

Lismullin Iron Age Enclosure



Rathlugh

Lismullin

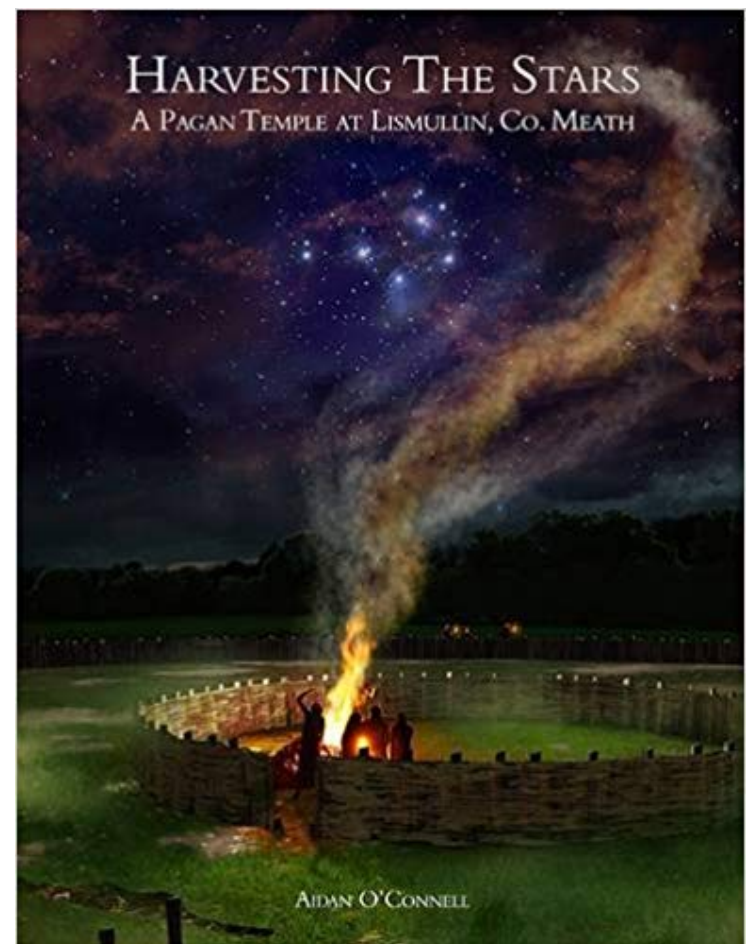
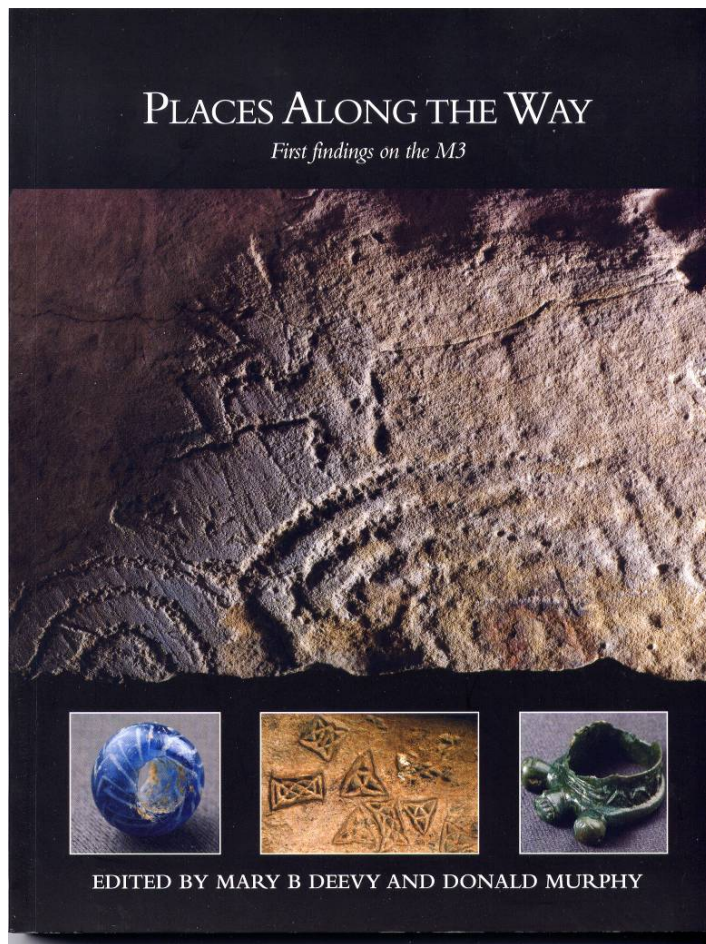
River Gabhra

Sophia Centre Summer School
UWTSD Lampeter June 2019

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w. <https://arrow.dit.ie/authors.html>







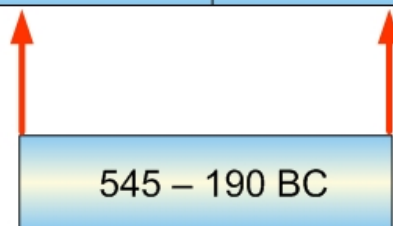
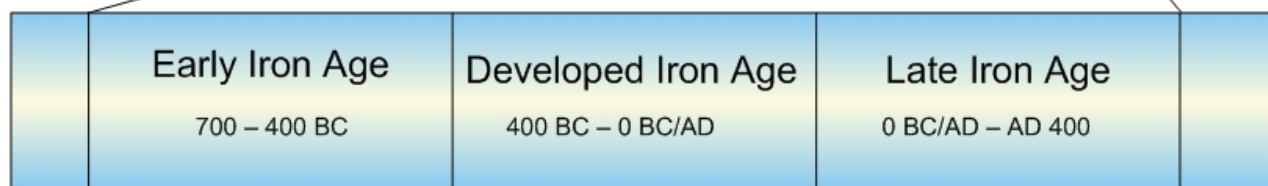
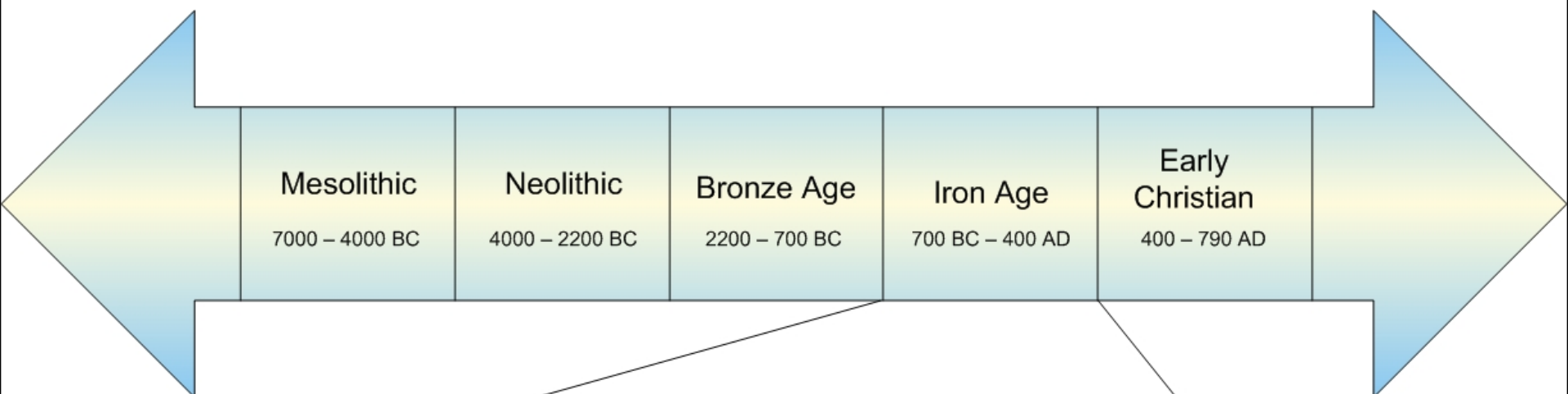
References (& at <https://arrow.dit.ie/authors.html>)

Deevy, M. B. & Murphy, D. (Eds.) (2009) *Places Along the Way: First findings on the M3*. Dublin: The National Roads Authority.

O'Connell, A. (2009) 'Director's first findings from excavations at Lismullin 1'. In Deevy, M. B. & Murphy, D. (Eds.) *Places Along the Way: First findings on the M3 NRA Scheme Monograph 5*. Dublin: The National Roads Authority.

Prendergast, F. (2013) 'An Iron Age Enclosure at Lismullin: Morphology, metrology and archaeoastronomy'. In O'Sullivan, M., Cunliffe, B., et al. (Eds.) *Tara from the Past to the Future*

Prendergast, F. (2013.) "The Lismullin Enclosure—a designed ritual space." In *Harvesting the stars: a pagan temple at Lismullin, Co. Meath*. NRA Scheme Monographs, edited by Aidan O'Connell, 151–157. Dublin: National Roads Authority.

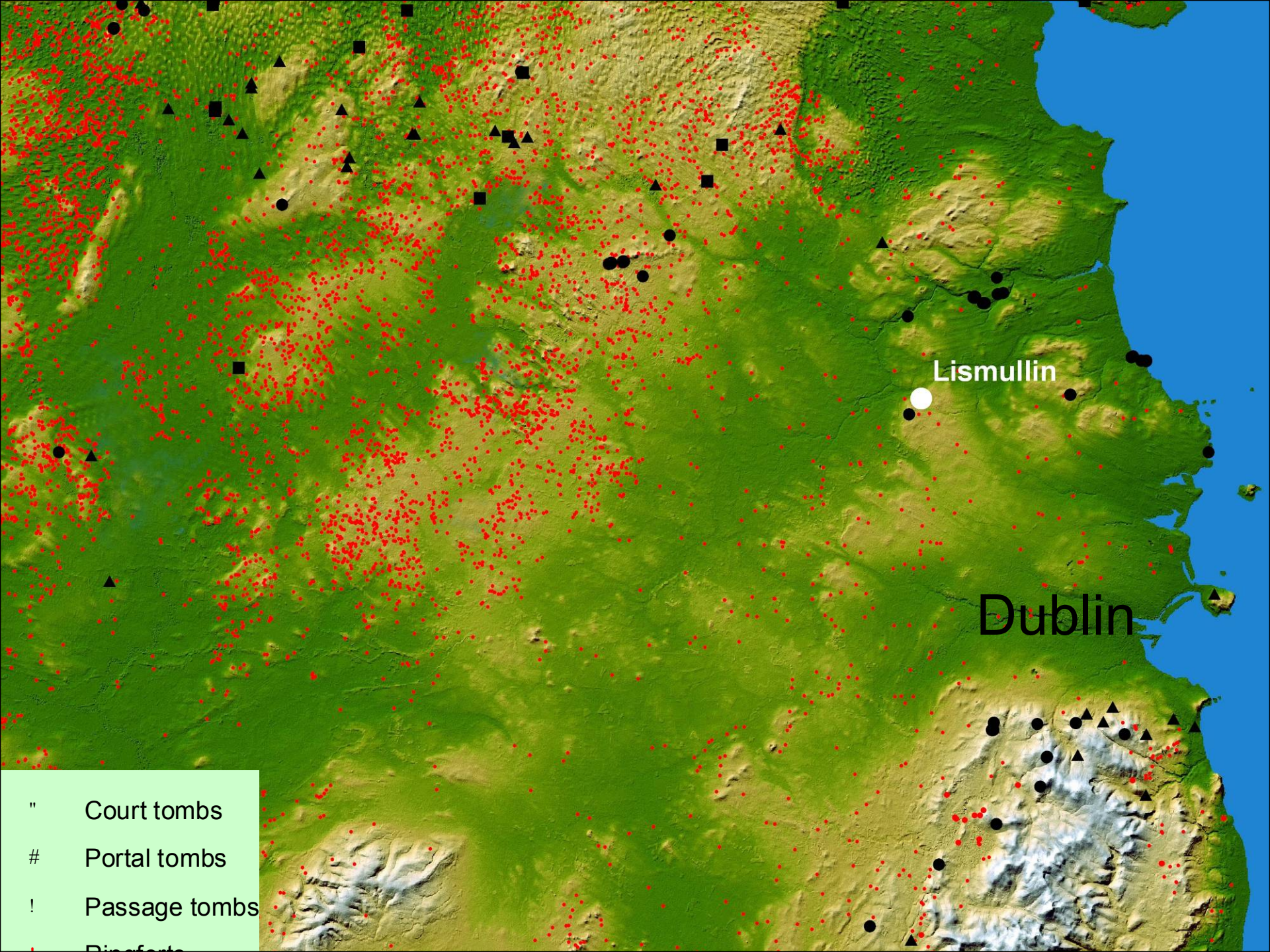


Lismullin enclosure

Dates cal BC

Iron Age subdivision after Becker et al 2008

Lismullin date range after Marshall 2008 (OxCal v.4.05)



Lismullin

Dublin

- " Court tombs
- # Portal tombs
- ! Passage tombs
- Dispersed



Iron Age Trackway, Co. Tipperary

7 m x 70 m

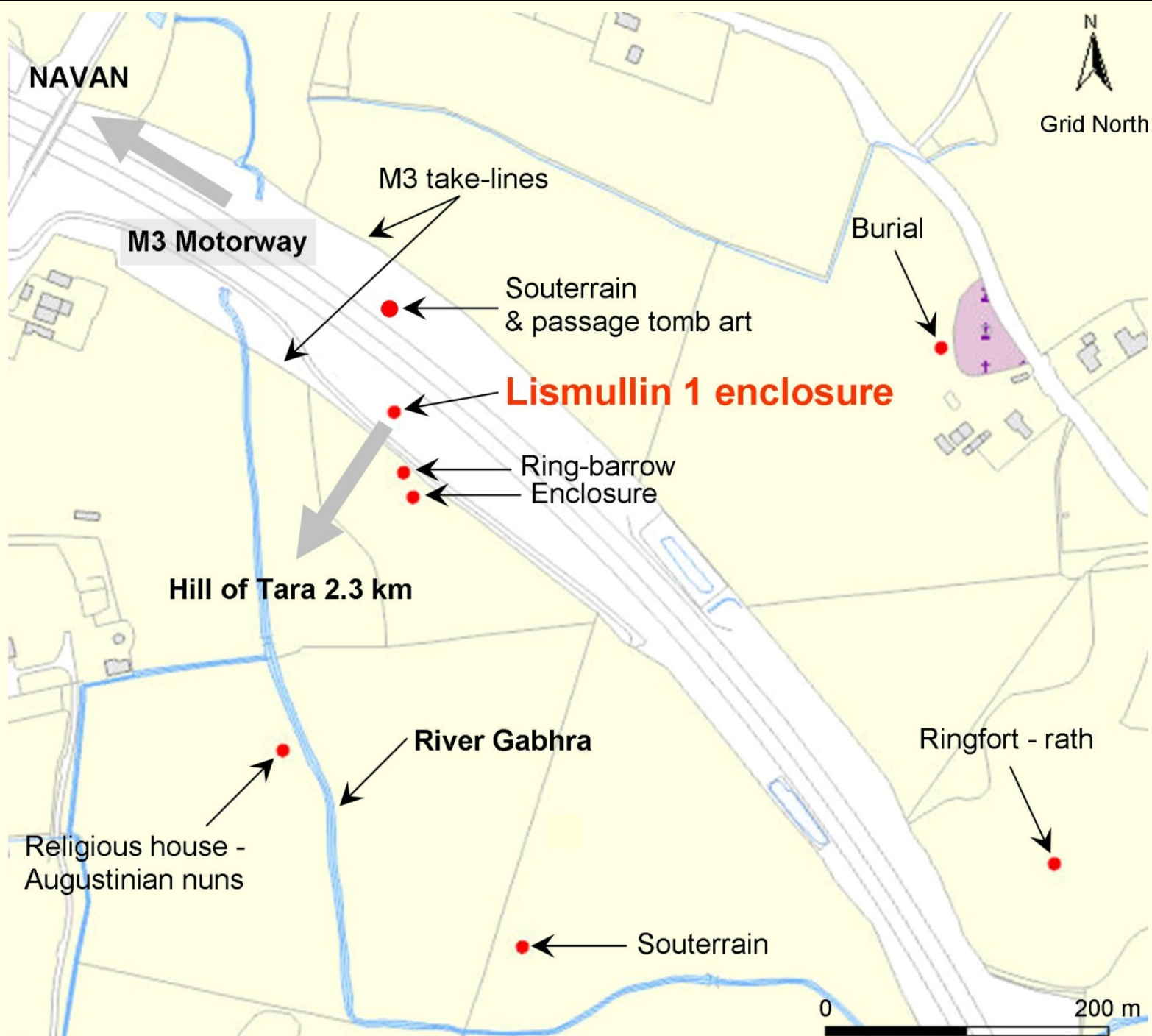
Oak planks felled c. 40 BC

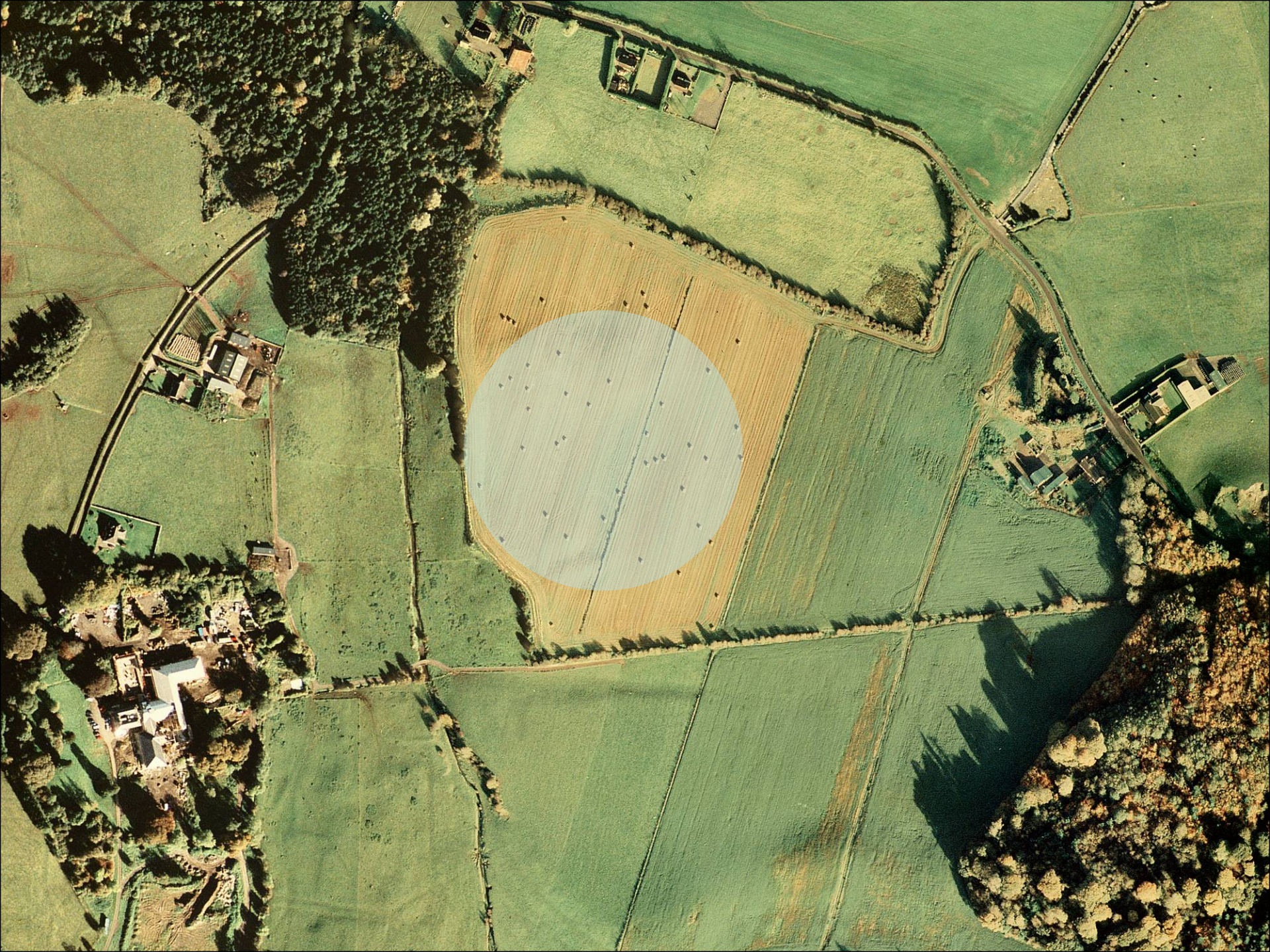




Iron Age bog body
Clonycavan, Co.Meath

c. 392BC—200 BC







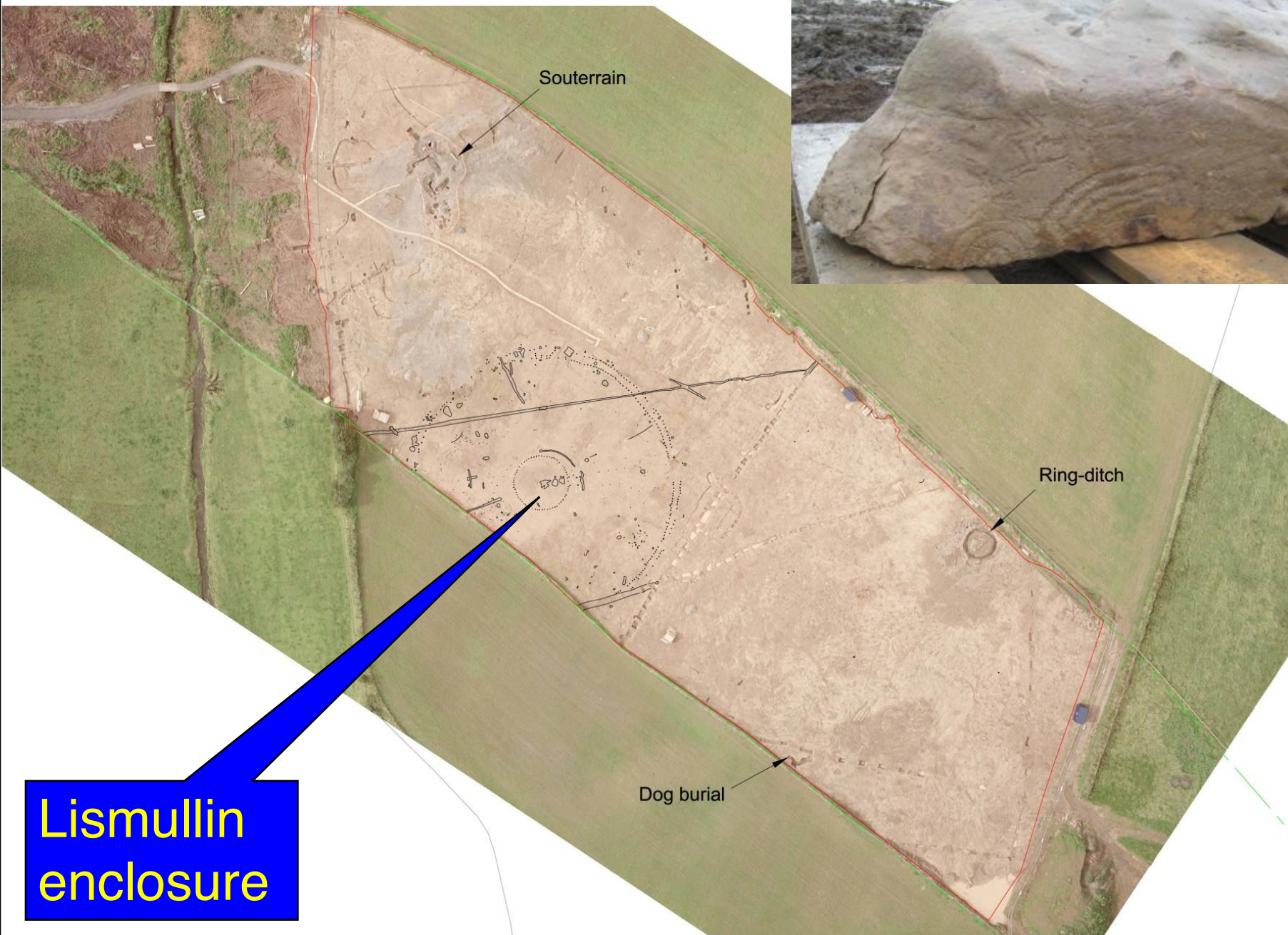
Meath Co. Council



Rathlugh

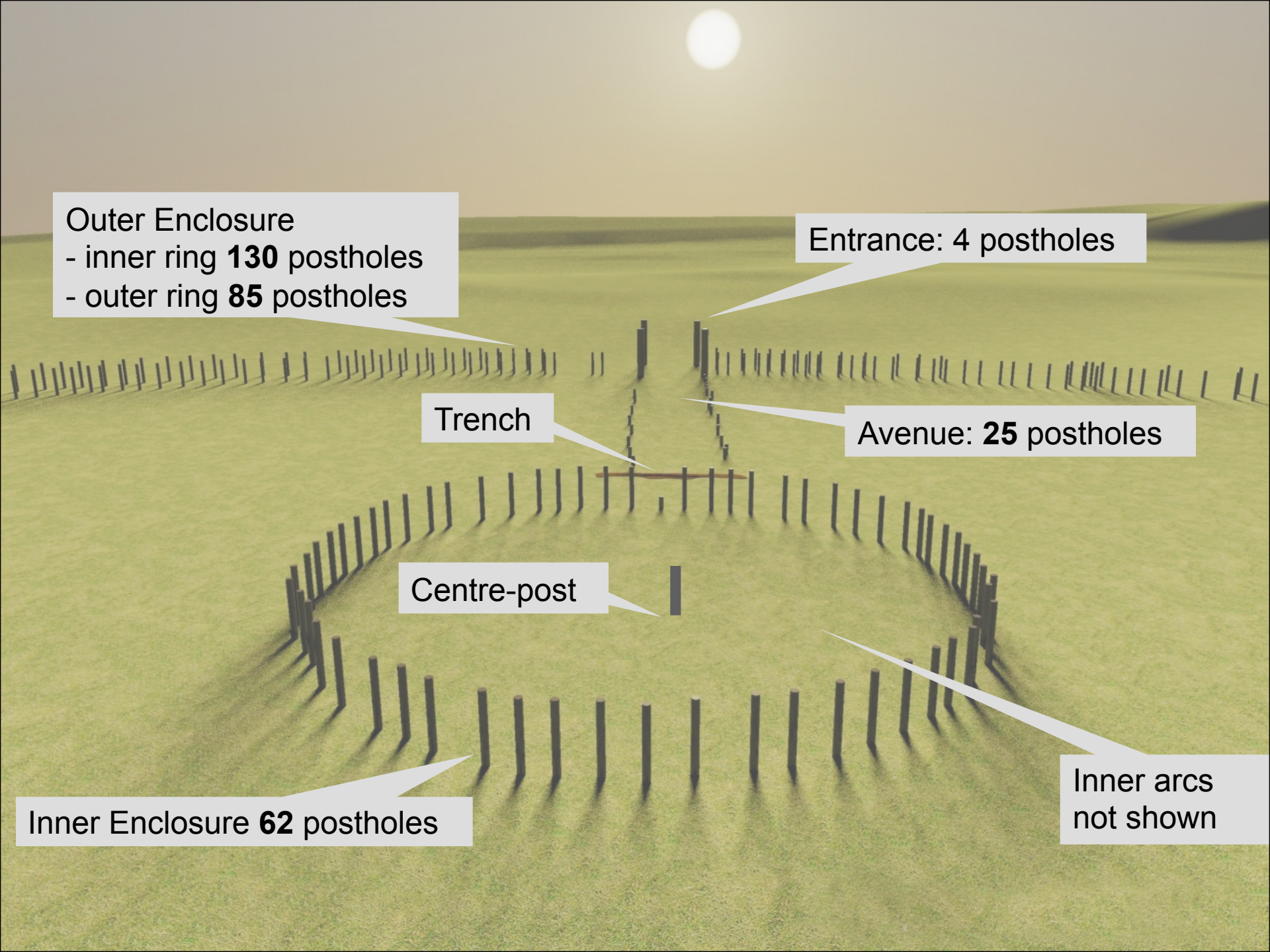
Lismullin

M3







A 3D digital reconstruction of the Stonehenge monument complex, showing the arrangement of standing stones in a grassy field under a bright sun. The image includes several callout boxes with labels and posthole counts. The labels identify the Outer Enclosure (130 inner ring, 85 outer ring), the Entrance (4 postholes), the Avenue (25 postholes), the Trench, the Centre-post, the Inner Enclosure (62 postholes), and note that inner arcs are not shown.

Outer Enclosure

- inner ring **130** postholes
- outer ring **85** postholes

Entrance: 4 postholes

Trench

Avenue: **25** postholes

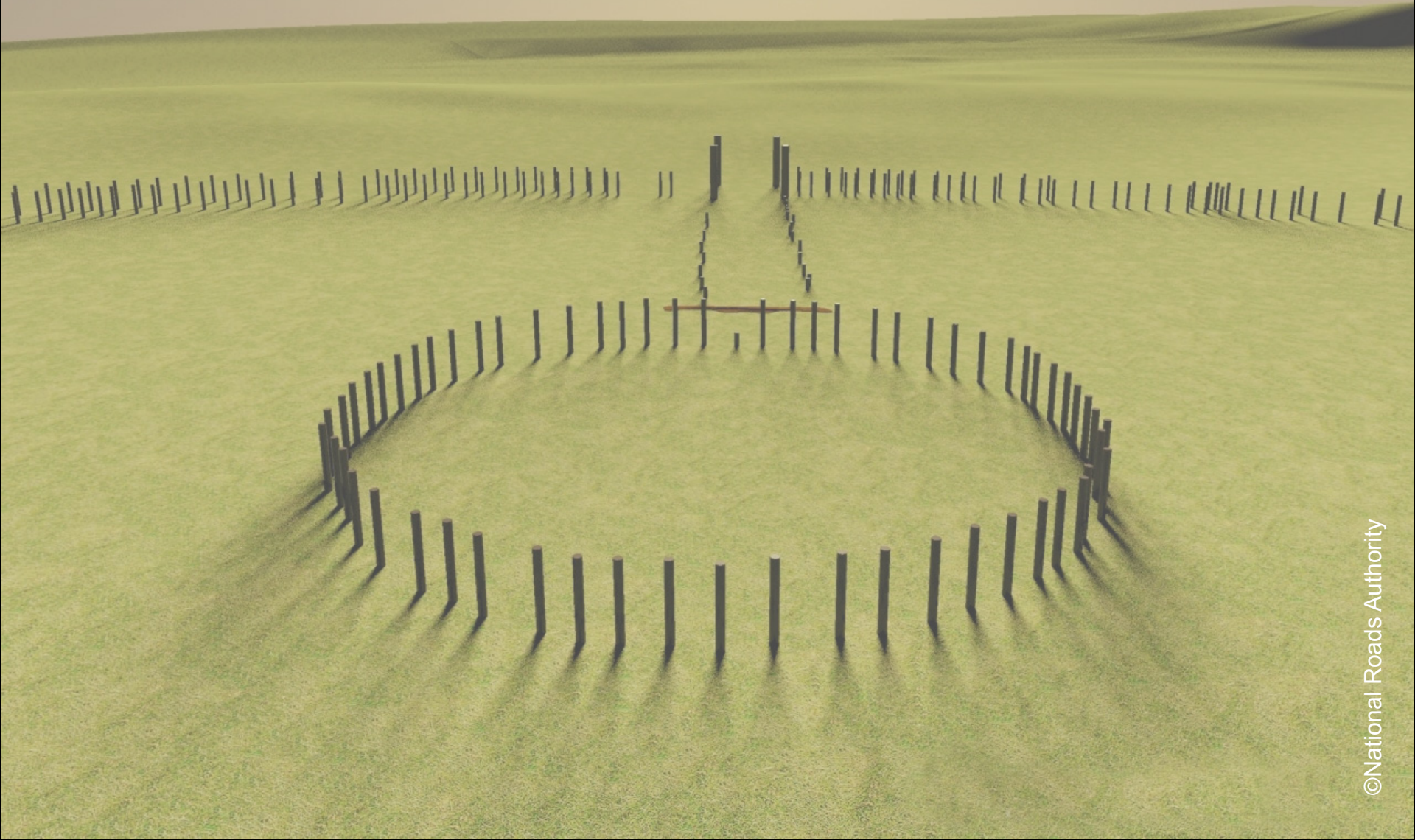
Centre-post

Inner Enclosure **62** postholes

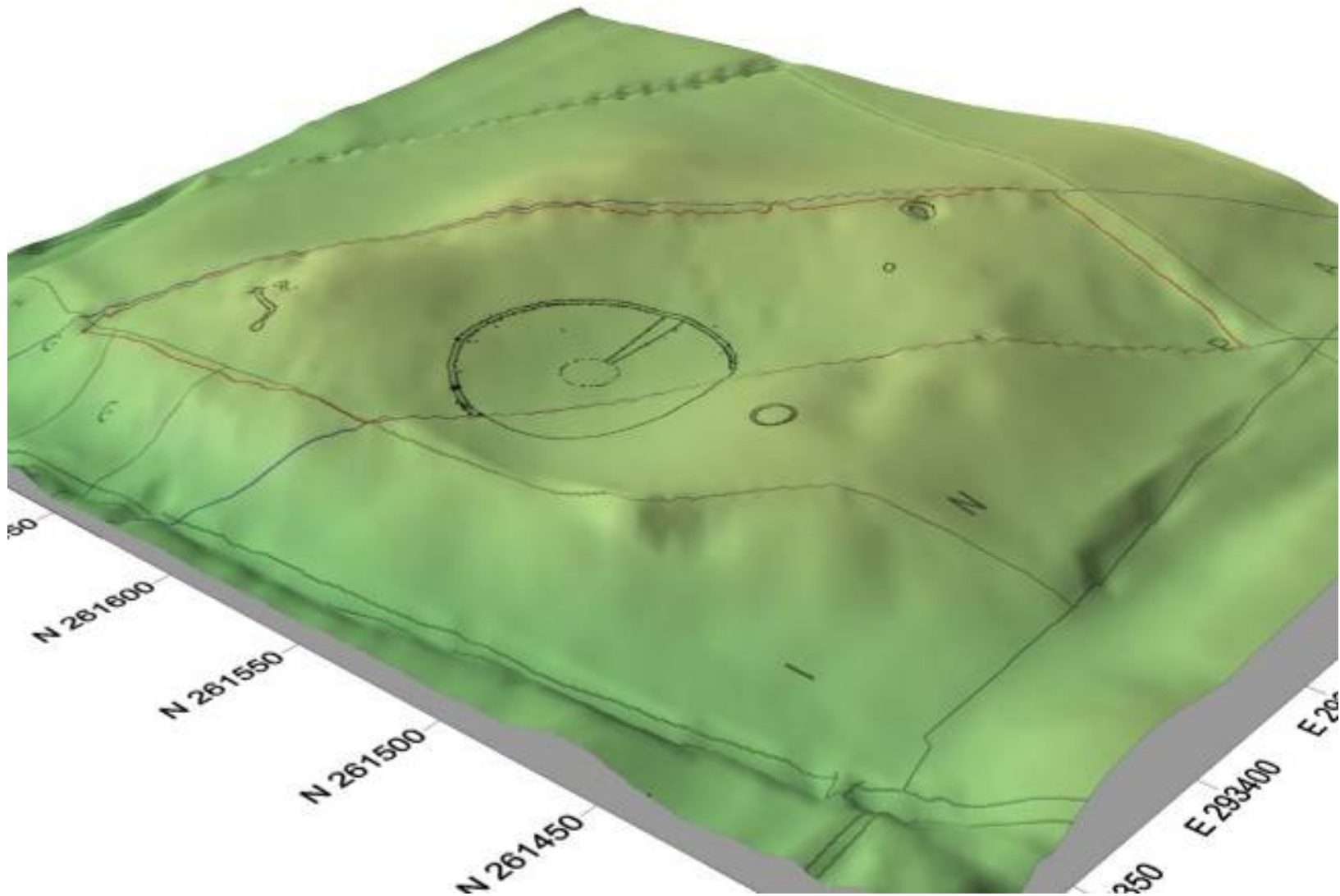
Inner arcs
not shown

Habitation, burial?

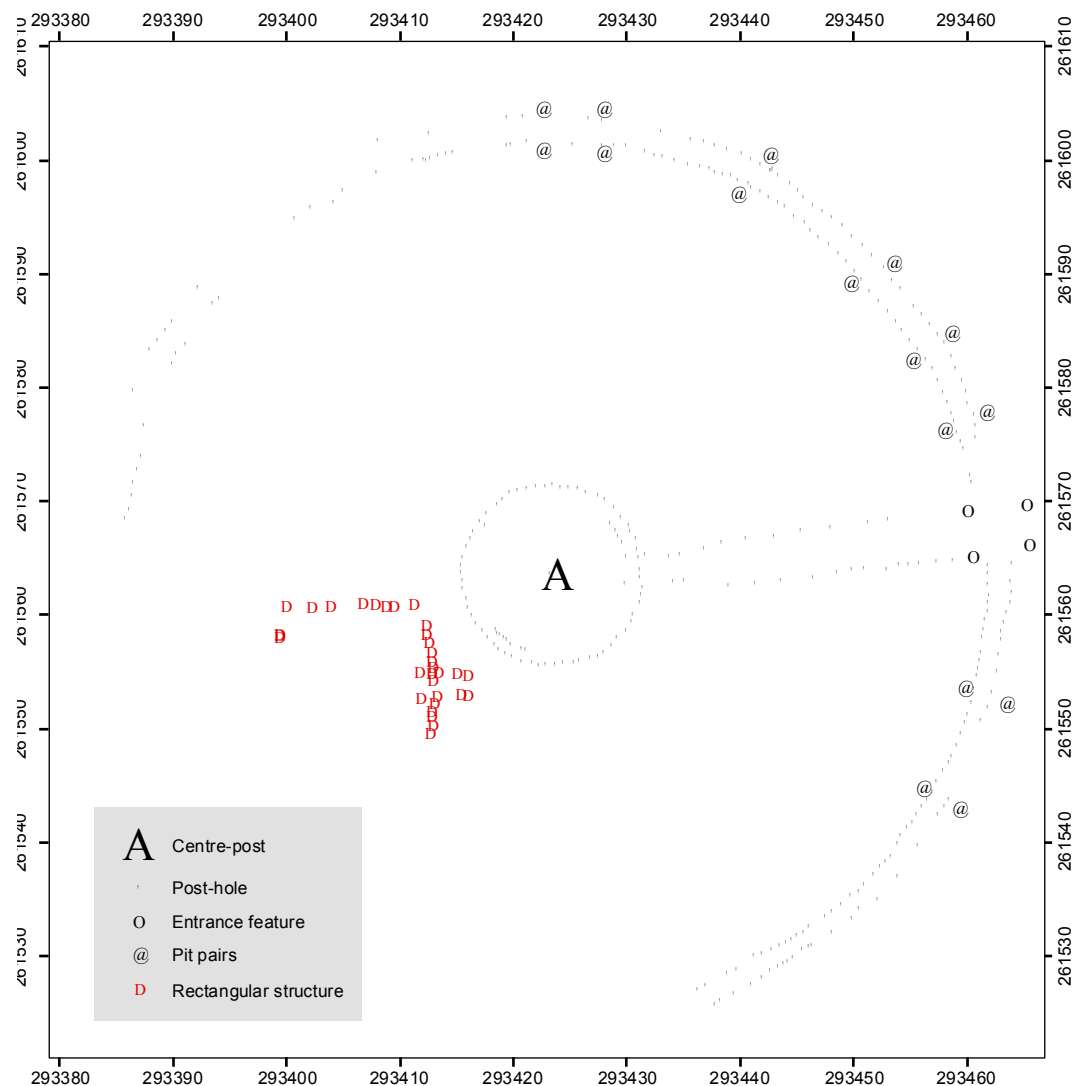
Gathering, ceremony, ritual?



Discrete landscape setting



Available geospatial data



Post	E	N
F120	293385.76	261568.60
F4845	293386.08	261569.47
F4844	293386.27	261570.63
F4839	293386.46	261571.80
F4838	293386.84	261572.89
F115	293387.19	261574.06
F4808	293387.36	261576.80
F117	293389.84	261582.29
F116	293390.41	261583.13
F3833	293391.09	261583.96
F2913	293393.47	261587.45
F2909	293394.01	261588.00
F2814	293400.65	261594.91
F2792	293402.12	261595.88
F2808	293404.09	261596.44
F2809	293404.97	261597.47
F2804	293407.92	261599.00
F3680	293411.12	261600.03
F3658	293411.99	261600.22
F3678	293412.24	261600.11
F3711	293412.62	261600.32
F3659	293413.35	261600.53
F3673	293414.04	261600.66
F3655	293414.83	261600.79
F3682	293419.39	261601.39
F3645	293419.77	261601.54
F3651	293421.15	261601.68
F3503	293425.17	261601.51
F3440	293427.74	261601.43
F3438	293428.86	261601.32
F3430	293429.91	261601.31



8 discrete design elements

Outer Enclosure

- inner ring 130 postholes
- outer ring 85 postholes

Entrance with 4 postholes

Trench

Avenue: 25 postholes

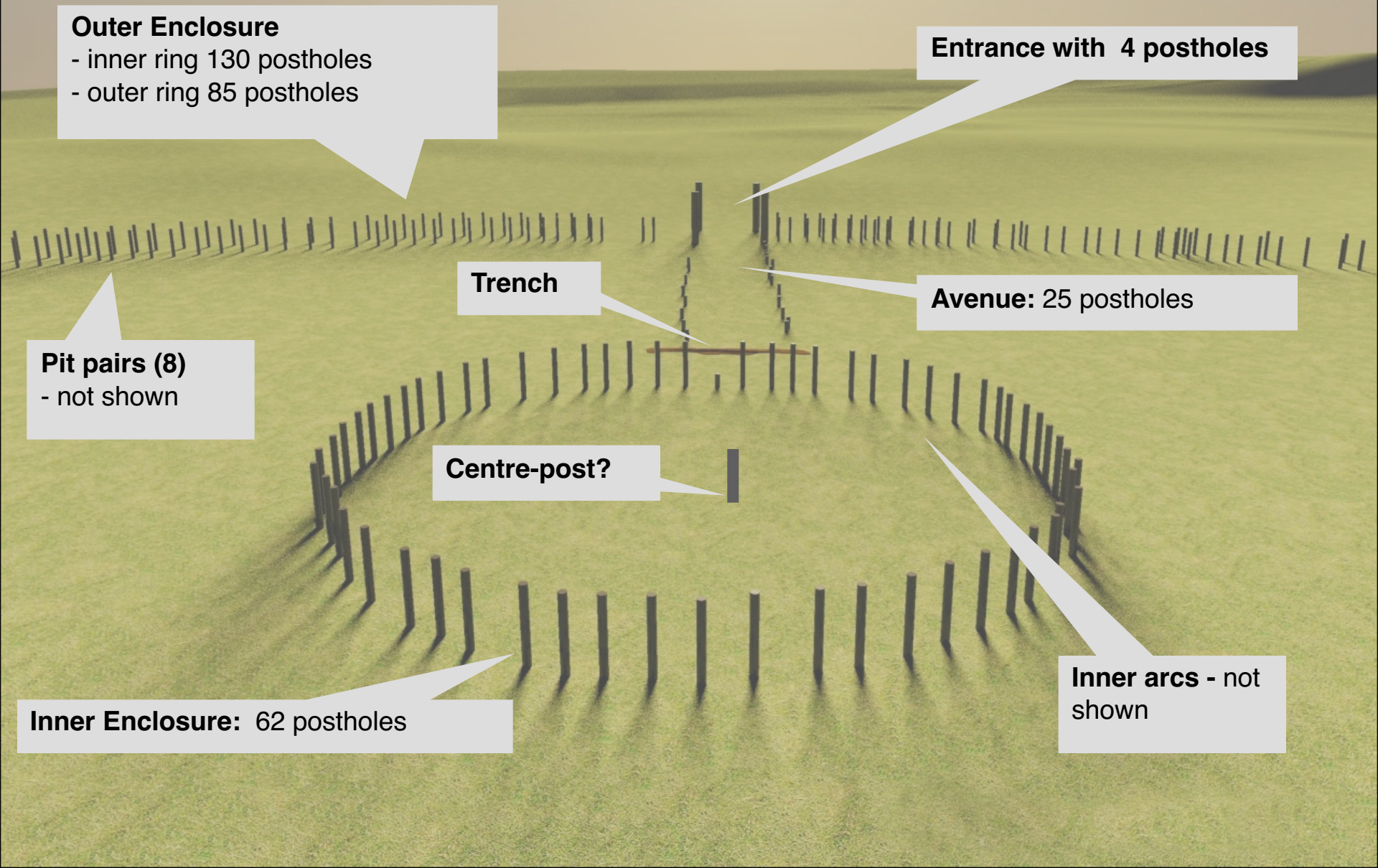
Pit pairs (8)

- not shown

Centre-post?

Inner Enclosure: 62 postholes

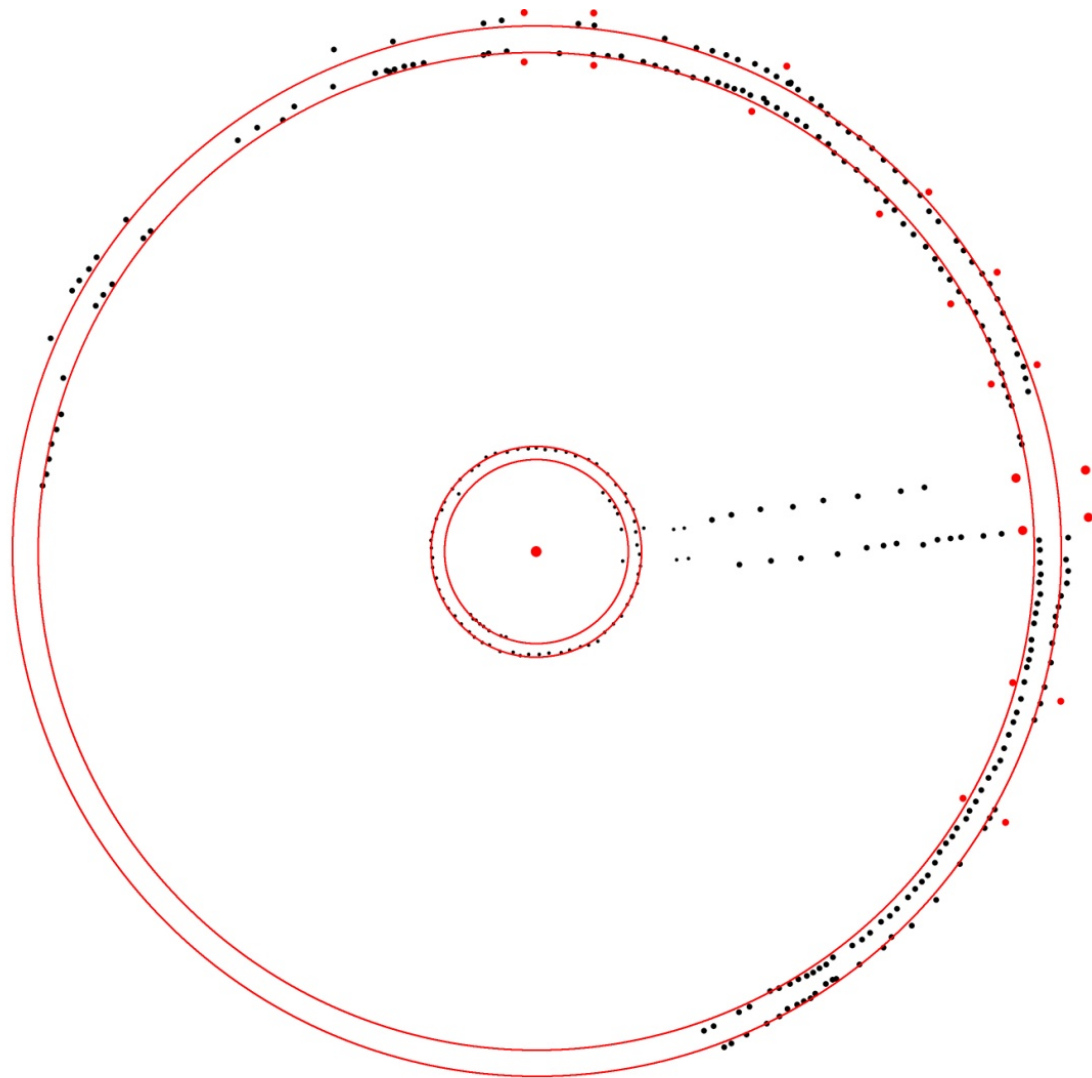
Inner arcs - not shown



NRA commissioned research

- Morphology (least squares analysis)
- Metrology (ANOVA analysis)
- Alignment (archaeoastronomical analysis)

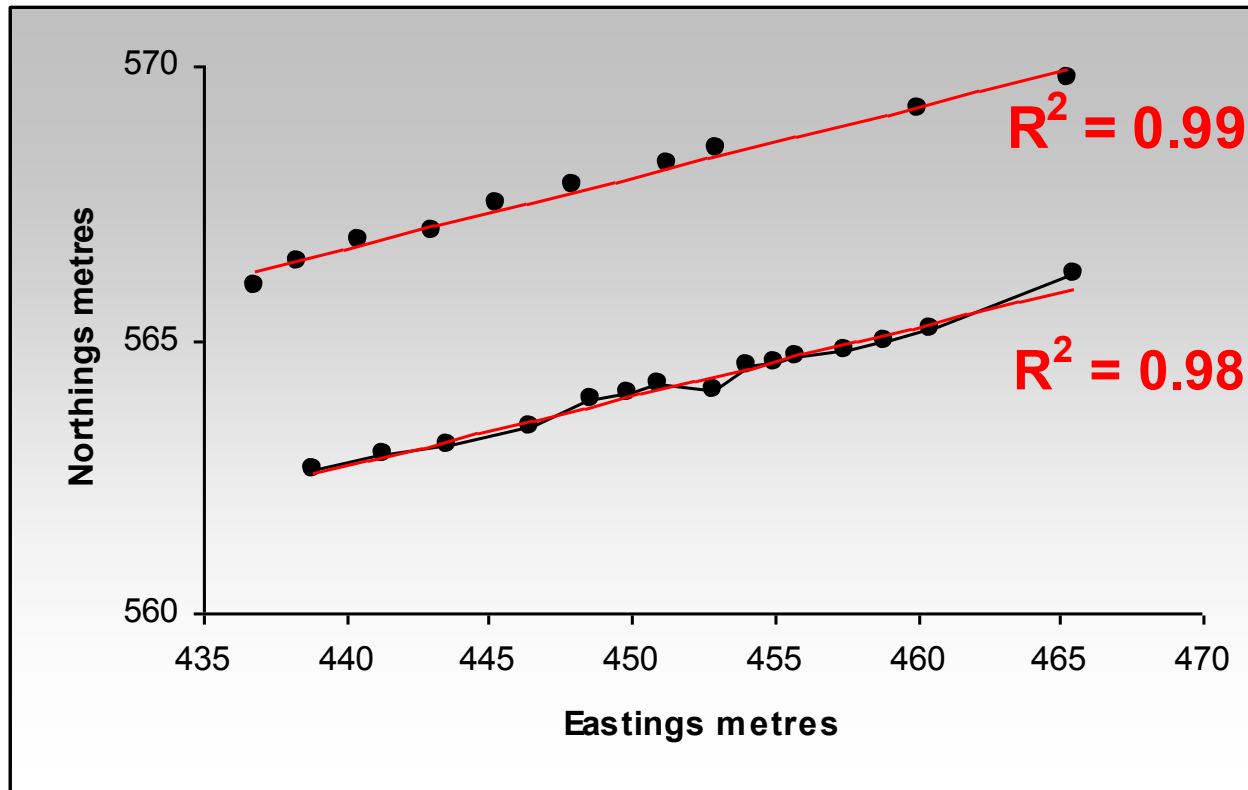
Circularity



Geometric centre?

Component	East m	North m	Radius m	Std. Dev.	n	Conf. Level (95%)
Inner Enclosure	423.4	563.6	8.0	±0.1	62	0.03
Outer Enclosure -inner circle	423.4	563.4	38.3	±0.3	130	0.05
Outer Enclosure -outer circle	423.2	563.7	40.3	±0.3	85	0.06
F4078 -centre post	423.9	563.7	-	-	-	-

Avenue linearity



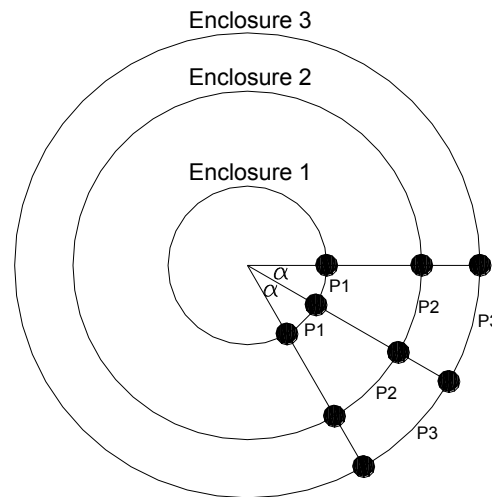
Radial design—cone angles/pitch

Element	Cone angle°	n	Variance m ²	Mean pitch m
Enclosure 1	5.8	62	1.2	0.8
Enclosure 2	1.4	109	0.1	0.9
Enclosure 3	1.5	62	0.1	1.05

$$p < 0.001$$

$$F_{\text{crit}} = 3.04$$

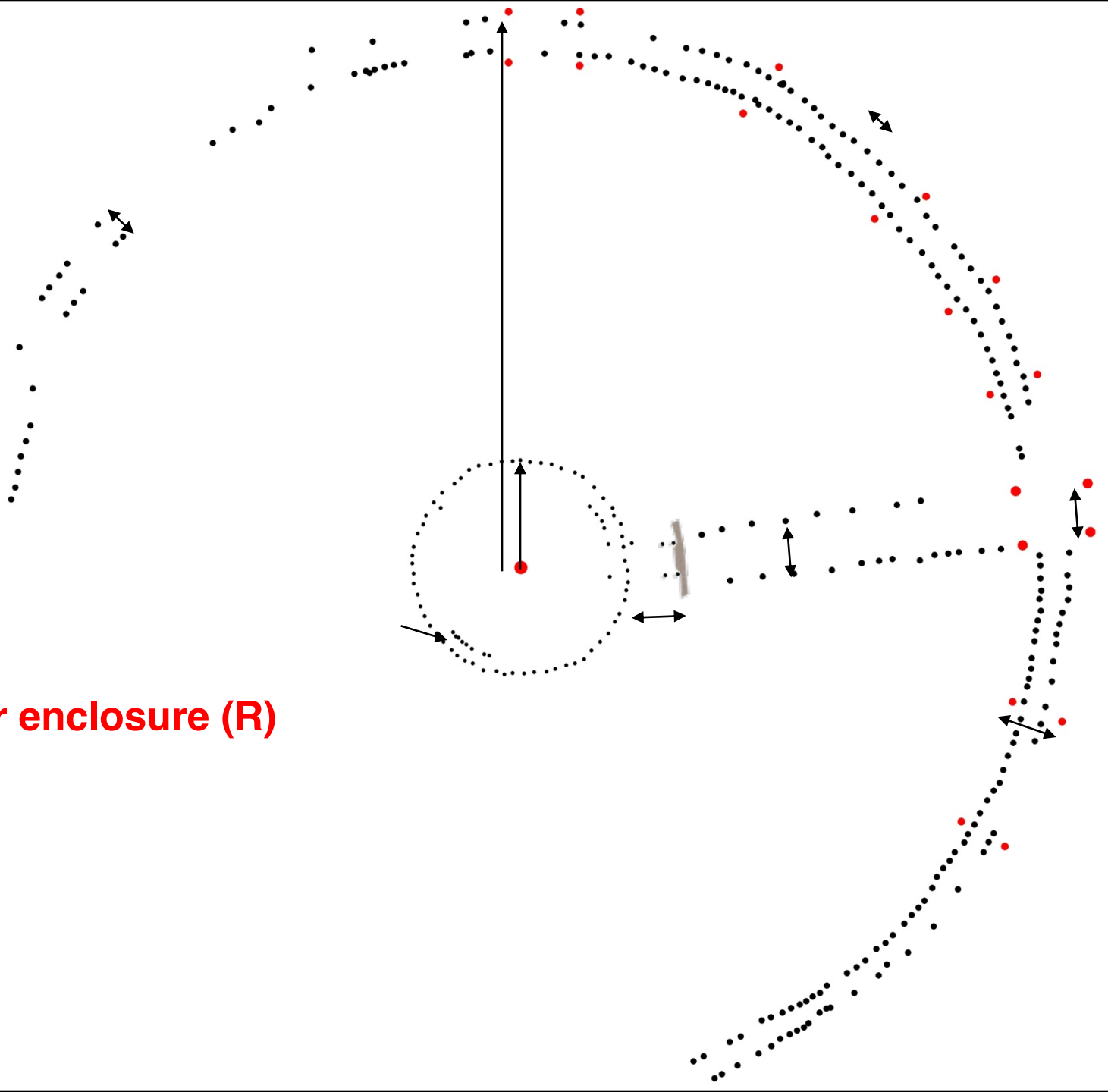
$$n = 232$$

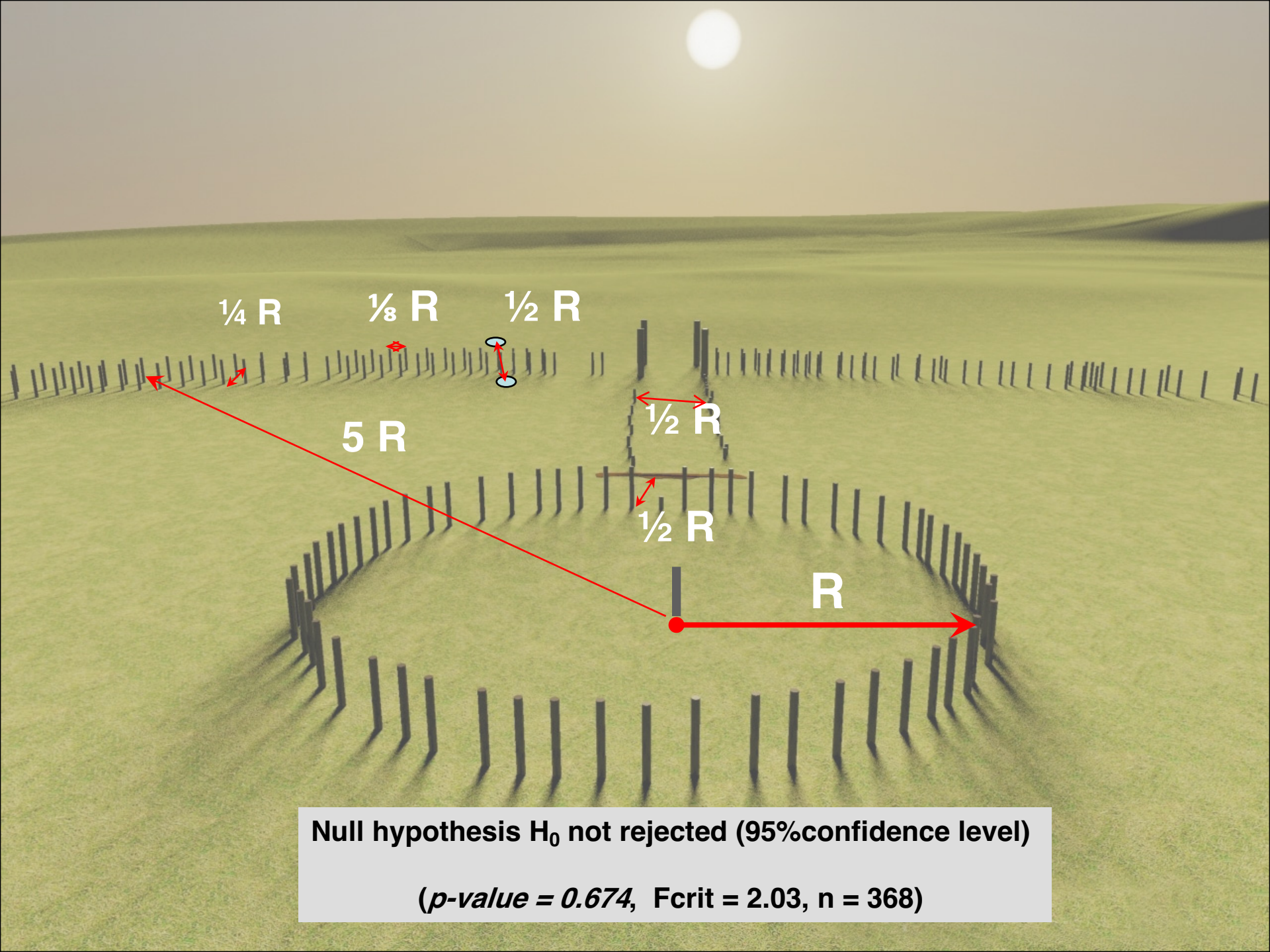


Metrology

Unit of measure

= radius of inner enclosure (R)

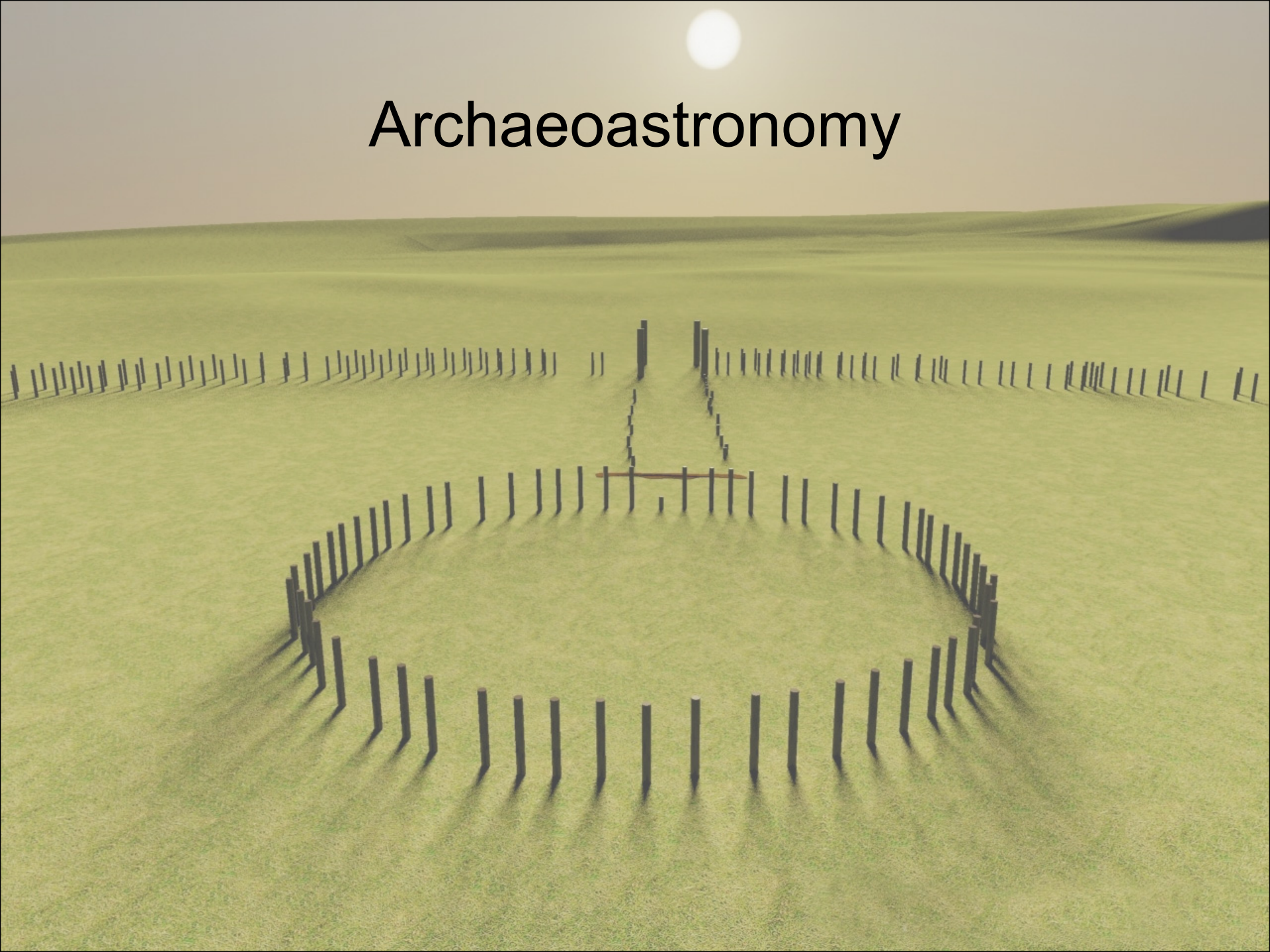




Null hypothesis H_0 not rejected (95% confidence level)

(p -value = 0.674, $F_{crit} = 2.03$, $n = 368$)

Archaeoastronomy



Celestial targets

STRONG CANDIDATES

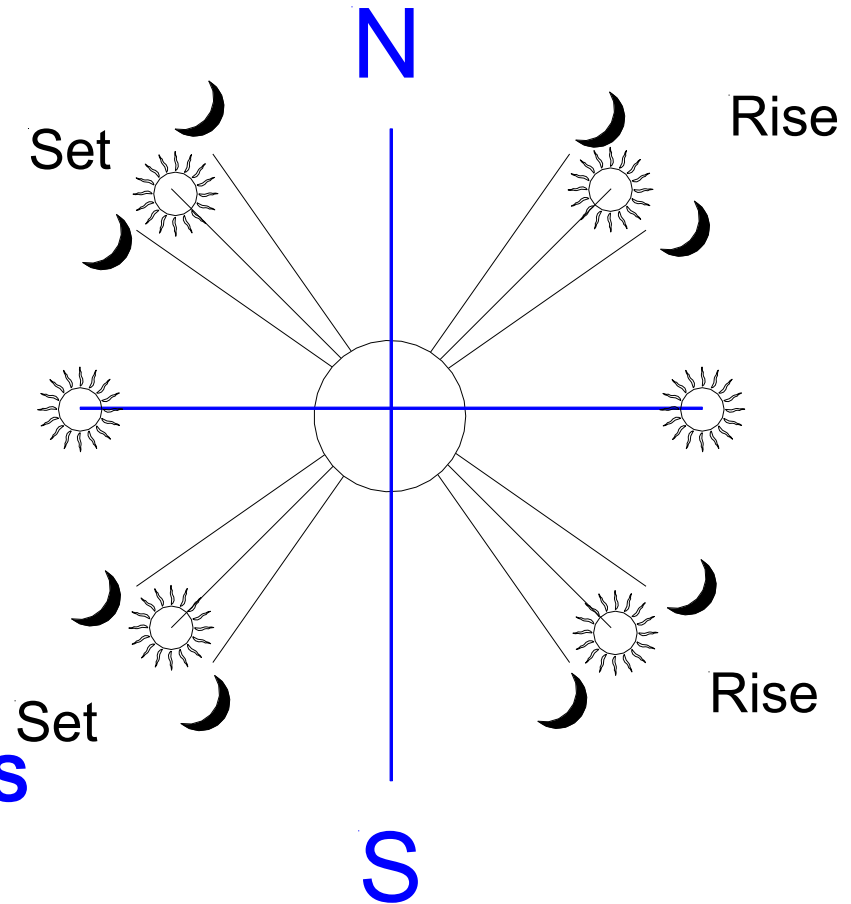
- Solar Solstices
- Major Lunar Standstills

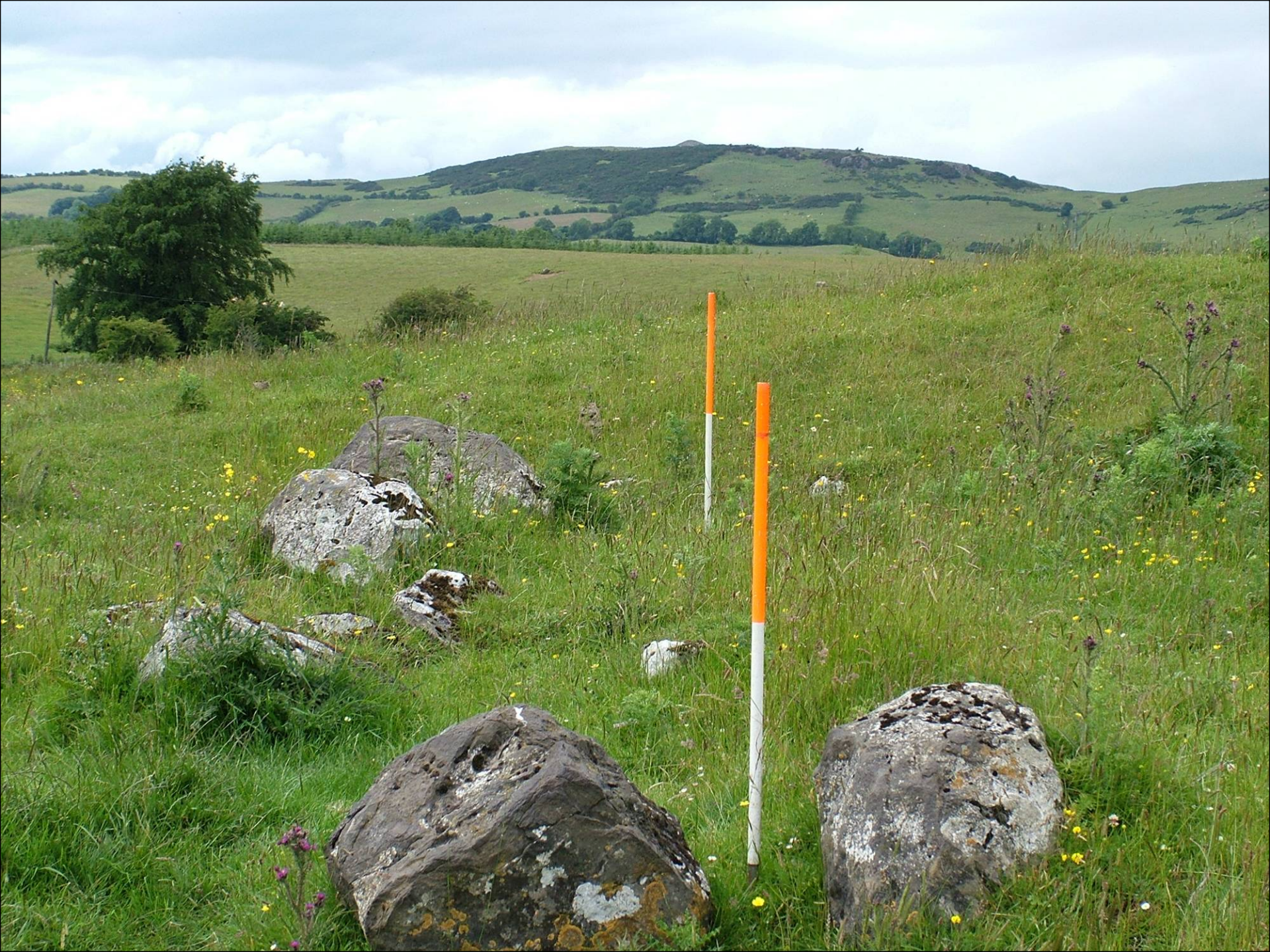
WEAK CANDIDATES

- Equinoxes
- Minor Lunar Standstills

OTHER PROMINENT BODIES

- Pleiades
- Planets





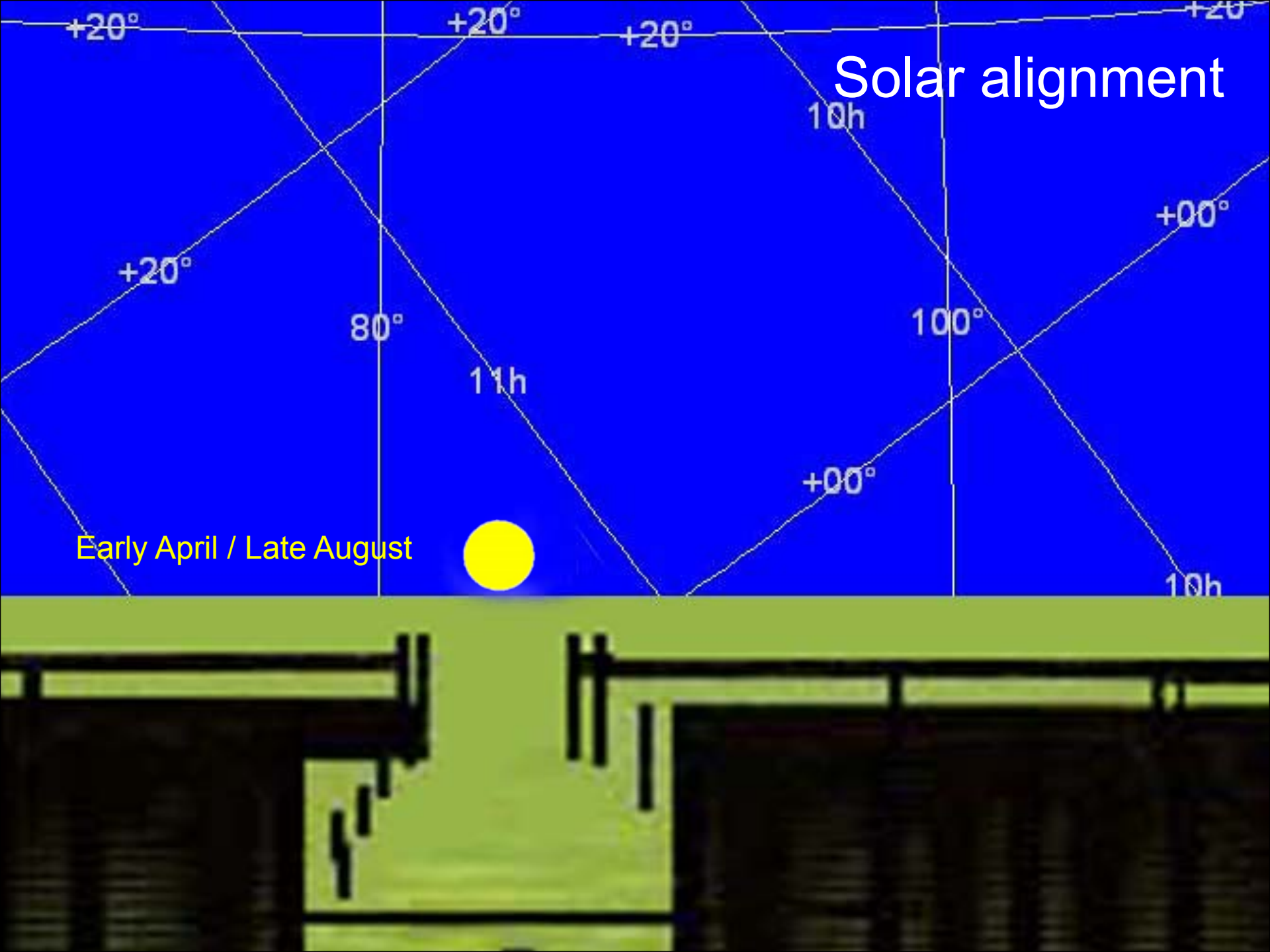


2010 June 19, 20:33 UTC $\delta^\circ = 24$

Image ©Ken Williams

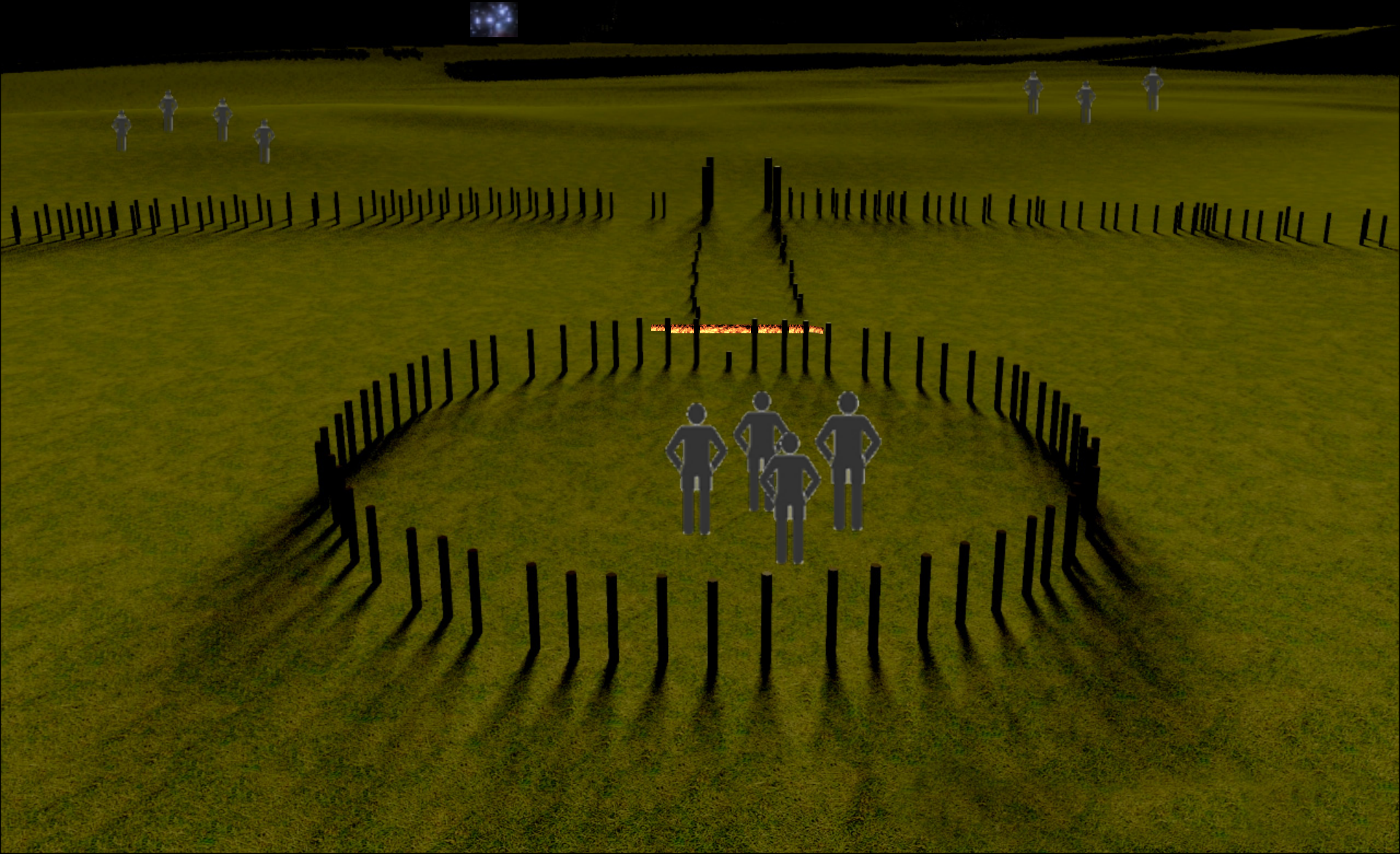
Avenue & astronomical alignment

Alignment	Horizon Alt°.	Azimuth°	δ° Sun UL	δ° Sun LL	δ° Moon Centre
Avenue axis (out)	2	83.8	4.8	5.3	5.8

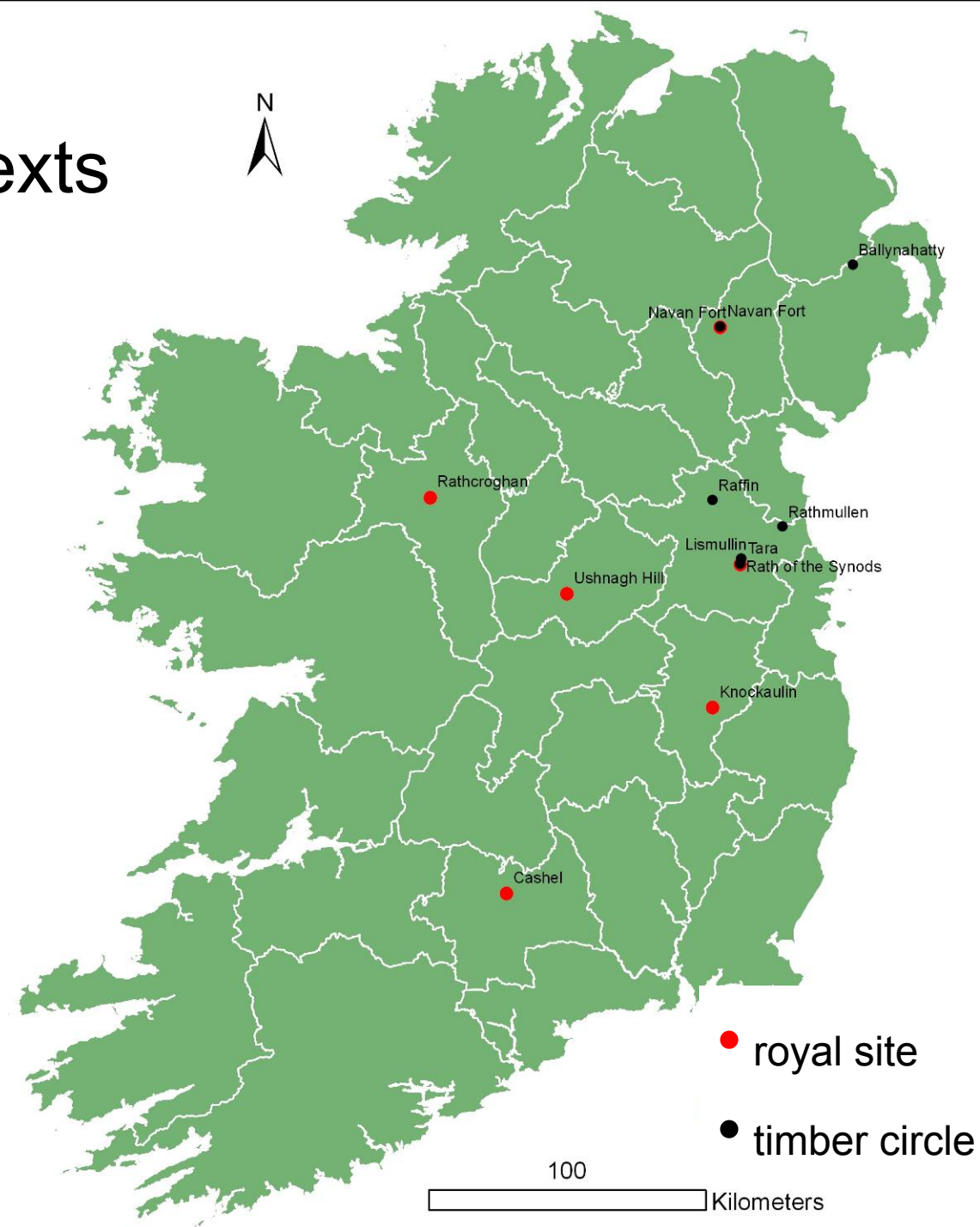


Stellar alignment?

Pleiades transit above
the avenue between
late August & early November



Wider contexts



Summary

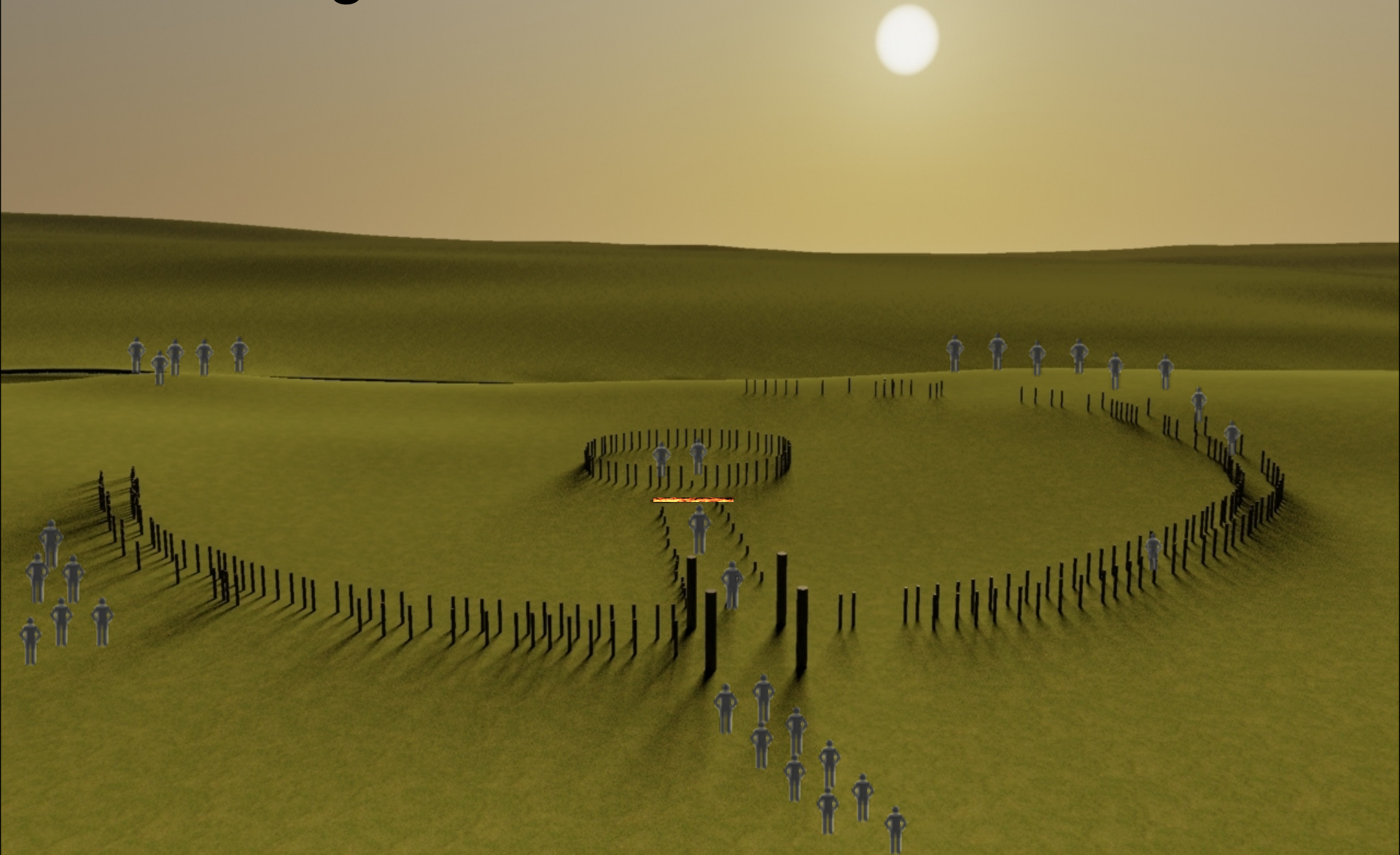
Archaeological evidence indicates

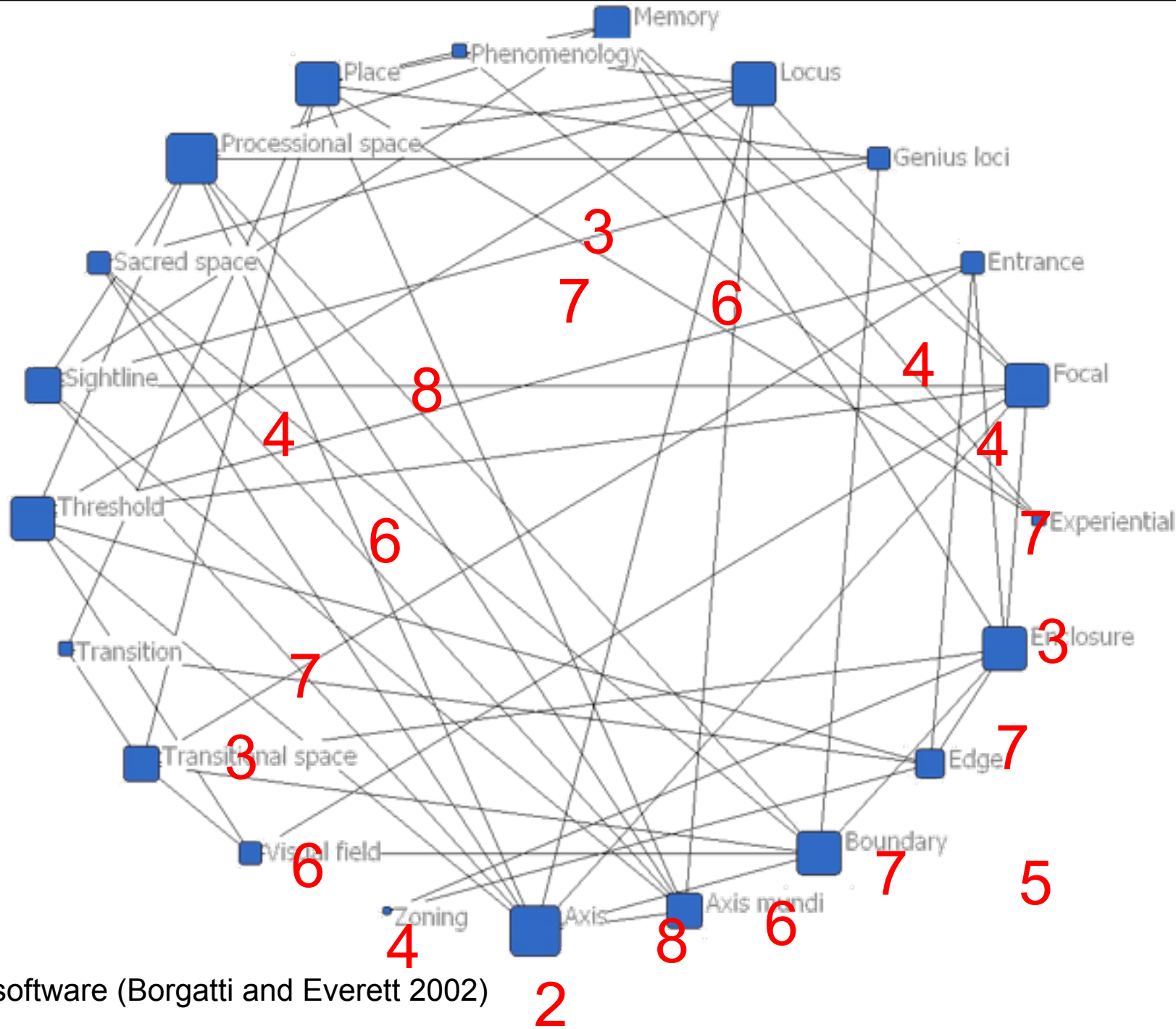
- No human burial
- No domestic artefacts
- No settlement
- Unroofed structure

Spatial data analysis strongly indicates:

- Carefully conceived & designed complex
- Unit of measure used in construction
- Possible astronomical alignments in avenue and inner enclosure
- Probable assembly & site usage likely at auspicious dates / periods

Thinking further.....





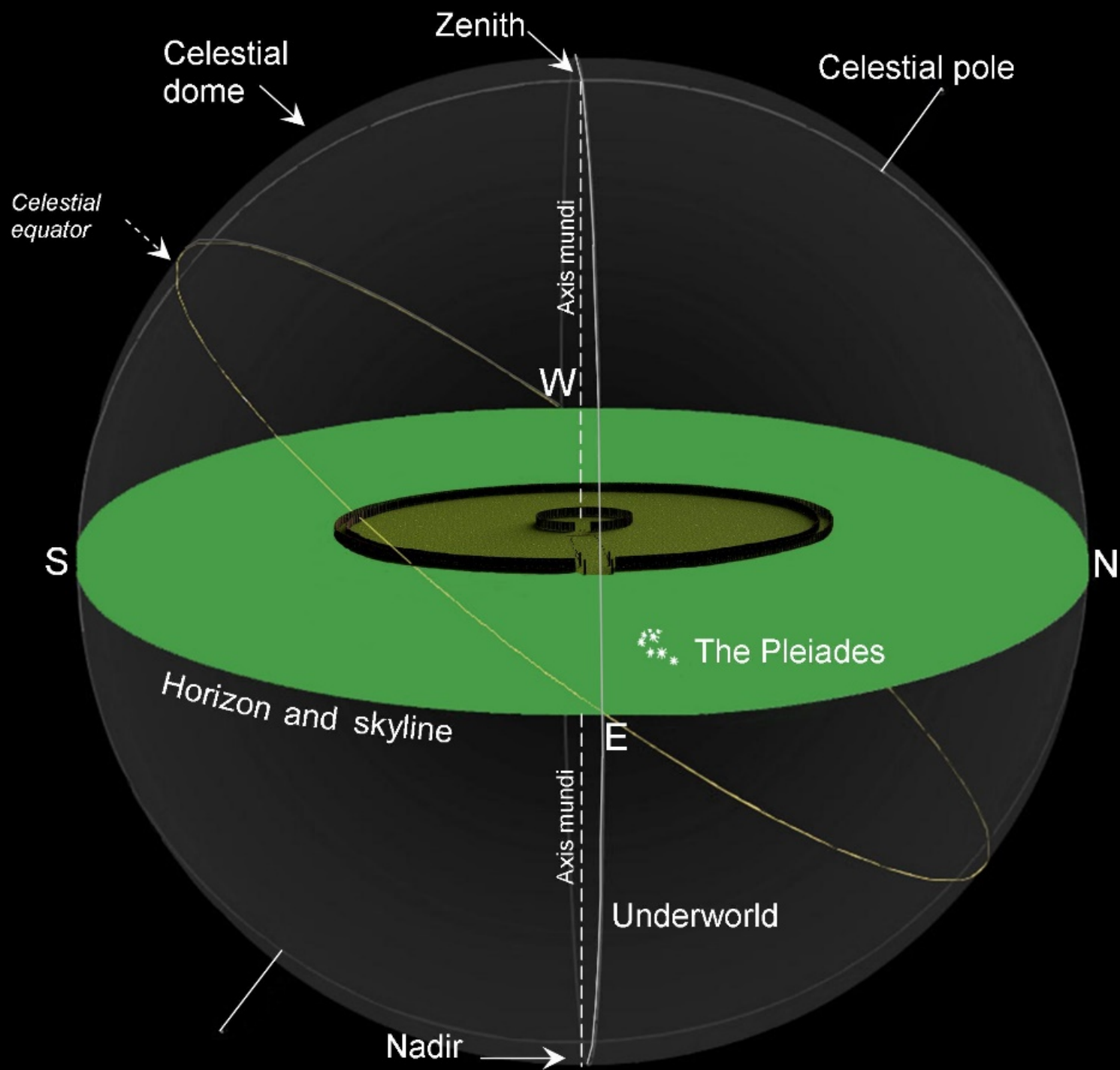
UCINET 6 software (Borgatti and Everett 2002)

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 Threshold Boundary Transition Gateway Place
 Place Threshold Memory Axis_Mundi Sightlines Locus
 Genius_Loci
 Gateway Threshold Edge_condition Boundary
 Genius_loci Phenomenology Place Axis_mundi
 Sacred_space
 Axis_mundi Axis Place Sacred_space
 Processional_space Genius_loci
 Sacred_space Processional_space Axis_mundi
 Genius_loci
 Processional_space Axis Axis_mundi Sacred_space
 Memory Place Experiential
 Axis Focal_point Axis_mundi Processional_space
 Sightline Focal_point
 Sightline Locus Focal_point Axis Visual_Field
 Visual_field Focal_point Sightline
 Locus Focal_point Place Axis Sightline
 Focal_point Axis Sightline Visual_field Locus
 Phenomenology Genius_loci Experiential
 Experiential Phenomenology Memory
 Enclosure Focal_point Locus Boundary
 Zoning Boundary Edge_condition

Language of Sacred Space

Degree Centrality

$$C_D(n_i) = \frac{d(n_i)}{g-1}$$



Acknowledgements

Aidan O'Connell & Donald Murphy ACS Ltd.

National Roads Authority

Meath Co. Council (Road Design Section)

Prof. Muiris O'Sullivan and Prof. Gabriel Cooney UCD

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Anselm Griffin, School of Civil and Building Services, DIT

Noel Brady, School of Architecture DIT

Dr. Padraic Houston, School of Mathematics DIT

Dr. Sean O'Hógain, School of Engineering Sciences DIT