

FLI structures

FLI Monopoles

FLI design, supply and install a full range of single & dual user monopoles for telecoms and other specialist markets:

DM3 Monopole

DM4 Monopole

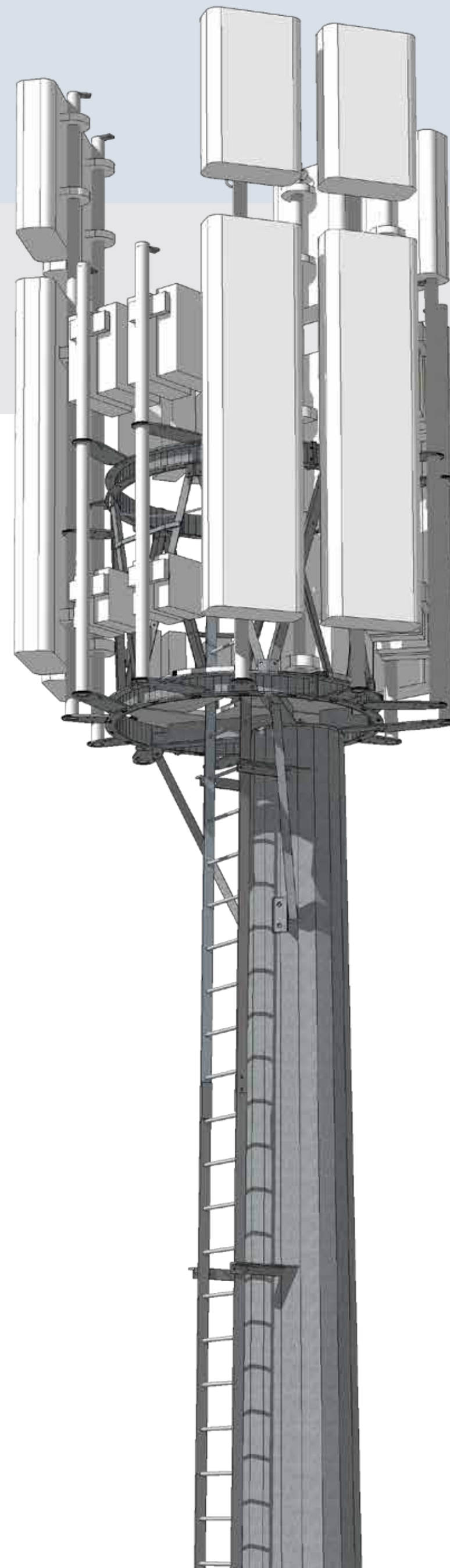
DM5 Monopole

Rocket Monopole

Streetworks Poles

Foundation Options

Planning Drawings



FLI structures

5G Monopoles & Headframes

FLI's monopoles for multi-user 5G antenna loads are available in heights up to 30m, in 5m increments.

Ladders and fall arrest systems are included, plus headframe flooring and latch on points where needed.

Headframe rings are 2.5m \varnothing with single level or dual level options.

A surmounted 1.6m \varnothing headframe is available. It's useful for upgrading existing poles, but is also a solution for new poles. It is completely open internally and so maximises climber comfort and safety.



Sales@fli.co.uk

01452 722200

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Hand Build Monopoles

The 'Rocket' monopole is a hand build CHS pole, designed for locations with poor access for plant.

Once the base section is erected using a HIAB, the mid and upper sections can be lifted into place using a derrick.

Heights from 10m to 20m, in 2.5m increments are available.



Streetworks Poles

FLI produce a range of monopoles and foundations for Streetworks applications and greenfield sites requiring unobtrusive solutions.

Heights from 10m to 25m, in 2.5m increments are available.

Foundation options include roots, concrete raft, single screw piles and grouped screw piles with grillages.

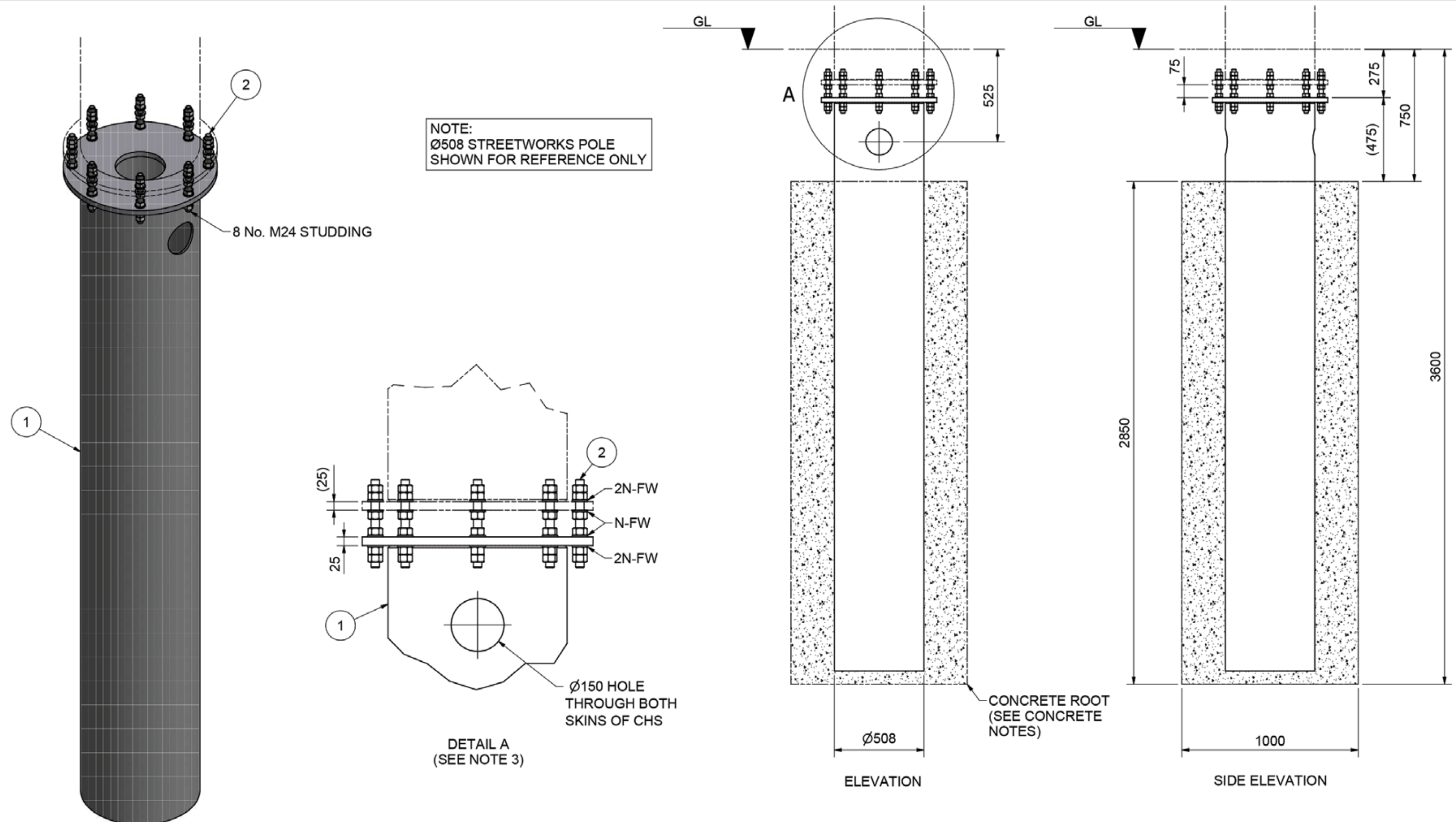


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Root Foundation For Streetworks Poles

Root foundation designs are available, subject to ground conditions. For lower loadings, single screw piles can be used while multiple piles with a grillage support higher loads.

Access hatches are included for cable management.



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Piles & Grillages for Streetworks Poles

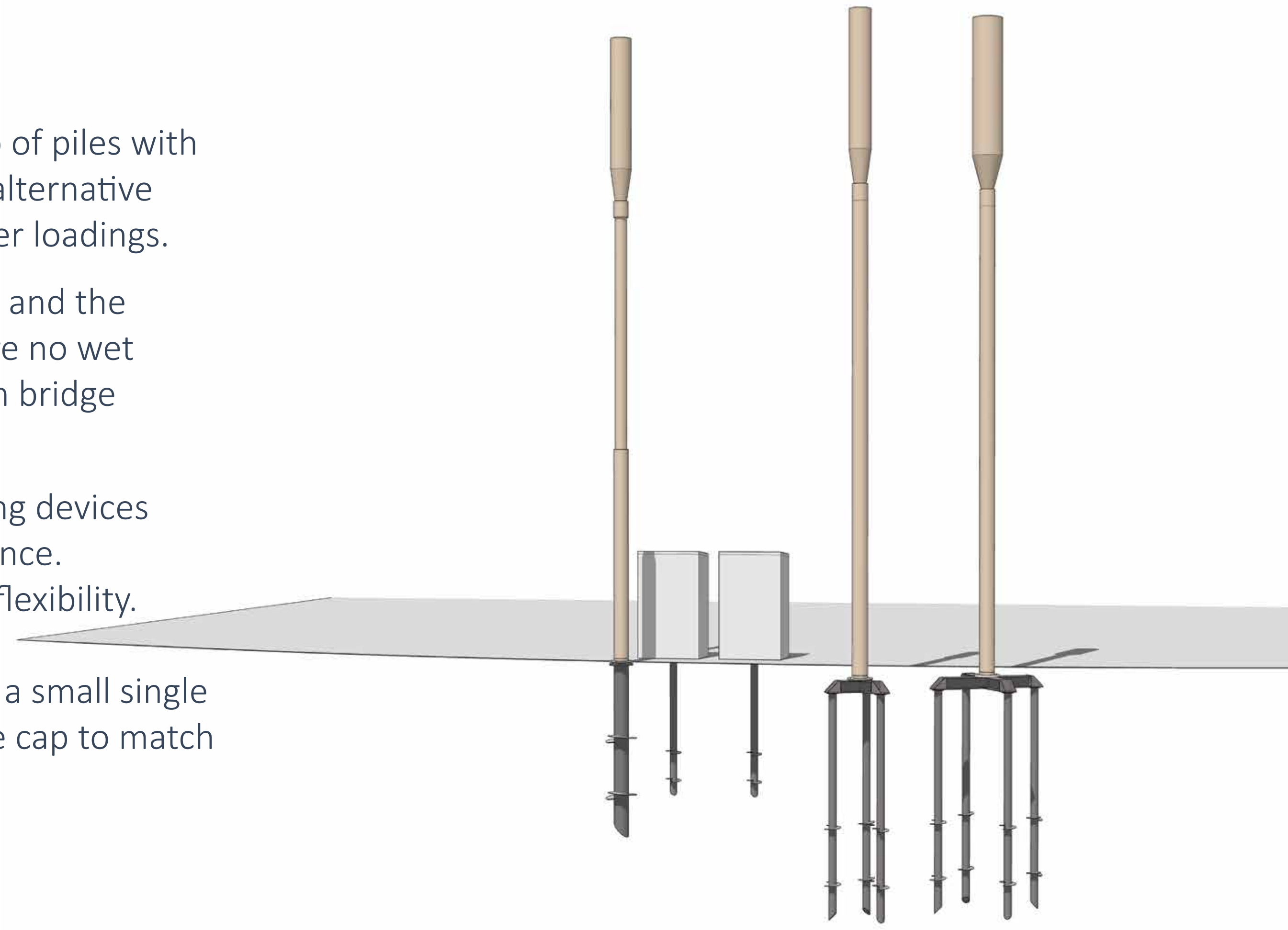


Single screw piles or a group of piles with interface grillages offers an alternative to root foundations for higher loadings.

There is minimal excavation, and the installation is rapid. There are no wet trades and grouped piles can bridge and avoid buried services.

The solutions include levelling devices and account for piling tolerance. There is inherent rotational flexibility.

Cabinets can be installed on a small single screw pile with a single plate cap to match the cabin size.



Piles & Grillage Foundations

Screw pile and grillage foundations are an efficient way to support monopoles and cabinets on embankments and cuttings and on soft made-up ground.

FLI's screw pile and grillage foundations are narrower than their mass concrete equivalent. This enables foundations to be installed within existing site compounds.

Grillages can be designed to span existing concrete bases or bridge buried services.



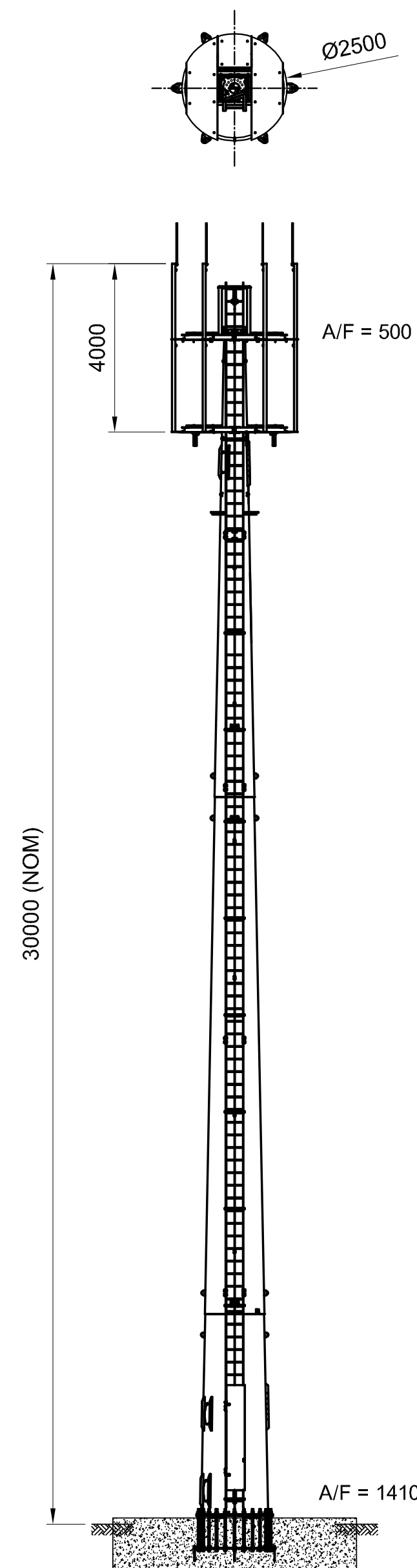
Existing Base- Interface Foot Adapter

New monopoles or existing monopoles with corroded mounting bolts in the foundation, can now be mounted onto an existing concrete foundation with FLI's Elephant Foot interface adapter.

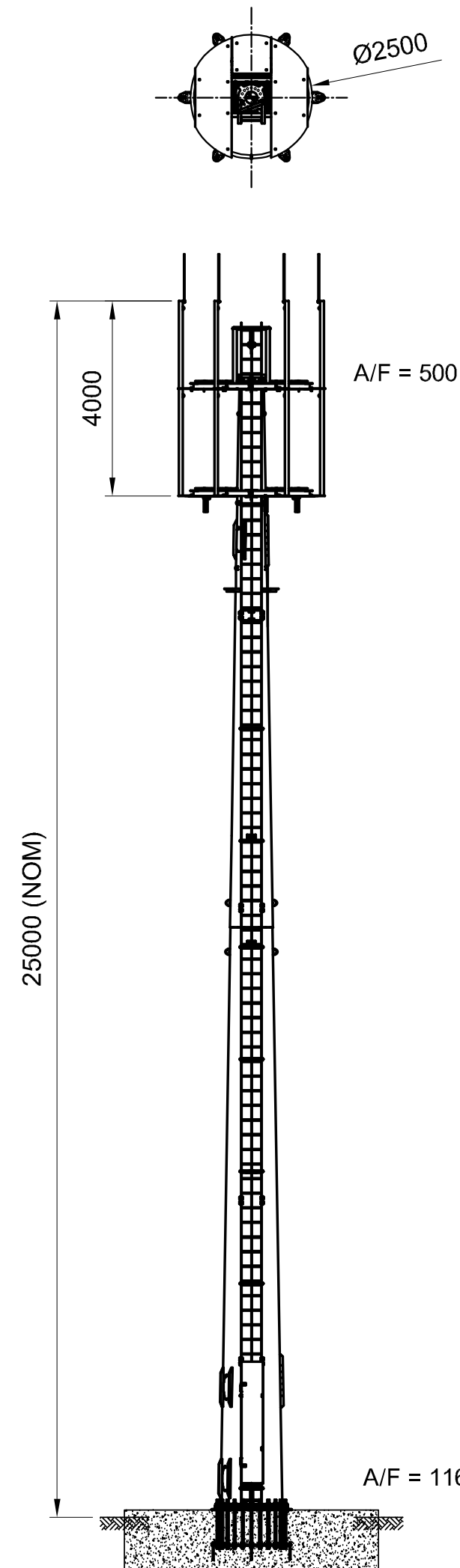
It's a fast and cost-effective site upgrade or remedial bypass solution, which avoids the cost of removing an existing concrete base.



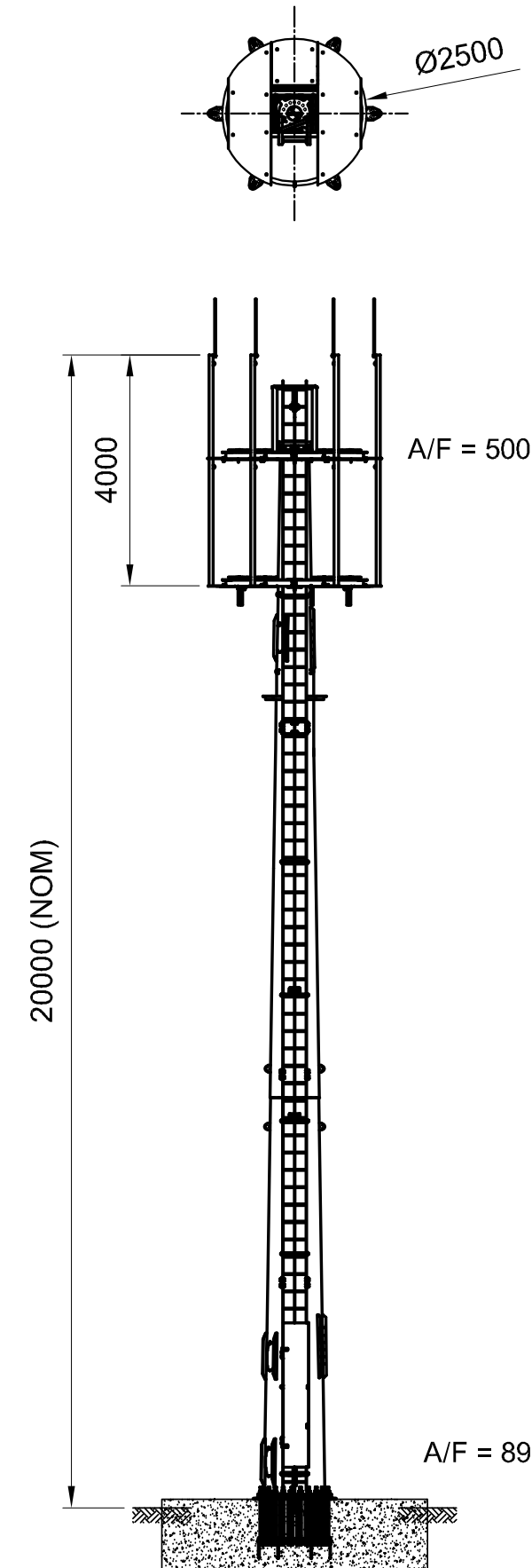
DM3 2 Ring Monopole



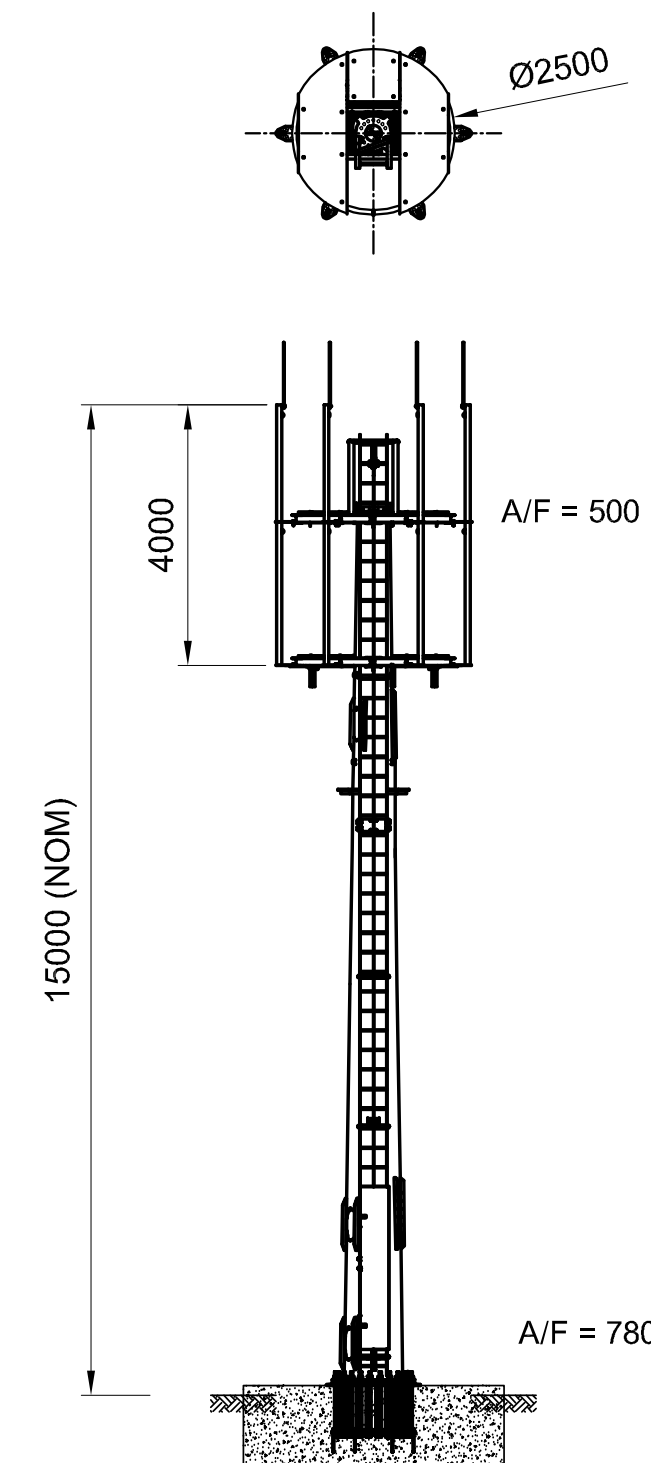
MONOPOLE REFERENCE	FLI-DM3-30
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE =	5.8 x 5.8 x 1.2m DP
MOMENT	1394 kNm
HORIZONTAL SHEAR	70 kN
VERTICAL LOAD	98 kN



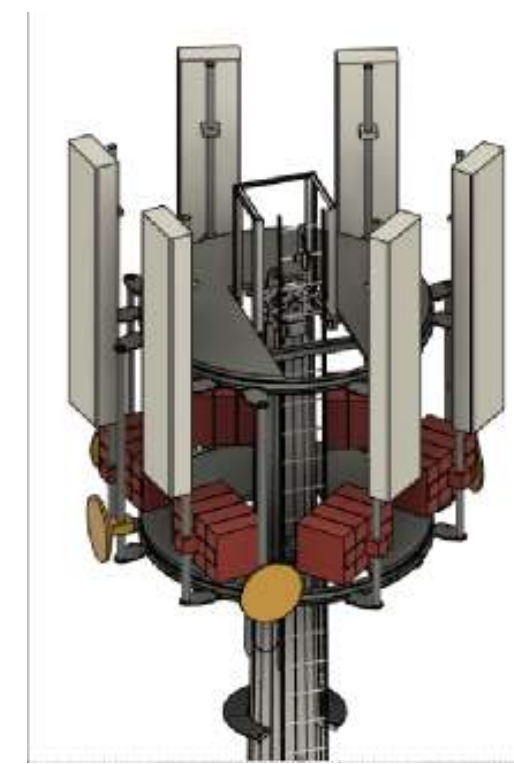
MONOPOLE REFERENCE	FLI-DM3-25
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE =	5.2 x 5.2 x 1.2m DP
MOMENT	1015 kNm
HORIZONTAL SHEAR	59 kN
VERTICAL LOAD	71 kN



MONOPOLE REFERENCE	FLI-DM3-20
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE =	4.6 x 4.6 x 1.2m DP
MOMENT	689 kNm
HORIZONTAL SHEAR	48 kN
VERTICAL LOAD	54 kN



MONOPOLE REFERENCE	FLI-DM3-15
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE =	4.0 x 4.0 x 1.2m DP
MOMENT	437 kNm
HORIZONTAL SHEAR	40 kN
VERTICAL LOAD	44 kN



TYPICAL 3D VIEW OF
Ø2.5m RING HEADFRAME

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MATERIAL:- GRADE AS PER FLI LTD FORM 11G
FINISH:- GALVANISED TO BS EN ISO 1461
DIMENSIONS:- MILLIMETRES (mm)
WELD INSP:- AS PER NISS LATEST EDITION ANNEX 'B'
TOLERANCES:-
CUT LENGTH = ±2mm
HOLE CENTRES = ±2mm
ANGULAR CUT = ±0.25°
FABRICATED ASSY = ±3mm
PCD = ±1mm

CERTIFIED TO EXECUTION CLASS EXC2
NON PRELOADED BOLTING ASSEMBLIES TO BS EN 15048-1

- NOTES:-
- Design Codes
- The Institution of Lighting Engineers, PLG 07 (2013) High Masts for Lighting & CCTV- 2000 Edition.
 - BS EN 1991-1-4
 - BS EN 1993-1 (Holding Down Bolts)

Capacity:
EACH HEADFRAMES:
6 No. 3.3m Apertures, 550mm wide X 350mm deep (comprising 2.2m passive antenna (4G) and an adjacent 1.1m active antenna (5G) mounted on yoke arm.
24 No. RRU, 12 MHA, 6 No. Active Routers, 6 No. BoBs
Located at o/all monopole height -2.5m
5 No. Ø600 DRL
24 LDF 5-50 Feeders, 5 Beldon internal & 6 Fibre / Power feeders.

Environmental Loading Parameters:
Windspeed: 24.4m/s 10 Minute Mean
Altitude: 175m
Terrain Category: Country
Distance from sea: 10 km
Return Period: 50 years ULS & SLS

No orographic features considered

Partial Factors:
Partial safety factor on wind speed γ_w : 1.6
Partial safety factor on design strength: γ_m : 1.2 (Shaft & base plate)
 γ_m : 1.3 (Holding down bolts)

Serviceability Requirements:
Maximum rotation of dishes <0.85°
Maximum rotation of antenna <0.85°

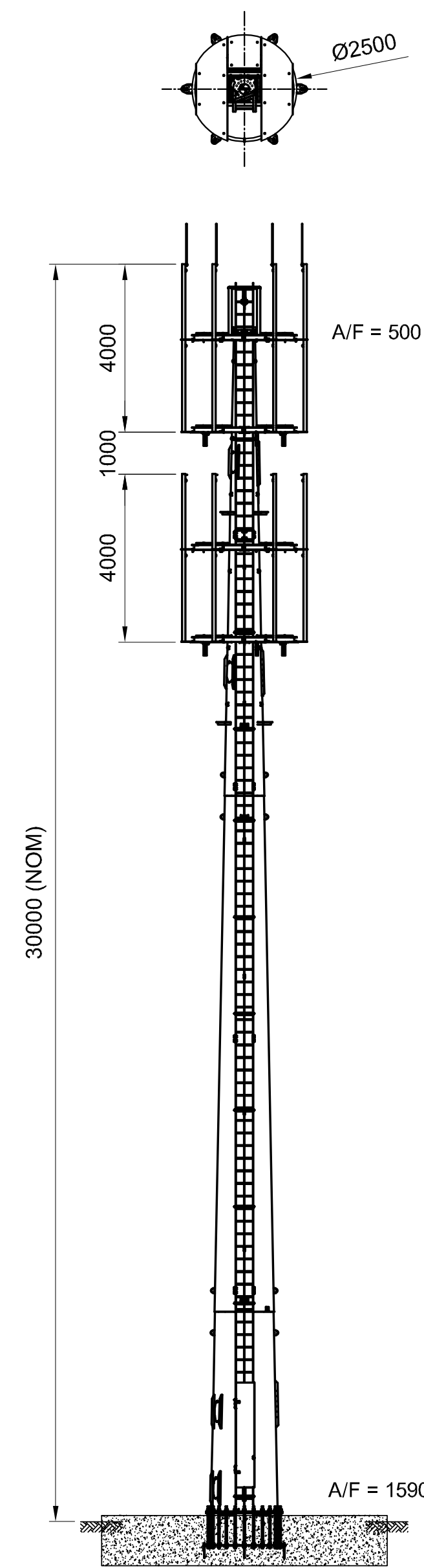
Material Specification:
All plates BS EN 10025 S355JR or Better
Plates 20mm thick and above to be S355J2 or Better.

A	24/04/24	FIRST ISSUE	BP
ISSUE	DATE	MODIFICATION	CKD

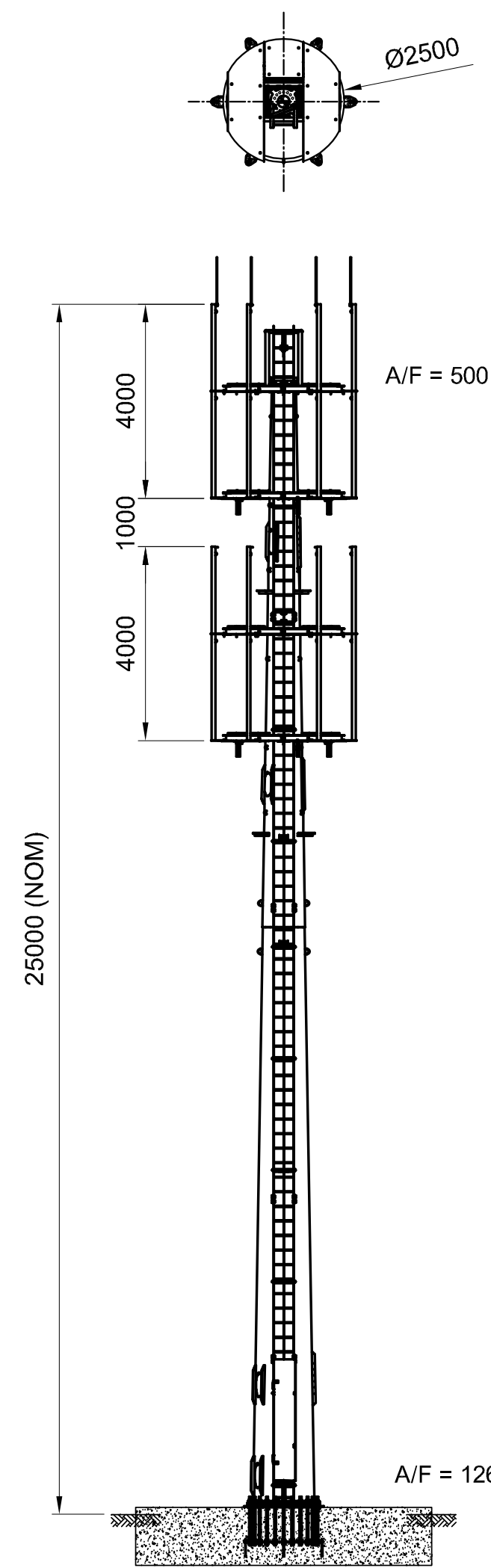
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DATE: 24/04/24	SCALE: N.T.S	F&L REF: N/A
DRN: BP	CKD: EC	APP'D: BP
CUSTOMER: FLI		
ORDER No. -----		
TITLE PLANNING DRWING FOR DM3 HEADFRAME 5G MONOPOLE. HEIGHTS = 30m, 25m, 20m & 15m (HEADFRAME DIA 2.5m)		
DRG No. SK4552		REV A

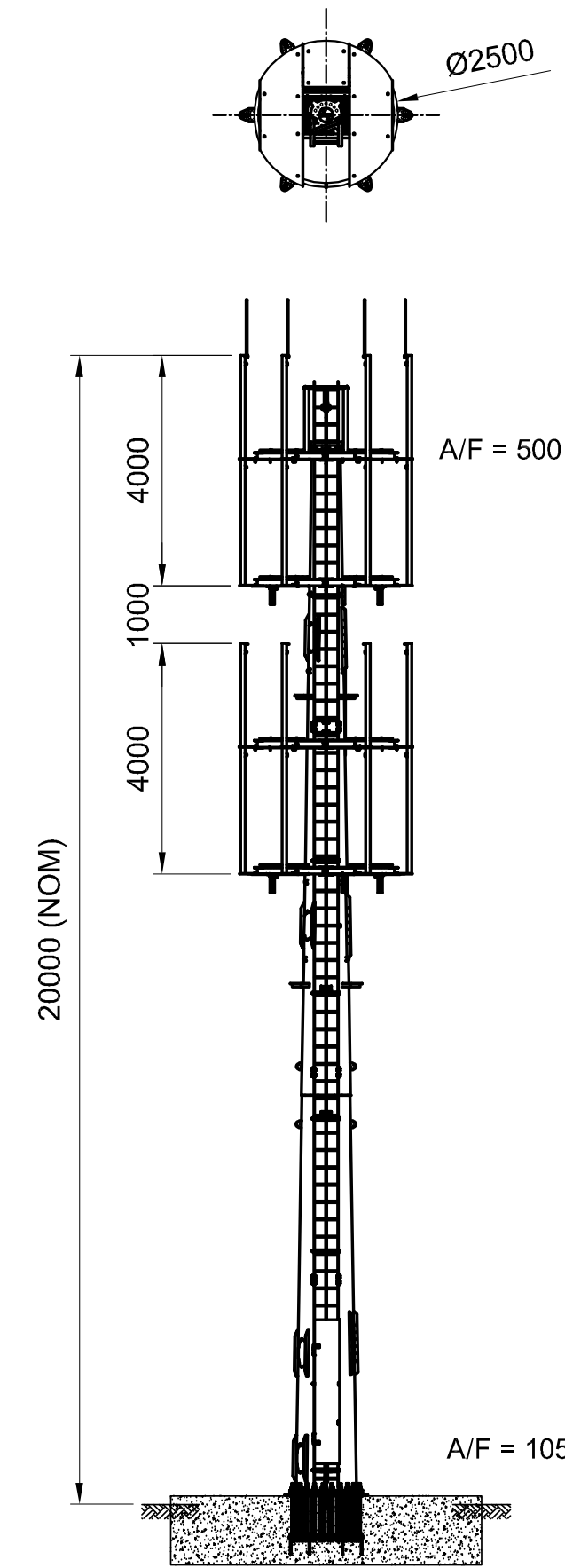
DM4 Dual Headframe Monopole



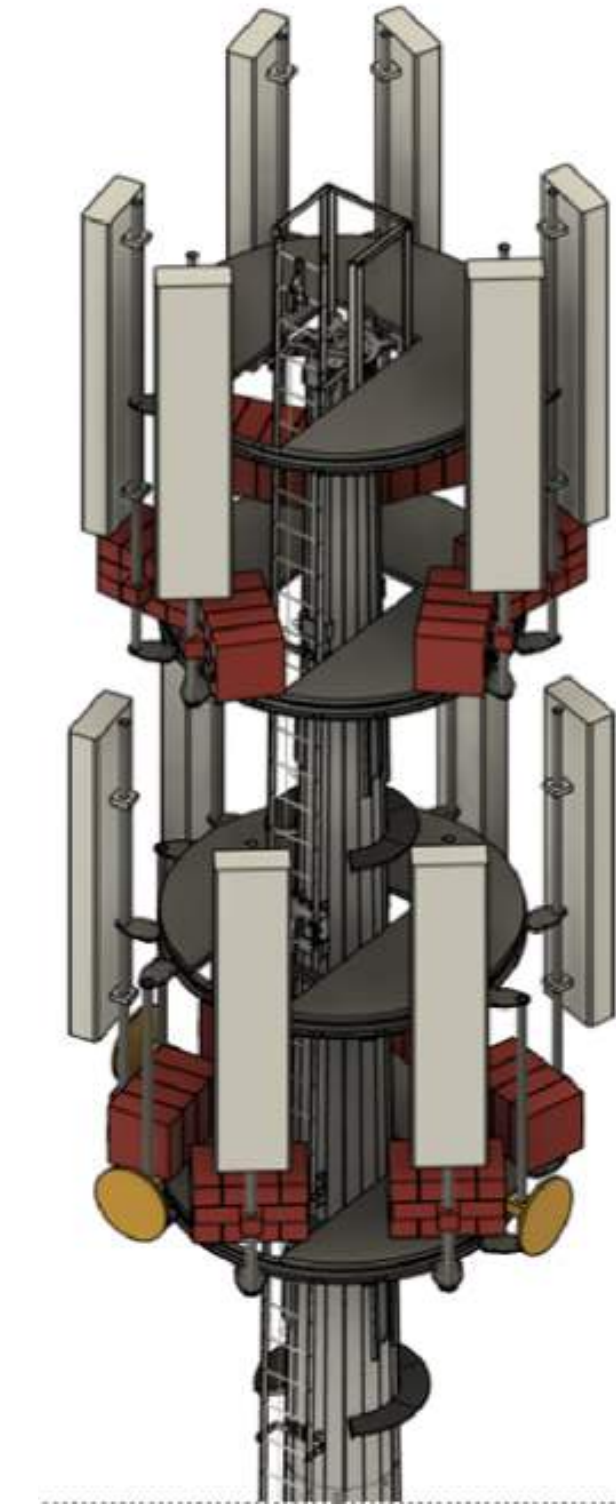
MONOPOLE REFERENCE	FLI-DM4-30
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE = 6.8 x 6.8 x 1.2m DP	
MOMENT	2289 kNm
HORIZONTAL SHEAR	110 kN
VERTICAL LOAD	147 kN



MONOPOLE REFERENCE	FLI-DM4-25
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE = 6.1 x 6.1 x 1.2m DP	
MOMENT	1680 kNm
HORIZONTAL SHEAR	95 kN
VERTICAL LOAD	125 kN



MONOPOLE REFERENCE	FLI-DM4-20
UN-FACTORED FORCES AT TOP OF BASE	
FOUNDATION SIZE = 5.4 x 5.4 x 1.2m DP	
MOMENT	1144 kNm
HORIZONTAL SHEAR	82 kN
VERTICAL LOAD	101 kN



TYPICAL 3D VIEW OF Ø2.5m RING HEADFRAME AT 2 LEVELS

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 HOLE CENTRES = ±2mm
 ANGULAR CUT = ±0.25°
 FABRICATED ASSY = ±3mm
 PCD = ±1mm

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 NON PRELOADED BOLTING ASSEMBLIES TO BS EN 15048-1

NOTES:-
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No orographic features considered

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 Partial safety factor on design strength:
 γ_m : 1.2 (Shaft & base plate)
 γ_m : 1.3 (Holding down bolts)

Serviceability Requirements:
 Maximum rotation of dishes <0.85°
 Maximum rotation of antenna <0.85°

Material Specification:
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ISSUE	DATE	MODIFICATION	CKD
A	24/04/24	FIRST ISSUE	BP



DATE: 24/04/24	SCALE: N.T.S	F&L REF: N/A
DRN: BP	CKD: EC	APP'D: BP

CUSTOMER: FLI

ORDER No. -----

TITLE: PLANNING DRAWING FOR DM4 DUAL HEADFRAME 5G MONOPOLE. HEIGHTS 30m, 25m & 20m. (HEADFRAME DIA 2.5m)

DRG No. SK4553 REV. A

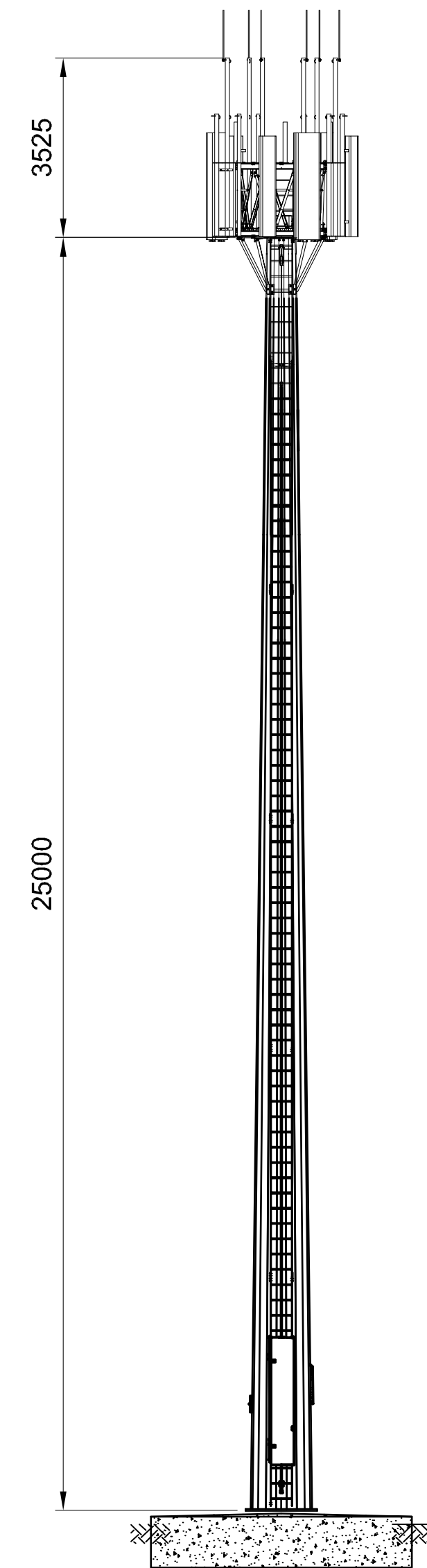
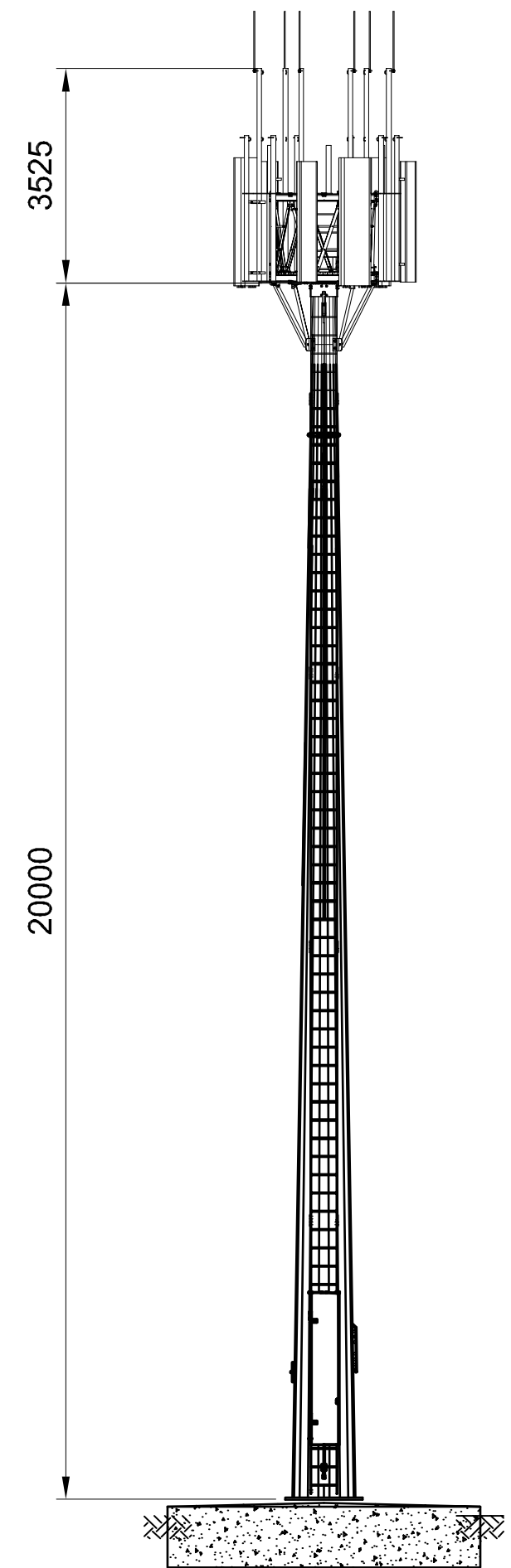
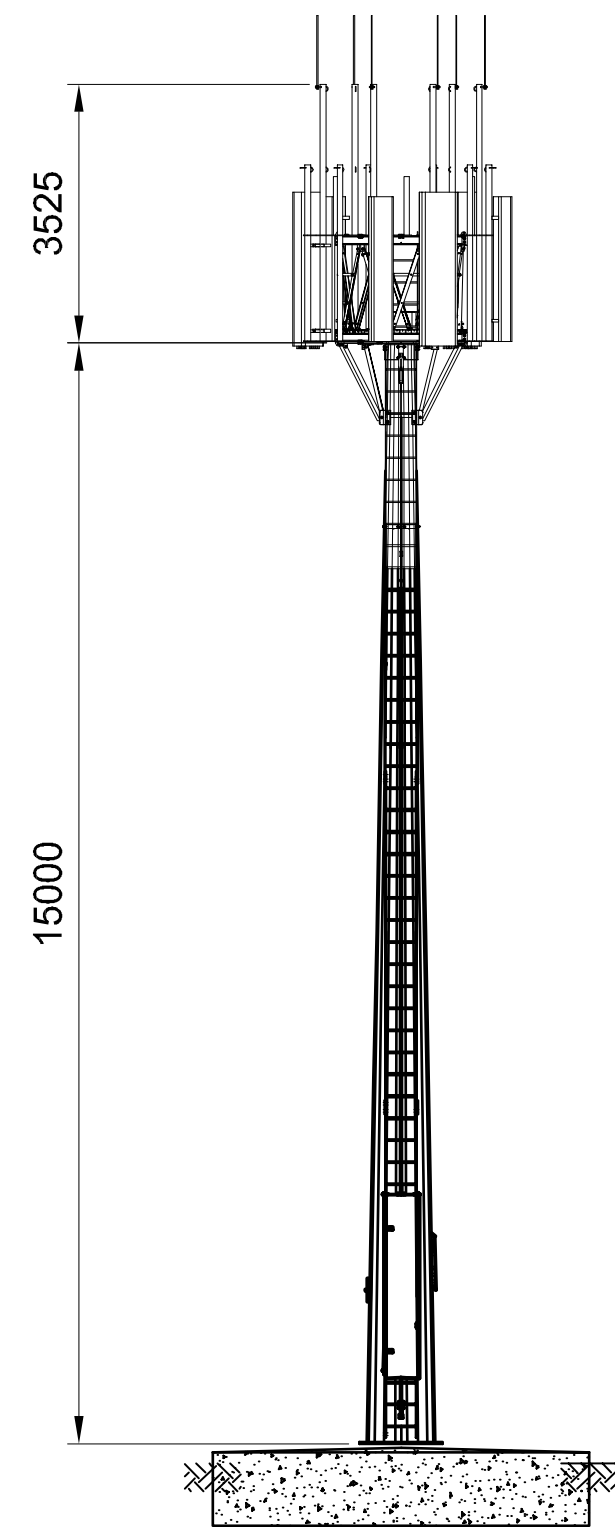
DM5 Monopole


Slimmer pole

Surmounted
headframe

Lighter structure

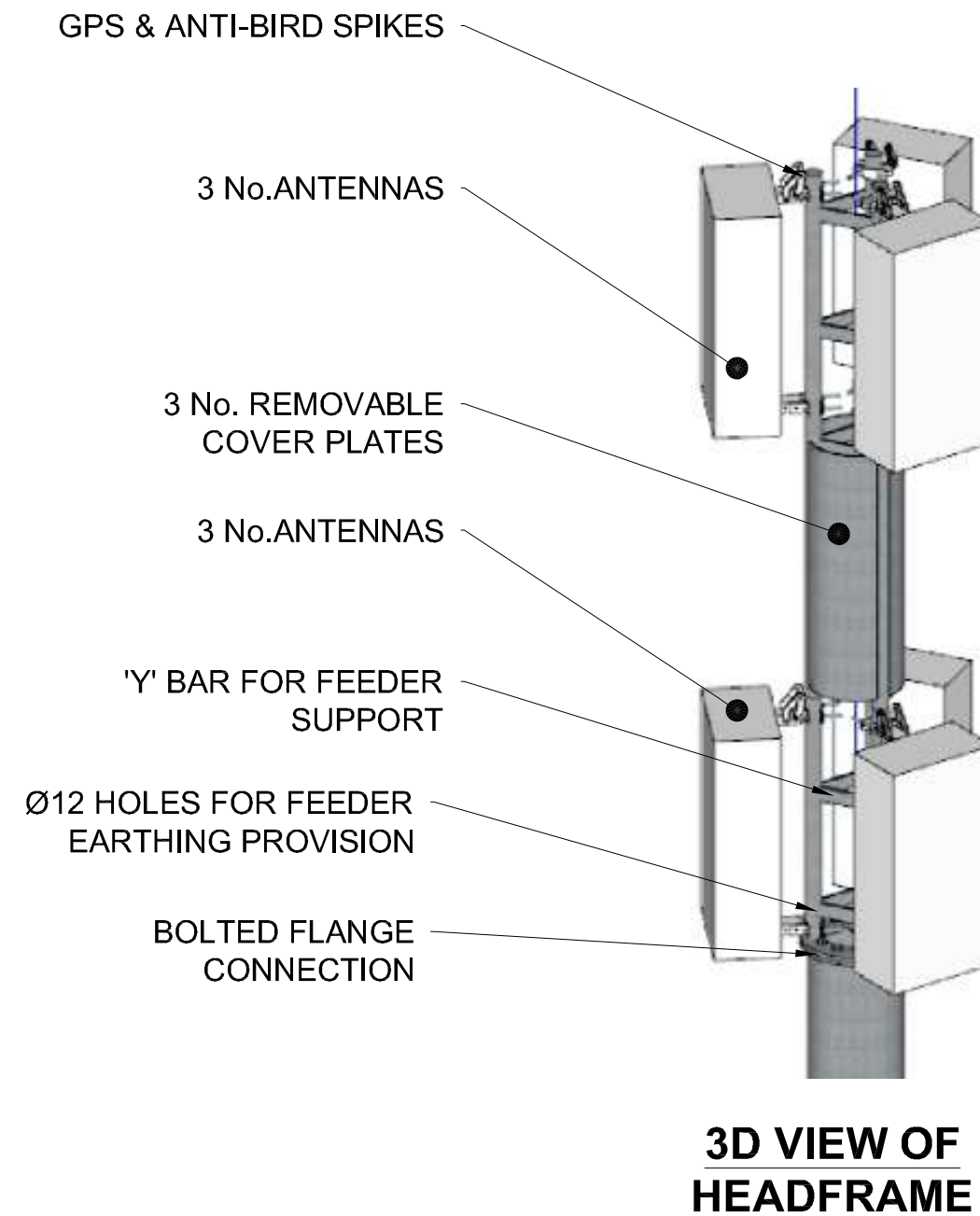
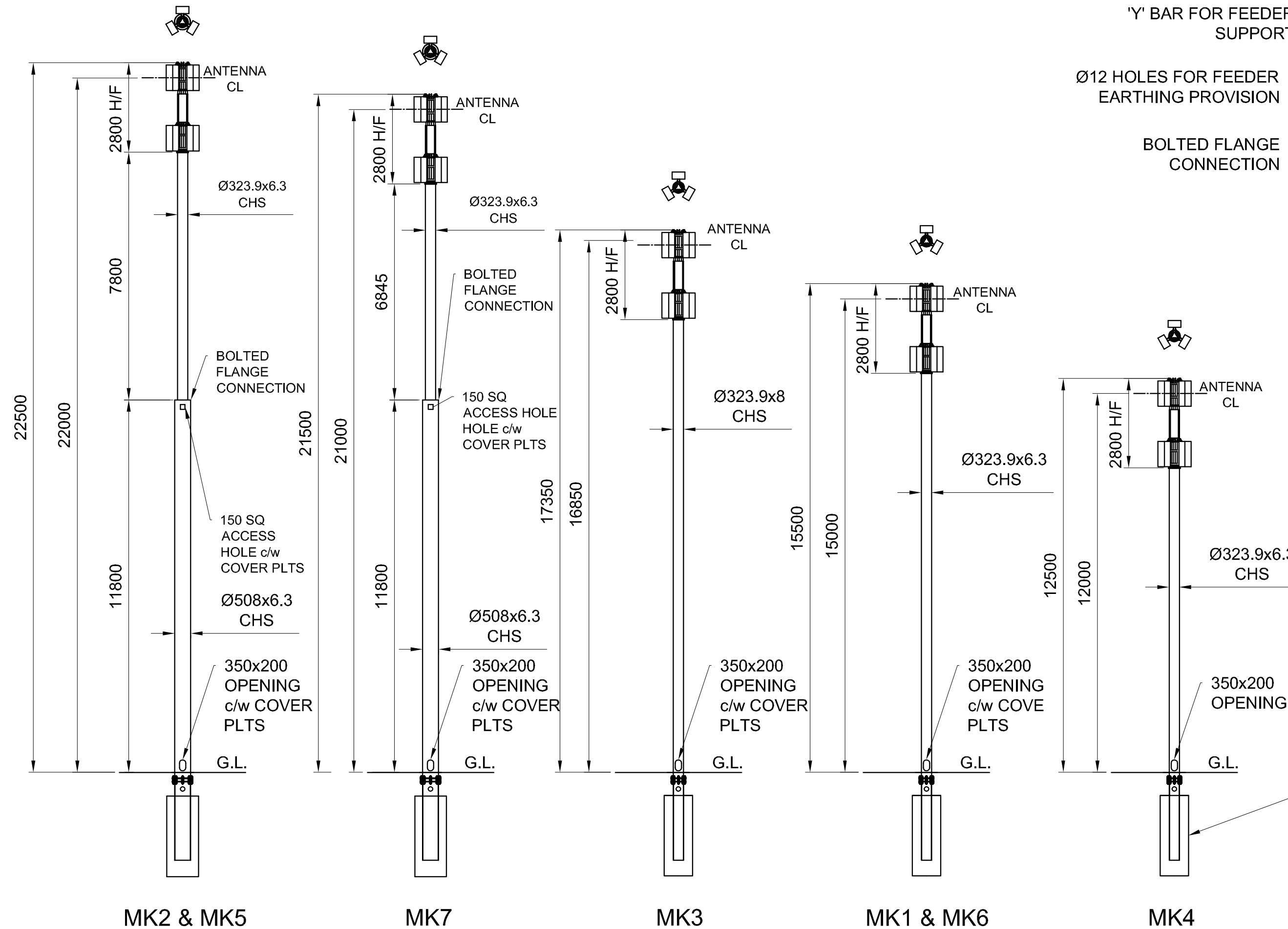
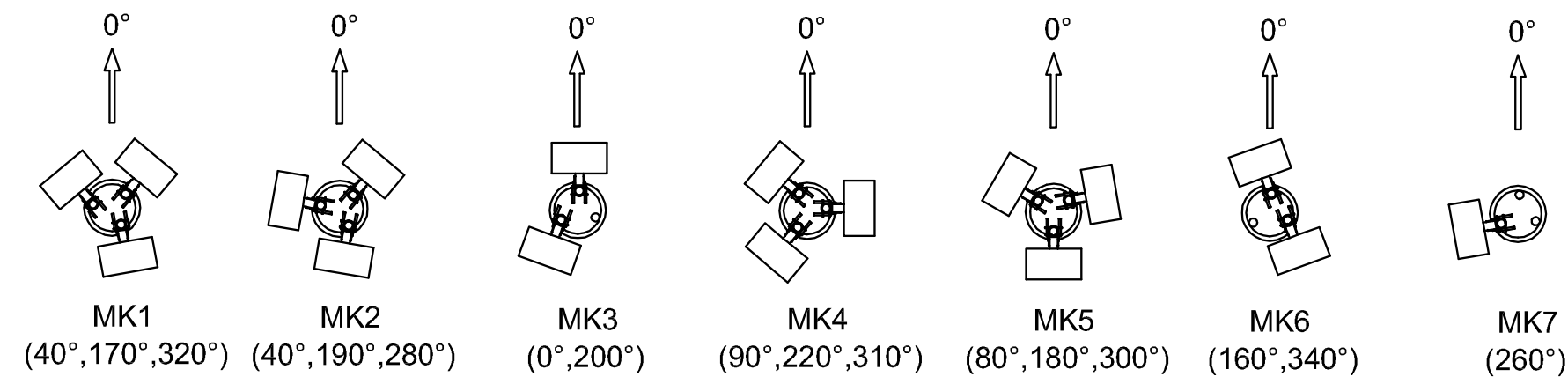
Lower cost



				UNLESS OTHERWISE STATED MATERIAL:- GRADES AS PER FLI LTD FORM 11G FINISH:- GALVANISED TO BS EN ISO 1461 DIMENSIONS:- MILLIMETRES (mm) TOLERANCES:- AS PER FLI LTD - FORM 15D WELD INSP: AS PER NSSS LATEST EDITION ANNEX 'B' CERTIFIED TO EXECUTION CLASS EXC2 NON PRELOADED BOLTING ASSEMBLIES TO BS EN 15048-1			 <small>FRANCIS & LEWIS INTERNATIONAL LTD TEL: +44 (0)1452 722200 WEB: WWW.FLI.CO.UK</small>			CUSTOMER FLI		
										ORDER No. -----		
							TITLE					
							PLANNING DRAWING FOR 15m, 20m & 25m MONOPOLE c/w UNILATERAL HEADFRAME					
A	07/04/22	FIRST ISSUE	BP									
ISSUE	DATE	MODIFICATION	CKD	F&L REF: -----	DATE: 07/04/22	SCALE: N.T.S	DRN: BP	CKD: TP	APP'D: BP	DRG No. SK4324	REV. A	

ORIGINAL SIZE A3

Streetworks Monopole



3D VIEW OF HEADFRAME

FOR FOUNDATION DETAILS REFER TO DRAWING No. SK4104

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 FABRICATED ASSY = ±3mm
 PCD = ±1mm

CERTIFIED TO EXECUTION CLASS EXC2

NON PRELOADED BOLTING ASSEMBLIES TO BS EN 15048-1

NOTES:-

The structures have been designed for the site specific environmental conditions of Milton Keynes.

These are a 10 minute wind speed of 21.6m/s, a site altitude of 100m and >100km from the sea.

Where necessary the precise altitudes of the sites were taken. The antenna and headframe have been modelled as a group and added to the mathematical model of the monopole.

The monopoles have been configured as parallel structures, with a step in the taller 2 poles.

A set of removable cover plates have been included between the antenna zones as requested.

Provision will be made at the top of the headframe for 2x GPS antennas and anti-bird spikes.

The exact mounting method is not yet confirmed as the GPS antennas need to be determined.

Cables are routed within the pole but can be accessed by a hatch at the bottom of the monopole, and fed into the bottom of the monopole via the root and underground ducting.

A	11/06/20	FIRST ISSUE	BP
ISSUE	DATE	MODIFICATION	CKD

FLI structures

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DRN: BP	CKD: HN	APP'D: TCB
CUSTOMER		
ORDER No. -----		
TITLE		
DRG No. SK4103	REV. A	