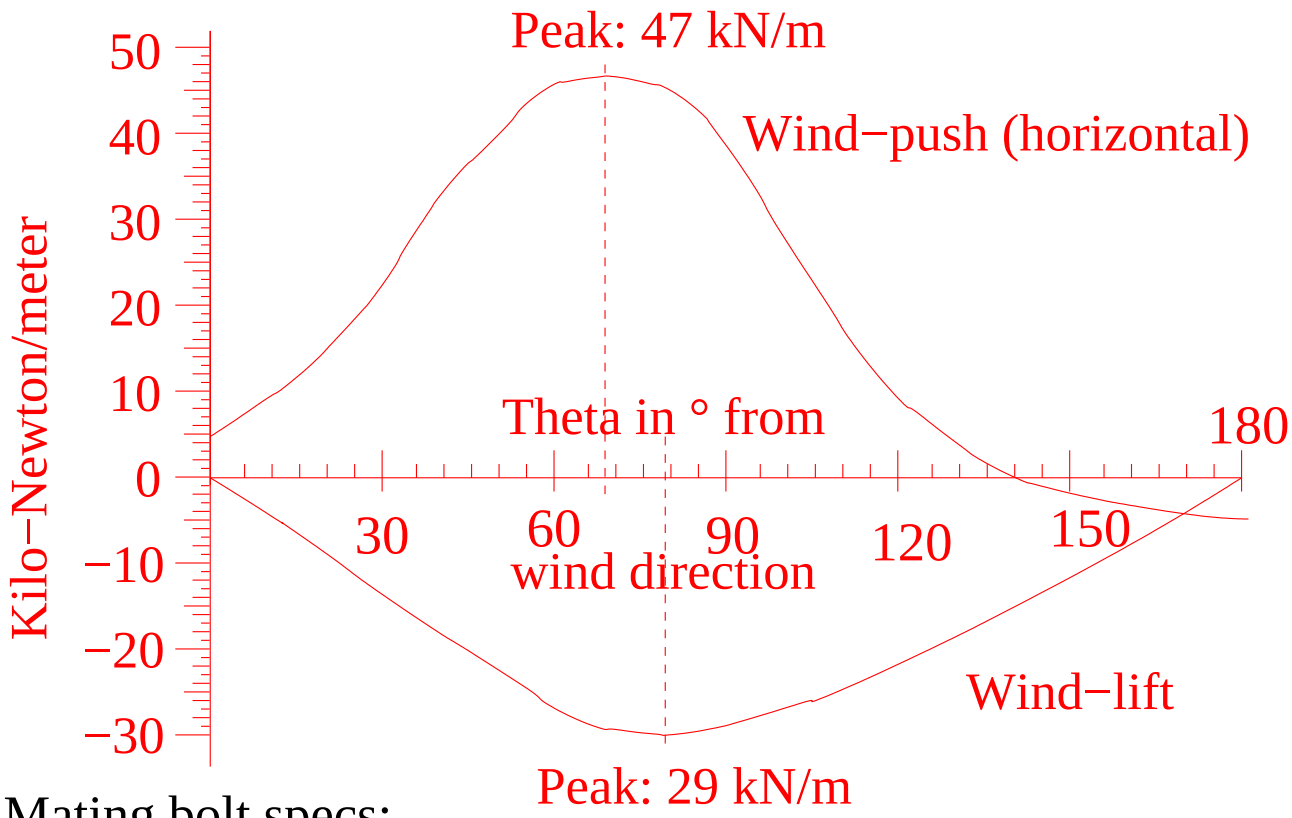
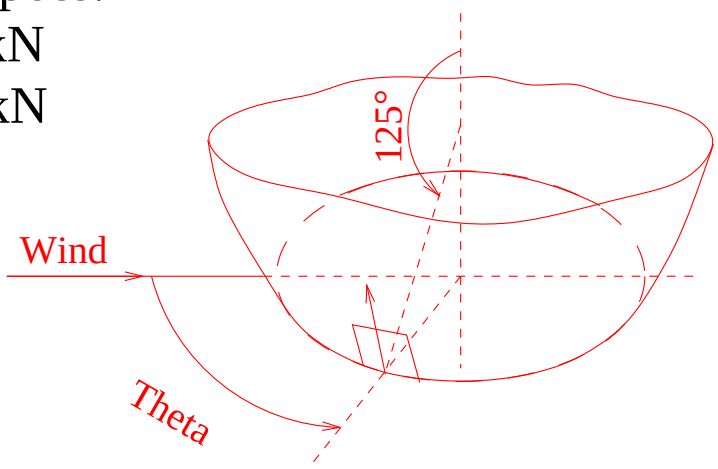


Mating bolt specs:
Tension: 37 kN
Shear: 36 kN



1:100

Wind−force estimate (survivability)

The Radome is rated for 150 M.P.H. wind (Hurricane!)

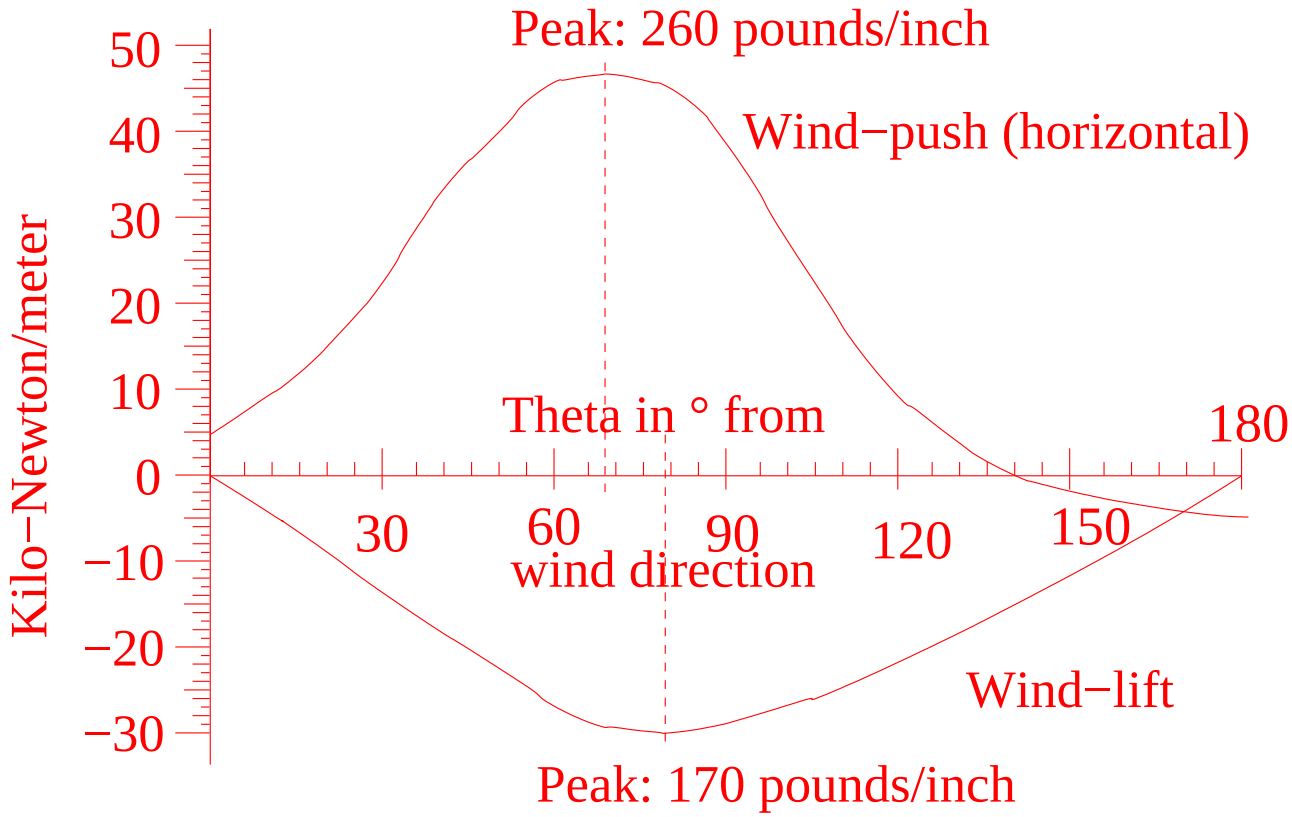
Net lift force: 179,200 LBS.

Drag force: 114,300 LBS.

Tilt moment: 2,214,000 FT.LBS.

Weight: 23,200 LBS.

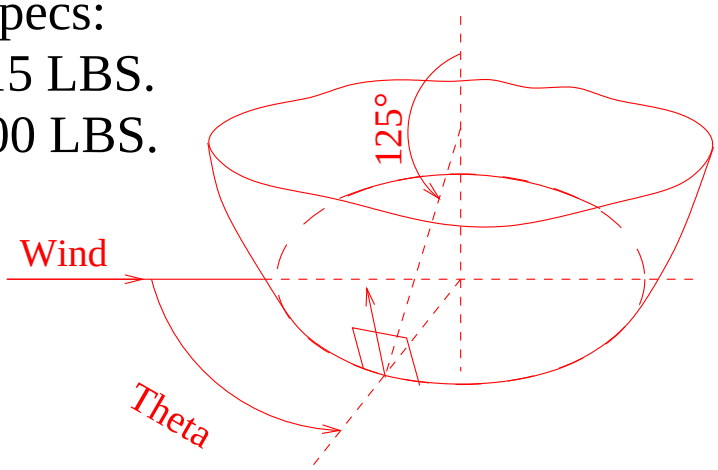
IN ORIGINAL US−IMPERIAL UNITS



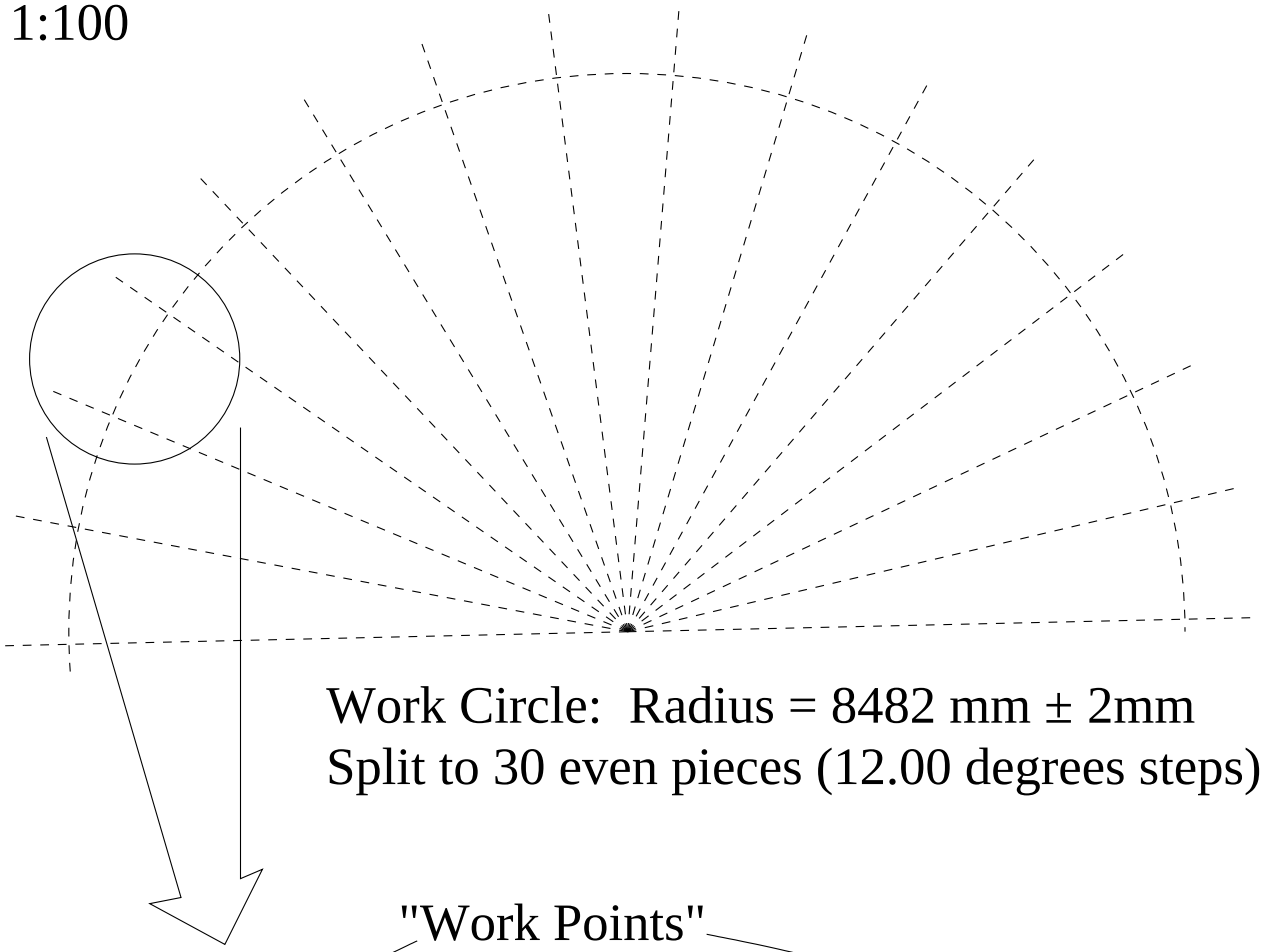
Mating bolt specs:

Tension: 8,015 LBS.

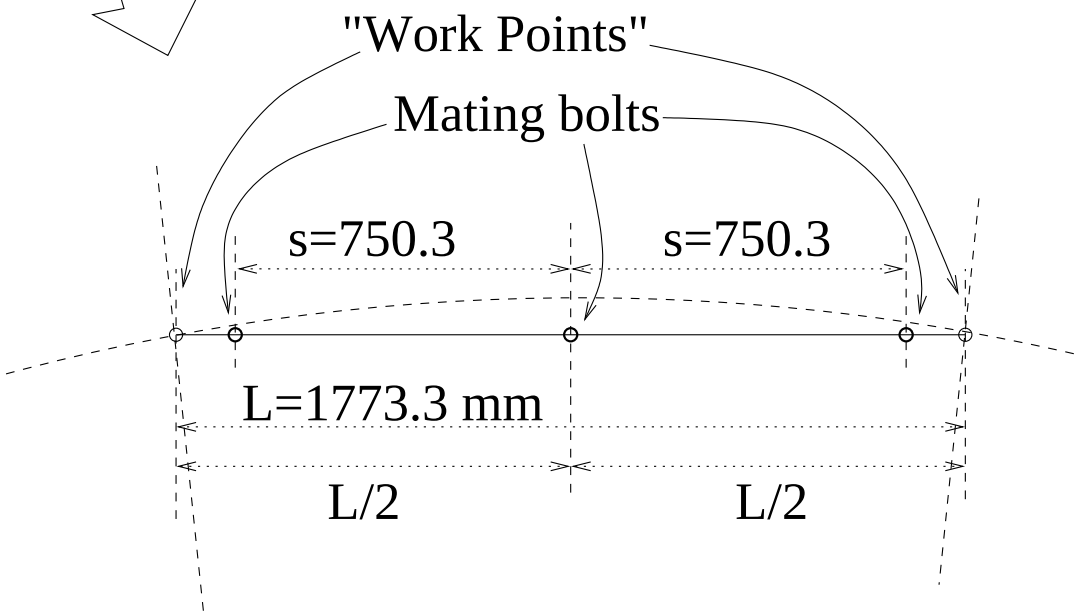
Shear: 7,800 LBS.



1:100



Work Circle: Radius = 8482 mm ± 2mm
Split to 30 even pieces (12.00 degrees steps)



Work−circle circularity within 25 mm of true circle
Mating bolts: d=25.0 mm (M24, M27)
Mating bolts positions within 3.0 mm of true position
Mating bolt holes at radome: d=34.95 mm

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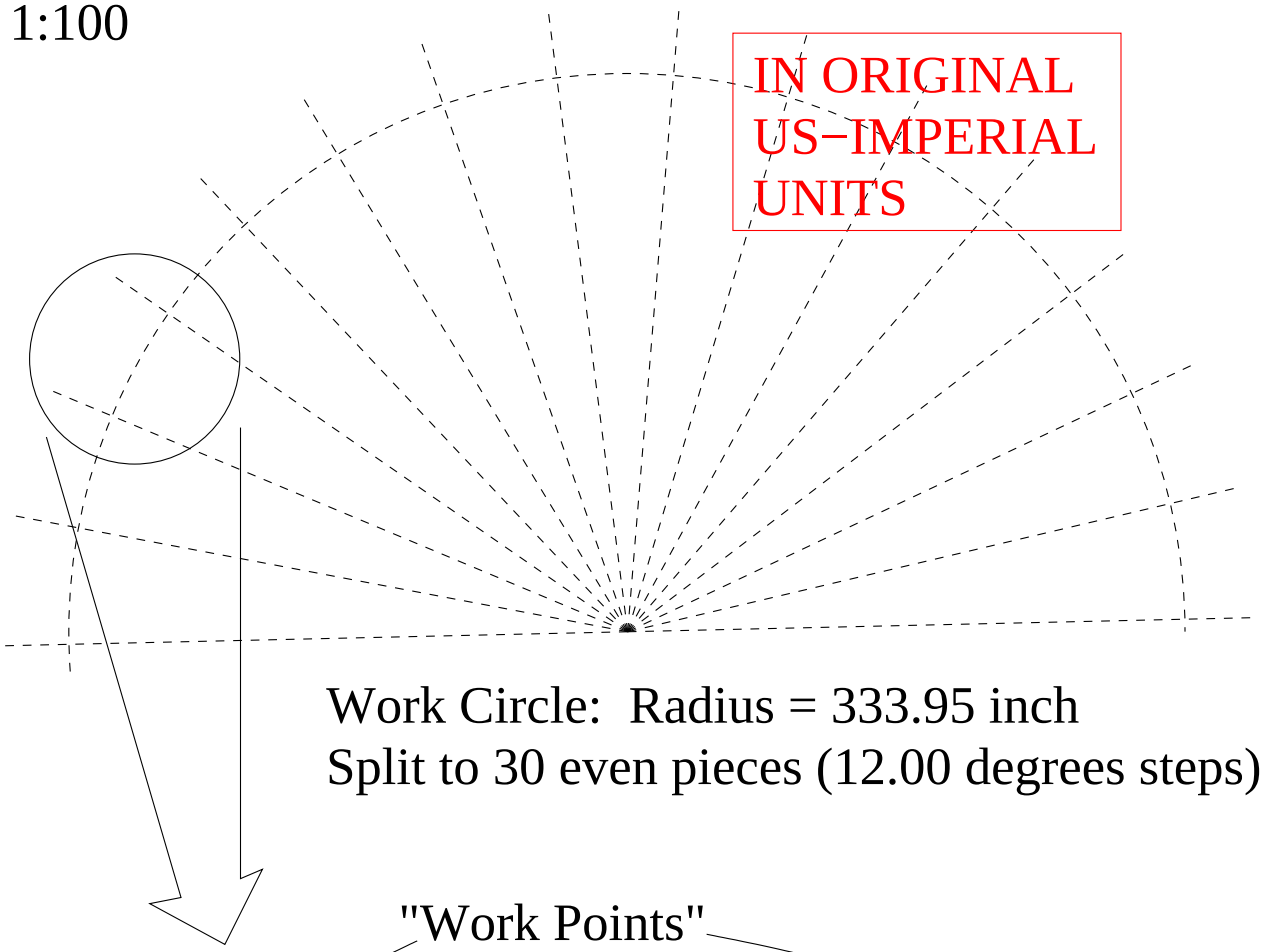
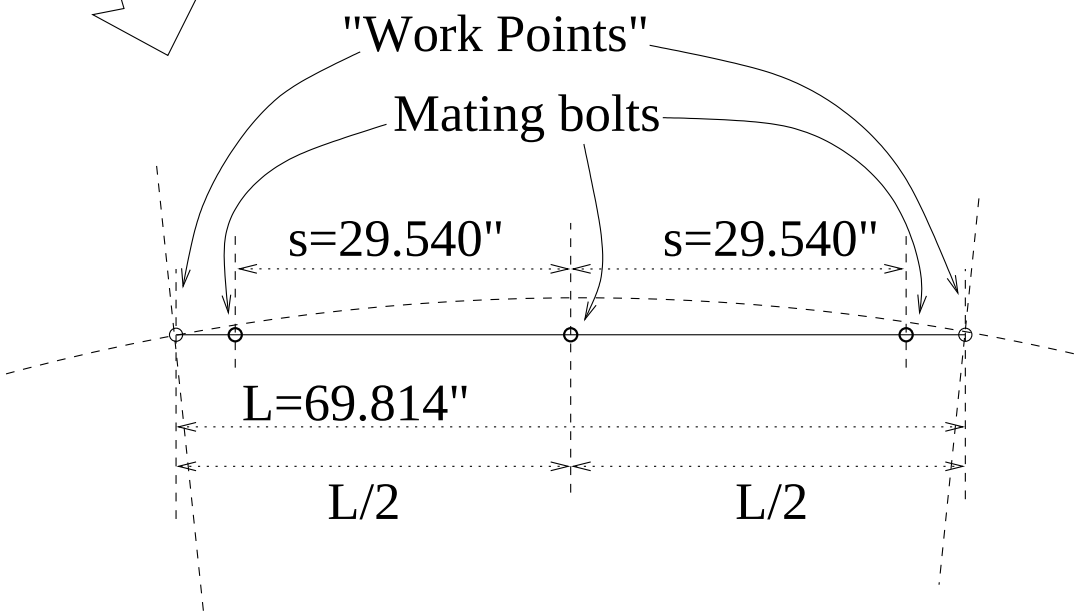
1:100

IN ORIGINAL
US−IMPERIAL
UNITS



Work Circle: Radius = 333.95 inch
Split to 30 even pieces (12.00 degrees steps)



Work−circle circularity within 1" T.I.R. of true circle
Mating bolts: d=1.00"
Mating bolts positions within 1/8" of true position
Mating bolt holes at radome: d=1 3/8"

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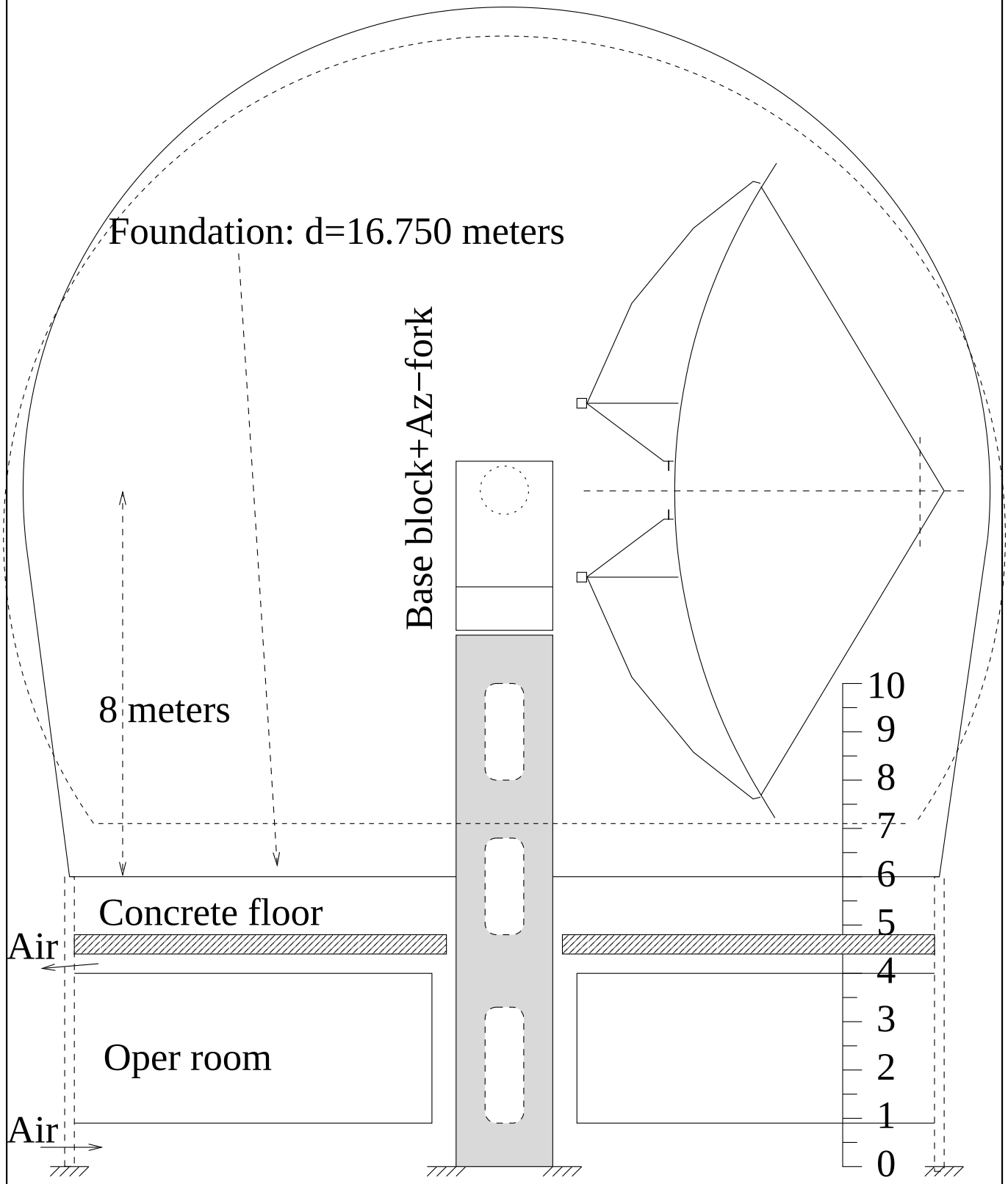
www.viestikallio.fi −− "Great Pumpkin" Fig21

1:100



Concrete tower; D=2.0m; d=1.6m, h=11.0m

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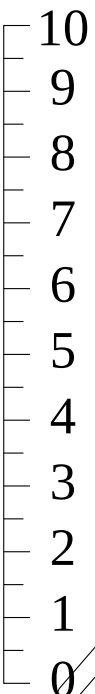
1:100



Dome internal floor I−beam grid
(IPE 200 ?)

The ring diameters, and thus exact geometry
ARE SUBJECT TO FURTHER STUDY!

~ 220 m^2
of concrete floor
0.2m thick −> 44 m^3 concrete −> 88 tons ... Oops...

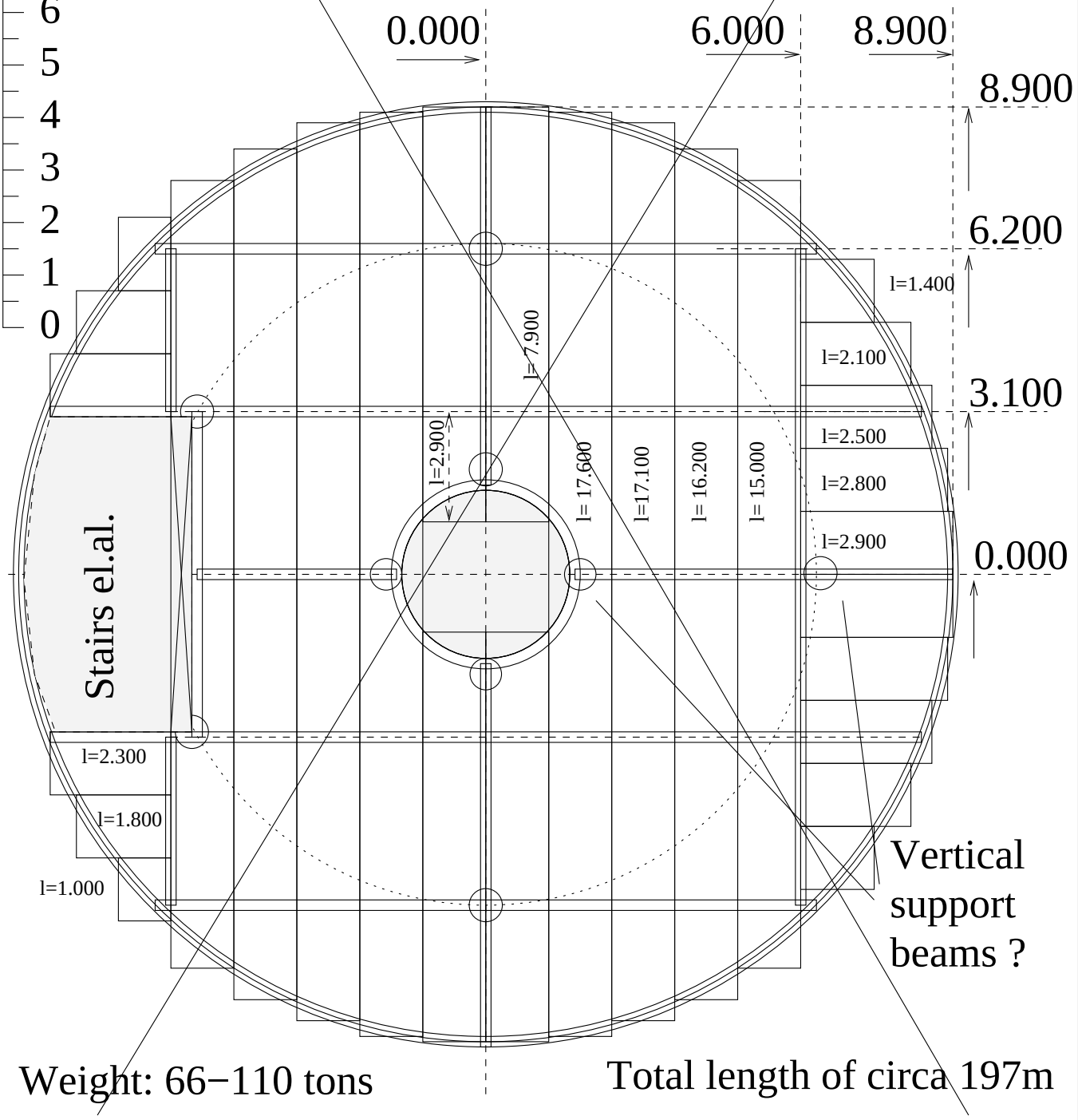
www.viestikallio.fi −− "Great Pumpkin" Fig22b

1:100

10 9 8 7 6 5 4 3 2 1 0

Dome internal floor I−beam grid (IPE 200 ?)

Using 1.200 m wide modular floor elements on steel I−beam grid with external circle of 18.000m, and inner circle of 3.000m.



Weight: 66−110 tons

Total length of circa 197m

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www.viestikallio.fi −− "Great Pumpkin" Fig22c

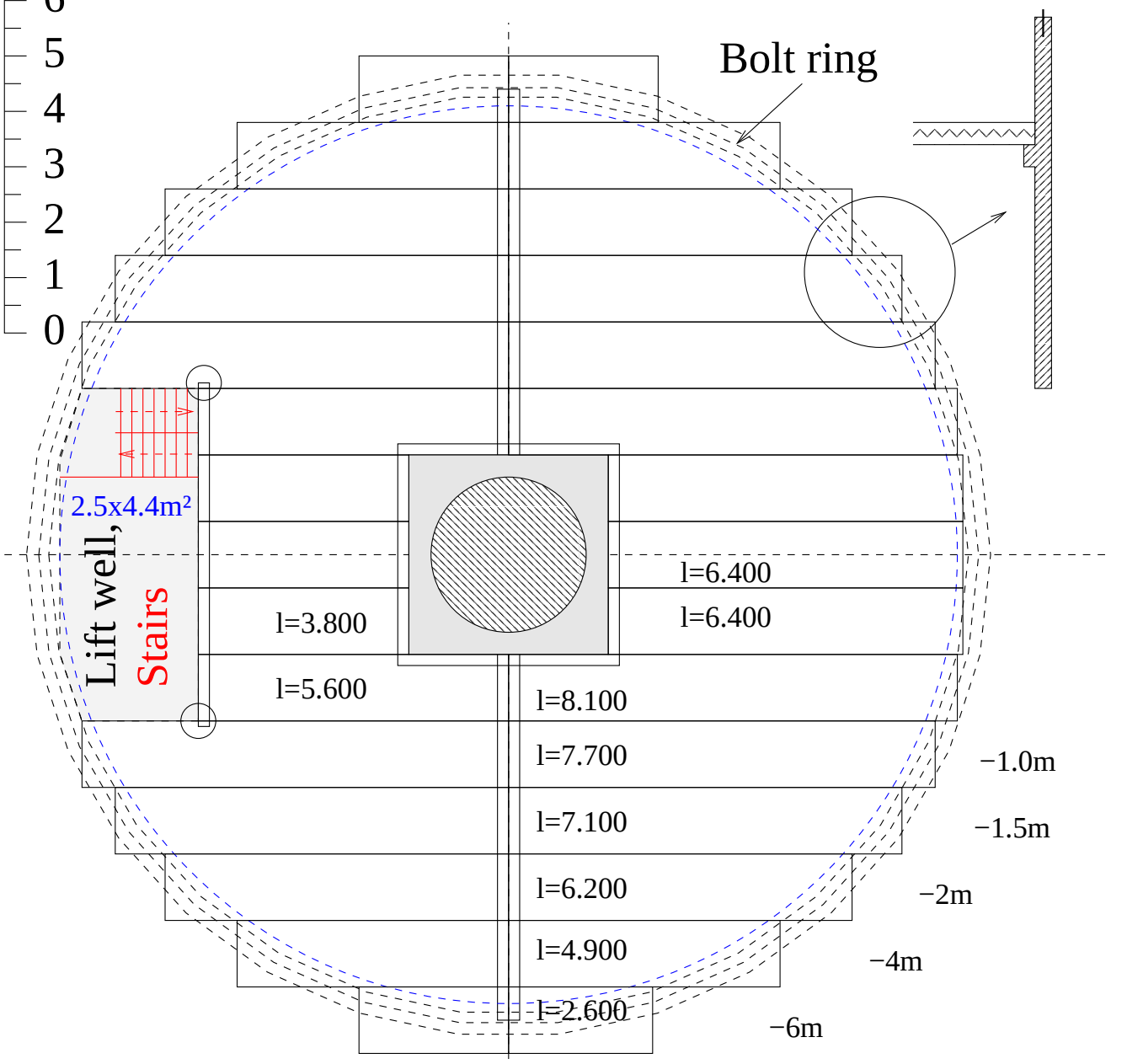
1:100

Dome internal floor "tiling" − std concrete elements

10 9 8 7 6 5 4 3 2 1 0

Using 1.200 m wide precast floor elements
on support ring with diameter of 16.750m, and
with couple internal openings.

SYMMETRICAL BITS LENGTHS ARE NOT MARKED



Weight: 44 tons of floor elts. Total length of circa 162m

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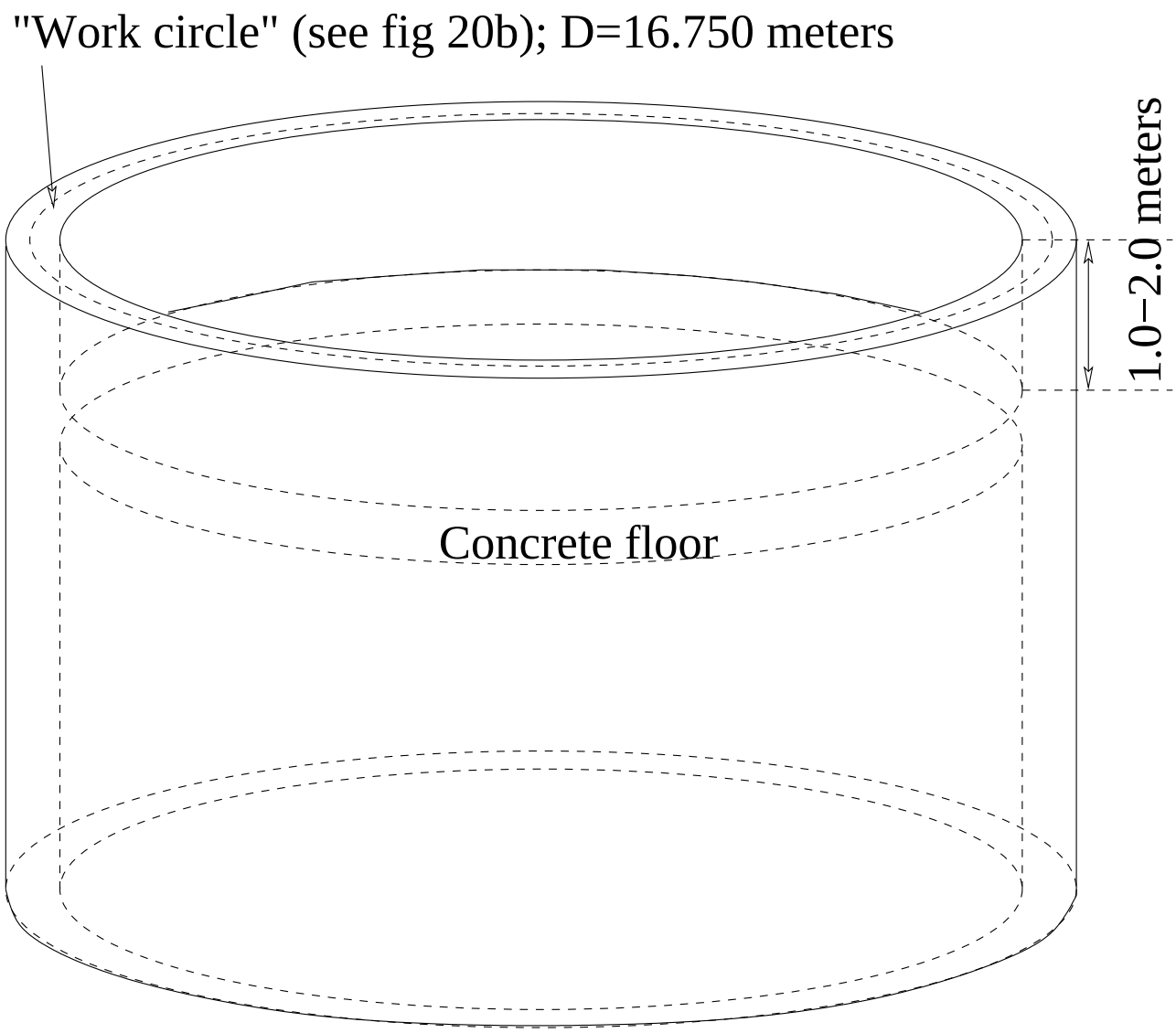
Concrete "silo" with a floor at 1−2 meters
down from the top.

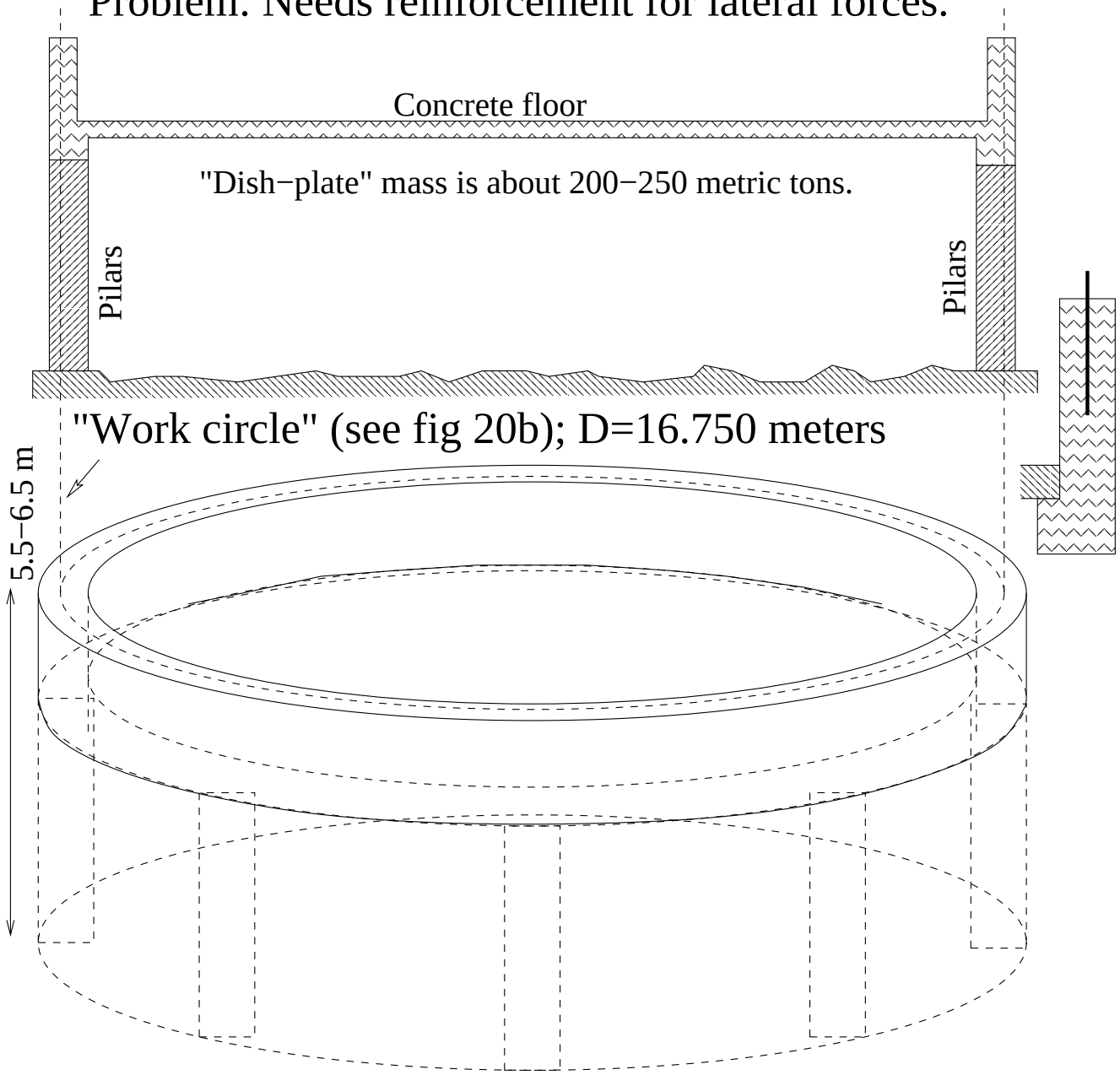
Vertical scale circa twice the horizontal one.



~ 1:100 www.viestikallio.fi −− "Great Pumpkin" Fig22e

Concrete "dish−plate" with a floor at 1−2 meters down from the top and raised on top of 8 concrete pilars.

Problem: Needs reinforcement for lateral forces.



8 pilars of 0.40x0.40 m² cross−section ? (4−5m height)
Distributed evenly at 45° steps. (See Fig22f/g/h)

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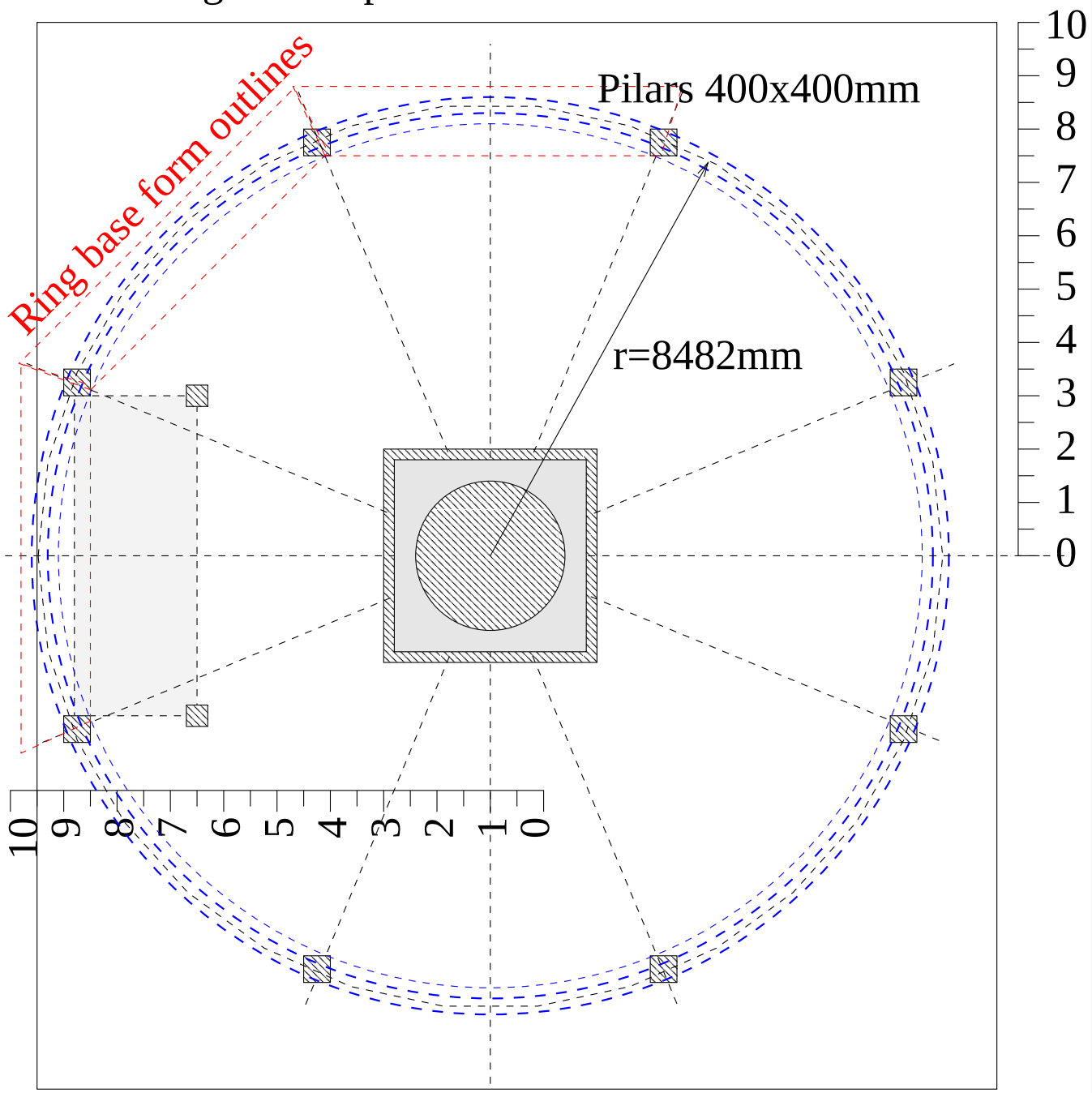
1:100

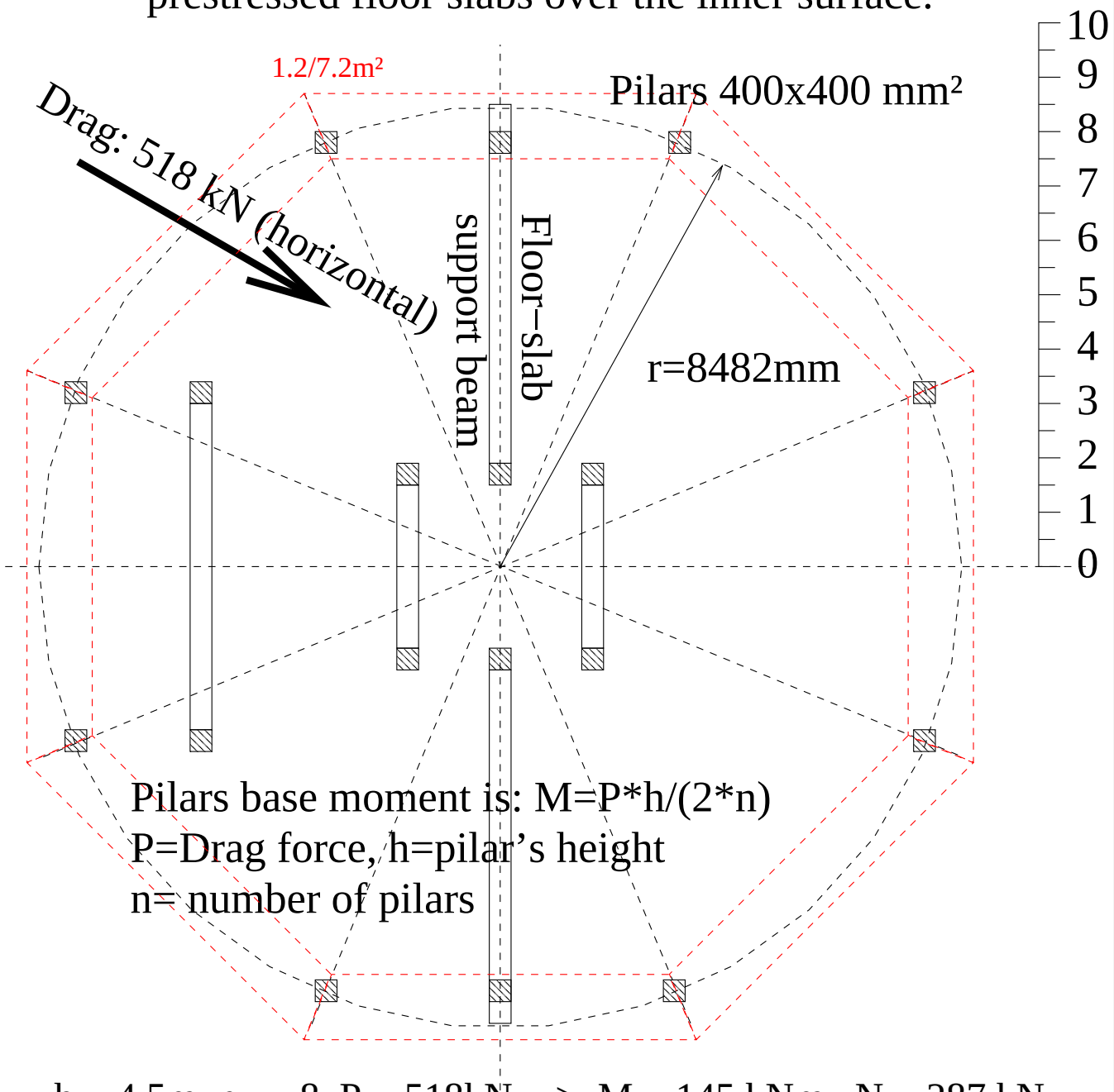
Rectangular building below the round radome base support structure ?

Building's outer perimeter



1:100

18 pilars of 400x400mm² cross sections
Pilar height about 4500 mm
Mass above the pilars: 230−250 metric tons,
of that circa 180 m²/44−45 metric tons is precast
prestressed floor slabs over the inner surface.



Pilars base moment is: M=P*h/(2*n)
P=Drag force, h=pilar's height
n= number of pilars

h = 4.5m, n = 8, P = 518kN -> M = 145 kNm, N = 287 kN
h = 4.5m, n = 18, P = 518kN -> M = 65 kNm, N = 127 kN

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1:100

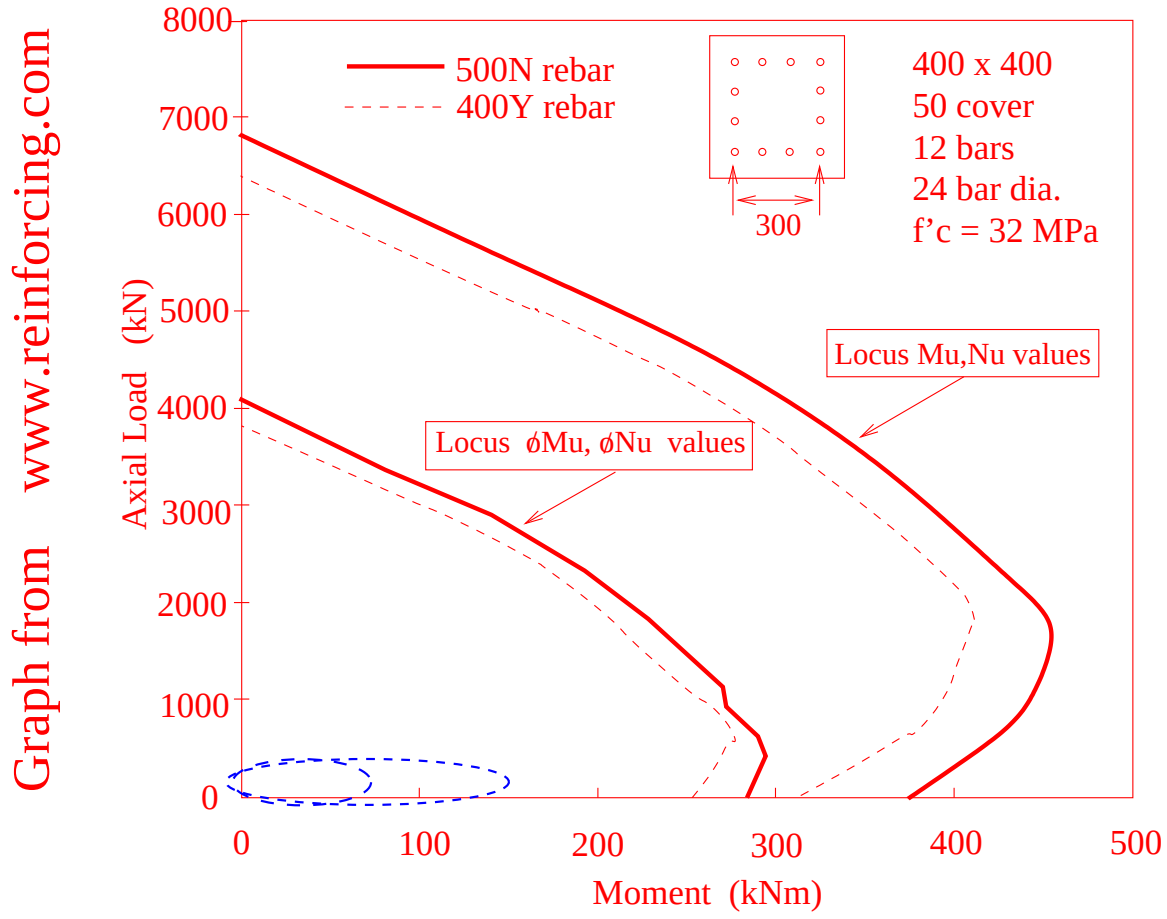
12 pilars of 400x400mm² cross sections
Pilar height about 4500 mm
Mass above the pilars: 230−250 metric tons,
of that circa 180 m²/44−45 metric tons is precast prestressed floor slabs over the inner surface.

Drag: 518 kN (horizontal)

Pilars base moment is: M=P*h/(2*n)

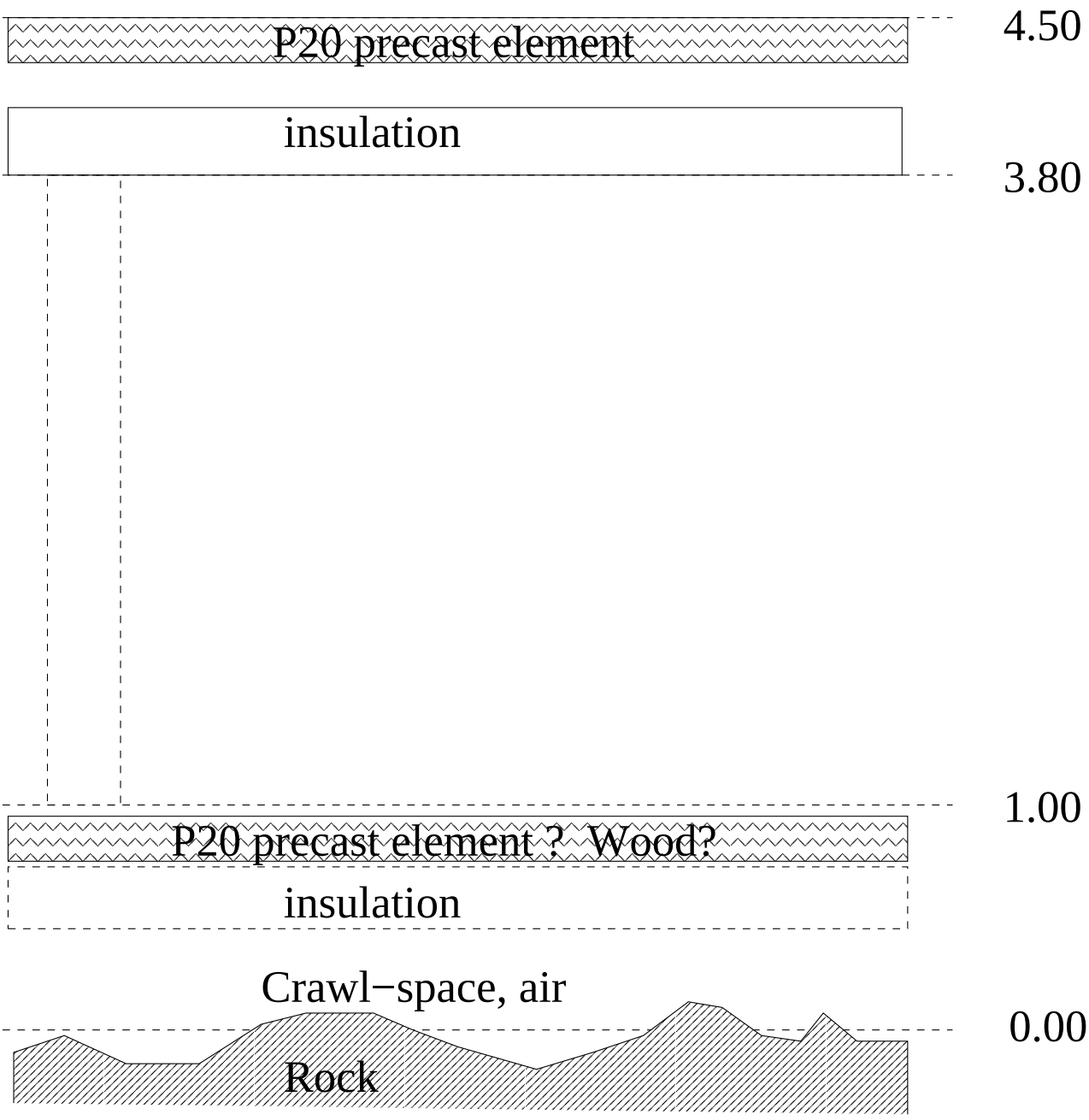
P=Drag force, h=pilar's height
n= number of pilars

h = 4.5m, n = 8, P = 518kN −> M = 145 kNm, N = 287 kN
h = 4.5m, n = 18, P = 518kN −> M = 65 kNm, N = 127 kN



~ 1:25

Some guesses regarding the levels of the floors



www.viestikallio.fi −− "Great Pumpkin" Fig24

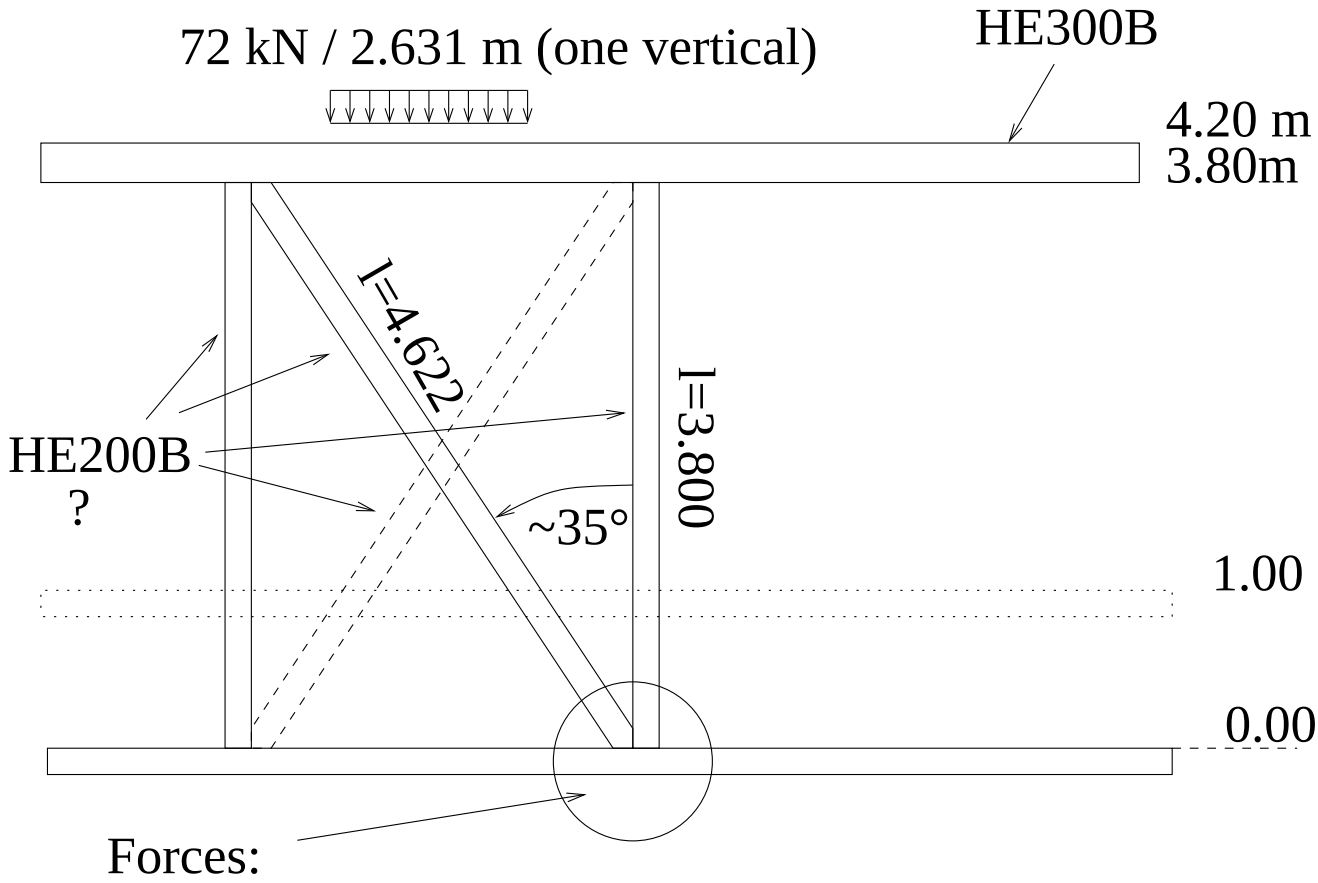
~ 1:50

Sideways view of a fraction of the wall.
Steel beams (I−beams?)

D=16.750 meters −> circumfence 52.62 meters

With 20 vertial beams, the pitch is 2.631 meters
With vertical beam l=3.800, the diagonal length
will then be: 4.622 meters.

20x3.8m + 20x4.622m = 168.44m for verticals+diags



Forces:

Push: > 72 kN
Net Lift: < 94 kN
Shear: ? kN

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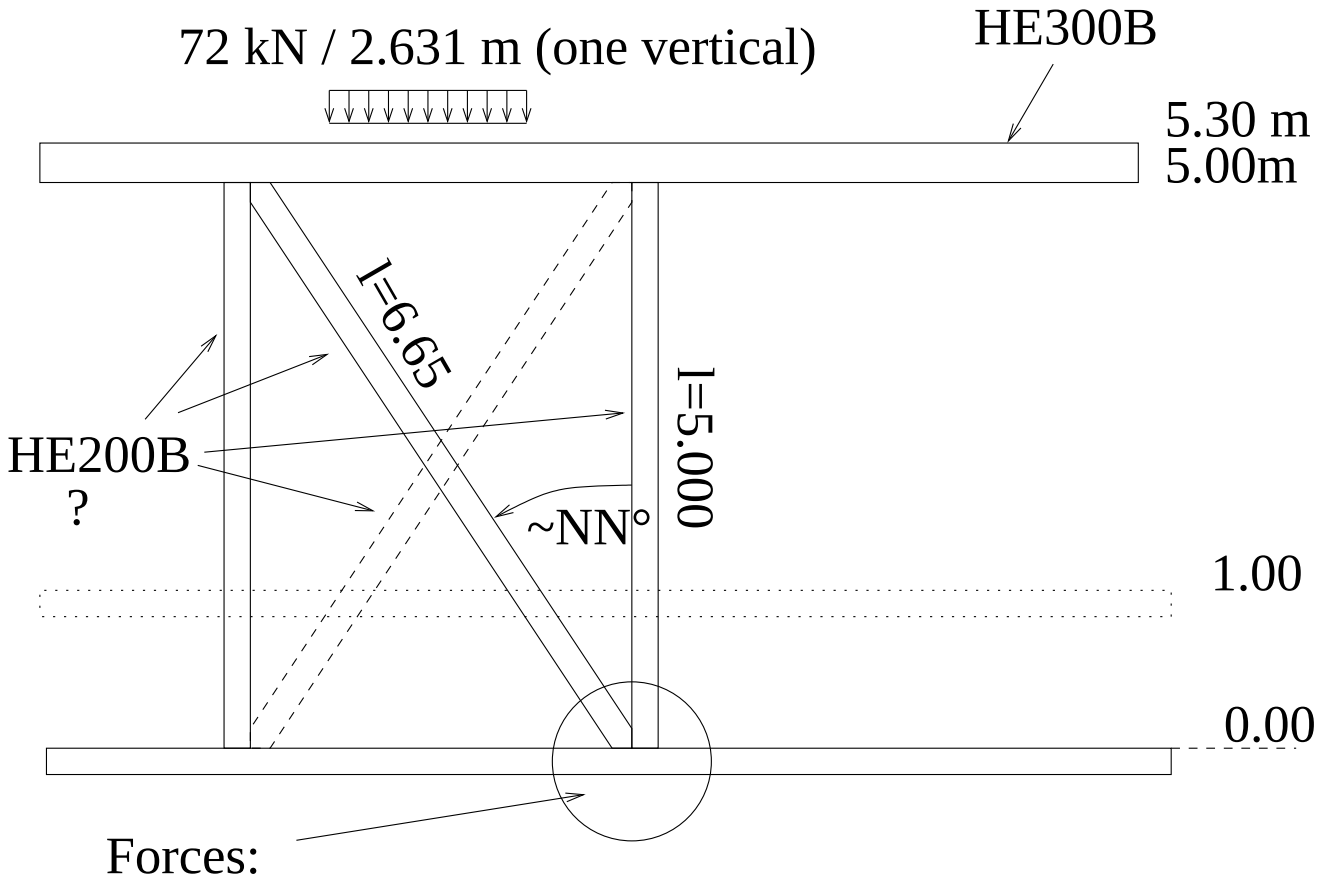
~ 1:50

Sideways view of a fraction of the wall.
Steel beams (I−beams?)

D=16.750 meters −> circumfence 52.62 meters

With 12 vertial beams, the pitch is 4.385 meters
With vertical beam l=5.000, the diagonal length will then be: 6.650 meters. Placing those at every second interval...

12x5.0m + 6x6.65m = 99.90m for verticals+diags



Forces:

Push: > 72 kN
Net Lift: < 94 kN
Shear: ? kN

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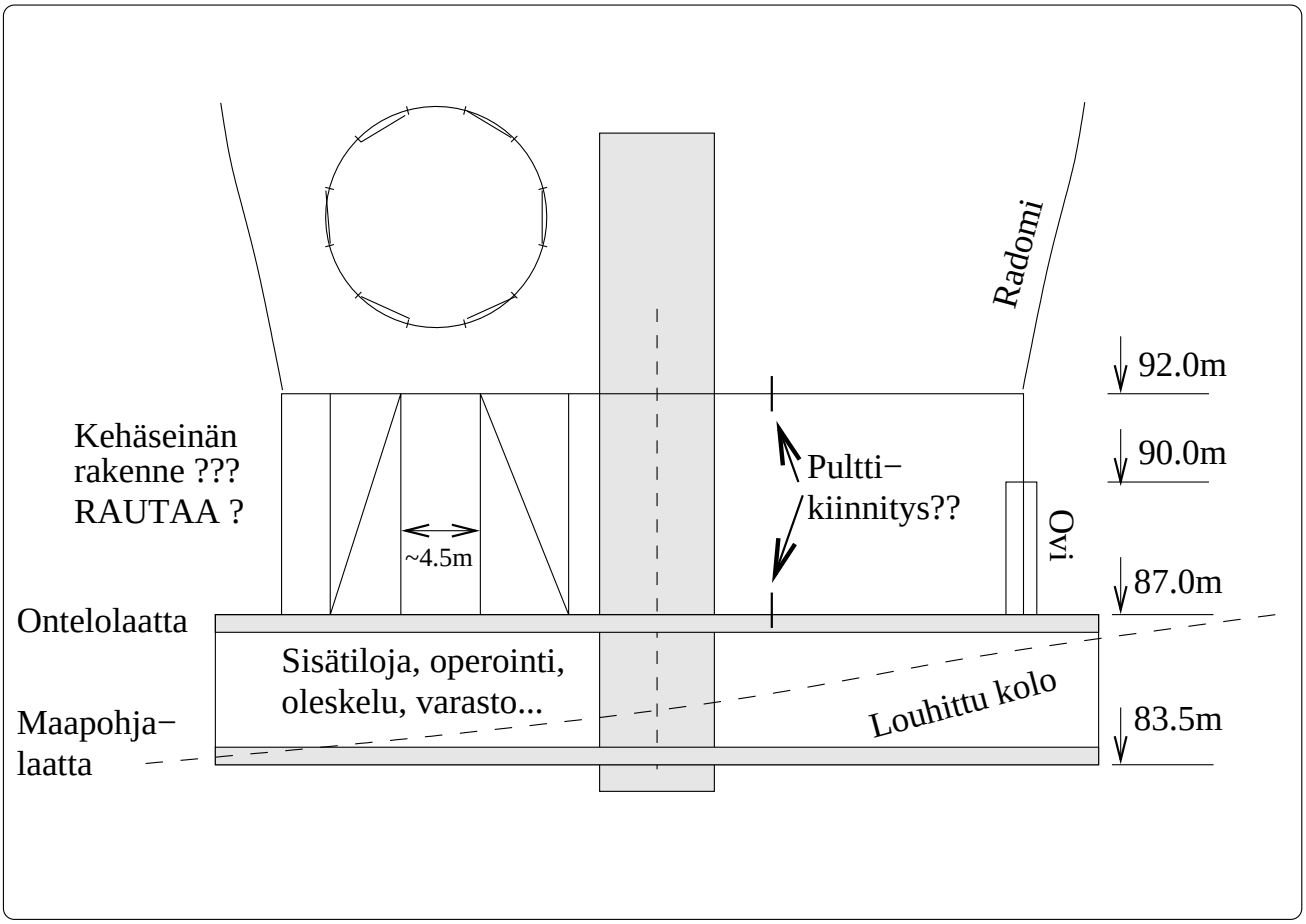
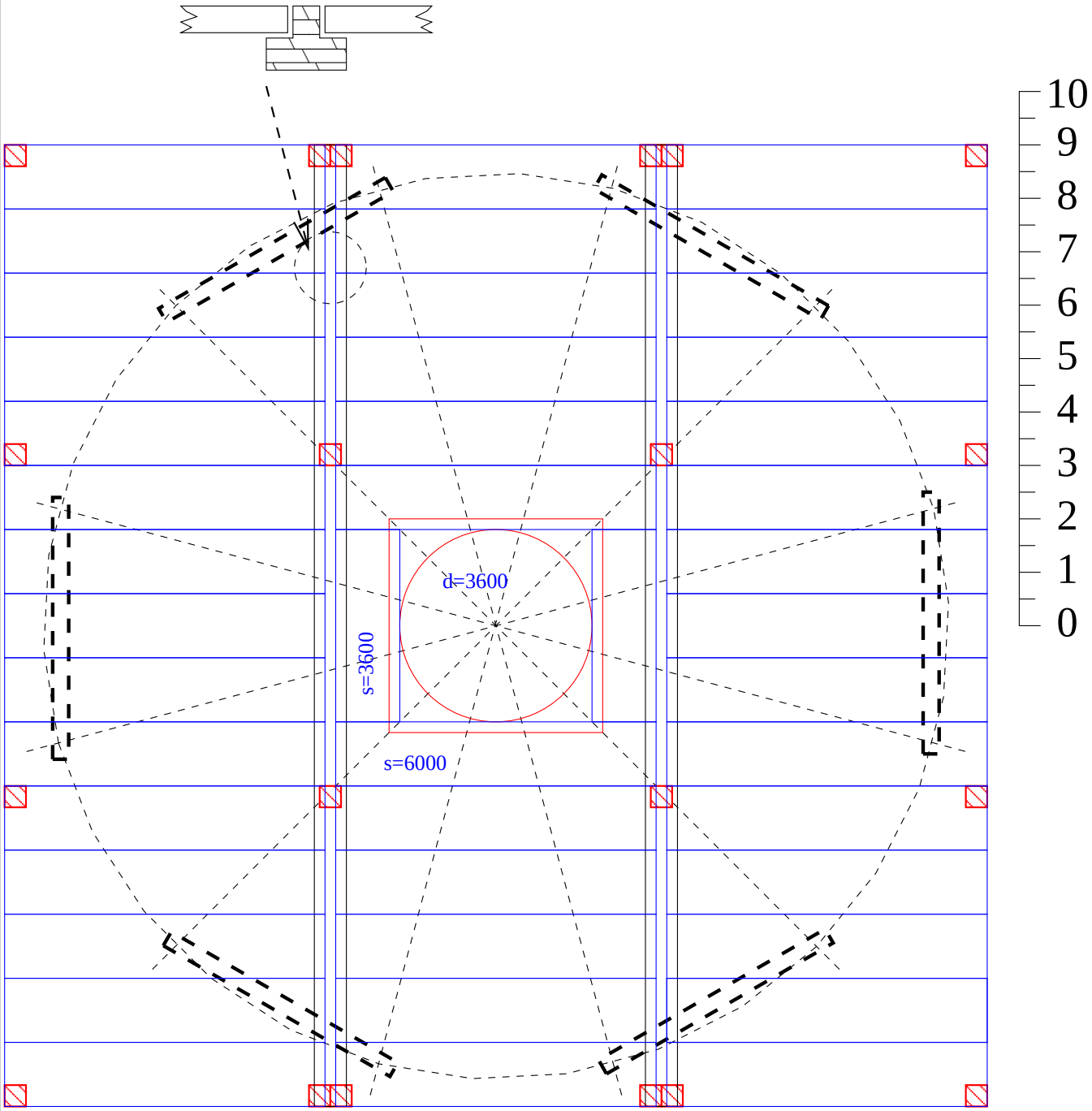
~ 1:NN

Plan N+1 −− precast floor slabs at the parking lot height, and PARTIALLY excavated basement contains control/storage/etc. facilities.

Ring−wall (radome raiser) is made of vertical steel beams, which are bolted on floor, and have intermediate diagonal beams to stiffen the structure −− needs engineering analysis...

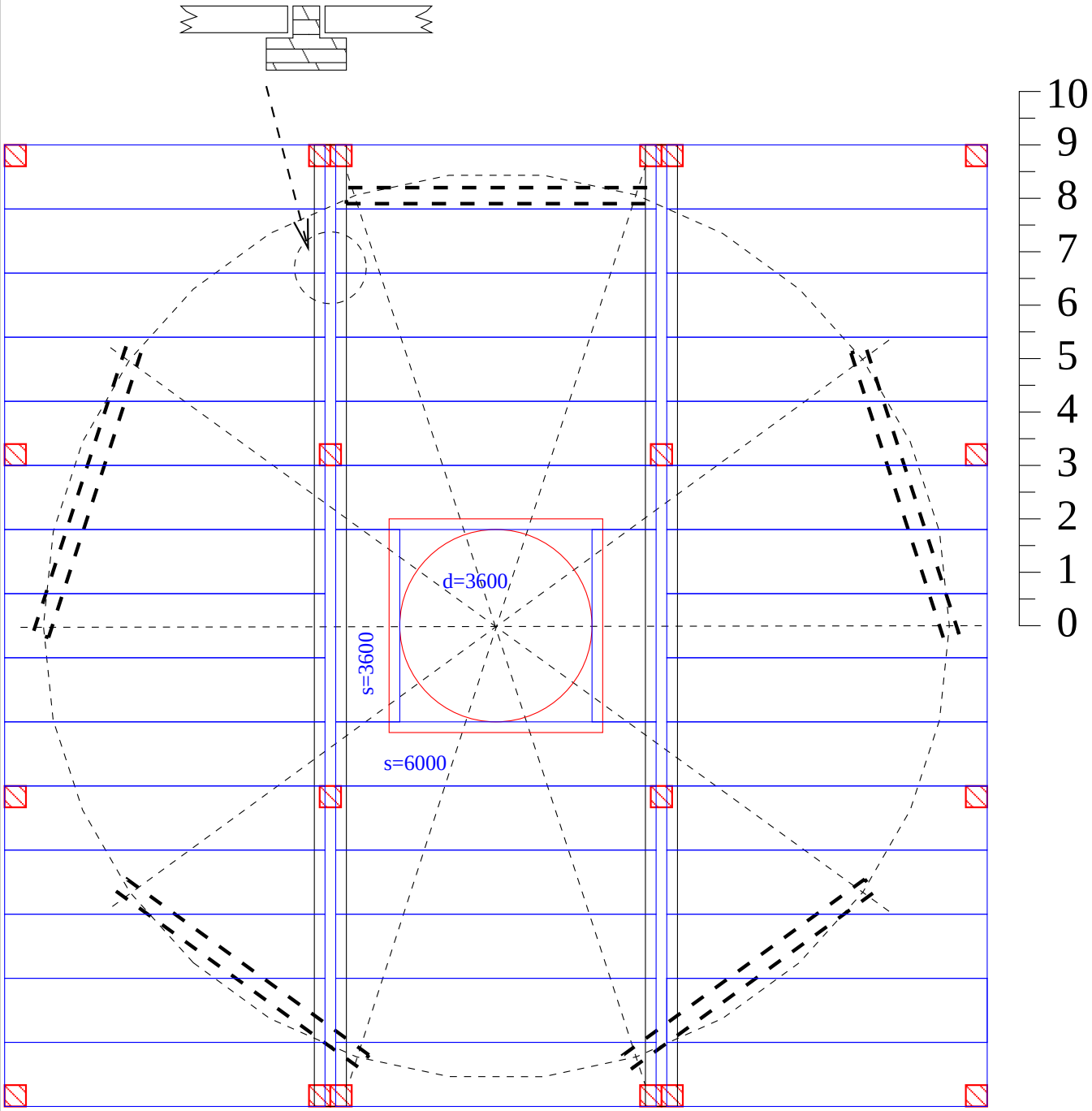


Pre−cast concrete slab mosaics (horizontal), and
two (vertical) support beam lines.
Base pillars (red)

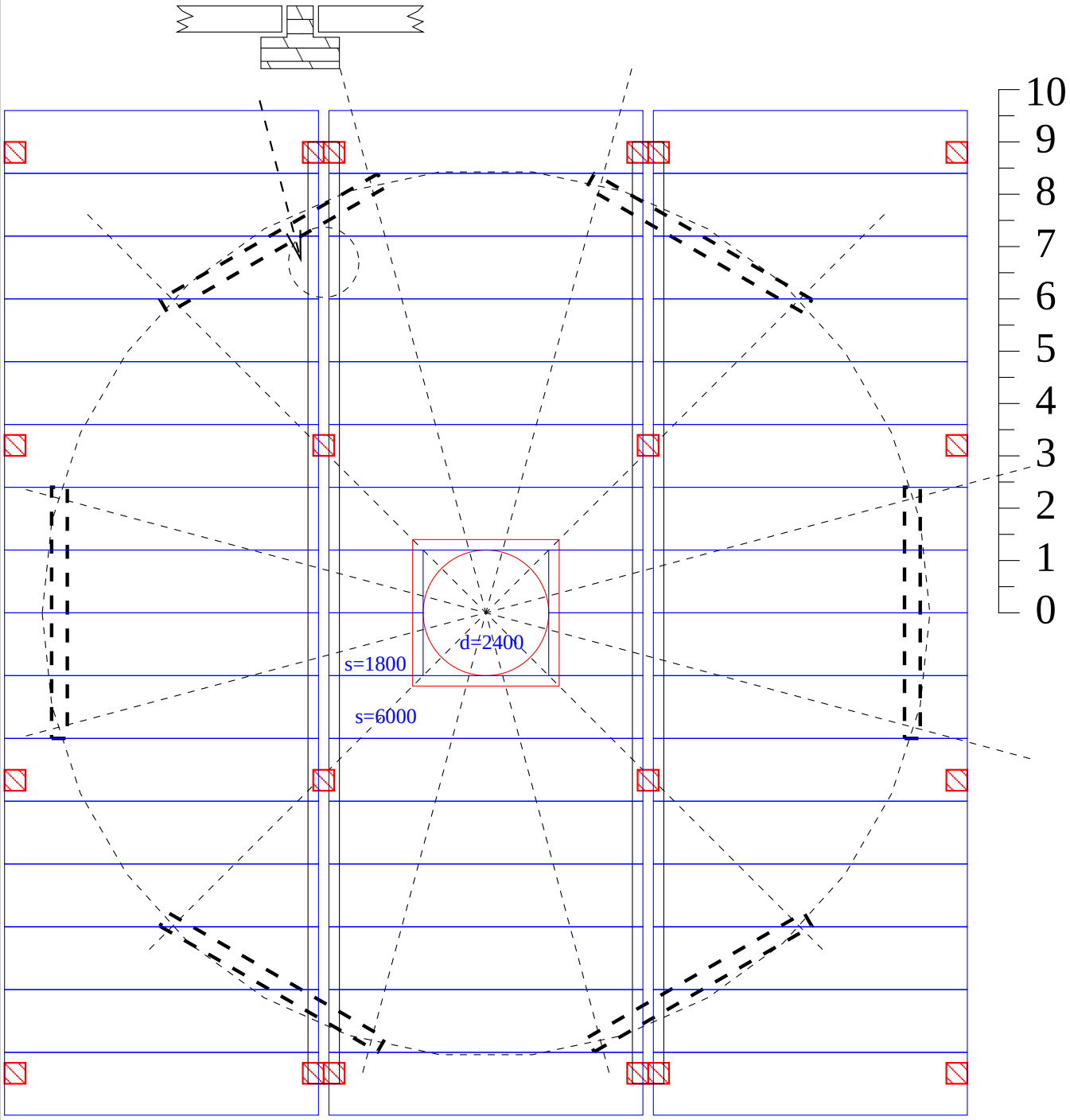


1:100 www.viestikallio.fi −− "Great Pumpkin" Fig25b10

Pre−cast concrete slab mosaics (horizontal), and
two (vertical) support beam lines.
Base pillars (red)

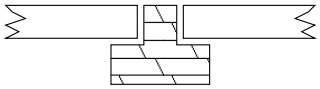


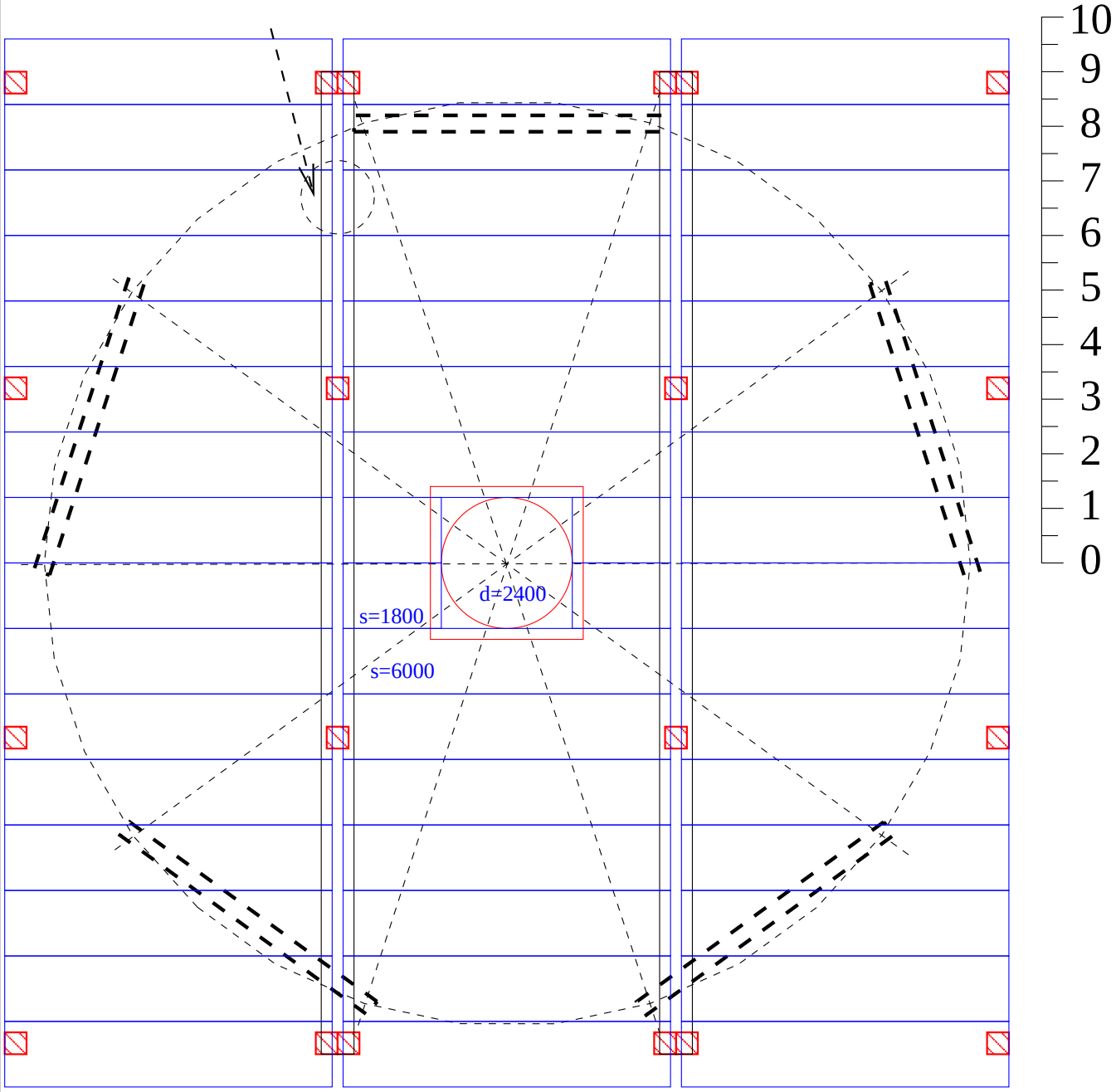
Pre−cast concrete slab mosaics (horizontal), and
two (vertical) support beam lines.
Base pillars (red)



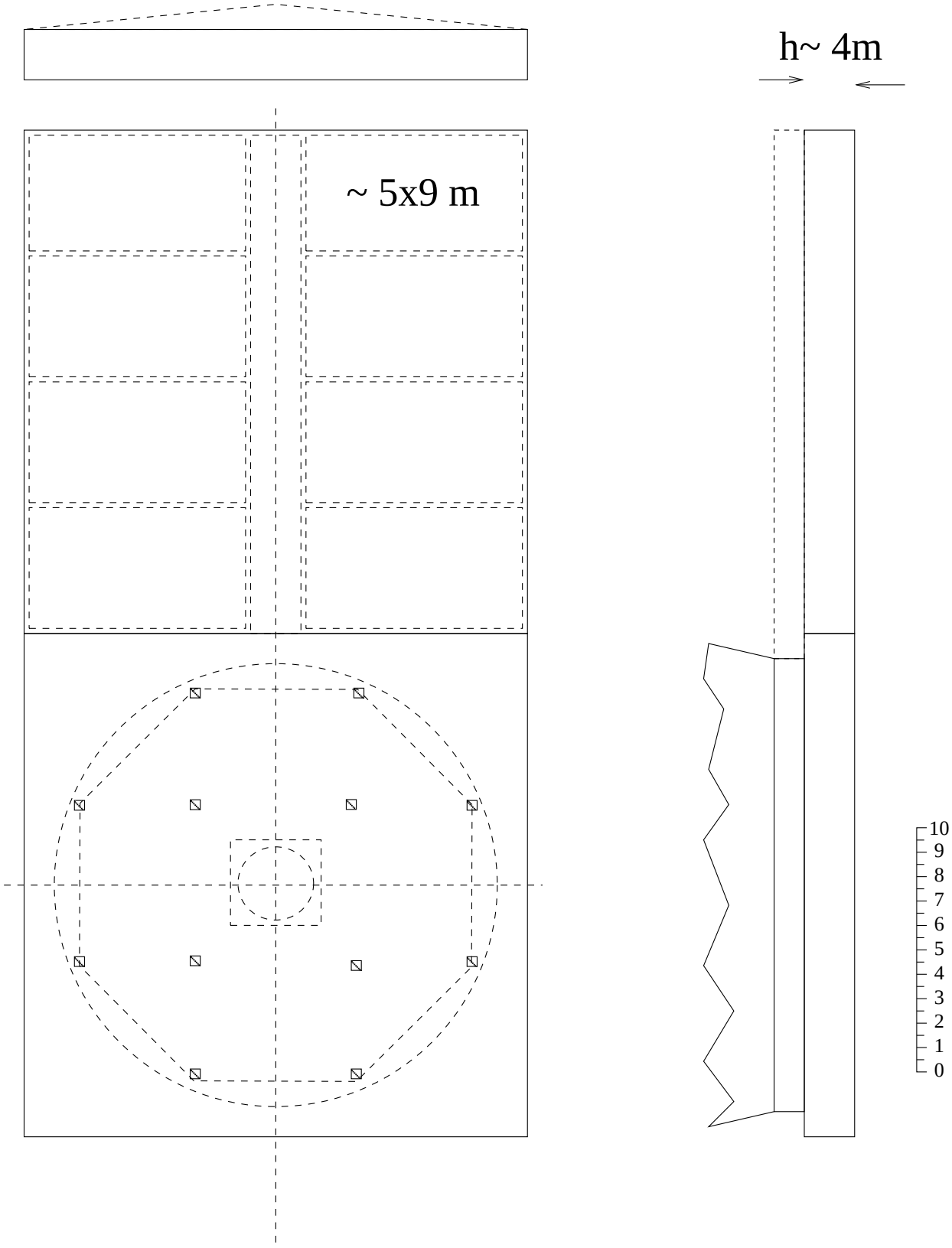
1:100 www.viestikallio.fi −− "Great Pumpkin"Fig25b20

Pre−cast concrete slab mosaics (horizontal), and
two (vertical) support beam lines.
Base pillars (red)

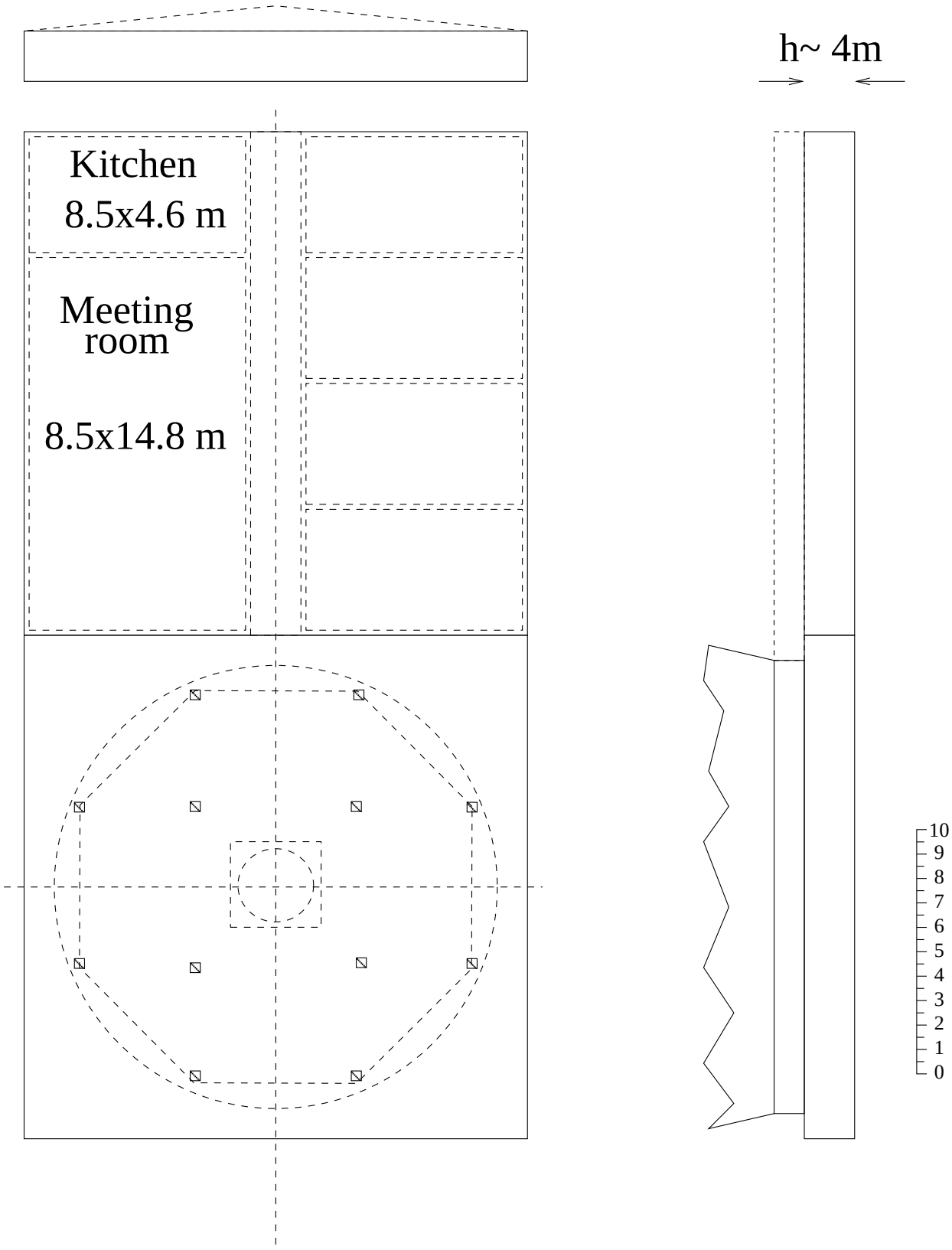




1:200

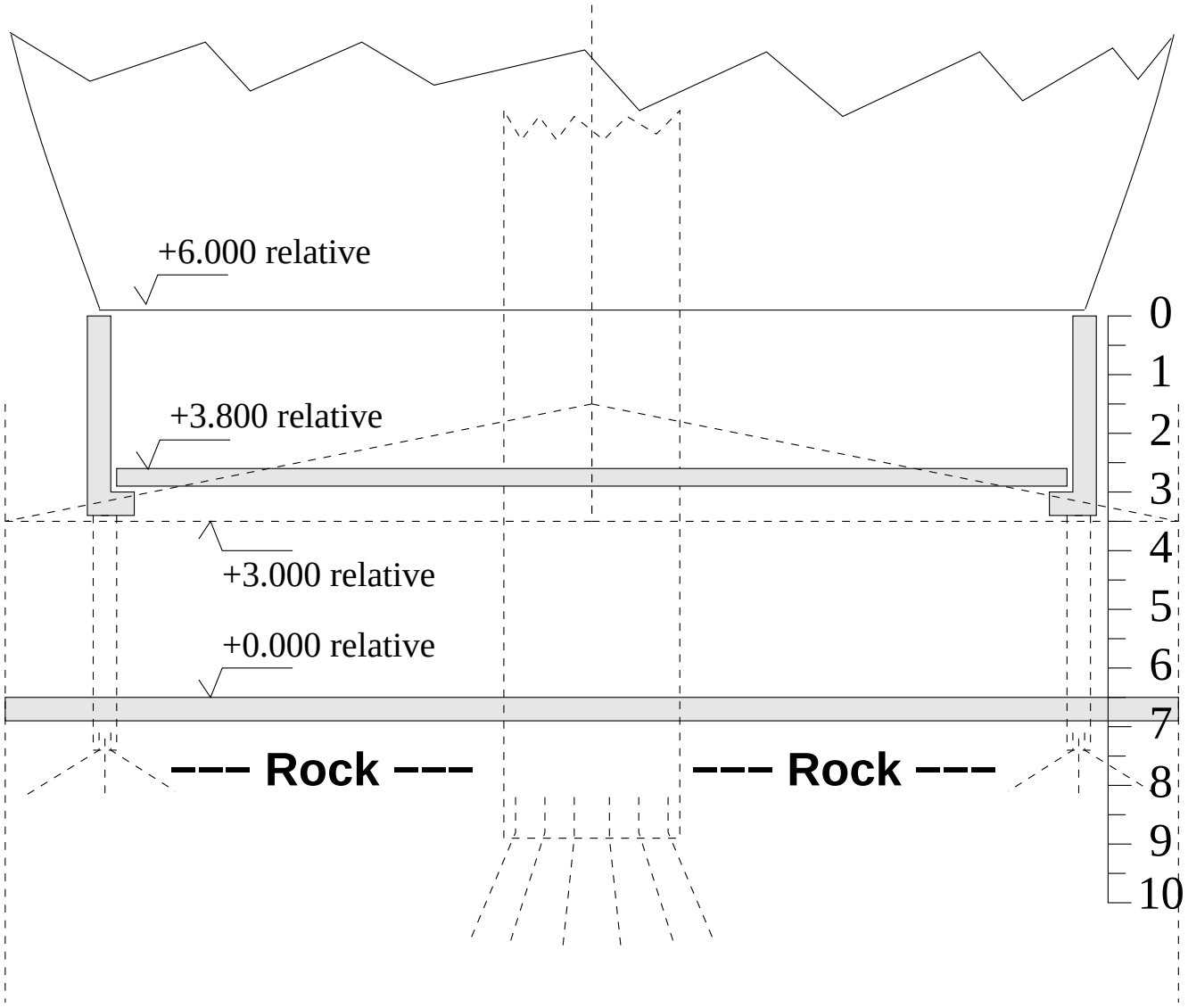


1:200

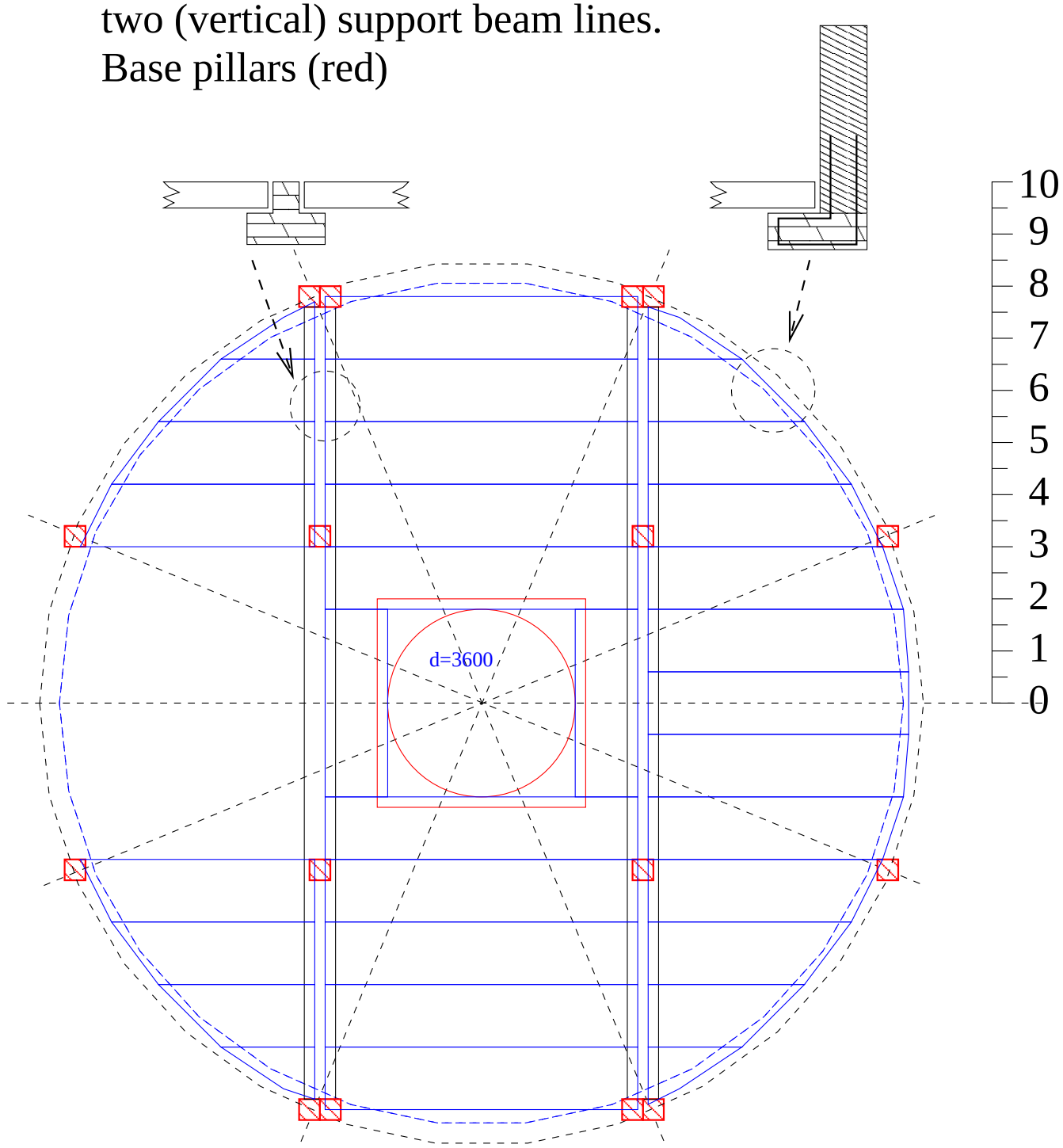


Some guestimates on relative heights

The +0.000 (relative) is the roll−in height from
the adjacent parking area without steps to lift over.

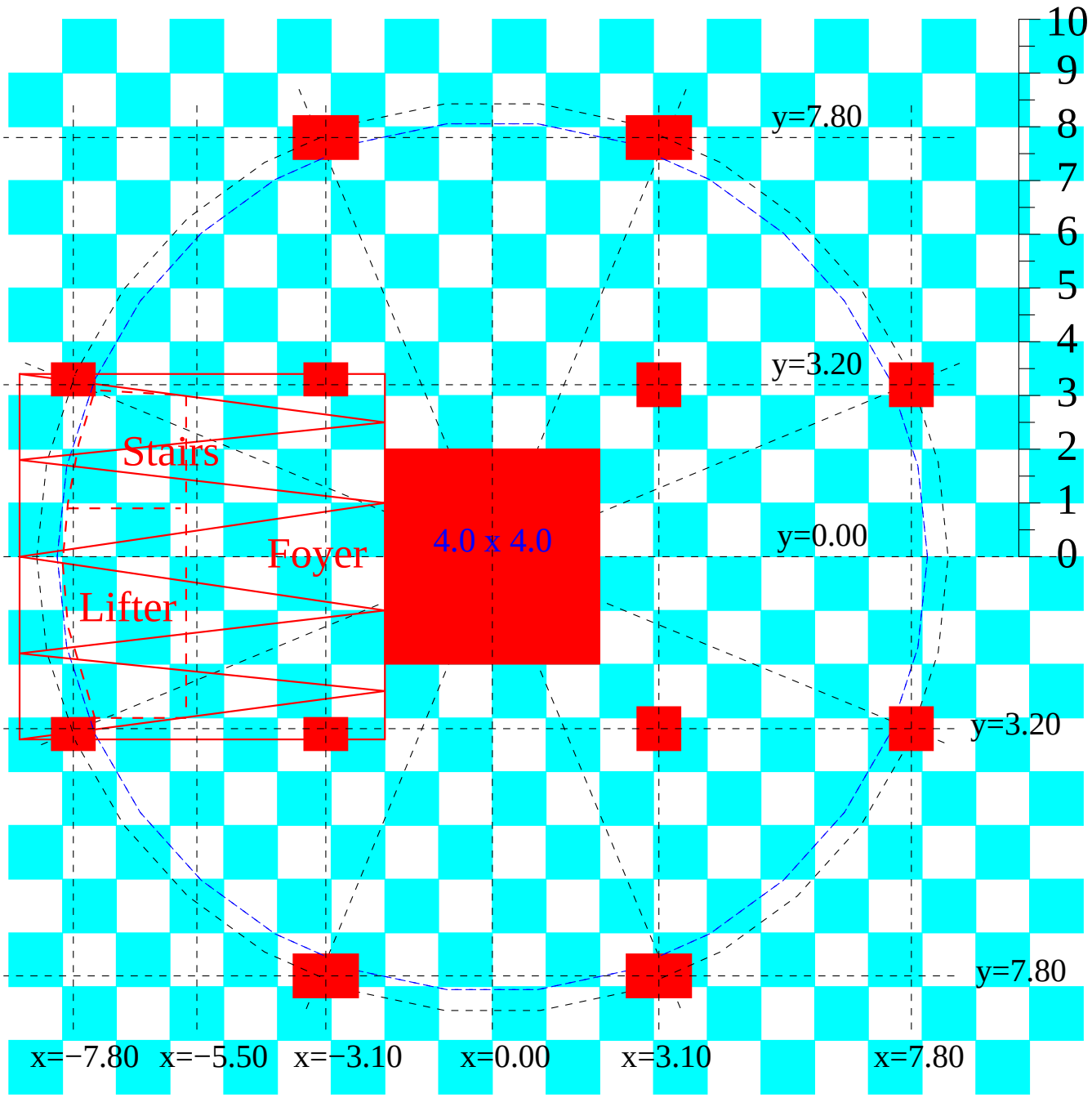


Pre−cast concrete slab mosaics (horizontal), and
two (vertical) support beam lines.
Base pillars (red)



1:100 www.viestikallio.fi −− "Great Pumpkin" Fig31c

Floor−space planning template.
Structural pillars and lift+stairwell reservations
are in RED.
The Cyan/White raster is 1.00 meter



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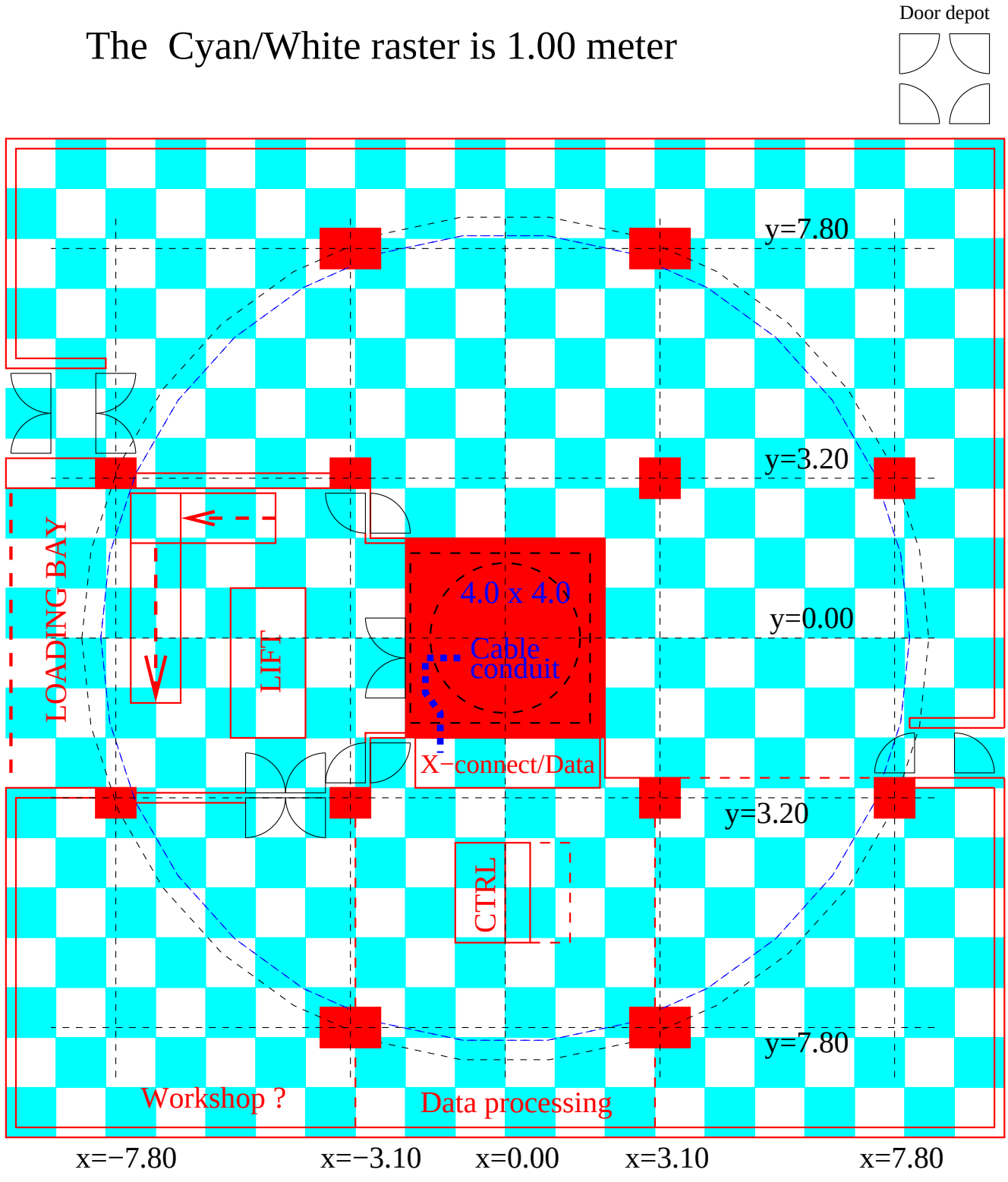
1:100 www.viestikallio.fi −− "Great Pumpkin" Fig31d

Floor−space planning template.
Structural pillars and lift+stairwell reservations
are in RED.

The Cyan/White raster is 1.00 meter

Door depot



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